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Results from Bottom Trawl Survey on Flemish Cap of June-July 2012

by

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Abstract

A stratified random bottom trawl survey on Flemish Cap was carried out from June 26th to July 24th 2012. The area surveyed was extended up to depths of 800 fathoms (1460 meters) following the same procedures as in previous years and 181 fishing stations planned. The survey was carried out by the R/V *Vizconde de Eza* with the usual survey gear (*Lofoten*). A total of 174 valid hauls were made by the vessel R/V *Vizconde de Eza*,118 up to 730 meters depth and 56 up to 1460 meters. Survey results including abundance indices of the main commercial species and age distributions for cod, redfish, American plaice, Greenland halibut, roughhead grenadier 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.) and the total area surveyed (strata 1-34, up to depths of 1460 m.).

Introduction

The survey on Flemish Cap was carried out on board R/V *Vizconde de Eza* in 2012. A total of 174 valid bottom trawls were made up to a depth of 1460 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 25th 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
2009	*Vizconde de Eza*	178 (119)	23/6-20/7
2010	*Vizconde de Eza*	153 (97)	22/6-21/7
2011	*Vizconde de Eza*	128 (79)	29/6-9/8
2012	*Vizconde de Eza*	174(118)	26/6-24/7

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

Material and Methods

As last year, 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

Biomasses of main species in past surveys estimated by swept area method (tons) are:

	Survey	Cod	American plaice	Redfish	Greenland halibut	Roughhead grenadier	Shrimp
120-730 m	**1988**	40839	16046	188331	6926	2009	5615
	1989	114050	14047	162535	4472	871	2252
	1990	59362	11983	126757	5799	852	3405
	1991	40248	10087	76955	8169	1335	11352
	1992	26719	8656	130209	8728	1577	24508
	1993	60963	7861	72608	6529	3021	11673
	1994	26463	8227	162525	8037	1975	3879
	1995	9695	6785	87644	10875	1558	7276
	1996	9013	4098	119662	11594	1362	10461
	1997	9966	3026	165816	16098	1197	7449
	1998	4986	3437	70832	24229	1691	39367
	1999	2854	2585	98651	21207	1250	24692
	2000	3062	1606	177990	16959	1047	19003
	2001	2695	2404	77345	13872	2079	27204
	2002	2496	2049	121312	12100	1211	36510
	2003	1593	2286	93816	6214	2348	21087
	2004	4071	3525	250605	12292	3597	20182
	2005	5242	2760	451215	11698	2387	30675
	2006	12505	1691	766922	11708	3933	16235
	2007	23886	1053	464628	13040	1367	17046
	2008	43675	1766	566126	11997	2961	11092
	2009	75228	1442	358479	7777	782	2797
	2010	69295	2446	212211	6657	1402	4894
	2011	106151	4084	197031	6765	888	1621
	2012	113227	4491	305946	4291	612	1041
120-1460 m	**2004**	4071	3525	250638	28676	17184	20195
	2005	5242	2760	453086	20460	14253	31186
	2006	12505	1691	766952	23475	12109	15250
	2007	23886	1053	464660	30731	7807	17120
	2008	43675	1766	566647	39614	12139	11141
	2009	75228	1442	358521	36047	7304	2792
	2010	69295	2446	212282	27096	9091	4896
	2011	106151	4084	196574	32309	8997	1733
	2012	113227	4491	305974	23505	5476	1063

Values for surveys before 2003, when R/V *Cornide de Saavedra* was used, are transformed to their equivalences for RV *Vizconde de Eza* following the accepted calibration among the two vessels (González Troncoso and Casas, 2005). From 2004 onwards, abundances are calculated for 19 shallowest strata covering the bank up to 730 m deep, as it was done in previous years, and for 32 strata up to 1460 m deep.

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. The composition of the species in 2012 is similar to that found in the beginning of the series: cod at high levels, shrimp residual, redfish fluctuating around 200-300 kt. and Greenland halibut and grenadiers at low levels. Everything seems to point to a return to the situation found at the beginning of the EU survey series, and prior to the changes induced by the collapse of cod in the late 90´s. Only American plaice with low values of biomass does not show clear signs of recovery.

Cod

Mean catch per towed mile and biomass by strata with standard errors 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		23,070		**1998**	4,986	-	-
1984		31,210		**1999**	2,854	-	-
1985		28,070		**2000**	3,062		-
1986		26,060		**2001**	2,695	784	-
1987		10,150	21,600	**2002**	2,496	694	-
1988	40,839	7,720	34,200	**2003**	1,593		-
1989	114,050	36,520	78,300	**2004**	4,071		
1990	59,362	3,920	15,200	**2005**	5,242		
1991	40,248	6,740	8,200	**2006**	12,505		
1992	26,719	2,490	2,400	**2007**	23,866		
1993	60,963	8,990	9,700	**2008**	43,675		
1994	26,463	-	-	**2009**	75,228		
1995	9,695	8,260	-	**2010**	69,295		
1996	9,013	730	-	**2011**	106,151		
1997	9,966	-	-	**2012**	113,227		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).

Tables 4, 6 and 7 show the length distribution, the age-length key and the abundance at age by stratum respectively. Distribution of survey catches is presented in Figure 2. Evolution of biomass and abundance are illustrated in Figure 3. The abundance at age along the series is also shown in Table 8.

The 1992 to 2003 year-classes failed almost completely. The abundances of 2004-2011 year classes are higher than in previous 12 years. The abundance of 2010 and 2011 year-classes were between the highest in time series based on results at age 1 and 2 in 2011 and 2012 (Figure 4).

American plaice

Mean catch per towed mile and biomass by strata with standard errors are presented in Table 9. Survey biomass, as calculated by the swept area method, is compared with results of previous surveys in Table 11. This biomass is compared with Russian survey results in the following table:

Year	EU	Russia (1)	Year	EU	Russia (1)	Year	EU	Russia (1)
1983		8,900	**1993**	7,861	2,700	**2003**	2,286	1,398
1984		7,500	**1994**	8,227		**2004**	3,525	
1985		7,800	**1995**	6,785		**2005**	2,760	
1986		20,200	**1996**	4,098		**2006**	1,691	
1987		9,300	**1997**	3,026		**2007**	1,053	
1988	16,046	6,500	**1998**	3,437		**2008**	1,766	
1989	14,047	5,000	**1999**	2,585		**2009**	1,442	
1990	11,983	1,200	**2000**	1,606		**2010**	2,446	
1991	10,087	14,400	**2001**	2,404		**2011**	4,084	
1992	8,656	1,200 tons	**2002**	2,049	548 tons	**2012**	4,491	tons

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

Tables 10, 12 and 13 show the length distribution, the age-length key and the abundances at age by stratum respectively. The figure 5 shows the distribution of the survey catches in 2012. The abundance at age along the series is shown in Table 14. Also, the evolution of survey biomass and abundance along the series is presented in Figure 6.

Fish aged 6 or more roughly correspond with fishable biomass. Results 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 increase in the group 6+ in 2012 was due to recruitment, with six years of age, of the relatively strong 2006 year class.The 2006 year-class is the more abundant since 1991, but its abundance is only intermediate. Recruitment for later year-classes seems to be weaker; too weak for a quick recovery of the stock. Figure 7 shows the age distribution over the years. It illustrates the lack of recruitment that occurred for many years, and how most recent year-classes are weaker than those at the beginning of the series.

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 catch per standard towed mile and biomass by strata with the standard errors are presented in Tables 15, 19, 23 and 27 for *Sebastes marinus*, *S. mentella*, *S. fasciatus* and the *juvenile* group respectively. The following table shows the total biomass (tons) by year in the traditional strata (<730 m.).

	Sebastes	***Sebastes spp.***			**Total**
Year	***marinus***	***mentella***	***fasciatus***	juvenile	
1988	18,229		170,102		188,331
1989	27,312		135,223		162,535
1990	16,751	86,695		23,311	126,757
1991	4,864	59,552	6,755	5,784	76,955
1992	4,909	85,408	6,314	33,578	130,209
1993	4,789	21,235	5,175	41,409	72,608
1994	39,516	42,495	9,303	71,211	162,525
1995	10,754	70,567	5,986	337	87,644
1996	13,431	92,647	13,112	472	119,662
1997	77,125	66,710	20,780	1,201	165,816
1998	7,640	53,946	7,656	1,590	70,832
1999	11,215	77,610	9,460	366	98,651
2000	53,388	106,283	15,364	2,955	177,990
2001	10,244	45,931	13,715	7,455	77,345
2002	11,651	48,760	27,556	33,345	121,312
2003	40,110	28,785	15,031	9,890	93,816
2004	85,383	45,999	76,164	43,059	250,605
2005	147,688	105,110	123,326	75,762	451,215
2006	298,290	105,849	319,387	43,396	766,922
2007	88,071	51,191	261,790	63,576	464,628
2008	240,777	42,570	202,288	80,491	566,126
2009	72,211	111,787	171,676	2,804	358,479
2010	47,377	62,684	97,067	5,083	212,211
2011	29,056	103,678	59,753	4,543	197,030
2012	55,410	166,693	82,539	1,304	305,946

Tables 16-18, 20-22, 24-26 show the age length key, length frequency and the abundance at age by stratum for the three species of redfish respectively. Catches per haul distributions and biomass of the three species and juveniles are presented in the Figure 8 and 9 respectively. The tables 27 and 28 show the mean catch per towed mile and biomass by stratum of the juveniles (redfish with length up to 15-17 cm).

Greenland halibut

Mean catch per towed mile and the estimated biomass by strata with their standard errors are presented in Table 29. These indices are compared with results of previous surveys in Table 30. The following table summarises the total biomass in tons by year in depths <730 m. (1988-2012 years) and in depths up to 1460 m. (2004-2012 years):

Year	EU < 730 m.	Year	EU < 730 m.	EU < 1460 m.
1988	6,926	**2001**	13,872	
1989	4,472	**2002**	12,100	
1990	5,799	**2003**	6,214	
1991	8,169	**2004**	12,292	28,343
1992	8,728	**2005**	11,698	21.515
1993	6,529	**2006**	11,706	24.357
1994	8,037	**2007**	13,040	31,723
1995	10,875	**2008**	11,995	39,614
1996	11,594	**2009**	7,775	36,047
1997	16,098	**2010**	6,299	26,739
1998	24,229	**2011**	6,713	32,257
1999	21,207	**2012**	4,291	23,505
2000	16,959			

Age-length keys, length frequency and frequency at age by stratum are presented in Tables 31, 32 and 33 respectively. Catch per haul distribution is presented in Figure 10. The figure 11 shows the estimated biomass with their standard error and numbers by year. The abundance at age along the series is shown in Table 34. Figure 12 shows the age distribution by year in the EU Flemish Cap surveys.

Roughhead grenadier (*Macrourus berglax*)

Mean catch per standard towed mile and estimated biomass by strata with their standard errors are presented in Table 35. These indices are compared with results of previous surveys in Table 36. The following table summarises the total biomass in tons by year:

Year	EU < 730 m.	Year	EU < 730 m.	EU < 1460 m.
1988	2,009	**2001**	2,079	
1989	871	**2002**	1,211	
1990	852	**2003**	2,348	
1991	1,335	**2004**	3,597	17,185
1992	1,577	**2005**	2,387	12,560
1993	3,021	**2006**	3,933	11,336
1994	1,975	**2007**	1,367	7,271
1995	1,558	**2008**	2,961	12,138
1996	1,362	**2009**	781	7,303
1997	1,197	**2010**	1,403	9,092
1998	1,691	**2011**	729	8,838
1999	1,250	**2012**	612	5,476
2000	1,047			

Age-length keys, length frequency and frequency at age by strata are presented in Tables 37, 38 and 39, respectively. Catch per haul distribution is presented in Figure 13. The figure 14 shows the estimated biomass with their standard error and numbers by year. The abundance at age along the series is shown in Table 40. The figure 15 shows the age distribution by year in the EU Flemish Cap surveys.

Shrimp

Casas J.M. (2012) presented detailed results.

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Table 1 – Technical data of the 2012 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	2 × depth echo sounder (m.) + 250.
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	6.30 to 18:30 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 –Biomass (t.) for the most important species or groups of species in 1988-2012 surveys in depths lesser than 730 m.

Species	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Rajidae	4495	1938	2823	4061	3780	6241	3506	2268	2051	1842	1978	1608	1150
Synaphobranchus sp.	217	88	40	80	72	105	8	16	0	8	40	0	0
Urophycis sp.	643	169	169	257	72	169	217	80	80	32	225	249	169
Antimora sp.	394	306	281	563	724	820	796	193	185	233	491	290	265
Macrouridae	3088	1456	1222	2252	2589	6498	3233	2606	2340	2292	2831	2332	1809
Notacanthus sp.	499	410	64	474	450	740	458	346	177	290	169	64	97
Illex sp.	8	8	1649	1158	64	0	209	0	88	64	72	16	0
Anarhichadidae	7994	7487	8122	10101	9095	14355	15642	19220	20563	14033	10985	5581	4471
Witch flounder	909	338	418	772	820	1045	788	708	507	322	241	378	410
Greenland halibut	6924	4471	5798	8171	8725	6530	8034	10873	11596	16100	24230	21207	16960
Zoarcidae	563	1142	1206	1978	1359	3474	1874	2179	1705	1729	2059	893	780
Cod	40837	114050	59365	40250	26715	60966	26466	9699	9015	9964	4986	2855	3064
American plaice	16044	14049	11982	10085	8653	7865	8227	6787	4101	3024	3434	2581	1608
Redfish	188333	162535	126757	76953	130206	72610	162527	87641	119664	165816	70833	98650	177991
Shrimp*	5742	2300	3490	11661	25155	12087	3981	7503	10905	7704	41971	25734	19719
Total	277325	310956	224530	169483	218909	193504	236440	150512	183669	224039	165655	163058	230087

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

Species	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Rajidae	2236	1544	4608	6241	4238	3506	2179	6289	2244	3471	2188	1658
Synaphobranchus sp.	24	8	24	88	72	32	64	40	24	14	2	20
Urophycis sp.	394	129	547	667	740	611	249	547	217	685	682	389
Antimora sp.	667	346	306	1158	1110	474	587	893	499	670	342	727
Macrouridae	3080	2043	3691	4914	3353	5026	2364	3957	1166	1926	561	1190
Notacanthus sp.	105	64	24	145	64	145	64	88	32	21	12	69
Illex sp.	8	8	225	474	80	3546	410	5139	1737	43	89	18
Anarhichadidae	5863	5227	5983	10591	9570	9272	8195	9867	4600	4256	3739	5073
Witch flounder	458	209	844	1568	1777	893	595	2220	764	1836	1458	2283
Greenland halibut	13872	12103	6216	12288	11701	11709	13044	11999	7777	6299	6481	4291
Zoarcidae	1246	812	2067	3683	3080	1801	354	458	56	75	20	18
Cod	2694	2493	1592	4069	5243	12505	23884	43676	75232	69295	106151	113227
American plaice	2405	2051	2284	3522	2758	1689	1053	1769	1440	2446	4084	4491
Redfish	77347	121312	93817	250602	453041	766924	464621	566649	358476	212212	196493	306053
Shrimp*	28316	40177	21512	20129	30672	16237	17049	11066	2799	4889	1593	1055
Total	140162	189459	149394	322866	529181	845252	534714	664655	457062	317805	320886	449552

Table 3 – Cod (*Gadus morhua*) mean catch per standard towed mile and the estimated biomass by strata and its standard error in the 2012 survey.

	area	tow	catch (kg)		Biomass (t.)	
stratum	sq. miles	number	mean	s. e.	value	s.e.
1	342	4	34.37	30.10	1567	686
2	838	10	124.05	144.58	13861	5108
3	628	7	211.9	86.73	17743	2745
4	348	4	62.56	23.54	2903	546
5	703	8	124.17	198.67	11639	6584
6	496	6	151.07	107.07	9991	2890
7	822	9	62.26	61.26	6824	2238
8	646	7	89.85	90.72	7739	2954
9	314	3	142.42	150.62	5963	3641
10	951	10	133.98	146.10	16988	5858
11	806	9	53.05	29.52	5701	1057
12	670	8	28.41	24.41	2538	771
13	249	3	26.35	10.65	875	204
14	602	7	45.64	32.73	3663	993
15	666	8	57.81	31.20	5133	979
16	634	7				
17	216	2				
18	210	2	3.58	5.06	100	100
19	414	4				
Total < 730 m.	10555	118	80.45	8.73	113227	12293
Total < 1460 m.	16070	174	52.84	5.74	113227	12293

Table 4 – Cod (*Gadus morhua*) length distribution (‘0000) in the 2012 survey.

length		length		length		length	
09-11	3	39-41	2073	69-71	93	99- 101	12
12-14	130	42-44	838	72-74	68	102-104	10
15-17	1190	45-47	301	75-77	44	105- 107	5
18-20	4552	48-50	228	78-80	39	108-110	2
21-23	3941	51-53	308	81-83	34	111-113	3
24-26	1315	54-56	419	84-86	32	114-116	2
27-29	1052	57-59	369	87-89	22	117-119	1
30-32	2196	60-62	272	90-92	27	120-122	1
33-35	3399	63-65	192	93-95	23	123-125	2
36-38	3318	66-68	138	96-98	17	total	26671

Table 5 – Cod (*Gadus morhua*) Biomass (t.) by strata in 1988-2012 surveys.

	year																								
stratum	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1	1345	649	767	5585	76	516	2165	1563	1006	243	125	99	250	86	477	173	1996	1091	2433	4420	4224	2253	11815	4694	1567
2	10150	10323	2065	5486	5150	9044	8186	3040	3991	2049	1899	1502	740	491	736	102	1668	1888	4145	1775	5346	6627	23368	22989	13861
3	4471	10276	2391	2459	8473	8435	6092	1146	1054	1132	703	145	360	230	451	90	9	1791	1948	11466	4129	7630	4512	16922	17743
4	3130	4843	2446	2900	3443	14171	1885	746	1068	857	140	25	443	488	66	136	168	152	466	1132	771	5190	1716	10114	2903
5	2130	10702	8447	10651	4570	6824	924	1274	936	1149	976	256	425	260	146	303	19	30	644	548	1129	6947	3600	10947	11639
6	3230	6789	3286	1531	952	4220	1412	1310	620	1074	613	375	511	749	525	24	155	206	1224	3214	12487	10734	2303	9510	9991
7	2224	16025	4385	2538	945	6153	857	122	55	1067	78	52	5	12	24	107	18		473	140	4692	12659	4667	2586	6824
8	8931	16434	15973	5107	2349	7964	3615	349	93	1610	77	23	74	123	37	111	5		347	475	3471	2814	4204	10921	7739
9	184	5261	6340	188	143	998	239	9	103	174		20	41		14	376			64	151	81	503	2048	1997	5963
10	1338	4898	4193	1558	327	936	506	58	46	301	199	102	107	81	2	24		28	304	246	2625	5071	4275	5247	16988
11	2505	13219	3859	1787	224	1678	582	78	41	310	176	255	106	175	18	58	33	56	381	272	3699	4336	4458	4557	5701
12	335	2469	1587	126		24										71					42	339	588	1135	2538
13	9	2534	734	93																	15	135	124	419	875
14	107	1121	545	131	67														76		160	9795	1056	3186	3663
15	748	8436	2344	108												18				47	805	195	475	926	5133
16		66																							
17		5																							
18	2																								100
19																							88		
total	40839	114050	59362	40248	26719	60963	26463	9695	9013	9966	4986	2854	3062	2695	2496	1593	4071	5242	12505	23886	43675	75228	69295	106151	113227
s.e.	5784	12205	8225	6704	5837	17397	7367	2070	1459	1725	646	451	593	380	398	273	780	813	980	4526	5507	8109	16269	11805	12293

s.e.: standard error

Table 6 – Cod (*Gadus morhua*) age-length key in 2012.

Length	age																total
cm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	
9-11	2																2
11-14	49																49
15-17	79																79
18-20	63																63
21-23	64	2															66
24-26	22	24															46
27-29	1	43															44
30-32		63															63
33-35		60															60
36-38		55	1														56
39-41		56	5														61
42-44		11	29	3													43
45-47			32	14													46
48-50			15	27	2												44
51-53			2	43	1												46
54-56				38	9												47
57-59				23	17	3											43
60-62				10	21	18											49
63-65				1	15	36	1										53
66-68					18	26	3										47
69-71					9	28	4										41
72-74					3	24	14	2									43
75-77					3	16	11	1									31
78-80						8	15	8									31
81-83						6	15	4									25
84-86						3	17	8									28
87-89							14	7									21
90-92							9	9									18
93-95							11	12		1							24
96-98							6	10	1	2		1					20
99- 101							3	7	2	4							16
102-104								3			1	1					5
105-107								3		3							6
108-110												2		1			3
111-113										1	1	1					3
114-116												3					3
117-119												1					1
120-122												1					1
123-125												1		1			2
total:	280	314	84	159	98	168	123	74	3	11	2	11		2			1329

Table 7 – Cod (*Gadus morhua*) frequency (‘00000) at age and stratum in the 2012 survey.

age	strata																total	mean	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	18		weight	length
1	9	103	172	84	221	91	35	98	57	109	54	2					1035	69	20
2	4	132	208	20	179	181	101	85	83	217	58	5	4	1	1		1279	353	34
3	1	15	23	2	20	6	4	6	6	22	6						110	699	43
4	2	26	34	4	9	5	5	9	3	13	5	1		1	1		117	1308	53
5	1	9	11	1	2	2	3	3	2	5	3	2	1	1	3		50	1935	60
6	1	6	7	1	2	2	2	3	3	5	3	3	1	3	6		49	2595	66
7	1	1	1		1	1	1	1	1	1	1	1		2	3		16	4835	81
8					1	1	1			1				1	1		8	6663	90
9																		8602	99
10																	1	9385	102
11																		10514	106
12																	1	12452	111
13																			
14																			
Set	4	10	7	4	8	6	9	7	3	10	9	8	3	6	8	1	103	426	31.5
n	18	292	456	113	435	290	151	206	154	373	131	15	7	10	16		2667		

Table 8- – Cod (*Gadus morhua*) abundance (‘000) at age in 1988-2012 surveys.

age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	4868	19604	2303	129032	71533	4075	3017	1425	36	37	23	5
2	79905	10800	12348	26220	41923	138357	4130	11901	3121	150	83	84
3	49496	91303	5121	16903	5578	31096	27756	1338	6659	3478	95	116
4	13448	54613	16952	2125	2385	1099	5097	3892	892	4803	1256	117
5	1457	20424	15834	6757	385	1317	130	928	2407	391	1572	717
6	211	1336	4492	1731	1398	173	67	33	192	952	78	444
7	225	143	340	299	244	489	7	23	8	21	146	19
8	72	126	146	68	14	87	111		5			5
9		6	77	32				21			6	
10		7	25	4			5	5				
11				10	8							
12										4		
Total	149683	198363	57637	183181	123468	176693	40319	19567	13320	9837	3259	1507

edades	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1	178	473		684		8069	19710	3912	6095	5130	66500	347800	103530
2	16	1990	1330	54	3379	16	3880	11625	16681	7480	27760	143100	127920
3	327	13	641	628	49	1118	60	5021	12419	16170	8640	16900	10980
4	198	122	29	134	618	78	1470	21	4545	14300	7660	6300	11720
5	96	79	70	22	168	708	90	1138	73	4150	5000	7800	4960
6	446	15	33	42	5	136	590	58	928	20	1800	3100	4870
7	172	142	26	7	10		120	425	58	1090	10	1200	1630
8	11	99	96	8	3	17	10	74	230		460		820
9	17	6	30	39	5	8		13	80	340	50	200	20
10		6		24	16	8	10	20			260		90
11		6	5				10		15		30		30
12	5									10			80
13							10						0
14	5												10
Total	1470	2951	2261	1642	4161	10157	25960	22307	41125	48690	118180	526500	266660

Table 9 – American plaice (*Hippoglossoides platessoides*) mean catch per towed mile and the estimated biomass by stratum, and their standard error in the 2012 survey.

	area	tow	catch (kg)		Biomass (t.)	
stratum	sq. miles	number	mean	s. e.	value	s.e.
1	342	4	10.14	13.03	462	297
2	838	10	11.39	5.89	1272	208
3	628	7	5.59	6.25	468	198
4	348	4	16.13	2.91	749	68
5	703	8	7.64	9.06	716	300
6	496	6	2.8	3.60	185	97
7	822	9	1.42	1.06	156	39
8	646	7	2.17	2.06	187	67
9	314	3	0.71	1.23	30	30
10	951	10	0.97	1.13	123	45
11	806	9	1.13	0.88	121	31
12	670	8	0.12	0.34	11	11
13	249	3				
14	602	7				
15	666	8	0.15	0.29	13	9
16	634	7				
17	216	2				
18	210	2				
19	414	4				
Total < 730 m.	10555	118	3.19	0.38	4491	534
Total < 1460 m.	16070	174	2.1	0.25	4491	534

Table 10 – American plaice (*Hippoglossoides platessoides*) length frequency (’00) in the 2012 survey.

length	male	female	length	male	female	length	male	female
12-13	36	36	30-31	2345	1410	48-49	215	1086
14-15			32-33	4888	1171	50-51		1079
16-17			34-35	7111	1446	52-53		1530
18-19			36-37	6841	1588	54-55		1168
20-21	73	230	38-39	4614	2208	56-57		807
22-23	154	223	40-41	2871	3701	58-59		436
24-25	444	223	42-43	2140	5540	60-61		145
26-27	574	224	44-45	783	4338			
28-29	1301	648	46-47	429	2079	Total		66135

Table 11 – American plaice (*Hippoglossoides platessoides*) survey biomass (t) by strata in 1988-2012.

	year																							
stratum	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1	1306	1000	505	1078	709	1079	661	2230	1462	381	156	372	345	1043	141	1292	1507	1038	714	284	144	548	716	693	462
2	2845	3602	1375	2663	1714	1267	1199	1335	943	740	1587	1810	976	835	1262	713	768	796	354	209	513	370	1084	1141	1272
3	1367	1118	1668	1247	631	444	325	252	168	495	284	97	21	93	75	17	427	101	74	101	147	74	103	364	468
4	2199	461	817	320	557	572	853	489	268	203	343	53	100	85		128	395	359	109	153	440	36	91	1201	749
5	2599	3093	1830	1407	837	1291	1230	549	500	619	744	73	56	112	189	82	72	45	63	81	88	72	200	190	716
6	479	1130	954	501	601	305	808	123	32	13	35	40	25	37	63	29	26	71	61	99	37	57	34	160	185
7	1174	531	837	389	639	319	316	249	72	83	47	19	15	28	52	30	84	31	37	20	47	32	28	160	156
8	417	164	263	251	727	487	171	132	56	123	165	3		45	43	14	55	175	163	58	128	47	49	65	187
9	103	163	343		373	205	20	500	55	36					1	9	77	18				77			30
10	2323	1491	2000	1308	1406	1459	2236	708	415	287	36	72	45	95	36	54	45	87	97	24	163	54	115	35	123
11	1186	1168	1316	401	372	292	303	109	68	32	29	37	23	27	59	29	69	35	19	22	50	64	26	33	121
12	9	19	45	17	11	15	33	12	32	7				4		11						11			11
13	3		20					3																	
14	8	8	7	389	29		24	15	4		4	9												32	
15	23	99	3	97	37	109	40	68	23	7	7					6		4		3	7	1		10	13
16	5			4	9	12	5																		
17																									
18																									
19				15	4	5	3	11																	
total	16046	14047	11983	10087	8656	7861	8227	6785	4098	3026	3437	2585	1606	2404	2049	2286	3525	2760	1691	1053	1766	1442	2446	4084	4491
s.e.	1845	2048	1276	1180	954	1040	1373	1083	912	708	751	869	332	429	729	748	740	684	342	159	300	327	526	780	534

Table 12 – American plaice (*Hippoglossoides platessoides*) age-length key in 2012.

MALE

Length	age																
cm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	total
20-21		1															1
22-23			2														2
24-25		1	5														6
26-27		1	6	1													8
28-29			8	9	1												18
30-31			1	16	10	6											33
32-33				7	21	19	1										48
34-35				2	19	36	1										58
36-37					10	48	7			1		1		1			68
38-39					7	22	10	2			1	2		2		2	48
40-41					1	11	5	1	4	4	1	3	1	1	1	2	35
42-43						3	1	5	5	1	5	1	2	4		4	31
44-45						1			1	1	1	1	1	3	1	3	13
46-47										1		1				3	5
48-49										1						2	3
total		3	22	35	69	146	25	8	10	9	8	9	4	11	2	16	377

FEMALE

Length	age																
cm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	total
20-21		3															3
22-23		1	2														3
24-25		1	2														3
26-27			3														3
28-29			10	1													11
30-31			14	4													18
32-33			5	11													16
34-35			3	16	1												20
36-37			1	13	6	1											21
38-39				2	14	11	1										28
40-41					10	30	1										41
42-43					2	30	6	1	1								40
44-45						37	4			1							42
46-47						16	6		1	1	1			1	1		27
48-49						4	1	1				2		1	4		13
50-51						4	1				3				3	4	15
52-53									1	2	1	1	2	4	2	6	19
54-55							1		1	3	2				3	6	16
56-57										1	2	1			2	5	11
58-59										1		1				4	6
60-61																2	2
total:		5	40	47	33	133	21	2	4	9	9	5	2	6	15	27	358

Table 13 – American plaice (*Hippoglossoides platessoides*) frequency (‘000) at age in the 2012 survey.

Age	stratum													total	mean weight	mean length
	1	2	3	4	5	6	7	8	9	10	11	12	15		g	cm
1					7									7	15	13
2			8	12	3	5	12			11	9			60	104	22
3	4	36	75	73	42	58	73			22	63			447	231	29
4	39	148	90	96	93	69	27	5		9	51		1	629	352	33
5	158	395	58	130	84	51	36	7	4	20	34		5	982	464	36
6	400	997	239	407	315	119	102	56	13	83	93	2	12	2837	652	39
7	67	141	41	63	62	16	16	13		15	11		2	447	745	41
8	19	26	4	14	13	2	2	2		2	1			84	787	42
9	27	27	9	14	20	3	3	3		3	1			110	924	44
10	25	35	11	17	29	3	6	8	1	4	2			142	1213	47
11	19	38	11	16	24	1	3	8	2	2		1		125	1227	47
12	26	34	7	17	17	2	2	5	1	2	2			115	1037	45
13	10	12	6	5	9		1	1						44	1096	46
14	26	39	18	16	24		3	3		2	1			131	1001	45
15	8	35	16	23	27	1	2	11	2	2		1		130	1448	50
16+	39	85	21	48	75	8	9	23	5	2		1		323	1502	51

Table 14- – American plaice (*Hippoglossoides platessoides*) abundance (‘000) at age in 1988-2012 surveys.

age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1	0	40	8	40	0	0	0	0	8	8	0	8	16	0	0	8	0	0	7	207	51	26	10		7
2	402	563	426	354	852	8	40	32	32	16	24	0	24	40	0	8	113	32	28	7	1492	293	341	394	60
3	1882	8364	917	1206	796	1544	48	113	121	113	32	24	8	48	32	32	281	113	37	13	69	1107	608	601	447
4	1311	1874	8372	2171	1070	1086	2131	740	257	24	48	64	80	56	64	97	72	290	106	35		147	2000	1384	629
5	4230	4367	1126	5348	1938	780	1037	2131	587	121	72	80	105	105	16	80	80	105	133	106	32	29	301	2467	982
6	6385	4359	3370	2445	4769	418	877	1367	1665	418	265	80	153	56	88	56	105	105	139	119	127	22	187	454	2837
7	5010	4142	2340	2686	1279	4134	973	1375	893	1206	619	241	121	113	64	48	105	129	72	49	120	80	72	94	447
8	5460	2429	2228	2067	1504	450	3426	909	547	273	901	474	153	265	129	137	129	105	57	49	108	57	139	49	84
9	1753	804	1351	852	828	780	322	1536	402	410	523	507	394	434	161	290	249	225	123	35	104	94	122	90	110
10	458	346	627	298	378	370	651	161	627	290	354	257	426	579	193	233	314	201	163	47	111	90	70	176	142
11	97	40	113	8	177	257	225	177	145	491	298	338	225	483	298	426	281	225	200	76	63	132	56	144	125
12	161	16	16	56	97	306	225	145	80	129	290	209	185	418	225	483	595	249	193	122	47	121	176	55	115
13	129	0	32	0	16	362	249	145	80	24	88	121	72	193	249	281	426	354	192	143	118	63	125	107	44
14	48	0	16	0	0	1070	523	290	105	97	113	121	56	161	145	265	402	394	213	82	110	104	114	148	131
15	56	0	0	0	0	32	491	217	72	48	56	56	48	113	129	145	330	257	201	75	150	121	134	82	130
16+	40	0	0	0	0	40	8	32	24	113	105	97	56	97	185	161	523	547	323	236	561	353	497	672	323
total	27415	27351	20949	17523	13711	11637	11226	9377	5645	3772	3804	2670	2131	3169	1970	2766	4013	3329	2188	1401	3262	2838	4952	6917	6613
N6+	19598	12135	10093	8412	9047	8219	7970	6353	4640	3498	3611	2501	1890	2911	1866	2525	3458	2791	1877	1033	1619	1237	1692	2072	4488
SOP	16041	14008	11982	10007	8623	7859	8229	6815	4073	3025	3437	2589	1596	2402	2047	2486	3524	2673	1743	1053	1817			4176	4428
Biomasa	16043	14044	11983	10088	8657	7861	8228	6785	4097	3024	3436	2587	1606	2404	2048	2286	3525	2760	1691	1053	1766	1442	2446	4084	4491

Table 15 – Redfish (*Sebastes marinus*) mean catch per towed mile and the estimated biomass by stratum, and their standard error in the 2012 survey.

	area	tow	catch (kg)		Biomass (t.)	
stratum	sq. miles	number	mean	s. e.	value	s.e.
1	342	4	0.79	1.22	36	28
2	838	10	0.68	0.92	76	33
3	628	7	19.32	36.38	1617	1151
4	348	4	0.51	0.68	24	16
5	703	8	13.23	31.79	1240	1053
6	496	6	130.89	194.88	8656	5261
7	822	9	45.07	41.22	4940	1505
8	646	7	155.73	250.66	13414	8160
9	314	3	20.84	22.20	872	537
10	951	10	92.68	163.77	11752	6567
11	806	9	117.95	124.92	12676	4475
12	670	8				
13	249	3				
14	602	7	0.41	1.08	33	33
15	666	8	0.84	2.38	74	74
16	634	7				
17	216	2				
18	210	2				
19	414	4				
20	525	6				
21	517	5				
22	533	3				
23	284	2				
24	253	3				
25	226	3				
28	530	6				
29	488	6				
30	1134	11				
31	203	2				
32	238	2				
33	98	2				
34	486	5				
Total < 1460 m.	16070	174	25.86	5.95	55410	12745
Total < 730 m.	10555	118	39.37	9.06	55410	12745

Table 16 – Redfish (*Sebastes marinus*): age-length key in the 2012 survey.

Male

Length	age																					All
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	22	23	25+	
12	1																						1
13																							0
14	3																						3
15	3																						3
16	3	2																					5
17		4																					4
18		5	2																				7
19		1	4																				5
20			3	2																			5
21				3																			3
22				3	2	2																	7
23					3	2																	5
24					5	4																	9
25					1	5	2																8
26					2	3	4																9
27						1	4		1														6
28						2	1	2	2	1	1												9
29						1	3		2			1											7
30						2	1	1	2		2												8
31									3	2	2	1	2										10
32								1	3	3	1		1										9
33											4	4	1										9
34						1		1	1		2	1	3							1			10
35									1			3	1	4									9
36										1	1	1	1		1			1					6
37											3	1		1		1							6
38												3	1				1		1				6
39												1										1	2
40																							0
41																				1	1		2
42																				1			1
total	10	12	9	8	13	23	15	5	15	7	16	16	10	5	1	1	1	1	1	3	1	1	174

Table 16 (cont.) – Redfish (*Sebastes marinus*): age-length key in the 2012 survey.

Female

Length	age																							All
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25+	
12																									0
13	1																								1
14	2	1																							3
15	2	2																							4
16	1	3																							4
17		2	1																						3
18		3	8																						11
19		1	6	2																					9
20			4	5	1																				10
21			2	11	1																				14
22			1	6	6																				13
23				1	9	1																			11
24				1	6	4	2																		13
25					2	8	2																		12
26					1	4	8		1																14
27						6	1	2	1		1														11
28						3	3	5	1	2															14
29						1	4	3	2	3	1														14
30							1	1	8	2	1														13
31								2	3	3	3		1												12
32								5	5	1	2													1	14
33					1				2	4	1	3		1											12
34									2	3	3	5			1										14
35									2	3	1	5	1												12
36										2	2	5	2		1										12
37										2	1	5	5	1											14
38										1	3	3	7	1											15
39										1	1	3	5	1											11
40										1	1	5	4												11
41											2	5	4	1											12
42											1	6	3												10
43											2	1	1	1	1										6
44											2		1	2						1					6
45																									0
46													1												1
47																								1	1
48																					1				1
49																									0
50																									0
51																			1						1
All	6	12	22	26	27	27	21	18	27	28	28	46	35	8	3				1	1	1			2	339

Table 17 – Redfish (*Sebastes marinus*) length frequency (‘000) in the 2012 survey.

length	male	female	length	male	female	length	male	female
12	48		27	3408	1885	42	48	712
13		14	28	2240	2527	43		278
14	50	98	29	2942	3048	44		317
15	142	116	30	3770	2689	45		
16	324	253	31	5288	2375	46		54
17	265	328	32	6126	3100	47		41
18	414	221	33	4385	2498	48		
19	612	411	34	5700	3417	49		
20	616	425	35	3315	3357	50		
21	790	1161	36	1246	3789	51		53
22	1071	1428	37	1138	3514	52		
23	1766	1813	38	662	3436	53		
24	2270	2971	39	296	1894			
25	2587	3083	40	32	1832			
26	2873	3021	41	165	1310	Total	54589	57469

Table 18 – *Sebastes marinus*: frequency at age (‘0000) by strata in the 2012 survey.

Age	Strata													total	average	
	1	2	3	4	5	6	7	8	9	10	11	14	15		weigth (g)	Length (cm)
1																
2	10	6	5	1	3	22	9				2	5		64	50	15
3	11	10	6	1	8	43	17	4	2	13	27			142	75	17
4	5	7	9	1	12	38	30	9	18	17	52			197	110	19
5	3	5	14	2	34	38	65	13	28	54	119			376	148	21
6	1	4	18		83	89	116	52	50	158	245			816	211	24
7	1	3	30		115	194	200	161	52	216	367			1338	280	26
8			19		65	162	199	178	29	131	282			1066	302	27
9			18		14	85	62	123	8	92	179	1		583	429	30
10			40		25	182	148	289	20	225	392	2		1324	458	31
11		1	36		11	132	69	253	9	212	265	2		990	548	33
12		1	42		16	180	92	274	12	269	318	1		1204	596	34
13		1	46		14	220	94	394	16	372	297		5	1458	707	36
14		1	34		7	166	70	299	10	292	210	1	2	1092	731	36
15			9		2	48	19	97	5	61	38			278	747	36
16			4		1	12	5	28	1	17	13			81	708	36
17			1			3	1	8		3	3			19	775	37
18						3		2		2	1		2	11	840	38
19			2			4	3	9		3	1			21	713	36
20						9		2		2	1		2	16	1232	42
21						2	2	1						5	1311	44
22			2			21	9	16		9	14			70	690	35
23						2	1	5						8	1058	41
24																
25						5	12	5		5	13			41	756	36
Set	3	6	7	3	7	6	9	7	3	10	9	1	1	72	475	
	33	39	334	8	411	1660	1223	2223	260	2154	2840	10	9	11202	5324	30.5

Table 19 – Redfish (*Sebastes mentella*) mean catch per towed mile and the estimated biomass by stratum, and their standard error in the 2012 survey.

	area	tow	catch (kg)		Biomass (t.)	
stratum	sq. miles	number	mean	s. e.	value	s.e.
1	342	4				
2	838	10				
3	628	7	0.02	0.03	1	1
4	348	4	0.02	0.04	1	1
5	703	8	0.19	0.31	18	10
6	496	6	0.14	0.20	9	5
7	822	9	267.77	328.41	29348	11998
8	646	7	194.93	499.44	16790	16259
9	314	3	3.37	5.84	141	141
10	951	10	41.91	79.66	5314	3195
11	806	9	46.18	53.82	4963	1928
12	670	8	433.49	289.60	38725	9147
13	249	3	413.02	283.95	13712	5443
14	602	7	307.23	234.68	24660	7120
15	666	8	350.88	316.56	31158	9938
16	634	7	5.38	13.68	455	437
17	216	2				
18	210	2	49.41	69.88	1383	1383
19	414	4	0.27	0.36	15	10
20	525	6				
21	517	5				
22	533	3				
23	284	2				
24	253	3				
25	226	3				
28	530	6	0.17	0.42	12	12
29	488	6				
30	1134	11				
31	203	2				
32	238	2				
33	98	2				
34	486	5				
Total < 1460 m.	16070	174	77.8	12.23	166705	26213
Total <730 m.	10555	118	118.45	18.63	166693	26213

Table 20 – *Sebastes mentella*: age-length key in the 2012 survey.

Male

Length	age																						All
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	19	20	22	23	24	25+	
14		5																					5
15	1	6																					7
16		3	1																				4
17			3																				3
18			4	2																			6
19				5	1																		6
20				5	5																		10
21				3	4																		7
22					5	2																	7
23					2	6	2																10
24						6	4																10
25						3	6	1	1														11
26							4	2	1														7
27							2	2	3		1												8
28								1	2	2	3	1											9
29									1		3	2						1	1				8
30											1	2	3	3	2							1	12
31											1	2	3	4	2		1		1				14
32												1	5	2	1				1	1			11
33												1	1			2	1				2	1	8
34															1								1
total:	1	14	8	15	17	17	18	6	8	2	9	9	12	9	6	2	2	1	3	1	2	2	164

Female

Length	age																							All
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25+	
14		1																							1
15		7																							7
16		7	2																						9
17		1	3																						4
18			8	5																					13
19				12																					12
20				7	6	1																			14
21				3	10	2																			15
22					4	10																			14
23					1	6	7																		14
24						1	8	5																	14
25						1	9	5																	15
26							6	9	2																17
27							2	9	3																14
28							1	4	6	1	1			1											14
29									4	3	3	2	2			1									15
30										1	4	4	2	2	1										14
31										2	4	1	3	1	1			1							13
32												5	7	4											16
33												1	8	1	1		1					1	1		14
34												2	3	2	2	2	1		1	1	1				15
35													1		2		1	1		1		1	1		8
36														1		1			1		1	1			5
37												1			1								1		3
38																									
39																1						1			2
All		16	13	27	21	21	33	32	15	7	12	16	26	12	8	5	3	2	2	2	2	4	3		282

Table 21 – Redfish (*Sebastes mentella*) length frequency (‘0000) in the 2012 survey.

length	male	female	length	male	female	length	male	female
14	48	14	24	8369	8163	34	3	194
15	424	212	25	5912	5816	35		55
16	798	505	26	2952	3587	36	2	40
17	728	880	27	1190	1800	37		29
18	834	1367	28	565	484	38		
19	1299	1103	29	345	368	39		15
20	1974	1522	30	365	216	40		
21	3369	2651	31	185	229			
22	6613	6712	32	128	204			
23	9855	8714	33	98	146	Total	46056	45026

Table 22 – *Sebastes mentella*: frequency at age (‘00000) by strata in the 2012 survey.

Age	Strata																	total	pm(g)	length
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	19	28			
1					4			1	1									6	48	15
2			2		131	3		25	20	1		1	1					185	56	16
3					182	43	1	44	30	5	3	1						310	74	17
4					282	116	4	47	53	71	16	43	39					671	109	20
5					379	251	3	45	61	289	66	153	229		2			1478	143	22
6					484	330	1	68	68	590	151	244	491		11			2440	173	23
7					370	239	1	66	63	673	216	255	552	1	23			2460	202	24
8					115	57		28	27	288	100	114	234	1	14			979	228	25
9					19	11		8	7	73	32	51	61	2	6			269	261	27
10								1		6	3	13	4		1			28	331	29
11					1	1		2	1	15	8	34	11	2	1			75	329	29
12									1	9	4	30	4	1				50	392	30
13										7	4	40	2	2				55	434	31
14										4	3	24	1	1				35	415	31
15										2	1	15		1				19	451	32
16										1	1	7	1					9	505	33
17												2						3	538	34
18												2						2	462	32
19												4						5	510	33
20										1		2	1					4	339	29
21												2						2	559	34
22										1	1	6	1					9	421	31
23												4						4	578	35
24												5						5	547	34
25+												4						4	409	31
Sets	2	1	3	3	9	5	1	10	9	8	3	7	8	4	1	2	1	77		
n			3	1	1968	1051	11	334	331	2038	610	1055	1631	14	60	1	1	9108	182	23.2

Table 23 – Redfish (*Sebastes fasciatus*) mean catch per towed mile and the estimated biomass by stratum, and their standard error in the 2012 survey.

	area	tow	catch (kg)		Biomass (t.)	
stratum	sq. miles	number	mean	s. e.	value	s.e.
1	342	4	0.01	0.02	0	0
2	838	10	0.03	0.09	4	3
3	628	7	0.98	0.77	82	24
4	348	4	0.04	0.06	2	1
5	703	8	0.54	0.93	51	31
6	496	6	8.67	13.25	573	357
7	822	9	285.66	309.33	31309	11300
8	646	7	110.03	220.07	9478	7164
9	314	3	178.27	303.52	7464	7337
10	951	10	28.98	21.38	3675	858
11	806	9	73.74	47.46	7925	1700
12	670	8	47.1	38.86	4208	1227
13	249	3	83.03	60.71	2757	1164
14	602	7	56.44	85.11	4530	2582
15	666	8	115.97	93.08	10298	2923
16	634	7	0.38	0.63	32	20
17	216	2	0.04	0.06	1	1
18	210	2	4.32	6.11	121	121
19	414	4	0.55	0.94	30	26
20	525	6	0.02	0.05	1	1
21	517	5				
22	533	3				
23	284	2				
24	253	3				
25	226	3				
28	530	6	0.18	0.39	12	11
29	488	6				
30	1134	11				
31	203	2				
32	238	2				
33	98	2	0.12	0.17	2	2
34	486	5				
Total < 1460 m.	16070	174	38.53	7.45	82555	15959
Total <730 m.	10555	118	58.65	11.34	82539	15959

Table 24 – *Sebastes fasciatus*: age-length key in the 2012 survey.

Males

length	age																							all
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
13	1	1																							2
14		3																							3
15		7	2																						9
16		6	4																						10
17			8	1																					9
18			3	6																					9
19				5	1																				6
20				3	7																				10
21					9	5																			14
22					5	6	1																		12
23						3	9	4																	16
24						1	6	6	1																14
25							5	6	1																12
26								4	2	1	1			1											9
27								2	3	1	1									1					8
28													1	1			1			1					4
29											2	1		1											4
30												1	1												2
31																									
total	1	17	17	15	22	15	21	22	7	2	4	2	2	3			1			2					153

Females

length	age																							all
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
13		1																							1
14		2																							2
15		10	3																						13
16		7	7																						14
17		1	11	1																					13
18			4	13																					17
19			1	13	3																				17
20				2	10																				12
21				2	10	2	1																		15
22					3	9	2																		14
23						9	8																		17
24						3	8	2			1														14
25							7	9																	16
26							5	7	1	2		1													16
27							1	4	6	3	3														17
28									8	2	1	2	3												16
29										5	5	1	3	1											15
30									1	1		4	4	1			1								12
31										2	2	2	3		2	2		1				1			15
32												3		1				1			1				6
33														1		1								1	3
34										1						1						1			3
35											1					1		1							3
36														1	1			1							3
37														1											1
38																									
39															1										1
total		21	26	31	26	23	32	22	16	16	13	13	13	6	4	5	1	4			1	2		1	276

Table 25 – Redfish (*Sebastes fasciatus*) length frequencies (‘0000) in the 2012 survey.

length	male	female	length	male	female	length	male	female
13	9	9	23	4604	1001	33		184
14	115	142	24	3771	1524	34		42
15	947	864	25	1334	1579	35		21
16	1611	1815	26	779	2067	36		31
17	2421	1475	27	212	1532	37		5
18	1773	1657	28	81	1417	38		
19	1094	1318	29	55	761	39		3
20	1293	1168	30	20	524			
21	2047	959	31	6	295			
22	3713	951	32		124	Total	25885	24468

Table 26 – *Sebastes fasciatus*: frequency at age (‘0000) by strata in the 2012 survey.

age	strata																						total	average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	28	33		weigth (g)	Length cm
1					1						3												4	36	13
2	1	2	25	3	18	177	1799	235	161	491	676		21	46	5								3659	60	15
3		2	31	1	21	187	3862	394	236	563	1035	4	14	65				4					6420	76	17
4			23		11	88	3286	464	209	398	755	19	75	96	14			21	1				5462	102	19
5			5		3	15	3534	581	258	275	572	134	210	252	123	1	1	28	3	1	2	1	5999	143	21
6			1		2	8	2710	587	375	215	494	234	176	266	232	1		14	1		2		5316	174	22
7			1		1	10	3295	879	838	294	781	464	303	459	703	3		7	1		2		8040	212	24
8						10	2104	741	716	205	562	398	268	411	780	4		2	1		1		6205	234	25
9						9	425	329	302	61	164	163	99	102	402	1			1				2059	298	27
10						9	249	167	160	29	88	91	41	79	257	1							1171	327	28
11						8	207	140	117	26	59	64	33	69	184	1		1					909	324	27
12						4	99	116	72	18	42	52	22	42	188				1				657	371	29
13						7	106	106	85	19	33	68	23	51	183				1				682	376	29
14						2	34	45	22	6	6	20	9	21	146	1							312	407	30
15						1	5	11	2	3	2	5		4	21								53	527	32
16						1	5	12	7	3	2	5		13	73								121	528	33
17							10	6	4	1	1	8	3	3	28								64	389	29
18							2	11	1	3	3	4		7	27								58	539	33
19																									
20							9	1		2	1	5	1	3	26								47	318	27
21								6			2	1			12								21	499	32
22							2	5	1	1	1	3		2	17								34	513	32
23																									
24								1	5	1				5	49								61	546	33
25+																									
Sets	1	3	7	2	4	6	9	7	3	10	9	8	3	7	8	3	1	1	3	1	2	1	99		
n	1	4	86	4	57	537	21741	4839	3573	2614	5280	1742	1298	1996	3469	13	1	79	11	1	7	1	47354	176	21.7

Table 27 – Juvenile redfish (*Sebastes sp*.) mean catch per towed mile and the estimated biomass by stratum, and their standard error in the 2012 survey.

	area	tow	catch (kg)		Biomass (t.)	
stratum	sq. miles	number	mean	s. e.	value	s.e.
1	342	4	0.11	0.20	5	5
2	838	10	0.08	0.16	9	6
3	628	7	0.24	0.21	20	6
4	348	4	0.08	0.08	4	2
5	703	8	0.26	0.54	24	18
6	496	6	0.75	0.73	49	20
7	822	9	4.37	5.94	479	217
8	646	7	0.45	0.85	38	28
9	314	3	0.67	0.40	28	10
10	951	10	2.58	3.29	327	132
11	806	9	2.99	3.39	321	121
12	670	8				
13	249	3				
14	602	7	0.01	0.03	0	0
15	666	8				
16	634	7				
17	216	2				
18	210	2				
19	414	4				
Total <730 m	10555	118	0.93	0.2	1304	284
Total < 1460 m.	16070	174	0.61	0.13	1304	284

Table 28– Juvenile redfish (*Sebastes sp*.) length frequency (‘0000) in the 2012 survey.

length		length	
6	9	14	1344
7	20	15	312
8	77	16	39
9	160	17	7
10	48		
11	88		
12	467		
13	1073	Total	3644

Table 29 – Greenland halibut (*Reinhardtius hippoglossoides*) mean catch per towed mile by strata and the estimated biomass with their standard errors in the 2012 survey.

	Area	tow	catch (Kg)		Biomass (t.)	
stratum	sq. miles	number	mean	st. error	value	s.e.
1	342	4				
2	838	10				
3	628	7				
4	348	4				
5	703	8				
6	496	6				
7	822	9				
8	646	7	0	0.01	0	0
9	314	3				
10	951	10				
11	806	9	0.08	0.23	8	8
12	670	8	3.72	2.89	332	91
13	249	3	0.58	1	19	19
14	602	7	3.19	4.23	256	128
15	666	8	1.25	1.76	111	55
16	634	7	22.61	6.99	1911	223
17	216	2	13.91	1.82	401	37
18	210	2	11.62	2.3	325	46
19	414	4	16.79	6.55	927	181
20	525	6	34.02	14.84	2381	424
21	517	5	21.7	11.94	1496	368
22	533	3	10.05	3.76	714	154
23	284	2	7.41	1.19	280	32
24	253	3	19.34	13.41	652	261
25	226	3	15.24	8.57	459	149
28	530	6	31.76	19.94	2244	575
29	488	6	34.39	13.36	2237	355
30	1134	11	31.33	18.25	4738	832
31	203	2	3.02	1.62	82	31
32	238	2	34.56	1.8	1097	40
33	98	2	24.46	1.69	320	16
34	486	5	38.79	19.17	2514	556
Total < 1460 m.	16070	174	10.97	0.66	23505	1416
Total < 730 m.	10555	118	3.05	0.24	4291	338

Table 30 – Greenland halibut (*Reinhardtius hippoglossoides*): Biomass (t.) by strata in 1988-2012 surveys.

Estrato	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	3	6	0	0	0	0	121	0	2	6	3
3	26	31	8	8	18	3	0	21	108	90	367	347
4	144	20	0	15	27	10	0	5	0	23	41	197
5	74	98	0	28	42	1	2	21	36	98	173	409
6	31	18	15	12	8	15	0	31	106	228	361	301
7	85	63	58	189	246	94	214	904	1148	1423	2607	2356
8	151	222	62	180	379	140	46	333	359	1065	989	1993
9	180	165	53	76	323	30	43	178	160	254	471	354
10	108	82	58	172	362	31	235	526	716	862	1369	1528
11	45	61	22	106	229	234	236	492	671	627	1227	1320
12	405	647	288	761	619	933	1219	1147	2124	2248	3077	3661
13	64	124	218	44	24	143	152	127	298	484	554	978
14	368	302	284	787	847	0	620	410	902	1589	1461	1080
15	435	169	525	973	643	1378	1492	1768	1448	2689	4055	2987
16	1374	1363	2543	2527	1827	2175	1524	1861	2098	1770	3356	1143
17	266	120	127	415	40	0	742	742	258	525	737	603
18	106	50	506	354	58	0	386	958	191	557	775	932
19	3064	934	1026	1522	3036	1342	1126	1230	971	1564	2603	1015
20												
21												
22												
23												
24												
25												
28												
29												
30												
31												
32												
33												
34												
Total (1-19)	6926	4472	5799	8169	8728	6529	8037	10875	11594	16098	24229	21207
d,t,(1-19)	768	392	809	817	1389	956	678	1226	882	1136	1348	1520

Table 30 –cont.

Estrato	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1	0	0	0		2								
2	0	15	10	0	12	7	9						
3	244	384	140	55	852	416	325	22		4	6		
4	207	157	58	105	347	91	182	8					
5	307	268	66	92	254	280	231	92	15	7		6	
6	178	265	104	21	466	332	61	75	8				
7	1570	982	429	414	1032	596	778	729	524	11	15	4	
8	1317	1124	878	507	811	934	910	432	226	31	0		0
9	245	355	138	140	464	91	550	487	401	31			
10	1602	1743	744	286	753	1058	850	560	777	25	19	5	
11	1088	1021	338	277	631	1063	290	503	563	21	32	2	8
12	2174	1582	1086	673	902	1020	978	1246	1393	1217	743	126	332
13	382	291	521	61	447	310	219	392	431	217	273	33	19
14	491	877	1081	885	1658	618	573	878	1023	742	62	35	256
15	2687	1616	1233	607	1084	1747	1783	3041	1621	771	1224	112	111
16	2016	1328	2182	633	1166	1357	1752	2263	1623	2186	2079	1892	1911
17	498	170	204	148	223	429	639	407	411	558	446	236	401
18	179	574	694	1062	578	434	606	865	944	540	526	562	325
19	1774	1120	2194	248	608	915	971	1042	2035	1414	1231	3700	927
20					1647	1061	666	2041	4119	1855	1490	2471	2381
21					729	345	359	742	2161	1569	1367	1258	1496
22					454	510	845	551	883	1970	2410	1226	714
23					407	42	130	495	1144	475	715	464	280
24					208	328	555	588	1082	1185	461	1749	652
25					2377	993	322	436	441	732	473	593	459
28					1728	1162	1239	2857	3920	3153	1994	4188	2244
29					2300	1330	674	1488	3335	2618	2091	2044	2237
30					2024	602	2772	4719	5066	7692	5381	5060	4738
31					546	186	354	347	385	944	319	414	82
32					599	596	1357	1040	1755	2391	1539	1916	1097
33					358	147	608	166	698	309	408	707	320
34					2675	1460	1886	2222	2627	3377	1790	3454	2514
Total (1-19)	16959	13872	12100	6214	12292	11698	11708	13040	11997	7777	6656	6713	4291
d,t,(1-19)	923	776	662	611	400	630	609	786	583	363	814	2728	338
Total (1-34)					28343	21515	24357	31723	39614	36047	27096	32257	23505
d,t, total (1-34)					1335	933	1263	1270	1312	1538	1791	3862	1416

Table 31 - Greenland halibut (*Reinhardtius hippoglossoides*) age-length key in the 2012 survey.

MALE

Length	age																
cm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	total
12-13																	
14-15																	
16-17																	
18-19																	
20-21																	
22-23																	
24-25																	
26-27			1														1
28-29			1														1
30-31			1														1
32-33				2													2
34-35				4	3												7
36-37				2	15	2											19
38-39				1	16	4											21
40-41					15	7											22
42-43					10	12											22
44-45						25	2										27
46-47						13	10										23
48-49						7	16										23
50-51						5	18	1									24
52-53							15	5									20
54-55						1	3	14	2								20
56-57							4	10	4								18
58-59							1	6		4							11
60-61									2	3							5
62-63										1	1						2
64-65																	
66-67																	
68-69																	
70-71																	
72-73													1				1
total			3	9	59	76	69	36	8	8	1		1				270

Table 31 – (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
14-15		1															1
16-17																	
18-19																	
20-21																	
22-23																	
24-25			1														1
26-27																	
28-29																	
30-31					1												1
32-33				1	1												2
34-35				2	4												6
36-37				3	13	1											17
38-39					18	6											24
40-41					14	10											24
42-43					7	21											28
44-45					3	25	5										33
46-47						26	7										33
48-49						5	19	1									25
50-51						4	25	1									30
52-53						1	15	13	1								30
54-55							8	14	6								28
56-57							4	13	4	3							24
58-59							1	6	12	3							22
60-61									3	14	4						21
62-63										9	11	2	1				23
64-65										3	16	3	1				23
66-67										1	4	8	3				16
68-69										1	2	5	2	3	1		14
70-71											1	3	2	3	1		10
72-73													1	4	1	2	8
74-75													2	1	1	2	6
76-77															2	2	4
78-79														1	1	2	4
80-81																1	1
82-83															1	2	3
84-85																3	3
86-87																	
88-89																	
90-91																	
92-93																1	1
total:		1	1	6	61	99	84	48	26	34	38	21	12	12	8	15	466

Table 32 – Greenland halibut (*Reinhardtius hippoglossoides*) length frequency (‘000) in the 2012 survey.

depths < 730 m

length	male	female	length	male	female	length	male	female
12-13			34-35	46	18	56-57	18	121
14-15		8	36-37	62	90	58-59	9	87
16-17			38-39	116	125	60-61		40
18-19			40-41	230	167	62-63		55
20-21			42-43	255	262	64-65		24
22-23			44-45	282	419	66-67		15
24-25		9	46-47	235	423	68-69		
26-27	9		48-49	244	370	70-71		
28-29	9		50-51	114	408	72-73		16
30-31	9	9	52-53	110	208	74-75		7
32-33	19	18	54-55	72	92	Total	1840	2992

depths < 1460 m

length	Indet.	male	female	length	Indet.	male	female	length	Indet.	male	female
14-15			8	42-43	17	839	1237	70-71			87
16-17				44-45	17	952	1484	72-73			78
18-19				46-47		901	1715	74-75			54
20-21				48-49	17	817	1510	76-77			39
22-23				50-51	17	751	1480	78-79			39
24-25			9	52-53		465	1269	80-81			9
26-27		9		54-55	8	339	891	82-83			26
28-29		18		56-57		214	949	84-85			28
30-31		9	9	58-59	17	93	602	86-87			
32-33		28	18	60-61		47	649	88-89			
34-35		121	46	62-63		25	341	90-91			
36-37		233	209	64-65			310	92-93			9
38-39	17	359	519	66-67			174				
40-41	17	800	781	68-69			139	Total	127	7020	14718

Table 33 – Greenland halibut (*Reinhardtius hippoglossoides*) frequency at age (‘000) and strata in the 2012 survey.

age	strata																							total	Average	
	8	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	28	29	30	31	32	33	34		weigth (g)	length (cm)
1																										
2	8																							8	18	15
3							9	9	9	9									9					46	149	28
4			2				27	15	3	40	5	14					19	10	22		22		20	200	319	35
5			51		11	11	358	70	65	256	213	161	120	18	21	11	282	219	521		195	19	360	2964	491	40
6		1	132	2	32	48	869	166	159	418	677	333	227	80	104	74	792	631	1071	5	342	44	866	7073	710	45
7		6	78	12	34	29	708	162	93	284	752	324	139	42	188	74	769	560	846	27	248	65	684	6124	1008	50
8			20		14	14	165	15	29	92	342	174	37	15	91	28	231	224	393	15	93	33	321	2349	1339	55
9			8		10	4	49	14	10	17	114	67	17	5	31	21	82	90	203	3	48	15	112	920	1547	57
10			14		17	7	26	13	1	5	92	91	28	14	20	28	39	99	260	1	52	28	71	906	1861	60
11			14		21	1	12	6			39	44	15	17	8	9	35	84	172	2	40	26	41	587	2184	63
12			2		10		2	1			11	10	12	12	1	8	9	30	84	5	7	5	25	233	2549	67
13			2		6		1		1		6	5	6	5		7	4	15	44	2	6	2	12	126	2796	68
14			4		1				5		6	6	9	6		7	4	9	36		7	1	13	114	3254	72
15			1		1				1		2	10	3	2	5	5	1	8	21		13		4	75	3788	75
16+			2		2				2		2	11			5	8	2	11	70		20		5	140	4636	80
	8	7	330	15	161	114	2226	472	378	1120	2261	1251	614	217	473	280	2269	1990	3752	60	1093	240	2533	21864	1029	49

Table 34 – Greenland halibut (*Reinhardtius hippoglossoides*) Abundance at age (‘000) in the 1991- 2012 survey.

<730 m. strata (1-19)

age	Year																					
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1	1302	1677	1423	1429	9978	4699	2674	2200	852	3014	6459	3282	1768	1762	437	550	301	157	61	38		
2	207	1260	1245	996	2045	6408	3036	1716	563	235	1153	2364	804	2644	652	312	64	78	7	9		8
3	348	447	777	1365	1793	1942	4822	6180	2419	479	1456	2248	489	3517	2554	525	455	121	30	29		36
4	1054	1023	692	1435	1535	2442	5225	8843	8419	1741	799	1342	1217	1585	2007	949	275	155	81	47	60	87
5	2307	1852	1021	1545	2136	3380	5714	9919	10787	5703	2242	3045	1991	5601	5537	4800	2765	1203	606	894	880	822
6	1291	2249	1545	2385	4099	4680	6800	9085	10119	11336	6262	4498	2362	6271	6105	6002	5928	4586	2905	2469	2930	1827
7	2212	1947	1627	2139	3029	2001	4014	6304	4467	4346	5328	4610	1552	2040	2345	2665	4632	4950	3255	2365	2850	1406
8	534	1054	1266	1180	1706	1299	1731	2108	1466	1865	2584	1025	375	518	491	623	1217	909	713	715	570	349
9	462	468	776	631	1052	341	528	600	280	361	147	104	105	233	89	180	247	283	153	259	160	112
10	352	273	213	219	209	70	177	157	82	92	36	48	79	107	97	143	165	210	215	137	110	83
11	141	138	104	90	53	21	23	27	6	44	5	16	15	63	44	103	62	100	62	50		54
12	12	67	38	47	18	31	17	6	3	0	0	6	4	38	15	45	38	43	47	22	10	15
13	0	25	21	18	0	0	17	16	3	0	0	0	0	5	3	10	5	18	35	10		10
14	0	12	9	0	5	4	0	0	5	0	0	0	0	3	3		2	10	12	2		10
15	15	0	0	0	0	5	6	0	0	0	0	0	0	3	3			4	0			3
16+	8	0	0	0	0	0	9	0	0	0	0	0	0	3	3			1	0			6
Total	10245	12490	10757	13479	27659	27323	34792	47160	39470	29216	26471	22587	10762	24390	20374	16907	16156	12825	8182	7046	7420	4823
Freq 10+	528	515	385	374	285	131	249	206	99	136	41	70	98	222	168	301	272	386	371	221	120	181

Tabla 34 Cont.

< 1460 m. strata (1-34)

Age	Year								
	2004	2005	2006	2007	2008	2009	2010	2011	2012
1	1710	438	550	310	160	60	38		
2	2680	652	320	60	80	10	9		8
3	3580	2561	540	480	120	40	29	10	46
4	1880	2117	1110	360	200	100	137	110	200
5	8330	6470	7160	4700	2480	1380	2447	2280	2964
6	11210	8314	10480	11130	11020	8330	7356	8260	7073
7	6060	4182	5730	10490	15340	13990	9587	10460	6124
8	1790	1206	1700	3530	3890	4340	3063	3160	2349
9	890	318	510	880	1400	1140	1200	1370	920
10	450	500	440	720	1060	1260	1019	1500	906
11	320	282	370	370	540	440	383	560	587
12	200	161	180	210	300	340	213	330	233
13	180	74	60	80	160	310	151	270	126
14	70	47	30	60	120	170	114	140	114
15	80	9	10	20	80	50	59	50	75
16+	60	9	10	10	70	70	55	40	140
total	39490	27340	29200	33410	37020	32030	25860	28539	21864
Freq 10+	1360	1082	1100	1470	2330	2640	1994	2890	2181

Table 35 – Roughhead grenadier (*Macrourus berglax*) mean catch per towed mile by strata and the estimated biomass with their standard errors in the 2012 survey.

	Area	tow	catch per tow (Kg)		Biomass (t.)	
stratum	sq. miles	number	mean	st. error	value	s.e.
1	342	4				
2	838	10				
3	628	7				
4	348	4				
5	703	8				
6	496	6				
7	822	9				
8	646	7				
9	314	3				
10	951	10				
11	806	9				
12	670	8	0.3	0.66	27	21
13	249	3	0.18	0.3	6	6
14	602	7	0.83	0.65	67	20
15	666	8				
16	634	7	1.58	1.06	134	34
17	216	2	3.86	4.68	111	95
18	210	2	8.41	11.86	235	235
19	414	4	0.57	0.54	32	15
20	525	6	1.26	1.81	88	52
21	517	5	11.14	8.18	768	252
22	533	3	13.3	10.39	945	426
23	284	2	8.59	5.39	325	144
24	253	3	6.45	8.84	218	172
25	226	3	4.83	6.42	146	112
28	530	6	0.96	0.65	68	19
29	488	6	4.75	2.77	309	74
30	1134	11	10.47	5.75	1582	262
31	203	2	5.06	3.58	137	68
32	238	2	1.97	1.45	63	32
33	98	2	4.12	3.27	54	30
34	486	5	2.49	1.2	162	35
Total < 1460 m.	16070	174	2.56	0.32	5476	678
Total <740 m.	10555	118	0.43	0.18	612	258

Table 36 – Roughhead grenadier (*Macrourus berglax*) biomass by strata in 1988-2012 surveys.

Stratum	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1																									
2								8																	
3																	10								
4																9									
5																									
6									22																
7					0								3	0		0	10								
8		10		1					11	3		7		16	2	13	28	65	13						
9	47	4		5	28	21	3	21	153	18	40	45	29	29		30	282	82	181	17	39				
10	1								6	1		18	68	18		0	48	38	21						
11												3	8	6			3	2							
12	112	103	40	108	100	413	55	126	46	137	55	191	81	236	154	165	292	207	97	22	92	73	60	0	27
13	21	64	18	18	60	18	32	75	5	18	78	92	50	116	121	123	299	94	154	80	108	25	97	43	6
14	200	145	107	85	139		73	67	270	77	194	135	103	292	124	346	877	379	362	223	539	1	3	10	67
15	92	5	29	64	52	321	82	180	84	69	101	72	103	60	16	87	259	16	85	55	12		132	8	
16	349	140	212	229	432	1333	523	256	397	211	405	150	225	338	272	352	594	426	1391	242	493	213	79	112	134
17	134	45	31	180	123		98	129	27	116	204	96	67	370	380	101	244	124	603	70	385	40	278	38	111
18	311	128	143	356	215		756	414	154	224	189	313	219	383	27	877	423	588	435	491	610	194	685	445	235
19	743	227	273	289	429	915	352	282	187	322	424	129	92	216	116	245	228	366	592	167	683	235	69	73	32
20																	419	182	353	144	269	130	355	78	88
21																	1432	996	763	755	1114	528	1135	1606	768
22																	1095	1115	1545	608	1735	1216	967	1610	945
23																	897	463	342	332	399	305	388	506	325
24																	137	1030	419	165	152	146	207	222	218
25																	344	870	817	197	391	362	149	98	146
28																	425	695	610	299	360	273	338	137	68
29																	3113	1012	445	527	555	424	509	163	309
30																	3553	2869	1108	2139	3356	2560	2816	2965	1582
31																	650	327	235	242	176	225	107	295	137
32																	274	267	132	86	222	197	242	172	63
33																	118	17	122	105	38	12	57	112	54
34																	1131	330	511	305	410	144	419	145	162
total (1-19)	2009	871	852	1335	1577	3021	1975	1558	1362	1197	1691	1250	1047	2079	1211	2348	3597	2387	3933	1367	2961	782	1403	729	612
d,t,(1-19)	264	142	149	250	270	487	169	223	277	169	243	338	196	284	176	611	362	281	700	314	611	209	201	409	258
total																	17184	12560	11336	7270	12139	7304	9091	8838	5476
d,t, total																	1616	1420	1167	808	659	478	930	1212	678

Table 37 - Roughhead grenadier (*Macrourus berglax*) age-length key in the 2012 survey.

MALE

Length cm	age																Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	
1																	
2																	
3																	
4		1															1
5		4	2														6
6		4	11														15
7			8	1													9
8			3	8													11
9			2	8	1												11
10				4	9												13
11					6	3											9
12					7	6	1										14
13					1	8	9	3									21
14						1	13	3									17
15							6	14	3								23
16								19	6								25
17								9	14		1						24
18								2	12	4	1						19
19								1	9	8	3	1					22
20										4	9						13
21									1	5	8	1					15
22										1	7	1					9
23												1					1
24												1	2				3
total		8	26	21	24	18	29	51	45	22	29	5	2				280

Table 37 (Continued)

FEMALE

Length cm	age																Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	
1																	
2																	
3																	
4		1															1
5		1	2														3
6		6	5														11
7		1	8														9
8			3	1													4
9				8	3												11
10				5	5												10
11				2	4	2											8
12					5	8											13
13					1	2	6										9
14						4	12	2									18
15							5	11									16
16							2	9	3								14
17								7	5	2							14
18								4	10	2							16
19								4	6	2	1						13
20								1	5	5	4						15
21									2	10	2	2					16
22										3	11	2					16
23										2	8	7	1				18
24											2	14	4				20
25											3	7	8	2			20
26											1	1	14	6			22
27												5	5	6	4		20
28													3	10	5	1	19
29														3	8	5	16
30														1	3	10	14
31															1	8	9
32																4	4
33																2	2
34																2	2
35																	
36																2	2
37																	
38																1	1
39																2	2
total		9	18	16	18	16	25	38	31	26	32	38	35	28	21	37	388

Table 38. – Roughhead grenadier (*Macrourus berglax*) length frequency (’00) in the 2012 survey.

depths < 730 m. strata (1-19)

length	indet.	male	female	length	indet..	male	female	length	indet.	male	female
3	90			13		95		23			274
4			92	14		73	314	24			434
5		73	183	15		92	183	25			253
6		260	344	16		430		26			186
7		73	258	17		219	182	27			452
8				18		333	183	28			
9			147	19		503	351	29			90
10				20		446	421				
11		95	90	21		275	624				
12		186		22		73	733	Total	90	3225	5792

depths < 1460 m. strata (1-34)

length	indet.	male	female	length	indet..	male	female	length	indet.	male	female
2	97			16		3489	1497	30			1483
3	425			17		3360	1330	31			761
4	280		92	18		2899	1608	32			369
5		590	274	19		2488	1312	33			212
6	284	1342	683	20		1400	1362	34			187
7		1017	696	21		1330	1738	35			
8		1118	218	22		903	1717	36			280
9		1115	1018	23		95	2006	37			
10	44	1339	732	24		284	2402	38			92
11		986	635	25			2512	39			258
12		1465	1245	26			2599				
13		2292	835	27			2099				
14		1711	1981	28			2057				
15		2913	1517	29			1575	Total	1130	32136	39382

Table 39 – Roughhead grenadier (*Macrourus berglax*) frequency (’000) at age and strata in the 2012 survey.

age	strata																				total	average	
	12	13	14	16	17	18	19	20	21	22	23	24	25	28	29	30	31	32	33	34		pm(g)	talla
1						9						9	10		15					9	52	3	3
2	5		7	15	4	16	2	9	5	6	22	12	17	5	11	18			8	16	177	16	5
3	2		22	12	15	20	7	9	37	51	61	18	19	9	22	50			24	27	405	30	7
4	5		6			2		6	51	65	24	16	26	17	24	49	10		21	24	349	70	9
5	2		2	5	11	5		1	66	71	26	15	14	9	17	76	22	16	15	38	409	121	11
6		2	4	4	13	2		5	53	45	37	6	13	3	22	72	20	10	5	33	348	177	12
7		5	15	6	11		2	15	42	81	55	18	20	9	32	183	23	7	6	39	572	244	14
8	7	4	18	25	30	6	9	9	66	122	144	41	51	21	49	289	59	4	8	89	1052	365	16
9	14	4	25	19	35	14	13	9	87	126	91	37	39	21	24	229	31	17	5	79	919	485	18
10	9		16	25	39	35	6	7	60	71	12	37	23	18	10	99	4	24	1	23	517	679	20
11	13		10	45	35	40	11	7	75	105	18	48	39	23	20	127	8	12		14	650	846	22
12	1		9	12	6	51	5	12	72	87	6	31	15	5	17	129	7	7		18	491	1144	24
13			4	9	6	24	1	6	77	77	14	14	24		25	123	12	1	3	10	429	1384	26
14			1	5	3	14		6	57	66	10	10	9		12	100	13		1	2	307	1647	27
15				2		12		4	29	39	13	15			9	84	8				215	1885	29
16+						3		6	48	49	37	9			34	165	10		13		373	2618	32
Total	59	15	139	183	208	252	55	111	824	1061	569	336	319	142	343	1793	228	97	111	419	7265	5064	17.9

Table 40 – Roughhead grenadier (*Macrourus berglax*). Abundance at age (‘000) in the 1994- 2012 survey.

<730 m. strata (1-19)

age	Year																			
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1			129		51	15	3	63	39	467	216	109	10	12	5	3	30	18	9
2	46	107	56	46	128	36	77	208	189	2139	466	267	353	23	79	15	73	48	49
3	136	209	110	186	227	49	108	271	220	1077	3119	362	438	59	228	31	232	76	79
4	487	467	224	153	236	216	50	120	57	672	1009	762	392	35	219	42	107	69	14
5	507	861	351	157	138	199	283	283	108	618	877	628	501	87	170	25	81	39	25
6	570	592	586	450	346	247	277	445	189	635	1105	544	561	202	285	96	66	54	24
7	566		351	613	725	445	218	540	290	843	810	499	719	268	458	94	128	63	40
8	493	458	338	162	907	616	231	505	283	901	955	593	519	298	743	168	446	119	98
9	379	263	216	158	250	422	339	510	241	535	962	413	487	178	536	87	492	199	124
10	181	113	264	98	226	197	338	666	266	474	896	579	577	345	471	48	347	251	129
11	109	35	254	151	135	109	72	231	203	472	465	371	727	172	431	82	224	122	154
12	82	23	93	164	182	80	95	131	244	236	392	167	396	108	162	56	113	70	84
13	40	19	38	124	152	55	57	80	75	88	147	227	293	95	318	56	62	43	44
14	15	5	34	42	76	61	55	104	63	31	89	191	211	77	79	49	61	33	23
15	27	15	4	42	48	33	23	55	19	18	18	21	195	39	179	43	21	18	14
16+	9		10	18	34	3	33	76	64	73	60	33	215	72	116	94	19	25	3
Total	3647	3685	3060	2564	3862	2783	2259	4288	2550	9278	11584	5765	6593	2069	4479	988	2501	1247	911

Tabla 40 Cont.

< 1460 m. strata (1-34)

Age	Year								
	2004	2005	2006	2007	2008	2009	2010	2011	2012
1	461	391	34	51	52	19	37	39	52
2	856	719	602	81	549	143	125	172	177
3	6380	1420	855	222	1086	306	622	395	405
4	2989	2303	1532	321	1268	419	616	509	349
5	2576	2425	1399	543	1269	253	755	587	409
6	3062	2695	2316	1063	1578	954	1084	775	348
7	2552	2069	2351	1209	1954	936	1054	1009	572
8	3215	2418	1184	1285	2010	1680	2392	1466	1052
9	2670	1442	1737	770	1649	866	1451	1241	919
10	2282	1666	1643	1109	1454	476	911	1160	517
11	1863	1123	1409	697	1333	824	685	652	650
12	1374	676	739	473	626	564	565	660	491
13	670	1090	823	412	1170	563	461	516	429
14	416	1007	566	432	348	490	510	570	307
15	178	298	478	272	718	434	255	460	215
16+	1130	1113	1069	944	887	959	692	1044	373
total	32674	22855	18737	9884	17951	9886	12215	11255	7265

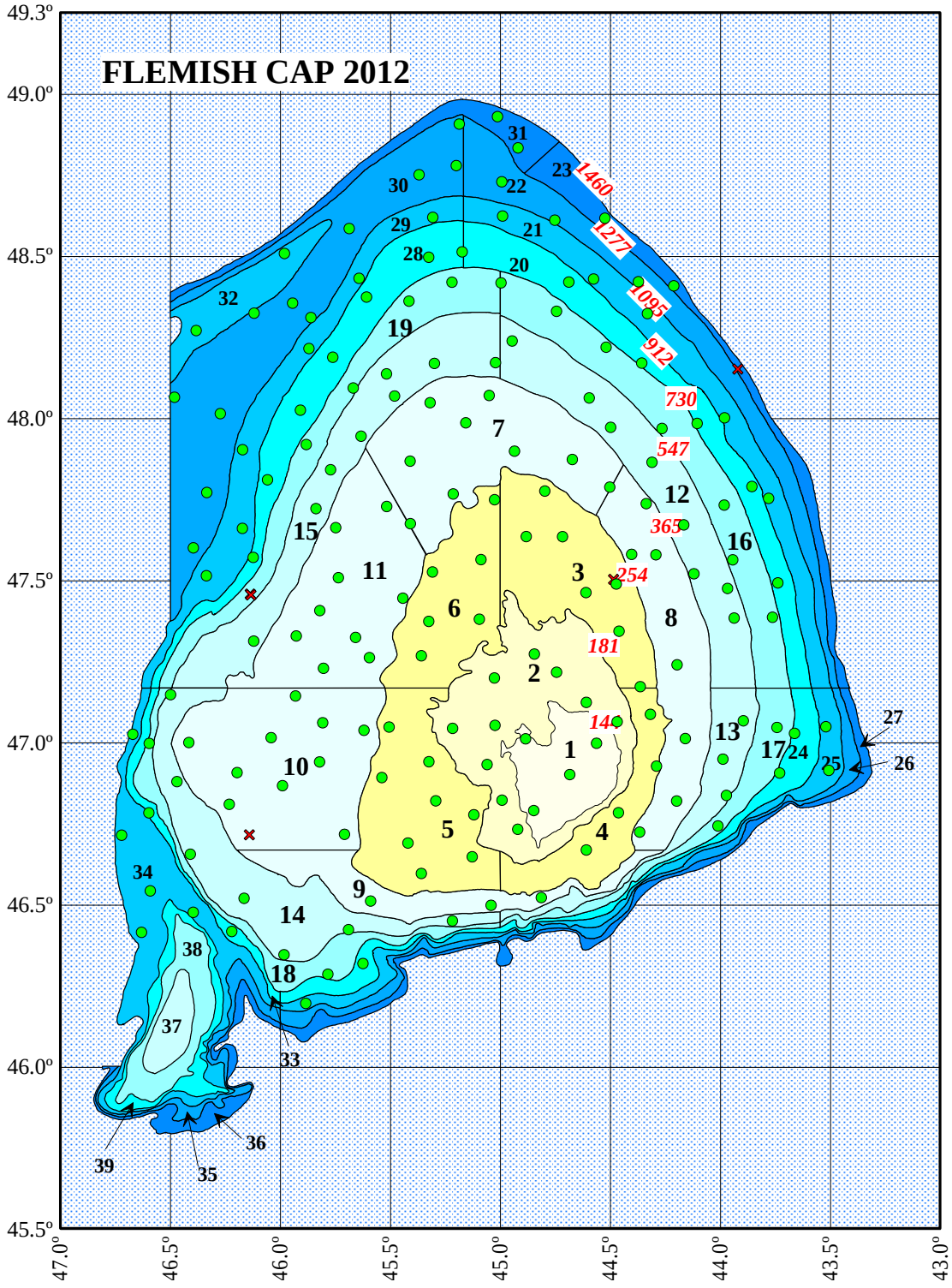

Figure 1 - Haul positions in the Flemish Cap survey 2012.

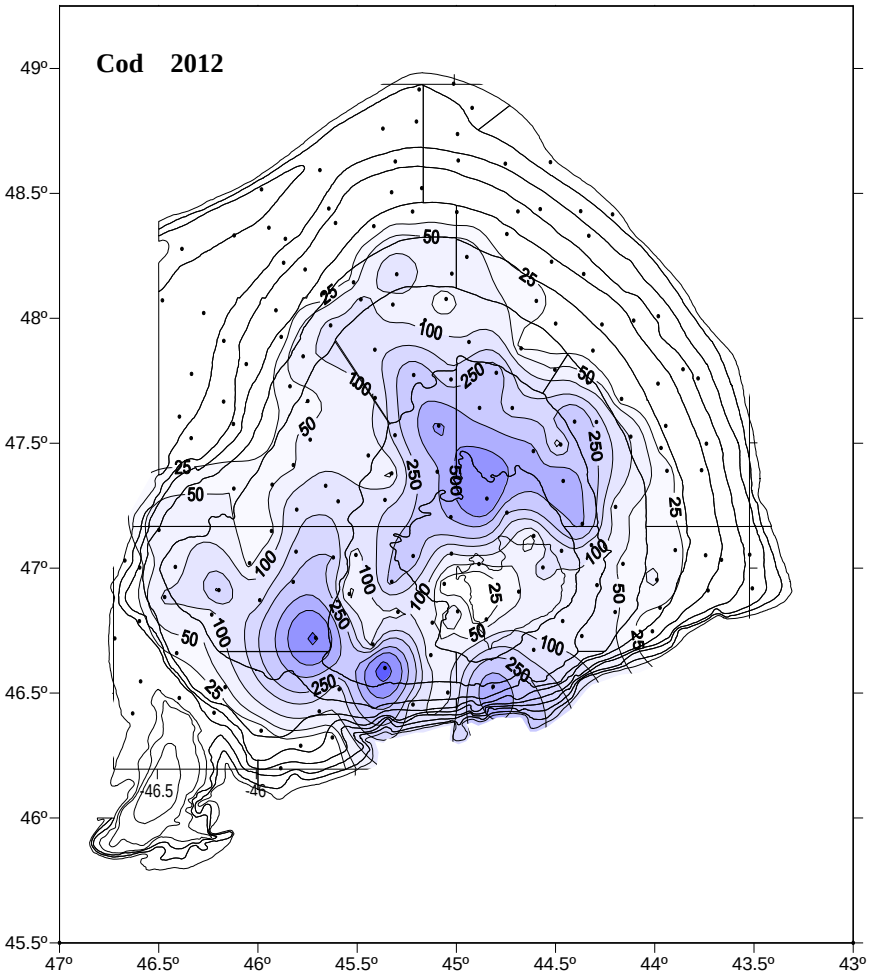

Figure 2 - Cod (*Gadus morhua*) catch (kg.) distribution in the 2012 survey.

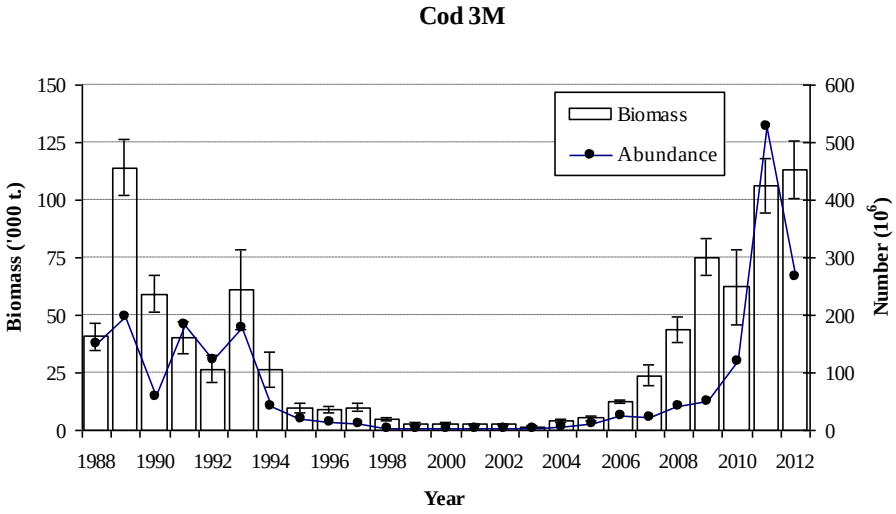

Figure 3 - Cod biomass (t.) ± S.E. and abundance 1988-2012.

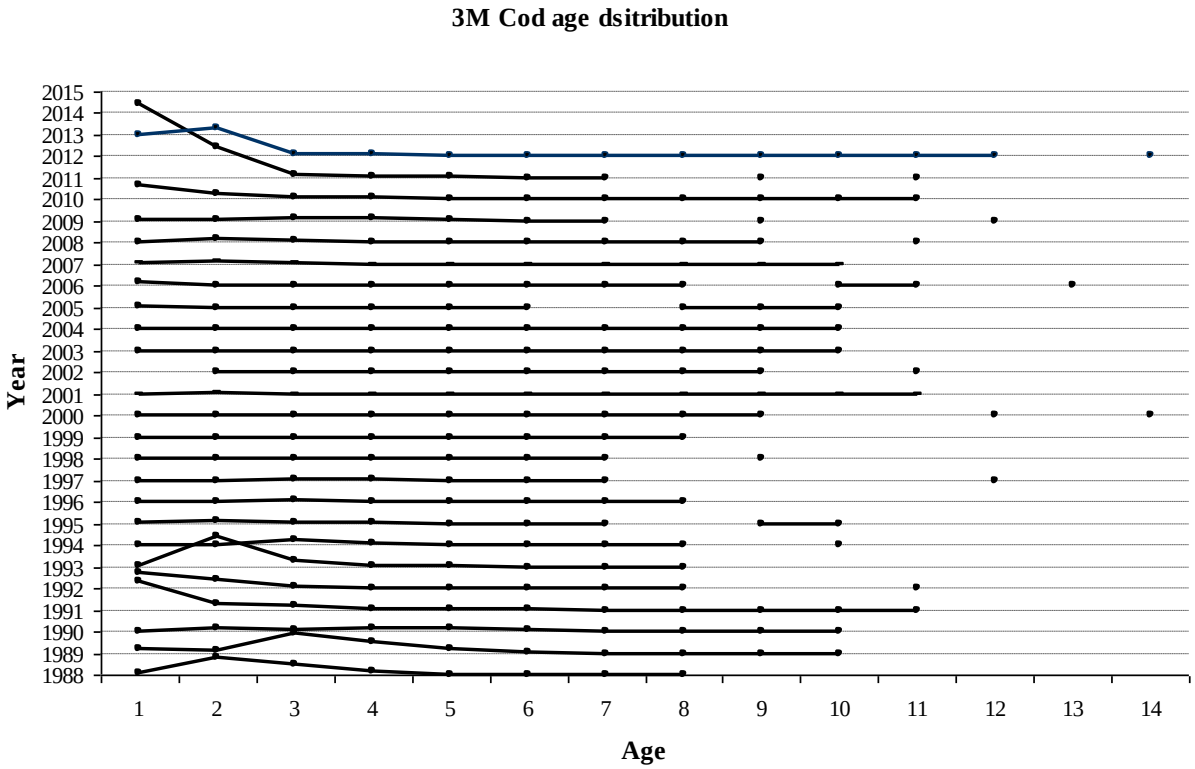

Figure 4 - Cod age distribution in Flemish Cap NAFO 3M 1988-2012.

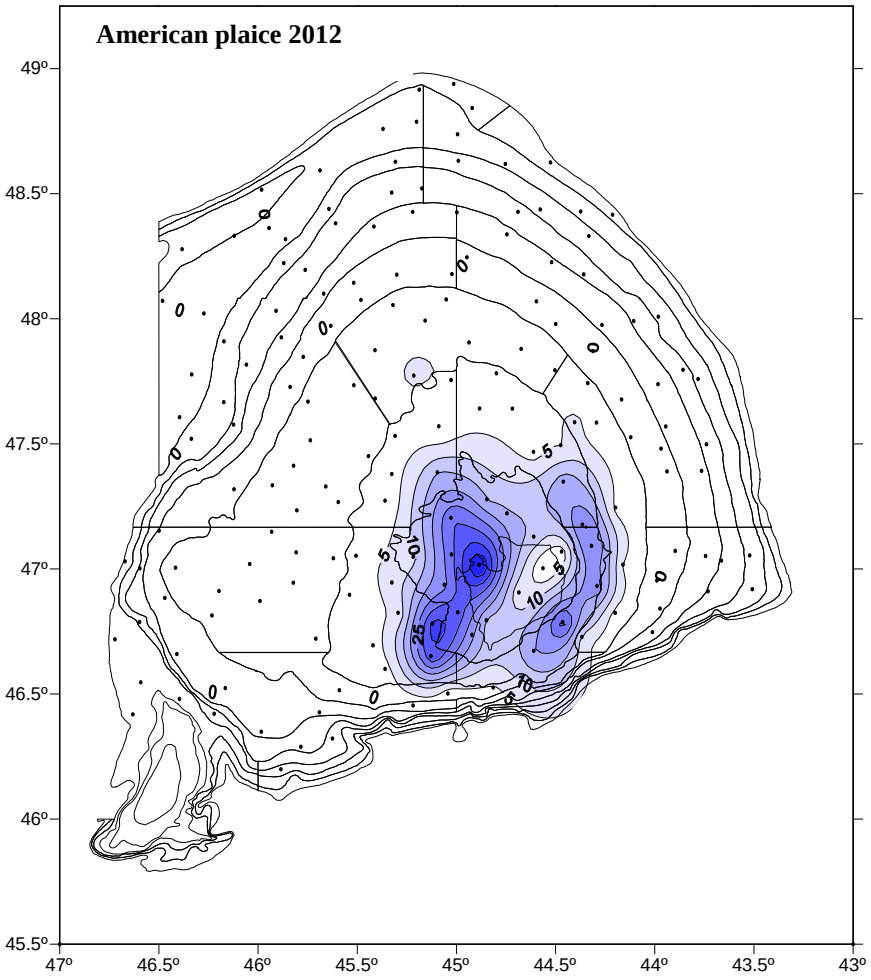

Figure 5 - American plaice (*Hippoglossoides platessoides*) catch (kg) distribution in 2012 survey.

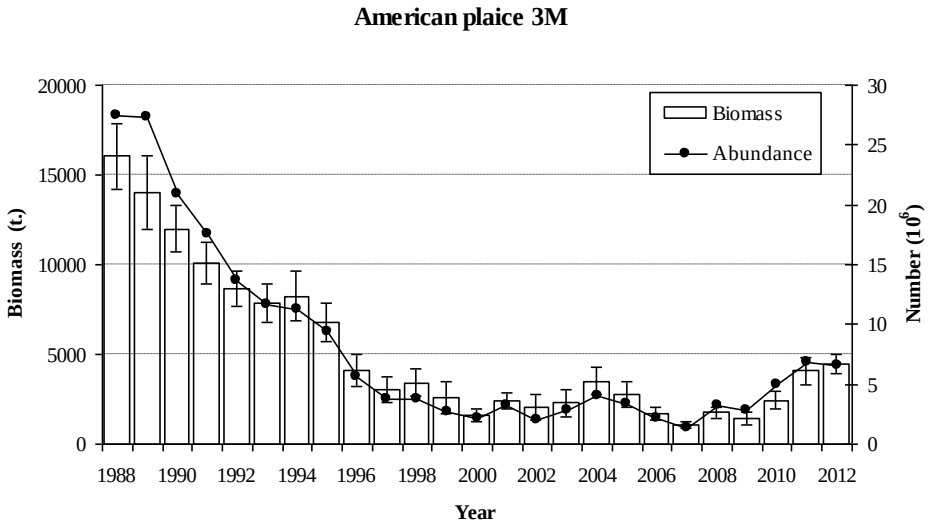

Figure 6 - American plaice (*Hippoglossoides platessoides*) biomass (t.) ± S.E. and abundance 1988-2012.

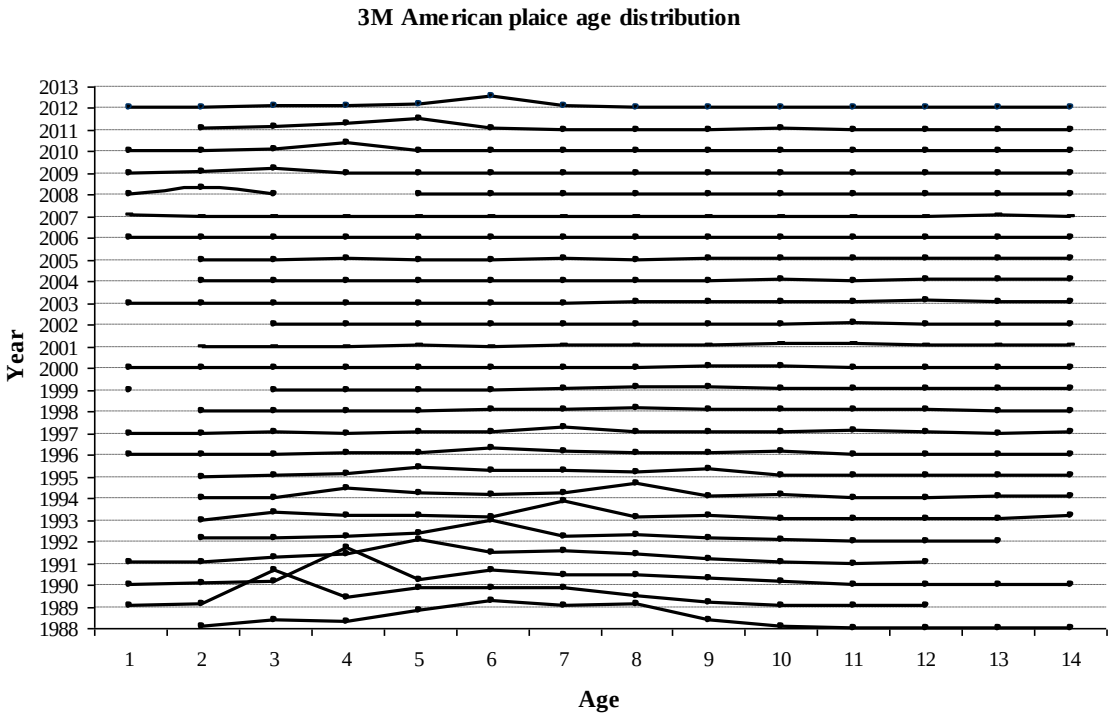

Figure 7 - American plaice age distribution on Flemish Cap, NAFO Div. 3M: 1988-2013.

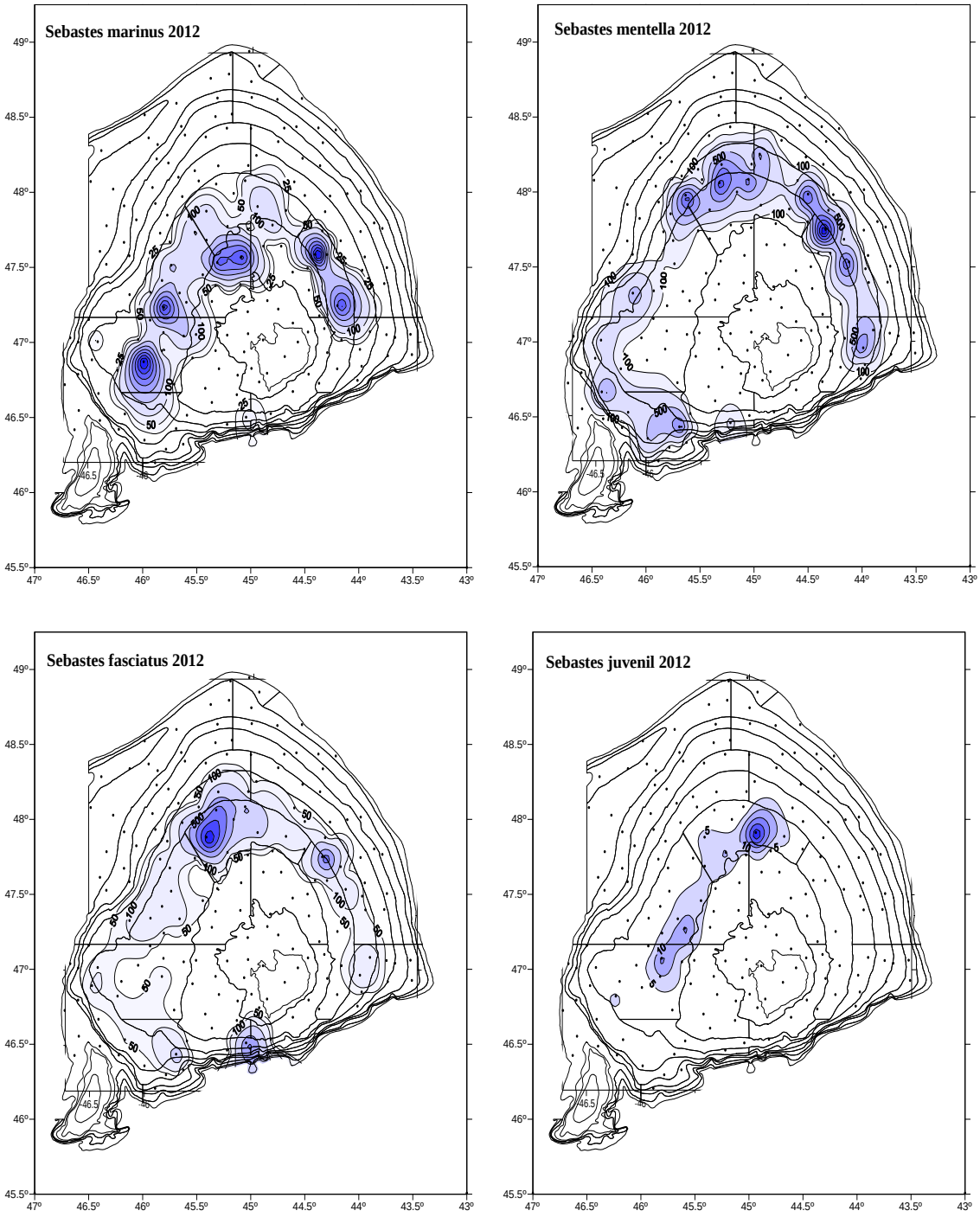

Figure 8 - Catch distribution (kg) of *S. marinus, S. mentella, S. fasciatus* and juveniles in 2012 survey .

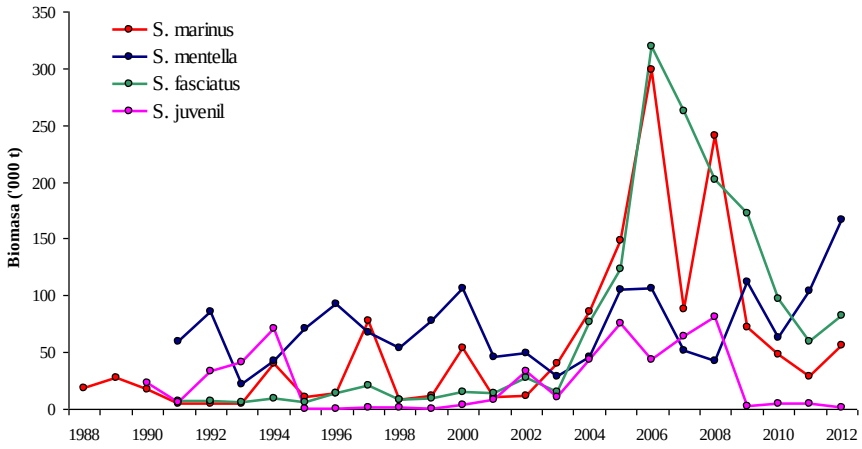

Figure 9 - Redfish species biomass (t.) 1988-2012.

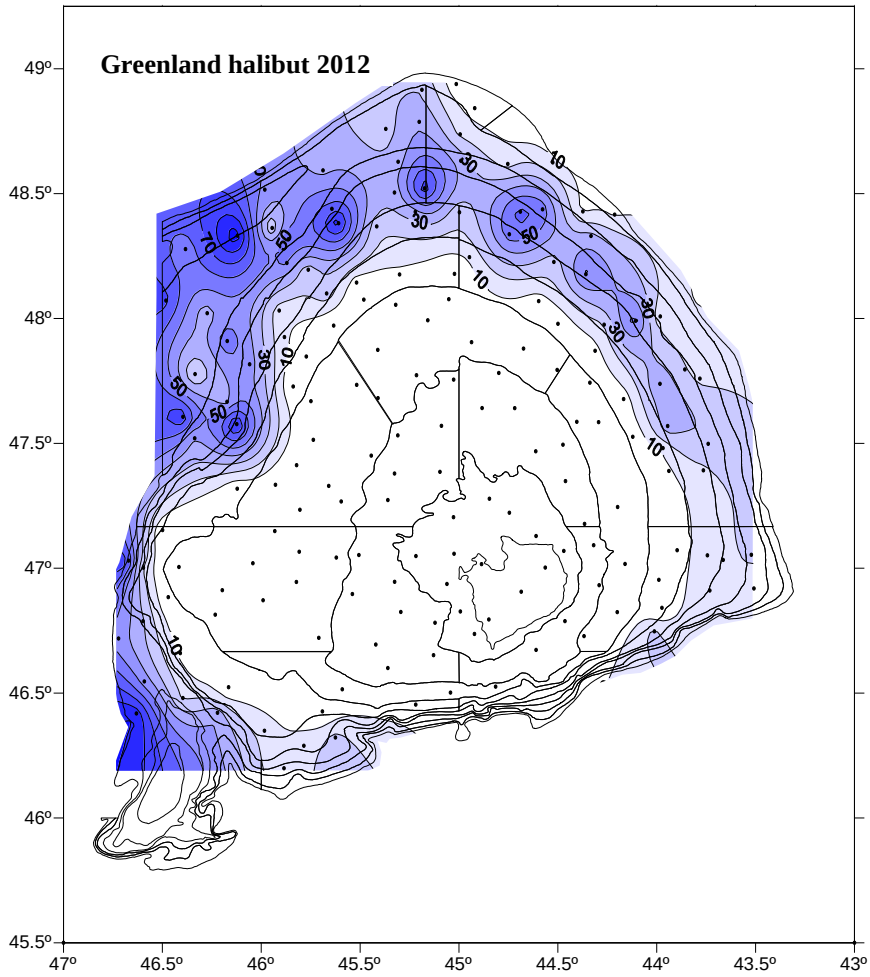

Figure 10. - Greenland halibut (*Reinhardtius hippoglossoides*) catch distribution (kg) in 2012 survey.

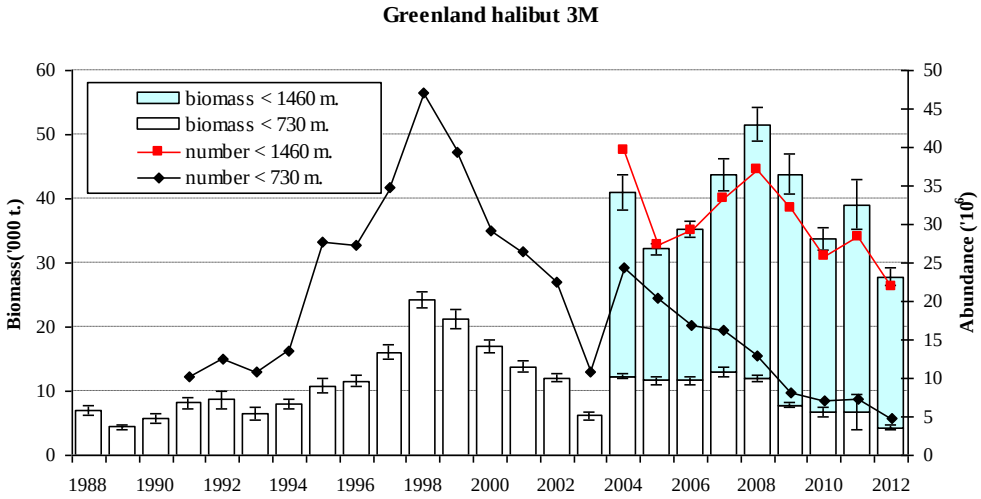

Figure 11 - Greenland halibut (*Reinhardtius hippoglossoides*) Biomass (t.) ± S.E. and abundance 1988-2012.

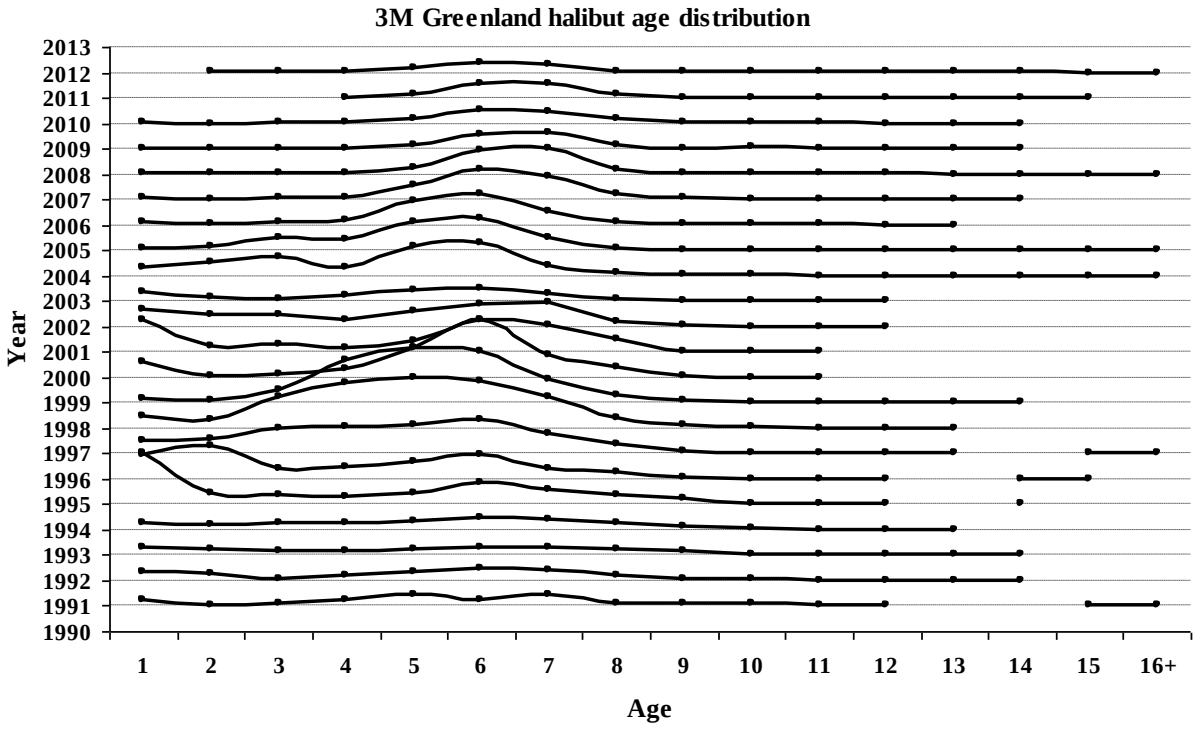

Figure 12 - Greenland halibut age distribution on Flemish Cap, NAFO Div. 3M: 1988-2012.

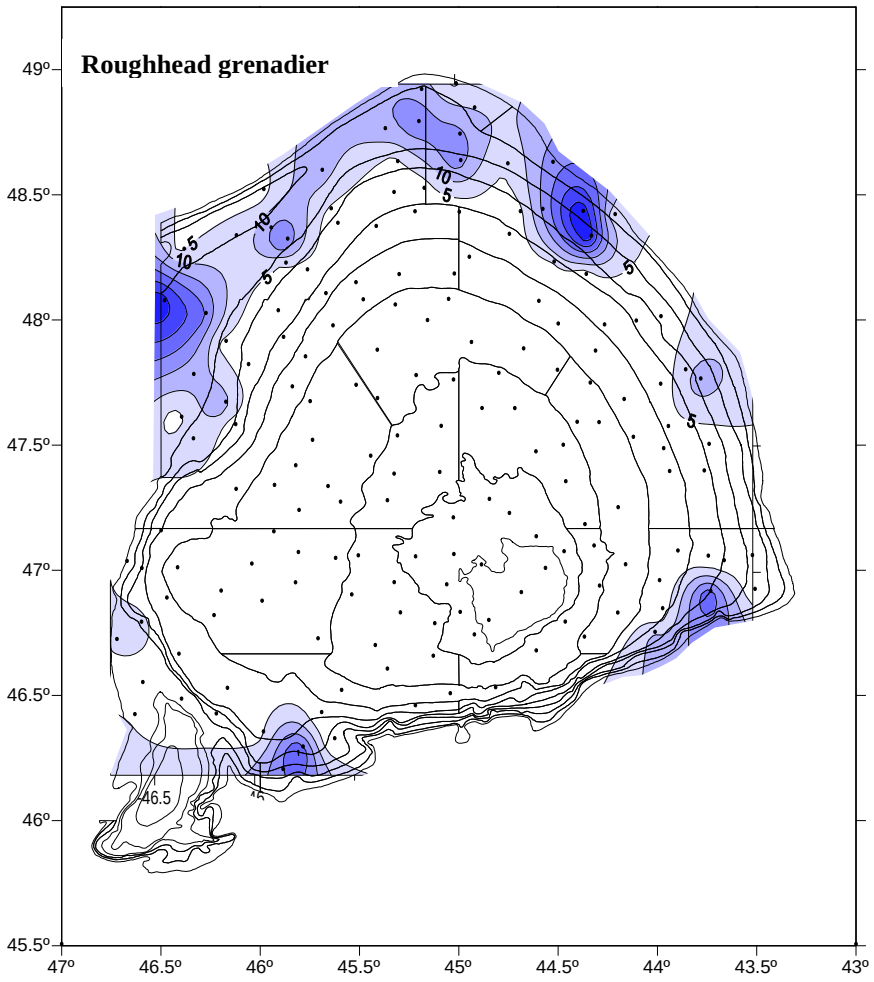

Figure 13. – Roughhead grenadier (*Macrourus berglax*) catch distribution (kg) in the 2012 survey.

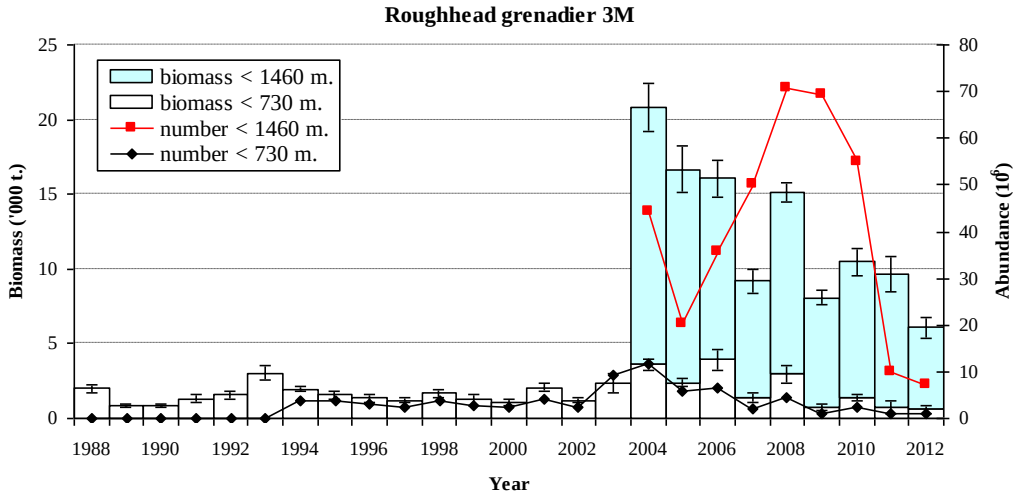

Figure 14 - Roughhead grenadier (*Macrourus berglax*) biomass (t.) ± S.E. and number ('000) 1988-2012.

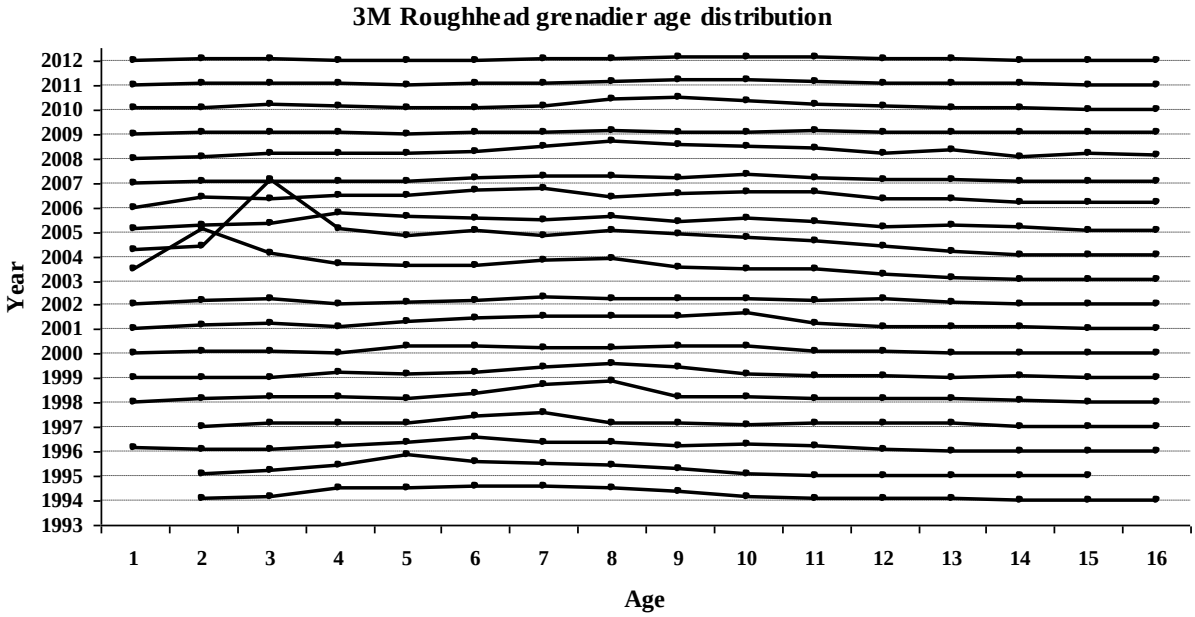

Figure 15 - Roughhead grenadier age distribution on Flemish Cap in depths < 730 m, NAFO Div. 3M: 1988-2012.