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Results from Bottom Trawl Survey on Flemish Cap of June-July 2014

by

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Abstract

A stratified random bottom trawl survey on Flemish Cap was carried out from June 25th to July 23th 2014. 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 181 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 2014. A total of 181 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 27th survey of the series initiated by the EU in 1988. All surveys had a stratified random design following NAFO specifications (Doubleday, 1981). Dates, vessel, number of valid tows (including the number of valid tows until 700 m in brackets since 2002) and dates of all the surveys were:

Year	Vessel	Valid tows	Dates	Year	Vessel	Valid tows	Dates
1988	Cornide de Saavedra	115	8/7 - 22/7	2002	Cornide de Saavedra	120	30/6 - 17/7
1989	Cryos	116	12/7 - 1/8	2003	Vizconde de Eza	177 (114)	2/6 - 2/7
					Cornide de Saavedra	50**	7/6 - 17/6
1990	Ignat Pavlyuchenkov	113	18/7 - 6/8	2004	Vizconde de Eza	177 (124)	25/6 - 2/8
1991	Cornide de Saavedra	117	24/6 - 11/7		Cornide de Saavedra	61**	23/7 - 2/8
1992	Cornide de Saavedra	117	29/6 - 18/7	2005	Vizconde de Eza	176 (117)	1/7 - 21/8
1993	Cornide de Saavedra	101	23/6 - 8/7	2006	Vizconde de Eza	179 (115)	1/7-26/7
1994	Cornide de Saavedra	116	6/7 - 23/7	2007	Vizconde de Eza	174 (117)	23/6-19/7
1995	Cornide de Saavedra	121	2/7 - 19/7	2008	Vizconde de Eza	179 (111)	23/6-19/7
1996	Cornide de Saavedra	117	28/6 - 14/7	2009	Vizconde de Eza	178 (119)	23/6-20/7
1997	Cornide de Saavedra	117	16/7 - 1/8	2010	Vizconde de Eza	153 (97)	22/6-21/7
1998	Cornide de Saavedra	119	17/7 - 2/8	2011	Vizconde de Eza	128 (79)	29/6-9/8
1999	Cornide de Saavedra	117	2/7 - 20/7	2012	Vizconde de Eza	174(118)	26/6-24/7
2000	Cornide de Saavedra	120	10/7 - 28/7	2013	Vizconde de Eza	181(120)	26/6-23/7
2001	Cornide de Saavedra	120	3/7 - 20/7	2014	Vizconde de Eza	181(120)	25/6-23/7

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

** calibration tows

Material and Methods

As the 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	
2013	72289	3698	219737	2799	807	844	
2014	159939	3800	179925	5168	399	900	
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
	2013	72289	3698	219767	23391	4298	855
2014	159939	3800	179956	29288	4111	901	

Values for surveys before 2003, when R/V *Cornide de Saavedra* was used, are transformed to their equivalences for R/V *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 2014 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. 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		1999	2,854	-	-
1984		31,210		2000	3,062		-
1985		28,070		2001	2,695	784	-
1986		26,060		2002	2,496	694	-
1987		10,150	21,600	2003	1,593		-
1988	40,839	7,720	34,200	2004	4,071		
1989	114,050	36,520	78,300	2005	5,242		
1990	59,362	3,920	15,200	2006	12,505		
1991	40,248	6,740	8,200	2007	23,866		
1992	26,719	2,490	2,400	2008	43,675		
1993	60,963	8,990	9,700	2009	75,228		
1994	26,463	-	-	2010	69,295		
1995	9,695	8,260	-	2011	106,151		
1996	9,013	730	-	2012	113,227		
1997	9,966	-	-	2013	72,289		
1998	4,986	-	-	2014	159,939		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 2004-2008 year classes are higher than in previous 12 years. The abundance of the 2010 year-class was the highest of those in previous recent years, and the 2009 and 2011 ones were also high. The 2012 and 2013 year-classes seem to have failed according to current results at age 1 (Figure 4).

The 2014 biomass is the highest of all the series, but not the abundance that is in the level of the 2010 one, which indicates an increase in older ages and a fail in recruitment.

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	1994	8,227		2005	2,760	
1984		7,500	1995	6,785		2006	1,691	
1985		7,800	1996	4,098		2007	1,053	
1986		20,200	1997	3,026		2008	1,766	
1987		9,300	1998	3,437		2009	1,442	
1988	16,046	6,500	1999	2,585		2010	2,446	
1989	14,047	5,000	2000	1,606		2011	4,084	
1990	11,983	1,200	2001	2,404		2012	4,491	
1991	10,087	14,400	2002	2,049	548	2013	3,698	
1992	8,656	1,200	2003	2,286	1,398	2014	3,800	ton
1993	7,861	2,700 ton	2004	3,525	ton			

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. Figure 5 shows the distribution of the survey catches in 2014. 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 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.).

Year	<i>Sebastes</i>	<i>Sebastes spp.</i>			Total
	<i>marinus</i>	<i>mentella</i>	<i>fasciatus</i>	<i>juvenile</i>	
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
2013	32,016	102,500	84,801	420	219,737
2014	37,171	96,158	46,174	422	179,925

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. Tables 27 and 28 show the mean catch per towed mile y 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. (1988-2014 years) and in depths up to 1460 m. (2004-2014 years).

Year	EU < 730 m.	Year	EU < 730 m.	EU < 1460 m.
1988	6,926	2002	12,100	
1989	4,472	2003	6,214	
1990	5,799	2004	12,292	28,343
1991	8,169	2005	11,698	21,515
1992	8,728	2006	11,706	24,357
1993	6,529	2007	13,040	31,723
1994	8,037	2008	11,995	39,614
1995	10,875	2009	7,775	36,047
1996	11,594	2010	6,299	26,739
1997	16,098	2011	6,713	32,257
1998	24,229	2012	4,291	23,505
1999	21,207	2013	2,799	23,391
2000	16,959	2014	5,168	29,288
2001	13,872			

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. 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. The 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:

Biomass (tons) along this survey series were:

Year	EU < 730 m.	Year	EU < 730 m.	EU < 1460 m.
1988	2,009	2002	1,211	
1989	871	2003	2,348	
1990	852	2004	3,597	17,185
1991	1,335	2005	2,387	12,560
1992	1,577	2006	3,933	11,336
1993	3,021	2007	1,367	7,271
1994	1,975	2008	2,961	12,138
1995	1,558	2009	781	7,303
1996	1,362	2010	1,403	9,092
1997	1,197	2011	729	8,800
1998	1,691	2012	612	5,477
1999	1,250	2013	807	4,298
2000	1,047	2014	399	4,111
2001	2,079			

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. 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. Figure 15 shows the age distribution by year in the EU Flemish Cap surveys.

Shrimp

Casas J.M. (2014) presented detailed results.

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Table 1 – Technical data of the 2014 survey.

Procedure	Specification
Vessel	R/V <i>Vizconde de Eza</i>
GT	1 400 t
Power	1 800 HP
Mean trawling speed	3.5 knots
Trawling time	30 minutes effective time
Fishing gear	type <i>Lofoten</i>
footrope / handrope	31.20 / 17.70 m
footgear	27 steel bobbins of 35 cm
vertical opening	3.0 m (MARPORT)
warps	100 meters, 45 mm, 200 Kg/100m
trawl doors	polyvalent, 850 Kg
wire length	2 × depth echosounder (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 echosounder 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 (<i>Sebastes mentella</i>), Greenland halibut and Roughhead grenadier (<i>Macrourus berglax</i>).

Table 2 –Biomass (t.) for the most important species or groups of species in 1988-2014 surveys in depths lesser than 730 m.

Species	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Rajidae	4495	1938	2823	4061	3780	6241	3506	2268	2051	1842	1978	1608	1150	2236
<i>Synaphobranchus sp.</i>	217	88	40	80	72	105	8	16	0	8	40	0	0	24
<i>Urophycis sp.</i>	643	169	169	257	72	169	217	80	80	32	225	249	169	394
<i>Antimora sp.</i>	394	306	281	563	724	820	796	193	185	233	491	290	265	667
Macrouridae	3088	1456	1222	2252	2589	6498	3233	2606	2340	2292	2831	2332	1809	3080
<i>Notacanthus sp.</i>	499	410	64	474	450	740	458	346	177	290	169	64	97	105
<i>Illex sp.</i>	8	8	1649	1158	64	0	209	0	88	64	72	16	0	8
Anarhichadidae	7994	7487	8122	1010	9095	1435	1564	1922	2056	1403	1098			
Witch flounder	909	338	418	772	820	1045	788	708	507	322	241	378	410	458
Greenland halibut	6924	4471	5798	8171	8725	6530	8034	1087	1159	1610	2423	2120	1696	1387
Zoarcidae	563	1142	1206	1978	1359	3474	1874	2179	1705	1729	2059	893	780	1246
Cod	4083	1140	5936	4025	2671	6096	2646							
American plaice	7	50	5	0	5	6	6	9699	9015	9964	4986	2855	3064	2694
Redfish	1604	1404	1198	1008										
Shrimp*	4	9	2	5	8653	7865	8227	6787	4101	3024	3434	2581	1608	2405
	1883	1625	1267	7695	1302	7261	1625	8764	1196	1658	7083	9865	1779	7734
	33	35	57	3	06	0	27	1	64	16	3	0	91	7
				1166	2515	1208			1090		4197	2573	1971	2831
	5742	2300	3490	1	5	7	3981	7503	5	7704	1	4	9	6
Total	2773	3109	2245	1694	2189	1935	2364	1505	1836	2240	1656	1630	2300	1401
	25	56	30	83	09	04	40	12	69	39	55	58	87	62

Species	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Rajidae	1544	4608	6241	4238	3506	2179	6289	2244	3471	2188	1658	743	680
<i>Synaphobranchus sp.</i>	8	24	88	72	32	64	40	24	14	2	20	9	14
<i>Urophycis sp.</i>	129	547	667	740	611	249	547	217	685	682	389	337	258
<i>Antimora sp.</i>	346	306	1158	1110	474	587	893	499	670	342	727	596	649
Macrouridae	2043	3691	4914	3353	5026	2364	3957	1166	1926	561	1190	1214	980
<i>Notacanthus sp.</i>	64	24	145	64	145	64	88	32	21	12	69	43	40
<i>Illex sp.</i>	8	225	474	80	3546	410	5139	1737	43	89	18	0	2
Anarhichadidae	5227	5983	1059	9570	9272	8195	9867	4600	4256	3739	5073	3859	4775
Witch flounder	209	844	1568	1777	893	595	2220	764	1836	1458	2283	964	1810
Greenland halibut	1210		1228	1170	1170	1304	1199						
Zoarcidae	3	6216	8	1	9	4	9	7777	6299	6481	4291	2799	5168
Cod	812	2067	3683	3080	1801	354	458	56	75	20	18	13	1
American plaice	2493	1592	4069	5243	5	4	6	75232	69295	1	7	72289	9
Redfish	2051	2284	3522	2758	1689	1053	1769	1440	2446	4084	4491	3698	3800
Shrimp*	1213	9381	2506	4530	7669	4646	5666	35847	21221	19649	30594	21973	17992
	12	7	02	41	24	21	49	6	2	3	7	6	5
	4017	2151	2012	3067	1623	1704	1106						
	7	2	9	2	7	9	6	2799	4889	1593	1055	844	900
Total	1894	1493	3228	5291	8452	5347	6646	45706	31780	32088	44955	31953	36547
	59	94	66	81	52	14	55	2	5	6	2	5	7

*) 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 towed mile and the estimated biomass by strata and its standard error in the 2014 survey.

stratum	area sq. miles	tow number	catch (kg)		Biomass (t.)	
			mean	s. e.	value	s.e.
1	342	4	102.81	66.27	4688	3022
2	838	10	244.51	79.66	27320	8901
3	628	7	269.72	110.37	22585	9242
4	348	4	66.4	37.59	3081	1744
5	703	8	54.3	14.31	5090	1341
6	496	6	173.79	83.47	11494	5520
7	822	9	343.13	177.08	37607	19408
8	646	7	108.38	17.04	9335	1468
9	314	3	215.93	130.81	9040	5477
10	951	11	52.48	20.7	6655	2624
11	806	9	89.19	19.99	9585	2148
12	670	8	10.38	3.17	927	284
13	249	3	15.95	4.87	529	162
14	602	7	103.79	50.86	8331	4082
15	666	8	39.77	5.77	3532	512
16	634	7	1.67	1.08	142	91
17	216	2				
18	210	2				
19	414	5				
Total < 730 m.	10555	120	113.65	18.07	159939	25425
Total < 1460 m.	16070	181	74.65	11.87	159939	25425

Table 4 – Cod (*Gadus morhua*) length distribution ('000) in the 2014 survey.

length	length	length	length	length	length	length	
09-11	41	42-44	5324	75-77	757	108-110	274
12-14	1123	45-47	7940	78-80	689	111-113	137
15-17	4553	48-50	11865	81-83	416	114-116	107
18-20	836	51-53	12659	84-86	517	117-119	51
21-23	272	54-56	10174	87-89	492	120-122	7
24-26	1816	57-59	6195	90-92	489	123-125	7
27-29	3986	60-62	3722	93-95	1101		
30-32	16685	63-65	2481	96-98	380		
33-35	18925	66-68	1906	99- 101	395		
36-38	10361	69-71	1129	102-104	365		
39-41	4919	72-74	1101	105- 107	260	total	133760

Table 5 – Cod (*Gadus morhua*) Biomass (t.) by strata in 1988-2014 surveys.

stratum	year																											
	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	2013	2014	
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	1931	4688	
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	10230	27320	
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	12291	22585	
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	7106	3081	
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	5528	5090	
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	3849	11494	
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	5872	37607	
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	4641	9335	
9	184	5261	6340	188	143	998	239	9	103	174		20	41		14	376			64	151	81	503	2048	1997	5963	970	9040	
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	5153	6655
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	4205	9585	
12	335	2469	1587	126		24																42	339	588	1135	2538	1323	927
13	9	2534	734	93																		15	135	124	419	875	940	529
14	107	1121	545	131	67															76		160	9795	1056	3186	3663	6094	8331
15	748	8436	2344	108													18				47	805	195	475	926	5133	1961	3532
16		66																									82	142
17		5																										
18	2																									100		
19																								88			113	
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	72289	159939	
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	8904	25425	

s.e.: standard error

Table 6 – Cod (*Gadus morhua*) age-length key in 2014.

Length cm	age																total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	
9-11	5																5
11-14	47																47
15-17	88																88
18-20	36																36
21-23	19	11															30
24-26	19	42	1														62
27-29		17	48														65
30-32			68														68
33-35			64	1													65
36-38			52	10													62
39-41			17	45													62
42-44			1	64													65
45-47				63	5												68
48-50				58	6												64
51-53				48	20	1											69
54-56				30	34												64
57-59				7	48	9											64
60-62				1	33	26	2										62
63-65				1	10	46	5										62
66-68					3	38	19	1									61
69-71					3	31	29	1									64
72-74						22	30	5									57
75-77						13	34	7	2								56
78-80						3	33	13	2								51
81-83						1	24	14									39
84-86							11	26	1								38
87-89							11	31	3								45
90-92							1	23	18	3							45
93-95								22	12	2							36
96-98								5	13	4							22
99-101								7	20	6							33
102-104									22	12	1	2					37
105-107									17	8	1						26
108-110								1	14	9	1	2					27
111-113									9	4	2						15
114-116									4	6	2		1				13
117-119									2	2	2	1					7
120-122										1							1
123-125												1					1
126-128										1							1
total:	214	70	251	328	162	190	199	156	139	58	9	6	1				1784

Table 7 – Cod (*Gadus morhua*) frequency ('0000) at age and stratum in the 2014 survey.

age	strata																total	mean	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	18		weight	length
1	7	83	78	160	235	101	11	30	1	7	13						727	42	17
2		14	23	31	43	43	20	46	1	6	10						238	151	26
3	3	319	303	91	709	845	724	804	247	379	405	2	7	6			4845	317	33
4	53	742	985	78	102	593	616	287	215	250	367	5	8	5	12		4316	972	48
5	62	463	417	41	23	110	182	91	171	81	124	6	2	9	13		1799	1494	55
6	49	185	115	17	11	32	62	27	61	23	33	8	1	38	23	2	689	2347	64
7	22	66	27	10	7	16	50	12	19	8	16	6	2	51	25	2	337	3567	74
8	6	22	4	4	6	8	76	4	5	5	6	2	1	35	13		198	5805	86
9	2	6	3	1	4	3	97	4	1	4	3	1	1	17	5		153	9050	100
10	1	2	2		1	1	39	2		2	1		1	6	2		60	10351	105
11							5	1						1			8	12470	112
12							4										5	12109	110
13							1										1	13588	115
14																			
Set	4	10	7	4	8	6	9	7	3	11	9	7	3	7	8	3	106	1094	44.5
n	206	1904	1957	434	1143	1751	1886	1308	721	765	980	31	24	168	94	4	13376		

Table 8 – Cod (*Gadus morhua*) abundance ('000) at age in 1988-2014 surveys.

age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1	4868	19604	2303	129032	71533	4075	3017	1425	36	37	23	5	178	473
2	79905	10800	12348	26220	41923	138357	4130	11901	3121	150	83	84	16	1990
3	49496	91303	5121	16903	5578	31096	27756	1338	6659	3478	95	116	327	13
4	13448	54613	16952	2125	2385	1099	5097	3892	892	4803	1256	117	198	122
5	1457	20424	15834	6757	385	1317	130	928	2407	391	1572	717	96	79
6	211	1336	4492	1731	1398	173	67	33	192	952	78	444	446	15
7	225	143	340	299	244	489	7	23	8	21	146	19	172	142
8	72	126	146	68	14	87	111		5			5	11	99
9		6	77	32				21			6		17	6
10		7	25	4			5	5						6
11				10	8									6
12										4			5	
13														
14													5	
Total	149683	198363	57637	183181	123468	176693	40319	19567	13320	9837	3259	1507	1470	2951

age	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1		684		8069	19710	3912	6095	5130	66500	347800	103530	5500	7273
2	1330	54	3379	16	3880	11625	16681	7480	27760	143100	127920	67560	2379
3	641	628	49	1118	60	5021	12419	16170	8640	16900	10980	32230	48452
4	29	134	618	78	1470	21	4545	14300	7660	6300	11720	4900	43163
5	70	22	168	708	90	1138	73	4150	5000	7800	4960	4170	17986
6	33	42	5	136	590	58	928	20	1800	3100	4870	2780	6894
7	26	7	10		120	425	58	1090	10	1200	1630	1800	3369
8	96	8	3	17	10	74	230		460		820	970	1977
9	30	39	5	8		13	80	340	50	200	20	290	1530
10		24	16	8	10	20			260		90	40	601
11	5				10		15		30		30	30	77
12								10			80	30	51
13					10						0	10	8
14											10		0
Total	2261	1642	4161	10157	25960	22307	41125	48690	118180	526500	266660	120310	133760

Table 9 – American plaice (*Hippoglossoides platessoides*) mean catch per towed mile and the estimated biomass by stratum, and their standard error in the 2014 survey.

stratum	area sq. miles	tow number	catch (kg)		Biomass (t.)	
			mean	s. e.	value	s.e.
1	342	4	3.97	114.38	181	61
2	838	10	16.75	471.00	1872	628
3	628	7	2.66	62.14	223	58
4	348	4	5.56	243.75	258	130
5	703	8	3.50	107.81	328	115
6	496	6	2.83	70.00	187	56
7	822	9	1.90	58.33	208	70
8	646	7	2.89	53.57	249	50
9	314	3	0.00	0.00	0	0
10	951	11	0.83	27.27	105	40
11	806	9	1.72	73.33	185	88
12	670	8				
13	249	3				
14	602	7				
15	666	8	0.06	4.69	5	5
16	634	7				
17	216	2				
18	210	2				
19	414	5				
Total < 730 m.	10555	120	2.70	41.94	3800	671
Total < 1460 m.	16070	181	1.77	27.80	3800	671

Table 10 – American plaice (*Hippoglossoides platessoides*) length frequency ('000) in the 2014 survey.

length	male	female	length	male	female	length	male	female
10-11	8.2	0	28-29	87.5	27.3	46-47	47.1	371
12-13	0	0	30-31	40.3	54.6	48-49	0	313.1
14-15	6.7	0	32-33	42.3	20.5	50-51	0	191.5
16-17	7.4	0	34-35	80	6.8	52-53	0	81.4
18-19	83.5	41.4	36-37	185.5	6.7	54-55	0	94.7
20-21	73.9	55.3	38-39	561.2	20.1	56-57	0	47.7
22-23	13.4	33.8	40-41	593.5	54.2	58-59	0	55.8
24-25	27.9	6.6	42-43	348.4	204	60-61	0	7.4
26-27	74.4	13.4	44-45	155.8	332.1	Total	2437	2039.4

Table 11 – American plaice (*Hippoglossoides platessoides*) survey biomass (t) by strata in 1988-2014.

stratum	year																											
	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	2013	2014	
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	329	181	
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	1202	1872	
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	266	223	
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	671	258	
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	267	328	
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	341	187	
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	166	208	
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	156	249	
9	103	163	343		373	205	20	500	55	36					1	9	77	18				77			30	25	0	
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	153	105	
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	121	185	
12	9	19	45	17	11	15	33	12	32	7				4		11						11			11	0		
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		5	
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	3698	3800	
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	439	671	

Table 12 – American plaice (*Hippoglossoides platessoides*) age-length key in the 2014 survey for males.

Length cm	age																total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	
10-11	1																1
12-13																	
14-15		1															1
16-17		1															1
18-19		11															11
20-21		10															10
22-23		1	1														2
24-25		3	1														4
26-27			10	1													11
28-29			8	5													13
30-31			1	4		1											6
32-33				3				1									4
34-35					3	3	1	3		1							11
36-37					2	6	6	14									28
38-39					3	15	21	21	2	1							63
40-41					1	4	16	32	6				2	1	1	1	64
42-43						1	9	26	5	3	1	2		1		2	50
44-45						1		7	2	1	1	2	2	3	1	3	23
46-47								2				1		2	1	1	7
total	1	27	21	13	9	31	53	106	15	6	2	5	4	7	3	7	310

Table 13 – American plaice (*Hippoglossoides platessoides*) age-length key in the 2014 survey for females.

Length cm	age																total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	
18-19		7															7
20-21		8															8
22-23		5															5
24-25			1														1
26-27		1	1														2
28-29			3														3
30-31			4	2													6
32-33			1	2													3
34-35				1													1
36-37				1													1
38-39					3												3
40-41					3	3		1									7
42-43					3	12	9	5									29
44-45						10	16	22	1								49
46-47						6	16	25	3	1	1	1					53
48-49						4	6	33		1						2	46
50-51						2	6	14	3	1				1		1	28
52-53							1	3	1	1	1				1	6	13
54-55								2	1					1	3	7	14
56-57									1		1	2				3	7
58-59										1	1	1	2			3	8
60-61											1						1
Total	0	21	10	6	9	37	54	105	10	3	6	4	2	2	4	22	295

Table 14- – American plaice (*Hippoglossoides platessoides*) abundance ('000) at age in 1988-2014 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	2013	2014
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	27	8
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	198	344
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	76	219
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	311	144
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	980	718	135
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	2833	866	510
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	1596	816
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	138	1569
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	111	64	190
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	143	94	65
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	109	55
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	108	62
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	45	55	46
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	133	61	64
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	54	50
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	195	159
total	2741	2735	2094	1752	1371	1163	1122	9377	5645	3772	3804	2670	2131	3169	1970	2766	4013	3329	2188	1401	3262	2838	4952	6917	6614	4670	4436
N6+	1959	1213	1009	8412	9047	8219	7970	6353	4640	3498	3611	2501	1890	2911	1866	2525	3458	2791	1877	1033	1619	1237	1692	2072	4489	3340	3586
SOP	1604	1400	1198	1000	8623	7859	8229	6815	4073	3025	3437	2589	1596	2402	2047	2486	3524	2673	1743	1053	1817			4176	4428	3485	3725
Biom ass	1604	1404	1198	1008	8657	7861	8228	6785	4097	3024	3436	2587	1606	2404	2048	2286	3525	2760	1691	1053	1766	1442	2446	4084	4491	3698	3800

Table 15 – Redfish (*Sebastes marinus*) mean catch per towed mile and the estimated biomass by stratum, and their standard error in the 2014 survey.

stratum	area sq. miles	tow number	catch (kg)		Biomass (t.)	
			mean	s. e.	value	s.e.
1	342	4	0.07	0.07	3	3
2	838	10	0.6	0.3	67	33
3	628	7	11.35	10.71	950	896
4	348	4	0.51	0.37	24	17
5	703	8	2.99	1.77	280	166
6	496	6	19.74	17.98	1306	1189
7	822	9	72.85	51.39	7984	5633
8	646	7	50.56	15.93	4355	1372
9	314	3	179.15	87.06	7500	3645
10	951	11	46.97	16.57	5955	2101
11	806	9	72.32	29.05	7772	3122
12	670	8	0.73	0.73	65	65
13	249	3	7.01	7.01	233	233
14	602	7	7.5	4.83	602	388
15	666	8	0.77	0.77	69	69
16	634	7	0.08	0.08	7	7
17	216	2				
18	210	2				
19	414	5				
20	525	6				
21	517	6				
22	533	6				
23	284	3				
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	181	17.35	3.72	37172	7970
Total < 730 m.	10555	120	26.41	5.66	37172	7970

Table 16 – Redfish (*Sebastes marinus*): age-length key in the 2014 survey.

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+		
14		1																							1	
15	2	2																							4	
16	1	3																							4	
17		2	2																						4	
18		2	6		1																				9	
19			5	2																					7	
20			3	5	2																				10	
21				6	4																				10	
22				7	7	2																			16	
23				1	8	4																			13	
24					8	7																			15	
25					2	9	1																		12	
26					2	9	3																		14	
27						6	6	2																	14	
28						3	4	5	2	1															15	
29							7	4	3	1	1	1													16	
30								6	1	2		1	1	1											12	
31								5	3	1	4	1						1							15	
32								1	4	5	3	2	1												16	
33								2	1	3	3	2		3	1										15	
34									1	4	3	3	2	2	1										16	
35											1	1	3	3	4	1		1							14	
36										1	1	5	4	8	1										20	
37												3	8	5	3	1	1								21	
38											2	1	4	4	1	1	1	1		1					15	
39												1	1	8	2	1									13	
40												1	1	2								1		1	6	
41														1		1									2	
42														2		1	1						1		5	
43														1											1	
44																						1			1	
All	3	10	16	21	34	40	21	25	15	17	18	21	29	37	14	5	3	2	0	1	2	1	0	1	336	

Table 16 – (cont.) Redfish (*Sebastes marinus*): age-length key in the 2014 survey.

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																												
13																												
14																												
15	1																										1	
16																												
17		1																										1
18		2	3	1																								6
19			9	4																								13
20				4																								4
21					6	2																						8
22			1	6	6																							13
23				2	8	1																						11
24				3	6	4																						13
25					9	5	1																					15
26						6	6																					12
27							10	7	2																			19
28							5	4	4		1																	14
29							1	9	6																			16
30								2	10	3			1	1														17
31								3	6	3	1	1		1														15
32									6	2		3	2															13
33									5	2	4																	11
34										4	4	3	1		1													13
35										2	4	2	1	2	1													12
36									1	1	7	1	2															12
37									2	2	1	2	3	1	1													12
38										2	4	3	3	4														16
39										1	2	1	4	5														13
40										1	2	2	3	5	1													14
41												3	4	2	3	1												13
42												1	4	6	5	3												19
43											1	1	3	6	1								1	1				14
44												3	3	3	3					1		1						14
45												1	2	2	1													6
46														5		1												6
47															1		1							1				3
48																1						1	1					3
49																								1				1
50															1											1		2
51																									1			1
52																												
53																									1			1
54																												
55																												
56																												
57																										1		1
All	1	3	13	26	31	32	32	39	19	21	26	23	35	41	17	5	2			1	1	3	5		2		378	

Table 17 – Redfish (*Sebastes marinus*) length frequency ('000) in the 2014 survey.

length	male	female	length	male	female	length	male	female
12			27	146 2	964	42	43	916
13			28	178 4	1498	43	14	612
14	6	7	29	213 7	1685	44	8	360
15	28	53	30	233 2	2152	45		311
16	34	13	31	256 6	1598	46		110
17	42	60	32	267 7	1960	47		44
18	225	56	33	240 4	1772	48		21
19	68	130	34	249 9	1928	49		
20	187	97	35	325 3	1747	50		27
21	83	107	36	241 7	2019	51		7
22	379	366	37	169 5	1542	52		
23	355	446	38	807	1830	53		7
24	610	453	39	433	1717			
25	846	651	40	81	1297			
26	119 8	939	41	42	1214	Total	3071 5	30716

Table 18 – *Sebastes marinus*: frequency at age ('000) by strata in the 2014 survey.

Age	Strata																total	average			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		weigh (g)	Length (cm)		
1																					
2		15	4			6	11			7	20							63	58	15	
3		51	18			22	42	5	12	16	58							224	78	17	
4		59	20	5	8	7	56	22	105	41	114			3				441	110	19	
5	4	71	12	5	24	19	75	29	350	139	163			31				923	165	22	
6	3	49	27	11	61	61	135	30	1023	292	498			48				2238	214	24	
7	3	40	78	11	37	136	216	73	2144	816	1122	22		143				4843	289	26	
8	3	18	76	8	7	128	337	133	1865	1211	1200	16		180				5181	355	28	
9		6	120	8	11	225	914	445	2750	1773	2210	4		158				8624	444	30	
10		2	78	3	7	193	817	325	1254	947	1159			52				4836	524	32	
11		2	128	3	15	265	1140	509	1275	919	1357			52				5663	599	34	
12		3	136	4	19	249	1397	631	1161	975	1389			51	10			6027	648	34	
13		3	160	3	31	235	1232	659	803	810	1102	9	36	73	5	1		5162	721	36	
14		6	205	2	41	274	1573	878	784	905	1236	9	69	97	21	1		6100	789	37	
15		3	294	4	73	341	1826	1074	792	954	1299	9	53	88	21	2		6832	836	37	
16		2	122	1	22	144	700	498	296	355	509	9	47	49	5			2760	846	38	
17		1	34		6	40	158	144	64	73	84		9	6				618	904	39	
18			13		6	7	56	41	60	61	56		3	19	5			327	687	35	
19			13			8	63	54	35	41	63			4	5			286	704	36	
20																					
21			2		1	5	11	16	1	15	13	3		7	5			80	1000	40	
22			1		5	3	4	10	3	2						1		29	1252	43	
23		1	1		6	7	15	18	5	9	13	3		4				82	1282	44	
24			1		2	24	15	5	6	8				10				70	1492	46	
25			1			7	7	5	3	2						1		27	1445	45	
Set	1	6	6	3	7	6	9	7	3	11	9	1	1	5	1	1					
n	13	332	1544	68	381	2374	1080	8	5607	1479	8	10368	13681	85	217	1076	77	7	61436	579	32.5

Table 19 – Redfish (*Sebastes mentella*) mean catch per towed mile and the estimated biomass by stratum, and their standard error in the 2014 survey.

stratum	area sq. miles	tow number	catch (kg)		Biomass (t.)	
			mean	s. e.	value	s.e.
1	342	4				
2	838	10				
3	628	7				
4	348	4				
5	703	8				
6	496	6				
7	822	9	0.18	0.06	20	6
8	646	7	0.13	0.1	11	8
9	314	3	0.17	0.09	7	4
10	951	11	6.39	5.9	811	749
11	806	9	35.62	27.15	3828	2917
12	670	8	201	58.04	17956	5185
13	249	3	104.63	25.56	3474	849
14	602	7	523.01	196.7	41981	15789
15	666	8	299.04	64.28	26555	5708
16	634	7	15.91	9.65	1345	816
17	216	2	0.15	0.15	4	4
18	210	2	3.32	1.31	93	37
19	414	5	1.3	0.68	72	38
20	525	6	0.15	0.08	11	5
21	517	6				
22	533	6				
23	284	3				
24	253	3	0.08	0.08	3	3
25	226	3	0.36	0.21	11	6
28	530	6	0.06	0.06	5	5
29	488	6				
30	1134	11				
31	203	2				
32	238	2				
33	98	2				
34	486	5	0.04	0.04	2	2
Total < 1460 m.	16070	120	68.32	12.7	96157	17866
Total < 730 m.	10555	181	44.89	8.34	96157	17866

Table 20 – *Sebastes mentella*: age-length key in the 2014 survey.

Male																										
Lengt h	age																									All
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	24	25+				
14																										
15	1	4																							4	
16		2	1																						3	
17			7																						7	
18			4	1																					5	
19			1	3																					4	
20				5	3																				8	
21				1	7																				8	
22					8	1																			9	
23					4	8	1																		13	
24						8	3																		11	
25						1	11	2	1																15	
26						1	13	2																	16	
27							6	8	2																16	
28							2	6	4		1	1													14	
29								4	6	2	1	1			1										15	
30									4			1	1	1	2	2				1	1			1	14	
31										3	1	1	1	4	1	1	2								13	
32											1	1		1	2	3					1				9	
33								1	1	2			2		1				1			1			9	
34											1	1		1	1			1							5	
35												1			1							1			3	
36															1										1	
total:	1	6	13	10	22	19	36	22	18	7	7	6	4	6	10	6	2	2	1	2	2	1	2	1	202	

Female																										
Length	age																									All
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	20	21	22	24	25+					
14																										
15	2																								2	
16	3	2																							5	
17		5																							5	
18		6	2																						8	
19			4	2																					6	
20			4	6																					10	
21			1	10	1																				12	
22				4	5																				9	
23				2	7	1																			10	
24					6	3	2																		11	
25					1	11	3																		15	
26					1	7	5	2																	15	
27						4	9	5		1															19	
28						1	6	8	1	2	1														19	
29							4	4	7	2	1														18	
30							1	6	5	3	2														17	
31									3	5	2	3	2	1											16	
32									2	3	2	2	1	2	2	2									16	
33										1	1	1		5	2	1									11	
34										1	1	1	1	1	3	2			1						11	
35														2	2	3	2	2							11	
36											1		1	1					1			1			5	
37																								2	2	
38														1			2								3	
39																								1	1	
40																										
41																						1			1	
42																						1			1	
All	5	13	11	24	21	27	30	30	23	14	12	4	12	11	8	4	4	3	2	1	1	3		259		

Table 21 – Redfish (*Sebastes mentella*) length frequency ('000) in the 2014 survey.

length	male	female	length	male	female	length	male	female
14	50	20	24	14380	10460	34	860	1560
15	160	80	25	31070	21140	35	190	960
16	190	90	26	43740	29990	36	240	1030
17	460	300	27	33180	35040	37	0	180
18	490	600	28	17160	28880	38	0	410
19	1410	940	29	5100	17210	39	0	10
20	2990	2200	30	2250	7600	40	0	0
21	2980	2550	31	2810	2710		0	0
22	3370	3530	32	970	2220		0	130
23	4970	5900	33	1720	790	Total	170740	176530

Table 22 – *Sebastes mentella*: frequency at age ('00000) by strata in the 2014 survey.

Age	Strata																total	pm(g)	length			
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	24	25				28	34	
1																						
2	1		2	1																4	52	15
3	2		4	8	1		4	1												20	79	18
4			6	22	5		14	4												53	108	20
5			11	36	44	2	35	19												148	140	21
6			6	24	114	4	102	89	1											341	195	24
7			5	33	320	29	411	385	10											1194	240	26
8			3	25	154	30	320	267	10											810	272	27
9			2	14	69	22	199	151	9											467	299	28
10			1	4	11	8	67	40	4											136	359	30
11			1	3	12	6	56	34	2											114	339	29
12				2	6	4	34	19	2											68	366	30
13						1	9	2	1											13	455	32
14				1	1	1	18	3	1											25	474	32
15					1	1	24	4	1											31	502	33
16						1	12	2	1											18	471	32
17							7	1												9	554	34
18							4													4	518	33
19							1													2	374	30
20							4	1												6	494	33
21							2	1												3	784	38
22																				0	945	41
23																				0		
24							4													5	575	35
25+							2													3	551	34
Sets	8	2	2	6	7	8	3	7	8	5	1	2	4	3	1	2	1	1	1	71		
n	3	1	1	42	175	740	109	1332	1023	43	0	2	2	0	0	0	0	0	0	3472	263	26.4

Table 23 – Redfish (*Sebastes fasciatus*) mean catch per towed mile and the estimated biomass by stratum, and their standard error in the 2014 survey.

stratum	area sq. miles	tow number	catch (kg)		Biomass (t.)	
			mean	s. e.	value	s.e.
1	342	4				
2	838	10	0.01	0.01	1	1
3	628	7	0.24	0.1	20	8
4	348	4	0.06	0.06	3	3
5	703	8	0.07	0.03	7	2
6	496	6	0.43	0.2	29	13
7	822	9	4.4	1.62	482	177
8	646	7	2.68	1.71	231	147
9	314	3	16.41	12.22	687	512
10	951	11	9.54	5.24	1210	665
11	806	9	54.07	29.94	5811	3217
12	670	8	39.04	7.6	3488	679
13	249	3	311.54	112.56	10343	3737
14	602	7	172.88	106.51	13877	8549
15	666	8	110.58	47.96	9819	4259
16	634	7	1.74	1.3	147	110
17	216	2	0.07	0.07	2	2
18	210	2	0.42	0.01	12	0
19	414	5	0.13	0.07	7	4
20	525	6	0.02	0.02	1	1
21	517	6				
22	533	6				
23	284	3				
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	120	32.81	7.68	46176	10806
Total < 730 m.	10555	181	21.55	5.04	46177	10806

Table 24 – *Sebastes fasciatus*: age-length key in the 2014 survey.

Male

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+
14	6																								6
15	7	2																							9
16	3	4																							7
17		2	6																						8
18		4	5	1																					10
19			6	5																					11
20			1	7	3																				11
21				8	3																				11
22				4	7	5																			16
23				4	8	2																			14
24					7	3	1																		11
25					2	5	3								1										11
26						10	1																		11
27						2	5	1		1		1													10
28							2	2	1	1		1			1	1				1					10
29														1								1			2
30													1												1
31									1																1
total	16	12	18	29	30	27	12	3	2	2	0	2	1	1	2	1	0	0	0	1	0	1	0	0	160

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+
14	3																								3
15	14	2																							16
16	6	11																							17
17		8	1																						9
18		6	6	1																					13
19		1	13	4																					18
20			2	12	5																				19
21			1	10	6																				17
22				8	13	1																			22
23				6	11	2																			19
24				1	14	6	1																		22
25				4	11	1																			16
26				1	12	8	1																		22
27					2	5	6	2	2	1															18
28						7	3	2	1	3		2	1												19
29								3		8	3	2	3	1											20
30								1		5	3	2	1	5	3										20
31								2	1	1	2	2	2	5	1		1								17
32										1	4	3	1	2	3	2				1					17
33									1	1	1	3	2	1	1	1									11
34										1	1		1	1	1	1						1	1		8
35											1		1		1			1	1						5
36										1		1	1	2	1										6
37																	1								1
38											1	1			2	1									5
39																				1					1
total	23	28	23	42	54	34	22	16	6	21	20	14	14	18	13	5	2	1	3	0	1	1	0	0	361

Table 25 – Redfish (*Sebastes fasciatus*) length frequencies ('000) in the 2014 survey.

length	male	female	length	male	female	length	male	female
13			23	17020	2840	33		1590
14	200	450	24	20430	3470	34		600
15	650	630	25	16890	4680	35		290
16	710	460	26	8360	7960	36		740
17	1280	800	27	3890	7750	37		100
18	1870	1860	28	1900	9430	38		20
19	4960	3800	29	800	7280	39		80
20	5580	5720	30	340	5440			
21	6850	3550	31	400	3500			
22	9490	4730	32		2430	Total	101620	80200

Table 26 – *Sebastes fasciatus*: frequency at age ('0000) by strata in the 2014 survey.

Age	strata																				total	average	
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	W(g)		L(cm)	
1																							
2		6	3	2	4	38	14	12	25	81		2	30								216	54	15
3		4	1	1	5	41	7	11	61	165	2	9	50	20							377	82	17
4		2	1	2	5	56	3	15	114	394	16	20	228	104			1				961	104	19
5		2		2	4	74	9	27	191	902	134	341	662	413	2		3				2767	146	21
6		1		1	3	45	16	40	140	811	448	992	1069	847	9	1	2	1			4428	190	23
7					1	16	20	67	72	416	371	941	1063	708	13		1	1			3690	234	25
8						10	6	29	28	167	168	498	526	414	6						1852	272	26
9						3	3	11	10	44	65	201	203	157	2						698	327	28
10						1	1	4	3	14	21	67	86	81	1						279	353	29
11						4	4	10	12	48	60	182	203	163	4						690	372	29
12						3	2	6	8	37	42	123	156	129	3						509	385	29
13						3	2	5	4	21	23	75	95	94	2						325	420	30
14						2	1	5	6	29	28	96	98	114	2						380	405	30
15						5	4	5	6	26	32	82	142	135	2						440	424	30
16						4	2	5	4	31	29	75	116	92	2						359	362	29
17						1		1		5	3	15	17	27							70	463	31
18										1	3	4	9	13							31	539	33
19													1	4							6	626	35
20										2	1	2	9	13							28	617	35
21								1		1	1	5	3	7							19	329	28
22										1		1	2	3							8	576	34
23						1	1			3		1	6	34							47	397	30
24																							
25+																							
Sets	1	5	1	6	4	9	7	3	10	9	8	3	7	8	4	1	2	3	1		92	233	
n	1	16	5	7	21	307	95	254	685	3198	1448	3734	4777	3573	49	1	8	3	1		18181	4241	24.3

Table 27 – Juvenile redfish (*Sebastes sp.*) mean catch per towed mile and the estimated biomass by stratum, and their standard error in the 2014 survey.

stratum	area sq. miles	tow number	catch (kg)		Biomass (t.)	
			mean	s. e.	value	s.e.
1	342	4				
2	838	10	0.05	0.02	5	2
3	628	7	0.08	0.03	6	3
4	348	4	0.15	0.05	7	2
5	703	8	0.08	0.03	7	3
6	496	6	0.21	0.06	14	4
7	822	9	0.91	0.27	100	30
8	646	7	0.98	0.22	84	19
9	314	3	0.49	0.09	20	4
10	951	11	0.38	0.08	48	10
11	806	9	1.14	0.36	122	39
12	670	8				
13	249	3				
14	602	7	0.06	0.04	5	3
15	666	8	0.04	0.04	3	3
16	634	7				
17	216	2				
18	210	2				
19	414	5				
Total <730 m	10555	120	0.30	0.04	421	54
Total < 1460 m.	16070	181	0.20	0.03	421	54

Table 28– Juvenile redfish (*Sebastes sp.*) length frequency ('000) in the 2014 survey.

length	length	length	length
4	7	12	1780
5		13	2751
6		14	2927
7	36	15	161
8	1370	16	
9	8072	17	
10	2378		
11	1216	Total	20698

Table 29 – Greenland halibut (*Reinhardtius hippoglossoides*) mean catch per towed mile by strata and the estimated biomass with their standard errors in the 2014 survey.

stratum	Area sq. miles	tow number	catch (Kg)		Biomass (t.)	
			mean	st. error	value	s.e.
1	342	4				
2	838	10				
3	628	7				
4	348	4				
5	703	8	0.00	0.00	0	0
6	496	6	0.03	0.03	2	2
7	822	9	0.07	0.05	8	5
8	646	7				
9	314	3				
10	951	11				
11	806	9	0.03	0.03	3	3
12	670	8	2.68	0.82	239	73
13	249	3				
14	602	7	0.27	0.27	22	22
15	666	8	1.34	0.70	119	62
16	634	7	25.61	3.89	2165	329
17	216	2	10.35	4.93	298	142
18	210	2	24.86	10.07	696	282
19	414	5	29.26	5.02	1615	277
20	525	6	50.80	12.13	3556	849
21	517	6	17.55	4.00	1210	276
22	533	6	16.90	2.46	1201	175
23	284	3	15.21	2.43	576	92
24	253	3	16.04	3.62	541	122
25	226	3	32.12	5.04	968	152
28	530	6	27.68	6.86	1956	485
29	488	6	70.74	18.61	4603	1211
30	1134	11	25.89	3.11	3915	470
31	203	2	27.86	5.28	754	143
32	238	2	82.25	16.45	2610	522
33	98	2	36.35	4.67	475	61
34	486	5	27.10	5.91	1756	383
Total < 1460 m.	16070	181	13.67	0.88	29288	1880
Total < 730 m.	10555	120	3.67	0.39	5167	542

Table 30 – (cont.) Greenland halibut (*Reinhardtius hippoglossoides*): Biomass (t.) by strata in 1988-2014 surveys.

Strata	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1	0		2										
2	10	0	12	7	9								
3	140	55	852	416	325	22		4	6				
4	58	105	347	91	182	8							
5	66	92	254	280	231	92	15	7		6			0
6	104	21	466	332	61	75	8					0	2
7	429	414	1032	596	778	729	524	11	15	4		4	8
8	878	507	811	934	910	432	226	31	0		0		
9	138	140	464	91	550	487	401	31				9	
10	744	286	753	1058	850	560	777	25	19	5			
11	338	277	631	1063	290	503	563	21	32	2	8	2	3
12	1086	673	902	1020	978	1246	1393	1217	743	126	332	140	239
13	521	61	447	310	219	392	431	217	273	33	19		
14	1081	885	1658	618	573	878	1023	742	62	35	256	28	22
15	1233	607	1084	1747	1783	3041	1621	771	1224	112	111	89	119
16	2182	633	1166	1357	1752	2263	1623	2186	2079	1892	1911	1038	2165
17	204	148	223	429	639	407	411	558	446	236	401	170	298
18	694	1062	578	434	606	865	944	540	526	562	325	395	696
19	2194	248	608	915	971	1042	2035	1414	1231	3700	927	924	1615
20			1647	1061	666	2041	4119	1855	1490	2471	2381	1858	3556
21			729	345	359	742	2161	1569	1367	1258	1496	1952	1210
22			454	510	845	551	883	1970	2410	1226	714	1220	1201
23			407	42	130	495	1144	475	715	464	280	534	576
24			208	328	555	588	1082	1185	461	1749	652	379	541
25			2377	993	322	436	441	732	473	593	459	392	968
28			1728	1162	1239	2857	3920	3153	1994	4188	2244	2150	1956
29			2300	1330	674	1488	3335	2618	2091	2044	2237	2060	4603
30			2024	602	2772	4719	5066	7692	5381	5060	4738	4685	3915
31			546	186	354	347	385	944	319	414	82	461	754
32			599	596	1357	1040	1755	2391	1539	1916	1097	1244	2610
33			358	147	608	166	698	309	408	707	320	594	475
34			2675	1460	1886	2222	2627	3377	1790	3454	2514	3063	1756
Total (1-19)	12100	6214	12292	11698	11708	13040	11997	7777	6656	6713	4291	2799	5168
s.e.(1-19)	662	611	400	630	609	786	583	363	814	2728	338	345	542
Total (1-34)			28343	21515	24357	31723	39614	36047	27096	32257	23505	23391	29288
s.e. total (1-34)			1335	933	1263	1270	1312	1538	1791	3862	1416	1847	1880

Table 31 - Greenland halibut (*Reinhardtius hippoglossoides*) age-length key in the 2014 survey.**Male**

Length cm	age																total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+		
12-13	1																	1
14-15																		
16-17																		
18-19																		
20-21																		
22-23																		
24-25																		
26-27																		
28-29																		
30-31				1														1
32-33				3														3
34-35				5	3	1												9
36-37				3	15	2												20
38-39				1	18	1												20
40-41					17	6												23
42-43					13	10												23
44-45					3	16	1											20
46-47						19	3											22
48-49						14	8											22
50-51						4	19											23
52-53						1	17	2										20
54-55							9	8	2									19
56-57							4	7	7	2								20
58-59							4	2	5	3								14
60-61									2	3	1							6
62-63										3	1							4
64-65										1								1
66-67										1			1					2
68-69																		
70-71																		
72-73																		
total	1			13	69	74	65	19	16	13	2		1					273

Table 31 – (cont.) Greenland halibut (*Reinhardtius hippoglossoides*) age-length key in the 2014 survey.**Female**

length cm	age																total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+		
10-11	1																	1
12-13																		
14-15	1																	1
16-17																		
18-19																		
20-21																		
22-23																		
24-25																		
26-27																		
28-29																		
30-31			1	1														2
32-33				2	2													4
34-35				6	4													10
36-37				3	17													20
38-39					17	2												19
40-41					16	5												21
42-43					6	14												20
44-45					3	17												20
46-47					1	17	3											21
48-49						13	9											22
50-51						6	17											23
52-53							17	5										22
54-55						1	13	7										21
56-57							9	10	2									21
58-59							4	9	4	5								22
60-61									8	9	3							20
62-63									1	13	6							20
64-65										6	9	1	4	2				22
66-67										1	6	7	3					17
68-69										2	4	7	6					19
70-71											1	4	5	3				13
72-73											1	2	4	4	2	1		14
74-75													4	4	1	1		10
76-77													1	2				3
78-79													1		1	1		3
80-81														1	1	2		4
82-83														1	3	2		6
84-85																3		3
86-87																		
88-89																		
90-91																	1	1
96-97																	1	1
98-99																	1	1
100-101																		
102-103																	1	1
total:	2		1	12	66	75	72	31	15	36	30	21	28	17	8	14		428

Table 32 – Greenland halibut (*Reinhardtius hippoglossoides*) length frequency ('000) in the 2014 survey.

depths < 730 m

length	male	female	length	male	female	length	male	female
10-11		7	36-37	109	74	62-63		21
12-13	7		38-39	130	177	64-65	10	23
14-15		7	40-41	221	153	66-67		
16-17			42-43	222	359	68-69		10
18-19			44-45	278	452	70-71		13
20-21			46-47	208	532	72-73		
22-23			48-49	159	541	74-75		
24-25			50-51	177	578	76-77		
26-27			52-53	109	343	78-79		
28-29			54-55	56	216	80-81		
30-31	7	7	56-57	37	118	82-83		7
32-33	20	13	58-59	32	61			
34-35			60-61		24			
						Total	1813	3746

depths < 1460 m

length	Indet	male	female	length	Indet	male	female	length	Indet	male	female
10-11			7	42-43		822	1216	74-75			72
12-13		7		44-45		994	1922	76-77			20
14-15			6	46-47		905	2446	78-79			14
16-17				48-49		917	2514	80-81			28
18-19				50-51		885	2714	82-83			40
20-21				52-53		536	2115	84-85			19
22-23				54-55		283	1540	86-87			
24-25				56-57		182	988	88-89			6
26-27				58-59		132	659	90-91			8
28-29				60-61		46	400	92-93			
30-31		7	16	62-63		36	370	94-95			
32-33		20	29	64-65		10	268	96-97			
34-35		72	59	66-67		7	178	98-99			
36-37		190	197	68-69			152	100- 1			
38-39		323	439	70-71			82	102- 3			6
40-41		590	696	72-73			111	Total		6964	19337

Table 33 – Greenland halibut (*Reinhardtius hippoglossoides*) frequency at age ('000) and strata in the 2014 survey.

age	strata																												total	Average			
	5	6	7	1	12	4	15	16	17	18	19	20	21	22	23	24	25	28	29	30	31	32	33	34	W(g)	L(cm)							
1	7	6			7																							20	14	12			
2																																	
3							3															5					8	222	31				
4	4				15	3	4	19		1	50	8	6				3	16	22	26		17	3	3	200	339	35						
5		3	8	6	40	3	14	36		10	15	21	80	13	16	21	4	52	37	7	35	66	7	3	6	25	2	40	1	5	565	41	
6			7		69	2	42	24	4	3	4	09	0	7	57	3	0	8	08	60	7	2	5	8	9	827	46						
7					33	5	46	76		18	45	12	25	26	11	22	28	65	13	11	17	53	14	54	841	116							
8					11		13	13		3	15	38	73	5	78	97	38	65	74	0	0	5	34	4	31	5	9	0	55				
9					1	3	1	32	4	13	10	79	43	32	18	6	19	44	64	73	15	55	3	33	548	173	9	58					
10						3		21	5	34	4	88	70	59	41	5	20	54	97	94	40	98	4	43	780	202	3	61					
11						1		7	3	10	1	41	28	27	32	3	12	27	57	61	20	54	3	18	406	232	9	64					
12								1		4	4	12	11	11	16		6	10	26	40	6	25	2	9	182	280	3	68					
13								3	2	3	5	12	25	13	15	1	10	11	43	38	18	25	2	9	235	299	5	69					
14					1			1	1		3	3	15	13	4	1	5	3	25	20	16	14	3	3	131	346	5	73					
15						3										7	10	3		1		11	10	5	1	2	1	55	2	78			
16																																	
+						2										5	14	3		7		17	14	12	1	5	1	81	4	83			
Se																																	
ts	1	2	2	1	8	1	6	7	2	2	5	6	6	6	3	3	3	6	6	11	2	2	2	5	98	108	8						
n	7	3	5	7	2	0	4	65	0	3	43	03	1	5	1	5	5	98	24	93	7	57	3	54	94	11	3						

Table 34 – Greenland halibut (*Reinhardtius hippoglossoides*) Abundance at age ('000) in the 1991- 2014 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	2013	2014
1	1302	1677	1423	1429	9978	4699	2674	2200	852	3014	6459	3282	1768	1762	437	550	301	157	61	38			6	20
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	3
4	1054	1023	692	1435	1535	2442	5225	8843	8419	1741	799	1342	1217	1585	2007	949	275	155	81	47	60	87	112	97
5	2307	1852	1021	1545	2136	3380	5714	9919	10787	5703	2242	3045	1991	5601	5537	4800	2765	1203	606	894	880	822	643	1089
6	1291	2249	1545	2385	4099	4680	6800	9085	10119	11336	6262	4498	2362	6271	6105	6002	5928	4586	2905	2469	2930	1827	1733	2315
7	2212	1947	1627	2139	3029	2001	4014	6304	4467	4346	5328	4610	1552	2040	2345	2665	4632	4950	3255	2365	2850	1406	718	1566
8	534	1054	1266	1180	1706	1299	1731	2108	1466	1865	2584	1025	375	518	491	623	1217	909	713	715	570	349	158	283
9	462	468	776	631	1052	341	528	600	280	361	147	104	105	233	89	180	247	283	153	259	160	112	39	63
10	352	273	213	219	209	70	177	157	82	92	36	48	79	107	97	143	165	210	215	137	110	83	44	66
11	141	138	104	90	53	21	23	27	6	44	5	16	15	63	44	103	62	100	62	50		54	12	22
12	12	67	38	47	18	31	17	6	3	0	0	6	4	38	15	45	38	43	47	22	10	15	10	9
13	0	25	21	18	0	0	17	16	3	0	0	0	0	5	3	10	5	18	35	10		10	6	12
14	0	12	9	0	5	4	0	0	5	0	0	0	0	3	3		2	10	12	2		10	2	6
15	15	0	0	0	0	5	6	0	0	0	0	0	0	3	3			4	0			3	4	3
16+	8	0	0	0	0	0	9	0	0	0	0	0	0	3	3			1	0			6	1	2
Total	10245	12490	10757	13479	27659	27323	34792	47160	39470	29216	26471	22587	10762	24390	20374	16907	16156	12825	8182	7046	7420	4823	3492	5156
Freq 10+	528	515	385	374	285	131	249	206	99	136	41	70	98	222	168	301	272	386	371	221	120	181	79	54

Table 34 - (cont.) Greenland halibut (*Reinhardtius hippoglossoides*) Abundance at age ('000) in the 1991-2014 survey.

< 1460 m. strata (1-34)

Age	Year										
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1	1710	438	550	310	160	60	38			6	20
2	2680	652	320	60	80	10	9		8		
3	3580	2561	540	480	120	40	29	10	46	15	8
4	1880	2117	1110	360	200	100	137	110	200	393	200
5	8330	6470	7160	4700	2480	1380	2447	2280	2964	2583	3405
6	11210	8314	10480	11130	11020	8330	7356	8260	7073	8608	9839
7	6060	4182	5730	10490	15340	13990	9587	10460	6124	5538	8415
8	1790	1206	1700	3530	3890	4340	3063	3160	2349	2005	1989
9	890	318	510	880	1400	1140	1200	1370	920	643	548
10	450	500	440	720	1060	1260	1019	1500	906	1026	780
11	320	282	370	370	540	440	383	560	587	412	406
12	200	161	180	210	300	340	213	330	233	349	182
13	180	74	60	80	160	310	151	270	126	153	235
14	70	47	30	60	120	170	114	140	114	73	131
15	80	9	10	20	80	50	59	50	75	103	55
16+	60	9	10	10	70	70	55	40	140	94	81
total	39490	27340	29200	33410	37020	32030	25860	28539	21864	22002	26294
Freq 10+	1360	1082	1100	1470	2330	2640	1994	2890	2181	1184	1090

Table 35 – Roughhead grenadier (*Macrourus berglax*) mean catch per towed mile by strata and the estimated biomass with their standard errors in the 2014 survey.

stratum	Area sq. miles	tow number	catch per tow (Kg)		Biomass (t.)	
			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	0.23	27	21
13	249	3	0.18	0.18	6	6
14	602	7	0.83	0.24	67	20
15	666	8				
16	634	7	1.58	0.4	134	34
17	216	2	3.86	3.31	111	95
18	210	2	8.41	8.39	235	235
19	414	4	0.57	0.27	32	15
20	525	6	1.26	0.74	88	52
21	517	5	11.14	3.66	768	252
22	533	3	13.3	6	945	426
23	284	2	8.59	3.81	325	144
24	253	3	6.45	5.1	218	172
25	226	3	4.83	3.71	146	112
28	530	6	0.96	0.27	68	19
29	488	6	4.75	1.13	309	74
30	1134	11	10.47	1.73	1582	262
31	203	2	5.06	2.53	137	68
32	238	2	1.97	1.02	63	32
33	98	2	4.12	2.31	54	30
34	486	5	2.49	0.54	162	35
Total < 1460 m.	16070	174	2.56	0.68	5476	678
Total <740 m.	10555	120	0.28	0.08	398	110

Table 36 – (cont.) Roughhead grenadier (*Macrourus berglax*) biomass by strata in 1988-2014 surveys.

Stratum	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1											
2											
3	10										
4											
5											
6											
7	10										
8	28	65	13								
9	282	82	181	17	39						
10	48	38	21								
11	3	2									
12	292	207	97	22	92	73	60	0	27	39	17
13	299	94	154	80	108	25	97	43	6		
14	877	379	362	223	539	1	3	10	67	28	14
15	259	16	85	55	12		132	8		34	4
16	594	426	1391	242	493	213	79	112	134	122	102
17	244	124	603	70	385	40	278	38	111	134	52
18	423	588	435	491	610	194	685	445	235	422	173
19	228	366	592	167	683	235	69	73	32	29	36
20	419	182	353	144	269	130	355	78	88	47	101
21	1432	996	763	755	1114	528	1135	1606	768	299	375
22	1095	1115	1545	608	1735	1216	967	1610	945	537	747
23	897	463	342	332	399	305	388	506	325	382	168
24	137	1030	419	165	152	146	207	222	218	97	160
25	344	870	817	197	391	362	149	98	146	260	326
28	425	695	610	299	360	273	338	137	68	70	29
29	3113	1012	445	527	555	424	509	163	309	200	437
30	3553	2869	1108	2139	3356	2560	2816	2965	1582	1224	836
31	650	327	235	242	176	225	107	295	137	60	199
32	274	267	132	86	222	197	242	172	63	100	80
33	118	17	122	105	38	12	57	112	54	22	42
34	1131	330	511	305	410	144	419	145	162	191	212
total (1-19)	3597	2387	3933	1367	2961	782	1403	729	612	807	399
s.e.(1-19)	362	281	700	314	611	209	201	409	258	141	113
total	17184	12560	11336	7270	12139	7304	9091	8838	5476	4298	4111
s.e. total	1616	1420	1167	808	659	478	930	1212	678	475	407

Table 37 - Roughhead grenadier (*Macrourus berglax*) age-length key in the 2014 survey.

Length cm	age																Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	
1																	
2																	
3																	
4																	
5		4															4
6		9	10														19
7		1	1														2
8			4	6													10
9				9													9
10				3	2												5
11				3	9	4											16
12					4	8											12
13						7	4	2									13
14						4	10	6									20
15						1	5	9	2								17
16								2	15	5							22
17								1	6	13							20
18								1		14	4						19
19										2	10	4					16
20										1	7	4	2				14
21											1	5	4				10
22												1	7	1			9
23													2	1	2		5
24													2				2
25													1				1
total		14	15	21	15	24	23	38	37	22	14	18	2	2			245

Table 37 - (cont.) Roughhead grenadier (*Macrourus berglax*) age-length key in the 2014 survey.

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																	
5		5															5
6		7	5														12
7			4														4
8			3	5													8
9				11	1												12
10			1	2	1												4
11				2	6	1											9
12					5	5											10
13					1	8	4										13
14						4	7	2									13
15						1	4	8	1								14
16							5	4	2								11
17								7	3	1							11
18								1	1	1							3
19									5	2	1						8
20										9	5						14
21										1	4	1					6
22											12						12
23											8	8	3				19
24											1	14	3	1	1		20
25												8	7	2			17
26													15	3	2		20
27												2	6	9	2	1	20
28												1	3	9	3		16
29													1	2	9	4	16
30															6	9	15
31															3	6	9
32														1		6	7
33															1	6	7
34																4	4
35																4	4
36																	
37																3	3
38																	
39																	
40																1	1
total		12	13	20	14	19	20	22	12	14	31	34	38	27	27	44	347

Table 38. – Roughhead grenadier (*Macrourus berglax*) length frequency ('000) in the 2014 survey.

depths < 730 m. strata (1-19)

length	indet.	male	female	length	indet.	male	female	length	indet.	male	female
3	14			13				23			39
4	15			14				24			37
5		13	16	15			7	25			44
6		47		16		7	10	26			18
7				17			7	27			28
8				18		24		28			
9		8	19	19		34	15	29			
10		8		20		10	15	30			21
11				21		27	22				
12				22		10	22	Total	29	188	317

depths < 1460 m. strata (1-34)

length	indet.	male	female	length	indet.	male	female	length	indet.	male	female
2	16			16		203	94	30			165
3	88			17		198	83	31			75
4	26			18		165	19	32			55
5	20	28	36	19		141	69	33			54
6	15	146	89	20		125	107	34			27
7		15	33	21		76	44	35			31
8		71	56	22		66	90	36			
9		69	82	23		35	138	37			24
10		37	31	24		16	184	38			
11		133	65	25		16	154	39			
12		110	83	26			171	40			9
13		113	89	27			200				
14		163	90	28			142				
15		140	107	29			116	Total	165	2064	2810

Table 39 – Roughhead grenadier (*Macrourus berglax*) frequency ('000) at age and strata in the 2014 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	W(g)	L(cm)
1				10			6		6	7	8	9	6	7		23	9	9	5		103	3	3
2		3		19	16	5	20	23	18	11	4	14	18	11	18	34		12	3	14	244	18	5
3		4			9	5	7	14	14	25	4	15	20	14	18	34	6	8	4	20	221	34	7
4				5	16	9		27	29	55	18	20	17	12	16	31	11	10	1	20	298	77	9
5				3	1	1		5	30	35	9	7	16	9	23	53		7	2	32	232	136	11
6		1						6	43	44	8	18	27	10	23	108	7	21	1	31	346	193	13
7		3	0			5		2	29	51	15	10	37	6	23	119	12	16	2	14	344	285	15
8		9				4	4		24	63	37	2	73	3	28	184	13	31	5	29	507	346	16
9		7	5	10	2	11	2		4	90	33		67	1	6	125	8	21	1	43	436	467	17
10		3	1	8	19	15	6		5	83	22		14	9	10	53	7	8		37	300	630	19
11	3	5		29	21	17	14	3	32	78	9	4	19	6	29	35	3	23		22	350	824	21
12	8	1		22	12	37	10	8	52	115	16	23	31	5	36	34	1	8	1	22	441	1116	24
13	2			18	3	27	2	20	54	59	17	23	37	1	34	33	3	9	5	3	350	1417	26
14	0			7	1	14	1	13	38	68	11	13	27	0	18	36	4	2	5	3	259	1632	27
15	0			2		12	1	7	29	34	6	11	23	0	22	64	8	2	6	10	237	1982	29
16+				0		13		5	15	49	13	13	17		67	109	44		4	23	372	2656	32
Sets	2	2	1	6	2	2	5	6	6	6	3	3	3	5	6	11	2	2	2	5	80		
n	14	34	7	134	100	174	71	132	421	866	229	183	447	93	370	1076	136	186	45	322	5039	785	18.2

Table 40 – Roughhead grenadier (*Macrourus berglax*). Abundance at age ('000) in the 1994 - 2014 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	2013	2014
1			129		51	15	3	63	39	467	216	109	10	12	5	3	30	18	9	14	16
2	46	107	56	46	128	36	77	208	189	2139	466	267	353	23	79	15	73	48	49	31	63
3	136	209	110	186	227	49	108	271	220	1077	3119	362	438	59	228	31	232	76	79	26	25
4	487	467	224	153	236	216	50	120	57	672	1009	762	392	35	219	42	107	69	14	27	30
5	507	861	351	157	138	199	283	283	108	618	877	628	501	87	170	25	81	39	25	22	5
6	570	592	586	450	346	247	277	445	189	635	1105	544	561	202	285	96	66	54	24	15	0
7	566		351	613	725	445	218	540	290	843	810	499	719	268	458	94	128	63	40	32	8
8	493	458	338	162	907	616	231	505	283	901	955	593	519	298	743	168	446	119	98	118	16
9	379	263	216	158	250	422	339	510	241	535	962	413	487	178	536	87	492	199	124	126	37
10	181	113	264	98	226	197	338	666	266	474	896	579	577	345	471	48	347	251	129	203	52
11	109	35	254	151	135	109	72	231	203	472	465	371	727	172	431	82	224	122	154	233	88
12	82	23	93	164	182	80	95	131	244	236	392	167	396	108	162	56	113	70	84	115	90
13	40	19	38	124	152	55	57	80	75	88	147	227	293	95	318	56	62	43	44	25	52
14	15	5	34	42	76	61	55	104	63	31	89	191	211	77	79	49	61	33	23	32	22
15	27	15	4	42	48	33	23	55	19	18	18	21	195	39	179	43	21	18	14	12	15
16+	9		10	18	34	3	33	76	64	73	60	33	215	72	116	94	19	25	3	18	14
Total	3647	3685	3060	2564	3862	2783	2259	4288	2550	9278	11584	5765	6593	2069	4479	988	2501	1247	911	1049	533

Table 40 – (cont.) Roughhead grenadier (*Macrourus berglax*). Abundance at age ('000) in the 1994 - 2014 survey.

< 1460 m. strata (1-34)

Age	Year										
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1	461	391	34	51	52	19	37	39	52	71	103
2	856	719	602	81	549	143	125	172	177	178	244
3	6380	1420	855	222	1086	306	622	395	405	279	221
4	2989	2303	1532	321	1268	419	616	509	349	320	298
5	2576	2425	1399	543	1269	253	755	587	409	316	232
6	3062	2695	2316	1063	1578	954	1084	775	348	435	346
7	2552	2069	2351	1209	1954	936	1054	1009	572	533	344
8	3215	2418	1184	1285	2010	1680	2392	1466	1052	836	507
9	2670	1442	1737	770	1649	866	1451	1241	919	610	436
10	2282	1666	1643	1109	1454	476	911	1160	517	638	300
11	1863	1123	1409	697	1333	824	685	652	650	583	350
12	1374	676	739	473	626	564	565	660	491	317	441
13	670	1090	823	412	1170	563	461	516	429	116	350
14	416	1007	566	432	348	490	510	570	307	247	259
15	178	298	478	272	718	434	255	460	215	138	237
16+	1130	1113	1069	944	887	959	692	1044	373	443	372
total	32674	22855	18737	9884	17951	9886	12215	11255	7265	6059	5039

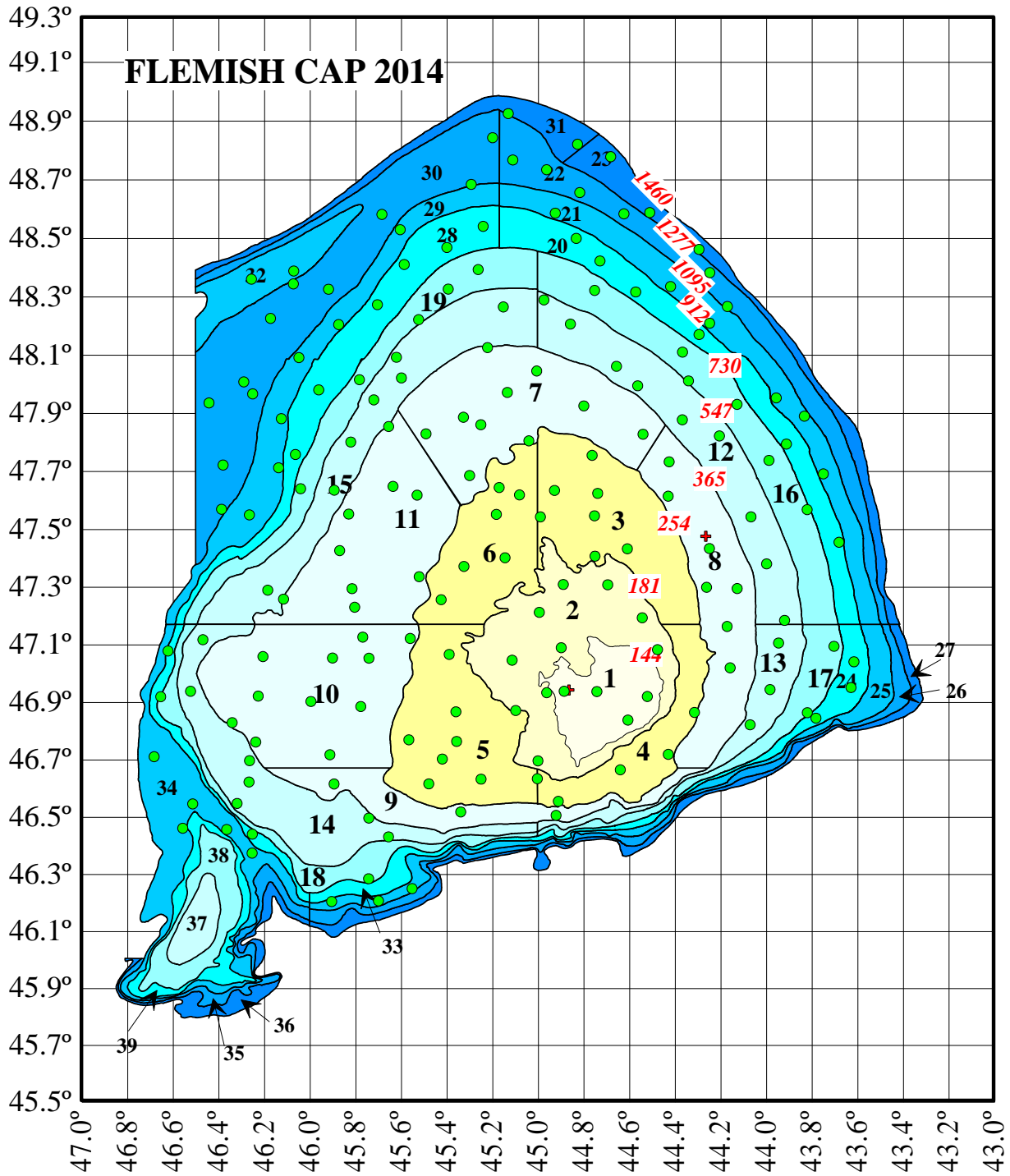


Fig. 1. Haul positions in the Flemish Cap survey 2014.

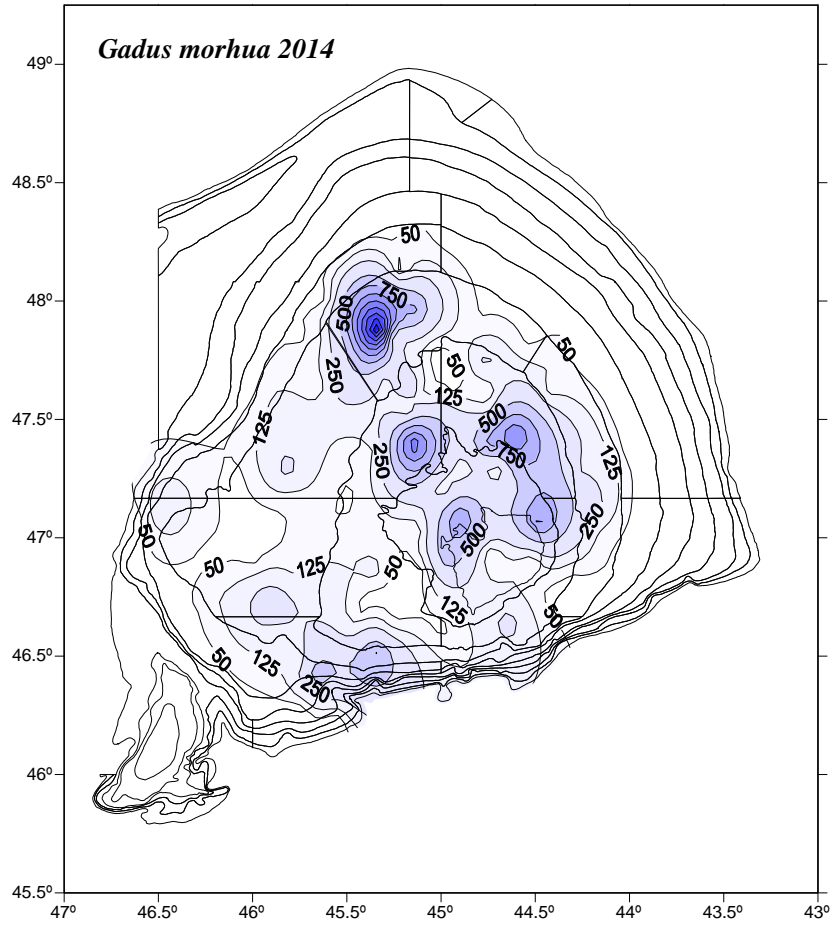


Fig. 2. Cod (*Gadus morhua*) catch (kg.) distribution in the 2014 survey.

Cod 3M

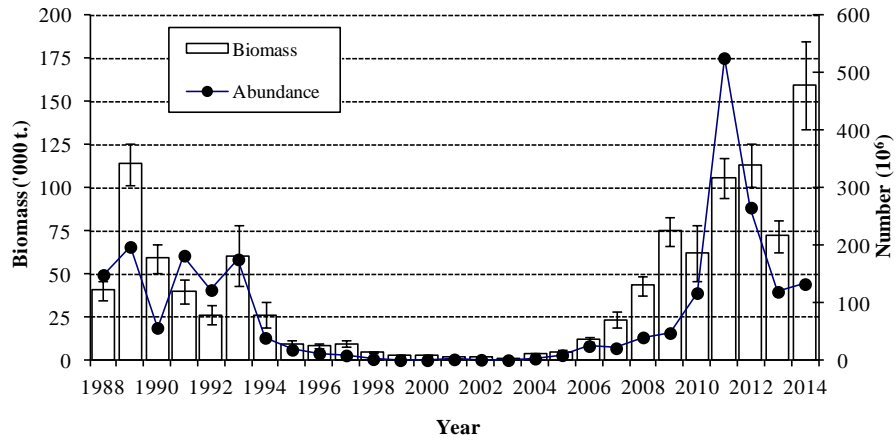


Fig. 3. Cod biomass (t) ± S.E. and abundance 1988-2014.

3M Cod age dsitribution

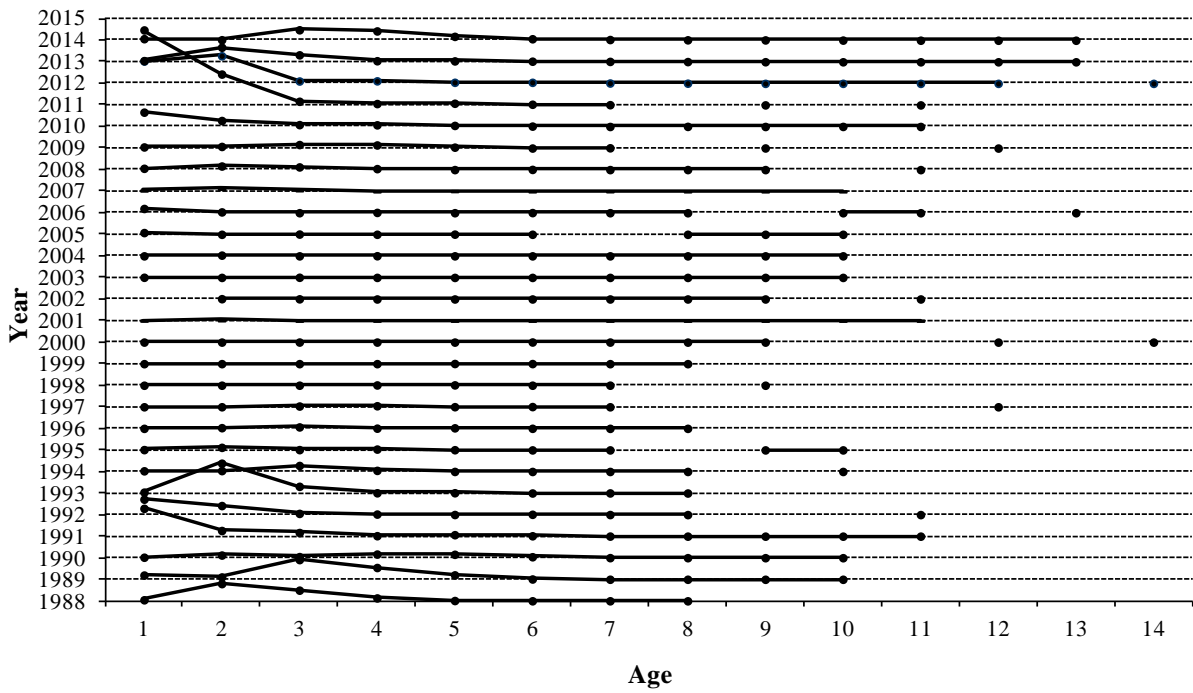


Fig. 4. Cod age distribution in Flemish Cap NAFO 3M 1988-2014.

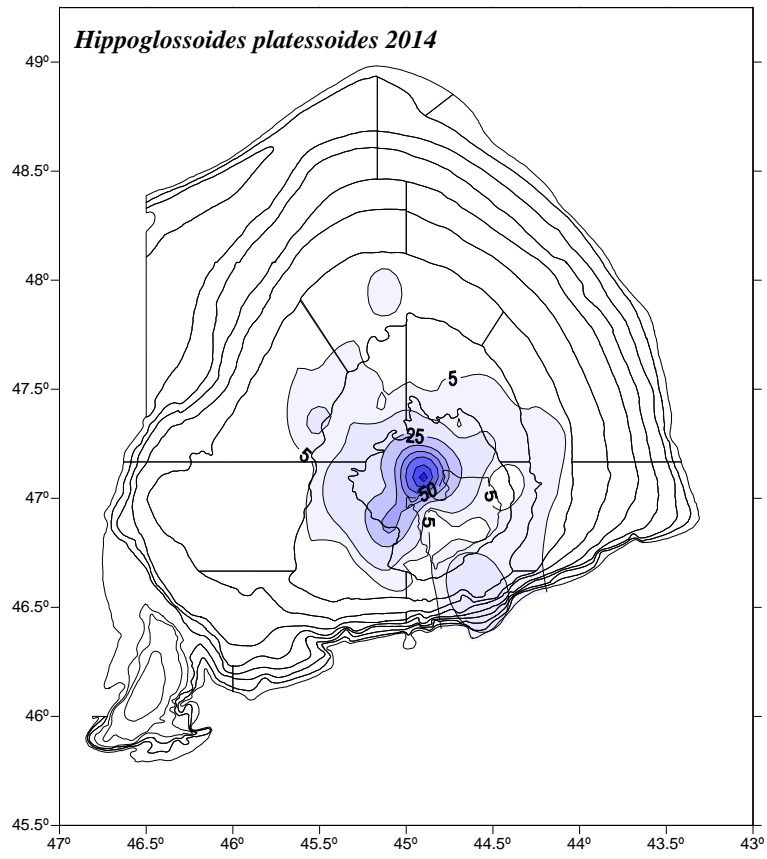


Fig. 5. American plaice (*Hippoglossoides platessoides*) catch (kg) distribution in 2014 survey.

American plaice 3M

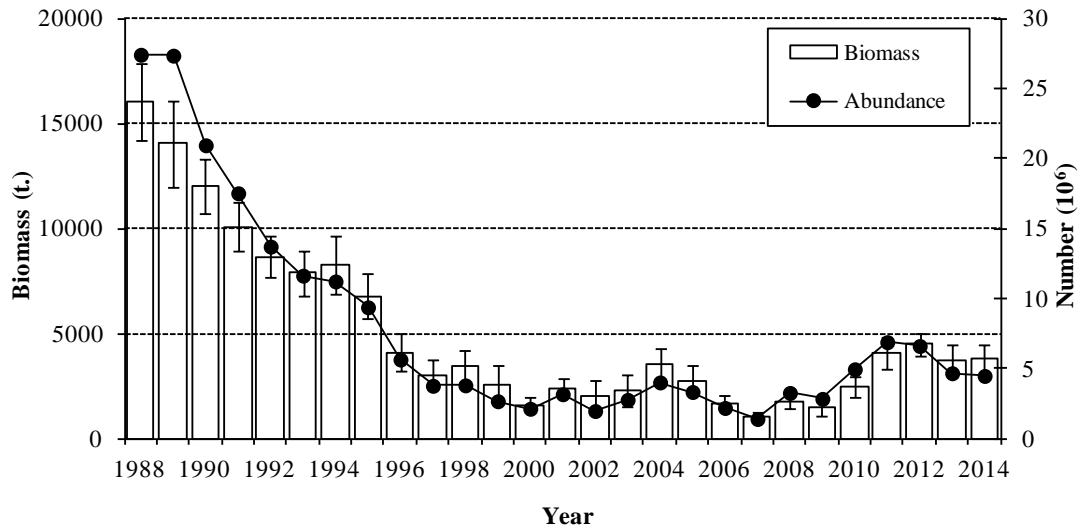


Fig. 6. American plaice (*Hippoglossoides platessoides*) biomass (t.) ± S.E. and abundance 1988-2014.

3M American plaice age distribution

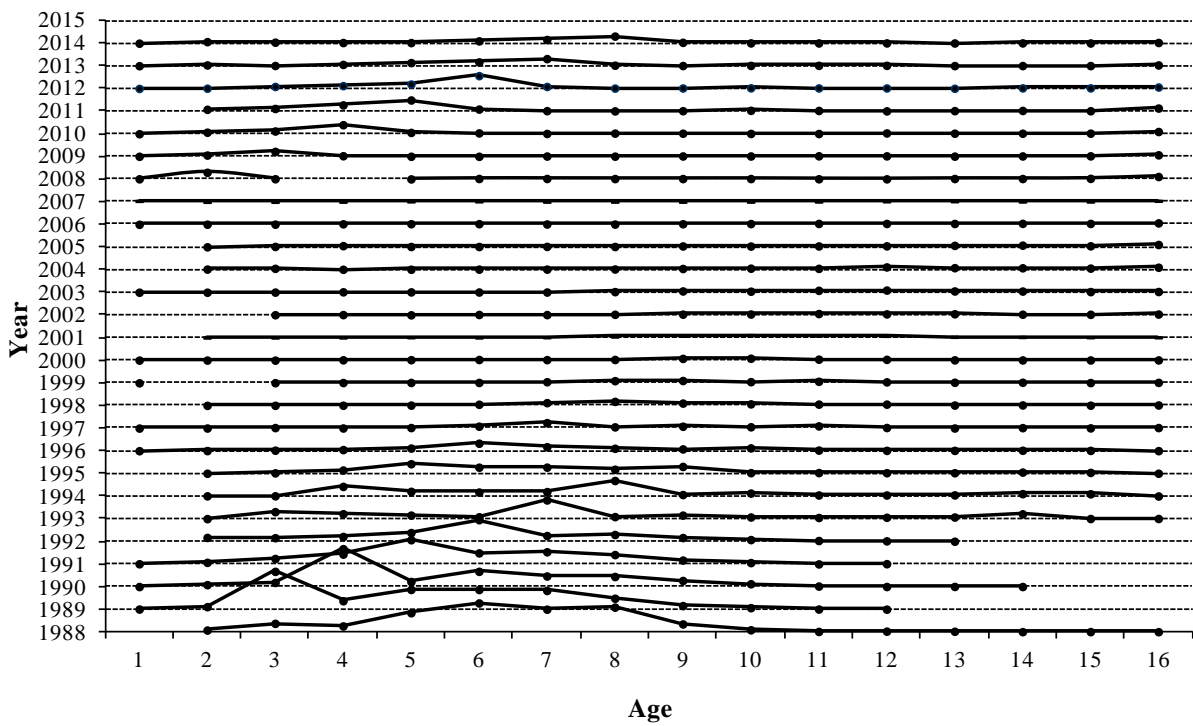


Fig. 7. American plaice age distribution on Flemish Cap, NAFO Div. 3M: 1988-2014.

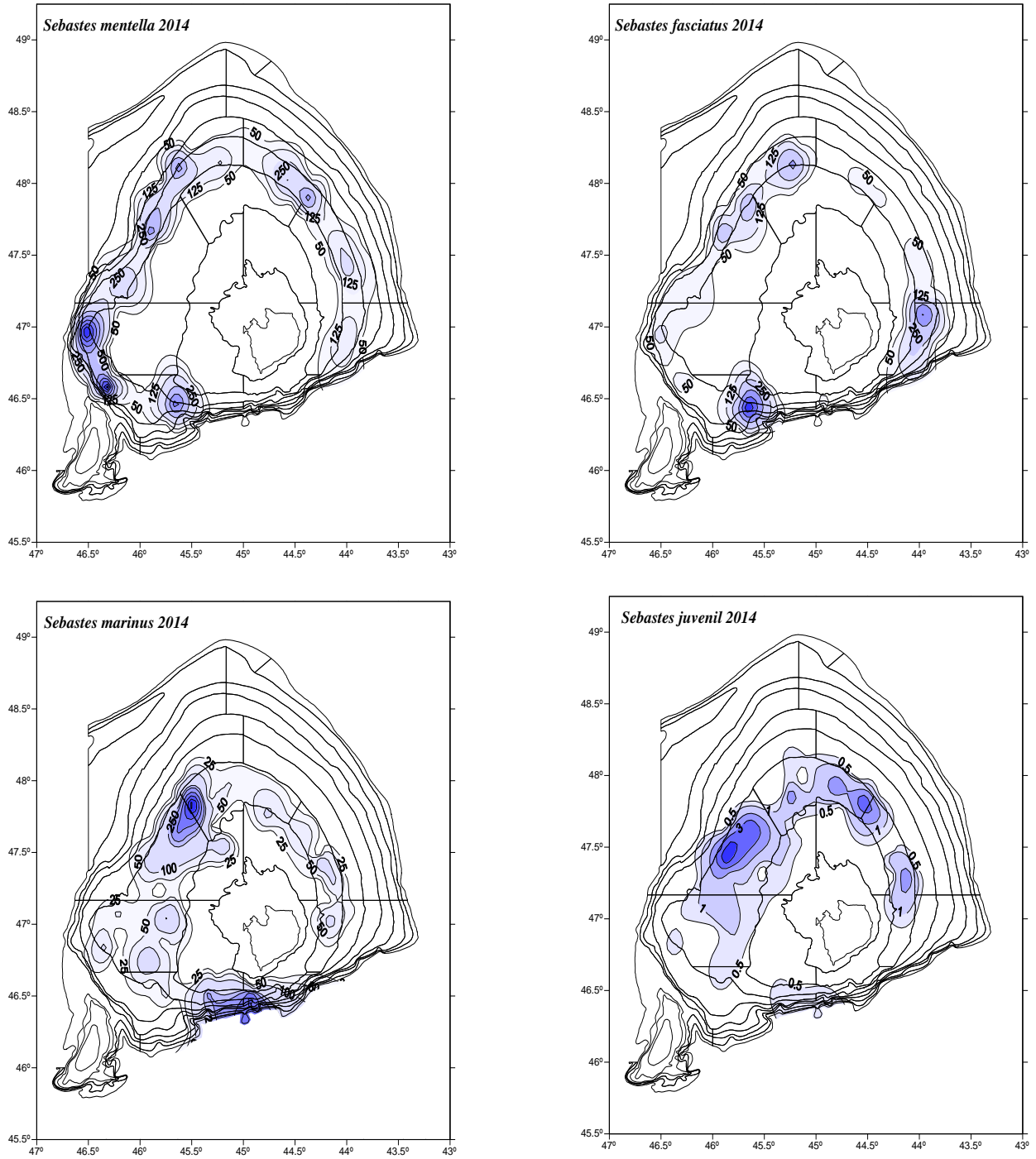


Fig. 8. Catch distribution (kg) of *S. marinus*, *S. mentella*, *S. fasciatus* and juvenile in 2014 survey .

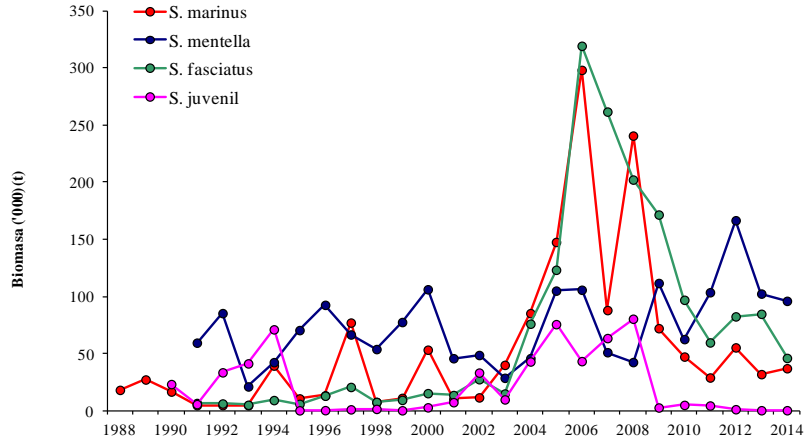


Fig. 9. Redfish species biomass (t) 1988-2014.

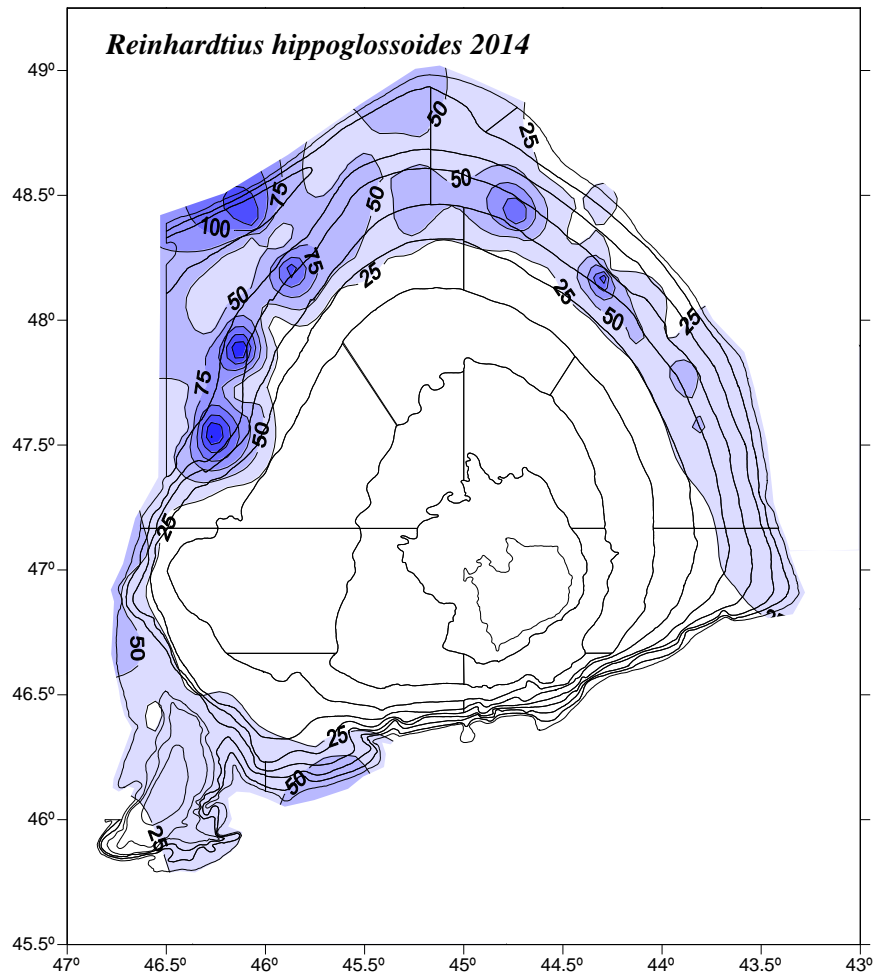


Fig. 10. Greenland halibut (*Reinhardtius hippoglossoides*) catch distribution (kg) in 2014 survey.

Greenland halibut 3M

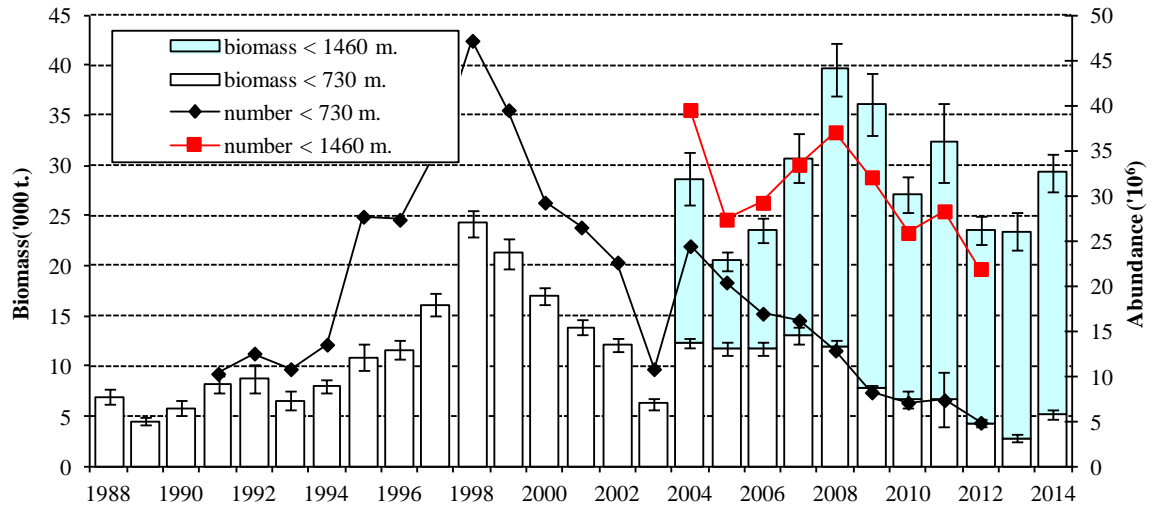


Fig. 11. Greenland halibut (*Reinhardtius hippoglossoides*) Biomass (t) \pm S.E. and abundance 1988-2014.

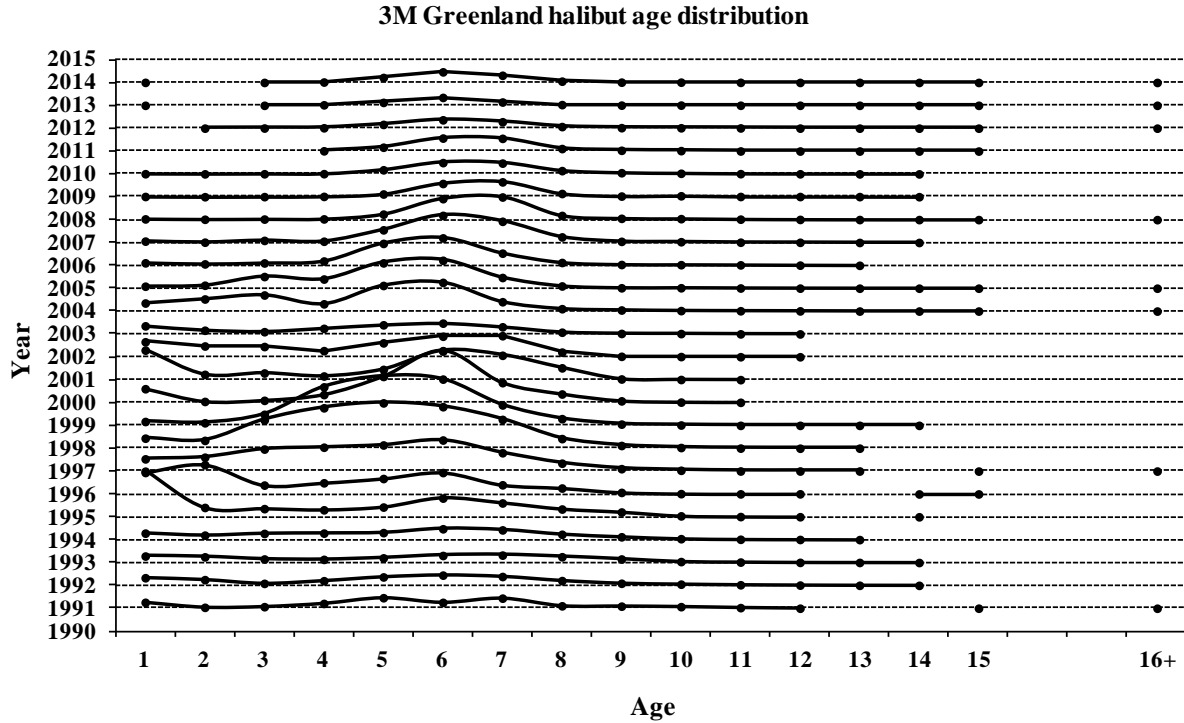


Fig. 12. Greenland halibut age distribution on Flemish Cap, NAFO Div. 3M: 1988-2014.

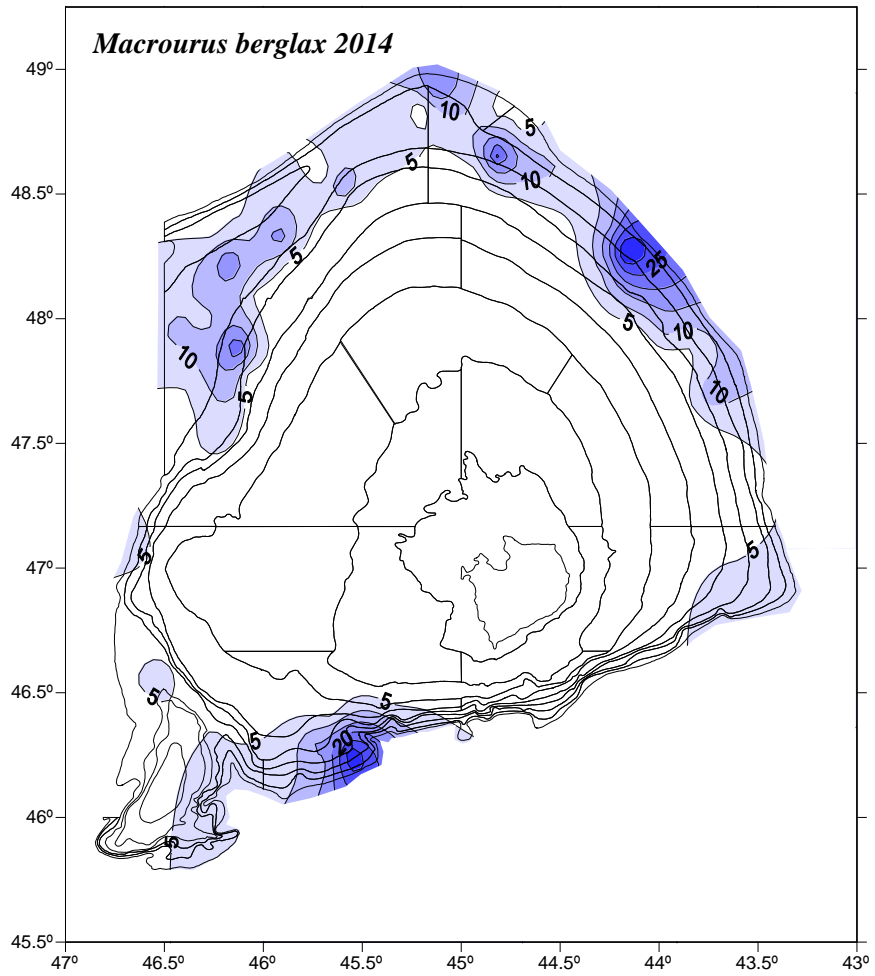


Fig. 13. Roughhead grenadier (*Macrourus berglax*) catch distribution (kg) in the 2014 survey.

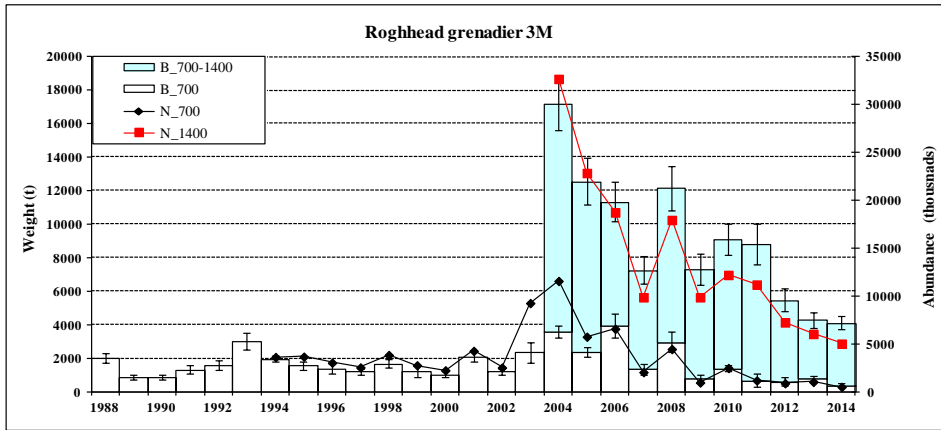


Fig. 14. Roughhead grenadier (*Macrourus berglax*) biomass (t) ± S.E. and number ('000) 1988-2014.

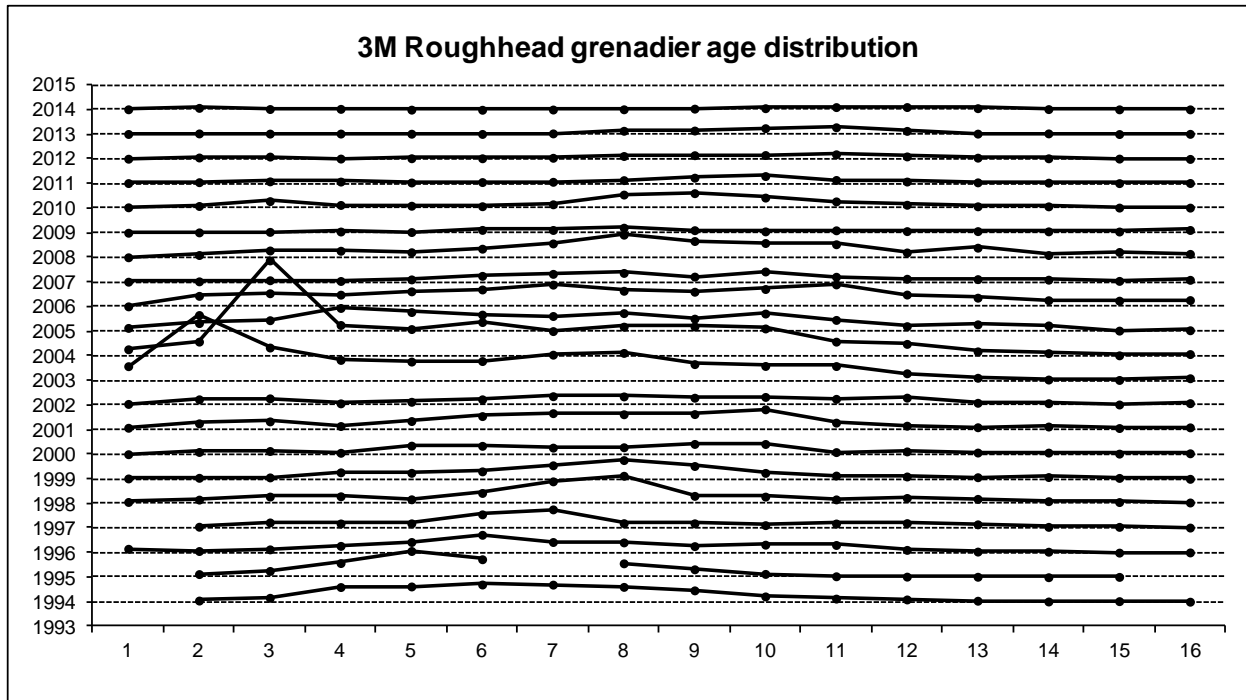


Fig. 15. Roughhead grenadier (*Macrourus berglax*) age distribution on Flemish Cap in depths < 730 m, NAFO Div. 3M: 1988-2014.