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Results from Bottom Trawl Survey on Flemish Cap of June-July 2020

by

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Abstract

A stratified random bottom trawl survey on Flemish Cap was carried out from 30 June to 29 July 2020. 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*, 120 up to 730 meters depth and 61 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, squid 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 2020. 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. In this Figure we can observe the closed areas for Vulnerable Marine Ecosystems. Although the closed areas are tried to be avoided during the survey, sometimes this is impossible due to the lack of trawled zones. A synoptic sheet of the survey with vessel and gear characteristics is shown in Table 1. This was the 33rd 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	08/07 - 22/07	2004	Vizconde de Eza	177 (124)	25/06 - 02/08
					Cornide de Saavedra	61**	23/07 - 02/08
1989	Cyros	116	12/07 - 01/08	2005	Vizconde de Eza	176 (117)	01/07 - 21/08
1990	Ignat Pavlyuchenkov	113	18/07 - 06/08	2006	Vizconde de Eza	179 (115)	01/07 - 26/07
1991	Cornide de Saavedra	117	24/06 - 11/07	2007	Vizconde de Eza	174 (117)	23/06 - 19/07
1992	Cornide de Saavedra	117	29/06 - 18/07	2008	Vizconde de Eza	179 (111)	23/06 - 19/07
1993	Cornide de Saavedra	101	23/06 - 08/07	2009	Vizconde de Eza	178 (119)	23/06 - 20/07
1994	Cornide de Saavedra	116	06/07 - 23/07	2010	Vizconde de Eza	153 (97)	22/06 - 21/07
1995	Cornide de Saavedra	121	02/07 - 19/07	2011	Vizconde de Eza	128 (79)	29/06 - 09/08
1996	Cornide de Saavedra	117	28/06 - 14/07	2012	Vizconde de Eza	174(118)	26/06 - 24/07
1997	Cornide de Saavedra	117	16/07 - 01/08	2013	Vizconde de Eza	181(120)	26/06 - 23/07
1998	Cornide de Saavedra	119	17/07 - 02/08	2014	Vizconde de Eza	181(120)	25/06 - 23/07
1999	Cornide de Saavedra	117	02/07 - 20/07	2015	Vizconde de Eza	181(120)	23/06 - 22/07
2000	Cornide de Saavedra	120	10/07 - 28/07	2016	Vizconde de Eza	181(120)	23/06 - 22/07
2001	Cornide de Saavedra	120	03/07 - 20/07	2017	Vizconde de Eza	181(120)	16/06 - 15/07
2002	Cornide de Saavedra	120	30/06 - 17/07	2018	Vizconde de Eza	181(120)	26/06 - 24/07
2003	Vizconde de Eza	177 (114)	02/06 - 02/07	2019	Vizconde de Eza	180(120)	01/07 - 27/07
	Cornide de Saavedra	50**	07/06 - 17/06	2020	Vizconde de Eza	181(120)	30/06 - 29/07

() 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 (Vazquez *et al.*, 2014).

Results

Biomass of the main species during the survey estimated by swept area method (tons) are:

	Survey	Cod	American plaice	Redfish	Greenland halibut	Roughhead grenadier	Squid	Shrimp
120-730 m	1988	40839	16046	188331	6926	2009	6	5615
	1989	114050	14047	162535	4472	871	9	2252
	1990	59362	11983	126757	5799	852	2107	3405
	1991	40248	10087	76955	8169	1335	1483	11352
	1992	26719	8656	130209	8728	1577	83	24508
	1993	60963	7861	72608	6529	3021	1	11673
	1994	26463	8227	162525	8037	1975	269	3879
	1995	9695	6785	87644	10875	1558	1	7276
	1996	9013	4098	119662	11594	1362	113	10461
	1997	9966	3026	165816	16098	1197	81	7449
	1998	4986	3437	70832	24229	1691	92	39367
	1999	2854	2585	98651	21207	1250	22	24692
	2000	3062	1606	177990	16959	1047	3	19003
	2001	2695	2404	77345	13872	2079	10	27204
	2002	2496	2049	121312	12100	1211	8	36510
	2003	1593	2286	93816	6214	2348	222	21087
	2004	4071	3525	250605	12292	3597	470	20182
	2005	5242	2760	451215	11698	2387	79	30675
	2006	12505	1691	766922	11708	3933	3541	16235
	2007	23886	1053	464628	13040	1367	411	17046
2008	43675	1766	566126	11997	2961	5137	11092	
2009	75228	1442	358479	7777	782	1688	2797	
2010	69295	2446	212211	6657	1402	43	4894	
2011	106151	4084	197031	6765	888	89	1621	
2012	113227	4491	305946	4291	612	38	1041	
2013	72289	3698	219737	2799	807		844	
2014	159939	3800	179925	5168	399	3	900	
2015	114807	3821	158001	6577	478		1551	
2016	80583	4325	171199	6139	373	3	2478	
2017	89414	7475	163262	7632	616	2350	2884	
2018	75795	6109	100483	5578	625	49	4394	
2019	42460	7654	143297	5496	590	363	9273	
2020	67442	7752	227261	6649	624	142	6734	
120-1460 m	2004	4071	3525	250638	28676	17184	479	20195
	2005	5242	2760	453086	20460	14253	83	31186
	2006	12505	1691	766952	23475	12109	3551	15250
	2007	23886	1053	464660	30731	7807	411	17120
	2008	43675	1766	566647	39614	12139	5144	11141

2009	75228	1442	358521	36047	7304	1694	2792
2010	69295	2446	212282	27096	9091	43	4896
2011	106151	4084	196574	32309	8997	90	1733
2012	113227	4491	305974	23505	5476	41	1063
2013	72289	3698	219767	23391	4298		855
2014	159939	3800	179956	29288	4111	3	901
2015	114807	3821	158055	58180	3702		1551
2016	80583	4325	171219	34642	3836	4	2479
2017	89414	7475	163273	52237	5141	2366	2897
2018	75795	6109	100512	36482	4375	52	4404
2019	42460	7654	143390	20673	6500	365	9325
2020	67442	7752	227332	16194	4037	142	6869

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 2020 is similar to that found in the beginning of the series: cod at high levels, shrimp residual, redfish fluctuating around 150-300 kt. and grenadiers and Greenland halibut (<730m) at low levels. Greenland halibut biomass index (<1400m) increased in 2017 next to historic maximums, decreasing since then and it is now the second lowest value recorded. 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. American plaice biomass has increased since 2014 and it seems to show signs of recovery.

Cod

Mean catch per haul 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		2002	2,496	694	-
1984		31,210		2003	1,593		-
1985		28,070		2004	4,071		
1986		26,060		2005	5,242		
1987		10,150	21,600	2006	12,505		
1988	40,839	7,720	34,200	2007	23,866		
1989	114,050	36,520	78,300	2008	43,675		
1990	59,362	3,920	15,200	2009	75,228		
1991	40,248	6,740	8,200	2010	69,295		
1992	26,719	2,490	2,400	2011	106,151		
1993	60,963	8,990	9,700	2012	113,227		
1994	26,463	-	-	2013	72,289		
1995	9,695	8,260	-	2014	159,939		
1996	9,013	730	-	2015	114,807		
1997	9,966	-	-	2016	80,583		
1998	4,986	-	-	2017	89,414		
1999	2,854	-	-	2018	75,795		
2000	3,062	-	-	2019	42,460		
2001	2,695	784	-	2020	67,442		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).

Table 4 shows the length distribution of this stock. Table 6 presents the 2020 ALKs, and Table 7 the abundance at age by stratum.

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 presented in Table 8.

The 1992 to 2003 year-classes failed almost completely. The abundances of 2004-2008 years classes were 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 2012-2018 year-classes failed according to current results at age 1 and the 2019-2020 years classes seems to be better than in recent years but it remains still at low level (Figure 4).

After the historic maximum in biomass in 2014, the biomass has decreased successively and it is now slightly below the average of the whole period. The abundance had a peak in 2011 due to a very high recruitment, and since then has decreased, indicating an increase in older ages and a fail in recruitment. After a low biomass in 2019, in the level of the 2008 one, the biomass increased in 2020.

American plaice

Mean catch per haul 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	1996	4,098		2009	1,442	
1984		7,500	1997	3,026		2010	2,446	
1985		7,800	1998	3,437		2011	4,084	
1986		20,200	1999	2,585		2012	4,491	
1987		9,300	2000	1,606		2013	3,698	
1988	16,046	6,500	2001	2,404		2014	3,800	
1989	14,047	5,000	2002	2,049		2015	3,821	
1990	11,983	1,200	2003	2,286	548	2016	4,325	
1991	10,087	14,400	2004	3,525	1,398	2017	7,475	
1992	8,656	1,200	2005	2,760		2018	6,109	tons
1993	7,861	2,700	2006	1,691		2019	7,654	
1994	8,227		2007	1,053		2020	7,752	
1995	6,785	ton	2008	1,766	ton			

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

Table 10 shows the length distribution and Tables 12 and 13 the age-length key and the abundances at age by stratum respectively (no updated yet for 2019 and 2020). Figure 5 shows the distribution of the survey catches in 2020. 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. The biomass and abundance were more or less stable from 2011 to 2016, showing an upward trend since 2017 and reaching in 2020 the maximum values since 1994.

The ALKs for American plaice for 2019 and 2020 are not available yet due to lack of time, so the indices by age are presented only until year 2018. The length distribution doesn't indicate a change with regards to previous years.

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 has been 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 haul and biomass by strata with the standard errors are presented in Tables 15, 19, 23 and 27 for *Sebastes norvegicus*, *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>norvegicus</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
2015	30,672	45,668	80,494	1,167	158,001
2016	35,069	79,143	55,394	1,593	171,199
2017	23,371	92,136	47,521	234	163,262
2018	10,771	57,403	30,407	1,931	100,512
2019	22,588	49,464	43,222	28,023	143,297
2020	70,138	95,372	58,304	3,508	227,261

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. Table 28 shows the length frequency of the juveniles. Not all the otoliths collected during the 2019 survey have been read due to lack of time, so the 2019 ALK is provisional, and so the numbers at age.

Greenland halibut

Mean catch per standard haul 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. (1988-2020) and in depths up to 1460 m. (2004-2020).

Year	EU < 730 m.	Year	EU < 730 m.	EU < 1460 m.
1988	6,926	2004	12,292	28,343
1989	4,472	2005	11,698	21,515
1990	5,799	2006	11,706	24,357
1991	8,169	2007	13,040	31,723
1992	8,728	2008	11,995	39,614
1993	6,529	2009	7,775	36,047
1994	8,037	2010	6,299	26,739
1995	10,875	2011	6,713	32,257
1996	11,594	2012	4,291	23,505
1997	16,098	2013	2,799	23,391
1998	24,229	2014	5,168	29,288
1999	21,207	2015	6,577	58,180
2000	16,959	2016	6,139	34,642
2001	13,872	2017	7,632	52,237
2002	12,100	2018	5,578	36,482
2003	6,214	2019	5,496	20,673
		2020	6,649	16,194

Age-length keys and length frequency are presented in Tables 31 and 32 respectively. Frequency at age by stratum for 2020 is presented. 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. Figure 12 shows the age distribution by year in the EU Flemish Cap surveys. The 2017 biomass and abundance indices until 1430 m are the second highest of the series, after the 2015 values. The 2020 biomass to 1400m is the lowest value in the historical series, since 2004. The 2017 age 1 numbers were the highest since 2004.

Roughhead grenadier (*Macrourus berglax*)

Mean catch per standard haul 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	2004	3,597	17,185
1989	871	2005	2,387	12,560
1990	852	2006	3,933	11,336
1991	1,335	2007	1,367	7,271
1992	1,577	2008	2,961	12,138
1993	3,021	2009	781	7,303
1994	1,975	2010	1,403	9,092
1995	1,558	2011	729	8,800
1996	1,362	2012	612	5,477
1997	1,197	2013	807	4,298
1998	1,691	2014	399	4,111
1999	1,250	2015	478	3,702
2000	1,047	2016	373	3,836
2001	2,079	2017	616	5,141
2002	1,211	2018	625	4,375
2003	2,348	2019	590	6,500
		2020	624	4,037

Age-length keys and length frequency and are presented in Tables 37 and 38. Frequency at age by strata is presented in Table 39. 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. Biomass and abundance have been stable in the last years at low levels.

Squid

Some indices of the squid (*Illex illecebrosus*) are presented. Total biomass and abundance are presented in Table 41. The biomass is presented by stratum and year. The 1988-2002 indices were transformed for the R/V *Cornide de Saavedra* to the R/V *Vizconde de Eza* level (González-Troncoso, 2016). The indices could be seen in Figure 16. No all the years squid is present in the survey, and the indices show a high variability.

Shrimp

Casas J.M. (2020) presented detailed results.

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Table 1. Technical data of the 2020 survey.

Procedure	Specification
Vessel	R/V <i>Vizconde de Eza</i>
GT	1 400 t
Power	1 800 HP
Mean trawling speed	3.0 -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 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 ecosounder 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, cephalopods, shrimp and invertebrates
Species for age determination	Cod, American plaice, redfish (<i>Sebastes sp.</i>), Greenland halibut and Roughhead grenadier (<i>Macrourus berglax</i>).

Table 2. Biomass (t.) for the most important species or groups of species in 1988-2020 surveys in depths lesser than 730 m.

Species	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Rajidae	4495	1938	2823	4061	3780	6241	3506	2268	2051	1842	1978	1608	1150	2236	1544	4608	6241
<i>Synaphobranchus sp.</i>	217	88	40	80	72	105	8	16	0	8	40	0	0	24	8	24	88
<i>Urophycis sp.</i>	643	169	169	257	72	169	217	80	80	32	225	249	169	394	129	547	667
<i>Antimora sp.</i>	394	306	281	563	724	820	796	193	185	233	491	290	265	667	346	306	1158
Macrouridae	3088	1456	1222	2252	2589	6498	3233	2606	2340	2292	2831	2332	1809	3080	2043	3691	4914
<i>Notacanthus sp.</i>	499	410	64	474	450	740	458	346	177	290	169	64	97	105	64	24	145
<i>Illex sp.</i>	8	8	1649	1158	64	0	209	0	88	64	72	16	0	8	8	225	474
Anarhichadidae	7994	7487	8122	10101	9095	14355	15642	19220	20563	14033	10985	5581	4471	5863	5227	5983	10591
Witch flounder	909	338	418	772	820	1045	788	708	507	322	241	378	410	458	209	844	1568
Greenland halibut	6924	4471	5798	8171	8725	6530	8034	10873	11596	16100	24230	21207	16960	13872	12103	6216	12288
Zoarcidae	563	1142	1206	1978	1359	3474	1874	2179	1705	1729	2059	893	780	1246	812	2067	3683
Cod	40837	114050	59365	40250	26715	60966	26466	9699	9015	9964	4986	2855	3064	2694	2493	1592	4069
American plaice	16044	14049	11982	10085	8653	7865	8227	6787	4101	3024	3434	2581	1608	2405	2051	2284	3522
Redfish	188333	162535	126757	76953	130206	72610	162527	87641	119664	165816	70833	98650	177991	77347	121312	93817	250602
Shrimp*	5742	2300	3490	11661	25155	12087	3981	7503	10905	7704	41971	25734	19719	28316	40177	21512	20129
Total	277325	310956	224530	169483	218909	193504	236440	150512	183669	224039	165655	163058	230087	140162	189459	149394	322866

Species	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Rajidae	4238	3506	2179	6289	2244	3471	2188	1658	743	680	836	1073	1365	775	1592	1650
<i>Synaphobranchus sp.</i>	72	32	64	40	24	14	2	20	40	14	9	23	10	25	19	11
<i>Urophycis sp.</i>	740	611	249	547	217	685	682	380	332	258	145	113	107	130	199	305
<i>Antimora sp.</i>	1110	474	587	893	499	670	342	727	655	649	630	748	520	442	455	370
Macrouridae	3353	5026	2364	3957	1166	1926	561	1190	1253	980	843	655	848	855	1065	1227
<i>Notacanthus sp.</i>	64	145	64	88	32	21	12	69	68	40	17	69	55	109	91	83
<i>Illex sp.</i>	80	3546	410	5139	1737	43	89	0	0	0	0	3	2350	49	363	142
Anarhichadidae	9570	9272	8195	9867	4600	4256	3739	5073	3893	4775	5402	5371	6182	6333	8802	9121
Witch flounder	1777	893	595	2220	764	1836	1458	2283	940	1810	2163	2126	3134	2465	3380	4291
Greenland halibut	11701	11709	13044	11999	7777	6299	6481	4291	2884	5168	6577	6139	7633	5578	5277	6649
Zoarcidae	3080	1801	354	458	56	75	20	1	6	0	1	5	1	0	30	58
Cod	5243	12505	23884	43676	75232	69295	106151	113227	71903	159939	114807	80583	89414	75621	42460	67442
American plaice	2758	1689	1053	1769	1440	2446	4084	4491	3632	3800	3821	4325	7475	6105	7654	7752
Redfish	453041	766924	464621	566649	358476	212212	196493	305947	219729	179925	158001	171198	163262	100484	143297	227261
Shrimp*	30672	16237	17049	11066	2799	4889	1593	1055	844	900	1551	2478	2885	4395	9273	6734
Total	529181	845252	534714	664655	457062	317805	320886	448661	319157	365459	300443	283269	325190	212421	236417	343032

*) 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 haul and the estimated biomass by strata and its standard error in the 2020 survey.

stratum	area sq. miles	tow number	catch (kg)		Biomass (t.)	
			mean	s. e.	value	s.e.
1	342	4	36.79	8.40	959	219
2	838	10	119.16	38.48	7608	2457
3	628	7	62.74	13.76	3002	658
4	348	4	36.63	18.69	971	495
5	703	8	67.95	16.45	3639	881
6	496	6	56.75	18.59	2145	702
7	822	9	620.34	212.85	38851	13331
8	646	7	46.03	10.03	2265	493
9	314	3	45.38	16.91	1086	405
10	951	11	13.55	2.57	981	186
11	806	9	28.46	7.96	1747	489
12	670	8	45.43	35.77	2319	1826
13	249	3	0.91	0.91	17	17
14	602	7	4.80	3.57	220	164
15	666	8	32.13	16.42	1630	833
16	634	7				
17	216	2				
18	210	2				
19	414	5				
Total < 730 m.	10555	120	83.86	17.17	67442	13801
Total < 1460 m.	16070	181	55.09	11.27	67442	13801

Table 4. Cod (*Gadus morhua*) length distribution ('000) in the 2020 survey.

length	length	length	length	length	length	length	
12-14	65	45-47	2243	78-80	560	111-113	
15-17	2183	48-50	1148	81-83	231	114-116	9
18-20	5038	51-53	2397	84-86	127	117-119	29
21-23	774	54-56	4936	87-89	129	120-122	7
24-26	134	57-59	3343	90-92	56	123-125	16
27-29	1767	60-62	2364	93-95	17	126-128	14
30-32	7309	63-65	1643	96-98	41		
33-35	14877	66-68	2237	99- 101	14		
36-38	7234	69-71	1743	102- 104	23		
39-41	960	72-74	1205	105- 107	29		
42-44	1272	75-77	555	108-110	15	total	66744

Table 5. Cod (*Gadus morhua*) biomass (t.) by strata in 1988-2020 surveys.

strata	year																
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
1	1345	649	767	5585	76	516	2165	1563	1006	243	125	99	250	86	477	173	1996
2	10150	10323	2065	5486	5150	9044	8186	3040	3991	2049	1899	1502	740	491	736	102	1668
3	4471	10276	2391	2459	8473	8435	6092	1146	1054	1132	703	145	360	230	451	90	9
4	3130	4843	2446	2900	3443	14171	1885	746	1068	857	140	25	443	488	66	136	168
5	2130	10702	8447	10651	4570	6824	924	1274	936	1149	976	256	425	260	146	303	19
6	3230	6789	3286	1531	952	4220	1412	1310	620	1074	613	375	511	749	525	24	155
7	2224	16025	4385	2538	945	6153	857	122	55	1067	78	52	5	12	24	107	18
8	8931	16434	15973	5107	2349	7964	3615	349	93	1610	77	23	74	123	37	111	5
9	184	5261	6340	188	143	998	239	9	103	174		20	41		14	376	
10	1338	4898	4193	1558	327	936	506	58	46	301	199	102	107	81	2	24	
11	2505	13219	3859	1787	224	1678	582	78	41	310	176	255	106	175	18	58	33
12	335	2469	1587	126		24											71
13	9	2534	734	93													
14	107	1121	545	131	67												
15	748	8436	2344	108													18
16		66															
17		5															
18	2																
19																	
total	40839	114050	59362	40248	26719	60963	26463	9695	9013	9966	4986	2854	3062	2695	2496	1593	4071
s.e.	5784	12205	8225	6704	5837	17397	7367	2070	1459	1725	646	451	593	380	398	273	780

s.e.: standard error

strata	year															
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	1091	2433	4420	4224	2253	11815	4694	1567	1931	4688	11089	3195	5589	15884	11385	959
2	1888	4145	1775	5346	6627	23368	22989	13861	10230	27320	1896	8348	18068	15592	3691	7608
3	1791	1948	11466	4129	7630	4512	16922	17743	12291	22585	5572	21702	10439	8556	5364	3002
4	152	466	1132	771	5190	1716	10114	2903	7106	3081	2046	11268	5305	2466	2389	971
5	30	644	548	1129	6947	3600	10947	11639	5528	5090	2051	3499	11273	4189	5000	3639
6	206	1224	3214	12487	10734	2303	9510	9991	3849	11494	7413	2298	8027	8814	4312	2145
7		473	140	4692	12659	4667	2586	6824	5872	37607	5914	7099	8053	4630	2292	38851
8		347	475	3471	2814	4204	10921	7739	4641	9335	5732	5284	2708	2260	1342	2265
9		64	151	81	503	2048	1997	5963	970	9040	256	9058	2334	2670	653	1086
10	28	304	246	2625	5071	4275	5247	16988	5153	6655	9852	1676	3217	1005	1780	981
11	56	381	272	3699	4336	4458	4557	5701	4205	9585	1490	2457	7350	1929	1778	1747
12				42	339	588	1135	2538	1323	927	747	974	1974	1475	1334	2319
13				15	135	124	419	875	940	529	311	846	213	513	120	17
14		76		160	9795	1056	3186	3663	6094	8331	3093	1092	1297	3355	175	220
15			47	805	195	475	926	5133	1961	3532	532	1787	3567	2375	815	1630
16									82	142	93					
17																80
18								100								
19						88			113		17					32
total	5242	12505	23886	43675	75228	69295	106151	113227	72289	159939	114807	80583	89414	75795	42460	67442
s.e.	813	980	4526	5507	8109	16269	11805	12293	8904	25425	19966	14715	11056	16599	6846	13801

s.e.: standard error

Table 6. Cod (*Gadus morhua*) age-length key in 2020.

Length (cm)	Age																Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	
12-14	7																7
15-17	41																41
18-20	51	4															55
21-23	7	4															11
24-26		6	2														8
27-29		24	17														41
30-32		26	35														61
33-35			53	5													58
36-38			39	19													58
39-41			10	18	2												30
42-44			11	19	1	1											32
45-47			2	44	1												47
48-50			1	28	8												37
51-53				37	11												48
54-56				34	21												55
57-59				17	27	8											52
60-62			2		20	26	8		1								57
63-65					2	37	13	1	2								55
66-68						19	28	4		1							52
69-71						11	16	4	3	2	2	1					39
72-74						4	15	5	5	9	1						39
75-77						2	8	6	4	7	1	1					29
78-80							2	4	5	6	4	1					22
81-83								1	3	5	6	1	2				18
84-86								2	1	3	6	1					13
87-89									1	1	4	2					8
90-92									2		1	1	1		1		6
93-95										1							1
96-98										1	2	1					4
99-101														1			1
102-104										1		1	1				3
105-107										1	1	1					3
108-110											1				1		2
111-113																	0
114-116											1						1
117-119											1	1	1				3
120-122											1						1
123-125															1	1	2
126-128													1		1		2
TOTAL	106	64	170	223	93	108	90	27	27	38	32	12	6	1	4	1	1002

Table 7. Cod (*Gadus morhua*) frequency ('000) at age and stratum in the 2020 survey.

age	strata															mean		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	total	Weight (g)	Length (cm)
1	110	4020	160	1270	270	570	70	510	100	0	0	0	0	0	0	7080	55	18
2	20	1030	770	510	280	440	1620	310	50	10	50	0	0	0	0	5100	213	28
3	30	3370	2820	800	900	1250	14060	830	150	110	270	0	0	0	0	24580	367	34
4	10	1630	550	130	370	340	9770	460	70	50	140	180	0	0	80	13780	1012	47
5	10	490	120	30	160	90	4110	220	10	20	90	180	0	0	100	5630	1658	56
6	40	380	160	20	160	100	2850	170	20	30	60	260	0	0	130	4390	2453	64
7	60	330	150	20	180	100	1870	110	20	50	60	200	0	10	120	3280	2949	68
8	20	80	30	10	60	30	320	20	10	20	20	40	0	0	30	680	3495	72
9	20	80	20	10	50	30	260	20	20	20	30	30	0	0	30	610	3926	74
10	30	140	40	10	100	40	360	30	30	40	50	50	0	10	50	970	4375	77
11	20	80	20	10	70	30	160	10	50	30	30	20	0	10	30	570	5469	82
12	10	20	0	0	20	10	60	0	10	10	0	10	0	0	10	150	5910	84
13	10	10	0	0	0	10	10	0	0	0	0	0	0	0	0	50	9551	98
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
15	10	10	0	0	10	0	0	0	0	0	10	0	0	0	0	40	14045	113
16+	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	10	17960	124
Sets	4	10	7	4	8	6	9	7	3	11	9	5	1	3	6	93	1022	
n	400	11650	4850	2820	2630	3040	35530	2670	530	400	810	970	10	40	560	66910	6841	42

Table 8. Cod (*Gadus morhua*) abundance ('000) at age in 1988-2020 surveys.

age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1	4868	19604	2303	129032	71533	4075	3017	1425	36	37	23	5	178	473	0	684
2	79905	10800	12348	26220	41923	138357	4130	11901	3121	150	83	84	16	1990	1330	54
3	49496	91303	5121	16903	5578	31096	27756	1338	6659	3478	95	116	327	13	641	628
4	13448	54613	16952	2125	2385	1099	5097	3892	892	4803	1256	117	198	122	29	134
5	1457	20424	15834	6757	385	1317	130	928	2407	391	1572	717	96	79	70	22
6	211	1336	4492	1731	1398	173	67	33	192	952	78	444	446	15	33	42
7	225	143	340	299	244	489	7	23	8	21	146	19	172	142	26	7
8	72	126	146	68	14	87	111	0	5	0	0	5	11	99	96	8
9	0	6	77	32	0	0	0	21	0	0	6	0	17	6	30	39
10	0	7	25	4	0	0	5	5	0	0	0	0	0	6	0	24
11	0	0	0	10	8	0	0	0	0	0	0	0	0	6	5	0
12	0	0	0	0	0	0	0	0	0	4	0	0	5	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	149683	198363	57637	183181	123468	176693	40319	19567	13320	9837	3259	1507	1470	2951	2261	1642

age	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	14	8069	19709	3917	6096	5139	66370	347674	103494	5525	7282	1141	56	2010	366	11900	7137
2	3380	16	3886	11620	16671	7479	27689	142999	128087	67521	2372	12952	4485	314	4303	1740	4733
3	25	1118	62	5022	12433	16150	8654	16993	10942	32339	48564	7250	14356	6516	271	5210	25203
4	600	78	1481	21	4530	14310	7633	6309	11721	4776	43168	25614	2230	16645	6114	310	13495
5	168	709	85	1138	72	4154	4911	7739	4967	4185	17861	14107	14540	3267	13117	3310	5678
6	5	136	592	58	946	26	1780	3089	4781	2782	6842	21854	12375	15842	3370	5700	4109
7	10		115	425	56	1091	8	1191	1630	1807	3447	3434	4814	8519	7074	400	3336
8	3	17	7	74	231	0	442	0	832	963	1931	1426	1157	2765	3948	1460	687
9	5	16	0	13	76	335	46	215	24	278	1551	762	522	789	1030	1960	631
10	15	8	7	20	0	0	251	0	93	40	600	366	303	345	272	830	938
11	0	0	14	0	14	0	26	89	30	29	79	194	145	137	182	130	566
12	0	0	0	0	0	14	0	0	101	32	54	14	28	53	63	30	126
13	0	0	7	0	0	0	0	0	0	5	8	21	20	27	13	10	54
14	0	0	0	0	0	0	0	0	17	0	0	21	0	6	0	10	14
15	0	0	0	0	0	0	0	0	0	0	0	0	0	7		0	29
16	0	0	0	0	0	0	0	0	0	0	0	7	0	0	6	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0
Total	4226	10166	25965	22308	41124	48697	117810	526300	266720	120280	133760	89164	55032	57241	40139	33002	66744

Table 9. American plaice (*Hippoglossoides platessoides*) mean catch per haul and the estimated biomass by stratum, and their standard error in the 2020 survey.

stratum	area sq. miles	tow number	catch (kg)		Biomass (t.)	
			mean	s. e.	value	s.e.
1	342	4	52.20	27.53	1360	717
2	838	10	28.07	6.88	1793	439
3	628	7	9.12	1.80	436	87
4	348	4	21.54	11.78	571	312
5	703	8	20.67	5.37	1107	288
6	496	6	17.97	2.89	680	109
7	822	9	7.89	2.66	495	167
8	646	7	2.42	0.91	119	44
9	314	3	1.45	1.45	35	35
10	951	11	6.65	1.68	482	122
11	806	9	7.53	1.44	462	88
12	670	8	2.52	2.01	128	103
13	249	3				
14	602	7	0.28	0.19	13	9
15	666	8	1.42	0.93	72	47
16	634	7				
17	216	2				
18	210	2				
19	414	5				
Total < 730 m.	10555	120	9.64	1.23	7752	987
Total < 1460 m.	16070	181	6.34	0.81	7752	987

Table 10. American plaice (*Hippoglossoides platessoides*) length frequency ('000) in the 2020 survey.

length	male	female	length	male	female	length	male	female
10-11	7		30-31	37	14	50-51	58	429
12-13			32-33	106	15	52-53	7	474
14-15			34-35	156	23	54-55	8	391
16-17		8	36-37	225	120	56-57		244
18-19		8	38-39	477	113	58-59		97
20-21	23	51	40-41	472	119	60-61		87
22-23	15	30	42-43	631	219	62-63		15
24-25		15	44-45	675	397			
26-27		8	46-47	453	469			
28-29	14	15	48-49	146	380	total	3510	3740

Table 11. American plaice (*Hippoglossoides platessoides*) survey biomass (t) by strata in 1988-2020.

stratum	year															
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1	1306	1000	505	1078	709	1079	661	2230	1462	381	156	372	345	1043	141	1292
2	2845	3602	1375	2663	1714	1267	1199	1335	943	740	1587	1810	976	835	1262	713
3	1367	1118	1668	1247	631	444	325	252	168	495	284	97	21	93	75	17
4	2199	461	817	320	557	572	853	489	268	203	343	53	100	85		128
5	2599	3093	1830	1407	837	1291	1230	549	500	619	744	73	56	112	189	82
6	479	1130	954	501	601	305	808	123	32	13	35	40	25	37	63	29
7	1174	531	837	389	639	319	316	249	72	83	47	19	15	28	52	30
8	417	164	263	251	727	487	171	132	56	123	165	3		45	43	14
9	103	163	343		373	205	20	500	55	36					1	9
10	2323	1491	2000	1308	1406	1459	2236	708	415	287	36	72	45	95	36	54
11	1186	1168	1316	401	372	292	303	109	68	32	29	37	23	27	59	29
12	9	19	45	17	11	15	33	12	32	7				4		11
13	3		20					3								
14	8	8	7	389	29		24	15	4		4	9				
15	23	99	3	97	37	109	40	68	23	7	7					6
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
s.e.	1845	2048	1276	1180	954	1040	1373	1083	912	708	751	869	332	429	729	748

stratum	year																
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	1507	1038	714	284	144	548	716	693	462	329	181	410	219	1014	764	945	1360
2	768	796	354	209	513	370	1084	1141	1272	1202	1872	1248	1307	4379	1807	831	1793
3	427	101	74	101	147	74	103	364	468	266	223	462	488	410	534	1042	436
4	395	359	109	153	440	36	91	1201	749	671	258	376	178	342	285	801	571
5	72	45	63	81	88	72	200	190	716	267	328	443	592	277	421	1602	1107
6	26	71	61	99	37	57	34	160	185	341	187	309	282	314	751	805	680
7	84	31	37	20	47	32	28	160	156	166	208	117	253	215	389	289	495
8	55	175	163	58	128	47	49	65	187	156	249	220	346	114	241	206	119
9	77	18				77			30	25	0	2	12	2		121	35
10	45	87	97	24	163	54	115	35	123	153	105	86	325	190	403	336	482
11	69	35	19	22	50	64	26	33	121	121	185	124	308	188	397	559	462
12						11			11	0				10	16	18	128
13													2			20	
14								32				3	3	16	39	28	13
15		4		3	7	1		10	13			22	10	4	51	52	72
16																	
17																	
18																	12
19																	
total	3525	2760	1691	1053	1766	1442	2446	4084	4491	3698	3800	3821	4325	7475	6109	7654	7752
s.e.	740	684	342	159	300	327	526	780	534	439	671	556	481	1547	558	852	987

Table 12a. American plaice (*Hippoglossoides platessoides*) age-length key in 2019.
NOT YET AVAILABLE

MALE

FEMALE

Table 12b. American plaice (*Hippoglossoides platessoides*) age-length key in 2020.
NOT YET AVAILABLE

MALE

FEMALE

Table 13a. American plaice (*Hippoglossoides platessoides*) frequency at age in the 2019 survey.
NOT YET AVAILABLE

Table 13b. American plaice (*Hippoglossoides platessoides*) frequency at age in the 2020 survey.
NOT YET AVAILABLE

Table 14. American plaice (*Hippoglossoides platessoides*) abundance ('000) at age in 1988-2020 surveys. 2019 and 2020 NOT YET AVAILABLE.

age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1	0	40	8	40	0	0	0	0	8	8	0	8	16	0	0	8
2	402	563	426	354	852	8	40	32	32	16	24	0	24	40	0	8
3	1882	8364	917	1206	796	1544	48	113	121	113	32	24	8	48	32	32
4	1311	1874	8372	2171	1070	1086	2131	740	257	24	48	64	80	56	64	97
5	4230	4367	1126	5348	1938	780	1037	2131	587	121	72	80	105	105	16	80
6	6385	4359	3370	2445	4769	418	877	1367	1665	418	265	80	153	56	88	56
7	5010	4142	2340	2686	1279	4134	973	1375	893	1206	619	241	121	113	64	48
8	5460	2429	2228	2067	1504	450	3426	909	547	273	901	474	153	265	129	137
9	1753	804	1351	852	828	780	322	1536	402	410	523	507	394	434	161	290
10	458	346	627	298	378	370	651	161	627	290	354	257	426	579	193	233
11	97	40	113	8	177	257	225	177	145	491	298	338	225	483	298	426
12	161	16	16	56	97	306	225	145	80	129	290	209	185	418	225	483
13	129	0	32	0	16	362	249	145	80	24	88	121	72	193	249	281
14	48	0	16	0	0	1070	523	290	105	97	113	121	56	161	145	265
15	56	0	0	0	0	32	491	217	72	48	56	56	48	113	129	145
16+	40	0	0	0	0	40	8	32	24	113	105	97	56	97	185	161
total	27415	27351	20949	17523	13711	11637	11226	9377	5645	3772	3804	2670	2131	3169	1970	2766
N6+	19598	12135	10093	8412	9047	8219	7970	6353	4640	3498	3611	2501	1890	2911	1866	2525
Biomass	16043	14044	11983	10088	8657	7861	8228	6785	4097	3024	3436	2587	1606	2404	2048	2286

age	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	0	0	7	207	51	26	10		7	27	8	20	70				
2	113	32	28	7	1492	293	341	394	60	198	344	578	178	847	211		
3	281	113	37	13	69	1107	608	601	447	76	219	695	1176	442	980		
4	72	290	106	35		147	2000	1384	629	311	144	599	1275	923	717		
5	80	105	133	106	32	29	301	2467	980	718	135	101	936	1397	899		
6	105	105	139	119	127	22	187	454	2833	866	510	109	263	891	1136		
7	105	129	72	49	120	80	72	94	447	1596	816	328	239	282	652		
8	129	105	57	49	108	57	139	49	84	138	1569	609	405	549	300		
9	249	225	123	35	104	94	122	90	111	64	190	1320	515	883	288		
10	314	201	163	47	111	90	70	176	143	94	65	140	1083	1528	467		
11	281	225	200	76	63	132	56	144	125	109	55	49	77	1623	617		
12	595	249	193	122	47	121	176	55	115	108	62	33	49	209	519		
13	426	354	192	143	118	63	125	107	45	55	46	41	21	68	66		
14	402	394	213	82	110	104	114	148	133	61	64	47	27	71	60		
15	330	257	201	75	150	121	134	82	130	54	50	55	34	86	46		
16+	523	547	323	236	561	353	497	672	323	195	201	228	175	329	228		
total	4013	3329	2188	1401	3262	2838	4952	6917	6614	4670	4477	4950	6523	10129	7186		
N6+	3458	2791	1877	1033	1619	1237	1692	2072	4489	3340	3628	2959	2888	6519	4379		
Biomass	3525	2760	1691	1053	1766	1442	2446	4084	4491	3698	3800	3821	4325	7475	6109	7654	7752

Table 15. Redfish (*Sebastes norvegicus*) mean catch per haul and the estimated biomass by stratum, and their standard error in the 2020 survey.

stratum	area sq. miles	tow number	catch (kg)		Biomass (t.)	
			mean	s. e.	value	s.e.
1	342	4	0.68	0.68	18	18
2	838	10	0.49	0.26	31	17
3	628	7	2.08	1.05	100	51
4	348	4	3.10	2.29	82	61
5	703	8	6.83	4.04	366	217
6	496	6	5.92	2.24	223	85
7	822	9	819.30	782.04	51311	48978
8	646	7	26.39	21.56	1299	1061
9	314	3	137.67	68.97	3294	1650
10	951	11	156.54	86.36	11342	6258
11	806	9	31.80	8.82	1953	542
12	670	8	0.98	0.98	50	50
13	249	3				
14	602	7	0.25	0.25	11	11
15	666	8	1.14	0.89	58	45
16	634	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	57.28	40.36	70138	49418
Total < 730 m.	10555	120	87.22	61.44	70138	49418

Table 16a. Redfish (*Sebastes norvegicus*): age-length key in the 2019 survey.
NOT YET AVAILABLE

Table 16b. Redfish (*Sebastes norvegicus*): age-length key in the 2020 survey.
NOT YET AVAILABLE

Table 17. Redfish (*Sebastes norvegicus*) length frequency ('000) in the 2020 survey.

length	male	female	length	male	female	length	male	female
11			27	270	555	43	2054	1794
12			28	242	265	44	30	4623
13			29	265	1056	45	24	3672
14			30	1256	102	46		551
15	37	8	31	166	149	47	7	2508
16	678	257	32	1506	1104	48		1275
17	461	306	33	671	214	49		2100
18	371	180	34	515	194	50	7	212
19	397	149	35	3171	117	51		139
20	188	90	36	3221	3551	52		52
21	1020	70	37	3292	4302	53		60
22	216	90	38	2581	6130	54		957
23	695	266	39	2117	392			
24	259	370	40	1928	2295			
25	168	256	41	561	2167			
26	176	252	42	180	4076	Total	28730	46906

Table 18a. *Sebastes norvegicus*: frequency at age ('000) by strata in the 2019 survey.
NOT YET AVAILABLE

Table 18b. *Sebastes norvegicus*: frequency at age ('000) by strata in the 2020 survey.
NOT YET AVAILABLE

Table 19. Redfish (*Sebastes mentella*) mean catch per haul and the estimated biomass by stratum, and their standard error in the 2020 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	0.00	0.00	0	0
6	496	6	0.09	0.05	3	2
7	822	9	394.82	194.88	24726	12205
8	646	7	37.85	22.26	1863	1095
9	314	3	64.21	59.82	1536	1431
10	951	11	199.76	43.66	14474	3163
11	806	9	148.56	53.88	9123	3309
12	670	8	65.31	25.15	3334	1284
13	249	3	218.63	198.22	4148	3761
14	602	7	465.34	166.02	21344	7615
15	666	8	264.30	55.23	13411	2802
16	634	7	6.76	4.97	327	240
17	216	2	0.82	0.39	14	6
18	210	2	3.54	2.78	57	45
19	414	5	30.19	20.25	952	639
20	525	6	0.33	0.21	13	8
21	517	6				
22	533	6				
23	284	3				
24	253	3	0.33	0.33	6	6
25	226	3				
28	530	6	0.68	0.68	28	28
29	488	6				
30	1134	11				
31	203	2				
32	238	2				
33	98	2	0.42	0.42	3	3
34	486	5	0.26	0.26	10	10
Total < 1460 m.	16070	181	77.89	13.06	95372	15977
Total <730 m.	10555	120	118.51	19.86	95312	15977

Table 20a. *Sebastes mentella*: age-length key in the 2019 survey. PROVISIONAL.

Length	age																								total
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25+	
16		3																							3
17		4	3																						7
18		1	3																						4
19			4	4																					8
20			1	5																					6
21					10																				10
22				7	2																				9
23				3	6																				9
24					8	3																			11
25					2	6																			8
26						4	2	2	1																9
27						1	2	2	2				1												8
28									1	1	1								1						4
29											2	1	1	1							1				6
30																						1			0
31											1														1
32									1				1	1									1		4
33													1	1	1	2			1						6
34												1	3	2		2						1			9
35						1																	1		2
36														1											1
37																									0
38																									0
39																									0
40																									0
total		8	11	29	18	15	4	4	5	1	4	4	6	5	1	4		1	4	1					125

Table 20a (cont.) *Sebastes mentella*: age-length key in the 2019 survey. PROVISIONAL.

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

Table 20b. *Sebastes mentella*: age-length key in the 2020 survey.

Length	age																								total	
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25+		
15	1																								1	
16	1	12																							13	
17		15	2																						17	
18		8	6																						14	
19			14																						14	
20			4	3																					7	
21				2																					2	
22				1	2																				3	
23					5																				5	
24					5	3																			8	
25					5	3	1																		9	
26						4	3	2	1																	10
27						1	6	4								1									12	
28						2	1	2		1		1	1	1	1	2		2	1	1					16	
29								1	1			1	3	3	1	3	3								16	
30										2	1	4	1	5	3		2								18	
31										1		1	3	3	3	2	2	1	2						18	
32										1		1	2	2	3	1	3	1		2		1	1	1	19	
33										1	1			3	2	1	2	2		1			2		15	
34										1		1		1	2	1	1		1	1			2		11	
35													1	1	1	2	1	1					1		8	
36																1	1		1						3	
37																1									1	
38															1										1	
total	2	35	26	6	17	13	11	9	2	4	4	5	11	15	19	18	14	10	5	7		1	1	6	241	



Table 20b (cont.) *Sebastes mentella*: age-length key in the 2020 survey.

Length	age																									total
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25+		
15	1																									1
16	2	13																								15
17		13	2																							15
18		8	6																							14
19		2	11	1																						14
20			5	2																						7
21			1	3																						4
22				1																						1
23				1	1																					2
24				1	2																					3
25					3	5																				8
26						5	1																			6
27						3	2	1	1																	7
28						1	3	4	2																	10
29							2	4	2		1															9
30								2	3			1					1									7
31									1	1	1	1		1									1			6
32								1		1	1		3	2	1		3	1								13
33										1		2	2	2	1	3	1	1	1							14
34								1	1	1	2			5	4		1		1							16
35													2	2	3	2	6									15
36									1	1		1	3	3			2		2	1						14
37													1	2	3		2		1							9
38													4	4	1					1			2			12
39													1	2	1		2	1						1		8
40																		1		1	2			1		5
41																										0
42																										0
43																						1				1
total	3	36	25	9	6	14	8	12	10	4	6	6	8	21	20	10	14	7	5	3	4		1	4	236	

Table 21. Redfish (*Sebastes mentella*) length frequency ('000) in the 2020 survey.

length	male	female	length	male	female	length	male	female
14		100	25	1800	600	36	200	3100
15	2500	500	26	2300	1400	37		1500
16	58300	41200	27	3200	2500	38	100	1200
17	175300	115000	28	4300	2500	39	100	300
18	161100	104600	29	6700	2400	40		400
19	32900	31600	30	8900	1400	41		
20	2900	2100	31	11000	2100	42		
21	800	100	32	8100	5000	43		0
22	100		33	3400	4100			
23	200	400	34	1000	4600			
24	900	100	35	700	4300	Total	486800	333100
14		100	25	1800	600	36	200	3100



Table 22a. *Sebastes mentella*: frequency at age ('0000) by strata in the 2019 survey. PROVISIONAL.

age	strata																	total	mean									
	3	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21		22	23	24	25	26	27	28	29	30	Weight
1																												
2			2		1	1	2			1																7		
3	4	7	75	41	33	197	44	3	2	12																418	62	16
4	1	6	82	28	22	125	28	3	2	7																304	73	17
5	1	1/2	157	85	47	122	10/5	11	9	32	12															592	92	18
6		3	55	84	81	291	91	29	15	196	63				1										1	910	143	21
7			27	49	62	367	62	63	31	380	137				1											1180	203	24
8			8	10	19	168	18	42	16	190	74															545	255	26
9			7	7	13	87	9	67	13	285	239			2												727	297	27
10			6	4	12	56	8	85	41	161	117	1														491	367	29
11			2		3	5	2	32	2	64	37															149	356	29
12			10	13	13	96	10	387	12/3	456	839	9	2	5	1											1967	325	28
13			4	5	5	53	3	143	79	215	420	3	1	4	1											937	447	31
14			4	12	5	104	4	245	12/2	413	870	5	1	8			1									1796	486	32
15			4	1	7	42	6	103	79	175	327	3	1	3												752	500	32
16				2	1	10	1	32	30	25	63															167	513	32
17						2	1	12	27	14	19		1	1												77	618	35
18								1	3		3															9	574	34
19			1		1	8	2	22	17	49	110			1												211	739	37
20			2	1	6	13	3	68	56	99	101	2		1												352	467	32
21			3	1	1	10		32	20	61	92	1														221	458	31
22																											447	31
23									2																	3		
24																											863	39
25+								1	10	2	3															17		
Sets	2	1	7	7	1	10	7	8	3	7	8	5	2	2	2	1	1	1	2							77	802	38
n	7	2/8	450	34/3	33/3	175/7	39/8	138/3	70/1	283/7	352/5	2/5	8/5	2/5	4/5	1	1	1	2							1183/0	374	

Table 22b. *Sebastes mentella*: frequency at age ('0000) by strata in the 2020 survey.

age	Strata																			mean			
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	total	Weight	Length
1																							
2			560	60		260	230	60			120										1290	60	16
3			223	184	780	995	895	162		40	4460										50020	77	17
4			80	0		0	0	0															
5			103	500	700	488	270	460		40	1480										21070	91	18
6			10			0	0																
7			160	10	90	140	30	10		10	80										520	119	20
8					10	50	10	10		70	70										230	215	24
9					10	140	20	10		250	130										550	269	26
10						80	10	10		280	110										490	298	27
11						70	10	10		330	140										570	337	28
12						40		10		190	80										330	375	29
13						10		10	20	130	50										230	496	32
14						20		20	30	200	80				10						360	465	32
15						20		10	20	200	80										340	459	31
16						30		40	60	430	170	10									750	451	31
17						60		50	120	550	230	10			30						1060	508	32
18						50		60	150	580	240	10			30						1130	510	32
19						30	10	50	90	450	180	10			20						840	465	31
20						40		40	100	470	180	10			20						870	508	32
21						20	10	30	50	260	100	10			10						490	478	32
22						10		10	30	110	40				10						220	532	33
23						10		20	50	150	60				10						310	497	32
24										20											30	905	40
25+										10	20	80									40	482	32
Sets	2	1	1	8	7	3	10	8	8	3	7	8	4	1	2	2	1	1	1	1	7.9	121	18.9
n			334	240	160	159	120	254	790	4900	8140	7	1	18				1			81970	994	
			20	0	0	10	00	0				0	0	0				0					

Table 23. Redfish (*Sebastes fasciatus*) mean catch per haul and the estimated biomass by stratum, and their standard error in the 2020 survey.

stratum	area sq. miles	tow number	catch (kg)		Biomass (t.)	
			mean	s. e.	value	s.e.
1	342	4	0.07	0.07	2	2
2	838	10	0.02	0.02	1	1
3	628	7	1.98	0.58	95	28
4	348	4	0.82	0.47	22	13
5	703	8	1.89	0.75	101	40
6	496	6	15.98	5.78	604	219
7	822	9	436.80	358.14	27357	22429
8	646	7	16.71	6.48	822	319
9	314	3	197.59	119.96	4727	2870
10	951	11	73.99	15.63	5361	1132
11	806	9	55.21	21.18	3390	1300
12	670	8	63.54	14.61	3243	746
13	249	3	41.04	33.09	779	628
14	602	7	91.04	44.33	4176	2033
15	666	8	146.90	64.07	7454	3251
16	634	7	0.18	0.12	8	6
17	216	2				
18	210	2	7.40	7.12	119	114
19	414	5	1.33	1.14	42	36
20	525	6				
21	517	6				
22	533	6				
23	284	3				
24	253	3				
25	226	3				
28	530	6	0.21	0.14	9	6
29	488	6				
30	1134	11				
31	203	2				
32	238	2				
33	98	2	0.25	0.25	2	2
34	486	5				
Total < 1460 m.	16070	181	47.64	18.81	58314	23024
Total < 730 m.	10555	120	72.50	28.63	58304	23024

Table 24a. *Sebastes fasciatus*: age-length key in the 2019 survey. PROVISIONAL.**Male**

Length	age																								total
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25+	
16	1	3																							4
17		2	2																						4
18			1																						1
19			6	2																					8
20				5																					5
21				6	2																				8
22				3	5																				8
23				1	3	3																			7
24					4	5	1																		10
25					3	4	2																		9
26						5	6	1																	12
27							3	1	2		2						1		1						10
28								4		1	1						1		3						10
29										1	1	1	2	2	1		4	2					1		15
30												1			1	3		2	1		1				9
31																1	1	2		1					5
32																1			3						4
total	1	5	9	17	17	17	12	6	2	2	4	2	2	2	2	5	7	6	8	1	1		1		129

Table 24a (cont.) *Sebastes fasciatus*: age-length key in the 2019 survey. PROVISIONAL.**Female**

Length	age																							total
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25+	
16	1																							1
17	4	1																						5
18	1	7																						8
19		2	4																					6
20			5																					5
21			10	2																				12
22			4	3																				7
23				3																				3
24				2																				2
25				1	2	1																		4
26					3	2	1																	6
27					3	8	1						1											13
28						1	1	2			1													5
29							2		2	1				1	1		1							8
30								1	3						1	1	1	1	2					10
31							1		1		1		1	4		1	1	1						11
32													1	1	1	1	2							6
33												1	1	1	3	1	1							8
34										1	1	1	4	1	3	2		1						14
35											1	2	3	1	2	2	1		1					13
36												1		2	3			1						7
37										1		1		1					1					4
38																								0
39															1				1					2
40																								0
41																								0
42															1	1				1				3
total	6	10	23	11	8	12	5	4	6	1	4	4	8	16	14	10	10	5	5	1				163

Table 25. Redfish (*Sebastes fasciatus*) length frequencies ('000) in the 2020 survey.

length	male	female	length	male	female	length	male	female
12	33		23	6367	3925	34	64	2965
13			24	8419	5164	35	11	1159
14		100	25	8347	6039	36		2368
15	505	114	26	8583	6721	37		657
16	8835	5402	27	9400	5745	38		148
17	9560	6030	28	8509	5277	39		158
18	7477	5831	29	6404	7718	40		
19	4453	3874	30	2981	5455	41		
20	3914	4181	31	1144	4400	42		51
21	5766	3416	32	183	7542			
22	6251	3842	33	177	4959	Total	107383	103190

Table 26a. *Sebastes fasciatus*: frequency at age ('0000) by strata in the 2019 survey. PROVISIONAL.

age	strata																		mean				
	3	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	24	28	total	W(g)	L(cm)		
1																							
2	2	2	3	3	5	2	15	11	1		2	1								47	72	16	
3	24	15	19	39	74	31	231	170	5	2	22	2								633	78	16	
4	19	16	26	70	140	62	329	248	2	8	32	2								953	106	18	
5	21	18	30	103	265	113	586	450	6	8	76	22		1		1				1701	150	21	
6	10	8	16	84	309	73	583	329	39	24	119	44	1	1	1		1	1		1642	217	23	
7	5	3	5	43	239	26	500	196	111	52	154	47	1					2		1385	269	25	
8	4	2	5	29	222	18	443	132	166	67	191	44	1			1	1	1		1328	305	26	
9	1		1	9	98	8	194	53	159	34	112	25	1							694	367	28	
10	1		1	6	71	5	138	35	50	21	71	10					1			410	350	27	
11	1			5	49	5	131	26	58	20	66	11								372	424	29	
12				6	51	4	90	20	89	20	72	11								364	356	28	
13				1	24	3	50	10	52	8	37	9								197	499	31	
14				1	17	2	49	3	72	9	37	8								199	579	32	
15				3	32	3	90	9	112	19	79	16								364	559	32	
16				4	52	5	180	19	187	34	129	29						1		639	574	32	
17				4	46	8	148	15	175	30	131	35	1					1		595	582	33	
18	1			8	71	6	167	21	221	37	135	30						1		699	494	31	
19				5	55	5	144	18	189	33	127	31						1		610	531	32	
20				7	56	7	122	23	151	29	97	36	1							529	428	29	
21				2	14	2	49	6	33	9	38	5						1		160	558	32	
22					2	1	8		26	2	8	4								52	580	33	
23																							
24					4		4	1	13	1	5	2								31	409	29	
25+																							
Sets	6	5	5	8	7	3	11	9	7	3	7	8	4	2	1	3	3	3	3	95	322	25.8	
n	91	66	107	433	1897	390	4251	1796	1918	466	1738	424	8	2	1	3	10	5	13605	4387			

Table 26b. *Sebastes fasciatus*: frequency at age ('0000) by strata in the 2020 survey.

age	strata																				mean		
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	19	25	28	33	total	W(g)	L(cm)
1																							
2			50	10	90	240	710	50	140	870	710	450		40	80						3430	71	16
3		10	270	90	440	1510	4810	580	840	6240	4960	2710		310	880						23650	80	17
4	10		190	70	300	1400	5710	790	1360	6520	5600	1290		600	1630			10			25460	107	18
5			80	10	100	750	7480	540	1420	4650	3390	230		1310	1540		70	20	10		21600	158	21
6			70	10	60	510	12580	300	1730	4110	2290	250	20	2800	1820		210	30	10		26830	215	23
7			20	10	30	240	12800	300	1530	2750	1200	890	140	2640	2450		120	30	10		25160	281	25
8			10		10	110	8200	310	1180	1860	740	890	180	1840	1980	10	50	20			17390	318	27
9						40	4400	150	710	850	310	640	200	790	1310		10	10			9430	369	28
10						30	3620	150	860	580	210	610	230	700	1330			10			8320	404	29
11						10	2630	80	530	340	130	350	120	360	790						5370	442	30
12						10	2090	60	490	280	150	290	70	330	870						4650	462	30
13						10	2570	80	550	260	140	450	150	380	930						5530	462	30
14						10	2530	60	640	400	140	270	80	500	960						5600	458	30
15						10	1270	30	350	140	130	250	80	160	630						3040	509	31
16						10	1800	30	420	160	170	320	100	210	650						3850	523	31
17						10	1770	50	430	180	160	320	90	300	790						4100	540	32
18							2280	50	560	190	130	360	110	330	780						4810	535	32
19							1960	50	450	190	190	460	160	370	1010						4850	547	32
20							1410	20	200	90	70	220	60	160	360						2610	568	32
21							1180	40	450	120	90	260	80	210	610						3040	491	31
22							90	10	80	30	20	40	10	40	130						440	594	33
23							90	10	20	20	10	30	10	20	80						280	409	29
24							210		70	10	10	30	10	10	100						450	532	32
25+							210	10	30	20	10	50	20	30	210						590	533	31
Sets	1	2	7	2	8	6	9	7	3	11	9	8	2	7	8	2	2	4	2	1	1010	276	24.3
n	10	10	730	190	1030	4920	82390	3750	15010	30860	20970	11660	1920	14440	21910	20	480	140	30	10	210490	5805	

Table 27. Juvenile redfish (*Sebastes sp.*) mean catch per haul and the estimated biomass by stratum, and their standard error in the 2020 survey.

stratum	area sq. miles	tow number	catch (kg)		Biomass (t.)	
			mean	s. e.	value	s.e.
1	342	4	0.05	0.05	1	1
2	838	10	0.14	0.09	9	6
3	628	7	1.47	0.54	70	26
4	348	4	0.82	0.47	22	13
5	703	8	2.07	0.46	111	24
6	496	6	7.56	1.59	286	60
7	822	9	10.19	4.13	638	259
8	646	7	2.54	0.96	124	47
9	314	3	6.76	3.17	162	76
10	951	11	13.46	3.57	976	259
11	806	9	12.88	3.05	791	187
12	670	8	1.17	0.82	59	42
13	249	3	0.04	0.04	1	1
14	602	7	0.39	0.19	18	9
15	666	8	4.74	2.15	240	109
16	634	7				
17	216	2				
18	210	2				
19	414	5				
20	525	6	0.00	0.00	0	0
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	2.87	0.37	3508	442
Total < 730 m.	10555	120	4.36	0.54	3507	442

Table 28. Juvenile redfish (*Sebastes sp.*) length frequency ('000) in the 2020 survey.

length	Ind	Males	length	Ind	Males
5	40		12	7780	
6	110		13	11150	30
7	200		14	15350	
8	620		15	33100	100
9	2570		16	70	
10	5530				
11	8100		Total	84620	130

Table 29. Greenland halibut (*Reinhardtius hippoglossoides*) mean catch per haul by strata and the estimated biomass with their standard errors in the 2020 survey.

stratum	Area sq. miles	tow number	catch (Kg)		Biomass (t.)	
			mean	s.e	value	s.e.
1	342	4	0.00	0.00		
2	838	10	0.00	0.00		
3	628	7	0.00	0.00		0
4	348	4	0.00	0.00		
5	703	8	0.00	0.00		
6	496	6	0.32	0.12		12
7	822	9	0.75	0.23		47
8	646	7	0.33	0.18		16
9	314	3	1.96	1.96	47	
10	951	11	0.21	0.12		15
11	806	9	0.30	0.11		18
12	670	8	19.57	5.22		999
13	249	3	19.95	10.38		378
14	602	7	6.21	2.05		285
15	666	8	22.40	8.09		1136
16	634	7	36.47	5.65		1762
17	216	2	37.96	22.98		625
18	210	2	31.05	19.60		497
19	414	5	25.74	4.38		812
20	525	6	27.02	5.62		1081
21	517	6	20.21	6.13		796
22	533	6	4.64	2.40		188
23	284	3	13.56	8.63		294
24	253	3	23.61	8.54		455
25	226	3	27.76	1.66		478
28	530	6	22.05	5.67		890
29	488	6	18.41	3.34		684
30	1134	11	28.23	6.77		2438
31	203	2	2.10	0.88		32
32	238	2	66.62	5.95		1208
33	98	2	56.88	14.60		425
34	486	5	15.54	7.26		575
Total < 1460 m.	16070	181	13.23	0.93		16194
Total < 730 m.	10555	120	8.26	0.98		6649

Table 30. Greenland halibut (*Reinhardtius hippoglossoides*) biomass (t.) by strata in 1988-2020 surveys.

Strata	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1	0	0	0	0	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	0	15	10	0
3	26	31	8	8	18	3	0	21	108	90	367	347	244	384	140	55
4	144	20	0	15	27	10	0	5	0	23	41	197	207	157	58	105
5	74	98	0	28	42	1	2	21	36	98	173	409	307	268	66	92
6	31	18	15	12	8	15	0	31	106	228	361	301	178	265	104	21
7	85	63	58	189	246	94	214	904	1148	1423	2607	2356	1570	982	429	414
8	151	222	62	180	379	140	46	333	359	1065	989	1993	1317	1124	878	507
9	180	165	53	76	323	30	43	178	160	254	471	354	245	355	138	140
10	108	82	58	172	362	31	235	526	716	862	1369	1528	1602	1743	744	286
11	45	61	22	106	229	234	236	492	671	627	1227	1320	1088	1021	338	277
12	405	647	288	761	619	933	1219	1147	2124	2248	3077	3661	2174	1582	1086	673
13	64	124	218	44	24	143	152	127	298	484	554	978	382	291	521	61
14	368	302	284	787	847	0	620	410	902	1589	1461	1080	491	877	1081	885
15	435	169	525	973	643	1378	1492	1768	1448	2689	4055	2987	2687	1616	1233	607
16	1374	1363	2543	2527	1827	2175	1524	1861	2098	1770	3356	1143	2016	1328	2182	633
17	266	120	127	415	40	0	742	742	258	525	737	603	498	170	204	148
18	106	50	506	354	58	0	386	958	191	557	775	932	179	574	694	1062
19	3064	934	1026	1522	3036	1342	1126	1230	971	1564	2603	1015	1774	1120	2194	248
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	16959	13872	12100	6214
s.e. (1-19)	768	392	809	817	1389	956	678	1226	882	1136	1348	1520	923	776	662	611
Total (1-34)																
s.e. total (1-34)																

Table 30 (cont.) Greenland halibut (*Reinhardtius hippoglossoides*) biomass (t.) by strata in 1988-2020 surveys.

Strata	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	2																
2	14	7	9													1	
3	852	416	324	22		4	7						0	1	4	5	0
4	348	91	182	8									0		12		
5	253	280	231	92	14	7		6			0	6		2	4	0	
6	466	332	61	75	8					0	2	1	8		3	6	12
7	1032	596	778	729	524	11	15	3		4	9	12	21	9	18	39	47
8	811	934	910	432	226	31	0		0				15	2	20	12	16
9	464	91	550	487	401	31	0			10						6	47
10	754	1059	851	559	777	25	19	5				1	1	23	11	26	15
11	631	1063	290	504	563	21	32	1	9	2	3		17	8	17	11	18
12	902	1020	978	1246	1393	1217	743	126	332	140	239	522	133	282	218	363	999
13	447	311	219	392	431	217	273	33	19			80	26	9	98	129	378
14	1659	618	573	878	1023	742	62	35	256	28	22	22	89	121	131	169	285
15	1084	1747	1783	3041	1621	771	1224	112	111	89	119	241	49	171	81	476	1136
16	1166	1357	1752	2264	1623	2186	2079	1892	1911	1038	2165	3049	2188	3921	1772	2179	1762
17	223	429	639	407	411	558	446		401	170	298	395	682	562	369	208	625
18	578	434	606	864	944	540	526	563	325	395	696	687	277	74	308	249	497
19	608	915	971	1042	2035	1414	1231	3700	927	924	1615	1560	2633	2447	2510	1617	812
20	1647	1061	666	2041	4119	1856	1490	2471	2381	1858	3556	2536	1904	4109	3498	1490	1081
21	906	345	359	742	2161	1569	1366	1257	1496	1952	1210	4577	1058	3080	1809	714	796
22	607	510	845	551	883	1971	2411	1226	714	1220	1201	4707	1901	3530	1741	730	188
23	407	42	130	495	1144	474	715	464	281	534	576	1623	677	1579	956	392	294
24	208	328	555	588	1082	1185	460	1749	652	379	540	846	1082	796	430	813	455
25	2377	993	322	436	441	732	473	593	459	392	968	450	506	1127	380	352	478
28	1614	1162	1239	2857	3920	3153	1994	4188	2244	2150	1955	5627	2920	7414	4914	1629	890
29	2300	1330	674	1487	3335	2618	2091	2044	2238	2060	4603	7198	3038	6525	4561	1956	684
30	2025	602	2771	4719	5067	7692	5381	5061	4737	4684	3916	14974	5662	8756	7340	3933	2438
31	546	186	354	347	385	944	319	414	82	461	754	1631	659	1393	563	374	32
32	598	596	1357	1040	1755	2391	1539	1916	1097	1244	2610	4308	2588	2597	2101	1375	1208
33	358	147	607	166	698	309	408	707	320	594	474	542	678	597	250	333	425
34	2675	1461	1886	2222	2627	3377	1790	3454	2514	3063	1756	2585	5831	3101	2362	1085	575
Total (1-19)	12288	11701	11709	13044	11990	7777	6659	6475	4291	2801	5168	6576	6139	7633	5578	5496	6649
s.e. (1-19)	796	627	611	1576	1182	724	812	2744	338	352	542	1246	802	812	691	398	790
Total (1-34)	28565	20459	23471	30732	39609	36046	27096	32019	23506	23398	29288	58180	34642	52237	36482	20673	6194
s.e. total (1-34)	2669	918	1237	2510	2620	3073	1788	3857	1414	1843	16736	4046	3454	3263	2152	1266	1145
total_700-1400	16269	8761	11765	17690	27615	28270	20438	25545	19214	20589	24121	51604	28503	44604	30904	15177	9545
s.e._700-1400	2544	664	1080	1958	2349	2988	1597	2721	1375	1816	1802	3849	3360	3161	2038	1201	829

Table 31. Greenland halibut (*Reinhardtius hippoglossoides*) age-length key in the 2020 survey.**MALE**

Length cm	age																total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+		
14-15	2																	2
16-17	1	4																5
18-19		2																2
20-21		4																4
22-23																		0
24-25		1	6															7
26-27			13															13
28-29			6	3														9
30-31				6														6
32-33			2	8	1													11
34-35				9	8													17
36-37				6	16													22
38-39				1	17	3												21
40-41					9	10												19
42-43					9	9												18
44-45					2	17												19
46-47					1	19	1											21
48-49						12	7											19
50-51						6	13	2										21
52-53							16	3	1									20
54-55							9	8	1									18
56-57							4	6	3	1								14
58-59								2	1	1								4
60-61									2	1	2	1						6
62-63											2							2
64-65												1						1
66-67																		0
68-69																		0
70-71															1			1
total:	3	11	27	33	63	76	50	21	8	3	4	2	0	1	0	0	0	302

Table 31 (cont.) Greenland halibut (*Reinhardtius hippoglossoides*) age-length key in the 2020 survey.**FEMALE**

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	2	1																3
16-17	3	1																4
18-19		1	1															2
20-21																		0
22-23		3	1															4
24-25		1	5															6
26-27		1	2															3
28-29			7															7
30-31			1	6														7
32-33			1	4	1													6
34-35				6	8													14
36-37				4	20													24
38-39				3	17	2												22
40-41					17	6												23
42-43					7	13												20
44-45					4	17	1											22
46-47					1	19	1											21
48-49						15	7											22
50-51						2	18	1										21
52-53						1	16	3	1									21
54-55							7	8	7	2								24
56-57							5	8	7	1	1							22
58-59								2	10	9	1							22
60-61									3	14	5	1						23
62-63									2	9	4	5						20
64-65										3	7	4	3	1				18
66-67											5	2	4	2				13
68-69											3	5	5	2				15
70-71												2	3	3				8
72-73												1	2	3			2	8
74-75													1	2	2			5
76-77															2	1		3
78-79															1	1		2
80-81																	1	1
82-83													1		1			2
84-85																	1	1
86-87																		0
88-89																	1	1
total	6	8	18	23	75	75	55	22	30	38	26	20	19	13	6	7		441

Table 32. Greenland halibut (*Reinhardtius hippoglossoides*) length frequency ('000) in the 2020 survey.

depths < 730 m

length	male	female	length	male	female	length	male	female
12-13		7	32-33	73	60	52-53	130	303
14-15	15	23	34-35	200	79	54-55	71	250
16-17	30	23	36-37	322	208	56-57	8	161
18-19	16	15	38-39	350	387	58-59	24	128
20-21	30		40-41	371	447	60-61	15	102
22-23		44	42-43	457	616	62-63		52
24-25	52	32	44-45	418	591	64-65	8	
26-27	110	36	46-47	368	525	66-67		8
28-29	79	68	48-49	272	512	68-69		26
30-31	45	37	50-51	226	430	total	3689	5166

depths < 1460 m

length	male	female	length	male	female	length	male	female
12-13		7	40-41	697	688	68-69		127
14-15	15	31	42-43	764	1007	70-71	7	98
16-17	30	23	44-45	736	952	72-73		77
18-19	16	15	46-47	720	894	74-75		28
20-21	29		48-49	533	930	76-77		25
22-23		44	50-51	369	768	78-79		17
24-25	52	39	52-53	293	804	80-81		10
26-27	110	36	54-55	261	712	82-83		19
28-29	79	67	56-57	95	541	84-85		8
30-31	55	47	58-59	36	530	86-87		
32-33	73	60	60-61	48	439	88-89		9
34-35	209	116	62-63	15	246			
36-37	389	274	64-65	17	160			
38-39	472	523	66-67		197	total	6120	10568

Table 33. Greenland halibut (*Reinhardtius hippoglossoides*) frequency at age ('0000) and strata in the 2020 survey.

age	strata																																		total	mean		
	3	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	28	29	30	31	32	33	34	Weight (g)	Length (cm)								
1	0		1	2		0	1				1	1																						1	7	25	15	
2	1		1	2		4	2	3		0	0	0	0		0	0																		0	15	67	20	
3		3	8	2		1	2	6	1	1	7	3	1	0	1	1																			0	38	153	27
4		1	4	1	0	2	0	9	2	3	16	7	2	2	5	1	0	0		0	0	1	0	2			3	1	1					62	330	34		
5			3	1	2	1	2	42	13	22	60	32	9	15	28	13	8	4	1	8	4	9	8	26	1	10	10	7						339	524	40		
6		1	1	1	4	0	0	58	23	15	67	55	30	25	49	31	23	11	7	16	15	20	13	45	2	25	23	17						576	758	45		
7					1			20	7	3	19	39	20	8	16	25	11	4	6	11	8	21	8	31	2	7	8	9						284	1135	51		
8								3	2	1	3	13	4	2	4	9	4	2	3	4	3	10	4	14	0	2	2	3						89	1375	55		
9								2	1	0	2	12	2	2	3	8	5	1	2	3	3	8	4	16			6	2	2					82	1557	57		
10								2	0	0	1	10	1	1	2	5	7	0	2	2	2	5	4	16			7	2	4					73	1810	60		
11								1	0	0	1	3		1	1	3	4		1	1	1	3	3	9			4	1	3					39	2131	63		
12								0		0	0	2		1	0	2	2		0	1	1	1	2	7			4	0	2					25	2420	65		
13												1		1		1	2		0	0	1	1	2	6			5	0	2					20	2864	69		
14												0		0		0	1		0	0	1	1	2	4			4		1					14	2950	70		
15																					1		0	3			1							5	4118	78		
16+																	0		1		0	0	1	2			2							6	4394	79		
Sets	1	4	7	3	1	7	7	8	3	7	8	7	2	2	5	6	6	4	2	3	3	6	6	10	2	2	2	4					128	976	47			
n	1	4	19	8	6	9	8	146	48	47	178	177	70	58	109	97	67	21	22	46	40	77	51	182	5	80	49	51					1673	16333				

Table 34. Greenland halibut (*Reinhardtius hippoglossoides*) abundance at age ('000) in the 1991-2020 surveys.

<730 m. strata (1-19)															
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1	1302	1677	1423	1429	9978	4699	2674	2200	852	3014	6459	3282	1768	1762	437
2	207	1260	1245	996	2045	6408	3036	1716	563	235	1153	2364	804	2644	652
3	348	447	777	1365	1793	1942	4822	6180	2419	479	1456	2248	489	3517	2554
4	1054	1023	692	1435	1535	2442	5225	8843	8419	1741	799	1342	1217	1585	2007
5	2307	1852	1021	1545	2136	3380	5714	9919	10787	5703	2242	3045	1991	5601	5537
6	1291	2249	1545	2385	4099	4680	6800	9085	10119	11336	6262	4498	2362	6271	6105
7	2212	1947	1627	2139	3029	2001	4014	6304	4467	4346	5328	4610	1552	2040	2345
8	534	1054	1266	1180	1706	1299	1731	2108	1466	1865	2584	1025	375	518	491
9	462	468	776	631	1052	341	528	600	280	361	147	104	105	233	89
10	352	273	213	219	209	70	177	157	82	92	36	48	79	107	97
11	141	138	104	90	53	21	23	27	6	44	5	16	15	63	44
12	12	67	38	47	18	31	17	6	3	0	0	6	4	38	15
13	0	25	21	18	0	0	17	16	3	0	0	0	0	5	3
14	0	12	9	0	5	4	0	0	5	0	0	0	0	3	3
15	15	0	0	0	0	5	6	0	0	0	0	0	0	3	3
16+	8	0	0	0	0	0	9	0	0	0	0	0	0	3	3
Total	10245	12490	10757	13479	27659	27323	34792	47160	39470	29216	26471	22587	10762	24390	20374
Freq 10+	528	515	385	374	285	131	249	206	99	136	41	70	98		
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	550	301	157	61	38			6	20	40	211	924	369	458	60
2	312	64	78	7	9		8			13	15	41	221	287	147
3	525	455	121	30	29		36	4	3		7	21	255	226	372
4	949	275	155	81	47	60	87	112	97	48	3	78	84	381	528
5	4800	2765	1203	606	894	880	822	643	1089	719	264	1067	1136	1655	2295
6	6002	5928	4586	2905	2469	2930	1827	1733	2315	3440	1826	3071	2705	2346	3307
7	2665	4632	4950	3255	2365	2850	1406	718	1566	2091	2256	2867	1687	1440	1323
8	623	1217	909	713	715	570	349	158	283	493	733	735	502	413	305
9	180	247	283	153	259	160	112	39	63	120	219	225	149	205	238
10	143	165	210	215	137	110	83	44	66	115	123	160	147	102	175
11	103	62	100	62	50		54	12	22	50	64	56	47	40	59
12	45	38	43	47	22	10	15	10	9	12	27	18	16	10	38
13	10	5	18	35	10		10	6	12	2	17	18	5	7	11
14		2	10	12	2		10	2	6		5	4	6	1	5
15			4	0			3	4	3		3			1	
16+			1	0			6	1	2		2			1	
Total	16907	16156	12825	8182	7046	7420	4823	3492	5156	7143	5775	9284	7330	7573	8863
Freq 10+	301	272	386	371	221	120	181	79	54	179	241	256	221	162	288

Table 34. (cont.) Greenland halibut (*Reinhardtius hippoglossoides*) abundance at age ('000) in the 1991-2020 surveys.

< 1460 m. strata (1-34)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	1710	438	550	310	160	60	38			6	20	40	210	926	369	458	66
2	2680	652	320	60	80	10	9		8			10	20	41	232	287	151
3	3580	2561	540	480	120	40	29	10	46	15	8	10	10	28	259	240	380
4	1880	2117	1110	360	200	100	137	110	200	393	200	150	10	363	152	758	621
5	8330	6470	7160	4700	2480	1380	2447	2270	2964	2583	3405	3110	710	5134	2610	3738	3393
6	11210	8314	10480	11130	11020	8330	7356	8200	7073	8608	9839	18180	5970	14080	7333	5408	5764
7	6060	4182	5730	10490	15340	13990	9587	10390	6124	5538	8415	17190	11310	15536	8776	4204	2835
8	1790	1206	1700	3530	3890	4340	3063	3140	2349	2005	1989	5650	4820	5902	3787	1611	887
9	890	318	510	880	1400	1140	1200	1360	920	643	548	2040	1800	2586	1933	1105	815
10	450	500	440	720	1060	1260	1019	1490	906	1026	780	1730	1300	2158	2671	1057	729
11	320	282	370	370	540	440	383	560	587	412	406	960	660	845	1129	620	387
12	200	161	180	210	300	340	213	320	233	349	182	360	280	333	647	252	248
13	180	74	60	80	160	310	151	270	126	153	235	210	190	382	364	121	201
14	70	47	30	60	120	170	114	140	114	73	131	230	100	115	232	98	140
15	80	9	10	20	80	50	59	50	75	103	55	150	80	152	122	93	46
16+	60	9	10	10	70	70	55	40	140	94	81	120	90	194	101	118	64
Total	39490	27340	29200	33410	37020	32030	25860	28350	21865	22002	26294	50140	27560	48774	30717	20168	16727
Freq 10+	1360	1082	1100	1470	2330	2640	1994	2870	2181	2210	1870	3760	2700	4178	5266	2359	1815

Table 35. Roughhead grenadier (*Macrourus berglax*) mean catch per haul by strata and the estimated biomass with their standard errors in the 2020 survey.

stratum	Area sq. miles	tow number	catch per tow (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				
8	646	7				
9	314	3	0.12	0.12	3	3
10	951	11				
11	806	9				
12	670	8	0.98	0.46	50	23
13	249	3	3.03	1.52	57	29
14	602	7	0.65	0.65	30	29
15	666	8	0.79	0.46	40	23
16	634	7	1.86	0.70	90	34
17	216	2	5.39	5.39	89	89
18	210	2	8.68	8.68	139	139
19	414	5	4.01	1.96	126	62
20	525	6	4.97	2.73	199	109
21	517	6	11.15	3.36	439	133
22	533	6	17.52	11.95	712	485
23	284	3	6.53	6.44	141	139
24	253	3	5.04	0.81	97	15
25	226	3	7.26	0.68	125	12
28	530	6	2.24	0.79	90	32
29	488	6	16.52	10.66	615	396
30	1134	11	8.30	2.15	717	185
31	203	2	2.28	0.95	35	15
32	238	2	5.53	0.84	100	15
33	98	2	3.66	1.19	27	9
34	486	5	3.12	1.35	115	50
Total < 1460 m.	16070	181	3.29	0.58	4037	717
Total <740 m.	10555	120	0.77	0.23	624	187

Table 36. Roughhead grenadier (*Macrourus berglax*) biomass by strata in 1988-2020 surveys.

Stratum	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
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
9	47	4		5	28	21	3	21	153	18	40	45	29	29		30	282
10	1								6	1		18	68	18		0	48
11												3	8	6			3
12	112	103	40	108	100	413	55	126	46	137	55	191	81	236	154	165	292
13	21	64	18	18	60	18	32	75	5	18	78	92	50	116	121	123	299
14	200	145	107	85	139		73	67	270	77	194	135	103	292	124	346	877
15	92	5	29	64	52	321	82	180	84	69	101	72	103	60	16	87	259
16	349	140	212	229	432	1333	523	256	397	211	405	150	225	338	272	352	594
17	134	45	31	180	123		98	129	27	116	204	96	67	370	380	101	244
18	311	128	143	356	215		756	414	154	224	189	313	219	383	27	877	423
19	743	227	273	289	429	915	352	282	187	322	424	129	92	216	116	245	228
20																	419
21																	1432
22																	1095
23																	897
24																	137
25																	344
28																	425
29																	3113
30																	3553
31																	650
32																	274
33																	118
34																	1131
total (1-19)	2009	871	852	1335	1577	3021	1975	1558	1362	1197	1691	1250	1047	2079	1211	2348	3597
s.e. (1-19)	264	142	149	250	270	487	169	223	277	169	243	338	196	284	176	611	362
total																	17184
s.e. total (1-34)																	1616

Table 36. (cont.) Roughhead grenadier (*Macrourus berglax*) biomass by strata in 1988-2020 surveys.

Stratum	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1																
2																
3																
4																
5																
6																
7																
8	65	13														
9	82	181	17	39												3
10	38	21											0	0		
11	2															
12	207	97	22	92	73	60	0	27	39	17	14	29	34	35	35	50
13	94	154	80	108	25	97	43	6				0	2	15	12	20
14	379	362	223	539	1	3	10	67	28	14	27	42	70	19	4	30
15	16	85	55	12		132	8		34	4	14	20	15	38	85	40
16	426	1391	242	493	213	79	112	134	122	102	26	80	108	125	62	90
17	124	603	70	385	40	278	38	111	134	52	142	62	77	110	123	89
18	588	435	491	610	194	685	445	235	422	173	202	100	227	195	178	139
19	366	592	167	683	235	69	73	32	29	36	51	37	70	91	84	126
20	182	353	144	269	130	355	78	88	47	101	25	120	94	55	263	199
21	996	763	755	1114	528	1135	1606	768	299	375	198	394	349	399	405	439
22	1115	1545	608	1735	1216	967	1610	945	537	747	658	669	548	376	906	712
23	463	342	332	399	305	388	506	325	382	168	251	259	113	264	229	141
24	1030	419	165	152	146	207	222	218	97	160	87	53	158	278	135	97
25	870	817	197	391	362	149	98	146	260	326	226	100	1093	276	668	125
28	695	610	299	360	273	338	137	68	70	29	57	89	184	141	57	90
29	1012	445	527	555	424	509	163	309	200	437	265	154	275	340	347	615
30	2869	1108	2139	3356	2560	2816	2965	1582	1224	836	887	1137	1023	1217	2313	717
31	327	235	242	176	225	107	295	137	60	199	270	153	113	123	127	35
32	267	132	86	222	197	242	172	63	100	80	117	92	361	94	264	100
33	17	122	105	38	12	57	112	54	22	42	39	89	43	28	40	27
34	330	511	305	410	144	419	145	162	191	212	146	154	171	159	155	115
total (1-19)	2387	3933	1367	2961	782	1403	729	612	807	399	478	373	616	625	590	624
s.e. (1-19)	281	700	314	611	209	201	409	258	141	113	147	86	143	142	201	187
total	12560	11336	7270	12139	7304	9091	8838	5476	4298	4111	3702	3836	5141	4375	6500	4037
s.e. total (1-34)	1420	1167	808	659	478	930	1212	678	475	407	300	403	914	356	1318	1318

Table 37. Roughhead grenadier (*Macrourus berglax*) age-length key in the 2020 survey.**MALE**

Length cm	age																total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	
3		1															1
4																	0
5		1															1
6		2															2
7		1	5														6
8			13														13
9			8	4													12
10			3	13													16
11				11	9												20
12				1	13	5											19
13					12	8											20
14					8	16	1										25
15					6	5	5	1									17
16						1	9	13	1								24
17							9	7	4								20
18							3	12	7	3							25
19								3	7	7							17
20									7	9	4						20
21										3	3	2	2				10
22											2	2	1	1			6
23												1	2	1			4
24												1					1
25												1		1			2
total		5	29	29	48	35	27	36	26	22	9	7	5	3			281

Table 37 (cont.) Roughhead grenadier (*Macrourus berglax*) age-length key in the 2020 survey.**FEMALE**

Length cm	age																total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	
5		3															3
6		1															1
7		1	3														4
8			3														3
9			12	3													15
10			1	6	1												8
11				12	5												17
12				3	17	2											22
13					11	10											21
14				1	7	10	1										19
15					3	11	6										20
16						2	12	7									21
17							5	8	5	2							20
18							3	7	4	1							15
19							1	4	7	3							15
20								1	2	6	2						11
21										4	6	3					13
22										1	3	1	2	1			8
23										2	2	5	1	1			11
24											2		2	2	5		11
25												1	5	1	1		8
26													3	4			7
27														4	2	2	8
28														5	4	6	15
29														1	3	5	9
30														2	1	8	11
31																12	12
32																8	8
33																10	10
34																3	3
35																2	2
36																1	1
37																	0
38																1	1
39																1	1
total		5	19	25	44	35	28	27	18	19	15	10	13	21	16	59	354

Table 38. Roughhead grenadier (*Macrourus berglax*) length frequency ('000) in the 2020 survey.

depths < 730 m. strata (1-19)											
length	indet.	male	female	length	indet.	male	female	length	indet.	male	female
3	26	8		14		7	25	25			7
4				15		9	24	26			7
5	7		8	16		44	26	27			
6				17		45	63	28			
7		15		18		78	47	29			8
8		7		19		69	25	30			7
9		28	9	20		61	26	31			8
10			16	21		67	22	32			
11		9	16	22		18	44	33			
12		40	27	23		18	23	34			8
13		16	15	24							
								Total	34	539	462

depths < 1460 m. strata (1-34)											
length	indet.	male	female	length	indet.	male	female	length	indet.	male	female
2	8			17		324	204	32			67
3	49	8		18		380	151	33			79
4				19		224	125	34			23
5	38	7	23	20		197	99	35			15
6	39	22	4	21		89	105	36			7
7	15	46	29	22		50	60	37			
8	15	92	22	23		34	114	38			8
9		97	121	24		8	86	39			9
10		121	68	25		14	62				
11		207	163	26			45				
12	9	302	189	27			54				
13		382	211	28			117				
14		234	204	29			77				
15		293	227	30			84				
16		403	196	31			92	Total	171	3534	3141

Table 39. Roughhead grenadier (*Macrourus berglax*) frequency ('000) at age and strata in the 2020 survey.

Age	strata																				total	mean	
	9	12	13	14	15	16	17	18	19	20	21	22	23	24	25	28	29	30	31	32		Weight (g)	Length (cm)
1						17								5		13	5				40	2	3
2			9			25				10	31			24	15	18	12	8			167	16	5
3			14	7			26	1		49	73	19	10	18	20	19	53	72			402	56	8
4		6	6			2	12	20	1	30	114	48	7	28	9	35	60	76		7	489	111	11
5	3	13	1	6	1	18	11	30	12	57	195	128	21	46	14	77	125	280	4	55	1136	191	13
6	3	8	1	9	4	7	12	12	8	35	124	87	25	25	16	52	91	253	11	47	855	236	14
7	3	14	15	8	3	14	13	7	24	6	72	54	28	3	46	21	56	252	11	43	719	375	16
8	1	21	22	16	3	14	18	19	40	4	67	70	28	1	50	20	61	270	15	55	831	436	17
9		13	13	10	11	10	15	21	32	2	28	60	10	1	20	13	53	140	10	34	517	530	18
10		11	17	8	13	4	17	35	25	2	21	61	13	6	5	10	45	91	9	21	423	648	20
11		5	9	1	5		11	30	11	4	10	36	8	6		3	28	26	5	4	208	819	21
12		4	3		1		7	22	9	1	10	45	2	3	3	4	24	7	3		149	957	23
13		2	1		4		11	20	7	6	7	43	2	6		1	16	10	1		142	1106	24
14		2			4	1	5	8	3	9	23	57	6	10	7	1	31	10	1		180	1489	26
15						3			2	5	18	37	6	9	6		22	12			125	1590	27
16+						20			5	40	60	105	27	10	10	8	106	52			464	2505	31
Sets	1	5	2	2	3	6	1	1	5	6	6	6	2	3	3	6	6	11	2	2	86	551	16.6
n	9	99	112	66	50	137	158	225	178	261	852	851	190	200	223	294	786	1559	71	266	6846	3776	

Table 40. Roughhead grenadier (*Macrourus berglax*) abundance at age ('000) in the 1994 - 2020 surveys.

<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	2015	2016	2017	2018	2019	2020
1			129		51	15	3	63	39	467	216	109	10	12	5	3	30	18	9	14	16	18	15	34	37	17	
2	46	107	56	46	128	36	77	208	189	2139	466	267	353	23	79	15	73	48	49	31	63	112	255	178	171	86	34
3	136	209	110	186	227	49	108	271	220	1077	3119	362	438	59	228	31	232	76	79	26	25	73	81	170	110	157	49
4	487	467	224	153	236	216	50	120	57	672	1009	762	392	35	219	42	107	69	14	27	30	41	68	78	53	136	47
5	507	861	351	157	138	199	283	283	108	618	877	628	501	87	170	25	81	39	25	22	5	21	34	115	75	138	95
6	570	592	586	450	346	247	277	445	189	635	1105	544	561	202	285	96	66	54	24	15	0	32	36	59	77	104	65
7	566		351	613	725	445	218	540	290	843	810	499	719	268	458	94	128	63	40	32	8	40	49	71	65	85	99
8	493	458	338	162	907	616	231	505	283	901	955	593	519	298	743	168	446	119	98	118	16	63	59	58	78	73	154
9	379	263	216	158	250	422	339	510	241	535	962	413	487	178	536	87	492	199	124	126	37	58	39	44	46	26	127
10	181	113	264	98	226	197	338	666	266	474	896	579	577	345	471	48	347	251	129	203	52	99	37	97	50	48	130
11	109	35	254	151	135	109	72	231	203	472	465	371	727	172	431	82	224	122	154	233	88	86	47	59	22	46	74
12	82	23	93	164	182	80	95	131	244	236	392	167	396	108	162	56	113	70	84	115	90	58	39	36	26	41	46
13	40	19	38	124	152	55	57	80	75	88	147	227	293	95	318	56	62	43	44	25	52	56	24	47	56	41	46
14	15	5	34	42	76	61	55	104	63	31	89	191	211	77	79	49	61	33	23	32	22	23	28	65	38	35	22
15	27	15	4	42	48	33	23	55	19	18	18	21	195	39	179	43	21	18	14	12	15	21	23	34	43	22	4
16+	9		10	18	34	3	33	76	64	73	60	33	215	72	116	94	19	25	3	18	14	11	16	31	65	55	26
Total	3647	3685	3060	2564	3862	2783	2259	4288	2550	9278	11584	5765	6593	2069	4479	988	2501	1247	911	1049	533	811	851	1175	1010	1095	1035

Table 40 (cont.). Roughhead grenadier (*Macrourus berglax*) abundance at age ('000) in the 1994 – 2020 surveys.

< 1460 m. strata (1-34)

Age	Year																
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	461	391	34	51	52	19	37	39	52	71	103	70	36	34	49	50	40
2	856	719	602	81	549	143	125	172	177	178	244	501	648	494	304	307	167
3	6380	1420	855	222	1086	306	622	395	405	279	221	482	575	863	648	793	402
4	2989	2303	1532	321	1268	419	616	509	349	320	298	531	818	902	767	1685	489
5	2576	2425	1399	543	1269	253	755	587	409	316	232	503	697	1303	1181	2023	1136
6	3062	2695	2316	1063	1578	954	1084	775	348	435	346	657	733	545	879	1487	855
7	2552	2069	2351	1209	1954	936	1054	1009	572	533	344	688	713	791	873	1059	719
8	3215	2418	1184	1285	2010	1680	2392	1466	1052	836	507	593	602	717	1003	963	831
9	2670	1442	1737	770	1649	866	1451	1241	919	610	436	449	405	365	554	386	517
10	2282	1666	1643	1109	1454	476	911	1160	517	638	300	442	347	698	382	451	423
11	1863	1123	1409	697	1333	824	685	652	650	583	350	295	294	409	234	387	208
12	1374	676	739	473	626	564	565	660	491	317	441	219	204	299	254	275	149
13	670	1090	823	412	1170	563	461	516	429	116	350	316	200	357	252	332	142
14	416	1007	566	432	348	490	510	570	307	247	259	125	214	420	160	271	180
15	178	298	478	272	718	434	255	460	215	138	237	280	228	256	193	167	125
16+	1130	1113	1069	944	887	959	692	1044	373	443	372	338	352	468	457	746	464
total	32674	22855	18737	9884	17951	9886	12215	11255	7265	6059	5039	6487	7066	8920	8190	11382	6847

Table 41. Squid (*Illex illecebrosus*) biomass (t.) by strata and total abundance ('000) in 1988-2020 surveys.

Strata	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
1			15	0	0		17		0		8				
2	1	0	120	18	12		19		6	8	17	3		0	0
3			9	93	1		6		12	3	5	1		1	0
4			3	3	4		8		3	1	3	0			0
5	1	4	1090	4	20		58	0	26	9	12	3		0	0
6		0	468	472	4		10	0	6	8	6	1			0
7	1		22	130	1	0	8		5	3	1	1		0	0
8			1	29	3	0	8		13	3	8	1		0	0
9		1	24	4	3		6		3	4	1				0
10	3	4	216	646	17	0	81		28	18	20	3		1	1
11			128	40	12		27	0	3	13	4	3		1	0
12				1				0	3	1	1	1	1	1	1
13				1			8			1	0	0	0		0
14			4	22	4		5	0	4	6	4	1		1	
15			5	13	3		4		1	1	0	1	0	1	1
16				4					0	1	1	1	1	1	1
17					0		1			0		0	0		1
18		0	1		1		4			0	0			0	
19				3	0		0	0	1	1	1	1	0	1	1
20															
21															
22															
23															
24															
25															
28															
29															
30															
31															
32															
33															
34															
Total (1-19)	6	9	2107	1483	83	1	269	1	113	81	92	22	3	10	8
s.e. (1-19)	4	4	604	395	18	1	33	1	15	12	12	4	1	3	3
Total (1-34)															
s.e. total (1-34)															
Abundance (1-19)	67	86	21184	17064	1114	32	3749	62	1561	1104	1481	801	182	608	457
Abundance (1-34)															

Table 41 (cont.) Squid (*Illex illecebrosus*) biomass (t.) by strata and total abundance (('000) in 1988-2020 surveys.

Strata	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	5	42	2	385	1	7	13	0	1	1				18	0	10		
2	29	36	7	1181	10	1736	296	6	14	11				0	383	4	86	4
3	8	19	2	8	62	66	158	1	1	1		0		0	630	1	33	2
4	2	51	2	130	0	6	17			1		0		0	31	3	41	
5	81	89	5	1457	40	357	285	3	2	8		0			114	15	22	14
6	5	26	4	222	58	37	21	3	3	0					259	2	37	28
7	22	39	6	28	38	48	34	3	1	1		0		1	294	2	1	10
8	8	8	1	7	24	38	36	2	4	0		1		0	19	1	43	2
9	2	25		1	22	16	345		5						10	8	8	1
10	25	52	17	26	56	2560	359	16	24	8		0			323	5	28	19
11	12	36	13	86	88	104	41	3	28	5		0		1	227	5	20	57
12	6	11	1	3	2	2	23			0					0	1	16	1
13	0	9	1				0								1		5	
14	10	15	4	1	6	106	52	5	5			0			17	1	5	1
15	6	3	6	4	3	49	2		0						18	0	5	2
16	1	4	4			2	0									0	2	
17	0	1	2			0		0							4			0
18	1	1	0			1	3			1					1			
19	1	3	2	1		0	1								1		0	
20		1	3	0			0									1		
21		0		0		1	0											
22		0	0	0					0							1		
23		1		0														
24		1	1				1									0		
25				1		1	0								0		0	
28		1	0	5			0								2		0	
29				2			0			1					3			
30		1		3		1	1			0				1	9			
31		1					2											
32				0						0								
33		2																
34		2				4	1			2					2	1	1	
Total (1-19)	222	470	79	3541	411	5137	1688	43	89	38		3		3	2350	49	363	142
s.e. (1-19)	60	55	8	1244	64	2392	346	7	19	8		1		1	490	6	50	22
Total (1-34)		479	83	3551	411	5144	1694	43	90	41		3		4	2366	52	365	142
s.e (1-34)		55	8	1244	64	2392	346	7	19	8		1		1	490	7	50	22
Abundance (1-19)	3898	4675	1463	28614	5793	48476	23029	616	699	695		83			683	3093	1679	
Abundance (1-34)		4944	1711	28953	5793	48563	23112	616	707	765		83			712	3105	1679	

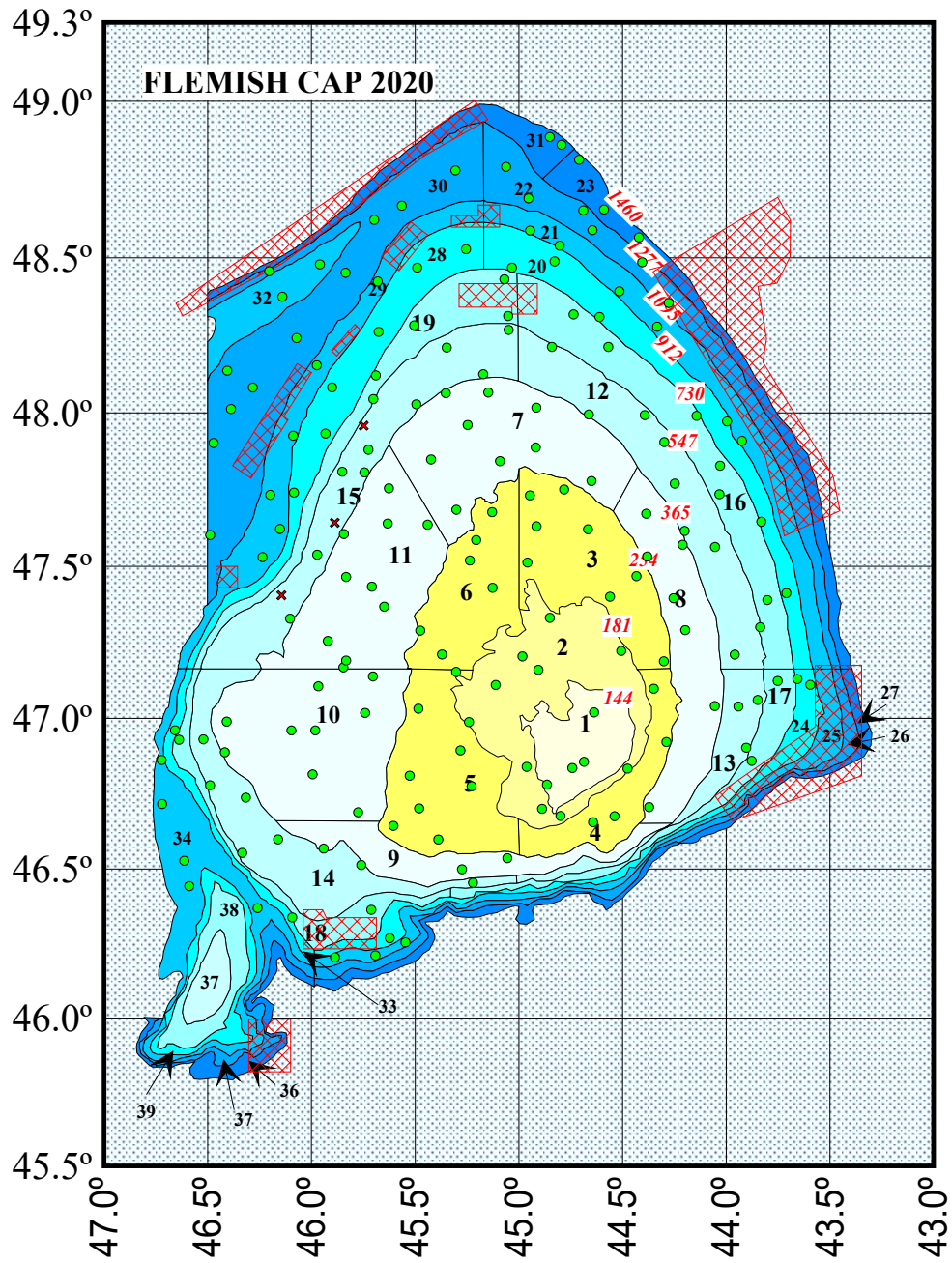


Figure 1. Haul positions in the Flemish Cap survey 2020. Coral and sponge protection areas (red squares); valid hauls (green circles); invalid hauls (red crosses).

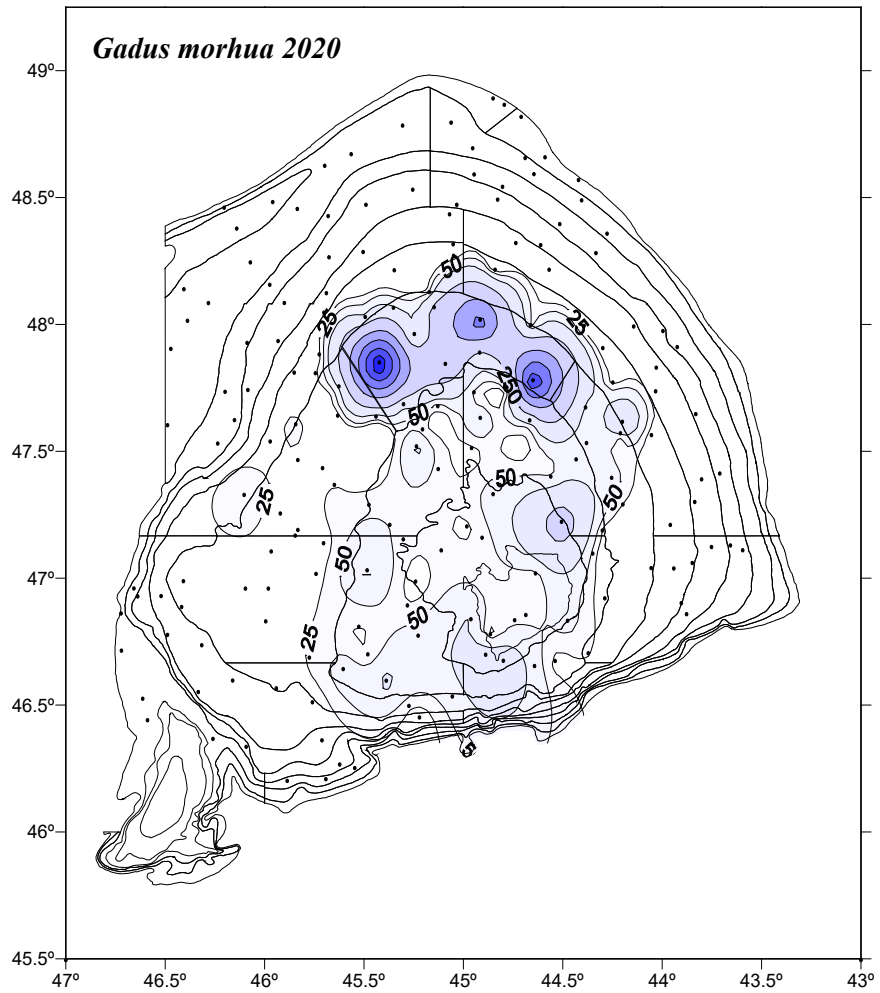


Figure 2. Cod (*Gadus morhua*) catch (kg.) distribution in the 2020 survey.

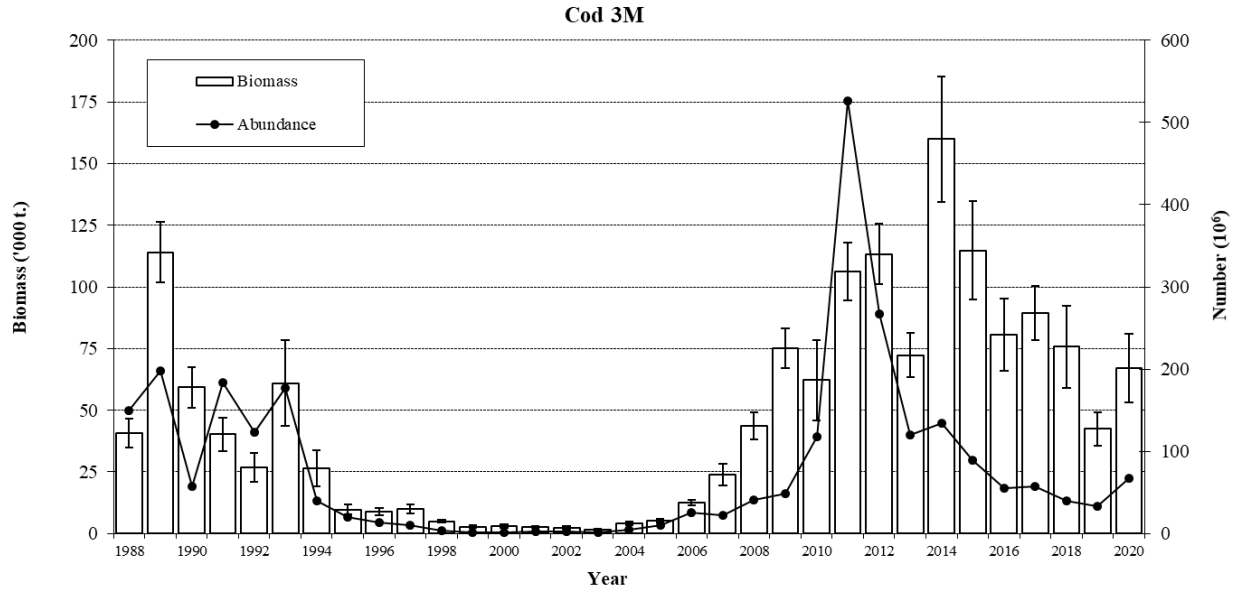


Figure 3. Cod biomass (t.) ± S.E. and abundance 1988-2020.

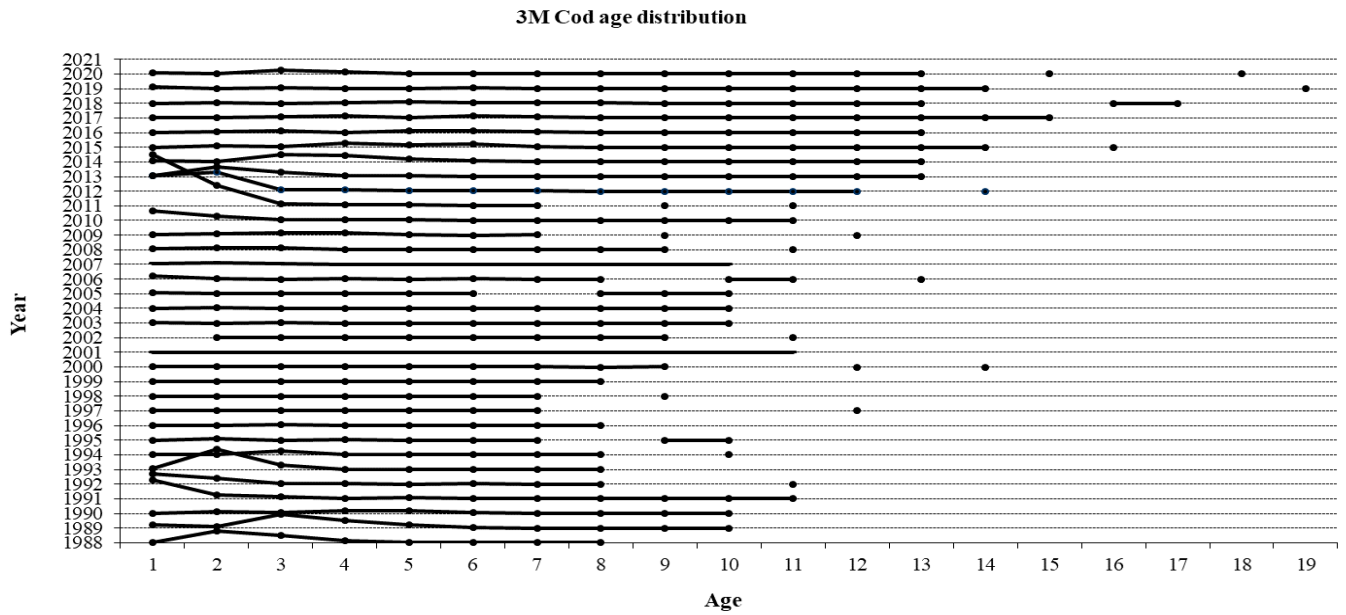


Figure 4. Cod age distribution in Flemish Cap NAFO 3M 1988-2020.

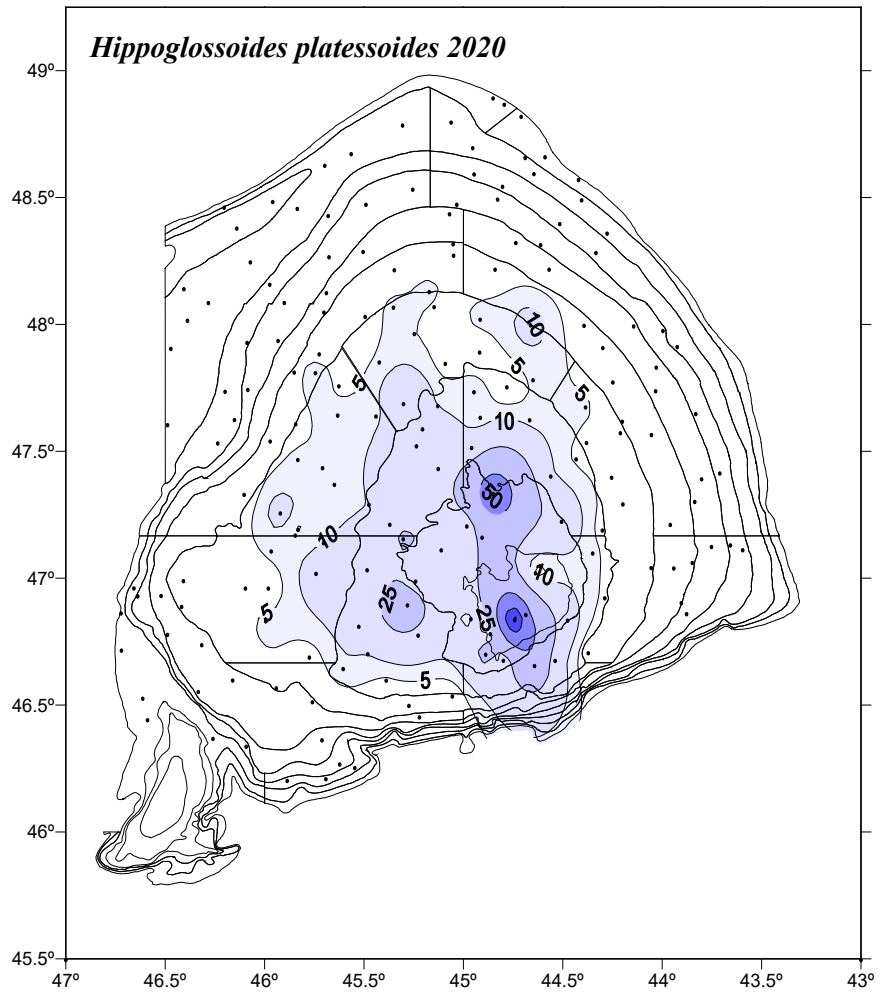


Figure 5. American plaice (*Hippoglossoides platessoides*) catch (kg) distribution in 2020 survey.

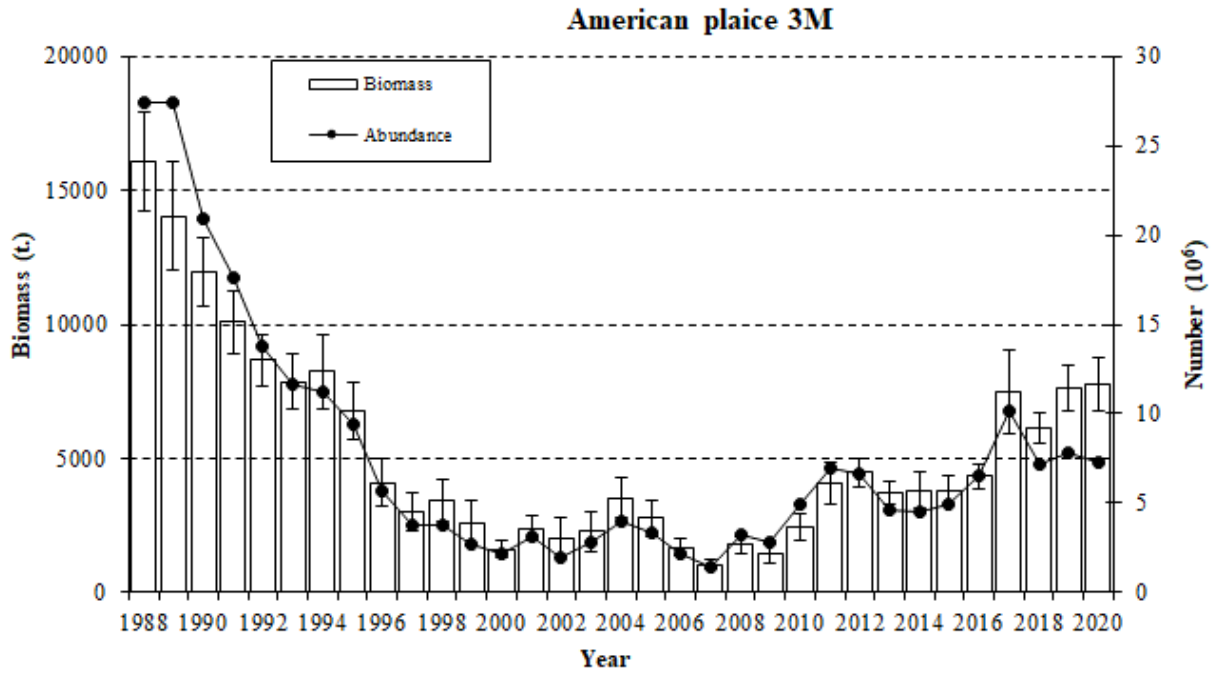


Figure 6. American plaice (*Hippoglossoides platessoides*) biomass (t.) ± S.E. and abundance 1988-2020.

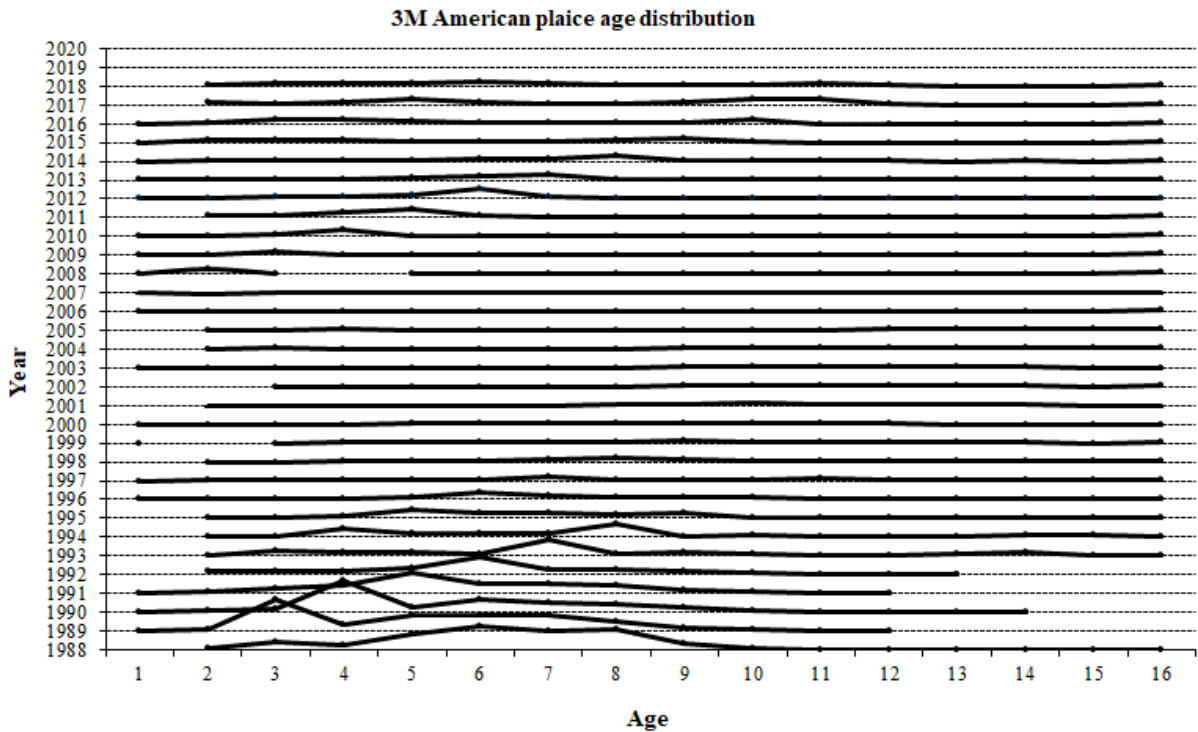


Figure 7. American plaice age distribution on Flemish Cap, NAFO Div. 3M: 1988-2020. 2019 AND 2020 NOT YET AVAILABLE.

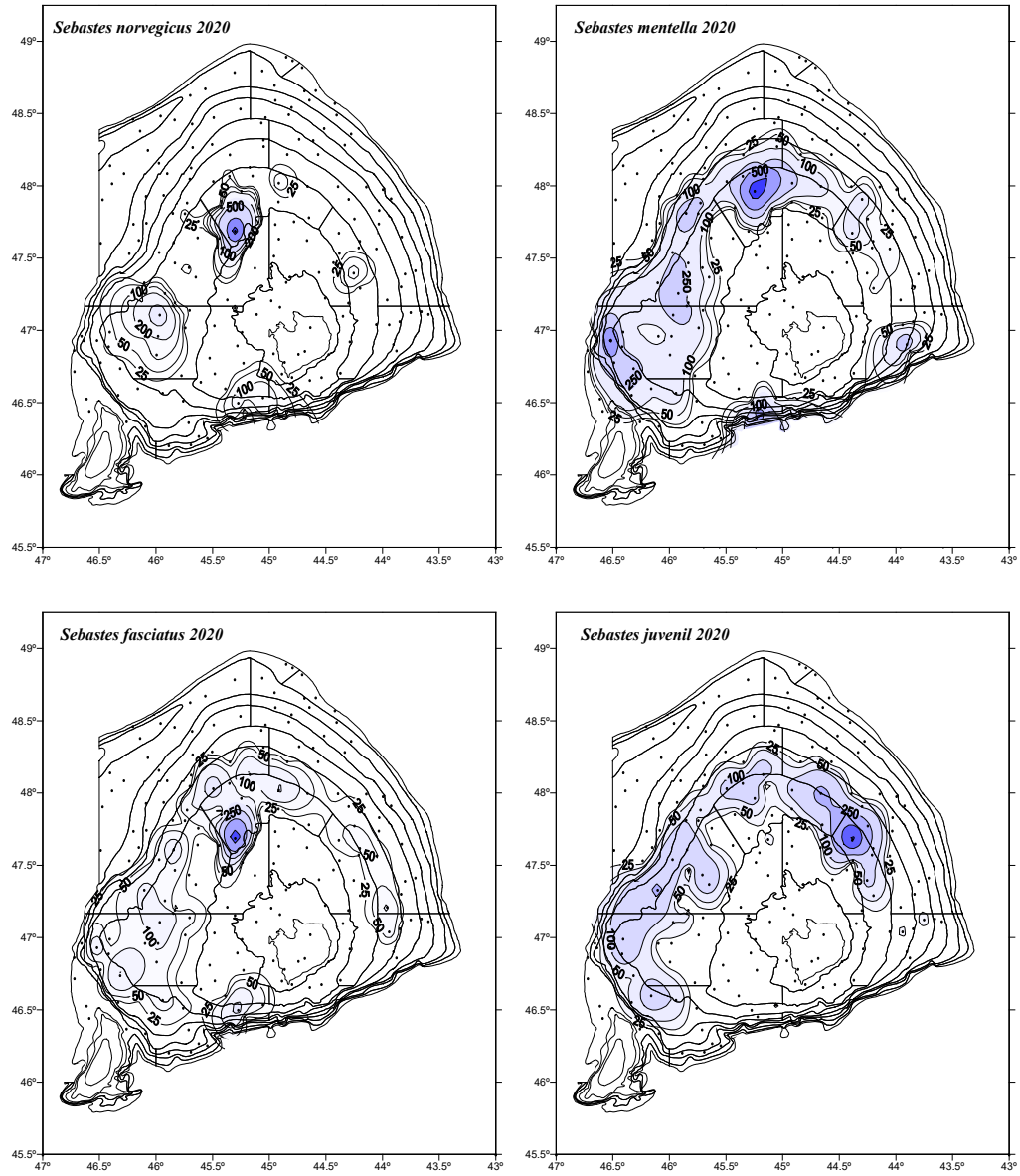


Figure 8. Catch distribution (kg) of *S. norvegicus*, *S. mentella*, *S. fasciatus* and *S. juvenile* in 2020 survey.

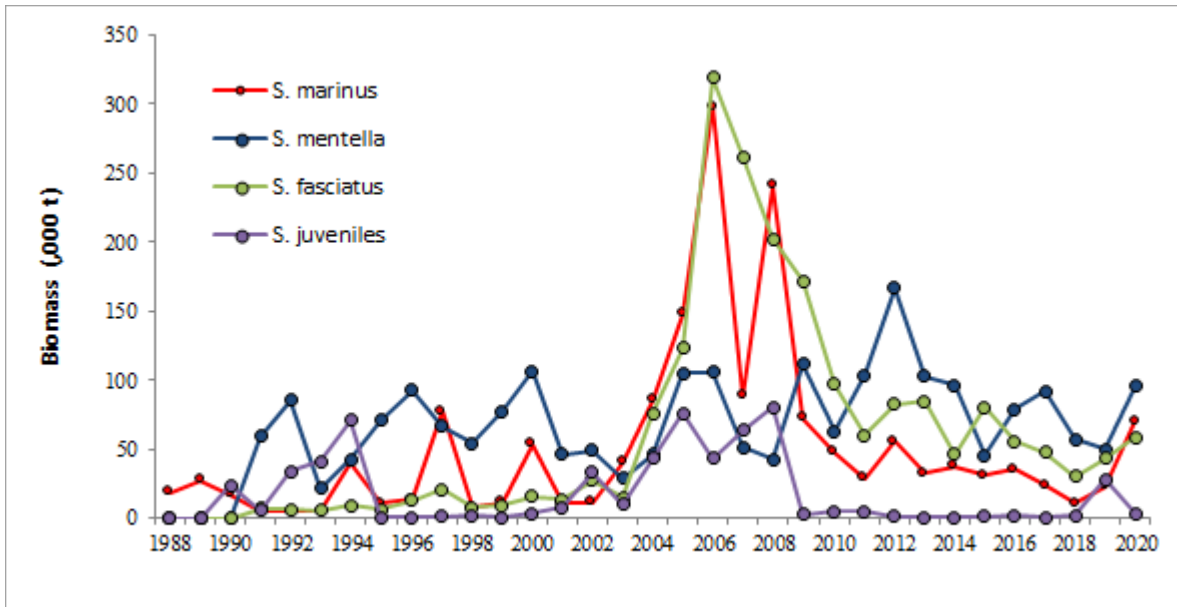


Figure 9. Redfish species biomass (t.) 1988-2020.

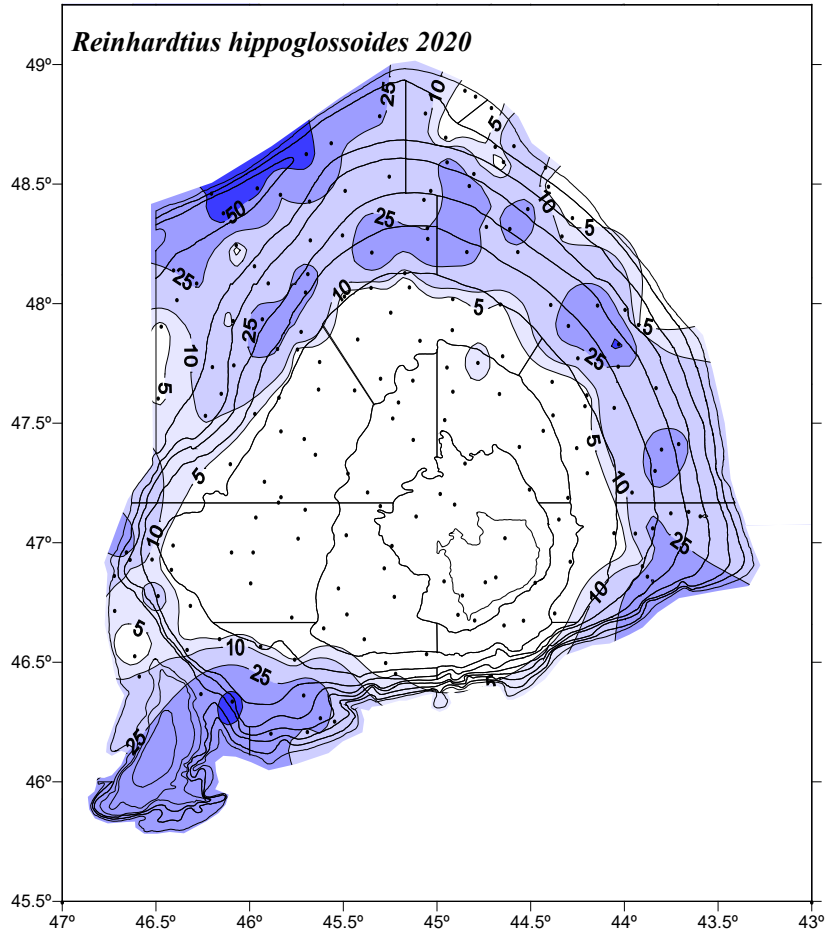


Figure 10. Greenland halibut (*Reinhardtius hippoglossoides*) catch distribution (kg) in 2020 survey.

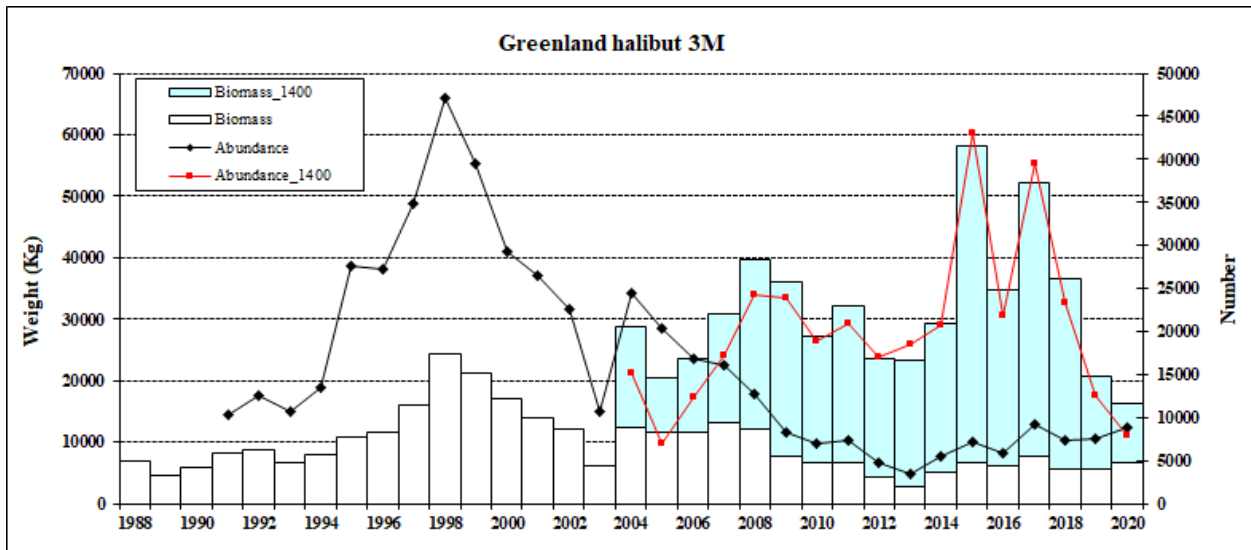


Figure 11. Greenland halibut (*Reinhardtius hippoglossoides*) biomass (t) ± S.E. and abundance 1988-2020.

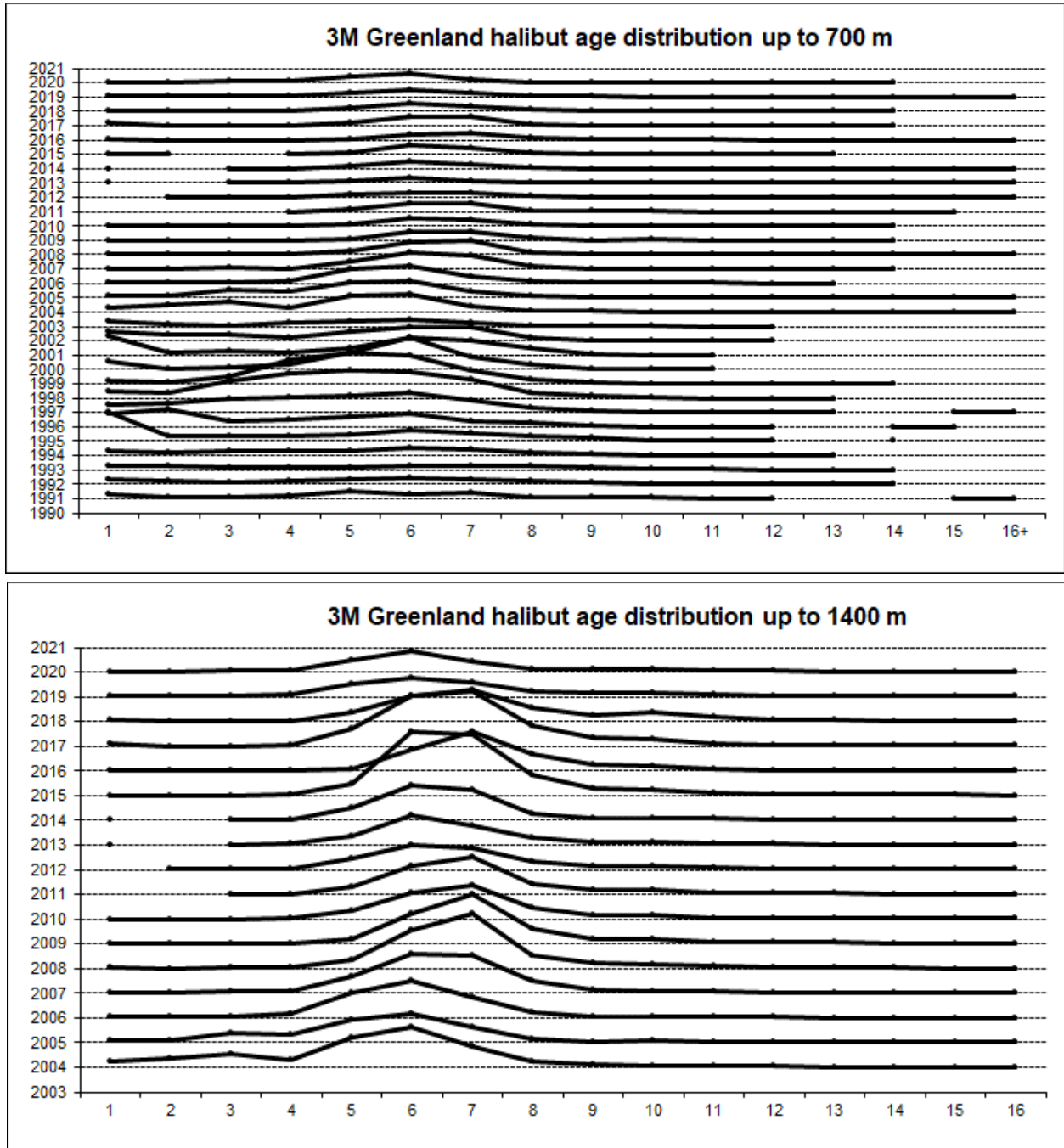


Figure 12. Greenland halibut (*Reinhardtius hippoglossoides*) age distribution on Flemish Cap in depths < 730 m (up, 1988-2020) and until 1440 m (bottom, 2004-2020), NAFO Div. 3M.

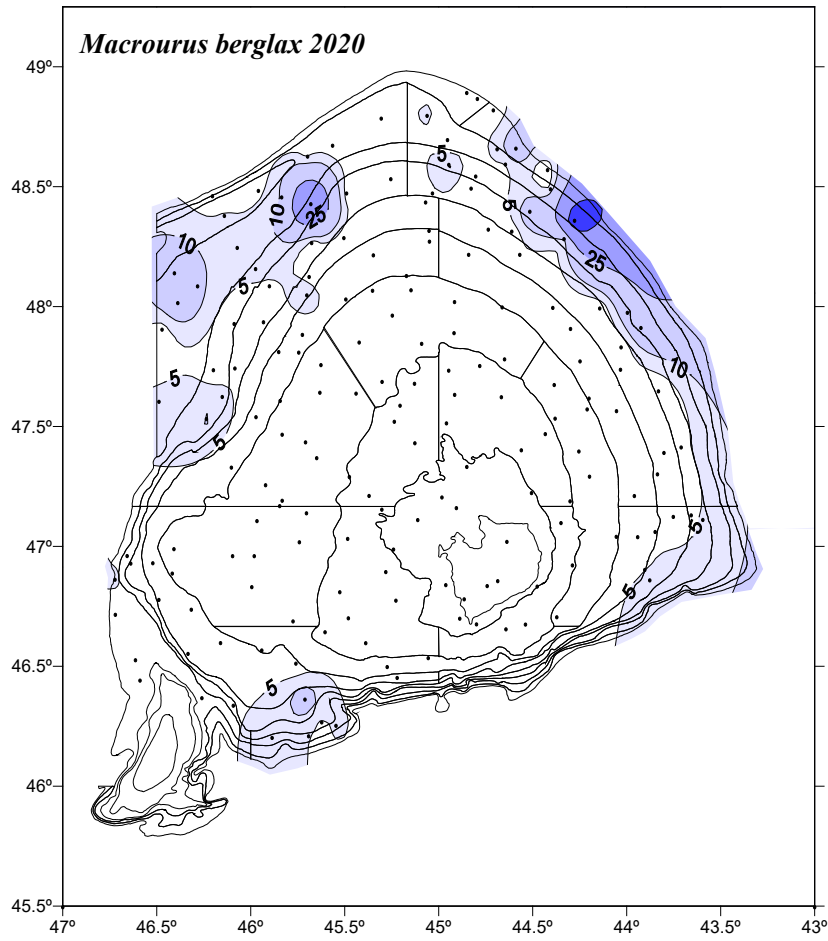


Figure 13. Roughhead grenadier (*Macrourus berglax*) catch distribution (kg) in the 2020 survey.

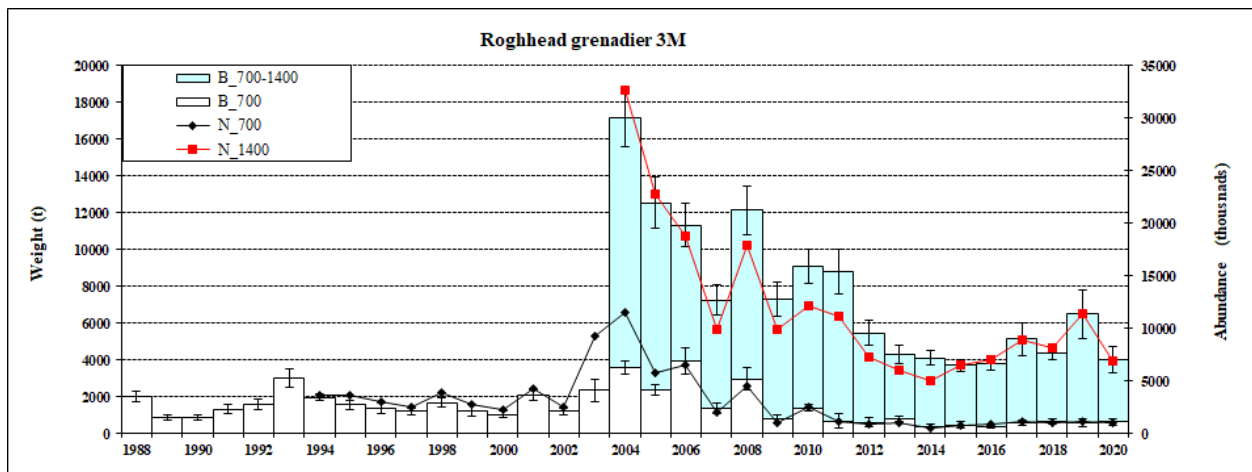


Figure 14. Roughhead grenadier (*Macrourus berglax*) biomass (t.) ± S.E. and number ('000) 1988-2020.

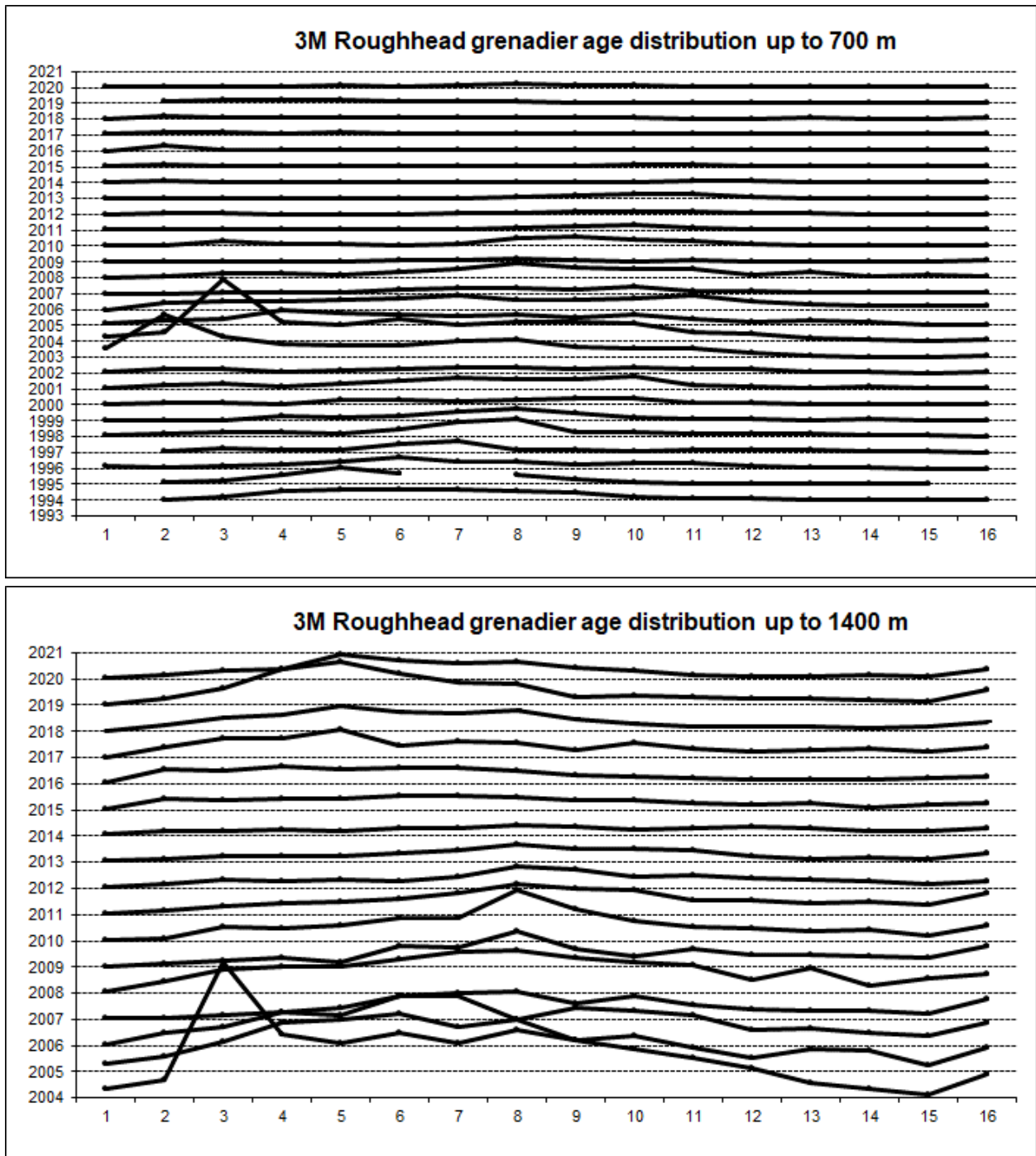


Figure 15. Roughhead grenadier (*Macrourus berglax*) age distribution on Flemish Cap in depths < 730 m (up, 1988-2020) and until 1440 m (bottom, 2004-2020), NAFO Div. 3M.

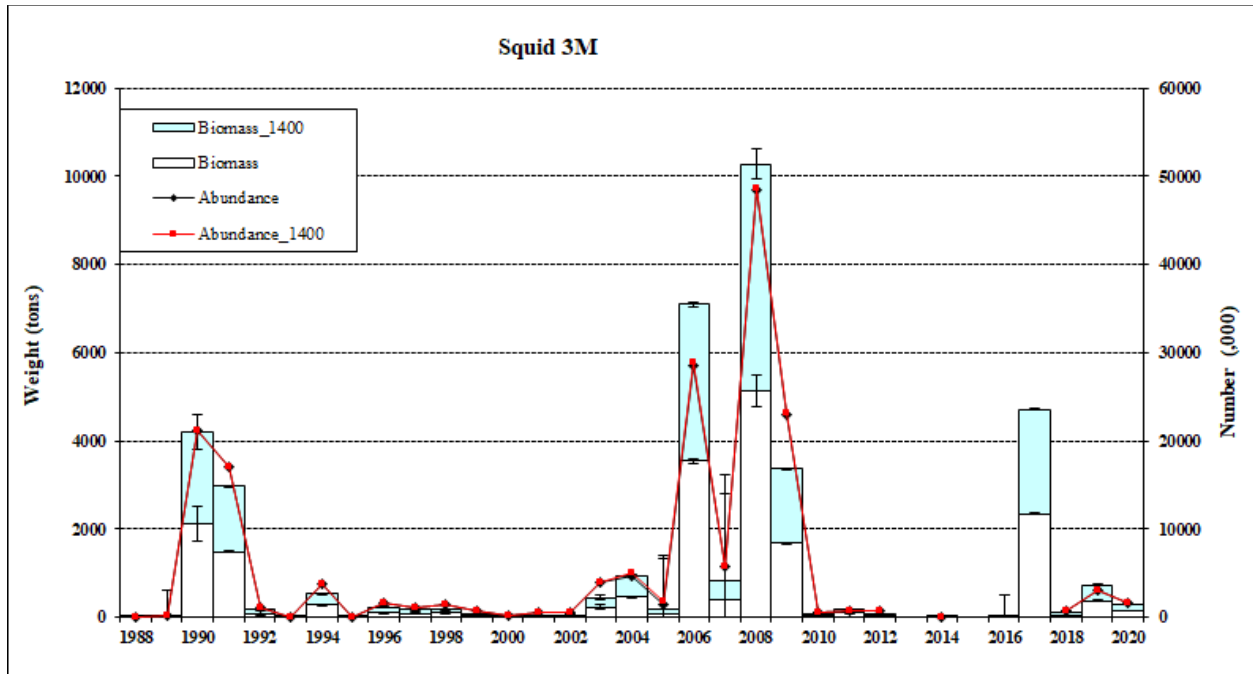


Figure 16. Squid (*Illex illecebrosus*) biomass (t.) \pm S.E. and number ('000) 1988-2020.