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Stock Abundance Indices and Length Compositions of Demersal Redfish and Other Finfish in NAFO Sub-area 1 and near bottom water temperature derived from the German bottom trawl survey 1982-2010 with particular reference to GLM survey standardization

by

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Abstract

Survey abundance, biomass estimates and length compositions for golden and deep sea redfish >= 17 cm (*Sebastes marinus* and *S. mentella*), juvenile redfish <17 cm, American plaice (*Hippoglossoides platessoides*), Atlantic and spotted wolfish (*Anarhichas lupus* and *A. minor*) and thorny skate (*Raja radiata*) in Division 1C to 1F are presented. In 2010, time series for the indices were calculated based on exact swept areas. For golden redfish, American plaice and both species of wolffishes, stocks sizes have declined significantly until the early 1990s and remained at a low level since until 2000. Since then, abundances increased only slightly and for 2010, indices are well below the average values from the 1980's. For thorny skate, abundances increased in the early 1990s and for deep-sea redfish in the late 1990s. All upward trends observed until 2004-2007 have declined in 2008 and 2009. But for 2010, the declining trend was reversed for all species considered. For thorny skate, the lowest biomass estimate for the whole times series was found in 2009. All stocks considered are presently composed of small and mainly juvenile specimens except for spotted wolffish. Near bottom water temperature continued to be high (since 1996). The former maximum of the time series observed in 2003 (5.28 °C) was superseded by the 2010 value (5.42 °C).

1 Introduction

This paper presents estimates of stock abundance and biomass indices disaggregated by length as derived from annual German groundfish surveys for golden and deep sea redfish >= 17 cm (*Sebastes marinus* and *S. mentella*), juvenile redfish <17 cm, American plaice (*Hippoglossoides platessoides*), Atlantic and spotted wolfish (*Anarhichas lupus* and *A. minor*) and thorny skate (*Raja radiata*). The surveys commenced in 1982 and represent the longest time series of quantitative information from the traditional fishing grounds off West Greenland south of 67° northern latitude. Environmental conditions are reflected as trends in near bottom water temperatures. The information is presented as an update of continued analyses of the survey results (Rätz, 1999; Rätz and Stransky, 2003.)

2 Materials and Methods

Abundance, biomass estimates and length structures were derived from annual groundfish surveys covering shelf areas and the continental slope off West Greenland. Surveys commenced in 1982 and were primarily designed for the assessment of cod. Because of favourable weather and ice conditions and to avoid spawning concentrations, autumn was chosen for the time of the surveys. These were carried out by the research vessel (R/V) WALTHER HERWIG (II) throughout most of the time period. In 1984 R/V ANTON DOHRN was used and she was replaced by the new R/V WALTHER HERWIG III since 1994, respectively.

The surveys were primarily designed for the assessment of cod. In order to reduce the error of abundance estimates, the subdivision of shelf areas and the continental slope into different geographic and depth strata was required due to a pronounced heterogeneity of cod distribution. The survey area was thus split into four geographic strata. Each stratum was itself subdivided into two depth strata covering the 0-200 m and 201-400 m zones. Figure 1 and Table 2 indicate the names of the 8 strata, their geographic boundaries, depth ranges and areas in nautical square miles (nm2). All strata were limited at the 3 mile offshore line.

The applied strategy was to distribute the sampling effort according both to the stratum areas and to cod abundance. Consequently, fifty percent of the hauls were allocated proportionally to strata by stratum area while the other fifty percent were apportioned on the basis of a review of the historical mean cod abundance/nm², all hauls being randomly distributed within trawlable areas of the various strata. Non-trawlable areas were mainly located inshore. During 1982-2002, 1 697 successful sets were carried out, the numbers of valid sets by year and stratum being listed in Table 3. In 1995 and since 2001, the survey area off West Greenland was incompletely covered due to technical problems. Only 75 % of the strata of West Greenland were covered in 2005. Figure 1 shows the positions of hauls conducted during the most recent survey.

The fishing gear used was a standardized 140-feet bottom trawl, its net frame rigged with heavy ground gear because of the rough nature of the fishing grounds. A small mesh liner (10mm) was used inside the cod end. The horizontal distance between wing-ends was 25 m at 300 m depth, the vertical net opening being 4 m. In 1994, smaller Polyvalent doors (4.5 m², 1,500 kg) were used for the first time to reduce net damages due to overspread caused by bigger doors (6 m², 1,700 kg), which have been used earlier. Fish were identified to species or lowest taxonomic level and the catch in number and weight was recorded. Total fish lengths were measured to cm below.

Hauls, which received net damage or became hang-up after less than 15 minutes, were rejected. Some hauls of the 1987 and 1988 surveys were also included although their towing time had been intentionally reduced to 10 minutes because of the expected large cod catches as observed from echo sounder traces. The coefficient of catchability was set arbitrarily at 1.0, implying that estimates are merely indices of abundance and biomass. The towing time was normally 30 min. at a speed of 4.5 knots (Table1). Stratified abundance estimates were calculated from catch-per-tow data using the stratum areas as weighting factor for the arithmetic means (Cochran, 1953; Saville, 1977). All calculations of abundance and biomass indices were based on the 'swept area' method using 22 m horizontal net opening as trawl parameter, i. e. the constructional width specified by the manufacturer.

In previous years, the conversion of catch-per-tow (C_{tow}) to catch per nautical square mile C_{sqnm} was achieved by using towing time:

$C_{sqnm}=C_{tow}$*30 minutes/trawled time*84.1616/2.25

Henceforth, catch is related to the actual distance trawled and thus directly linked to the area swept:

$C_{sqnm}=C_{tow}$/distance *84.1616

Respective confidence intervals (CI) were set at the 95% level of significance of the stratified mean.

Near bottom water temperature was measured directly before or after a trawl haul be means of a CTD sonde.

3 Survey standardization

Strata with less than five valid sets were rejected from the calculation of biomass and abundance indices.

(1) To account for missing strata, a further experimental General Linear Model (GLM) index was calculated for biomass assuming multiplicative effects of year and stratum on biomass, which implies log-transformation of the catch data C. The GLM delivers standardized survey estimates by year and stratum:

$\log (C_{tow}+1) = \alpha + ß1\ year + ß2\ stratum + e \quad (=a)$

Accordingly, residuals are assumed log-normally distributed. Specific treatment of zero catches is required (here: unit value is added to every catch datum) and backtransformation to the stratum mean follows

$C_{stratum,year} = \exp(a + b/2)-1$

where a is the mean by stratum and year and b is the corresponding stratum variance. Using the stratum variance improved the performance of the GLM considerably as compared to cases when the variance of the mean was applied. The addition of b/2 accounts partly for negative bias due to log-transformation. Though the addition and subtraction of unit value to the catch prior to transformation is incorrect, for catch rates the application of the log-normal model is likely more realistic than the gamma model (Venables and Dichmont 2004).

GLM estimates depend on matrix decomposition procedures and thus estimates change as the length of time series increases. This may be seen as retrospective pattern for this type of analysis. Figure A shows the respective figure *A. minor*. The pattern becomes weaker as the length of time series increases.

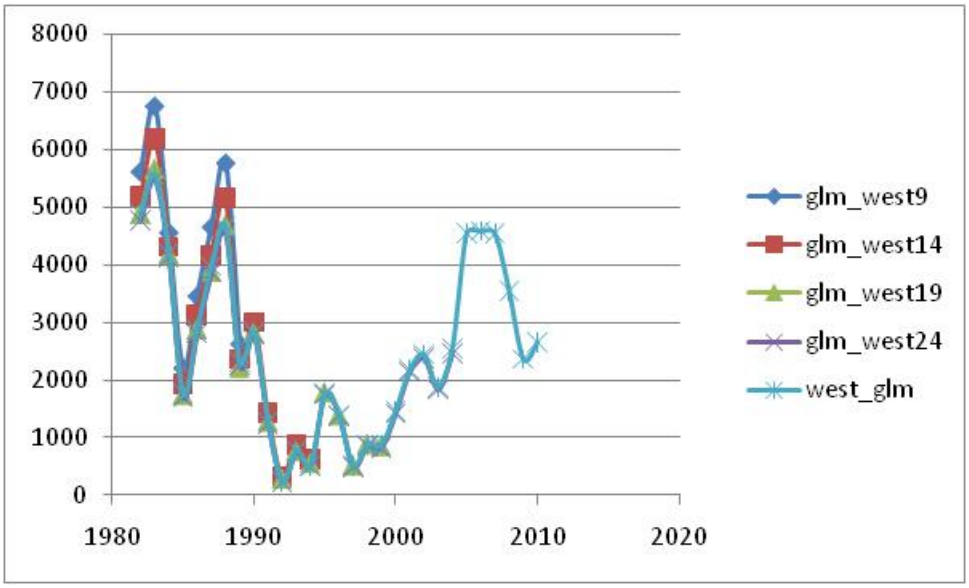

Fig. A GLM with different time series length indicate the degree of retrospective pattern, here for *Anarhichas minor*. Numbers indicate time series length in years.

(2) Three other models were tested. A gamma model proved to be less sensitive (not shown). The second model was based on the SAS SURVEYREG procedure using strata as class variables and year as variable defining unequally distributed subsamples to account for changing sample sizes between years with log+1 transformed data and subsequent backtransformation. Many SAS/STAT procedures, such as the MEANS and GLM procedures, can compute sample means and estimate regression relationships. However, in most of these procedures, statistical inference is based on the assumption that the sample is drawn from an infinite population by simple random sampling. If the sample is actually selected from a finite population using a complex design, these procedures

generally do not calculate the estimates and their variances correctly. The SURVEYREG procedures does properly analyze survey data, taking into account the sample design. These procedures use the Taylor expansion method to estimate sampling errors of estimators based on complex sample designs. This method obtains a linear approximation for the estimator and then uses the variance estimate for this approximation to estimate the variance of the estimate itself. When the design is stratified, the procedures pool stratum variance estimates to compute the overall variance estimate (SAS 2010).

(3) Third model tested was a generalized linear model applying the negative binomial distribution as error distribution in conjunction with a log link function for the dependent variable.

Table A shows, that on average GLM had the closest fit to the traditional survey index thus providing the most conservative estimate of a standardized index.

Table A : Deviation statistics of three standardization models in relation to the survey index (Biomass, $*10^3$). Smaller values indicate a better fit.

Species	GLM	Negative binomial with log link function	SURVEYREG with TAYLOR expansion
Raja radiata	13.5	38.7	15.7
Sebastes marinus	73.4	70.6	116.5
Sebastes mentella	17.4	52.3	21.1
Hippoglossoides platessoides	40.1	63.6	47.4
Anarhichas lupus	36.3	60.0	44.6
Anarhichas minor	18.8	42.6	29.6

Results

Fig. 1 displays the coverage of the survey area by the geographical haul distribution in 2007.

The abundance and biomass indices by stratum of *S. marinus* >= 17 cm is given in Table 3 and illustrated in Figure 2. The stock is indicated to be depleted since the early 1990s. Since 2002 a slight increase was observed. However, in 2008 all indices (abundance, biomass, GLM) showed a downward trend again, but increased in 2010. Thus, recovery back to historical levels does not appear. Both incoming year classes (specimens < 20 cm) and larger speciemens (>40 cm) were more frequently encountered than in previous years (Table 4, Fig. 3).

Table 5 lists the abundance and biomass indices of *S. mentella* >= 17 cm by stratum, the values being presented in Figure 4. Abundance peaked in 1997. Since then, three further years with high abundances have been recorded including 2006. Since 2006, abundance declined but the trend was halted in 2010.
In 2008, the length distribution was multi-modal with peaks at 17 cm, 22 cm, 26 cm, 31 cm, 35 cm. This indicates several year classes present, however at low abundances each (Fig. 5 and Table 6). In 2010, peaks appeared at 19 cm, 24 cm, 28 cm and 35 cm. Assuming that the 2010 peaks correspond to those of 2008 indicates a slow growth of 1-2 cm per year. This is less than for *S. mentella* observed at Flemish Cap (Saborido-Rey et al. 2004) but comparable to VBGF results from the Irminger Sea(Stransky et al. 2005). It must be noted, that the survey design hardly covers the distribution area of deep sea redfish, and the survey results should be carefully interpreted. Larger fish are likely to replenish the pelagic stock of *S. mentella*.

The abundance of juvenile redfish <17 cm *Sebastes spp.* has varied over a wide range since 1982. The recent index is among the lowest observed since 1982 (Fig. 6 and Table 7). The length composition revealed no strong peaks, so that at present age classes 0, 1 and 2 are only weakly represented in the autumn survey (Fig. 7 and Table 8).

Abundance and biomass of American plaice *Hippoglossoides platessoides* significantly declined since the late 1980s but increased slightly since 2002 – 2004 (Fig. 8 and Table 9). Since then, a decline is evident in survey index and GLM index. In 2010, in particular small specimen's (< 20 cm) were caught in the survey, resulting in an increase in

survey abundance halting the decline trend (Figure 9 and listed in Table 10). The catchability of flatfish by the survey gear is considered poor but the time series seems is deemed appropriate to indicate the trend of the stock.

With regard to biomass index, Atlantic wolfish *Anarhichas lupus* has recovered slightly after 2002 but still is below historical stock levels and is declining since 2004 (Fig. 10 and Table 11). In 2010, both biomass and abundance increased. As in 2009, the length distribution for 2010 revealed strong presence of 0-group specimens at a length of 6-7 cm (Figure 11). Table 12 shows that since 1998 the share of specimens larger than 40 cm has increased until 2005 but decreased since then.

The abundance and biomass of spotted wolfish *Anarhichas minor* decreased significantly until 1992 (Fig. 12 and Table 13). From 2000 to 2007, stock size increased in terms of biomass, but decreased in 2008 and 2009. An increase was revealed for 2010. The size distribution is scattered as a result of low catch rates and high variation in body length (Fig. 13 and Table 14).

Both abundance and biomass indices of thorny skate *Raja radiata* are recently very low compared to the values estimated during the 1980s and early 1990s (Fig. 14 and Table 15). For 2009, the GLM index indicates the lowest biomass value in the time series since 1982. However, in 2009 a significant number of 0-groupspecimens at a size of ca 10 cm TL was indicated. As in previous years, size composition was dominated by small specimens below 25 cm body length (Fig. 15 and Table 16).

Trends in near bottom temperature means by stratum and stratified mean temperature are listed in Table 2, 17 and shown in Figure 16. Near bottom water temperature continued to be high (since 1996). The former maximum of the time series observed in 2003 (5.28 °C) was superseded by the 2010 value (5.42 °C). The stratum mean temperatures show a significant depth effect, with the colder temperatures measured in the shallow strata (<200 m). Deeper strata are generally warmer by about 1-2°C.

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Table 1 Trawl parameters of the German bottom trawl survey off West Greenland.

	German survey
Gear	140-feet bottom trawl
Horizontal net opening	22 m
Standard trawling speed	4.5 kn
Towing time	30 minutes
Coefficient of catchability	1.0

Tab. 2 Survey areas and effort (hauls) of the German bottom trawl survey off West Greenland by stratum and bottom water temperatures, 1982-2010. Strata 1.1 – 4.2 refer to West Greenland, corresponding NAFO SA's indicated.

	1C		1D		1E		1F		East Greenland								
Stratum	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	6.1	6.2	7.1	7.2	Sum	YEAR	Temp. (°C)
	20	11	16	7	9	6	13	2	1	10	3	12	1	25	136	1982	2.97
	26	11	25	11	17	5	18	4	3	19	10	36	0	18	203	1983	2.75
	25	13	26	8	18	6	21	4	5	4	2	8	0	5	145	1984	2.46
	10	8	26	10	17	5	21	4	5	21	14	50	0	28	219	1985	4.10
	27	9	21	9	16	7	18	3	3	15	14	37	1	34	214	1986	4.06
	25	11	21	4	18	3	21	3	19	16	13	40	0	18	212	1987	3.70
	34	21	28	5	18	5	18	2	21	8	13	39	0	26	238	1988	3.84
	26	14	30	9	8	3	25	3	17	18	12	29	0	11	205	1989	4.20
	19	7	23	8	16	3	21	6	18	19	6	15	0	13	174	1990	3.43
	19	11	23	7	12	6	14	5	8	11	10	28	0	16	170	1991	3.57
	6	6	6	5	6	6	7	5	0	0	0	0	0	6	53	1992	3.49
	9	6	9	6	10	8	7	0	9	6	6	18	0	14	108	1993	3.70
	16	13	13	8	10	6	7	5	0	0	0	0	0	6	84	1994	3.52
	0	0	3	0	10	7	10	5	8	6	6	17	0	12	84	1995	3.96
	5	5	8	5	12	5	10	5	7	9	5	13	0	9	98	1996	4.72
	5	6	5	5	6	5	8	5	5	5	4	8	0	8	75	1997	4.18
	9	5	10	7	11	6	10	5	5	8	6	12	0	9	103	1998	5.10
	8	6	14	8	13	6	9	3	5	6	6	13	0	5	102	1999	4.50
	13	6	14	7	14	5	9	5	6	5	8	16	0	11	119	2000	4.33
	0	0	15	7	15	5	11	6	5	6	9	18	0	15	112	2001	4.58
	0	0	7	2	5	6	8	4	6	6	5	10	0	10	69	2002	4.86
	0	0	7	6	7	7	6	5	6	5	5	7	0	16	77	2003	5.28
	9	7	11	9	9	6	9	5	7	7	8	12	0	15	114	2004	4.99
	0	0	9	7	8	6	6	5	6	7	8	11	0	15	88	2005	4.48
	6	5	7	5	7	7	8	5	2	1	5	11	0	12	81	2006	4.26
	5	5	7	5	6	5	9	6	4	5	6	10	0	13	86	2007	4.60
	5		7	7	8	9	8	6	6	8	5	9	0	12	90	2008	4.51
	2		5	5	6	6	5	5	2	4	5	11	0	11	67	2009	4.37
	5	5	10	5	7	9	10	6	1	2	10	12	0	12	94	2010	5.42

Table 3 *S. marinus* >= 17cm, abundance ('1000) and biomass indices (tons) for West Greenland by stratum and total, 1982-2010. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance for West Greenland.

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	7483	9238	1E+05	5486	5417	18681	3969	.	191606	117
1983	3410	2923	2867	5655	3452	6615	1829	.	26751	82
1984	1456	3308	490	1353	10591	2780	3892	.	23870	101
1985	3946	7685	26782	1689	3154	13781	4876	.	61913	87
1986	4837	4429	1760	2983	15649	2768	2065	.	34491	58
1987	1007	499	1221	.	8661	.	622	2985	14995	77
1988	667	5667	310	2049	6460	2207	752	.	18112	60
1989	572	663	840	749	6104	.	333	.	9261	49
1990	388	821	370	1265	1165	.	186	2310	6505	41
1991	521	274	96	1215	341	928	352	2658	6385	68
1992	147	145	86	368	165	548	465	795	2719	69
1993	193	619	67	328	91	167	0	.	1465	55
1994	104	352	153	175	60	48	153	278	1323	45
1995	.	.	.	.	55	68	35	228	386	68
1996	160	292	22	270	403	470	32	343	1992	57
1997	244	639	17	175	127	364	35	565	2166	58
1998	121	149	57	151	21	210	131	264	1104	57
1999	264	279	172	276	86	227	19	.	1323	37
2000	221	717	75	716	108	244	12	994	3087	53
2001	.	.	116	341	77	514	10	1964	3022	75
2002	.	.	116	.	354	631	15	.	1116	75
2003	.	.	258	435	193	601	0	2407	3894	63
2004	175	323	62	416	240	657	71	2649	4593	61
2005	.	.	214	463	164	1213	181	7159	7866	97
2006	0	285	29	219	74	1048	135	11643	11095	116
2007	390	3057	147	953	196	2096	249	12269	15984	87
2008	0	.	29	145	48	2940	70	8763	11995	103
2009	.	.	0	464	71	2072	0	7608	10215	101
2010	181	2165	95	390	225	4638	71	11464	19229	86

Biomass											
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI	GLM Biomass
1982	1916	1636	54218	2545	3057	12305	2464	.	78141	106	30976
1983	705	849	1335	2647	1608	5487	1133	.	13764	106	10364
1984	342	869	222	588	4896	2294	1950	.	11161	111	9630
1985	907	1531	13107	548	1397	8662	2673	.	28825	121	8961
1986	1102	1274	655	1137	7219	1649	1345	.	14381	76	15365
1987	273	279	603	.	4472	.	402	2841	8870	106	16082
1988	133	747	110	865	2773	1529	391	.	6548	55	5037
1989	118	159	297	272	2471	.	196	.	3513	55	4781
1990	55	190	82	329	545	.	105	1317	2623	58	4768
1991	69	93	24	295	116	407	4	889	1897	93	2726
1992	21	48	24	104	46	282	169	428	1122	83	1568
1993	57	146	22	150	46	67	0	.	488	54	635
1994	31	159	48	69	26	37	45	89	504	53	779
1995	.	.	.	.	21	20	20	60	121	60	768
1996	67	112	4	66	136	144	9	152	690	51	513
1997	37	275	4	61	36	220	11	253	897	70	506
1998	22	47	18	45	14	109	60	122	437	71	467
1999	60	69	40	79	18	88	14	.	368	53	545
2000	73	199	34	271	30	92	2	459	1160	59	1051
2001	.	.	27	129	29	258	3	941	1387	83	2217
2002	.	.	28	.	166	270	15	.	479	75	2588
2003	.	.	98	199	89	331	0	1183	1900	59	3204
2004	75	166	25	205	103	382	46	1569	2571	63	2209
2005	.	.	89	234	54	543	133	3631	4684	100	5462
2006	0	85	14	159	38	577	105	7505	8483	122	4577
2007	57	559	60	239	134	876	107	7408	9440	101	10096
2008	0	.	14	41	23	773	39	3532	4422	91	4054
2009	.	.	0	215	19	589	0	3977	4800	102	6550
2010	26	346	24	171	63	1321	56	8934	10941	110	7263

Table 4 *S. marinus* >= 17 cm. Length composition by year ('1000), 1998-2010.

Length	###	###	###	###	2002	2003	2004	2005	2006	2007	2008	2009	2010
15.5	0	12	0	0	0	0	0	0	0	0	0	0	0
16.5	0	0	0	0	0	0	0	0	0	0	0	0	0
17.5	0	0	30	28	26	27	64	49	19	512	435	265	1356
18.5	0	22	65	6	26	69	45	123	11	903	696	441	1090
19.5	6	31	95	85	44	51	77	219	57	974	621	315	595
20.5	34	41	127	30	34	32	55	371	151	521	480	460	797
21.5	5	100	78	52	32	120	61	501	166	483	613	543	833
22.5	68	51	113	97	96	93	88	290	125	516	723	554	870
23.5	33	103	84	63	18	97	95	456	278	414	926	425	976
24.5	76	51	150	74	68	109	153	437	426	626	620	681	771
25.5	71	64	179	134	31	95	207	485	249	858	696	588	807
26.5	121	109	199	166	22	85	202	443	276	721	755	469	715
27.5	103	86	115	175	74	160	266	434	289	716	735	515	625
28.5	36	66	184	219	35	150	256	478	439	653	634	536	534
29.5	66	75	142	143	32	280	124	431	817	703	656	288	490
30.5	53	91	138	143	54	199	189	374	835	644	413	342	456
31.5	19	109	124	145	13	227	127	219	755	598	305	306	393
32.5	16	10	86	137	60	244	103	229	607	722	228	224	410
33.5	10	21	115	129	47	199	179	240	602	573	155	272	266
34.5	82	19	84	77	27	214	172	319	360	473	199	276	275
35.5	14	26	95	107	31	107	112	178	321	404	227	278	216
36.5	5	25	84	107	47	144	181	130	309	274	218	281	237
37.5	43	5	76	63	32	96	153	214	359	336	127	358	260
38.5	11	5	60	94	36	75	114	199	200	382	155	284	342
39.5	27	21	24	63	46	52	103	155	520	426	223	402	372
40.5	7	0	37	24	4	132	129	148	627	389	183	356	441
41.5	6	0	32	52	4	86	64	188	730	350	236	315	498
42.5	0	5	29	40	13	30	127	146	502	346	214	204	536
43.5	5	0	27	18	13	37	57	133	381	323	175	144	767
44.5	5	0	0	18	9	34	91	76	286	465	86	108	775
45.5	15	0	0	6	0	6	7	48	150	211	100	115	700
46.5	5	0	0	0	0	27	31	83	113	178	77	64	629
47.5	0	5	0	0	0	14	7	20	15	125	14	34	362
48.5	0	0	0	6	9	29	0	15	81	22	8	14	248
49.5	0	0	7	0	0	0	17	15	38	68	22	6	208
50.5	0	0	0	0	0	8	0	15	7	15	0	17	186
51.5	0	0	0	0	0	0	0	0	0	15	15	11	69
52.5	0	0	0	0	0	0	0	0	0	7	8	11	71
53.5	0	0	0	0	0	0	7	0	0	7	0	0	0
54.5	0	0	0	0	0	0	4	0	7	7	0	0	7
55.5	0	0	0	0	0	0	0	0	0	0	0	0	8
56.5	0	0	0	0	0	0	0	0	0	7	8	0	0
57.5	0	0	0	0	0	0	0	0	0	7	4	0	0
58.5	0	0	0	0	0	0	0	0	0	7	0	0	8
59.5	0	0	0	0	0	0	0	0	0	7	0	0	0
60.5	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 5 *S. mentella* >= 17cm, abundance ('1000) and biomass indices (tons) for West Greenland by stratum and total, 1982-2008. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance for West Greenland. GLM 1985-1989 subject to revision.

Abundance											
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI	
1982	0	342	14	354	0	2662	0	.	3372	158	
1983	30	789	78	2211	0	6304	0	.	9412	110	
1984	2215	3580	10	1664	0	1097	0	.	8566	70	
1985	0	300	30	32	48	335	0	.	745	103	
1986	1327	360	33	303	4	342	0	.	2369	53	
1987	673	14769	37	1268	56	.	0	2350	19153	70	
1988	141	11507	23	688	60	5341	0	.	17760	117	
1989	0	629	11	109	0	.	8	.	757	81	
1990	39	11786	4	2490	40	.	0	4680	19039	87	
1991	0	4376	0	231	0	3724	0	1720	10051	107	
1992	0	46	0	15	0	145	0	0	206	154	
1993	0	35	0	284	9	0	0	.	328	212	
1994	0	294	18	105	90	158	0	38	703	75	
1995	.	.	.	.	32	255	87	1901	2275	128	
1996	1644	694	0	259	0	2237	30	8204	13068	97	
1997	254	1866	0	370	39	3651	141	31400	37721	111	
1998	0	336	0	228	168	851	11	2635	4229	117	
1999	36	858	9	616	55	2287	179	.	4040	104	
2000	0	108	6	948	33	1673	0	25033	27801	139	
2001	.	.	24	725	126	6025	0	17407	24307	109	
2002	.	.	0	.	0	1616	29	.	1645	97	
2003	.	.	0	651	121	1809	41	11929	14551	108	
2004	171	1257	43	1264	237	1627	153	6089	10841	75	
2005	.	.	43	1214	29	928	89	1403	3100	76	
2006	0	1684	74	887	61	1529	56	16078	16761	108	
2007	798	2104	16	788	51	1005	0	1441	5068	57	
2008	0	.	64	641	136	896	0	1083	2820	84	
2009	.	.	0	38	33	816	0	76	963	220	
2010	116	254	10	503	36	503	0	812	2234	106	
Biomass											
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI	GLM Bio
1982	0	83	5	114	0	1024	0	.	1226	175	1128
1983	13	167	29	1021	0	3493	0	.	4723	129	2325
1984	46	1019	6	641	0	462	0	.	2174	95	1771
1985	0	81	15	12	23	116	0	.	247	102	1468
1986	245	37	18	112	3	151	0	.	566	53	788
1987	67	3292	7	388	32	.	0	952	4738	115	2031
1988	18	899	19	144	45	2148	0	.	3273	111	2949
1989	0	53	9	17	0	.	1	.	80	68	877
1990	1	324	2	123	6	.	0	642	1098	105	951
1991	0	210	0	4	0	273	0	404	891	118	1951
1992	0	4	0	2	0	38	0	0	44	181	1083
1993	0	7	0	39	2	0	0	.	48	176	1760
1994	0	34	3	11	11	25	0	3	87	73	877
1995	.	.	.	.	5	27	9	207	248	131	2805
1996	5	61	0	21	0	274	4	795	1160	111	3773
1997	19	150	0	37	3	366	19	3056	3650	111	3058
1998	0	27	0	19	20	77	3	336	482	135	2397
1999	8	106	5	55	7	215	34	.	430	112	1187
2000	0	12	1	81	2	145	0	2245	2486	132	2075
2001	.	.	2	76	12	522	0	1789	2401	104	4169
2002	.	.	0	.	0	173	3	.	176	98	2029
2003	.	.	0	76	13	260	4	1959	2312	98	5215
2004	23	124	7	138	47	219	27	1421	2006	93	2506
2005	.	.	4	146	4	104	28	501	649	109	2799
2006	0	178	8	96	11	325	28	4967	4633	120	4509
2007	80	245	1	82	17	323	0	630	1114	80	3558
2008	0	.	5	64	27	213	0	261	570	95	2209
2009	.	.	0	6	10	272	0	34	322	228	1424
2010	13	60	1	82	5	171	0	557	889	156	1946

Table 6 *S. mentella* >= 17 cm. Length composition by year ('1000), 1998-2008.

Length	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
15.5	0	0	0	0	0	0	0	0	0	0	0	0	0
16.5	0	0	0	0	0	0	0	0	0	0	0	0	0
17.5	0	0	10530	5250	263	874	1286	244	613	289	252	16	108
18.5	1341	987	4518	5763	157	1401	1232	416	720	1055	316	24	127
19.5	752	479	3353	3910	252	1104	771	363	709	848	215	11	186
20.5	543	380	1903	1827	316	1003	552	399	686	454	125	33	55
21.5	408	114	635	655	207	891	683	179	841	236	239	6	24
22.5	364	95	733	713	78	1516	510	217	1083	259	240	6	88
23.5	264	49	579	519	37	1613	343	59	1225	197	227	11	90
24.5	120	85	413	498	23	1230	503	76	1105	104	178	18	100
25.5	80	58	264	354	9	325	546	43	943	162	151	39	94
26.5	102	57	214	262	32	290	639	85	786	163	213	104	81
27.5	34	45	130	156	0	405	658	78	865	159	172	116	115
28.5	29	28	85	59	0	386	341	143	923	83	113	122	172
29.5	15	11	59	53	0	250	372	107	1406	119	72	92	68
30.5	20	9	29	35	0	142	276	283	1582	120	44	107	82
31.5	0	11	15	30	0	75	141	157	1051	140	83	49	54
32.5	0	0	29	11	0	55	103	68	866	181	26	31	27
33.5	0	5	7	23	0	15	66	102	569	103	12	63	83
34.5	0	0	7	12	0	19	31	47	261	108	22	39	142
35.5	0	0	0	6	0	4	32	9	108	98	61	33	171
36.5	0	12	0	0	0	0	7	17	139	47	14	23	89
37.5	0	0	6	0	0	7	7	9	66	35	0	6	40
38.5	0	5	0	0	0	0	10	0	65	28	15	0	56
39.5	0	0	0	0	0	0	0	0	106	13	16	0	74
40.5	0	0	0	0	0	0	0	0	7	13	0	6	85
41.5	0	0	0	0	0	0	0	0	38	0	7	6	8
42.5	0	0	0	0	0	0	0	0	0	15	0	0	13
43.5	0	0	0	0	0	0	0	0	0	33	0	0	0
44.5	0	0	0	0	0	0	0	0	0	0	0	0	0
45.5	0	0	0	0	0	0	0	0	0	0	0	0	0
46.5	0	0	0	0	0	0	0	0	0	0	7	0	0
47.5	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 7 *Sebastes. spp.* < 17cm, abundance ('1000) and biomass indices (tons) for West Greenland by stratum and total, 1982-2008. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance for West Greenland.

Abundance										
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	1038	568	205	26	7	42	22	.	1908	36
1983	3356	461	12	134	7	18	17	.	4005	47
1984	3258	3487	22	242	140	27	9	.	7185	61
1985	4349	11552	73	2833	44	84	66	.	19001	77
1986	11303	257203	136	1921	60	250	41	.	270914	179
1987	11966	59044	5	523	20	.	0	64	71622	117
1988	17014	33545	0	105	21	143	0	.	50828	46
1989	7893	12887	3125	6008	18	.	65	.	29996	43
1990	12569	29587	14810	207	55	.	6788	636	64652	60
1991	63808	57993	34238	23467	14469	166	863	0	195004	32
1992	30472	24488	14682	19452	19895	17824	73	3902	130788	47
1993	6324	48693	833	14367	392	3205	18	.	73832	79
1994	3233	12607	9625	3970	1160	1683	10684	11539	54501	44
1995	.	.	.	.	395	10602	930	18698	30625	100
1996	527	15892	5891	10305	27782	14201	2812	119504	196914	115
1997	6651	47530	0	15680	44272	22014	427	68787	205361	72
1998	1695	26799	53290	33500	59212	19606	40732	13941	248775	61
1999	4023	50874	1122	9062	1153	8921	723	.	75878	94
2000	1429	11329	80	3720	456	9411	0	39760	66185	97
2001	.	.	1395	4002	120	2672	9	1968	10166	60
2002	.	.	1359	.	144	1784	27	.	3314	84
2003	.	.	431	8596	124	1826	30	1328	12335	76
2004	5156	12893	377	5306	118	1412	12	1333	26607	45
2005	.	.	128	3075	58	902	0	430	3920	82
2006	1848	31048	315	2655	86	1131	197	730	32110	108
2007	2935	13838	158	991	32	1262	62	480	16457	71
2008	0	.	21	1277	50	900	23	1280	3551	76
2009	.	.	201	560	158	892	66	1660	3537	68
2010	403	2244	934	613	591	1615	64	2512	8976	53
Biomass										
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	37	22	10	1	0	2	0	.	72	35
1983	87	18	1	6	0	1	1	.	114	44
1984	60	97	1	5	5	1	0	.	169	74
1985	83	432	3	65	2	4	2	.	591	95
1986	388	6805	5	80	2	8	1	.	7289	172
1987	263	2601	0	25	1	.	0	3	2893	132
1988	218	1147	0	4	1	5	0	.	1375	67
1989	90	236	23	55	0	.	1	.	405	46
1990	113	98	63	2	0	.	10	1	287	49
1991	226	637	71	252	31	2	2	0	1221	54
1992	175	511	55	152	71	286	2	59	1311	61
1993	83	623	20	337	7	87	1	.	1158	88
1994	25	229	54	58	30	63	138	321	918	52
1995	.	.	.	.	6	344	10	534	894	101
1996	4	310	15	129	94	361	22	3703	4638	155
1997	65	354	0	207	167	592	14	2447	3846	110
1998	20	452	174	346	235	453	154	556	2390	53
1999	57	858	14	187	17	288	15	.	1436	84
2000	34	289	2	129	15	326	0	1696	2491	112
2001	.	.	8	73	5	99	0	94	279	69
2002	.	.	12	.	1	34	1	.	48	93
2003	.	.	10	166	1	43	1	34	255	73
2004	53	351	10	158	4	99	1	28	704	60
2005	.	.	4	82	0	23	0	4	93	94
2006	43	826	9	73	2	24	9	40	867	109
2007	95	530	3	28	0	19	1	15	621	78
2008	0	.	0	16	1	23	0	32	72	78
2009	.	.	5	12	4	26	1	42	90	94
2010	11	72	30	19	30	63	2	95	322	60

Table 8 *Sebastes spp.* < 17 cm. Length composition by year (1 000), 1998-2008.

Length	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
0.5	0	0	0	0	0	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0	0	0	0	0	0
2.5	0	0	0	0	0	0	0	0	0	0	0	0	0
3.5	0	0	0	0	0	0	0	0	0	0	0	0	0
4.5	0	0	0	6	0	0	0	0	4	0	0	0	0
5.5	182	1235	186	146	65	243	329	28	251	13	106	2629	178
6.5	44724	3401	639	1202	699	1344	4039	178	1590	463	473	1800	1047
7.5	1E+05	232	411	1564	791	1115	7585	683	996	1801	479	131	356
8.5	4670	126	87	58	97	60	1041	161	89	455	449	11	48
9.5	3927	3177	1114	123	117	120	98	18	1288	114	211	173	201
10.5	10533	27661	1800	502	308	1007	403	168	4769	258	328	272	293
11.5	4294	23335	566	582	162	2030	1023	692	6865	828	367	569	309
12.5	2104	3134	4074	356	82	1614	612	604	3432	508	125	838	346
13.5	6322	4979	13437	729	105	628	476	215	1042	679	215	459	627
14.5	10205	4558	14810	824	214	802	2450	390	4212	2989	296	349	1249
15.5	5645	1482	9324	955	188	780	5131	451	4931	5847	226	251	2039
16.5	5203	1764	9607	1864	124	593	3040	332	2640	2504	275	354	2210
17.5	4585	2139	0	0	0	0	0	0	0	0	0	0	75
18.5	0	0	0	0	0	0	0	0	0	0	0	0	0
19.5	0	0	0	0	0	0	0	0	0	0			
20.5	0	0	0	0	0	0	0	0	0	0			

Table 9 *Hippoglossoides platessoides*, abundance ('1000) and biomass indices (tons) for West Greenland by stratum and total, 1982-2010. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance for West Greenland.

Abundance											
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI	
1982	31898	5512	30554	5749	2566	2500	987	.	79766	31	
1983	37896	6029	46212	2501	7507	458	1605	.	102208	44	
1984	19482	5978	56619	4618	3584	2265	1386	.	93932	52	
1985	19232	5254	22506	7120	2578	237	2851	.	59778	28	
1986	20047	12356	53114	9294	2671	2261	4072	.	103815	47	
1987	24735	3011	26775	.	2401	.	992	490	58404	30	
1988	10577	3492	8519	5599	3741	873	1079	.	33880	21	
1989	8695	4813	12773	3987	8767	.	1278	.	40313	24	
1990	9622	8286	8935	3348	1270	.	1777	673	33911	30	
1991	8654	5006	5250	2172	1665	807	1475	848	25877	21	
1992	8567	5876	3670	3463	1634	2273	1746	172	27401	24	
1993	6942	3999	1598	1734	760	927	438	.	16398	20	
1994	2070	3575	1450	1449	614	274	1638	206	11276	28	
1995	.	.	.	.	905	1162	1053	1308	4428	44	
1996	4020	1489	1052	1539	2067	897	1681	555	13300	21	
1997	8543	3297	2606	3494	3017	1399	2536	114	25006	24	
1998	6552	4211	6247	3033	1858	1197	2420	212	25730	27	
1999	5690	2516	5384	3139	1919	441	1467	.	20556	25	
2000	2471	4321	2146	3848	1135	396	1364	43	15724	28	
2001	.	.	12447	4278	1228	421	4021	425	22820	41	
2002	.	.	7682	.	1237	2383	1764	.	13066	47	
2003	.	.	21608	12743	1202	2262	2249	19	40083	46	
2004	20652	9294	19864	7082	1048	539	1881	71	60431	29	
2005	.	.	18161	9327	1561	1243	1084	871	32247	43	
2006	5298	5465	10649	8364	1228	1287	1297	53	28707	34	
2007	9962	5753	4009	3125	681	448	223	43	20971	32	
2008	5520	.	3181	4773	367	868	493	37	15239	45	
2009	.	.	2851	3227	819	640	849	57	8443	38	
2010	23751	6103	5236	8075	638	517	856	0	45176	34	
Biomass											
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI	GLM Biomass
1982	6203	1008	7776	1163	811	451	147	.	17559	34	8617
1983	6070	1089	9924	526	3218	89	279	.	21195	41	9647
1984	1776	732	9028	851	715	394	257	.	13753	58	10784
1985	1757	531	3777	1205	504	48	299	.	8121	33	7341
1986	1974	1218	7653	1352	649	428	410	.	13684	47	11068
1987	3338	311	5663	.	639	.	214	120	10285	37	7774
1988	887	300	1750	791	852	147	235	.	4962	31	4597
1989	515	321	1675	391	2101	.	256	.	5259	35	4024
1990	473	524	1321	400	247	.	372	247	3584	42	4247
1991	375	437	504	303	303	158	222	152	2454	26	4136
1992	616	465	273	262	211	330	158	25	2340	27	3092
1993	385	270	106	144	83	95	27	.	1110	22	2558
1994	140	430	130	139	64	33	110	31	1077	41	1268
1995	.	.	.	.	72	149	127	96	444	52	4779
1996	231	112	73	178	167	91	162	45	1059	27	3155
1997	484	269	210	337	359	183	197	7	2046	30	3303
1998	319	270	386	259	195	167	197	20	1813	26	2778
1999	254	151	355	290	190	39	95	.	1374	25	2230
2000	135	367	154	361	116	41	61	7	1242	34	2021
2001	.	.	714	332	104	48	164	24	1386	36	3659
2002	.	.	436	.	125	224	117	.	902	49	3725
2003	.	.	1536	1173	129	273	186	4	3301	40	4786
2004	1277	767	1795	852	141	138	239	5	5214	28	4651
2005	.	.	2350	1559	255	152	170	112	4598	45	5536
2006	297	512	1148	1224	140	127	235	10	3693	45	3672
2007	600	501	695	432	90	66	54	8	2446	41	2345
2008	366	.	404	528	37	98	62	6	1501	51	1905
2009	.	.	310	255	93	78	53	10	799	37	2034
2010	1639	403	409	694	91	63	80	0	3379	34	2389

Table 10 *Hippoglossoides platessoides*. Length composition by year ('1000), 1998-2010.

Length	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
0.5	0	0	0	0	0	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0	0	0	0	0	0
2.5	0	0	0	0	0	0	0	0	0	0	0	0	0
3.5	0	6	0	0	0	0	0	0	0	0	0	0	0
4.5	14	87	6	44	18	0	198	0	18	0	0	0	136
5.5	0	43	0	6	0	0	141	0	0	0	0	19	66
6.5	51	95	71	0	13	0	0	0	0	0	0	0	10
7.5	506	546	183	134	53	0	28	19	42	0	0	0	254
8.5	353	334	148	203	80	0	36	29	6	14	126	0	360
9.5	194	435	147	241	143	107	194	31	182	14	0	22	411
10.5	139	635	183	533	245	151	203	32	401	108	25	173	190
11.5	278	1106	414	768	334	233	278	0	661	140	20	41	246
12.5	406	1281	604	989	537	315	1720	9	914	469	196	484	407
13.5	761	796	932	1582	1036	1352	3931	355	934	1227	778	488	2142
14.5	1164	1053	1003	2031	1711	1804	4534	739	1147	1328	832	939	3704
15.5	2329	1269	1273	2161	2470	3390	4324	986	1889	1640	955	1581	4588
16.5	2540	1183	1227	2057	2344	4059	4679	2051	1527	1427	775	1164	4652
17.5	3044	1089	965	1700	2571	3489	4258	2180	1957	1493	1460	1895	4321
18.5	2233	1180	816	1644	1940	2658	4689	2256	1440	1345	1284	1645	3596
19.5	1817	1165	625	1039	1845	2898	3563	1792	1771	1015	948	805	3468
20.5	1309	1272	647	1159	1333	1868	3374	1239	1984	1014	1145	1145	2445
21.5	966	1365	494	876	929	2047	3086	1240	1351	999	940	1251	2069
22.5	816	810	562	421	1146	1442	2105	999	1513	1332	798	628	2088
23.5	701	679	634	430	741	1534	2354	847	1451	1109	781	885	1641
24.5	759	729	534	329	736	1302	2414	1038	1066	1040	460	727	1473
25.5	674	429	579	211	692	1446	2548	1304	874	1227	441	602	1667
26.5	757	433	402	402	637	1061	2030	1694	889	706	474	459	831
27.5	535	536	360	352	406	1122	1770	1279	934	524	635	491	958
28.5	530	366	371	384	442	648	1867	1455	1124	421	337	183	892
29.5	366	232	206	253	299	925	1947	1504	891	537	478	269	659
30.5	339	270	246	210	471	511	1080	1391	999	268	315	322	743
31.5	211	132	178	115	136	401	434	982	744	365	419	109	343
32.5	123	146	232	119	211	240	460	771	766	361	77	115	175
33.5	58	50	84	77	145	141	180	647	417	219	148	115	250
34.5	44	48	79	50	77	61	297	599	219	207	89	24	108
35.5	10	40	26	22	55	34	139	370	312	108	59	6	98
36.5	24	30	42	0	33	73	69	298	161	112	61	21	63
37.5	27	10	26	0	5	8	62	359	67	125	24	9	37
38.5	5	0	0	0	5	13	63	66	35	21	31	6	26
39.5	10	0	0	11	13	0	9	104	0	36	0	0	8
40.5	0	0	6	0	0	0	0	45	21	8	0	0	0

Table 11 *Anarhichas lupus*, abundance ('1000) and biomass indices (tons) for West Greenland by stratum and total, 1982-2010. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance for West Greenland.

Abundance										
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	11313	3985	3703	2377	1783	701	866	.	24728	19
1983	6501	2884	1501	412	2798	263	989	.	15348	20
1984	6325	1223	1531	205	1347	104	868	.	11603	17
1985	4607	2413	1569	344	898	1009	880	.	11720	19
1986	4371	1685	1844	581	1283	487	717	.	10968	25
1987	5086	1006	821	.	957	.	666	1060	9596	19
1988	4731	2060	856	403	1165	617	773	.	10605	25
1989	3804	712	2063	537	2472	.	1043	.	10631	21
1990	4350	1277	2118	358	1912	.	1319	657	11991	22
1991	3389	1088	978	1026	2758	684	724	446	11093	27
1992	3250	469	1713	1831	3376	950	1607	1988	15184	31
1993	5407	2174	941	487	675	463	448	.	10595	29
1994	1466	1264	1622	568	1196	156	4474	1213	11959	46
1995	.	.	.	.	1372	615	545	958	3490	31
1996	812	1067	273	419	2816	780	843	1264	8274	33
1997	3063	1280	1070	336	3849	1295	1674	2880	15447	36
1998	3372	1011	855	718	2076	821	1077	1099	11029	28
1999	4692	1049	2066	740	6453	1423	1144	.	17567	46
2000	2075	1927	456	460	2321	1284	521	3174	12218	34
2001	.	.	1120	1249	3962	1300	788	2057	10476	34
2002	.	.	3212	.	3615	463	557	.	7847	40
2003	.	.	1407	2028	7789	607	647	1748	14226	46
2004	8905	2436	1906	935	3423	1354	1379	2088	22426	23
2005	.	.	3954	522	6598	1374	2848	748	16044	41
2006	2123	1610	1809	908	1677	1252	1573	1573	10640	32
2007	2776	661	1268	840	2270	994	428	1153	8851	34
2008	1411	.	691	365	575	358	231	887	4518	27
2009	.	.	1035	189	1097	460	138	700	3619	39
2010	2823	467	1433	127	1283	614	399	1101	8247	37

Biomass											
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI	GLM Biomass
1982	10181	3527	5402	4104	2172	722	1130	.	27238	26	13625
1983	3223	3074	1828	397	4221	343	1379	.	14465	27	8133
1984	3305	665	1297	208	803	70	1038	.	7386	18	6679
1985	1608	998	1025	190	535	557	617	.	5530	19	5412
1986	1587	895	1336	392	855	427	684	.	6176	23	6610
1987	2129	315	538	.	992	.	622	1023	5619	20	6941
1988	1067	429	761	269	907	388	702	.	4523	20	4827
1989	770	231	733	275	1571	.	965	.	4545	27	4335
1990	905	204	534	127	699	.	857	340	3666	22	4103
1991	544	175	162	210	715	161	369	194	2530	30	2810
1992	486	103	347	522	901	206	397	606	3568	33	3734
1993	783	398	131	100	157	95	130	.	1794	24	2575
1994	204	221	353	97	283	27	859	199	2243	45	2214
1995	.	.	.	.	253	76	137	149	615	29	3756
1996	73	298	46	75	531	141	178	278	1620	33	3795
1997	308	244	86	78	691	186	386	379	2358	39	3544
1998	389	204	136	159	299	136	184	279	1786	25	2694
1999	346	254	343	166	1072	246	186	.	2613	45	3817
2000	246	334	77	95	399	193	188	668	2200	39	2526
2001	.	.	235	297	1033	244	198	650	2657	37	5799
2002	.	.	631	.	919	105	148	.	1803	38	4523
2003	.	.	521	517	2615	167	214	768	4802	47	7243
2004	1391	458	609	273	1031	424	611	779	5576	22	6613
2005	.	.	1531	188	1891	362	1443	464	5879	28	7048
2006	337	377	804	359	700	242	1179	989	4311	32	5564
2007	658	165	547	301	847	233	333	830	3340	35	3568
2008	160	.	368	79	260	102	133	378	1480	37	1783
2009	.	.	375	57	256	108	43	392	1231	43	2283
2010	492	127	211	40	469	191	234	998	2762	66	2520

Table 12 *Anarhichas lupus*. Length composition by year ('1000), 1998-2008.

Length	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
0.5	0	0	0	0	0	0	0		0	0	0	0	0
1.5	0	0	0	0	0	0	0		0	0	0	0	0
2.5	0	0	0	0	0	0	0		0	0	0	0	0
3.5	0	0	0	0	0	0	0		0	0	0	0	0
4.5	0	0	0	0	0	0	0		0	0	0	0	0
5.5	0	0	0	0	13	0	0		0	0	0	0	0
6.5	85	134	0	0	88	0	104	13	22	0	6	143	0
7.5	186	567	25	44	241	23	164	406	88	28	25	425	154
8.5	186	389	36	89	179	43	112	94	64	14	248	180	382
9.5	201	480	105	70	38	18	128	0	86	11	20	0	258
10.5	231	475	110	39	115	68	205	57	181	53	246	178	268
11.5	110	432	96	58	156	13	258	81	106	130	172	228	282
12.5	280	396	177	129	253	60	220	158	159	70	42	93	235
13.5	435	670	124	145	212	87	433	137	88	40	119	37	210
14.5	517	666	146	108	132	214	550	84	48	82	88	143	235
15.5	350	623	143	112	192	164	475	179	65	35	75	54	175
16.5	343	671	410	163	170	107	561	303	55	172	69	227	246
17.5	410	595	584	275	124	171	574	369	167	74	60	161	304
18.5	543	855	584	447	186	268	647	438	381	231	113	139	201
19.5	435	808	766	340	266	355	758	311	345	126	113	97	250
20.5	712	842	780	414	172	401	886	475	221	323	287	98	250
21.5	462	879	775	380	251	435	1128	509	519	349	80	173	231
22.5	409	607	635	409	454	331	1167	479	341	303	24	117	163
23.5	386	708	778	530	304	643	1059	384	400	239	179	244	163
24.5	350	513	488	360	317	635	1144	634	501	416	221	304	144
25.5	438	580	509	472	383	620	872	425	379	342	146	261	226
26.5	329	588	474	442	205	363	874	716	453	575	215	130	263
27.5	338	465	419	458	196	590	714	575	348	413	67	109	144
28.5	168	436	346	373	312	528	778	492	453	401	97	203	444
29.5	200	461	251	391	288	390	515	475	385	336	123	93	218
30.5	277	379	242	310	214	527	432	441	331	345	46	164	177
31.5	162	272	163	325	159	411	452	466	331	329	193	79	191
32.5	109	282	131	329	113	480	547	492	307	332	109	244	304
33.5	230	240	195	307	208	507	291	446	310	235	60	80	186
34.5	64	200	158	286	161	559	469	405	237	306	56	58	58
35.5	209	178	64	197	171	425	499	387	214	287	54	178	143
36.5	166	176	147	158	92	343	288	357	281	167	11	14	179
37.5	94	107	131	181	121	413	254	339	172	172	0	20	207
38.5	85	116	128	155	95	300	294	317	200	126	195	74	55
39.5	133	145	91	144	84	372	316	447	186	98	42	27	66
40.5	58	133	69	127	101	396	301	422	200	116	36	83	82
41.5	87	115	44	122	54	224	132	169	186	127	83	68	70
42.5	40	84	64	147	51	393	133	282	120	106	60	57	92
43.5	23	34	81	76	28	250	178	301	173	165	91	25	36
44.5	27	63	86	59	57	228	290	196	229	148	42	0	80
45.5	57	80	33	69	28	176	143	170	79	61	53	42	65
46.5	62	26	42	63	41	63	82	127	181	118	86	22	64
47.5	7	11	20	25	37	127	170	106	144	102	48	68	63
48.5	24	12	61	22	37	76	110	156	73	140	59	20	45
49.5	35	64	33	47	32	15	58	223	174	47	34	45	85
50.5	12	6	17	55	28	7	59	193	77	182	0	21	36
51.5	0	11	39	30	42	12	59	83	127	51	57	60	46
52.5	0	0	12	26	42	65	18	53	113	21	7	57	24
53.5	14	17	0	5	28	0	56	65	102	87	21	30	35
54.5	9	12	11	17	4	0	13	62	41	29	21	6	31
55.5	14	9	0	11	15	0	41	31	81	59	22	11	15
56.5	0	6	21	0	13	31	7	0	19	20	7	22	20
57.5	0	0	0	0	15	0	0	8	38	38	26	0	20
58.5	5	0	0	6	0	8	0	0	12	7	14	30	24
59.5	0	0	0	0	0	0	7	0	21	29	0	0	20
60.5	28	0	0	6	0	0	0	19	7	15	27	11	15

Table 13 *Anarhichas minor*, abundance ('1000) and biomass (tons) for West Greenland by stratum and total, 1982-2008. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance for West Greenland.

Abundance										
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	376	211	392	155	116	14	309	.	1573	28
1983	197	31	125	3	115	48	1230	.	1749	35
1984	202	61	193	18	94	21	308	.	897	24
1985	200	103	107	3	27	63	104	.	607	28
1986	412	196	103	37	63	16	112	.	939	21
1987	304	136	58	.	123	.	238	59	918	29
1988	231	165	47	13	150	38	358	.	1002	29
1989	436	133	58	26	254	.	101	.	1008	32
1990	119	246	39	22	106	.	204	5	741	32
1991	356	164	31	41	58	8	87	47	792	26
1992	38	63	15	151	32	23	14	28	364	61
1993	93	276	59	62	39	21	70	.	620	43
1994	60	112	56	59	18	10	28	9	352	36
1995	.	.	.	.	18	5	18	0	41	72
1996	0	68	59	44	19	14	0	8	212	59
1997	111	61	17	38	61	19	39	75	421	39
1998	124	30	28	12	27	32	42	46	341	36
1999	33	89	60	43	51	19	31	.	326	37
2000	240	188	30	104	39	13	59	55	728	22
2001	.	.	51	31	85	6	46	14	233	30
2002	.	.	115	.	81	26	0	.	222	40
2003	.	.	68	38	31	9	14	8	168	49
2004	139	68	69	92	69	38	141	99	715	29
2005	.	.	127	78	38	16	310	36	605	39
2006	485	16	105	54	195	45	145	113	1013	35
2007	225	34	172	18	158	20	110	71	702	31
2008	224	.	35	6	48	29	150	56	548	43
2009	.	.	143	18	88	23	32	22	326	47
2010	118	20	53	9	80	13	112	52	457	38

Biomass											
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI	GLM Biomass
1982	2172	667	2298	875	484	42	1891	.	8429	37	4874
1983	1790	211	566	5	760	207	8211	.	11750	36	5555
1984	902	214	1142	20	459	50	1801	.	4588	27	4197
1985	13	102	508	0	118	310	672	.	1723	36	1758
1986	1048	314	535	58	337	39	933	.	3264	29	2871
1987	674	108	299	.	983	.	2065	373	4502	38	3975
1988	-77	85	211	75	1171	117	3421	.	5003	66	4655
1989	574	34	184	44	1249	.	776	.	2861	41	2322
1990	107	93	211	9	722	.	1643	2	2787	50	2830
1991	27	33	2	11	290	9	781	156	1309	73	1279
1992	6	9	0	10	25	4	36	34	124	85	226
1993	55	51	16	40	41	22	240	.	465	68	779
1994	28	27	67	25	11	2	159	4	323	73	510
1995	.	.	.	.	70	49	202	0	321	91	1759
1996	0	147	36	45	39	9	0	11	287	71	1389
1997	75	9	25	38	38	3	23	60	271	51	507
1998	24	3	113	30	122	4	274	51	621	65	875
1999	34	50	150	33	113	13	166	.	559	44	868
2000	266	112	102	208	240	97	277	234	1536	40	1463
2001	.	.	172	70	499	43	241	60	1085	35	2174
2002	.	.	218	.	611	128	0	.	957	55	2443
2003	.	.	263	77	92	61	51	123	667	53	1871
2004	113	47	306	212	490	281	819	648	2916	40	2551
2005	.	.	448	358	373	169	1711	250	3309	41	4547
2006	1473	19	304	222	946	244	451	645	3647	36	4586
2007	1752	236	952	15	1158	93	1216	569	5234	35	4545
2008	752	.	49	1	369	265	1294	513	3243	48	3554
2009	.	.	402	176	514	125	262	129	1608	54	2364
2010	779	20	146	9	641	70	1062	488	3215	50	2653

Table 14 *Anarhichas minor*. Length composition by year ('1000), 1998-2010.

Length	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
10.5	0	0	12	0	0	0	0	0	0	0	0	0	0
11.5	0	6	0	0	0	0	0	0	42	0	0	0	0
12.5	0	0	20	0	0	0	0	0	0	0	0	0	0
13.5	0	0	52	0	0	0	0	0	0	0	0	0	0
14.5	43	0	69	0	0	0	0	0	0	13	0	0	0
15.5	0	12	20	0	0	0	0	0	0	0	0	0	0
16.5	0	0	12	0	0	0	0	0	0	0	6	0	0
17.5	0	0	27	0	5	0	0	0	0	0	21	0	0
18.5	0	6	0	0	0	0	0	0	0	0	0	0	0
19.5	5	6	0	0	0	0	0	0	0	0	0	0	0
20.5	11	0	0	0	0	0	0	0	0	0	0	0	0
21.5	7	5	0	0	13	0	29	0	0	0	0	0	0
22.5	0	0	0	0	0	0	4	0	0	0	0	0	0
23.5	5	0	6	0	0	6	0	0	42	8	0	0	0
24.5	12	0	0	9	0	0	0	0	85	0	0	14	0
25.5	7	0	35	0	0	0	39	0	42	0	112	0	0
26.5	0	0	11	5	13	0	7	0	0	0	0	0	0
27.5	0	0	6	0	0	8	10	0	0	0	0	20	0
28.5	14	12	35	0	0	0	4	0	0	0	0	37	60
29.5	0	12	0	0	0	0	8	11	0	0	0	0	0
30.5	5	0	0	6	0	0	4	0	0	0	0	0	0
31.5	0	12	0	0	0	0	4	0	42	0	0	0	0
32.5	0	5	6	0	13	0	0	0	0	0	0	0	0
33.5	0	11	0	0	0	0	6	0	0	0	0	0	0
34.5	0	0	0	0	0	0	0	0	0	0	0	0	0
35.5	0	5	0	0	0	0	0	0	0	0	0	0	0
36.5	0	0	0	0	13	0	0	7	13	0	0	0	0
37.5	0	5	0	0	0	0	10	0	8	0	0	0	0
38.5	0	0	0	0	0	0	0	0	0	0	0	0	0
39.5	0	5	6	0	0	0	0	0	0	0	0	0	0
40.5	0	6	7	0	0	0	18	0	0	0	0	0	0
41.5	0	12	0	0	0	0	33	0	0	0	0	0	0
42.5	15	0	0	5	13	0	4	0	0	0	0	0	0
43.5	29	0	6	0	0	0	0	0	12	0	0	0	0
44.5	0	0	0	6	0	6	0	0	0	0	0	0	0
45.5	0	0	0	0	0	6	4	10	0	0	0	0	0
46.5	0	12	0	0	0	0	0	20	10	0	0	0	10
47.5	0	6	0	0	0	0	0	10	27	7	0	0	0
48.5	0	12	0	0	0	0	0	34	0	0	0	0	0
49.5	0	45	0	0	0	13	51	0	21	0	0	0	0
50.5	0	0	12	0	13	0	14	34	0	0	0	0	0
51.5	0	5	0	0	0	0	10	16	12	0	0	0	0
52.5	0	0	0	0	0	0	19	0	13	0	0	0	0
53.5	0	5	0	0	0	10	0	0	4	13	0	0	0
54.5	0	0	0	0	0	0	0	0	19	8	0	0	20
55.5	0	0	21	0	0	0	0	0	37	82	7	0	0
56.5	9	12	6	0	0	0	44	10	0	0	0	0	9
57.5	0	5	6	0	0	10	8	0	13	0	0	0	0
58.5	0	5	0	5	0	0	4	0	0	0	0	0	0
59.5	10	6	0	12	0	0	6	0	0	0	0	0	11
60.5	7	0	0	12	0	0	0	0	0	0	0	0	0
61.5	15	0	0	0	0	0	8	25	19	13	4	0	4

62.5	7	5	6	0	0	13	8	0	0	0	0	0	0
63.5	0	0	6	0	0	0	8	0	26	6	0	0	0
64.5	0	0	0	0	0	0	4	0	8	12	0	0	0
65.5	9	0	0	6	0	0	0	17	4	19	0	0	0
66.5	0	12	0	6	0	13	0	0	21	14	0	0	0
67.5	0	0	5	0	0	0	0	5	0	0	0	0	0
68.5	0	6	0	11	0	0	0	10	10	0	14	0	0
69.5	10	0	12	6	14	0	0	0	36	11	14	6	0
70.5	0	0	12	12	0	0	0	25	24	12	0	22	0
71.5	0	0	0	6	0	15	11	15	4	25	0	0	4
72.5	0	6	29	0	0	0	0	10	10	0	23	0	11
73.5	0	6	0	6	0	0	0	25	0	12	0	0	0
74.5	0	0	12	9	9	0	4	30	13	0	0	14	13
75.5	0	0	7	6	0	10	4	10	0	13	10	0	0
76.5	0	0	11	0	0	0	0	10	7	0	0	0	0
77.5	0	11	42	9	13	0	15	0	18	0	0	0	0
78.5	0	6	0	6	0	13	21	5	0	12	0	0	0
79.5	0	0	0	0	0	0	11	10	10	0	0	0	0
80.5	6	6	0	6	0	0	7	0	27	12	30	0	0
81.5	0	0	0	6	0	0	11	49	11	0	0	6	11
82.5	0	0	5	0	0	0	0	5	42	0	34	0	0
83.5	0	6	26	0	0	0	19	25	0	0	112	20	10
84.5	0	0	0	0	0	0	0	0	11	17	0	0	0
85.5	10	0	6	0	0	4	0	0	10	0	0	0	12
86.5	0	0	0	6	0	0	0	5	0	11	0	20	0
87.5	0	0	0	17	0	0	10	0	24	0	15	0	0
88.5	0	0	6	5	0	4	8	0	17	24	0	0	0
89.5	0	0	0	6	0	0	0	0	8	6	0	51	10
90.5	0	11	0	0	14	0	8	0	10	13	0	0	24
91.5	0	0	7	0	14	6	7	10	21	91	0	22	22
92.5	0	0	12	0	0	0	4	7	0	11	0	0	0
93.5	0	0	6	0	0	0	6	25	7	12	0	0	0
94.5	9	0	6	23	19	0	27	25	0	7	7	32	28
95.5	0	0	0	12	0	13	19	0	105	25	8	0	0
96.5	0	0	0	0	0	0	10	15	10	18	0	0	10
97.5	0	0	0	0	14	0	8	0	0	7	0	0	0
98.5	0	0	0	0	5	0	8	0	7	0	37	6	10
99.5	0	0	0	0	0	0	4	0	0	15	0	15	0
100.5	0	0	0	0	0	0	0	0	0	0	7	0	10

Table 15 *Raja radiata*, abundance (1 000) and biomass (tons) for West Greenland by stratum and total, 1982-2010. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Abundance											
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI	
1982	5417	1930	1547	468	516	122	152	.	10152	28	
1983	3764	587	741	303	691	28	57	.	6171	54	
1984	3235	1862	802	542	152	482	163	.	7238	34	
1985	2082	2133	1801	721	373	58	245	.	7413	32	
1986	1890	2604	717	316	266	121	186	.	6100	36	
1987	1719	341	597	.	275	.	59	28	3019	22	
1988	3906	1046	1145	759	340	43	78	.	7317	30	
1989	13263	2199	4141	728	543	.	132	.	21006	26	
1990	9744	2983	2673	690	333	.	668	385	17476	36	
1991	2173	503	1273	289	697	163	153	64	5315	22	
1992	4135	718	3414	1652	608	683	205	57	11472	38	
1993	2749	422	798	382	244	353	116	.	5064	27	
1994	2327	384	823	254	227	76	394	16	4501	31	
1995	.	.	.	.	181	282	106	26	595	74	
1996	1359	154	463	85	122	125	59	34	2401	24	
1997	4862	507	852	45	123	135	186	0	6710	31	
1998	1789	581	502	212	271	55	51	15	3476	24	
1999	2268	213	730	211	301	216	236	.	4175	27	
2000	767	215	531	1013	271	144	251	18	3210	42	
2001	.	.	524	107	93	142	702	32	1600	39	
2002	.	.	707	.	119	219	131	.	1176	40	
2003	.	.	448	400	65	309	224	0	1446	52	
2004	1003	100	678	251	121	170	210	26	2559	28	
2005	.	.	830	242	227	391	263	0	1953	39	
2006	387	88	700	483	41	425	541	43	2372	43	
2007	596	144	379	213	83	70	126	0	1380	28	
2008	233	.	622	221	178	223	106	7	1590	43	
2009	.	.	1729	265	132	231	186	0	2543	51	
2010	1106	80	825	268	35	182	30	0	2526	37	
Biomass											
Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI	GLM Bi
1982	3097	993	1465	336	388	86	146	.	6511	28	4323
1983	810	184	652	115	666	28	55	.	2510	25	1858
1984	824	355	434	105	134	127	137	.	2116	27	2068
1985	447	377	791	207	146	50	52	.	2070	27	1791
1986	452	545	386	80	113	58	35	.	1669	27	1576
1987	397	108	281	.	137	.	-168	30	785	39	1290
1988	640	98	563	243	90	19	31	.	1684	27	1579
1989	2225	434	1084	109	258	.	79	.	4189	24	3057
1990	1409	409	560	76	111	.	135	231	2931	34	2204
1991	295	83	188	43	274	52	20	32	987	28	1006
1992	334	109	167	170	255	111	26	26	1198	30	1351
1993	388	104	94	40	39	38	4	.	707	23	902
1994	215	73	134	29	90	14	57	12	624	22	767
1995	.	.	.	.	69	35	39	1	144	49	1894
1996	102	27	40	26	22	18	9	15	259	26	617
1997	346	97	173	6	16	32	37	0	707	31	843
1998	186	99	100	49	58	15	9	16	532	29	736
1999	159	61	152	70	69	29	59	.	599	30	1052
2000	119	55	142	355	110	14	30	15	840	54	1075
2001	.	.	89	36	44	27	143	19	358	40	1733
2002	.	.	150	.	25	36	15	.	226	35	1716
2003	.	.	80	62	28	56	102	0	328	43	1840
2004	80	22	156	53	39	24	37	12	423	34	799
2005	.	.	167	62	79	68	78	0	454	32	1836
2006	28	16	169	152	8	78	164	12	548	46	1043
2007	83	23	78	24	29	5	19	0	222	35	691
2008	10	.	45	21	35	28	5	5	149	56	674
2009	.	.	73	42	15	26	5	0	131	59	1369
2010	64	34	137	40	7	18	8	0	308	45	591

Table 16 *Raja radiata*. Length composition by year (1 000), 1998-2010.

Length	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
0.5	0	0	0	0	0	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0	0	0	0	0	0
2.5	0	0	0	0	0	0	0	6	0	0	0	0	0
3.5	0	0	0	0	0	0	0	0	0	0	0	0	0
4.5	0	0	0	0	0	0	0	0	0	0	0	0	0
5.5	0	0	0	0	0	0	0	0	0	0	0	0	0
6.5	0	0	0	0	0	0	11	0	0	0	0	0	0
7.5	0	0	0	0	0	0	0	0	0	0	0	0	0
8.5	0	38	12	0	0	0	0	0	0	25	0	0	0
9.5	82	364	89	9	13	0	61	11	27	21	62	143	4
10.5	435	681	62	84	93	63	155	23	74	69	162	739	126
11.5	225	369	124	82	80	49	179	85	110	126	185	1004	224
12.5	196	249	131	82	5	76	242	75	105	190	86	930	135
13.5	121	277	93	81	36	50	116	61	141	64	175	979	124
14.5	165	152	56	98	72	107	85	143	83	13	31	524	127
15.5	92	88	137	90	68	80	100	68	37	107	22	257	137
16.5	116	43	127	52	84	38	126	102	33	40	202	132	232
17.5	162	125	96	72	9	91	249	58	106	76	96	105	175
18.5	125	133	109	50	14	88	198	42	223	51	77	191	40
19.5	93	40	63	41	22	26	69	54	43	73	31	45	132
20.5	63	44	58	35	64	39	70	47	90	72	69	55	277
21.5	97	18	86	58	50	51	91	33	108	33	21	50	74
22.5	49	89	77	24	55	37	167	32	83	53	62	35	44
23.5	95	63	112	35	15	37	101	98	165	8	27	36	113
24.5	79	40	47	11	33	35	94	68	28	32	55	6	54
25.5	73	41	80	17	13	30	73	84	24	14	24	49	59
26.5	103	71	77	15	38	4	127	81	56	27	4	6	43
27.5	151	85	16	44	15	8	33	59	27	11	7	0	4
28.5	54	58	144	17	25	0	69	27	27	51	30	6	36
29.5	74	126	47	9	13	46	68	14	82	11	6	9	93
30.5	91	46	30	20	25	6	29	30	59	8	14	0	8
31.5	54	142	90	12	13	16	44	5	45	14	6	0	22
32.5	9	77	71	20	28	20	62	29	45	0	16	0	0
33.5	58	90	121	20	0	14	40	15	45	0	0	9	20
34.5	59	45	72	36	13	4	12	26	25	0	0	6	30
35.5	40	34	68	21	18	8	79	23	50	0	18	0	25
36.5	59	74	40	29	0	0	20	28	60	0	0	15	11
37.5	33	30	92	24	13	0	0	5	65	0	0	0	10
38.5	42	130	93	19	37	29	22	27	34	38	10	9	20
39.5	34	33	79	43	13	17	24	22	25	23	10	0	34
40.5	49	33	60	30	14	20	12	47	33	8	18	30	28
41.5	0	29	91	60	13	25	12	6	20	69	17	21	9
42.5	7	35	57	11	18	49	48	45	67	0	0	0	29
43.5	0	0	38	19	49	30	21	73	24	0	0	9	8
44.5	5	11	34	44	0	13	64	53	64	39	4	0	10
45.5	14	0	33	12	0	20	16	11	20	0	0	9	0
46.5	20	0	0	0	13	17	8	0	15	0	0	0	0
47.5	5	0	0	9	0	18	9	0	8	25	4	0	0
48.5	0	0	0	0	0	0	4	26	0	0	0	6	10
49.5	0	0	0	0	0	16	4	0	0	0	0	0	0
50.5	5	0	0	0	0	0	13	0	0	0	0	0	0
51.5	0	0	0	0	0	0	4	0	0	0	0	0	0

Table 17 Stratum means of near bottom temperature (°C), 1982-2008.

2

Bottem temperature - Mean by stratum year	1C	1D		1E		1F			East Greenland				
	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	6.1	6.2	7.2
1981	2.5	2.7	1.4	4.7	3.0	3.9	4.2	4.0	3.4	4.3	4.4	4.1	3.2
1982	2.5	4.2	2.1	4.2	3.3	4.4	2.6	5.4				4.3	4.6
1983	2.0	3.7	1.4	3.8	2.1	4.7	2.2	5.0	3.7	4.2	3.6	4.0	4.0
1984	1.4	2.8	1.6	3.9	2.6	4.7	2.4	3.8	4.5	4.8	4.2	4.1	5.0
1985	4.2	5.2	3.1	4.6	2.6	4.3	4.4	5.3	5.0	5.2	4.4	4.3	3.3
1986	3.7	4.4	4.0	5.1	4.2	5.1	4.0	4.6	4.6	4.8	4.0	4.5	3.3
1987	3.1	4.8	3.4	4.5	3.5	5.3	3.5	4.6	3.3	4.5	3.7	4.4	3.3
1988	2.7	4.3	3.0	5.0	4.2	5.2	4.3	5.3	4.5	4.6	4.3	4.6	3.8
1989									3.3	3.7	3.7	4.1	5.6
1990	2.5	3.9	3.0	4.8	3.4	4.8	2.5	4.6	4.4	4.6	3.3	4.0	3.0
1992	3.9	4.4	2.9	4.5	3.0	4.7	1.9	3.5					3.6
1993	3.0	4.3	2.5	3.4	4.7	5.0	2.8		3.8	4.1	4.3	4.4	2.8
1994	2.9	4.4	3.7	4.6	3.9	5.1	3.8	5.2					3.6
1995			3.8		4.2	4.6	3.5	4.2	2.6	3.6	3.7	4.3	3.8
1996	4.6	5.5	4.3	5.7	5.6	5.7	4.9	5.7	4.5	5.1	5.3	5.0	2.9
1997	3.3	4.9	4.0	5.2	4.6	5.5	4.6	5.5	4.6	4.7	4.6	4.3	3.5
1998	4.1	5.3	4.6	5.8	6.4	6.4	5.4	6.0	6.0	5.8	5.5	5.2	4.7
1999	4.9	5.7	4.4	5.7	4.8	5.8	4.1	5.7	5.2	5.3	4.8	4.1	3.0
2000	3.1	4.6	4.3	5.0	4.6	5.3		5.2					
2001			5.0	5.4	5.1	6.0	4.3	5.9	5.7	5.2	4.9	4.2	4.3
2002			4.5	5.7	5.8	6.0	4.9	6.0	4.8	5.3	4.8	4.9	4.3
2003			6.9	6.5	6.5	6.6	5.5	6.5	6.1	5.8	5.0	5.1	3.9
2004	4.8	5.6	5.1	5.8	5.6	6.2	5.9	6.0	5.9	5.7	5.8	4.4	4.6
2005			5.0	5.6	4.6	5.8	4.7	5.5	3.8	5.3	4.6	4.4	3.9
2006	3.3	5.8	4.0	4.9	4.1	5.0	2.7	5.8	5.6	6.3	5.0	4.8	4.1
2007	4.8	5.8	4.4	5.8	4.7	6.0	4.0	6.0	5.2	5.8	5.1	4.8	3.6
2008	4.4		3.8	4.8	4.4	5.4	4.0	5.5	5.6	5.5	4.9	4.7	3.7

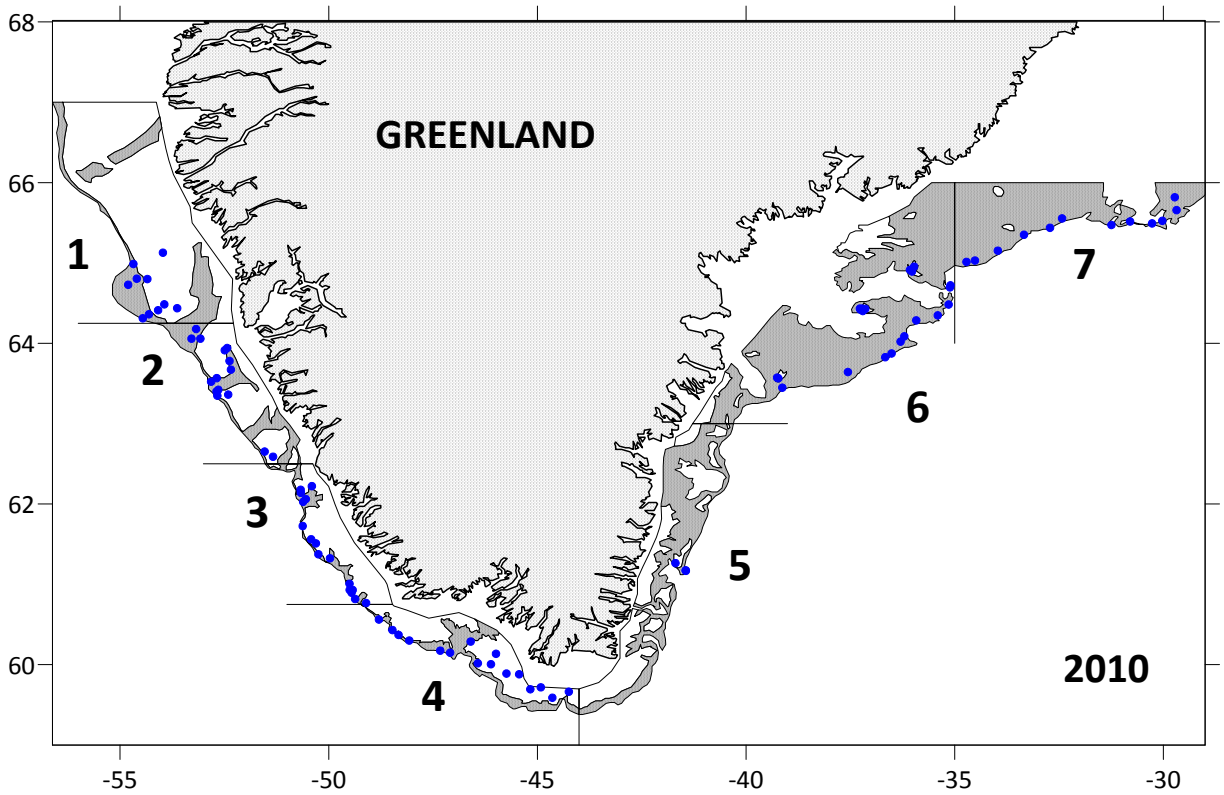

Fig. 1 Stratification of the survey area in 2010 as specified in Table 2, positions of hauls carried out off West Greenland refer to strata 1 to 4.

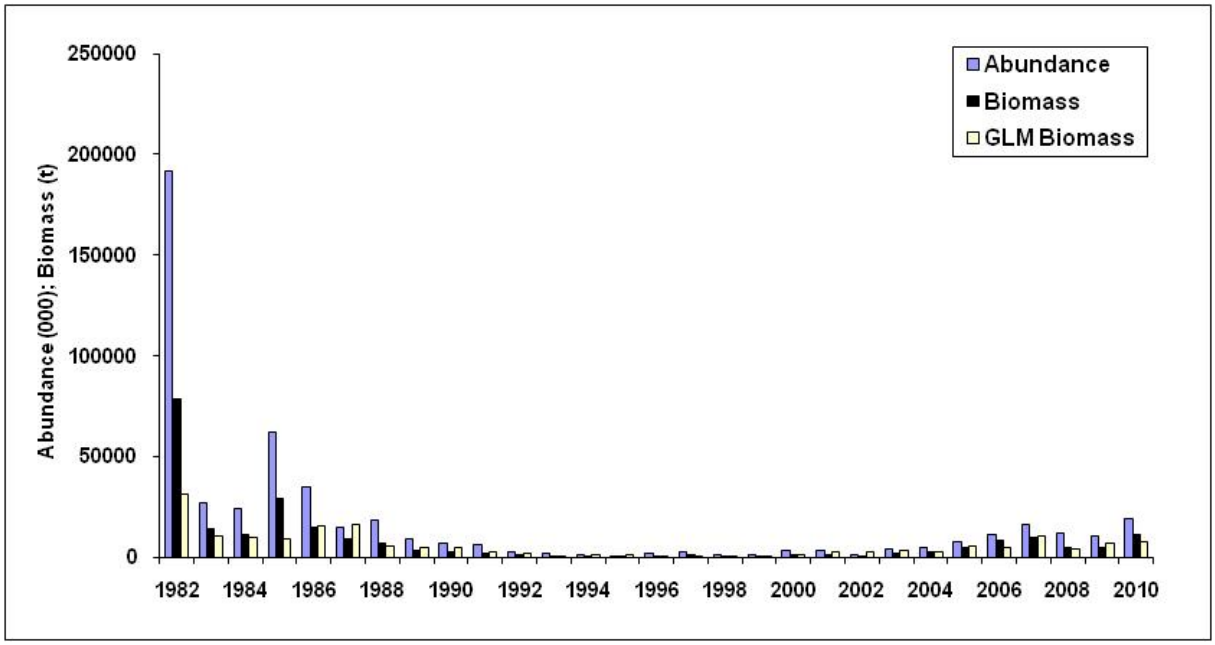

Fig. 2 Abundance and biomass indices for *S. marinus* >=17 cm off West Greenland, 1982-2010. Respective values are listed in Table 3. GLM 1985-1989 subject to revision.

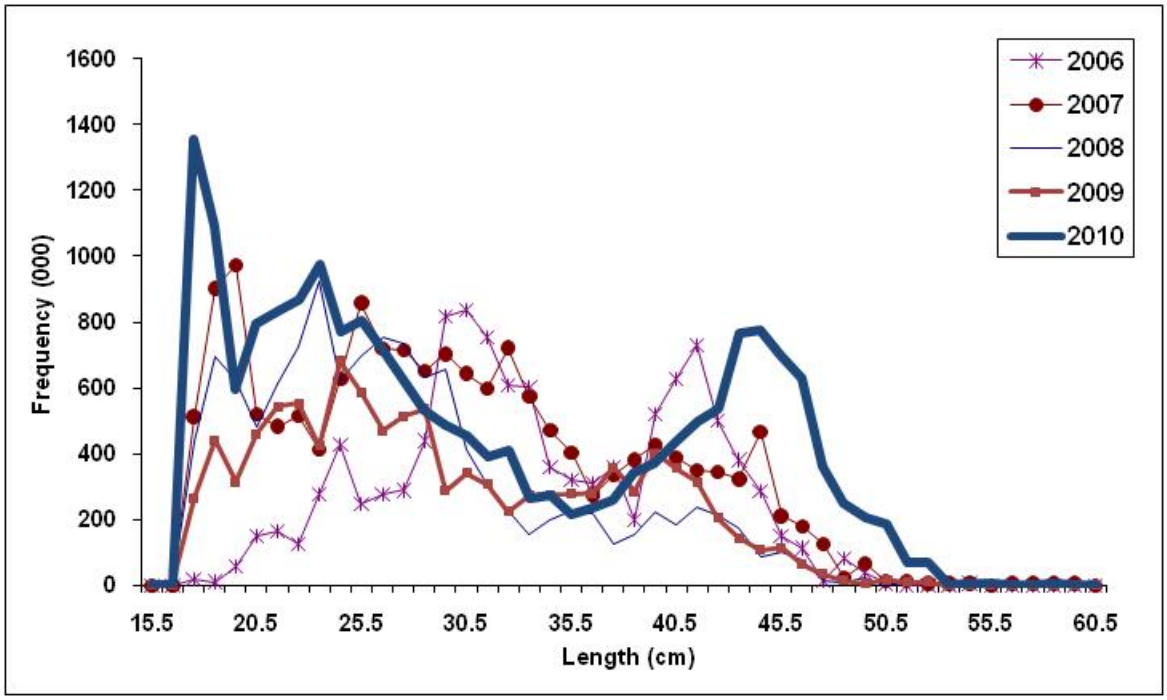

Fig. 3 Length disaggregated abundance indices for *S. marinus* >=17 cm off West Greenland, 2006-2010. Respective values are listed in Table 4.

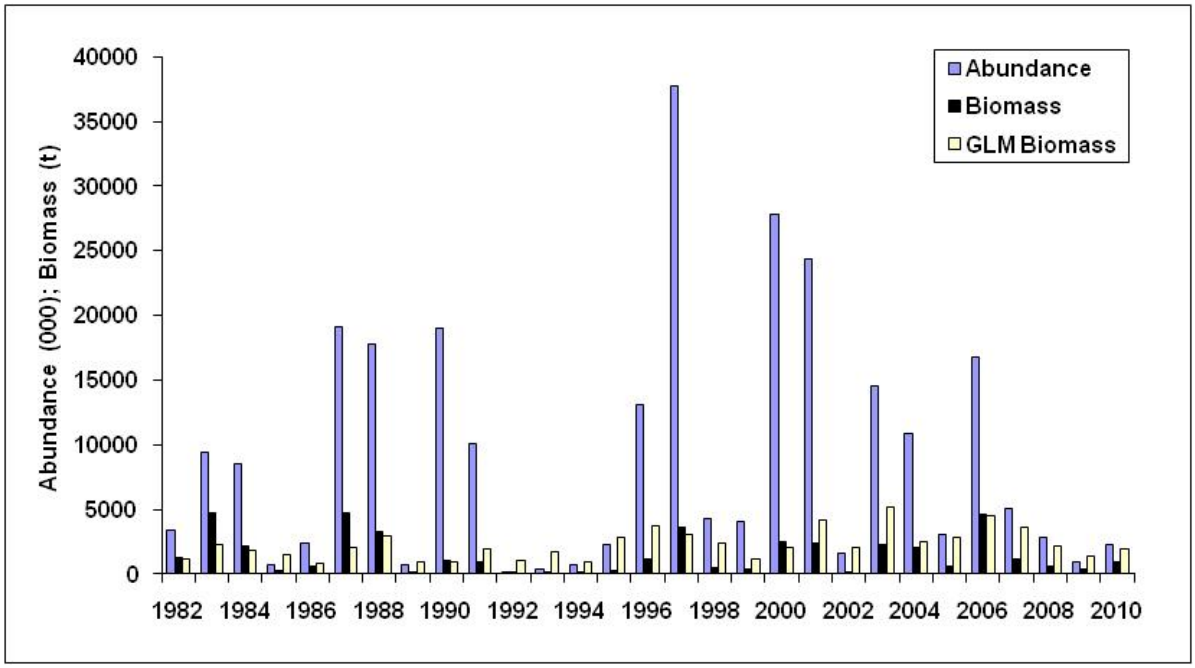

Fig. 4 Abundance and biomass indices for *S. mentella* >=17 cm off West Greenland, 1982-2010. Respective values are listed in Table 5. GLM 1985-1989 subject to revision.

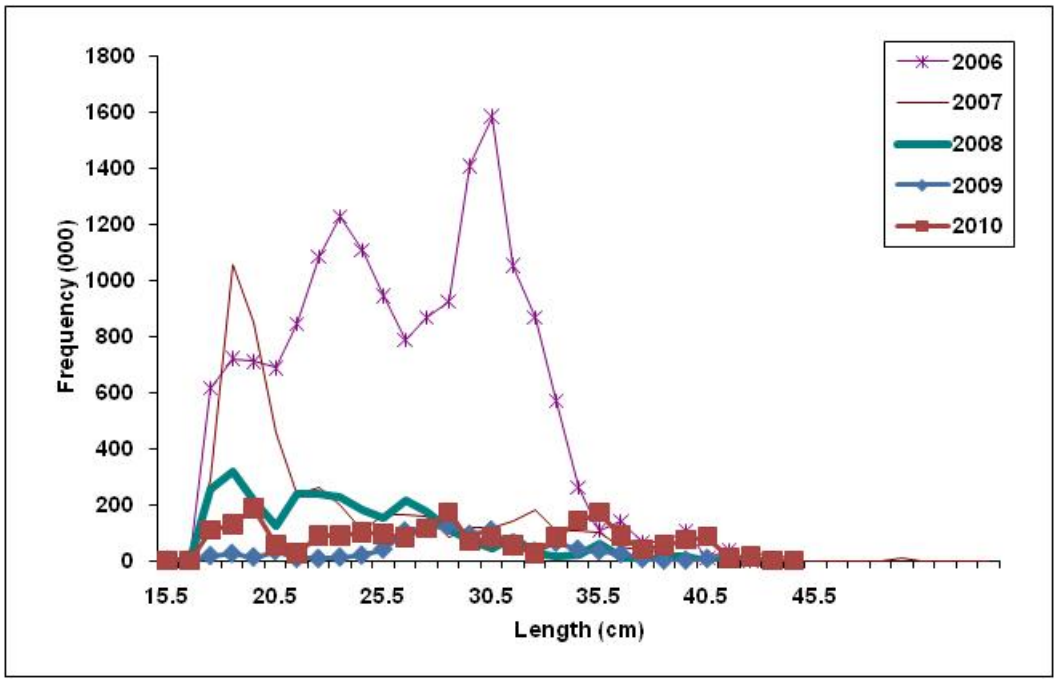

Fig. 5 Length disaggregated abundance indices for *S. mentella* >=17 cm off West Greenland, 2006-2010. Respective values are listed in Table 6.

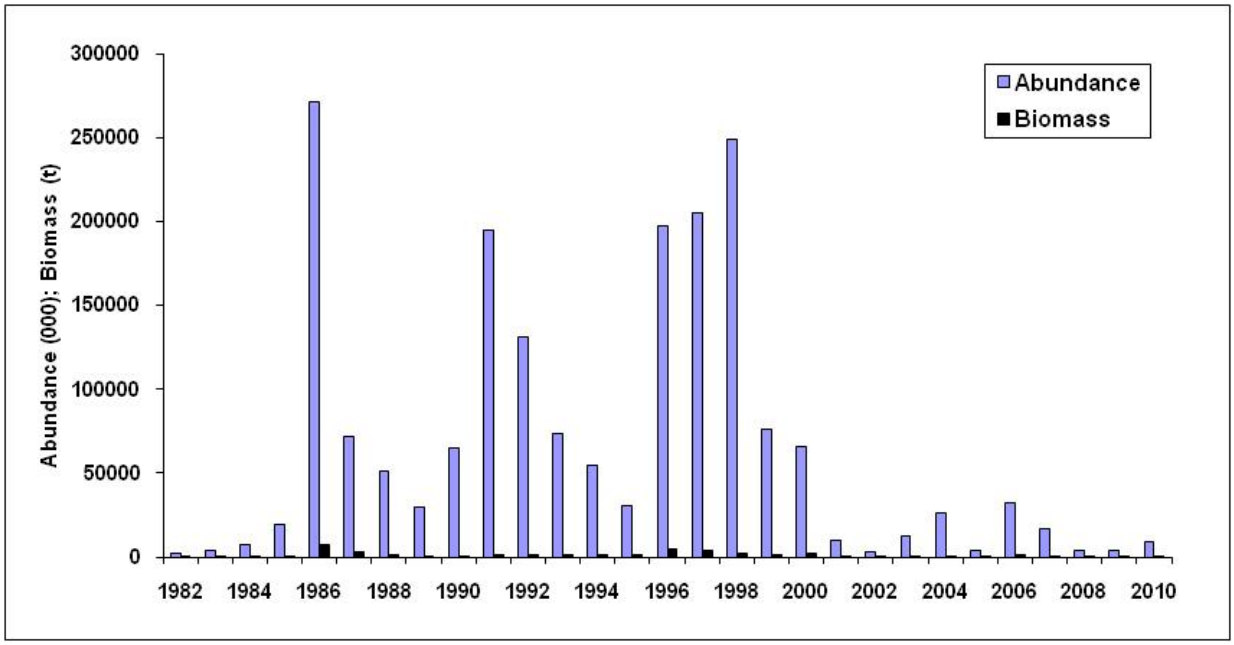

Fig. 6 Abundance and biomass indices for *Sebastes spp.* <17 cm off West Greenland, 1982-2010. Respective values are listed in Table 7.

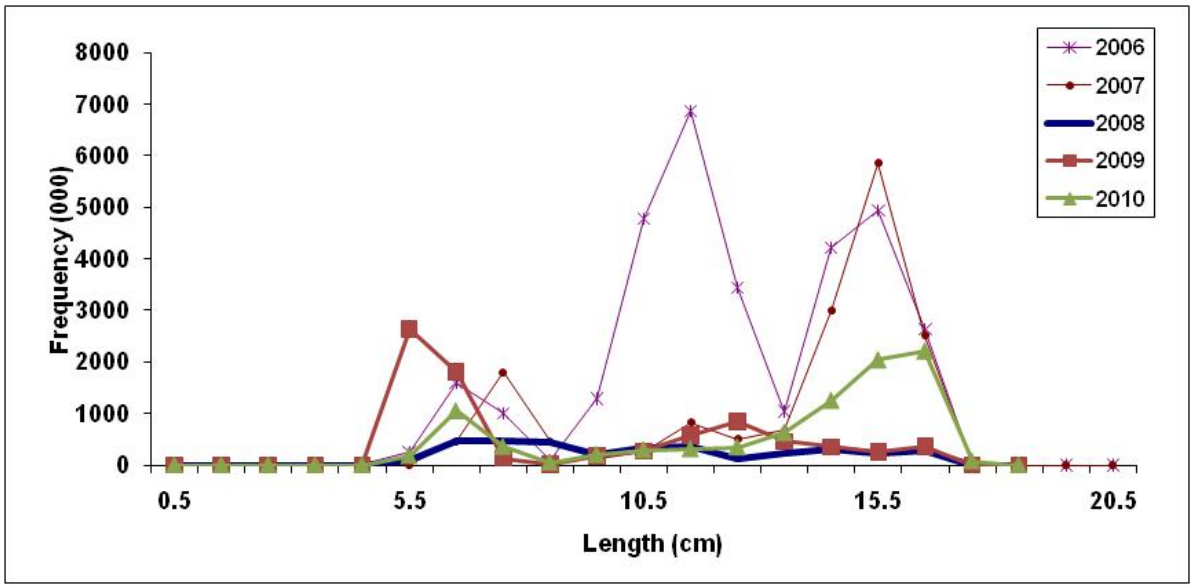

Fig. 7 Length disaggregated abundance indices for *Sebastes spp.* <17 cm off West Greenland, 2006-2010. Respective values are listed in Table 8.

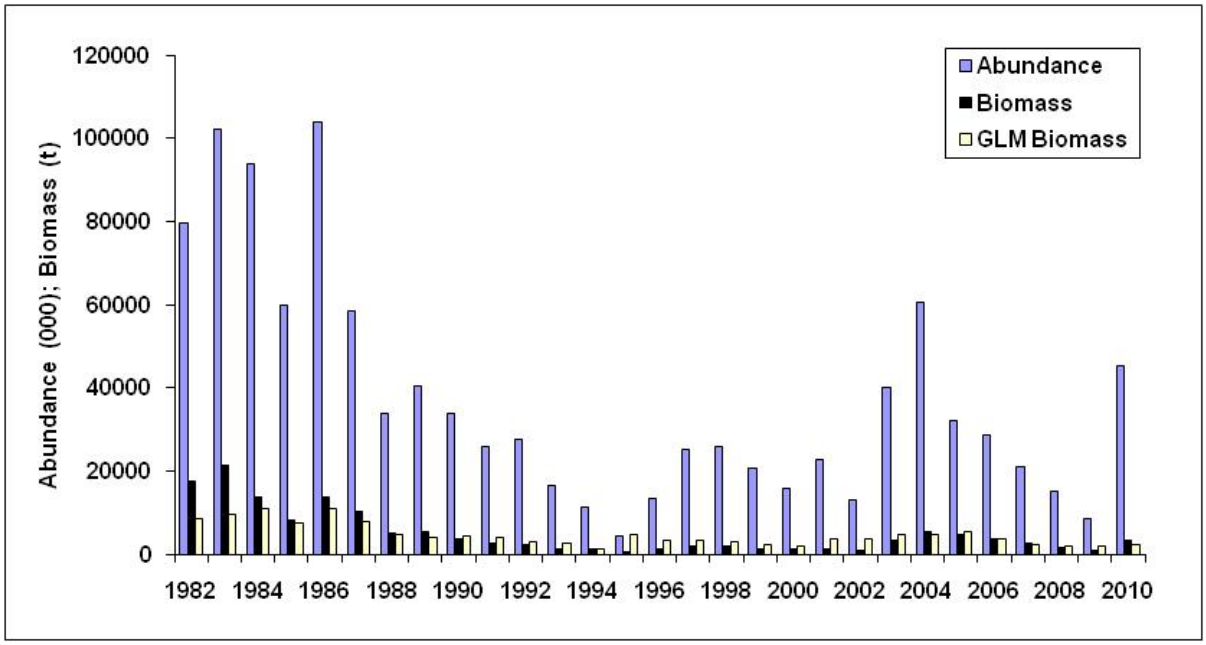

Fig. 8 Abundance and biomass indices for *Hippoglossoides platessoides* off West Greenland, 1982-2010. Respective values are listed in Table 9.

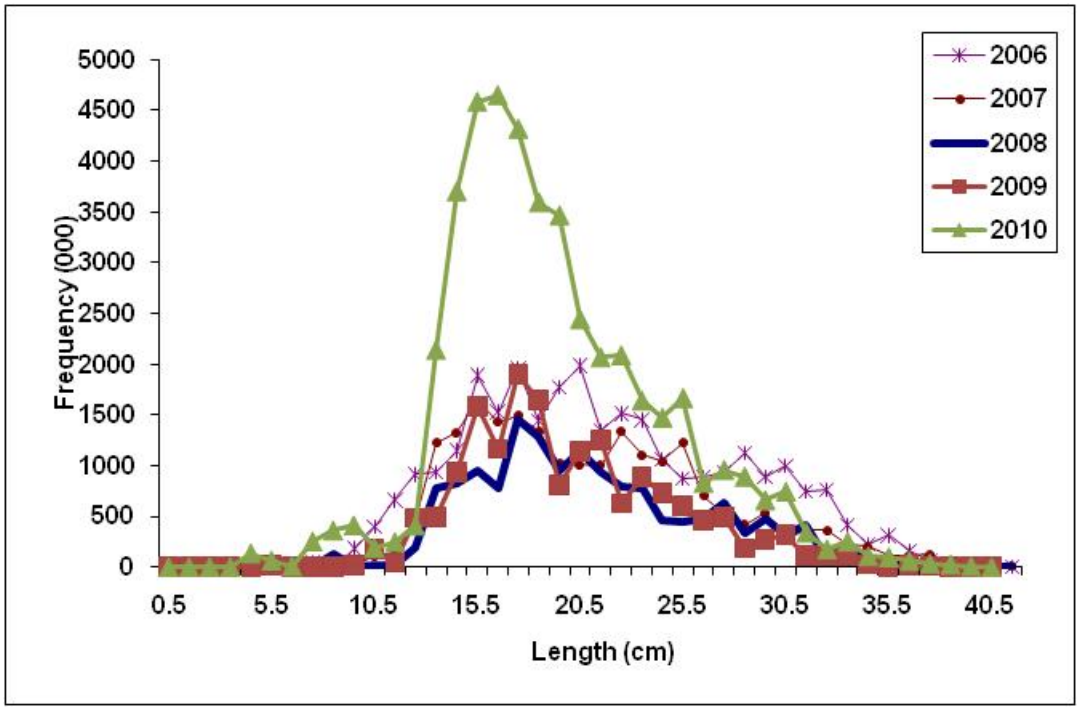

Fig. 9 Length disaggregated abundance indices for *Hippoglossoides platessoides* off West Greenland, 2006-2010. Respective values are listed in Table 10.

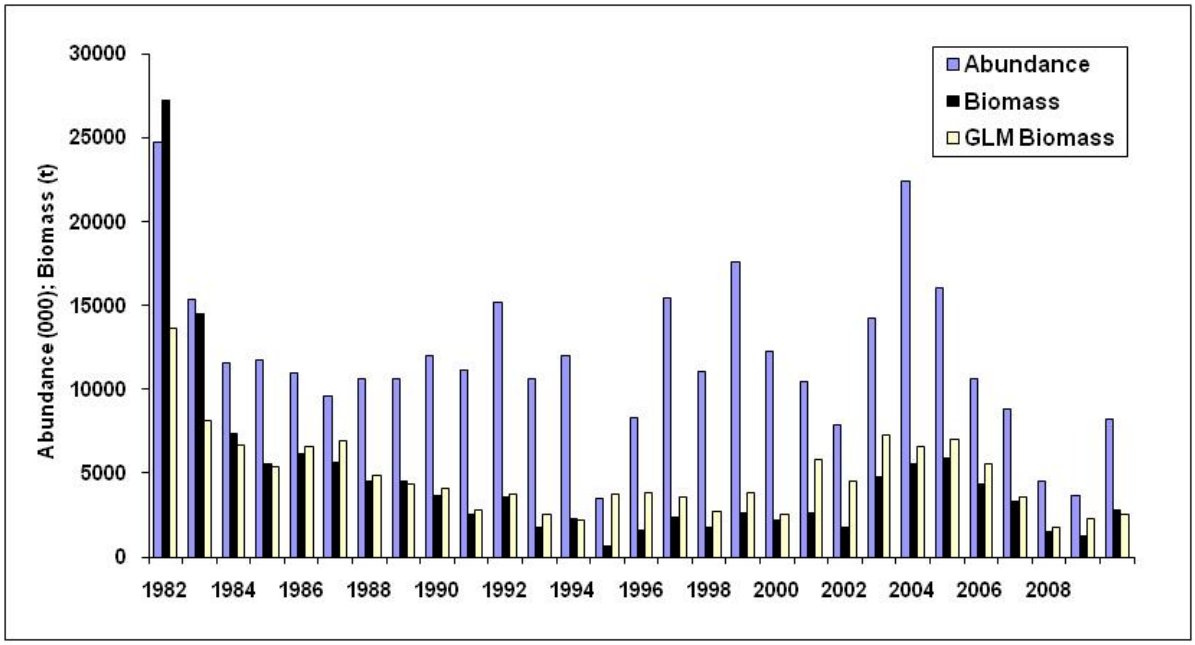

Fig. 10 Abundance and biomass indices for *Anarhichas lupus* off West Greenland, 1982-2010. Respective values are listed in Table 11.

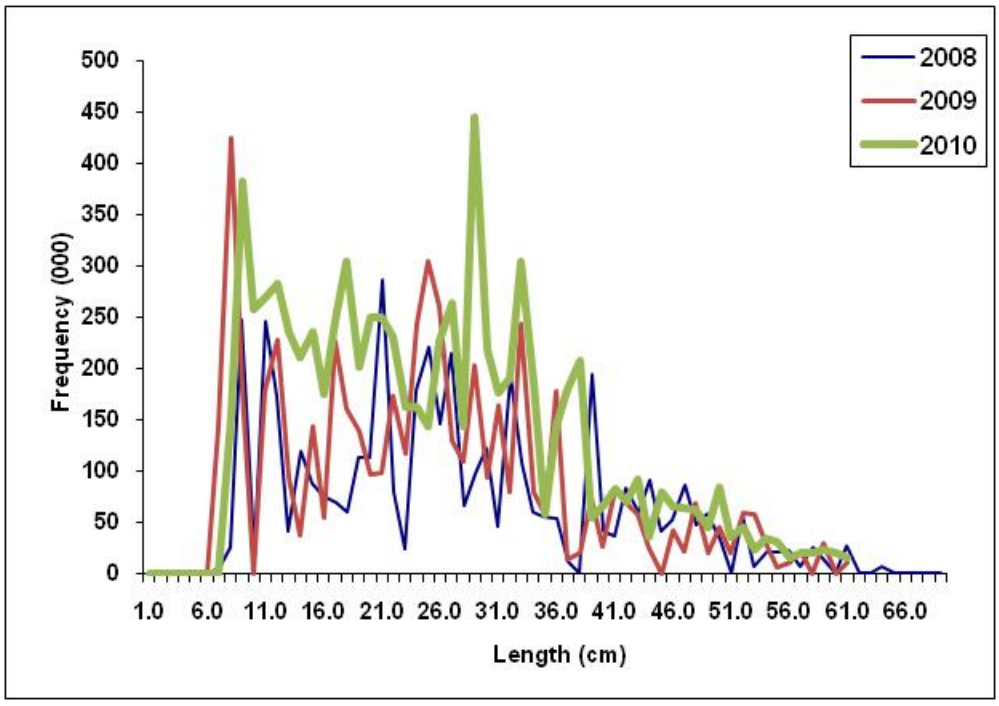

Fig. 11 Length disaggregated abundance indices for *Anarhichas lupus* off West Greenland, 2008-2010. Respective values are listed in Table 12.

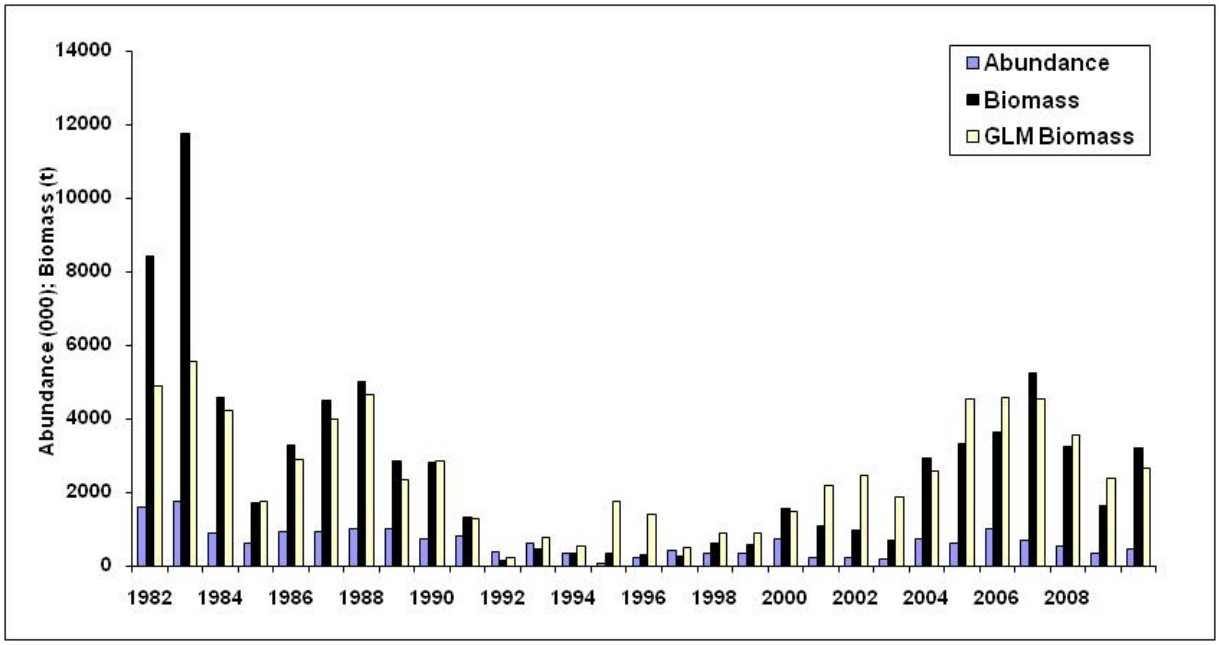

Fig. 12 Abundance and biomass indices for *Anarhichas minor* off West Greenland, 1982-2010. Respective values are listed in Table 13.

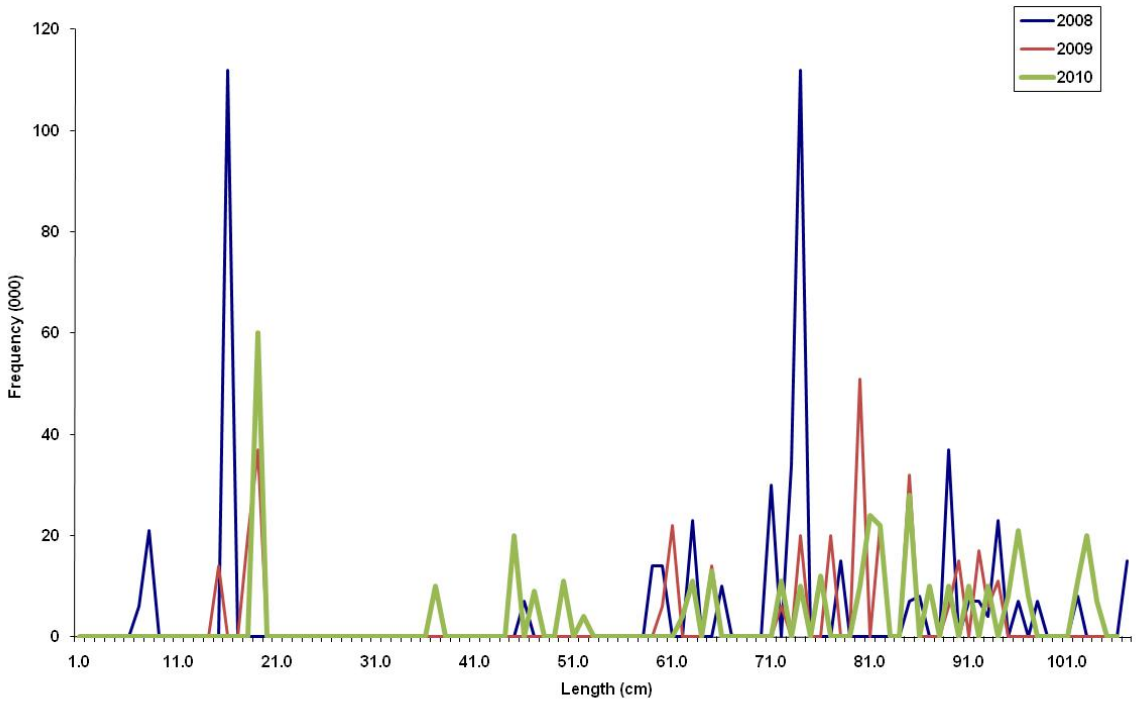

Fig. 13 Length disaggregated abundance indices for *Anarhichas minor* off West Greenland, 2008-2010. Respective values are listed in Table 14.

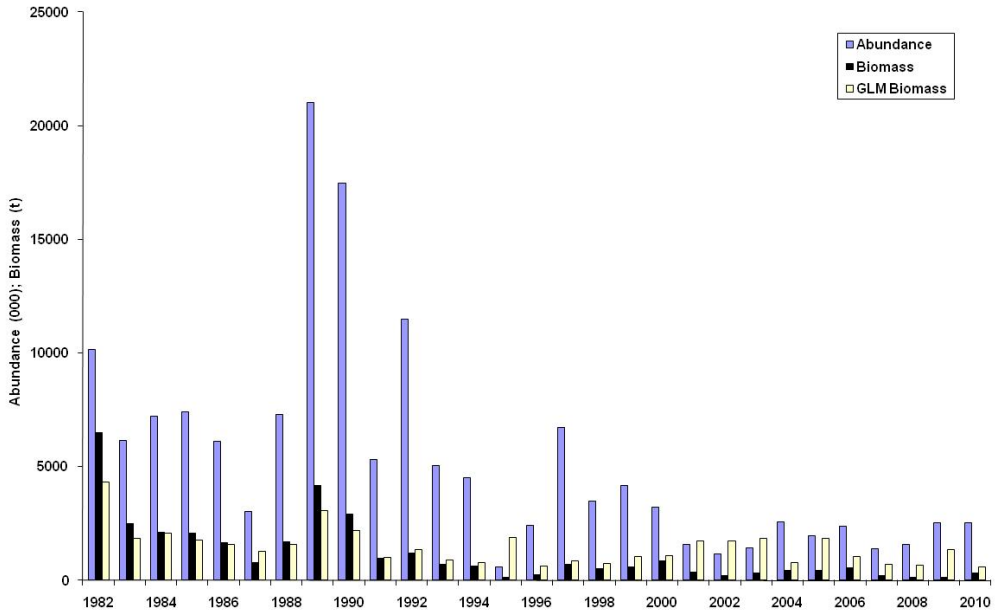

Fig. 14 Abundance and biomass indices for *Raja radiata* off West Greenland, 1982-2008. Respective values are listed in Table 15.

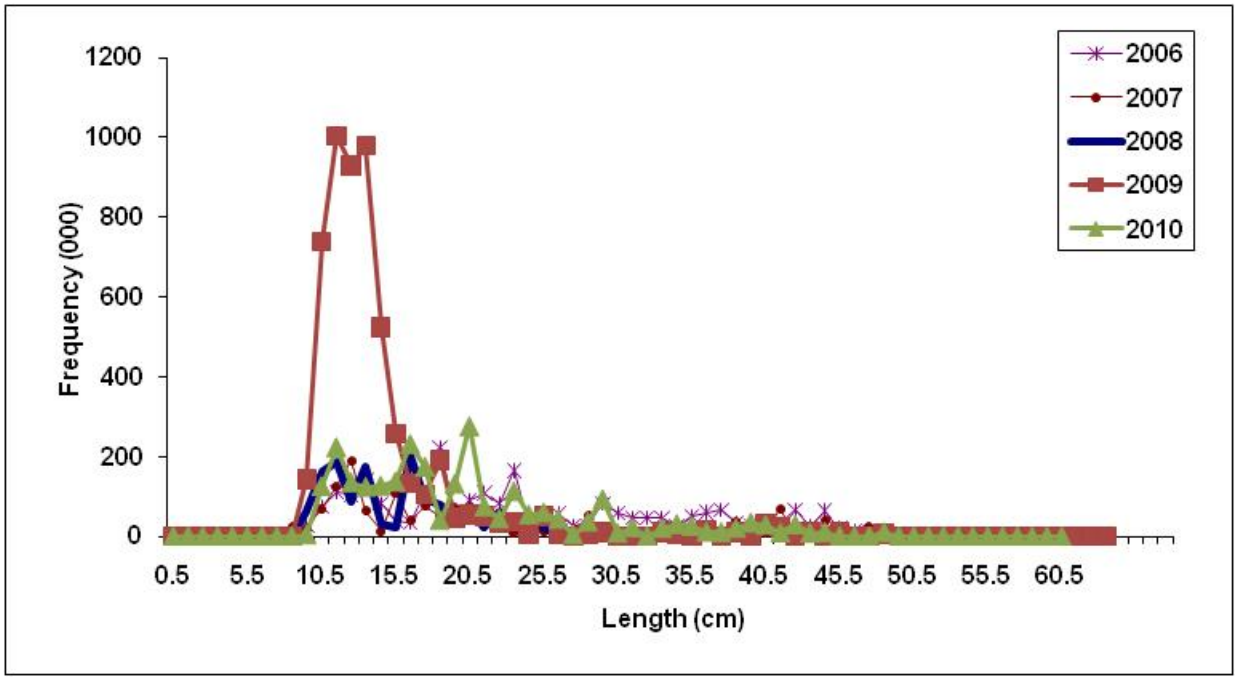

Fig. 15 Length disaggregated abundance indices for *Raja radiata* off West Greenland, 2006-2010. Respective values are listed in Table 16. Year 2009 includes samples from stratum 1 (NAFO SA 1C) which were not included in the abnundance and biomass indices since they did not satisfy the minimum of 5 valid per stratum.

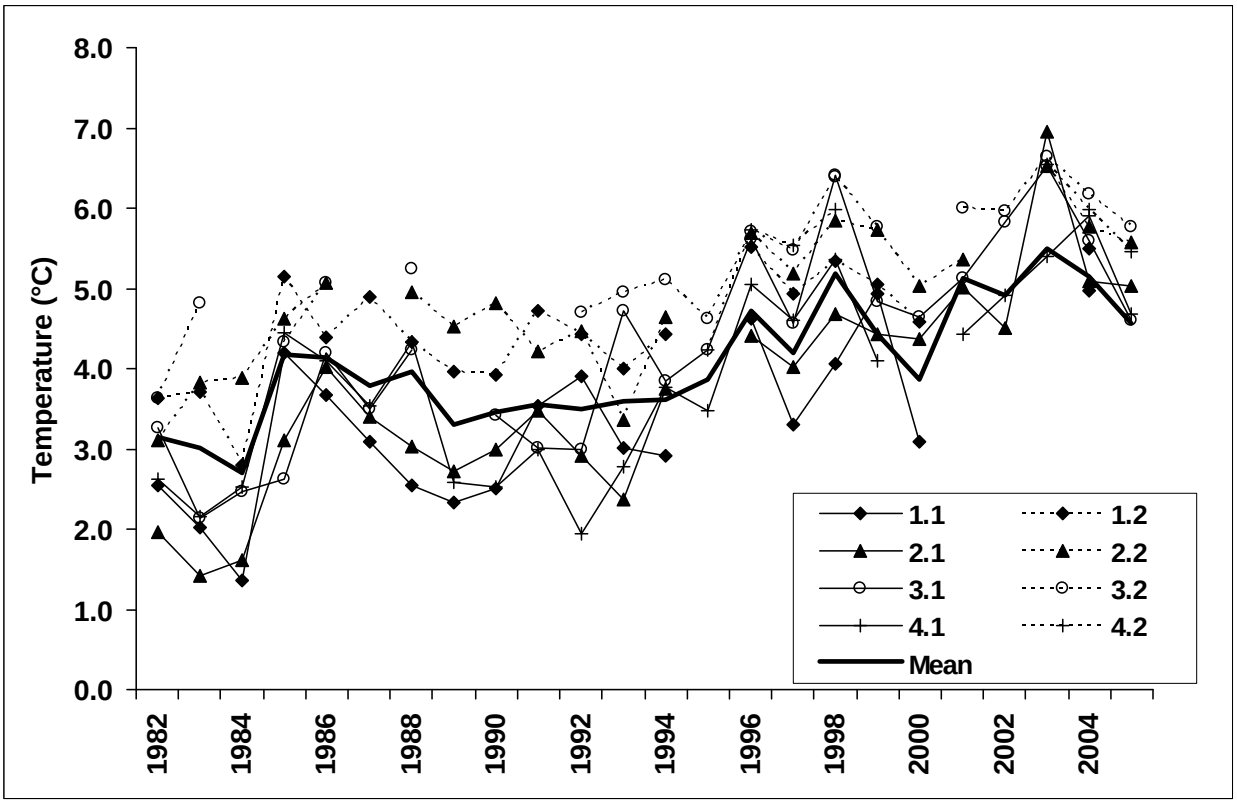

Fig. 16 Stratum means of near bottom temperature (°C) and stratified mean, 1982-2008. Respective values are listed in Table 17. Solid lines display trends in shallow strata (<200 m), dashed lines display trends in deep strata (>200 m),

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