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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 1982-2007

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 1D to 1F are presented. For golden redfish, American plaice and both 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. For thorny skate, abundances increased in the early 1990s and for deep-sea redfish in the late 1990s. Both abundances decreased since then. 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 maximum of the time series was observed in 2003.

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. The conversion of catch-per-tow (C_{tow}) to catch per nautical square mile C_{sqnm} is:

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

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

Strata with less than five valid sets were rejected from the calculation. 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.

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

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 of the mean. 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 is incorrect prior to transformation, for catch rates the application of the log-normal model is likely more realistic than the gamma model (Venables and Dichmont 2004). A gamma model proved to be less sensitive (not shown).

Near bottom water temperature was measured directly before or after a trawl haul be means of a CTD sonde. The annual stratified mean temperature was estimated in the same manner as applied for the fish abundance, i.e. through area weighting (Cochran, 1953; Saville, 1977).

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. Despite an increase in index values since 2002 both in the survey index and the GLM index, substantial recovery back to historical levels does not appear. In 2007, the stock was mainly composed of three length groups of 17-20, 25-35 cm and 40-45 cm in body length. In particular the size group 17-20 cm is the strongest observed since 1988, indicating further potential for recovery (Table 4).

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. The year 2007 indicates low index values. As in 2002 and 2005, the length distribution is unimodal with a maximum at 17-20 cm. In particular, the abundance of larger specimens as observed in 2006 has declined. As for golden redfish, the latter indicates an incoming year class (Fig. 5 and Table 6). 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. The decline for larger fish is likely due to a pelagic migration.

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 peaks at 6-7, 10-12 and 14-16 cm, an indication of sizes at ages 0, 1 and 2 in autumn (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. Compared to 2005 and 2006 (Figure 9 and listed in Table 10), the share of specimens > 30 cm decreased in 2007. The catchability of flatfish by the survey gear is considered poor but the time series seems to represent the stock development.

With regard to biomass index, Atlantic wolfish *Anarhichas lupus* has recovered slightly after 2002 but still is below historical stock levels (Fig. 10 and Table 11). The length composition has remained almost constant since 2005 (Figure 11). Table 12 shows that since 1995 the share of specimens larger than 40 cm has increased steadily. In 1994, 1999 and 2004 size composition of the stock was dominated by specimens < 20 cm.

The abundance and biomass of spotted wolfish *Anarhichas minor* decreased significantly until 1992 (Fig. 12 and Table 13). Since 1996, a clear upward trend in particular for the biomass estimates is evidenced in the survey series. 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). Size composition was dominated by small specimens below 25 cm body length in 2004, 2006 and 2007 (Fig. 15 and Table 16). In 2005, the length distribution was more even.

Trends in near bottom temperature means by stratum and stratified mean temperature are listed in Table 17 and shown in Figure 16. They reveal that the warm conditions off West Greenland continued since 1996 with a maximum stratified mean temperature in 2003. 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.

References

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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, 1982-2007. Strata 1.1 – 4.2 refer to West 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	7.1	7.2	Sum	YEAR	Temp. (°C)
20	11	16	7	9	6	13	2	1	10	3	12	1	25	136	1982	3.139
26	11	25	11	17	5	18	4	3	19	10	36	0	18	203	1983	3.012
25	13	26	8	18	6	21	4	5	4	2	8	0	5	145	1984	2.698
10	8	26	10	17	5	21	4	5	21	14	50	0	28	219	1985	4.181
27	9	21	9	16	7	18	3	3	15	14	37	1	34	214	1986	4.136
25	11	21	4	18	3	21	3	19	16	13	40	0	18	212	1987	3.783
34	21	28	5	18	5	18	2	21	8	13	39	0	26	238	1988	3.959
26	14	30	9	8	3	25	3	17	18	12	29	0	11	205	1989	3.295
19	7	23	8	16	3	21	6	18	19	6	15	0	13	174	1990	3.461
19	11	23	7	12	6	14	5	8	11	10	28	0	16	170	1991	3.558
6	6	6	5	6	6	7	5	0	0	0	0	0	6	53	1992	3.489
9	6	9	6	10	8	7	0	9	6	6	18	0	14	108	1993	3.597
16	13	13	8	10	6	7	5	0	0	0	0	0	6	84	1994	3.620
0	0	3	0	10	7	10	5	8	6	6	17	0	12	84	1995	3.862
5	5	8	5	12	5	10	5	7	9	5	13	0	9	98	1996	4.709
5	6	5	5	6	5	8	5	5	5	4	8	0	8	75	1997	4.189
9	5	10	7	11	6	10	5	5	8	6	12	0	9	103	1998	5.181
8	6	14	8	13	6	9	3	5	6	6	13	0	5	102	1999	4.435
13	6	14	7	14	5	9	5	6	5	8	16	0	11	119	2000	3.860
0	0	15	7	15	5	11	6	5	6	9	18	0	15	112	2001	5.128
0	0	7	2	5	6	8	4	6	6	5	10	0	10	69	2002	4.904
0	0	7	6	7	7	6	5	6	5	5	7	0	16	77	2003	5.500
9	7	11	9	9	6	9	5	7	7	8	12	0	15	114	2004	5.152
0	0	9	7	8	6	6	5	6	7	8	11	0	15	88	2005	4.387
6	5	7	5	7	7	8	5	2	1	5	11	0	12	81	2006	4.100
5	5	7	5	6	5	9	5	4	5	6	10	0	13	85	2007	4.518

Table 3 *S. marinus* >= 17cm, abundance (1 000) and biomass (tons) for West Greenland by stratum and total, 1982-2007. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Abundance

Abundance Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	7016	6341	88792	5511	5736	14876	4088		132360	55
1983	4022	3186	3356	6523	4043	5886	1697		28713	53
1984	1327	3438	461	1209	10671	2776	4214		24096	65
1985	4661	10451	6157	1569	3221	14442	4974		45475	52
1986	6329	4324	2077	3483	21504	2883	2717		43317	53
1987	905	653	1328		9611		660		13157	39
1988	830	2238	343	2255	5938	1954	732		14290	54
1989	422	421	776	690	6490		362		9161	60
1990	122	433	280	710	1037		146	2270	4998	75
1991	225	256	96	691	236	528	21	1671	3724	51
1992	129	105	73	190	194	476	193	836	2196	151
1993	170	482	59	267	79	132	0		1189	93
1994	109	325	155	167	66	46	152	247	1267	41
1995					50	68	39	146	303	97
1996	150	267	21	243	380	383	28	298	1770	47
1997	252	609	16	175	120	311	36	552	2071	40
1998	116	141	45	142	19	106	126	254	949	160
1999	225	293	132	219	72	213	10		1164	70
2000	197	621	63	571	83	200	10	836	2581	59
2001			106	304	72	456	8	1557	2503	124
2002			101		333	536	13		983	93
2003			251	375	186	516	0	1998	3326	50
2004	143	331	56	373	209	453	64	2042	3671	63
2005			195	399	155	1041	159	5916	7866	83
2006	0	241	25	183	62	823	120	9642	11095	106
2007	343	2437	127	874	160	1693	214	10136	15984	87

Biomass

Biomass Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI	GLM Biomass
1982	1797	1354	34439	2557	3205	9794	2532		55678	54	10765
1983	844	944	1572	3043	1874	4816	1084		14177	61	6315
1984	306	893	197	518	4934	2284	2088		11220	55	4409
1985	1021	1819	2968	472	1426	9210	2720		19636	34	5057
1986	1279	1215	752	1230	10122	1705	1762		18065	38	7967
1987	252	246	660		4954		439		6551	38	5504
1988	143	404	118	942	2570	1342	383		5902	60	3139
1989	184	137	273	249	2620		208		3671	47	3374
1990	41	149	75	275	479		80	1343	2442	45	3543
1991	41	83	24	226	120	272	3	1007	1776	98	1627
1992	20	36	21	61	52	241	69	447	947	130	1082
1993	48	111	19	114	39	55	0		386	68	221
1994	34	147	47	64	27	36	41	80	476	38	739
1995					19	19	21	43	102	38	224
1996	61	102	2	60	128	118	8	132	611	40	393
1997	41	261	5	61	35	188	10	246	847	58	359
1998	20	43	12	42	14	54	56	117	358	102	352
1999	54	71	35	68	17	82	8		335	61	401
2000	68	173	31	215	21	76	3	388	975	96	715
2001			24	113	54	228	3	776	1198	67	723
2002			24		157	230	13		424	82	1243
2003			96	174	83	284	0	966	1603	85	1753
2004	61	171	24	181	91	262	41	1235	2066	61	1735
2005			82	201	52	476	118	2986	3915	60	2768
2006	0	72	12	133	32	450	92	6226	7017	78	2618
2007	50	446	52	219	110	686	93	5205	6861	98	5691

Table 4 *S. marinus* >= 17 cm. Length composition by year (1 000), 1982-2007.

1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
0	0	0	0	0	0	9	39	50	14	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0
662	574	2381	1438	30	686	8	24	21	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
629	572	1918	1347	64	321	46	137	87	15	0	0	0	8	12	0	0	30	28	26	27	64	49	19	512
510	442	1372	1733	51	131	37	58	94	51	35	90	0	22	0	0	22	65	6	26	69	45	123	11	903
435	397	1258	1241	76	351	90	45	53	5	95	89	33	16	30	6	31	95	85	44	51	77	219	57	974
657	332	1434	1047	95	253	131	74	122	44	147	85	29	425	113	34	41	127	30	34	32	55	371	151	521
614	378	1192	940	132	243	109	79	87	147	71	42	30	27	93	5	100	78	52	32	120	61	501	166	483
770	418	1320	1155	187	303	140	143	135	80	22	48	15	34	81	68	51	113	97	96	93	88	290	125	516
806	465	1285	1140	264	298	214	176	102	87	23	26	11	79	75	33	103	84	63	18	97	95	456	278	414
808	532	1119	1787	449	464	320	187	131	148	45	70	11	27	158	76	51	150	74	68	109	153	437	426	626
1231	690	1374	1611	381	640	343	251	160	106	110	68	4	63	143	71	64	179	134	31	95	207	485	249	858
1408	833	1556	1717	631	765	561	218	186	140	41	91	7	152	124	121	109	199	166	22	85	202	443	276	721
1509	994	2049	1879	647	798	679	255	171	94	86	70	29	43	155	103	86	115	175	74	160	266	434	289	716
1690	1315	1781	2213	768	769	732	272	192	81	35	40	18	41	144	36	66	184	219	35	150	256	478	439	653
1992	1490	2358	2549	937	914	871	221	273	140	16	65	14	34	83	66	75	142	143	32	280	124	431	817	703
2524	2054	3193	3285	1024	1081	1071	410	141	144	75	44	15	39	120	53	91	138	143	54	199	189	374	835	644
1941	1978	2321	3090	1155	947	709	327	192	107	41	45	8	23	113	19	109	124	145	13	227	127	219	755	598
1797	1928	2873	3224	1028	826	715	268	193	132	49	49	25	8	150	16	10	86	137	60	244	103	229	607	722
1422	1684	2080	2926	1235	720	625	204	236	150	35	19	0	148	33	10	21	115	129	47	199	179	240	602	573
1188	1424	2144	2505	946	645	430	260	134	129	40	52	0	78	57	82	19	84	77	27	214	172	319	360	473
1247	1250	1765	2199	901	721	397	259	185	106	27	53	11	29	78	14	26	95	107	31	107	112	178	321	404
980	1052	1446	1321	650	562	329	214	134	61	43	49	31	56	40	5	25	84	107	47	144	181	130	309	274
668	683	1211	945	485	467	219	169	156	57	44	0	0	137	17	43	5	76	63	32	96	153	214	359	336
650	635	1289	631	251	364	115	130	81	21	20	37	0	0	22	11	5	60	94	36	75	114	199	200	382
453	379	1091	413	252	252	120	82	114	9	37	39	0	0	38	27	21	24	63	46	52	103	155	520	426
310	320	1107	415	201	234	51	127	102	62	4	5	0	127	60	7	0	37	24	4	132	129	148	627	389
259	236	537	222	128	127	27	118	25	5	4	11	0	0	45	6	0	32	52	4	86	64	188	730	350
231	179	572	84	56	64	11	82	65	17	24	29	15	0	40	0	5	29	40	13	30	127	146	502	346
222	197	430	94	39	65	22	54	28	14	0	16	0	0	30	5	0	27	18	13	37	57	133	381	323
101	110	243	40	42	53	15	0	27	0	10	23	0	0	6	5	0	0	18	9	34	91	76	286	465
106	120	221	22	22	45	0	42	19	0	12	14	0	127	6	15	0	0	6	0	6	7	48	150	211
119	92	185	25	13	53	0	24	5	0	0	5	0	0	6	5	0	0	0	0	27	31	83	113	178
48	65	94	17	5	16	0	18	14	0	0	0	0	0	0	0	5	0	0	0	14	7	20	15	125
85	64	94	0	0	4	0	12	6	0	0	0	0	0	0	0	0	0	6	9	29	0	15	81	22
23	37	68	0	0	6	4	0	0	0	0	0	0	0	0	0	0	7	0	0	0	17	15	38	68
73	48	22	9	0	0	4	12	0	0	0	0	0	0	0	0	0	0	0	0	8	0	15	7	15
20	9	6	0	4	0	4	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	15
71	14	11	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
89	9	6	4	0	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	7
50	10	22	8	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	7	7
39	5	17	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47	5	4	0	0	6	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	7
16	14	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
38	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
28	5	6	5	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
50	23	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 5 *S. mentella* >= 17cm, abundance (1 000) and biomass (tons) for West Greenland by stratum and total, 1982-2007. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance. GLM 1985-1989 subject to revision.

Abundance

Abundance Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	0	389	16	348	0	2360	0		3113	65
1983	41	1010	71	2528	0	5236	0		8886	42
1984	41	2966	7	1276	0	1115	0		5405	93
1985	0	369	31	26	56	327	0		809	47
1986	2144	414	38	292	4	444	0		3336	36
1987	987	13679	42		56		0		14764	45
1988	150	3186	26	777	60	4620	0		8819	58
1989	0	186	9	102	0		8		305	60
1990	0	9	5	704	50		0	3881	4649	43
1991	0	0	0	0	0	652	0	1773	2425	81
1992	0	36	0	15	0	106	0	0	157	165
1993	0	23	0	159	8	0	0		190	86
1994	0	271	21	96	95	162	0	36	681	168
1995					29	234	95	1468	1826	55
1996	1524	619	0	236	0	1921	28	7135	11463	64
1997	252	1759	0	381	37	3204	144	30742	36519	62
1998	0	324	0	212	151	828	10	2543	4068	67
1999	34	235	7	281	39	1735	95		2426	153
2000	0	94	7	768	31	1422	0	21187	23509	139
2001			24	636	116	5419	0	13939	20134	109
2002			0		0	1351	23		1374	149
2003			0	571	114	1554	0	9365	11604	116
2004	225	1206	40	1122	242	1115	139	5021	9110	74
2005			40	1042	27	791	77	1123	3100	76
2006	0	1309	63	739	52	1239	48	13311	16761	108
2007	676	1679	13	689	42	777	0	1192	5068	57

Biomass

Biomass Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI	GLM Biomass
1982	0	96	7	114	0	893	0		1110	68	5
1983	14	213	26	1158	0	2857	0		4268	47	417
1984	7	798	5	491	0	472	0		1773	97	860
1985	0	96	14	11	27	110	0		258	35	667
1986	225	38	19	110	4	180	0		576	36	612
1987	82	1183	9		31		0		1305	46	371
1988	20	425	21	159	45	1878	0		2548	56	1233
1989	0	23	7	15	0		0		45	63	221
1990	0	6	2	87	8		0	542	645	44	298
1991	0	0	0	0	0	153	0	445	598	80	466
1992	0	2	0	1	0	28	0	0	31	160	4
1993	0	4	0	22	2	0	0		28	61	776
1994	0	32	2	10	12	24	0	3	83	128	314
1995					6	24	10	159	199	52	1704
1996	7	55	0	19	0	235	3	689	1008	59	2698
1997	20	141	0	38	2	320	18	2973	3512	59	2782
1998	0	26	0	17	17	88	3	326	477	73	1610
1999	7	21	5	36	6	188	21		284	52	1117
2000	0	9	0	65	2	122	0	1915	2113	57	1060
2001			2	66	10	469	0	1468	2015	74	2273
2002			0		0	145	3		148	102	807
2003			0	66	12	223	0	1557	1858	120	3797
2004	34	117	7	122	50	149	23	1172	1674	74	2125
2005			5	125	4	89	23	403	649	109	1544
2006	0	138	7	80	10	260	24	4115	4633	76	3327
2007	67	196	1	71	14	245	0	520	1114	80	2623

Table 6 *S. mentella* >= 17 cm. Length composition by year (1 000), 1982-2007.

Length	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
15.5	0	0	0	0	0	6	0	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16.5	0	23	95	29	0	5220	230	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17.5	9	58	140	6	1303	2178	217	14	72	0	0	0	0	0	0	6345	0	0	10530	5250	263	874	1286	244	613	289
18.5	29	51	102	9	442	2794	99	19	83	9	17	6	267	701	3188	9988	1341	987	4518	5763	157	1401	1232	416	720	1055
19.5	6	79	164	41	199	1721	965	64	240	31	25	6	163	366	2675	11375	752	479	3353	3910	252	1104	771	363	709	848
20.5	28	89	149	26	117	1922	748	92	636	9	0	12	76	251	1853	4345	543	380	1903	1827	316	1003	552	399	686	454
21.5	40	96	155	26	54	272	532	30	1077	71	20	6	30	349	935	1446	408	114	635	655	207	891	683	179	841	236
22.5	18	143	130	13	98	131	722	25	1544	300	5	19	62	44	721	1034	364	95	733	713	78	1516	510	217	1083	259
23.5	41	124	194	35	88	84	409	9	640	389	18	6	25	15	328	658	264	49	579	519	37	1613	343	59	1225	197
24.5	38	184	160	85	106	137	346	0	191	649	28	13	22	39	168	721	120	85	413	498	23	1230	503	76	1105	104
25.5	105	265	98	76	35	36	355	19	76	607	9	19	0	29	42	262	80	58	264	354	9	325	546	43	943	162
26.5	83	362	182	52	49	18	320	0	58	165	18	14	5	29	29	111	102	57	214	262	32	290	639	85	786	163
27.5	231	548	184	37	43	47	319	0	18	93	5	25	0	0	0	151	34	45	130	156	0	405	658	78	865	159
28.5	181	559	329	46	81	43	265	5	0	38	0	25	12	0	0	28	29	28	85	59	0	386	341	143	923	83
29.5	315	776	457	38	71	0	296	0	5	19	0	0	5	0	0	6	15	11	59	53	0	250	372	107	1406	119
30.5	571	1452	742	55	81	52	454	0	0	29	0	12	0	7	0	6	20	9	29	35	0	142	276	283	1582	120
31.5	391	1179	664	44	61	36	324	0	0	0	0	0	0	0	0	0	0	11	15	30	0	75	141	157	1051	140
32.5	380	928	522	48	106	24	397	0	0	0	0	6	0	0	0	22	0	0	29	11	0	55	103	68	866	181
33.5	247	744	440	40	58	6	397	0	0	0	0	0	0	0	0	0	0	5	7	23	0	15	66	102	569	103
34.5	125	563	245	32	117	6	421	0	0	0	0	0	0	0	0	0	0	0	7	12	0	19	31	47	261	108
35.5	93	358	139	26	71	0	482	5	0	5	5	13	0	0	0	22	0	0	0	6	0	4	32	9	108	98
36.5	69	137	51	15	46	6	228	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	7	17	139	47
37.5	28	71	10	4	27	0	130	6	0	0	0	0	5	0	0	0	0	0	6	0	0	7	7	9	66	35
38.5	5	28	24	0	36	4	38	0	0	0	5	0	0	0	0	0	0	5	0	0	0	0	10	0	65	28
39.5	19	10	11	9	13	0	50	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	106	13
40.5	19	6	8	7	0	7	18	0	0	0	0	6	5	0	0	0	0	0	0	0	0	0	0	0	7	13
41.5	9	14	5	9	14	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	0
42.5	14	0	0	0	0	4	17	8	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	15
43.5	9	6	0	0	9	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33
44.5	5	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45.5	0	0	5	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46.5	5	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47.5	5	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49.5	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
50.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 7 *Sebastes. spp.* < 17cm, abundance (1 000) and biomass (tons) for West Greenland by stratum and total, 1982-2007. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Abundance

Abundance

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	1055	357	120	27	8	42	23		1632	44
1983	3954	506	14	138	8	16	21		4657	56
1984	5022	3713	21	219	141	27	13		9156	67
1985	4886	9616	54	2712	47	67	54		17436	164
1986	10738	237636	113	1811	54	218	39		250609	168
1987	12453	113990	5		19		18		126485	87
1988	19680	42481	0	107	19	139	0		62426	41
1989	7717	13159	3071	5370	17		69		29403	35
1990	11255	35933	15416	1538	72		6199	848	71261	52
1991	51936	59846	34872	22668	13692	2508	891	1540	187953	38
1992	25716	19083	12690	17276	17463	13973	41	13718	119960	54
1993	5458	39035	665	11331	355	2773	13		59630	111
1994	3403	12003	9828	4014	1190	1730	10842	9867	52877	95
1995					399	10236	855	34695	46185	106
1996	456	14356	5210	9377	26961	11571	2488	107236	177655	98
1997	6519	47117	0	15852	43421	20194	444	68931	202478	62
1998	1558	25350	50177	30834	55983	13090	37049	13318	227359	100
1999	3886	54143	1067	8617	1105	7643	758		77219	48
2000	1293	9958	63	3052	393	8195	0	33103	56057	62
2001			1318	3559	110	2432	8	1484	8911	24
2002			1255		145	1523	23		2946	85
2003			390	7090	114	1674	15	1054	10337	79
2004	6676	12206	343	4706	112	1083	10	1089	26225	44
2005			118	2628	54	778	0	342	3920	82
2006	1697	26157	264	2186	73	962	168	603	32110	108
2007	2544	11361	139	896	26	1038	53	400	16457	71

Biomass

Biomass

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	34	13	7	1	0	1	0		56	41
1983	102	21	0	6	0	1	0		130	52
1984	88	105	0	5	6	1	0		205	73
1985	82	367	2	58	2	3	0		514	142
1986	456	6646	2	77	2	6	0		7189	168
1987	265	5020	0		0		0		5285	93
1988	218	1492	0	3	0	5	0		1718	56
1989	109	271	21	49	0		0		450	42
1990	102	369	63	20	0		10	2	566	58
1991	197	798	73	242	29	24	3	15	1381	46
1992	150	386	49	111	74	220	0	64	1054	54
1993	75	512	16	265	6	76	0		950	90
1994	27	216	54	57	29	64	141	277	865	132
1995					6	330	10	348	694	97
1996	7	284	14	117	91	297	18	3300	4128	96
1997	61	344	0	214	163	544	15	2437	3778	81
1998	20	433	165	322	221	351	141	531	2184	120
1999	54	941	14	190	17	272	18		1506	47
2000	27	252	2	106	14	284	0	1414	2099	61
2001			7	65	6	90	0	71	239	29
2002			12		2	29	0		43	83
2003			9	138	2	40	0	26	215	53
2004	54	348	9	140	4	70	0	22	647	160
2005			2	69	0	19	0	3	93	179
2006	40	696	7	60	2	21	8	33	867	72
2007	83	435	2	25	0	16	1	59	621	74

Table 8 *Sebastes spp.* < 17 cm. Length composition by year (1 000), 1982-2007.

Length	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
0.5	0	0	0	0	0	0	0	0	0	0	0	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	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	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	0	0	0	0	0	0	0	0	0	0	0
4.5	0	0	0	0	6	0	7	0	14	59	0	0	0	0	0	0	0	0	0	6	0	0	0	0
5.5	0	6	255	25	36	121	97	39	3468	15519	2396	0	2392	26	236	622	182	1235	186	146	65	243	329	28
6.5	6	78	584	111	97	850	486	1814	5708	59602	30723	117	9939	193	7127	32049	44724	3401	639	1202	699	1344	4039	178
7.5	0	219	179	185	460	1393	1940	2111	2758	11107	27896	200	1053	142	28816	54642	124965	232	411	1564	791	1115	7585	683
8.5	70	518	425	326	1913	902	9815	2176	8484	15958	5799	1935	4092	540	7089	2405	4670	126	87	58	97	60	1041	161
9.5	57	579	835	2161	4221	658	7404	4284	11835	23919	11346	9480	9035	616	7908	4589	3927	3177	1114	123	117	120	98	18
10.5	96	359	1432	4165	8595	941	3378	5703	6994	36922	8922	8916	5238	935	28169	13241	10533	27661	1800	502	308	1007	403	168
11.5	259	594	2151	1470	19713	2445	1453	4835	7050	16197	5788	5980	2909	5090	17615	11127	4294	23335	566	582	162	2030	1023	692
12.5	188	719	1284	508	106866	7017	1560	3156	7575	2388	7518	9527	6043	9656	12200	6785	2104	3134	4074	356	82	1614	612	604
13.5	114	511	679	1599	76491	8666	3244	2148	6284	1648	11461	5614	4357	4247	17440	20084	6322	4979	13437	729	105	628	476	215
14.5	384	464	681	2716	14063	18412	8866	1020	4611	1196	6078	6021	2686	7343	11415	26222	10205	4558	14810	824	214	802	2450	390
15.5	460	609	650	4173	4189	47210	13645	709	3556	1549	1220	5822	2401	8718	11658	16131	5645	1482	9324	955	188	780	5131	451
16.5	0	0	0	0	5121	31716	4826	572	944	1005	391	3914	1329	5090	16748	14577	5203	1764	9607	1864	124	593	3040	332
17.5	0	0	0	0	6513	6136	2998	505	654	591	379	2105	1241	3545	11162	0	4585	2139	0	0	0	0	0	0
18.5	0	0	0	0	1400	0	2514	307	824	218	46	0	68	44	58	0	0	0	0	0	0	0	0	0
19.5	0	0	0	0	930	0	194	24	133	32	0	0	47	0	15	0	0	0	0	0	0	0	0	0
20.5	0	0	0	0	0	0	0	0	133	13	0	0	16	0	0	0	0	0	0	0	0	0	0	0

Table 9 *Hippoglossoides platessoides*, abundance (1 000) and biomass (tons) for West Greenland by stratum and total, 1982-2007. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Abundance

Abundance

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	31582	5092	29598	5735	2843	2133	1043		78026	30
1983	46601	6482	55493	2871	2725	461	811		115444	49
1984	18251	6258	53766	4366	2928	2244	1792		89605	43
1985	21388	5974	22819	6185	2632	239	3161		62398	23
1986	22035	11393	58741	9556	2936	2388	4463		111512	39
1987	23321	3314	26226		2357		1030		56248	26
1988	10963	3476	8025	5698	3566	800	1035		33563	18
1989	9370	4454	11362	3775	8764		1446		39171	28
1990	8615	6465	8227	2614	1083		1492	606	29102	25
1991	7826	4537	5168	1899	1517	639	1248	952	23786	17
1992	8527	4996	3020	2704	1233	1707	1744	175	24106	28
1993	5859	3284	1201	1212	632	694	398		13280	17
1994	2212	3525	1488	1514	624	282	1661	189	11495	21
1995					891	1189	1019	785	3884	18
1996	3716	1337	956	1424	1946	772	1566	472	12189	17
1997	8656	3262	2585	3543	2973	1288	2427	109	24843	21
1998	6254	3956	5654	2873	1767	865	2296	204	23869	17
1999	5410	2675	5013	2904	1835	389	1356		19582	20
2000	2273	3929	1953	3302	1016	361	1197	36	14067	18
2001			11195	3831	1275	394	3616	182	20493	23
2002			6820		1203	2138	1718		11879	23
2003			20675	9700	1140	2170	1633	15	35333	34
2004	23681	7048	18111	6319	998	1120	1741	50	59068	24
2005			16344	8276	1459	1087	950	606	28722	32
2006	4579	4563	9006	7031	1139	1156	1189	44	28707	25
2007	8696	4921	3505	2692	574	355	192	36	20971	32

Biomass

Biomass

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI	GLM Biomass
1982	6050	946	7797	1151	919	376	157		17396	32	4923
1983	7451	1155	11771	607	1008	88	167		22247	41	4826
1984	1701	762	8662	807	607	387	365		13291	45	5003
1985	1939	600	3861	1062	519	49	321		8351	22	3927
1986	2150	1147	8429	1385	703	452	460		14726	30	5772
1987	3130	339	5471		645		229		9814	30	4337
1988	919	293	1699	807	814	137	236		4905	19	3153
1989	517	297	1476	371	2120		288		5069	40	2648
1990	395	397	1220	314	213		288	221	3048	22	2729
1991	347	399	486	260	266	125	187	173	2243	18	2934
1992	578	419	228	183	151	250	152	25	1986	26	2337
1993	327	222	82	102	66	70	26		895	17	2155
1994	143	416	134	143	64	34	108	28	1070	25	1184
1995					70	154	123	58	405	20	3538
1996	211	100	66	164	159	78	149	38	965	22	2866
1997	490	265	209	343	353	168	185	7	2020	27	2891
1998	306	252	355	244	186	122	185	19	1669	20	2269
1999	245	160	331	268	180	35	85		1304	26	1880
2000	122	331	136	309	105	38	49	6	1096	22	1805
2001			637	297	109	45	149	12	1249	22	2435
2002			390		122	200	113		825	22	2485
2003			1462	922	124	258	126	3	2895	35	2958
2004	1613	581	1629	753	136	175	221	4	5112	22	3510
2005			2115	1398	238	134	149	79	4113	32	3077
2006	256	429	975	1036	136	114	218	9	3171	37	2469
2007	524	430	608	369	77	53	47	7	2115	41	1557

Table 10 *Hippoglossoides platessoides*. Length composition by year (1 000), 1982-2007.

Length	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	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	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	0	0	0	0	0	0	0	0	0	0	0	0	0
3.5	0	0	0	0	0	10	0	0	0	0	0	0	0	0	11	73	0	6	0	0	0	0	0	0	0	0
4.5	0	0	0	0	0	10	7	0	5	10	0	0	7	0	0	108	14	87	6	44	18	0	198	0	18	0
5.5	0	0	0	127	14	0	22	0	0	27	0	0	0	0	0	0	0	43	0	6	0	0	141	0	0	0
6.5	0	0	0	5	19	51	33	10	0	86	14	0	0	0	0	0	51	95	71	0	13	0	0	0	0	0
7.5	13	0	10	73	9	68	52	19	20	252	68	0	14	0	20	20	506	546	183	134	53	0	28	19	42	0
8.5	7	20	36	59	43	97	103	43	42	174	123	7	93	0	29	20	353	334	148	203	80	0	36	29	6	14
9.5	20	14	49	143	64	103	158	34	172	273	163	136	34	10	44	71	194	435	147	241	143	107	194	31	182	14
10.5	20	29	84	412	155	364	235	230	352	279	505	251	57	24	318	155	139	635	183	533	245	151	203	32	401	108
11.5	59	46	148	364	334	381	473	508	588	618	618	438	73	19	115	189	278	1106	414	768	334	233	278	0	661	140
12.5	161	228	368	382	705	561	749	743	1052	1084	846	901	353	86	182	841	406	1281	604	989	537	315	1720	9	914	469
13.5	301	404	940	617	1154	703	875	1161	1867	1109	731	901	574	34	361	1235	761	796	932	1582	1036	1352	3931	355	934	1227
14.5	431	978	1285	1069	2118	1250	1008	1678	2608	1290	1024	644	833	29	599	1689	1164	1053	1003	2031	1711	1804	4534	739	1147	1328
15.5	790	1976	2027	1678	3384	1455	1141	2161	2547	1391	1625	971	1269	293	986	2599	2329	1269	1273	2161	2470	3390	4324	986	1889	1640
16.5	812	2232	2565	2442	5466	1814	1366	1974	2261	1851	1663	1106	1200	386	1483	2177	2540	1183	1227	2057	2344	4059	4679	2051	1527	1427
17.5	1331	3336	3783	3633	6816	2611	1211	1914	1837	1777	1899	1098	884	372	1002	1786	3044	1089	965	1700	2571	3489	4258	2180	1957	1493
18.5	1668	3934	4835	4282	6750	3582	1727	1737	1713	1599	1790	1067	631	454	1071	1660	2233	1180	816	1644	1940	2658	4689	2256	1440	1345
19.5	2029	5257	4171	3899	6883	4436	1683	1888	1439	1327	1853	703	487	447	706	1553	1817	1165	625	1039	1845	2898	3563	1792	1771	1015
20.5	2841	8731	5899	4258	7010	4774	1987	2043	1466	1320	1254	826	593	412	582	1570	1309	1272	647	1159	1333	1868	3374	1239	1984	1014
21.5	2700	8334	5767	3765	7337	4764	1830	2014	1123	1223	1292	602	450	370	716	1042	966	1365	494	876	929	2047	3086	1240	1351	999
22.5	3445	7697	5213	3995	6902	4522	1816	1740	1026	946	1342	483	437	248	648	1111	816	810	562	421	1146	1442	2105	999	1513	1332
23.5	2920	7502	7217	3426	5337	4565	1676	1933	923	1047	1217	441	421	291	650	930	701	679	634	430	741	1534	2354	847	1451	1109
24.5	3757	6773	4271	3335	4734	3909	1465	2046	754	934	855	409	417	111	449	1090	759	729	534	329	736	1302	2414	1038	1066	1040
25.5	4426	6553	4938	3057	3472	3780	1742	2225	816	916	1084	488	567	121	437	783	674	429	579	211	692	1446	2548	1304	874	1227
26.5	4774	8563	4630	2449	2937	3190	1707	2040	930	739	1050	343	431	290	477	826	757	433	402	402	637	1061	2030	1694	889	706
27.5	5212	7078	5224	2475	2865	3910	1236	2219	1015	681	552	324	367	148	222	667	535	536	360	352	406	1122	1770	1279	934	524
28.5	5099	6700	6408	2579	2444	3025	1361	1529	927	596	671	335	248	96	394	769	530	366	371	384	442	648	1867	1455	1124	421
29.5	4801	4102	4894	2998	2531	3341	1436	2042	936	451	595	215	261	149	221	502	366	232	206	253	299	925	1947	1504	891	537
30.5	5313	5194	4688	3036	2579	3834	1909	1758	814	485	427	199	239	74	184	510	339	270	246	210	471	511	1080	1391	999	268
31.5	4150	3381	2799	2253	2239	3071	1490	1307	518	374	215	112	235	100	83	379	211	132	178	115	136	401	434	982	744	365
32.5	3655	3120	2141	1620	1854	2551	1399	1147	332	323	339	149	130	144	34	156	123	146	232	119	211	240	460	771	766	361
33.5	2614	2328	2128	1706	1538	2319	910	884	338	184	119	9	62	45	97	116	58	50	84	77	145	141	180	647	417	219
34.5	2362	2278	1195	1148	1121	1390	826	743	169	166	67	77	60	48	37	65	44	48	79	50	77	61	297	599	219	207
35.5	2480	2012	784	589	698	969	525	348	87	144	86	17	32	28	20	23	10	40	26	22	55	34	139	370	312	108
36.5	1984	1818	489	364	311	747	332	245	67	59	21	12	11	11	12	47	24	30	42	0	33	73	69	298	161	112
37.5	1611	1352	374	267	204	430	213	207	53	19	0	12	5	7	0	0	27	10	26	0	5	8	62	359	67	125
38.5	1093	1051	292	146	148	151	57	77	42	32	5	0	5	4	0	51	5	0	0	0	5	13	63	66	35	21
39.5	933	512	212	141	77	174	68	46	5	18	0	0	0	0	0	0	10	0	0	11	13	0	9	104	0	36
40.5	925	754	84	83	45	84	4	49	4	5	0	0	0	4	0	0	0	0	6	0	0	0	0	45	21	8
43.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	13

Table 11 *Anarhichas lupus*, abundance (1 000) and biomass (tons) for West Greenland by stratum and total, 1982-2007. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Abundance

Abundance Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	11113	2955	3457	2313	1822	458	945		23063	23
1983	7567	3186	1720	485	1471	211	786		15426	24
1984	5777	1277	1542	185	1382	111	750		11024	26
1985	5369	2718	1419	370	955	999	907		12737	19
1986	4961	1704	1967	635	1500	511	811		12089	19
1987	5328	1644	888		1023		691		9574	15
1988	4927	1834	895	449	1136	555	758		10554	21
1989	3675	673	1669	516	2901		1130		10564	21
1990	3511	1076	1981	295	1899		1066	612	10440	17
1991	2838	1010	968	756	2593	639	562	494	9860	21
1992	3015	376	1509	937	3360	916	948	2107	13168	26
1993	4723	1712	703	426	574	326	385		8849	28
1994	1545	1196	1725	567	1225	153	4515	1047	11973	48
1995					1349	563	529	705	3146	26
1996	715	942	254	381	2574	622	799	1075	7362	21
1997	3001	1279	1126	335	3771	1149	1538	2863	15062	30
1998	3083	957	783	653	1990	620	1009	1047	10142	21
1999	4457	1138	1941	653	6287	1337	801		16614	29
2000	1980	1725	402	413	2072	1116	480	2652	10840	21
2001			973	1110	3800	1160	724	1774	9541	28
2002			3001		3351	403	552		7307	22
2003			1307	1714	7345	511	575	1468	12920	27
2004	8234	2071	1718	826	3238	953	1271	1744	20055	20
2005			3565	462	6264	1138	2517	625	14571	27
2006	1759	1304	1529	769	1481	1019	1477	1301	10640	24
2007	2423	556	1107	724	1883	822	384	952	8851	34

Biomass

Biomass Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI	GLM Biomass
1982	9908	2974	5203	3926	2273	475	1240		25999	31	6070
1983	3661	3442	2084	471	1769	271	1086		12784	31	4066
1984	3089	673	1283	189	820	71	871		6996	24	4379
1985	1837	1134	1020	200	581	557	632		5961	16	3561
1986	1783	912	1441	434	973	458	768		6769	16	4218
1987	2191	521	573		1048		616		4949	16	4305
1988	1102	384	797	298	882	341	696		4500	16	3499
1989	687	222	620	246	1750		1037		4562	19	3093
1990	708	177	496	111	655		660	320	3127	16	2710
1991	456	166	160	161	674	148	249	214	2228	20	1988
1992	436	79	322	237	831	200	231	630	2966	27	2730
1993	646	314	101	80	130	67	108		1446	22	1900
1994	218	209	376	97	285	26	865	171	2247	42	1618
1995					248	68	131	114	561	25	2562
1996	61	261	42	68	486	114	169	238	1439	19	3232
1997	306	239	89	77	665	164	352	372	2264	24	2744
1998	361	194	125	146	287	97	175	266	1651	16	2288
1999	327	273	322	146	1039	230	136		2473	23	2686
2000	231	297	63	88	349	168	172	560	1928	22	1932
2001			209	263	1006	218	185	579	2460	25	3550
2002			578		859	91	146		1674	21	3136
2003			486	438	2475	141	200	646	4386	26	4370
2004	1327	389	550	242	971	299	758	652	5188		4413
2005			1372	165	1812	299	1284	384	5316	27	4453
2006	279	306	682	302	614	196	1110	821	4311	23	3633
2007	576	137	475	266	705	192	306	683	3340	36	2331

Table 12 *Anarhichas lupus*. Length composition by year (1 000), 1982-2007.

Length	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
0.5	0	0	0	0	0	0	0	0	0	0	0	0	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	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	0	0	0	0	0	0	0	0	0	0		0	0
3.5	0	0	0	0	0	0	0	10	0	0	0	0	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	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	0	0	0	0	0	0	0	13	0	0		0	0
6.5	0	0	0	0	19	10	3	0	33	86	0	29	20	0	0	0	85	134	0	0	88	0	104	13	22	0
7.5	0	0	0	76	19	92	7	22	74	241	8	61	37	0	77	330	186	567	25	44	241	23	164	406	88	28
8.5	13	0	3	32	39	26	52	31	62	214	75	0	14	0	81	180	186	389	36	89	179	43	112	94	64	14
9.5	0	0	0	4	20	70	120	45	35	245	97	20	28	0	81	223	201	480	105	70	38	18	128	0	86	11
10.5	0	0	15	34	50	102	134	64	159	199	112	251	43	15	15	388	231	475	110	39	115	68	205	57	181	53
11.5	0	6	0	26	125	186	103	97	173	112	194	267	163	51	91	242	110	432	96	58	156	13	258	81	106	130
12.5	18	0	3	46	138	69	199	100	241	212	252	172	28	82	69	405	280	396	177	129	253	60	220	158	159	70
13.5	0	0	4	36	59	96	134	71	325	231	346	271	245	88	153	561	435	670	124	145	212	87	433	137	88	40
14.5	52	29	55	34	49	226	243	187	321	188	396	305	322	70	130	716	517	666	146	108	132	214	550	84	48	82
15.5	41	14	44	71	239	179	190	237	289	292	333	659	404	24	143	583	350	623	143	112	192	164	475	179	65	35
16.5	50	41	71	22	195	247	199	300	448	286	243	522	631	116	140	543	343	671	410	163	170	107	561	303	55	172
17.5	88	97	85	89	299	404	273	313	426	376	512	492	867	158	252	638	410	595	584	275	124	171	574	369	167	74
18.5	72	146	154	92	312	255	324	257	480	278	770	631	656	188	429	834	543	855	584	447	186	268	647	438	381	231
19.5	84	156	261	167	199	221	566	371	367	339	556	345	678	171	419	827	435	808	766	340	266	355	758	311	345	126
20.5	202	306	252	110	200	259	545	388	498	559	659	408	889	216	444	771	712	842	780	414	172	401	886	475	221	323
21.5	134	273	251	231	151	309	616	396	420	604	566	462	714	198	316	701	462	879	775	380	251	435	1128	509	519	349
22.5	208	291	388	183	172	295	530	279	358	336	785	392	574	236	361	831	409	607	635	409	454	331	1167	479	341	303
23.5	151	321	384	244	126	131	315	334	247	407	650	232	532	295	402	787	386	708	778	530	304	643	1059	384	400	239
24.5	406	220	362	315	170	176	326	512	294	374	514	176	585	155	363	621	350	513	488	360	317	635	1144	634	501	416
25.5	348	318	436	367	232	144	336	470	416	413	950	317	714	98	379	557	438	580	509	472	383	620	872	425	379	342
26.5	311	375	362	335	289	253	257	438	251	352	563	345	375	137	311	345	329	588	474	442	205	363	874	716	453	575
27.5	357	416	336	408	275	142	182	317	295	338	496	155	270	55	305	321	338	465	419	458	196	590	714	575	348	413
28.5	382	519	354	441	359	90	107	343	282	370	457	198	450	157	302	409	168	436	346	373	312	528	778	492	453	401
29.5	404	381	291	494	386	157	166	330	300	253	469	271	272	37	248	405	200	461	251	391	288	390	515	475	385	336
30.5	343	553	283	549	371	247	197	210	364	267	332	302	348	62	286	377	277	379	242	310	214	527	432	441	331	345
31.5	381	361	382	525	457	218	103	147	311	207	338	268	212	48	181	312	162	272	163	325	159	411	452	466	331	329
32.5	396	513	277	518	431	294	173	323	187	258	270	150	208	108	134	375	109	282	131	329	113	480	547	492	307	332
33.5	404	499	269	716	499	244	127	110	189	165	191	208	141	15	167	344	230	240	195	307	208	507	291	446	310	235
34.5	454	333	326	496	439	274	125	141	108	228	261	187	188	33	152	258	64	200	158	286	161	559	469	405	237	306
35.5	449	452	354	531	475	287	137	262	201	200	339	88	280	29	73	96	209	178	64	197	171	425	499	387	214	287
36.5	335	447	321	505	394	170	210	174	140	64	183	107	192	28	103	155	166	176	147	158	92	343	288	357	281	167
37.5	453	314	319	443	411	305	134	216	165	138	142	75	111	22	113	74	94	107	131	181	121	413	254	339	172	172
38.5	307	245	295	609	388	173	145	230	134	189	184	61	142	29	99	113	85	116	128	155	95	300	294	317	200	126
39.5	447	310	163	402	403	201	190	135	139	65	91	128	138	14	82	170	133	145	91	144	84	372	316	447	186	98
40.5	377	507	302	467	405	210	254	218	224	155	181	22	111	33	113	90	58	133	69	127	101	396	301	422	200	116
41.5	398	306	174	448	403	239	300	161	177	78	79	22	64	52	77	103	87	115	44	122	54	224	132	169	186	127
42.5	480	321	192	373	338	280	271	163	131	82	147	0	27	7	53	67	40	84	64	147	51	393	133	282	120	106
43.5	442	263	215	178	296	214	152	212	143	82	86	72	62	33	76	73	23	34	81	76	28	250	178	301	173	165
44.5	444	295	158	265	290	166	224	275	104	70	70	41	31	15	36	79	27	63	86	59	57	228	290	196	229	148
45.5	562	365	248	292	312	207	249	236	155	57	70	66	67	15	21	18	57	80	33	69	28	176	143	170	79	61
46.5	527	275	229	190	316	206	296	195	131	6	61	23	38	0	22	25	62	26	42	63	41	63	82	127	181	118
47.5	569	299	143	149	221	290	169	166	80	53	33	3	34	25	15	19	7	11	20	25	37	127	170	106	144	102
48.5	645	295	189	220	166	213	189	143	159	45	41	9	16	0	0	25	24	12	61	22	37	76	110	156	73	140
49.5	680	263	178	110	107	198	196	131	61	19	0	6	20	0	16	0	35	64	33	47	32	15	58	223	174	47
50.5	864	320	190	154	158	165	189	107	95	33	0	0	7	24	6	27	12	6	17	55	28	7	59	193	77	182
51.5	830	380	208	101	108	97	153	63	62	14	32	0	0	0	0	30	0	11	39	30	42	12	59	83	127	51
52.5	855	338	173	78	133	107	54	198	27	19	25	0	5	0	0	0	0	0	12	26	42	65	18	53	113	21
53.5	580	362	118	97	87	115	95	111	41	33	12	17	28	0	21	12	14	17	0	5	28	0	56	65	102	87
54.5	662	383	125	66	75	64	56	41	6	7	0	0	0	0	0	0	9	12	11	17	4	0	13	62	41	29
55.5	846	347	141	77	21	66	65	56	23	12	0	0	0	0	0	0	14	9	0	11	15	0	41	31	81	59
56.5	712	343	144	39	34	31	52	35	11	0	0	7	0	7	15	0	0	6	21	0	13	31	7	0	19	20
57.5	818	289	71	39	55	22	15	68	13	6	0	0	0	0	0	0	0	0	0	0	15	0	0	8	38	38
58.5	587	299	114	23	17	34	37	33	13	0	0	0	0	0	0	0	5	0	0	6	0	8	0	0	12	7
59.5	606	231	95	78	31	0	10	4	6	0	0	14	0	0	0	8	0	0	0	0	0	0	7	0	21	29
60.5	552	207	60	16	21	45	14	37	15	18	0	0	0	0	0	0	28	0	0	6	0	0	0	19	7	15

Table 13 *Anarhichas minor*, abundance (1 000) and biomass (tons) for West Greenland by stratum and total, 1982-2007. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Abundance

Abundance

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	381	154	353	153	130	14	326		1511	29
1983	184	38	148	3	89	39	367		868	32
1984	184	60	176	14	89	23	241		787	30
1985	204	115	106	4	29	61	110		629	33
1986	483	203	108	38	68	16	118		1034	22
1987	306	211	63		130		239		949	28
1988	231	150	45	15	145	33	316		935	25
1989	245	130	49	25	281		110		840	34
1990	109	201	38	19	99		152	6	624	27
1991	333	141	26	33	54	4	74	50	715	27
1992	41	47	14	107	37	23	13	29	311	63
1993	82	222	49	51	37	17	69		527	35
1994	61	109	61	62	21	9	28	7	358	79
1995					14	4	18	0	36	73
1996	0	56	54	38	17	11	0	7	183	45
1997	102	58	16	38	60	16	49	73	412	46
1998	116	28	26	11	27	23	39	44	314	55
1999	34	83	56	38	50	19	21		301	56
2000	218	164	26	88	37	11	44	44	632	28
2001			47	27	87	5	44	12	222	49
2002			101		72	23	0		196	32
2003			63	32	31	8	15	7	156	52
2004	143	60	63	80	64	23	108	80	621	32
2005			118	70	37	14	270	29	538	42
2006	437	14	88	46	166	36	132	94	1013	73
2007	197	28	151	15	135	17	101	58	702	31

Biomass

Biomass

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI	GLM Biomass
1982	2198	470	1896	827	531	42	1988		7952	43	2310
1983	1674	256	656	5	562	183	2357		5693	37	1652
1984	851	196	1036	15	448	55	1358		3959	34	2097
1985	14	119	569	0	134	307	681		1824	44	994
1986	1157	307	566	63	370	36	1004		3503	27	1548
1987	653	126	334		1029		2034		4176	29	1632
1988	136	85	195	87	1141	101	3010		4755	38	1430
1989	374	32	167	40	1382		847		2842	36	986
1990	82	83	200	7	667		1217	3	2259	31	1190
1991	27	30	2	9	252	5	724	179	1228	41	710
1992	7	6	0	7	29	4	36	35	124	104	259
1993	68	40	16	33	35	16	211		419	42	499
1994	27	24	75	25	10	1	141	3	306	76	446
1995					66	40	218	0	324	64	500
1996	0	137	33	42	39	7	0	10	268	68	546
1997	75	9	26	38	37	2	23	57	267	69	513
1998	20	2	103	26	118	3	252	49	573	61	630
1999	34	43	141	30	109	13	113		483	61	602
2000	218	96	108	167	225	86	198	177	1275	38	857
2001			157	65	516	38	229	56	1061	42	945
2002			197		535	99	0		831	55	984
2003			247	73	91	53	56	113	633	45	820
2004	116	40	289	186	455	188	557	539	2370	33	1322
2005			416	324	347	152	1487	205	2931	41	1804
2006	1237	16	254	188	808	192	415	537	3647	58	2360
2007	1537	208	831	13	992	78	1108	467	5234	35	1676

Table 14 *Anarhichas minor*. Length composition by year (1 000), 1982-2007.

Length	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
10.5	13	22	0	5	32	0	0	0	0	11	0	0	0	12	0	0	0	0	0	0	0
11.5	0	3	4	0	0	0	15	0	0	0	0	0	6	0	0	0	0	0	0	42	0
12.5	0	0	0	10	28	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0
13.5	10	22	0	24	61	0	57	5	0	0	0	0	0	52	0	0	0	0	0	0	0
14.5	0	7	12	0	82	14	23	20	0	0	0	43	0	69	0	0	0	0	0	0	13
15.5	10	15	0	10	67	8	17	37	0	0	0	0	12	20	0	0	0	0	0	0	0
16.5	10	7	33	0	6	20	32	12	0	0	19	0	0	12	0	0	0	0	0	0	0
17.5	16	14	3	0	19	27	36	12	0	11	26	0	0	27	0	5	0	0	0	0	0
18.5	6	14	9	18	33	20	28	0	0	0	0	0	6	0	0	0	0	0	0	0	0
19.5	0	7	0	10	4	0	12	12	0	0	12	5	6	0	0	0	0	0	0	0	0
20.5	6	7	0	10	0	5	15	7	0	0	24	11	0	0	0	0	0	0	0	0	0
21.5	13	15	13	24	14	0	12	11	0	0	0	7	5	0	0	13	0	29	0	0	0
22.5	13	14	23	40	20	12	35	5	0	0	0	0	0	0	0	0	0	4	0	0	0
23.5	6	10	4	0	6	0	25	26	0	0	7	5	0	6	0	0	6	0	0	42	8
24.5	6	3	33	4	6	49	12	26	0	14	5	12	0	0	9	0	0	0	0	85	0
25.5	6	22	0	0	20	0	0	5	0	0	5	7	0	35	0	0	0	39	0	42	0
26.5	0	7	13	0	0	27	6	0	0	0	7	0	0	11	5	13	0	7	0	0	0
27.5	10	0	0	5	4	8	12	0	0	0	5	0	0	6	0	0	8	10	0	0	0
28.5	16	3	3	0	26	13	0	0	0	0	0	14	12	35	0	0	0	4	0	0	0
29.5	19	0	0	0	13	0	3	0	0	0	0	0	12	0	0	0	0	8	11	0	0
30.5	0	7	10	14	0	24	6	0	0	0	0	5	0	0	6	0	0	4	0	0	0
31.5	13	25	13	10	0	0	23	16	0	0	12	0	12	0	0	0	0	4	0	42	0
32.5	26	10	0	0	6	0	6	7	0	0	0	0	5	6	0	13	0	0	0	0	0
33.5	16	10	0	0	0	0	0	0	0	8	0	0	11	0	0	0	0	6	0	0	0
34.5	6	3	0	0	20	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0
35.5	0	17	9	0	6	7	0	15	0	0	54	0	5	0	0	0	0	0	0	0	0
36.5	6	3	9	10	13	19	0	0	0	0	27	0	0	0	0	13	0	0	7	13	0
37.5	0	22	0	6	6	0	0	7	0	0	0	0	5	0	0	0	0	10	0	8	0
38.5	16	17	0	0	6	8	0	5	0	0	21	0	0	0	0	0	0	0	0	0	0
39.5	13	7	0	0	0	0	0	0	0	0	0	0	5	6	0	0	0	0	0	0	0
40.5	10	9	24	0	14	0	0	5	0	6	0	0	6	7	0	0	0	18	0	0	0
41.5	6	0	0	0	0	0	0	0	0	19	12	0	12	0	0	0	0	33	0	0	0
42.5	0	3	0	10	0	0	0	12	0	11	0	15	0	0	5	13	0	4	0	0	0
43.5	10	10	0	0	0	0	0	19	0	0	22	29	0	6	0	0	0	0	0	12	0
44.5	0	0	4	10	0	0	0	7	0	0	0	0	0	0	6	0	6	0	0	0	0
45.5	0	0	29	0	0	0	0	24	0	14	64	0	0	0	0	0	6	4	10	0	0
46.5	20	0	0	5	0	8	0	0	0	0	29	0	12	0	0	0	0	0	20	10	0
47.5	0	0	0	15	0	0	0	0	0	0	0	0	6	0	0	0	0	0	10	27	7
48.5	0	7	41	10	0	0	3	0	0	25	0	0	12	0	0	0	0	0	34	0	0
49.5	20	0	29	0	4	0	9	5	7	0	0	0	45	0	0	0	13	51	0	21	0
50.5	0	3	0	4	0	25	0	10	0	0	0	0	0	12	0	13	0	14	34	0	0
51.5	0	3	10	0	6	0	0	0	0	11	0	0	5	0	0	0	0	10	16	12	0
52.5	0	7	20	14	0	0	0	0	0	7	0	0	0	0	0	0	0	19	0	13	0
53.5	4	4	0	0	0	0	10	0	0	0	0	0	5	0	0	0	10	0	0	4	13
54.5	0	3	9	0	7	0	12	0	0	8	28	0	0	0	0	0	0	0	0	19	8
55.5	4	14	18	5	0	0	0	15	0	0	0	0	0	21	0	0	0	0	0	37	82
56.5	0	0	0	0	0	0	0	0	0	0	0	9	12	6	0	0	0	44	10	0	0
57.5	0	11	9	4	0	0	0	0	0	0	0	0	5	6	0	0	10	8	0	13	0
58.5	0	0	0	0	0	0	0	0	0	0	8	0	5	0	5	0	0	4	0	0	0
59.5	0	10	0	0	0	0	30	0	0	0	15	10	6	0	12	0	0	6	0	0	0
60.5	4	10	36	0	0	0	0	0	0	8	0	7	0	0	12	0	0	0	0	0	0
61.5	24	0	3	0	0	0	0	0	0	0	0	15	0	0	0	0	0	8	25	19	13
62.5	20	4	3	5	7	0	6	0	0	0	0	7	5	6	0	0	13	8	0	0	0
63.5	20	14	4	0	0	0	0	0	0	0	0	0	0	6	0	0	0	8	0	26	6
64.5	0	14	9	27	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	8	12
65.5	4	0	20	9	0	0	0	0	0	14	0	9	0	0	6	0	0	0	17	4	19
66.5	6	0	4	9	0	0	0	0	0	0	0	0	12	0	6	0	13	0	0	21	14
67.5	6	0	3	0	12	0	0	0	0	0	0	0	0	5	0	0	0	0	5	0	0
68.5	5	4	0	15	6	0	0	0	0	0	0	0	6	0	11	0	0	0	10	10	0
69.5	0	11	0	10	0	13	0	0	0	0	0	10	0	12	6	14	0	0	0	36	11
70.5	24	3	13	5	0	7	14	0	0	0	0	0	0	12	12	0	0	0	25	24	12
71.5	9	6	0	5	7	0	0	0	0	0	0	0	0	0	6	0	15	11	15	4	25
72.5	20	4	7	9	7	0	0	0	0	0	0	0	6	29	0	0	0	0	10	10	0
73.5	21	0	0	0	0	0	0	0	0	0	0	0	6	0	6	0	0	0	25	0	12
74.5	0	11	77	4	6	0	0	0	0	0	0	0	0	12	9	9	0	4	30	13	0
75.5	5	8	31	10	0	0	0	0	0	0	0	0	0	7	6	0	10	4	10	0	13
76.5	10	3	27	5	0	0	0	0	0	6	0	0	0	11	0	0	0	0	10	7	0
77.5	0	4	8	0	0	0	0	0	0	0	0	0	11	42	9	13	0	15	0	18	0
78.5	28	0	22	10	0	0	7	0	0	0	0	0	6	0	6	0	13	21	5	0	12
79.5	9	4	0	9	7	0	0	0	0	14	0	0	0	0	0	0	0	11	10	10	0
80.5	9	4	0	10	0	0	0	0	7	0	0	6	6	0	6	0	0	7	0	27	12
81.5	13	4	8	0	7	0	0	0	0	0	0	0	0	0	6	0	0	11	49	11	0
82.5	9	4	4	10	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5	42	0
83.5	0	8	9	0	0	0	0	0	0	0	0	0	6	26	0	0	0	19	25	0	0

Table 15 *Raja radiata*, abundance (1 000) and biomass (tons) for West Greenland by stratum and total, 1982-2007. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Abundance

Abundance

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI
1982	5383	1625	1412	473	556	83	162		9694	38
1983	4798	589	815	360	349	27	59		6997	87
1984	2742	1672	653	505	149	482	116		6319	42
1985	2239	2393	1847	689	397	56	257		7878	44
1986	2178	2806	766	326	295	131	203		6705	46
1987	1790	538	653		291		64		3336	30
1988	3879	1046	996	770	335	39	85		7150	39
1989	11963	2141	3859	694	607		149		19413	38
1990	7145	1981	2489	548	271		550	345	13329	51
1991	1967	480	1220	262	610	130	95	65	4829	26
1992	4457	598	2844	1531	496	523	205	58	10712	50
1993	2266	352	684	279	188	263	95		4127	39
1994	2531	378	872	272	233	79	398	15	4778	43
1995					182	301	116	15	614	59
1996	1273	126	428	76	114	111	56	29	2213	29
1997	4886	493	879	46	120	122	180	0	6726	41
1998	1694	534	439	202	258	46	49	15	3237	31
1999	2164	235	684	195	297	194	213		3982	36
2000	721	188	503	870	248	134	234	15	2913	37
2001			435	88	116	134	629	30	1432	41
2002			642		116	194	121		1073	35
2003			428	292	62	286	208	0	1276	40
2004	878	81	623	228	120	888	193	21	3032	46
2005			743	218	217	342	223	0	1743	36
2006	339	70	593	411	41	375	504	36	2372	36
2007	514	120	331	184	68	56	107	0	1380	28

Biomass

Biomass

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Total	CI	GLM Biomass
1982	2994	811	1328	340	409	59	154		6095	36	2098
1983	966	192	703	132	331	27	56		2407	34	1245
1984	728	333	404	96	136	126	95		1918	31	1296
1985	497	427	804	181	159	46	56		2170	22	1409
1986	517	527	421	83	122	65	39		1774	28	1105
1987	415	149	306		184		13		1067	29	972
1988	653	122	503	238	174	19	33		1742	28	1082
1989	2076	429	980	107	314		90		3996	31	1548
1990	980	263	526	56	91		113	201	2230	45	1219
1991	279	81	181	36	246	42	10	33	908	28	819
1992	327	94	139	134	221	89	23	27	1054	49	1055
1993	340	88	82	31	29	24	3		597	28	720
1994	231	71	143	30	91	14	54	11	645	61	707
1995					70	37	41	0	148	75	870
1996	95	23	38	23	21	16	8	13	237	44	613
1997	354	96	181	6	16	29	33	0	715	35	711
1998	143	90	89	47	56	13	8	15	461	33	653
1999	150	68	143	65	68	26	54		574	56	864
2000	116	47	141	298	103	12	28	13	758	42	861
2001			75	30	58	24	131	18	336	49	918
2002			136		21	32	15		204	35	792
2003			73	55	25	51	90	0	294	45	940
2004	82	17	143	47	39	152	33	10	523	42	778
2005			148	55	78	59	67	0	407	40	894
2006	25	13	145	130	8	66	151	10	548	36	912
2007	71	19	69	21	23	4	15	0	222	35	575

Table 16 *Raja radiata*. Length composition by year (1 000), 1982-2007.

Length	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.5	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0
3.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4.5	0	3	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0	0
6.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0
7.5	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8.5	0	0	0	25	0	0	0	0	0	0	0	29	16	0	51	0	0	38	12	0	0	0	0	0	0	25
9.5	0	10	11	12	5	0	11	5	87	18	0	41	31	0	62	162	82	364	89	9	13	0	61	11	27	21
10.5	64	127	100	177	487	94	158	271	630	143	350	121	300	12	136	660	435	681	62	84	93	63	155	23	74	69
11.5	89	394	422	416	70	188	279	602	741	216	881	376	418	4	187	684	225	369	124	82	80	49	179	85	110	126
12.5	128	526	317	492	117	204	450	704	860	357	1568	338	267	8	221	681	196	249	131	82	5	76	242	75	105	190
13.5	135	740	237	329	154	153	363	650	586	263	1180	272	179	34	192	343	121	277	93	81	36	50	116	61	141	64
14.5	164	373	271	502	269	195	404	855	583	252	1180	351	224	39	93	392	165	152	56	98	72	107	85	143	83	13
15.5	222	352	301	385	260	156	386	873	781	249	781	195	221	66	146	189	92	88	137	90	68	80	100	68	37	107
16.5	134	411	179	385	94	103	431	996	718	333	462	149	175	46	39	277	116	43	127	52	84	38	126	102	33	40
17.5	238	347	203	447	182	59	273	1221	779	257	479	146	123	26	104	201	162	125	96	72	9	91	249	58	106	76
18.5	247	244	302	323	166	104	232	1010	887	231	363	141	220	39	115	441	125	133	109	50	14	88	198	42	223	51
19.5	166	175	249	263	165	123	276	1025	989	211	406	81	139	23	22	213	93	40	63	41	22	26	69	54	43	73
20.5	213	127	255	269	159	117	419	1108	419	137	245	96	303	20	86	165	63	44	58	35	64	39	70	47	90	72
21.5	322	182	239	273	256	106	352	817	493	159	284	161	205	4	100	405	97	18	86	58	50	51	91	33	108	33
22.5	221	90	182	261	155	103	263	896	488	189	432	119	171	35	31	53	49	89	77	24	55	37	167	32	83	53
23.5	189	99	123	244	113	50	209	949	523	180	198	172	245	31	11	273	95	63	112	35	15	37	101	98	165	8
24.5	209	129	167	212	376	46	246	787	422	87	164	77	219	16	149	152	79	40	47	11	33	35	94	68	28	32
25.5	246	114	203	184	85	98	256	761	472	168	340	149	188	8	105	240	73	41	80	17	13	30	73	84	24	14
26.5	373	174	216	165	72	83	188	550	441	102	155	152	66	12	42	199	103	71	77	15	38	4	127	81	56	27
27.5	226	72	240	174	375	37	157	575	235	110	73	89	161	8	24	128	151	85	16	44	15	8	33	59	27	11
28.5	181	145	138	204	43	76	135	453	229	81	109	78	156	29	30	289	54	58	144	17	25	0	69	27	27	51
29.5	224	89	97	124	34	100	77	490	176	123	102	68	49	4	69	83	74	126	47	9	13	46	68	14	82	11
30.5	303	83	144	186	89	96	128	531	275	122	115	141	132	0	32	83	91	46	30	20	25	6	29	30	59	8
31.5	146	94	175	85	299	67	149	332	138	89	136	41	53	0	11	55	54	142	90	12	13	16	44	5	45	14
32.5	230	172	120	32	52	73	103	313	186	120	43	13	55	10	20	58	9	77	71	20	28	20	62	29	45	0
33.5	193	78	87	71	83	99	40	199	135	80	146	29	53	19	6	42	58	90	121	20	0	14	40	15	45	0
34.5	192	43	106	86	17	27	62	215	85	42	116	144	35	8	43	6	59	45	72	36	13	4	12	26	25	0
35.5	126	93	75	102	10	17	97	179	116	48	86	100	43	8	51	31	40	34	68	21	18	8	79	23	50	0
36.5	181	63	78	65	285	36	56	253	127	86	24	130	33	4	0	30	59	74	40	29	0	0	20	28	60	0
37.5	166	60	51	121	321	39	85	241	86	46	32	41	31	12	11	18	33	30	92	24	13	0	0	5	65	0
38.5	107	89	56	128	27	45	25	117	66	47	17	0	39	14	6	69	42	130	93	19	37	29	22	27	34	38
39.5	138	53	49	66	47	52	29	138	135	30	92	22	43	15	0	0	34	33	79	43	13	17	24	22	25	23
40.5	152	81	74	78	364	86	47	262	56	15	7	10	40	0	0	12	49	33	60	30	14	20	12	47	33	8
41.5	136	44	73	56	24	36	32	143	58	58	40	7	10	10	6	58	0	29	91	60	13	25	12	6	20	69
42.5	144	33	38	50	68	33	48	174	37	6	12	3	38	27	0	0	7	35	57	11	18	49	48	45	67	0
43.5	127	105	47	61	83	9	57	135	52	33	13	0	53	8	0	24	0	0	38	19	49	30	21	73	24	0
44.5	125	54	47	76	889	56	61	93	54	4	0	12	7	0	15	0	5	11	34	44	0	13	64	53	64	39
45.5	199	42	57	53	72	56	89	86	19	29	13	0	0	0	0	0	14	0	33	12	0	20	16	11	20	0
46.5	178	57	40	77	31	37	61	71	65	19	0	0	0	8	0	18	20	0	0	0	13	17	8	0	15	0
47.5	270	87	63	75	29	31	103	29	9	0	12	0	7	0	0	0	5	0	0	9	0	18	9	0	8	25
48.5	277	50	47	38	29	31	76	39	19	11	0	29	0	0	0	0	0	0	0	0	0	0	4	26	0	0
49.5	253	55	47	56	32	73	56	61	10	12	24	0	36	4	8	0	0	0	0	0	0	16	4	0	0	0
50.5	369	154	66	78	50	33	44	77	15	19	24	0	0	0	0	0	5	0	0	0	0	0	13	0	0	0
51.5	276	71	58	42	53	0	32	27	15	4	8	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
52.5	292	86	93	110	58	24	17	30	19	0	5	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
53.5	254	54	33	63	11	0	7	29	0	11	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0
54.5	168	88	49	21	5	20	30	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
55.5	286	37	28	44	10	14	3	20	13	12	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
56.5	114	56	31	49	6	24	16	6	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
57.5	130	23	16	18	18	14	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
58.5	54	41	3	11	6	4	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
59.5	27	19	10	17	0	4	6	11	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
60.5	45	0	7	3	0	4	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0

Table 17 Stratum means of near bottom temperature (°C) and stratified mean, 1982-2007.

YEAR	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	Mean
1982	2.540	3.627	1.953	3.100	3.256	3.633	2.623							4.600	3.139
1983	2.028	3.713	1.420	3.819	2.139	4.808	2.160			4.117		4.000		2.943	3.012
1984	1.365	2.790	1.617	3.886	2.462		2.519					4.129			2.698
1985	4.190	5.154	3.116	4.612	2.614	4.336	4.444		5.040	5.190	4.421	4.300		3.300	4.181
1986	3.669	4.393	4.014	5.073	4.203	5.066	4.102			4.796	4.042	4.516		3.347	4.136
1987	3.086	4.890	3.393		3.504		3.530			4.467		4.400		3.300	3.783
1988	2.548	4.328	3.034	4.956	4.228	5.234	4.332		4.479	4.559	4.298	4.578		3.792	3.959
1989	2.323	3.953	2.718	4.525			2.579		3.392	3.743	3.648	4.064		3.146	3.295
1990	2.497	3.922	3.000	4.809	3.421		2.516		4.395	4.570	3.252	4.019		3.025	3.461
1991	3.533	4.726	3.477	4.204	3.016		2.997								3.558
1992	3.900	4.418	2.911	4.457	2.985	4.691	1.938							3.472	3.489
1993	3.007	4.003	2.360	3.360	4.711	4.959	2.773		3.771	4.056	4.327	4.394		2.820	3.597
1994	2.914	4.436	3.747	4.641	3.847	5.109	3.773								3.620
1995					4.229	4.614	3.469	4.242	2.601	3.623	3.683	4.318		3.834	3.862
1996	4.614	5.506	4.414	5.688	5.610	5.700	5.057	5.732	4.505	5.129	5.320	4.903		2.848	4.709
1997	3.304	4.938	4.022	5.180	4.570	5.478	4.606	5.540	4.578	4.742		4.266		3.464	4.189
1998	4.059	5.336	4.686	5.840	6.400	6.382	5.359	5.978	6.021	5.820	5.583	5.346		4.641	5.181
1999	4.941	5.051	4.429	5.729	4.834	5.773	4.104		5.225	5.315	4.777	4.087		2.435	4.435
2000	3.085	4.583	4.377	5.033	4.645										3.860
2001			5.007	5.350	5.133	5.992	4.429		5.620						5.128
2002			4.503		5.832	5.961	4.906		4.820	5.298		4.924		4.278	4.904
2003			6.948	6.515	6.529	6.633	5.406	6.539	6.124	5.821	4.970	5.093		4.021	5.500
2004	4.979	5.4914	5.0883	5.7722	5.5936	6.1778	5.91	5.976	5.9304	5.6729	5.7543	4.414		4.562	5.142
2005			5.020	5.564	4.611	5.774	4.681	5.461	3.839	5.335	4.552	4.359		3.9499	4.565

2

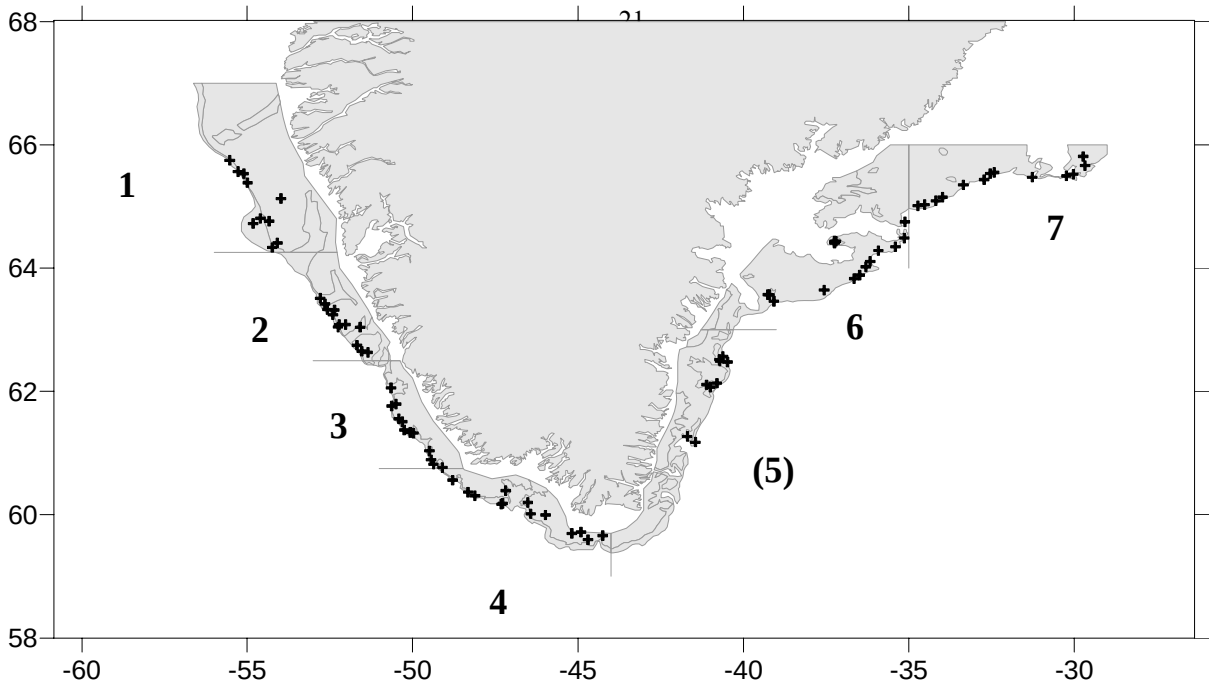

Fig. 1 Stratification of the survey area in 2007 as specified in Table 2, positions of hauls carried out off West Greenland refer to strata 1 to 4.

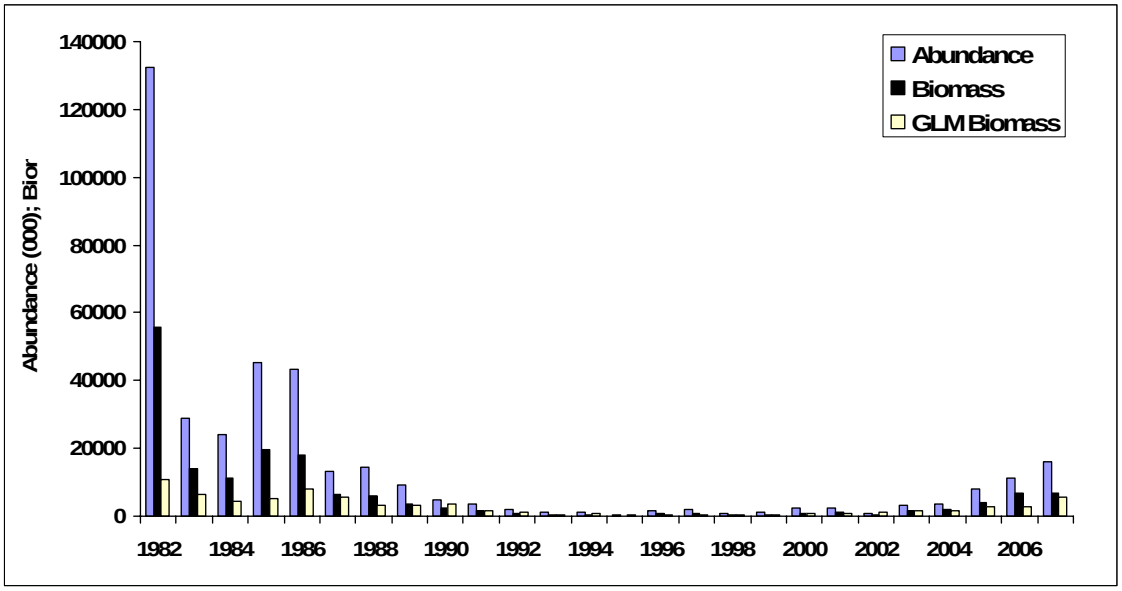

Fig. 2 Abundance and biomass indices for *S. marinus* >=17 cm off West Greenland, 1982-2007. Respective values are listed in Table 3. GLM 1985-1989 subject to revision.

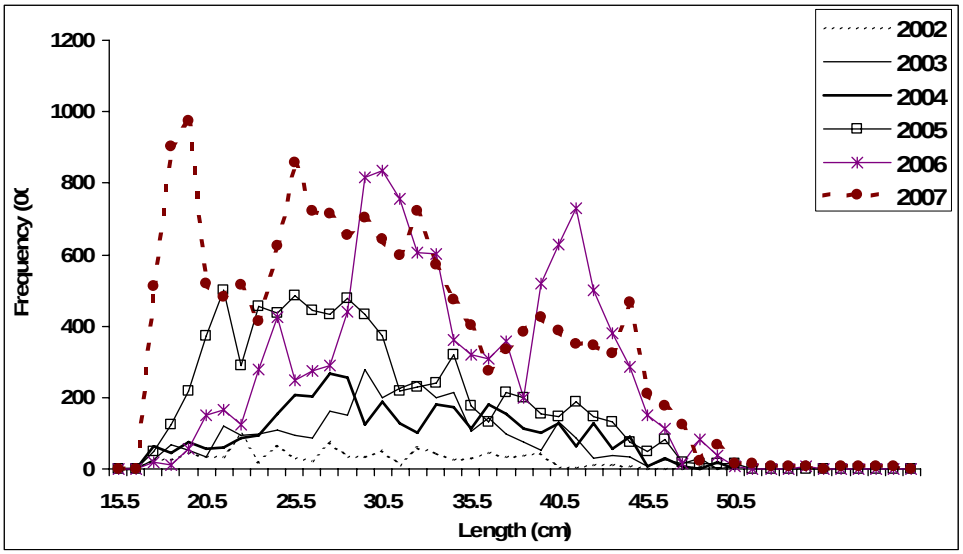

Fig. 3 Length disaggregated abundance indices for *S. marinus* >=17 cm off West Greenland, 2002-2007. Respective values are listed in Table 4.

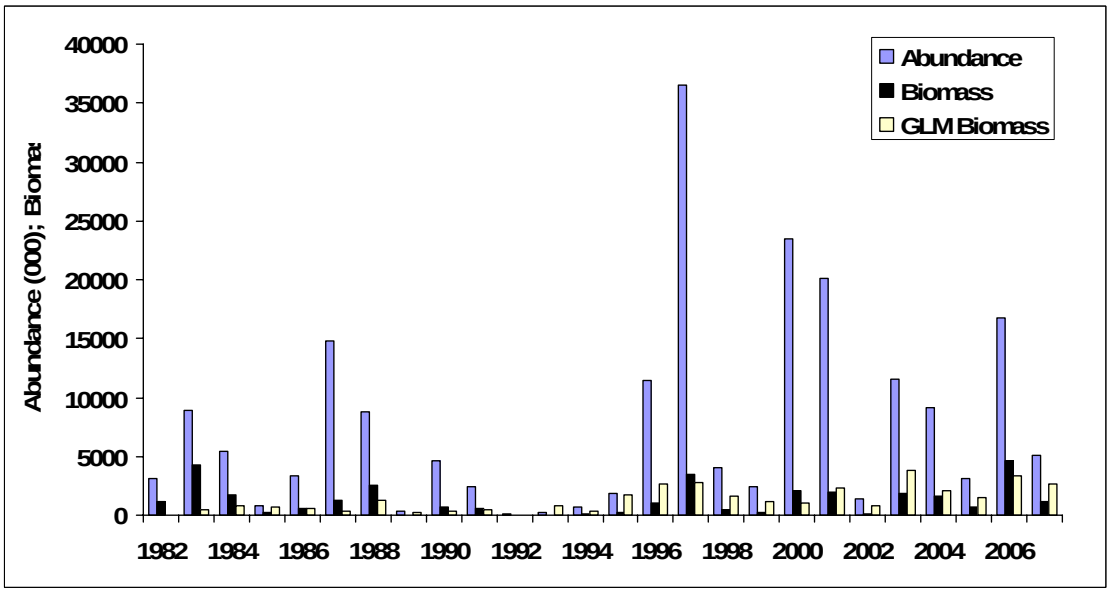

Fig. 4 Abundance and biomass indices for *S. mentella* >=17 cm off West Greenland, 1982-2007. Respective values are listed in Table 5. GLM 1985-1989 subject to revision.

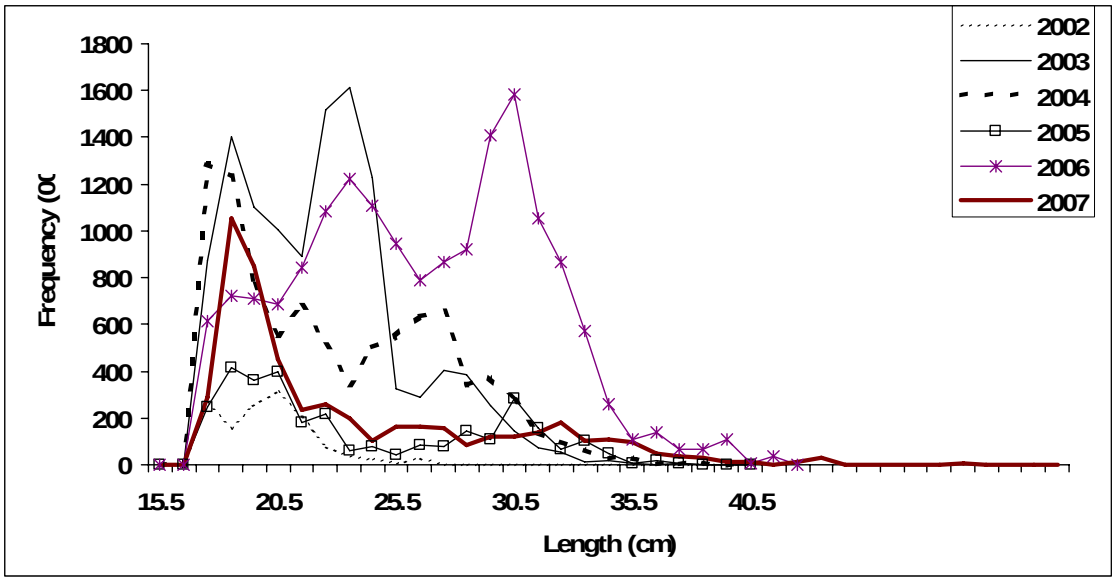

Fig. 5 Length disaggregated abundance indices for *S. mentella* >=17 cm off West Greenland, 2002-2007. Respective values are listed in Table 6.

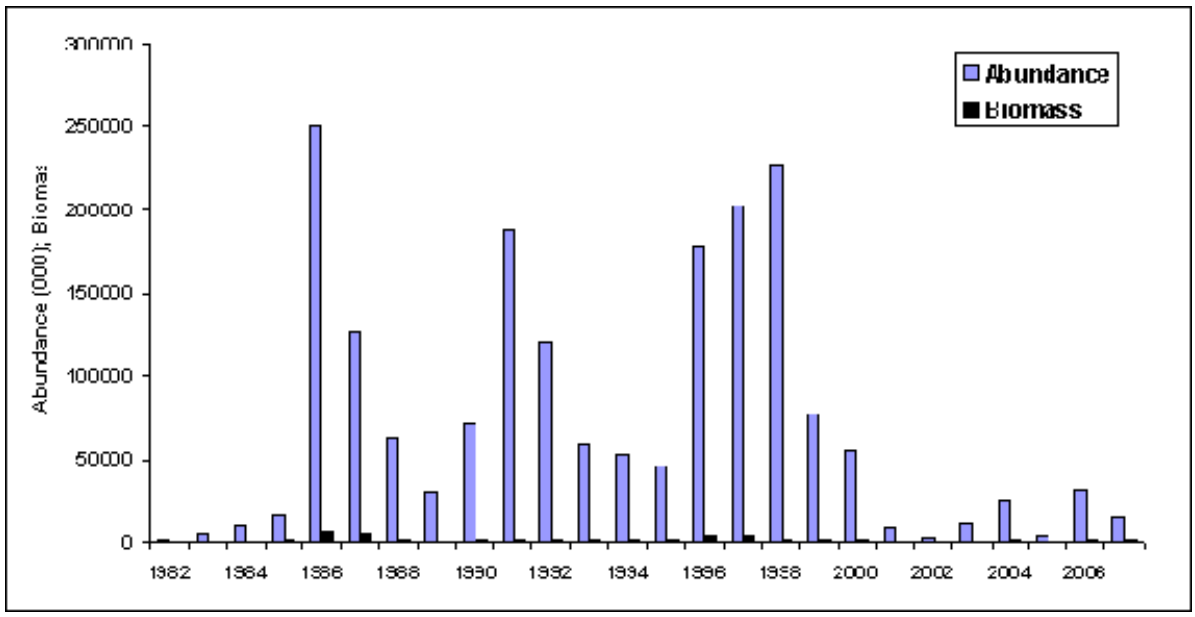

Fig. 6 Abundance and biomass indices for *Sebastes spp.* <17 cm off West Greenland, 1982-2007. Respective values are listed in Table 7.

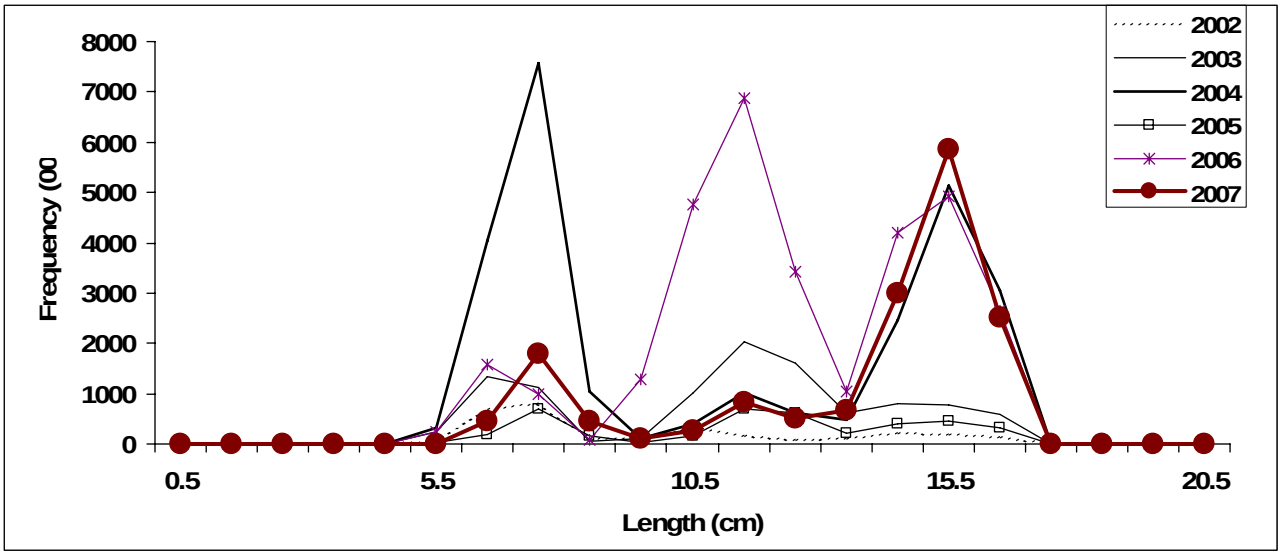

Fig. 7 Length disaggregated abundance indices for *Sebastes spp.* <17 cm off West Greenland, 2002-2007. Respective values are listed in Table 8.

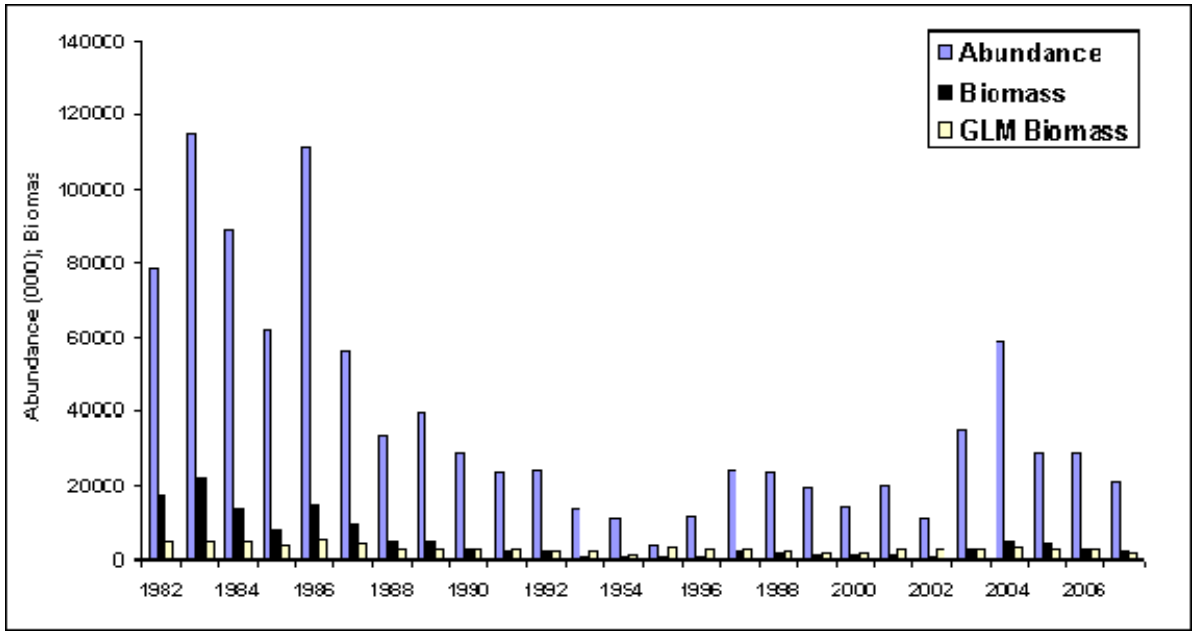

Fig. 8 Abundance and biomass indices for *Hippoglossoides platessoides* off West Greenland, 1982-2007. Respective values are listed in Table 9.

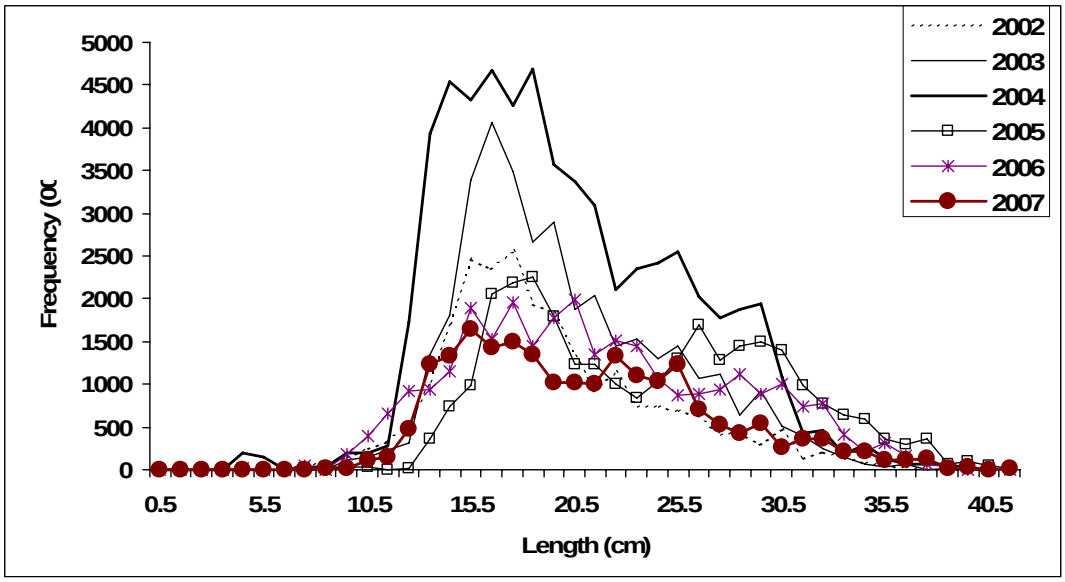

Fig. 9 Length disaggregated abundance indices for *Hippoglossoides platessoides* off West Greenland, 2002-2007. Respective values are listed in Table 10.

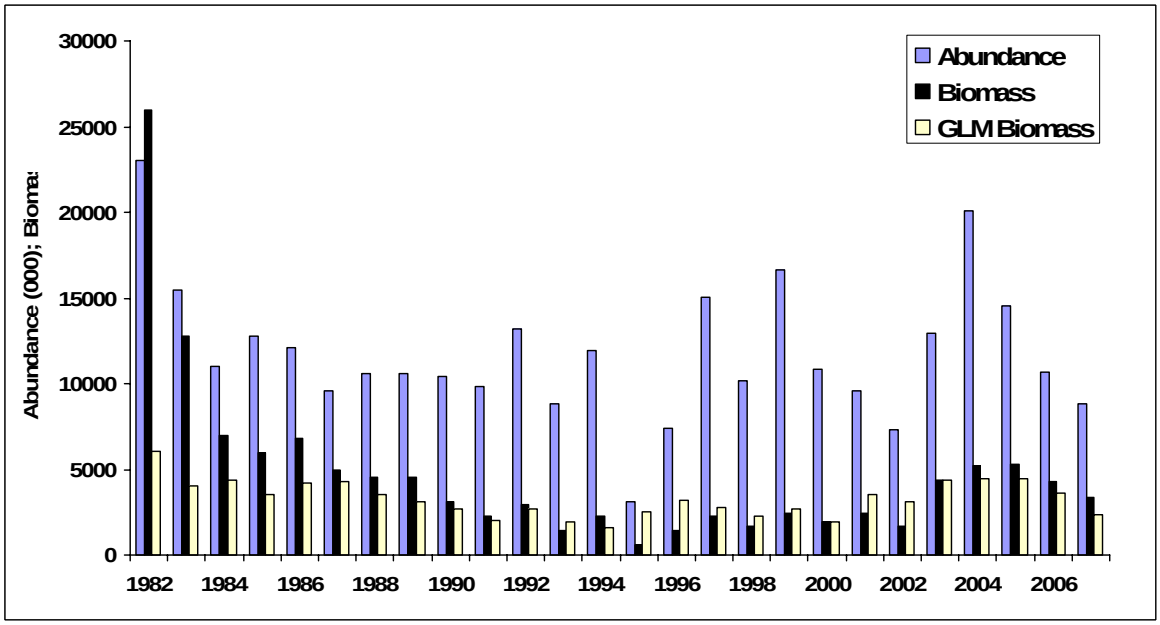

Fig. 10 Abundance and biomass indices for *Anarhichas lupus* off West Greenland, 1982-2007. Respective values are listed in Table 11.

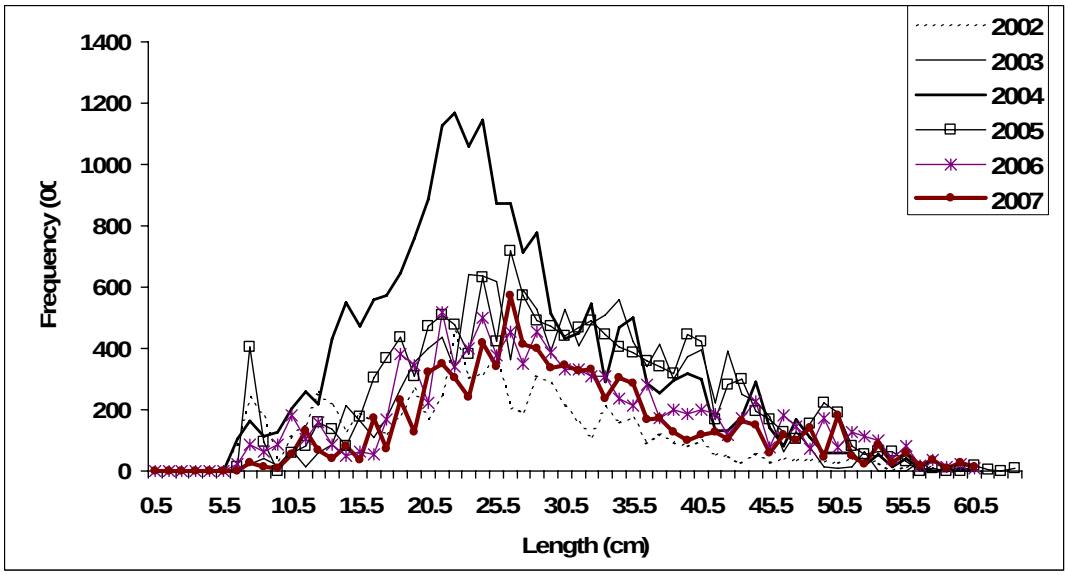

Fig. 11 Length disaggregated abundance indices for *Anarhichas lupus* off West Greenland, 2002-2007. Respective values are listed in Table 12.

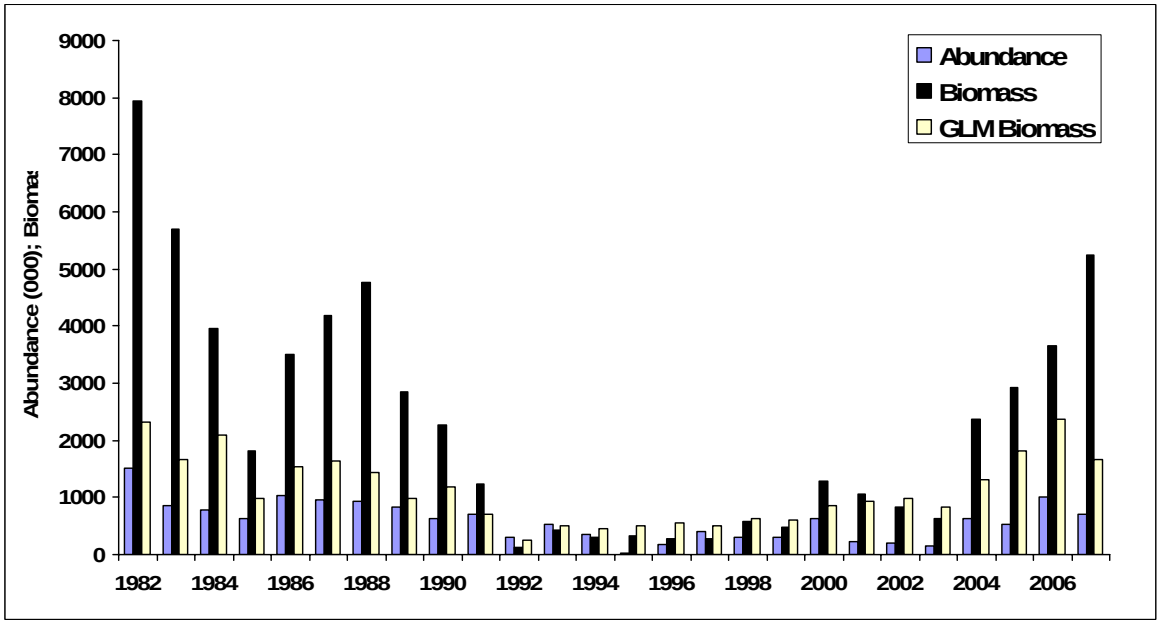

Fig. 12 Abundance and biomass indices for *Anarhichas minor* off West Greenland, 1982-2007. Respective values are listed in Table 13.

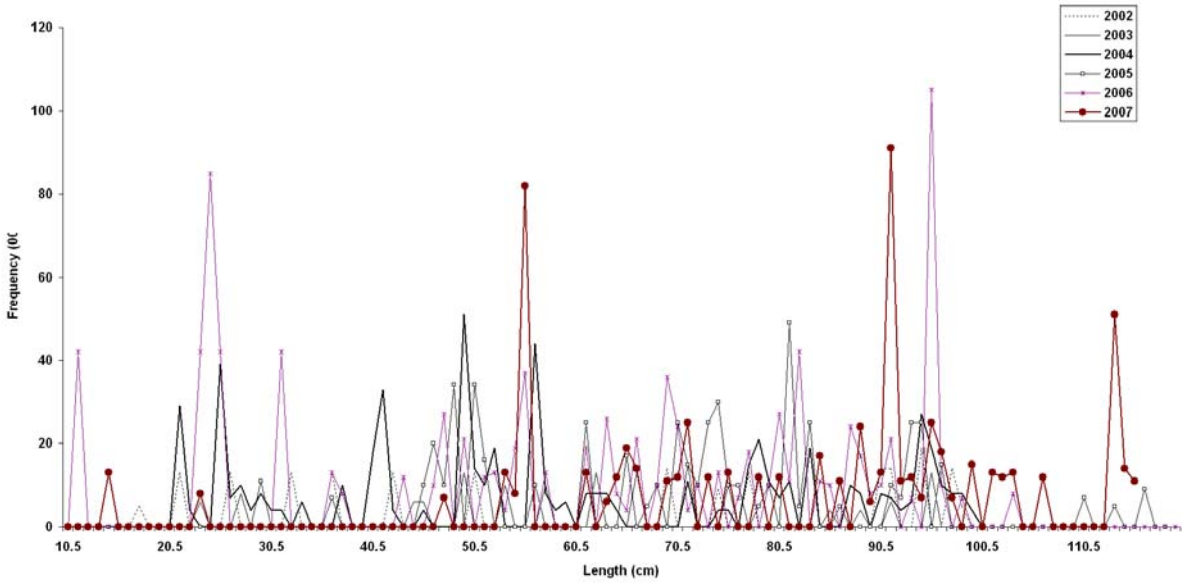

Fig. 13 Length disaggregated abundance indices for *Anarhichas minor* off West Greenland, 2002-2007. Respective values are listed in Table 14.

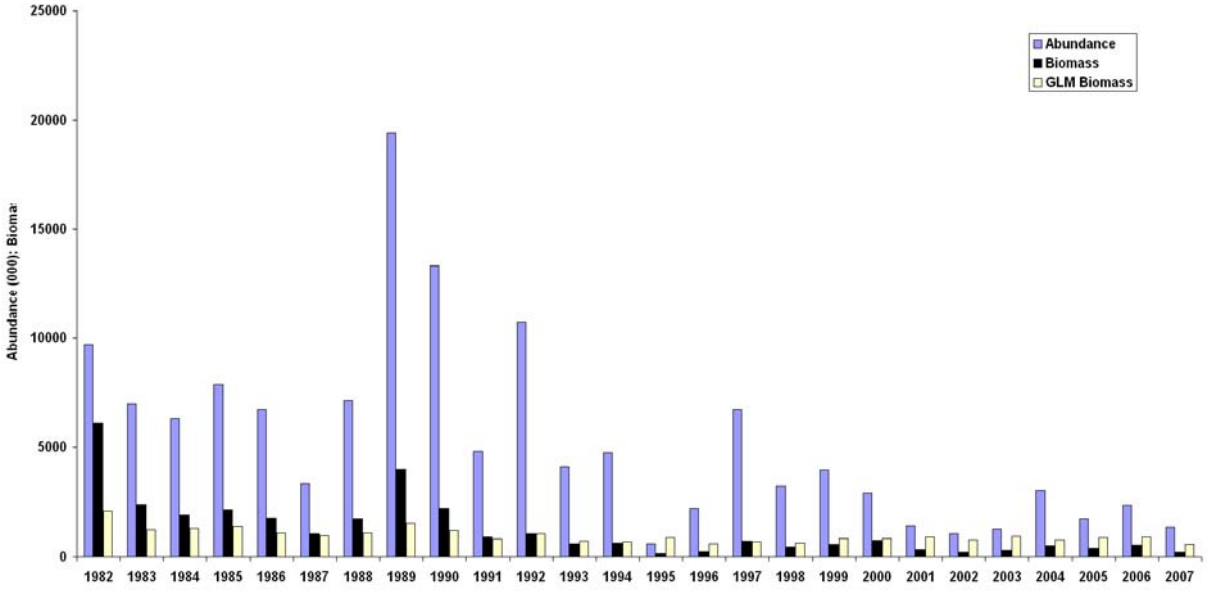

Fig. 14 Abundance and biomass indices for *Raja radiata* off West Greenland, 1982-2007. Respective values are listed in Table 15.

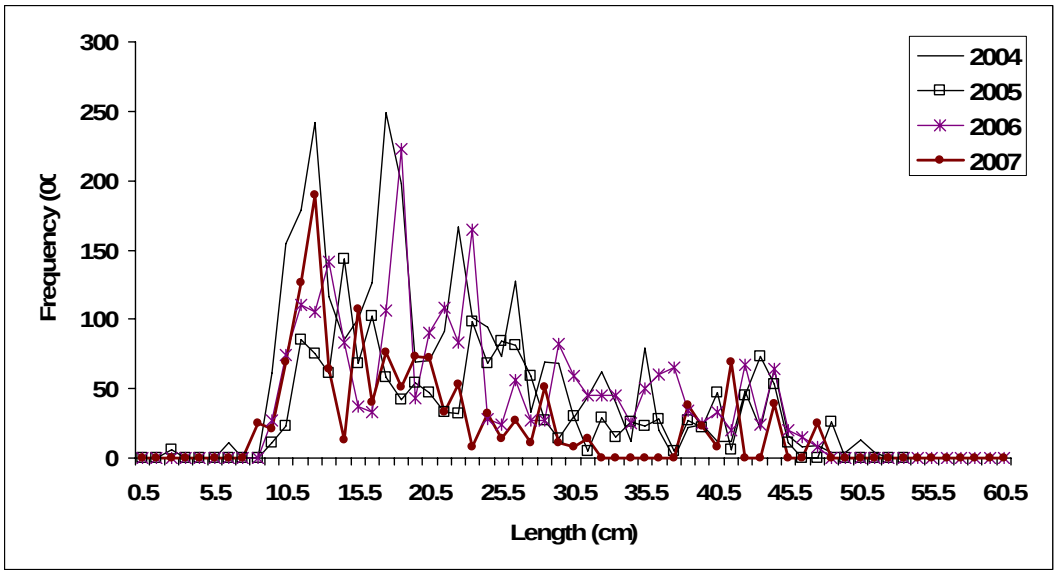

Fig. 15 Length disaggregated abundance indices for *Raja radiata* off West Greenland, 2002-2007. Respective values are listed in Table 16.

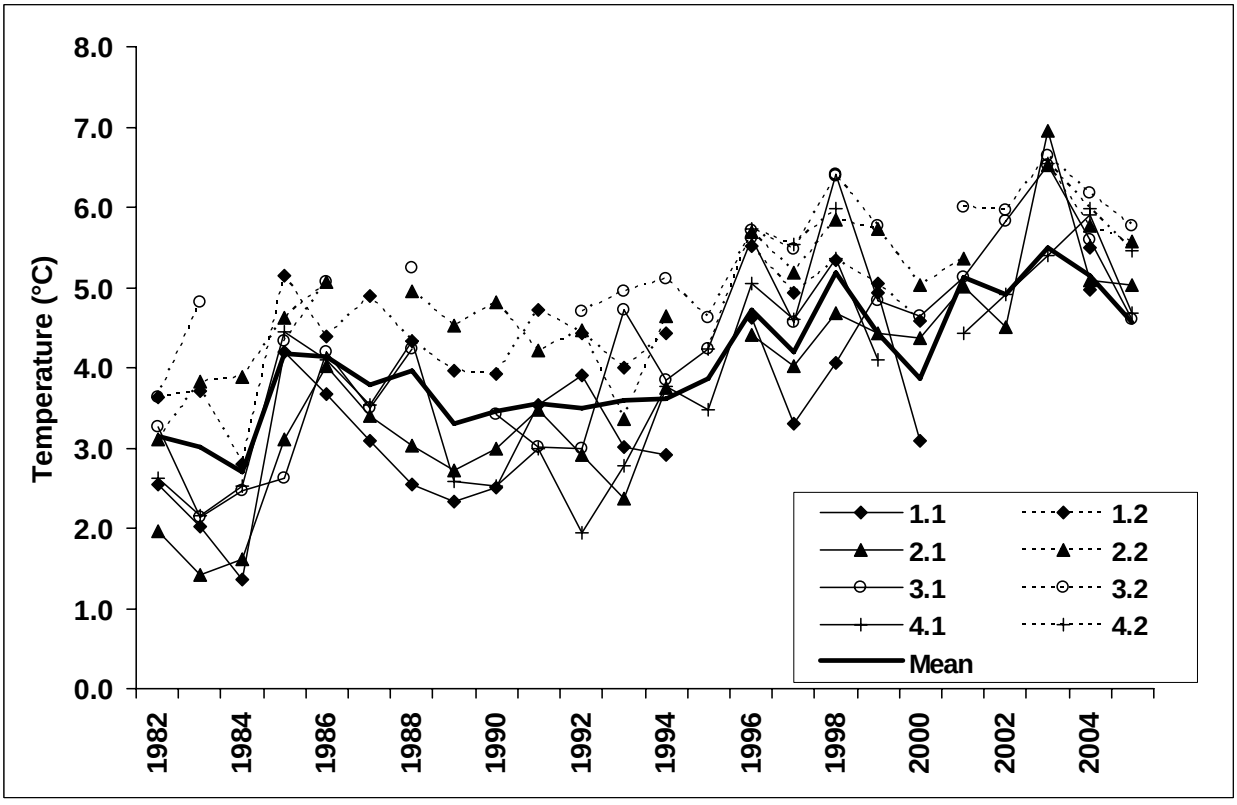

Fig. 16 Stratum means of near bottom temperature (°C) and stratified mean, 1982-2007. Respective values are listed in Table 17. Solid lines display trends in shallow strata (<200 m), dashed lines display trends in deep strata (>200 m),