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Abundance and length composition for *Sebastes marinus* L., deep sea *S. mentella* and juvenile redfish *(Sebastes spp.)* off Greenland and Iceland based on groundfish surveys 1985-2002

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Abstract

The joint presentation of the German and Icelandic research survey results off Greenland and Iceland is considered a comprehensive review of available information regarding demersal redfish occurrences in the shelf areas and on the continental slopes down to 400 m depth. The main difference between the surveys is the season of operations. Apart from catchability related problems there have been yet no attempts undertaken to account for seasonal differences in the survey series (migration, recruitment, mortality, growth). Such effects need to be evaluated in future to improve the joint German-Icelandic survey evaluation.

After a severe depletion of the *S. marinus* stock on the traditional fishing grounds around East Greenland in the early 1990‘s, the survey estimates showed a significant increase in abundance in 2002. The abundance off Iceland increased until 1999 to the level observed during the mid 1980s when the surveys commenced. However, the most recent survey results indicate a decreasing trend in stock size off Iceland since 2000 and a concentration of the stock off southwest Iceland. Marked shifts of size-spectra peaks might indicate annual growth increments of single cohorts between 2-5 cm/year.

The combined German-Icelandic survey results indicate that they do cover only the immature part of the deep-sea *S. mentella* stock and should therefore be used only as a recruitment indicator. However, the poor status of the deep-sea *S. mentella* stock on the East Greenland shelves in the 80‘s was subject to a steady improvement since the early 1990s. This positive trend was due to successful recruitment of one individual year classes until 1997. During the following two years, the year class has obviously left the survey area and is believed to have also recruited into the oceanic stock of *S. mentella*. Most recently, there are indications of further recruiting year classes, which seem, however, to be significantly less abundant. The observed growth rate of about 2cm/year coincides quite closely with results from other studies.

Juvenile unspecified redfish *S. spp.* (<17cm) were found almost exclusively off East Greenland more abundant during the latter half of the survey period during 1993-1998. They were recorded to be bigger off East Greenland as compared to West Greenland and exhibited growth rates of about 5 cm/year in age-groups 0, 1 and 2. Especially for the juvenile redfish the estimated combined abundance, biomass and length frequencies must be corrected for the seasonal difference between the survey series.

Introduction

The shelf areas and continental slopes around Greenland and Iceland traditionally are important fishery grounds for redfish. Two species constitute to the commercial fishery, namely the golden redfish *Sebastes marinus* and the deep sea redfish *S. mentella*. Landings of *S. marinus* around Iceland have declined until mid 1990s by 50 % but remained stable since then on the low level at around 40 000 t. Landings taken on the Greenland shelf have been declining over the last three decades, and since 1991, there is almost no targeted fishery on this stock (ICES, 2002). Deep sea *S. mentella* landings caught on the Greenland shelf have varied considerably during the past 2 decades but they were recently restricted to by-catches in the Greenland halibut fishery mainly (ICES, 1998). In Icelandic waters, the catches of deep sea *S. mentella* peaked in 1994 and decreased thereafter to less than 40 000 t. Mean lengths in commercial redfish catches off Greenland have decreased since the mid-1970‘s (Rätz, 1996).

Extensive redfish nursery grounds on the East Greenland shelf are known since the mid 1950‘s (Magnússon, 1956; Magnússon and Magnússon, 1975) and possible effects of recruitment success for *S. marinus* and the Irminger Sea stocks of *S. mentella* were described frequently (e.g. Magnússon *et al.*, 1988 and 1990, Magnússon and Magnússon, 1995; Magnússon and Jóhannesson, 1997; ICES, 1998). The occurrence of large amounts of young redfish on the East Greenland shelf, observed by Magnússon *et al.* (1988), was found to be present during 1993-1998 (ICES, 2002).

The mean growth rate for young redfish (< 17cm), reported by Friðriksson (1961) from Icelandic surveys in the 1930‘s and by Magnússon *et al.* (1988), was found to be around 2cm/year. Similar observations were made for redfish off Nova Scotia (Perlmutter and Clarke, 1949) and Newfoundland (Sandemann, 1957 and 1961). Age-validation studies by Mayo *et al.* (1981), Nedreaas (1990) and ICES, (2002) indicated slightly higher growth rates, referring to strong year classes.

This paper presents survey results for *S. marinus* (≥17 cm), deep sea *S. mentella* (≥17 cm), and juvenile redfish *S. spp.* (<17 cm) off West and East Greenland and Iceland down to 400 m depth. The combination of the German survey series off Greenland and the Icelandic survey series is performed to allow a comprehensive review of their results. Estimates of stock abundance and biomass indices as well as length compositions are given for the period 1985-2002.

Material and Methods

Abundance, biomass estimates and length structures have been derived using annual German groundfish surveys covering shelf areas and the continental slopes off West and East Greenland and Icelandic groundfish surveys covering the shelves around Iceland, respectively. Both survey series were primarily designed for the assessment of cod and are considered similar in survey design and evaluation. A distribution map of the efforts is shown in Figure 1.

The German survey off Greenland is designed as a stratified random survey. The hauls are allocated to the strata off West and East Greenland both according to the area and the mean historical cod abundance at equal weights. Stations are randomly selected from successfully trawled grounds. 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 (RV) WALTHER HERWIG (II) throughout most of the time period. In 1984 and since 1994, she was replaced by RV ANTON DOHRN and the new RV WALTHER HERWIG III, respectively. 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 (10 mm) 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. Hauls which received net damage or became hanging 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 Icelandic groundfish surveys have been carried out annually in March since 1985, covering the continental shelf waters around Iceland with 540-600 “semi-randomly” distributed tows (Pálsson *et al.*, 1989). Each year 4-5 commercial trawlers, of the same type have been hired to cover the stations with a standard fishing gear. The fishing gear is a standardised 105-feet bottom trawl, also rigged with heavy ground gears. The net opening was estimated to be 17 m and the trawling covered a standard distance of 4 nautical miles. The Icelandic survey

design has been called a semi-random design, which also allocated the numbers of trawl stations due to the cod abundance and stratum area. The Icelandic survey area has been re-stratified according the Greenland scheme of 200 m depth intervals.

Fish were identified to species or lowest taxonomic level and the catch in number and weight was recorded. Redfish inhabiting the survey area close to the bottom are believed to belong to the traditional stocks off Greenland, Iceland and Faeroes (ICES, 1995). In the German surveys off Greenland, fish (≥ 17 cm) were separated to *Sebastes marinus* L. or deep sea *Sebastes mentella* Travin, whereas juvenile redfish (<17 cm) were classified as *Sebastes spp.* due to time-consuming and difficult species identification. However, in the Icelandic surveys the redfish <17 cm were identified to the species level. These data were transformed to meet the category of small and unspecified redfish *S. spp.* (<17 cm) as used in the German survey records. Total fish lengths were measured to cm below.

Calculations of abundance and biomass indices were based on the 'swept area' method using the trawl parameters as specified in Table 1. The redfish survey catches off Iceland were converted to 30 min. trawling duration irrespective of the distance covered during that time. 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 redfish distribution. The survey area was thus split into eleven 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 22 strata, their geographic boundaries, depth ranges and areas in nautical square miles (nm^2). The inner limit of all strata was the 3 mile offshore line. Figure 1 also shows the positions of hauls conducted during the surveys.

Stratified abundance estimates were calculated from catch-per-tow data using the stratum areas as weighting factor (Cochran, 1977; Saville, 1977). Strata with less than five valid sets per year were rejected from the calculation. The coefficient of catchability was set arbitrarily at 1.0, implying that estimates are merely indices of abundance and biomass. Respective confidence intervals (CI) were determined at the 95% significance level of the stratified mean. The length measurements were compiled by stratum and year and raised to the respective abundance estimation.

The main difference between the German surveys off Greenland and the Icelandic groundfish surveys is the season. The German survey is conducted during fall (October-November) due to favourable weather and ice conditions while the Icelandic survey is conducted in spring (March). Apart from catchability related problems there have been yet no attempts undertaken to account for the seasonal difference in the survey series (recruitment, mortality, growth). Such effects need to be evaluated in future to improve the joint German-Icelandic survey evaluation.

Results

S. marinus (≥17 cm)

S. marinus (≥17 cm) were mainly distributed off south-west Iceland and north-east Greenland (Fig.2). For the period 1985-2002, survey abundance and biomass indices for *S. marinus* (≥17 cm) are listed in Tables 3 and 4 by stratum, West and East Greenland and Iceland, aggregated to total and accompanied confidence intervals. The trends of the combined survey indices are illustrated in Figures 4 and 5. Total estimates showed a variation between two levels, the estimates since 1991 are reduced by 50 % as compared to earlier periods. This is mainly due to the significant decrease in abundance and biomass of *S. marinus* (≥17 cm) in East Greenland waters to very low values in the recent past except for 2002 when higher abundance and biomass were recorded off East Greenland, obviously due to good recruitment. West Greenland shares are negligible while the Icelandic values decreased during the early 1990s but increased again since the mid 1990s until 1999 to the level observed at the start of the time series in 1985. Since 2000, both abundance and biomass indices have decreased again to 470 Mill. fish and 190,000 tons.

Length frequencies of *S. marinus* (≥17 cm) are listed for West, East Greenland, Iceland and aggregated to total in Tables 5-8, and illustrated in Figures 5 and 6 for the periods 1985-1994 and 1995-2002, respectively. They reveal pronounced year and area effects. Usually, the few individuals off West Greenland are hard to discover. The fish off East Greenland were generally smaller than those observed in Icelandic waters and there are

indications of several good individual year classes growing up off East Greenland and recruiting to Icelandic grounds. There are marked peaks at lengths of 20, 24, 27, 29 and 30 cm between the successive years 1985-89 and at lengths of 22 and 25 cm between the successive years 1990-91 and 2001-2002 off East Greenland. Age readings and comparative studies in recent years indicate similar growth rates by year as derived from the length distributions. The abrupt decrease in size of the indices of such year classes indicated major recruitment migrations in 1987-1988 and 1990-1991. Such recruitment events explain the increased abundance and biomass estimates of *S. marinus* (≥17 cm) during the late 1990s.

Deep sea S. mentella (≥17 cm)

Survey abundance and biomass estimates and accompanied confidence intervals for deep sea *S. mentella* (≥17 cm) are presented in Tables 9 and 10, broken down by stratum, West and East Greenland, Iceland and aggregated to total. The trends in stock size in numbers and weight are illustrated in Figures 8 and 9 while Figure 10 shows the geographic abundance distribution. The abundance and biomass figures are clearly dominated by the occurrences off East Greenland, while there were only negligible parts distributed off West Greenland and Iceland at depths of 0-400 m. It can be derived from those figures that the surveys do cover only the immature part of the stock (recruits) since the figures also are dominated by a number of strong year class recorded in 1989 for the first time at a mean length of 20 cm (Fig. 10). These cohorts grew about 2 cm a year and recruited to the survey gear until 1997 (Fig. 11) when they reached its maximum abundance and biomass at a length of about 27 cm (total abundance 7 billion and biomass 1.5 million tons). During the following two years, the year classes declined drastically. Most recently, there are indications of further recruiting year classes, which seem, however, to be significantly less abundant. The size compositions for the period 1985-2002 by area and total are given in Tables 11-14.

Juvenile S. spp. (<17 cm)

Trends in survey abundance and biomass for juvenile redfish (<17 cm) are listed in Tables 15 and 16, again broken down by stratum, West and East Greenland, Iceland and total and accompanied with confidence intervals. Respective values are shown in Figures 13 and 14. Figure 12 shows the geographic abundance distribution recorded in 1985-2001. In 1985 and from 1993 to 1998, small and unspecified redfish (<17 cm) were very abundant and distributed almost exclusively off East Greenland. The abundance and biomass values estimated since 1999 are very low. Weighted mean lengths and length distributions are listed in Tables 17, 18, 19 and 20 for West, East Greenland, Iceland and total. These data are illustrated in Figures 15 and 16. Juveniles off East Greenland were found to be bigger than those off West Greenland. Reappearing peaks at 6-7, 10-12 and 15-16 cm might indicate annual growth increments and represent the age groups 0, 1 and 2 years of unspecified juvenile redfish.

Discussion

The joint presentation of the German and Icelandic research survey results off Greenland and Iceland is considered a comprehensive review of available information regarding demersal redfish occurrences in the shelf areas and on the continental slopes down to 400 m depth. Both survey designs are rather similar and required only minor adaptations of the data structure and evaluation. The main difference is the season of operations. The German survey is conducted during fall (October-November) due to favourable weather and ice conditions while the Icelandic survey is conducted in spring (March). Apart from catchability related problems there have been yet no attempts undertaken to account for the seasonal difference in the survey series (migration, recruitment, mortality, growth). Such effects need to be evaluated in future to improve the joint German-Icelandic survey evaluation.

The stock of *S. marinus* on the traditional fishing grounds around East Greenland decreased to depletion in the early 1990‘s with a first significant increase recorded in 2002 due to good recruitment. The survey estimates off Iceland increased until 1999 to the level observed during the mid 1980s when the surveys commenced. However, the most recent survey results indicate a decreasing trend in stock size off Iceland since 2000 and a concentration of the stock off southwest Iceland. Marked shifts of size-spectra peaks might indicate annual growth increments of single cohorts between 2-5 cm/year (Stransky *et al.*, 2001).

The combined German-Icelandic survey results indicate that they do cover only the immature part of the deep-sea *S. mentella* stock and should therefore be used only as a recruitment indicator. However, the poor status of the deep-sea *S. mentella* stock on the East Greenland shelves in the 80‘s was subject to a steady improvement since the early 1990s. This positive trend was due to successful recruitment of one individual year classes until 1997. During the following two years, the year class has obviously left the survey area and is believed to have not only recruited to the East Greenland-Iceland-Faeroe Island stock but also recruited into the oceanic stock of *S. mentella* (Stransky, 2000). Most recently, there are indications of further recruiting year classes, which seem, however, to be significantly less abundant. The observed growth rate of about 2cm/year coincides quite closely with results from studies by Perlmutter and Clarke (1949), Sandemann (1957 and 1961), Friðriksson (1961), Mayo *et al.* (1981), Magnússon *et al.* (1988), Nedreaas (1990) and Stransky *et al.* (2002).

Juvenile unspecified redfish *S. spp.* (<17cm) were found almost exclusively off East Greenland more abundant during the latter half of the survey period during 1993-1998. They were recorded to be bigger off East Greenland as compared to West Greenland and exhibited growth rates of about 5 cm/year in age-groups 0, 1 and 2. Especially for the juvenile redfish the estimated combined abundance, biomass and length frequencies must be corrected for the seasonal difference between the survey series.

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Table 1 Trawl parameters of the joint German-Icelandic groundfish surveys.

	German survey	Icelandic survey
Gear	140-feet bottom trawl	105-feet bottom trawl
Horizontal net opening	22 m	17 m
Standard trawling speed	4.5 kn	3.8 kn
Towing time	30 minutes	Corrected to 30 minutes
Variable to standard distance		
Coefficient of catchability	1.0	1.0

Tab. 2 Survey area and effort (hauls) of the joint German-Icelandic groundfish survey database including West Greenland, East Greenland and Iceland, 1985-2002.

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	8.1	8.2	9.1	9.2	10.1	10.2	11.1	11.2	WEST	EAST	ICELAND	TOTAL
DEPTH (m)	0-200	200-400	0-200	200-400	0-200	200-400	0-200	200-400	0-200	200-400	0-200	200-400	0-200	200-400	0-200	200-400	0-200	200-400	0-200	200-400	0-200	200-400				
AREA (nm^2)	6805	1881	2350	1018	1938	742	2568	971	2468	3126	1120	7795	92	4589	7973	5771	7824	6405	10940	11231	6391	2363	18273	19190	58898	96361
YEAR																										
1985	10	8	26	10	17	5	21	4	5	21	14	50	0	28	53	35	116	94	127	93	45	22	101	118	585	804
1986	27	9	21	9	16	7	18	3	3	15	14	37	1	34	45	34	108	85	119	93	45	21	110	104	550	764
1987	25	11	21	4	18	3	21	3	19	16	13	40	0	18	48	35	112	93	116	93	40	22	106	106	559	771
1988	34	21	28	5	18	5	18	2	21	8	13	39	0	26	46	34	113	79	114	92	38	21	131	107	537	775
1989	26	14	30	9	8	3	25	3	17	18	12	29	0	11	37	35	113	92	111	86	40	23	118	87	537	742
1990	19	7	23	8	16	3	21	6	18	19	6	15	0	13	44	30	113	90	100	90	42	23	103	71	532	706
1991	19	11	23	7	12	6	14	5	8	11	10	28	0	16	40	31	110	89	108	89	36	22	97	73	525	695
1992	6	6	6	5	6	6	7	5	0	0	0	0	0	6	33	34	110	80	115	89	35	21	47	6	517	570
1993	9	6	9	6	10	8	7	0	9	6	6	18	0	14	41	28	117	84	111	84	50	21	55	53	536	644
1994	16	13	13	8	10	6	7	5	0	0	0	0	0	6	39	30	117	84	116	87	43	19	78	6	535	619
1995	0	0	3	0	10	7	10	5	8	6	6	17	0	12	54	33	107	86	116	86	42	15	35	49	539	623
1996	5	5	8	5	12	5	10	5	7	9	5	13	0	9	51	34	108	90	106	70	48	23	55	43	530	628
1997	5	6	5	5	6	5	8	5	5	5	4	8	0	8	38	35	108	86	104	55	47	22	45	30	495	570
1998	9	5	10	7	11	6	10	5	5	8	6	12	0	9	45	34	99	62	99	58	47	22	63	40	466	569
1999	8	6	14	8	13	6	9	3	5	6	6	13	0	5	52	32	92	70	110	61	49	20	67	35	486	588
2000	13	6	14	7	14	5	9	5	6	5	8	16	0	11	49	33	104	85	113	69	48	22	73	46	523	642
2001	0	0	15	7	15	5	11	6	5	6	9	18	0	15	50	31	172	45	89	63	49	23	59	53	522	634
2002	0	0	7	2	5	6	8	4	6	6	5	10	0	10	52	32	128	88	89	67	42	30	32	37	528	597

Table 3 *S. marinus* (≥17 cm). Abundance indices (n*1000) for West and East Greenland, Iceland and total by stratum, 1985-2002. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Str5.1	Str5.2	Str6.1	Str6.2	Str7.1	Str7.2	Str8.1	Str8.2	Str9.1	Str9.2	Str10.1	Str10.2	Str11.1	Str11.2	West	East	Ice	Total	CI
1985	4661	10451	6157	1569	3221	14442	4974		78117	32398	1786	141503		25946	112276	177729	82724	86210	31214	19054	41439	38725	45475	279750	589372	914597	21
1986	6329	4324	2077	3483	21504	2883	2717			124615	470	298704		22234	135764	186392	101959	106802	36469	27225	33118	52182	43317	446023	679911	1169252	26
1987	905	653	1328		9611		660		50962	9422	245	507384		27919	105650	187806	140757	85377	27903	40173	39081	27104	13156	595933	653851	1262940	23
1988	830	2238	343	2255	5938	1954	732		3011	5014	148	132460		34353	138180	109418	91725	109657	28277	32938	34185	17871	14291	174987	562252	751530	21
1989	422	421	776	690	6490		362		4003	33320	625	110666		76935	207497	226316	80731	31165	27751	14756	18170	35268	9161	225548	641652	876362	29
1990	122	433	280	710	1037		146	2270	14973	72317	391	653011		37483	128628	351916	27743	20872	20467	23108	19742	24081	4998	778175	616557	1399729	54
1991	225	256	96	691	236	528	21	1671	1385	13239	171	64691		28199	151646	83558	71031	66150	40518	34790	34754	12335	3724	107685	494782	606190	19
1992	129	105	73	190	194	476	193	836						32623	114676	73713	53646	25868	46503	31566	14597	16350	2197	32623	376918	411737	21
1993	170	482	59	267	79	132	0		175	6043	77	54425		4171	54137	118848	58228	90289	31868	26385	20183	15492	1189	64891	415429	481509	28
1994	109	325	155	167	66	46	152	247						3350	81149	96964	40884	84580	46808	29449	30875	28011	1266	3350	438721	443337	29
1995					50	68	39	146	346	1519	153	38889		2060	111439	99942	17745	26029	28795	28800	15179	29897	302	42968	357824	401094	25
1996	150	267	21	243	380	383	28	298	647	3145	494	21109		2363	95875	173678	44357	33691	36885	40971	26638	34880	1770	27757	486975	516503	30
1997	252	609	16	175	120	311	36	552	721	913		21257		1611	118750	206232	25174	40457	26655	25342	49633	36359	2072	24501	528602	555176	44
1998	116	141	45	142	19	106	126	254	590	1388	328	166868		5837	94448	236519	46258	37294	29406	35364	31207	24485	949	175011	534981	710941	49
1999	225	293	132	219	72	213	10		128	644	412	30603		2405	145547	377435	32798	86924	29652	16501	32364	25858	1163	34192	747079	782435	37
2000	197	621	63	571	83	200	10	836	247	2151	241	57106		2685	120895	285993	33178	19683	20374	26427	28529	27739	2582	62429	562818	627829	35
2001			106	304	72	456	8	1557	148	2007	540	95364		7154	89058	196191	39631	9201	19032	18682	22362	36253	2502	105213	430411	538125	33
2002			101		333	536	13		138	3332	645	242557		102073	139240	158437	28441	22083	39219	18874	26420	34063	984	348746	466777	816507	42

Table 4 *S. marinus* (≥17 cm). Biomass indices (n*1000) for West and East Greenland, Iceland and total by stratum, 1985-2002. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Str5.1	Str5.2	Str6.1	Str6.2	Str7.1	Str7.2	Str8.1	Str8.2	Str9.1	Str9.2	Str10.1	Str10.2	Str11.1	Str11.2	West	East	Ice	Total	CI
1985	1021	1819	2968	472	1426	9210	2720		8613	22454	1317	65299		23762	52622	86305	27445	30836	11443	7032	27200	27434	19636	121445	270317	411398	16
1986	1279	1215	752	1230	10122	1705	1762			43120	382	213271		24368	58458	90847	31236	41877	13438	7777	21787	35296	18065	281141	300716	599922	22
1987	252	246	660		4954		439		9539	5345	105	230841		19329	48715	94425	62205	32130	9779	15863	28184	18389	6551	265160	309690	581401	24
1988	143	404	118	942	2570	1342	383		1091	4930	68	98131		48263	60547	56412	31113	37560	10713	14629	24823	13800	5900	152483	249595	407978	27
1989	184	137	273	249	2620		208		970	14920	442	54588		34358	90111	94021	33342	10342	9049	5117	13721	25662	3671	105279	281366	390316	24
1990	41	149	75	275	479		80	1343	6760	27246	155	130527		14722	60284	128278	7470	6248	6010	9447	13268	16619	2441	179409	247624	429474	41
1991	41	83	24	226	120	272	3	1007	726	10632	120	34267		62979	68974	39831	17385	17772	11961	14012	21205	8249	1775	108723	199391	309889	37
1992	20	36	21	61	52	241	69	447						12074	56369	35117	11261	6633	13769	7766	9785	10652	948	12074	151353	164374	23
1993	48	111	19	114	39	55	0		74	1379	30	20181		2900	22556	47051	12104	21474	8608	7692	12641	8975	385	24564	141100	166050	25
1994	34	147	47	64	27	36	41	80						1542	28304	39133	7686	19976	14406	9256	18035	15341	475	1542	152137	154154	26
1995					19	19	21	43	114	713	50	8894		1143	40726	39664	2990	5849	8947	10745	9523	17992	102	10913	136437	147452	25
1996	61	102	2	60	128	118	8	132	138	1713	196	10851		1409	35185	73828	9443	9271	10518	14586	15498	21525	611	14307	189854	204771	32
1997	41	261	5	61	35	188	10	246	163	447		15411		1225	42145	81388	5477	13028	9525	8384	28012	20168	847	17246	208127	226219	40
1998	20	43	12	42	14	54	56	117	193	597	112	34680		2005	39291	72530	12659	10887	10832	14469	17678	14726	359	37587	193072	231018	29
1999	54	71	35	68	17	82	8		47	294	119	16221		1537	54208	146243	7049	21418	12046	6766	18208	15707	337	18218	281645	300200	32
2000	68	173	31	215	21	76	3	388	72	1200	56	45897		2317	44234	98684	7028	5255	7377	11586	16617	17113	974	49542	207893	258410	33
2001			24	113	54	228	3	776	49	975	116	31687		5681	32490	73286	9063	4107	6885	6777	12641	19455	1197	38509	164703	204409	24
2002			24		157	230	13		35	597	198	74637		50144	55500	64854	5918	6528	12861	7543	17518	19140	423	125611	189863	315897	35

Table 5 *S. marinus* (≥17 cm). Length disaggregated abundance indices (n*1000) for West Greenland, 1985-2002.

West	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Length																		
15,5	0	0	0	0	9	39	50	14	0	0	0	0	0	0	12	0	0	0
16,5	2381	1438	30	686	8	24	21	29	0	0	0	0	0	0	0	0	0	0
17,5	1918	1347	64	321	46	137	87	15	0	0	0	8	12	0	0	30	28	26
18,5	1372	1733	51	131	37	58	94	51	35	90	0	22	0	0	22	65	6	26
19,5	1258	1241	76	351	90	45	53	5	95	89	33	16	30	6	31	95	85	44
20,5	1434	1047	95	253	131	74	122	44	147	85	29	425	113	34	41	127	30	34
21,5	1192	940	132	243	109	79	87	147	71	42	30	27	93	5	100	78	52	32
22,5	1320	1155	187	303	140	143	135	80	22	48	15	34	81	68	51	113	97	96
23,5	1285	1140	264	298	214	176	102	87	23	26	11	79	75	33	103	84	63	18
24,5	1119	1787	449	464	320	187	131	148	45	70	11	27	158	76	51	150	74	68
25,5	1374	1611	381	640	343	251	160	106	110	68	4	63	143	71	64	179	134	31
26,5	1556	1717	631	765	561	218	186	140	41	91	7	152	124	121	109	199	166	22
27,5	2049	1879	647	798	679	255	171	94	86	70	29	43	155	103	86	115	175	74
28,5	1781	2213	768	769	732	272	192	81	35	40	18	41	144	36	66	184	219	35
29,5	2358	2549	937	914	871	221	273	140	16	65	14	34	83	66	75	142	143	32
30,5	3193	3285	1024	1081	1071	410	141	144	75	44	15	39	120	53	91	138	143	54
31,5	2321	3090	1155	947	709	327	192	107	41	45	8	23	113	19	109	124	145	13
32,5	2873	3224	1028	826	715	268	193	132	49	49	25	8	150	16	10	86	137	60
33,5	2080	2926	1235	720	625	204	236	150	35	19	0	148	33	10	21	115	129	47
34,5	2144	2505	946	645	430	260	134	129	40	52	0	78	57	82	19	84	77	27
35,5	1765	2199	901	721	397	259	185	106	27	53	11	29	78	14	26	95	107	31
36,5	1446	1321	650	562	329	214	134	61	43	49	31	56	40	5	25	84	107	47
37,5	1211	945	485	467	219	169	156	57	44	0	0	137	17	43	5	76	63	32
38,5	1289	631	251	364	115	130	81	21	20	37	0	0	22	11	5	60	94	36
39,5	1091	413	252	252	120	82	114	9	37	39	0	0	38	27	21	24	63	46
40,5	1107	415	201	234	51	127	102	62	4	5	0	127	60	7	0	37	24	4
41,5	537	222	128	127	27	118	25	5	4	11	0	0	45	6	0	32	52	4
42,5	572	84	56	64	11	82	65	17	24	29	15	0	40	0	5	29	40	13
43,5	430	94	39	65	22	54	28	14	0	16	0	0	30	5	0	27	18	13
44,5	243	40	42	53	15	0	27	0	10	23	0	0	6	5	0	0	18	9
45,5	221	22	22	45	0	42	19	0	12	14	0	127	6	15	0	0	6	0
46,5	185	25	13	53	0	24	5	0	0	5	0	0	6	5	0	0	0	0
47,5	94	17	5	16	0	18	14	0	0	0	0	0	0	0	5	0	0	0
48,5	94	0	0	4	0	12	6	0	0	0	0	0	0	0	0	0	6	9
49,5	68	0	0	6	4	0	0	0	0	0	0	0	0	0	0	7	0	0
50,5	22	9	0	0	4	12	0	0	0	0	0	0	0	0	0	0	0	0
51,5	6	0	4	0	4	0	0	0	0	0	0	0	6	0	0	0	0	0
52,5	11	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
53,5	6	4	0	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0
54,5	22	8	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55,5	17	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56,5	4	0	0	6	0	0	0	0	0	5	0	0	0	0	0	0	0	0
57,5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58,5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59,5	6	5	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60,5	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 6 *S. marinus* (≥17 cm). Length disaggregated abundance indices (n*1000) for East Greenland, 1985-2002.

East	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Length																		
15,5	187	0	0	0	0	39	0	0	0	0	7	11	0	2001	0	0	0	0
16,5	12373	24	7	0	413	13	31	0	0	0	17	0	0	0	0	0	0	0
17,5	12112	875	43	119	1210	305	286	0	16	0	0	0	0	12049	0	335	2723	1187
18,5	17364	2696	3943	88	9897	33894	678	172	997	0	2357	84	0	18047	132	475	4888	3881
19,5	23545	6560	6846	286	16446	75037	997	200	692	29	2503	145	54	16162	64	418	5847	5862
20,5	21553	13489	9955	322	18186	129668	1848	772	874	88	5876	421	110	14261	120	391	7785	13415
21,5	15097	18902	15099	413	15321	136359	2440	743	2473	88	5125	153	128	20295	228	601	8369	23756
22,5	13596	18877	18697	817	5958	113752	3167	1229	471	88	5432	563	201	16411	463	604	9242	30887
23,5	7292	32300	20955	1174	5616	75314	5427	1544	504	59	3412	592	652	16778	370	895	10333	30531
24,5	8030	34850	36708	2494	5517	32945	5660	2630	981	206	2495	1126	587	11643	720	923	10335	38288
25,5	10005	28103	46562	4370	7426	24280	7865	3774	7676	118	1195	1174	798	10370	1422	2058	8292	34866
26,5	9016	24499	63065	7625	12136	24797	7312	5661	7441	441	1018	1766	629	5545	2443	2703	3804	37625
27,5	11082	23963	67566	12543	13871	23832	4924	6690	15611	118	1231	1841	738	3730	2907	3805	2956	36715
28,5	11925	25507	58098	14890	18560	20193	3213	3974	6356	470	1253	1685	985	3996	3331	4109	3325	20188
29,5	10119	28797	40954	14160	17615	18376	2797	2459	4579	529	1327	1537	1175	3509	3995	3427	2466	11802
30,5	11604	23392	31243	9313	16793	12865	3304	629	3232	88	1388	2309	2188	1371	2931	4351	2682	8566
31,5	4988	16142	19699	5744	10512	7707	2404	229	2411	29	1050	1992	979	2994	2445	2902	2858	6457
32,5	4262	11808	18287	4215	7796	5866	2621	286	1426	176	1087	1440	1144	1065	1987	2186	1776	4959
33,5	4932	8255	16669	2173	3071	4288	2052	57	420	118	862	1386	983	921	1195	2971	1504	2854
34,5	4945	5731	14076	4077	2288	3186	2261	86	858	59	939	2199	969	1234	979	974	1092	2139
35,5	6507	7555	10726	3099	1878	3030	2161	257	703	88	719	1675	971	797	1069	1479	951	1991
36,5	5300	6606	7792	3516	2305	2619	1806	57	357	59	760	1638	1088	754	798	1401	1040	2031
37,5	4141	6643	6090	3089	1663	1906	1841	114	165	0	560	900	1080	966	747	638	1319	1322
38,5	5617	6376	7457	5459	1675	2509	1461	57	952	0	390	704	851	1024	472	1551	852	1557
39,5	4433	6029	5899	3958	1801	2300	2134	57	154	29	399	697	1064	1114	753	2084	929	1707
40,5	5245	7172	5452	5474	2025	2686	2321	0	1146	59	234	683	1348	1380	468	3015	1274	1348
41,5	3385	7407	5917	4471	2357	1484	2878	0	446	0	164	246	955	1268	695	1709	1010	3906
42,5	5480	6182	6301	6429	2260	2173	2457	114	473	29	154	199	926	971	625	1911	1070	3232
43,5	3515	8500	4999	7116	2425	2080	2780	0	691	88	189	263	720	1200	528	2187	1848	3059
44,5	3856	8717	4841	8198	2801	1458	2408	86	32	29	100	27	823	857	582	1336	899	2406
45,5	3860	9387	7268	8498	2425	1835	4035	143	591	59	207	79	825	509	371	1385	628	2344
46,5	2637	7970	7234	5867	2407	1997	3279	57	133	29	168	34	240	554	663	1729	972	2644
47,5	2520	7163	7353	5632	2083	1269	2429	29	89	29	83	95	182	403	259	2806	618	1374
48,5	1770	5723	5491	5582	1662	1423	2634	114	598	59	112	0	313	396	132	1073	508	1429
49,5	1975	5348	3949	2688	1746	1249	1935	114	92	59	34	45	240	146	90	1177	516	1100
50,5	1556	4224	3909	3760	1614	1589	2385	143	836	29	17	45	130	97	124	869	206	953
51,5	900	2301	1838	1945	895	772	1572	29	288	0	17	0	189	49	45	505	88	764
52,5	501	1510	1565	1622	727	961	1553	29	32	0	17	0	96	49	45	663	34	735
53,5	649	1475	1272	1318	391	774	1407	57	0	0	17	0	36	24	0	146	88	201
54,5	400	1248	959	775	450	407	1170	29	24	0	17	0	57	24	0	146	65	29
55,5	488	747	372	395	272	362	1245	0	0	0	14	0	0	24	0	156	0	172
56,5	177	551	151	407	269	69	116	0	16	0	0	0	0	0	0	0	0	172
57,5	156	470	130	234	112	145	897	0	16	0	0	0	36	0	0	16	16	0
58,5	84	335	41	143	138	39	288	0	16	0	0	0	0	0	0	146	0	86
59,5	67	310	63	36	112	19	128	0	0	0	0	0	0	0	0	16	0	0
60,5	37	164	19	157	80	19	278	0	12	0	0	0	0	24	0	0	0	0

Table 7 *S. marinus* (≥17 cm). Length disaggregated abundance indices (n*1000) for Iceland, 1985-2002.

Ice	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Length																		
15,5	0	0	0	0	0	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	0	0	0	0	0
17,5	4848	5516	1996	1619	3589	4907	5997	5640	4299	6882	3529	3578	2074	1891	1621	2575	2266	2578
18,5	4882	6197	3035	1360	2365	4905	7397	6337	4147	6968	4519	4649	2000	1752	1539	3102	2492	2563
19,5	4798	6761	4147	1874	1794	4242	7768	6585	4207	6497	4360	5201	2728	1655	1681	2812	2553	2316
20,5	4484	6470	5007	2311	1549	3964	8679	6341	5150	7518	5096	6165	3767	1960	1953	3701	2947	2425
21,5	4296	6644	5407	3043	1515	4712	10497	6973	5695	7479	5080	7011	4464	2250	2287	3914	3329	2464
22,5	3988	6751	6630	4152	2203	2926	11129	7383	7016	8056	5462	8663	7083	4270	2367	4313	4084	3232
23,5	3885	7166	6649	5242	2470	2477	11727	9218	7573	8694	5498	8254	6997	6443	4131	5786	3584	4757
24,5	3418	7206	6306	6649	4276	2487	10585	10168	9853	10032	5924	9103	7770	12650	5888	5475	4731	4680
25,5	5723	7060	7964	8278	6416	3003	10531	10832	13249	11647	7145	8944	10749	21083	7778	9052	5459	6732
26,5	9851	9183	9835	11421	7181	5040	8821	11967	16973	16146	8433	10990	9049	26163	14773	8571	7944	8775
27,5	12054	10713	12249	11902	12763	11684	9725	10964	22675	21301	8945	12672	14001	32885	21845	13541	10845	11118
28,5	16282	14403	13553	19051	17422	14576	11646	10329	32324	27089	12644	15536	18784	39530	39454	16793	15434	13767
29,5	20886	19177	14378	20919	28303	34659	13482	10189	32786	26471	14160	16691	23812	31285	55257	28484	19040	21858
30,5	21119	25376	16868	23930	32056	44591	16053	9886	31118	24984	16285	22447	24155	23133	51223	41689	28995	25630
31,5	23690	30993	21856	25579	42459	58326	18786	11696	23465	26788	27790	22085	22118	23565	52907	45643	40626	32220
32,5	23979	36943	24053	27007	43259	59048	21995	13279	17947	23758	20601	29554	28181	31439	52046	47567	41964	39682
33,5	28266	38837	31987	28233	42106	51433	25312	13909	16849	22642	26974	33361	39653	27071	64572	51298	42900	43237
34,5	27176	37598	33116	35534	39844	40434	27417	16393	16512	20649	23041	35952	37369	27273	51371	50462	34458	41046
35,5	33852	41567	41140	34311	41128	40947	29800	17835	16384	19900	22228	36065	46975	31472	40935	37840	32462	39371
36,5	35405	45651	46464	40532	37779	24134	30986	20934	17652	17845	21604	31021	38720	29659	46844	35114	26471	33827
37,5	42907	46131	46043	40120	41763	27277	30992	23159	16239	19235	20320	27774	34935	31527	46121	29825	25400	28700
38,5	48434	48214	50648	38757	45507	25870	30079	25875	15921	17900	14915	25155	31258	26847	43846	27246	19264	22212
39,5	40606	47405	46707	33726	36811	25965	23997	23430	15922	13810	13732	22042	27268	22459	37401	19527	15398	19091
40,5	38731	41274	43064	29884	32769	23752	24061	21249	14928	13995	13586	17205	19923	18646	28252	16436	12027	13530
41,5	32367	33145	38475	26466	27631	23135	24235	16923	12852	11727	11402	16170	18443	15989	21986	13865	9237	11335
42,5	24345	24450	30128	19676	22418	20303	18532	15855	9069	10620	8221	13113	13664	11198	17907	11569	5421	9130
43,5	21789	20098	24695	16111	18812	14151	14657	10347	6928	7592	6491	10678	11255	9648	10386	7659	3745	6449
44,5	12058	12520	18155	12212	13953	12221	9588	7588	4971	6231	5120	6649	7589	5698	8335	5914	2415	4221
45,5	10914	11512	12328	9313	9127	8054	6833	5368	3783	4355	3494	7063	5153	4903	5108	4772	1663	2669
46,5	8322	7570	10729	6507	6964	4960	5068	3419	2472	2963	2414	4316	3148	4120	2021	2509	1084	2607
47,5	4878	4256	6862	4455	4277	4611	2521	1985	1625	2745	2082	3240	1534	1974	2278	2008	774	2415
48,5	3260	3518	5079	3850	2652	2821	1872	1241	1143	1564	1237	1544	1217	1236	627	1055	443	784
49,5	2464	3283	2170	2365	2046	1446	1231	1060	1455	1222	814	1156	706	1188	1080	692	236	547
50,5	1809	1851	2325	1669	1769	878	613	602	808	1087	582	489	642	686	521	1172	125	190
51,5	959	1462	1068	1220	1193	919	465	682	573	686	394	460	474	393	204	185	124	191
52,5	556	894	845	637	1004	434	413	392	451	492	215	567	186	228	134	171	64	113
53,5	680	570	600	608	1084	473	257	405	74	375	142	258	228	357	148	76	102	58
54,5	452	534	206	403	576	273	206	106	74	124	24	207	146	187	42	151	36	15
55,5	294	317	595	289	325	114	149	30	63	307	28	128	126	36	35	36	31	31
56,5	149	147	118	229	134	132	186	29	74	112	35	122	29	47	37	31	66	37
57,5	127	202	24	175	132	106	116	36	21	13	20	56	22	91	36	20	50	20
58,5	18	48	173	188	120	27	188	43	56	47	83	38	52	12	44	41	5	43
59,5	114	78	40	88	33	66	11	26	7	53	5	24	30	25	12	21	17	6
60,5	123	103	30	22	14	28	22	0	14	19	5	84	44	20	11	25	46	10

Table 8 *S. marinus* (≥17 cm). Length disaggregated abundance indices (n*1000) for Greenland and Iceland combined, 1985-2002.

Total	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Length																		
15,5	187	0	0	0	9	78	50	14	0	0	7	11	0	2001	12	0	0	0
16,5	14754	1462	37	686	421	37	52	29	0	0	17	0	0	0	0	0	0	0
17,5	18878	7738	2103	2059	4845	5349	6370	5655	4315	6882	3529	3586	2086	13940	1621	2940	5017	3791
18,5	23618	10626	7029	1579	12299	38857	8169	6560	5179	7058	6876	4755	2000	19799	1693	3642	7386	6470
19,5	29601	14562	11069	2511	18330	79324	8818	6790	4994	6615	6896	5362	2812	17823	1776	3325	8485	8222
20,5	27471	21006	15057	2886	19866	133706	10649	7157	6171	7691	11001	7011	3990	16255	2114	4219	10762	15874
21,5	20585	26486	20638	3699	16945	141150	13024	7863	8239	7609	10235	7191	4685	22550	2615	4593	11750	26252
22,5	18904	26783	25514	5272	8301	116821	14431	8692	7509	8192	10909	9260	7365	20749	2881	5030	13423	34215
23,5	12462	40606	27868	6714	8300	77967	17256	10849	8100	8779	8921	8925	7724	23254	4604	6765	13980	35306
24,5	12567	43843	43463	9607	10113	35619	16376	12946	10879	10308	8430	10256	8515	24369	6659	6548	15140	43036
25,5	17102	36774	54907	13288	14185	27534	18556	14712	21035	11833	8344	10181	11690	31524	9264	11289	13885	41629
26,5	20423	35399	73531	19811	19878	30055	16319	17768	24455	16678	9458	12908	9802	31829	17325	11473	11914	46422
27,5	25185	36555	80462	25243	27313	35771	14820	17748	38372	21489	10205	14556	14894	36718	24838	17461	13976	47907
28,5	29988	42123	72419	34710	36714	35041	15051	14384	38715	27599	13915	17262	19913	43562	42851	21086	18978	33990
29,5	33363	50523	56269	35993	46789	53256	16552	12788	37381	27065	15501	18262	25070	34860	59327	32053	21649	33692
30,5	35916	52053	49135	34324	49920	57866	19498	10659	34425	25116	17688	24795	26463	24557	54245	46178	31820	34250
31,5	30999	50225	42710	32270	53680	66360	21382	12032	25917	26862	28848	24100	23210	26578	55461	48669	43629	38690
32,5	31114	51975	43368	32048	51770	65182	24809	13697	19422	23983	21713	31002	29475	32520	54043	49839	43877	44701
33,5	35278	50018	49891	31126	45802	55925	27600	14116	17304	22779	27836	34895	40669	28002	65788	54384	44533	46138
34,5	34265	45834	48138	40256	42562	43880	29812	16608	17410	20760	23980	38229	38395	28589	52369	51520	35627	43212
35,5	42124	51321	52767	38131	43403	44236	32146	18198	17114	20041	22958	37769	48024	32283	42030	39414	33520	41393
36,5	42151	53578	54906	44610	40413	26967	32926	21052	18052	17953	22395	32715	39848	30418	47667	36599	27618	35905
37,5	48259	53719	52618	43676	43645	29352	32989	23330	16448	19235	20880	28811	36032	32536	46873	30539	26782	30054
38,5	55340	55221	58356	44580	47297	28509	31621	25953	16893	17937	15305	25859	32131	27882	44323	28857	20210	23805
39,5	46130	53847	52858	37936	38732	28347	26245	23496	16113	13878	14131	22739	28370	23600	38175	21635	16390	20844
40,5	45083	48861	48717	35592	34845	26565	26484	21311	16078	14059	13820	18015	21331	20033	28720	19488	13325	14882
41,5	36289	40774	44520	31064	30015	24737	27138	16928	13302	11738	11566	16416	19443	17263	22681	15606	10299	15245
42,5	30397	30716	36485	26169	24689	22558	21054	15986	9566	10678	8390	13312	14630	12169	18537	13509	6531	12375
43,5	25734	28692	29733	23292	21259	16285	17465	10361	7619	7696	6680	10941	12005	10853	10914	9873	5611	9521
44,5	16157	21277	23038	20463	16769	13679	12023	7674	5013	6283	5220	6676	8418	6560	8917	7250	3332	6636
45,5	14995	20921	19618	17856	11552	9931	10887	5511	4386	4428	3701	7269	5984	5427	5479	6157	2297	5013
46,5	11144	15565	17976	12427	9371	6981	8352	3476	2605	2997	2582	4350	3394	4679	2684	4238	2056	5251
47,5	7492	11436	14220	10103	6360	5898	4964	2014	1714	2774	2165	3335	1716	2377	2542	4814	1392	3789
48,5	5124	9241	10570	9436	4314	4256	4512	1355	1741	1623	1349	1544	1530	1632	759	2128	957	2222
49,5	4507	8631	6119	5059	3796	2695	3166	1174	1547	1281	848	1201	946	1334	1170	1876	752	1647
50,5	3387	6084	6234	5429	3387	2479	2998	745	1644	1116	599	534	772	783	645	2041	331	1143
51,5	1865	3763	2910	3165	2092	1691	2037	711	861	686	411	460	669	442	249	690	212	955
52,5	1068	2404	2410	2259	1734	1395	1966	421	483	492	232	567	282	277	179	834	98	848
53,5	1335	2049	1872	1934	1479	1247	1664	462	74	375	159	258	264	381	148	222	190	259
54,5	874	1790	1169	1184	1026	680	1376	135	98	124	41	207	203	211	42	297	101	44
55,5	799	1076	967	684	597	476	1394	30	63	307	42	128	126	60	35	192	31	203
56,5	330	698	269	642	403	201	302	29	90	117	35	122	29	47	37	31	66	209
57,5	288	672	154	409	244	251	1013	36	37	13	20	56	58	91	36	36	66	20
58,5	108	383	214	331	258	66	476	43	72	47	83	38	52	12	44	187	5	129
59,5	187	393	103	130	145	85	139	26	7	53	5	24	30	25	12	37	17	6
60,5	160	276	49	179	94	47	300	0	26	19	5	84	44	44	11	25	46	10

Table 9 *S. mentella* (≥17 cm). Abundance indices (n*1000) for West and East Greenland, Iceland and total by stratum, 1985-2002. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Str5.1	Str5.2	Str6.1	Str6.2	Str7.1	Str7.2	Str8.1	Str8.2	Str9.1	Str9.2	Str10.1	Str10.2	Str11.1	Str11.2	West	East	Ice	Total	CI
1985	0	369	31	26	56	327	0		34905	16909	105	38687		81487	0	7745	0	1162	8	21874	0	9041	809	172092	39829	212731	41
1986	2144	414	38	292	4	444	0			6930	27	76656		67174	0	300	0	140	144	9277	6	652	3335	150787	10520	164643	34
1987	987	13679	42		56		0		0	18340	65	7179		62456	0	560	62	3750	0	4085	0	1040	14764	88041	9497	112301	42
1988	150	3186	26	777	60	4620	0		22024	28156	74	176635		25345	80	5159	0	56	0	5979	77	858	8818	252234	12209	273261	56
1989	0	186	9	102	0		8		847	3067	0	72049		222282	0	1552	0	7	0	2958	0	3122	305	298244	7639	306188	59
1990	0	9	5	704	50		0	3881	328	12454	2353	13517		16048	0	410	0	0	0	2362	722	154	4650	44700	3647	52997	41
1991	0	0	0	0	0	652	0	1773	0	10707	46	724506		234746	0	162	0	0	0	1234	0	683	2425	970004	2079	974508	80
1992	0	36	0	15	0	106	0	0						60065	0	312	10	7	0	883	45	4683	157	60065	5940	66163	148
1993	0	23	0	159	8	0	0		62	3529	140	1258378		121925	0	12	0	7	8	1202	0	239	189	1384034	1468	1385691	86
1994	0	271	21	96	95	162	0	36						77894	853	617	0	0	0	702	6	562	680	77894	2742	81316	160
1995					29	234	95	1468	267	24464	1174	2394063		83313	8	121	0	7	0	2415	0	480	1826	2503280	3031	2508137	54
1996	1524	619	0	236	0	1921	28	7135	395	176447	1215	4246100		75012	0	1021	0	0	0	32	0	87	11464	4499169	1141	4511773	64
1997	252	1759	0	381	37	3204	144	30742	165	22270		6257093		628353	0	8639	10	406	0	1255	0	1434	36518	6907882	11745	6956144	61
1998	0	324	0	212	151	828	10	2543	627	50219	0	2803222		39167	0	3174	0	385	8	74	0	210	4068	2893235	3852	2901155	66
1999	34	235	7	281	39	1735	95		276	16277	35	552260		15144	0	681	0	77	0	1096	0	704	2426	583992	2558	588976	43
2000	0	94	7	768	31	1422	0	21187	0	54245	90	656674		10752	0	791	31	105	17	575	0	1602	23509	721761	3120	748390	64
2001			24	636	116	5419	0	13939	74	61985	52	617083		184914	0	1333	0	0	51	9511	6	5	20134	864108	10906	895148	65
2002			0		0	1351	23		0	3098	109	685594		310354	0	208	10	196	0	904	0	922	1374	999154	2240	1002768	94

Table 10 *S. mentella* (≥17 cm). Biomass indices (n*1000) for West and East Greenland, Iceland and total by stratum, 1985-2002. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Str5.1	Str5.2	Str6.1	Str6.2	Str7.1	Str7.2	Str8.1	Str8.2	Str9.1	Str9.2	Str10.1	Str10.2	Str11.1	Str11.2	West	East	Ice	Total	CI
1985	0	96	14	11	27	110	0		2959	7168	40	17009		38534	0	3843	0	420	0	11937	0	4851	258	65710	21052	87020	34
1986	225	38	19	110	4	180	0			3945	15	29278		31334	0	150	0	63	25	5054	6	366	574	64571	5665	70810	34
1987	82	1183	9		31		0		0	4892	17	2331		23266	0	323	10	1840	0	2075	0	659	1305	30506	4908	36719	41
1988	20	425	21	159	45	1878	0		3542	10166	9	55836		11606	32	3393	0	21	0	3149	38	470	2548	81157	7104	90809	52
1989	0	23	7	15	0		0		89	656	0	21148		45454	0	941	0	0	0	1841	0	1860	45	67347	4641	72033	59
1990	0	6	2	87	8		0	542	62	2742	329	1964		3277	0	225	0	0	0	1532	735	64	644	8373	2556	11573	38
1991	0	0	0	0	0	153	0	445	0	2960	30	211471		69455	0	115	0	0	0	840	0	480	598	283916	1436	285949	80
1992	0	2	0	1	0	28	0	0						19857	0	190	0	0	0	500	32	2209	31	19857	2932	22820	138
1993	0	4	0	22	2	0	0		35	494	19	194672		34101	0	12	0	0	0	479	0	64	28	229321	554	229903	61
1994	0	32	2	10	12	24	0	3						7122	175	162	0	0	0	319	6	97	84	7122	759	7965	115
1995					6	24	10	159	30	2860	207	355943		16507	0	40	0	0	0	1064	0	201	200	375547	1305	377052	52
1996	7	55	0	19	0	235	3	689	12	24445	123	837222		14501	0	387	0	0	0	21	0	50	1008	876304	458	877770	58
1997	20	141	0	38	2	320	18	2973	20	3445		1323965		162744	0	2349	0	77	0	202	0	766	3512	1490174	3394	1497080	59
1998	0	26	0	17	17	88	3	326	153	6458	0	728848		8719	0	1091	0	56	0	11	0	78	478	744179	1235	745892	73
1999	7	21	5	36	6	188	21		39	1932	8	178194		3878	0	202	0	14	0	564	0	189	283	184051	969	185302	52
2000	0	9	0	65	2	122	0	1915	0	6796	21	135196		1923	0	265	0	21	0	298	0	768	2114	143936	1352	147403	56
2001			2	66	10	469	0	1468	7	6924	16	172293		37795	0	744	0	0	25	4256	6	5	2015	217035	5037	224087	72
2002			0		0	145	3		0	363	28	203839		114560	0	75	0	14	0	340	0	484	147	318790	914	319851	101

Table 11 Deep sea *S. mentella* (≥17 cm). Length disaggregated abundance indices (n*1000) for West Greenland, 1985-2002.

West	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Length																		
15,5	0	0	6	0	5	5	5	0	0	0	0	0	0	0	0	0	0	0
16,5	29	0	5220	230	0	0	5	0	0	0	0	0	0	0	0	0	0	0
17,5	6	1303	2178	217	14	72	0	0	0	0	0	0	6345	0	0	10530	5250	263
18,5	9	442	2794	99	19	83	9	17	6	267	701	3188	9988	1341	987	4518	5763	157
19,5	41	199	1721	965	64	240	31	25	6	163	366	2675	11375	752	479	3353	3910	252
20,5	26	117	1922	748	92	636	9	0	12	76	251	1853	4345	543	380	1903	1827	316
21,5	26	54	272	532	30	1077	71	20	6	30	349	935	1446	408	114	635	655	207
22,5	13	98	131	722	25	1544	300	5	19	62	44	721	1034	364	95	733	713	78
23,5	35	88	84	409	9	640	389	18	6	25	15	328	658	264	49	579	519	37
24,5	85	106	137	346	0	191	649	28	13	22	39	168	721	120	85	413	498	23
25,5	76	35	36	355	19	76	607	9	19	0	29	42	262	80	58	264	354	9
26,5	52	49	18	320	0	58	165	18	14	5	29	29	111	102	57	214	262	32
27,5	37	43	47	319	0	18	93	5	25	0	0	0	151	34	45	130	156	0
28,5	46	81	43	265	5	0	38	0	25	12	0	0	28	29	28	85	59	0
29,5	38	71	0	296	0	5	19	0	0	5	0	0	6	15	11	59	53	0
30,5	55	81	52	454	0	0	29	0	12	0	7	0	6	20	9	29	35	0
31,5	44	61	36	324	0	0	0	0	0	0	0	0	0	0	11	15	30	0
32,5	48	106	24	397	0	0	0	0	6	0	0	0	22	0	0	29	11	0
33,5	40	58	6	397	0	0	0	0	0	0	0	0	0	0	5	7	23	0
34,5	32	117	6	421	0	0	0	0	0	0	0	0	0	0	0	7	12	0
35,5	26	71	0	482	5	0	5	5	13	0	0	0	22	0	0	0	6	0
36,5	15	46	6	228	0	0	0	0	0	0	0	0	0	0	12	0	0	0
37,5	4	27	0	130	6	0	0	0	0	5	0	0	0	0	0	6	0	0
38,5	0	36	4	38	0	0	0	5	0	0	0	0	0	0	5	0	0	0
39,5	9	13	0	50	5	0	0	5	0	0	0	0	0	0	0	0	0	0
40,5	7	0	7	18	0	0	0	0	6	5	0	0	0	0	0	0	0	0
41,5	9	14	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42,5	0	0	4	17	8	0	0	0	0	5	0	0	0	0	0	0	0	0
43,5	0	9	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44,5	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45,5	0	0	0	11	0	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	0	0	0	0	0	0	0	0
47,5	0	4	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
49,5	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50,5	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
52,5	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
54,5	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
56,5	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
58,5	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
60,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 12 Deep sea *S. mentella* (≥17 cm). Length disaggregated abundance indices (n*1000) for East Greenland, 1985-2002.

East	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Length																		
15,5	0	0	9	0	0	0	0	0	307	0	0	742	0	0	0	0	0	0
16,5	73	0	0	620	2061	0	966	0	319	0	0	4707	472	19	0	0	0	0
17,5	12060	102	0	1381	3125	238	235	0	74	0	0	2627	152323	10078	258	20366	20140	933
18,5	9056	347	798	3076	7749	3742	814	0	333995	22779	200067	74794	311504	76658	25871	28778	21308	1424
19,5	7544	455	1913	3697	18831	4178	1812	429	207529	23237	241881	127533	213710	91452	22051	55140	29441	3397
20,5	9617	1050	3588	5505	54201	6713	5105	801	132958	10645	373074	274530	491989	104205	27944	86330	38382	11823
21,5	5026	1526	4444	7258	72956	6110	8838	1259	95583	3978	515997	376323	303044	99922	28081	71388	51412	29264
22,5	2929	2702	5368	8367	44631	7596	34773	2203	67838	4006	521701	481578	351810	88151	39793	53626	61279	56486
23,5	2721	4739	6965	9589	12277	3182	70531	1860	55216	1660	330707	610032	495466	112435	42946	44397	81311	69211
24,5	2865	8155	6142	12993	3087	2935	156528	3663	70069	2633	175357	827123	904459	147194	52379	66171	93866	88479
25,5	4620	10831	5254	17279	5282	1490	232104	7183	82962	2833	76326	876234	1141871	289798	57657	74034	95648	112230
26,5	4886	12548	7437	22992	10243	940	229277	11818	81127	2032	27451	439568	925720	401287	62502	60623	77555	127172
27,5	6798	11990	7186	32960	12409	1005	154058	11418	83942	944	17232	233226	764082	468784	50940	52768	77452	167910
28,5	8070	9907	7373	35625	10505	1405	46165	10445	64237	572	5969	91689	440296	404285	53222	35949	64678	150063
29,5	9909	11937	4852	33744	9087	1356	10596	4063	53497	2118	7094	42717	236198	326253	47125	25369	51639	84854
30,5	14501	16547	4476	24607	10599	1639	6914	2661	33668	229	6021	18203	109619	196460	31288	20108	45324	39128
31,5	9391	13576	5230	15089	7665	798	3319	658	11080	143	2700	10976	47591	56154	18133	14625	25907	24424
32,5	10832	11839	3573	6874	6339	606	4096	601	6227	29	1381	1513	7597	15865	7402	7600	15171	16654
33,5	11495	9471	4035	3908	2579	253	2223	658	1146	0	29	2474	5612	3361	5809	2909	7046	9437
34,5	12526	7733	3338	2453	1491	159	663	315	732	0	0	673	3300	38	3970	1052	3533	2665
35,5	11398	6045	2017	1233	1066	122	323	29	354	0	292	743	1078	19	1537	219	2098	1689
36,5	6265	3227	1867	1252	1042	49	287	0	663	0	0	347	21	112	1570	36	243	481
37,5	4361	2677	859	575	495	25	106	0	44	0	0	714	0	0	1368	18	315	470
38,5	1967	1450	470	504	156	44	25	0	53	0	0	0	0	225	909	128	92	583
39,5	1211	1013	452	169	256	49	207	0	0	0	0	0	0	225	1234	0	43	86
40,5	774	436	168	208	50	45	0	0	0	0	0	57	0	19	0	0	227	0
41,5	228	219	57	27	20	6	0	0	196	0	0	0	0	0	0	0	0	86
42,5	139	75	74	71	10	6	21	0	10	0	0	0	0	0	0	0	0	0
43,5	131	9	16	57	20	0	0	0	22	0	0	0	0	206	0	128	0	0
44,5	125	47	31	50	0	6	4	0	0	29	0	0	0	0	0	0	0	0
45,5	139	38	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46,5	79	15	0	0	0	0	0	0	0	29	0	0	0	27	0	0	0	0
47,5	51	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48,5	46	22	22	13	16	0	15	0	0	0	0	0	0	0	0	0	0	0
49,5	23	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50,5	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51,5	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52,5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53,5	11	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
55,5	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
57,5	0	0	0	33	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
59,5	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

Table 13 Deep sea *S. mentella* (≥17 cm). Length disaggregated abundance indices (n*1000) for Iceland, 1985-2002.

Ice	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Length																		
15,5	0	0	0	0	0	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	0	0	0	0	0
17,5	116	177	22	29	34	42	13	21	40	82	23	0	31	11	0	7	0	85
18,5	71	268	79	15	7	50	20	14	67	93	78	0	142	29	0	14	0	47
19,5	46	249	58	51	7	50	13	7	83	36	147	0	199	35	0	13	10	61
20,5	14	223	173	88	28	33	20	21	89	50	225	0	368	33	0	13	19	41
21,5	28	93	245	146	21	0	7	21	72	70	107	0	196	35	0	10	0	18
22,5	32	82	229	212	28	0	13	14	51	43	114	0	325	54	0	20	10	9
23,5	14	71	230	258	48	0	6	28	74	185	99	0	32	45	0	10	0	31
24,5	62	20	194	220	48	17	7	28	51	185	61	0	84	82	0	17	0	27
25,5	48	26	111	310	62	0	7	58	98	219	47	0	663	70	0	13	10	32
26,5	76	51	75	240	83	58	13	28	88	150	38	0	175	66	0	47	10	32
27,5	59	28	57	192	104	50	19	27	41	214	34	39	1079	79	0	50	50	27
28,5	67	43	53	112	81	107	30	49	35	303	24	39	921	233	0	57	10	44
29,5	133	39	122	82	76	88	55	33	32	286	18	29	908	349	0	132	71	27
30,5	482	84	110	102	78	79	61	73	28	222	62	97	1098	205	0	301	50	18
31,5	796	64	98	80	83	117	81	259	22	96	100	128	1253	655	0	423	592	48
32,5	1053	45	277	91	89	88	81	295	40	62	91	156	1410	262	0	446	1509	40
33,5	1204	121	209	137	121	95	58	799	33	18	77	180	417	539	0	228	1695	107
34,5	3623	295	352	341	253	57	49	460	22	11	212	146	606	301	0	241	1480	332
35,5	6030	473	536	465	540	73	44	424	22	11	122	112	653	281	0	103	601	240
36,5	4856	1011	668	601	431	46	67	636	17	7	118	20	145	201	0	80	1254	272
37,5	5370	1425	699	881	552	84	62	510	33	18	168	39	225	76	0	102	754	157
38,5	4072	1412	838	1024	661	63	49	310	17	18	171	20	199	104	0	119	551	213
39,5	3716	1181	1125	1028	604	109	37	625	33	14	127	34	250	46	0	97	592	102
40,5	1711	966	929	1066	870	182	121	231	34	0	88	5	163	15	0	135	571	72
41,5	1646	455	628	662	650	196	144	331	28	32	61	34	92	10	0	42	84	72
42,5	1177	452	332	841	580	255	167	148	28	28	114	5	0	10	0	138	304	36
43,5	602	243	140	919	369	225	101	87	24	35	114	5	49	10	0	30	245	27
44,5	510	159	247	671	348	278	122	72	22	56	154	10	49	10	0	48	238	13
45,5	668	125	88	316	195	184	146	54	22	28	62	10	4	0	0	42	40	9
46,5	357	103	131	419	175	275	104	59	29	46	34	10	9	0	0	10	33	4
47,5	371	115	102	204	116	208	106	79	34	32	53	5	0	0	0	12	50	0
48,5	236	145	128	143	124	225	97	63	47	35	23	0	0	0	0	64	23	0
49,5	165	137	122	150	78	152	87	37	46	21	38	16	0	0	0	0	10	0
50,5	183	72	43	83	64	67	39	21	29	20	15	0	0	0	0	54	30	0
51,5	132	58	22	15	30	77	20	17	12	7	0	0	0	0	0	0	10	0
52,5	7	7	7	15	0	17	19	0	17	7	8	0	0	0	0	0	0	0
53,5	85	0	14	0	0	0	0	7	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
55,5	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
57,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58,5	7	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
60,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 14 Deep sea *S. mentella* (≥17 cm). Length disaggregated abundance indices (n*1000) for Greenland and Iceland combined, 1985-2002.

Total	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Length																		
15,5	0	0	15	0	5	5	5	0	307	0	0	742	0	0	0	0	0	0
16,5	102	0	5220	850	2061	0	971	0	319	0	0	4707	472	19	0	0	0	0
17,5	12182	1582	2200	1627	3173	352	248	21	114	82	23	2627	158699	10089	258	30903	25390	1281
18,5	9136	1057	3671	3190	7775	3875	843	31	334068	23139	200846	77982	321634	78028	26858	33310	27071	1628
19,5	7631	903	3692	4713	18902	4468	1856	461	207618	23436	242394	130208	225284	92239	22530	58506	33361	3710
20,5	9657	1390	5683	6341	54321	7382	5134	822	133059	10771	373550	276383	496702	104781	28324	88246	40228	12180
21,5	5080	1673	4961	7936	73007	7187	8916	1300	95661	4078	516453	377258	304686	100365	28195	72033	52067	29489
22,5	2974	2882	5728	9301	44684	9140	35086	2222	67908	4111	521859	482299	353169	88569	39888	54379	62002	56573
23,5	2770	4898	7279	10256	12334	3822	70926	1906	55296	1870	330821	610360	496156	112744	42995	44986	81830	69279
24,5	3012	8281	6473	13559	3135	3143	157184	3719	70133	2840	175457	827291	905264	147396	52464	66601	94364	88529
25,5	4744	10892	5401	17944	5363	1566	232718	7250	83079	3052	76402	876276	1142796	289948	57715	74311	96012	112271
26,5	5014	12648	7530	23552	10326	1056	229455	11864	81229	2187	27518	439597	926006	401455	62559	60884	77827	127236
27,5	6894	12061	7290	33471	12513	1073	154170	11450	84008	1158	17266	233265	765312	468897	50985	52948	77658	167937
28,5	8183	10031	7469	36002	10591	1512	46233	10494	64297	887	5993	91728	441245	404547	53250	36091	64747	150107
29,5	10080	12047	4974	34122	9163	1449	10670	4096	53529	2409	7112	42746	237112	326617	47136	25560	51763	84881
30,5	15038	16712	4638	25163	10677	1718	7004	2734	33708	451	6090	18300	110723	196685	31297	20438	45409	39146
31,5	10231	13701	5364	15493	7748	915	3400	917	11102	239	2800	11104	48844	56809	18144	15063	26529	24472
32,5	11933	11990	3874	7362	6428	694	4177	896	6273	91	1472	1669	9029	16127	7402	8075	16691	16694
33,5	12739	9650	4250	4442	2700	348	2281	1457	1179	18	106	2654	6029	3900	5814	3144	8764	9544
34,5	16181	8145	3696	3215	1744	216	712	775	754	11	212	819	3906	339	3970	1300	5025	2997
35,5	17454	6589	2553	2180	1611	195	372	458	389	11	414	855	1753	300	1537	322	2705	1929
36,5	11136	4284	2541	2081	1473	95	354	636	680	7	118	367	166	313	1582	116	1497	753
37,5	9735	4129	1558	1586	1053	109	168	510	77	23	168	753	225	76	1368	126	1069	627
38,5	6039	2898	1312	1566	817	107	74	315	70	18	171	20	199	329	914	247	643	796
39,5	4936	2207	1577	1247	865	158	244	630	33	14	127	34	250	271	1234	97	635	188
40,5	2492	1402	1104	1292	920	227	121	231	40	5	88	62	163	34	0	135	798	72
41,5	1883	688	696	700	670	202	144	331	224	32	61	34	92	10	0	42	84	158
42,5	1316	527	410	929	598	261	188	148	38	33	114	5	0	10	0	138	304	36
43,5	733	261	156	990	389	225	101	87	46	35	114	5	49	216	0	158	245	27
44,5	635	210	278	721	348	284	126	72	22	85	154	10	49	10	0	48	238	13
45,5	807	163	88	347	195	184	146	54	22	28	62	10	4	0	0	42	40	9
46,5	436	118	131	419	175	275	104	59	29	75	34	10	9	27	0	10	33	4
47,5	422	142	102	204	116	208	106	79	34	32	53	5	0	0	0	12	50	0
48,5	282	167	150	156	140	225	112	63	47	35	23	0	0	0	0	64	23	0
49,5	188	175	122	160	78	152	87	37	46	21	38	16	0	0	0	0	10	0
50,5	194	72	43	83	64	67	39	21	29	20	15	0	0	0	0	54	30	0
51,5	155	58	22	15	30	77	20	17	12	7	0	0	0	0	0	0	10	0
52,5	13	7	7	15	0	17	19	0	17	7	8	0	0	0	0	0	0	0
53,5	96	0	14	0	0	0	0	7	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
55,5	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
57,5	0	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58,5	7	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
60,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 15 *Sebastes spp.* (<17 cm). Abundance indices (n*1000) for West and East Greenland, Iceland and total by stratum, 1985-2002. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Str5.1	Str5.2	Str6.1	Str6.2	Str7.1	Str7.2	Str8.1	Str8.2	Str9.1	Str9.2	Str10.1	Str10.2	Str11.1	Str11.2	West	East	Ice	Total	CI
1985	4886	9616	54	2712	47	67	54		817414	149898	209	5067		96	2049	548	7439	3512	6969	10224	6	0	17435	972684	30749	1020868	159
1986	10738	237636	113	1811	54	218	39			2651	68	12308		5755	3149	542	5364	3582	3846	10809	0	0	250609	20782	27293	298684	153
1987	12453	113990	5		19		18		2342	2579	132	8964		123715	2918	1449	4264	8228	10985	18299	0	12	126486	137732	46155	310373	74
1988	19680	42481	0	107	19	139	0		1580	2982	896	13064		18457	6737	2031	9309	6780	6672	9501	0	0	62426	36979	41031	140435	30
1989	7717	13159	3071	5370	17		69		1330	3170	150	4272		2152	3101	877	7151	7291	7258	8894	0	0	29405	11074	34573	75052	21
1990	11255	35933	15416	1538	72		6199	848	2268	3182	482	13704		4360	3747	629	6042	6605	5357	8001	0	0	71261	23995	30380	125636	39
1991	51936	59846	34872	22668	13692	2508	891	1540	45453	3051	209	1707		624	4608	1027	11107	20403	6138	11703	0	0	187952	51045	54987	293984	31
1992	25716	19083	12690	17276	17463	13973	41	13718						1372	5828	2499	13018	13091	2997	14544	115	33	119961	1372	52125	173459	38
1993	5458	39035	665	11331	355	2773	13		3401242	2403635	244	810641		6007	9544	877	8230	10272	3149	12650	13	19	59629	6621769	44754	6726151	110
1994	3403	12003	9828	4014	1190	1730	10842	9867						57890	11601	560	9648	8291	1927	5724	332	14	52877	57890	38097	148864	70
1995					399	10236	855	34695	274128	2671933	4071	188896		3061	6881	1506	3750	3596	866	2532	89	0	46185	3142089	19221	3207496	104
1996	456	14356	5210	9377	26961	11571	2488	107236	405273	223350	1373188	2424		3070	3269	2158	4192	2533	1180	1447	198	24	177655	2007305	15001	2199961	97
1997	6519	47117	0	15852	43421	20194	444	68931	225859	89354		374542		1372	6737	2862	2692	1182	484	2085	141	12	202479	691127	16196	909801	61
1998	1558	25350	50177	30834	55983	13090	37049	13318	474804	1219068	13	1911622		4961	1770	1783	3617	1322	314	989	6	0	227359	3610468	9802	3847630	99
1999	3886	54143	1067	8617	1105	7643	758		16195	169704	1313	53458		5700	1387	929	5569	2372	212	809	0	0	77218	246370	11278	334866	46
2000	1293	9958	63	3052	393	8195	0	33103	14344	35205	131	10243		1625	3038	2447	11847	4982	1426	2245	0	0	56059	61547	25985	143590	50
2001			1318	3559	110	2432	8	1484	4025	13254	335	4599		1831	3819	1131	11775	1994	1316	2383	13	0	8911	24044	22431	55386	16
2002			1255		145	1523	23		11681	86684	58	8606		4034	1316	525	7604	2652	450	1394	0	0	2946	111063	13940	127948	75

Table 16 *Sebastes spp.* (<17 cm). Biomass indices (n*1000) for West and East Greenland, Iceland and total by stratum, 1985-2002. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance.

Year	Str1.1	Str1.2	Str2.1	Str2.2	Str3.1	Str3.2	Str4.1	Str4.2	Str5.1	Str5.2	Str6.1	Str6.2	Str7.1	Str7.2	Str8.1	Str8.2	Str9.1	Str9.2	Str10.1	Str10.2	Str11.1	Str11.2	West	East	Ice	Total	CI
1985	82	367	2	58	2	3	0		15336	7130	7	203		5	56	6	226	84	187	266	0	0	514	22681	824	24019	137
1986	456	6646	2	77	2	6	0			122	2	218		73	72	12	164	70	102	202	0	0	7189	416	622	8227	156
1987	265	5020	0		0		0		148	138	4	288		6503	40	23	82	98	119	192	0	0	5286	7081	553	12920	89
1988	218	1492	0	3	0	5	0		67	144	41	616		1413	128	35	175	119	127	170	0	0	1718	2281	753	4752	47
1989	109	271	21	49	0		0		81	166	7	320		133	80	29	185	154	170	181	0	0	450	707	798	1954	26
1990	102	369	63	20	0		10	2	67	119	19	834		266	96	17	154	112	144	192	0	0	567	1305	715	2586	42
1991	197	798	73	242	29	24	3	15	563	94	3	62		32	112	17	277	294	153	192	0	0	1380	754	1045	3179	32
1992	150	386	49	111	74	220	0	64						18	128	46	319	203	68	245	0	0	1054	18	1008	2080	30
1993	75	512	16	265	6	76	0		51858	75674	11	48524		262	215	23	206	224	76	319	0	0	950	176328	1063	178342	89
1994	27	216	54	57	29	64	141	277						2703	303	12	267	217	59	170	13	0	865	2703	1041	4609	101
1995					6	330	10	348	3833	40791	46	9752		193	175	35	103	98	25	85	0	0	694	54614	521	55829	95
1996	7	284	14	117	91	297	18	3300	5839	10853	26881	133		170	80	46	113	63	34	43	0	0	4128	43876	378	48383	95
1997	61	344	0	214	163	544	15	2437	5017	2141		16112		73	144	58	72	28	8	43	6	0	3779	23344	359	27482	79
1998	20	433	165	322	221	351	141	531	7310	29572	1	93376		280	40	40	82	28	8	32	0	0	2184	130540	231	132954	119
1999	54	941	14	190	17	272	18		427	3401	20	2541		317	40	17	134	42	8	21	0	0	1506	6706	263	8475	45
2000	27	252	2	106	14	284	0	1414	47	1028	3	546		73	64	46	247	77	25	32	0	0	2099	1698	491	4288	54
2001			7	65	6	90	0	71	35	472	9	203		92	72	29	247	49	34	53	0	0	239	810	483	1532	21
2002			12		2	29	0		62	1569	1	179		197	32	6	195	56	8	43	0	0	43	2009	340	2391	71

Table 17 *Sebastes spp.* (<17 cm). Length disaggregated abundance indices (n*1000) for West Greenland, 1985-2002.

West	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Length																		
0,5	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
2,5	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
4,5	0	6	0	7	0	14	59	0	0	0	0	0	0	0	0	0	6	0
5,5	25	36	121	97	39	3468	15519	2396	0	2392	26	236	622	182	1235	186	146	65
6,5	111	97	850	486	1814	5708	59602	30723	117	9939	193	7127	32049	44724	3401	639	1202	699
7,5	185	460	1393	1940	2111	2758	11107	27896	200	1053	142	28816	54642	124965	232	411	1564	791
8,5	326	1913	902	9815	2176	8484	15958	5799	1935	4092	540	7089	2405	4670	126	87	58	97
9,5	2161	4221	658	7404	4284	11835	23919	11346	9480	9035	616	7908	4589	3927	3177	1114	123	117
10,5	4165	8595	941	3378	5703	6994	36922	8922	8916	5238	935	28169	13241	10533	27661	1800	502	308
11,5	1470	19713	2445	1453	4835	7050	16197	5788	5980	2909	5090	17615	11127	4294	23335	566	582	162
12,5	508	106866	7017	1560	3156	7575	2388	7518	9527	6043	9656	12200	6785	2104	3134	4074	356	82
13,5	1599	76491	8666	3244	2148	6284	1648	11461	5614	4357	4247	17440	20084	6322	4979	13437	729	105
14,5	2716	14063	18412	8866	1020	4611	1196	6078	6021	2686	7343	11415	26222	10205	4558	14810	824	214
15,5	4173	4189	47210	13645	709	3556	1549	1220	5822	2401	8718	11658	16131	5645	1482	9324	955	188
16,5	0	5121	31716	4826	572	944	1005	391	3914	1329	5090	16748	14577	5203	1764	9607	1864	124
17,5	0	6513	6136	2998	505	654	591	379	2105	1241	3545	11162	0	4585	2139	0	0	0
18,5	0	1400	0	2514	307	824	218	46	0	68	44	58	0	0	0	0	0	0
19,5	0	930	0	194	24	133	32	0	0	47	0	15	0	0	0	0	0	0
20,5	0	0	0	0	0	133	13	0	0	16	0	0	0	0	0	0	0	0
21,5	0	0	0	0	0	67	0	0	0	32	0	0	0	0	0	0	0	0
22,5	0	0	0	0	0	67	19	0	0	0	0	0	0	0	0	0	0	0
23,5	0	0	0	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0
24,5	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
25,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 18 *Sebastes spp.* (<17 cm). Length disaggregated abundance indices (n*1000) for East Greenland, 1985-2002.

East	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Length																		
0,5	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
2,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3,5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4,5	59	173	20	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0
5,5	169	417	85	9	20	0	11	0	7407	0	208	17	0	105	1092	853	313	738
6,5	193	0	54	0	20	252	292	0	184	0	302	989	803	11703	7843	11217	2265	5506
7,5	214	460	158	126	46	281	373	0	8205	0	87545	2831	1212	67654	1493	1910	2172	4654
8,5	3719	2007	475	356	110	1234	746	0	77003	0	757306	13655	905	31523	1795	126	367	3586
9,5	80721	7288	754	284	133	1212	6038	0	693957	0	498874	165504	23970	45502	21325	1755	1295	18014
10,5	350907	5779	1896	756	127	1211	21767	0	413320	0	109292	418879	114109	317417	63608	2808	1319	36442
11,5	246177	1054	2690	1471	298	732	17348	28	562208	29	428703	402736	44359	612504	45762	1412	913	11132
12,5	35246	365	3764	2818	611	1314	2488	168	1753530	543	618072	78735	46097	148411	13549	9074	384	8508
13,5	41307	658	11437	3287	1028	511	598	56	736969	1745	361458	204342	83578	305157	17876	12433	1025	11113
14,5	66498	704	36338	3090	1776	1381	355	168	396138	8237	49198	399689	134051	371674	13445	6342	2461	5736
15,5	70011	249	53226	3426	2517	2533	379	168	652488	11469	52623	163138	117029	457390	9082	5534	3778	2729
16,5	56545	777	23023	4698	2759	6819	501	448	510139	9582	61631	84279	124540	878446	21025	8082	7753	2861
17,5	20913	851	3568	7172	1572	6492	109	112	391937	26285	116856	71455	431	361575	28477	0	0	29
18,5	0	0	248	6849	34	20	33	224	257	0	0	466	43	1382	0	0	0	15
19,5	0	0	0	2313	20	0	0	0	418027	0	0	366	0	19	0	0	0	0
20,5	0	0	0	324	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21,5	0	0	0	0	0	0	0	0	0	0	0	224	0	0	0	0	0	0
22,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 19 *Sebastes spp.* (<17 cm). Length disaggregated abundance indices (n*1000) for Iceland, 1985-2002.

Ice	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Length																		
0,5	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
2,5	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
4,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5,5	0	4	0	0	0	0	0	0	0	40	164	373	10	5	10	0	3	0
6,5	0	128	18	0	4	4	9	5	0	10	5	70	87	9	0	23	94	64
7,5	25	1322	412	50	336	108	322	52	51	16	57	94	689	71	95	106	240	84
8,5	19	5275	2926	214	2126	602	2857	641	78	127	231	222	553	99	427	429	703	180
9,5	92	2054	5249	1309	909	1228	10769	1578	193	138	172	555	201	246	710	1545	1182	722
10,5	673	565	14069	3051	680	2645	4014	5221	1785	665	490	1086	682	1042	736	3282	2199	1481
11,5	1220	479	11770	5033	1833	3629	3804	11388	3328	2070	890	1696	1775	1581	1094	4829	2818	1260
12,5	2768	798	5497	8899	3704	2939	4902	9454	4999	3626	1482	1298	2110	1047	1013	3921	3235	1396
13,5	4895	1666	1642	8680	5672	3166	6224	5601	8130	5531	2550	1380	1851	945	1484	2763	3613	1889
14,5	6177	2940	1091	6684	6819	4151	7125	5577	10370	7163	3163	1625	2672	938	1818	3167	3055	1968
15,5	7396	4901	1404	4336	6143	5515	7924	6258	8643	9381	4677	2602	3280	2290	1945	2767	2848	2441
16,5	7479	7155	2077	2777	6341	6394	7036	6355	7176	9334	5340	4001	2291	1527	1950	3154	2433	2460
17,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18,5	0	0	0	0	0	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	0	0	0	0	0	0	0	0
20,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 20 *Sebastes spp.* (<17 cm). Length disaggregated abundance indices (n*1000) for Greenland and Iceland combined, 1985-2002.

Total	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Length																		
0,5	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
2,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3,5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4,5	59	179	20	7	0	14	59	0	0	0	23	0	0	0	0	0	6	0
5,5	194	457	206	106	59	3468	15530	2396	7407	2432	398	626	632	292	2337	1039	462	803
6,5	304	225	922	486	1838	5964	59903	30728	301	9949	500	8186	32939	56436	11244	11879	3561	6269
7,5	424	2242	1963	2116	2493	3147	11802	27948	8456	1069	87744	31741	56543	192690	1820	2427	3976	5529
8,5	4064	9195	4303	10385	4412	10320	19561	6440	79016	4219	758077	20966	3863	36292	2348	642	1128	3863
9,5	82974	13563	6661	8997	5326	14275	40726	12924	703630	9173	499662	173967	28760	49675	25212	4414	2600	18853
10,5	355745	14939	16906	7185	6510	10850	62703	14143	424021	5903	110717	448134	128032	328992	92005	7890	4020	38231
11,5	248867	21246	16905	7957	6966	11411	37349	17204	571516	5008	434683	422047	57261	618379	70191	6807	4313	12554
12,5	38522	108029	16278	13277	7471	11828	9778	17140	1768056	10212	629210	92233	54992	151562	17696	17069	3975	9986
13,5	47801	78815	21745	15211	8848	9961	8470	17118	750713	11633	368255	223162	105513	312424	24339	28633	5367	13107
14,5	75391	17707	55841	18640	9615	10143	8676	11823	412529	18086	59704	412729	162945	382817	19821	24319	6340	7918
15,5	81580	9339	101840	21407	9369	11604	9852	7646	666953	23251	66018	177398	136440	465325	12509	17625	7581	5358
16,5	64024	13053	56816	12301	9672	14157	8542	7194	521229	20245	72061	105028	141408	885176	24739	20843	12050	5445
17,5	20913	7364	9704	10170	2077	7146	700	491	394042	27526	120401	82617	431	366160	30616	0	0	29
18,5	0	1400	248	9363	341	844	251	270	257	68	44	524	43	1382	0	0	0	15
19,5	0	930	0	2507	44	133	32	0	418027	47	0	381	0	19	0	0	0	0
20,5	0	0	0	324	0	133	13	0	0	16	0	0	0	0	0	0	0	0
21,5	0	0	0	0	0	67	0	0	0	32	0	224	0	0	0	0	0	0
22,5	0	0	0	0	0	67	19	0	0	0	0	0	0	0	0	0	0	0
23,5	0	0	0	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0
24,5	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
25,5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

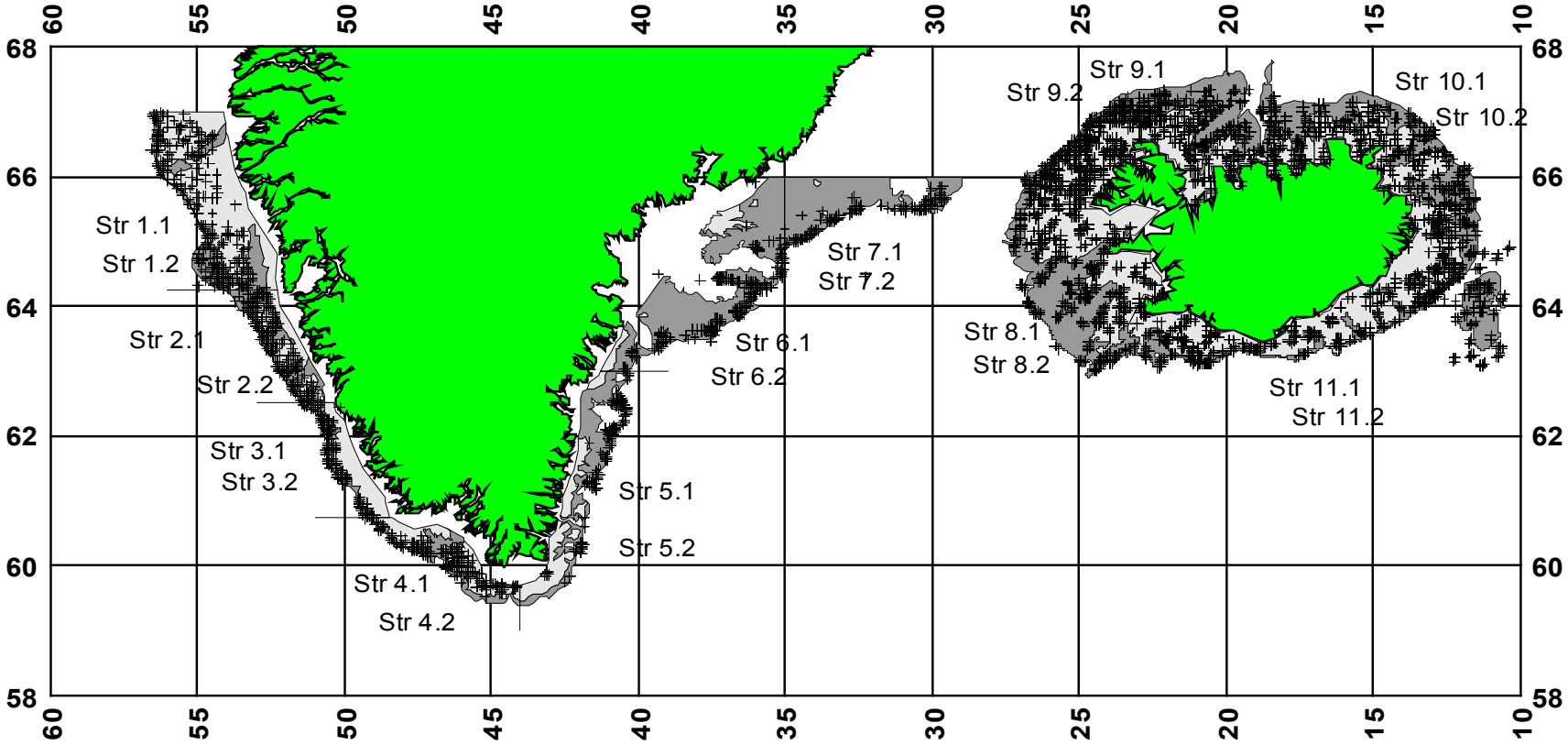

Fig. 1 Stratification scheme of the joint German-Iceland groundfish surveys (Tab. 2) and haul distribution, 1985-2002

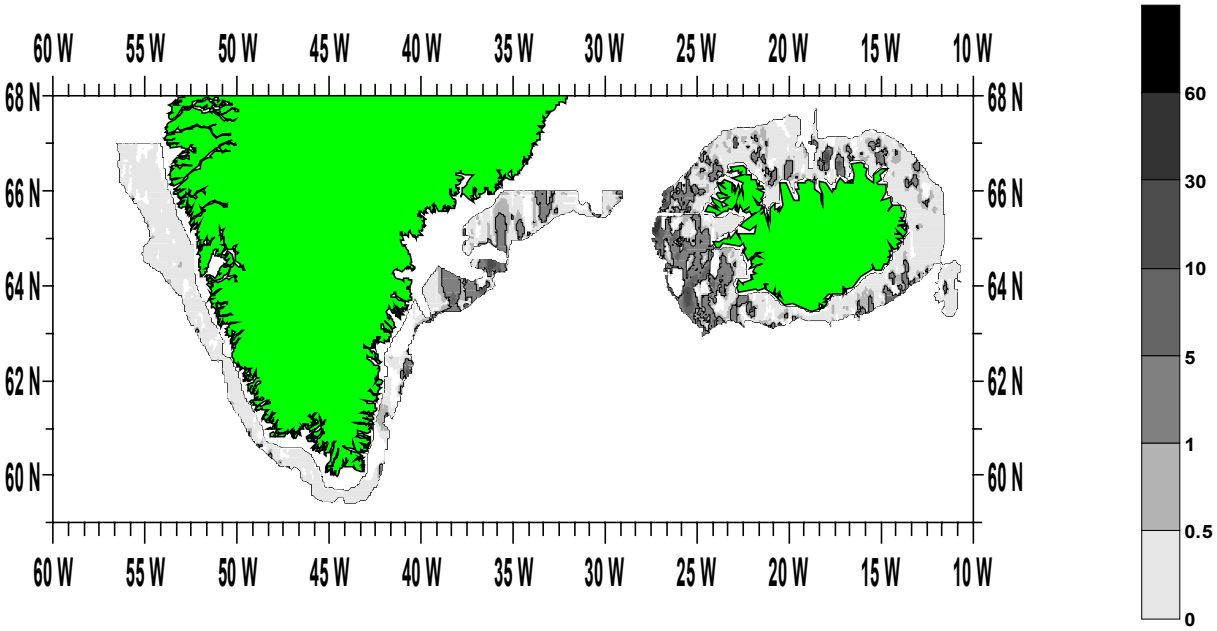

Fig. 2 *S. marinus* (≥17 cm). Average survey abundance distribution (n/nm^2) off East and West Greenland and Iceland, 1985-2002. Dark shaded areas >1 indicate above average densities.

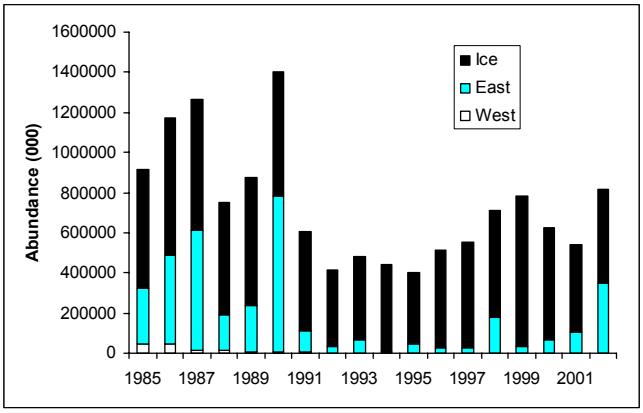

Fig. 3 *S. marinus* (≥17 cm). Survey abundance indices for East and West Greenland and Iceland, 1985-2002.

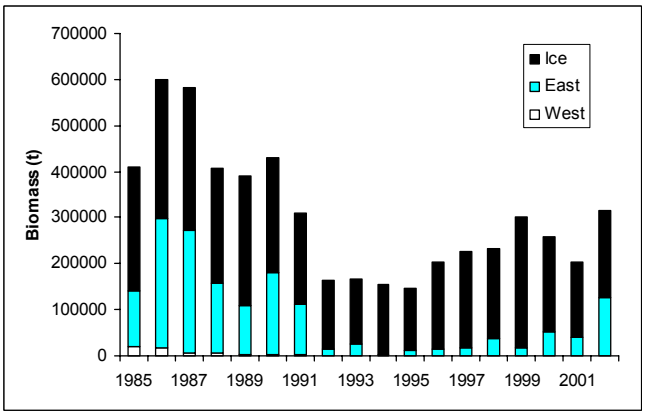

Fig. 4 *S. marinus* (≥17 cm). Survey biomass indices for East and West Greenland and Iceland, 1985-2002.

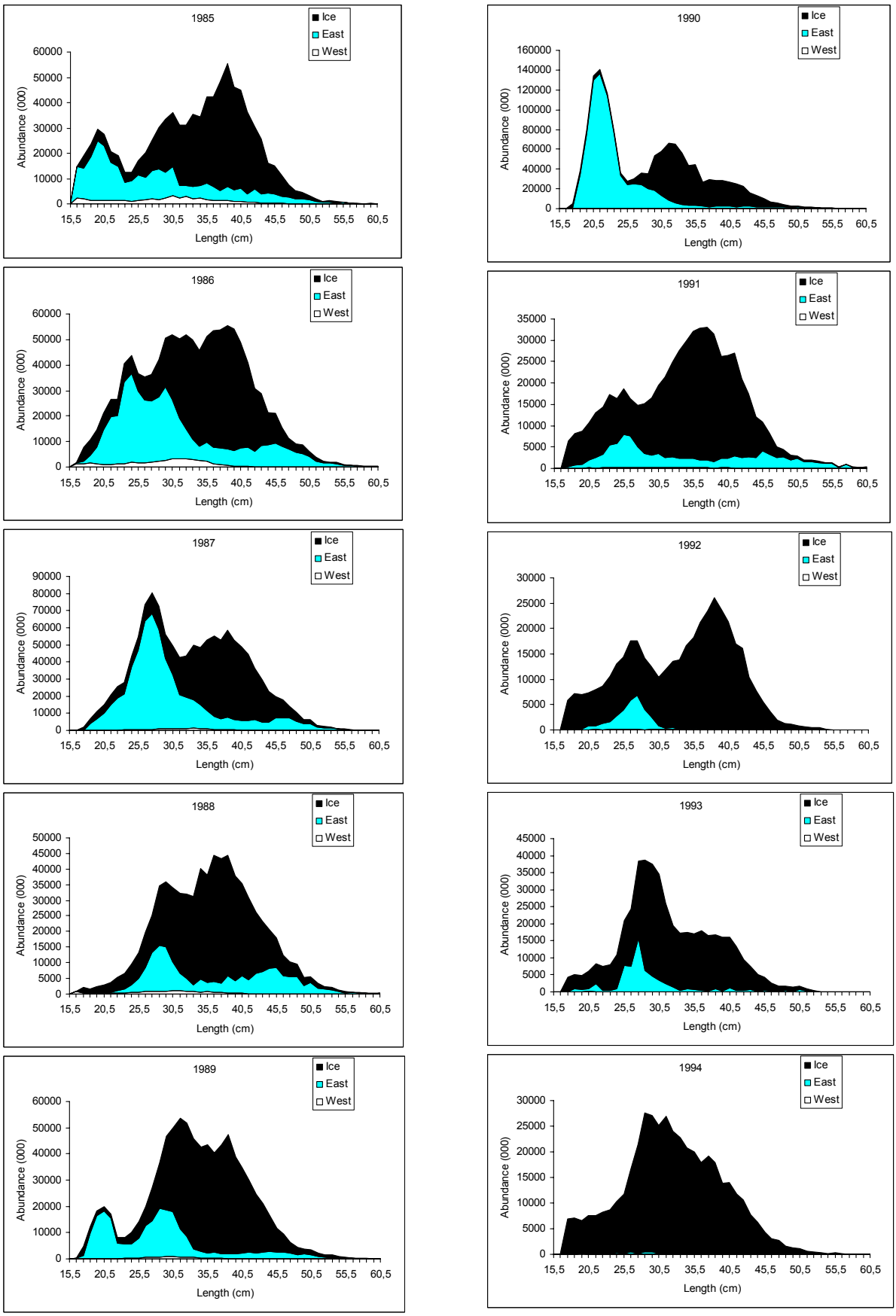

Fig. 5 *S. marinus* (≥17 cm). Length frequencies for East Greenland, West Greenland and Iceland, 1985-94.

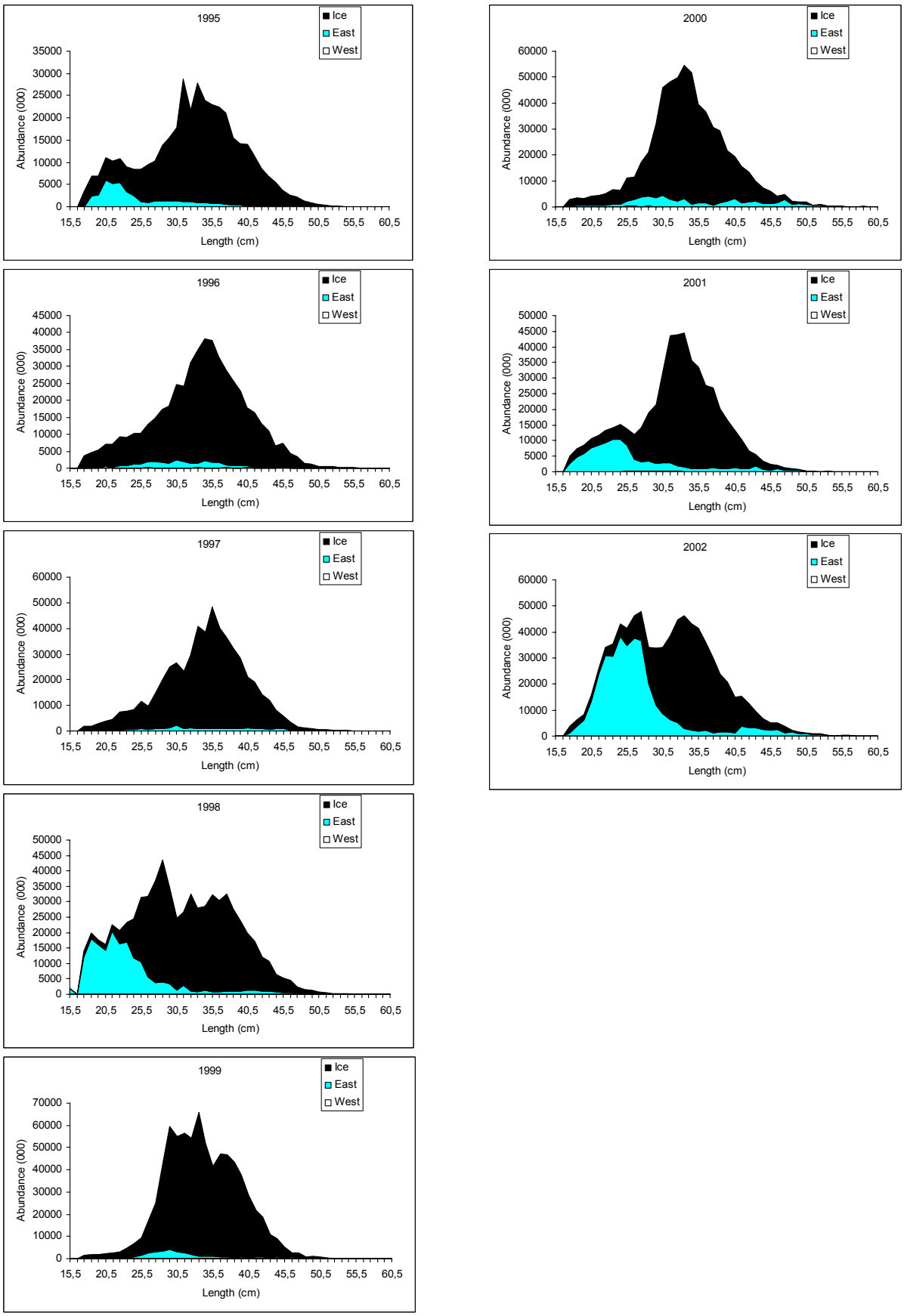

Fig. 6 *S. marinus* (≥17 cm). Length frequencies for East Greenland, West Greenland and Iceland, 1995-2002.

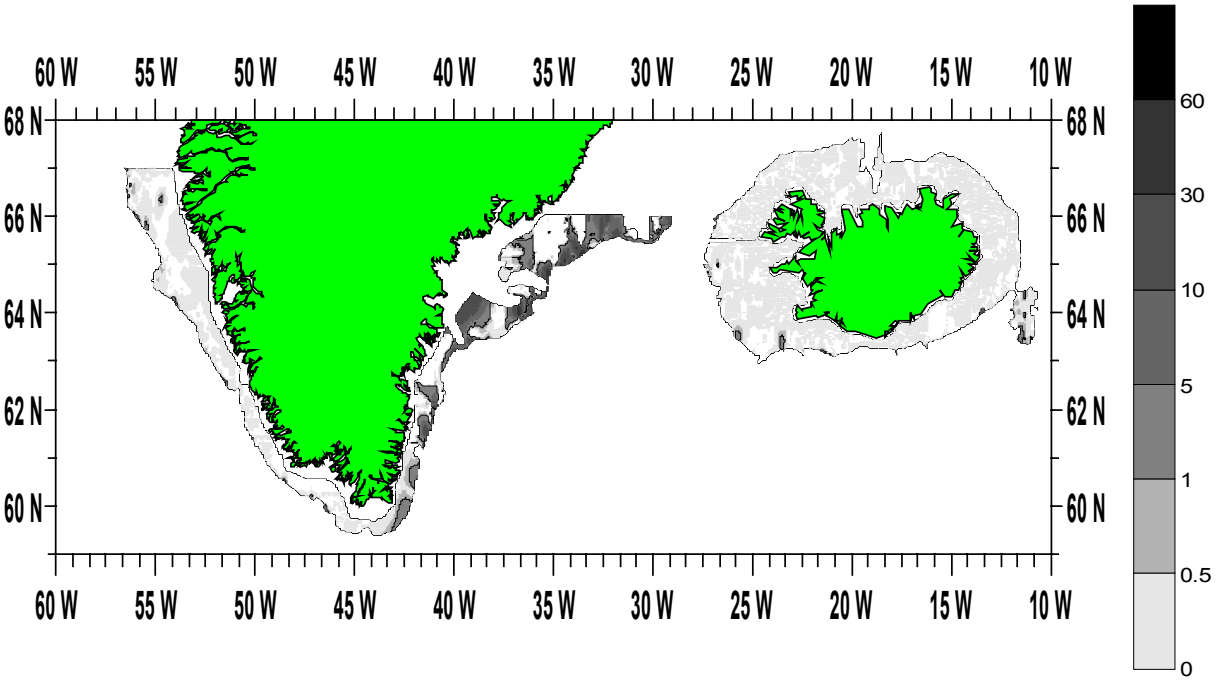

Fig. 7 *S. mentella* (≥17 cm). Average survey abundance distribution (n/nm^2) off East and West Greenland and Iceland, 1985-2002. Dark shaded areas >1 indicate above average

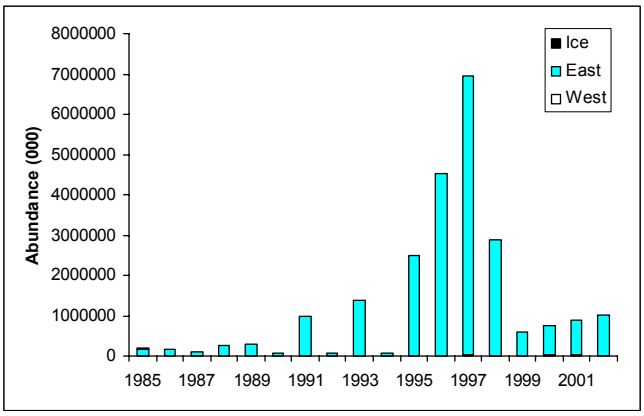

Fig. 8 *S. mentella* (≥17 cm). Survey abundance indices for East and West Greenland and Iceland, 1985-2001.

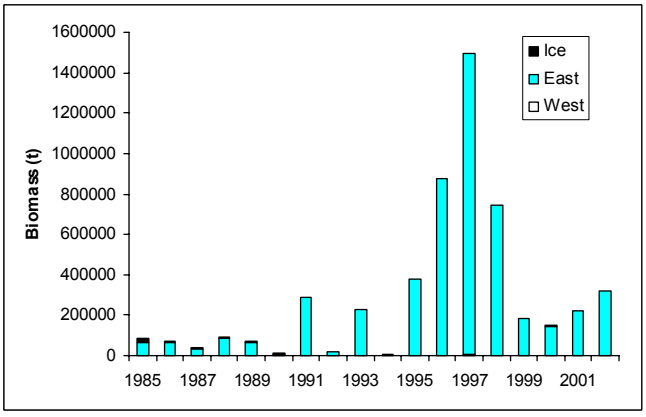

Fig. 9 *S. mentella* (≥17 cm). Survey biomass indices for East and West Greenland and Iceland, 1985-2001.

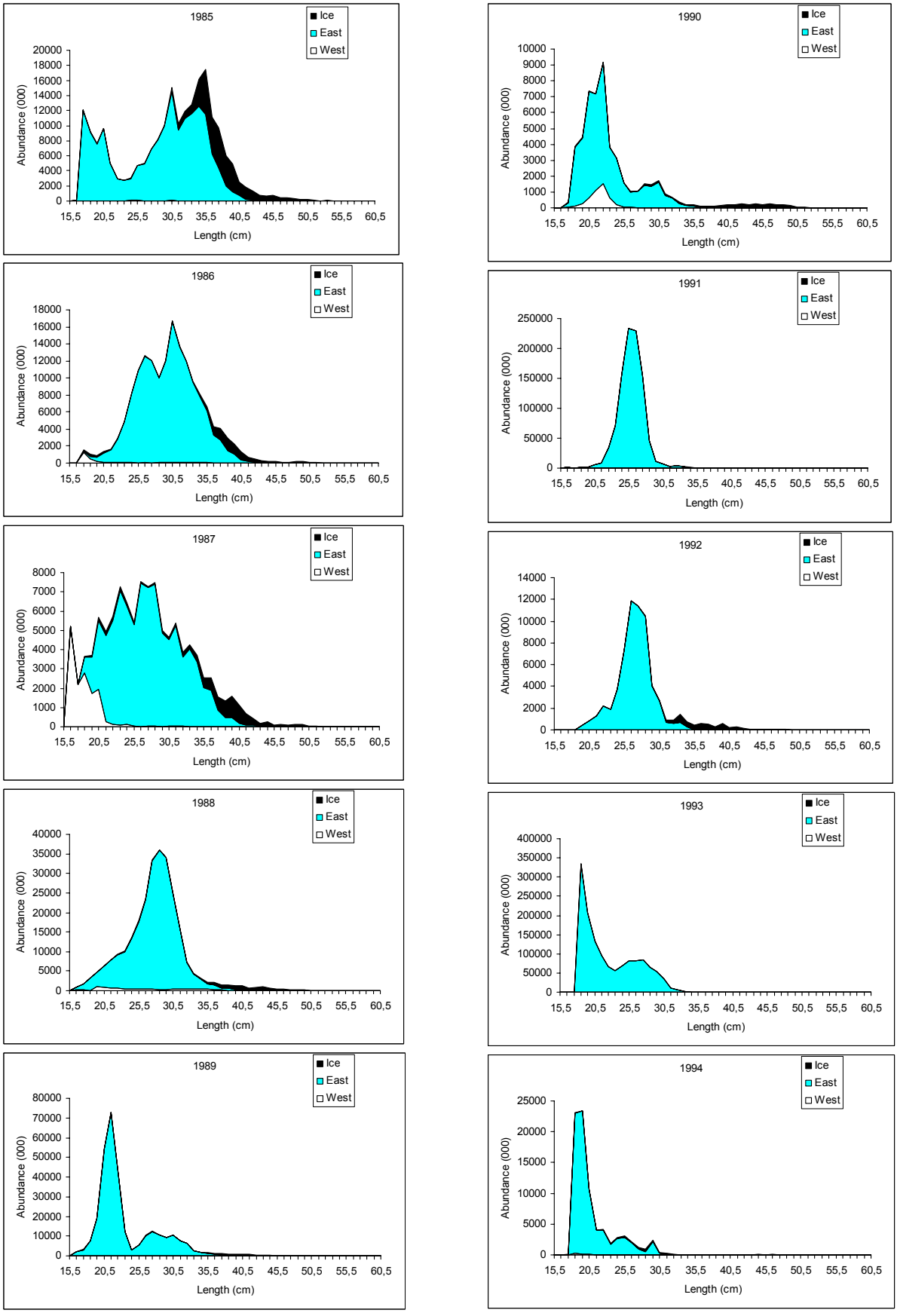

Fig. 10 *S. mentella* (≥17 cm). Length frequencies for East Greenland, West Greenland and Iceland, 1985-94.

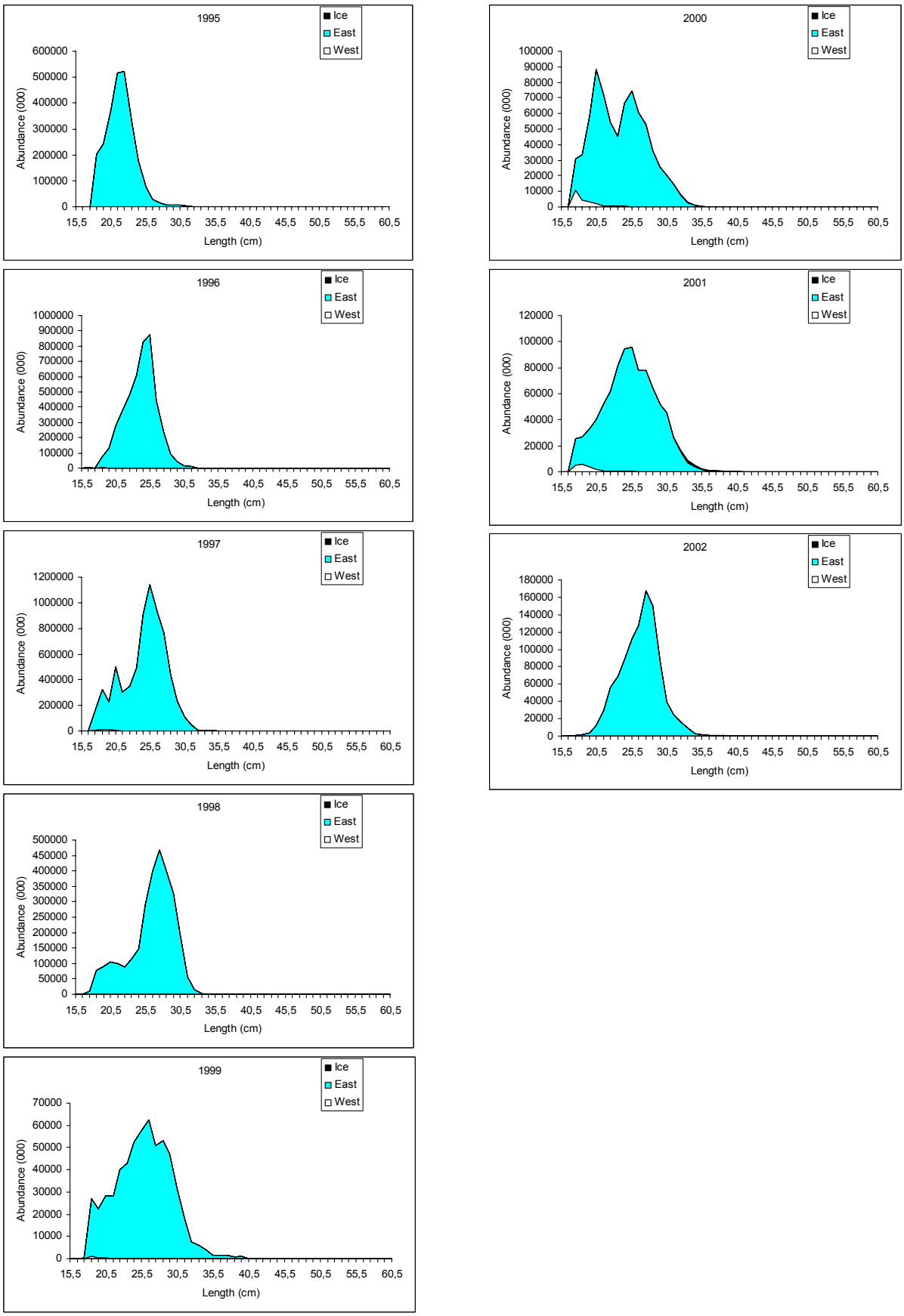

Fig. 11 *S. mentella* (≥17 cm). Length frequencies for East Greenland, West Greenland and Iceland, 1995-2002.

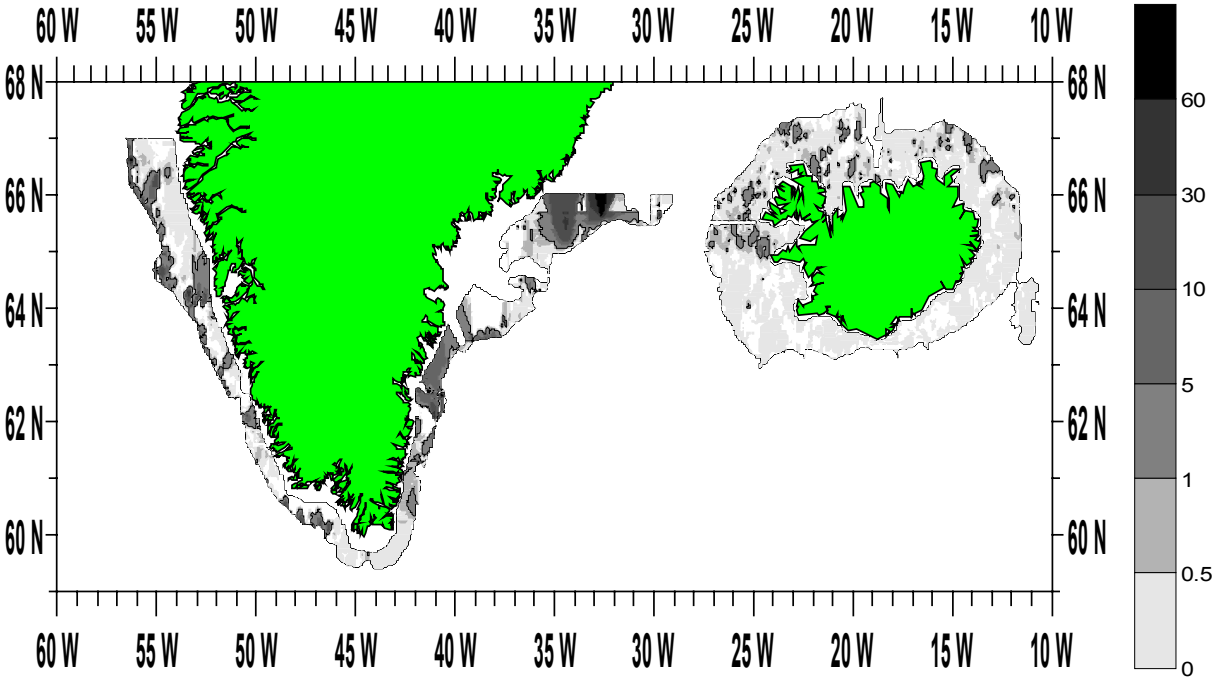

Fig. 12 *S. spp.* (<17 cm). Average survey abundance distribution (n/nm^2) off East and West Greenland and Iceland, 1985-2002. Dark shaded areas >1 indicate above average

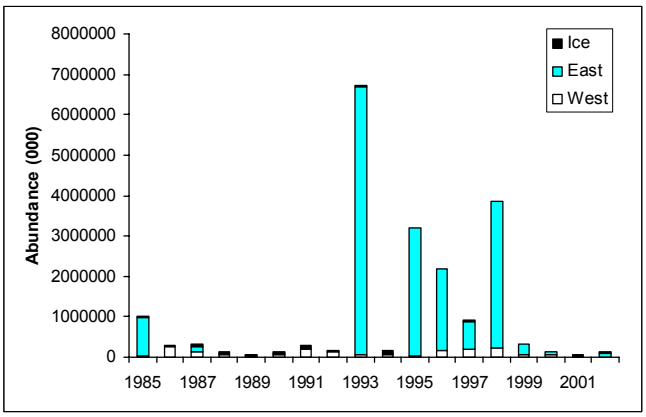

Fig. 13 *S. spp.* (<17 cm). Survey abundance indices for East and West Greenland and Iceland, 1985-2002.

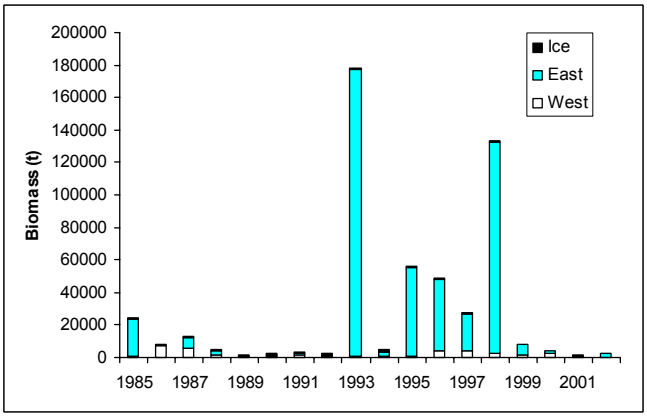

Fig. 14 *S. spp.* (<17 cm). Survey biomass indices for East and West Greenland and Iceland, 1985-2002.

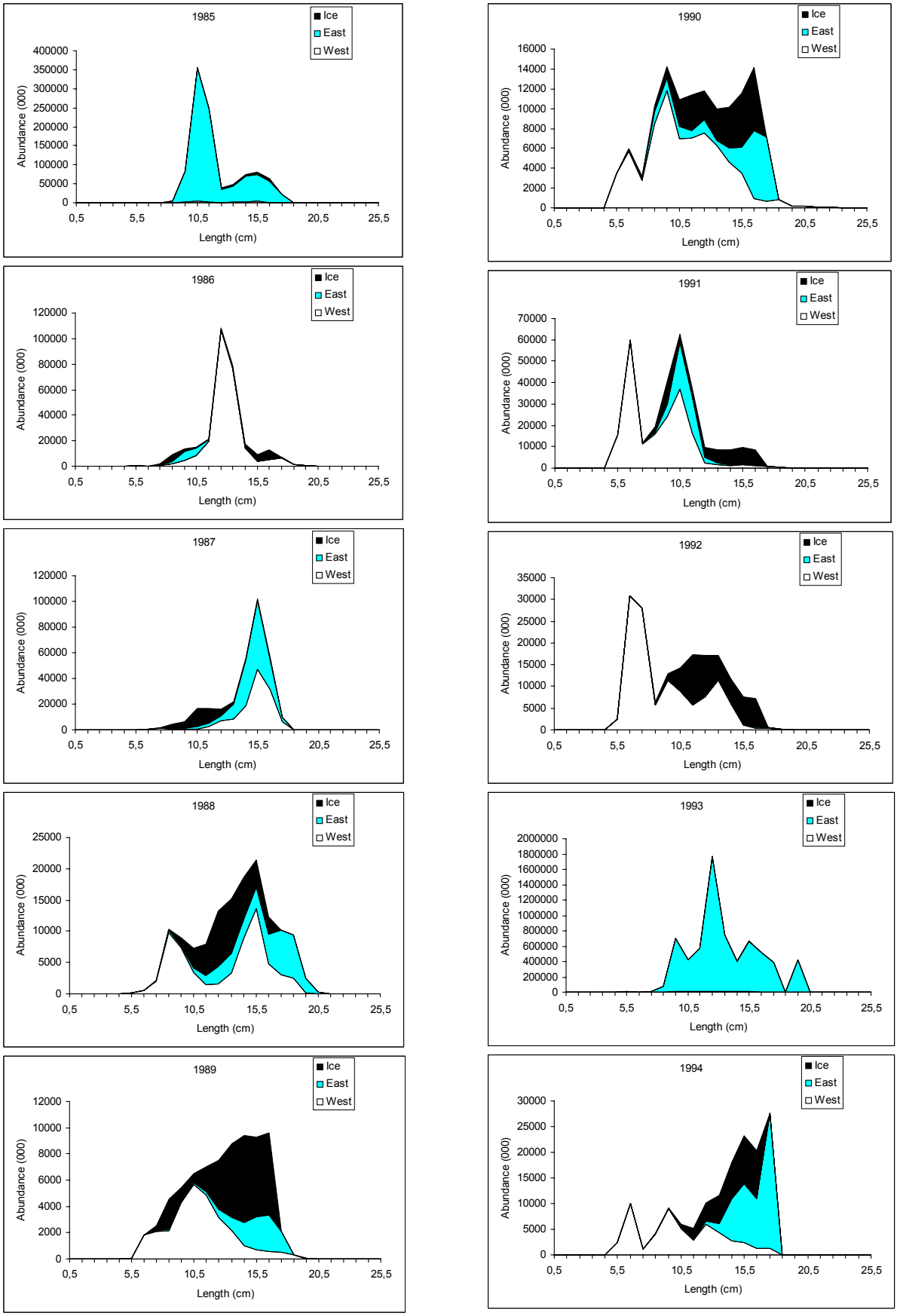

Fig. 15 *S. spp.* (<17 cm). Length frequencies for East Greenland, West Greenland and Iceland, 1985-94.

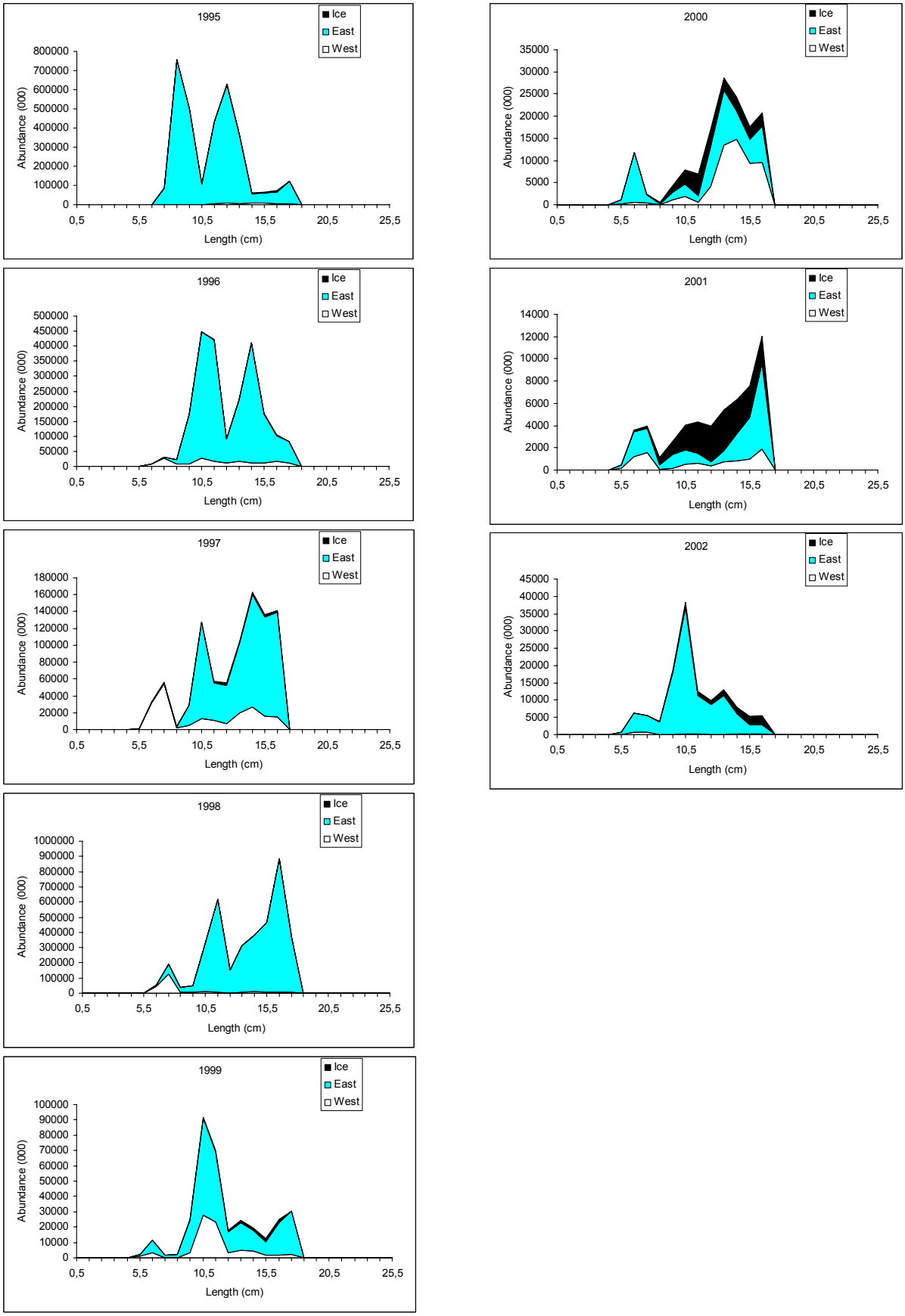

Fig. 16 *S. spp.* (<17 cm). Length frequencies for East Greenland, West Greenland and Iceland, 1995-2002.