

Northwest Atlantic



Fisheries Organization

Serial No. N1630

NAFO SCR Doc. 89/51

SCIENTIFIC COUNCIL MEETING - JUNE 1989

Survey Biomass and Abundance Estimates for Redfish (*Sebastes marinus*
and *S. mentella*) off West Greenland (NAFO Subarea 1), 1982-88,
and off East Greenland (ICES Div. XIV.b), 1980-88

by

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Introduction

Stratified-random bottom trawl surveys have been conducted yearly in late autumn by the Federal Republic of Germany. Although the surveys were primarily designed for cod, catch data and at least length frequencies of all species obtained in the survey catches have been recorded. In view of apparent differences between the distribution patterns of cod and redfish the allocation of trawling positions was not optimal for redfish. However, biomass and abundance estimates for *S. marinus* and *S. mentella* are presented and trends are discussed. Analyses including length and age compositions are, however, not yet available.

Methods and Materials

Biomass and abundance estimates were calculated from mean catches by applying the swept area method and assuming a catchability coefficient of 1.0. Confidence intervals are given at the 95% level of significance. Gear parameters of the survey trawl are as follows:

Groundrope length	- 140 feet
Horizontal net opening	- 22 m
Towing time	- 30 minutes
Towing speed	- 4.5 knots

The survey area off West Greenland was stratified by geographical strata (1-7) corresponding to Divisions 1B-F or parts thereof and sub-stratified by depth zones within each division. Strata areas are given in Table 2. Off East Greenland, stratification was done by depth zones only (Anon, 1982).

Results

A. West Greenland redfish

Because of distinct and permanent differences observed in overall size compositions, both of *Sebastes marinus* and *S. mentella* between the northern and southern half of the survey area, survey biomass and abundance estimates and corresponding mean weights are given in Table 1 for Divisions 1B+C and 1D-F separately. The comparatively low mean weights observed for both redfish species in the northern part of the survey area throughout the survey time series confirms this area as being a nursery ground with prevailing abundance of small, juvenile redfish. These results are in accordance with considerable by-catches of small redfish obtained in the shrimp fishery within the same area.

Trends in biomass and abundance, if any, since 1982 are illustrated for both redfish species and for the northern and southern part of the survey area separately in Fig. 1.

For adult *Sebastes marinus*, i.e. the fishable stock, mainly inhabiting the southern Divisions (1D-F) the survey estimates reveal a continuous decline in biomass and abundance since 1982. In the northern Divisions (1B+C), however, abundance of *Sebastes marinus* is fluctuating with high numbers of small fish in 1985 and 1988.

For *S. mentella* survey estimates for the southern Divisions were low and did not show remarkable trends since 1982 probably due to insufficient survey coverage of the slope area beyond 400-m depth. High abundance of small juvenile *Sebastes mentella* was, however, observed in Divisions 1B+C in 1986 and 1987.

The biomass and abundance estimates were calculated using the basic survey data given for *S. marinus* in Table 3 and for *S. mentella* in Table 4.

B. East Greenland Redfish

It is known, that redfish are much more abundant north of 63 N, but because of technical reasons a geographical subdivision in the calculations is not yet considered.

Sebastes marinus are most abundant in the depth zone 200 to 400 m while *Sebastes mentella* prefers the zone 400 to 600 m. From 1986 onward prerecruit *Sebastes mentella* shifts the greatest abundance to the depth zone 200 to 400 m.

The estimates of biomass and abundance of *Sebastes mentella* show considerable variations without any trend, whereas those of *Sebastes marinus* show a more continued shape (Tables 5 and 6). From 1981 a decrease is obvious up to 1984 where a minimum is reached. Another maximum can be seen in 1987. A low estimate of biomass and abundance results in 1988. This may be explained by an increase of catches by a factor of 5.5 for 1988. In spite of the restrictions of the survey design in relation to redfish, a similar trend can be seen comparing the survey biomass 11+ and the total international catch (Fig. 2).

References

- Anon. 1982. Report of the Working Group on Cod Stocks off East Greenland. C. M. 1982/Assess:4.

Table 1 : West Greenland redfish, Biomass and Abundance estimates, separately for Sebastes marinus and S. mentella, from survey results, 1982-88.

<u>Sebastes marinus:</u>						
Year	NAFO- Divisions	Biomass (to)	confid. interval ±%	Abundance ('000)	confid. interval ±%	mean weight (g)
1982	1 B+C	3 411	23.3	16 014	23.5	213
	D-F	74 231	57.4	129 482	77.9	573
	Total	77 642	54.5	145 496	68.9	534
1983	1 B+C	2 281	34.8	13 043	49.8	175
	D-F	55 397	45.2	77 188	45.3	718
	Total	57 678	43.3	90 231	39.2	639
1984	1 B+C	1 562	47.4	14 386	91.8	109
	D-F	31 167	86.8	53 137	91.8	587
	Total	32 729	82.3	67 523	74.5	485
1985	1 B+C	5 501	55.9	55 142	74.2	100
	D-F	35 197	110.7	53 009	88.0	664
	Total	40 698	95.8	108 151	64.0	376
1986	1 B+C	4 627	41.3	29 278	64.4	158
	D-F	31 481	54.3	50 503	45.8	623
	Total	36 108	47.4	79 781	37.1	453
1987	1 B+C	704	37.8	2 717	43.1	259
	D-F	27 601	75.9	36 315	58.5	760
	Total	28 305	73.7	39 032	54.2	725
1988	1 B+C	1 772	57.6	52 293	58.9	034
	D-F	9 658	45.1	17 334	37.6	557
	Total	11 430	38.9	69 627	37.1	164
<u>Sebastes mentella:</u>						
1982	1 B+C	1 068	107.5	3 376	96.6	316
	D-F	3 684	86.7	8 502	70.4	433
	Total	4 752	70.8	11 878	56.8	400
1983	1 B+C	501	80.1	2 906	90.4	172
	D-F	3 193	81.7	6 331	72.9	504
	Total	3 694	71.1	9 237	57.1	400
1984	1 B+C	1 466	40.6	9 035	50.5	152
	D-F	2 601	46.9	6 129	47.4	424
	Total	4 067	33.1	15 164	35.2	268
1985	1 B+C	2 370	151.2	9 012	140.4	263
	D-F	1 554	54.5	3 754	52.6	414
	Total	3 924	99.5	12 766	95.6	307
1986	1 B+C	5 710	115.1	129 504	178.8	044
	D-F	3 757	28.4	7 285	21.0	516
	Total	9 467	69.1	136 789	166.3	069
1987	1 B+C	8 605	81.5	126 089	97.1	068
	D-F	3 697	84.5	8 839	76.1	418
	Total	12 302	61.5	134 928	89.4	091
1988	1 B+C	1 293	47.7	21 778	47.9	059
	D-F	1 513	58.2	4 600	54.7	329
	Total	2 806	38.1	26 378	40.3	106

Depth zone (m)	Division/stratum number						Total (nm ²)
	1B	1C	1C	1D	1E	1F	
	1	2	3+4	5	6	7	
0-100	865	593	598	1475	276	+	3807+
101-200	1256	1574	1919	875	1662	+	7286+
0-200	2121	2167	2517	2350	1938	2568	13661
201-300	297	259	737	628	464	607	2992
301-400	209	54	325	390	278	364	1620
201-400	506	313	1062	1018	742	971	4612
401-500	149	122	216	176	33	+	696+
501-600	215	293	196	83	24	+	811+
401-600	364	415	412	259	57	353	1860
Total	2991	2895	3991	3627	2737	3892	20133

+) area of 100 m depth zone not available

Table 2 : Survey area off West Greenland (NAFO Subarea 1) in square nautical miles by Divisions, strata and depth zones (substrata).

Div./ Stratum	Depth zone (m)	1982			1983			1984					
		No. of sets	kg	mean catch/30' n	s	No. of sets	kg	mean catch/30' n	s	No. of sets	kg	mean catch/30' n	s
1 B ₁ +C ₂	0-100	4	0.59	0.16	2.75	0.85	0.78	0.03	0.33	3	0.03	0.03	0.33
	101-200	9	6.97	1.65	36.11	7.11	27.04	2.67	70.75	10	4.49	2.67	70.75
	201-300	4	-	-	-	-	-	-	-	2	17.25	0.25	104.00
	301-400	3	16.16	2.88	126.22	32.83	33.68	0.25	104.00	2	3.46	1.19	7.75
	401-500	2	-	-	-	-	-	-	-	2	-	-	-
501-600	2	-	-	-	-	-	-	-	2	-	-	-	
1 C ₃₊₄	0-100	3	1.60	0.15	5.67	1.45	0.29	0.56	21.64	3	1.58	0.56	21.64
	101-200	8	14.03	3.64	55.00	13.91	5.66	2.63	50.40	11	9.08	2.63	50.40
	201-300	4	21.87	5.05	66.50	7.51	11.96	8.50	49.00	5	17.43	8.50	49.00
	301-400	2	-	-	-	-	-	4.67	13.00	4	9.40	4.67	13.00
	401-500	2	4.60	2.36	11.33	6.36	5.31	0.96	3.71	3	4.61	0.96	3.71
501-600	1	-	-	-	-	-	-	-	7	-	-	-	
1 B+C	Total	42	9.23	1.06	43.33	5.03	8.76	1.00	38.93	54	4.23	1.00	38.93
	0-100	8	5.59	3.17	11.75	6.94	1.13	0.06	0.47	15	0.12	0.06	0.47
	101-200	9	691.78	557.12	1778.56	1471.50	37.17	1.93	18.82	11	5.14	1.93	18.82
	201-300	3	-	-	-	-	-	5.49	40.80	7	15.59	5.49	40.80
	301-400	4	57.59	23.34	122.44	49.52	60.99	7.55	42.00	3	25.45	7.55	42.00
401-500	2	-	-	-	-	-	-	-	2	-	-	-	
501-600	2	-	-	-	-	-	-	-	2	-	-	-	
1 E ₆	0-100	1	45.89	18.86	83.10	35.97	0.60	0.08	0.50	4	0.08	0.08	0.50
	101-200	9	-	-	-	-	21.80	30.65	187.77	17	92.25	30.65	187.77
	201-300	3	352.85	97.03	537.33	168.64	128.97	60.95	171.00	5	121.50	60.95	171.00
	301-400	3	-	-	-	-	-	7.51	6.40	3	14.44	7.51	6.40
	401-500	-	-	-	-	-	-	-	-	1	-	-	-
501-600	-	-	-	-	-	-	-	-	1	-	-	-	
1 F ₇	0-200	15	25.38	16.68	41.67	27.95	11.25	7.37	36.04	24	18.50	7.37	36.04
	201-300	4	-	-	-	-	466.74	369.93	887.44	5	552.46	369.93	887.44
	301-400	2	662.98	211.13	811.38	276.62	-	14.56	7.67	4	21.03	14.56	7.67
	401-600	2	-	-	-	-	-	-	-	3	-	-	-
	Total	65	193.45	55.58	337.44	131.58	45.90	35.54	138.48	105	81.22	35.54	138.48
1 B-F	Total	107	103.08	28.32	193.16	67.07	23.77	18.11	89.64	159	43.45	18.11	89.64
	Total	107	103.08	28.32	193.16	67.07	23.77	18.11	89.64	159	43.45	18.11	89.64

Table 3 : West Greenland redfish, basic survey data 1982-88 for *Sebastes marinus*; number of sets, mean catches per 30 minutes by weight (kg) and number (n) and respective standard deviations of the mean (s).

Div./ Stratum	Depth zone (m)	No. of sets	kg	mean catch/30'	s	n	1985	No. of sets	kg	mean catch/30'	s	n	1986	No. of sets	kg	mean catch/30'	s	n	1987	No. of sets	kg	mean catch/30'	s	n	1988	No. of sets	kg	mean catch/30'	s	n
1 B ₁ + C ₂	0-100	2	15.99	4.88	174.47	64.92		4	0.07	0.04	2.00	0.91	2	2	0.52	0.24	6.56	2.98	2	2	2.39	1.10	158.44	75.15	2	2	0.05	0.05	0.13	0.13
	101-200	9	62.77	58.49	131.21	118.96		14	3.99	1.06	42.50	15.83	14	14	0.09	0.06	0.40	0.27	13	13	0.29	0.15	0.62	0.27	13	13	0.83	0.18	11.27	7.03
	201-300	6	29.00	2.00	103.00	3.00		4	-	-	-	-	4	4	17.55	6.46	42.37	15.16	16	16	2.28	0.76	6.94	2.37	16	16	2.45	0.74	10.20	4.36
	301-400	2	0.43	0.43	0.33	0.33		2	3.15	2.85	3.00	2.00	2	2	9.20	4.80	5.50	3.50	4	4	39.16	16.91	95.60	43.52	4	4	0.00	0.00	0.00	0.00
	401-500	1	14.55	4.45	20.00	14.00		1	12.52	2.57	79.23	25.37	50	50	2.62	0.89	4.80	1.36	71	71	4.80	1.38	141.51	41.78	71	71	4.80	1.38	141.51	41.78
501-600	2	14.89	4.00	149.22	53.23		48	12.52	2.57	79.23	25.37	50	50	2.62	0.89	4.80	1.36	71	71	4.80	1.38	141.51	41.78	71	71	4.80	1.38	141.51	41.78	
1 B+C	Total	22	14.89	4.00	149.22	53.23		48	12.52	2.57	79.23	25.37	50	50	2.62	0.89	4.80	1.36	71	71	4.80	1.38	141.51	41.78	71	71	4.80	1.38	141.51	41.78
1 D ₅	0-100	13	0.15	0.08	0.77	0.55		12	0.59	0.26	2.00	0.79	10	10	0.09	0.06	0.40	0.27	10	10	0.09	0.06	0.40	0.27	10	10	0.09	0.06	0.40	0.27
	101-200	14	62.77	58.49	131.21	118.96		14	3.99	1.06	42.50	15.83	14	14	0.09	0.06	0.40	0.27	10	10	0.09	0.06	0.40	0.27	10	10	0.09	0.06	0.40	0.27
	201-300	6	29.00	2.00	103.00	3.00		4	-	-	-	-	4	4	17.55	6.46	42.37	15.16	16	16	2.28	0.76	6.94	2.37	16	16	2.45	0.74	10.20	4.36
	301-400	5	28.19	14.50	138.64	37.05		3	20.61	5.97	73.64	16.38	5	5	17.55	6.46	42.37	15.16	16	16	2.28	0.76	6.94	2.37	16	16	2.45	0.74	10.20	4.36
	401-500	1	14.55	4.45	20.00	14.00		2	8.20	3.84	8.67	3.84	2	2	9.20	4.80	5.50	3.50	4	4	39.16	16.91	95.60	43.52	4	4	0.00	0.00	0.00	0.00
501-600	1	14.55	4.45	20.00	14.00		2	8.20	3.84	8.67	3.84	2	2	9.20	4.80	5.50	3.50	4	4	39.16	16.91	95.60	43.52	4	4	0.00	0.00	0.00	0.00	
1 E ₆	0-100	3	21.28	5.19	50.58	12.78		4	121.31	36.74	252.50	77.93	5	5	2.62	0.89	4.80	1.36	4	4	35.25	11.83	83.14	28.72	4	4	35.25	11.83	83.14	28.72
101-200	16	279.13	150.29	460.83	230.26		15	121.31	36.74	252.50	77.93	19	19	85.31	24.54	156.77	42.90	17	17	35.25	11.83	83.14	28.72	17	17	35.25	11.83	83.14	28.72	
201-300	6	29.00	2.00	103.00	3.00		5	10.70	6.98	7.40	2.71	4	4	33.92	16.33	34.40	11.74	2	2	41.51	13.50	63.00	18.81	2	2	41.51	13.50	63.00	18.81	
301-400	4	85.30	59.67	104.80	69.53		3	10.70	6.98	7.40	2.71	4	4	33.92	16.33	34.40	11.74	2	2	41.51	13.50	63.00	18.81	2	2	41.51	13.50	63.00	18.81	
401-500	1	14.55	4.45	20.00	14.00		2	8.20	3.84	8.67	3.84	2	2	9.20	4.80	5.50	3.50	4	4	39.16	16.91	95.60	43.52	4	4	0.00	0.00	0.00	0.00	
501-600	1	14.55	4.45	20.00	14.00		2	8.20	3.84	8.67	3.84	2	2	9.20	4.80	5.50	3.50	4	4	39.16	16.91	95.60	43.52	4	4	0.00	0.00	0.00	0.00	
1 F ₇	0-200	24	26.97	14.77	51.13	25.72		21	15.79	9.42	25.10	14.54	21	21	4.56	2.43	6.86	3.66	24	24	7.28	2.20	13.54	3.94	24	24	7.28	2.20	13.54	3.94
201-300	6	943.97	849.30	1146.17	995.01		5	684.90	346.10	815.60	401.14	5	5	501.19	284.90	534.13	277.10	4	4	72.33	37.61	85.33	36.46	4	4	72.33	37.61	85.33	36.46	
301-400	2	16.10	10.95	19.33	14.38		3	67.18	23.68	51.25	29.26	2	2	28.80	28.20	17.00	16.00	1	1	72.33	37.61	85.33	36.46	1	1	72.33	37.61	85.33	36.46	
401-600	1	16.10	10.95	19.33	14.38		1	67.18	23.68	51.25	29.26	2	2	28.80	28.20	17.00	16.00	1	1	72.33	37.61	85.33	36.46	1	1	72.33	37.61	85.33	36.46	
1 D-F	Total	103	91.73	51.18	138.15	61.32		99	82.04	22.43	131.62	30.39	94	94	71.93	27.50	94.64	27.87	95	95	25.17	5.72	45.17	8.56	95	95	25.17	5.72	45.17	8.56
1 B-F	Total	125	54.03	26.14	143.58	40.72		147	47.94	11.50	105.92	19.86	144	144	37.58	14.01	51.82	14.22	166	166	15.17	2.99	92.43	17.35	166	166	15.17	2.99	92.43	17.35

Table 3, cont'd.

Div./ Stratum	Depth zone (m)	1982			1983			1984		
		No. of sets	kg	mean catch/30' n	No. of sets	kg	mean catch/30' n	No. of sets	kg	mean catch/30' n
1 B ₁ +C ₂	0-100	4	0	0	5	0	0	3	0	0
	101-200	9	0	0	10	0	0	10	0.34	16.25
	201-300	4	0	0	2	0	0	2		15.19
	301-400	3	0	0	1	0	0	2		
	401-500	2	11.63	0.36	1	0	0	2	14.59	3.94
	501-600	-	-	-	-	-	-	2		114.00
1 C ₃₊₄	0-100	3	0	0	4	0	0	3	0	0
	101-200	8	0	0	16	0.11	0.11	11	0.04	0.04
	201-300	4	0	0	7	0	0	5		0.62
	301-400	2	34.44	20.61	3	17.90	7.26	4	30.81	9.12
	401-500	2		102.40	3		104.75	3		89.36
	501-600	1		56.52	2		47.52	7		24.71
1 B+C	Total	42	2.89	1.54	54	1.36	0.54	54	3.97	0.80
1 D ₅	0-100	8	0	0	10	0	0	15	0	0
	101-200	9	1.38	1.31	15	0.50	0.50	11	0.60	0.28
	201-300	3		4.19	8	42.36	25.35	7		2.11
	301-400	4		3.99	4		93.38	4		1.01
	401-500	2	31.00	10.00	4		0	3	35.90	18.88
	501-600	-	-	-	-	-	-	2	-	98.00
1 E ₆	Total	26	32.15	23.01	43	73.51	41.94	43	12.34	12.17
1 F ₇	0-100	1	0	0	5	0	0	4	0	0
	101-200	9	0	0	13	0	0	17	0	0
	201-300	3		85.00	4		135.00	5		31.40
	301-400	3		57.36	3		71.84	3		30.90
	401-500	-	-	-	-	-	-	1	30.46	16.19
	501-600	-	-	-	-	-	-	1	-	61.00
1 D-F	Total	15	0	0	19	0	0	24	0	0
1 B-F	0-100	4	0	0	9	3.87	3.08	5	5.90	5.70
	101-200	2	92.83	54.51	1		9.50	4	35.99	9.47
	201-300	2		199.00	-	-	-	4		71.43
	301-400	2		93.60	-	-	-	3		15.90
	401-500	2		7.80	91	8.32	3.42	105	6.78	1.60
	501-600	2		22.16	91	8.32	3.42	105	6.78	1.60
1 B-F	Total	107	6.31	2.25	145	4.90	1.76	159	5.40	0.91
	Total	107	6.31	2.25	145	4.90	1.76	159	5.40	0.91

Table 4 : West Greenland redfish, basic survey data 1982-88 for *Sebastes mentella*; number of sets, mean catches per 30 minutes by weight (kg) and number (n) and respective standard deviations of the mean (s).

Div./ Stratum	Depth zone (m)	1985			1986			1987			1988											
		No. of sets	mean catch/30' s	n	No. of sets	mean catch/30' s	n	No. of sets	mean catch/30' s	n	No. of sets	mean catch/30' s	n									
1 B ₁ +C ₂	0-100	4	0	0	0	0	0	2	0	0	2	0	0									
	101-200	14	0	0	0	0	0	14	2.28	1.62	89.29	53.39	14	0.26	0.19	22.29	15.44					
	201-300	4	44.32	41.52	1524.85	1482.53	3	152.17	91.75	3180.50	1971.92	8	1.28	1.19	30.75	30.61						
	301-400	2	29.33	9.24	306.33	93.64	3	33.74	9.13	297.00	97.22	5	46.92	22.91	918.40	379.16						
	401-500	3	91.53	26.84	370.67	138.78	2					4	17.09	6.69	163.43	66.06						
501-600	2					3					3											
1 C ₃ +4	0-100	2	0	0	0	0	0	4	0.14	0.07	5.00	3.88	8	0.02	0.01	1.88	1.61					
	101-200	9	0	0	0	0	9	0.01	0.01	0.13	0.13	17	0.15	0.09	4.77	2.13						
	201-300	6	0	0	0	0	4	9.83	3.62	142.67	81.06	6	4.02	2.03	133.67	92.28						
	301-400	2	35.60	25.88	135.40	91.43	1	15.00	5.00	62.00	2.00	3	4.78	2.55	43.33	34.04						
	401-500	1	35.60	25.88	135.40	91.43	1	15.00	5.00	62.00	2.00	2	6.40	2.78	24.75	12.38						
501-600	2					2					2											
1 B+C	Total	22	6.41	4.66	24.39	16.47	48	15.45	8.84	350.45	311.55	50	23.29	9.44	341.21	164.91	74	3.50	0.84	58.93	14.17	
1 D ₅	0-100	13	0	0	0	0	12	0	0	0	0	10	0	0	0	0	13	0	0	0	0	
	101-200	14	2.43	2.10	6.80	6.15	14	1.24	0.73	3.16	2.01	12	0.17	0.11	0.83	0.75	16	0	0	0	0	
	201-300	6	2.43	2.10	6.80	6.15	8	1.24	0.73	3.16	2.01	5	1	1	1	1	4	1	1	1	1	
	301-400	5	53.50	23.50	129.00	52.00	2	68.67	32.46	169.67	77.74	1	6.94	3.17	23.25	11.88	1	1	1	1	1	1
	401-500	1	53.50	23.50	129.00	52.00	2	68.67	32.46	169.67	77.74	1	6.94	3.17	23.25	11.88	1	1	1	1	1	1
501-600	1					1					1						1					
1 E ₆	0-100	3	0.29	0.12	0.72	0.29	4	0	0	0	0	5	0	0	0	0	4	0.75	0.25	2.08	0.98	
	101-200	16	0.29	0.12	0.72	0.29	15	0.09	0.06	0.20	0.16	19	1.14	0.48	2.32	0.99	17	0.75	0.25	2.08	0.98	
	201-300	6	23.02	13.18	55.60	28.79	5	17.00	5.13	39.40	9.50	3	150.72	113.93	293.00	215.88	3	71.92	31.93	171.33	77.75	
	301-400	4	23.02	13.18	55.60	28.79	3	17.00	5.13	39.40	9.50	4	150.72	113.93	293.00	215.88	3	71.92	31.93	171.33	77.75	
	401-500	1	23.02	13.18	55.60	28.79	2	17.00	5.13	39.40	9.50	1	150.72	113.93	293.00	215.88	3	71.92	31.93	171.33	77.75	
501-600	1					2					1											
1 F ₇	0-200	24	0	0	0	0	21	0	0	0	0	21	0	0	0	0	24	0	0	0	0	
	201-300	6	11.08	5.74	25.44	13.06	5	6.88	6.54	19.40	18.90	5	27.88	12.94	77.60	39.51	2	7.83	3.58	34.50	15.16	
	301-400	2	11.08	5.74	25.44	13.06	3	97.95	15.01	166.50	28.68	3	27.88	12.94	77.60	39.51	1	7.83	3.58	34.50	15.16	
401-600	1					1					2						1					
1 D-F	Total	103	4.05	1.11	9.78	2.60	99	9.79	1.40	18.99	2.01	93	9.64	4.10	23.04	8.83	94	3.94	1.16	11.99	3.30	
1 B-F	Total	125	5.21	2.36	16.95	8.19	147	12.57	1.98	181.60	152.85	143	16.33	5.08	179.13	81.03	168	3.73	0.72	35.02	7.15	

Table 4, contd.

	1980		1981		1982		1983		1984	
	Biom.	Abund.	Biom.	Abund.	Biom.	Abund.	Biom.	Abund.	Biom.	Abund.
No of sets	106		63		80		124		40	
Sebastes marinus										
0-200 m	91837	114203	458	633	32065	46874	15102	21720	2321	4107
201-400 m	344419	535203	465033	637212	201006	274053	250180	260739	43994	55710
401-600 m	9441	4646	49167	31894	6150	4091	3894	2331	7484	2529
601-800 m	403	141	-	-	-	-	157	90	-	-
Total	446100	654193	504658	669739	239221	325018	269333	248880	53804	62364
%	42.6	42.7	45.1	42.6	52.9	53.1	64.2	54.9	68.9	65.5

	1985		1986		1987		1988		
	Biom.	Abund.	Biom.	Abund.	Biom.	Abund.	Biom.	Abund.	
No of sets	119		147		145		132		
Sebastes marinus									
0-200 m	1778	4330	3139	17503	4315	23627	356	1120	
201-400 m	94721	155655	154294	254650	190052	365609	48983	56056	
401-600 m	1013	1263	6848	3809	10543	8297	437	545	
601-800 m	-	-	222	119	46	51	-	-	
Total	97512	161248	164493	276161	204956	397584	49776	57721	
%	121.2	87.4	36.2	49.2	39.5	37.1	62.7	56.8	

Table 5. East Greenland Redfish: biomass and abundance of *Sebastes marinus*, 1980 to 1988.

	1980		1981		1982		1983		1984	
	Biom.	Abund.	Biom.	Abund.	Biom.	Abund.	Biom.	Abund.	Biom.	Abund.
No of sets	106		63		80		124		40	
Sebastes mentella										
0-200 m	2	4							13	18
201-400 m	103843	315384	26940	80519	29658	76329	19827	38511	26866	62551
401-600 m	133981	254196	38103	85244	54802	111714	46058	78425	75329	122660
601-800 m	6556	6605	9074	33184	1540	1718	2486	3156	-	-
Total	244380	576185	74117	199047	86027	189761	68970	120092	102208	185229
%	57.6	71.6	51.0	46.8	44.5	44.8	26.5	24.6	76.3	70.6

	1985		1986		1987		1988		
	Biom.	Abund.	Biom.	Abund.	Biom.	Abund.	Biom.	Abund.	
No of sets	119		147		145		132		
Sebastes mentella									
0-200 m	10	20	32	56	102	452	2295	13864	
201-400 m	2453	6588	42977	99156	24681	120687	23867	80750	
401-600 m	5254	14234	29283	44869	16379	31330	2591	5467	
601-800 m	2336	8414	1067	1134	758	2573	-	-	
Total	10053	29256	73359	145215	41920	155032	28753	100081	
%	61.1	63.5	27.2	27.6	37.1	61.1	51.0	50.9	

Table 6. East Greenland Redfish: biomass and abundance of *Sebastes mentella*, 1980 to 1988.

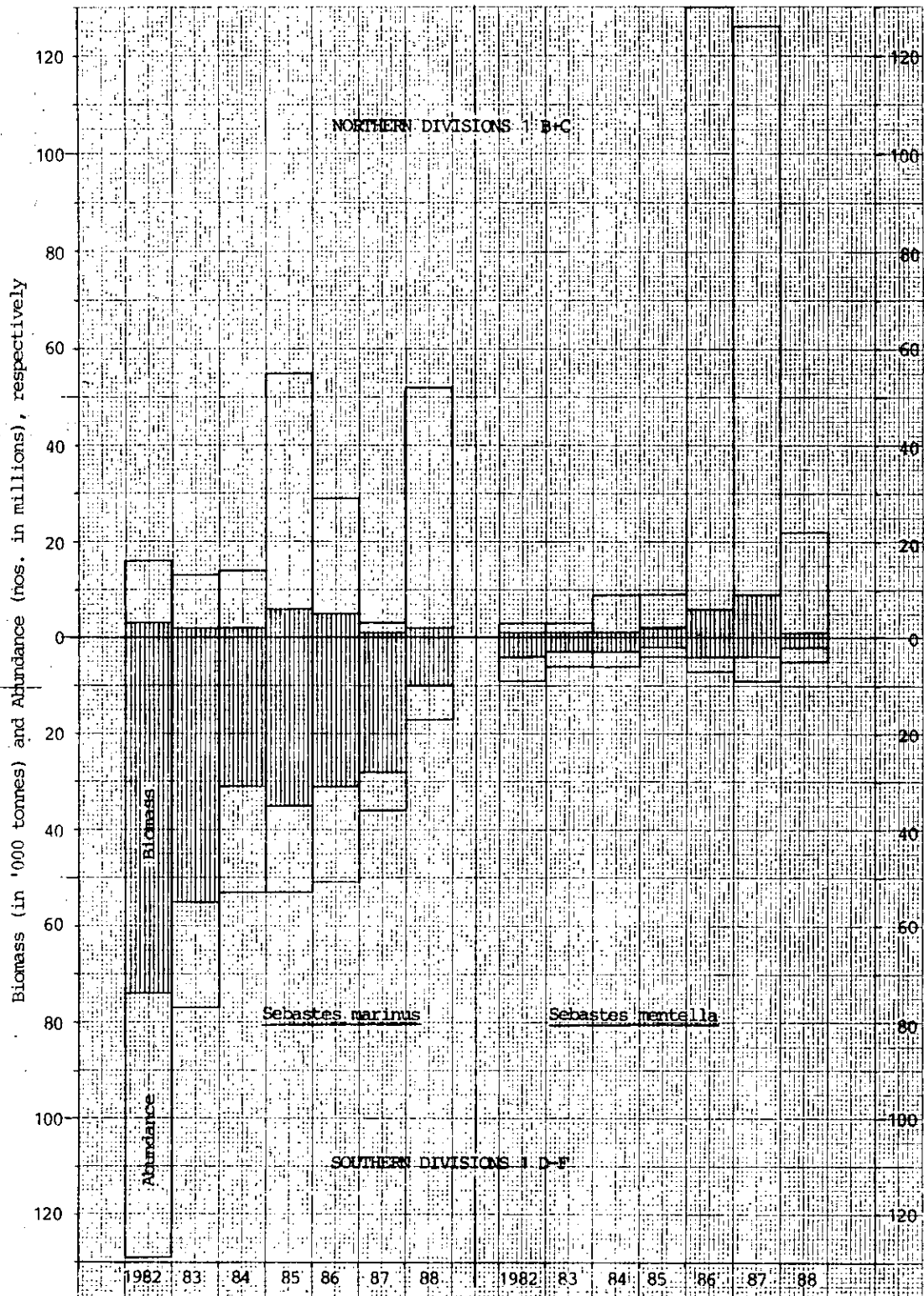


Figure 1. West Greenland redfish, Biomass and Abundance estimates, separately for Div. 1B+C and 1D-F (northern and southern half of the total survey area) and for *Sebastes marinus* and *Sebastes mentella*, from survey results, 1982 - 1988.

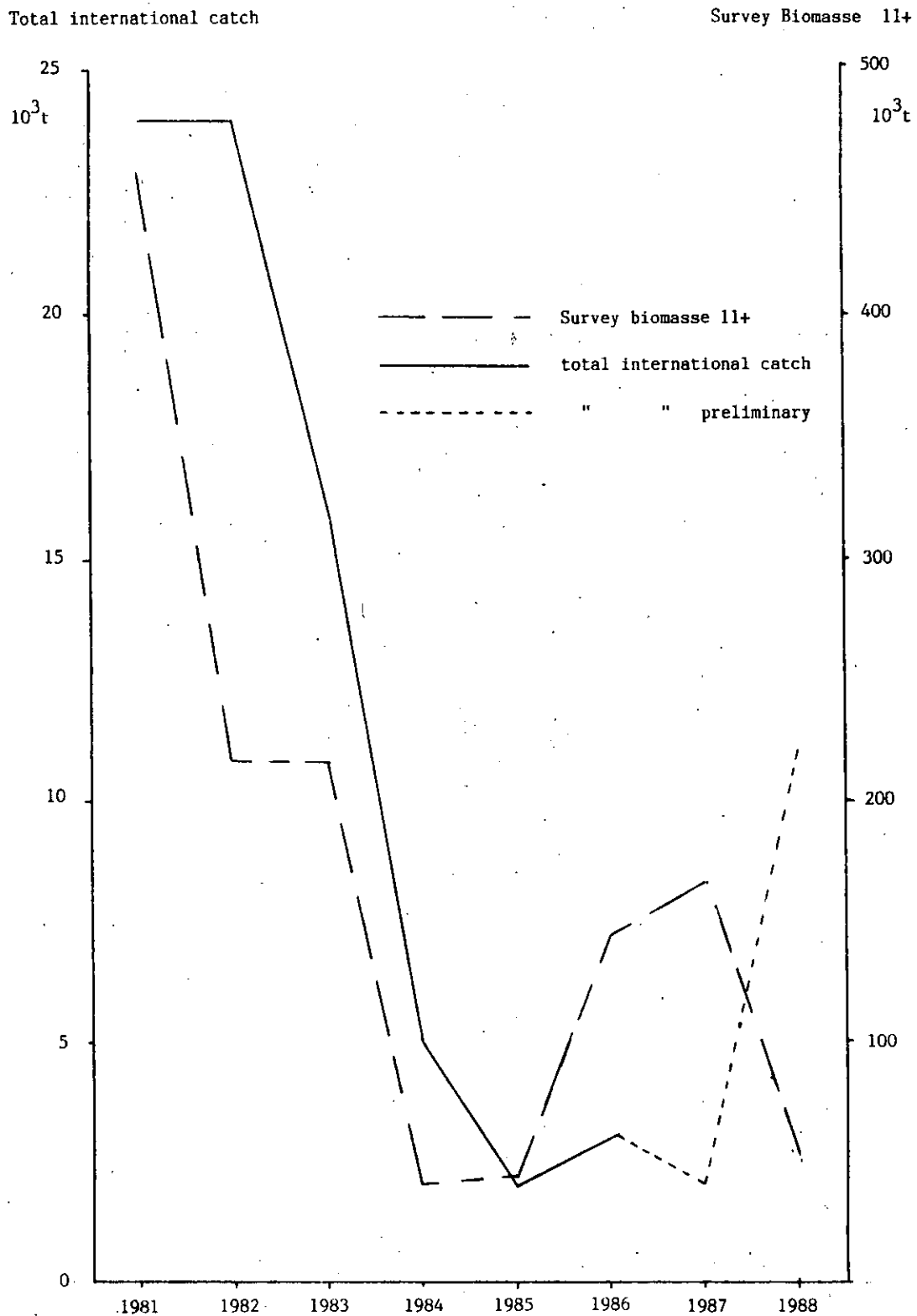


Fig. 2. East Greenland Redfish (*Sebastes marinus*) survey biomass 11+ and total international catch.