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A Review of the Status of the Greenland Halibut Resources in NAFO Subarea 2 and Divisions 3K and 3L

by

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Introduction

Greenland halibut catches in the Labrador-eastern Newfoundland area have averaged between 25,000-30,000 t annually from 1970 to 1976 with the 1978 catch being the highest since the beginning of the fishery in the early 1960's (Table 1). Catches declined rather steadily since 1978 to reach an all time low of about 16,000 t in 1986 with the second lowest catch (18,600 t) over the period occurring in 1985 (Table 1). In 1987, on the other hand, the fishery improved to the extent that the 1987 preliminary catch of 27,000 t (Table 1 and 2) was approaching double the 1986 catch and slightly above the average over the last 18 years. Most of the catch was accounted for by Canada with 17,000 t, followed by GDR with 3,300 t, the Faroes with 2,200 t, and Poland, Japan, and EEC countries accounting for most of the remainder. Most of the Canadian trawler catches (4,400 t out of 4,800 t) was taken in Div. 2J during August and December (Table 2). The inshore gillnet catches mainly in the southern divisions of 3K and 3L (4,400 t in each) with 3,100 t taken in Div. 2J. The gillnet fishery occurs primarily during the months of July to October. Catches by other countries occurred generally later in the year, quite often in conjunction with catching other species and varied with division fished. However, Div. 3L is rarely directly fished for Greenland halibut by countries other than the coastal state.

The TAC has increased from 30,000 t in 1976 to 35,000 t in 1980, 55,000 t in 1981 for Div. 2J3KL only, with an additional 20,000 t in Div. 2GH, and to 100,000 t in 1986 where it has remained through 1988. These increases were attributable to indications of good recruitment, estimated high levels of biomass and what was considered to be low overall levels of fishing mortality.

It is worth re-emphasizing that this resource undertakes extensive migrations throughout its life history with the main spawning component migrating to Davis Strait while the younger immature portion of the stock (particularly ages 6-10 years old) supports the fishery in the southern areas. It was cautioned that a TAC of 100,000 t would not likely harm the resource provided it were spread over all commercial age groups and all areas of the distribution. If, on the other hand, a highly concentrated effort were directed in localized areas on a few age groups, a significant component of the stock could be detrimentally affected.

Research vessel surveys

i) Biomass estimates and abundance indices in Divisions 2J3KL

Results of stratified-random groundfish surveys for Greenland halibut in Div. 2J (1977-87), Div. 3K (1978-87), and Div. 3L (1981-87) are presented as mean weight (kg) per set per stratum in Tables 3, 4, and 5 respectively. For the area surveyed in Div. 2J in 1987 (Table 3), the biomass estimate was 50,770 t which was the lowest in the time series. The previous low was in 1985 at 62,600 t. The 1986 estimate of 77,550 t was equal to the average over the period. The 1985 estimate was possibly attributed to the effect on availability due to adverse environmental conditions. This would unlikely explain the drop in 1987.

In Div. 3K the 1987 biomass estimate was 76,480 t (Table 4), considerably below the 1986 estimate of 106,380 t despite the low coverage in 1986 but similar to the catch of 78,800 t in 1985. While it is below the average of 85,000 t over the period, it is well within the range of fluctuation over the time series.

For Div. 3L data from four surveys have become available since the previous assessment (Table 5). Surveys were conducted during the spring, summer, and fall of 1987 and as recent as the spring of 1988. The estimates from all four surveys showed remarkable stability ranging between 9,100 t in the 1987 spring survey and 11,550 t in the 1987 summer survey. The values compare to 10,610 t in the 1987 fall survey. It should be noted that many deep water strata are not covered in these surveys and they are likely to be underestimating the total biomass by as much as one-half in some seasons when compared to the 1985 surveys where coverage was complete in most cases.

A plot of the trends in biomass for Div. 2J and 3K (where most of the biomass occurs) is shown in Fig. 1, both separately and combined. It would appear that, in most cases, the trends are similar in both divisions with somewhat of a lag. The combined figure shows a systematic increase in biomass from 1979 to 1984 with large annual fluctuations between 1984 and 1987. While there is an apparent decline since 1984 (since 1982 for Div. 2J only), it is difficult to evaluate the magnitude because of these large fluctuations. Abundance indices from fall surveys (except for 1984 in Div. 3L where the summer survey was used since there was a fall survey) expressed as stratified mean number per set are shown in Fig. 2. In Div. 2J, the abundance index declined from 1978 to 1980, increased again to the 1978 level by 1982, then declined almost steadily with the 1988 level being the lowest in the 10 year period. In Div. 3K, on the other hand, the trend is almost the reverse. There is an overall increasing trend in abundance since 1978 with the 1986 and 1987 indices both being the highest since 1978. With the exception of the lower 1985 estimate, it would appear that the overall abundance has been stable at a relatively high level since 1983. The abundance in Div. 3L is at a much lower level than the northerly divisions of 2J and 3K, however, the level has been stable since 1981. The overall abundance indices for the three divisions combined (weighted by divisional area) has shown practically no change from 1981 to 1987 with the weighted mean number per set ranging from a low of 31 fish to a high of 37 fish.

ii) Catch numbers at age from groundfish surveys

Stratified mean numbers per set (from fall surveys) at age are shown in Table 6 for Div. 2J and 3K from 1978 to 1987, Table 7 for Div. 3L from 1981 to 1987 and Table 8 and Fig. 3 for Div. 2J, 3K, and 3L combined (Div. 3L summer survey used in 1984). It is clear from the data presented that Greenland halibut do not fully recruit to the survey gear until age 5 as evidenced by the 1979 year-class which has been predicted to be a strong year-class, a prediction which has been borne out in fisheries to be true. The 1980 year-class was also predicted to be a strong year-class from data in earlier shrimp surveys. It was more difficult to reach this conclusion here except that it was probably better than average. The dominant age-class in the 1987 survey is age 3 which represents the 1984 year-class and is more abundant than any other year-classes at age 3 in the Div. 2J3KL series.

During 1987 stratified-random groundfish surveys were conducted from Div. 2G to Div. 3L, for the first time, covering the whole stock area for Greenland halibut. The age compositions by divison of Greenland halibut from surveys in 1987 are presented in Fig. 4. More detailed informatin on the results of the survey in Div. 2G and 2H can be found in SCR Doc. /88 (this meeting). A combined figure for all divisions is presented in Fig. 5. In observing recruiting year-classes from these figures, it would appear that the 1984 year-class is predominant in the more southerly divisions (particularly Div. 3K) while the 1985 year-class clearly dominates the more northerly divisions (particularly Div. 2H). The abundance of younger fish in Div. 2G may also be underestimated since only depths greater than 200 m were surveyed. Given that Greenland halibut are not fully recruited to the survey gear until age 5 and if the 1982 year-class (age 5) is considered average (Fig. 3), then it may be interpreted here that the 1983, 1984, and 1985 year-classes are all stronger than average. However, additional surveys would be required before this could be established with confidence.

iii) Catch numbers at length and age from shrimp surveys

Shrimp surveys have been conducted in the deep water channels of Labrador since 1979 in Div. 2H (Hopedale Channel) and Div. 2J (Cartwright Channel). During these surveys, the most significant by-catch has been Greenland halibut. From 1979 to 1983 the catches of Greenland halibut have been sampled for length but not age, however, since 1984 age samples have also been collected. The stratified mean numbers per set at length for 1979-87 and at age for 1984-87 are presented in Fig. 6-9 for Div. 2H and 2J respectively. It is evident from the figures that Greenland halibut 10-12 cm in length are fully recruited to the survey gear (Fig. 6-9). It is also evident that the distribution of length and age groups are quite different (particularly the first 3-4 age-groups) although age 1 appears well represented in both divisions. The differences between the two divisions could not be easily reconciled except that they are likely to be real differences in distribution. It must be realized also that these channels are only portions of the divisions and could be affected by annual variation throughout the divisions as a whole.

Using the relationship between age and length compositions from the 1984-87 surveys, an attempt was made at estimating the abundance of age 1 from the length compositions in the 1979-83 surveys. It was considered that a good approximation of age 1 would be to use the abundance indices of lengths $\leq$13 cm.

The indices derived are shown in Fig. 10 and are plotted relative to the 1985 year-class strength in Div. 2J. Only 1979-83 data are estimates while the 1984-87 data are actual age-length calculations. Both divisions agree in predicting the 1985 year-class to be the strongest in the series. There is also good agreement between divisions on the strength of the 1984 year-class (which also appears stronger than average), the 1978 year-class (which is about average), and the 1982 and 1986 year-classes (which appear relatively weak). Division 2H did not predict the 1979 and 1980 year-classes to be more than average whereas Div. 2J did. It should be noted that with respect to the 1979 year-class, and to some degree the 1980 year-class, the predictions of Div. 2J are more supportive of what eventually occurred in the commercial fishery. It is also noteworthy that the 1985 year-class at age 2 was also dominant in both divisions in the 1987 survey.

Commercial data

i) Catch and effort

Considering the nature of this fishery and the migratory behaviour of this species as well as the low levels of directed catch, it is difficult to obtain catch and effort statistics which are accurately representative of total stock abundance. Those that are available (mainly Canada (N)), however, can be helpful as indicators of distribution and abundance in localized areas. The only directed catch-effort data available during the last couple of years was from Div. 2J in the summer (Table 9). It appears that the catch rate declined steadily in Div. 2J from 1984 to 1986 but increased markedly in 1987 to a level higher than 1982 but still below the 1983-84 levels.

ii) Catch numbers and weights at age

Catch numbers and weights at age for 1987 were calculated in the usual manner using Canadian samples collected from domestic fleets and samples collected by Canadian observers on foreign fleets. The results are shown in table 10. The matrices of catch numbers at age, percentages at age, average weights at age and catch biomass at age from 1975-87 are shown in tables 11-14 respectively. The catch in 1987 was made up primarily of the 1979 (33%) and 1980 (40%) year-classes. Ages 6-9 comprised more than 90% of the catch.

iii) Assessment

During recent assessments of this stock SPA's were presented, however, could not be accepted due to serious inconsistencies in the data and the lack of suitable calibration procedures. Since, the problems outlined are not yet resolved, no such analyses are presented here.

Table 1. Greenland halibut landings (metric tons) by year and country for Subarea 2 and Division 3KL from 1970–87.

Country	Year																	
	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86[a]	87[a]
Canada	10706	9408	8952	6840	5745	7807	9306	17967	24692	29940	31774	24125	19248	19031	17283	12277	8220	16930
FRG	13	–	86	707	515	622	927	755	1022	15	55	–	57	2	9	482	15	–
Poland	8266	5234	6986	9060	7105	8447	5942	5998	5215	1813	203	1806	1111	5258	943	460	177	1378
Iceland	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Norway	–	–	1389	501	117	–	6	15	3	8	1	–	–	15	18	1	–	–
USSR	7384	9094	10183	8652	9650	9439	6799	4308	5632	1961	238	3325	1471	937	440	149	770	342
Romania	225	7	120	80	–	–	–	–	3	–	–	–	–	–	–	–	–	–
GDR	–	647	402	1681	2701	2025	1512	1953	1636	178	316	1350	2487	2587	2498	1850	1868	3264
Den–F	–	–	970	950	4	–	–	350	268	–	–	–	–	–	–	193	451	2174
Spain	–	–	3	–	–	–	1	–	–	4	–	–	–	–	–	–	–	–
UK	–	–	731	201	1112	62	–	476	53	110	22	–	1	–	3	–	–	–
Den–G	–	–	–	65	2	–	–	–	–	–	–	–	–	–	–	–	–	–
Portugal	–	–	–	207	161	231	73	119	–	38	21	16	1818	–	2612	2940	3107	–
Fra–M	–	–	–	–	5	–	–	–	–	–	–	–	–	–	–	–	–	–
Fra–Sp	–	–	–	–	6	48	32	–	5	1	–	–	7	–	–	–	–	–
Japan	–	–	–	–	–	–	–	–	3	–	12	60	14	–	1003	258	1277	1911
Other	–	–	–	–	–	–	–	–	–	–	–	–	–	9	–	–	–	
EEC	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1407	–
Total	26594	24392	29822	28944	27123	28681	24598	31941	38532	34068	32642	30682	26206	27839	24809	18610	15885	27406

[a]Provisional.

Table 2 Greenland halibut (SA 2+3KL) Catches in 1987 by Country and month.

Country	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	2H	2J	3K	3L
Can(SF)(ins)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(off)	1	5	-	-	-	2	3	73	4	18	-	7	113	5	54	10	44
Can(N)(ins)	1	1	2	-	135	218	2362	3957	3275	1664	357	4	11976	-	3101	4467	4408
(off)	156	-	1	-	-	13	2	2055	64	33	20	2497	4841	54	4420	251	116
Can(Q)																	
Can(G)																	
Japan	256				297				462	344[c]	552		1911				
GDR	13							396	297	408	648	1502	3264				
Poland		20	91	66	44		141 + 377	178	198	17		246	1378				
EEC[b]			6*			20**		18***	834[1]	1011[2]	1328[3]	1407[4]	1407				
Faroes[b]						600**		1135***		823	2174[a]		2174				
USSR								190	66	25	29	32	342				
TOTAL	427	26	94	66	476	233	2885	6849	4366	2509	1606	4288	27406				
2H Can(ins)	-	-	-	-	-	-	-	-	-	-	-	-	-				
(off)	-	-	-	-	-	-	-	5	-	-	-	54	59				
2J Can(ins)	-	-	-	-	-	-	60	501	1323	879	338	-	3101				
(off)	-	-	-	-	-	1	2	2029	21	1	-	2420	4474				
3K Can(ins)	-	1	2	-	14	145	1233	1898	895	278	1	-	4467				
(off)	152	3	1	-	-	14	-	74	11	-	-	6	261				
3L Can(ins)	1	-	-	-	121	73	1069	1558	1057	507	18	4	4408				
(off)	5	2	-	-	-	-	3	20	36	50	20	24	160				

*(Jan-Mar) **(Jan-June) ***(Jan-Nov)

[a](Jan-Nov)

[b]Not included in vertical totals

[c]Not in circular letter but missing from total 'to date' in Nov

[1](Jan-Sept) [2](Jan-Oct) [3](Jan-Nov) [4](Jan-Dec)

Table 3. Average weight (kg) of Greenland halibut caught per set from research vessel surveys by the GADUS ATLANTICA in Division 2J. Numbers in parenthesis indicate the number of sets per stratum.

Stratum	Gadus 3 1977	Gadus 12&15 1978	Gadus 27&29 1979	Gadus 42&44 1980	Gadus 58 1981	Gadus 71&72 1982	Gadus 86, 87,&88 1983	Gadus 101, 102,103 1984	Gadus 116, 117,118 1985	Gadus 131, 132,133 1986	Gadus 145, 146,147 1987
201	7.26(2)	1.36(3)	0.45(2)	2.83(3)	2.70(5)	9.67(6)	3.72(6)	4.83(3)	0.41(6)	0.98(5)	0.19(6)
202	21.34(2)	16.39(4)	22.00(4)	29.00(4)	34.50(2)	45.50(2)	30.75(2)	92.75(2)	10.05(2)	8.50(2)	17.76(2)
203	31.55(2)	40.08(3)	65.32(3)	21.13(4)	52.00(2)	64.33(3)	226.83(3)	179.25(2)	25.00(3)	108.00(2)	27.83(3)
204	175.70(2)	484.67(2)	260.36(2)	–	170.50(2)	284.00(3)	250.83(3)	260.00(2)	16.50(2)	267.50(2)	146.50(2)
205	20.97(4)	6.58(4)	10.21(2)	3.75(4)	14.94(8)	24.09(12)	14.25(8)	6.97(8)	1.44(8)	1.11(7)	0.35(10)
206	20.80(11)	7.78(7)	8.11(8)	10.11(7)	37.18(11)	18.72(18)	8.70(14)	10.86(11)	4.44(14)	4.03(11)	0.41(14)
207	77.77(5)	25.54(4)	10.39(5)	6.90(5)	18.22(9)	10.33(15)	7.65(10)	6.26(7)	2.18(13)	1.21(7)	0.26(11)
208	186.14(4)	145.98(5)	90.72(4)	149.62(4)	240.75(2)	348.67(3)	110.00(2)	496.17(3)	406.14(3)	189.75(2)	103.00(2)
209	65.25(7)	22.01(6)	88.44(7)	104.75(6)	55.67(6)	129.64(11)	52.77(7)	37.42(7)	34.47(9)	13.67(7)	8.55(8)
210	19.41(6)	8.81(7)	9.53(4)	10.80(5)	5.00(3)	20.88(6)	41.50(2)	26.88(4)	5.19(4)	3.67(3)	4.00(4)
211	34.96(2)	85.30(4)	46.97(4)	72.82(5)	35.75(2)	55.75(2)	134.75(2)	55.75(2)	164.00(3)	103.00(2)	44.50(2)
212	189.61(4)	150.82(2)	232.24(2)	103.50(2)	147.75(2)	144.10(5)	44.75(3)	70.83(3)	109.75(4)	383.00(3)	374.69(4)
213	16.46(8)	13.16(7)	9.59(7)	22.94(8)	29.33(6)	34.19(10)	23.25(10)	20.50(5)	35.83(9)	19.67(9)	8.82(9)
214	38.97(6)	48.18(7)	22.01(6)	15.40(5)	60.10(5)	84.31(8)	44.63(8)	59.75(4)	66.83(6)	8.87(6)	13.75(6)
215	37.68(4)	22.03(8)	7.11(6)	18.50(4)	12.30(5)	38.28(9)	14.46(8)	42.00(3)	16.21(6)	14.85(5)	11.87(7)
216	102.83(2)	145.78(3)	181.36(4)	186.25(4)	63.25(2)	215.25(2)	102.67(3)	173.00(2)	81.75(2)	34.66(2)	51.15(2)
217	141.95(3)	168.28(2)	87.15(2)	156.00(2)	41.00(2)	58.25(2)	64.50(2)	–	145.00(2)	108.75(2)	41.50(2)
218	217.92(2)	238.14(2)	–	129.50(2)	156.50(2)	40.00(2)	39.00(2)	–	30.25(2)	82.25(2)	49.00(2)
219	–	–	–	–	48.00(2)	–	103.00(2)	–	83.75(2)	286.25(2)	84.00(2)
220	–	56.92(2)	–	–	–	–	–	–	–	–	–
221	–	–	–	–	–	–	–	–	–	–	–
222	115.32(4)	64.52(5)	76.69(4)	90.38(4)	55.75(2)	188.00(3)	131.50(3)	27.67(3)	34.00(2)	2.25(2)	33.00(2)
223	251.52(2)	84.82(2)	63.98(2)	136.00	94.75(2)	88.00(2)	61.75(2)	113.75(2)	80.25(2)	127.00(2)	21.00(2)
224	173.65(2)	78.70(2)	122.47(2)	32.75(2)	115.00(2)	36.50(2)	50.50(2)	37.50(2)	28.00(2)	244.18(2)	63.50(2)
225	39.95(2)	–	–	–	–	–	–	–	–	–	–
226	–	3.17(2)	–	–	–	–	–	–	–	–	–
227	115.32(4)	86.86(2)	27.47(2)	73.75(2)	43.50(2)	54.90(5)	38.50(4)	36.67(3)	37.13(4)	20.67(3)	36.75(4)
228	6.53(8)	2.19(3)	8.39(6)	18.40(5)	8.00(6)	9.25(10)	10.33(6)	16.50(7)	6.36(7)	10.41(6)	5.29(7)
229	39.03(4)	14.40(4)	23.82(4)	25.63(4)	30.50(2)	21.50(4)	36.50(4)	11.00(3)	13.00(3)	14.67(3)	5.93(3)
230	243.28(3)	80.74(2)	–	169.44(2)	60.25(2)	30.80(2)	93.00(2)	21.50(2)	26.25(2)	102.25(2)	68.00(2)
231	64.24(2)	138.57(2)	–	186.50(2)	–	93.75(2)	51.25(2)	98.75(2)	119.75(2)	28.25(2)	38.50(2)
232	49.03(2)	27.21(2)	–	–	–	–	–	–	–	–	–
233	–	–	–	–	–	–	–	–	–	–	–
234	49.03(2)	98.53(5)	65.21(4)	79.00(4)	52.00(2)	98.00(3)	46.71(3)	90.70(2)	18.33(3)	12.75(2)	5.17(3)
235	117.59(4)	107.05(2)	83.99(2)	128.00(2)	39.00(2)	89.67(3)	252.50(2)	82.00(3)	85.00(2)	182.75(2)	118.75(2)
236	98.06(2)	–	–	–	44.75(2)	66.75(2)	101.00(2)	53.00(2)	85.25(2)	223.90(2)	94.00(2)
Biomass (tons)	106,834	85,136	66,970	74,564	76,661	104,233	78,546	81,234	62,603	77,555	50,771

Table 4. Average weight (kg) of Greenland halibut caught per set from research vessel surveys by the GADUS ATLANTICA in Division 3K. Numbers in parenthesis indicate the number of sets per stratum.

Stratum	GADUS 12+15 1978	GADUS 27+29 1979	GADUS 42+44 1980	GADUS 58+59 1981	GADUS 71+72 1982	GADUS 86, 87,&88 1983	GADUS 101, 102,103 1984	GADUS 116, 117,118, 1985	Gadus 131, 132, 133 1986	Gadus 145, 146, 147 1987
618							1.50(5)	4.43(6)	0.20(5)	0.07(7)
619							1.90(7)	0.57(7)	0.22(5)	0.06(8)
620	66.73(12)	29.39(10)	28.31(12)	25.72(10)	22.33(9)	19.25(10)	13.08(13)	14.68(14)	12.74(9)	5.96(14)
621	126.48(12)	114.39(11)	48.40(13)	32.77(11)	14.68(14)	31.87(12)	18.32(14)	30.53(15)	5.01(14)	8.16(12)
622	143.11(2)	119.44(3)	43.75(2)	132.50(2)	120.83(3)	224.00(2)	143.75(4)	60.38(4)	563.76(2)	207.12(3)
623	159.51(6)	33.53(4)	83.17(6)	83.33(4)	146.20(5)	217.17(6)	270.00(5)	67.50(6)	179.62(4)	136.80(5)
624	9.36(7)	10.60(4)	5.13(4)	3.75(2)	5.25(4)	2.38(4)	5.00(4)	4.97(4)	3.60(2)	5.80(3)
625	17.56(6)	14.24(5)	14.50(6)	31.50(4)	8.75(2)	66.33(3)	42.95(5)	55.60(5)	39.00(3)	52.63(4)
626	60.74(7)	42.18(5)	139.90(5)	58.20(5)	120.40(5)	101.75(4)	217.75(6)	124.69(5)	155.00(4)	66.30(5)
627	71.67(2)	41.73(3)	68.50(2)	189.75(6)	124.43(7)	220.83(6)	300.56(8)	140.36(7)	263.60(5)	136.85(6)
628	43.18(7)	35.75(5)	68.21(6)	16.33(6)	12.92(6)	36.08(6)	27.21(7)	81.96(6)	60.38(4)	42.46(5)
629	20.57(6)	13.38(2)	26.10(5)	31.33(3)	68.50(2)	65.67(3)	31.13(4)	22.00(4)	54.00(3)	79.67(3)
630	27.23(2)	10.78(4)	21.37(4)	117.25(2)	–	67.75(2)	7.73(3)	33.16(4)	30.75(2)	56.50(3)
631	45.42(2)	23.30(3)	34.50(3)	68.60(5)	38.00(2)	66.70(5)	105.30(5)	70.86(7)	67.58(4)	108.75(6)
632	3.20(7)	2.83(4)	11.69(4)	6.25(2)	7.50(3)	3.43(3)	–	8.57(3)	2.25(2)	2.00(2)
633	8.10(9)	9.05(10)	16.10(10)	9.98(8)	7.93(7)	12.38(12)	12.05(10)	14.46(12)	19.70(8)	19.61(11)
634	6.31(9)	9.44(8)	5.29(7)	5.41(7)	14.09(11)	6.60(5)	5.93(7)	4.68(9)	3.72(5)	9.05(11)
635	6.69(9)	6.12(8)	19.25(6)	12.00(5)	17.10(5)	7.83(6)	10.19(8)	4.21(7)	11.02(6)	11.08(6)
636	5.58(7)	4.67(7)	11.79(7)	12.75(6)	21.85(10)	4.05(6)	7.40(8)	4.34(8)	3.40(4)	1.70(7)
637	3.93(9)	4.15(7)	6.00(6)	8.25(6)	9.71(7)	14.80(5)	4.97(6)	13.50(7)	10.95(4)	9.08(6)
638	15.15(8)	13.24(9)	11.11(9)	21.31(8)	20.39(15)	18.05(11)	12.55(10)	34.52(11)	25.45(4)	18.68(10)
639	5.13(9)	7.83(4)	6.58(6)	7.38(6)	19.05(10)	11.71(7)	2.41(8)	4.69(8)	7.33(6)	3.60(7)
640	32.91(2)	–	59.25(2)	36.00(2)	21.50(2)	–	13.75(2)	18.50(3)	10.25(2)	20.25(2)
641	5.45(2)	26.77(2)	31.75(2)	21.80(2)	24.50(4)	61.33(3)	62.50(3)	22.69(4)	–	25.90(3)
642	18.63(2)	–	33.25(2)	9.33(3)	33.33(6)	–	81.35(6)	33.50(5)	–	27.70(5)
643	7.49(2)	12.94(2)	–	–	–	–	–	–	–	–
644	15.22(2)	4.99(2)	–	–	–	–	–	–	–	–
645	18.61(2)	–	12.00(2)	21.75(2)	17.67(3)	3.25(2)	54.25(2)	41.83(3)	–	25.50(2)
646	59.24(2)	88.96(2)	51.50(2)	63.25(2)	15.50(2)	91.25(2)	100.50(2)	66.50(3)	–	30.00(2)
647	160.23(2)	48.13(2)	89.25(2)	82.50(2)	39.50(2)	–	–	114.72(3)	–	–
648	15.45(2)	–	–	–	–	–	–	–		
649	10.91(2)	–	–	–	–	–	–	–	–	–
Total	99,134	66,330	70,623	77,966	70,870	97,790	111,612	78,804	106,386	76,482

Table 5. Average wt. (kg) of Greenland halibut per set from research vessel surveys in Division 3L. Numbers in parentheses indicate number of sets per stratum.

Stratum	ATC 323,324,325 1981 (Fall)	ATC 333,334 1982 (Fall)	W.T. 7,8,9 1983 (Fall)	W.T. 16,17,18 1984 (Summer)	W.T. 22,23,24 1985 (Winter)	W.T. 28,29,30 1985 (Spring)	W.T. 32,33,34 1985 (Summer)	W.T. 37,38,39 1985 (Fall)	W.T. 48 1986 (Spring)	A.N. 72 1986 (Fall)	WT 59, 60 1987 (Spring)	GADUS 142 1987 (Summer)	WT 65 1987 (Fall)	WT 70 1988 (Spring)
328	–	–	–	0.20(4)	0.19(6)	0.18(4)	0.00(4)	0.09(8)	0.02(9)	0.52(6)	0.05(7)	0.00(2)	0.25(4)	0.05(3)
341	0.50(3)	0.19(4)	0.80(4)	0.50(5)	0.15(8)	0.02(8)	0.00(4)	0.26(7)	0.01(9)	0.04(7)	0.07(6)	3.28(4)	0.62(9)	0.00(6)
342	1.33(3)	2.83(3)	0.87(4)	0.00(2)	0.20(3)	0.67(3)	0.25(2)	0.73(3)	0.00(3)	0.20(3)	0.25(2)	0.00(2)	0.00(3)	0.00(2)
343	0.88(4)	–	0.53(3)	0.00(4)	0.03(3)	0.02(3	0.20(2)	0.08(3)	0.00(4)	0.02(3)	0.00(3)	0.00(3)	0.00(3)	0.05(3)
344	6.94(4)	1.00(3)	4.34(6)	0.18(6)	1.14(7)	0.00(5)	13.55(4)	2.46(9)	0.25(8)	4.63(7)	0.50(4)	4.05(4)	2.88(4)	15.30(7)
345	20.75(4)	8.67(6)	9.25(8)	39.60(7)	13.17(3)	16.16(5)	50.71(7)	36.61(9)	12.29(7)	6.26(4)	43.13(4)	40.33(3)	18.00(2)	41.57(7)
346	9.00(3)	11.63(4)	17.50(5)	27.33(6)	7.50(4)	12.25(2)	14.83(3)	35.80(5)	12.40(5)	26.06(3)	20.90(5)	25.00(2)	22.50(4)	17.00(4)
347	1.83(3)	3.02(4)	2.58(6)	0.17(6)	0.40(5)	0.76(5)	1.33(3)	0.76(4)	0.05(5)	2.94(4)	0.80(3)	0.50(3)	0.13(2)	2.04(5)
348	0.42(6)	2.08(5)	0.30(11)	0.11(11)	0.44(8)	0.15(18)	0.31(13)	0.61(14)	0.09(12)	0.88(5)	0.09(8)	0.53(6)	0.43(9)	0.43(11)
349	0.09(7)	0.03(5)	0.43(9)	0.10(14)	0.01(10)	0.07(14)	0.17(7)	0.07(10)	0.00(14)	0.09(9)	0.00(11)	0.02(5)	0.24(10)	0.00(8)
350	0.00(6)	0.00(2)	0.00(8)	0.00(12)	0.00(9)	0.00(12)	0.00(11)	0.00(9)	0.00(11)	0.00(11)	0.00(11)	0.00(5)	0.00(9)	0.00(8)
363	0.00(4)	0.00(3)	0.00(3)	0.00(8)	0.02(8)	0.00(8)	0.00(10)	0.00(10)	0.00(10)	0.0(7)	0.00(9)	0.00(4)	0.00(9)	0.00(7)
364	0.49(9)	0.25(11)	0.87(11)	0.00(10)	0.08(12)	0.22(17)	0.02(12)	0.05(18)	0.01(17)	0.14(5)	0.01(15)	0.50(8)	0.53(14)	0.31(4)
365	2.88(4)	2.75(4)	1.30(5)	0.30(4)	0.55(4)	0.02(7)	0.80(7)	0.12(8)	0.04(5)	1.08(5)	0.00(5)	0.01(3)	3.18(6)	0.00(4)
366	5.00(3)	9.58(6)	6.00(4)	6.23(11)	0.62(5)	0.43(6)	1.90(5)	18.09(9)	1.55(8)	10.90(4)	2.71(7)	3.58(4)	8.11(7)	2.08(6)
368	21.50(2)	28.75(2)	–	17.75(2)	5.75(2)	1.65(2)	35.50(2)	29.00(2)	34.75(2)	6.66(2)	47.67(3)	27.50(2)	9.00(2)	20.55(2)
369	13.25(2)	13.00(4)	14.00(6)	5.19(7)	0.63(5)	1.75(5)	11.80(6)	13.33(6)	9.17(6)	6.36(3)	0.55(5)	0.77(3)	9.25(4)	3.78(4)
370	0.00(4)	0.50(6)	0.44(6)	0.39(7)	0.06(7)	1.07(8)	0.01(6)	1.52(9)	0.02(8)	2.30(2)	0.00(7)	0.01(4)	0.25(6)	0.00(5)
371	0.01(4)	0.00(5)	0.00(5)	0.00(7)	0.00(6)	0.00(7)	0.00(6)	0.00(7)	0.00(6)	0.04(3)	0.00(7)	0.00(3)	0.00(5)	0.00(5)
372	0.00(5)	0.00(7)	0.00(4)	0.00(13)	0.00(11)	0.01(12)	0.00(10)	0.00(17)	0.0(14)	0.01(9)	0.00(13)	0.00(6)	0.00(13)	0.00(11)
384	–	0.00(4)	0.00(3)	0.00(6)	0.00(4)	0.00(6)	0.00(2)	0.00(8)	0.0(6)	0.08(5)	0.00(7)	0.00(3)	0.00(6)	0.00(5)
385	0.26(8)	2.19(8)	3.20(5)	0.50(12)	0.01(11)	0.35(15)	1.00(8)	1.24(12)	0.01(13)	4.67(8)	0.36(11)	0.24(5)	2.44(9)	0.90(10)
386	37.00(3)	21.75(4)	–	12.69(8)	0.35(5)	4.54(5)	7.78(5)	37.50(5)	4.50(6)	8.34(4)	4.46(5)	3.17(3)	6.13(4)	7.00(4)
387	67.50(2)	43.67(3)	–	49.00(3)	6.88(4)	6.70(6)	13.83(3)	42.25(4)	11.00(4)	8.00(2)	7.25(4)	14.50(2)	26.33(3)	7.05(4)
388	–	2.33(3)	–	24.00(2)	5.67(3)	6.00(2)	67.75(2)	24.75(2)	8.00(2)	–	4.75(2)	13.50(2)	17.25(2)	4.45(2)
389	–	7.88(4)	–	19.25(6)	4.57(4)	1.92(5)	17.13(4)	26.80(5)	5.80(5)	9.80(4)	6.50(6)	10.05(2)	11.25(4)	3.83(3)
390	0.00(3)	3.50(4)	0.07(3)	0.00(3)	0.00(5)	0.07(9)	1.01(7)	2.72(7)	1.44(8)	3.62(6)	0.00(7)	4.00(2)	1.06(8)	0.00(5)
391	–	2.75(2)	21.50(2)	18.75(2)	4.75(4)	1.50(2)	4.10(2)	29.75(7)	9.50(2)	8.25(2)	1.88(2)	9.60(2)	4.10(2)	4.50(2)
392	–	14.00(2)	15.25(2)	26.50(2)	7.50(2)	5.00(2)	80.50(2)	25.00(2)	14.50(2)	18.00(2)	7.25(2)	4.55(2)	8.25(2)	5.25(2)
729	–	–	–	70.75(2)	54.75(2)	4.75(2)	24.00(2)	30.50(2)	–	17.92(2)	–	–	–	–
730	–	–	–	12.25(2)	26.75(2)	6.75(2)	16.00(2)	6.75(2)	–	–	–	–	–	–
731	–	–	–	41.75(2)	46.50(3)	31.00(2)	39.75(2)	15.00(2)	–	–	–	–	–	–
732	–	–	–	12.63(2)	80.75(2)	7.50(2)	22.75(2)	21.00(2)	–	–	–	–	–	–
733	–	–	–	12.75(4)	17.50(3)	15.97(3)	69.00(2)	35.83(3)	–	–	–	–	–	–
734	–	–	–	17.67(3)	119.25(2)	81.00(2)	37.75(2)	37.00(2)	–	–	–	–	–	–
735	–	33.00(2)	–	42.00(3)	4.00(2)	66.00(2)	58.50(2)	29.25(2)	–	47.50(2)	–	–	–	–
736	–		30.00(2)	–	–	32.50(2)	20.75(2)	70.00(2)	–	52.53(2)	–	50.25(2)	–	–
Biomass (t)	12,722	11,649	6,634	17,548	9,519	8,684	21,713	23,848	5,897	10,610	9,099	11,552	9,821	10,152

Table 6. Age composition - numbers/standard tow from groundfish surveys in Div. 2J, 3K (all strata fished).

Div.	Age	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
3K	1	0.62	0.54	0.34	1.37	0.22	0.14	0.38	1.23	2.37	0.27
	2	7.64	3.20	2.53	4.89	1.35	1.09	1.55	2.99	6.24	2.31
	3	15.54	6.18	4.33	9.20	6.75	6.20	4.46	4.92	11.39	16.54
	4	13.45	5.39	6.03	5.33	6.63	10.75	11.67	6.32	18.75	13.14
	5	13.98	7.83	9.06	7.85	7.58	12.35	23.24	12.44	11.07	13.23
	6	11.41	9.57	10.91	11.38	7.46	9.94	9.92	12.69	15.70	10.36
	7	7.51	4.83	6.45	7.22	7.31	11.33	6.76	8.10	13.70	7.85
	8	2.88	1.72	1.68	2.32	7.29	9.39	3.58	2.49	3.37	4.27
	9	1.12	0.61	0.58	0.93	2.22	3.18	2.08	0.90	0.75	1.24
	10	0.79	0.49	0.46	0.42	0.56	0.73	0.68	0.66	0.16	0.24
	11	0.74	0.32	0.50	0.23	0.34	0.41	0.33	0.30	0.12	0.11
	12	0.42	0.30	0.28	0.09	0.24	0.21	0.22	0.21	0.19	0.12
	13	0.22	0.26	0.16	0.07	0.15	0.12	0.15	0.09	0.03	0.07
	14	0.05	0.11	0.07	0.01	0.15	0.06	0.11	0.08		0.01
	15	0.04	0.08	0.02	0.00	0.03	0.01	0.03	0.04		0.02
	16	0.03	0.04	0.01	0.01	0.01	0.00	0.01	0.02		0.02
	17	0.01	0.01			0.01			0.02		0.02
	18		0.01						0.01		
	19		0.00								
	20										
	unknown		0.01						0.03	0.03	0.00
	Total	76.46	41.50	43.41	51.51	48.33	65.90	65.16	53.54	83.88	69.81
2J	1	0.45	0.91	0.63	1.88	0.52	0.09	0.12	1.31	0.67	0.40
	2	3.36	7.92	0.79	5.68	0.92	0.37	1.62	1.53	0.76	1.31
	3	7.79	7.35	2.15	4.15	3.87	1.43	5.79	1.14	0.98	3.45
	4	10.66	5.64	3.32	4.04	8.07	3.55	4.24	2.06	2.49	1.61
	5	9.80	7.81	5.53	5.82	6.64	6.92	8.26	4.93	4.99	1.63
	6	7.07	7.23	6.56	5.68	5.27	6.73	6.93	7.06	8.33	3.35
	7	4.87	3.82	5.44	5.52	7.44	7.14	6.45	6.55	8.66	6.40
	8	3.00	1.87	2.49	3.53	9.05	5.52	5.99	3.81	3.85	5.07
	9	2.24	1.10	1.27	1.68	4.87	2.42	2.44	1.85	1.59	2.80
	10	1.73	1.20	0.98	1.03	2.32	0.86	1.18	1.25	0.58	0.62
	11	1.31	0.79	1.11	0.97	1.16	0.68	0.59	0.46	0.45	0.50
	12	0.83	0.68	0.78	0.46	0.71	0.58	0.39	0.44	0.29	0.38
	13	0.59	0.54	0.53	0.23	0.54	0.46	0.33	0.21	0.24	0.14
	14	0.19	0.29	0.31	0.14	0.55	0.33	0.31	0.25	0.17	0.18
	15	0.13	0.18	0.12	0.09	0.44	0.16	0.21	0.16	0.18	0.12
	16	0.10	0.19	0.07		0.17	0.04	0.16	0.09	0.10	0.00
	17	0.05	0.07	0.02		0.02	0.00	0.08	0.08	0.03	0.02
	18	0.00	0.03			0.01	0.02		0.02	-	
	19	0.00	0.02						0.01	-	
	20	0.02									
	unknown	0.04		0.03	0.25	0.02			0.01	0.01	0.10
	Total	54.21	47.64	32.13	41.15	52.61	37.31	45.08	33.23	34.37	28.08
2J+3K		130.67	89.14	75.54	92.46	100.94	103.21	110.24	86.77	104.27	97.89

Table 7. Age composition of Greenland halibut - numbers/standard tow for Division 3L.

AGE	ATC 323, 324, 325 1981 (Fall)	ATC 333, 334 1982 (Fall)	WT 7, 8,9 1983 (Fall)	WT 16, 17, 18 1984 (Sum.)	WT 22, 23, 24 1985 (Win.)	WT 28, 29, 30 1985 (Spr.)	WT 32, 33, 34 1985 (Sum.)	WT 37, 38, 39 1985 (Fall)	WT 48 1986 (Spr.)	A.N. 72 1986 (Fall)	WT 59, 60 1987 (Spr.)	WT 65 1987 (Fall)
1	0.29	0.22	0.12	0.13	0.02	0.10	0.45	0.69	0.10	1.55	0.04	0.01
2	0.37	0.42	0.69	0.26	0.11	0.11	0.50	0.80	0.20	1.43	1.04	0.15
3	0.80	0.74	0.86	0.36	0.21	0.22	0.42	0.46	0.26	0.50	1.72	0.85
4	0.56	0.53	0.69	0.66	0.42	0.49	0.93	0.76	0.33	0.32	1.59	0.65
5	1.51	0.74	0.55	1.53	0.75	1.10	2.57	1.39	0.59	0.58	0.83	0.49
6	1.61	0.84	0.52	1.38	0.84	1.16	2.53	2.56	0.81	1.00	0.83	0.68
7	0.86	1.05	0.65	1.32	0.72	0.75	1.44	1.68	1.08	1.15	1.00	0.77
8	0.21	0.89	0.54	1.02	0.40	0.46	0.69	0.91	0.29	0.36	0.37	0.79
9	0.00	0.23	0.16	0.40	0.37	0.16	0.24	0.50	0.05	0.09	0.11	0.28
10	0.05	0.07	0.00	0.17	0.24	0.07	0.09	0.18		0.02	0.02	0.09
11	0.01	0.02	0.00	0.03	0.10	0.01	0.01	0.09		0.01	0.00	0.06
12	0.00	0.01	0.01	0.01	0.05	0.01	0.01	0.06		0.00		0.02
13	0.00		0.01	0.02	0.01		0.01	0.00		0.00		0.01
14	0.00			0.00	0.02			0.01		0.01		0.00
15	0.00			0.00	0.00			0.01				0.01
16	0.01							0.00				
17								0.00				
Unknown	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.01
Total	6.30	5.77	4.80	7.28	4.24	4.65	9.89	10.08	3.71	7.05	7.54	4.88

Table 8. Age composition of Greenland halibut from surveys for Divisions 2J3KL.

Age	1981	1982	1983	1984	1985	1986	1987
1	3.54	0.96	0.35	0.50	3.23	4.17	0.68
2	10.94	2.69	2.15	3.17	5.32	7.00	3.77
3	14.15	11.36	8.49	10.25	6.52	11.12	20.84
4	9.93	15.23	14.99	15.91	9.14	17.71	15.40
5	15.18	14.96	19.82	31.50	18.76	15.89	15.35
6	18.67	13.57	17.19	16.85	22.31	22.05	14.39
7	13.60	15.80	19.12	13.21	16.33	20.89	15.02
8	6.06	17.23	15.45	9.57	7.21	7.57	10.13
9	2.61	7.32	5.76	4.52	3.25	2.33	4.32
10	1.50	2.95	1.59	1.86	2.09	0.74	0.95
11	1.21	1.52	1.09	0.92	0.85	0.57	0.67
12	0.55	0.96	0.80	0.61	0.71	0.45	0.52
13	0.30	0.69	0.59	0.48	0.30	0.27	0.22
14	0.15	0.70	0.39	0.42	0.34	0.18	0.19
15	0.09	0.47	0.17	0.24	0.21	0.18	0.15
16	0.02	0.18	0.04	0.17	0.11	0.10	0.02
17		0.03	0.00	0.08	0.10	0.03	0.04
18		0.01	0.02		0.03		
19					0.01		
Unknown	0.28	0.02	0.03		0.04	0.07	0.11
Total	98.78	106.65	108.04	110.26	96.86	111.32	102.77

Table 9. Catch and effort statistics of Greenland halibut in NAFO Div. 2HJ3K from Canada(N) where effort was considered directed in 1979-87.

Year	NAFO Div.	Months	Mean CPUE (t/hr.)	Directed catch (t)
			Canada(N) (TC 5)	
1980	3K	Mar.-May	0.559	1148
1981	3K	Mar.-May	0.485	3118
1982	3K	May	0.416	304
	2J	Aug.-Sept.	0.610	1132
	2H	Aug.-Sept.	0.924	3406
1983	3K	May-July	0.587	1471
	2J	Aug.	1.153	1465
	2H	Aug.-Sept.	1.423	2168
1984	3K	May-July	0.901	1838
	2J	Aug.	1.509	1140
	2H	Aug.-Sept.	1.120	1541
1985	3K	May-Sept.	0.269	151
	2J	July-Sept.	0.655	1796
	2H	Aug.-Sept.	0.832	973
1986	2J	Jul.-Aug.	0.559	1098
1987	2J	Aug.	0.820	1938

Table 10. Catch numbers and mean weights and lengths at age for 1987.

	AVERAGE		CATCH		
AGE	WEIGHT	LENGTH	MEAN	STD. ERR.	C. V.
* 3	0.095	24.500	1	0.00	0.01
* 4	0.194	30.127	5	1.27	0.24
* 5	0.364	36.132	113	12.21	0.11
* 6	0.589	41.865	1576	62.10	0.04
* 7	0.836	46.523	9117	117.73	0.01
* 8	1.161	51.317	7403	111.76	0.02
* 9	1.589	56.363	2349	53.35	0.02
*10	2.129	61.492	707	20.74	0.03
*11	2.818	66.831	318	11.50	0.04
*12	3.603	71.885	233	8.47	0.04
*13	4.635	77.456	186	7.60	0.04
*14	5.477	81.416	139	6.20	0.04
*15	6.671	86.327	88	4.39	0.05
*16	7.848	90.612	47	2.91	0.06
*17	9.841	96.901	15	1.00	0.07
*18	11.324	101.064	4	0.38	0.10
19	11.833	102.500		0.08	1.06
*20	13.826	107.341		0.00	0.00

TABLE 11, CATCH NUMBERS (X10^3) AT AGE,

AGE	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
5	322	19	464	3016	2182	204	810	236	766	858	1662	245	113
6	2719	680	4351	8511	7980	2032	4242	2020	3889	2211	4449	1958	1576
7	5547	3600	9374	9072	11726	8913	9209	5552	10714	5560	4955	5604	9117
8	4781	6030	6377	7662	5611	9429	10753	5064	8215	7308	2933	4450	7403
9	3821	4199	2546	2898	1069	5258	4045	3112	2509	3888	1156	1284	2349
10	1628	2457	879	1454	440	3729	836	1480	756	1198	429	412	707
11	677	923	191	731	262	987	240	524	229	387	133	213	318
12	130	290	113	371	136	125	133	225	83	136	83	122	233
13	269	113	101	225	131	52	40	143	116	101	73	61	186
14	131	36	26	110	84	14	27	70	93	55	40	49	139
15	63	21	18	58	76	9	20	55	74	73	18	32	88
16	41	1	22	54	56	2	13	29	10	28	12	20	47
17	43	1	7	39	44	1	5	14	14	18	2	1	15
5+	20172	18370	24469	34201	29797	30755	30373	18524	27468	21819	15945	14450	22291

TABLE 12 CATCH AT AGE AS PERCENTAGES

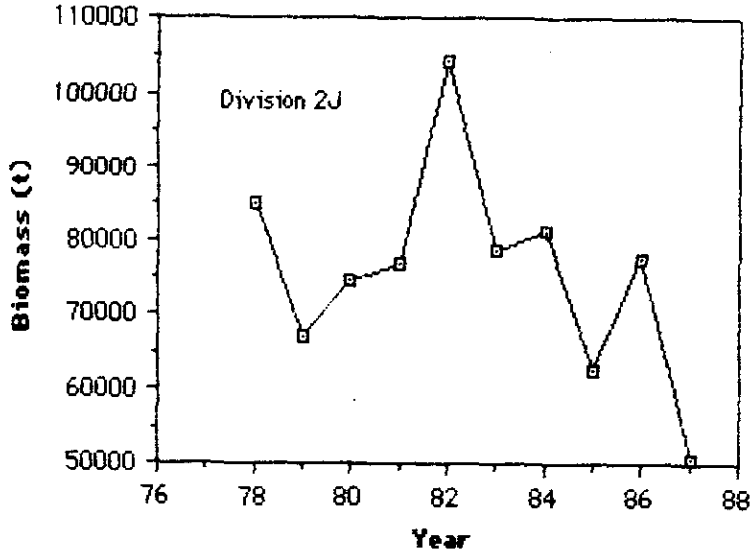
AGE	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
5	1.6	0.1	1.9	8.8	7.3	0.7	2.7	1.3	2.8	3.9	10.4	1.7	0.5
6	13.5	3.7	17.8	24.9	26.8	6.6	14.0	10.9	14.2	10.1	27.9	13.5	7.1
7	27.5	19.6	38.3	26.5	39.4	29.0	30.3	30.0	39.0	25.5	31.1	38.8	40.9
8	23.7	32.8	26.1	22.4	18.8	30.7	35.4	27.3	29.9	33.5	18.4	30.8	33.2
9	18.9	22.9	10.4	8.5	3.6	17.1	13.3	16.8	9.1	17.8	7.2	8.9	10.5
10	8.1	13.4	3.6	4.3	1.5	12.1	2.8	8.0	2.8	5.5	2.7	2.9	3.2
11	3.4	5.0	0.8	2.1	0.9	3.2	0.8	2.8	0.8	1.8	0.8	1.5	1.4
12	0.6	1.6	0.5	1.1	0.5	0.4	0.4	1.2	0.3	0.6	0.5	0.8	1.0
13	1.3	0.6	0.4	0.7	0.4	0.2	0.1	0.8	0.4	0.5	0.5	0.4	0.8
14	0.6	0.2	0.1	0.3	0.3	0.0	0.1	0.4	0.3	0.3	0.3	0.3	0.6
15	0.3	0.1	0.1	0.2	0.3	0.0	0.1	0.3	0.3	0.3	0.1	0.2	0.4
16	0.2	0.0	0.1	0.2	0.2	0.0	0.0	0.2	0.0	0.1	0.1	0.1	0.2
17	0.2	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.1

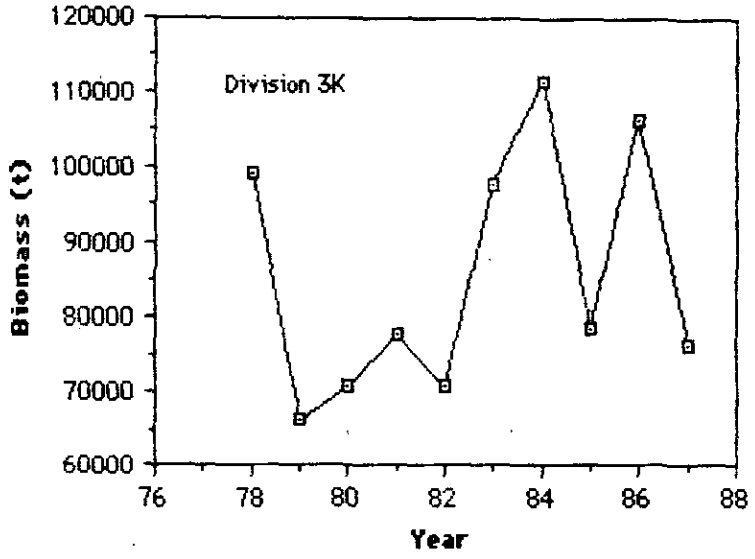
TABLE 13, AVERAGE WEIGHTS AT AGE (KG);

AGE	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
5	0.609	0.609	0.609	0.609	0.609	0.514	0.392	0.525	0.412	0.377	0.568	0.350	0.364
6	0.760	0.760	0.760	0.760	0.760	0.659	0.598	0.684	0.629	0.583	0.749	0.584	0.589
7	0.955	0.955	0.955	0.955	0.955	0.869	0.789	0.891	0.861	0.826	0.941	0.811	0.836
8	1.192	1.192	1.192	1.192	1.192	1.049	0.985	1.130	1.176	1.097	1.244	1.096	1.161
9	1.580	1.580	1.580	1.580	1.580	1.145	1.235	1.400	1.648	1.462	1.685	1.580	1.589
10	2.209	2.209	2.209	2.209	2.209	1.256	1.700	1.787	2.231	1.943	2.242	2.124	2.129
11	2.699	2.699	2.699	2.699	2.699	1.573	2.460	2.381	3.006	2.632	2.953	2.885	2.818
12	3.371	3.371	3.371	3.371	3.371	2.708	3.507	3.471	3.964	3.485	3.711	3.887	3.603
13	3.884	3.884	3.884	3.884	3.884	3.115	4.794	4.506	5.061	4.486	4.851	4.954	4.635
14	4.563	4.563	4.563	4.563	4.563	4.418	5.944	5.847	6.058	5.730	6.134	6.089	5.477
15	5.918	5.918	5.918	5.918	5.918	5.037	8.055	7.527	7.315	6.849	7.163	7.637	6.671
16	7.144	7.144	7.144	7.144	7.144	7.022	8.710	8.684	8.599	8.329	8.921	9.807	7.848
17	7.887	7.887	7.887	7.887	7.887	10.147	9.576	11.527	11.318	9.572	11.833	10.103	9.841

TABLE 14; CATCH BIOMASS AT AGE,

AGE	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
5	196	12	283	1837	1329	105	318	124	316	323	944	86	41
6	2066	517	3307	6468	6065	1339	2537	1383	2446	1290	3331	1144	928
7	5297	3438	8952	8664	11198	7745	7266	4947	9223	4591	4662	4545	7626
8	5699	7188	7601	9133	6688	9891	10592	5724	9662	8017	3648	4878	8592
9	6037	6634	4023	4579	1689	6020	4996	4357	4135	5684	1948	2029	3733
10	3596	5428	1942	3212	972	4684	1421	2645	1686	2327	962	875	1505
11	1827	2491	516	1973	707	1553	590	1248	689	1018	393	615	896
12	438	978	381	1251	458	338	466	781	330	473	308	476	840
13	1045	439	392	874	509	162	192	644	589	452	354	300	862
14	598	164	119	502	383	62	160	409	566	316	245	297	761
15	373	124	107	343	450	45	161	414	542	501	129	241	587
16	293	7	157	386	400	14	113	252	88	230	107	194	369
17	339	8	55	308	347	10	48	161	155	172	24	13	148
5+	27805	27427	27834	39529	31196	31969	28860	23089	30426	25393	17054	15693	26888





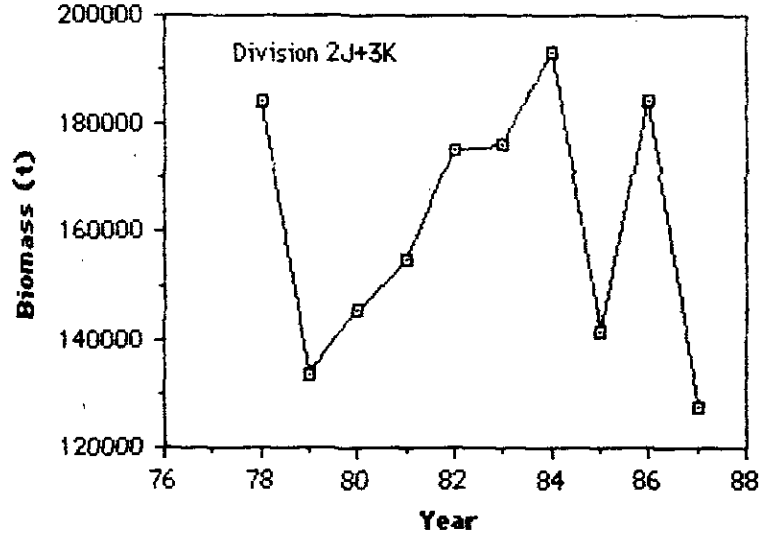


Fig. 1 Biomass estimates of G. halibut in Div. 2J+3K from 1978-1987.

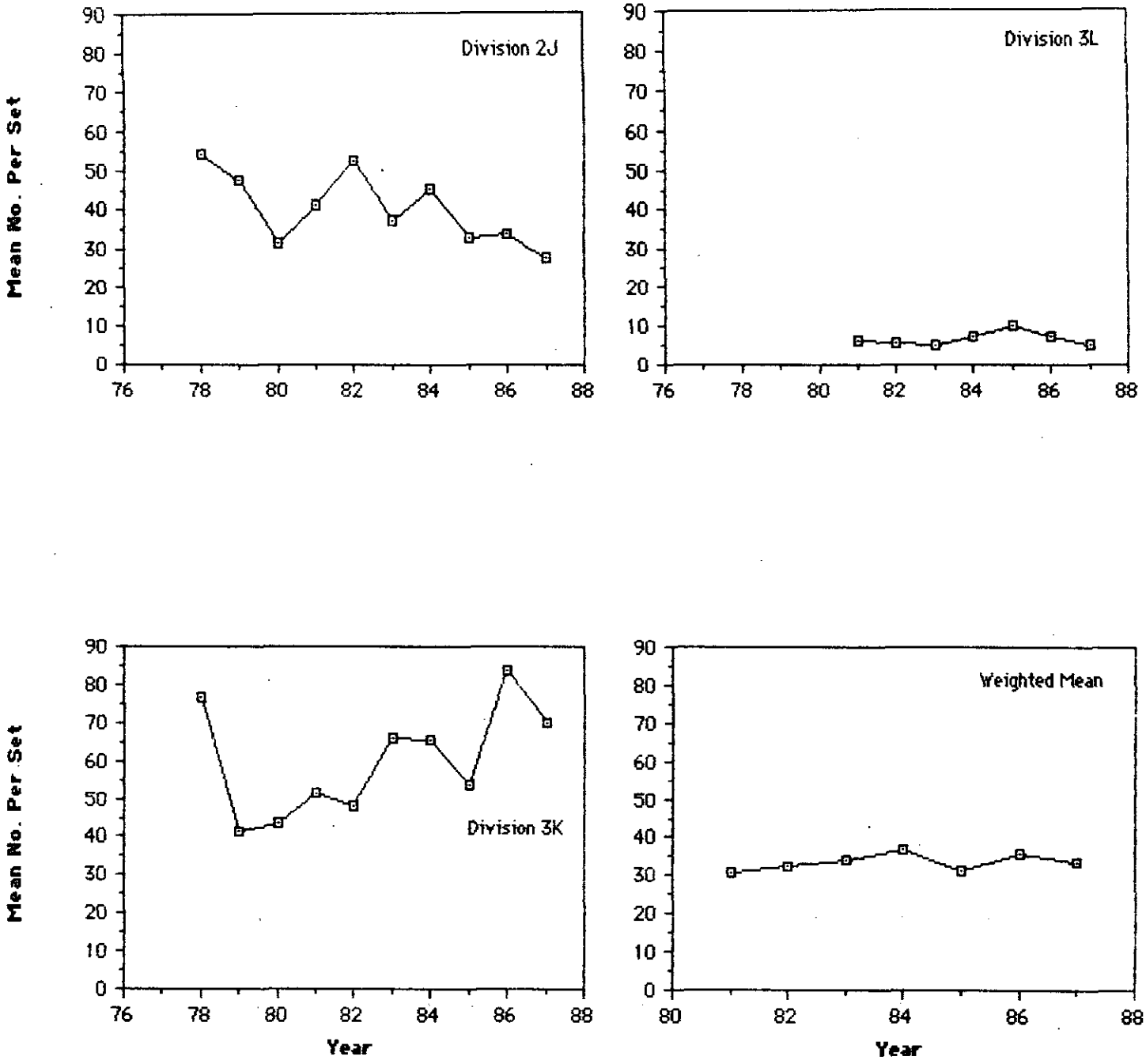


Fig.2 Mean nos. per set of G. halibut in Div. 2J3KL from surveys.

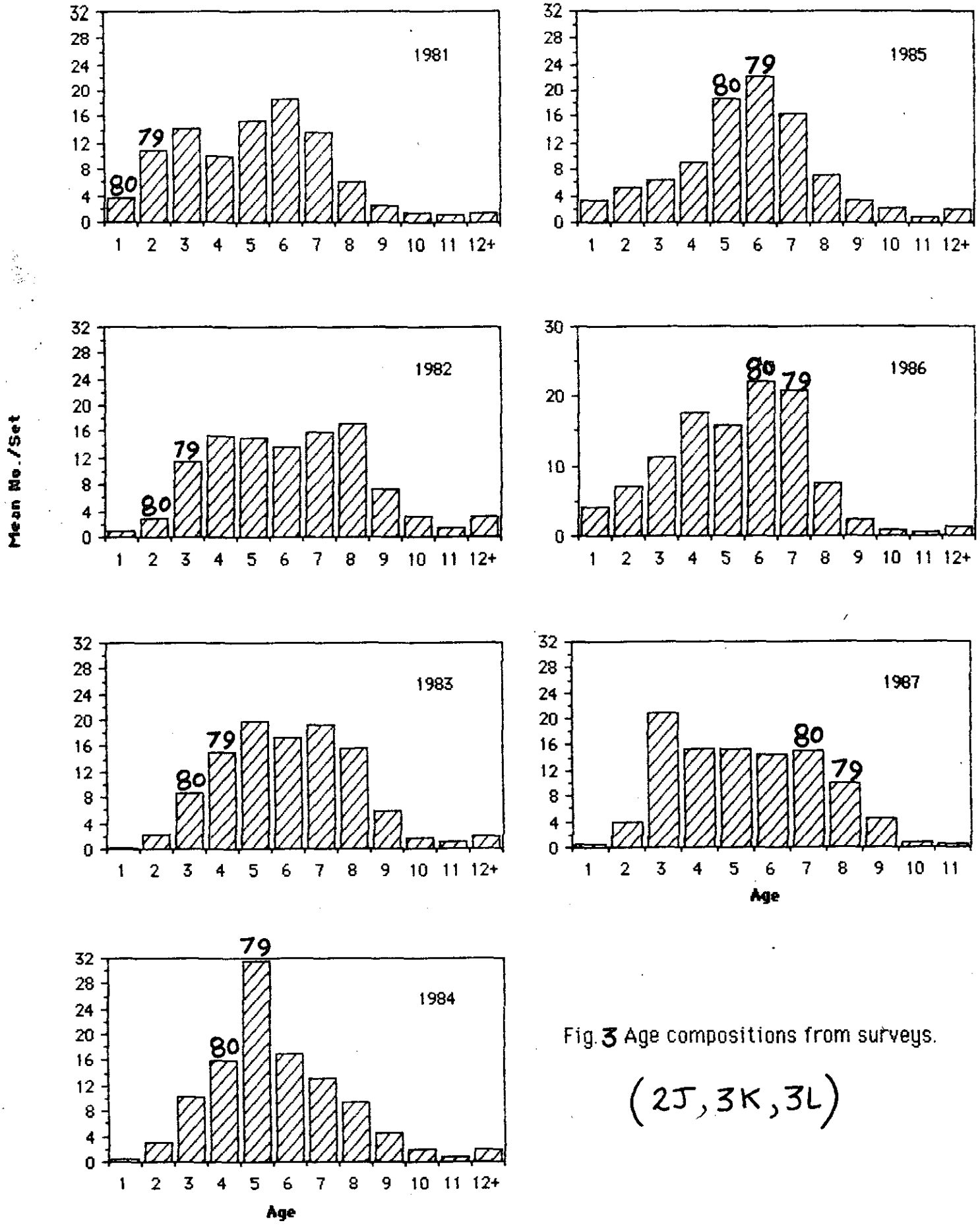


Fig. 3 Age compositions from surveys.

(2J, 3K, 3L)

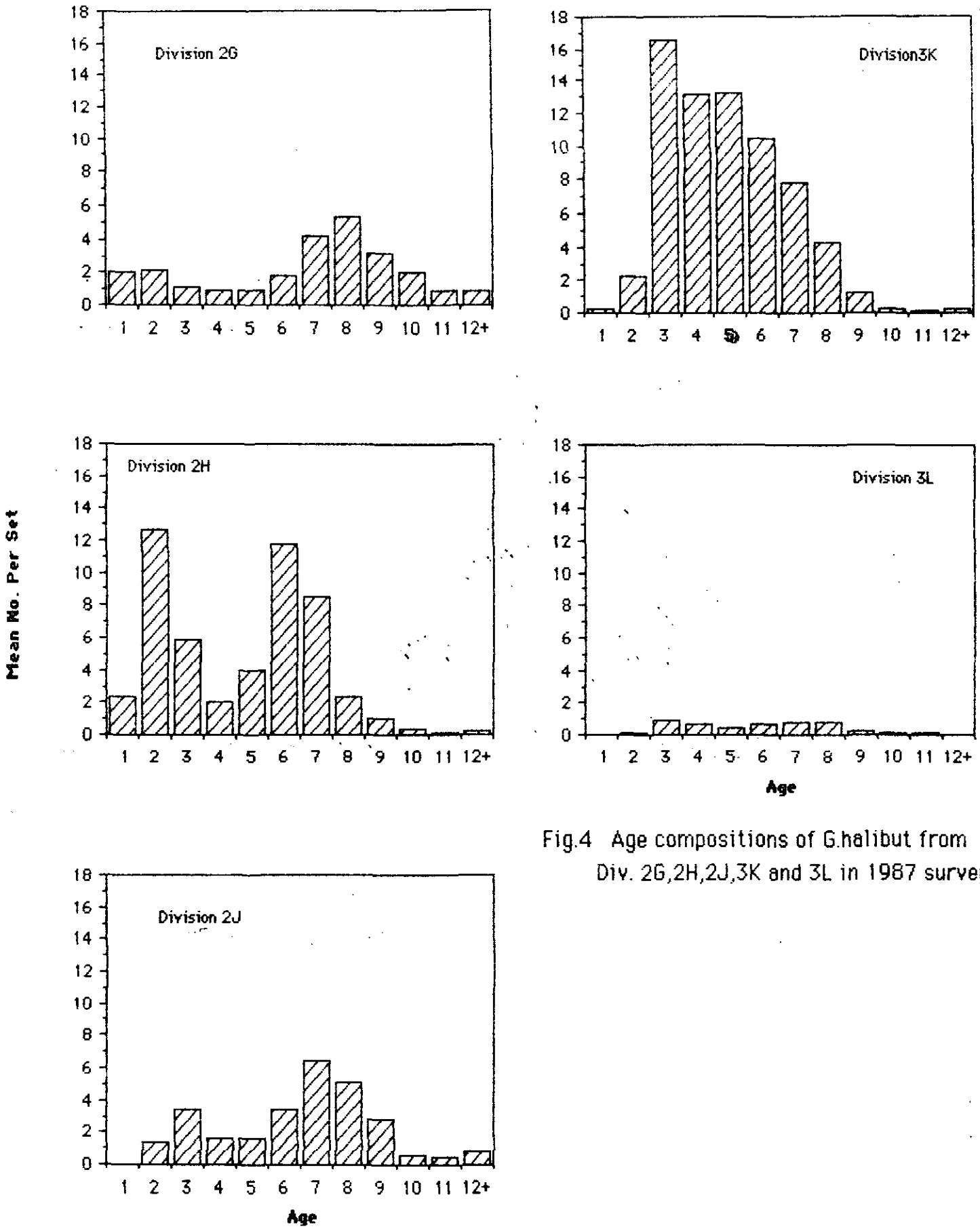


Fig.4 Age compositions of G.halibut from Div. 2G,2H,2J,3K and 3L in 1987 surveys.

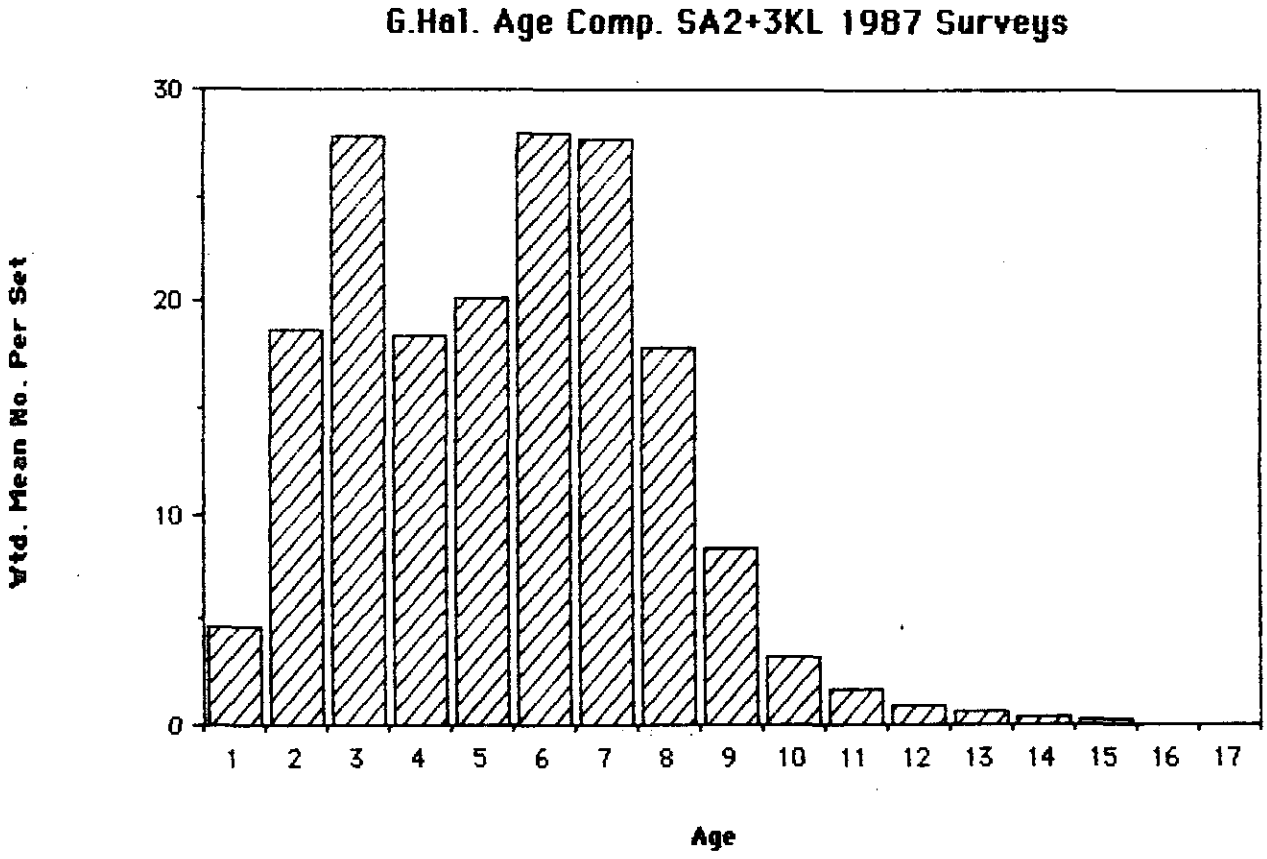


Fig. 5 Age composition of G.halibut in SA2+3KL from 1987 Surveys.

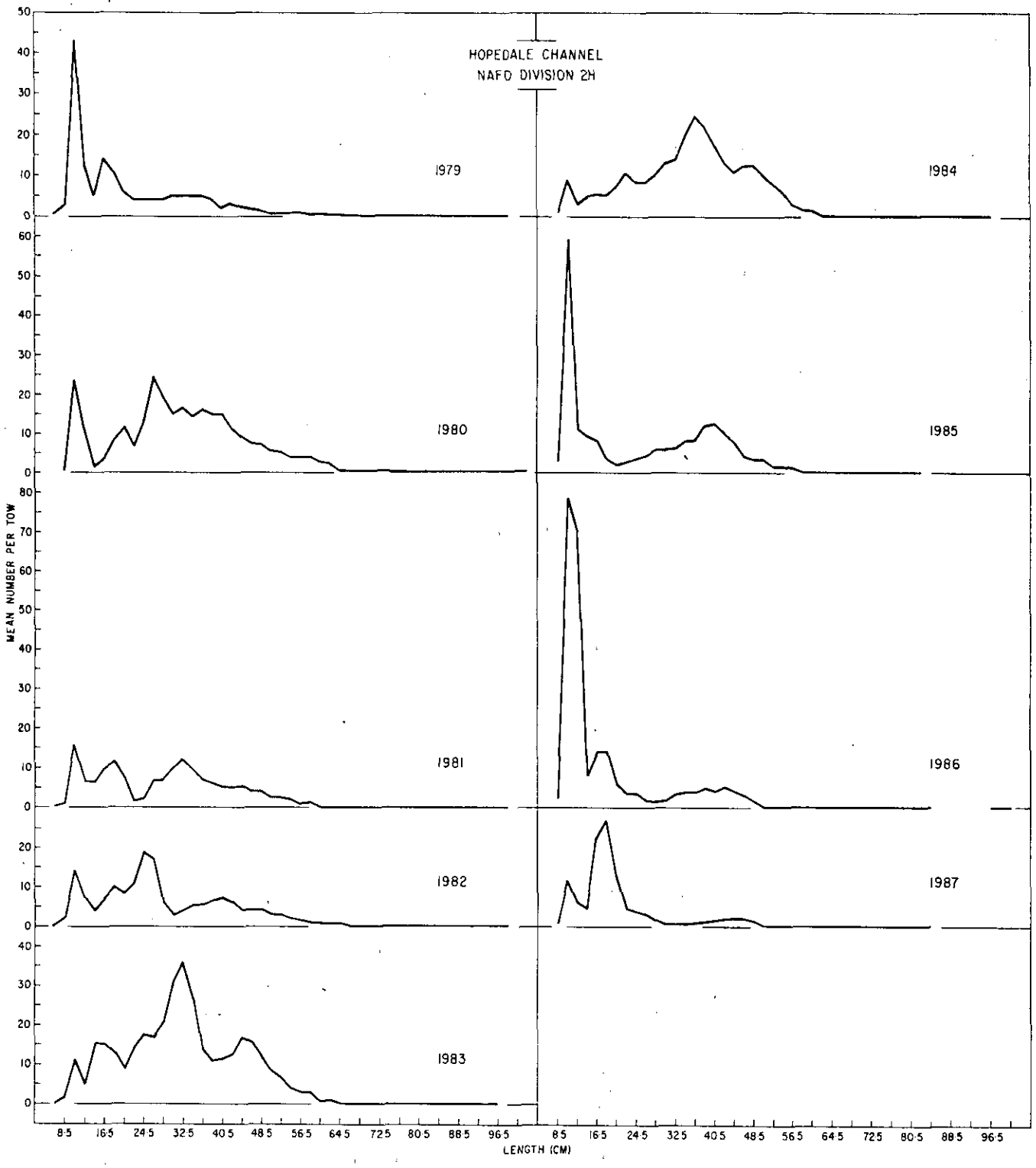

HOPEDALE CHANNEL
NAFO DIVISION 2H
1979
1980
1981
1982
1983
1984
1985
1986
1987
MEAN NUMBER PER TOW
LENGTH (CM)
8·5
16·5
24·5
32·5
40·5
48·5
56·5
64·5
72·5
80·5
88·5
96·5

Fig 6.

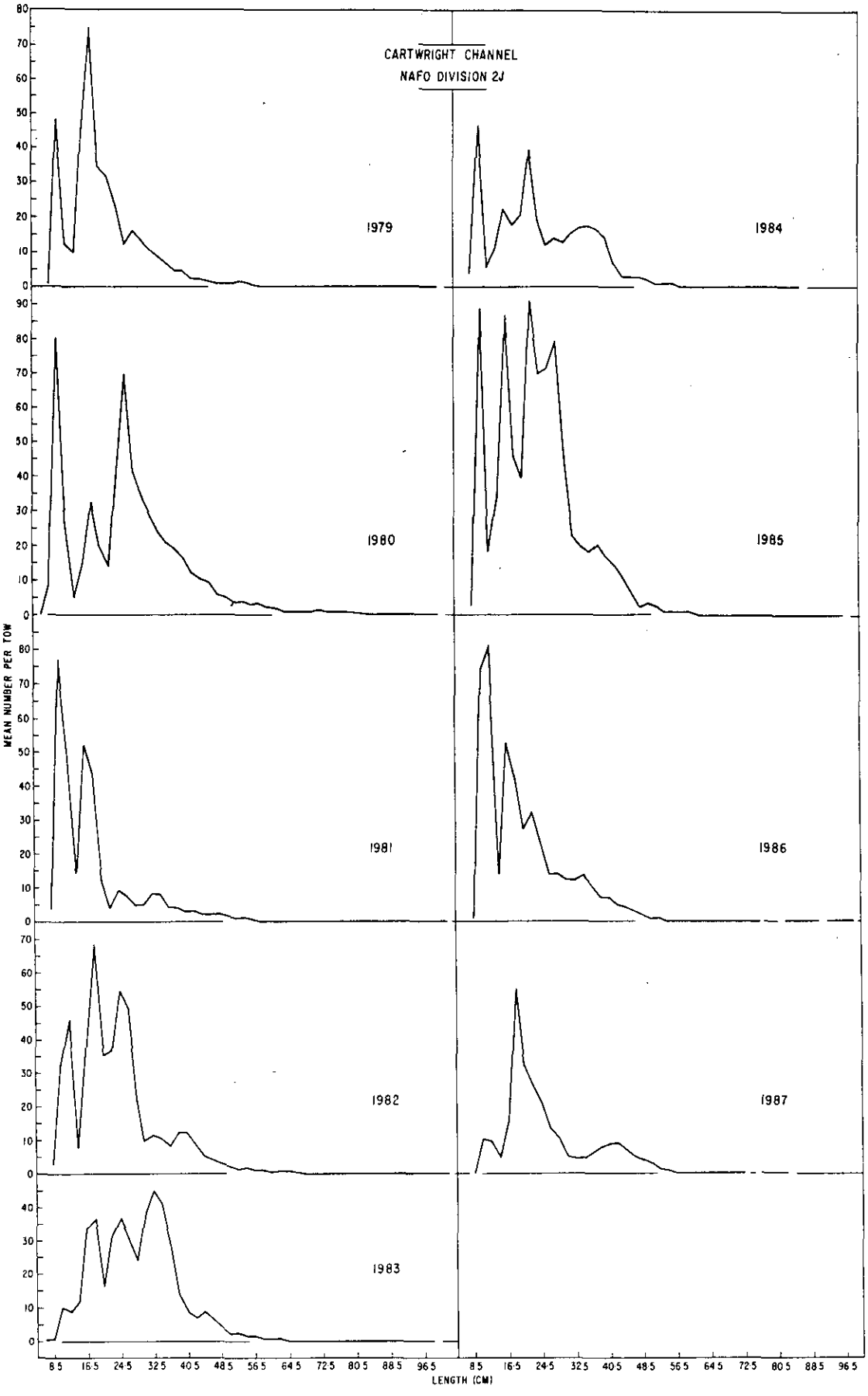

CARTWRIGHT CHANNEL
NAFO DIVISION 2J
1979
1980
1981
1982
1983
1984
1985
1986
1987
MEAN NUMBER PER TOW
LENGTH (CM)
8.5
16.5
24.5
32.5
40.5
48.5
56.5
64.5
72.5
80.5
88.5
96.5

Fig 7

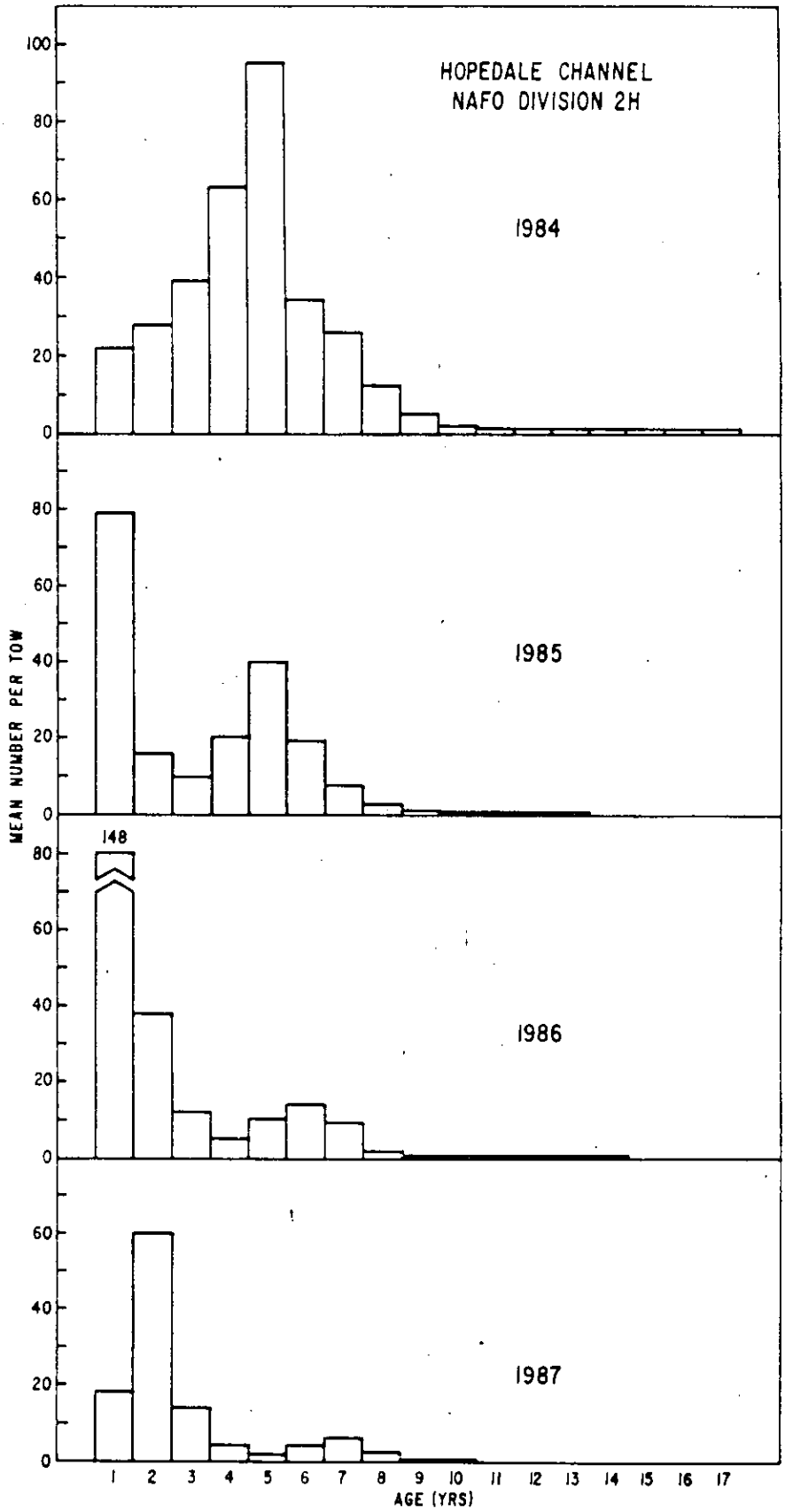

HOPEDALE CHANNEL
NAFO DIVISION 2H
1984
1985
1986
1987
148
MEAN NUMBER PER TOW
AGE (YRS)

Fig 8.

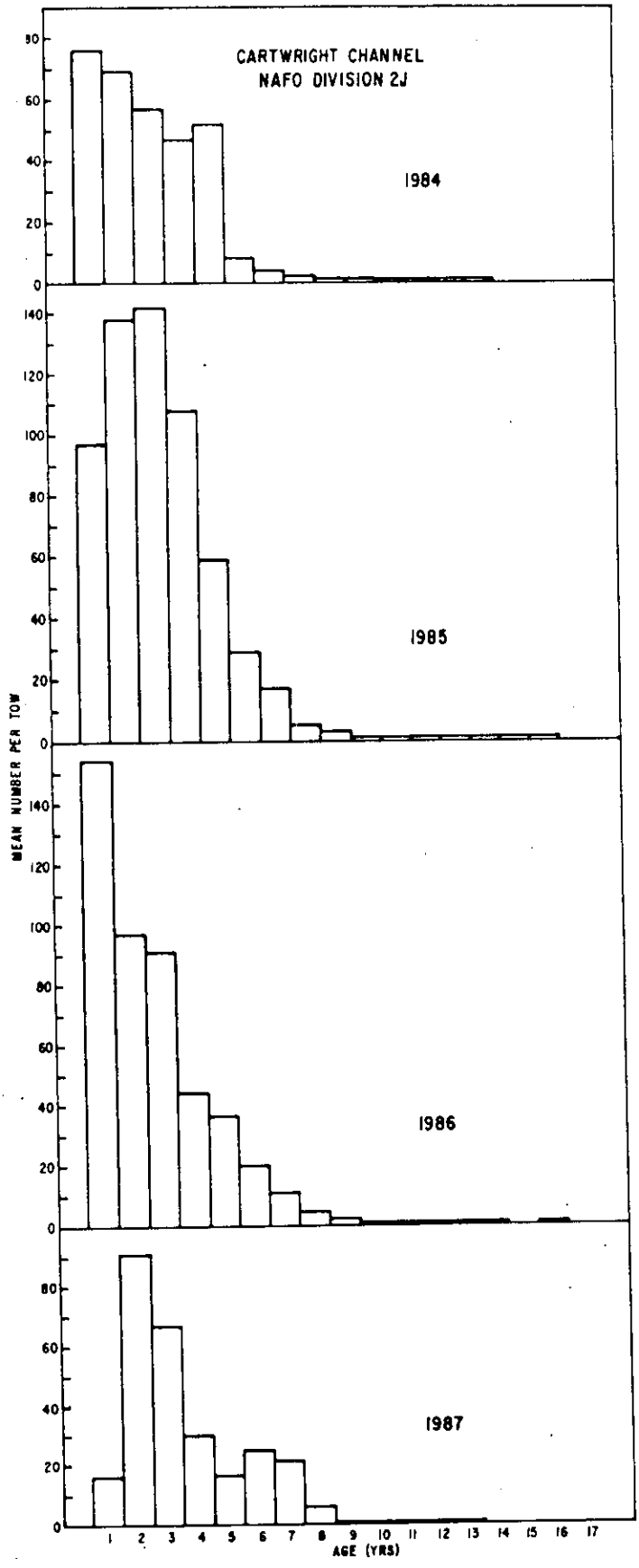
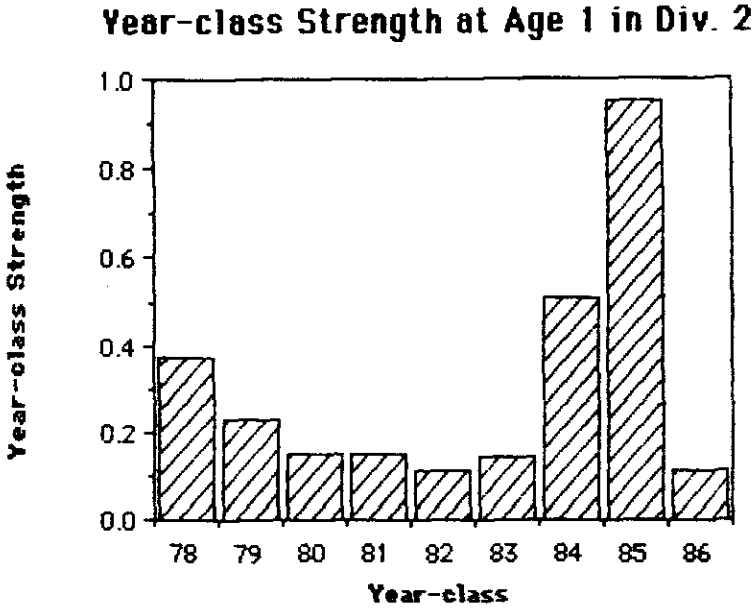

CARTWRIGHT CHANNEL
NAFO DIVISION 2J
1984
1985
1986
1987
MEAN NUMBER PER TOW
AGE (YRS)

Fig. 9



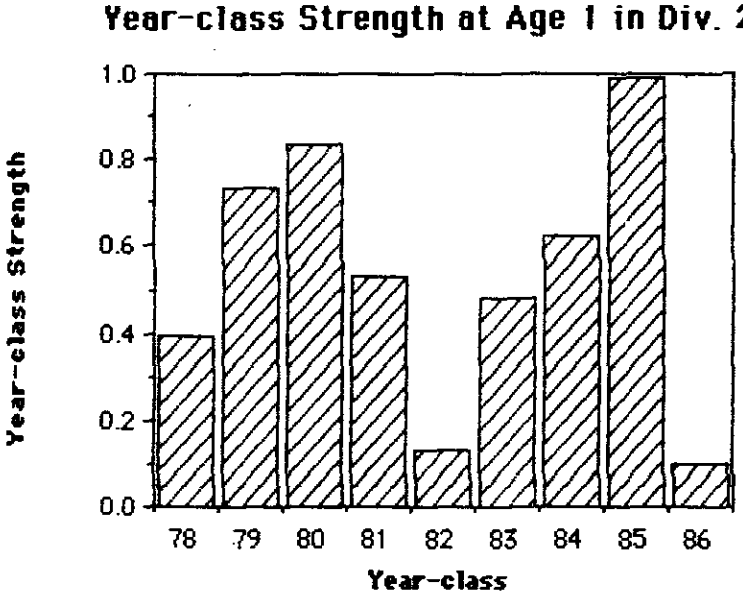


Fig. 10 Estimated yearclass strengths of Greenland halibut at age 1 relative to the 1985 year-class in Division 2J.