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An Assessment of Greenland Halibut in SA 2 + Divisions 3KL

by

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Catches and TACs

Catches of Greenland halibut increased from fairly low levels in the early 1960s to over 36,000 t in 1969 and ranged from 24,000 t to 39,000 t over the next 15 years (Table 1, Fig. 1). From 1985 to 1989, catches exceeded 20,000 t only in 1987. In 1990, an extensive fishery for G. halibut developed in the deepwater area around the boundary of Div. 3L and 3M, resulting in an increase in catch to about 47,000 t (Table 2). The major participants in this fishery were EEC/Spain and Portugal, as well as some non-member countries such as Panama. Catches listed as "other" in Table 2 were derived from observations on the fishery in the Div. 3LM area.

Up to 1990, Canada, USSR, GDR, and Poland were usually the main participants in the fishery (Table 1), although Portugal and Japan have become more involved in the fishery since 1984. Canadian catches peaked in 1980 at just over 31,000 t while the largest non-Canadian catches before 1990 occurred in 1969-70 (Fig. 2). In most years, the majority of the catch has come from Div. 3K and 3L, with catches from Div. 2G and 2H usually being relatively low (Fig. 1).

Canadian catches are taken mainly by gillnet and have been around 7000-10,000 t in most recent years, down from a peak of about 28,000 t in 1980 (Fig. 3). Otter trawl catches peaked at about 8000 t in 1982, declined to less than 1000 t in 1988, and increased to about 3100 t in 1990 (Table 3), which is close to the highest level in the last 5 years.

The TAC for this resource increased from 35,000 t in 1980 to 55,000 t in 1981-84, 75,000 t in 1985, and 100,000 t in 1986-89. The TAC was reduced to 50,000 t in 1990, following declines in the surveyed biomass of G. halibut, and this level was maintained in 1991.

Catch-at-age and mean weights-at-age

Sampling data from the catches of Canada, Portugal, and Spain were analyzed. Data from other countries involved in the fishery were collected during 1990 but were not available at this time. Table 4 contains a summary of the sampling data from the Canadian catch in 1990; and Tables 5, 6, and 7 show the calculated catch-at-age and mean weights-at-age for the Canadian inshore, offshore, and total fisheries in 1990 respectively. Ages 6-8 dominated the catch in all components in 1990, which is consistent with the Canadian catch in virtually all years. In most years, 7 is the peak age in the catch, followed by age 8 (Table 8). Only in a few years did age 6 constitute a higher percentage of the catch numbers than age 8, which was the case in 1990. This is likely to be a reflection of the relative strengths of these year-classes. The mean weights at age in 1990 were very close to those calculated from the Canadian fishery in 1989.

Length frequency data from the Portuguese fishery in Div. 3L in 1990 were available. To determine numbers-at-age, an age-length key from the Canadian fall survey in Div. 3KL was applied to the total numbers caught at length. The resulting age composition is shown in Table 9, which indicates that ages 6-9 comprise the majority of the catch, similar to the Canadian fishery. Length frequencies from Spanish catches of Greenland halibut in Div. 3LM in 1990 were very similar to those from the Portuguese fishery and would, therefore, be expected to result in much the same age composition.

There is also some information from the 1991 Canadian fishery in the Div. 3L/3M area (Fig. 4). Figure 5 shows length frequency data from Div. 3L from 10 fishing sets carried out in depths between 720 m and 1330 m during April 1991. Figure 6 shows the data from 18 sets

made by the same vessel in Div. 3M, depth range 950-1300 m, fished between April 24 and May 13, 1991. These data show somewhat larger fish predominated in the catch compared to the Portuguese and Spanish data from 1990, even allowing for the difference in growth expected from 1990 to 1991. The Canadian frequencies show larger fish in most of the catches in Div. 3M compared to Div. 3L.

Catch and effort data

It has been noted previously for this stock that C/E data are incomplete for some fisheries/areas/seasons. Canadian trawler catches have been relatively low in many years, and effort by many other nations has been variable over time. Thus there is no C/E index for this stock at present. However, an examination of the database is planned for the next assessment of this stock to determine if a meaningful index can be derived.

Declines in C/E in 1990 were reported compared to 1989 for the directed G. halibut fishery by Portugal in Div. 3L.

Research vessel surveys

1) Stratified-random groundfish surveys

Results of stratified-random groundfish surveys in autumn in Div. 2J, 3K, and 3L are shown in Tables 10-12 respectively as mean weight (kg) per tow on a stratified basis. Figures 7-9 show the stratification schemes used in the surveys in these divisions. The biomass and abundance indices were calculated using a multiplicative model to estimate strata not surveyed. It should be noted that in Div. 2J and 3K, the strata from 1001-1500 m were rarely surveyed and thus were not included in the indices. In Div. 3L, the deepest strata are only 732 m, and these areas were not surveyed in all years. Div. 2GH were last surveyed by Canada in 1988.

The trends in the abundance and biomass indices for Div. 2J3KL are shown in Figures 10-17. The biomass index shows a decline, particularly in Div. 2J and 3K, while the abundance has increased with 1989 and 1990 being among the highest 4 points in the 1981-90 period. The opposite trends in these indices can be explained by Table 13 and Figure 18. These show a substantial drop in 9+ abundance in the late 1980s; at the same time, an increase in the abundance of younger fish was occurring. The abundance of G. halibut aged 7-9, which form the bulk of the fishery in most years, particularly the Canadian fishery, was at its lowest level in recent surveys. However, abundance at ages 4-6 was at the highest level in 1989 and 1990. In fact, the groundfish surveys suggest that the 1984-86 year-classes are as large or larger at ages 4 and 5 (age 4 only for 1986 year-class) than any others since the 1974 year-class (Fig. 19).

An examination of the 1990 survey results on an age-by-age and stratum-by-stratum basis showed that the majority of the abundance of the 1984-86 year-classes was found in strata 622-623 and 625-627 in Div. 3K and strata 208, 211, 212, and 235 (Hawke Channel) in Div. 2J. Strata 622 and 627 accounted for about 65%, 38%, and 24% of the total abundance at ages 4, 5, and 6 respectively in 1990. These deepwater areas are usually associated with high abundance of G. halibut (Table 11).

2) Shrimp surveys

Shrimp surveys have been conducted in Div. 2H and 2J for several years and catch considerable quantities of young G. halibut. Data from these surveys have been used to determine the strength of recruiting year-classes of G. halibut, particularly from 1984 onward, when age samples have been collected from the survey catches. The surveys use a stratified-random design and are directed at shrimp, primarily in Hopedale Channel (Div. 2H) and Cartwright and Hawke channels (Div. 2J). The stratification schemes used differ from those in the groundfish surveys. The time series is different for each channel, as the survey did not cover all areas in each year. For Hopedale, data are available from 1984-88 and 1990; for Cartwright, 1984-88; and for Hawke, 1988-90. Table 14 gives the results, in mean number per tow at age, and Figures 20-22 show the same data as histograms.

In Hopedale Channel, the 1985 year-class dominated the survey catches in 1986 and 1987 and was more than twice as large as any other year-class in the series at age 3 in 1988. The 1984 year-class was not as strong, but the 1986 year-class dominated the survey catches in 1988 and 1990. In Cartwright Channel, large numbers of G. halibut at ages 1-3 were taken in 1985 and 1988, making the results somewhat difficult to interpret. However, the 1985 year-class dominated the catches in 1986 and 1987 and showed up strongly in 1988, which is consistent with Hopedale Channel. The 1986 year-class was poor at age 1 and strong at age 2, while the results for the 1984 year-class are also variable. In Hawke Channel, only 3 years of data are available; so it is only possible to compare the strengths of a few year-classes. In all 3 years, 1988-90, the 1984, 1985, and 1986 year-classes were dominant. These 3 year-classes constituted about 67% of the total abundance in the 1990 survey. There is no substantial evidence from the shrimp surveys in any of the 3 areas to indicate that the 1987-89 year-classes are as strong as the 3 previous cohorts, although not all channels were surveyed in 1989 and 1990.

Assessment

In the 1989 assessment of this stock, the TAC was reduced by 50% to 50,000 t following declines in stock biomass. This advice was continued in 1990, mainly because surveys indicated relative stability at this lower level of biomass. The current assessment confirms that the biomass in Div. 2J3KL is still stable at a relatively low level compared to the early to mid-1980s but that the abundance in recent years is higher relative to the earlier period. This is a result of the stronger 1984-86 year-classes; and although the recruitment of these year-classes should cause the stock biomass to increase, a continuing decline in the number of older fish in the surveyed part of the stock is cause for concern.

A further complicating factor in the assessment of this resource is the rapid development of the fishery in the deepwater area of Div. 3LM. It is highly likely that the G. halibut taken in this fishery are from the same stock as the rest of the fish caught in SA2 + Div. 3KL, although little is known about the population in the Div. 3LM area. The data from the commercial fisheries in this region indicate that G. halibut aged 6-10 comprise most of the catch, which is the situation in the Canadian fishery in the remainder of the stock area. Virtually no r.v. survey information is available from this area, meaning almost nothing is known of the abundance and biomass of G. halibut there, both at present and in the past. Thus no information is available on what proportion of the stock is located in the area, annually and seasonally, or whether there is any interchange between these fish and those of the surveyed population in Div. 2J3KL. Without such data, it is very difficult to determine total stock status and advise on appropriate catch levels.

Prognosis

The catch in the deepwater 3LM area in 1990 was about 35,000 t, compared to about 12,000 t in the rest of the stock area. The effect on the stock of such a high proportion of catch coming from one component of the fishery is unknown, as is the sustainability of such a catch in the Div. 3LM area. However, in some previous years, it was advised that if the TAC for this stock was to be achieved, fishing effort should be spread over a wider area, particularly in the deepwater slopes of Div. 2GH, where older fish were thought to be more abundant. The reason for this was to avoid possible over-exploitation of the 3 or 4 age-groups which comprise the bulk of the fishery in the shallower waters of Div. 3KL.

Given the present biomass levels as measured by r.v. surveys, and the apparent improvement in recruitment, a catch of 50,000 t in 1992 is likely to approximate exploitation at $F_{0.1}$. Thus a TAC of 50,000 t is appropriate for this stock in 1992; and it should apply to the entire stock, including the portion located in the Regulatory Area in Div. 3LM.

Table 1. Greenland halibut landings (metric tons) by year and country for Subarea 2 and Division 3KL from 1963 to 1989.

Country	Year													
	63	64	65	66	67	68	69	70	71	72	73	74	75	76
Canada	776	1757	8082	16209	16604	13322	11553	10706	9408	8952	6840	5745	7807	9306
FRG	10	35	-	355	42	4	202	13	-	86	707	515	622	927
Poland	691	1834	939	1114	3296	5806	5406	8266	5234	6986	9060	7105	8447	5942
Iceland	-	-	-	-	-	-	-	-	2	-	-	-	-	-
Norway	-	-	-	-	-	-	4	-	-	1389	501	117	-	6
USSR	125	302	479	242	4287	8732	9268	7384	9094	10183	8652	9650	9439	6799
Romania	-	-	-	-	-	-	40	225	7	120	80	-	-	-
GDR	-	-	-	1324	1415	4122	10014	-	647	402	1681	2701	2025	1512
Den-F	-	-	-	-	-	-	-	-	-	970	950	4	-	-
Spain	-	-	-	-	-	-	-	-	-	3	-	-	-	1
UK	-	-	-	-	-	-	-	-	-	731	201	1112	62	-
Den-G	-	-	-	-	-	-	-	-	-	-	65	2	-	-
Portugal	-	-	-	-	-	-	-	-	-	-	207	161	231	73
Fra-M	-	-	-	-	-	-	-	-	-	-	-	5	-	-
Fra-Sp	-	-	-	-	-	-	-	-	-	-	-	6	48	32
Japan	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EEC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1602	3928	9500	19244	25644	31986	36488	26594	24392	29822	28944	27123	28681	24598

Country	Year												
	77	78	79	80	81	82	83	84	85	86	87	88	89[a]
Canada	17967	24692	29940	31774	24125	19248	19031	17283	12277	8213	13450	8451	11919
FRG	755	1022	15	55	-	57	2	9	482	15	1	-	5
Poland	5998	5215	1813	203	1806	1111	5258	943	460	177	1001	904	360
Iceland	-	-	-	-	-	-	-	-	-	-	-	-	-
Norway	15	3	8	1	-	-	15	18	1	-	-	-	-
USSR	4308	5632	1961	238	3325	1471	937	440	149	770	6716	1063	1058
Romania	-	3	-	-	-	-	-	-	-	-	-	-	-
GDR	1953	1636	178	316	1350	2487	2587	2498	1850	1868	3268	2246	1726
Den-F	350	268	-	-	-	-	-	-	193	451	2877	740	730
Spain	-	-	4	-	-	-	-	-	-	-	107	15	22
UK	476	53	110	22	-	1	-	3	-	-	-	-	-
Den-G	-	-	-	-	-	-	-	-	-	-	-	-	-
Portugal	119	-	38	21	16	1818	-	2612	2940	3107	1390	4118	3168
Fra-M	-	-	-	-	-	-	-	-	-	-	-	-	-
Fra-SP	-	5	1	-	-	7	-	-	-	-	-	-	-
Japan	-	3	-	12	60	14	-	1003	258	1277	2128	1506	477
Other	-	-	-	-	-	-	9	-	-	-	-	-	-
EEC	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	31941	38532	34068	32642	30682	26206	27839	24809	18610	15878	30938	19043	19465

[a]Provisional.

Table 2. Catches of Greenland halibut in SA2+Div.3KLM in 1990.

Canada	9863
Poland	360
USSR	1161
GDR	12
Den-F	571
Spain	4685
Port.	10637
Japan	1662
Other(member)	14815
Other(non-member)	3300
Total	46796

Table 3 . Catches of Greenland halibut by Canadian vessels in 1990.

	Gillnet						Otter trawl						Other gears	
	2G	2H	2J	3K	3L	GN Total	2G	2H	2J	3K	3L	OT Total	2+3KL	Total
Jan										222		222		222
Feb										364	3	367		367
Mar										82	28	110		110
Apr					2	2			1	107	18	128		130
May				4	10	14				3		3	1	18
Jun				51	12	63					1	1	2	66
Jul				654	426	1080			254	12		266	7	1353
Aug			356	1771	621	2748		7	882	33	1	923	6	3677
Sep	26	96	573	535	109	1339			26	6	63	95	99	1533
Oct	28	39	334	234	622	1257	34	142	9	7	40	232	2	1491
Nov		4	93	4	34	135	114	5	132		9	260		395
Dec				1	1	2	53	297	116	3		469	30	501
Total	54	139	1356	3254	1837	6640	201	451	1420	839	165	3076	147	9863

Table 4 . Samples used to calculate catch at age and mean weights at age for Greenland halibut in the Canadian fishery in SA2+Division 3KL in 1990. Numbers in parentheses are the number of observations, and n is the number of samples.

Age-length key	Length frequency	n	Catch (t)	Description
Inshore, Q3, 3L (500)	GN, Jun, 3L (349)	1	24	3L, GN, Jan-Jun
	Jul (683)	2	426	Jul
	Aug (2877)	9	621	Aug
Inshore, Q4, 3L (280)	GN, Sep, 3L (1211)	4	766	3L, GN, Sep-Dec
Inshore, Q3, 3K (266)	GN, Jul, 3K (2564)	6	709	3K, GN, Jan-Jul
	Aug (2087)	6	1771	Aug
Inshore, Q4, 3K (240)	GN, Sep, 3K (1132)	6	774	3K, GN, Sep-Dec
Inshore, Q3, 2J (296)	GN, Aug, 2J (1248)	4	356	2J, GN, Jan-Aug
Inshore, Q4, 2J (70) 2H (312)	GN, Sep, 2J (392)	1	1000	2J, GN, Sep-Dec
Inshore, Q4, 2H (312)	GN, Sep, 2H (742)	2	122	2GH, GN, Jan-Sep
	Nov (332)	1	71	Oct-Dec
Offshore, Q2, 3L (77) 3K (297)	OT, Apr, 3L (338)	1	50	3L, OT, Jan-Jun
Offshore, Q3, 3L (155)	OT, Aug, 3L (303)	1	115	3L, OT, Jul-Dec
Offshore, Q1, 3K (670)	OT, Jan, 3K (3136)	8	222	3K, OT, Jan
	Feb (620)	2	364	Feb
	Mar (994)	3	189	Mar-Apr
Offshore, Q2, 3K (297)	OT, May, 3K (661)	1	64	3K, OT, May-Dec
Offshore, Q3, 2J (198)	OT, Jul, 2J (601)	2	255	2J, OT, Jan-Jul
	Aug (360)	1	915	2HJ, OT Aug-Sep
Offshore, Q4, 2J (218)	OT, Nov, 2J (1070)	3	902	2GHJ, OT, Oct-Dec

Table 5. Catch at age and mean weights at age of G.halibut in the Canadian inshore fishery in SA 2+Div 3KL. in 1990.

	AVERAGE		CATCH		
AGE	WEIGHT	LENGTH	MEAN	STD. ERR.	C. V.
* 5	0.396	37.305	36	5.36	0.15
* 6	0.600	42.184	1912	131.22	0.07
7	0.746	45.006	4969	140.26	0.03
8	1.034	49.591	1365	54.56	0.04
* 9	1.500	55.370	182	12.49	0.07
*10	2.061	60.889	28	3.79	0.14
*11	2.775	66.496	9	1.99	0.21
*12	3.472	71.185	2	1.76	0.74

Table 6. Catch at age and mean weights at age of G.halibut in the Canadian offshore fishery in SA 2 + Div. 3KL in 1990.

	AVERAGE		CATCH		
AGE	WEIGHT	LENGTH	MEAN	STD. ERR.	C. V.
4	0.250	32.539	2	0.61	0.27
* 5	0.423	37.849	110	22.11	0.20
6	0.562	41.293	1023	63.84	0.06
7	0.778	45.513	1637	70.62	0.04
8	1.108	50.585	421	34.38	0.08
* 9	1.610	56.580	114	10.08	0.09
*10	2.146	61.620	49	5.69	0.12
*11	2.880	67.278	24	3.40	0.14
*12	3.654	72.240	18	2.22	0.12
13	4.524	76.995	11	1.36	0.13
*14	5.567	81.859	13	1.49	0.12
15	6.906	87.274	9	1.23	0.14
*16	8.546	92.988	2	0.58	0.31
17	9.601	96.325		0.25	0.58

Table 7. Catch at age and mean weights at age of G.halibut in the Canadian fishery in total in SA 2 + Div. 3KL in 1990.

	AVERAGE		CATCH		
AGE	WEIGHT	LENGTH	MEAN	STD. ERR.	C. V.
4	0.250	32.539	2	0.62	0.27
* 5	0.416	37.715	148	23.10	0.16
* 6	0.587	41.874	2979	148.14	0.05
7	0.754	45.131	6706	159.41	0.02
8	1.052	49.825	1813	65.46	0.04
* 9	1.542	55.836	300	16.30	0.05
*10	2.116	61.357	78	6.93	0.09
*11	2.850	67.054	34	4.00	0.12
*12	3.632	72.117	21	2.87	0.14
13	4.524	76.995	11	1.38	0.13
*14	5.567	81.859	13	1.51	0.12
15	6.906	87.274	9	1.25	0.14
*16	8.546	92.988	2	0.59	0.31
17	9.601	96.325		0.26	0.58

Table 8. Catch at age ('000) of G.halibut in SA2-Div.3KL.

AGE	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
5	322	19	464	3016	2182	204	810	236	766	858	1662	245	128	269
6	2719	680	4351	8511	7980	2032	4242	2020	3889	2211	4449	1958	1779	2900
7	5547	3600	9374	9072	11726	8913	9209	5552	10714	5560	4955	5604	10293	7405
8	4781	6030	6377	7662	5611	9429	10753	5064	8215	7308	2933	4450	8358	3986
9	3821	4199	2546	2898	1069	5258	4045	3112	2509	3888	1156	1284	2652	1172
10	1628	2457	879	1454	440	3729	836	1480	756	1198	429	412	798	423
11	677	923	191	731	262	987	240	524	229	387	133	213	359	183
12	130	290	113	371	136	125	133	225	83	136	83	122	263	96
13	269	113	101	225	131	52	40	143	116	101	73	61	210	97
14	131	36	26	110	84	14	27	70	93	55	40	49	157	56
15	63	21	18	58	76	9	20	55	74	73	18	32	99	48
16	41	1	22	54	56	2	13	29	10	28	12	20	53	11
17	43	1	7	39	44	1	5	14	14	18	2	1	17	2

Table 9. Age composition of G.halibut estimated from Portuguese catches in Div.3L in 1990.

Age	Catch ('000)
3	2
4	213
5	226
6	1006
7	2071
8	1834
9	791
10	356
11	179
12	94
13	74
14	23
15	4
16	4

Table 10. Average weight (kg) of Greenland halibut caught per set from fall 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(2)	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)
Estimated biomass (t) (surveyed area)	106,834	85,136	66,970	74,564	76,661	104,233	78,546	81,234	62,603	77,555	50,771
Estimated biomass (t) multiplicative model (excl. strata 220, 221, 225, 226, 232, 233)	109,228	86,537	74,722	84,121	79,715	107,906	78,547	89,168	62,605	77,554	50,772

Stratum	Gadus 159, 160, 161 1988	Gadus 174, 175, 176 1989	Gadus 190, 191, 192 1990
201	0.08(8)	0.80(8)	0.53(6)
202	-	0.47(2)	3.37(2)
203	34.00(2)	89.98(3)	24.33(2)
204	166.00(2)	567.23(2)	125.15(2)
205	1.05(6)	0.39(10)	0.30(8)
206	1.78(14)	0.65(13)	0.94(11)
207	0.05(7)	0.04(10)	0.00(7)
208	84.00(2)	201.75(2)	170.96(2)
209	11.22(5)	10.28(8)	8.20(6)
210	7.88(3)	6.76(4)	11.83(3)
211	81.50(2)	23.33(2)	151.35(2)
212	75.25(2)	42.75(4)	80.02(3)
213	5.85(8)	2.35(9)	2.26(8)
214	22.08(6)	5.97(6)	5.09(5)
215	9.01(7)	5.39(6)	7.04(6)
216	3.50(2)	12.55(2)	7.90(2)
217	43.75(2)	6.03(2)	32.08(2)
218	58.50(2)	17.98(2)	42.15(2)
219	45.25(2)	35.00(2)	93.92(2)
-220	-	-	-
-221	-	-	-
222	41.50(2)	8.00(2)	14.22(2)
223	63.50(2)	15.76(2)	23.43(2)
224	63.00(2)	2.60(2)	12.35(2)
-225	-	-	-
-226	-	-	-
227	32.00(3)	52.37(4)	40.83(3)
228	2.60(5)	5.27(8)	8.53(6)
229	3.23(3)	3.08(3)	2.25(2)
230	44.25(2)	43.28(2)	46.48(2)
231	170.50(2)	-	124.75(2)
-232	-	-	-
-233	-	-	-
234	20.25(2)	10.18(2)	4.90(2)
235	70.25(2)	145.25(2)	185.95(2)
236	13.00(2)	-	110.69(2)
Estimated biomass(t) (surveyed area)	35,447	42,339	38,616
Estimated biomass(t) multiplicative model (excl. strata 220, 221, 225, 226, 232, 233)	35,450	42,774	38,617

Table 11. Average weight (kg) of Greenland halibut caught per set from fall 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	Gadus 159, 160, 161 1988	Gadus 174, 175, 176 1989	Gadus 190, 191, 192 1990
-618							1.50(5)	4.43(6)	0.20(5)	0.07(7)	0.03(6)	0.33(8)	0.00(4)
-619							1.90(7)	0.57(7)	0.22(5)	0.06(8)	0.01(7)	0.27(8)	0.00(5)
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)	9.52(12)	1.59(15)	1.13(9)
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)	6.77(10)	8.35(17)	0.98(11)
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)	221.33(3)	148.27(3)	385.48(2)
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)	135.70(5)	82.06(6)	35.77(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)	2.30(3)	3.30(3)	3.60(4)
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)	30.58(4)	7.04(4)	34.64(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)	95.10(5)	98.92(5)	23.49(4)
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)	145.15(5)	243.56(6)	115.92(5)
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)	40.30(5)	29.90(4)	17.46(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)	100.50(2)	66.27(3)	15.55(2)
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)	56.33(3)	39.35(3)	28.04(2)
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)	76.52(6)	111.82(7)	34.94(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)	0.80(2)	1.58(2)	7.20(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)	13.24(8)	22.34(10)	11.99(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)	3.45(6)	2.69(7)	3.18(7)
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)	4.54(5)	6.99(7)	1.71(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)	3.97(6)	3.52(5)	2.03(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)	3.96(8)	3.37(5)	5.42(5)
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)	11.00(8)	11.49(11)	27.57(9)
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)	3.23(6)	2.76(8)	4.57(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)	6.25(2)	9.01(2)	16.48(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)	-	-	39.92(2)
642	18.63(2)	-	33.25(2)	9.33(3)	33.33(6)	-	81.35(6)	33.50(5)	-	27.70(5)	-	-	45.20(3)
-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)	11.40(2)	3.23(2)	20.40(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)	-		10.40(2)
647	160.23(2)	48.13(2)	89.25(2)	82.50(2)	39.50(2)	-	-	114.72(3)	-	-	-		95.70(2)
-648	15.45(2)	-	-	-	-	-	-	-			-		-
-649	10.91(2)	-	-	-	-	-	-	-	-	-	-		-
Estimated biomass (t) (surveyed area)	99,134	66,330	70,623	77,966	70,870	97,790	111,612	78,804	106,386	76,482	68,270	68,878	60,272
Estimated biomass (t) multiplicative model (excl. strata 618,619, 643, 644, 648, 649)	96,896	65,662	70,668	78,098	72,464	105,275	115,399	78,355	113,205	79,475	73,039	72,962	60,354

Table 12. Average weight (kg) of Greenland halibut per set from fall research vessel surveys in Division 3L. Numbers in parentheses indicate number of sets per stratum.

Stratum	ATC 323, 324, 325 1981	ATC 333, 334 1982	W.T. 7, 8, 9 1983	W.T. 16, 17, 18 1984	W.T. 37, 38, 39 1985	A.N. 72 1986	W.T. 65 1987	W.T. 78 1988	W.T. 87 1989	W.T. 101 1990
328	–	–	–	0.20(4)	0.09(8)	0.52(6)	0.25(4)	0.06(7)	0.10(7)	0.01(5)
341	0.50(3)	0.19(4)	0.80(4)	0.50(5)	0.26(7)	0.04(7)	0.62(9)	0.31(8)	0.26(8)	0.18(6)
342	1.33(3)	2.83(3)	0.87(4)	0.00(2)	0.73(3)	0.20(3)	0.00(3)	0.23(3)	0.17(3)	0.56(2)
343	0.88(4)	–	0.53(3)	0.00(4)	0.08(3)	0.02(3)	0.00(3)	0.00(3)	0.27(3)	0.09(3)
344	6.94(4)	1.00(3)	4.34(6)	0.18(6)	2.46(9)	4.63(7)	2.88(4)	3.20(7)	6.89(7)	1.13(6)
345	20.75(4)	8.67(6)	9.25(8)	39.60(7)	36.61(9)	6.26(4)	18.00(2)	23.07(7)	12.43(7)	24.62(5)
346	9.00(3)	11.63(4)	17.50(5)	27.33(6)	35.80(5)	26.06(3)	22.50(4)	16.00(5)	25.75(4)	32.63(3)
347	1.83(3)	3.02(4)	2.58(6)	0.17(6)	0.76(4)	2.94(4)	0.13(2)	20.30(5)	15.10(5)	3.94(2)
348	0.42(6)	2.08(5)	0.30(11)	0.11(11)	0.61(14)	0.88(5)	0.43(9)	0.44(10)	0.29(9)	0.26(11)
349	0.09(7)	0.03(5)	0.43(9)	0.10(14)	0.07(10)	0.09(9)	0.24(10)	0.00(9)	0.04(10)	0.06(7)
350	0.00(6)	0.00(2)	0.00(8)	0.00(12)	0.00(9)	0.00(11)	0.00(9)	0.00(10)	0.00(10)	0.00(8)
363	0.00(4)	0.00(3)	0.00(3)	0.00(8)	0.00(10)	0.00(7)	0.00(9)	0.00(10)	0.00(9)	0.00(8)
364	0.49(9)	0.25(11)	0.87(11)	0.00(10)	0.05(18)	0.14(5)	0.53(14)	0.27(14)	0.35(11)	0.21(12)
365	2.88(4)	2.75(4)	1.30(5)	0.30(4)	0.12(8)	1.08(5)	3.18(6)	0.30(5)	0.90(5)	0.31(4)
366	5.00(3)	9.58(6)	6.00(4)	6.23(11)	18.09(9)	10.90(4)	8.11(7)	20.64(7)	11.50(7)	6.81(6)
368	21.50(2)	28.75(2)	–	17.75(2)	29.00(2)	6.66(2)	9.00(2)	21.75(2)	27.25(2)	184.63(2)
369	13.25(2)	13.00(4)	14.00(6)	5.19(7)	13.33(6)	6.36(3)	9.25(4)	3.64(5)	4.08(5)	12.40(4)
370	0.00(4)	0.50(6)	0.44(6)	0.39(7)	1.52(9)	2.30(2)	0.25(6)	0.01(7)	0.04(6)	0.73(5)
371	0.01(4)	0.00(5)	0.00(5)	0.00(7)	0.00(7)	0.04(3)	0.00(5)	0.00(6)	0.00(4)	0.00(5)
372	0.00(5)	0.00(7)	0.00(4)	0.00(13)	0.00(17)	0.01(9)	0.00(13)	0.00(13)	0.00(12)	0.00(10)
384	–	0.00(4)	0.00(3)	0.00(6)	0.00(8)	0.08(5)	0.00(6)	0.00(6)	0.00(5)	0.00(4)
385	0.26(8)	2.19(8)	3.20(5)	0.50(12)	1.24(12)	4.67(8)	2.44(9)	0.00(13)	0.17(11)	0.72(7)
386	37.00(3)	21.75(4)	–	12.69(8)	37.50(5)	8.34(4)	6.13(4)	4.86(5)	10.90(5)	11.57(4)
387	67.50(2)	43.67(3)	–	49.00(3)	42.25(4)	8.00(2)	26.33(3)	12.75(4)	15.33(3)	12.00(3)
388	–	2.33(3)	–	24.00(2)	24.75(2)	–	17.25(2)	19.00(2)	15.50(2)	4.18(2)
389	–	7.88(4)	–	19.25(6)	26.80(5)	9.80(4)	11.25(4)	8.88(4)	10.25(2)	6.28(3)
390	0.00(3)	3.50(4)	0.07(3)	0.00(3)	2.72(7)	3.62(6)	1.06(8)	0.00(8)	0.57(7)	0.52(6)
391	–	2.75(2)	21.50(2)	18.75(2)	29.75(7)	8.25(2)	4.10(2)	2.40(2)	13.00(2)	6.03(2)
392	–	14.00(2)	15.25(2)	26.50(2)	25.00(2)	18.00(2)	8.25(2)	13.25(2)	12.00(2)	10.73(2)
729	–	–	–	70.75(2)	30.50(2)	17.92(2)	–	–	–	22.60(2)
730	–	–	–	12.25(2)	6.75(2)	–	–	–	–	–
731	–	–	–	41.75(2)	15.00(2)	–	–	–	–	18.20(2)
732	–	–	–	12.63(2)	21.00(2)	–	–	–	–	16.25(2)
733	–	–	–	12.75(4)	35.83(3)	–	–	–	–	14.33(2)
734	–	–	–	17.67(3)	37.00(2)	–	–	–	–	18.40(2)
735	–	33.00(2)	–	42.00(3)	29.25(2)	47.50(2)	–	–	–	–
736	–	30.00(2)	–	–	70.00(2)	52.53(2)	–	–	–	19.20(2)
Estimated biomass (t) (surveyed area)	12,722	11,649	6,634	17,548	23,848	10,610	9,821	10,851	10,518	16,055
Estimated biomass (t) multiplicative model (all strata included)	17,102	14,339	14,112	17,923	23,924	13,432	12,913	13,401	13,213	16,589

Table 13. Abundance ('000) of G.halibut at age from Canadian fall surveys in Div. 2J3KL.

AGE	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1	2537	2798	2992	7558	2134	992	1452	7460	12921	1491	4019	3451	495
2	25680	22465	8908	22479	5983	5837	7143	18147	22090	8684	12417	10446	5204
3	54693	28791	15308	30861	23939	18936	21415	20024	32925	47689	28362	35837	14303
4	55894	25756	22667	21216	31168	31365	36079	36224	55591	35749	50267	69405	67068
5	57631	35827	35974	34249	31022	40089	72152	44886	45138	35851	58843	78059	63943
6	45127	38749	42128	38639	29024	34659	38907	37715	57771	33483	39545	56868	46751
7	28914	18814	27921	26643	32031	38809	30661	22359	45214	33952	29701	32273	27643
8	13374	7364	9501	11458	32580	31456	21692	12761	12644	20718	9251	9679	6203
9	6978	3308	4202	5280	13522	11534	10213	6293	3299	7620	2523	2909	1656
10	5109	3170	3225	2824	5370	3038	4128	3498	1429	2156	808	681	650
11	4235	2096	3597	2255	2798	2048	1867	1592	958	1065	541	563	485
12	2540	1838	2390	1030	1789	1496	1214	1218	960	642	309	164	262
13	1610	1516	1549	579	1275	1088	963	517	441	504	267	59	160
14	476	760	857	276	1304	713	803	636	411	200	210	73	110
15	334	491	326	155	834	306	426	330	213	151	151	77	49
16	243	424	182	19	325	81	293	210	62	100	81	23	25
17	130	152	53	0	51	0	140	161	0	10	38	0	0
1+	305505	194319	181780	205523	215148	222447	249550	214030	292067	230065	237334	300568	235007
2+	302968	191521	178788	197965	213014	221455	248098	206570	279146	228574	233315	297117	234512
3+	277288	169056	169880	175485	207031	215618	240955	188424	257057	219890	220898	286671	229308
4+	222595	140266	154573	144625	183092	196682	219540	168400	224132	172201	192536	250834	215005
5+	166701	114510	131905	123408	151924	165317	183461	132176	168541	136452	142269	181429	147937
6+	109070	78683	95931	89159	120902	125228	111309	87290	123403	100601	83425	103370	83994
7+	63943	39934	53803	50520	91878	90569	72401	49576	65632	67119	43880	46503	37243
8+	35029	21120	25882	23877	59848	51760	41740	27217	20418	33166	14180	14230	9601
9+	21655	13756	16381	12419	27268	20304	20048	14456	7774	12449	4928	4551	3398
10+	14677	10448	12179	7139	13746	8770	9835	8163	4475	4829	2405	1642	1742
11+	9568	7278	8953	4315	8376	5732	5707	4665	3046	2673	1597	960	1091
12+	5333	5182	5357	2060	5578	3684	3839	3073	2088	1608	1055	397	606
13+	2794	3345	2966	1030	3789	2188	2625	1855	1127	965	747	233	344
14+	1184	1828	1418	451	2514	1100	1662	1338	686	461	480	173	184
15+	708	1068	561	174	1210	387	859	702	275	261	270	100	74

Table 14. Mean No. per tow, by age, of G. halibut caught in shrimp surveys in Divisions 2H and 2J.

A) Hopedale Channel

Age	1984	1985	1986	1987	1988	1989	1990
1	22.5	79.2	148.6	17.8	1.1	-	13.3
2	28.2	15.8	38.2	59.6	128.2	-	53.6
3	39.0	10.0	12.4	14.4	108.5	-	45.7
4	63.3	20.0	4.6	4.2	45.7	-	92.4
5	94.7	39.7	10.4	1.5	22.7	-	27.2
6	34.4	18.7	14.3	3.5	13.8	-	11.4
7	25.9	7.6	9.5	5.8	16.6	-	1.6
8	11.6	2.6	1.6	2.4	8.7	-	1.4
9	5.0	1.0	0.4	0.4	1.3	-	0.4
10	1.8	0.2	0.1	0.2	0.1	-	0.2

B) Cartwright Channel

Age	1984	1985	1986	1987	1988	1989	1990
1	75.8	145.2	154.4	16.3	103.1	-	-
2	69.3	200.5	96.6	90.8	180.4	-	-
3	57.3	173.4	91.1	67.0	154.9	-	-
4	46.7	109.5	44.3	30.1	73.6	-	-
5	51.7	60.3	36.6	15.9	26.4	-	-
6	8.0	21.4	19.7	25.2	20.4	-	-
7	4.1	8.6	11.0	21.4	20.2	-	-
8	1.7	2.6	3.8	5.9	6.6	-	-
9	0.9	1.5	1.7	1.0	1.1	-	-
10	0.4	0.5	0.6	0.3	0.3	-	-

C) Hawke Channel

Age	1984	1985	1986	1987	1988	1989	1990
1	-	-	-	-	9.2	15.9	2.2
2	-	-	-	-	26.1	15.9	16.3
3	-	-	-	-	50.4	29.9	18.3
4	-	-	-	-	36.1	45.5	44.6
5	-	-	-	-	18.5	45.0	37.5
6	-	-	-	-	23.1	25.0	36.2
7	-	-	-	-	23.9	13.3	14.8
8	-	-	-	-	6.6	4.9	3.7
9	-	-	-	-	1.1	1.1	0.7
10	-	-	-	-	0.1	0.2	0.1

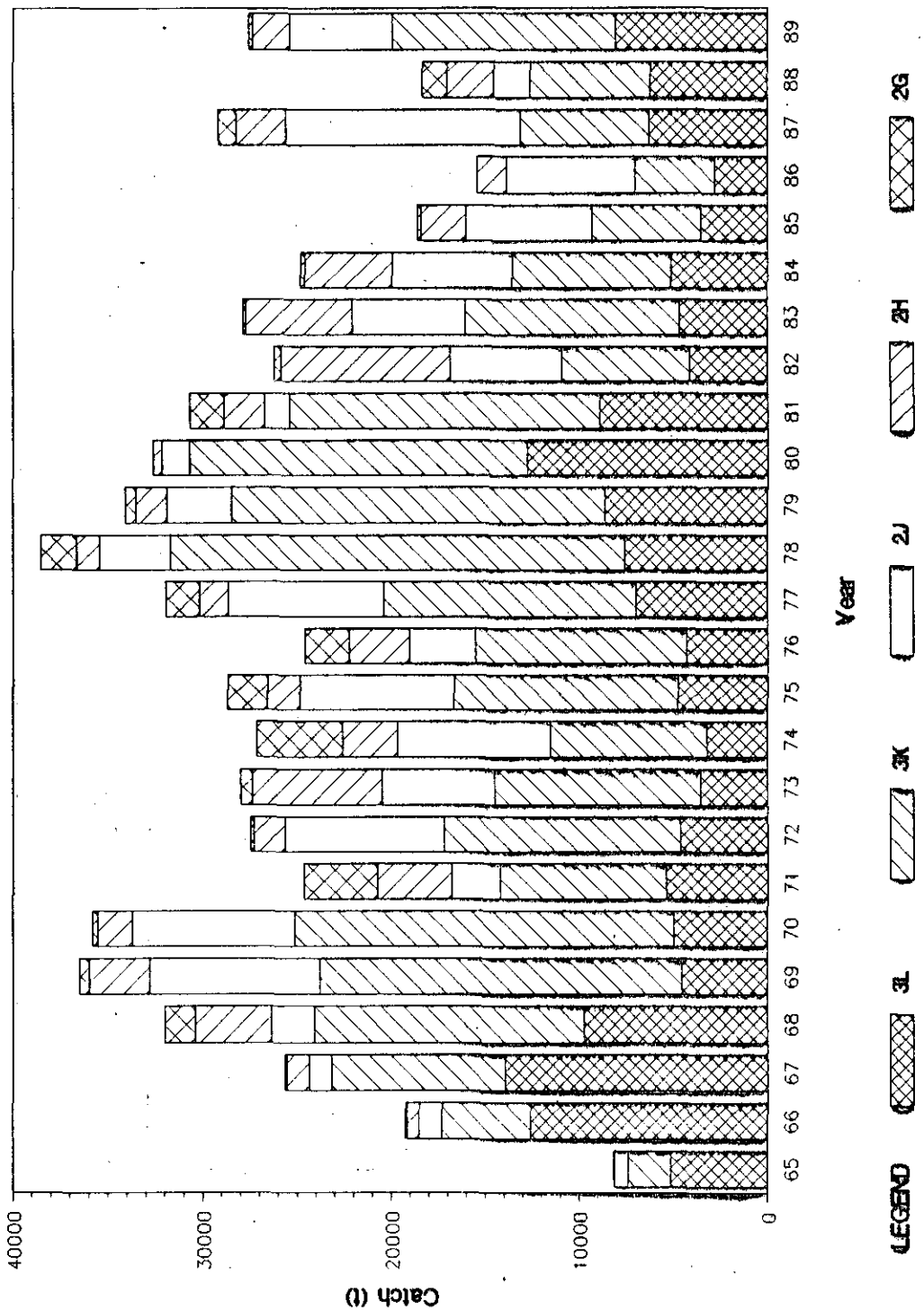

Figure 1. Catches of Greenland Halibut by Division

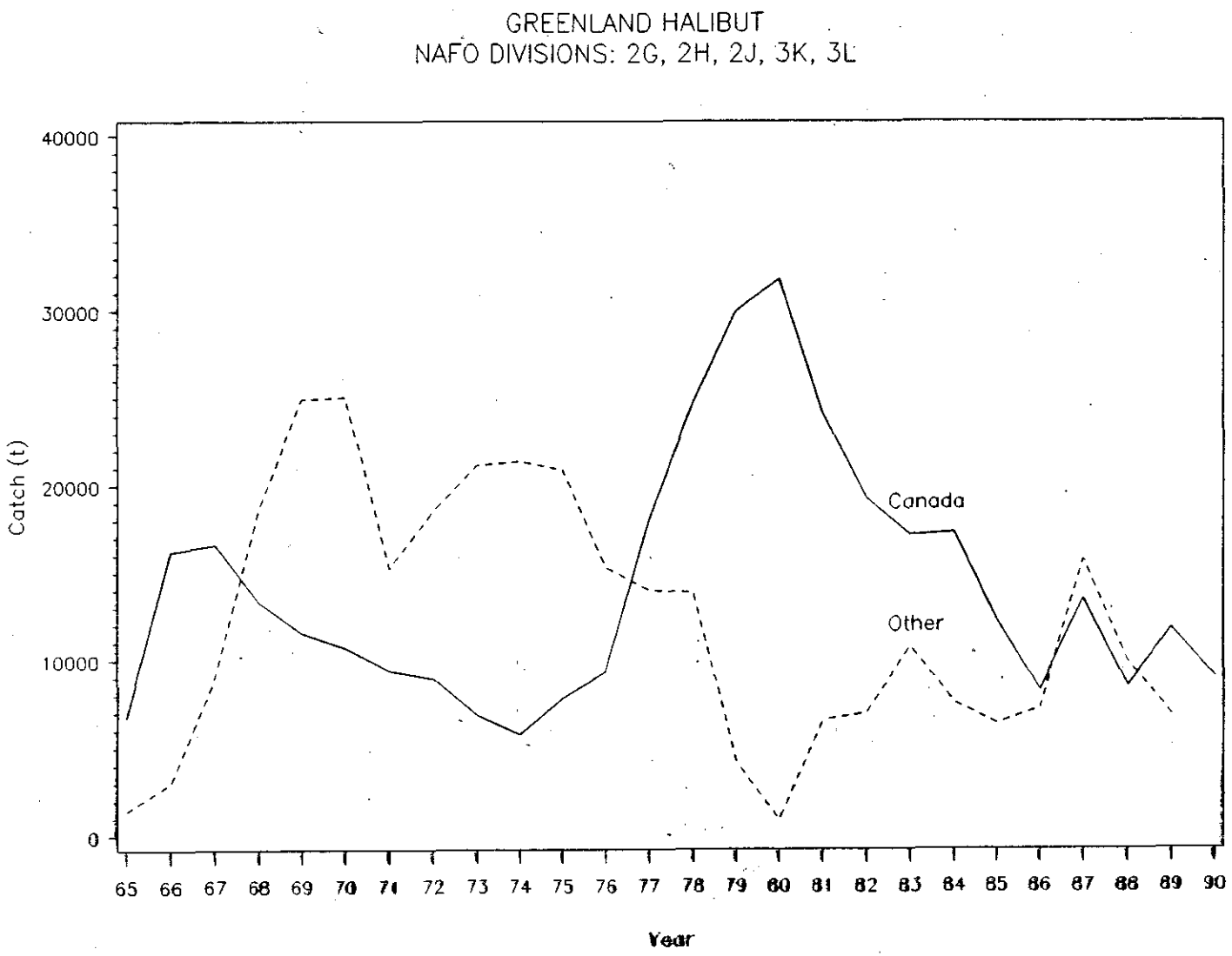

Fig.2. Catches of G.halibut by Canada and other nations in SA 2+Div. 3KL.

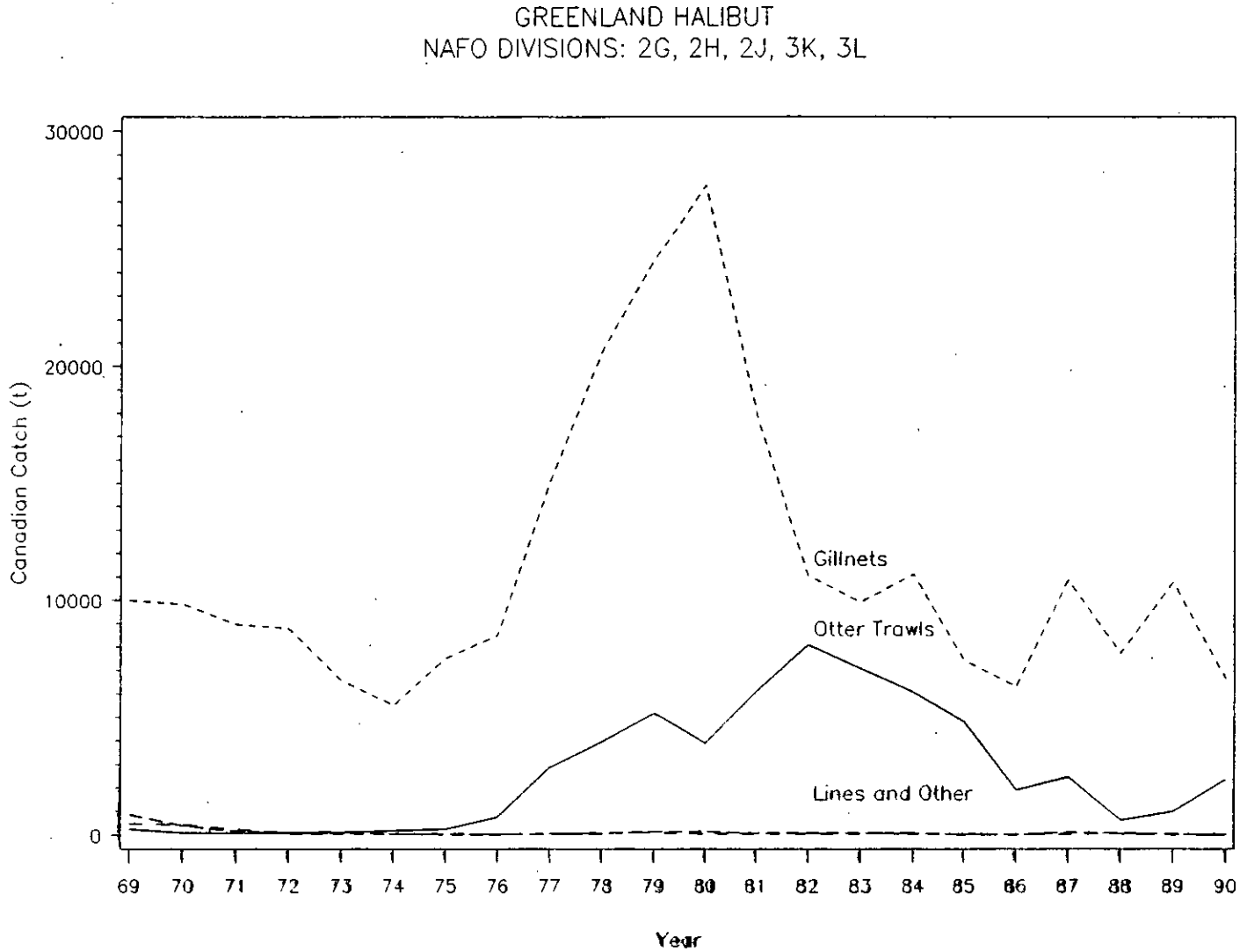

Fig.3. Canadian catches of G.halibut by gear type.

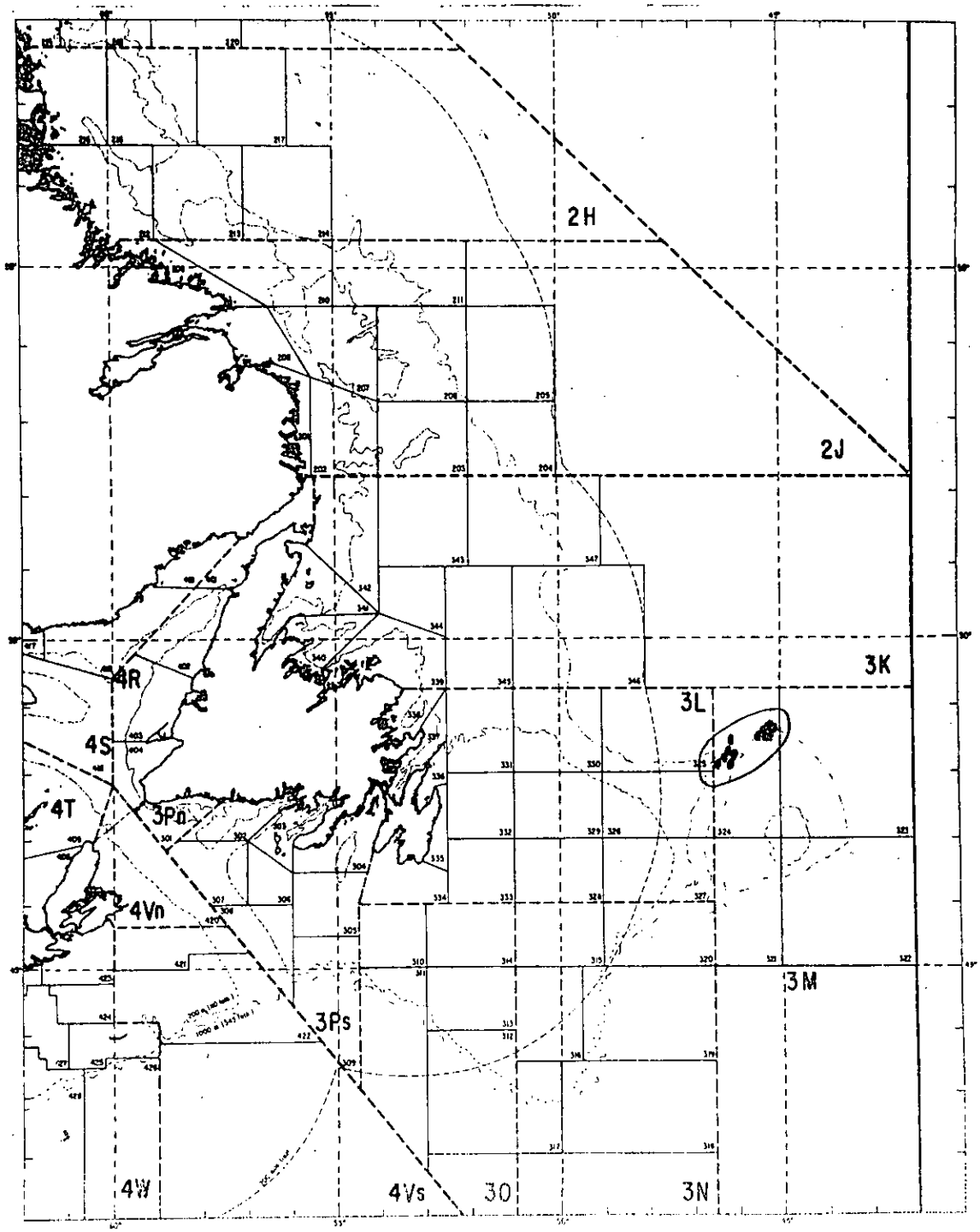

Fig.4. Approximate location of samples collected from a Canadian vessel fishing for G.halibut in April-May,1991.

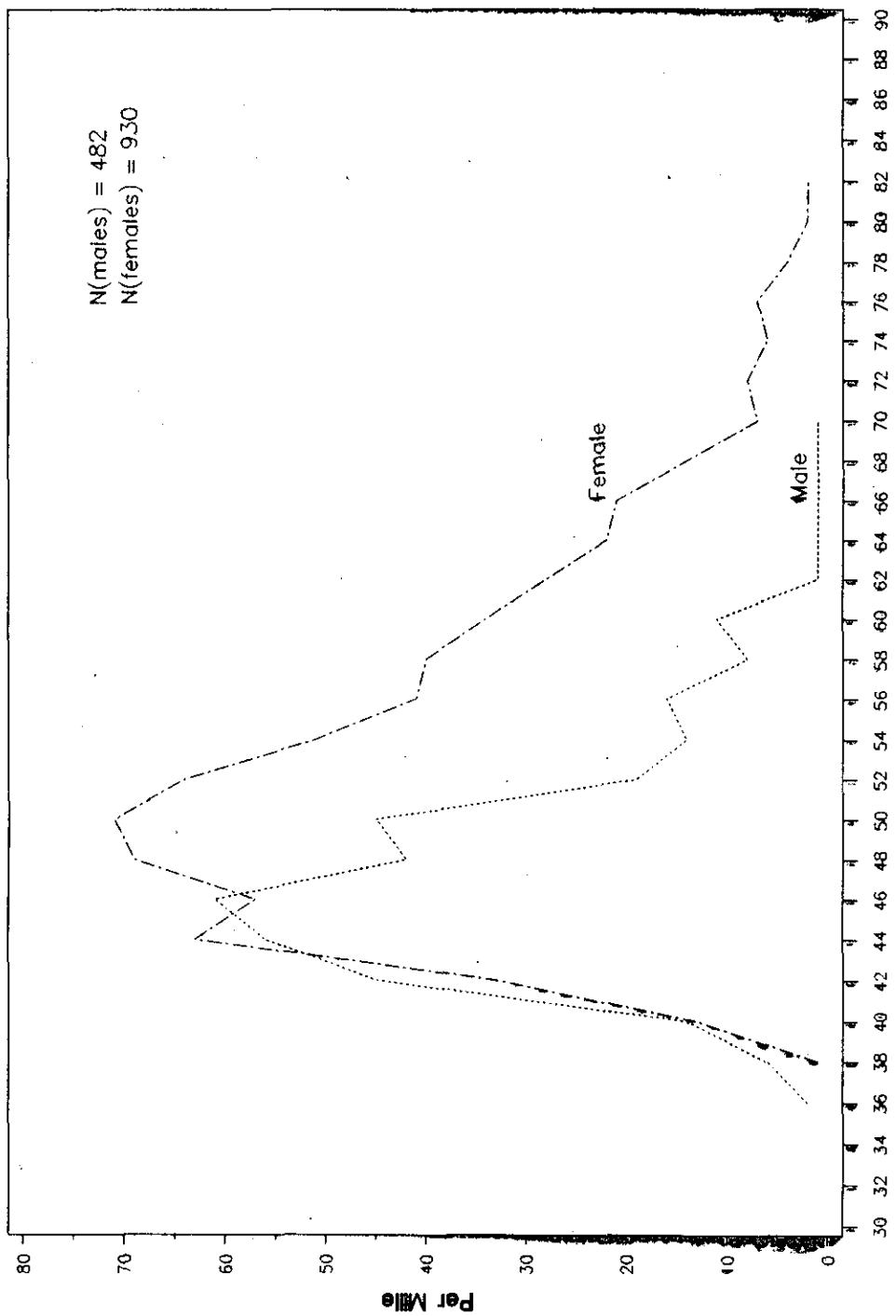

Figure 5. Length Composition of Greenland Halibut from Canadian Commercial Fishery in Division 3L during April 1991

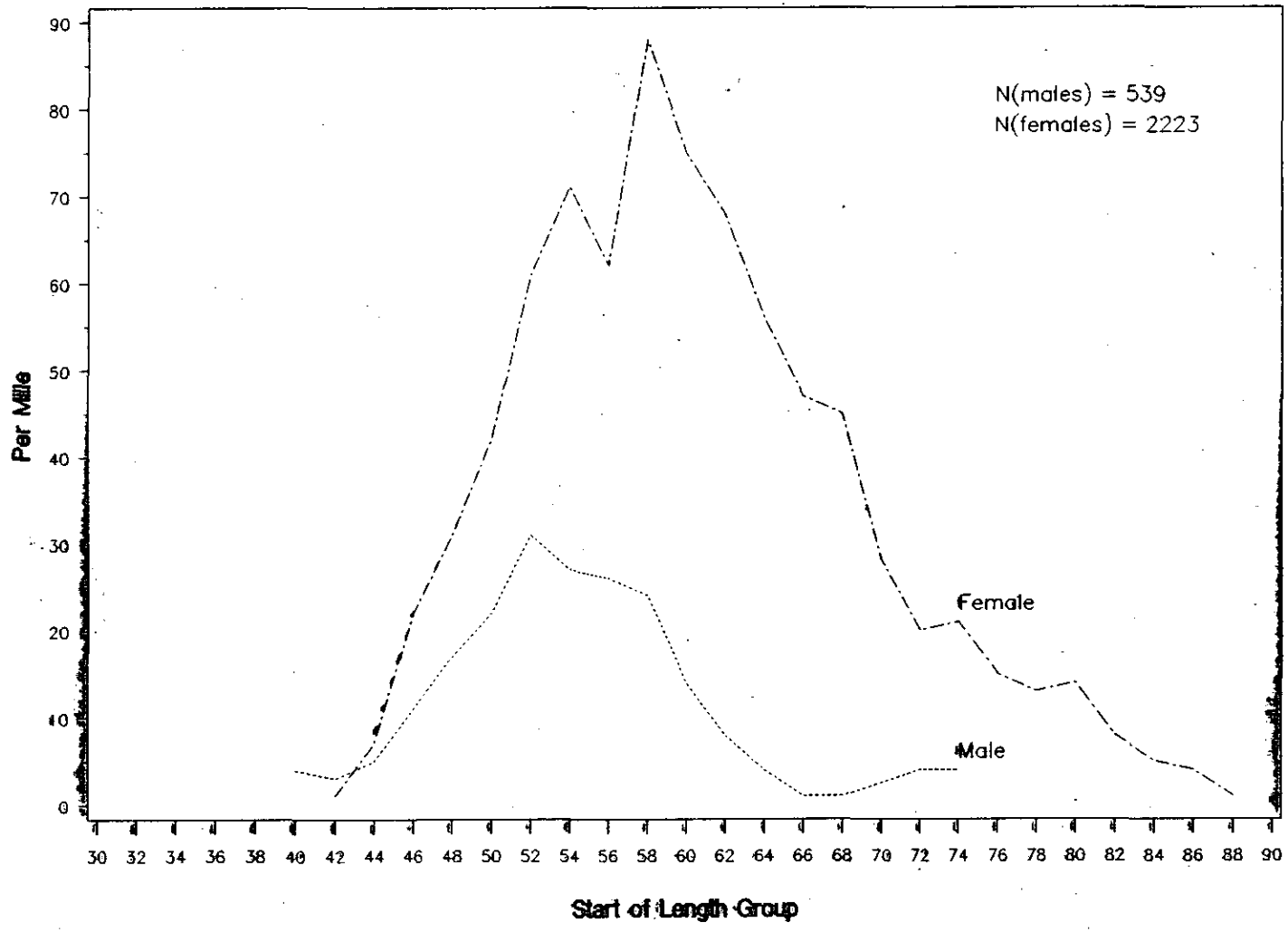

Figure 6. Length Composition of Greenland Halibut from Canadian Commercial Fishery in Division 3M during May 1991

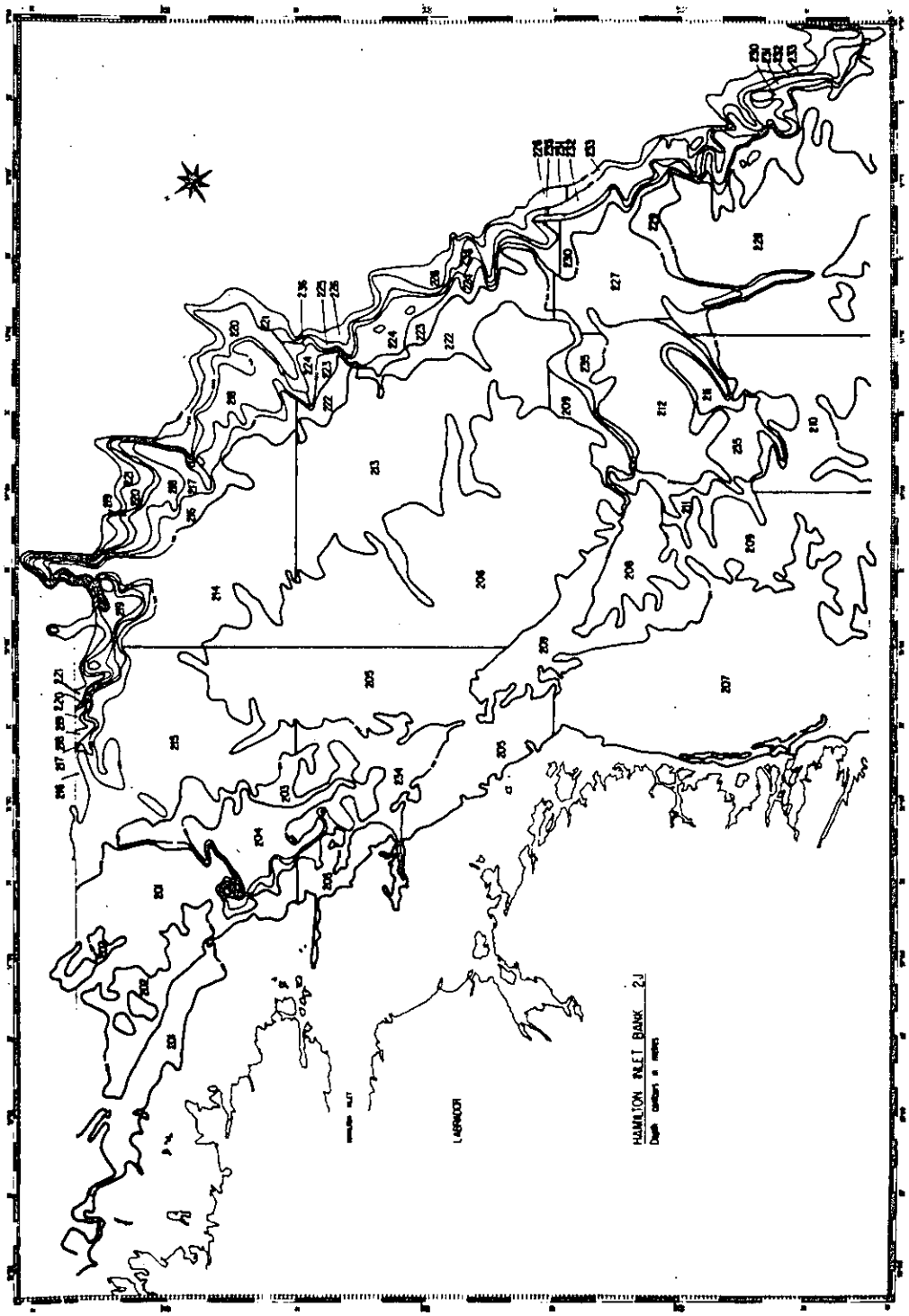

Fig.7. Stratum map for groundfish surveys in Div. 2J.

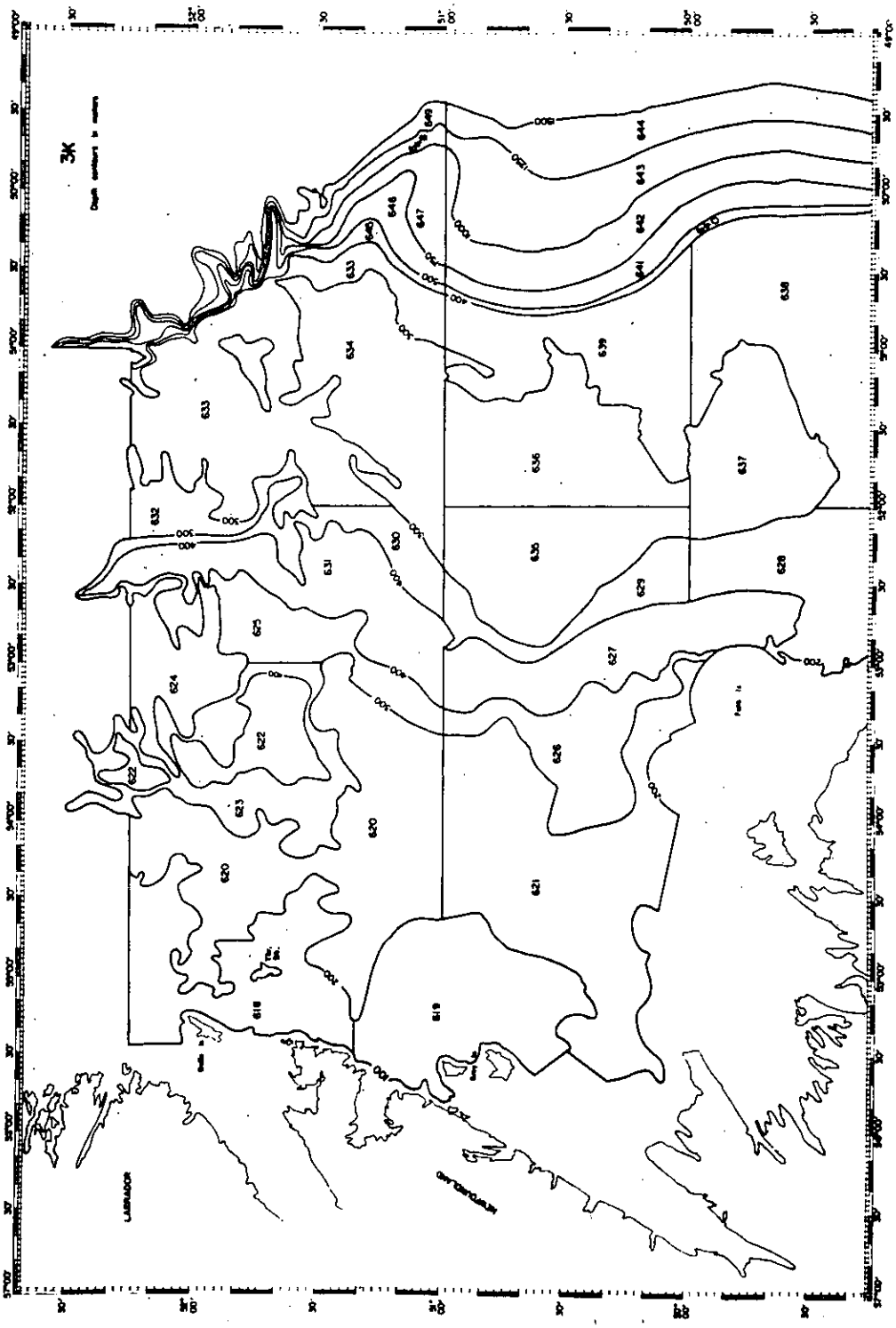

Fig.8. Stratum map for groundfish surveys in Div. 3K.

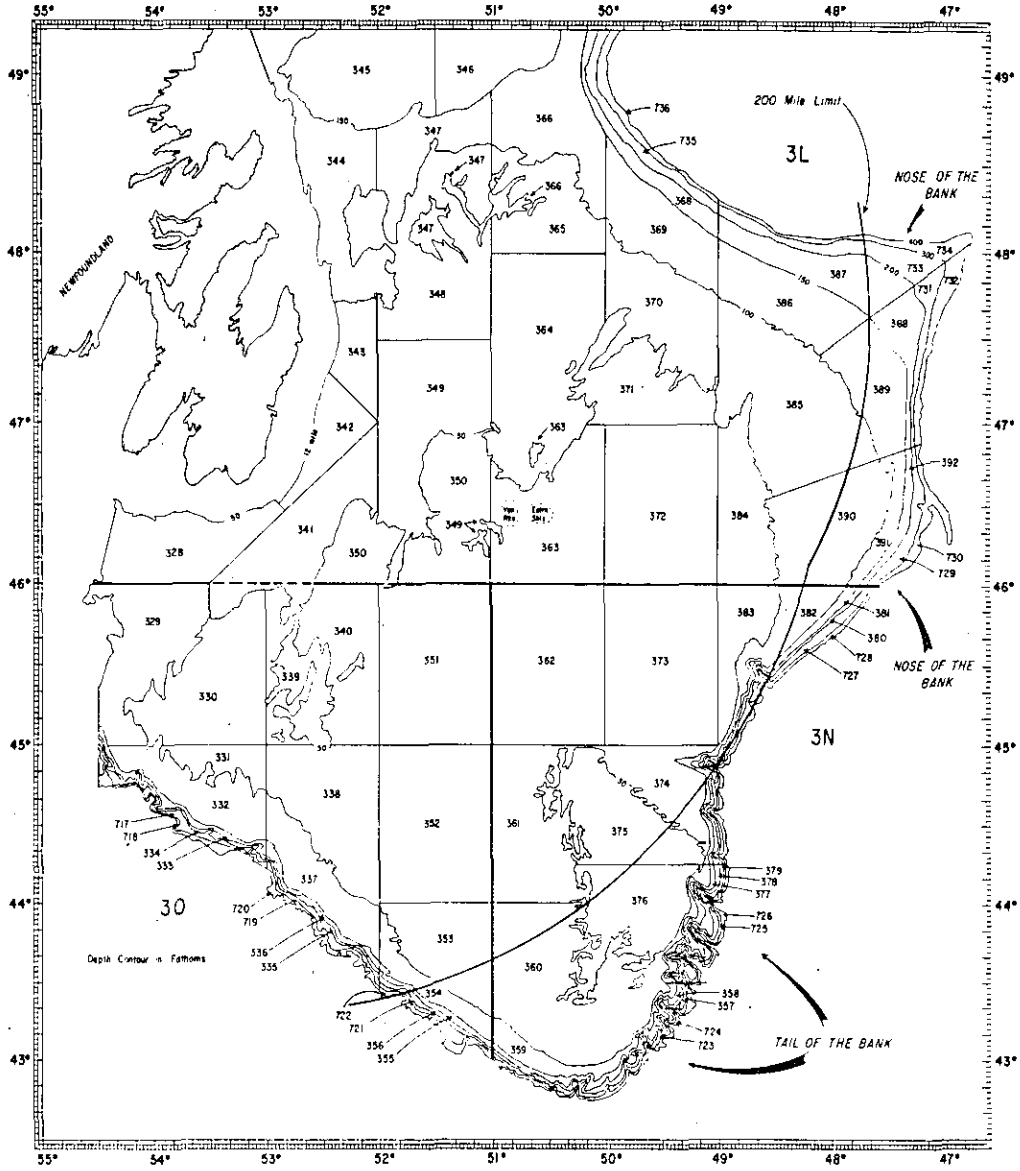

Fig.9. Stratum map for groundfish surveys in Div. 3L.

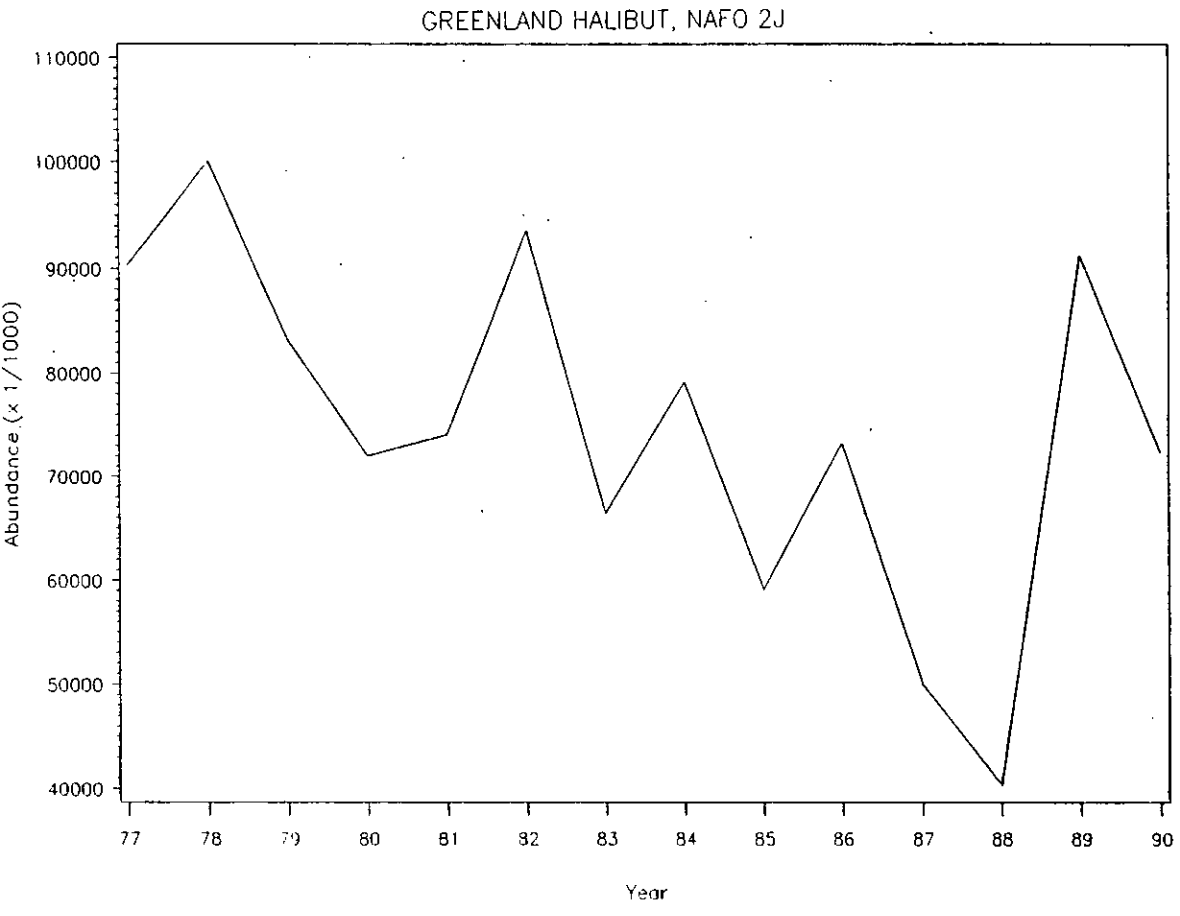

Fig.10. Abundance of G.halibut from Canadian surveys in Div.2J.

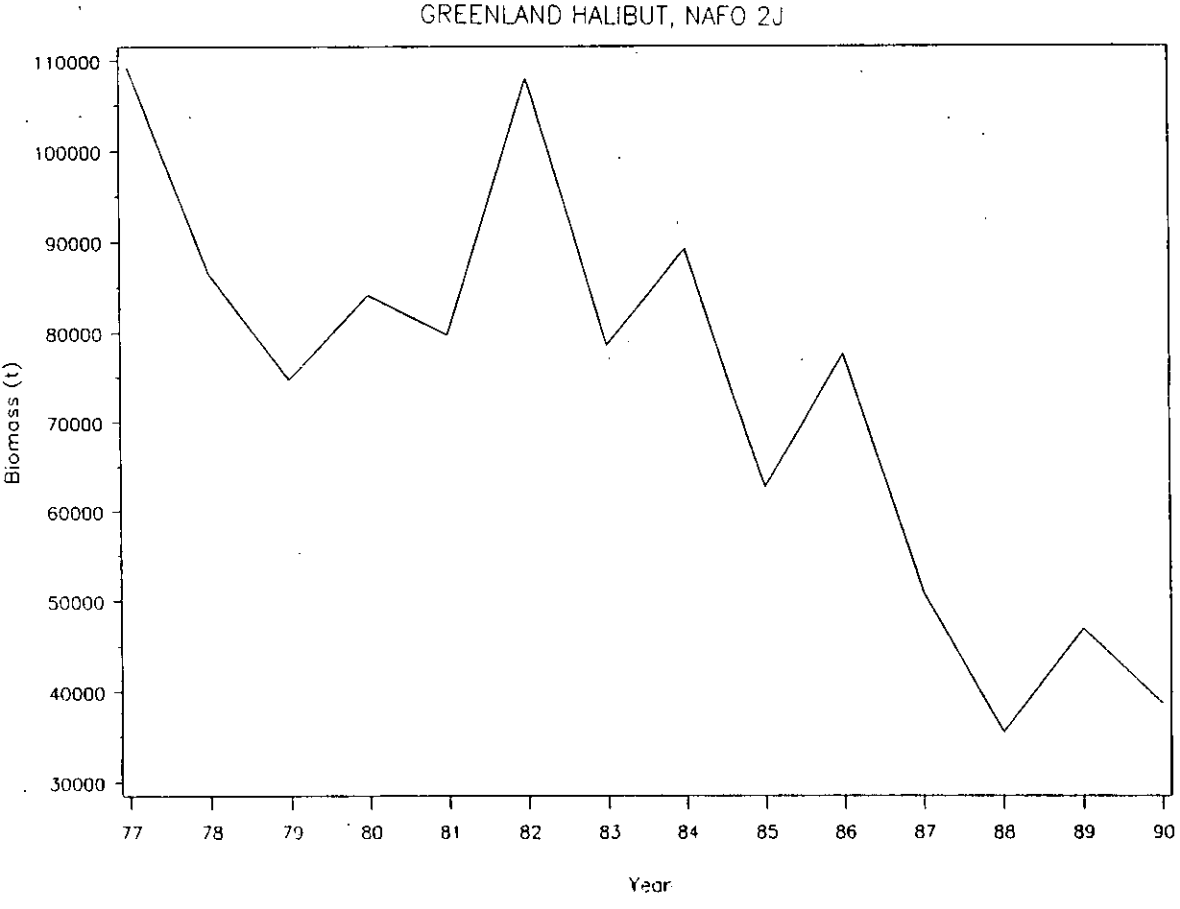

Fig.11. Biomass of G.halibut from Canadian surveys in Div.2J.

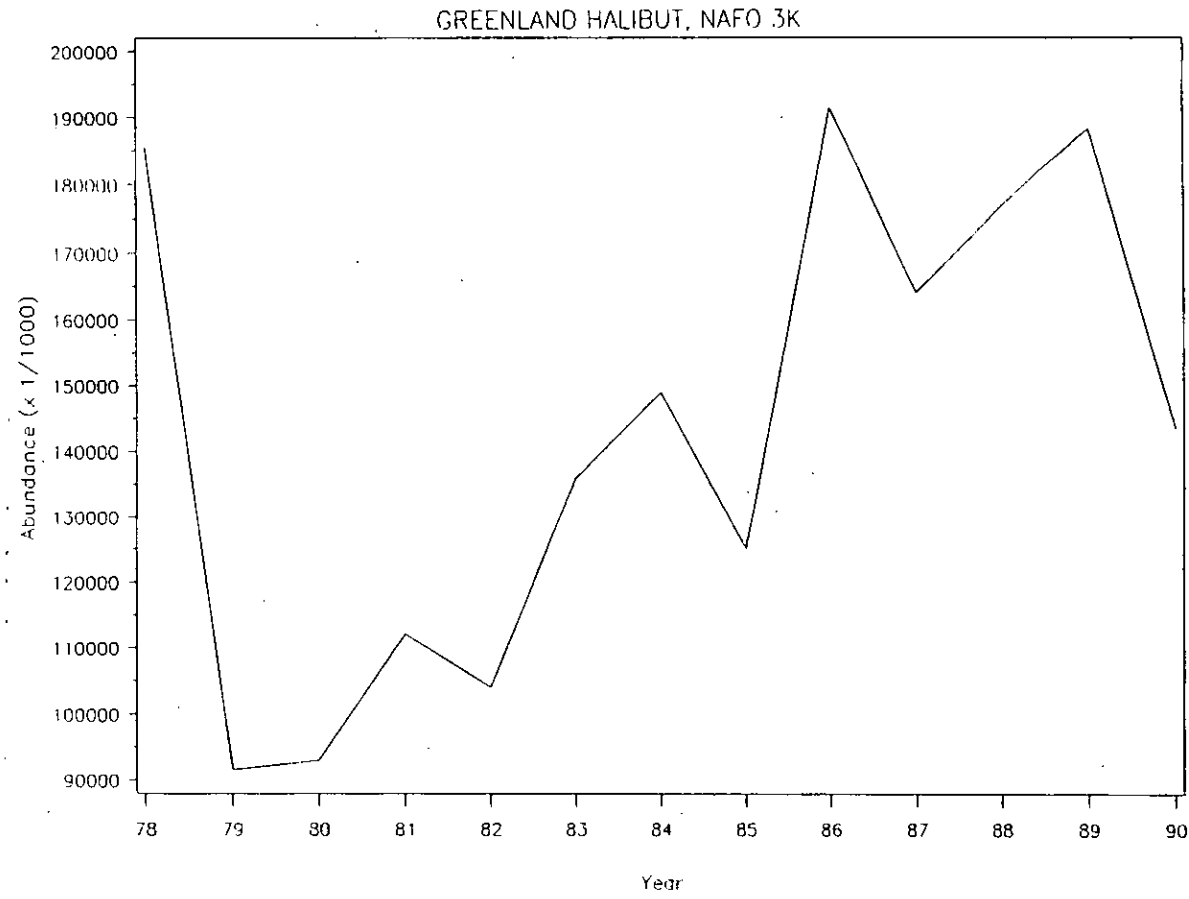

Fig.12. Abundance of G.halibut from Canadian surveys in Div.3K.

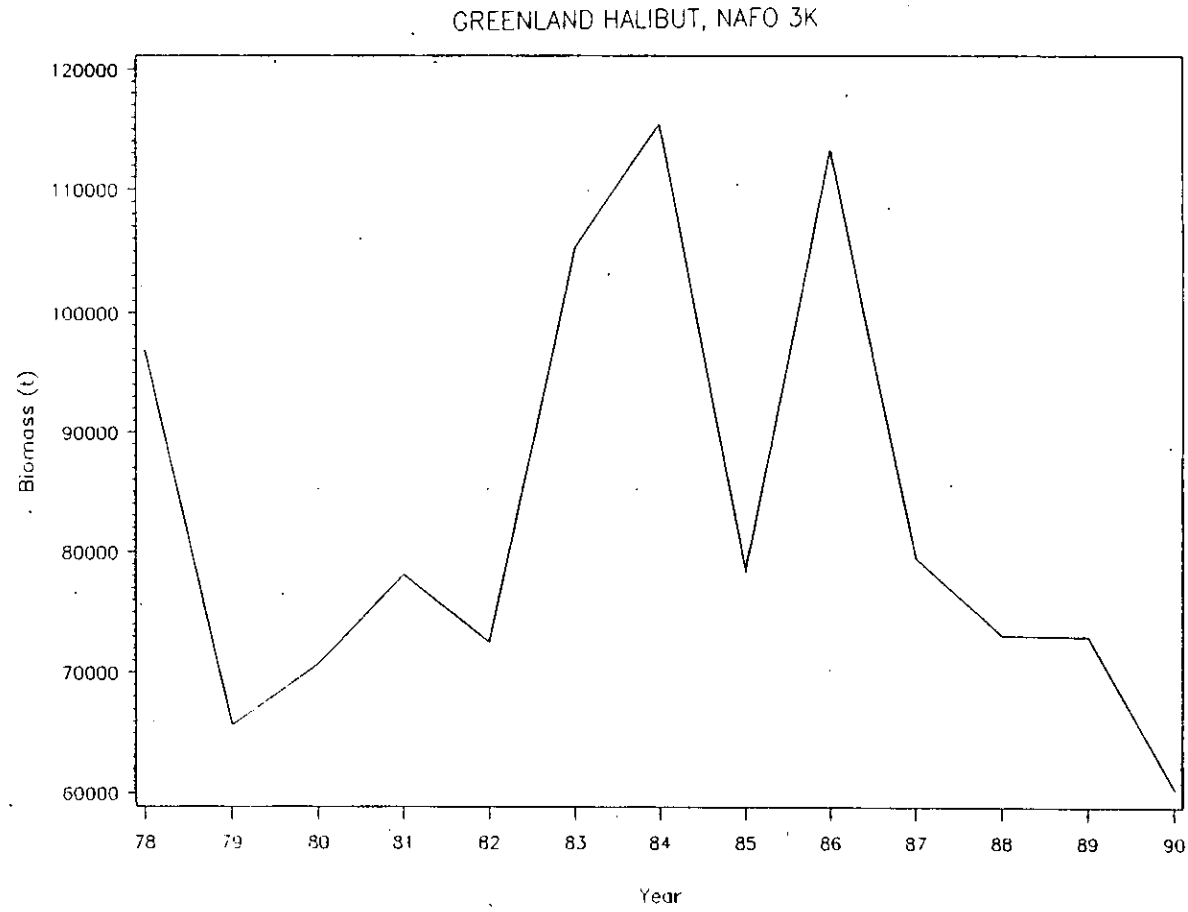

Fig.13. Biomass of G.halibut from Canadian surveys in Div.3K.

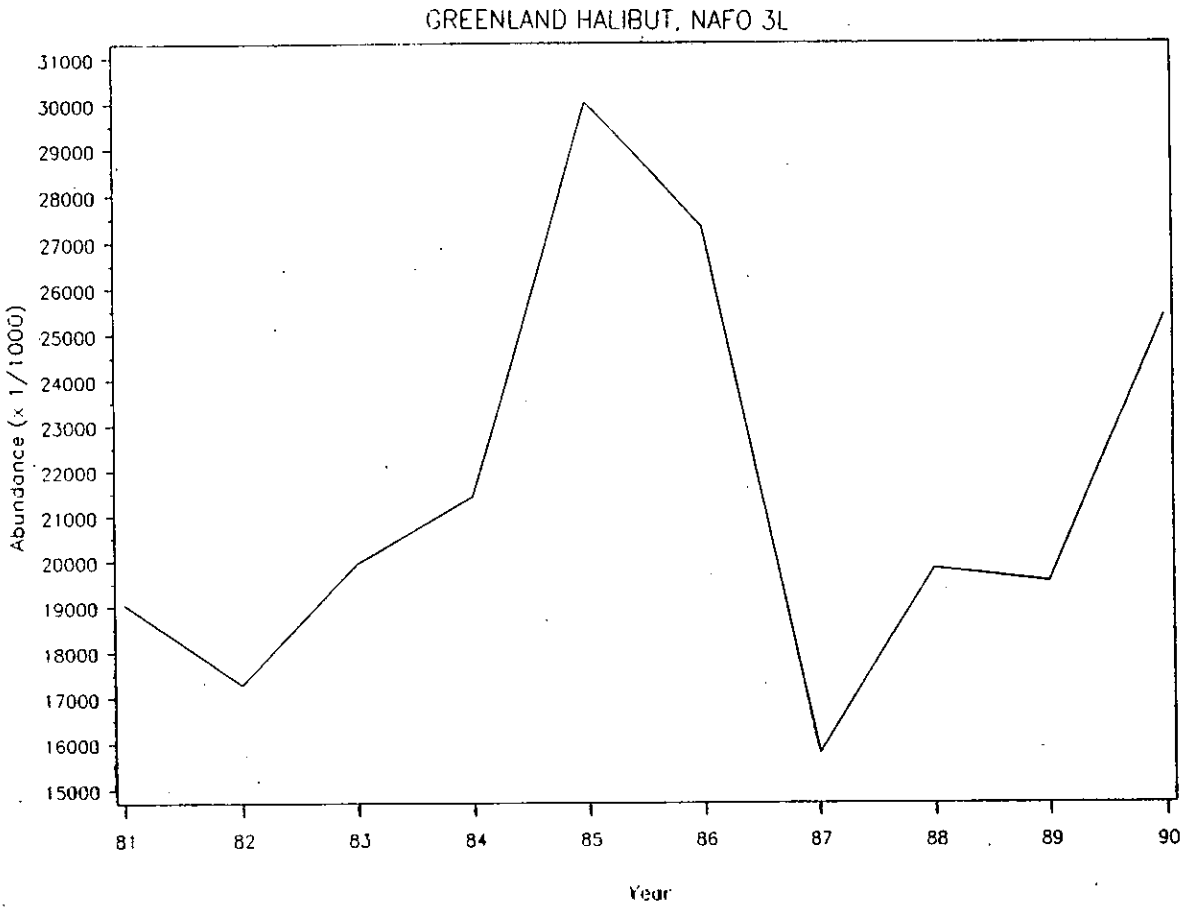

Fig.14. Abundance of G.halibut from Canadian surveys in Div.3L.

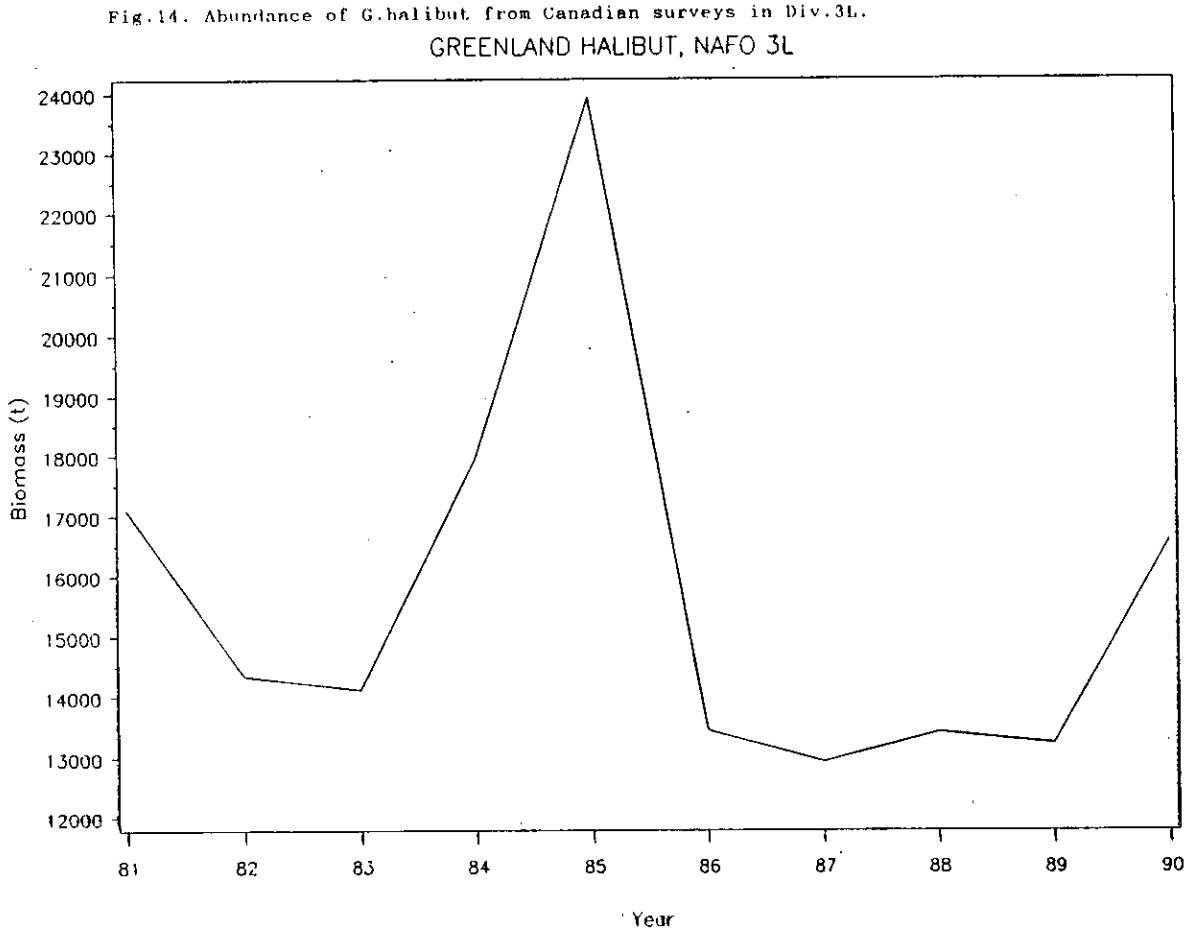

Fig.15. Biomass of G.halibut from Canadian surveys in Div.3L.

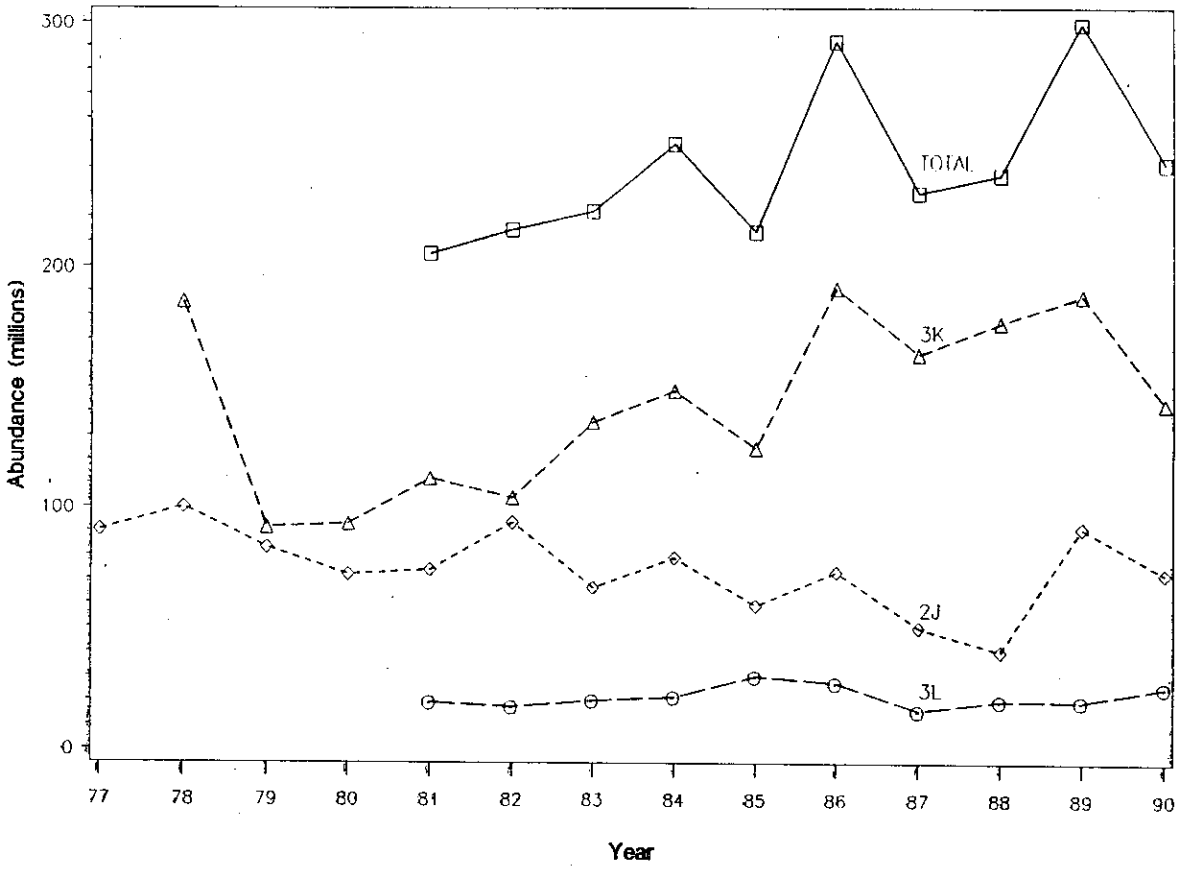

Figure 16. Abundance of Greenland Halibut from Canadian RV Surveys in 2J3KL

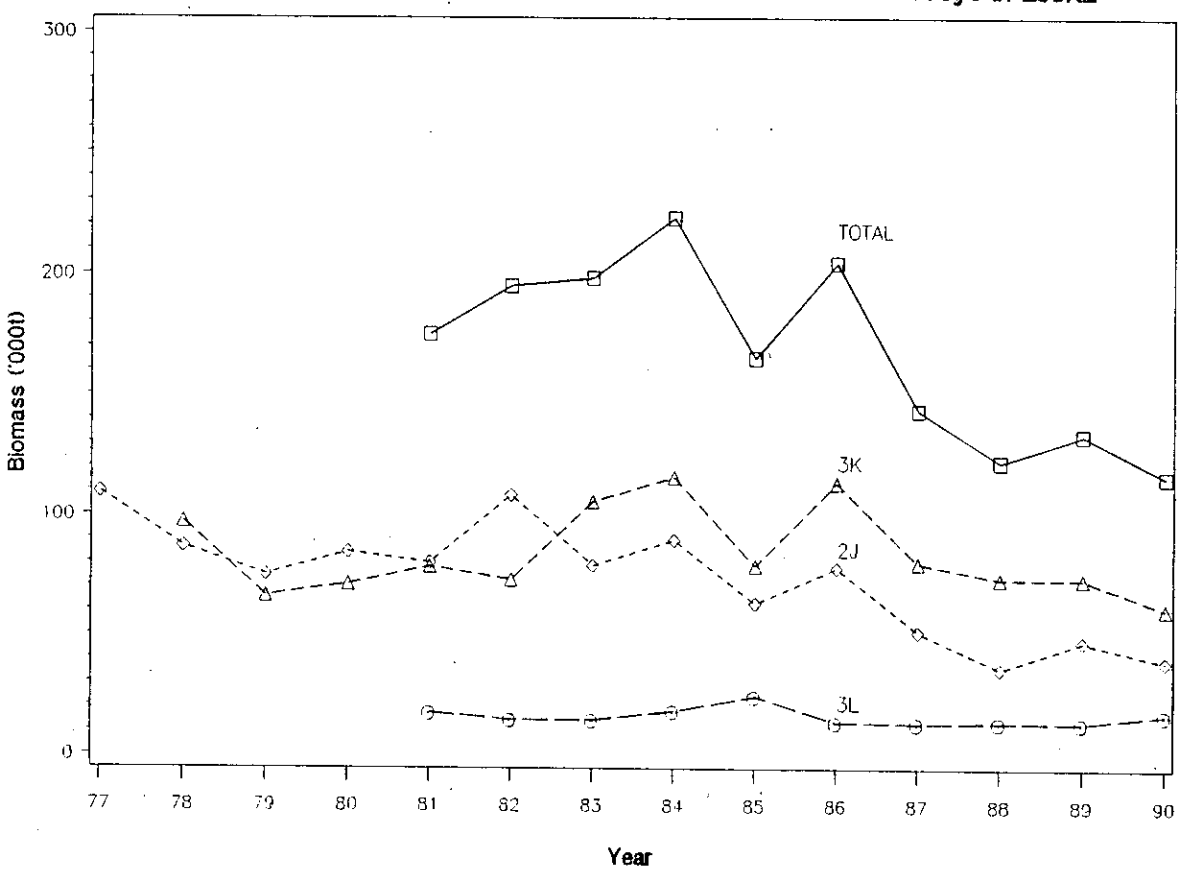

Figure 17. Biomass of Greenland Halibut from Canadian RV Surveys in 2J3KL

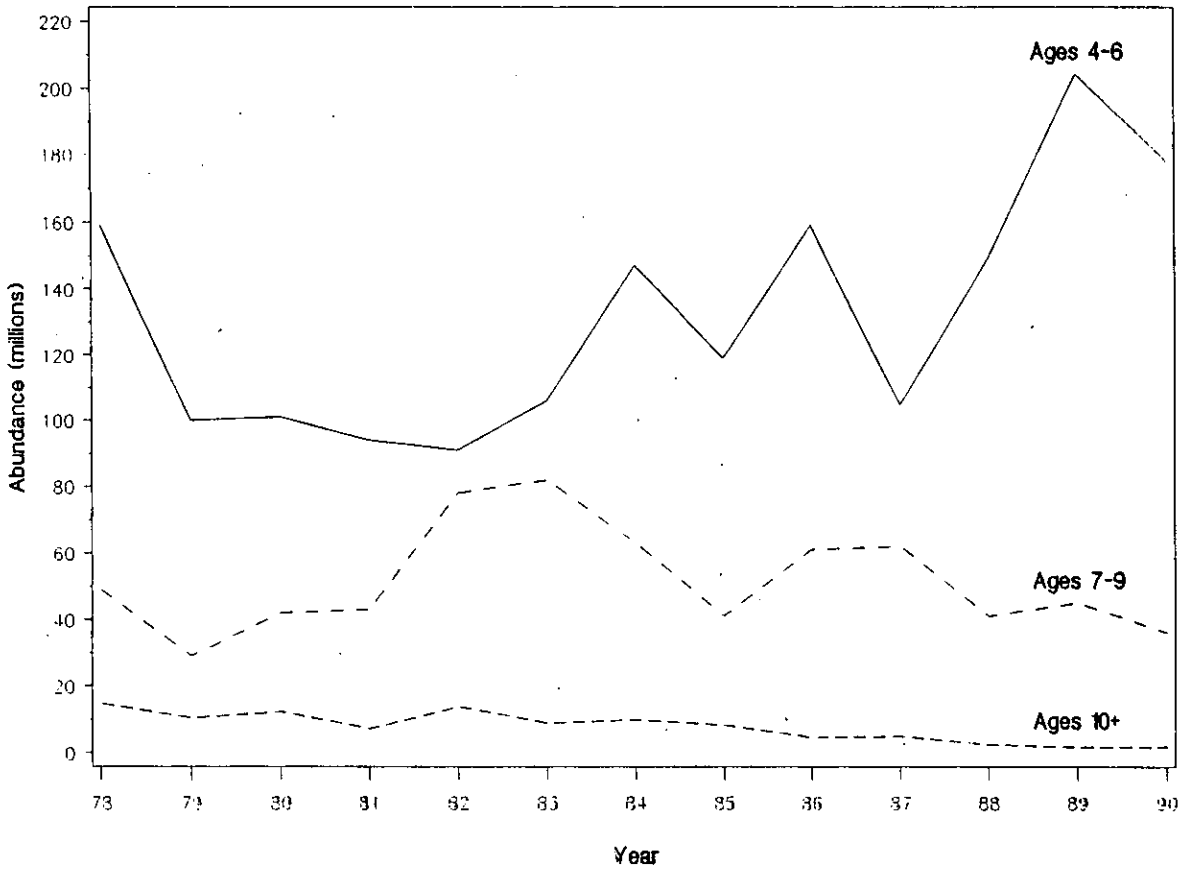

Figure 18. Abundance of Greenland Halibut in 2J3KL from Canadian Fall Surveys

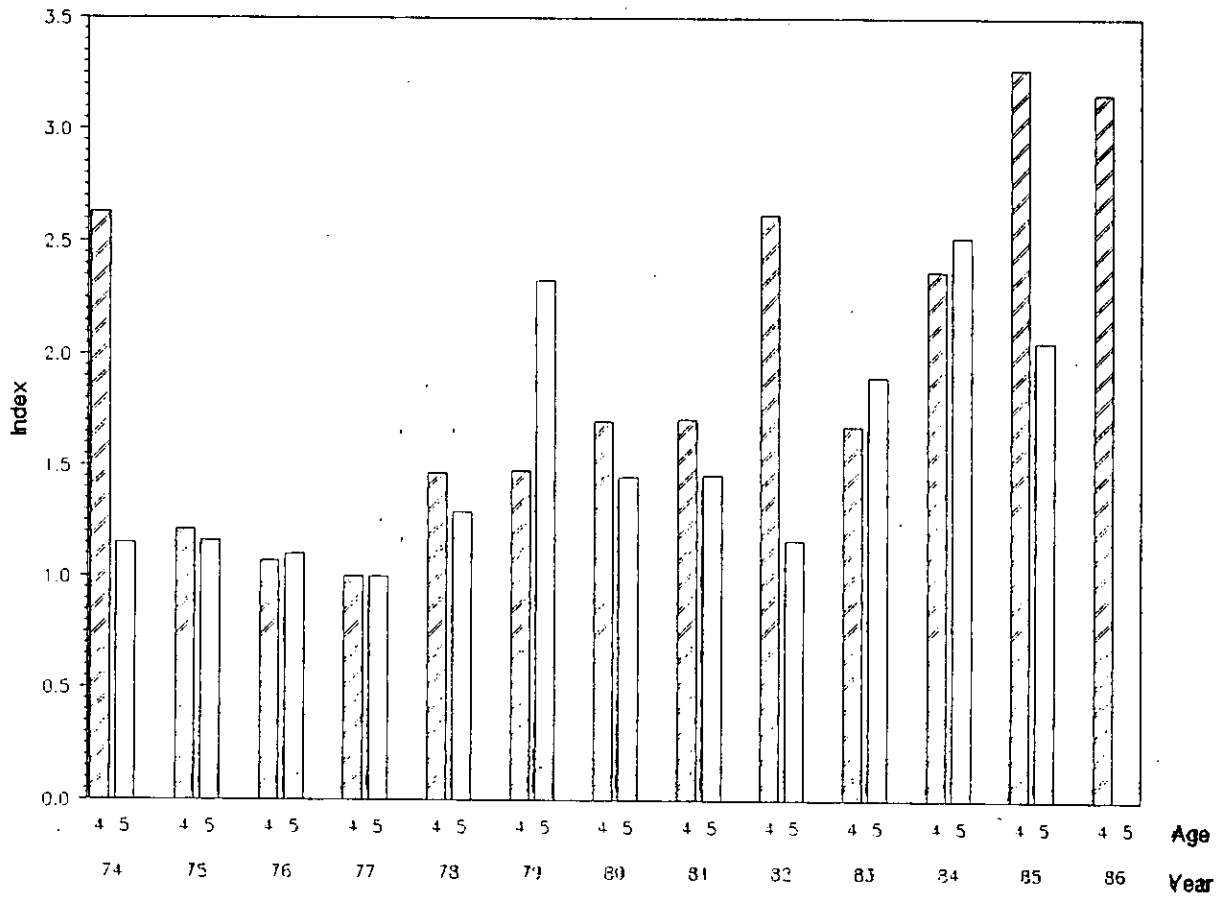

Figure 19. Relative Strength of Year Classes at Ages 4 and 5 from Canadian Fall Surveys in 2J3KL

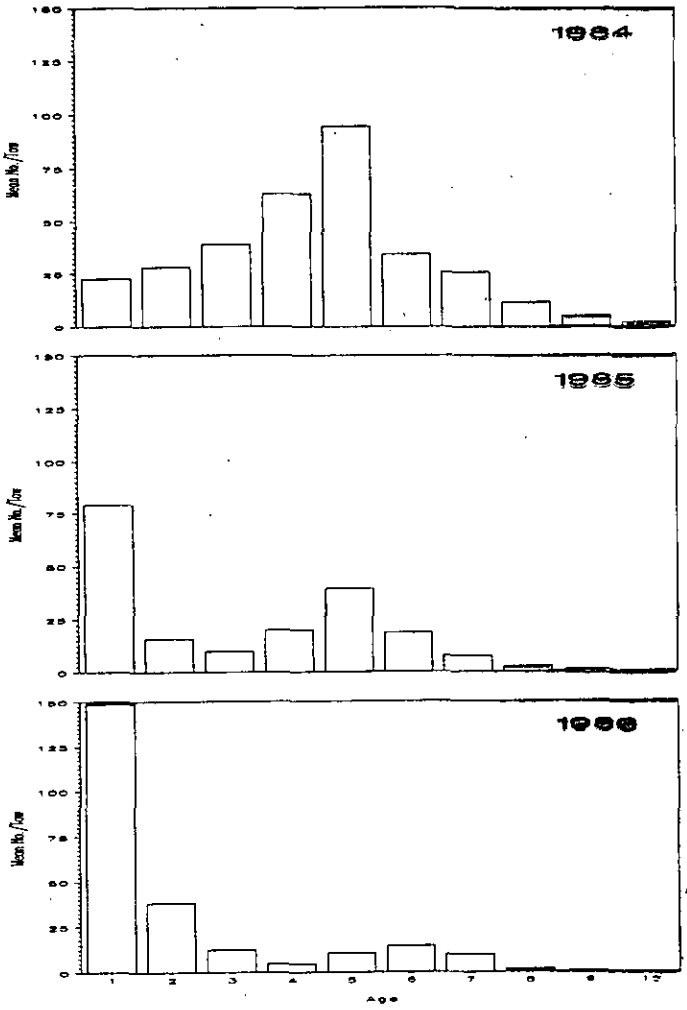

Figure 20. Mean Number Per Tow of Greenland Halibut Caught in Shrimp Surveys in Division 2H

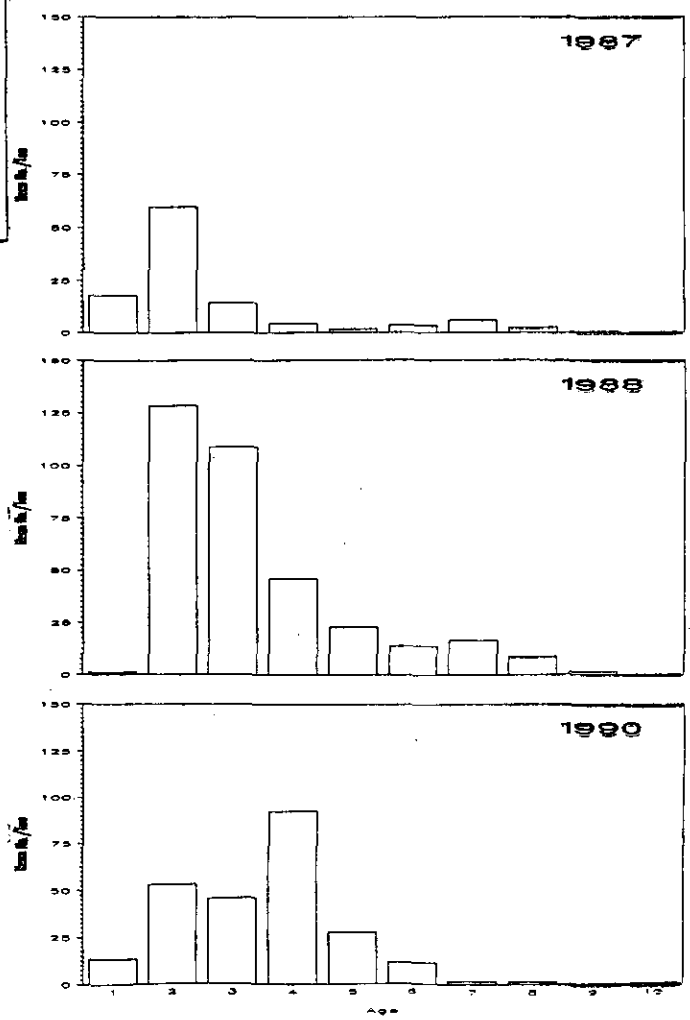

Figure 20. Continued

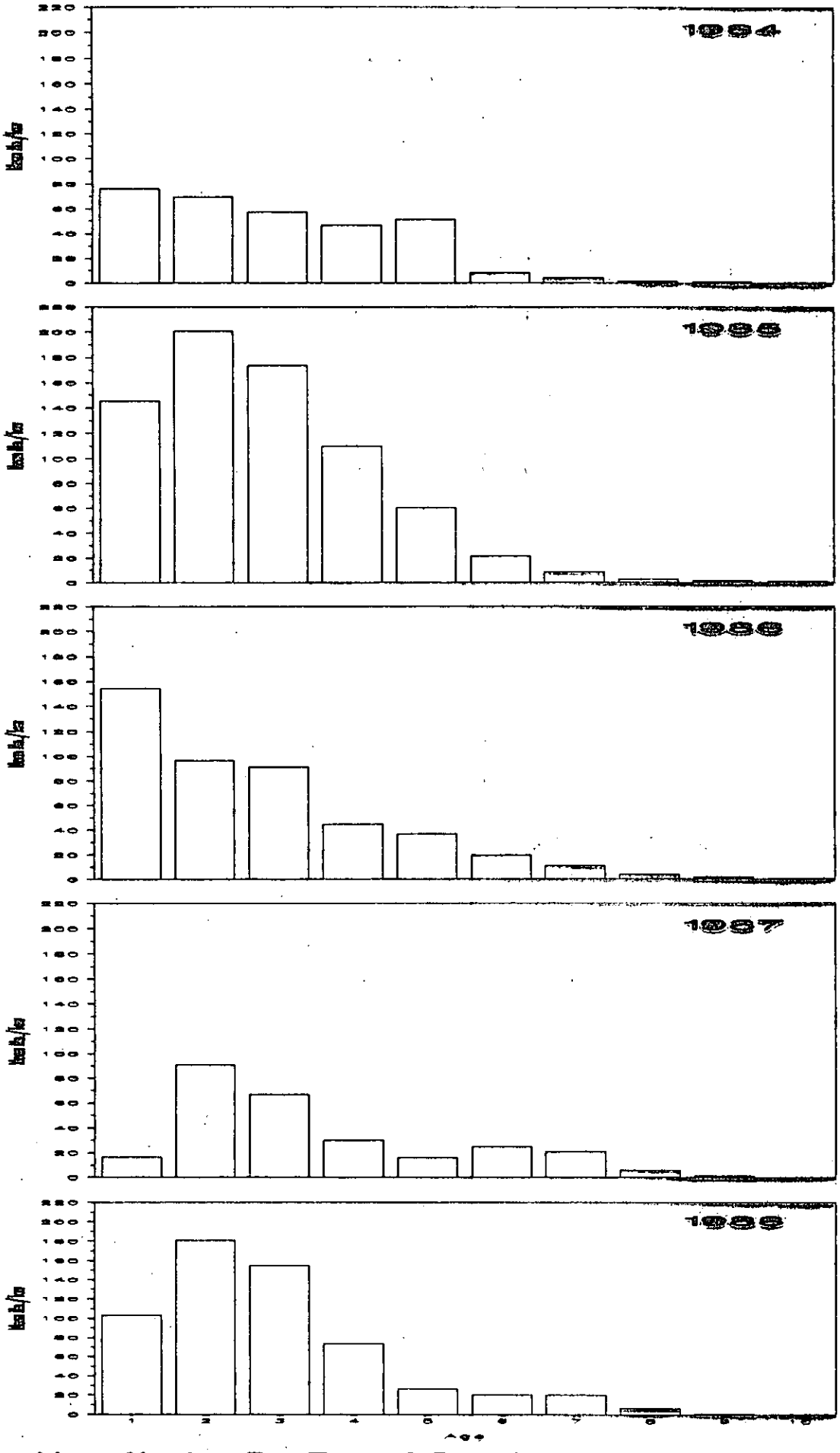

Figure 21. Mean Number Per Tow of Greenland Halibut Caught in Shrimp Surveys in Cartwright Channel in Division 3J

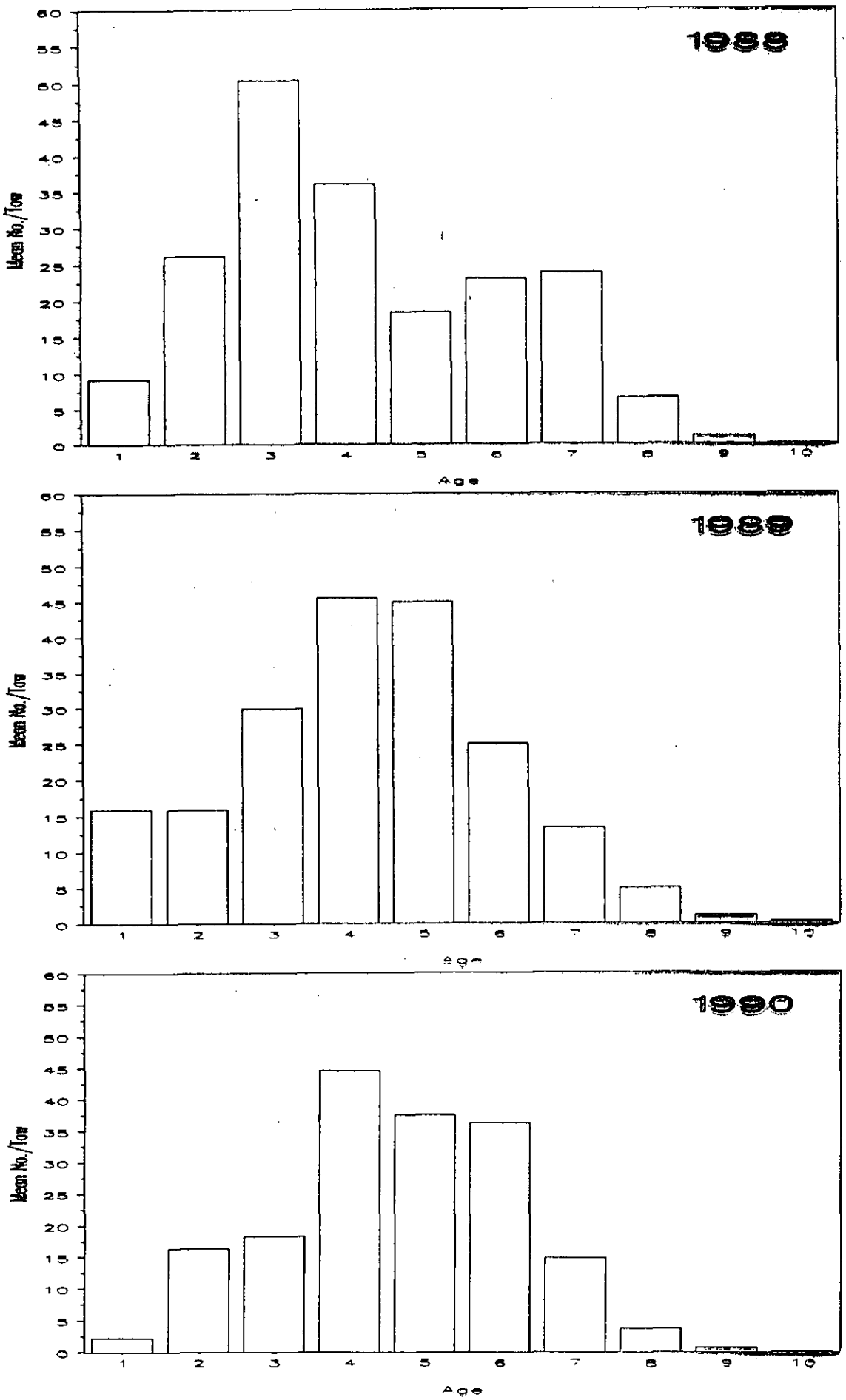

Figure 20. Mean Number Per Tow of Greenland Halibut Caught in Shrimp Surveys in Hawke Channel in Division 2J