

Northwest Atlantic



Fisheries Organization

Serial No. N4630

NAFO SCR Doc. 02/24

SCIENTIFIC COUNCIL MEETING – JUNE 2002

Greenland Halibut (*Reinhardtius hippoglossoides*) in NAFO Subarea 2 and Divisions 3KLMNO: Stock Trends
Based on Canadian Research Vessel Survey Results During 1978-2001

by

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Abstract

Greenland halibut are widely distributed throughout the Labrador-eastern Newfoundland area. During the late-1970s and most of the 1980s they were found in relatively high abundance along the deep slopes of the continental shelf particularly in Division 2G. They were similarly plentiful in the deep channels running between the fishing banks especially in Div. 2H, 2J and 3K. By 1991 distribution in the northern areas was greatly reduced and most of the resource was located in Div. 3K and along the north slope of Div. 3L and to some degree Div. 3N. By 1996-2001 distribution to some areas of historically high abundance off southern and central Labrador as well as northeast Newfoundland again began to occur. In Div. 2J and 3K where most of the Greenland halibut resource resides the stock biomass was relatively stable until the mid-1980s after which it declined substantially to reach an all time low in the early-1990s with the disappearance of older fish from the population. From about 1995 the stock showed considerable recovery and continued to improve to 1999 based upon several good successive year-classes particularly 1993-95. The fishable biomass (>30 cm) has declined somewhat since 1999 while the spawning stock biomass estimates remain well below those of the 1980s.

Canadian Research Vessel Surveys

Divisions 2GH

Research vessel surveys have been conducted occasionally in NAFO Div. 2G and 2H since 1978 usually during late summer or early fall. During 1978, 1979 and 1981 surveys were conducted according to fixed station design, which were later post stratified in order to provide estimates of biomass and abundance. Surveys in these divisions were again conducted in both 1987 and 1988 using true stratified random (SR) design. All surveys were carried out by the research vessel *Gadus Atlantica* using an *Engel 145'* High Rise otter trawl. In 1991, a survey (SR) covering mainly Div. 2H was conducted with the research vessel *Alfred Needler* also using an *Engel 145'* High Rise otter trawl but with some variation from the one used above. Depths fished generally ranged from <200-1 000 meters although it varied from survey to survey depending on fishing days available, weather conditions and bottom topography.

Surveys also were carried out annually from 1996-99 in Div. 2GH. By this time the *Gadus Atlantica* had been replaced by the research vessel *Teleost* and a new standard survey trawl was introduced i.e. a *Campelen 1800* Shrimp trawl which was much more effective in capturing very small fish. With the introduction of the *Teleost* the depth range of the surveys also were extended where possible to 1 500 meters. No survey was conducted in Div. 2GH during 2000 and only Div. 2H was surveyed in 2001.

Divisions 2J and 3K

Stratified random fall surveys generally within a depth range of 100-1 000 meters have been conducted annually in Div. 2J and 3K from 1977-94 and 1978-94, respectively, using the research vessel *Gadus Atlantica* with its *Engel 145'* High Rise otter trawl. From 1995-2001 the surveys were conducted primarily using the research vessel *Teleost* that was sometimes supported by the research vessels *Wilfred Templeman* (sister ship of the *Alfred Needler*) and the *Alfred Needler* usually covering a depth range of 100-1 500 meters. All vessels used the *Campelen 1800* Shrimp trawl with identical construction. Because the operation of the gear was monitored by electronic sensors during these surveys in order to maintain consistency from set to set, catchability was considered to be the same for all vessels.

Divisions 3L, 3M, 3N and 3O

Surveys have been conducted by Canada in Div. 3L, 3NO and occasionally Div. 3M for many years, however, prior to 1996 the maximum depth usually did not exceed 400 meters. Therefore, the data collected on Greenland halibut were considered too minimal to adequately describe its distribution and abundance and were not used in the assessments of the resource. From 1996-2001, attempts were made to extend the surveys to depths of at least 730 meters and where possible to 1 500 meters. Surveys were carried out in both spring and fall by a combination of the research vessels *Teleost*, *Wilfred Templeman* and *Alfred Needler* using the *Campelen 1800* Shrimp trawl. For comparison with the more northerly areas, however, only the fall survey results are presented in detail here. Nevertheless, plots of the spring survey biomass indices and age compositions for Div. 3LNO from 1996-2001 are shown for comparison with the fall surveys.

Comparative Fishing Exercises

In order to maintain consistency in the data time series with the introduction of the new research vessel *Teleost* (which replaced the *Gadus Atlantica*) and replacement of the standard *Engel 145'* High Rise survey trawls by the *Campelen 1800* Shrimp trawl, comparative-fishing trials were conducted.

In 1995, comparative-fishing trials were carried out between the *Gadus Atlantica* using the *Engel 145'* High Rise trawl and the *Teleost* using the *Campelen 1800* shrimp trawl. Data analysis and results of these exercises are presented in Warren (1996) including the associated length frequency conversion factors for the major species including Greenland halibut.

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As a result of these analyses all length frequency data on Greenland halibut collected during the above surveys carried out in NAFO Subarea 2 and Div. 3K from 1977-94 were converted to *Campelen 1800* trawl catch equivalents to allow for direct comparison of the old data series with the results of surveys from 1995 onwards (Bowering *et al.* 1996). Data conversions for the *Engel 145'* trawl used in surveys in Div. 3LMNO have not yet been conducted due to poor coverage of the depth zones where most Greenland halibut are encountered.

To allow for comparison of the biomass estimates between the converted data series and the true *Campelen 1800* estimates, the converted abundance at length was transformed to biomass at length using length-weight relationships applied annually to the entire converted data set (from Gundersen and Brodie, 1999).

As a result of the above data analyses, all data presented in this paper are therefore in *Campelen 1800* trawl catch equivalents.

Survey coverage by NAFO Division and depth zone for the true *Campelen 1800* surveys from 1996-2001 is presented in Table A.

Geographic Distribution

The spatial distribution of Greenland halibut in NAFO Subarea 2 and Div. 3KLMNO from the Canadian summer-fall surveys was examined by depicting standardized survey catches by set as expanding symbols (kg per standard set) plotted on a map of the survey area according to the position of each catch (using the software Surfer Version 8). All catches within the bounds of a particular size grouping are represented by the same circle diameter. Sets where G. halibut did not occur are depicted with a plus (+) symbol. To demonstrate the changing distribution patterns throughout the period 1978-2001 only data from the years 1978, 1988, 1991, 2000 and 2001 are presented here for illustration purposes in Fig. 1-5, respectively. Data from Div. 3LMNO were only available for the 2000 and 2001 figures shown here.

In 1978 Greenland halibut were in relatively high abundance along the deep slopes of the continental slope particularly in Div. 2G (Fig. 1). They were similarly plentiful in the deep channels running between the fishing banks especially in Div. 2H and 2J and to a significant degree in Div. 3K (Fig. 1). By 1988 the distribution pattern was largely similar to that of 10 years before except that the catch per set had declined substantially (Fig. 2). Just three years later in 1991 (Fig. 3), distribution along the slopes of the most northerly divisions i.e. Div. 2G, 2H and to some degree Div. 2J had been greatly reduced (although survey coverage in slope waters of Div. 2G was also lacking significantly in the 1991 survey). Nevertheless, the disappearance of large numbers of Greenland halibut in the deepwater channels of Subarea 2 was especially outstanding (Fig. 3). The main concentrations of Greenland halibut that remained were in the deep channels of Div. 3K (Fig. 3).

By the late-1990s survey catches improved considerably compared to 1991. The 1999 survey results reported in Bowering (2001) indicated continued improvements in survey catches with considerable recovery of catches in the deepwater channels of Div. 2H and 2J although little, if any, improvement appears to have occurred in Div. 2G either in the deepwater channels or the continental slope area (Fig. 4). Larger catches were most widespread in Div. 3K and along the northern slope of Div. 3L with some relatively large catches along the slope of Div. 3N. Catches remained relatively low along the eastern slope of Div. 3L and in Div. 3M (Fig. 4). In 2000, survey results showed improved catches along the NE slope of Div. 3L and around the deep edge of the slope of Div. 3NO compared to 1999 (Fig. 4) with similar distributions in Div. 2J and 3K. The 2001 survey (Fig. 5) indicated relatively high concentrations in Hopedale Channel (Div. 2H) and widespread distribution of good catches along the slope from central Labrador to the northeast Grand Bank.

Trends in Biomass

Biomass and abundance indices by stratum are shown in Tables 1 and 2, respectively for Div. 2G; Tables 3 and 4 for Div. 2H; Tables 5 and 6 for Div. 2J; Tables 7 and 8 for Div. 3K; Tables 9 and 10 for Div. 3L; Tables 11 and 12 for Div. 3M; Tables 13 and 14 for Div. 3N; and Tables 15 and 16 for Div. 3O. The respective trends in total biomass indices by division are presented for ease of illustration in Fig. 6.

The biomass index for Div. 2G declined by nearly half from an average of about 50 000 tons during 1978, 1979 and 1981 to 23 000 tons during 1987-88 (Table 1; Fig. 6). It further declined by another 50% to an average of 13 000 tons during 1996-99. The 1999 value of 10,000 tons is among the lowest observed despite one of the more complete years of survey coverage (Table 1; Fig. 6). A similar but less severe trend was experienced in Div. 2H (Table 3; Fig. 6). The biomass index declined from an average of about 52 000 tons (excluding 1979 which was considered to be anomalously high) during 1978-81 to around 40 000 tons in 1987-88 and 34 000 tons during 1996-99 with an estimated 38 000 tons for 2001 (Table 3; Fig. 6). Unfortunately, there are so many years throughout the series that have no surveys it is difficult to determine when the various declining trends actually began. No survey was conducted in Div. 2GH during 2000 and only Div. 2H was surveyed in 2001.

Unlike Div. 2G and 2H, the annual survey series is unbroken from 1978-2001 for both Div. 2J and 3K. In Div. 2J the biomass index was relatively stable from 1978-84 at an average level of about 115 000 tons (Table 5; Fig. 6). It then began to decline to reach an all time low in 1992 at about 18 000 tons and only increased marginally until 1995 after which it began to increase more rapidly. By 1999 it had reached a level of around 87 000 tons, the highest since 1986 but declined again in 2000 to 55 000 tons, the lowest since 1995 (Table 5; Fig. 6). The 2001 estimate was 66 000 tons which is similar to that of 1996.

In Div. 3K there was a rather long period of apparent stability from 1978-89 at an average annual biomass estimate of 130 000 tons (Table 7; Fig. 6). It then declined to a low of 44 000 tons in 1992 with an average of 63 000 tons between 1991-94. After 1994 the biomass index increased rather rapidly and steadily until by 1999 it reached an estimate of 176 000 tons, the highest in the time series (Table 7; Fig. 6). In 2000 and 2001, the biomass index declined to 143 000 tons and 129 000 tons, respectively the 2001 value being the lowest since 1995. It is worth noting that the estimates from 1995-2001 represent actual *Campelen 1800* Shrimp trawl surveys and therefore any trends are not potential artifacts of data conversions.

The fall survey biomass indices for Div. 3L, 3M, 3N and 3O are based on only six years of data and generally lack trend (Tables 9, 11, 13 and 15, respectively; Fig. 6). Survey coverage in Div. 3L has been rather comprehensive for the period and the biomass index for 1999-2001 is rather stable over 30 000 tons but is lower than during the 1996-98 period. Lack of trend in Div. 3MNO may largely be a result of high variation in survey coverage from year to year as well as very low estimates in these Divisions generally (Tables 9, 11, 13 and 15, respectively; Fig. 6). Nevertheless, it appears that the overall combined biomass estimates in these divisions are rather low in proportion to Subarea 2 + Div. 3K ranging from about 12-25% (Table 17).

A comparison of biomass estimates between spring and fall surveys in Div. 3LNO during 1996-2001 is presented in Fig. 6. Trends are similar in Div. 3L but estimates are higher in the fall series likely due to more survey coverage. The trends are less clear in Div. 3NO, however, survey intensity can be quite different between seasons (Fig. 6).

Trends in Biomass by Size Category

Most of the stock biomass resides in Div. 2J and 3K combined (Table 17) and these divisions comprise the longest time series of annual survey data throughout the stock area. In order to illustrate the biomass trends for important size categories from 1978-2001 the data were combined for Div. 2J and 3K (Fig. 7). Panel 7A shows the trends in biomass for Greenland halibut <30 cm compared to those ≥30 cm. The value of 30 cm was chosen because it represents the minimum allowable size of Greenland halibut that can be retained in the commercial fishery. Panel 7B shows the trends in biomass for Greenland halibut ≤70 cm compared to those >70 cm. The value of 70 cm was chosen because it was considered to be an approximate knife-edge median size of Greenland halibut at maturity (M_{50}).

The results presented in Fig. 7 indicate that the total stock began to rebuild rapidly after 1995 and by 1999 had reached a level near historic highs since the surveys began in the late-1970s. Although it declined again in 2000 it was still at a relatively high level and remained there in 2001. However, until its lowest point was reached at about 1992, the stock was largely comprised of Greenland halibut ≥ 30 cm in length with the ≥30 cm and <30 cm lines intersecting for the first time in 1992 (Fig. 7A). The lines intersected in reverse again in 1997 and grew apart since then. Since then it is clear that the improvement in the stock has come from above average recruitment. As these recruits add growth the contributions to the stock biomass should shift back to the more usual size compositions assuming normal recruitment patterns. Nevertheless, the fishable stock under the current management regime (≥30 cm) considering all divisions is probably still well below historically high levels.

During the late-1970s and early-1980s Greenland halibut greater than 70 cm contributed about 20% to the estimated trawlable stock biomass (Fig. 7B). However, after 1984 this size category declined to the point that by 1991 virtually no Greenland halibut in this size range contributed to the estimates of stock biomass. Although there is some slight improvement since 1995, the contribution to stock biomass from this size group remains extremely low.

Age Composition and Recruitment

Annual age compositions from the Div. 2J and 3K combined time series from 1978-2001 are presented in Table 18 and Fig. 8. Although Greenland halibut were caught as old as 20 years few were ever caught older than 17 years with the age structure fairly consistent from about 1978-88 (Table 18). Since then the older ages began to disappear from the survey catches and by 1995 none were caught older than 11 years. After 1995 some older fish again began to appear in the surveys at least up to 14 years old which continued into 2001 (Table 18). The population abundance has increased considerably during the mid-1990s but is almost entirely driven by recruitment to the surveys of the 93-95 year-classes (Table 18; Fig. 8). Abundance peaked in 1996 then declined to 1993-95 levels by 1998-99. The 2000 value is somewhat lower than the previous two years' estimates with a slight increase again in 2001 (Fig. 8). Although the abundance of

ages 6-9 (upon which most commercial fishing takes place) improved it still remains below historic levels when stock abundance of these age groups were highest (Table 18).

Age compositions of Greenland halibut by division from actual Campelen 1800 Shrimp trawl surveys during 1996-2001 are shown in Table 19. For ease of comparison the data are combined for Div. 2GH, Div. 2J3K, Div. 3LM, and Div. 3NO. These data are then presented as abundance at age (Fig. 9) to illustrate the dominance of Div. 2J3K with respect to the overall stock size and percent at age (Fig. 10) to highlight the importance of the various year-classes to stock abundance. Distribution and abundance of ages over the full time series (1978-2001) for Div. 2J and 3K are presented for illustration in Fig. 11.

It is clear from Fig. 10 that in all years and all areas the 1994-95 year-classes are very dominant cohorts particularly in Subarea 2 and Div. 3K. The 1993 year-class and to a lesser degree the 1992 year-class are particularly important in the more southern areas especially Div. 3LM where about 75% of the annual catch occurs (Fig. 10). However, the younger ages would not be expected to show significantly in Div. 3LM because of the lack of survey coverage particularly in Div. 3M in shallower depths where young fish are most abundant. The 1997 year-class appears relatively abundant in the 1999 surveys in Subarea 2 and Div. 3K, however, the estimates are still well below those of the 1995 year-class at similar ages (Fig. 9). The 1999 year-class at age 1 in 2000 is more abundant than any recent year-classes but still well below the 1995 year-class estimate at the same age (Fig. 9). The 2000 year-class dominates in all areas from Div. 2H to the Div. 3LM at age 1, however, the 1994 and 1995 year-classes are still the most abundant in Div. 3NO during the 2001 survey.

A comparison of age distributions of the spring and fall surveys in Div. 3LNO during 1996-2000 is shown in Fig. 12. Few fish older than age 8 are caught. The distributions are largely similar for surveys with rather similar coverage (1997 and 1999). However, in 1998, 2000 and 2001 when fall survey coverage included depths to 1 500 m the fall surveys are dominated proportionately by older fish than the shallower spring surveys (Fig. 12).

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Table 1 Biomass estimates (tons) by depth stratum of Greenland halibut from various Canadian surveys in Division 2G during the period 1978-99 (No survey in 2000-2001). Estimates are expressed in Campelen units or Campelen equivalents.

Depth Range (m)	V1 Area	V4 Area	Stratum	1978	1979	1981	1987	1988	1991	1996	1997	1998	1999
<=200	2773	2773	909	7475	1547	2139	.	.	47	142	.	271	117
	2339	2339	910	11062	1788	1890	.	.	45	23	.	11	128
	1804	1804	925	10644	3064	2508	.	.	.	15	.	.	92
201 - 300	1213	1213	901	7714	7673	7143	2228	2823	623	517	853	.	1526
	585	585	908	607	1960	393	396	139	86	606	587	451	300
	692	692	911	599	879	585	456	29	110	241	975	525	209
	756	756	924	765	1197	1596	556	198	.	225	815	.	384
	433	433	926	.	.	.	.	592	.	426	443	.	301
301 - 400	120	120	902	.	.	.	287	41	.	312	253	67	106
	73	73	912	.	.	.	112	2	.	.	227	87	64
	186	186	923	5650	.	1357	97	317	.	200	195	.	77
	832	832	927	.	.	.	2694	864	.	6729	1623	.	3342
401 - 500	80	80	903	.	832	526	120	123	30	.	112	123	95
	62	62	913	.	.	.	181	170	.	.	34	37	19
	186	186	922	5085	.	1591	.	.	.	.	273	.	195
	783	783	928	.	.	.	4257	1061	.	6949	2957	.	1134
501 - 750	153	153	904	.	4025	1816	770	410	.	.	233	249	198
	113	113	914	.	.	.	377	891	.	.	88	211	63
	142	142	921	.	9314	.	209	260	.	.	470	.	127
	1261	1261	929	.	18966	26440	6809	5045	.	5891	2706	.	.
751 -1000	164	164	905	.	.	.	.	3038	.	.	.	688	481
	96	96	915	.	.	.	.	1835	.	.	.	.	.
	172	172	920	.	.	.	4428	3283	.	.	.	.	.
1001 -1250	229	229	906	.	.	.	40	538	.	.	776	699	795
	146	146	916	.	.	.	.	181	.	.	.	1092	.
	316	316	919	.	.	.	.	579	.	.	1883	.	.
1251 -1500	360	360	907	.	.	.	.	.	.	.	.	.	773
	165	165	917	.	.	.	.	.	.	.	.	.	.
	515	515	918	.	.	.	.	.	.	.	.	.	.
Total Biomass (t)			49600	51244	47985	24016	22419	941	22275	15503	4511	10525	

Table 2 Abundance estimates (000s) by depth stratum of Greenland halibut from various Canadian surveys in Division 2G during the period 1978-99 (No survey in 2000-2001). Estimates are expressed in Campelen units or Campelen equivalents.

Depth Range (m)	V1 Area	V4 Area	Stratum	1978	1979	1981	1987	1988	1991	1996	1997	1998	1999
<=200	2773	2773	909	60505	13478	5054	.	.	496	6379	.	8774	1730
	2339	2339	910	34669	9371	4223	.	.	2413	804	.	572	2181
	1804	1804	925	17917	6080	4632	.	.	.	358	.	.	1551
201 - 300	1213	1213	901	56325	25196	50893	42883	15018	5435	14165	6213	.	13349
	585	585	908	724	30794	241	20376	1288	1100	9013	5195	3380	3139
	692	692	911	1690	2546	3395	20593	190	238	4760	12202	6886	2031
	756	756	924	624	1040	2444	9308	3682	.	4312	6397	.	6898
	433	433	926	.	.	.	.	1866	.	1387	1430	.	1162
301 - 400	120	120	902	.	.	.	435	66	.	2330	998	206	388
	73	73	912	.	.	.	110	10	.	.	899	241	176
	186	186	923	2699	.	793	90	563	.	870	915	.	409
	832	832	927	.	.	.	3411	7554	.	15176	5778	.	9557
401 - 500	80	80	903	.	820	259	138	171	99	.	619	314	286
	62	62	913	.	.	.	230	158	.	.	171	132	47
	186	186	922	2162	.	806	.	.	.	.	819	.	422
	783	783	928	.	.	.	2693	969	.	14756	7827	.	2908
501 - 750	153	153	904	.	2498	663	659	442	.	.	968	579	582
	113	113	914	.	.	.	326	847	.	.	315	567	241
	142	142	921	.	5792	.	166	244	.	.	1391	.	498
	1261	1261	929	.	7849	11391	4718	3556	.	23379	7056	.	.
751 -1000	164	164	905	.	.	.	.	2267	.	.	.	1027	699
	96	96	915	.	.	.	.	1373	.	.	.	.	.
	172	172	920	.	.	.	2904	3005	.	.	.	.	.
1001 -1250	229	229	906	.	.	.	63	252	.	.	973	630	740
	146	146	916	.	.	.	.	40	.	.	.	1306	.
	316	316	919	.	.	.	.	283	.	.	2360	.	.
1251 -1500	360	360	907	.	.	.	.	.	.	.	.	.	371
	165	165	917	.	.	.	.	.	.	.	.	.	.
	515	515	918	.	.	.	.	.	.	.	.	.	.
Abundance (000s)			177315	105464	84795	109103	43844	9781	97689	62525	24612	49365	

Table 3 Biomass estimates (tons) by depth stratum of Greenland halibut from various Canadian surveys in Division 2H during the period 1978-2001 (No survey in 2000). Estimates are expressed in Campelen units or Campelen equivalents.

Depth Range (m)	V1 Area	V4 Area	Stratum	1978	1979	1981	1987	1988	1991	1996	1997	1998	1999	2000	2001
<=200	1028	1028	930	315	263	707	50	96	343	152	.	97	168	.	1
	971	971	954	583	804	265	103	348	6	91	.	34	127	.	42
	1051	1051	956	1020	332	562	135	457	57	12	.	102	48	.	17
	1371	1371	957	3183	693	1274	374	578	86	15	.	29	43	.	22
201 - 300	276	276	931	560	68	1113	94	107	200	180	71	171	150	.	.
	354	354	943	822	18	1371	242	626	19	338	212	442	234	.	.
	261	261	950	.	.	.	.	.	.	283	1402	.	211	.	465
	291	291	953	11257	940	2984	1115	530	1347	179	659	594	258	.	224
301 - 400	389	389	955	630	1062	311	243	387	47	1475	363	363	271	.	127
	294	294	958	.	487	158	63	253	103	178	391	270	277	.	202
	55	55	932	.	.	.	28	39	35	131	166	97	105	.	.
	860	860	944	4747	5420	8446	761	995	242	500	5918	2276	3205	.	No Survey
401 - 500	206	206	949	.	.	.	.	.	.	3985	839	.	.	.	783
	177	177	952	.	4345	1697	875	3187	171	337	1227	2596	3017	.	2045
	178	178	959	.	1817	948	298	747	84	151	684	664	175	.	543
	50	50	933	.	.	.	.	25	17	105	310	104	84	.	.
501 - 750	55	55	942	.	1562	1002	61	47	36	61	135	104	85	.	187
	461	461	945	.	14164	6684	2583	5095	1265	1302	2019	1310	2892	.	7920
	246	246	948	.	.	.	.	.	.	3234	3605	10034	.	.	4112
	234	234	951	2027	8478	2253	1999	1692	865	1629	2571	1396	2449	.	1462
751 -1000	107	107	960	.	4767	569	506	119	23	97	332	375	184	.	232
	78	78	934	.	5019	.	504	102	.	303	191	166	272	.	.
	89	89	941	.	.	.	379	713	.	81	507	178	356	.	666
	721	721	946	31158	57014	13063	18281	11105	.	4680	7045	7813	6231	.	9549
1001 -1250	227	227	947	.	16477	2539	6266	6206	.	2002	2770	3999	2255	.	4532
	211	211	961	.	6300	1888	666	880	.	285	223	270	275	.	1321
	96	96	935	.	.	.	457	481	.	.	478	519	713	.	.
	97	97	940	.	.	.	400	360	.	268	658	492	644	.	.
1251 -1500	242	242	962	.	.	.	1243	1812	.	884	922	1119	1852	.	.
	78	78	936	.	.	.	85	1810	.	.	486	883	.	.	1383
	130	130	939	.	.	.	284	651	.	832	603	.	692	.	.
	265	265	963	.	.	.	1443	2248	.	1023	1909	541	1258	.	.
Total Biomass (t)	94	94	937	.	.	.	.	.	.	.	389	195	.	.	677
	191	191	938	.	.	.	.	.	.	447	731	624	837	.	1170
	342	342	964	.	.	.	.	.	.	826	815	1131	1362	.	.
Total Biomass (t)				56300	130030	47835	39539	41694	4946	26062	38628	38988	30730	.	37682

Table 4 Abundance estimates (000s) by depth stratum of Greenland halibut from various Canadian surveys in Division 2H during the period 1978-2001 (No survey in 2000). Estimates are expressed in Campelen units or Campelen equivalents.

Depth Range (m)	V1 Area	V4 Area	Stratum	1978	1979	1981	1987	1988	1991	1996	1997	1998	1999	2000	2001
<=200	1028	1028	930	7813	4949	2811	3708	1966	3300	5374	.	368	672	.	47
	971	971	954	11300	19528	846	12361	39684	2137	1985	.	267	4308	.	445
	1051	1051	956	18988	16795	4735	10771	18014	1157	723	.	1475	1121	.	713
	1371	1371	957	35154	17225	9304	6361	25231	3018	566	.	219	1590	.	571
201 - 300	276	276	931	3113	456	937	3389	2493	1822	6341	683	1029	1177	.	.
	354	354	943	2654	1339	3725	8534	9959	536	5235	2237	1777	2292	.	.
	261	261	950	.	.	.	.	.	.	2082	9856	.	1167	.	2844
	291	291	953	100676	4310	13410	74723	17613	6345	1301	12727	2962	1521	.	3009
301 - 400	389	389	955	1231	25043	178	7478	7759	1391	49950	5048	1357	1686	.	1403
	294	294	958	.	8999	61	5514	7806	5986	2002	8345	3155	4894	.	6006
	55	55	932	.	.	.	49	102	238	2474	1313	804	688	.	.
	860	860	944	13151	25369	5744	13628	9050	2514	6656	53118	10151	24991	.	.
401 - 500	206	206	949	.	.	.	.	.	.	29457	7391	.	.	.	4846
	177	177	952	.	17519	3555	8352	46002	2642	6014	6708	14938	17708	.	14098
	178	178	959	.	1730	392	547	1739	502	1146	3783	2204	673	.	5539
	50	50	933	.	.	.	.	45	65	898	2253	474	259	.	.
501 - 750	55	55	942	.	810	367	103	64	95	250	885	431	269	.	602
	461	461	945	.	36739	19617	22348	55983	6817	10051	19595	5454	17312	.	56925
	246	246	948	.	.	.	.	.	.	25826	23100	56810	.	.	27958
	234	234	951	6712	27506	3702	5569	11991	3718	11105	20202	7033	12008	.	6364
751 - 1000	107	107	960	.	2569	199	594	152	110	206	1253	1188	515	.	1348
	78	78	934	.	1540	.	628	111	.	783	789	569	714	.	.
	89	89	941	.	.	.	441	643	.	269	1181	465	1096	.	2007
	721	721	946	32110	117728	17768	118795	83445	.	30614	35062	32182	26459	.	39331
1001 - 1250	227	227	947	.	33053	5574	14957	27870	.	10492	13622	15379	8447	.	19229
	211	211	961	.	3261	677	697	1180	.	653	839	755	726	.	6815
	96	96	935	.	.	.	390	178	.	.	767	1281	1181	.	.
	97	97	940	.	.	.	434	314	.	427	1334	1061	941	.	.
1251 - 1500	242	242	962	.	.	.	877	1565	.	1548	2367	1598	2264	.	.
	78	78	936	.	.	.	97	724	.	.	542	939	.	.	1813
	130	130	939	.	.	.	215	206	.	742	519	.	787	.	.
	265	265	963	.	.	.	638	1276	.	1167	2098	635	1258	.	.
Abundance (000s)	94	94	937	.	.	.	.	.	.	.	401	149	.	.	606
	191	191	938	.	.	.	.	.	.	263	488	355	749	.	1337
	342	342	964	.	.	.	.	.	.	428	565	1186	941	.	.
				232902	366466	93601	322194	373163	42392	217026	239069	168649	140410	.	203855

Table 5a Biomass (tons) by stratum (converted to Campelen units from 1978-94) from Canadian fall surveys in Division 2J from 1978-2001.

Depth Range (m) V1 Area V4 Area Stratum	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992			
101 - 200	1427	633	201	257	91	486	439	1620	524	913	91	206	42	21	171	103	34	0
	1823	1594	205	1753	2385	1007	2591	4878	2748	1521	502	283	113	168	126	87	104	16
	2582	1870	206	3384	2279	3315	9691	5703	2647	3370	1545	1399	250	590	217	335	99	75
	2246	2264	207	6538	2707	2153	4177	2601	1921	1526	627	352	93	58	14	0	0	0
	733	237																
	778	238																
201 - 300	440	621	202	1007	1437	1673	1778	1915	1307	4167	563	448	867		32	246	164	79
	1608	680	209	4481	15830	15100	8547	19662	8897	5183	6062	2398	1491	1997	2003	1488	574	454
	774	1035	210	956	782	960	549	1845	3694	2268	566	374	281	786	654	908	266	373
	1725	1583	213	2686	1921	4701	5070	6550	4853	3547	6427	3754	1918	1146	494	609	84	301
	1171	1341	214	5954	2893	1904	6928	9277	5862	7527	7489	1398	1923	2598	862	883	176	425
	1270	1302	215	3247	1181	2407	1842	5350	1967	5528	2829	2056	1920	1265	896	1445	750	869
	1428	2196	228	528	1406	3057	1289	1643	1817	2615	1119	1392	889	330	1034	1517	475	424
301 - 400	508	530	234	7009	4357	3916	3492	5306	2665	4868	1143	922	454	1426	853	386	226	141
	480	487	203	2311	4188	1296	2925	3502	11077	12390	1400	6043	1586	2104	4732	2108	2424	587
	448	588	208	7045	4799	6542	10304	15563	5125	19043	17885	8229	4397	3640	9245	8660	2572	2006
	330	251	211	3152	1736	2734	1256	1821	4216	1912	5424	3300	1992	3049	1016	6051	922	352
	384	360	216	2832	6574	6969	2551	7456	4258	6788	3213	1460	2197	170	487	447	166	167
	441	450	222	3064	3243	3729	2527	7887	5835	2964	1850	128	1506	1847	407	865	70	154
	567	536	229	1024	1412	1464	2017	1261	2235	681	1021	985	371	208	233	152	545	783
401 - 500	354	288	204	21544	12476		9195	11739	9016	8750	728	8930	6466	6227	20968	5584	3045	2276
	268	241	217	4717	1845	3767	1192	1694	1595		3480	2589	1325	1349	181	1012	164	100
	180	158	223	1711	1208	2623	1635	1622	1106	1893	1358	2065	462	1134	306	574	72	75
	686	598	227	6618	2186	5935	3056	3822	2768	2565	2912	1652	3068	2352	4044	3232	1101	1937
	420	414	235	5146	4006	5923	2000	4265	10840	3224	3269	7547	4825	2789	6721	8779	661	609
	133	240																
501 - 750	664	557	212	11338	15580	7520	9579	9423	3113	4609	7201	23242	21891	4953	2937	5488	1658	2331
	420	362	218	11403		5223	6388	1767	1695		1461	3151	2308	2513	859	2077	1096	174
	270	228	224	2250	3012	1067	2825	1182	1438	1167	847	5782	1554	1661	89	374	248	191
	237	185	230	2124		4016	1823	769	2452	629	766	2386	1369	1273	1063	1268	903	1647
	120	239																
751 - 1000	213	283	219				1005		2120		1664	6187	1872	1104	791	2015	293	253
	182	186	231	2634		3261		1805	1117	1842	2372	580	791	2975		2131	574	730
	122	193	236				640	946	1287	718	1113	2478	1199	182		1390	1501	593
1001 - 1250	324	303	220	1571														
	177	195	225															
1251 - 1500	236	228	232	870														
	286	330	221															
	180	201	226	99														
180	237	233																
Total Biomass (t)				129254	99533	102747	107311	142873	110193	112208	86927	101716	69422	49917	61433	60215	20968	18121

Table 5b Biomass (tons) by stratum (converted to Campelen units from 1978-94) from Canadian fall surveys in Division 2J from 1978-2001.

Depth Range (m)	V1 Area	V4 Area	Stratum	1993	1994	1995	1996	1997	1998	1999	2000	2001
101 - 200	1427	633	201	6	27	.	82	26	91	0	65	27
	1823	1594	205	6	14	.	514	35	502	532	281	863
	2582	1870	206	28	132	399	1120	404	349	403	357	1367
	2246	2264	207	0	33	1	56	51	74	192	16	208
	.	733	237	0	0	0	1	4	19	320	0	5
201 - 300	.	778	238	.	7	.	15	0	79	0	53	27
	440	621	202	8	307	95	89	157	593	1685	574	2215
	1608	680	209	384	123	360	1059	424	282	2204	694	291
	774	1035	210	589	121	2708	3904	893	1047	613	661	1140
	1725	1583	213	302	422	236	1338	1146	1962	1426	893	2332
	1171	1341	214	1064	507	327	4057	1258	1502	1883	1204	1930
	1270	1302	215	1349	855	1370	1247	1448	1889	1886	1139	1967
	1428	2196	228	967	2749	2219	5478	3666	4356	2566	2870	2803
301 - 400	508	530	234	895	129	.	163	753	352	311	122	349
	480	487	203	1856	1404	387	946	2233	3303	2553	2200	4090
	448	588	208	1025	4820	4799	3707	12593	6479	11101	9423	5230
	330	251	211	1628	871	1400	1343	1875	870	3541	640	2964
	384	360	216	331	392	64	506	1090	1631	881	1103	1076
	441	450	222	170	535	122	1672	930	382	751	995	1151
401 - 500	567	536	229	246	1202	1799	3900	1940	2514	1206	1639	1591
	354	288	204	2512	3442	1437	3823	7941	6171	3707	4652	5240
	268	241	217	270	226	131	932	676	621	704	628	1983
	180	158	223	130	168	162	438	425	598	505	.	346
	686	598	227	1648	2009	909	5850	9244	1793	13071	3628	4226
	420	414	235	810	1042	3895	4373	8365	3256	4183	3929	4170
501 - 750	.	133	240	85	118	632	537	501	251	643	204	413
	664	557	212	5048	1485	5499	4940	10735	4375	14447	4366	3802
	420	362	218	248	136	693	1783	1207	1319	1019	690	1413
	270	228	224	85	309	214	702	625	401	293	701	360
	237	185	230	135	379	652	1350	1589	547	2230	786	569
751 -1000	.	120	239	1917	1411	1676	2586	2725	4867	4064	1959	1945
	213	283	219	639	1579	2021	405	1727	2249	1402	1731	1297
	182	186	231	613	604	376	1013	651	1635	1744	2828	2820
1001 -1250	122	193	236	886	230	1007	698	381	725	1107	592	937
	324	303	220	.	.	.	1296	503	1196	.	568	786
	177	195	225	.	.	.	835	693	655	478	175	1219
1251 -1500	236	228	232	.	.	.	717	935	627	1787	1063	1146
	286	330	221	.	.	.	131	1246	692	567	401	268
	180	201	226	.	.	.	277	407	1313	626	400	368
	180	237	233	.	.	.	889	596	542	418	628	844
Total Biomass (t)				25880	27786	35591	64772	82095	62111	87147	54858	65777

Table 6a Abundance (000s) by stratum (converted to Campelen units from 1978-94) from Canadian fall surveys in Division 2J from 1978-2001.

Depth Range (m)	V1 Area	V4 Area	Stratum	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	
101 - 200	1427	633	201	654	1669	1570	4515	1865	523	2487	1832	118	196	1080	2895	393	916	0	
	1823	1594	205	8777	7147	6457	11159	23615	2981	2382	18275	1505	1304	418	2784	658	752	63	
	2582	1870	206	21666	20201	9184	71327	9314	4186	4133	23036	4295	4262	4212	1694	1808	6097	3694	
	2246	2264	207	16838	6921	4202	5287	4820	4109	1324	7011	1545	225	2692	649	0	0	0	
	.	733	237
	778	238																	
201 - 300	440	621	202	3768	8353	5947	6446	10774	1604	6567	6234	817	3934	.	182	2088	3813	444	
	1608	680	209	13530	45061	22673	10396	19405	11660	5246	12166	6383	1797	5397	10175	4830	2654	2654	
	774	1035	210	5491	1012	1022	3230	2200	3780	2502	2209	1171	772	1952	1544	1562	852	5704	
	1725	1583	213	5254	1017	2877	4944	9658	3109	3607	26577	5352	1977	4271	1345	3352	712	8792	
	1171	1341	214	9274	1101	3286	14755	5739	3947	5638	20807	2524	4618	2175	1638	4382	3383	12323	
	1270	1302	215	17317	4542	15592	8491	6639	2621	10366	32058	16422	2920	5341	9288	9725	6383	16212	
	1428	2196	228	917	1604	1807	1637	864	1244	2301	1740	1801	2133	1061	4395	4715	2619	4440	
	508	530	234	28190	22799	14518	28267	12695	4589	7687	4449	3075	6662	6918	5556	2341	1468	4216	
301 - 400	480	487	203	8716	20491	4226	19710	11313	22142	70783	4380	21856	5547	12810	16683	14725	16463	6119	
	448	588	208	10637	12926	8119	14791	31163	6933	16455	32827	15314	15746	6255	22525	22925	14072	24610	
	330	251	211	4903	3632	4058	2542	3110	5311	2678	6144	6106	12824	10214	3881	16388	4984	3125	
	384	360	216	1726	3024	3249	2932	2747	1074	3486	1770	1796	2404	792	1400	1875	370	599	
	441	450	222	1626	1031	1320	971	3074	1557	1193	1062	243	1486	910	607	3337	324	586	
	567	536	229	507	1190	799	585	585	1034	286	858	2002	286	78	520	273	1430	3900	
401 - 500	354	288	204	133064	82687	.	80982	35662	22254	17093	3068	15169	30825	14658	52836	20867	24933	19284	
	268	241	217	1696	645	866	387	553	369	.	1843	1677	774	774	258	1807	406	221	
	180	158	223	570	322	582	458	483	310	669	631	1350	248	681	483	1770	190	239	
	686	598	227	5143	944	5426	3067	2397	1203	1416	2548	1887	7903	3271	12386	6323	3130	7455	
	420	414	235	7511	6355	7453	8291	9841	20106	3486	3149	12740	10313	5287	15599	24439	1521	4410	
	.	133	240
501 - 750	664	557	212	17446	21648	8632	4978	6376	1736	4110	7627	25088	20894	7307	3928	8586	3014	6303	
	420	362	218	3958	.	1156	1271	404	433	.	664	1156	1531	1184	867	3987	1473	404	
	270	228	224	650	817	279	799	371	576	371	390	1857	761	854	149	594	557	316	
	237	185	230	636	.	1369	489	261	1157	196	424	913	864	864	815	1206	1744	3912	
	120	239																	
751 -1000	213	283	219	.	.	.	234	.	659	.	440	5538	967	557	674	1494	542	1392	
	182	186	231	964	.	1527	.	789	325	1239	1452	351	588	2153	.	1377	951	1252	
	122	193	236	.	.	.	227	344	646	260	638	1418	613	76	.	1393	1636	1133	
1001 -1250	324	303	220	513	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	177	195	225	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	236	228	232	325	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1251 -1500	286	330	221	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	180	201	226	50	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	180	237	233	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Total No. (000s)				332313	277137	138197	313166	217059	132178	177961	226308	161466	145374	104242	175753	169218	107390	143801	

Table 6b. Abundance (000s) by stratum (converted to Campelen units from 1978-94) from Canadian fall surveys in Division 2J from 1978-2001.

Depth Range (m)	V1 Area	V4 Area	Stratum	1993	1994	1995	1996	1997	1998	1999	2000	2001
101 - 200	1427	633	201	87	131	.	2235	218	740	0	958	305
	1823	1594	205	157	146	.	16190	767	4105	4276	1759	10624
	2582	1870	206	161	2315	22586	42257	5071	4336	5549	15413	29015
	2246	2264	207	0	208	78	1142	519	727	857	381	1077
	.	733	237	0	0	0	101	34	202	2790	0	50
201 - 300	.	778	238	.	2569	.	321	0	603	0	759	71
	440	621	202	214	4328	732	1068	2772	4046	22296	3930	22424
	1608	680	209	2557	6501	3555	17149	4116	1666	41034	8419	1608
	774	1035	210	5944	641	17946	49120	5232	9966	9682	3915	8839
	1725	1583	213	8347	10090	4609	33785	17703	16223	18872	15316	31344
	1171	1341	214	21657	17678	17525	102676	13946	9703	22210	18927	18652
	1270	1302	215	13146	7988	18080	14129	22364	13051	13433	10961	33998
	1428	2196	228	10909	51858	42618	112816	40114	34324	20882	33305	35242
	508	530	234	8640	802	.	2625	5209	1786	1005	620	1094
	480	487	203	13633	11690	3153	5862	19093	27969	19320	13164	37956
301 - 400	448	588	208	10111	40470	43881	75750	122273	32031	67095	50294	45512
	330	251	211	17540	8908	12534	16642	16470	3930	22424	4713	18264
	384	360	216	1510	1808	300	2284	4209	5401	3032	6983	4581
	441	450	222	867	18777	1238	11620	5076	1802	2259	5571	4640
	567	536	229	1180	14157	24774	14857	6890	13972	3281	7189	5510
	354	288	204	24682	28327	21397	26841	62076	51107	20444	50711	43690
	268	241	217	1061	751	583	3599	2254	1936	2105	2188	8789
401 - 500	180	158	223	283	942	1695	1883	1043	1720	1272	.	815
	686	598	227	6773	11039	3743	34184	35002	7486	46025	16946	16740
	420	414	235	5999	6378	19335	25337	41431	13753	17414	14260	19161
	.	133	240	320	427	3061	1601	1336	672	1491	448	1088
	664	557	212	22412	5670	20151	25042	44440	11915	49344	13485	13366
	420	362	218	573	373	3818	5951	3205	3231	2238	1369	2589
	270	228	224	188	1077	889	2023	1286	934	608	1506	800
501 - 750	237	185	230	305	1120	2799	3084	3932	1400	4428	1552	1377
	.	120	239	22953	10367	11193	18970	21936	36305	34310	8955	15341
	213	283	219	915	2063	5586	547	2180	3523	2219	2745	1995
	182	186	231	832	1254	760	1663	1151	3425	2815	4618	3915
	122	193	236	1208	195	3270	850	504	1043	1513	982	1412
1001 - 1250	324	303	220	.	.	.	1751	646	1005	.	688	634
	177	195	225	.	.	.	845	563	590	644	228	1419
	236	228	232	.	.	.	643	737	748	2371	1349	1354
1251 - 1500	286	330	221	.	.	.	78	931	402	318	363	141
	180	201	226	.	.	.	140	221	1078	512	415	401
	180	237	233	.	.	.	359	342	560	538	717	880
Total No. (000s)				205162	271047	311890	678016	517293	329415	470904	326101	446712

Table 7a Biomass (tons) by stratum (converted to Campelen units from 1978-94) from Canadian fall surveys in Division 3K from 1978-2001.

Depth Range (m)	V1 Area	V4 Area	Stratum	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
101 - 200	.	798	608	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	445	612	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	250	616	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	1455	1347	618	.	.	.	.	.	.	263	874	49	17	31	70	0	0	0
.	1588	1753	619	.	.	.	.	.	.	685	401	108	41	26	78	0	0	0
201 - 300	.	342	609	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	573	611	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	251	615	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	2709	2545	620	18712	9129	9090	9404	7175	6302	4074	5095	4164	2108	3737	583	451	899	152
.	2859	2537	621	41597	36475	15203	11844	6287	12035	6600	12389	2323	4458	3166	4278	485	1151	2264
.	668	1105	624	837	878	491	305	467	232	527	434	298	445	196	310	288	335	413
.	447	.	632	204	147	620	344	426	187	.	394	133	86	49	81	384	111	267
.	1618	1555	634	1482	1819	1196	1233	3348	1410	1293	1157	877	1919	776	587	707	526	296
.	1274	1274	635	1548	960	3092	2074	3013	1388	1668	773	1924	1932	910	1335	307	46	88
.	1455	1455	636	1650	872	2155	2163	3642	792	1299	861	806	353	852	701	401	240	282
.	1132	1132	637	723	575	907	1180	1366	2275	662	1780	1441	1349	700	466	818	293	144
301 - 400	.	256	610	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	263	614	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	593	617	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	1027	494	623	16992	3898	9646	10319	16038	24364	29298	8090	18912	14251	17661	11384	4603	5417	2598
.	850	888	625	1915	1387	1530	3242	822	5794	3856	4936	3449	5773	3204	847	3881	2176	484
.	919	1113	626	7394	4470	14225	6023	11576	11302	20810	13944	16278	8319	12970	11682	3365	3698	5003
.	1085	1085	628	4700	4183	8400	2305	1867	5126	4652	9824	9477	5858	6368	4150	2513	902	590
.	499	495	629	532	834	1790	2004	4063	3706	1779	1335	2978	5191	7176	4634	1053	385	1058
.	544	332	630	2056	800	1368	7048	.	4258	485	2244	1861	4436	4313	3075	2065	2188	917
.	2179	2067	633	2393	2472	4271	2834	2296	3115	3219	3432	4445	5532	3380	5842	5285	3440	2813
.	2059	2059	638	4198	3427	2615	4854	4801	4371	2922	7321	5983	4382	3057	2972	6809	1993	2625
.	1463	1463	639	1031	1254	1385	1266	3321	2174	436	872	1288	703	653	511	854	766	1175
401 - 500	.	30	613	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	632	691	622	16724	8517	3448	10766	7914	14953	8922	4742	36448	12755	17950	13695	30531	6256	4326
.	1184	1255	627	11452	5878	9820	24040	16903	27637	38222	18219	33516	21372	21502	37862	18637	10870	4355
.	1202	1321	631	8523	3909	4910	8787	5115	8693	12698	9456	8334	15010	11317	17190	4993	16791	3570
.	198	69	640	835	.	1177	756	531	.	344	398	204	417	163	225	367	310	130
.	204	216	645	462	.	336	534	434	97	1157	1055	.	613	351	81	460	103	213
.	.	134	650	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
501 - 750	584	230	641	776	1647	2245	1521	1622	3609	3924	1384	.	1367	.	.	2661	651	440
.	333	325	646	2231	3156	1852	2656	590	2959	3167	2337	.	1143	.	.	449	1083	375
.	.	359	651	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
751 -1000	931	418	642	2417	.	3824	1134	3305	.	8496	3279	.	2722	.	.	4475	4484	9225
.	409	360	647	7096	2019	3855	3634	1817	.	4473	.	.	.	.	.	3857	1197	655
.	.	516	652	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1001 -1250	1266	733	643	1254	1364	.	.	.	.	.	.	.	.	.	.	.	.	.
.	232	228	648	406	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	531	653	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1251 -1500	954	474	644	1890	783	.	.	.	.	.	.	.	.	.	.	.	.	.
.	263	212	649	366	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	479	654	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Total biomass (t)				162396	100851	109450	122269	108737	146777	160510	120223	155137	122493	120451	122490	100699	66310	44458

Table 7b Biomass (tons) by stratum (converted to Campelen units from 1978-94) from Canadian fall surveys in Division 3K from 1978-2001.

Depth Range (m)	V1 Area	V4 Area	Stratum	1993	1994	1995	1996	1997	1998	1999	2000	2001
101 - 200	.	798	608	.	.	.	0	44	37	.	0	8
	.	445	612	.	.	.	0	135	0	.	1	0
	.	250	616	.	.	.	0	4	23	.	0	0
	1455	1347	618	0	8	286	19	11	15	1	59	0
	1588	1753	619	0	0	18	29	57	0	0	13	0
201 - 300	.	342	609	.	.	.	117	386	202	.	177	8
	.	573	611	.	.	.	113	265	162	.	41	43
	.	251	615	.	.	.	39	67	176	.	23	20
	2709	2545	620	53	1113	790	4213	1275	1171	1367	3389	992
	2859	2537	621	972	1021	1068	3967	1320	2524	858	1495	113
	668	1105	624	1017	754	508	2516	1610	1752	1805	1186	2358
	447	.	632	.	.	.	.	.	.	.	.	.
	1618	1555	634	990	962	727	2370	2144	1321	1933	1197	2195
	1274	1274	635	99	41	128	1344	1545	1266	971	491	215
	1455	1455	636	829	398	1393	2336	1171	1054	1002	1015	641
	1132	1132	637	435	119	179	1722	869	2008	1145	.	526
301 - 400	.	256	610	.	.	.	344	630	1638	.	1000	1924
	.	263	614	.	.	.	154	399	184	.	164	16
	.	593	617	5604	2993	3844	2464	4941	3865	2919	2227	7873
	1027	494	623	1672	1931	308	3588	1938	6167	3346	4322	5040
	850	888	625	3229	2385	1437	4381	3075	3944	6783	3649	6294
	919	1113	626	3469	4263	1962	5453	10283	9604	18305	3890	2111
	1085	1085	628	1438	1372	529	1799	2685	3116	10764	5142	2763
	499	495	629	1324	1337	2682	6569	2179	6214	5900	4291	1429
	544	332	630	1274	1331	858	4800	3261	1561	5114	3821	4474
	2179	2067	633	4511	2868	4649	3487	6739	4178	7634	3474	6544
	2059	2059	638	2804	1908	1750	3952	7031	8115	2400	4792	2535
	1463	1463	639	1718	872	1520	1381	1556	1266	1183	2362	2114
401 - 500	.	30	613	.	.	.	51	192	92	.	64	6
	632	691	622	6993	3921	2638	6896	11901	10364	13165	10064	11830
	1184	1255	627	31882	7308	18946	15576	22176	25568	45497	42775	11732
	1202	1321	631	9779	9453	10094	25499	14500	13683	18514	23958	20494
	198	69	640	77	111	179	105	59	37	39	144	103
	204	216	645	110	108	357	192	162	75	114	446	253
	.	134	650	193	338	252	147	242	224	39	.	18
501 - 750	584	230	641	411	109	227	394	197	369	1020	.	558
	333	325	646	105	463	327	564	1180	158	84	436	811
	.	359	651	704	894	1222	321	1361	1016	734	.	2603
751 -1000	931	418	642	1541	2336	1741	760	2036	2513	3081	2134	2677
	409	360	647	2413	1829	1087	749	2025	2961	2191	2465	3228
	.	516	652	2242	1445	2366	3585	2575	4843	3246	2591	6162
1001 -1250	1266	733	643	.	.	1487	2121	6830	5453	3480	1537	4660
	232	228	648	.	.	.	1641	1118	1687	1552	624	2891
	.	531	653	1718	.	1583	2306	1643	3660	3927	3045	2514
1251 -1500	954	474	644	.	.	688	870	2036	2845	1480	1917	2084
	263	212	649	.	.	.	387	1083	282	681	622	908
	.	479	654	.	.	1376	1016	3612	4808	3358	2287	4953
Total biomass (t)				89603	53980	68902	120019	129578	141582	175631	143329	128721

Table 8a Abundance (000s) by stratum (converted to Campelen units from 1978-94) from Canadian fall surveys in Division 3K from 1978-2001.

Depth Range (m)	V1 Area	V4 Area	Stratum	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
101 - 200		798	608															
		445	612															
		250	616															
201 - 300	1455	1347	618							1451	5437	560	114	1134	1426	0	0	0
	1588	1753	619							18849	28835	7471	1311	1623	3195	0	0	0
		342	609															
		573	611															
		251	615															
	2709	2545	620	79313	26011	22483	45352	21324	19900	10750	22838	22690	14773	32669	5143	2691	6734	870
	2859	2537	621	163739	93030	31584	74868	31379	45130	23738	93419	30733	41918	22142	41850	5435	8102	39198
	668	1105	624	2704	1424	1999	781	391	758	1080	1723	459	1378	1409	1562	735	1470	6065
	447		632	228	261	307	154	307	512		389	154	307	31	123	2552	498	3008
	1618	1555	634	5911	2281	2798	3180	13334	2048	1812	3809	5564	8964	3079	3466	3021	2822	5475
1274	1274	635	9561	2256	6630	6239	9674	4352	4009	2479	10077	12852	7150	7035	1227	307	818	
1455	1455	636	11409	1544	3374	5071	9267	2102	1651	1451	6355	2488	3603	2522	1658	1401	7939	
1132	1132	637	3841	3070	2492	3140	3404	5357	1220	2558	8409	3659	6443	1308	2336	2388	1038	
301 - 400		256	610															
		263	614															
		593	617															
	1027	494	623	62444	10278	18366	40758	31561	51095	62359	26654	56934	33624	79255	55309	18620	33247	34895
	850	888	625	3079	6595	3410	7308	877	8692	4888	11482	10835	27390	14996	4151	16077	16643	7912
	919	1113	626	37167	10366	35220	15903	19924	35302	45005	47205	67065	46497	58431	48166	20891	21491	58068
	1085	1085	628	13497	7582	15672	5572	4702	14851	10426	30622	30448	19493	30328	12649	7731	4826	7562
	499	495	629	2826	2025	3062	5858	9644	8763	3569	4256	9930	19586	42181	27663	3398	1853	6384
	544	332	630	10514	2114	3405	12684		9429	798	6511	6960	21053	17311	14143	8905	11000	6486
	2179	2067	633	2864	4167	4286	4871	5824	3122	3717	3322	14238	25233	5733	18794	19347	13644	18848
2059	2059	638	9099	5161	4123	9772	9800	11124	4504	16531	12958	9234	5877	6669	16365	4724	22625	
1463	1463	639	1096	956	1174	1409	6118	1294	453	1258	6876	1093	973	1509	2300	2147	10739	
401 - 500		30	613															
	632	691	622	146318	18866	6781	41426	10201	19822	17431	22691	126974	33182	74999	78998	126018	44426	65813
	1184	1255	627	64905	20088	26874	44410	46628	47016	75267	48629	106258	115015	63455	166401	77527	55702	68189
	1202	1321	631	60931	15102	11574	15311	6945	14881	13459	32503	21537	62006	34558	74737	17747	65120	23920
	198	69	640	912		586	272	300		150	254	123	381	95	259	558	763	436
	204	216	645	225		112	196	131	182	449	318		463	225	126	814	206	767
		134	650															
	584	230	641	362	1125	1366	803	964	2116	2330	864		1044			3615	924	924
	333	325	646	527	1031	618	962	137	802	1145	1619		321			321	2046	687
		359	651															
751 - 1000	931	418	642	1217		1921	768	2412		4120	2433		1614			4184	5635	16265
	409	360	647	3516	703	1688	1210	816			2082					3207	1500	1107
	516	652																
1001 - 1250	1266	733	643	522	348													
	232	228	648	96														
	531	653																
1251 - 1500	954	474	644	394	328													
	263	212	649	145														
	479	654																
Total No. (000s)				699361	236713	211905	348277	246062	308649	294329	387899	555577	503568	504942	572583	367279	309619	416037

Table 8b Abundance (000s) by stratum (converted to Campelen units from 1978-94) from Canadian fall surveys in Division 3K from 1978-2001.

Depth Range (m)	V1 Area	V4 Area	Stratum	1993	1994	1995	1996	1997	1998	1999	2000	2001
101 - 200	.	798	608	.	.	.	0	293	110	.	0	63
	.	445	612	.	.	.	0	857	0	.	31	0
	.	250	616	.	.	.	0	34	120	.	17	0
	1455	1347	618	0	53	3330	226	93	139	124	62	0
	1588	1753	619	0	0	841	425	448	0	121	95	34
201 - 300	.	342	609	.	.	.	839	1506	602	.	349	47
	.	573	611	.	.	.	465	1340	586	.	90	109
	.	251	615	.	.	.	236	432	784	.	138	200
	2709	2545	620	233	7702	8286	50340	10662	8370	8816	36955	7433
	2859	2537	621	8531	12044	17351	40571	14182	14778	3966	10239	2169
	668	1105	624	14571	20622	9987	41839	15930	17967	14677	10519	34688
	447	.	632	.	.	.	.	.	.	.	.	.
	1618	1555	634	10642	10321	12468	28382	18641	11979	10390	6369	26367
	1274	1274	635	643	131	1057	11407	17490	11602	6975	4431	846
	1455	1455	636	13810	8406	19987	26446	9607	5504	5504	6829	5296
	1132	1132	637	3737	8743	3512	11087	6167	10713	5025	.	5853
301 - 400	.	256	610	.	.	.	2195	4560	7343	.	9191	11171
	.	263	614	.	.	.	1369	3021	923	.	1318	326
	.	593	617	60446	45722	64933	45872	39808	22113	17998	14955	52343
	1027	494	623	21321	19594	3228	51938	23445	32102	22561	28065	38176
	850	888	625	41573	41980	18861	69363	28279	37542	28615	22904	43640
	919	1113	626	36745	39756	15421	61923	132559	64794	84650	35409	34372
	1085	1085	628	13980	8557	3974	11330	26358	12955	30657	32507	15530
	499	495	629	9964	9976	23208	55189	18794	37008	35306	25834	8677
	544	332	630	14310	9286	9215	31901	32380	12240	25141	29679	27676
	2179	2067	633	53772	35827	54535	31687	47011	16523	37329	13147	39049
	2059	2059	638	24967	33314	26066	44481	46671	38835	9072	14615	16777
	1463	1463	639	17173	16628	22428	9276	9224	4595	3815	11347	10546
401 - 500	.	30	613	.	.	.	448	1577	549	.	586	66
	632	691	622	56296	72546	39289	132742	104560	64289	73410	52914	69929
	1184	1255	627	358859	96592	225916	116359	206365	158172	160052	151814	69006
	1202	1321	631	103337	111802	128176	162295	96509	65419	78684	100559	84520
	198	69	640	326	494	1429	377	142	104	66	242	218
	204	216	645	436	396	1590	624	393	211	178	1040	465
	.	134	650	1057	2258	2120	654	691	479	100	.	28
501 - 750	584	230	641	1371	475	886	1076	348	902	1951	.	1076
	333	325	646	343	1371	1185	1321	2347	335	201	700	1140
	.	359	651	2799	4309	5778	840	2609	2692	1449	.	4628
751 - 1000	931	418	642	3872	6383	3364	1179	3179	4284	4773	3092	3524
	409	360	647	2806	3797	2649	1411	3417	5497	3615	2894	4383
	.	516	652	6246	4277	4969	6637	4969	10470	4933	3336	8239
1001 - 1250	1266	733	643	.	.	2252	2252	9109	8470	4403	1888	5411
	232	228	648	.	.	.	1786	1555	2368	2478	737	3595
	.	531	653	1437	.	2264	2849	2131	6063	5750	4325	2854
1251 - 1500	954	474	644	.	.	565	587	1891	2706	1695	2013	2237
	263	212	649	.	.	.	160	1094	204	619	617	802
	.	479	654	.	.	1120	988	4159	6109	3594	2519	5727
Total No. (000s)				885602	633308	738068	1061182	951832	707209	698447	644371	649233

Table 9 Biomass estimates (t) of Greenland halibut from Canadian fall surveys in Div. 3L using a Campelen trawl during 1996-2001.

Depth Range (m)	V1 Area	V4 Area	Stratum	1996	1997	1998	1999	2000	2001
30 - 56	.	268	784	0	0	0	.	0	0
57 - 92	2071	2071	350	0	0	0	0	0	0
	1780	1780	363	0	0	0	0	0	0
	1121	1121	371	3	0	0	24	0	0
	2460	2460	372	0	0	0	0	0	0
	1120	1120	384	0	0	0	0	0	0
	.	465	785	0	0	0	.	0	0
93 - 183	1519	1519	328	1	6	1	11	18	0
	1574	1574	341	2	249	184	0	6	0
	585	585	342	1	85	16	0	6	0
	525	525	343	0	34	45	0	1	0
	2120	2120	348	2	129	177	216	22	2
	2114	2114	349	2	60	252	416	0	0
	2817	2817	364	0	103	414	30	0	1
	1041	1041	365	0	169	140	55	.	0
	1320	1320	370	14	48	871	555	19	1
	2356	2356	385	64	502	334	253	29	47
	1481	1481	390	67	200	625	310	69	497
	.	84	786	67	2	4	.	0	0
	.	613	787	1	86	0	.	0	0
	.	261	788	0	45	31	.	0	0
	.	89	790	0	6	6	.	25	0
	.	72	793	0	4	4	.	0	0
	.	216	794	0	15	4	.	.	0
	.	98	797	0	3	14	.	0	0
	.	72	799	0	0	4	.	0	0
184 - 274	1494	1582	344	11	96	885	181	42	0
	983	983	347	0	37	1021	297	160	88
	1394	1394	366	338	878	2172	2108	62	265
	961	961	369	108	888	2347	719	85	296
	983	983	386	447	1010	1683	1129	473	337
	821	821	389	900	875	474	673	727	1143
	282	282	391	344	892	257	135	379	89
	.	164	795	5	35	6	.	11	8
	.	72	789	0	14	10	.	12	1
	.	227	791	66	193	151	.	201	2
	.	100	798	76	108	152	.	226	19
275 - 366	1432	1432	345	3747	1775	4359	1665	2659	1249
	865	865	346	5483	2378	2062	1312	1021	1224
	334	334	368	690	338	2272	860	857	871
	718	718	387	1765	1614	1609	5284	4897	4503
	361	361	388	711	814	380	270	704	993
	145	145	392	500	618	215	170	234	116
	.	175	796	37	355	289	.	154	96
	.	81	800	.	.	.	.	.	191
367 - 549	186	186	729	648	496	242	239	1002	438
	216	216	731	.	713	305	1795	891	407
	468	468	733	706	752	2535	1511	1321	906
	272	272	735	1111	938	2093	2465	728	1504
	.	50	792	186	349	808	.	316	69
550 - 731	170	170	730	37	330	44	224	125	627
	231	231	732	463	590	705	519	858	319
	228	228	734	642	604	515	184	554	671
	175	175	736	1117	951	1285	498	4028	1038
732 - 914	.	227	737	2198	1981	4765	1472	1522	1689
	.	223	741	867	3224	5059	961	444	1653
	.	348	745	1075	1722	1299	358	364	680
	.	159	748	429	287	166	255	390	458
915 - 1097	.	221	738	1906	1439	769	548	903	857
	.	206	742	567	901	918	628	451	579
	.	392	746	783	992	531	1231	363	1126
	.	126	749	125	377	135	.	185	17
1098 - 1280	.	254	739	1227	2248	1784	245	515	329
	.	211	743	931	2820	472	2427	861	671
	.	724	747	438	1446	570	284	622	37
	.	556	750	586	3947	1750	1100	1872	348
1281 - 1463	.	264	740	981	2604	1013	337	1109	1068
	.	280	744	2961	1101	1746	.	698	1295
	.	229	751	1207	2810	2633	.	711	1061
Total Biomass (t)				36642	48283	55410	33955	34161	29886

Depth Range (m)	V1 Area	V4 Area	Stratum	1996	1997	1998	1999	2000	2001
30 - 56	.	268	784	0	0	0	.	0	0
57 - 92	2071	2071	350	0	0	0	0	0	0
	1780	1780	363	0	0	0	0	0	0
	1121	1121	371	39	0	0	39	0	0
	2460	2460	372	0	42	0	0	0	0
	1120	1120	384	0	0	0	0	0	0
	.	465	785	0	0	0	.	0	0
93 - 183	1519	1519	328	42	42	42	125	84	0
	1574	1574	341	72	595	650	43	173	0
	585	585	342	40	201	80	0	201	0
	525	525	343	0	96	132	0	36	0
	2120	2120	348	83	458	622	311	73	83
	2114	2114	349	125	208	686	914	0	0
	2817	2817	364	0	517	1287	43	0	172
	1041	1041	365	0	668	382	143	.	95
	1320	1320	370	227	227	2623	986	171	227
	2356	2356	385	540	3110	1058	770	36	203
	1481	1481	390	204	815	1892	693	149	1580
	.	84	786	331	12	12	.	0	0
	.	613	787	42	295	0	.	0	0
	.	261	788	0	180	90	.	0	0
	.	89	790	0	6	18	.	37	0
	.	72	793	0	5	10	.	0	5
	.	216	794	0	40	15	.	.	0
	.	98	797	0	13	34	.	0	0
	.	72	799	0	0	9	.	0	0
184 - 274	1494	1582	344	69	696	3096	392	64	0
	983	983	347	0	180	3200	541	456	45
	1394	1394	366	2732	6673	7278	4913	192	2923
	961	961	369	1124	4451	7193	1880	595	2071
	983	983	386	2524	7437	5980	4958	1037	1017
	821	821	389	8019	7680	2146	3338	2485	7943
	282	282	391	3369	6459	969	601	3491	369
	.	164	795	21	104	23	.	20	34
	.	72	789	0	50	25	.	35	15
	.	227	791	127	487	375	.	283	28
	.	100	798	261	281	468	.	309	55
275 - 366	1432	1432	345	18723	12712	22231	6457	24864	7192
	865	865	346	40360	16064	7913	3490	5421	9162
	334	334	368	8664	1815	7305	1940	1447	3045
	718	718	387	13169	8214	5004	10310	11803	12922
	361	361	388	2657	6605	894	472	1788	4569
	145	145	392	4317	4149	568	459	559	436
	.	175	796	72	1071	975	.	1061	542
	.	81	800	.	.	.	.	.	936
367 - 549	186	186	729	1797	1241	461	486	1689	819
	216	216	731	.	2333	517	2791	1501	728
	468	468	733	2694	3058	5991	2414	2437	2015
	272	272	735	3511	3592	4808	4457	1154	3031
	.	50	792	1494	1510	1861	.	517	277
550 - 731	170	170	730	84	503	52	366	164	1050
	231	231	732	607	1414	1176	763	1128	632
	228	228	734	1854	1812	929	298	795	1129
	175	175	736	2848	2696	3045	867	6644	2195
732 - 914	.	227	737	4965	4216	9306	2014	1936	2264
	.	223	741	1917	8083	10239	1363	506	1810
	.	348	745	1891	3064	1987	404	438	814
	.	159	748	853	711	264	400	427	667
915 - 1097	.	221	738	3283	2003	1176	725	1094	1125
	.	206	742	808	2706	1204	867	468	652
	.	392	746	1267	1845	674	770	351	1159
	.	126	749	121	841	186	.	121	19
1098 - 1280	.	254	739	1655	3127	2568	349	472	360
	.	211	743	1205	2245	493	3316	1055	697
	.	724	747	498	1029	498	299	697	50
	.	556	750	841	4245	1874	814	2027	153
1281 - 1463	.	264	740	1543	2978	1217	436	1180	908
	.	280	744	2773	1213	2140	.	757	1266
	.	229	751	1040	2991	3103	.	929	971
Abundance (000s)				147500	152116	141050	68018	85919	80458

Table 11 Biomass estimates (t) of Greenland halibut from Canadian fall surveys in Div. 3M using a Campelen trawl during 1996-2001.

Depth Range (m)	V1 Area	V4 Area	Stratum	1996	1997	1998	1999	2000	2001
128 - 146	342	342	501	0	.	.	.	.	.
147 - 184	838	838	502	0	.	.	.	.	.
185 - 256	628	628	503	91	.	.	.	.	.
	348	348	504	0	.	.	.	.	.
	703	703	505	12	.	.	.	.	.
	496	496	506	33	.	.	.	.	.
257 - 366	822	822	507	380	.	.	.	.	.
	646	646	508	230	.	.	.	.	.
	314	314	509	56	.	.	.	.	.
	951	951	510	271	.	.	.	.	.
	806	806	511	316	.	.	.	.	.
367 - 549	670	670	512	261	.	.	.	.	.
	249	249	513	64	.	.	.	.	.
	602	602	514	171	.	.	.	.	.
	666	666	515	434	.	.	.	.	.
	.	102	537	.	.	.	.	.	.
550 - 731	634	634	516	342	.	.	.	.	.
	216	216	517	77	.	.	.	.	.
	210	210	518	143	.	.	.	.	.
	414	414	519	581	.	.	.	.	.
	.	194	538	.	.	.	.	.	.
732 - 914	.	525	520	.	.	.	.	.	.
	.	253	524	.	.	.	.	.	.
	.	530	528	279	1580	2297	.	950	1142
	.	98	533	59	270	77	.	119	78
	.	133	539	.	.	.	.	.	.
915 - 1097	.	517	521	.	.	.	.	.	.
	.	226	525	.	.	.	.	.	.
	.	488	529	72	218	667	562	508	1233
	.	238	532	938	466	524	398	124	278
	.	486	534	814	2026	1466	.	1437	1020
1098 - 1280	.	533	522	.	.	.	.	.	.
	.	177	526	.	.	.	.	.	.
	.	1134	530	3769	1587	1506	1111	1285	958
	.	92	535	235	218	434	.	720	30
1281 - 1463	.	284	523	.	.	.	.	.	.
	.	171	527	.	.	.	.	.	.
	.	203	531	346	216	508	337	149	302
	.	112	536	202	385	296	.	219	218
Total Biomass (t)				10175	6966	7776	2408	5511	5260

Table 12 Abundance estimates (000s) of Greenland halibut from Canadian fall surveys in Div. 3M using a Campelen trawl during 1996-2001.

Depth Range (m)	V1 Area	V4 Area	Stratum	1996	1997	1998	1999	2000	2001
128 - 146	342	342	501	0	.	.	.	.	.
147 - 184	838	838	502	0	.	.	.	.	.
185 - 256	628	628	503	199	.	.	.	.	.
	348	348	504	0	.	.	.	.	.
	703	703	505	58	.	.	.	.	.
	496	496	506	184	.	.	.	.	.
257 - 366	822	822	507	1427	.	.	.	.	.
	646	646	508	1595	.	.	.	.	.
	314	314	509	65	.	.	.	.	.
	951	951	510	884	.	.	.	.	.
	806	806	511	1360	.	.	.	.	.
367 - 549	670	670	512	315	.	.	.	.	.
	249	249	513	84	.	.	.	.	.
	602	602	514	180	.	.	.	.	.
	666	666	515	489	.	.	.	.	.
	.	102	537	.	.	.	.	.	.
550 - 731	634	634	516	358	.	.	.	.	.
	216	216	517	131	.	.	.	.	.
	210	210	518	176	.	.	.	.	.
	414	414	519	658	.	.	.	.	.
	.	194	538	.	.	.	.	.	.
732 - 914	.	525	520	.	.	.	.	.	.
	.	253	524	.	.	.	.	.	.
	.	530	528	292	1977	3297	.	1094	1361
	.	98	533	94	351	120	.	173	74
	.	133	539	.	.	.	.	.	.
915 - 1097	.	517	521	.	.	.	.	.	.
	.	226	525	.	.	.	.	.	.
	.	488	529	110	224	614	537	470	1188
	.	238	532	1408	557	688	557	141	327
	.	486	534	735	2674	1790	.	1872	938
1098 - 1280	.	533	522	.	.	.	.	.	.
	.	177	526	.	.	.	.	.	.
	.	1134	530	4619	1524	1595	1248	1181	884
	.	92	535	165	247	373	.	386	34
1281 - 1463	.	284	523	.	.	.	.	.	.
	.	171	527	.	.	.	.	.	.
	.	203	531	182	73	517	293	140	115
	.	112	536	74	216	265	.	216	123
Abundance (000s)				15841	7841	9258	2635	5672	5045

Table 13 Biomass estimates (t) of Greenland halibut from Canadian fall surveys in Div. 3N using a Campelen trawl during 1996-2001.

Depth Range (m)	V1 Area	V4 Area	Stratum	1996	1997	1998	1999	2000	2001
<=56	1593	1593	375	.	0	0	0	0	0
	1499	1499	376	.	0	0	0	0	0
57 - 92	2992	2992	360	.	880	974	144	165	0
	1853	1853	361	.	0	0	0	0	0
	2520	2520	362	.	0	0	0	0	0
	2520	2520	373	.	2	0	0	0	0
	931	931	374	.	12	0	0	0	0
93 - 183	674	674	383	.	0	0	0	0	0
	421	421	359	.	160	724	67	28	81
	100	100	377	.	166	30	21	30	1
184 - 274	647	647	382	.	24	111	0	0	0
	225	225	358	.	94	42	13	5	488
	139	139	378	.	262	2198	257	5	237
275 - 366	182	182	381	.	615	1622	590	253	138
	164	164	357	.	58	7	.	6	8
	106	106	379	.	41	31	22	36	404
367 - 549	116	116	380	.	516	794	330	151	141
	155	155	723	115	109	336	14	48	70
	105	105	725	165	1646	65	95	171	59
550 - 731	160	160	727	1006	371	509	494	391	570
	124	124	724	160	589	374	126	67	62
	72	72	726	296	448	765	55	30	517
732 - 914	156	156	728	1035	455	675	511	201	299
	.	134	752	.	.	563	.	664	68
	.	106	756	.	.	242	.	243	230
915 -1097	.	154	760	.	.	352	.	183	283
	.	138	753	.	.	224	.	109	55
	.	102	757	.	.	643	.	455	454
1098 -1280	.	171	761	.	.	687	.	778	402
	.	180	754	.	.	1554	.	179	83
	.	99	758	.	.	443	.	427	274
1281 -1463	.	212	762	.	.	.	.	1096	772
	.	385	755	.	.	658	.	965	571
	.	127	759	.	.	165	.	509	378
Total Biomass (t)	.	261	763	2775	6448	14788	2738	9330	7155

Table 14 Abundance estimates (000s) of Greenland halibut from Canadian fall surveys in Div. 3N using a Campelen trawl during 1996-2001.

Depth Range (m)	V1 Area	V4 Area	Stratum	1996	1997	1998	1999	2000	2001
<=56	1593	1593	375	.	31	0	0	0	0
	1499	1499	376	.	0	0	0	0	0
57 - 92	2992	2992	360	.	4961	3293	257	257	0
	1853	1853	361	.	0	0	0	0	0
	2520	2520	362	.	0	0	0	0	0
	2520	2520	373	.	99	0	0	0	0
	931	931	374	.	49	0	0	0	0
93 - 183	674	674	383	.	0	0	0	0	0
	421	421	359	.	1419	1853	87	29	290
	100	100	377	.	571	76	55	69	16
	647	647	382	.	45	223	0	0	0
184 - 274	225	225	358	.	696	232	77	14	2132
	139	139	378	.	1589	7276	1013	34	417
	182	182	381	.	3693	6534	2353	739	663
275 - 366	164	164	357	.	481	45	.	21	66
	106	106	379	.	132	169	69	80	710
	116	116	380	.	1779	2278	846	339	412
367 - 549	155	155	723	320	591	1002	53	95	113
	105	105	725	701	12676	231	217	372	318
	160	160	727	10334	1123	1868	1079	658	884
550 - 731	124	124	724	644	2789	1421	213	159	94
	72	72	726	1124	1406	2665	122	53	1033
	156	156	728	3573	1356	2060	1094	377	807
732 - 914	.	134	752	.	.	995	.	959	74
	.	106	756	.	.	525	.	396	314
	.	154	760	.	.	821	.	354	478
915 -1097	.	138	753	.	.	351	.	142	66
	.	102	757	.	.	1143	.	687	645
	.	171	761	.	.	958	.	1264	524
	.	180	754	.	.	2392	.	173	66
1098 -1280	.	99	758	.	.	536	.	586	302
	.	212	762	.	.	.	.	1448	864
	.	385	755	.	.	871	.	1074	556
1281 -1463	.	127	759	.	.	183	.	580	376
	.	261	763	.	.	.	.	2805	521
	Abundance (000s)			16696	35487	40002	7536	13763	12740

Table 15 Biomass estimates (t) of Greenland halibut from Canadian fall surveys in Div. 3O using a Campelen trawl during 1996-2001.

Depth Range (m)	V1 Area	V4 Area	Stratum	1996	1997	1998	1999	2000	2001
57 - 92	2089	2089	330	0	0	0	0	0	0
	456	456	331	0	0	11	0	0	0
	1898	1898	338	39	195	38	39	0	0
	1716	1716	340	0	0	0	17	0	0
	2520	2520	351	.	0	0	0	0	0
	2580	2580	352	0	9	28	0	0	4
93 - 183	1282	1282	353	.	769	544	108	0	0
	1721	1721	329	28	57	11	50	46	3
	1047	1047	332	25	81	74	0	0	0
	948	948	337	48	30	21	67	0	0
	585	585	339	0	103	8	.	46	16
	474	474	354	.	59	15	1094	95	71
184 - 274	151	147	333	.	10	0	0	3	0
	121	121	336	3	7	5	0	0	0
	103	103	355	.	22	3	1	0	1
275 - 366	92	96	334	.	6	6	0	0	0
	58	58	335	7	2	0	3	3	0
	61	61	356	.	6	8	8	9	6
367 - 549	93	166	717	.	42	27	6	0	72
	76	76	719	11	4	14	36	18	10
	76	76	721	50	35	47	26	23	42
550 - 731	111	134	718	.	131	158	186	20	26
	105	105	720	82	.	92	105	181	141
	93	93	722	153	490	124	160	73	106
732 - 914	.	105	764	.	.	620	.	437	239
	.	99	768	.	.	1070	.	403	274
	.	135	772	.	.	1334	.	360	.
915 -1097	.	124	765	.	.	175	.	665	155
	.	138	769	.	.	409	.	405	438
	.	128	773	.	.	560	.	386	340
1098 -1280	.	144	766	.	.	.	.	322	238
	.	128	770	.	.	.	.	172	1116
	.	135	774	.	.	.	.	186	259
1281 -1463	.	158	767	.	.	.	.	101	257
	.	175	771	.	.	.	.	171	604
	.	155	775	.	.	.	.	96	130
Total Biomass (t)				447	2058	5402	1905	4222	4546

Table 16 Abundance estimates (000s) of Greenland halibut from Canadian fall surveys in Div. 3O using a Campelen trawl during 1996-2001.

Depth Range (m)	V1 Area	V4 Area	Stratum	1996	1997	1998	1999	2000	2001
57 - 92	2089	2089	330	0	0	0	0	0	0
	456	456	331	0	0	63	0	0	0
	1898	1898	338	131	940	261	104	0	0
	1716	1716	340	0	0	0	34	0	0
	2520	2520	351	.	0	0	0	0	0
	2580	2580	352	0	25	111	0	0	101
93 - 183	1282	1282	353	.	4453	2293	397	0	0
	1721	1721	329	47	1657	47	95	84	47
	1047	1047	332	1224	864	624	0	0	0
	948	948	337	717	522	169	261	0	0
	585	585	339	0	1086	138	.	201	80
	474	474	354	.	619	65	3097	130	174
184 - 274	151	147	333	.	121	0	0	20	0
	121	121	336	25	75	31	0	8	0
	103	103	355	.	241	21	7	0	13
275 - 366	92	96	334	.	53	33	0	0	0
	58	58	335	12	28	0	8	8	0
	61	61	356	.	55	8	22	17	4
367 - 549	93	166	717	.	34	57	11	0	57
	76	76	719	52	37	31	42	12	16
	76	76	721	329	182	125	88	37	31
550 - 731	111	134	718	.	590	553	120	28	46
	105	105	720	461	.	274	173	276	207
	93	93	722	768	2900	385	294	180	203
732 - 914	.	105	764	.	.	1760	.	758	383
	.	99	768	.	.	2997	.	763	429
	.	135	772	.	.	3714	.	592	.
915 - 1097	.	124	765	.	.	210	.	1032	273
	.	138	769	.	.	854	.	494	484
	.	128	773	.	.	778	.	518	376
1098 - 1280	.	144	766	.	.	.	.	205	283
	.	128	770	.	.	.	.	170	1039
	.	135	774	.	.	.	.	186	195
1281 - 1463	.	158	767	.	.	.	.	116	261
	.	175	771	.	.	.	.	179	481
	.	155	775	.	.	.	.	77	107
Abundance (000s)				3767	14482	15604	4754	6092	5291

Table 17a. Greenland halibut biomass estimates (000 t), by division, from Canadian fall surveys during 1995-2001.

Year	DIVISION										TOTAL		
	2G	2H	2J	3K	SA2+3K	3L	2J3KL	3M	3N	3O		3LMNO	
1995	NO SURVEY		35.6	69.2	-	11.3	116.1	NO SURVEY				-	
1996	22.3	26.1	64.8	120.3	233.5	36.6	221.7	10.2	5.1	1.0	52.9	286.4	
1997	15.5	38.6	82.1	130.5	266.7	48.6	261.2	7.0	6.4	2.1	64.1	330.8	
1998	4.5	39.0	62.1	142.2	247.8	55.9	260.2	7.8	14.8	5.4	83.9	331.7	
1999	10.5	30.7	87.1	175.6	303.9	34.0	296.7	2.4	2.7	1.9	41.0	344.9	
2000	NO SURVEY		54.9	143.3	198.2	34.1	232.3	5.5	9.3	4.2	53.1	251.3	
2001	NO SURVEY		37.7	65.8	128.7	232.2	29.9	224.4	5.3	7.2	4.5	46.9	279.1

Table 17b. Abundance and biomass estimates of Greenland halibut, by Division, from Canadian fall 2001 survey. Upper and lower indicate approximate 95% confidence limits.

Area	Total	Upper	Lower	Mean	Upper	Lower	
Division 2G	NO SURVEY						
Abundance							
Biomass (kg)							
Division 2H							
Abundance	203,853,358	278,444,344	129,262,372	165.93	226.64	105.22	
Biomass (kg)	37,682,244	54,093,653	21,270,836	30.67	44.03	17.31	
Division 2J							
Abundance	446,714,263	642,748,252	250,680,273	No/Tow	128.50	184.89	72.11
Biomass (kg)	65,776,930	86,598,328	44,955,532	Kg/Tow	18.92	24.91	12.93
Division 3K							
Abundance	649,232,122	745,405,477	553,058,768	No/Tow	127.38	146.25	108.51
Biomass (kg)	128,720,285	146,595,765	110,844,804	Kg/Tow	25.26	28.76	21.75
Division 3L							
Abundance	80,458,004	102,593,977	58,322,031	No/Tow	12.62	16.09	9.15
Biomass (kg)	29,885,658	36,303,322	23,467,994	Kg/Tow	4.68	5.69	3.68
Division 3M							
Abundance	5,045,139	6,662,785	3,427,493	No/Tow	10.85	14.33	7.37
Biomass (kg)	5,259,897	7,031,171	3,488,622	Kg/Tow	11.31	15.12	7.50
Division 3N							
Abundance	12,740,143	23,830,392	1,649,894	No/Tow	4.74	8.87	0.61
Biomass (kg)	7,154,595	9,887,274	4,421,915	Kg/Tow	2.66	3.68	1.65
Division 3O							
Abundance	5,290,695	10,191,840	389,550	No/Tow	1.92	3.70	0.14
Biomass (kg)	4,545,549	20,496,918	-11,405,820	Kg/Tow	1.65	7.43	-4.14
Combined SA2+Div. 3KLMNO							
Abundance	1,403,333,725	1,585,023,700	1,221,643,749.00	No/Tow	63.55	71.77	55.32
Biomass (kg)	279,025,158	305,820,564	252,229,752	Kg/Tow	12.63	13.85	11.42

Table 18 Abundance (000s) of G. halibut at age from Canadian fall surveys in Div. 2J3K combined during 1978-2001. Data prior to 1995 are in Campelen equivalents. Age 0 not estimated prior to 1995.

AGE	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
0																		80159	41996	19546	12880	51961	25436	73019
1	67133	76275	47941	141166	33748	12131	31845	192902	125257	36234	74055	52954	9858	84583	52907	62241	359982	342056	793447	222012	199610	93492	322796	360130
2	315362	128771	46187	158149	39589	34727	50917	113558	106161	81046	71555	95755	39744	59211	188121	281182	189873	397121	452542	486571	216980	289040	182144	192986
3	243378	95883	43767	109462	88918	71282	70143	65428	112555	212676	109246	174201	70539	44644	148380	497522	171493	122856	267483	398365	265730	217037	139877	150045
4	146864	50861	39304	41433	75651	75711	74837	54235	104606	99109	114836	174689	177413	103158	95263	182333	112859	39605	96568	192045	188600	227676	99212	130034
5	90817	53099	49738	47202	57104	71101	103171	66317	72301	75271	119818	108472	115858	65701	38552	42962	51870	50370	55611	89809	92110	162884	111556	81596
6	68495	50976	52627	49991	41105	51583	61334	69541	81840	53188	59218	87210	70699	40331	22088	13677	9898	15863	22305	40112	38350	90149	65480	70117
7	40908	24408	32283	35482	43097	50698	42301	42805	71749	47138	41431	38560	36649	12485	10472	5905	4478	3513	7422	17321	17250	29589	19417	31107
8	19170	9977	11102	15613	41244	39418	27028	17028	22142	25791	12233	9604	6200	2383	1067	1967	1347	920	1920	5658	4770	5048	3379	5324
9	9940	4777	4960	7017	16566	15223	13058	7982	6546	9434	3134	2847	1500	635	140	232	172	266	1141	1547	1100	1100	670	794
10	7366	4572	3891	4213	6765	4414	6306	5296	2380	2833	1105	747	746	310	89	32	69	104	377	493	580	415	210	202
11	6469	3000	4461	3349	4129	3180	2602	2257	1856	1481	781	568	640	181	12	22	13	49	178	280	240	143	165	95
12	4117	2638	2882	1559	2714	2291	1812	1997	1668	1454	463	151	389	104	0	94	17	0	115	151	150	86	17	45
13	2683	2193	1874	857	1929	1664	1480	874	879	754	361	35	223	22	0	41	9	0	118	100	140	170	20	107
14	992	1079	1070	446	1975	1109	1285	1002	542	583	327	81	155	8	15	24	0	0	42	54	20	10	54	11
15	560	699	411	268	1257	495	677	606	555	385	236	103	90	0	0	0	0	0	10	0	0	0	0	0
16	365	624	231	43	589	131	461	302	318	204	149	31	21	4	0	0	0	0	0	0	20	0	0	0
17	213	234	71	0	97	0	226	311	96	150	70	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	128	0	0	43	81	0	100	0	14	16	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	65	0	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	25	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0
Ages 0+																		1052882	1741275	1474064	1038530	1168800	970433	1095612
Ages 1+	1024856	510258	342799	616250	456520	435238	489484	642558	711450	647746	609063	746008	530726	413761	557105	1088235	902080	972723	1699279	1454518	1025650	1116839	944997	1022593
Ages 1-2	362496	205046	94128	299315	73337	46859	82762	306460	231418	117280	145609	148709	49602	143794	241027	343422	549855	739177	1245989	708583	416590	382532	504940	553116
Ages 1-4	772737	351790	177199	450210	237906	193852	227742	426123	448579	429064	369691	497600	297555	291597	484670	1023278	834207	901638	1610040	1298993	870920	827245	744029	833195
Ages 3-5	481058	199843	132809	198097	221673	218093	248151	185979	289461	387056	343900	457363	363811	213503	282195	722818	336222	212831	419662	680219	546440	607597	350645	361675
Ages 6-9	138513	90137	100972	108103	142012	156921	143721	137355	182277	135551	116016	138221	115048	55833	33767	21782	15895	20562	32788	64638	61470	125886	88946	107342
Ages 5+	252119	158468	165600	166040	218614	241386	261742	216435	262871	218681	239372	248408	233171	122165	72435	64957	67873	71085	89239	155525	154730	289594	200968	189398
Ages 10+	22789	15232	14891	10735	19498	13364	14849	12763	8294	7859	3537	1715	2264	630	116	213	108	153	840	1078	1150	824	466	460

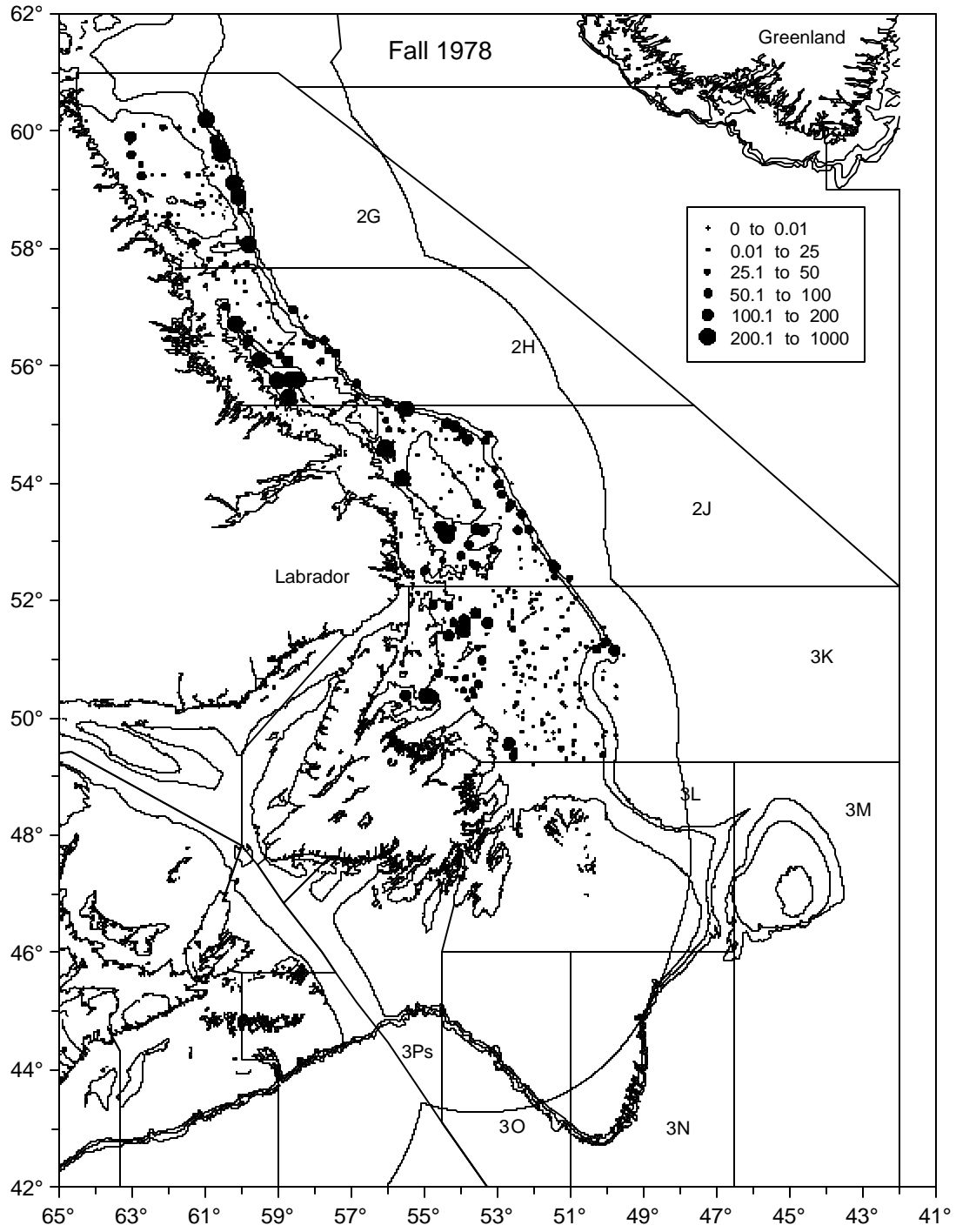


Fig. 1 Distribution (kg. per set) of Greenland halibut from Canadian fall surveys during 1978.

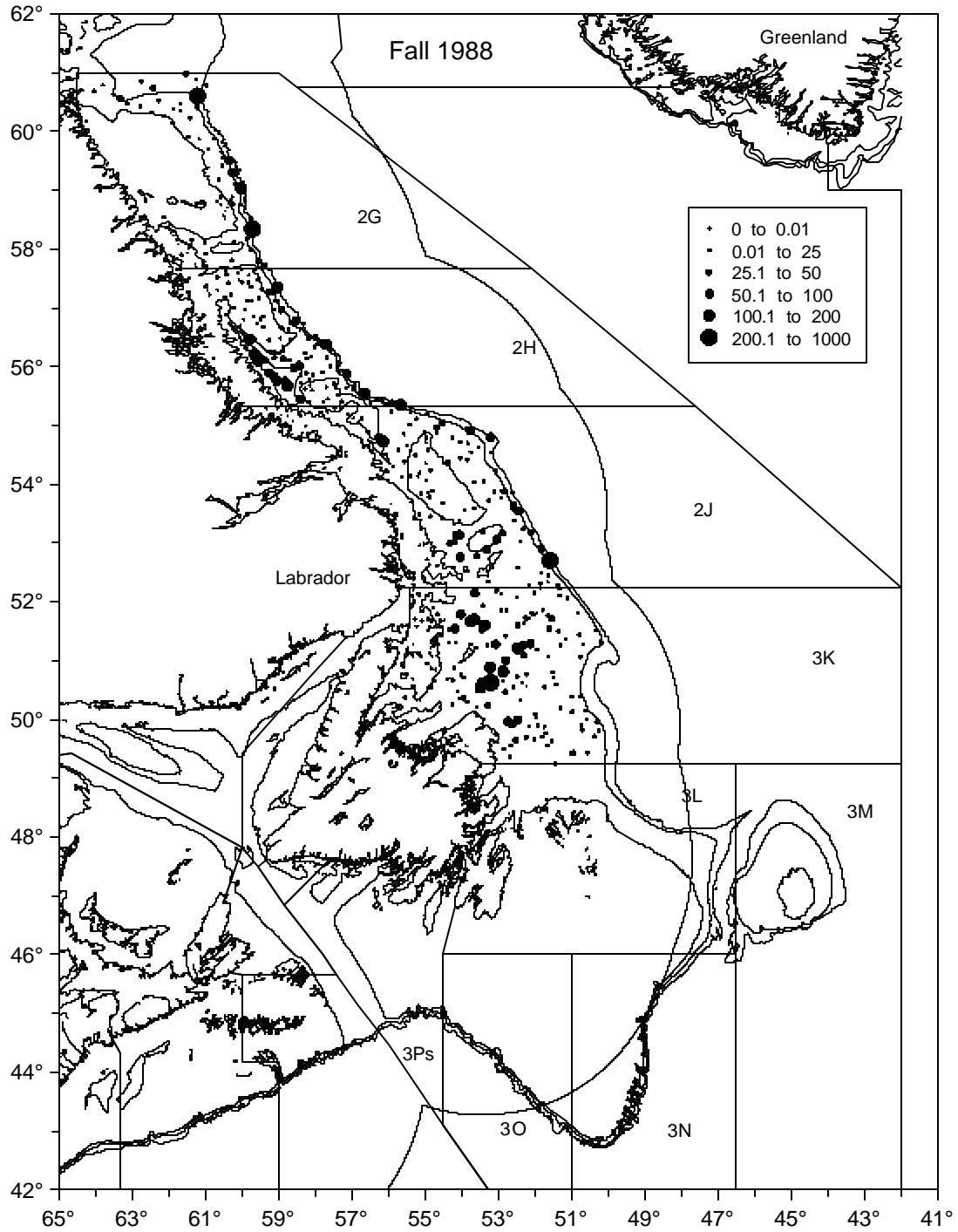


Fig. 2 Distribution (kg. per set) of Greenland halibut from Canadian fall surveys during 1988.

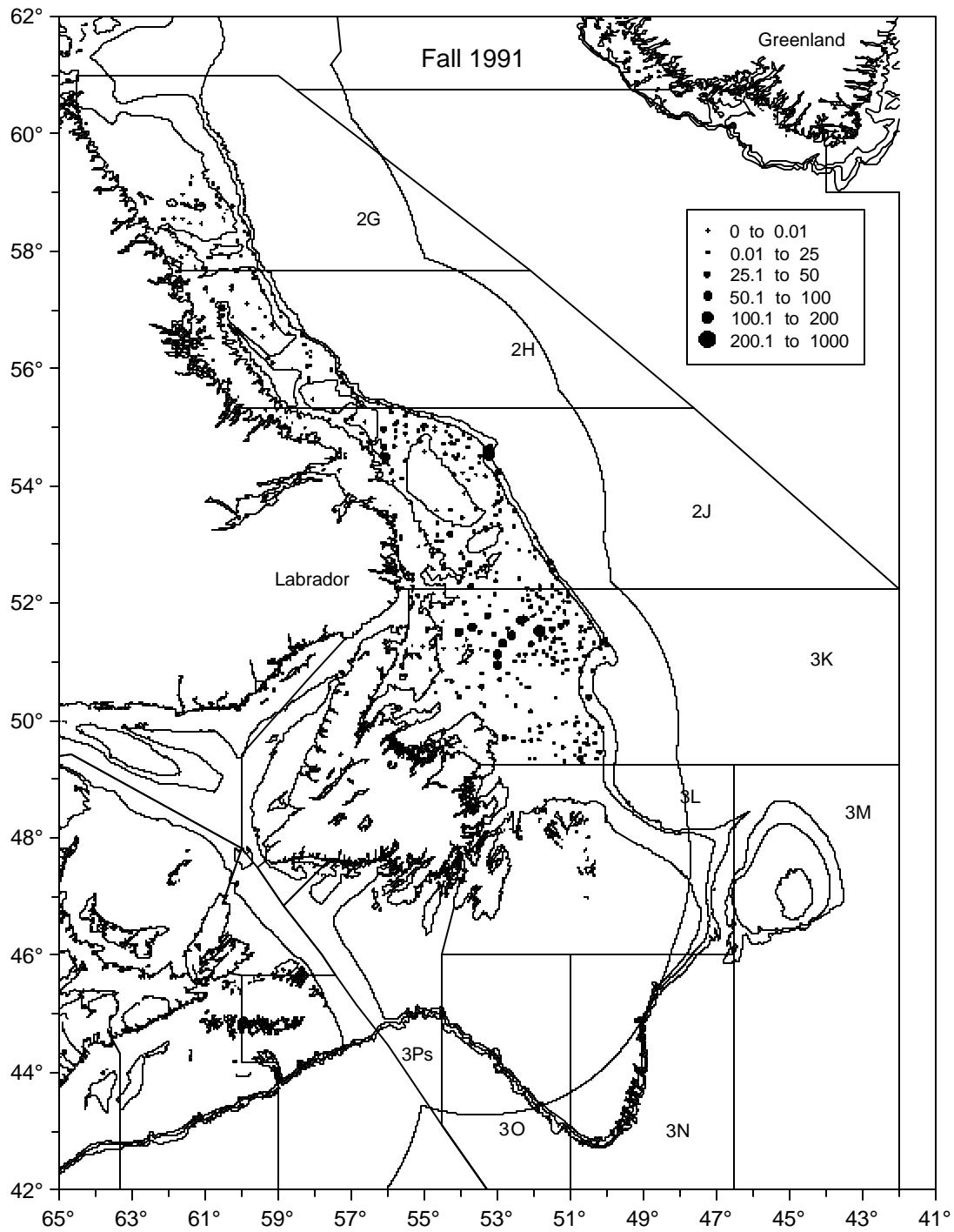


Fig. 3 Distribution (kg. per set) of Greenland halibut from Canadian fall surveys during 1991.

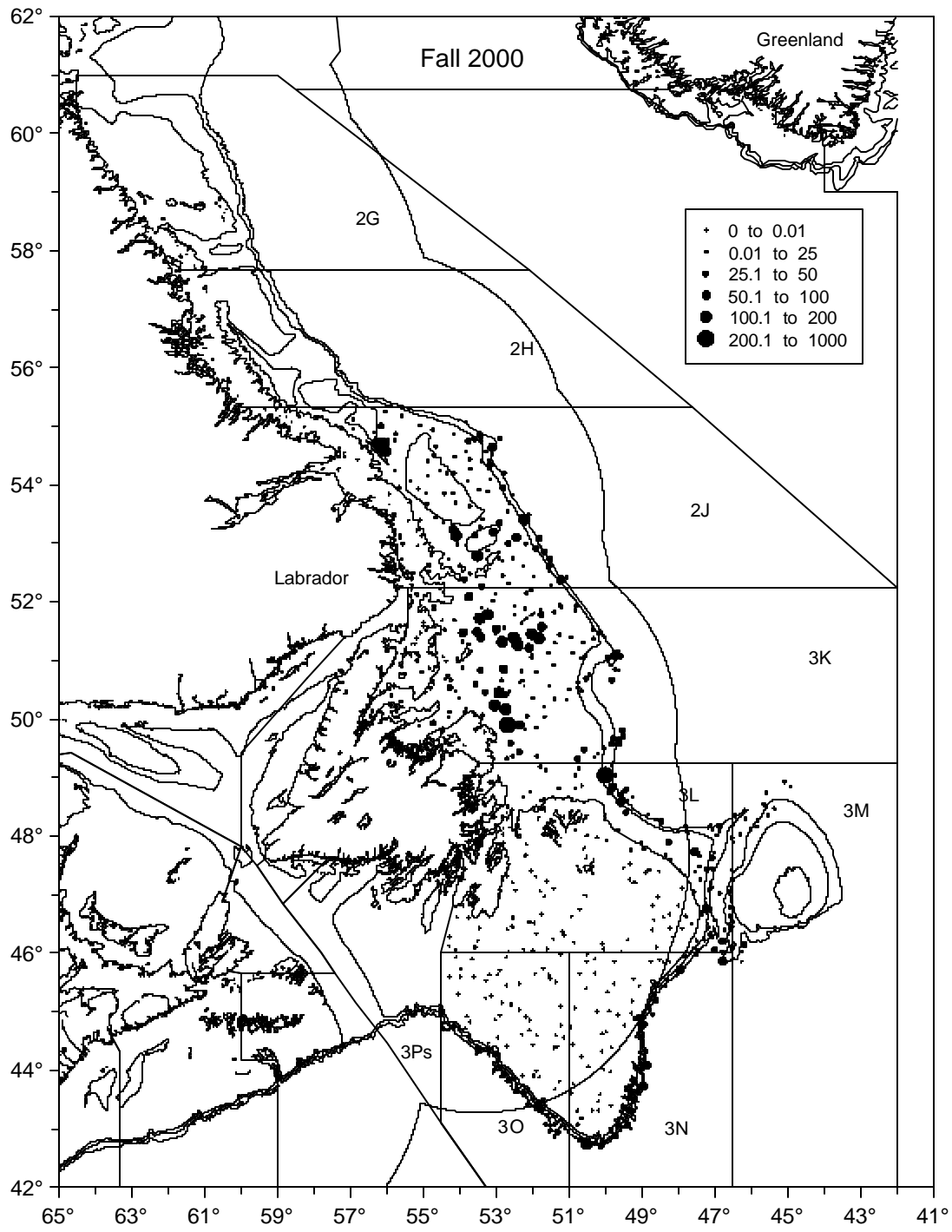


Fig. 4 Distribution (kg. per set) of Greenland halibut from Canadian fall surveys during 2000.

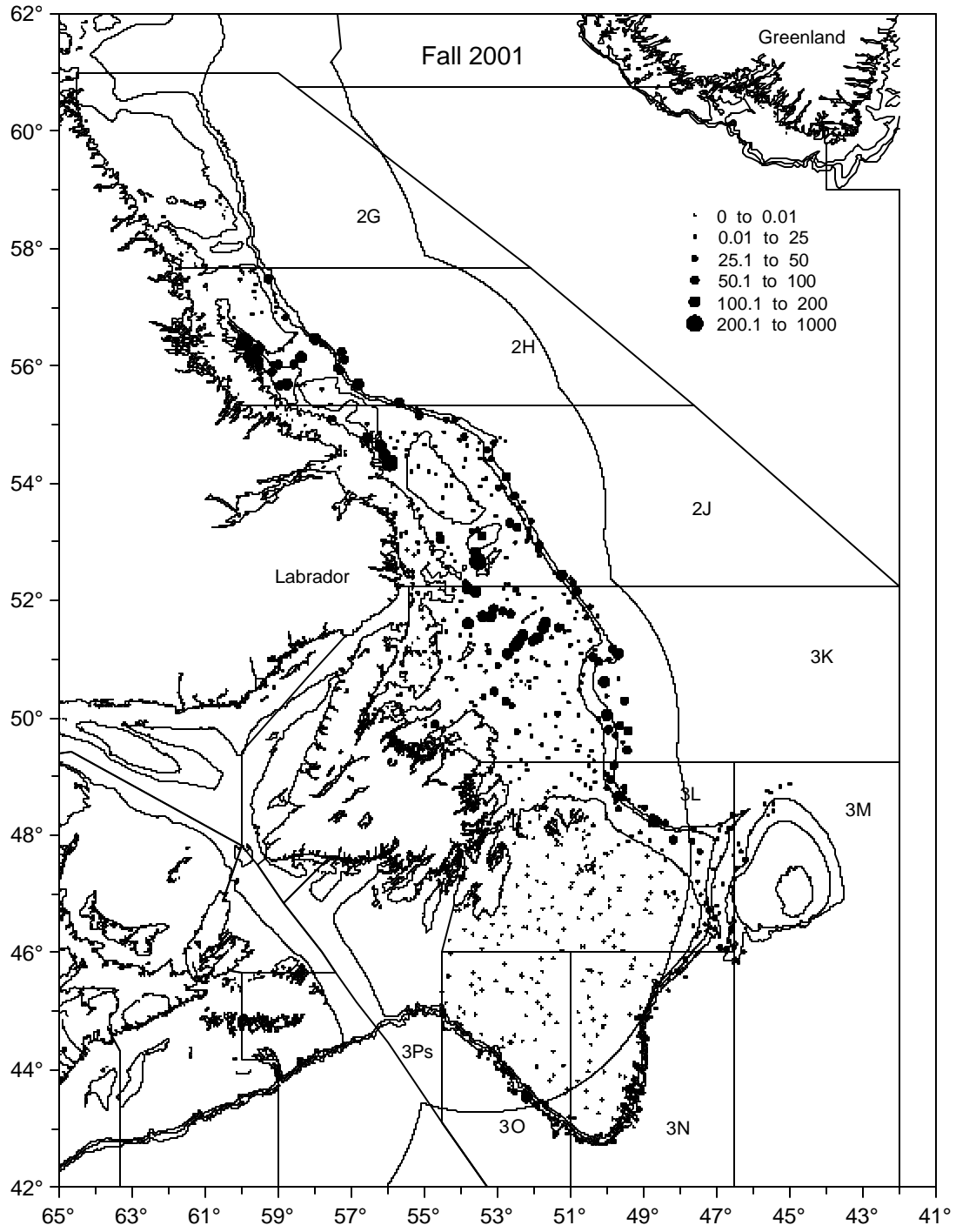


Fig. 5 Distribution (kg. per set) of Greenland halibut from Canadian fall surveys during 2001.

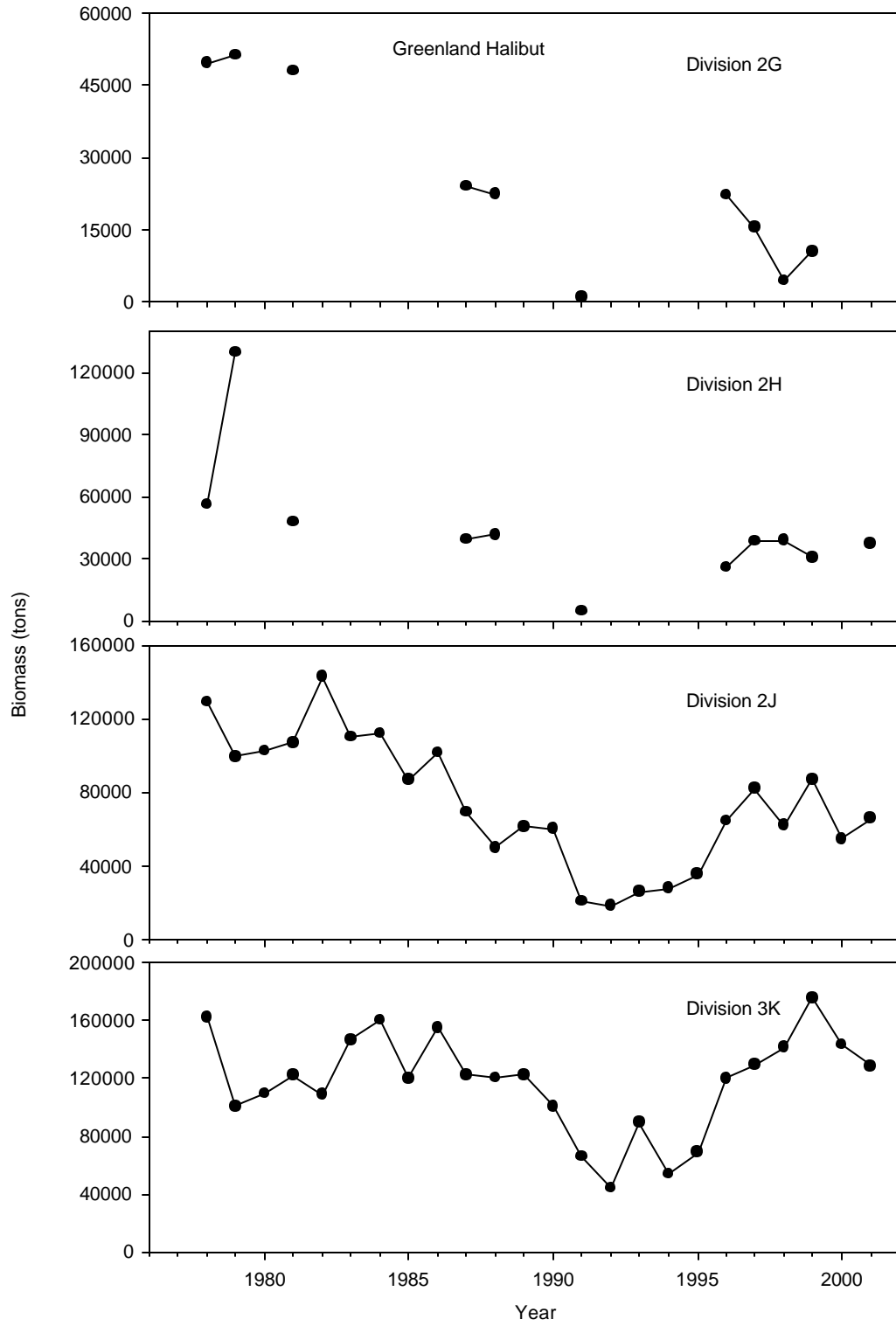


Fig. 6 Campelen biomass estimates by NAFO Division from Canadian fall surveys during 1978-2001.

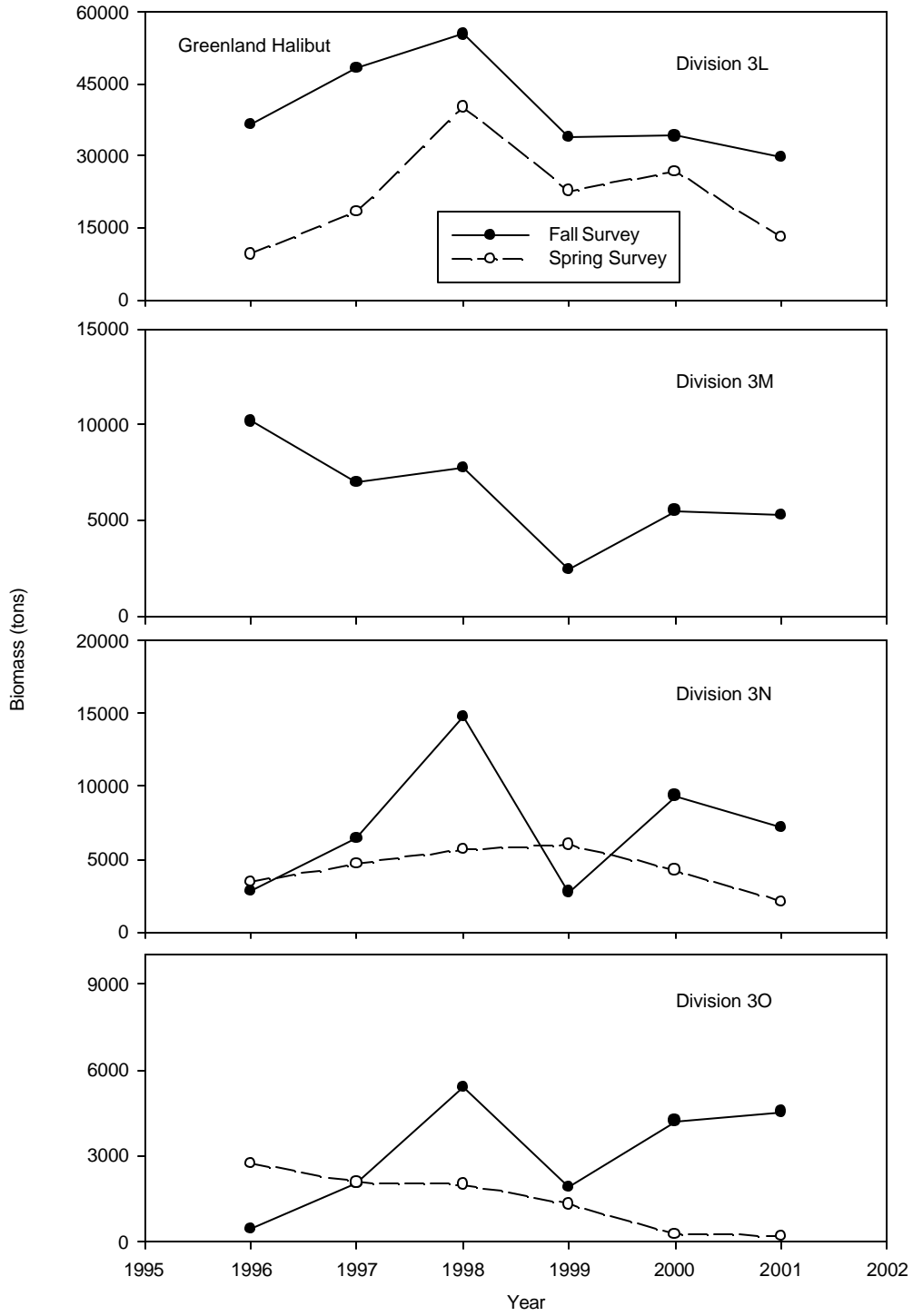


Fig. 6 (con'd) Campelen biomass estimates by NAFO Division from Canadian spring and fall surveys during 1996-2001.

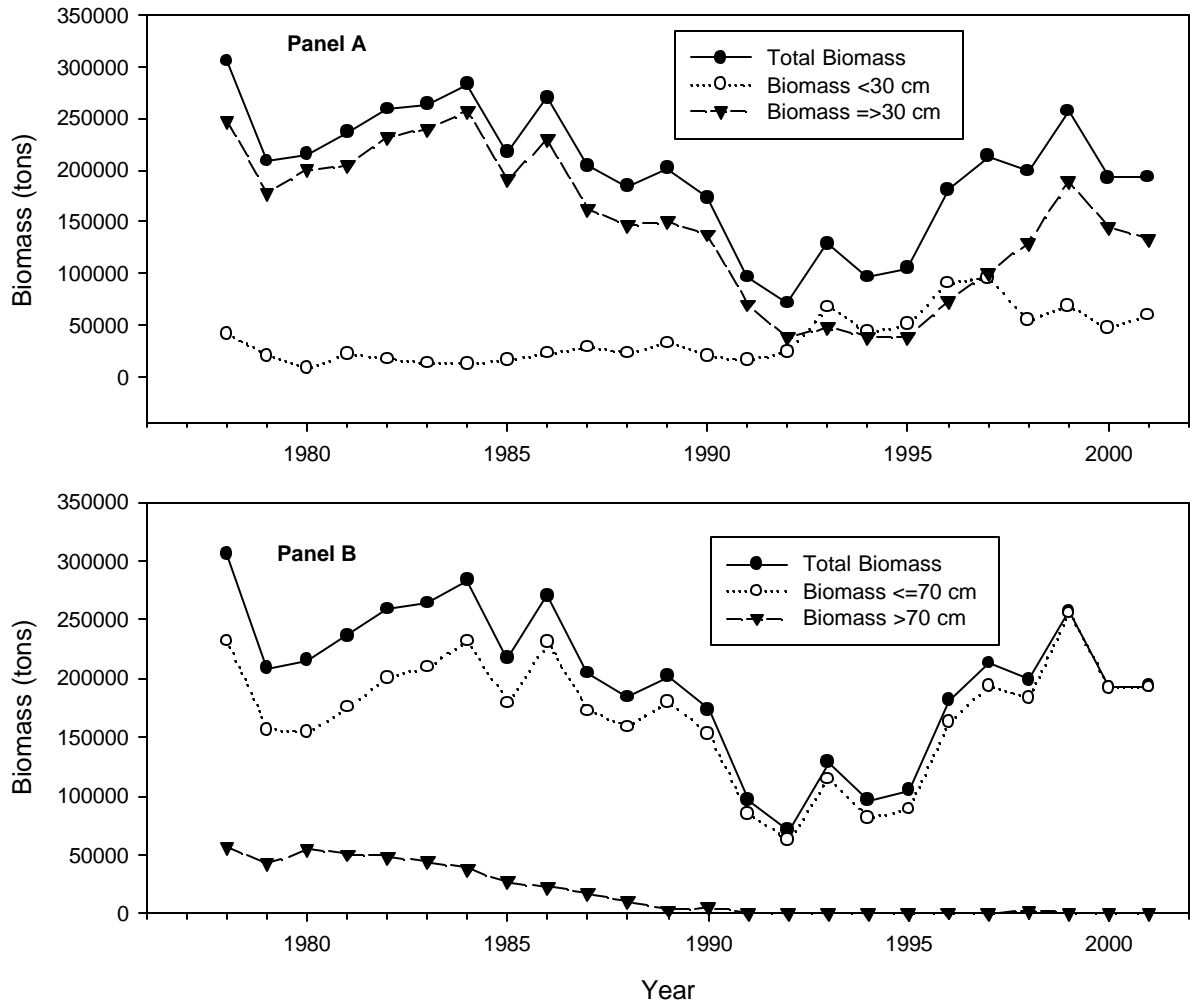


Fig. 7 Biomass (tons) of Greenland halibut by length grouping from Canadian fall surveys conducted in Div. 2J+3K during 1978-2001. Biomass was calculated using the at sea L/W equations as applied to Campelen or Campelen equivalent abundance indices. The annual L/W equations were applied to 1990-98; the 1990 equation was applied to 1978-89; the average of 1997-99 was applied to 1999-2001.

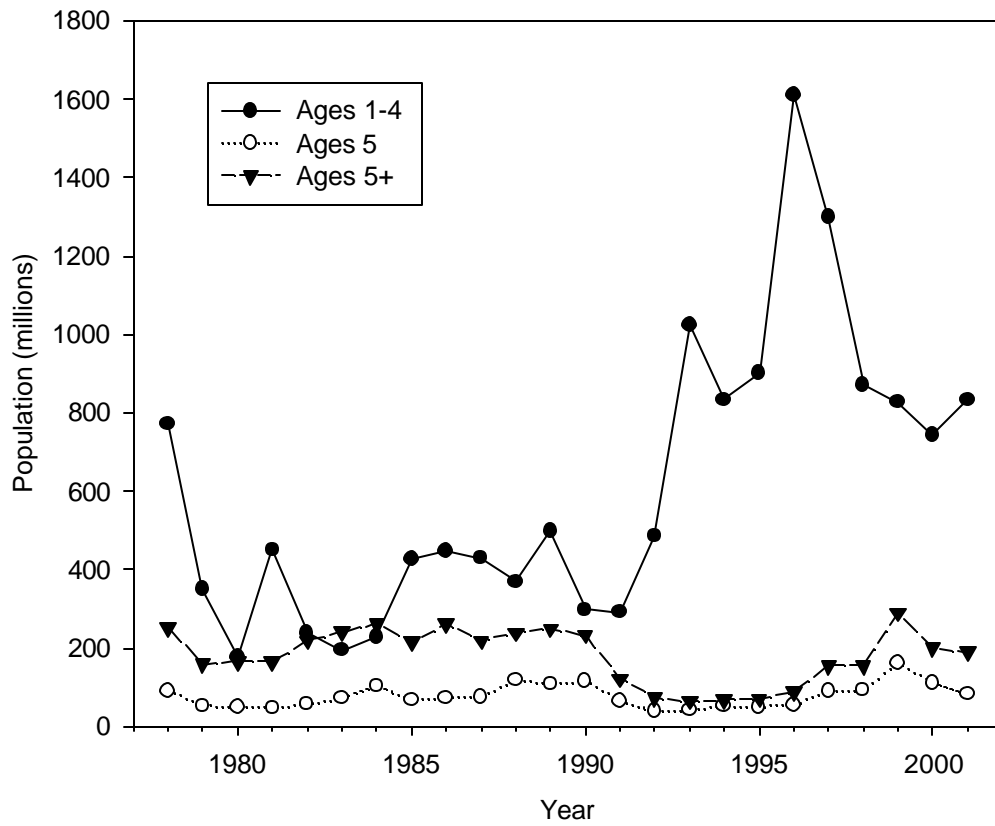


Fig. 8 Trends in population abundance estimates by age category from Canadian fall surveys in Divisions 2J and 3K combined during 1978-2001.

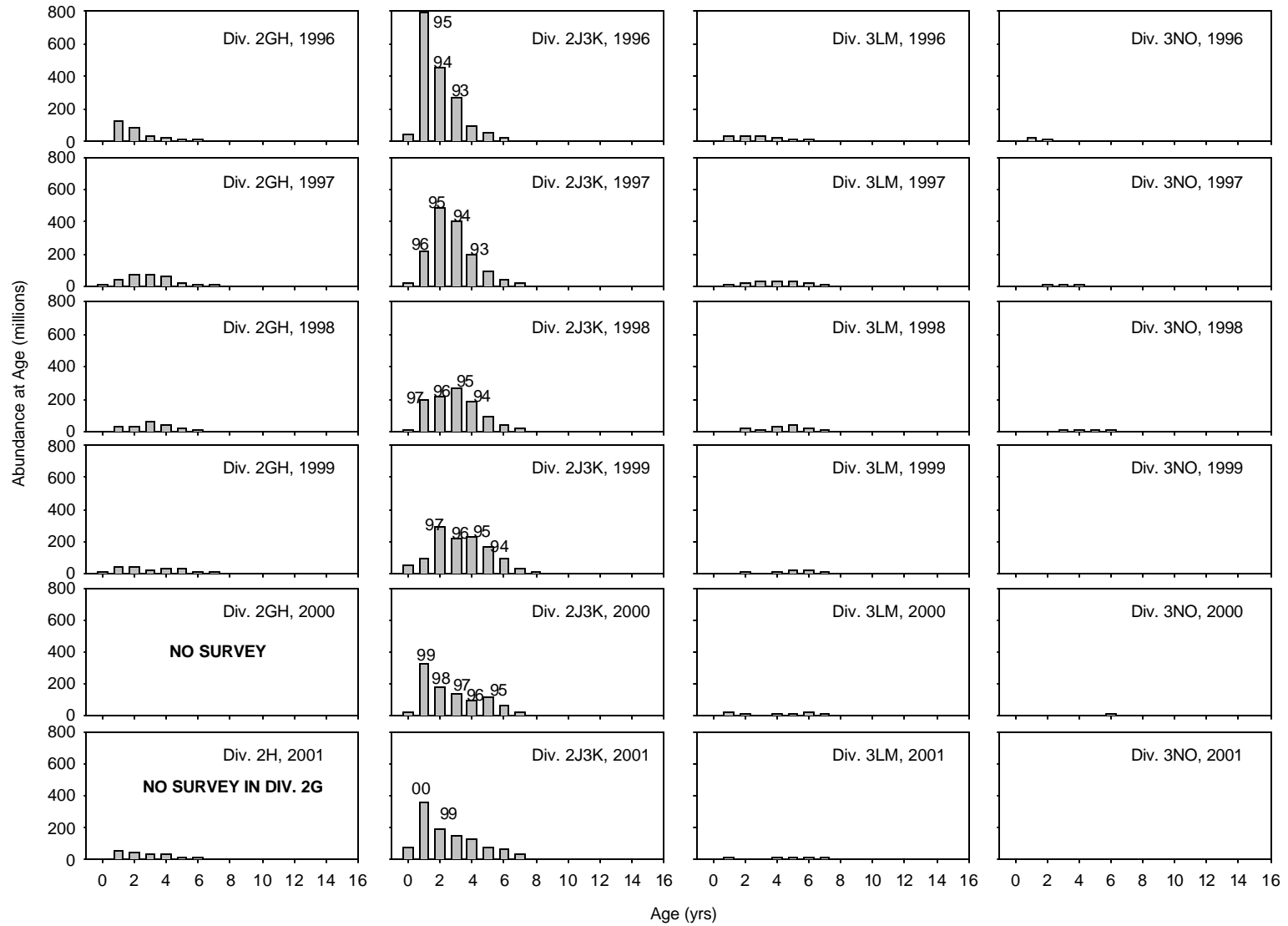


Fig. 9 Greenland halibut abundance at age (millions) by year and NAFO Division groupings from Canadian fall surveys during 1996-2001. Numbers on graph represent year-classes.

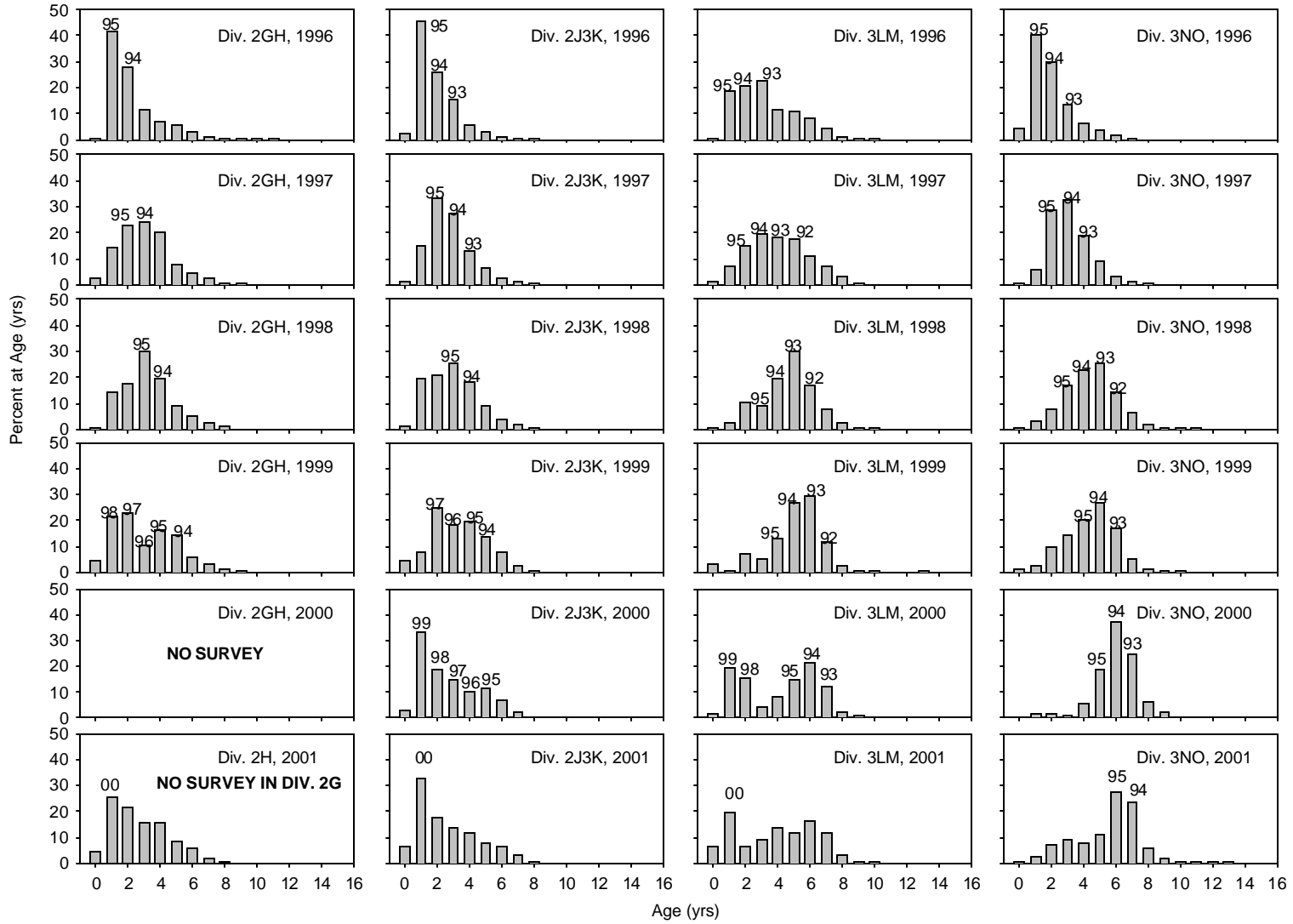


Fig. 10 Greenland halibut percent at age by year and NAFO Division groupings from Canadian fall surveys during 1996-2001. Numbers on graphs represent year-classes.

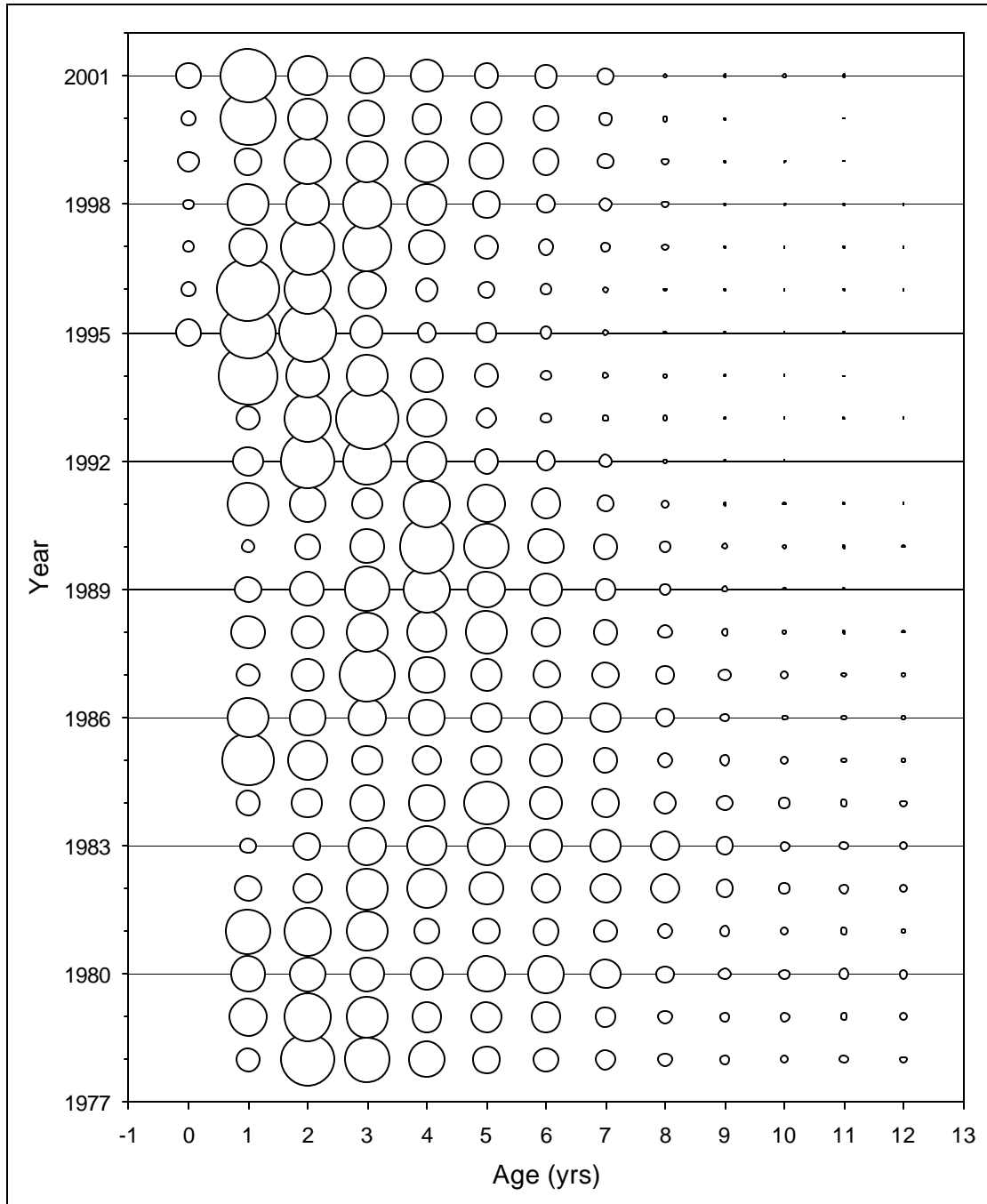


Fig. 11 Proportions at age for Greenland halibut in Divisions 2J and 3K based on population abundance from Canadian surveys during 1978-2001.

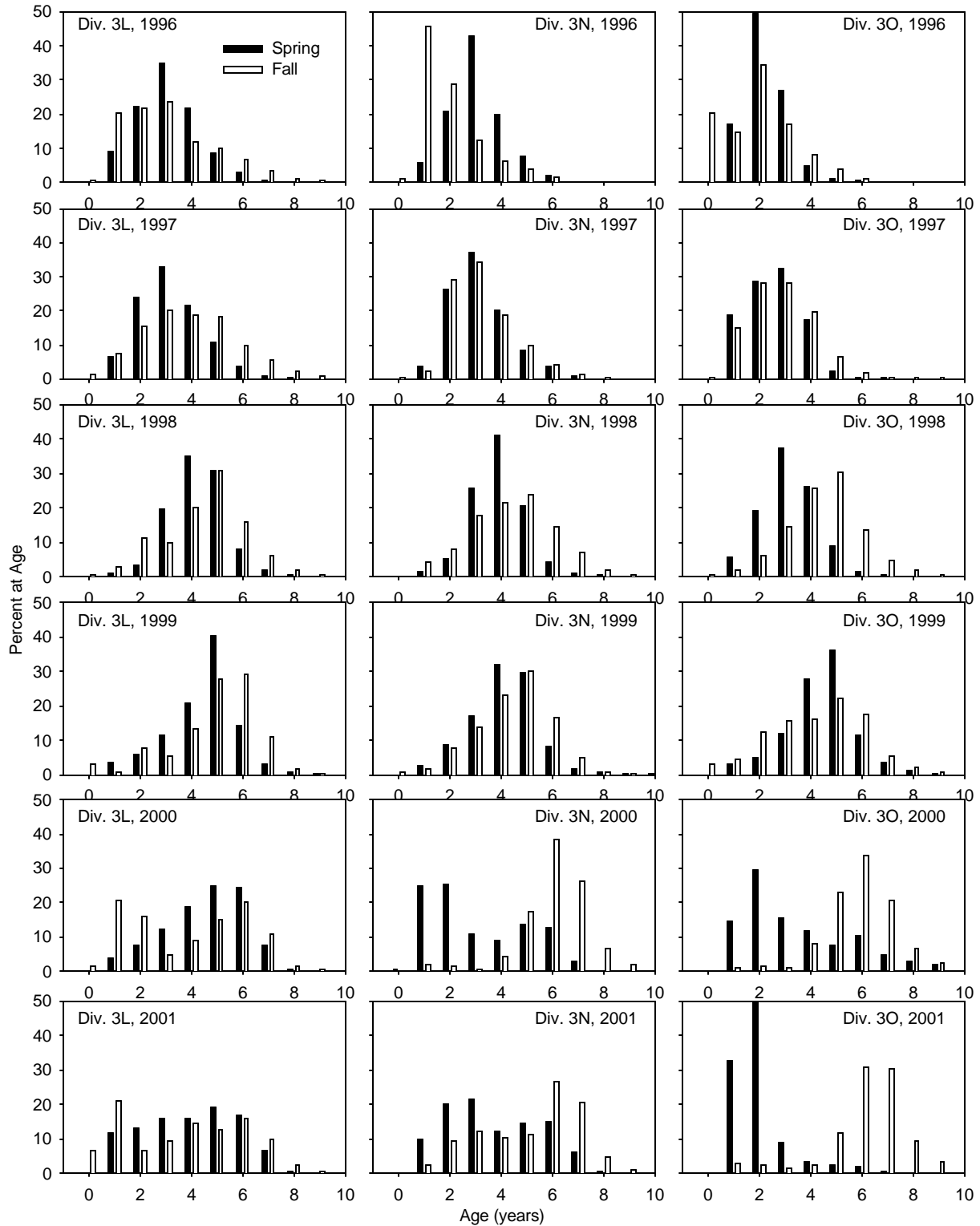


Fig. 12 A comparison of percent population size at age by division for Greenland halibut from Canadian spring and fall surveys in NAFO Divisions 3L, 3N and 3O during 1996-2001 using a *Campelen 1800* shrimp trawl.