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Population Trends in the Greenland halibut (*Reinhardtius hippoglossoides*) Resource of NAFO Subarea 2 and Divisions 3KLMNO based on Canadian Research Vessel Survey Results during 1978-2000

by

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Abstract

Greenland halibut are distributed throughout the Labrador-eastern Newfoundland area. In the late 1970's and throughout most of the 1980's they were found in relatively high abundance along the deep slopes of the continental slopes particularly in Division 2G. They were similarly plentiful in the deep channels running between the fishing banks especially in Divisions 2H, 2J and 3K. By 1991 distribution in the northern areas was greatly reduced and most of the resource was located in Division 3K and along the north slope of Division 3L and to some degree 3N. By 1996-2000 distribution to some traditional areas off southern Labrador and northeast Newfoundland again began to occur, however, areas northward of the northern half of Division 2J still remain low in abundance. In Divisions 2J and 3K where most of the Greenland halibut resource resides the stock biomass was relatively stable up until the mid 1980's after which it declined substantially to reach an all time low in the early 1990's with the disappearance of older fish from the population. From about 1995 the stock showed considerable recovery and continues to improve based upon several successive good year-classes particularly 1993-95. Nevertheless, the fishable biomass and spawning stock biomass indices remain below those of the 1980's.

Canadian Research Vessel Surveys

Divisions 2GH

Research vessel surveys have been conducted occasionally in NAFO Divisions 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 Division 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 <200-1000 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 Divisions 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 1500 meters. No survey was conducted in Divisions 2GH during 2000.

Divisions 2J and 3K

Stratified random fall surveys generally within a depth range of 100-1000 meters have been conducted annually in Divisions 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 1995-2000 the surveys were conducted primarily using the research vessel *Teleost* that was sometimes supported by the research vessel *Wilfred Templeman* (sister ship of the *Alfred Needler*) usually covering a depth range of 100-1500 meters. Both 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 both vessels.

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

Surveys have been conducted by Canada in Divisions 3L, 3NO and occasionally 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 1996-2000, attempts were made to extend the surveys to depths of at least 730 meters and where possible to 1500 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 Divisions 3LNO from 1996-2000 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 Division 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 Divisions 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 1996-2000 is presented in Table A.

Geographic Distribution

The spatial distribution of Greenland halibut in NAFO Subarea 2 and Divisions 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 7.02). 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 1978-2000 only data from the years 1978, 1988, 1991, 1999 and 2000 are presented here for illustration purposes in Figures 1-5, respectively. Data from Divisions 3LMNO were only available for 1999 and 2000 figures shown here.

In 1978 Greenland halibut were in relatively high abundance along the deep slopes of the continental slope particularly in Division 2G (Fig. 1). They were similarly plentiful in the deep channels running between the fishing banks especially in Divisions 2H and 2J and to a significant degree in Division 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. Division 2G, 2H and to some degree Division 2J had been greatly reduced (although survey coverage in slope waters of Division 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 Division 3K (Fig. 3).

By the late 1990's survey catches improved considerably compared to 1991. The 1999 survey results indicated continued improvements in survey catches with considerable recovery of catches in the deepwater channels of Division 2H and 2J although little, if any, improvement appears to have occurred in Division 2G either in the deepwater channels or the continental slope area (Fig. 4). Larger catches were most widespread in Division 3K and along the northern slope of Division 3L with some relatively large catches along the slope of Division 3N. Catches remained relatively low along the eastern slope of Division 3L and in Division 3M (Fig. 4). In 2000, survey results showed improved catches along the NE slope of Division 3L and around the deep edge of the slope of Divisions 3NO compared to 1999 (Fig. 5) with similar distributions in Divisions 2J and 3K.

Trends in Biomass and Abundance

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

The biomass index for Division 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 Division 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 (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 Divisions 2GH during 2000.

Unlike Divisions 2G and 2H, the annual survey series is unbroken from 1978-2000 for both Divisions 2J and 3K. In Division 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). In Division 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, the biomass index declined to 143,000 tons which is about the average of the last five years. It is worth noting that the estimates from 1995-2000 represent actual *Campelen 1800* Shrimp trawl surveys and therefore any trends are not potential artifacts of data conversions.

The fall survey biomass indices for Divisions 3L, 3M, 3N and 3O are based on only five years of data and generally lack trend (Tables 9, 11, 13 & 15, respectively; Fig. 6). Survey coverage in Division 3L has been rather comprehensive for the period and the biomass index for 1999 and 2000 is stable at about 34,000 tons. Lack of trend in Divisions 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 & 15, respectively; Fig. 6). Nevertheless, it appears that the overall combined biomass estimates in these divisions are rather low in proportion to Subarea 2 + Division 3K ranging from about 12-25% (Table 17).

A comparison of biomass estimates between spring and fall surveys in Divisions 3LNO during 1996-2000 is presented in Figure 6. Trends are similar in Division 3L but estimates are higher in the fall series likely due to more survey coverage. The trends are less clear in Divisions 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 Divisions 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 1978-2000 the data were combined for Divisions 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 ≤ 60 cm compared to those > 60 cm. The value of 60 cm was chosen because it was considered to be an approximate knife-edge median size of Greenland halibut at maturity (M_{50}) in the previous assessment (Bowering 2000). A more realistic value is 70 cm and thus the biomass ≤ 70 cm and > 70 cm is shown in Panel 7C.

The results presented in Figure 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 1970's. Although it declined again in 2000 it still remained at a relatively high level. 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 resurgence of the stock has come from good recruitment. As these recruits add growth the contributions to the stock biomass should shift back to the more usual size compositions. This is already becoming evident in that by 1999 the size group lines have again intersected (Fig. 7A). Nevertheless, the fishable stock under the current management regime (≥ 30 cm) considering all divisions is probably still only half of historic high levels.

During the late 1970's and early 1980's Greenland halibut greater than 60 cm contributed about 20% to the estimated trawlable stock biomass (Fig. 7B). However, after 1984 this size category declined to the point that by 1992 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. Since there are few fish > 60 cm during the 1990's then logically there are few fish > 70 cm (Fig. 7C). However, it will also take several years longer to improve that part of the resource > 70 cm compared to 60 cm due to slow growth and increased mortality.

Age Composition and Recruitment

Annual age compositions from the Divisions 2J and 3K combined time series from 1978-2000 are presented in Table 18 and Figure 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 2000 (Table 18). The population abundance has increased considerably during the mid 1990's 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 1999-2000 with the 2000 value somewhat lower than the previous two year estimates (Fig. 8). This is likely a result of high natural mortality on ages 1 & 2. 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 and in fact declined in 2000 (Fig. 8). It is worthy of note that in the 1999 survey, the 1993 and 1994 year-classes are both the highest in the time series at ages 5 and 6, respectively but much lower than many previous cohorts at ages 6 and 7 during the 2000 survey (Table 18). These ages should not be seriously influenced by the gear conversions.

Age compositions of Greenland halibut by division from actual Campelen 1800 Shrimp trawl surveys during 1996-2000 are shown in Table 19. For ease of comparison the data are combined for Divisions 2GH, Divisions 2J3K, Divisions 3LM, and Divisions 3NO. These data are then presented as abundance at age (Fig. 9) to illustrate the dominance of Divisions 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 (1978-2000) for Divisions 2J and 3K are presented for illustration in Figure 11.

It is clear from Figure 10 that in all years and all areas the 1994-95 year-classes are very dominant cohorts particularly in Subarea 2 and Division 3K. The 1993 year-class and to a lesser degree the 1992 year-class are particularly important in the more southern areas especially Divisions 3LM where about 75% of the annual catch occurs (Fig. 10). However, the younger ages would not be expected to show significantly in Divisions 3LM because of the lack of survey coverage particularly in Division 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 Divisions 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).

A comparison of age distributions of the spring and fall surveys in Divisions 3LNO during 1996-2000 is shown in Figure 12. Few fish older than age 8 are caught. The distributions are largely similar for surveys with rather similar coverage (1997, 1997 and 1999). However, in 1998 and 2000 where fall survey coverage included depths to 1500 m the fall surveys are dominated proportionately by older fish than the shallower spring surveys (Fig. 12).

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Table A. Summary of sets in true Campelen 1800 fall surveys in SA 2+3 during 1996 - 2000.
Depth range is given in meters with numbers of sets appear in parentheses.

Year	Division	Ship			Year	Division	Ship		
		Teleost	W. Templeman	A. Needler	Total		Teleost	W. Templeman	Total
1996	2G	127 - 1436 (47)			47	1999	2G	142-1415(69)	69
	2H	122 - 1415 (77)			77		2H	104-1454(81)	81
	2J	126 - 1410 (117)			117		2J	109-1375(115)	115
	3K	111 - 1368 (115)	126 - 472 (60)		175		3K	146-1477(154)	154
	3L	605 - 1433 (31)	51 - 671 (180)		211		3L	1366(1) 63-1407 (169)	170
	3M	764 - 1400 (18)	127 - 707 (68)		86		3M	853-1403(12)	12
	3N	390 - 1147 (13)		37 - 309 (54)	67		3N	39-664(68)	68
	3O	68 - 690 (24)	65 - 139 (19)	63 - 304 (15)	58		3O	58-692(75)	75
					838				744
1997	2G	201-1209 (69)			69	2000	2G	Not surveyed in 2000	0
	2H	220-1382 (71)			71		2H		0
	2J	123-1488 (117)			117		2J	127-1400 (117)	117
	3K	143-1431 (155)	117-421 (20)		175		3K	113-1379 (159)	159
	3L	161-1436 (71)	35-714 (134)		205		3L	152-1430 (74) 42-447 (102)	176
	3M	799-1379 (26)			26		3M	764-1401 (26)	26
	3N		41-769 (74)		74		3N	747-1419 (24) 46-642 (70)	94
	3O		62-611 (73)		73		3O	752-1424 (24) 62-654 (76)	100
					810				672
1998	2G	143-1488 (34)			34				
	2H	98-1473 (83)			83				
	2J	126-1398 (118)			118				
	3K	122-1415 (154)	121-346 (17)		171				
	3L	691-1437 (32)	34-675 (172)		204				
	3M	768-1436 (26)			26				
	3N	834-1447 (12)	37-1079 (78)		90				
	3O		82-1076 (67)		67				
					813				

NOTE: Type1 sets only (no type 0 juvenile sets in 3NO included)

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). 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	3084	2508	.	.	15	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	.	481
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	.	773
1251 - 1500	360	360	907	.	.	.	.	.	.	.	.	.	.
	165	165	917	.	.	.	.	.	.	.	.	.	.
	515	515	918	.	.	.	.	.	.	.	.	.	.
Total Biomass (t)				49600	51244	47985	24016	22419	941	22275	15503	4511	10525

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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). 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	.	.	.	435	1866	.	1387	1430	.	1162
301 - 400	120	120	902	.	.	.	110	66	.	2330	998	206	388
	73	73	912	.	.	.	10	10	.	.	899	241	176
	186	186	923	2699	.	793	90	563	.	870	915	.	409
401 - 500	832	832	927	.	.	.	3411	7554	.	15176	5778	.	9557
	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	.	.	.	.	.	.	.	.	.	.
Abundance (000s)	515	515	918	177315	105464	84795	109103	43844	9781	97689	62525	24812	49365

Table 3 Biomass estimates (tons) by depth stratum of Greenland halibut from various Canadian surveys in Division 2H during the period 1978-98 (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
<=200	1028	1028	930	315	263	707	50	96	343	152		97	168
	971	971	954	583	804	265	103	348	6	91		34	127
	1051	1051	956	1020	332	562	135	457	57	12		102	48
	1371	1371	957	3183	693	1274	374	578	86	15		29	43
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	11257	940	2984	1115	530	1347	179	659	594	258
	291	291	953	630	1062	311	243	387	47	1475	363	363	271
	389	389	955		487	158	63	253	103	178	391	270	277
	294	294	958				28	39	35	131	166	97	105
301 - 400	55	55	932	4747	5420	8446	761	995	242	500	5918	2276	3205
	860	860	944							3985	839		
	206	206	949		4345	1697	875	3187	171	337	1227	2596	3017
	177	177	952		1817	948	298	747	84	151	684	664	175
401 - 500	50	50	933					25	17	105	310	104	84
	55	55	942		1562	1002	61	47	36	61	135	104	85
	461	461	945		14164	6684	2563	5095	1265	1302	2019	1310	2892
	246	246	948							3234	3605	10034	
	234	234	951	2027	8478	2253	1999	1692	865	1629	2571	1396	2449
	107	107	960		4767	569	506	119	23	97	332	375	184
501 - 750	78	78	934		5019		504	102		303	191	166	272
	89	89	941				379	713		81	507	178	356
	721	721	946		13063	18281	11105			4680	7045	7813	6231
	227	227	947	31158	57014	2539	6266	6206		2002	2770	3999	2255
	211	211	961		16477		666	880		285	223	270	275
751 - 1000	96	96	935		6300	1888		457	481		478	519	713
	97	97	940				400	360		268	658	492	644
1001 - 1250	242	242	962				1243	1812		884	922	1119	1852
	78	78	936				85	1810			486	883	692
	130	130	939				284	651		832	603	541	1258
1251 - 1500	265	265	963				1443	2248		1023	1909	541	1258
	94	94	937							447	731	624	837
	191	191	938							826	815	1131	1362
Total Biomass (t)	342	342	964	56300	130030	47835	39639	41694	4946	26062	38628	38988	30730

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Table 4 Abundance estimates (000s) by depth stratum of Greenland halibut from various Canadian surveys in Division 2H during the period 1978-99 (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
<=200	1028	1028	930	7813	4949	2811	3708	1966	3300	5374		368	672
	971	971	954	11300	19528	846	12361	39684	2137	1985		267	4308
	1051	1051	956	18988	16795	4735	10771	18014	1157	723		1475	1121
	1371	1371	957	35154	17225	9304	6361	25231	3018	566		219	1590
201 - 300	276	276	931	3113	456	937	3389	2493	1822	6341	683	1029	1177
	354	354	943	2654	1339	3725	8534	9859	536	5235	2237	1777	2292
	261	261	950						2082	9856			1167
	291	291	953	100676	4310	13410	74723	17613	6345	1301	12727	2962	1521
301 - 400	389	389	955	1231	25043	178	7478	7759	1391	49950	5048	1357	1886
	294	294	958		8999	61	5514	7806	5986	2002	8345	3155	4894
	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		
	177	177	952		17519	3555	8352	46002	2642	6014	6708	14938	17708
	178	178	959		1730	392	547	1739	502	1146	3783	2204	673
	50	50	933					45	65	898	2253	474	259
501 - 750	55	55	942		810	367	103	64	95	250	885	431	269
	461	461	945		36739	19617	22348	55983	6817	10051	19595	5454	17312
	246	246	948							25826	23100	56810	
	234	234	951	6712	27506	3702	5569	11991	3718	11105	20202	7033	12008
751 - 1000	107	107	960		2569	199	594	152	110	206	1253	1188	515
	78	78	934		1540		628	111		783	789	569	714
	89	89	941				441	643		269	1181	465	1096
	721	721	946	32110	117728	17768	118795	83445		30614	35062	32182	26459
1001 - 1250	227	227	947		33053	5574	14957	27870		10492	13622	15379	8447
	211	211	961		3261	677	697	1180		653	839	755	726
	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	
	130	130	939				215	206		742	519		787
	265	265	963				638	1276		1167	2098	635	1258
Abundance (000s)	94	94	937								401	149	
	191	191	938							263	488	355	749
	342	342	964	232902	366466	93601	322194	373163	42392	217026	239069	168649	140410
										428	565	1186	941

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Table 5a Biomass (tons) by stratum (converted to Campelen units from 1978-94) from Canadian fall surveys in Division 2J from 1978-2000.

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	283	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	19562	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	320	1034	1517	475	424
	508	530	234	7009	4357	3916	3492	5306	2655	4868	1143	922	454	1426	893	366	226	141
301 - 400	480	487	203	2311	4188	1296	2325	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	8650	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
	288	241	217	4717	1845	3767	1192	1694	1595	3480	2588	1325	1349	181	1012	164	100	100
	180	168	223	1711	1208	2623	1635	1822	1106	1893	1358	2085	462	1134	306	574	72	75
	686	598	227	6618	2186	5935	3056	3822	2768	2555	2912	1652	3066	2352	4044	3232	1101	1937
	420	414	235	5146	4006	5923	2000	4265	10840	3224	3269	7547	4625	2789	6721	8779	661	609
501 - 750		133	240	11338	15580	7520	9579	9423	3113	4809	7201	23242	21891	4953	2937	5488	1658	2331
	664	557	212	11403		5223	6388	1767	1695		1461	3151	2308	2513	859	2077	1096	174
	420	362	218	2250	3012	1067	2825	1182	1438	1167	847	5782	1554	1661	89	374	248	191
	270	228	224	2124		4016	1823	769	2452	629	766	2386	1369	1273	1063	1288	903	1647
	237	185	230															
751 - 1000	213	283	219				1005		2120		1664	6187	1872	1104	791	2015	253	253
	182	186	231	2634		3261		1805	1117	1842	2372	580	791	2975		2131	574	730
1001 - 1250	122	193	236	1571			640	946	1287	718	1113	2478	1199	182		1390	1501	593
	177	195	225															
	236	228	232	870														
1251 - 1500	286	330	221															
	180	201	226	99														
Total Biomass (t)	180	237	233	129254	99533	102747	107311	142873	110193	112208	86927	101716	69422	49917	61433	60215	20968	18121

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Table 5b. Biomass (tons) by stratum (converted to Campelen units from 1978-94) from Canadian fall surveys in Division 2J from 1978-2000.

Depth Range (m)	V1 Area	V4 Area	Stratum	1993	1994	1995	1996	1997	1998	1999	2000
101 - 200	1427	633	201	6	27		82	28	91		65
	1823	1594	205	6	14		514	35	502	532	281
	2582	1870	206	28	132	389	1120	404	349	403	357
	2246	2264	207	0	33	1	56	51	74	192	16
		733	237	0	0	0	1	4	19	320	0
		778	238		7		15	0	79	0	53
201 - 300	440	621	202	8	307	95	88	157	583	1855	574
	1608	680	209	384	123	360	1059	424	282	2204	694
	774	1035	210	589	121	2708	3904	893	1047	813	881
	1725	1553	213	302	422	236	1338	1146	1962	1426	893
	1171	1341	214	1064	507	327	4057	1258	1502	1883	1204
	1270	1302	215	1349	855	1370	1247	1448	1889	1986	1139
	1428	2196	228	967	2749	2219	5478	3666	4356	2566	2870
	508	530	234	895	129		163	753	352	311	122
301 - 400	480	487	203	1856	1404	387	946	2233	3303	2553	2200
	448	588	208	1025	4820	4759	3707	12593	6479	11101	9423
	330	251	211	1628	871	1400	1343	1875	870	3541	640
	384	380	216	331	332	64	506	1090	1631	881	1103
	441	450	222	170	535	122	1672	930	382	751	985
	567	536	229	246	1202	1799	3900	1940	2514	1206	1639
401 - 500	354	288	204	2512	3442	1437	3823	7841	6171	3707	4652
	268	241	217	270	228	131	932	576	621	704	628
	180	156	223	130	188	162	438	425	598	505	
	886	598	227	1648	2009	909	5850	9244	1793	13071	3628
	420	414	235	810	1042	3895	4373	8365	3256	4183	3929
	133	240	240	85	118	632	537	501	251	643	204
501 - 750	664	557	212	5048	1485	5499	4940	10735	4375	14447	4366
	420	362	218	248	136	693	1783	1207	1319	1019	690
	270	228	224	85	309	214	702	625	401	293	701
	237	185	230	135	379	652	1350	1589	547	2230	786
	120	239	219	1917	1411	1676	2586	2725	4867	4064	1959
751 - 1000	213	283	219	639	1579	2021	405	1727	2249	1402	1731
	182	186	231	613	604	376	1013	651	1635	1744	2828
	122	183	236	886	230	1007	698	381	725	1107	592
1001 - 1250	324	303	220				1296	503	1196		568
	177	195	225				835	693	655	478	176
	236	228	232				717	935	627	1787	1083
1251 - 1500	286	330	221				131	1246	692	567	401
	180	201	226				277	407	1313	626	400
	180	237	233				889	596	542	418	628
Total Biomass (t)				25880	27786	35591	64772	82095	62111	87147	54858

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Table 6a: Abundance (000s) by stratum (converted to Campelen units from 1978-94) from Canadian fall surveys in Division 2J from 1978-2000.

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	383	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	2652	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	880	208	13530	45061	22673	10396	19405	11660	5246	12166	6383	1797	5397	10175	4830	2854	2654
	774	1035	210	5481	1012	1022	3230	2200	3780	2302	2209	1171	772	1952	1544	1562	852	5704
	1725	1563	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	12323
	1428	2196	228	917	1604	1807	1637	864	1244	2301	1740	1801	2133	1061	4395	4715	2819	4440
	508	530	234	28190	22799	14518	28267	12695	4589	7687	4449	3075	6662	6918	5556	2341	1468	4216
301-400		480	487	8716	20491	4226	19710	11313	22142	70783	4380	21856	5547	12810	16683	14725	16463	6119
	448	588	208	10637	12526	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
401-500		567	536	507	1190	799	80982	35682	22354	17093	3068	15169	30825	14658	52836	20867	24933	19294
	364	288	204	133064	82687	866	387	553	369	1843	1677	1677	774	774	258	1807	406	221
	268	241	217	1696	645	866	866	585	1034	286	858	2002	286	78	520	273	1430	3800
	180	158	223	570	322	582	458	483	310	589	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	17446	21648	8632	4978	6376	1736	4110	7627	25088	20894	7307	3928	8586	3014	6303
	420	362	218	39558		1156	1271	404	433		654	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	156	424	913	864	864	815	1206	1744	3912
751-1000		213	263	219			234		659		440	5538	967	557	674	1494	542	1392
	182	186	231	964		1527		789	325	1239	1452	351	568	2153		1377	951	1252
1001-1250		122	193	296							638	1418	613	76		1393	1636	1133
	324	303	220	513														
	177	195	225															
1251-1500		236	228	325														
	286	330	221															
	180	201	226	50														
Total No. (000s)	180	237	233	332313	277137	138197	313166	217059	132178	177961	226308	161466	145374	104242	175763	169218	107390	143801

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Table 6b. Abundance (000s) by stratum (converted to Campelen units from 1978-94) from Canadian fall surveys in Division 2J from 1978-2000.

Depth Range (m)	V1 Area	V4 Area	Stratum	1993	1994	1995	1996	1997	1998	1999	2000
101 - 200	1427	633	201	87	131	2235	218	740	0	958	1759
	1823	1594	205	157	146	16190	767	4105	4276	5549	15413
	2582	1870	206	161	2315	42257	5071	4336	5549	857	381
	2246	2264	207	0	208	78	1142	519	727	2790	0
		733	237	0	0	0	101	34	202	0	759
201 - 300		778	238		2569		321	0	603	0	3630
	440	621	202	214	4328	732	1058	2772	4046	22296	8419
	1608	680	209	2557	6501	3555	17149	4116	1668	41034	3915
	774	1035	210	5944	641	17946	49120	5232	9966	9682	15316
	1725	1583	213	8347	10090	4609	33785	17703	16223	18872	18927
	1171	1341	214	21657	17678	17525	102676	13946	9703	22210	10961
	1270	1302	215	13146	79988	18030	14129	22354	13051	13433	33305
	1428	2196	228	10909	51858	42618	112816	40114	34324	20882	820
301 - 400	508	530	234	8640	802	2625	5209	1786	1005	19320	50294
	480	487	203	13633	11690	3153	5862	19093	27969	19320	50294
	448	588	208	10111	40470	43881	75750	122273	32031	67095	22424
	330	251	211	17540	8908	12534	16642	16470	3930	5401	3032
	384	360	216	1510	1808	300	2284	4209	5401	3032	6983
	441	450	222	867	18777	1238	11620	5076	1802	2259	5571
401 - 500	567	536	229	1180	14157	24774	14857	6890	13972	3281	7189
	288	241	217	1061	751	583	3599	2254	1936	2105	2188
	180	158	223	283	942	1695	1883	1043	1720	1272	16946
	686	598	227	6773	11039	3743	34184	35002	7486	46025	14260
	420	414	235	5999	6378	19335	25337	41431	13753	17414	14260
501 - 750		133	240	320	427	3081	1801	1336	672	1491	448
	664	557	212	22412	5670	20151	25042	44440	11915	49344	13485
	420	362	218	573	373	3818	5951	3205	3231	2238	1369
	270	228	224	188	1077	889	2023	1286	934	608	1506
	237	185	230	305	1120	2799	3084	3932	1400	4428	1552
751 - 1000		120	239	22953	10367	11193	16970	21936	36305	34310	8955
	213	283	219	915	2063	5586	547	2180	3523	2219	2745
	182	186	231	832	1254	760	1663	1151	3425	2815	4618
1001 - 1250	122	193	236	1208	195	3270	850	504	1043	1513	982
	324	303	220				1751	646	1005		688
	177	195	225				845	563	590	644	228
	236	228	232				643	737	748	2371	1349
1251 - 1500	286	330	221				78	931	402	318	363
	180	201	226				140	221	1078	512	415
	180	237	233				359	342	560	538	717
Total No. (000s)				205162	271047	311890	678016	517293	329415	470904	326101

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Table 7a Biomass (tons) by stratum (converted to Campden units from 1978-94) from Canadian fall surveys in Division 3K from 1978-2000.

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															
201 - 300		1588	1753	619						263	874	49	17	31	70	0	0	0	
		342	609							695	401	108	41	26	78	0	0	0	
		573	611																
		251	615																
301 - 400		2709	2545	620	18712	91279	90900	9404	7175	6302	4074	5985	4164	2108	3737	583	451	899	
		2859	2537	621	41987	36475	13203	11844	6267	12035	6800	12389	2383	4456	3166	4278	465	1151	
		668	1105	624	837	876	491	305	467	232	527	434	292	333	196	310	268	335	
		447		632	1424	1619	1386	314	426	187	334	394	133	85	49	61	384	111	
		1616	1555	634	2062	1819	1196	1233	3346	1470	1293	1157	877	1919	776	587	707	526	
		1274	1274	635	1563	1563	3122	2104	3013	1388	1668	773	1824	1932	910	1335	307	46	
		1455	1455	636	1860	872	2155	2163	3642	792	1289	861	806	353	852	701	401	240	
		1132	1132	637	723	575	907	1180	1366	2275	682	1780	1441	1349	700	466	816	293	
		256	610																
		263	614																
		593	617																
		1027	494	623	16992	3898	9646	10319	16038	24364	28228	8090	18912	14251	17861	11384	4603	5417	
		850	888	626	1915	1387	1630	3242	822	5794	3866	4935	3449	573	3204	847	3881	2176	48
		919	1113	628	7394	4470	14225	6023	11576	11302	20810	13944	16278	8319	12370	11682	3365	3698	5003
		1085	1085	628	4700	4183	8400	2305	1867	5126	4652	9824	9477	5858	6968	4150	2513	902	385
		499	495	629	532	834	1780	2004	4063	3706	1779	1935	2978	5191	7178	4634	1053	385	1058
	544	332	630	2058	800	1368	7048	4063	4258	485	2244	1861	4436	4313	3075	2065	2188	917	
	2179	2067	633	2393	2472	4271	2834	2296	3115	3219	3432	4444	4552	3380	5842	5385	3440	2813	
	2059	2059	638	4198	3427	2615	4854	4801	4371	2822	7321	5983	4382	3057	2972	6809	1993	2625	
	1463	1463	639	1031	1254	1385	1266	3321	2174	436	672	1288	703	653	511	854	766	1175	
401 - 500		30	613																
		632	691	622	16724	8517	3448	10766	7914	14953	8922	4742	39448	12755	17950	13695	30531	6256	
		1184	1255	627	11452	5878	9820	24040	16903	27637	38222	18219	33516	21372	21602	37862	18637	10870	
		1202	1321	631	8523	3908	4910	9787	5115	8593	12598	9456	8334	15010	11317	17190	4983	16791	
751 - 1000		198	69	640	835	1177	756	531	344	398	204	417	163	225	397	310	130	130	
		204	216	645	485	336	534	434	97	1157	1055		613	351	81	480	103	213	
		584	230	641	776	1547	2245	1521	1622	3609	3924	1384		1367		2661	661	440	
		333	325	646	2231	3166	1852	2656	590	2959	3167	2337		1143		449	1083	375	
1001 - 1250		359	651																
		831	418	642	7096	2019	3855	3634	1817										
		409	360	647	2417														
		516	652																
1251 - 1500		1266	733	643	1254	1364													
		232	228	648	406														
		531	653																
		954	474	644	1890	783													
Total biomass (t)		263	212	649	366														
		479	654																
				162396	100851	109450	122269	108737	146777	160510	120223	155137	122493	120451	122490	100569	66310	44458	

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Table 7b Biomass (tons) by stratum (converted to Campelen units from 1978-94) from Canadian fall surveys in Division 3K from 1978-2000.

Depth Range (m)	V1 Area	V4 Area	Stratum	1993	1994	1995	1996	1997	1998	1999	2000
101 - 200	-	798	608	-	-	-	0	44	37	-	0
	-	445	612	-	-	-	0	135	0	-	1
	1455	250	616	0	8	286	19	4	23	1	0
	1588	1753	619	0	0	18	29	57	0	0	13
201 - 300	-	342	609	-	-	-	117	386	202	-	177
	-	573	611	-	-	-	113	265	162	-	41
	-	251	615	-	-	-	39	67	176	-	23
	2709	2545	620	53	1113	790	4213	1275	1171	1367	3389
	2659	2537	621	972	1021	1068	3967	1320	2524	858	1495
	668	1105	624	1017	754	508	2516	1610	1752	1805	1186
	447	-	632	-	-	-	-	-	-	-	-
	1616	1555	634	990	962	727	2370	2144	1321	1933	1197
	1274	1274	635	99	41	128	1344	1545	1268	971	491
	1455	1455	636	629	398	1393	2336	1171	1054	1002	1015
	1132	1132	637	435	119	179	1722	869	2008	1145	-
301 - 400	-	296	610	-	-	-	344	630	1638	-	1000
	-	263	614	-	-	-	154	399	184	-	164
	1027	593	617	5904	2893	3844	2484	4841	3865	2919	2227
	850	888	625	1672	1931	308	3588	1938	6167	3546	4322
	919	1113	626	3229	2385	1437	4331	3075	3944	6783	3649
	1085	1085	628	3469	4263	1962	5453	10283	9504	18505	3890
	489	485	629	1438	1372	529	1789	2685	3116	10764	5142
	544	332	630	1324	1337	2682	6989	2179	6214	5900	4291
	2179	2067	633	1274	1331	858	4800	3261	1561	5114	3821
	2059	2059	638	4511	2668	4649	3487	6739	4178	7634	3474
	1463	1463	639	3804	1908	1750	3952	7031	8115	2400	4792
401 - 500	-	30	613	1718	872	1520	1331	1586	1183	2362	64
	632	691	622	6993	3921	2638	6896	11901	10364	13165	10064
	1184	1255	627	31882	7308	18846	15576	22176	25588	45497	42775
	1202	1321	631	9779	9453	10094	25499	14500	13683	18514	23958
	196	69	640	77	111	179	105	59	37	39	144
	204	216	645	110	108	357	192	162	75	114	446
501 - 750	-	134	650	193	338	252	147	242	224	39	-
	584	230	641	411	109	227	394	197	369	1020	-
	333	325	646	105	483	327	564	1180	156	84	436
	-	359	651	704	894	1222	321	1361	1015	734	-
751 - 1000	-	931	648	1541	2336	1741	760	2036	2513	3081	2134
	409	360	647	2413	1829	1087	749	2025	2961	2191	2465
	-	516	652	2242	1445	2366	3585	2575	4843	3246	2591
1001 - 1250	-	1268	733	643	-	1487	2121	6930	5453	3490	1537
	232	228	648	-	-	-	1641	1118	1687	1552	624
	-	531	653	1718	-	1583	2306	1643	3660	3927	3045
1251 - 1500	-	954	644	-	-	688	870	2036	2845	1480	1917
	263	212	649	-	-	-	387	1083	282	681	622
Total biomass (t)	-	479	654	89603	53980	68902	120019	129578	141582	175631	143326

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Table 8a Abundance (000s) by stratum (converted to Campelen units from 1978-94) from Canadian fall surveys in Division 3K from 1978-2000.

[illegible]

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Table 8b: Abundance (000s) by stratum (converted to Campelen units from 1978-94) from Canadian fall surveys in Division 3K from 1978-2000.

Depth Range (m)	V1 Area	V4 Area	Stratum	1993	1994	1995	1996	1997	1998	1999	2000
101 - 200		798	608	-	-	-	-	293	110	-	0
		445	612	-	-	-	0	857	0	-	31
		250	616	-	-	-	0	34	120	-	17
	1455	1347	618	0	53	3330	228	93	139	124	62
	1588	1753	619	0	0	841	425	448	0	121	95
201 - 300		342	609	-	-	-	-	839	1506	602	349
		573	611	-	-	-	-	465	1340	586	90
		251	615	-	-	-	-	236	432	784	138
	2709	2545	620	233	7702	8266	50340	10662	8370	8816	36955
	2859	2537	621	8531	12044	17351	40571	14182	14778	3966	10239
	668	1105	624	14571	20622	9987	41839	15830	17867	14677	10519
	447	-	632	-	-	-	-	-	-	-	-
	1618	1555	634	10642	10321	12468	28382	18641	11979	10390	6369
	1274	1274	635	643	131	1057	11407	17490	11602	6975	4431
	1455	1455	636	13510	8406	19987	26446	9607	5504	5504	6829
301 - 400		1132	637	3737	8743	3512	11087	6167	10713	5025	8191
		286	610	-	-	-	2195	4560	7343	-	-
		263	614	-	-	-	1389	3021	923	-	1318
		593	617	60446	45722	64933	48872	38808	22113	17988	14855
	1027	494	623	21321	19584	3228	51938	23445	32102	22661	28065
	850	888	623	41573	41960	18661	68363	28279	37542	28613	22804
	919	1113	626	39745	39756	15421	61923	13259	64794	84650	35409
	1085	1085	628	13880	8557	3974	11330	26356	12955	30657	32507
	498	495	629	9864	9976	23208	55189	18794	37008	35306	25504
	544	332	630	14310	9296	9215	31901	32380	12240	25141	29679
	2179	2067	633	53772	35827	54535	31687	47011	16523	37329	13147
	2059	2059	638	24867	33314	28066	44481	46871	38835	9072	14815
	1463	1463	639	17173	16628	22428	9276	9224	4595	3815	11347
401 - 500		30	613	-	-	-	448	1577	549	-	586
	632	691	622	56296	72546	39289	132742	104560	64289	73410	52914
	1184	1255	627	358659	86592	225916	116359	206365	158172	160052	151814
	1202	1321	631	103337	111802	128176	162285	96509	65419	78684	100559
	198	69	640	326	494	1429	377	142	104	66	242
	204	216	645	436	396	1590	624	383	211	178	1040
		134	650	1057	2258	2120	654	691	479	100	-
501 - 750		584	641	1371	475	886	1076	348	902	1951	-
	333	325	646	343	1371	1185	1321	2347	335	201	700
		359	651	2789	4309	5778	840	2609	2692	1449	-
751 - 1000		931	642	3872	6383	3364	1179	3179	4284	4773	3092
	409	380	647	2806	3797	2649	1411	3417	5497	3615	2864
		516	652	6246	4277	2252	6637	4069	10470	4833	3336
1001 - 1250		1266	643	-	-	-	1786	1555	2368	2478	737
	232	228	648	-	-	-	1786	1555	2368	2478	737
		531	653	1437	-	-	2849	2131	6063	5750	4325
1251 - 1500		954	644	-	-	-	565	587	1891	2705	1685
	253	212	649	-	-	-	160	1094	204	619	617
Total No. (000s)		479	654	885602	633308	739068	1061182	951632	707269	698447	64371

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Table 9 Biomass estimates (t) of Greenland halibut from Canadian fall surveys in Div. 3L using a Campelen trawl during 1996-2000.

Depth Range (m)	V1 Area	V4 Area	Stratum	1996	1997	1998	1999	2000
30 - 56		268	784	0	0	0		0
57 - 92	2071	2071	350	0	0	0	0	0
	1780	1780	383	0	0	0	0	0
	1121	1121	371	3	0	0	24	0
	2460	2460	372	0	0	0	0	0
	1120	1120	384	0	0	0	0	0
		465	785	0	0	0		0
93 - 183	1519	1519	328	1	6	1	11	18
	1574	1574	341	2	249	184	0	6
	585	585	342	1	85	18	0	6
	525	525	343	0	34	45	0	1
	2120	2120	348	2	129	177	216	22
	2114	2114	349	2	60	252	416	0
	2817	2817	364	0	103	414	30	0
	1041	1041	365	0	169	140	55	
	1320	1320	370	14	48	871	555	19
	2356	2356	385	64	502	334	253	29
	1481	1481	390	67	200	625	310	69
		84	786	67	2			0
		613	787	1	86	0		0
		261	788	0	45	31		0
		89	790	0	6	6		0
		72	793	0	4	4		25
		216	794	0	15	4		0
		98	797	0	3	14		0
		72	799	0	0	4		0
184 - 274	1494	1582	344	11	96	885	181	42
	983	983	347	0	37	1021	297	160
	1394	1394	366	338	878	2172	2108	62
	961	961	369	108	888	2347	719	85
	983	983	386	447	1010	1683	1129	473
	821	821	389	900	875	474	673	727
	282	282	391	344	892	257	135	379
		164	795	5	35	6		11
		72	789	0	14	10		12
		227	791	66	193	151		201
		100	798	76	108	162		226
275 - 366	1432	1432	345	3747	1775	4359	1665	2659
	865	865	346	5483	2378	2062	1312	1021
	334	334	368	690	338	2272	860	857
	718	718	387	1765	1614	1609	5284	4897
	361	361	388	711	814	380	270	704
	145	145	392	500	618	215	170	234
		175	796	37	355	289		154
367 - 549	186	186	729	648	496	242	239	1002
	216	216	731		713	305	1795	891
	468	468	733	706	752	2535	1511	1321
	272	272	735	1111	938	2093	2465	728
		50	792	186	349	608		316
550 - 731	170	170	730	37	330	44	224	125
	231	231	732	463	590	705	519	858
	228	228	734	642	604	515	184	554
	175	175	736	1117	951	1285	498	4028
732 - 914		227	737	2198	1981	4765	1472	1522
		223	741	867	3224	5059	961	444
		348	745	1075	1722	1299	358	364
		159	748	429	287	166	255	390
915 - 1097		221	738	1906	1439	769	548	903
		206	742	567	901	918	628	451
		392	746	783	992	531	1231	363
		126	749	125	377	135		185
1098 - 1280		254	739	1227	2248	1784	245	515
		211	743	931	2820	472	2427	861
		724	747	438	1446	570	284	622
		556	750	586	3947	1750	1100	1872
1281 - 1463		264	740	981	2604	1013	337	1109
		280	744	2961	1101	1746		698
		229	751	1207	2810	2633		711
Total Biomass (t)				36642	48283	55410	33955	34161

Table 10 Abundance estimates (000s) of Greenland halibut from Canadian fall surveys in Div. 3L using a Campelen trawl during 1996-2000.

Depth Range (m)	V1 Area	V4 Area	Stratum	1996	1997	1998	1999	2000
30 - 56		268	784	0	0	0		0
57 - 92	2071	2071	350	0	0	0	0	0
	1780	1780	363	0	0	0	0	0
	1121	1121	371	39	0	0	39	0
	2460	2460	372	0	42	0	0	0
	1120	1120	384	0	0	0	0	0
		465	785	0	0	0		0
93 - 183	1519	1519	328	42	42	42	125	84
	1574	1574	341	72	595	650	43	173
	585	585	342	40	201	80	0	201
	525	525	343	0	96	132	0	36
	2120	2120	348	83	458	622	311	73
	2114	2114	349	125	208	686	914	0
	2817	2817	364	0	517	1287	43	0
	1041	1041	365	0	668	382	143	
	1320	1320	370	227	227	2623	986	171
	2356	2356	385	540	3110	1058	770	36
	1481	1481	390	204	815	1892	693	149
		84	786	331	12	12		0
		813	787	42	295	0		0
		261	788	0	180	90		0
		89	790	0	6	18		37
		72	793	0	5	10		0
		216	794	0	40	15		0
		98	797	0	13	34		0
		72	799	0	0	9		0
184 - 274	1494	1582	344	69	696	3086	392	64
	983	983	347	0	180	3200	541	456
	1394	1384	366	2732	6673	7278	4913	192
	961	961	369	1124	4451	7193	1880	595
	983	983	386	2524	7437	5980	4958	1037
	821	821	389	8019	7680	2146	3338	2485
	282	282	391	3369	6459	969	601	3491
		164	795	21	104	23		20
		72	789	0	50	25		35
		227	791	127	487	375		283
		100	798	261	281	468		309
275 - 366	1432	1432	345	18723	12712	22231	6457	24854
	865	865	346	40360	16064	7913	3490	5421
	334	334	368	8664	1815	7305	1940	1447
	718	718	387	13169	8214	5004	10310	11803
	361	361	388	2657	6605	894	472	1788
	145	145	392	4317	4149	568	459	559
		175	796	72	1071	975		1061
367 - 549	186	186	729	1797	1241	461	486	1689
	216	216	731		2333	517	2791	1501
	468	468	733	2694	3058	5991	2414	2437
	272	272	735	3511	3592	4808	4457	1154
		50	792	1494	1510	1861		517
550 - 731	170	170	730	84	503	52	386	164
	231	231	732	607	1414	1176	763	1128
	228	228	734	1854	1812	929	298	795
	175	175	736	2848	2696	3045	867	6644
732 - 914		227	737	4965	4216	9306	2014	1936
		223	741	1917	8083	10239	1363	506
		348	745	1891	3064	1987	404	438
		159	748	853	711	264	400	427
915 - 1097		221	738	3283	2003	1176	725	1094
		206	742	808	2706	1204	867	468
		392	746	1267	1845	674	770	351
		126	749	121	841	186		121
1098 - 1280		254	739	1655	3127	2568	349	472
		211	743	1205	2245	493	3316	1055
		724	747	498	1029	498	299	697
		556	750	841	4245	1674	814	2027
1281 - 1463		264	740	1543	2978	1217	436	1180
		280	744	2773	1213	2140		757
		229	751	1040	2991	3103		929
Abundance (000s)				147500	152116	141050	68018	85919

Table 11 Biomass estimates (t) of Greenland halibut from Canadian fall surveys in Div. 3M using a Campelen trawl during 1996-2000.

Depth Range (m)	V1 Area	V4 Area	Stratum	1996	1997	1998	1999	2000
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
	.	98	533	59	270	77	.	119
	.	133	539	.	.	.	.	.
915 -1097	.	517	521	.	.	.	.	.
	.	226	525	.	.	.	.	.
	.	488	529	72	218	667	562	508
	.	238	532	938	466	524	398	124
	.	486	534	814	2026	1466	.	1437
1098 -1280	.	533	522	.	.	.	.	.
	.	177	526	.	.	.	.	.
	.	1134	530	3769	1587	1506	1111	1285
	.	92	535	235	218	434	.	720
1281 -1463	.	284	523	.	.	.	.	.
	.	171	527	.	.	.	.	.
	.	203	531	346	216	508	337	149
	.	112	536	202	385	296	.	219
Total Biomass (t)				10175	6966	7776	2408	5511

Table 12 Abundance estimates (000s) of Greenland halibut from Canadian fall surveys in Div. 3M using a Campelen trawl during 1996-2000.

Depth Range (m)	V1 Area	V4 Area	Stratum	1996	1997	1998	1999	2000
128 - 146	342	342	501	0	.	.	.	.
147 - 184	838	838	502	0	.	.	.	.
185 - 256	828	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
	.	98	533	94	351	120	.	173
	.	133	539	.	.	.	.	.
915 - 1097	.	517	521	.	.	.	.	.
	.	226	525	.	.	.	.	.
	.	488	529	110	224	614	537	470
	.	238	532	1408	557	688	557	141
	.	486	534	735	2674	1790	.	1872
1098 - 1280	.	533	522	.	.	.	.	.
	.	177	526	.	.	.	.	.
	.	1134	530	4619	1524	1595	1248	1181
	.	92	535	165	247	373	.	386
1281 - 1463	.	284	523	.	.	.	.	.
	.	171	527	.	.	.	.	.
	.	203	531	182	73	517	283	140
	.	112	536	74	216	265	.	216
Abundance (000s)				15841	7841	9258	2635	5672

Table 13 Biomass estimates (t) of Greenland halibut from Canadian fall surveys
in Div. 3N using a Campelen trawl during 1996-2000.

Depth Range (m)	V1 Area	V4 Area	Stratum	1996	1997	1998	1999	2000
<=56	1593	1593	375	.	0	0	0	0
	1499	1499	376	.	0	0	0	0
57 - 92	2992	2992	360	.	880	974	144	165
	1853	1853	361	.	0	0	0	0
	2520	2520	362	.	0	0	0	0
	2520	2520	373	.	2	0	0	0
	931	931	374	.	12	0	0	0
93 - 183	674	674	383	.	0	0	0	0
	421	421	359	.	160	724	67	28
	100	100	377	.	166	30	21	30
	647	647	382	.	24	111	0	0
184 - 274	225	225	358	.	94	42	13	5
	139	139	378	.	262	2198	257	5
	182	182	381	.	615	1622	590	253
275 - 366	164	164	357	.	58	7	.	6
	106	106	379	.	41	31	22	36
	116	116	380	.	516	794	330	151
367 - 549	155	155	723	115	109	336	14	48
	105	105	725	165	1646	65	95	171
	160	160	727	1006	371	509	494	391
550 - 731	124	124	724	160	589	374	126	67
	72	72	726	296	448	765	55	30
	156	156	728	1035	455	675	511	201
732 - 914	.	134	752	.	.	563	.	664
	.	106	756	.	.	242	.	243
	.	154	760	.	.	352	.	183
915 - 1097	.	138	753	.	.	224	.	109
	.	102	757	.	.	643	.	455
	.	171	761	.	.	687	.	778
1098 - 1280	.	180	754	.	.	1554	.	179
	.	99	758	.	.	443	.	427
	.	212	762	.	.	.	.	1096
1281 - 1463	.	385	755	.	.	658	.	965
	.	127	759	.	.	165	.	509
	.	261	763	.	.	.	.	2135
Total Biomass (t)				2775	6448	14788	2738	9330

Table 14 Abundance estimates (000s) of Greenland halibut from Canadian fall surveys in Div. 3N using a Campelen trawl during 1996-2000.

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

Table 15 Biomass estimates (t) of Greenland halibut from Canadian fall surveys
in Div. 3O using a Campelen trawl during 1996-2000.

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

Table 16 Abundance estimates (000s) of Greenland halibut from Canadian fall surveys in Div. 3O using a Campelen trawl during 1996-2000.

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

Table 17a. Greenland halibut biomass estimates (000 t), by division, from Canadian fall surveys during 1995-2000.

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	175.8	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

Table 17b. Abundance and biomass estimates of Greenland halibut, by Division, from Canadian fall 2000 survey.
Upper and lower indicate approximate 95% confidence limits.

Area	Total	Upper	Lower	Mean	Upper	Lower
Division 2G Abundance	NO SURVEY					
Biomass (kg)	NO SURVEY					
Division 2H Abundance	NO SURVEY					
Biomass (kg)	NO SURVEY					
Division 2J Abundance	326,100,752	383,113,000	269,088,503	No/Tow	94.39	110.89
Biomass (kg)	54,857,637	68,464,478	41,250,796	Kg/Tow	15.87	19.82
Division 3K Abundance	644,371,037	784,719,148	504,022,927	No/Tow	133.09	162.07
Biomass (kg)	143,329,359	198,377,931	88,280,787	Kg/Tow	29.60	40.97
Division 3L Abundance	85,919,104	106,298,584	65,539,625	No/Tow	13.85	17.14
Biomass (kg)	34,160,545	48,385,734	19,935,355	Kg/Tow	5.50	7.80
Division 3M Abundance	5,671,973	8,863,587	2,480,360	No/Tow	12.19	19.05
Biomass (kg)	5,510,962	7,857,091	3,164,833	Kg/Tow	11.84	16.69
Division 3N Abundance	13,762,892	50,823,405	-23,297,620	No/Tow	5.12	18.92
Biomass (kg)	9,330,180	36,759,072	-18,098,712	Kg/Tow	3.47	13.68
Division 3O Abundance	6,091,801	9,725,696	2,457,505	No/Tow	2.19	3.50
Biomass (kg)	4,221,556	8,496,837	1,946,275	Kg/Tow	1.52	2.34
Combined SA2+Div. 3KLMNO Abundance	1,081,917,361	1,229,969,690	933,865,031.00	No/Tow	52.97	60.22
Biomass (kg)	251,410,240	305,219,346	197,601,135	Kg/Tow	12.31	14.94

Table 18 Abundance (000s) of G. halibut at age from Canadian fall surveys in Div. 2J3K combined during 1978-2000. 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
0																							
1	67133	76275	47941	141166	33748	12131	31845	192002	125257	36234	74055	52954	9859	84583	62241	359982	342056	80159	41996	19546	12880	51861	25436
2	315382	128771	46187	158149	39589	34727	50917	113556	109161	81046	71055	96755	39744	59211	188121	189873	397121	397121	452542	222012	198610	83492	322796
3	243378	95893	43767	108462	88918	7282	70143	65428	112555	212676	103246	174201	70539	44644	148380	497522	171483	122856	267483	398355	265730	217037	138877
4	148894	50881	39304	41433	75651	75711	74837	94435	104606	99109	114836	174689	177413	103198	95263	182333	112689	39605	96568	192045	168600	227676	99212
5	90817	53399	48738	47202	57104	71101	103171	66317	72301	75271	119816	106472	115858	65701	38552	42962	51870	50370	55611	89609	82110	162864	111556
6	58485	50376	32827	28991	41105	68891	61354	68891	61354	68891	61354	68891	61354	68891	61354	68891	61354	68891	61354	68891	61354	68891	61354
7	48485	50376	32827	28991	41105	68891	61354	68891	61354	68891	61354	68891	61354	68891	61354	68891	61354	68891	61354	68891	61354	68891	61354
8	19170	9977	11102	15813	41244	39418	27028	17028	22142	25791	12333	28644	6200	6383	1067	1867	1347	320	1920	555	1100	1100	377
9	9940	4777	4860	7017	16566	15223	13058	7982	6546	9434	3134	2847	1500	635	140	232	172	265	1141	1547	1100	1100	270
10	7356	4572	3891	4213	6765	4414	6308	5296	2380	2833	1105	747	746	310	89	32	69	104	377	493	580	415	210
11	6469	3000	4461	3349	4129	3180	2602	2257	1856	1481	781	568	640	181	12	22	13	49	178	280	240	143	165
12	4117	2638	2882	1559	2714	2291	1812	1997	1658	1454	463	151	389	104	0	94	17	0	115	151	150	86	17
13	2683	2193	1874	857	1929	1664	1480	874	879	754	361	35	223	22	0	41	9	0	118	100	140	170	20
14	992	1079	1070	446	1975	1109	1285	1002	542	583	327	81	155	8	15	24	0	0	42	54	20	10	54
15	560	699	411	268	1257	495	677	606	555	385	236	103	90	0	0	0	0	0	10	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	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
18	0	128	0	0	43	81	0	100	0	14	16	0	0	0	0	0	0	0	0	0	0	0	0
19	0	65	0	0	0	0	0	16	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	28	0	0	0	0	0	0	0	0	0	0	0	0
Unk	3706	1122	4208	35052	2831	0	0	0	4374	0	1047	4744	0	0	2404	759	0	0	0	0	0	0	0
Ages 0+	102852	511381	347004	651312	469351	435238	489484	642558	715824	647746	810710	750752	530726	413761	559589	1089993	902080	972723	1698413	1454518	1026190	1168890	870432
Ages 1+	392486	205046	94128	299315	73337	46859	82762	306460	231418	211280	145609	146709	48602	143784	241027	343422	548655	739177	1245699	708583	416590	382532	504940
Ages 1-2	481058	198643	132609	199097	221673	218093	248151	165979	289461	387056	343900	457363	353811	213503	282195	723818	336222	212831	415662	680219	546440	607597	350545
Ages 3-5	138513	90137	100672	108103	142012	156921	143721	137355	182277	135551	115016	136221	115048	55893	33767	21782	15895	20562	32788	64638	61470	125886	88948
Ages 6-9	26485	16355	19096	45797	23329	13354	14849	12783	12688	7859	5185	6459	2284	630	2600	972	108	153	974	1078	1690	524	468

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Table 19 Abundance at age (millions), by division, from 1996-2000 Canadian fall surveys.

1996										
Age (yrs)	Div. 2G	Div. 2H	Div. 2J	Div. 3K	Div. 3L	Div. 3M	Div. 3N	Div. 3O	Total	
0	1.73	0.58	38.51	5.49	0.72	0.04	0.61	1.89	47.56	
1	38.28	92.11	349.25	444.20	29.71	0.40	22.26	1.35	977.56	
2	18.47	69.30	155.92	295.63	32.41	1.62	14.04	3.18	591.56	
3	11.25	25.10	64.01	203.47	35.04	1.75	6.13	1.58	348.33	
4	9.24	12.64	34.59	61.98	17.72	1.43	3.07	0.75	141.42	
5	8.52	8.84	22.84	32.78	14.74	2.68	1.95	0.38	92.82	
6	5.09	4.71	9.88	12.42	9.85	3.91	0.75	0.12	46.73	
7	2.08	1.87	2.97	4.46	4.83	2.52	0.10	0.01	18.82	
8	1.11	0.85	0.78	1.14	1.45	0.83	0.01	0.00	6.17	
9	1.09	0.64	0.73	0.41	0.67	0.40	0.01	0.01	3.96	
10	0.21	0.16	0.14	0.24	0.22	0.05	0.00	0.00	1.02	
11	0.25	0.05	0.07	0.11	0.07	0.03	0.00	0.00	0.58	
12	0.12	0.05	0.07	0.05	0.05	0.05	0.00	0.00	0.38	
13	0.00	0.03	0.09	0.03	0.03	0.09	0.00	0.00	0.26	
14	0.00	0.00	0.02	0.02	0.01	0.04	0.00	0.00	0.09	
15	0.00	0.00	0.00	0.01	0.02	0.01	0.00	0.00	0.04	
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Unk	0.16	0.08	0.13	0.00	0.04	0.00	0.04	0.02	0.47	
5+	18.73	17.28	37.72	81.58	31.96	10.89	2.85	0.55	171.33	
9+	1.83	1.00	1.25	0.86	1.10	0.66	0.05	0.03	6.79	
Total	97.70	217.00	877.99	1063.42	147.58	15.83	48.96	9.30	2277.77	

1997										
Age (yrs)	Div. 2G	Div. 2H	Div. 2J	Div. 3K	Div. 3L	Div. 3M	Div. 3N	Div. 3O	Total	
0	0.82	5.80	11.90	7.65	2.15	0.00	0.11	0.07	28.50	
1	8.35	34.69	55.31	166.70	11.18	0.00	0.80	2.14	279.18	
2	8.75	59.28	172.56	314.02	24.00	0.00	10.26	4.08	593.94	
3	12.13	60.66	128.94	285.43	31.30	0.02	12.10	4.07	518.64	
4	15.34	45.59	84.51	107.53	26.14	0.07	6.80	2.84	291.61	
5	7.42	16.82	33.57	56.24	27.81	0.87	3.53	0.94	147.20	
6	4.47	9.27	18.25	20.86	14.97	2.42	1.46	0.22	72.93	
7	2.68	4.71	7.41	9.91	8.22	2.73	0.49	0.04	36.19	
8	0.93	1.45	1.62	4.04	3.48	1.19	0.10	0.06	12.87	
9	0.26	0.45	0.60	0.95	0.91	0.29	0.01	0.02	3.49	
10	0.22	0.13	0.24	0.25	0.25	0.05	0.00	0.00	1.14	
11	0.13	0.09	0.21	0.07	0.17	0.07	0.00	0.01	0.74	
12	0.01	0.04	0.10	0.05	0.15	0.04	0.00	0.00	0.39	
13	0.01	0.04	0.07	0.03	0.10	0.07	0.01	0.00	0.33	
14	0.00	0.06	0.03	0.03	0.12	0.02	0.00	0.00	0.25	
15	0.00	0.01	0.00	0.00	0.03	0.00	0.00	0.00	0.01	
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Unk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5+	16.14	33.08	63.10	92.43	58.18	7.75	6.61	1.29	275.54	
9+	0.63	0.81	1.25	1.38	1.89	0.53	0.03	0.03	6.35	
Total	62.52	238.07	517.31	956.76	153.94	7.84	35.48	14.48	1987.39	

1998										
Age (yrs)	Div. 2G	Div. 2H	Div. 2J	Div. 3K	Div. 3L	Div. 3M	Div. 3N	Div. 3O	Total	
0	0.08	0.94	9.59	3.29	0.48	0.02	0.08	0.08	14.54	
1	13.82	13.89	55.45	144.16	4.19	0.00	1.62	0.27	233.40	
2	2.83	30.72	85.69	151.29	16.14	0.01	3.19	0.98	270.85	
3	1.60	56.78	94.57	171.16	14.19	0.02	7.12	2.24	347.68	
4	1.77	35.48	58.93	128.67	29.06	0.28	8.63	4.02	267.84	
5	1.53	16.33	28.16	65.95	43.93	1.60	9.50	4.72	169.72	
6	1.22	8.28	10.92	27.43	22.86	3.04	5.80	2.12	81.47	
7	0.94	4.11	5.32	11.93	8.51	2.81	2.85	0.72	37.19	
8	0.58	1.63	1.68	3.09	2.52	0.90	0.73	0.28	11.41	
9	0.04	0.31	0.39	0.71	0.74	0.24	0.22	0.07	2.72	
10	0.04	0.08	0.17	0.41	0.19	0.13	0.09	0.04	1.15	
11	0.01	0.04	0.14	0.10	0.12	0.10	0.07	0.05	0.63	
12	0.00	0.00	0.09	0.06	0.08	0.10	0.01	0.01	0.35	
13	0.01	0.03	0.07	0.07	0.01	0.02	0.01	0.00	0.22	
14	0.01	0.00	0.02	0.00	0.06	0.02	0.02	0.00	0.13	
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
16	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.02	
Unk	0.12	0.00	0.25	0.29	0.00	0.00	0.05	0.00	0.71	
5+	4.50	36.81	45.21	110.08	78.62	8.96	18.36	8.91	305.72	
9+	0.23	0.48	1.13	1.66	1.20	0.61	0.47	0.17	5.93	
Total	24.6	168.62	329.44	708.63	142.88	9.29	39.99	15.8	1440.03	

1999										
Age (yrs)	Div. 2G	Div. 2H	Div. 2J	Div. 3K	Div. 3L	Div. 3M	Div. 3N	Div. 3O	Total	
0	2.60	5.53	39.20	12.76	2.09	0.00	0.04	0.14	62.35	
1	15.98	25.38	60.10	33.40	0.51	0.00	0.14	0.20	135.11	
2	8.15	35.05	117.62	171.22	5.18	0.00	0.59	0.59	338.59	
3	3.52	15.86	74.17	142.87	3.56	0.00	1.03	0.74	241.74	
4	7.58	23.04	77.88	149.80	6.95	0.03	1.75	0.77	269.80	
5	6.67	19.91	66.96	95.93	18.71	0.21	2.26	1.06	211.70	
6	2.85	8.28	24.53	65.62	19.78	0.85	1.25	0.82	123.97	
7	1.41	4.42	1.66	3.39	1.23	0.37	0.06	0.10	9.40	
8	0.84	1.76	1.66	3.39	1.23	0.37	0.06	0.10	9.40	
9	0.14	0.67	0.41	0.70	0.28	0.13	0.03	0.04	2.36	
10	0.08	0.24	0.12	0.29	0.10	0.10	0.01	0.02	0.96	
11	0.06	0.10	0.06	0.08	0.03	0.05	0.01	0.01	0.40	
12	0.02	0.04	0.04	0.05	0.05	0.00	0.00	0.01	0.21	
13	0.01	0.07	0.08	0.10	0.14	0.00	0.00	0.01	0.39	
14	0.01	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.04	
15	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.04	
16	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Unk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5+	12.10	35.61	101.85	188.04	47.70	2.80	3.98	2.32	393.80	
9+	0.34	1.15	0.70	1.22	0.88	0.28	0.04	0.09	4.40	
Total	49.33	140.38	470.71	698.09	67.99	2.83	7.53	4.74	1441.38	

2000										
Age (yrs)	Div. 2G	Div. 2H	Div. 2J	Div. 3K	Div. 3L	Div. 3M	Div. 3N	Div. 3O	Total	
0			21.19	4.25	1.26	0.00	0.01	0.00	26.70	
1			102.50	220.30	17.65	0.00	0.26	0.07	340.77	
2			74.76	107.38	13.84	0.00	0.21	0.10	196.29	
3			44.23	95.65	4.07	0.00	0.09	0.07	144.11	
4			28.30	70.92	7.61	0.05	0.58	0.48	107.94	
5			29.85	61.91	12.81	0.48	2.37	1.39	128.59	
6			18.82	46.66	17.40	2.08	5.30	2.06	92.31	
7			5.16	14.26	9.20	1.93	3.64	1.25	35.44	
8			0.98	2.40	1.40	0.60	0.90	0.40	6.68	
9			0.28	0.39	0.34	0.28	0.28	0.14	1.71	
10			0.09	0.12	0.09	0.10	0.04	0.03	0.46	
11			0.07	0.09	0.10	0.07	0.04	0.05	0.42	
12			0.01	0.01	0.06	0.02	0.04	0.02	0.16	
13			0.01	0.01	0.06	0.04	0.01	0.03	0.15	
14			0.00	0.05	0.01	0.00	0.00	0.01	0.08	
15			0.00	0.00	0.00	0.00	0.00	0.00	0.01	
16			0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Unk			0.01	0.00	0.00	0.00	0.00	0.00	0.01	
5+	0.00	0.00	55.08	145.89	41.47	5.59	12.61	5.37	266.01	
9+	0.00	0.00	0.48	0.87	0.66	0.61	0.40	0.27	2.99	
Total			326.06	644.38	85.90	5.64	13.76	6.08	1081.82	

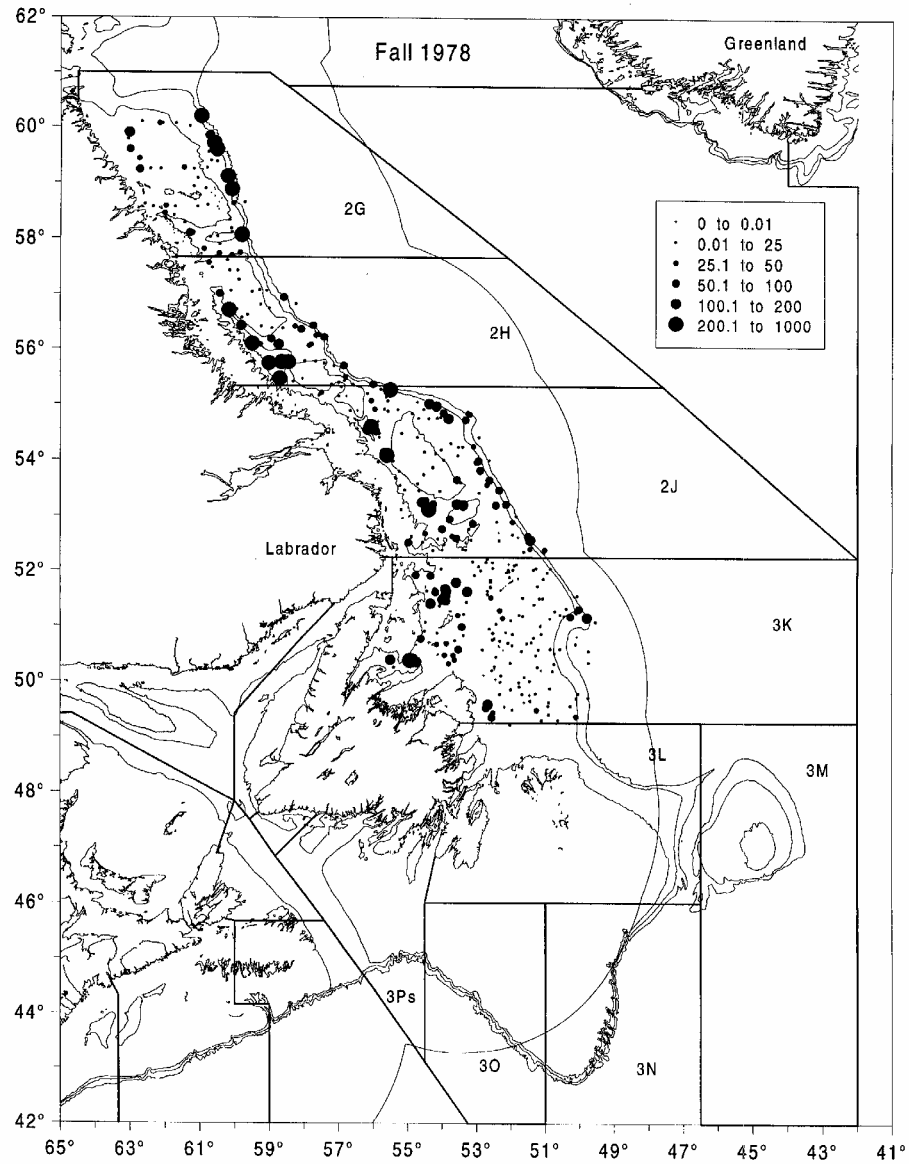


Fig. 1 Distribution (kg. per set) of Greenland halibut from Canadian fall surveys during 1978.

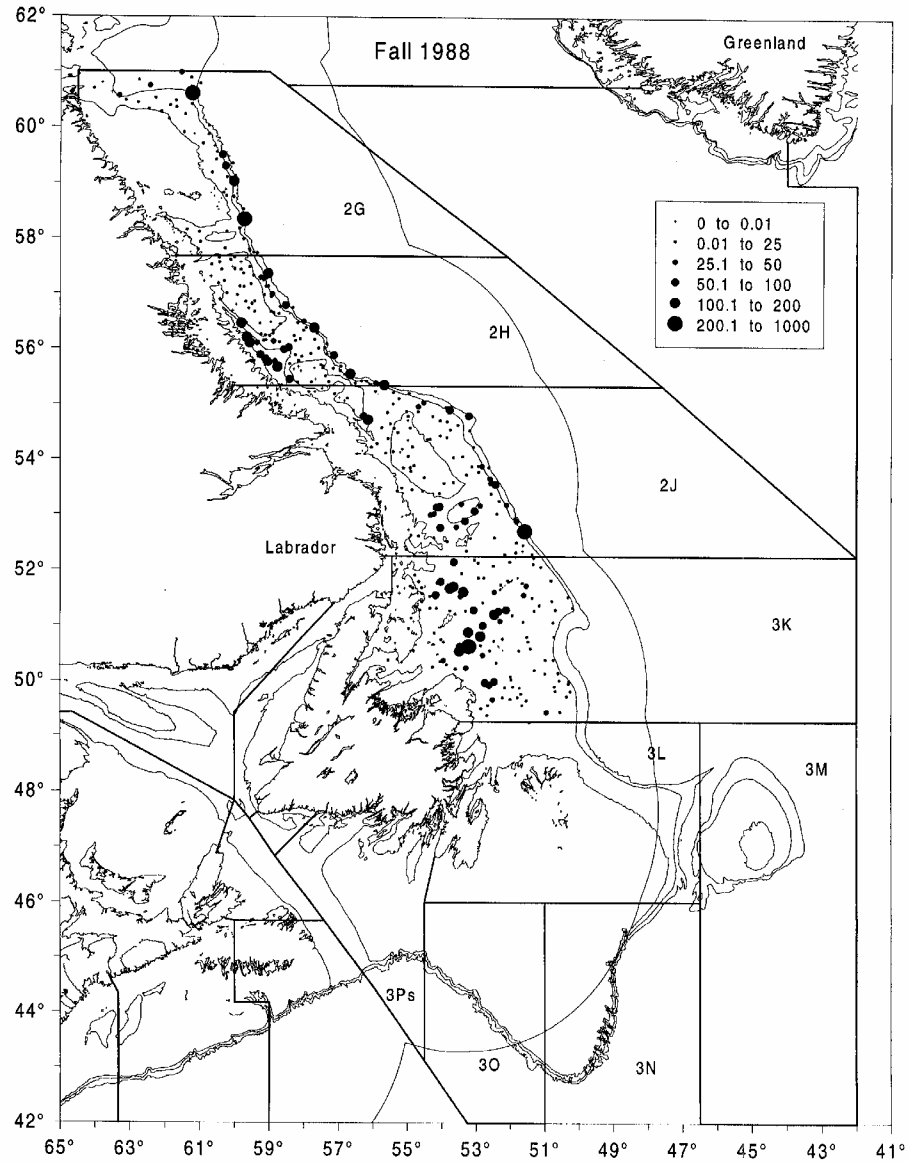


Fig. 2 Distribution (kg. per set) of Greenland halibut from Canadian fall surveys during 1988.

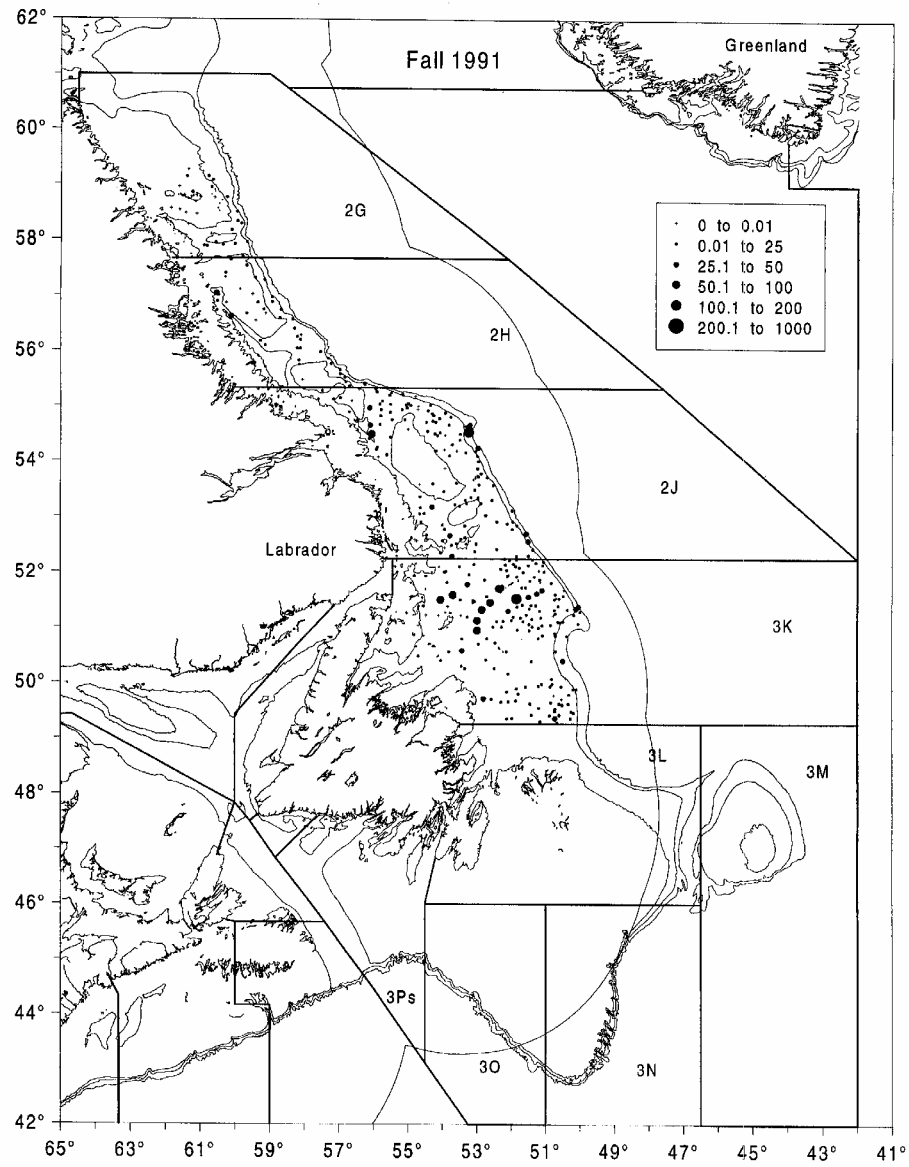


Fig. 3 Distribution (kg. per set) of Greenland halibut from Canadian fall surveys during 1991.

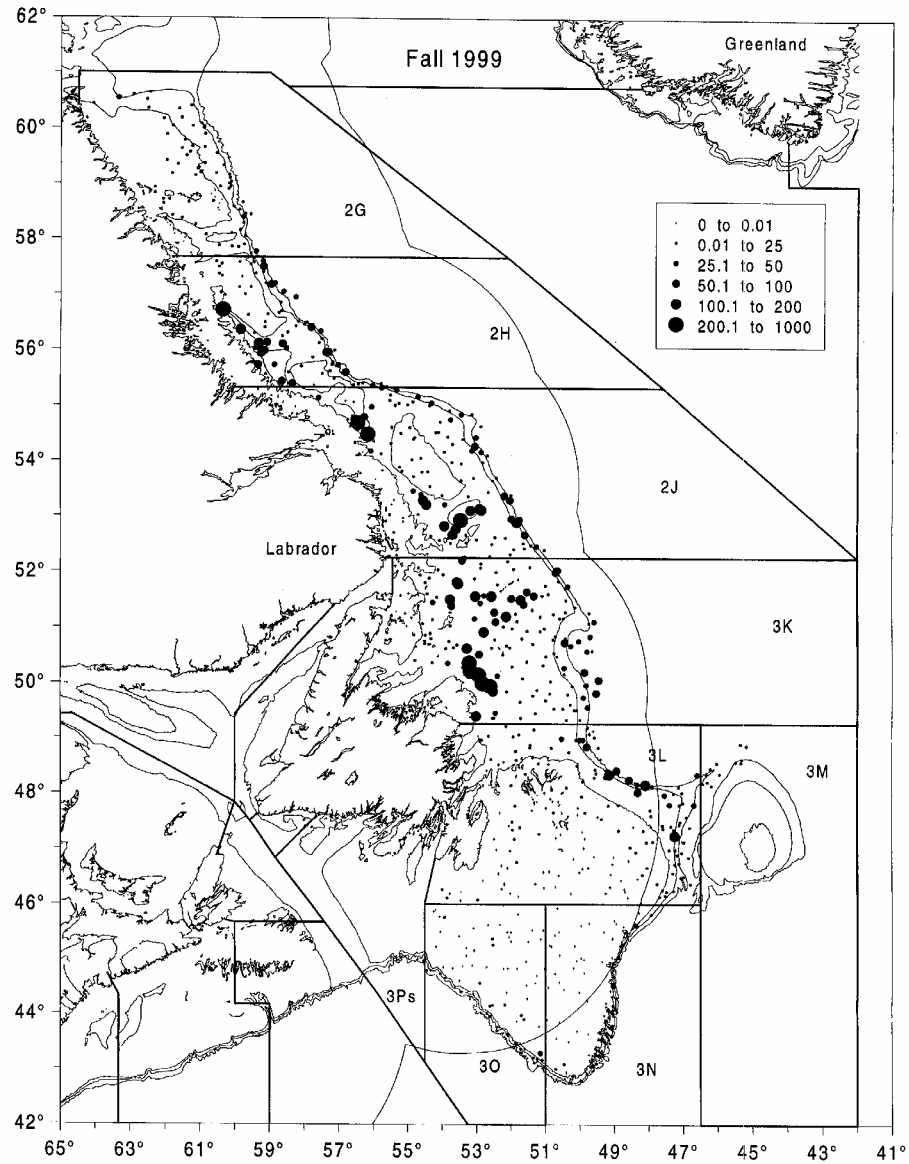


Fig. 4 Distribution (kg. per set) of Greenland halibut from Canadian fall surveys during 1999.

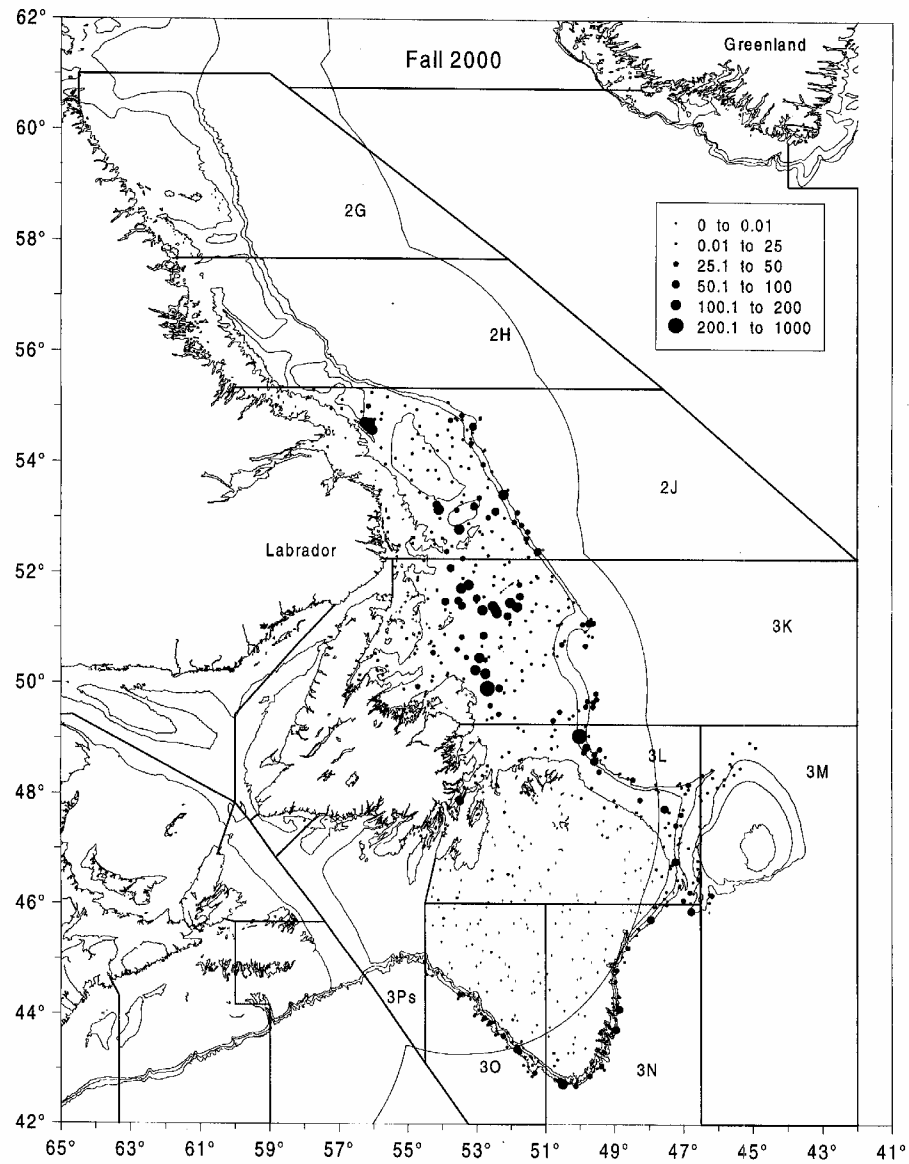


Fig. 5 Distribution (kg. per set) of Greenland halibut from Canadian fall surveys during 2000.

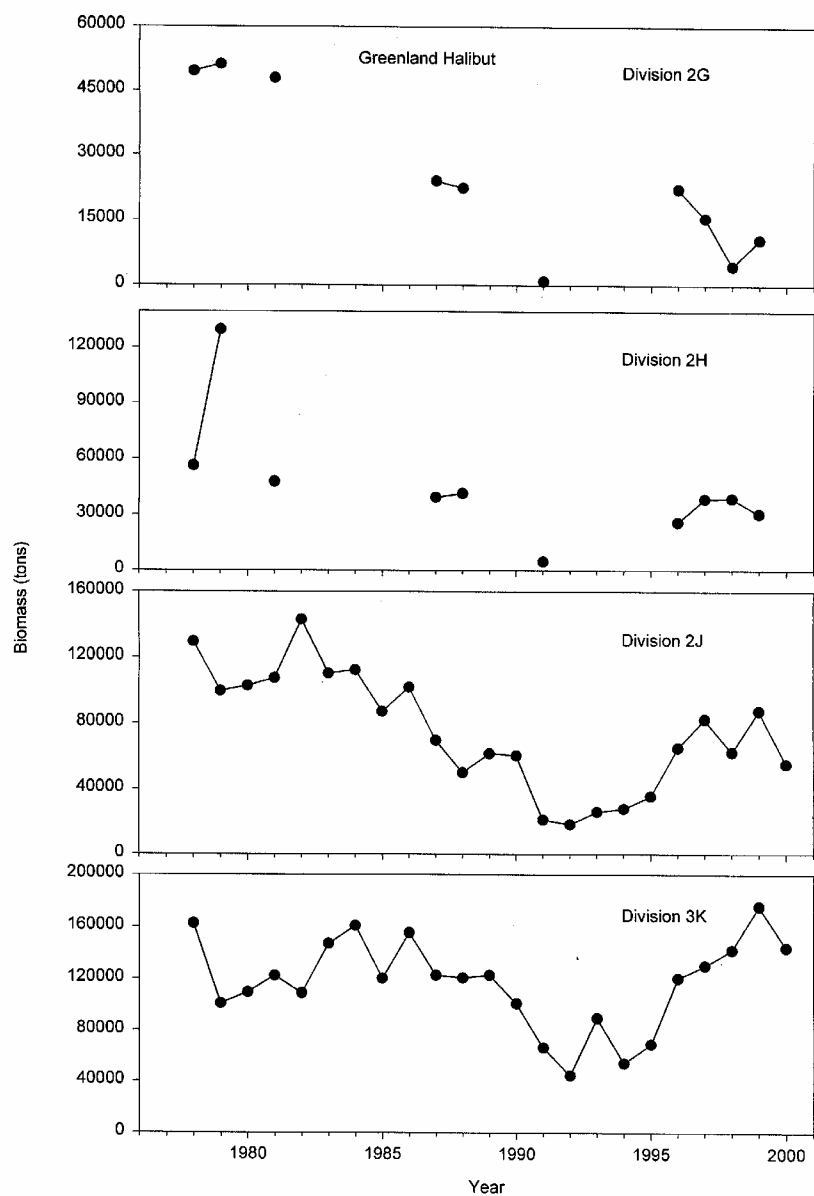


Fig. 6 Campelen biomass estimates by NAFO Division from Canadian fall surveys during 1978-2000.

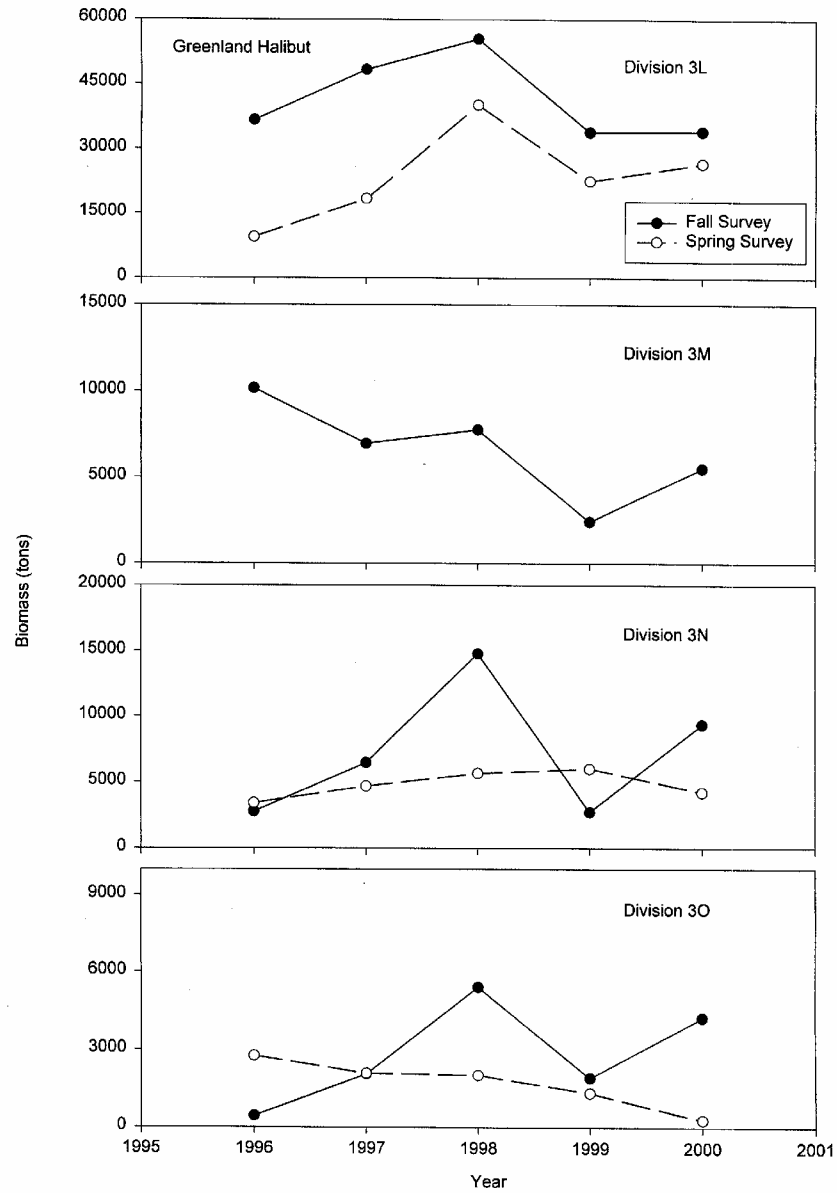


Fig. 6 (con'd) Campelen biomass estimates by NAFO Division from Canadian spring and fall surveys during 1996-2000.

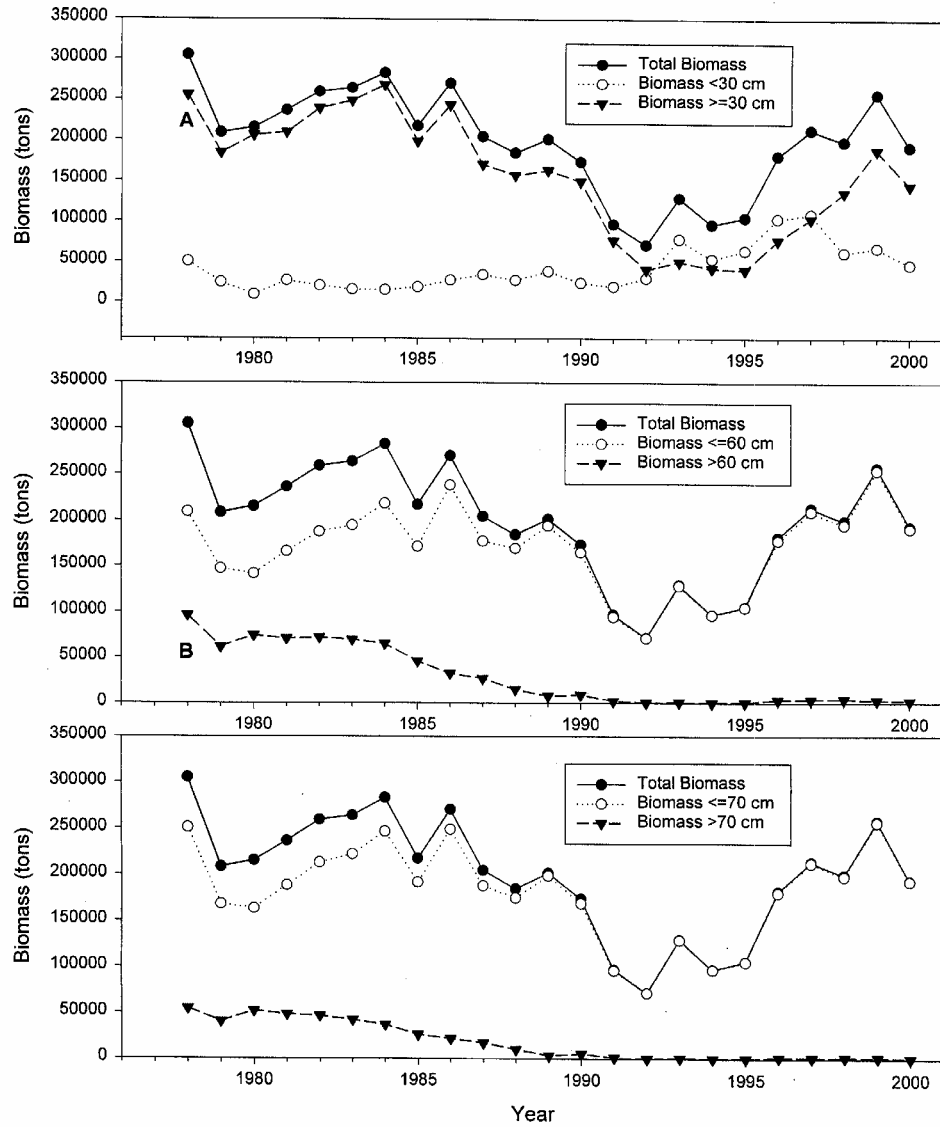


Fig. 7 Biomass (tons) of Greenland halibut by length grouping from Canadian fall surveys conducted in Div. 2J+3K during 1978-2000. Biomass was calculated using the at sea L/V equations as applied to Campelen or Campelen equivalent abundance indices. The annual L/V equations were applied to 1990-98; the 1990 equation was applied to 1978-89; the average of 1997-99 was applied to 1999 and 2000.

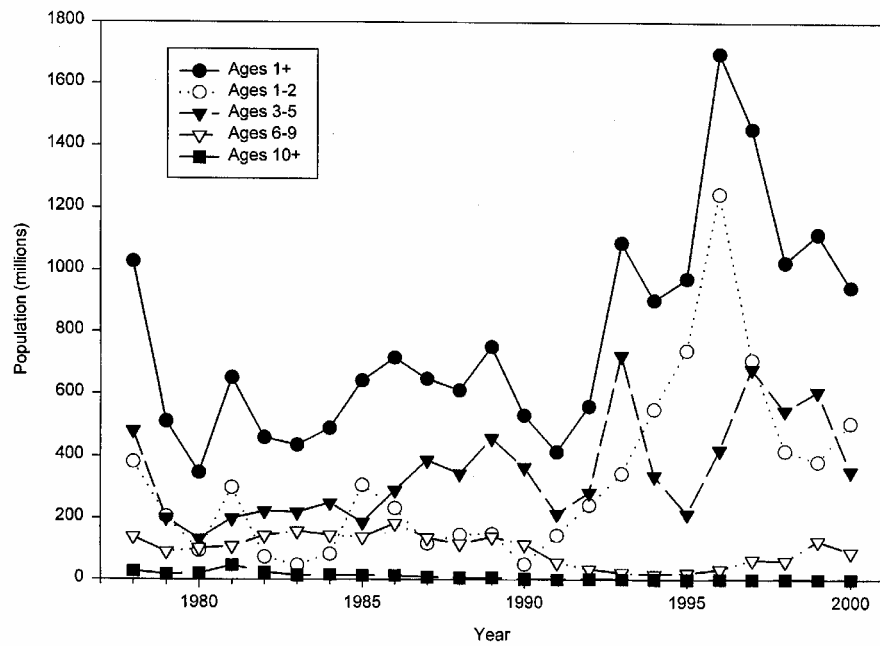


Fig. 8 Trends in population abundance estimates by age category from Canadian fall surveys in Divisions 2J and 3K combined during 1978-2000.

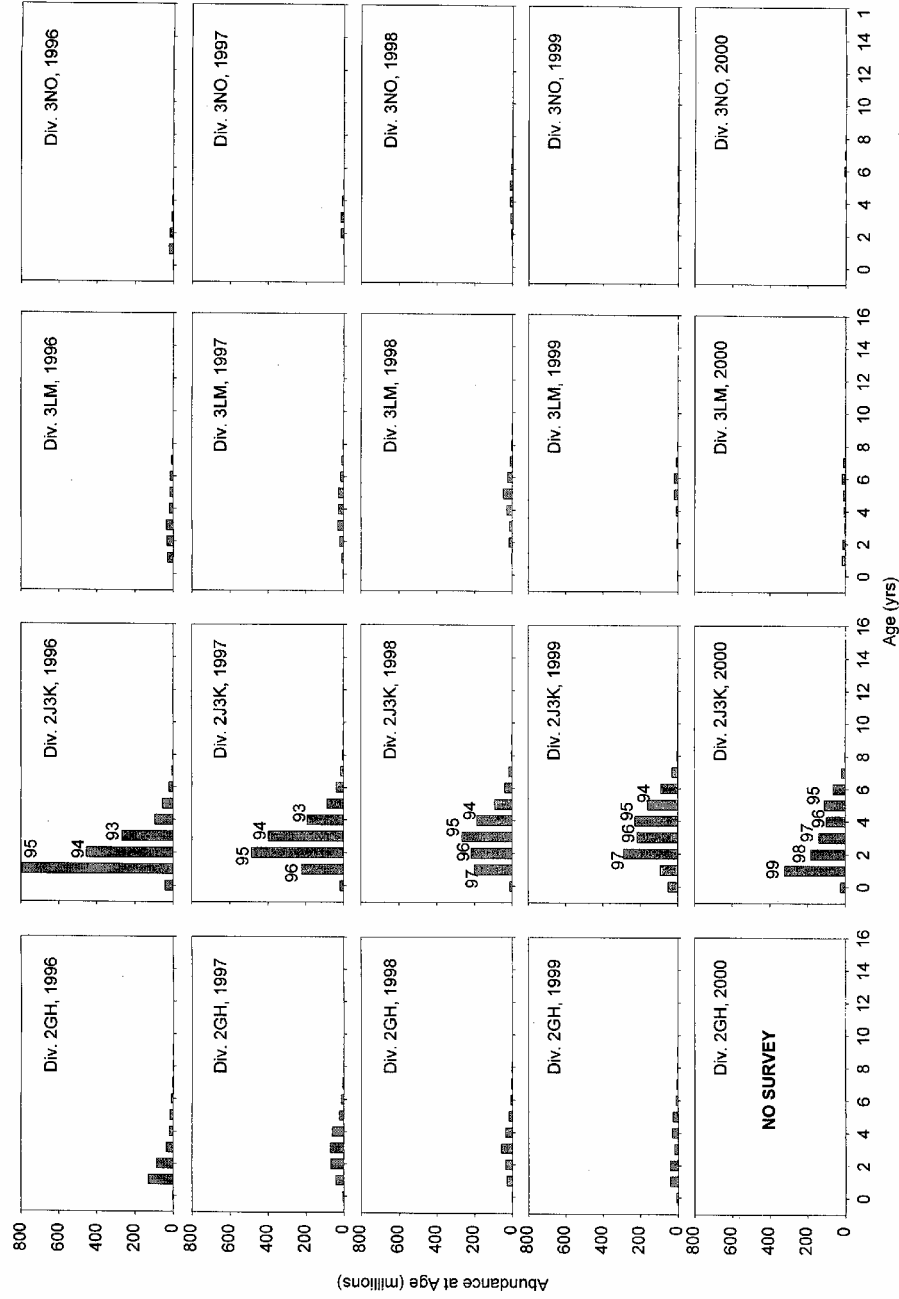


Fig. 9 Greenland halibut abundance at age (millions) by year and NAFO Division groupings from Canadian fall surveys during 1996-2000. Numbers on graph represent year-classes.

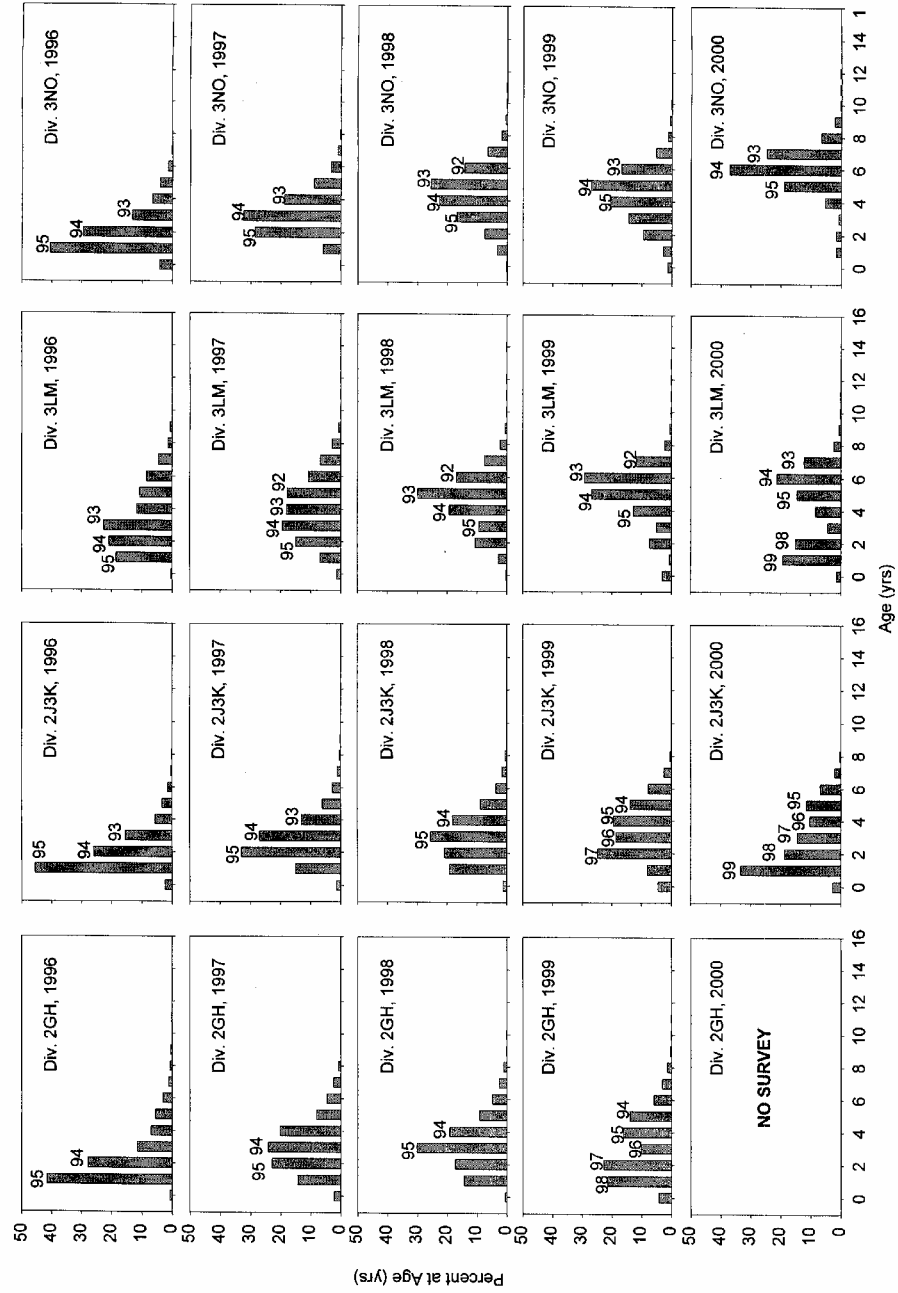


Fig. 10 Greenland halibut percent at age by year and NAFO Division groupings from Canadian fall surveys during 1996-2000. Numbers on graphs represent year-classes.

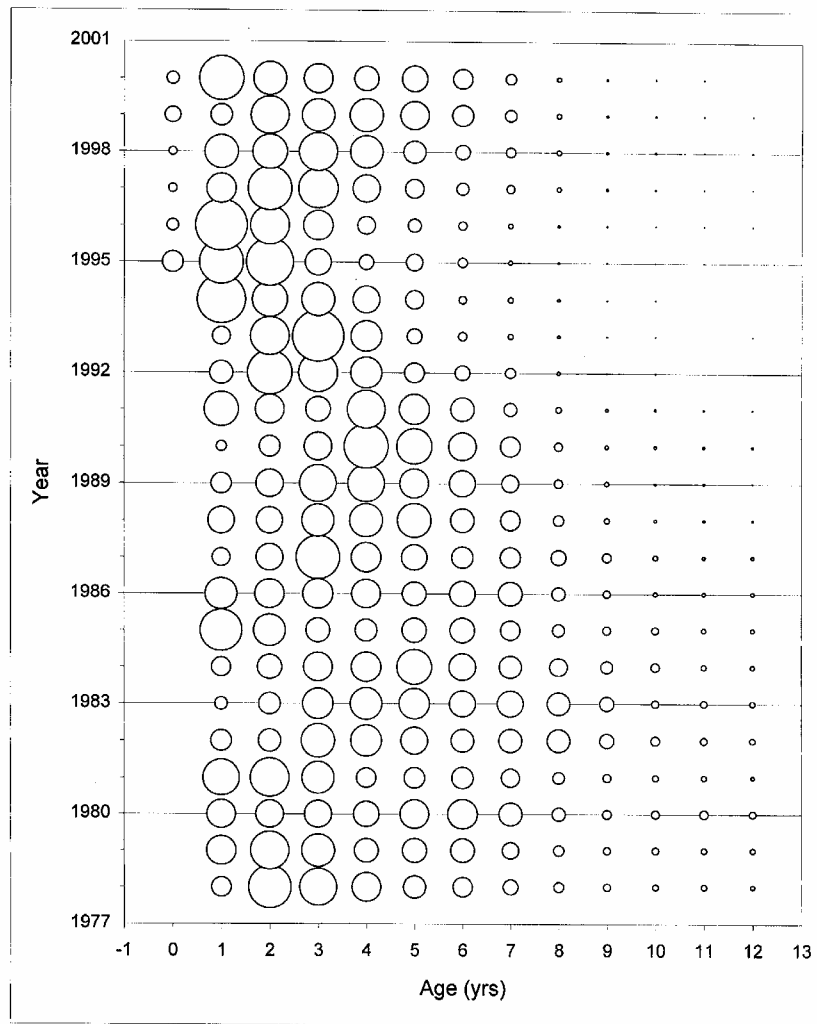


Fig. 11 Proportions at age for Greenland halibut in Divisions 2J and 3K based on population abundance from Canadian surveys during 1975-2000.

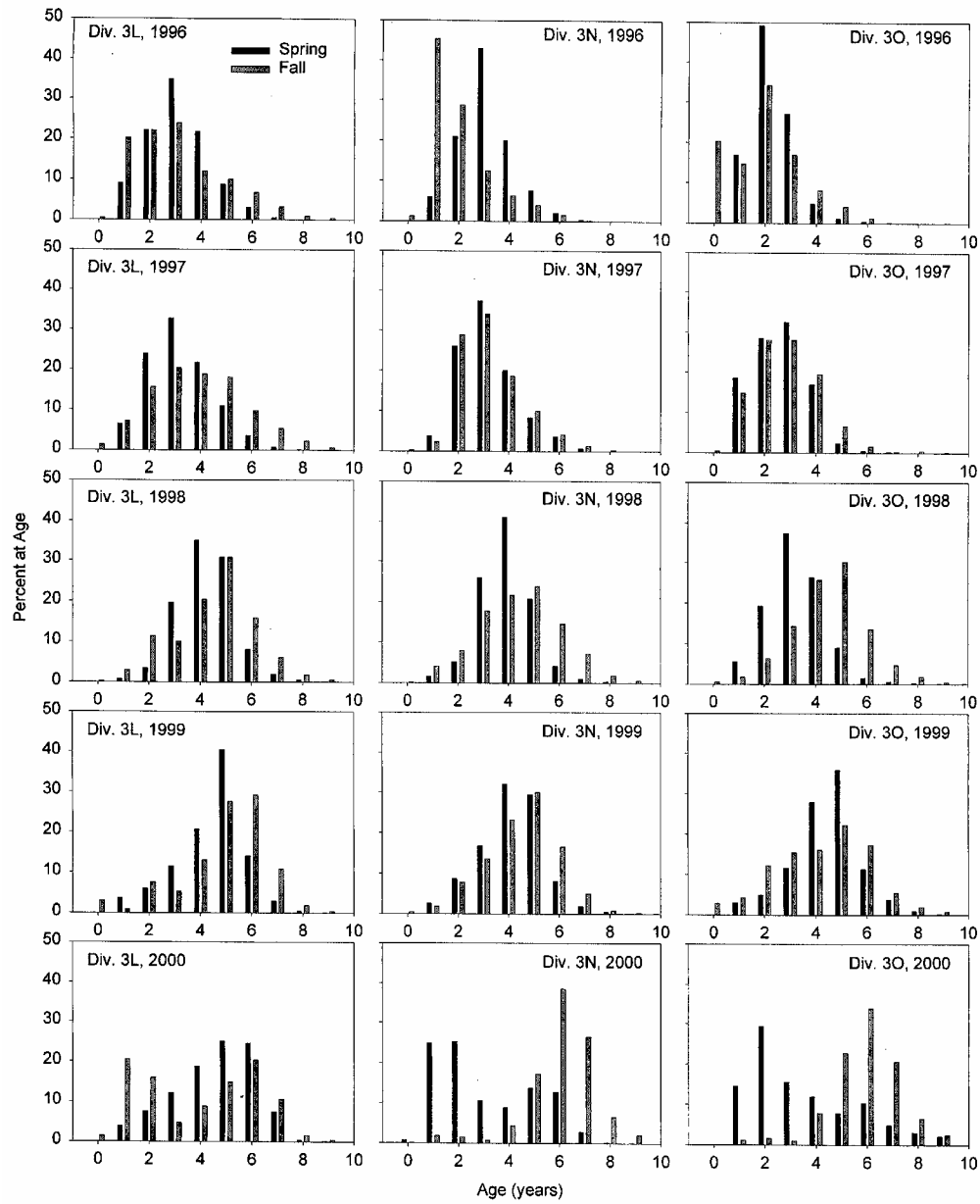


Fig. 12 A comparison of percent population size at age by division for Greenland halibut from Canadian spring and fall surveys in NAFO Divisions 3L, 3N and 3O during 1996-2000 using a *Campelen 1800* shrimp trawl.