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A Simple Examination of Canadian Autumn Survey Trends in NAFO Divisions 3LNO for Greenland Halibut and American Plaice: the Impact of Incomplete Coverage of this Survey in 2004

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Abstract

The Canadian autumn multi-species survey is an integral component in assessing many stocks within the NAFO Convention Area. During the course of the 2004 autumn multi-species survey, operational difficulties lead to incomplete coverage of the survey in NAFO Divisions 3LNO. We explore the importance of the un-sampled strata in 2004 for computing indices of biomass and abundance, based upon survey results from the previous decade. We restrict this examination to those stocks which incorporate the autumn multi-species survey into analytical assessment methods, focusing on Greenland halibut and American plaice stocks. Based upon this exploration, we comment on the validity of using data from the autumn 2004 survey in assessing these stocks.

Introduction

The Canadian autumn multi-species survey (stratified) is an integral component in assessing many stocks within the NAFO Convention Area. During the course of the 2004 autumn multi-species survey, operational difficulties led to incomplete coverage of the survey area. In addition to the incomplete areal coverage, the survey timing was also of concern: the 'autumn' survey continued into February 2005. Brodie (2005) provides detailed discussion of the autumn 2004 survey results in light of the operational delays and missed coverage. A summary of the coverage problems: the deep water strata (deeper than 732 m) in Div. 3LNO were not surveyed, strata in addition to the deep-waters of 3L were not surveyed, Div. 3M was not surveyed, and in Div. 3K, coverage in several strata was reduced. The stratification scheme for Div. 3LNO highlighting the strata not completed in 2004 is displayed in Fig. 1.

The extent of the missed coverage is such that the use of multiplicative models (see Shelton *et al*. 1996 for application) to estimate survey values for 2004 using observations from previous surveys is not practical.

The incomplete autumn survey data in Div. 3LNO affects several stocks with analytical assessments, primarily Greenland Halibut in Subarea 2 + Div. 3KLMNO and American Plaice in Div. 3LNO.

The missed coverage does not present problems for the assessments of Yellowtail flounder in Div. 3LNO and Cod in Div. 3NO. The portions of the survey area which were not completed in the autumn of 2004 are deeper than the range of depths which Div. 3LNO Yellowtail Flounder inhabit (see Fig. 10, Walsh *et al*. 2004). Furthermore, stock-size estimates from production model analyses (e.g. Brodie *et al*., 2004) have been calibrated using indices of total abundance and would be unaffected by survey results deepwater strata. Note, however, that estimates of mean number or weight per set would be biased as a result of the missing coverage. For Cod in Div. 3NO, the Canadian survey data typically used in assessment models consist of a subset of the strata in Div. 3NO, specifically those strata less than 200 fm or 366 m in depth (see Tables 7, 15 and 18, Healey *et al*., 2003).

The missed coverage is most problematic for indices of Greenland Halibut in SA2 + Div. 3KLMNO. Particularly, the lack of any deep water coverage in the 2004 autumn survey for Div. 3LMNO means that the 2004 input data for various analytical analyses used in assessing this stock are either missing or partially completed.

For the American Plaice stock in Div. 3LNO, the missed deep water coverage is not crucial. However, as noted above, additional strata in Div. 3L towards the northeastern edge of the plateau of the Banks were not surveyed in 2004. In past years, these strata have contributed in varying degrees to the 3L estimates of abundance and biomass for American Plaice. The importance of those strata not completed in the autumn 2004 survey requires exploration, to gauge their influence on the assessment indices.

In recent assessments of Greenland Halibut in SA2 + Div. 3KLMNO, data from the Canadian autumn multi-species survey have been used in estimating parameters in various stock assessment models. Estimates of population size from XSA, ADAPT and ASPIC (Darby et *al*., 2004) utilize autumn survey data from Div. 3L, and analyses of year-class strength (Healey et *al*., 2004) incorporate autumn data from Div. 3LNO.

In assessing American Plaice in Div. 3LNO, the autumn survey data from Div. 3LNO is used in estimating population size and estimating the size of recruiting year-classes (Morgan *et al*., 2003).

We present the results of some simple exploratory analyses of the Canadian autumn multi-species survey time series (Campelen gear; 1995-2003) to rationalize the decision-making process on whether or not to include the data from the 2004 autumn surveys in the assessment models.

Data Exploration and Discussion

Greenland Halibut in Subarea 2 + Divisions 3KLMNO

Figure 2 illustrates the weight of Greenland Halibut caught per set from the autumn surveys in 2003 and 2004, with the 2004 coverage deficiencies in Div. 3LMNO highlighted.

Table 1 (abundance) and table 2 (biomass) list the stratum by stratum survey results for Greenland Halibut in Div. 3L, (taken from Dwyer and Healey (2005)). Note that the coverage in 1995 is also incomplete. Based upon past surveys using the Campelen 1800 shrimp gear (first employed in the autumn of 1995), it is evident that a substantial portion of the survey estimates of abundance and biomass have been observed in the strata that were not covered in the autumn of 2004. Figures 3 and 4 illustrate these proportions.

As the majority of the missed strata in 2004 were deeper waters where older Greenland Halibut are predominant, it is possible that indices of juvenile Greenland Halibut may be acceptable for use in assessment models. However, examination of survey results at age (Table 3a) indicates that even for the youngest ages, the strata not covered during the 2004 constitute the bulk of the index. For ages 0-3, the shallower strata that were missed during 2004 (strata 365, 366 368, 369, 370, 386 and 387) have typically contributed a relatively large proportion of the index. For ages 4 and older, the deep strata that were not covered in 2004 (strata 734-751) have contributed most of the index, and sometimes 100% of the index. To illustrate these problems, we display the percentage-wise contributions over the past decade for ages 1, 4, 7, and 10 (Fig. 5a).

We also consider the impact of the missed coverage in Div. 3L to the 2J3KL index as a whole, as the 2J3KL MNPT index has been used in recent assessments to calibrate the XSA analysis (see Darby *et al*., 2004). The percentage of the 2J3KL abundance and biomass indices which have been measured in the missed strata of 2004 are plotted from 1995 to 2003. Note that in terms of abundance, the missed strata have contributed minimally to the abundance index, ranging from 0.4% to 2.3%. However, the strata missed in 2004 have contributed substantially to the biomass index, typically about 10% of the 2J3KL total. This suggests that the strata missed in 2004 are particularly important for larger (i.e. older) individuals. Table 3b indicates that this is accurate – for ages 5 and older, the percentage of the 2J3KL abundance index coming from the missed strata is sizeable. Again, for illustration, we display the percentage-wise contributions over the past decade for ages 1, 4, 7, and 10 (Fig. 5b).

Based upon these results, it seems most prudent not to include the Div. 3L Canadian autumn 2004 survey results for Greenland Halibut in any assessment models. The coverage deficiencies are substantial. However, it may be reasonable to use these data if they are down-weighted in some manner compared to the other data in the time series.

In Div. 3N, the strata missed in the autumn of 2004 (deeper than 732 m) have only been completed in four of the nine years of the Campelen time series. In Div. 3O, the deep strata not completed in the autumn of 2004 have been fully surveyed just twice over the Campelen time series, and have partial coverage in three additional years. The abundance and biomass for Div. 3N (Tables 4 and 5) and 3O (Tables 6 and 7) indicate that when these deeper strata are covered (shaded rows in tables); they constitute the majority of the index. For Div. 3NO combined, full coverage was attained in 2000 and 2002 only. In these years, the percentage of the biomass index observed in the deepwater strata (strata 752-763 in Div. 3N and 764-775 in Div. 3O) was 84% and 79%, respectively. For abundance, 78% and 53% of the overall abundance index for 2000 and 2002 were sampled in the deepwater strata that were missed in the fall of 2004.

As with the Div. 3L data, we focus on the abundance estimates at age for Div. 3NO, to determine if the strata covered during the autumn 2004 survey (which have been consistently surveyed over the Campelen time-series) are useful indices for juvenile Greenland Halibut. As noted previously, 2000 and 2002 are the only two years in the series with full coverage of Div. 3NO, however, we also consider 2001, a year in which just one stratum was not surveyed. For 2000-2002, the percentage of the Div. 3NO abundance index observed in those strata missed in the autumn of 2004 are given in Table 8. Note particularly that for ages 3-5, those ages included in the modeling process for estimating year class strength, a substantial portion of the index is observed in the deep water strata. Thus, the index for the years in which these strata have not been sampled (1996-1999; 2003, 2004) exclude important strata for survey estimates of juvenile Greenland Halibut.

Given the routine coverage shortfalls, it may be that a set of index strata (as discussed previously for cod in Div. 3NO) could be defined to create a consistent index. However, this is not to say that complete divisional coverage for Greenland halibut in the Canadian multi-species survey is not important. It provides much-needed biological information which is of use in answering long-held questions on this stock (e.g. maturity schedules and sites; distribution range of older animals). For the purposes of estimating year class strength, we advocate excluding the Canadian autumn data from Div. 3NO, as in most years, the survey in these divisions is incomplete.

We have not analyzed the impact of changing survey dates of the autumn survey over 1995-2004; see Brodie (2005) for further discussion. For Greenland Halibut, it is noteworthy that the highest catch rates in fisheries have been in the early winter period (Power, 2004). Variable survey timing adds another layer of uncertainty in assessing this stock.

American Plaice in Divisions 3LNO

Figure 6 illustrates the weight of American Plaice caught per set from the autumn surveys in 2003 and 2004, with the 2004 coverage deficiencies in Div. 3LNO highlighted.

Estimates of American Plaice survey biomass from each stratum in Div. 3L from 1995-2004 are presented in Table 9. Although the strata missed in the autumn of 2004 do not dominate the index, in some years these strata (particularly those within 732-914 m) contribute non-trivial amounts to the overall biomass estimates. Note that the coverage in 1995 is also incomplete. Figure 7 illustrates the biomass index and the proportion coming from those strata missed in autumn 2004.

For each age, we examine 1995-2003 autumn data to determine the portion of the index observed in the strata missed in autumn 2004 (Table 10). Although the VPA for this stock (Morgan *et al*., 2003) uses ages 5-14 as the calibration ages, analyses of the strength of the recruiting year classes have utilized survey data for younger ages. For ages 2, 5, 8 and 12, we illustrate (Fig. 8) the proportion of the index from 1995-2003 sampled in those strata not surveyed in 2004. The results indicate that over the past decade, a relatively high proportion of the index has been sampled in the autumn 2004 missing strata. For ages 2-11, typically between 20-50% of the index has been observed in these strata.

Given these results, it seems that the missed coverage in the autumn of 2004 is problematic for the American Plaice index in Div. 3L. Although the proportion of the index originating in these strata is not as large as that for Greenland Halibut, it is still relatively high. Thus, we suggest that the 3L data should be used with caution in assessment models.

In Div. 3NO, the missed coverage is not of concern for American Plaice indices. In Div. 3NO, the survey index is infrequently greater than 0 for strata having depths below 732m (see Tables 11 and 12 in Morgan *et al.*, 2003). Although mean numbers (weights) per set would be affected, the American Plaice VPA has been typically calibrated using the total estimates of abundance.

In Div. 3LNO combined, having noted the problems with the index in Div. 3L, we consider the proportion of the abundance and biomass estimates from Div. 3LNO that were observed in Div. 3L. In recent years, abundance in Div. 3L as a percent of the total stock abundance has been declining, but is variable, ranging from 54% in 1996 to 13% in 2000. Similarly, the biomass in Div. 3L as a percentage of total stock biomass has shown a similar trend, ranging from 37% in 1996 to 10% in 2000. Combining this information with that previously discussed for 3L, we can compute the proportion of the biomass index in 3LNO that has been observed in the autumn 2004 missed strata. This proportion (Fig. 10) has been variable but declining over the past decade, ranging from 13% in 1996 to about 3.5% in 2000. Given the magnitude of this proportion which has previously been observed in these strata, it is recommended that percent numbers at age in Div. 3L (and Div. 3LNO combined) be examined for the usage in the next assessment of this stock.

Conclusions

We examine the time series of Campelen data from the Canadian autumn survey series in Div. 3LNO to identify the feasibility of using the autumn 2004 data in assessments considering the 2004 coverage deficiencies. Given the trends observed, it seems most prudent not to include the Div. 3LNO Canadian autumn 2004 survey results for Greenland Halibut in any assessment models. The coverage deficiencies are substantial.

For American Plaice, the incomplete coverage of the Canadian autumn survey series in Div. 3NO is not problematic. However, in Div. 3L, the proportion of the index originating in the autumn 2004 missed strata is still relatively high. Thus, we suggest that the 3L data should used cautiously in assessment models. For Div. 3LNO as a whole, the proportion of the biomass index sampled in the strata missed in 2004 has been variable. It is recommended that percent numbers at age in Div. 3L (and Div. 3LNO combined) be examined for the usage in the next assessment.

Further, we note that variable survey timing adds another layer of uncertainty in assessing these stocks using the Canadian autumn survey series.

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References

Brodie, W. B., S. J. Walsh, M. J. Morgan, and K. S. Dwyer. 2004. An Assessment of the Grand Bank Yellowtail Flounder Stock, NAFO Divisions 3LNO, in 2004. NAFO SCR Doc. 04/54, Ser. No. N5007.

Brodie, W. B. 2005. A description of the fall multispecies surveys in SA2 + Divisions 3KLMNO from 1995-2004. NAFO SCR Doc. 05/08, Ser. No. N5083.

Darby, C. D., B. P. Healey, J.-C. Mahé, and W. R. Bowering. 2004. Greenland Halibut (*Reinhardtius hippoglossoides*) in Subarea 2 and Divisions 3KLMNO: An Assessment of Stock Status Based upon Extended Survivors Analysis, ADAPT and ASPIC Analyses, with Stochastic Projections of Potential Stock Dynamics. NAFO SCR Doc. 04/55, Ser. No. N5008.

Dwyer, K. S., and B. P. Healey. 2005. Greenland halibut (Reinhardtius hippoglossoides) in NAFO Subarea 2 and Divisions 3KLMNO: Stock Trends based on annual Canadian Research Vessel survey results during 1978-2004 NAFO SCR Doc. 05/64, Ser. No. N5150**.**

Dwyer, K. S., M. J. Morgan, D. Maddock-Parsons, W. B. Brodie, and B. P. Healey. An Assessment of American plaice in NAFO Divisions 3LNO. NAFO SCR Doc. 05/61, Ser. No. N5147.

Healey, B. P. E. F. Murphy, D. E. Stansbury, and J. Brattey. 2003. An Assessment of the Cod Stock in NAFO Divisions 3NO. NAFO SCR Doc. 03/59, Ser. No. N4878.

Healey, B. P., W. R. Bowering, and K. S. Dwyer. 2004. Greenland Halibut (Reinhardtius hippoglossoides) in Subarea 2 and Divisions 3KLMNO: Trends in recruitment based upon research vessel survey data. NAFO SCR Doc. 04/46, Ser. No. N4998.

Morgan M.DJ., W. B. Brodie, D. Maddock Parsons, and B. P. Healey. 2003. An assessment of American plaice in NAFO Div. 3LNO. NAFO SCR Doc. 03/56, Ser. No. N4874.

Power, D. Standardized Catch Rate Indices for Greenland Halibut in SA2+3KLMNO. NAFO SCR Doc. 04/37, Ser. No. N4988.

Shelton, P. A., D. E. Stansbury, E. F. Murphy, G. R. Lilly, and J. Brattey. 1996. An assessment of the cod stock in NAFO Divisions 2J+3KL. DFO Atlantic Fisheries Research Document 96/80.

Walsh, S. J., M. F. Veitch, W. B. Brodie, and K. S. Dwyer. 2004. Canadian bottom trawl survey estimates of the distribution and abundance of yellowtail founder (*Limanda ferruginea*) on the Grand Banks, in NAFO Divisions 3LNO from 1984-2003. NAFO SCR Doc. 04/36, Ser. No. N4986.

Table 1. Abundance estimates (000s) of Greenland halibut from Canadian fall surveys in Div. 3L using a Campelen trawl during 1995-2004. Light Shading indicates strata not fished in 2004. Darker shading denotes surveyed strata in with <100% coverage.

Depth Range (m)	Area	Stratum	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
30 - 56	268	784	.	0	0	0	.	0	0	0	0	0
57 - 92	2071	350	71	0	0	0	0	0	0	0	41	0
	1780	363	0	0	0	0	0	0	0	0	0	41
	1121	371	0	39	0	0	39	0	0	0	0	0
	2460	372	0	0	42	0	0	0	0	0	0	0
	1120	384	31	0	0	0	0	0	0	0	0	0
	465	785	.	0	0	0	.	0	0	0	0	0
93 - 183	1519	328	0	42	42	42	125	84	0	42	0	48
	1574	341	0	72	595	650	43	173	0	38	0	62
	585	342	0	40	201	80	0	201	0	0	0	40
	525	343	0	0	96	132	0	36	0	0	0	72
	2120	348	0	83	458	622	311	73	83	79	0	357
	2114	349	144	125	208	686	914	0	0	0	42	184
	2817	364	86	0	517	1287	43	0	172	43	0	129
	1041	365	179	0	668	382	143	.	95	0	48	.
	1320	370	73	227	227	2623	986	171	227	136	52	.
	2356	385	1577	540	3110	1058	770	36	203	648	243	1273
	1481	390	272	204	815	1892	693	149	1580	1100	81	477
	84	786	.	331	12	12	.	0	0	0	6	0
	613	787	.	42	295	0	.	0	0	0	0	126
	261	788	.	0	180	90	.	0	0	0	0	0
	89	790	.	0	6	18	.	37	0	0	0	41
	72	793	.	0	5	10	.	0	5	10	0	0
	216	794	.	0	40	15	.	.	0	0	0	0
	98	797	.	0	13	34	.	0	0	0	0	31
	72	799	.	0	0	9	.	0	0	0	0	0
184 - 274	1582	344	73	69	696	3096	392	64	0	44	87	2497
	983	347	120	0	180	3200	541	456	45	90	45	1871
	1394	366	2246	2732	6673	7278	4913	192	2923	6286	682	.
	961	369	338	1124	4451	7193	1880	595	2071	813	1807	.
	983	386	1758	2524	7437	5980	4958	1037	1017	6641	3316	.
	821	389	753	8019	7680	2146	3338	2485	7943	3179	3802	4480
	282	391	886	3369	6459	969	601	3491	369	1410	2289	834
	164	795	.	21	104	23	.	20	34	0	15	1523
	72	789	.	0	50	25	.	35	15	5	15	144
	227	791	.	127	487	375	.	283	28	21	16	250
	100	798	.	261	281	468	.	309	55	78	99	1842
275 - 366	1432	345	4671	18723	12712	22231	6457	24864	7192	10703	10046	20558
	865	346	23203	40360	16064	7913	3490	5421	9162	7972	25821	16698
	334	368	3630	8664	1815	7305	1940	1447	3045	4411	4847	.
	718	387	16297	13169	8214	5004	10310	11803	12922	1778	8758	.
	361	388	1639	2657	6605	894	472	1788	4569	1018	2226	1539
	145	392	537	4317	4149	568	459	559	436	239	1116	973
	175	796	.	72	1071	975	.	1061	542	235	36	746
	81	800	.	.	1839	1821	.	.	936	584	145	1788
367 - 549	186	729	587	1797	1241	461	486	1689	819	273	537	316
	216	731	604	.	2333	517	2791	1501	728	700	782	458
	468	733	1610	2694	3058	5991	2414	2437	2015	601	2439	554
	272	735	2301	3511	3592	4808	4457	1154	3031	2611	1310	
	50	792	.	1494	1510	1861	.	517	277	137	957	2486
550 - 731	170	730	342	84	503	52	366	164	1050	412	322	104
	231	732	374	607	1414	1176	763	1128	632	234	1198	226
	228	734	668	1854	1812	929	298	795	1129	394	248	.
	175	736	706	2848	2696	3045	867	6644	2195	1626	535	.
732 - 914	227	737	3170	4965	4216	9306	2014	1936	2264	2123	2077	.
	223	741	.	1917	8083	10239	1363	506	1810	2163	1210	.
	348	745	.	1891	3064	1987	404	438	814	407	1963	.
	159	748	.	853	711	264	400	427	667	25	55	.
915 -1097	221	738	2919	3283	2003	1176	725	1094	1125	775	1094	.
	206	742	.	808	2706	1204	867	468	652	1474	3245	.
	392	746	.	1267	1845	674	770	351	1159	129	67	.
	126	749	.	121	841	186	.	121	19	61	9	.
1098 -1280	254	739	.	1655	3127	2568	349	472	360	332	1136	.
	211	743	.	1205	2245	493	3316	1055	697	1901	566	.
	724	747	.	498	1029	498	299	697	50	199	199	.
	556	750	.	841	4245	1874	814	2027	153	497	191	.
1281 -1463	264	740	.	1543	2978	1217	436	1180	908	946	617	.
	280	744	.	2773	1213	2140	.	757	1266	770	4452	.
	229	751	.	1040	2991	3103	.	929	971	221	54	.
Abundance (000s)			71863	147500	153954	142871	68018	85354	80458	66613	90941	62770
Total			34284	61312	78883	81474	42510	36295	41569	36718	38534	0
% of Annual Abundance Index			47.7%	42%	51%	57%	62%	43%	52%	55%	42%	N/A

Table 2. Biomass estimates (t) of Greenland halibut from Canadian fall surveys in Div. 3L using a Campelen trawl during 1995-2003. Light Shading indicates strata not fished in 2004. Darker shading denotes surveyed strata in with <100% coverage.

Depth Range (m)	Area	Stratum	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
30 - 56	268	784	.	0	0	0	.	0	0	0	0	0
57 - 92	2071	350	1	0	0	0	0	0	0	0	1	0
	1780	363	0	0	0	0	0	0	0	0	0	0
	1121	371	0	3	0	0	24	0	0	0	0	0
	2460	372	0	0	0	0	0	0	0	0	0	0
	1120	384	0	0	0	0	0	0	0	0	0	0
	465	785	.	0	0	0	.	0	0	0	0	0
93 - 183	1519	328	0	1	6	1	11	18	0	1	0	0
	1574	341	0	2	249	184	0	6	0	13	0	22
	585	342	0	1	85	16	0	6	0	0	0	4
	525	343	0	0	34	45	0	1	0	0	0	43
	2120	348	0	2	129	177	216	22	2	23	0	162
	2114	349	4	2	60	252	416	0	0	0	2	47
	2817	364	1	0	103	414	30	0	1	6	0	56
	1041	365	17	0	169	140	55	.	0	0	0	.
	1320	370	0	14	48	871	555	19	1	55	23	.
	2356	385	73	64	502	334	253	29	47	190	69	348
	1481	390	43	67	200	625	310	69	497	222	13	193
	84	786	.	67	2	4	.	0	0	0	0	0
	613	787	.	1	86	0	.	0	0	0	0	59
	261	788	.	0	45	31	.	0	0	0	0	0
	89	790	.	0	6	6	.	25	0	0	0	29
	72	793	.	0	4	4	.	0	0	5	0	0
	216	794	.	0	15	4	.	.	0	0	0	0
	98	797	.	0	3	14	.	0	0	0	0	23
	72	799	.	0	0	4	.	0	0	0	0	0
184 - 274	1582	344	16	11	96	885	181	42	0	7	17	918
	983	347	2	0	37	1021	297	160	88	28	0	476
	1394	366	204	338	878	2172	2108	62	265	689	119	.
	961	369	72	108	888	2347	719	85	296	55	278	.
	983	386	126	447	1010	1683	1129	473	337	998	453	.
	821	389	71	900	875	474	673	727	1143	531	563	706
	282	391	177	344	892	257	135	379	89	135	448	144
	164	795	.	5	35	6	.	11	8	0	0	664
	72	789	.	0	14	10	.	12	1	0	1	67
	227	791	.	66	193	151	.	201	2	10	12	81
	100	798	.	76	108	152	.	226	19	50	38	806
275 - 366	1432	345	937	3747	1775	4359	1665	2659	1249	2344	2052	3998
	865	346	2237	5483	2378	2062	1312	1021	1224	1045	4602	3555
	334	368	385	690	338	2272	860	857	871	1829	1059	.
	718	387	1546	1765	1614	1609	5284	4897	4503	661	1147	.
	361	388	310	711	814	380	270	704	993	309	554	431
	145	392	69	500	618	215	170	234	116	53	266	165
	175	796	.	37	355	289	.	154	96	41	2	318
	81	800	.	.	313	517	.	233	191	215	52	636
367 - 549	186	729	215	648	496	242	239	1002	438	100	218	139
	216	731	242	.	713	305	1795	891	407	318	306	262
	468	733	501	706	752	2535	1511	1321	906	312	949	364
	272	735	526	1111	938	2093	2465	728	1504	1177	412	.
	50	792	.	186	349	608	.	316	69	31	200	1021
550 - 731	170	730	140	37	330	44	224	125	627	200	183	74
	231	732	83	463	590	705	519	858	319	152	430	130
	228	734	280	642	604	515	184	554	671	214	124	.
	175	736	271	1117	951	1285	498	4028	1038	910	214	.
732 - 914	227	737	1244	2198	1981	4765	1472	1522	1689	1433	1041	.
	223	741	.	867	3224	5059	961	444	1653	1337	661	.
	348	745	.	1075	1722	1299	358	364	680	267	971	.
	159	748	.	429	287	166	255	390	458	26	74	.
915 -1097	221	738	1490	1906	1439	769	548	903	857	571	750	.
	206	742	.	567	901	918	628	451	579	982	2183	.
	392	746	.	783	992	531	1231	363	1126	132	39	.
	126	749	.	125	377	135	.	185	17	50	6	.
1098 -1280	254	739	.	1227	2248	1784	245	515	329	227	918	.
	211	743	.	931	2820	472	2427	861	671	1527	358	.
	724	747	.	438	1446	570	284	622	37	204	110	.
	556	750	.	586	3947	1750	1100	1872	348	581	119	.
1281 -1463	264	740	.	981	2604	1013	337	1109	1068	946	456	.
	280	744	.	2961	1101	1746	.	698	1295	957	3571	.
	229	751	.	1207	2810	2633	.	711	1061	206	59	.
Total Biomass (t)			11282	36642	48596	55927	33955	34161	29886	22377	26123	15940
Total			6162	22513	35337	38595	23705	22713	21355	16035	15144	0
% of Annual Biomass Index			55%	61%	73%	69%	70%	66%	71%	72%	58%	

Table 3a. Percent of abundance index of Greenland Halibut in Div. 3L observed in strata that were not surveyed during 2004 for ages 1-13. (Values >100% result from rounded values in formatted output.)

Age	1995	1996	1997	1998	1999	2000	2001	2002	2003
0	54%	23%	25%	60%	60%	47%	55%	65%	52%
1	43%	35%	22%	38%	30%	7%	21%	50%	41%
2	42%	26%	28%	30%	37%	7%	29%	35%	28%
3	44%	28%	36%	35%	36%	35%	38%	30%	23%
4	57%	48%	46%	54%	53%	46%	53%	47%	33%
5	59%	66%	68%	64%	67%	61%	62%	66%	57%
6	61%	81%	84%	73%	69%	69%	73%	82%	82%
7	66%	89%	93%	86%	74%	79%	83%	89%	94%
8	33%	95%	97%	93%	86%	89%	88%	96%	98%
9	0%	99%	100%	99%	96%	98%	94%	99%	99%
10		100%	100%	101%	78%	97%	102%	100%	101%
11		100%	101%	101%	94%	101%	106%	100%	100%
12		100%	100%	100%	102%	102%	100%	100%	100%
13		104%	101%	100%	100%	100%	100%	102%	100%

Table 3b. Percent of abundance index of Greenland Halibut in Div. 2J3KL (combined) observed in strata that were not surveyed during 2004 for ages 1-13. (Values >100% result from rounded values in formatted output.)

Age	1995	1996	1997	1998	1999	2000	2001	2002	2003
0	3%	0%	3%	2%	2%	2%	4%	1%	1%
1	3%	1%	1%	1%	0%	0%	1%	2%	2%
2	2%	2%	1%	2%	1%	0%	1%	1%	1%
3	3%	3%	3%	2%	1%	1%	2%	2%	3%
4	5%	8%	6%	9%	2%	3%	4%	5%	6%
5	9%	14%	16%	16%	7%	7%	7%	12%	11%
6	13%	25%	23%	24%	13%	15%	11%	21%	21%
7	9%	36%	30%	27%	15%	23%	17%	32%	28%
8	1%	40%	38%	34%	16%	28%	24%	42%	33%
9	0%	36%	38%	41%	16%	32%	31%	46%	36%
10	0%	39%	36%	28%	15%	28%	39%	37%	38%
11	0%	27%	35%	37%	16%	32%	24%	52%	13%
12		32%	47%	29%	42%	63%	68%	100%	29%
13		16%	53%	28%	43%	100%	46%	70%	67%

Table 4. Biomass estimates (t) of Greenland halibut from Canadian fall surveys in Div. 3N using a Campelen trawl during 1995-2004. Light Shading indicates strata not fished in 2004.

Depth Range (m)	Area	Stratum	1996	1997	1998	1999	2000	2001	2002	2003	2004
<=56	1593	375	0	0	0	0	0	0	0	1	0
	1499	376	0	0	0	0	0	0	0	0	0
57 - 92	2992	360	447	880	974	144	165	0	0	32	0
	1853	361	0	0	0	0	0	0	0	0	0
	2520	362	0	0	0	0	0	0	2	0	12
	2520	373	0	2	0	0	0	0	0	0	0
	931	374	0	12	0	0	0	0	0	0	0
	674	383	0	0	0	0	0	0	0	0	0
93 - 183	421	359	0	160	724	67	28	81	0	0	2
	100	377	4	166	30	21	30	1	0	10	7
	647	382	0	24	111	0	0	0	96	0	1
184 - 274	225	358	140	94	42	13	5	488	1	8	4
	139	378	112	262	2198	257	5	237	206	20	135
	182	381	802	615	1622	590	253	138	73	67	114
275 - 366	164	357	40	58	7	.	6	8	20	21	8
	106	379	581	41	31	22	36	404	98	59	629
	116	380	178	516	794	330	151	141	95	130	362
367 - 549	155	723	115	109	336	14	48	70	8	31	11
	105	725	165	1646	65	95	171	59	54	42	.
	160	727	1006	371	509	494	391	570	211	209	342
550 - 731	124	724	160	589	374	126	67	62	154	.	122
	72	726	296	448	765	55	30	517	214	136	52
	156	728	1035	455	675	511	201	299	510	291	1084
732 - 914	134	752	.	.	563	.	664	68	97	.	.
	106	756	.	.	242	.	243	230	211	.	.
	154	760	.	.	352	.	183	283	786	.	.
915 -1097	138	753	.	.	224	.	109	55	75	.	.
	102	757	.	.	643	.	455	454	175	.	.
	171	761	.	.	687	.	778	402	315	.	.
1098 -1280	180	754	.	.	1554	.	179	83	103	.	.
	99	758	.	.	443	.	427	274	78	.	.
	212	762	.	.	.	.	1096	772	339	.	.
1281 -1463	385	755	.	.	658	.	965	571	454	.	.
	127	759	.	.	165	.	509	378	217	.	.
	261	763	.	.	.	.	2135	509	1111	.	.
Total Biomass (t)			5079	6448	14788	2738	9330	7155	5705	1057	2885
	Total				5530		7743	4078	3962		
	% of Annual Biomass Index				37%		83%	57%	69%		

Table 5. Abundance estimates (000s) of Greenland halibut from Canadian fall surveys in Div. 3N using a Campelen trawl during 1995-2004. Light Shading indicates strata not fished in 2004.

Depth Range (m)	Area	Stratum	1996	1997	1998	1999	2000	2001	2002	2003	2004
<=56	1593	375	0	31	0	0	0	0	0	55	0
	1499	376	0	0	0	0	0	0	0	0	0
57 - 92	2992	360	3293	4961	3293	257	257	0	0	463	0
	1853	361	0	0	0	0	0	0	0	0	0
	2520	362	0	0	0	0	0	0	50	0	50
	2520	373	0	99	0	0	0	0	0	0	0
	931	374	0	49	0	0	0	0	0	0	0
	674	383	0	0	0	0	0	0	0	0	0
93 - 183	421	359	0	1419	1853	87	29	290	0	0	29
	100	377	31	571	76	55	69	16	10	110	28
	647	382	0	45	223	0	0	0	401	0	51
184 - 274	225	358	959	696	232	77	14	2132	15	90	46
	139	378	1027	1589	7276	1013	34	417	676	76	1080
	182	381	19548	3693	6534	2353	739	663	613	310	688
275 - 366	164	357	370	481	45	.	21	66	60	113	23
	106	379	4511	132	169	69	80	710	416	305	1999
	116	380	2525	1779	2278	846	339	412	465	606	2066
367 - 549	155	723	320	591	1002	53	95	113	38	84	64
	105	725	701	12676	231	217	372	318	213	193	.
	160	727	10334	1123	1868	1079	658	884	649	698	757
550 - 731	124	724	644	2789	1421	213	159	94	468	.	415
	72	726	1124	1406	2665	122	53	1033	1074	584	168
	156	728	3573	1356	2060	1094	377	807	2361	975	2997
732 - 914	134	752	.	.	995	.	959	74	184	.	.
	106	756	.	.	525	.	396	314	343	.	.
	154	760	.	.	821	.	354	478	1727	.	.
915 -1097	138	753	.	.	351	.	142	66	129	.	.
	102	757	.	.	1143	.	687	645	247	.	.
	171	761	.	.	958	.	1264	524	470	.	.
1098 -1280	180	754	.	.	2392	.	173	66	99	.	.
	99	758	.	.	536	.	586	302	86	.	.
	212	762	.	.	.	.	1448	864	525	.	.
1281 -1463	385	755	.	.	871	.	1074	556	424	.	.
	127	759	.	.	183	.	580	376	132	.	.
	261	763	.	.	.	.	2805	521	1364	.	.
Abundance (000s)			48959	35487	40002	7536	13763	12740	13237	4663	10461
Total					8776		10467	4786	5729		
% of Annual Index					22%		76%	38%	43%		

Table 6. Biomass estimates (t) of Greenland halibut from Canadian fall surveys in Div. 3O using a Campelen trawl during 1995-2004. Light Shading indicates strata not fished in 2004.

Depth Range (m)	Area	Stratum	1996	1997	1998	1999	2000	2001	2002	2003	2004
57 - 92	2089	330	0	0	0	0	0	0	0	0	0
	456	331	0	0	11	0	0	0	0	0	0
	1898	338	39	195	38	39	0	0	0	26	16
	1716	340	0	0	0	17	0	0	0	0	0
	2520	351	0	0	0	0	0	0	0	0	0
	2580	352	56	9	28	0	0	4	0	0	0
	1282	353	472	769	544	108	0	0	3	0	180
93 - 183	1721	329	28	57	11	50	46	3	0	0	0
	1047	332	25	81	74	0	0	0	0	16	26
	948	337	48	30	21	67	0	0	0	7	0
	585	339	0	103	8	.	46	16	0	1	0
	474	354	5	59	15	1094	95	71	24	84	39
184 - 274	147	333	.	10	0	0	3	0	0	0	5
	121	336	3	7	5	0	0	0	0	12	5
	103	355	39	22	3	1	0	1	5	3	25
275 - 366	96	334	.	6	6	0	0	0	0	0	0
	58	335	7	2	0	3	3	0	0	5	0
	61	356	8	6	8	8	9	6	7	0	2
367 - 549	166	717	.	42	27	6	0	72	0	27	1
	76	719	11	4	14	36	18	10	1	0	31
	76	721	50	35	47	26	23	42	5	25	0
550 - 731	134	718	.	131	158	186	20	26	107	355	35
	105	720	82	.	92	105	181	141	152	131	17
	93	722	153	490	124	160	73	106	40	437	23
732 - 914	105	764	.	.	620	.	437	239	324	.	.
	99	768	.	.	1070	.	403	274	460	.	.
	135	772	.	.	1334	.	360	.	194	164	.
915 -1097	124	765	.	.	175	.	665	155	127	.	.
	138	769	.	.	409	.	405	438	374	.	.
	128	773	.	.	560	.	386	340	632	526	.
1098 -1280	144	766	.	.	.	.	322	238	267	.	.
	128	770	.	.	.	.	172	1116	379	.	.
	135	774	.	.	.	.	186	259	174	480	.
1281 -1463	158	767	.	.	.	.	101	257	60	.	.
	175	771	.	.	.	.	171	604	254	.	.
	155	775	.	.	.	.	96	130	488	290	.
Total Biomass (t)			1026	2058	5402	1905	4222	4546	4077	2589	407
Total					4167		3703	4049	3733	1460	
% of Annual Biomass Index					77%		88%	89%	92%	56%	

Table 7. Abundance estimates (000s) of Greenland halibut from Canadian fall surveys in Div. 3O using a Campelen trawl during 1995-2004. Light Shading indicates strata not fished in 2004.

Depth Range (m)	Area	Stratum	1996	1997	1998	1999	2000	2001	2002	2003	2004
57 - 92	2089	330	0	0	0	0	0	0	0	0	0
	456	331	0	0	63	0	0	0	0	0	0
	1898	338	131	940	261	104	0	0	0	209	16
	1716	340	0	0	0	34	0	0	0	0	0
	2520	351	0	0	0	0	0	0	0	0	0
	2580	352	659	25	111	0	0	101	0	0	0
	1282	353	4321	4453	2293	397	0	0	88	0	180
93 - 183	1721	329	47	1657	47	95	84	47	0	0	0
	1047	332	1224	864	624	0	0	0	0	384	26
	948	337	717	522	169	261	0	0	0	174	0
	585	339	0	1086	138	.	201	80	0	40	0
	474	354	87	619	65	3097	130	174	333	652	39
184 - 274	147	333	.	121	0	0	20	0	9	0	5
	121	336	25	75	31	0	8	0	0	50	5
	103	355	418	241	21	7	0	13	92	14	25
275 - 366	96	334	.	53	33	0	0	0	0	0	0
	58	335	12	28	0	8	8	0	0	16	0
	61	356	57	55	8	22	17	4	29	0	2
367 - 549	166	717	.	34	57	11	0	57	0	46	1
	76	719	52	37	31	42	12	16	5	0	31
	76	721	329	182	125	88	37	31	16	105	0
550 - 731	134	718	.	590	553	120	28	46	116	524	35
	105	720	461	.	274	173	276	207	255	231	17
	93	722	768	2900	385	294	180	203	108	1478	23
732 - 914	105	764	.	.	1760	.	758	383	708	.	.
	99	768	.	.	2997	.	763	429	624	.	.
	135	772	.	.	3714	.	592	.	259	248	.
915 -1097	124	765	.	.	210	.	1032	273	184	.	.
	138	769	.	.	854	.	494	484	427	.	.
	128	773	.	.	778	.	518	376	634	537	.
1098 -1280	144	766	.	.	.	.	205	283	271	.	.
	128	770	.	.	.	.	170	1039	324	.	.
	135	774	.	.	.	.	186	195	72	244	.
1281 -1463	158	767	.	.	.	.	116	261	76	.	.
	175	771	.	.	.	.	179	481	193	.	.
	155	775	.	.	.	.	77	107	146	192	.
Abundance (000s)			9309	14482	15604	4754	6092	5291	4967	5144	407
Total					10313		5089	4310	3917	1221	
% of Annual Index					66%		84%	81%	79%	24%	

Table 8. Percent of abundance index of Greenland Halibut in Div. 3NO observed in strata that were not surveyed during 2004 for ages 1-13, for 2000-2002 only (see text). (Values >100% result from rounded values in formatted output.)

Age	2000	2001	2002
0	0%	0%	0%
1	9%	2%	1%
2	19%	5%	5%
3	41%	5%	13%
4	59%	8%	31%
5	72%	40%	61%
6	81%	63%	86%
7	89%	75%	88%
8	95%	83%	93%
9	94%	87%	91%
10	98%	81%	102%
11	85%	94%	97%
12	102%	95%	104%
13	103%	98%	93%

Table 9 . Biomass estimates ('000t) of A.plaice, by stratum and depth zone (m), from Canadian fall surveys in Div. 3L in 1995-2003 (Campelen). (+) indicates biomass <50 t, (-) means stratum not surveyed. Light shading indicates strata not fished in 2004.

Biomass

Depth	Stratum	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
30-56	784	-	+	+	0.0	-	+	+	+	+	+
	Total	-	+	+	0.0	-	+	+	+	+	+
57-92	350	0.8	0.9	0.5	1.1	1.0	0.5	7.7	0.5	0.2	0.4
	363	3.1	2.0	1.4	2.1	1.9	2.3	3.7	0.7	0.3	0.5
	371	1.2	1.1	0.2	0.5	0.4	0.8	0.8	1.8	0.3	0.2
	372	1.4	1.6	1.5	0.3	1.7	0.6	2.5	0.9	1.1	0.4
	384	1.6	1.6	0.5	0.2	1.5	0.1	1.3	2.2	0.1	0.1
	785	-	+	+	+	-	+	0.1	0.1	0.1	+
	Total	8.1	7.2	4.0	4.2	6.5	4.3	16.1	6.2	2.2	1.5
93-183	328	3.0	1.6	0.9	0.5	2.0	0.8	1.6	7.3	0.7	1.1
	341	1.6	2.8	0.8	2.1	0.6	0.7	0.9	0.8	0.4	0.3
	342	0.6	+	0.4	0.2	-	0.2	0.1	0.1	0.2	0.1
	343	0.7	0.1	0.0	0.1	-	+	0.1	0.1	0.1	+
	348	3.1	1.8	1.3	1.5	1.4	0.4	0.6	1.0	0.6	1.0
	349	3.4	1.4	1.5	0.8	0.4	0.3	0.6	0.1	0.7	1.3
	364	2.8	3.6	2.8	5.2	1.2	1.8	2.9	2.1	1.0	0.7
	365	1.7	1.1	1.0	1.4	1.0	-	0.4	0.6	0.5	-
	370	2.0	6.3	1.3	4.6	3.9	1.1	2.2	3.7	0.8	-
	385	3.9	7.6	1.9	4.0	2.9	0.8	3.5	5.4	3.3	6.5
	390	1.7	1.6	2.2	3.3	2.1	0.7	3.1	1.0	0.5	0.6
	786	-	0.3	0.1	0.1	-	0.1	0.2	0.1	0.1	0.1
	787	-	0.4	0.5	0.1	-	0.1	0.1	0.1	0.1	0.1
	788	-	0.3	0.3	0.1	-	0.1	+	0.3	+	0.2
	790	-	0.2	0.2	+	-	+	+	+	+	0.1
	793	-	0.1	0.1	0.1	-	+	0.1	+	+	0.1
	794	-	+	0.1	+	-	-	+	+	+	+
	797	-	0.1	0.1	+	-	+	+	0.1	+	+
	799	-	0.1	0.1	+	-	+	+	0.4	+	+
	Total	24.5	29.4	15.6	24.1	15.5	7.1	16.4	23.2	9.1	12.1
184-274	344	1.0	1.1	0.1	0.5	0.5	0.4	0.6	0.7	0.3	0.8
	347	1.8	0.7	0.3	0.8	0.5	0.4	0.4	0.7	0.2	0.7
	366	1.6	1.2	0.5	0.8	1.7	0.5	0.3	0.4	0.7	-
	369	1.0	1.6	0.5	1.8	1.6	0.8	2.7	1.1	0.3	-
	386	1.8	2.6	1.0	0.9	1.2	0.4	1.3	2.3	0.9	-
	389	0.6	0.6	0.6	0.7	0.6	0.4	1.4	0.4	0.6	0.4
	391	0.4	0.2	0.2	0.2	0.3	+	0.1	0.1	0.4	0.1
	789	-	0.2	0.2	0.1	-	0.1	0.2	0.1	+	+
	791*	-	0.5	0.4	0.1	-	0.3	0.3	0.7	+	0.1
	795	-	+	0.2	0.4	-	+	+	0.1	0.2	0.2
	798	-	0.2	0.7	0.3	-	+	0.2	+	+	0.3
	Total	8.2	8.9	4.6	6.6	6.4	3.3	7.5	6.6	3.6	2.6
275-366	345	4.1	2.4	0.8	2.5	1.3	0.6	0.8	1.3	0.6	1.9
	346	2.8	1.1	2.2	1.7	1.7	0.4	0.9	0.8	0.5	1.4
	368	0.2	0.3	0.2	0.4	0.7	0.6	0.3	0.5	0.1	-
	387	0.4	0.7	0.7	0.2	1.8	1.0	0.4	0.2	0.5	-
	388	0.3	0.1	0.4	+	0.9	0.4	0.1	0.1	0.1	0.1
	392	+	+	0.2	0.1	0.5	0.2	0.1	0.1	0.1	+
	796	-	0.6	0.9	0.4	-	-	0.2	0.1	0.1	0.1
	800	-	-	-	0.2	-	0.2	0.3	0.3	0.2	0.2
	Total	7.8	5.2	5.5	5.5	6.9	3.4	3.1	3.4	2.2	3.8
367-549	729	+	+	0.2	0.1	0.7	1.6	0.4	+	0.1	0.1
	731	0.2	-	0.6	0.1	1.0	1.1	0.1	+	0.1	0.1
	733	0.2	0.2	0.5	0.6	0.3	1.0	0.6	0.3	0.4	0.2
	735	0.7	0.7	0.3	0.8	1.9	2.1	1.6	1.1	0.1	-
	792	-	0.2	1.9	0.3	-	0.2	0.6	0.1	0.2	0.1
	Total	1.1	1.1	3.6	1.9	3.9	6.0	3.3	1.5	0.9	0.5
550-731	730	+	0.0	0.5	0.1	0.2	0.4	0.9	0.1	+	0.5
	732	+	+	1.3	0.2	1.9	0.7	1.3	+	+	0.1
	734	0.0	0.2	0.3	0.1	0.1	0.1	+	+	0.0	-
	736	0.2	0.5	0.8	0.6	0.6	1.5	1.3	1.7	0.3	-
	Total	0.2	0.7	2.8	1.0	2.8	2.7	3.5	1.8	0.3	0.6
732-914	737	0.4	1.5	1.8	3.3	0.8	0.7	1.4	1.0	1.1	-
	741	-	1.0	2.3	1.7	0.1	0.0	0.0	0.6	0.1	-
	745	-	0.1	2.2	0.1	0.7	0.0	0.0	0.0	0.3	-
	748	-	1.4	0.7	0.0	1.1	0.0	0.0	+	1.1	-
	Total	0.4	4.0	7.0	5.1	2.7	0.7	1.4	1.6	2.6	-
915-1097	738	0.6	0.2	0.0	0.0	0.0	0.0	+	+	2.2	-
	742	-	0.1	0.0	0.0	+	0.0	0.0	0.0	3.5	-
	746	-	0.1	0.0	+	0.0	0.0	0.0	0.0	0.0	-
	749	-	+	0.2	0.0	-	0.0	0.0	0.0	+	-
	Total	0.6	0.4	0.2	+	+	0.0	+	+	5.7	-
1098-1280	739	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
	743	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
	747	-	0.0	0.0	0.1	+	0.0	0.0	0.0	0.0	-
	750	-	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
	Total	-	0.1	0.0	0.1	+	0.0	0.0	0.0	0.0	-
1281-1463	740	-	0.0	0.0	0.0	0.1	0.0	0.0	0.0	+	-
	744	-	0.5	0.0	0.1	-	0.0	0.0	0.0	0.0	-
	751	-	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-
	Total	-	0.5	0.0	0.1	0.1	0.0	0.0	0.0	+	-
Grand Total		50.9	57.5	43.3	48.6	44.8	27.5	51.3	44.3	26.4	21.0

* in 1996 stratum 791 covered a depth range of 184-366 m

Table 10. Percent of abundance index of American Plaice in Div. 3L observed in strata that were not surveyed during 2004 for ages 1-13. (Values >100% result from rounded values in formatted output.)

Age	1995	1996	1997	1998	1999	2000	2001	2002	2003
0				7%	27%				
1	25%	23%	0%	12%	6%	15%	17%	18%	25%
2	21%	28%	19%	13%	11%	11%	21%	30%	29%
3	23%	24%	20%	13%	18%	11%	17%	25%	31%
4	20%	22%	19%	19%	27%	15%	18%	24%	29%
5	21%	26%	21%	21%	35%	22%	22%	25%	32%
6	21%	35%	27%	27%	40%	34%	27%	25%	44%
7	20%	43%	37%	34%	44%	38%	28%	27%	53%
8	20%	45%	42%	40%	44%	36%	30%	28%	55%
9	17%	45%	45%	45%	41%	33%	28%	30%	58%
10	13%	45%	42%	42%	36%	28%	23%	32%	58%
11	6%	23%	46%	41%	35%	27%	16%	31%	58%
12	22%	54%	29%	25%	31%	15%	11%	32%	62%
13		23%	17%	103%	24%	11%	6%	36%	64%
14				103%	34%		5%	27%	57%

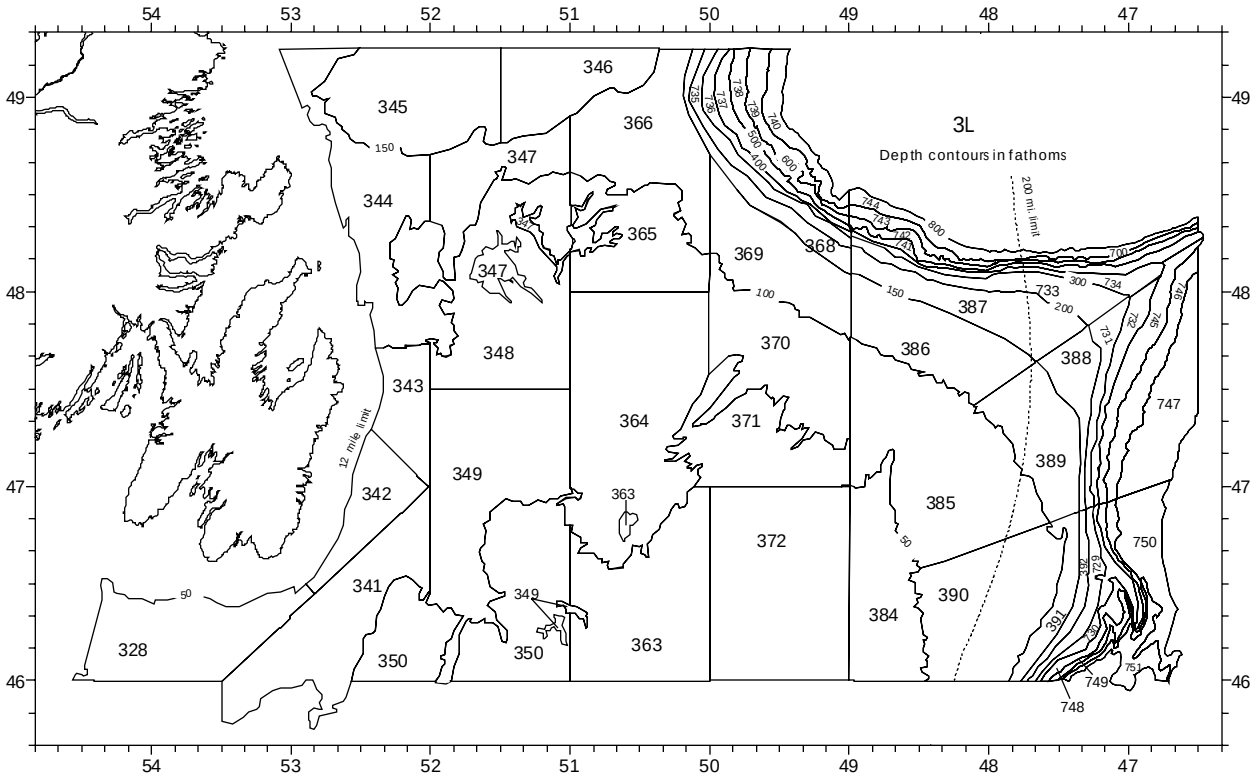

Fig. 1a. Stratification scheme for Canadian multi-species survey in Division. 3L.

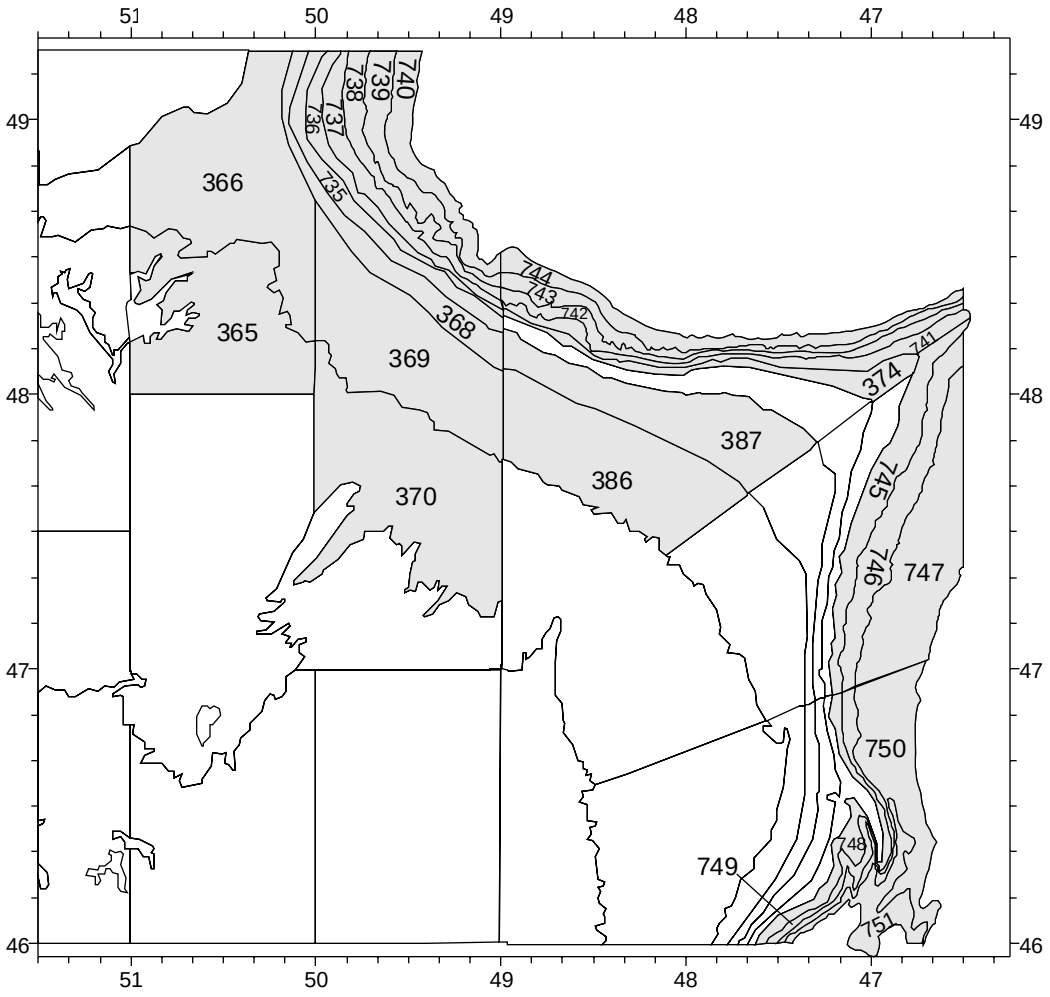

Fig. 1b. Strata in Div. 3L which were not surveyed (numbered and shaded strata) in the autumn of 2004.

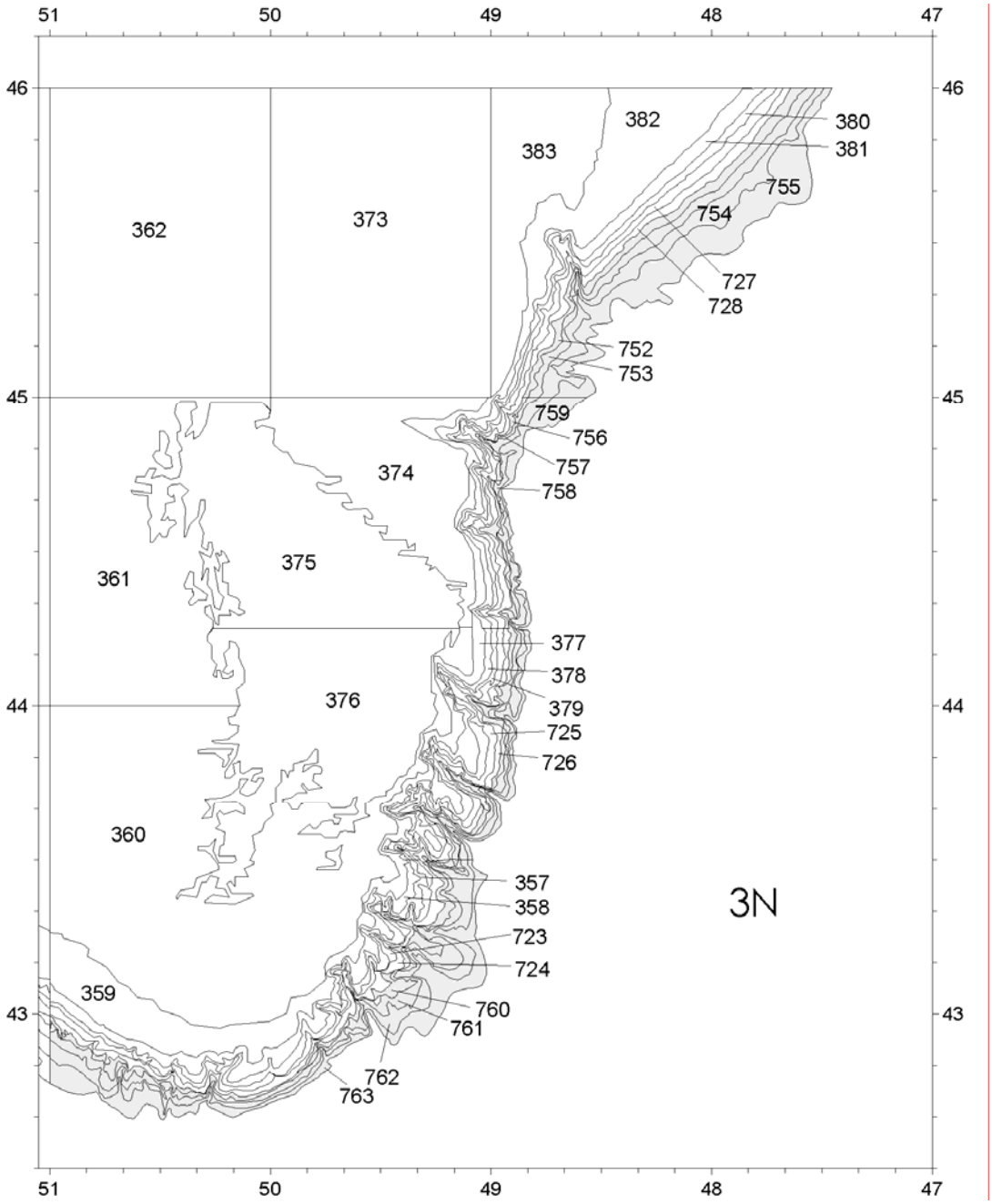

Fig. 1c. Stratification scheme for Canadian multi-species survey in Div. 3N. Strata 752-763 inclusive (depths >732 m) have been completed only sporadically over 1995-2004. Shaded strata were not surveyed during the 2004 autumn survey.

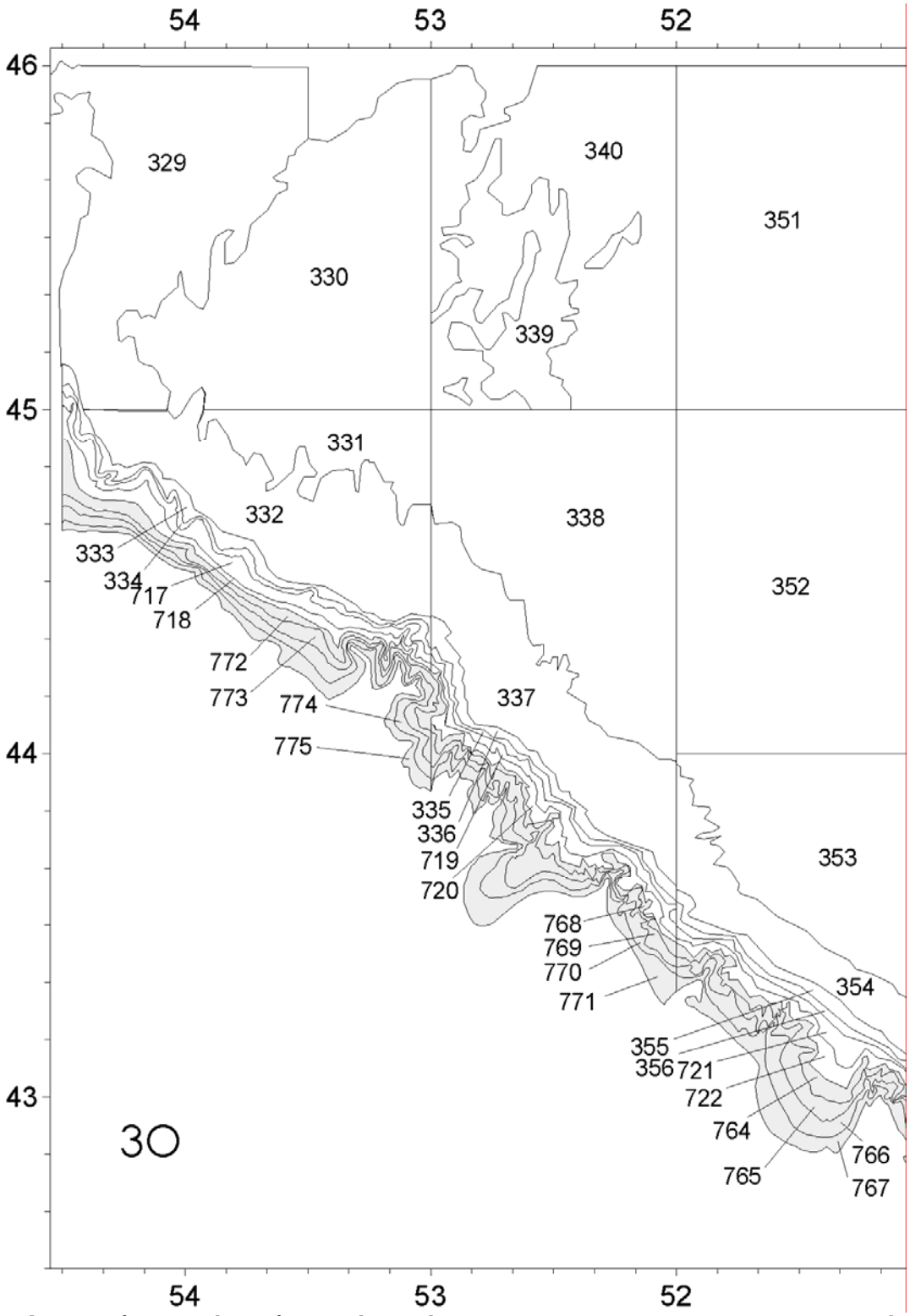

Fig. 1d. Stratification scheme for Canadian multi-species survey in Div. 3O. Strata 764-775 inclusive (depths >732 m) have been completed only sporadically over 1995-2004. Shaded strata were not surveyed during the 2004 autumn survey.

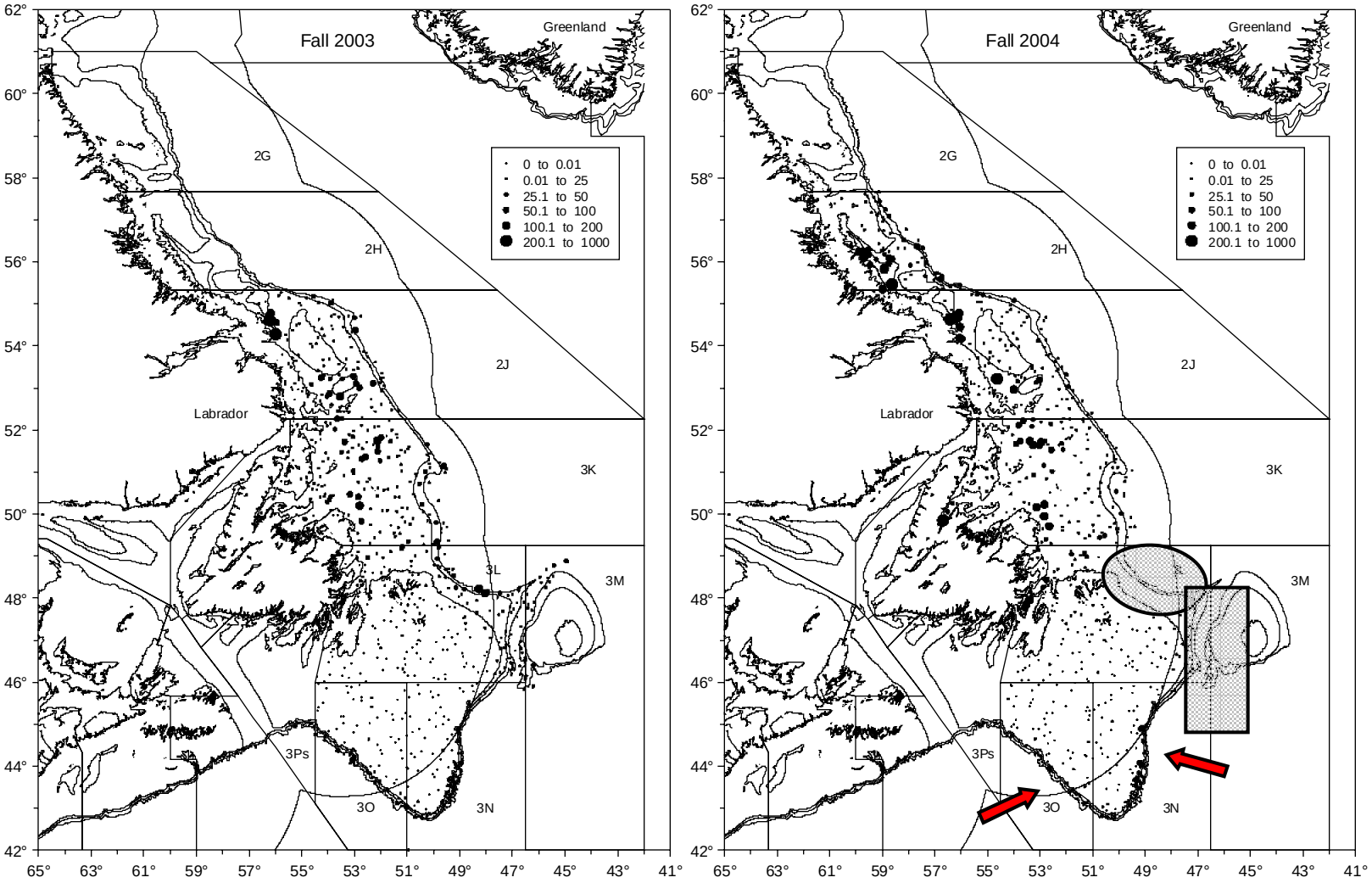

Fig. 2. Greenland Halibut Mean Weight per set from Canadian autumn surveys for 2003 (left) and 2004 (right). Autumn 2004 coverage deficiencies in Div. 3LMNO highlighted.

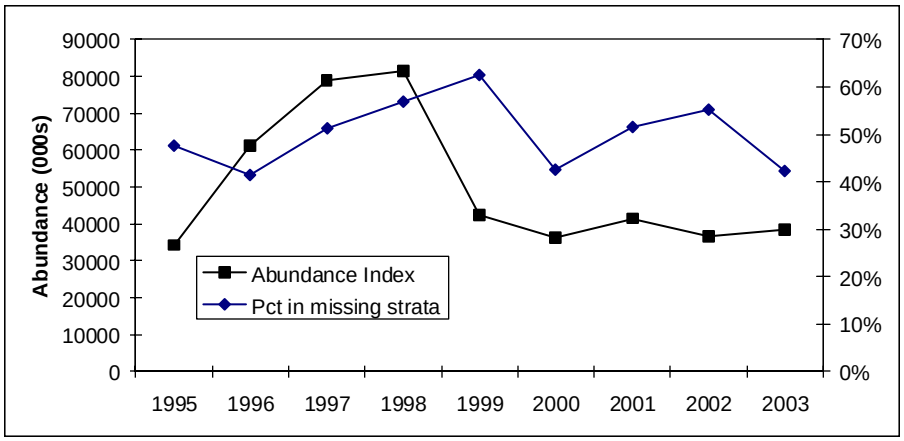

Fig. 3. Abundance (000s) of Greenland halibut in Div. 3L from Canadian autumn survey, and percent of the annual index observed in strata that were not surveyed during 2004.

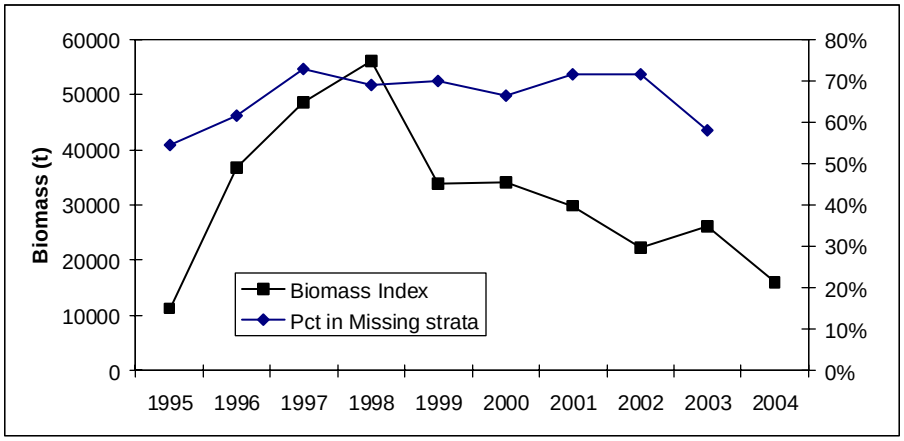

Fig. 4. Biomass (t) of Greenland halibut in Div. 3L from Canadian autumn survey, and percent of the annual index observed in strata that were not surveyed during 2004.

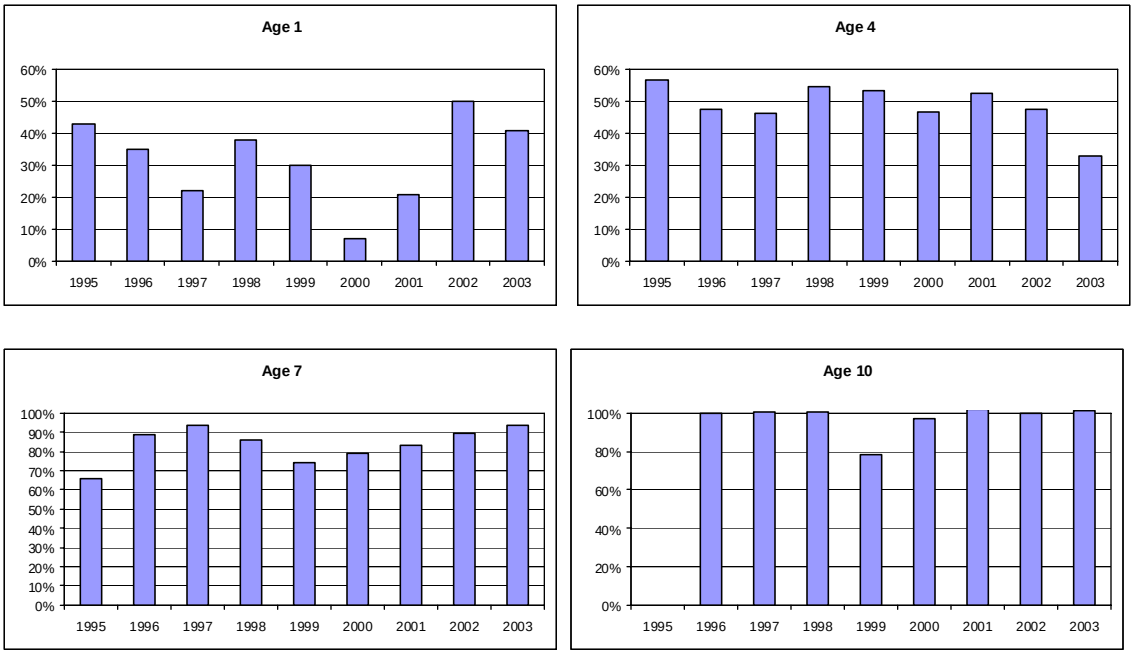

Fig. 5a. Percent of the annual abundance index of Greenland halibut in Div. 3L (autumn survey) observed in strata that were not surveyed during 2004, for ages 1, 4, 7, and 10.

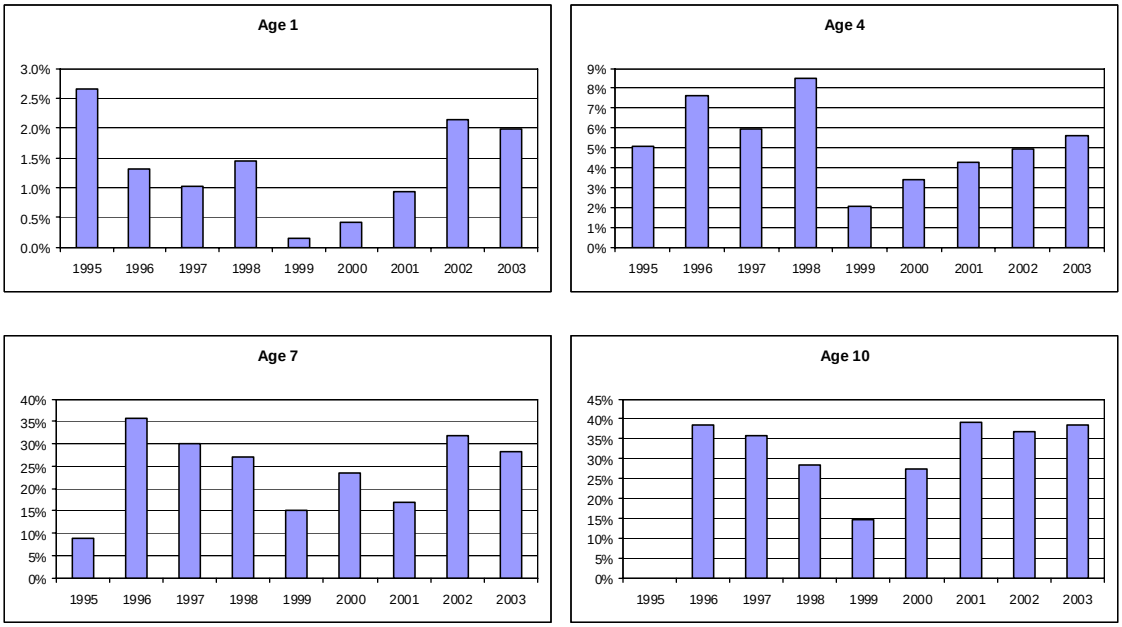

Fig 5b. Percent of the annual abundance index of Greenland halibut in Div. 2J+3KL (combined; autumn survey) observed in strata that were not surveyed during 2004, for ages 1, 4, 7, and 10.

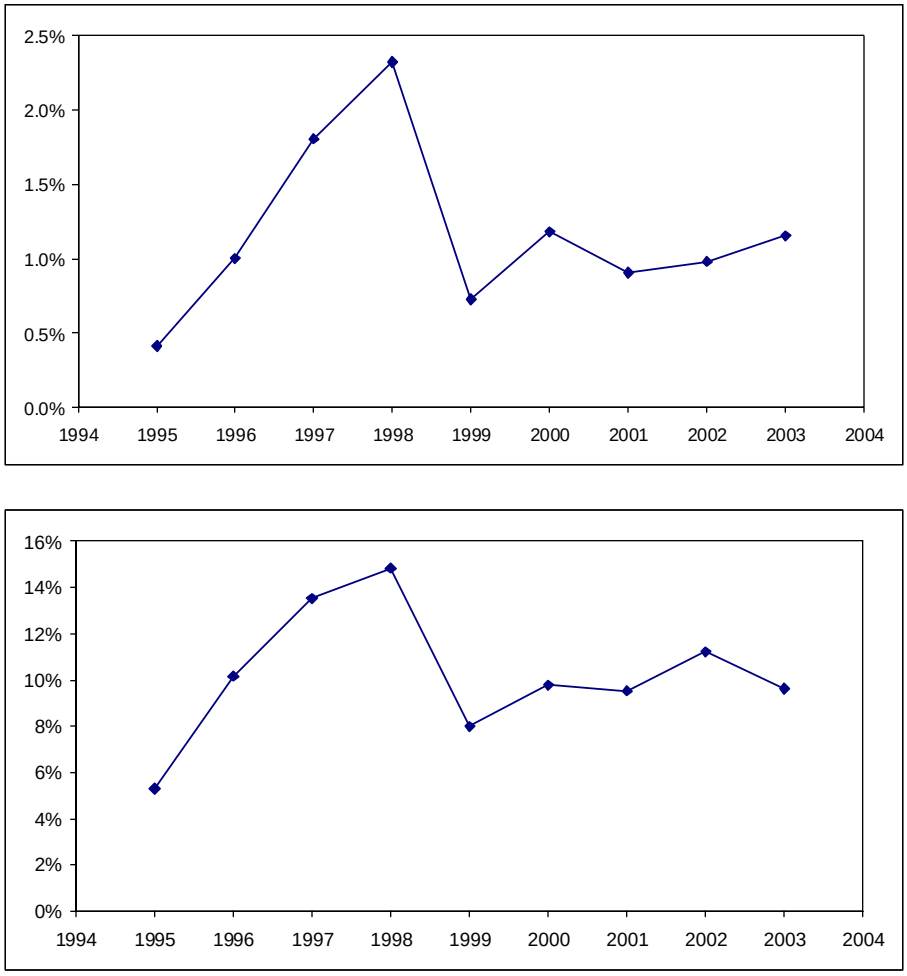

Fig. 6. Percent of Greenland halibut abundance (upper panel) and biomass (lower panel) indices in Div. 2J+3K3L sampled in the Div. 3L strata that were not surveyed in the autumn of 2004, from 1995-2003.

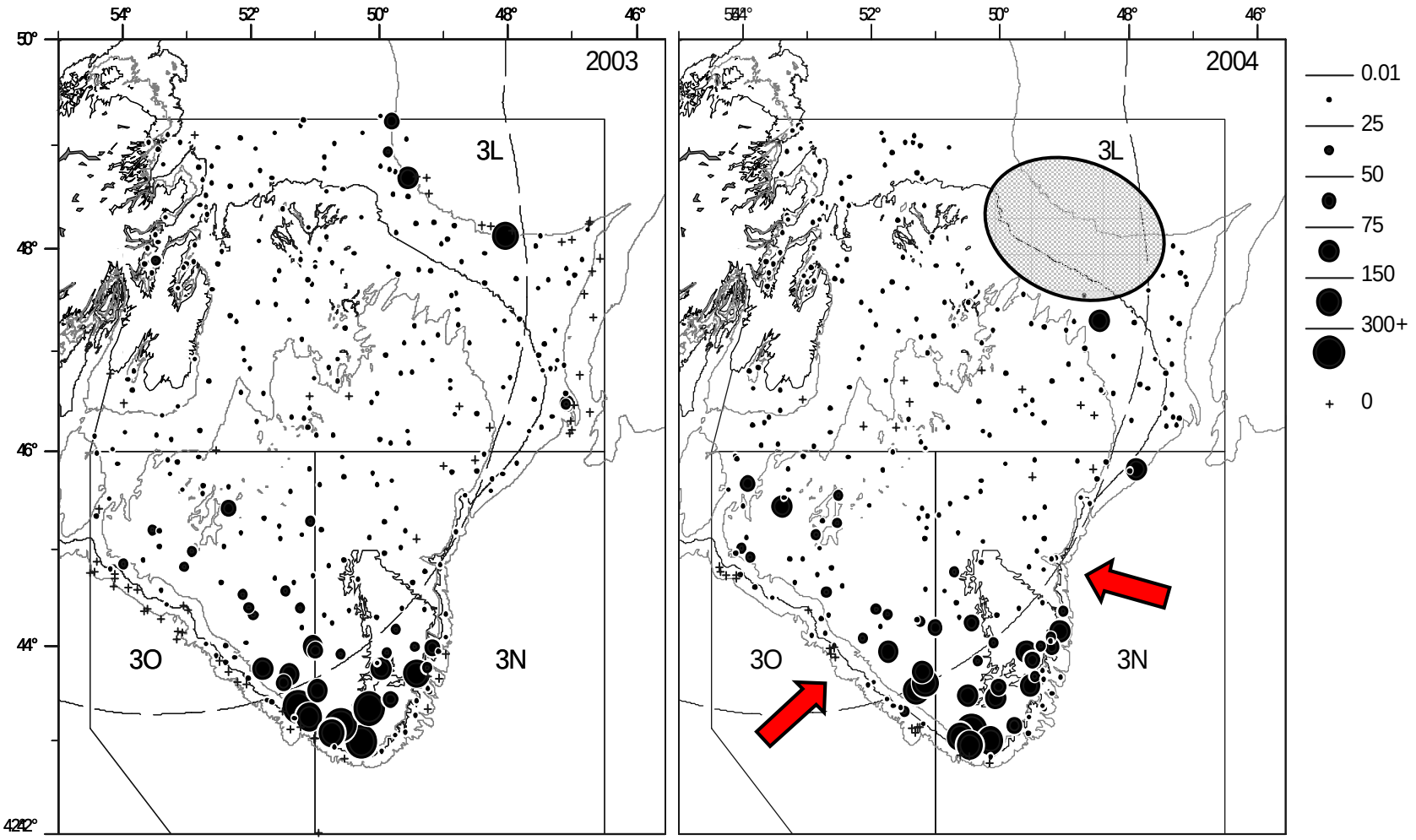

Fig. 6. American plaice Mean Weight per set from Canadian autumn surveys for 2003 (left) and 2004 (right). Autumn 2004 coverage deficiencies in Div. 3LNO highlighted.

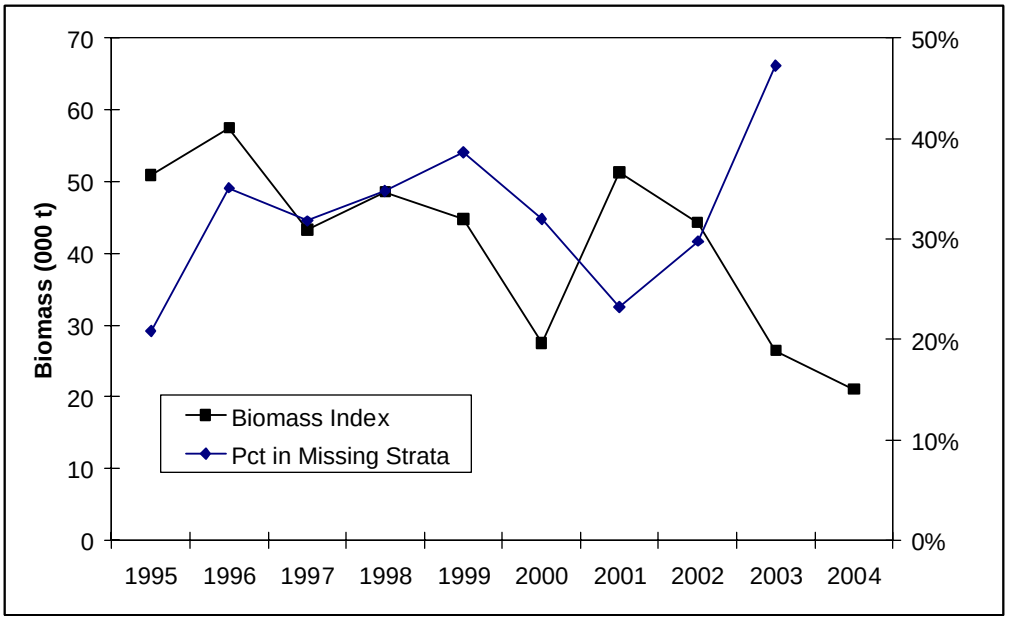

Fig. 7. Biomass (000 tons) of American Plaice in Div. 3L from Canadian autumn survey, and percent of the annual index observed in strata that were not surveyed during 2004.

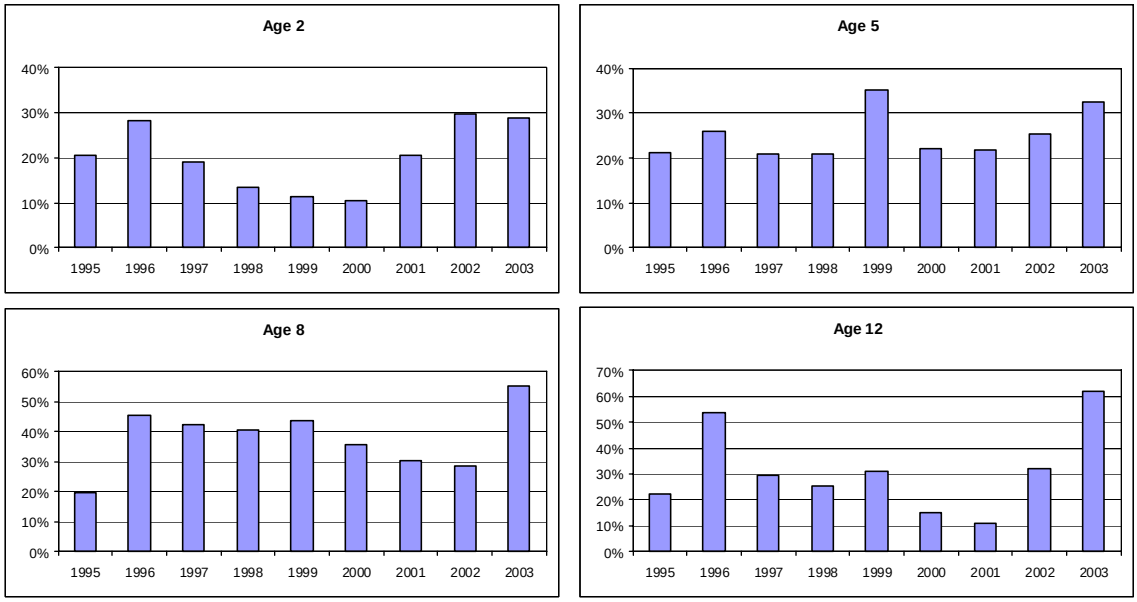

Fig. 8. Percent of the annual abundance index of American plaice in Div. 3L (autumn survey) observed in strata that were not surveyed during 2004, for ages 2, 5, 8, and 12.

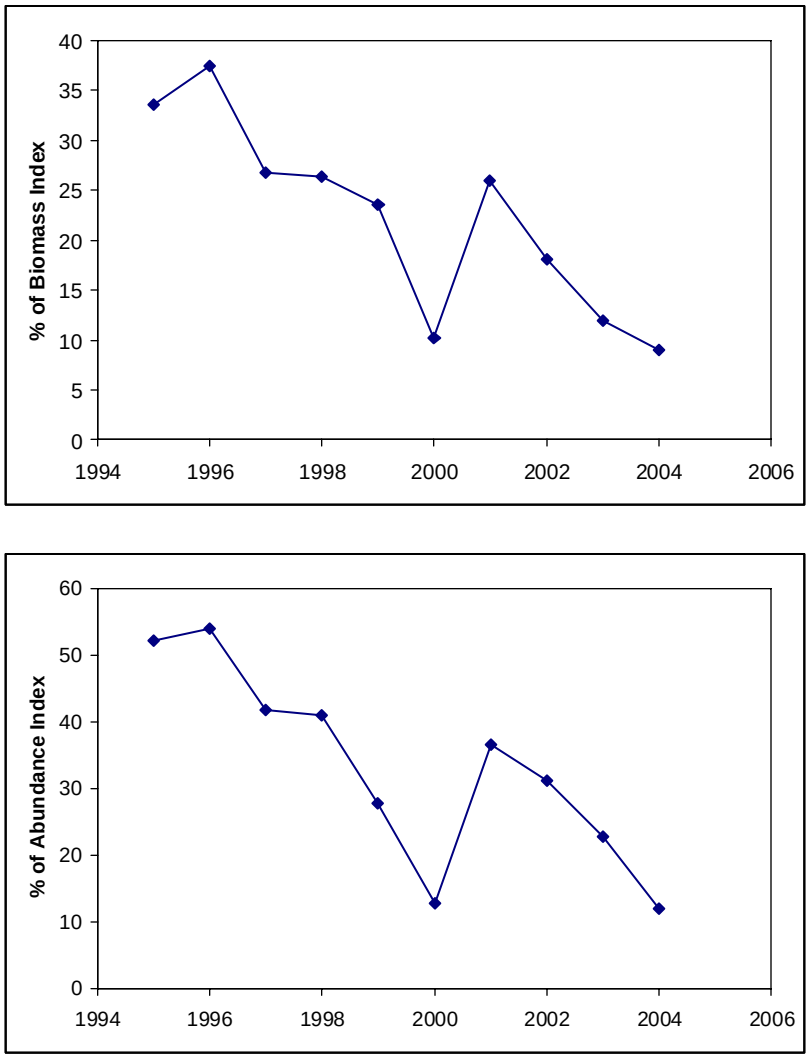

Fig. 9. Percent abundance and biomass of American Plaice found in Div. 3L (autumn survey) as a percent of the total found in Div. 3LNO from 1995-2004.

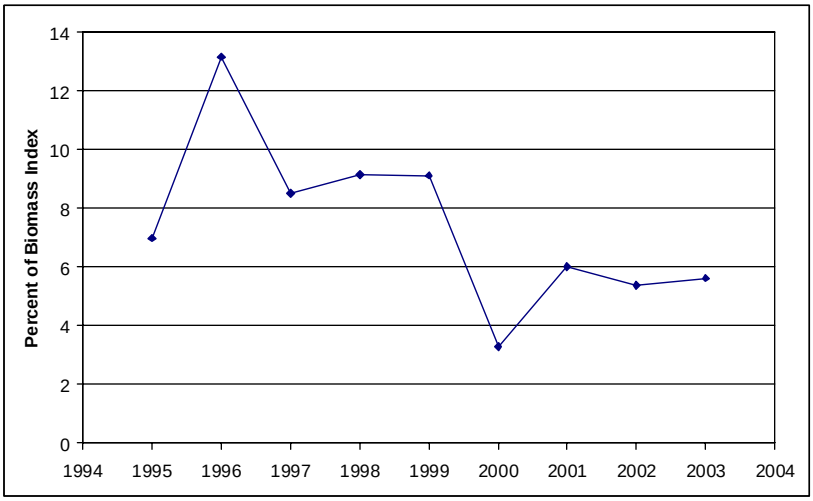

Fig. 10. Percent of American plaice biomass index in Div. 3LNO sampled in the Div. 3L strata that were not surveyed in the autumn of 2004, from 1995-2003.