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An Update of the Stock Status of Div. 2J3KL Cod

by

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Abstract

A moratorium on commercial fishing on this stock has been in effect since 1992. A limited food fishery in 1994 obtained about 1300 t while the foreign catch was estimated at 50 t. The 1994 research vessel surveys indicate that the stock is still at a very low level and abundance is not increasing. There were few older cod and no indication of improved recruitment. The declining trend in condition factors appears reversed in 1993-94, particularly for Div. 2J.

Résumé

La pêche commerciale de ce stock fait l'objet d'un moratoire depuis 1992. Une pêche de subsistance limitée a produit environ 1 300 t en 1994, tandis que les captures étrangères sont estimées à 50 t. Les relevés par navire de recherche de 1994 indiquent que le stock est encore à un très faible niveau et on n'observe aucun signe d'augmentation de l'abondance. Il y avait peu de morues âgées et aucune indication d'amélioration du recrutement. La tendance à la baisse du coefficient de condition semble renversée en 1993-1994, surtout dans la division 2J.

Nominal catch

The commercial fishery on this stock was closed in mid-1992. A food and subsistence fishery was permitted in 1993 which accounted for a catch of about 9,000 t. This fishery was closed at the end of 1993 but was re-opened on a limited basis (10 fishing days) in 1994, during August and September. The occurrence of low catches and small cod lead to the closure of this fishery after 8 fishing days had been completed. It is estimated that about 1,300 t were caught by handline and jigger during the course of the fishery, with the majority being caught in Div. 3L (Tables 1-2). A small amount was also obtained as by-catch in other fisheries.

The foreign catch in 1994 (outside the 200 mile limit on the nose of the Grand Bank) was estimated by Canadian Surveillance at about 50 t.

Catch-and weight-at-age

A considerable number of cod were measured (16,458) and sampled for ages (756) during the fishery in 1994 (Table 3). The resulting data were used to estimate the catch and average-length-at age. Average weights-at-age were obtained using the relationship: log weight = 3.0879 log length -5.2106. No sampling data were available for the small foreign catch. Catches were mainly from ages 4 and 5 with age 5 predominating (Table 4).

The catch numbers, average weights and catch biomass for the years 1962-94 are presented in Tables 5-7. Average weights-at-age increased from the early 1970's to the early 1980's and then declined. Although the 'fishery' has changed radically, the 1994 data suggest that average weights have increased for the dominant age group (4-6).

Research vessel survey data

Research vessel surveys have been conducted by Canada during autumn in Div. 2J, 3K and 3L since 1977, 1978 and 1981 respectively. Spring surveys have also been conducted in Div. 3L for the years 1971-82 and 1985-94. To account for incomplete coverage of strata, particularly in earlier years, estimates of biomass and abundance for non-sampled strata were obtained using data to 1991 in a multiplicative model. Data from recent years were not included in this analysis because of apparent distributional changes.

The 1994 surveys in Div. 2J and 3K used the revised stratification schemes (Bishop, 1994) which were first used in the 1993 survey. The stratification schemes used in the 1994 surveys are shown in Fig. 2-4. The survey was similar to those previously conducted with regard to timing, area covered and total number of sets. Set positions were selected in a similar manner to that of recent years (Gagnon 1991). The most recent two survey years (1992, 1993) were used along with maximum and minimum sets per stratum restrictions of 20 and 3 sets respectively.

Autumn survey estimates of biomass and abundance have shown severe declines in recent years (Tables 8-15, 19; Fig. 5-7). The 1994 values were even lower than the previously recorded lows from the 1993 surveys. Estimates from spring surveys in Div. 3L have also declined substantially in recent years (Tables 16-17; Fig. 8) with the 1993 and 1994 being at similar but very low values. The distribution of set positions and cod abundance per tow (Fig. 9) further describes the low abundance and lack of any concentrations.

Mean numbers per tow at age indices by division and stock area as well as associated CV's for the latter, are presented in Tables 20-24. The severe decline in recent years is evident, as well as the virtual absence of cod older than age 7. Survey average lengths (Fig. 10-12) and weights

(Table 18) at age for the dominant ages generally declined for most years from the late 1970's and 80's to 1992. The declines were more pronounced in Div. 2J (about 24%) than 3K (17%) and 3L (12%). Although these may not be well estimated since 1992, because of smaller sample sizes, there appears to be increases in 1993-94.

Condition Factors

Condition factor (gutted weight/length^3) data were obtained for the survey catch in 1994 and compared with that from previous years (Fig. 13-15). The declining trend observed in Div. 2J from 1989 to 1992 appears reversed in 1993-94. However, the latter is based on smaller sample sizes. A similar pattern was observed for 3K data although less pronounced. No trend was apparent for the 3L data.

Summary

The research vessel survey data would suggest that even in the absence of commercial fisheries since mid-1992 the 2J3KL cod stock has continued to decline and is currently at an extremely low level. While these surveys do not cover the inshore bays, the results for the 1994 food and subsistence fishery did not suggest that cod were particularly abundant in these areas. The autumn bottom trawl surveys have not been considered adequate indicators of abundance for cod aged 0-2 because of the selection characteristics of the Engel's trawl. However, large year-classes are usually present, albeit in variable strengths, by age two. The very low 1994 survey abundances at age suggests that all recent year-classes are weak.

The most recent attempted analytical assessment of this stock (Bishop, et al. 1994) was unable to adequately determine the absolute stock size. Results from ADAPT were considered too imprecise and did not adequately represent the stock abundance. Residual patterns showed strong year effects reflecting the large interannual variation in the research vessel index. It was considered possible to describe general trends from the data and these suggested high total mortalities although catches were low.

This situation once again appears to be the case when the 1994 data are considered, particularly with respect to the very low survey abundance estimate. An analysis of available data in an analytical model (ADAPT) was not considered at this time as difficulties previously experienced in the determination of absolute stock biomass were again expected.

References

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Gagnon, P. 1991. Optimisation des campagne d'echantillonnage: les programmes REGROUPE et PARTS. Rapp. tech. can. sci. halieut. acquat. 1818: iii+20 p.

Table 1. Historical catches of cod from NAFO Divisions 2J3KL for the period 1959-94.

	2J					3K					3L					2J3KL				
	Offshore mobile gear			Fixed		Offshore mobile gear			Fixed		Offshore mobile gear			Fixed						
Year	Can.	Other	Total	gear	Total	Can.	Other	Total	gear	Total	Can.	Other	Total	gear	Total	Total Canada	Total fixed gear	Total offshore mobile gear	Total	TAC
1959	-	46372	46372	17533	63905	-	97678	97678	56264	153942	4515	51515	56030	85695	141725	164007	159492	200080	359572	-
1960	1	164036	164037	15418	179455	53	69855	69908	47676	117584	7355	60213	67568	94192	161760	164695	157286	301513	458799	-
1961	1	243147	243148	17545	260693	-	60574	60574	31159	91733	4675	70318	74993	70659	145652	124039	119363	378715	498078	-
1962	-	226841	226841	23424	250265	-	45554	45554	42816	88370	4383	87463	91846	72271	164117	142894	138511	364241	502752	-
1963	1	197868	197869	23767	221636	-	79331	79331	47486	126817	4446	83015	87461	73295	160756	148995	144548	364661	509209	-
1964	13	197359	197372	14787	212159	-	121423	121423	40735	162158	10158	142370	152528	75806	228334	141499	131328	471323	602651	-
1965	-	246650	246650	25117	271767	21	50097	50118	26467	76585	7353	130387	137740	58943	196683	117901	110527	434508	545035	-
1966	39	226244	226283	22645	248928	13	58907	58920	32208	91128	8253	120206	128459	55990	184449	119148	110843	413662	524505	-
1967	28	217255	217283	27721	245004	114	78687	78801	24905	103706	13478	200343	213821	49233	263054	115479	101859	509905	611764	-
1968	4650	355108	359758	12937	372695	1849	119778	121627	40768	162395	15784	211808	227592	47332	274924	123320	101037	708977	810014	-
1969	30	405231	405261	4328	409589	56	80949	81005	24923	105928	18255	151945	170200	67973	238173	115565	97224	656466	753690	-
1970	-	212961	212961	1963	214924	92	78274	78366	21512	99878	14471	137840	152311	53113	205424	91151	76588	443638	520226	-
1971	-	154700	154700	3313	158013	31	61506	61537	21111	82648	11976	148766	160742	38115	198857	74546	62539	376979	439518	-
1972	-	149435	149435	1725	151160	7	133369	133376	14054	147430	4380	109052	113432	46273	159705	66439	62052	396243	458295	-
1973	1123	52985	54108	3619	57727	108	159653	159761	13190	172951	1258	97734	98992	24839	123831	44137	41648	312861	354509	666000
1974	-	119463	119463	1804	121267	19	149189	149208	10747	159955	880	67918	68798	22630	91428	36080	35181	337469	372650	657000
1975	410	78578	78988	3000	81988	189	112678	112867	15518	128385	670	53770	54440	22695	77135	42482	41213	246295	287508	554000
1976	94	30691	30785	3851	34636	771	79540	80311	20879	101190	2187	40998	43185	35209	78394	62991	59939	154281	214220	300000
1977	525	39584	40109	3523	43632	1051	26776	27827	28818	56645	5362	26799	32161	40282	72443	79561	72623	100097	172720	160000
1978	4682	17546	22228	6638	28866	7027	6373	13400	29623	43023	9213	12263	21476	45194	66670	102377	81455	57104	138559	135000
1979	9194	6537	15731	8445	24176	21579	16890	38469	27018	65487	14184	12693	26877	50359	77236	130779	85822	81077	166899	180000
1980	13592	7437	21029	17210	38239	21920	6830	28750	37015	65765	15523	13963	29486	42298	71784	147558	96523	79265	175788	180000
1981	22125	4760	26885	14215	41100	23112	3847	26959	23002	49961	21760	15070	36830	42821	79651	147035	80038	90674	170712	200000
1982	58384	8923	67307	14429	81736	8881	4074	12955	42141	55096	27192	9271	36463	56479	92942	207506	113049	116725	229774	230000
1983	37281	4158	41439	10743	52182	31623	2815	34438	40681	75119	39125	10920	50044	54999	105043	214452	106423	125922	232345	260000
1984	10754	1259	12013	13150	25163	48114	11059	59173	35143	94316	49620	13944	63564	49428	112992	206209	97721	134750	232471	266000
1985	1541	5	1546	10209	11755	72111	9714	81825	30368	112193	39112	28927	68039	39306	107345	192647	79883	151410	231293	266000
1986	4627	7373	12011	12567	24578	58239	2226	60465	28539	89004	55117	51555	106672	31263	137935	190352	72369	179137	251506	266000
1987	38216	3620	41836	16139	57975	39240	6119	45359	27141	72500	43185	25883	69068	35467	104535	199388	78747	156263	235010	256000
1988	41468	9	41477	17112	58589	40260	50	40310	33820	74130	59107	26748	85855	50103	135958	241870	101035	167642	268677	266000
1989	33584	1014	34598	22920	57518	37280	1194	38474	20711	59185	40943	36540	77483	59238	136721	214676	102869	150555	253424	235000
1990	17863	689	18493	14332	32884	26893	883	27691	27577	55353	33371	26456	59827	70624	130451	190660	112533	106155	218688	199262
1991	635	84	719	2195	2914	29505	1009	30514	13318	43832	30146	49660	79806	44317	124123	120116	59830	111039	170869	190000
1992	-	-	-	19	19	584	273	857	899	1756	16418	14610	31028	10876	36904	28796	11794	31885	43679	-
1993	-	-	-	14	14	-	-	-	547	547	2	2425[a]	2426	3384	5810	9000[b]	9000[b]	2425	11425	-
1994	-	-	-	9	9	-	-	-	367	367	-	50[a]	50	932	982	1308	1308	50	1358	-

[a]Surveillance catch estimate.

[b]This includes a further 5053 t catch estimated from the recreational fishery additional to that recorded in DFO statistical records.

Table 2. Cod landings by the 'recreational' and by-catch fisheries in Division 2J3KL during 1994.

	2J		3K			3L					
Mo.	Jig.	HL	GN	Jig.	HL	GN	LL	Jig.	HL	Trap	Total
J								1	16		17
F											
M											
A											
M			3			2					5
J			4			7					11
J			1			6			3	6	16
A	2	1		78	74	11	13	116	126		421
S	4	2		99	107	1	10	370	238		831
O					1			1			2
N											
D						5					5
Total	6	3	8	177	182	32	23	488	383	6	1308

Table 3. Sampling used to estimate catch at age for Divisions 2J3KL in 1994.

Division	Gear	Month	No. measured	No. aged	Total wt (t)	Cumulative total (t)
3K	HL	Aug.	696	480	152	
		Sept.	2675		206	376
3L	HL	Sept.	13087	276	608	982
Totals			16458	756		1358

Table 4. Estimated catch, average weight, and average length-at-age from the recreational and by-catch fisheries in NAFO Divs. 2J3KL during 1994.

	AVERAGE		CATCH		
AGE	WEIGHT	LENGTH	MEAN	STD. ERR.	C. V.
3	0.398	35.858	105	8.76	0.08
4	0.675	42.537	379	20.80	0.05
5	0.981	48.028	575	26.32	0.05
6	1.411	54.023	177	19.76	0.11
7	1.845	58.887	74	11.70	0.16
8	2.046	60.960	22	6.30	0.29
9	3.051	69.827	2	1.39	0.69

TABLE 5. CATCH NUMBERS AT AGE (THOUSANDS) FROM THE COMMERCIAL COD FISHERY IN NAFO DIVISIONS 2J3KL FOR THE YEARS 1962-94

	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
2	301	1446	2872	85	819	790	288	59	6819	33	236	0
3	8666	5746	19338	5177	14057	15262	6142	4330	18104	12876	6737	3963
4	26194	27577	27603	28709	65992	77873	94291	39626	60102	71557	79809	40785
5	64337	60234	57757	46800	93687	100339	205805	100858	82357	95384	116562	94844
6	58163	118112	60681	66946	62812	96759	150541	163228	101249	98111	76196	59503
7	47314	58996	100147	64360	59312	54996	83808	107509	85696	57865	55984	35464
8	27521	29349	50865	68176	30423	38691	39443	52661	29218	25055	29553	27351
9	20142	15520	20892	33819	23844	17146	23171	19651	10857	11732	11750	14153
10	18036	11612	12264	14913	8762	16084	10984	12370	3825	4470	6393	7566
11	10444	8248	8698	6945	4528	5949	5591	6389	2000	2223	2987	3815
12	9468	4204	6352	3729	2280	3367	5249	4479	1200	1287	1660	2153
13	7778	3942	4989	3948	1825	2108	1939	3004	507	1140	1388	1173
14	5785	2933	4036	3730	1186	1529	1334	1557	224	720	725	450
15	4669	2928	2703	2722	967	685	818	622	214	355	748	278
16	3888	1737	1456	1859	806	424	610	567	244	474	606	309
17	3955	1263	1918	575	416	193	127	319	124	124	452	85
18	2161	1352	1154	971	279	107	89	100	32	128	136	27
19	232	328	501	183	486	72	83	46	10	148	195	38
20	403	182	312	226	178	211	26	99	34	78	36	8
2+	319457	355709	384538	353873	372659	432585	630339	517474	402816	383760	392153	291965

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
2	473	420	15	108	0	0	92	0	0	18	3	0
3	3231	3968	13767	7128	1323	1152	2554	2185	1702	2585	782	650
4	13201	14101	33727	65510	17556	12361	12025	7172	31286	13616	14871	14824
5	34927	25370	28049	40462	39206	37493	28814	13191	19003	42602	31760	36614
6	74403	34426	20898	12107	20319	29202	30016	24800	14397	19028	38624	33922
7	60539	39105	16811	5397	7711	10982	18017	22014	25435	12044	12503	28006
8	35687	36485	16022	3396	3078	3460	4830	11848	16930	14701	7246	7050
9	18854	13421	10931	2730	1530	1300	1217	3175	11936	8934	8910	3836
10	10492	7514	4637	1381	1083	757	520	779	1923	6341	4227	5162
11	5818	2315	1462	532	437	560	232	309	338	1018	2536	2905
12	2934	1179	631	296	219	183	229	195	156	248	451	1681
13	1078	808	292	149	105	116	56	125	90	90	146	254
14	652	372	251	75	62	51	65	48	153	41	48	107
15	249	165	100	42	40	43	37	14	40	29	41	39
16	338	82	50	21	21	38	13	28	12	11	30	20
17	162	5	40	20	7	7	10	20	13	9	7	17
18	113	8	64	14	8	7	14	5	4	6	7	1
19	45	22	30	2	2	4	4	5	0	2	4	3
20	20	1	20	6	7	9	10	5	0	3	3	5
2+	263216	179767	147797	139376	92714	97725	98755	85918	123418	121326	122199	135096

	1986	1987	1988	1989	1990	1991	1992	1993	1994
2	1	42	25	8	58	35	0	0	0
3	831	2329	2779	1696	7693	3111	430	940	105
4	15219	9217	14651	17639	40557	31654	3860	4993	379
5	44168	32340	20184	21150	36410	53805	14535	3343	575
6	45869	49061	47917	25212	22695	29553	12211	1940	177
7	26025	28469	45725	38708	16390	9064	4526	700	74
8	14722	19505	18608	28499	17940	6164	1372	147	22
9	3104	5818	9026	8696	9156	4745	376	21	2
10	2000	1346	4337	3640	2865	1696	199	0	0
11	1977	676	774	1695	1084	641	104	0	0
12	1101	873	422	572	478	250	18	0	0
13	574	391	366	244	103	88	9	0	0
14	116	200	223	180	98	39	4	0	0
15	29	37	100	94	36	21	0	0	0
16	18	22	32	43	25	9	0	0	0
17	11	3	5	4	8	3	0	0	0
18	9	1	10	9	7	2	0	0	0
19	2	4	5	0	1	2	0	0	0
20	2	0	5	1	0	0	0	0	0
2+	155778	150334	165194	148090	155604	140882	37644	12084	1334

ABLE 6. AVERAGE WEIGHTS AT AGE (KILOGRAMS) FROM THE COMMERCIAL COD FISHERY IN NAFO DIVISIONS 2J3KL FOR THE YEARS 1962-94

	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
2	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.00	0.11	0.26	0.25
3	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.44	0.32	0.35	0.45	0.45
4	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.53	0.47	0.68	0.63	0.61
5	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.64	0.71	0.91	0.96	0.93
6	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.08	0.96	1.11	1.18	1.32
7	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.52	1.30	1.27	1.39	1.75
8	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.13	1.80	1.56	1.74	2.07
9	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.86	2.20	2.05	2.21	2.24
10	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.29	2.82	2.75	2.61	2.99
11	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.95	3.19	3.13	3.34	3.67
12	4.15	4.15	4.15	4.15	4.15	4.15	4.15	4.15	4.15	4.15	4.12	3.79	3.41	3.66	4.56
13	6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.06	5.00	4.53	4.92	4.78	6.18
14	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	9.32	6.93	4.40	5.20	8.19
15	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	9.40	7.22	6.33	5.20	9.77
16	5.83	5.83	5.83	5.83	5.83	5.83	5.83	5.83	5.83	5.83	6.89	7.05	5.50	5.46	11.23
17	6.44	6.44	6.44	6.44	6.44	6.44	6.44	6.44	6.44	6.44	14.67	9.45	7.57	8.51	12.44
18	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	12.04	11.16	11.07	9.24	11.16
19	6.61	6.61	6.61	6.61	6.61	6.61	6.61	6.61	6.61	6.61	7.62	7.62	7.62	7.62	7.62
20	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.19	17.46	17.46	17.46	17.46	17.46

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
2	0.09	0.00	0.00	0.41	0.00	0.00	0.31	0.34	0.00	0.21	0.32	0.29	0.26
3	0.45	0.40	0.46	0.53	0.55	0.53	0.62	0.59	0.48	0.51	0.43	0.49	0.48
4	0.60	0.72	0.74	0.77	0.78	0.84	0.87	0.88	0.73	0.72	0.66	0.73	0.74
5	0.97	1.04	1.13	1.16	1.17	1.20	1.32	1.20	1.10	1.04	1.03	1.08	1.03
6	1.66	1.58	1.67	1.71	1.64	1.77	1.75	1.79	1.43	1.54	1.32	1.38	1.44
7	2.33	2.46	2.46	2.38	2.23	2.10	2.28	2.28	2.06	1.85	1.87	1.67	1.83
8	2.82	3.26	3.57	3.56	2.86	2.66	2.61	2.71	2.66	2.35	1.93	2.21	2.07
9	3.46	4.05	4.41	5.01	3.81	3.09	3.18	2.96	3.23	2.94	2.80	2.51	2.64
10	3.88	4.46	5.25	5.49	5.32	4.18	3.50	3.65	3.32	3.47	3.51	3.04	3.02
11	4.78	5.02	5.80	6.72	6.29	6.16	4.79	4.28	4.06	3.80	4.80	4.37	3.96
12	6.13	6.72	7.03	7.87	7.06	7.19	7.76	6.19	4.55	4.54	4.64	5.49	5.41
13	7.31	8.10	8.96	8.38	7.32	8.00	9.07	8.39	7.03	5.34	5.74	6.55	7.50
14	8.40	7.42	8.54	10.03	10.01	8.36	9.14	10.26	9.67	7.12	6.13	8.60	9.24
15	8.81	8.20	9.46	11.31	8.99	7.86	10.62	11.44	11.37	11.77	8.53	9.76	10.05
16	11.75	11.26	10.70	13.87	11.54	7.91	10.57	11.61	11.27	11.24	13.51	9.73	9.34
17	10.63	11.61	13.12	10.68	10.48	9.58	13.13	17.47	12.68	14.15	9.10	12.58	15.74
18	12.27	8.92	13.49	16.09	11.15	12.95	15.97	12.94	12.42	16.14	21.77	16.01	18.66
19	7.62	10.57	15.51	12.04	9.82	0.00	9.73	15.21	14.38	12.30	17.66	16.60	0.00
20	17.46	16.00	14.77	11.37	12.59	0.00	15.88	12.81	19.49	15.72	0.00	11.03	17.64

	1990	1991	1992	1993	1994
2	0.29	0.17	0.00	0.00	0.00
3	0.42	0.36	0.29	0.57	0.40
4	0.69	0.61	0.58	0.71	0.68
5	1.06	0.97	0.81	0.97	0.98
6	1.50	1.41	1.19	1.25	1.41
7	1.94	1.88	1.73	1.59	1.85
8	2.22	2.27	2.05	8.40	2.05
9	2.44	2.63	2.66	9.23	3.05
10	3.06	3.14	2.24	0.00	0.00
11	3.58	3.80	2.68	0.00	0.00
12	4.68	4.96	4.95	0.00	0.00
13	6.23	5.49	5.34	0.00	0.00
14	8.51	7.61	7.02	0.00	0.00
15	9.78	11.58	0.00	0.00	0.00
16	12.58	11.01	0.00	0.00	0.00
17	15.45	12.82	0.00	0.00	0.00
18	13.58	13.00	0.00	0.00	0.00
19	17.26	13.10	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00

TABLE 7. CATCH BIOMASS AT AGE (TONS) FROM THE COMMERCIAL COD FISHERY IN NAFO DIVISIONS 2J3KL FOR THE YEARS 1962-94

	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
2	42	202	402	12	115	111	40	8	955	5	33	0
3	2946	1954	6575	1760	4779	5189	2088	1472	6155	4378	2964	1268
4	14407	15167	15182	15790	36296	42830	51860	21794	33056	39356	42299	19169
5	56617	53006	50826	41184	82445	88298	181108	88755	72474	83938	74600	67339
6	71540	145278	74638	82344	77259	119014	185165	200770	124536	120677	82292	57123
7	78541	97933	166244	106838	98458	91293	139121	178465	142255	96056	85096	46103
8	58345	62220	107834	144533	64497	82025	83619	111641	61942	53117	62948	49232
9	53175	40973	55155	89282	62948	45265	61171	51879	28662	30972	33605	31137
10	57354	36926	39000	47423	27863	51147	34929	39337	12164	14215	21033	21336
11	39269	31012	32704	26113	17025	22368	21022	24023	7520	8358	11799	12170
12	39292	17447	26361	15475	9462	13973	21783	18588	4980	5341	6839	8160
13	47135	23889	30233	23925	11060	12774	11750	18204	3072	6908	6940	5314
14	32049	16249	22359	20664	6570	8471	7390	8626	1241	3989	6757	3119
15	28528	17890	16515	16631	5908	4185	4998	3800	1308	2169	7031	2007
16	22667	10127	8488	10838	4699	2472	3556	3306	1423	2763	4175	2178
17	25470	8134	12352	3703	2679	1243	818	2054	799	799	6631	803
18	13117	8207	7005	5894	1694	649	540	607	194	777	1637	301
19	1534	2168	3312	1210	3212	476	549	304	66	978	1486	290
20	2898	1309	2243	1625	1280	1517	187	712	244	561	629	140
2+	644926	590090	677428	655244	518248	593302	811698	774346	503047	475357	458793	327188

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
2	52	109	4	10	0	0	38	0	0	6	1	0
3	1131	1786	6195	3208	529	530	1354	1202	902	1603	461	312
4	8977	8884	20573	39306	12640	9147	9259	5594	26280	11846	13086	10822
5	31784	24355	26086	39248	40774	42367	33424	15433	22804	56235	38112	40275
6	82587	40623	27585	20098	32104	48767	51327	40672	25483	33299	69137	48508
7	76885	54356	29419	12575	18969	27016	42880	49091	53414	27460	28507	57692
8	55672	63484	33166	9577	10034	12352	17195	33885	45034	38370	19637	18753
9	38651	29660	24485	9446	6197	5733	6097	12097	36882	28410	26374	12390
10	28853	19612	13865	5358	4830	3974	2855	4144	8038	22194	15429	17138
11	18210	7732	5366	2543	2194	3248	1559	1944	2082	4876	10854	11794
12	10005	4315	2877	1814	1472	1286	1802	1377	1122	1924	2792	7649
13	5304	3862	1805	1089	851	1039	469	915	720	816	1225	1786
14	2869	1934	2056	630	460	436	652	480	1279	375	492	1035
15	1576	858	977	370	328	407	418	126	314	308	469	443
16	1859	448	562	247	236	407	180	323	95	116	348	225
17	1226	43	498	213	81	92	107	210	125	118	122	216
18	1251	74	714	172	71	94	225	56	52	96	91	12
19	343	168	229	15	21	62	48	49	0	19	61	43
20	349	17	349	105	112	133	114	63	0	48	38	97
2+	367583	262319	196809	146023	131904	157091	170005	167661	224625	228118	227236	229191

	1986	1987	1988	1989	1990	1991	1992	1993	1994
2	0	13	7	2	17	6	0	0	0
3	424	1001	1362	814	3231	1120	125	536	42
4	10958	6083	10695	13053	27984	19309	2239	3545	258
5	45935	33310	21799	21785	38595	52191	11773	3243	564
6	70638	64761	66125	36305	34043	41670	14531	2425	250
7	48146	53237	76361	70836	31797	17040	7830	1113	137
8	34597	37645	41124	58993	39827	13992	2813	1235	45
9	9126	16290	22655	22957	22341	12479	1000	194	6
10	6940	4724	13184	10993	8767	5325	446	0	0
11	7513	3245	3382	6712	3881	2436	279	0	0
12	4999	4051	2317	3095	2237	1240	89	0	0
13	3065	2244	2397	1830	642	483	48	0	0
14	826	1226	1918	1663	834	297	28	0	0
15	341	316	976	945	352	243	0	0	0
16	202	297	311	402	315	99	0	0	0
17	156	27	63	63	124	38	0	0	0
18	145	22	160	168	95	26	0	0	0
19	25	71	83	0	17	26	0	0	0
20	31	0	55	18	0	0	0	0	0
2+	244066	228564	264975	250632	215096	168021	41200	12290	1301

Table 8 . Cod abundance estimates (thousands of fish) from research vessel surveys in NAFO Division 2J (Fall).

Depth range (m)	Stratum number	area sq. mi.	Gadus 15 1978	Gadus 29 1979	Gadus 44 1980	Gadus 58 1981	Gadus 71 1982	Gadus 86-88 1983	Gadus 101-102 1984	Gadus 116-118 1985	Gadus 131-132 1986	Gadus 145-146 1987	Gadus 159-160 1988	Gadus 174-176 1989	Gadus 190-191 1990	Gadus 208-209 1991	Gadus 224-226 1992
101-200	201	1427	3071	1500	5749	8377	16692	16246	10533	15246	21638	6784	54	0	0	0	0
	205	1823	8039	1574	787	4550	21765	13547	25230	8159	9481	7841	13707	164	68	0	0
	206	2582	1634	1236	2104	6220	5868	8694	30077	12764	29985	4222	21638	9363	211	420	485
	207	2246	5100	2664	3406	5479	9094	13024	14210	27850	6310	9027	4504	711	1740	0	225
	Total	8078	17844	6974	12046	24626	53419	51511	80050	64019	67414	27874	39903	10238	2019	420	710
201-300	202	440	462	396	5681	2378	2378	1833	1866	760	7663	2626	746	0	0	0	0
	209	1608	3531	21485	3410	10099	7681	29567	3863	8599	28567	13594	6711	14318	583	1224	338
	210	774	4169	2760	2982	445	4703	59785	4953	299	21187	145	2401	8686	3776	3976	363
	213	1725	19714	18516	19811	2158	5807	12806	6915	14028	23624	10316	12334	30271	10278	3663	206
	214	1171	10680	6527	10958	3956	5900	4659	25667	19030	43496	40024	31085	13844	3621	334	132
	215	1270	34281	9986	25692	35768	27583	7233	8040	7424	85617	8593	32304	111	2069	337	255
	228	1428	3509	6780	8254	10701	2187	2269	1853	352	12702	1164	2272	3001	2358	20652	236
	234	508	553	267	1506	534	2250	4698	3005	2339	5415	1760	1125	0	0	0	25
	Total	8924	76899	66717	78294	66039	58489	122850	56162	52831	228271	78222	88978	70231	22685	30186	1555
301-400	203	480	299	236	3081	81	1117	462	703	156	1784	1405	2090	0	0	12	24
	208	448	247	1480	202	303	1368	1749	224	1043	2051	3918	757	6356	1073	146	359
	211	330	5450	2737	4659	1746	2415	1325	297	776	1090	1709	1647	12299	3109	10582	1181
	216	384	152	202	3603	86	14	10	331	115	94	3127	476	749	86	96	10
	222	441	1479	149	1258	132	0	11	11	182	17	281	66	2847	712	188	55
	229	567	234	2873	1319	447	298	670	71	936	539	85	440	1475	1085	1518	199
	Total	2650	7861	7677	14122	2795	5212	4227	1637	3208	5575	10525	5476	23726	6065	12542	1828
401-500	204	354	151	118	163	1342	142	540	1422	0	518	425	1860	13	13	0	18
	217	268	1	0	1	0	0	0	5	0	0	50	0	0	0	13	0
	223	180	1	0	2	0	0	0	0	0	0	0	14	7	68	32	5
	227	686	98	73	108	0	21	26	0	0	51	77	86	1146	4446	1337	94
	235	420	146	114	158	158	126	1135	63	32	0	268	173	236	567	1734	32
	Total	1908	397	305	432	1500	289	1701	1490	32	569	820	2133	1402	5094	3116	149
501-750	Total	1591	nf	nf	nf	50	50	0	33*	12	249	125	218	100	936	6350	50
751-1000	Total	517	nf	nf	nf	0*	0*	0	0*	0	14	0	0	0*	0	0	48
Total **			103001	81673	104894	94960	117409	180289	139339	120090	301829	117441	136490	105597	35863	46264	4242
mean no. per tow			63.64	50.47	64.82	58.68	72.55	111.4	86.1	74.21	186.5	72.57	84.78	65.25	22.16	28.59	2.62
Unadjusted total for all sampled strata			98643	81130	104461	95010	117459	180290	139366	120103	302093	117569	136682	105669	36801	52613	4336
Upper limit			135651	129789	139530	162767	151075	744685	184179	154187	468811	163856	183268	149747	51757	126298	6077
Lower limit			61634	32470	69392	27253	83843	-34105	94553	86020	135374	71282	90096	61651	21845	-21071	2595

Note shaded numbers are estimates for non sampled strata and only 0-500 m strata are used in deriving these estimates.
nf =not fished
* not all strata fished
** total and mean no. per tow include sampled and estimated values for depths to 500 meters. Estimates were derived from a multiplicative model using survey data to 1991.

Table 9. Cod biomass estimates (t) from research vessel surveys in NAFO Division 2J (Fall).

Depth range (m)	Stratum Stratum number	area sq mi.	GADUS 15 1978	GADUS 29 1979	GADUS 44 1980	GADUS 58 1981	GADUS 71 1982	GADUS 86-88 1983	GADUS 101-102 1984	GADUS 116-118 1985	GADUS 131-132 1986	GADUS 145-146 1987	GADUS 159-160 1988	GADUS 174-176 1989	GADUS 190-191 1990	GADUS 208-209 1991	GADUS 224-226 1992
101-200	201	1427	4847	3256	11319	15998	18085	16764	12033	14952	24712	9158	84	0	0	0	0
	205	1823	16200	2669	1676	10126	39216	17742	25093	7526	11016	9456	27403	240	11	0	0
	206	2582	2074	2671	3849	13153	8533	11442	39133	13186	34327	5313	36617	13183	107	221	252
	207	2246	8209	4192	7738	12284	12612	12608	18136	27954	7864	11883	7613	465	1770	0	101
	Total	8078	31330	12788	24582	51561	78446	58556	94395	63618	77919	35810	71717	13888	1888	221	353
201-300	202	440	525	749	12964	6292	5681	3798	2948	850	10363	4533	1436	0	0	0	0
	209	1608	5384	43569	12810	22275	18351	53925	7678	12245	37475	19297	11006	13957	228	746	154
	210	774	5572	5771	5810	823	10428	97578	9448	782	25147	360	4532	13125	2115	2932	161
	213	1725	31627	31100	34068	5622	8073	14748	9401	16121	27904	13819	20289	36371	6159	2227	83
	214	1171	20791	13231	25096	9669	10993	6944	33853	24715	61918	62937	52313	19424	4369	175	79
	215	1270	55780	19546	64301	96161	60996	12584	10471	10732	131984	14279	65032	40	3013	228	123
	228	1428	5671	12374	16972	23904	4357	2215	3012	299	15820	1749	4845	4582	3096	11877	121
	234	508	1030	553	3699	1192	4614	5370	3657	2402	7178	2790	2521	0	0	0	10
	Total	8924	126380	126893	175720	165938	123493	197162	80468	68146	317789	119764	161974	87499	18980	18185	731
301-400	203	480	649	641	7467	230	3141	1369	2054	192	2982	2798	4396	0	0	10	17
	208	448	438	3341	631	908	3750	3153	454	1454	2589	6120	1816	5189	682	82	185
	211	330	10285	5685	9384	4747	6490	3016	954	1400	1462	3573	3412	26274	2162	6930	615
	216	384	311	484	10204	454	86	24	908	180	142	5462	937	1356	48	52	3
	222	441	2029	653	2780	281	0	105	22	281	15	463	91	1199	656	84	28
	229	567	319	7394	3150	1144	467	516	106	1397	816	96	786	2525	1641	916	116
	Total	2650	14031	18198	33616	7764	13934	8183	4498	4904	8006	18512	11438	36543	5189	8074	964
401-500	204	354	261	258	397	3149	316	1506	2192	0	829	683	3514	2	3	0	9
	217	268	3	3	9	0	0	0	7	0	0	80	0	0	0	9	0
	223	180	2	2	7	0	0	0	0	0	0	0	19	4	39	34	3
	227	686	186	183	291	0	36	129	0	0	101	117	137	2483	6291	1063	64
	235	420	252	249	385	347	315	1584	121	24	0	497	334	410	465	925	16
	Total	1908	704	695	1089	3496	667	3219	2320	24	930	1377	4004	2899	6798	2031	92
501-750	Total	1591	nf	nf	nf	137	140	0	58*	31	515	202	388	269	1097	3817	37
751-1000	Total	517	nf	nf	nf	0*	0*	0	0*	0	27	0	0	0*	0	0	28
Total **			172445	158574	235007	228759	216540	267120	181681	136692	404644	175463	249133	140829	32855	28511	2140
Mean wt. per tow			106.55	97.98	145.21	141.35	133.8	165.06	112.26	84.46	250.03	108.42	153.94	87.02	20.3	17.62	1.32
Unadjusted total for all sampled strata			165109	157237	233916	228894	216680	267121	181731	136723	405185	175668	248085	141098	33950	32327	2207
Upper limit			228826	255091	314420	424722	288881	1174856	241662	174398	667127	248495	336941	234034	51160	74147	3110
Lower limit			101392	59384	153412	33067	144479	-640615	121800	99048	143243	102841	159229	48162	16739	-9493	1304

Note shaded numbers are estimates for non sampled strata and only 0-500 m strata are used in deriving these estimates.
nf =not fished
* not all strata fished
** total and mean no. per tow include sampled and estimated values for depths to 500 meters. Estimates were derived from a multiplicative model using survey data to 1991.

Table 10. Abundance and Biomass for Division 2J
Using revised stratification scheme.

Depth range (m)	Stratum number	Stratum area sq mi.	GADUS 236-238 1993 abundance	GADUS 250-252 1994 (000's)	GADUS 236-238 1993 biomass	GADUS 250-252 1994 (t)
101-200	201	633	0	0	0	0
	205	1594	17	40	16	28
	206	1870	53	0	24	0
	207	2246	156	170	49	54
	236	733	0	0	0	0
	237	778	28	0	15	0
	Total	7854	254	210	104	82
201-300	202	621	0	0	0	0
	209	680	34	26	10	3
	210	1035	408	52	125	26
	213	1583	119	0	82	0
	214	1341	221	50	111	33
	215	1302	156	66	71	51
	223	158	0	0	0	0
	228	2196	92	0	63	0
	234	530	0	0	0	0
	Total	9446	1030	194	462	113
301-400	203	487	0	73	0	67
	208	588	0	15	0	4
	211	251	72	38	58	21
	216	360	0	27	0	15
	222	450	51	90	41	33
	229	536	40	40	8	20
	Total	2672	163	283	107	160
401-500	204	288	0	0	0	0
	217	241	18	6	17	2
	227	598	135	0	93	0
	235	414	104	166	48	107
	240	133	5	0	7	0
	Total	1674	262	172	165	109
501-750	212	557	21	28	25	28
	218	362	0	14	0	13
	224	228	0	0	0	0
	230	185	0	9	0	12
	239	120	5	3	5	2
	Total	1452	26	54	30	55
751-1000	219	283	0	0	0	0
	231	186	0	0	0	0
	236	193	0	0	0	0
	Total	662	0	0	0	0
Total			1733	912	867	517
Mean wt. or # per tow			1.00	0.51	0.50	0.28
Upper limit			2431	1299	1145	784
Lower limit			1034	526	588	251

Table 11. Cod abundance estimates (thousands of fish) from research vessel surveys in NAFO Division 3K (Fall).

Depth range (m)	Stratum number	Stratum area sq mi	GADUS 15 1978	GADUS 29 1979	GADUS 44 1980	GADUS 58-59 1981	GADUS 71-72 1982	GADUS 87-88 1983	GADUS 101-103 1984	GADUS 117-118 1985	GADUS 131-132 1986	GADUS 146-147 1987	GADUS 160-161 1988	GADUS 175-176 1989	GADUS 191-192 1990	GADUS 209-210 1991	GADUS 224-226 1992
101-200	618	1455	2031	2855	1580	1699	1407	2063	4806	6458	12975	2652	1074	560	573	87	146
	619	1588	521	751	396	429	348	530	1243	221	930	671	460	1430	72	30	40
	Total	3043	2552	3606	1976	2128	1755	2593	6049	6679	13905	3323	1534	1990	645	117	186
201-300	620	2709	17749	26203	15206	12689	4248	17610	22825	1728	31158	6449	4236	9368	606	378	271
	621	2859	14655	25646	2739	7453	6472	4603	6070	1531	4654	930	2854	2512	441	129	72
	624	668	13121	23166	627	3686	2470	1128	978	552	602	234	769	520	2733	1128	100
	632	447	727	2265	5078	3171	2494	8321	2236	1029	1158	1879	12516	604	2684	1631	206
	634	1618	4057	18157	13651	19455	11384	14186	6229	7112	99787	18660	4676	77314	625	21400	136
	635	1274	3921	1492	3706	4743	3175	1227	3275	874	3727	829	1033	710	319	192	104
	636	1455	1820	2446	6051	3695	7001	2603	3413	928	3440	1482	2312	1136	109	109	36
	637	1132	2634	5778	3909	4744	6409	8718	19062	3824	11939	3781	6936	3212	816	708	28
	Total	12162	58684	105153	50967	59636	43653	58396	64088	17578	156465	34244	35332	95376	8333	25675	953
301-400	623	1027	6142	2981	7593	876	1557	5769	11764	1015	1060	3855	1172	6877	4390	360	642
	625	850	1340	2488	1515	1021	2169	1276	574	1723	808	2760	1340	3238	1308	255	85
	626	919	3191	759	1012	2235	911	1276	770	826	10451	1173	317	1628	310	115	69
	628	1085	1433	2891	1008	1371	570	1955	1140	1826	624	375	2101	1853	684	1249	434
	629	495	724	449	144	50	412	562	459	272	1348	237	431	425	655	37	175
	630	544	255	388	315	225	172	306	414	82	65	177	191	2151	204	82	27
	633	2179	4283	3044	2944	3106	3552	3748	5954	10059	26717	15375	3660	39354	46720	36933	1295
	638	2059	2720	8081	3246	9158	5699	13643	3323	9189	9080	7388	4637	41590	91652	41601	1084
	639	1463	1603	3075	741	1303	2921	4095	1304	2128	3423	1459	1977	2320	7264	20390	299
	Total	10621	21691	24156	18518	19345	17963	32630	25702	27120	53576	32799	15826	99436	153187	101022	4110
401-500	622	632	306	436	234	356	190	142	308	59	332	47	237	2499	1020	158	190
	627	1194	478	685	365	104	152	193	178	89	1262	341	284	1304	4977	403	266
	631	1202	571	801	430	162	0	523	18	103	68	752	1585	8185	3564	2587	211
	640	198	24	37	18	0	0	25	7	10	7	7	59	632	52	352	4414
	645	204	19	29	13	0	5	8	15	15	32	31	15	505	103	0	15
	Total	3430	1398	1988	1060	622	347	891	526	276	1701	1178	2180	13125	9716	3500	5096
501-750	Total	917	nf	nf	nf	0	0	15	0	0	nf	44	nf	nf	25	33	64
751-1000	Total	1340	nf	nf	nf	0	0	nf	0*	0	nf	0*	nf	nf	23	10	0
Total **			84311	134903	72521	81732	63717	94508	96355	51652	225648	71544	54871	209692	171919	130316	10346
Mean no. per tow			38.39	61.43	33.02	37.22	29.01	43.04	43.88	23.52	102.75	32.58	24.99	95.497	8.29	59.34	4.71
Unadjusted total for all sampled strata			80120	129310	69485	79602	61791	91908	94131	51653	225616	71587	54871	209925	171930	130355	10410
Upper limit			118124	219416	93324	104929	75262	119956	125238	65202	498233	101570	207965	360927	287775	204411	29184
Lower limit			42115	39204	45645	54276	48320	63859	63023	38104	-47002	41603	-98223	58923	56085	56300	-8364

Note shaded numbers are estimates for non sampled strata and only 0-500 m strata are used in deriving these estimates.
nf =not fished
* not all strata fished
** total and mean no. per tow include sampled and estimated values for depths to 500 meters. Estimates were derived from a multiplicative model using survey data to 1991.

Table 12. Cod biomass estimates (t) from research vessel surveys in NAFO Division 3K (Fall).

Depth range (m)	Stratum number	Stratum area sq. mi.	GADUS 15 1978	GADUS 29 1979	GADUS 44 1980	GADUS 58-59 1981	GADUS 71-72 1982	GADUS 87-88 1983	GADUS 101-103 1984	GADUS 117-118 1985	GADUS 132-133 1986	GADUS 146-147 1987	GADUS 160-161 1988	GADUS 175-176 1989	GADUS 191-192 1990	GADUS 209-210 1991	GADUS 224-226 1992
101-200	618	1455	2015	3623	2319	2383	1891	2600	9363	10318	18917	3979	97	209	202	39	450
	619	1588	681	1256	790	813	637	890	3004	652	811	1164	469	254	4	15	20
	Total	3043	2696	4879	3109	3196	2528	3490	12367	10970	19728	5143	566	463	206	54	470
201-300	620	2709	32708	55286	33699	33603	9851	33248	41781	4190	46251	11244	2721	2293	263	174	126
	621	2859	25889	63106	5939	10935	11764	6750	14149	2229	7283	887	4361	1401	59	42	95
	624	668	29936	40531	1742	7973	5365	1586	959	953	1153	232	1112	284	1597	712	44
	632	447	873	3896	10165	7566	5721	13992	4163	1667	2072	2726	16458	514	1726	1217	112
	634	1618	6907	29309	29404	40573	23579	22967	11703	11161	163994	32997	7054	116699	432	20673	108
	635	1274	3702	2551	7902	10271	7249	3236	5457	1619	7900	1404	1423	745	195	96	62
	636	1455	2248	5040	11959	8428	14144	6335	7065	1884	4489	3011	4087	649	142	39	45
	637	1132	3540	10613	7871	9829	13256	17317	34548	6209	17860	7109	11429	4815	579	475	16
	Total	12162	105803	210332	108681	129178	90929	105431	119825	29912	251002	59610	48645	127400	4993	23428	608
301-400	623	1027	11293	7522	15746	2175	4849	12071	20190	2303	2182	7108	1041	3353	1665	178	284
	625	850	1825	5538	4626	2640	4817	3499	1397	2935	1446	4490	2549	3446	657	152	48
	626	919	6976	1940	3242	4781	2076	3932	1653	1735	12331	1914	327	1696	31	36	26
	628	1085	2729	6206	2739	3848	1480	3841	2112	3000	842	658	2329	1739	397	798	279
	629	495	1145	1070	337	150	1255	1167	832	346	2066	322	270	443	273	5	76
	630	544	531	1019	1174	939	498	847	708	230	84	327	415	3726	191	49	18
	633	2179	6947	6379	8073	8406	8482	6558	10861	16779	45140	26825	6307	40630	50281	33839	929
	638	2059	4210	13362	7161	17706	10143	23310	5511	13854	13234	12674	6547	92164	125506	41930	750
	639	1463	2204	5734	1949	3225	8335	9295	2684	3349	5372	2526	3185	1589	5031	22727	185
	Total	10621	37860	48770	45047	43870	41935	64520	45948	44531	82697	56844	22970	148786	184032	99714	2595
401-500	622	632	457	830	527	1257	561	287	646	79	451	47	353	2249	416	90	83
	627	1194	688	1257	796	267	330	601	318	127	2121	350	446	1580	1319	218	114
	631	1202	874	1589	1009	451	0	1489	72	220	113	1200	2165	9010	1930	1767	203
	640	198	61	115	71	0	0	81	119	59	11	45	216	841	97	302	4889
	645	204	52	99	61	0	54	42	176	130	79	47	77	197	123	0	12
	Total	3430	2132	3890	2464	1975	945	2500	1331	615	2775	1689	3257	13877	3885	2377	5301
501-750	Total	917	nf	nf	nf	0	0	88	0	0	nf	73	nf	nf	28	44	66
751-1000	Total	1340	nf	nf	nf	0	0	nf	0*	0	nf	0*	nf	nf	16	7	0
Total **			148482	267862	159298	178220	136326	175936	179468	86029	356203	123283	75437	290535	193130	125576	8974
Mean wt. per tow			67.61	121.97	72.54	81.15	62.08	80.11	81.72	39.17	162.2	56.14	34.35	132.3	87.94	57.18	4.09
Unadjusted total for all sampled strata			143132	259102	153728	175023	133310	172458	175308	86030	356120	123358	75437	290526	193164	125625	9040
Upper limit			216442	426266	201839	237799	159091	216591	228070	107721	796817	180376	285967	542668	382515	204831	29925
lower limit			69822	91937	105616	112247	107529	128325	122545	64338	-84576	66340	-135093	38385	3812	46418	-1184

Note shaded numbers are estimates for non sampled strata and on1y 0-500 m strata are used in deriving these estimates.
nf =not fished
* not all strata fished
** total and mean wgt. per tow Include sampled and estimated values for depths to 500 meters. Estimates were derived from a multiplicative model using survey data to 1991.

Table 13. Abundance and Biomass for Division 3K
Using revised stratification scheme.

Depth range (m)	Stratum number	Stratum area sq. mi.	GADUS 236-238 1993 abundance	GADUS 250-252 1994 (000's)	GADUS 236-238 1993 biomass	GADUS 250-252 1994 (t)
101-200	618	1347	236	14	110	4
	619	1753	197	0	148	0
	Total	3100	433	14	258	4
201-300	620	2545	191	38	103	12
	621	2736	0	68	0	72
	624	1105	47	28	34	16
	634	1555	58	117	29	113
	635	1274	64	0	34	0
	636	1455	109	36	121	27
	637	1132	623	24	434	8
	Total	11802	1092	311	755	248
301-400	617	593	134	24	47	14
	623	494	76	0	18	0
	625	888	67	0	78	0
	626	1113	139	28	131	12
	628	1085	217	27	118	10
	629	495	99	9	60	1
	630	332	0	0	0	0
	633	2067	155	341	107	207
	638	2059	1182	125	791	70
	639	1463	198	233	114	150
	Total	10589	2267	787	1464	464
401-500	622	691	91	10	48	6
	627	1255	283	71	120	63
	631	1321	0	50	0	79
	640	69	38	3	27	3
	645	216	22	22	23	28
	650	134	134	13	82	12
	Total	3686	568	169	300	191
501-750	641	230	6	6	8	4
	646	325	16	0	12	0
	651	359	9	34	14	35
	Total	914	31	40	34	39
751-1000	642	418	21	0	21	0
	647	360	0	0	0	0
	652	516	52	19	85	11
	Total	1294	73	19	106	11
Total			4463	1342	2919	955
Mean # or wt. per tow			1.86	0.57	1.22	0.41
Upper Limit			5764	2102	3830	1431
Lower Limit			3163	582	2007	480

Table 14. Cod abundance estimates (thousands of fish) from research vessel surveys in NAFO Division 3L (Fall).

Depth range (fath)	Stratum number	Stratum area sq mi.	ATC 323-325 1981	ATC 333-334 1982	WT 7-9 1983	WT 16-18 1984	WT 37-39 1985	AN 72 1986	WT 65 1987	WT 78 1988	WT 87 1989	WT 101 1990	WT 114-115 1991	WT 129-130 1992	WT 145-146 1993	WT 160-162 1994
31-50	350	2071	4923	2332	6335	15455	13698	15197	4785	3902	3327	1498	1825	505	622	67
	363	1780	802	1960	13050	19374	40659	2439	6770	9193	12159	12259	1377	2517	134	67
	371	1121	105	1010	4679	8018	1058	151	1330	1963	105	2844	168	280	28	0
	372	2460	14256	8679	37532	27415	21453	6039	21406	5128	8956	54511	781	585	87	0
	384	1120	168	273	6025	20303	452	52	8589	336	67	19295	103	40	32	0
	Total	8552	20254	14254	67621	90565	77320	23878	42880	20522	24614	90407	4254	3927	903	134
51-100	328	1519	299	375	554	285	385	4598	257	928	309	114	76	274	76	76
	341	1574	1930	975	1359	1512	945	1287	144	266	74	217	236	79	118	0
	342	585	381	1039	274	439	205	219	176	132	44	417	66	29	0	15
	343	525	897	223	328	2089	236	617	131	210	13	236	53	158	26	13
	348	2120	1724	3310	1953	7002	1284	1999	1008	1194	1432	984	557	517	149	119
	349	2114	2154	1492	1622	8059	3047	2739	681	2257	730	1111	1587	32	635	23
	364	2817	963	1113	1629	8162	1774	964	1012	2145	442	2397	159	169	352	70
	365	1041	8693	2090	578	8400	684	1583	521	375	234	195	547	104	26	52
	370	1320	173	413	727	7799	561	248	380	255	66	357	66	165	66	0
	385	2356	44	309	318	1827	118	702	197	27	16	354	106	212	0	0
	390	1481	37	111	111	2483	48	241	764	125	79	111	0	37	0	0
	Total	17452	17295	11450	9453	48057	9287	15197	5271	7914	3439	6493	3453	1776	1448	368
101-150	344	1494	2075	5047	1103	3701	2978	2464	1654	977	881	2093	336	1009	393	154
	347	983	2706	2915	2041	2976	576	1290	553	2966	1476	7600	148	74	129	9
	366	1394	5197	8022	4447	6221	18207	23099	9433	23992	6278	2703	5454	14704	942	42
	369	961	2669	1371	2525	2803	1960	21671	5194	3203	418	866	4408	334	62	0
	386	983	861	553	1443	1513	1269	5737	1107	1004	1550	2287	49	123	49	0
	389	821	933	1756	1622	811	961	985	3374	1017	1263	801	1335	0	0	0
	391	282	72	95	635	32	635	95	169	32	64	191	28	7	21	0
	Total	6918	14513	19759	13816	18057	26586	55341	21484	33191	11930	16541	11758	16251	1596	205
151-200	345	1432	2015	3637	2929	2300	4658	5105	3386	4208	2319	2826	618	242	358	94
	346	865	5822	2337	4389	1731	3441	5089	11834	10259	4091	4523	10631	10783	242	37
	368	334	1316	1429	2645	602	2871	6168	1617	1580	928	4162	9540	10568	4240	27
	387	718	808	3000	1797	3072	1253	10618	880	377	305	1590	1046	683	790	120
	388	361	263	253	460	528	461	446	149	339	935	420	271	135	108	46
	392	145	20	147	33	103	60	16	5	38	16	65	47	4	21	0
	Total	3855	10244	10803	12253	8336	12744	27442	17871	16801	8594	13586	22153	22415	5759	324
201-300	Total	1142	nf	20*	nf	410	90	0*	nf	nf	nf	180*	404	541	2390	75
301-400	Total	804	nf	nf	0*	0*	0	0*	nf	nf	nf	0*	13	0	31	29
Total **			62303	56265	103140	165002	125933	121853	87504	78420	48577	127023	41616	44369	9692	1032
Mean no. per tow			22.57	20.38	37.37	59.78	45.62	44.14	31.7	28.41	17.6	46.02	15.08	16.07	3.51	0.37
Unadjusted total for all sampled strata			60719	55689	94623	165427	126027	121411	87505	78427	48578	127207	42036	44909	11966	1137
Upper limit			83412	67092	123050	197373	175608	169896	109122	98525	65582	185198	53941	68984	20008	1505
Lower limit			38025	44285	66195	133482	76446	72925	65889	58329	31575	69216	30131	20834	3923	769

Note shaded numbers are estimates for non sampled strata and only 0-200 fathom strata are used in deriving these estimates.
nf =not fished
* not all strata fished
** total and mean no. per tow include sampled and estimated values for depths to 200 fathom. Estimates were derived from a multiplicative model using survey data to 1991.

Table 15. Cod biomass (t) from research vessel cruises in NAFO Division 3L (Fall).

Depth range (fath)	Stratum number	Stratum area sq mi.	ATC 323-325 1981	ATC 333-334 1982	WT 7-9 1983	WT 16-18 1984	WT 37-39 1985	AN 72 1986	WT 65 1987	WT 78 1988	WT 87 1989	WT 101 1990	WT 114-115 1991	WT 129-130 1992	WT 145-146 1993	WT 160-162 1994
31-50	350	2071	6244	3848	8463	16498	11219	21047	6486	8216	4815	3270	3165	984	645	105
	363	1780	852	2009	17993	20017	40414	4605	11261	15379	13532	14606	2065	2815	128	90
	371	1121	137	1363	6126	11210	1304	89	2710	4404	231	4906	230	398	26	0
	372	2460	20737	6882	44364	27045	29915	11255	40873	9964	13626	99532	1636	778	146	0
	384	1120	112	1090	5941	27463	583	53	13690	911	76	33264	293	47	24	0
	Total	8552	28082	15192	82887	102233	83435	37049	75020	38874	32280	155578	7389	5022	969	195
51-100	328	1519	334	370	659	299	656	3128	131	1215	437	130	84	930	33	133
	341	1574	2146	901	1949	1760	957	1793	309	561	69	582	463	87	56	0
	342	585	834	951	263	736	205	233	167	237	60	257	186	65	0	8
	343	525	1419	237	661	2261	99	690	194	269	39	234	30	138	35	5
	348	2120	2651	4249	3125	11537	1995	2384	1512	1973	1312	1026	645	500	124	155
	349	2114	3604	3174	2266	8257	3856	3211	1069	3835	1238	1681	2444	37	608	5
	364	2817	1932	1800	1946	4536	1419	1298	1521	3309	773	2536	482	256	278	131
	365	1041	17904	3702	961	3624	977	1512	1087	1035	316	205	1288	159	55	59
	370	1320	300	446	1184	7891	597	69	842	562	116	520	160	332	64	0
	385	2356	38	43	1019	1886	94	1095	951	326	64	711	124	278	0	0
	390	1481	9	58	852	1130	9	35	277	204	108	65	0	26	0	0
	Total	17452	31171	15931	14925	43917	10864	15448	8060	13526	4532	7947	5906	2808	1253	496
101-150	344	1494	3869	7701	1682	6121	4010	3623	2019	897	854	1485	140	760	207	120
	347	983	4550	4805	3167	5731	996	1833	701	3852	2332	5735	122	20	132	6
	366	1394	9313	11920	8999	7101	27549	34160	15868	39741	8412	3593	6226	15681	936	54
	369	961	7755	2290	5849	3962	4557	33585	12236	6341	2034	1683	6328	351	78	0
	386	983	1414	1430	3892	2546	4162	13630	2869	4044	4007	5653	49	143	93	0
	389	821	1428	3428	2791	2737	2521	1723	1733	704	2009	1875	907	0	0	0
	391	282	83	487	159	79	325	370	70	6	23	165	15	1	10	0
	Total	6918	28392	32061	26539	28277	44120	88924	35496	55585	19671	20189	13787	16956	1456	180
151-200	345	1432	4703	7686	6443	3673	8104	9106	5375	7693	4028	3034	520	222	263	63
	346	865	12012	4212	7746	3003	5805	7670	19771	18031	7978	6309	10622	11524	226	31
	368	334	5948	3604	7481	1222	6011	12300	5353	4319	3165	7317	11827	12239	3991	31
	387	718	1334	9216	5379	7465	4056	20225	2740	1289	476	8644	1733	820	722	92
	388	361	415	461	815	616	1951	592	115	366	1362	1066	258	125	91	43
	392	145	27	220	109	68	106	11	8	41	22	120	30	2	6	0
	Total	3855	24439	25399	27973	16047	26033	49904	33362	31739	17031	26490	24990	24932	5299	260
201-300	Total	1142	nf	20*	nf	1224	721	0*	nf	nf	nf	522*	647	787	1932	65
301-400	Total	804	nf	nf	0*	0*	0	0*	nf	nf	nf	0*	32	0	21	37
Total **			112086	88586	152325	190480	164451	191326	151936	139727	73512	210203	52073	49718	8977	1129
Mean wt. per tow			40.6	32.09	55.18	69	59.57	69.31	55.04	50.61	26.63	76.14	18.86	18.01	3.25	0.41
Unadjusted total			109819	87997	131268	191702	165169	190732	151936	139726	73514	210725	52750	50506	10930	1232
Upper limit			153245	105967	175408	226109	213267	264592	191200	172522	92871	319223	67681	77415	18480	1709
Lower limit			66392	70027	87127	157294	117071	116872	112672	106929	54156	102228	37820	23596	3136	745

Note shaded numbers are estimates for non sampled strata and only 0-200 fathom strata are used in deriving these estimates.
nf =not fished
* not all strata fished
** total and mean wgt. per tow include sampled and estimated values for depths to 200 fathom. Estimates were derived from a multiplicative model using survey data to 1991.

Table 16. Cod abundance estimates (thousands of fish) from research vessel surveys in NAFO Division 3L (Spring).

Depth range (fath)	Stratum number	Stratum area sq mi.	ATC 276 1978	ATC 290 1979	ATC 304-305 1980	ATC 317-318 1981	ATC 329 1982	WT 28-30 1985	WT 48 1986	WT 59-60 1987	WT 70-71 1988	WT 83 1989	WT 96 1990	WT 106-107 1991	WT 119-122 1992	WT 137-138 1993	WT 152-154 1994
31-50	350	2071	1373	7756	2798	829	1221	15883	5893	6685	32355	9836	2199	369	71	17	0
	363	1780	2378	7649	1817	3296	1924	7182	7429	11194	14621	3982	2119	363	59	50	0
	371	1121	477	1599	2917	0	189	8061	926	1647	1178	1501	996	15483	17	17	0
	372	2460	9022	6135	3293	5032	1477	27099	12451	9290	13346	4281	1794	203	18	34	0
	384	1120	56	2711	1555	28	42	98	1906	2174	387	280	84	147	0	17	0
	Total	8552	13306	25850	12380	9185	4853	58323	28605	30990	61887	19880	7192	16565	165	135	0
51-100	328	1519	104	296	243	0	342	257	443	794	285	0	1124	76	0	76	0
	341	1574	325	827	1024	1004	2150	3505	1661	2599	8330	1669	591	59	0	0	24
	342	585	922	132	417	132	278	586	454	307	176	454	176	0	29	29	15
	343	525	867	768	1399	887	2374	1103	719	381	801	1340	105	99	39	20	20
	348	2120	2361	3687	3456	887	2467	4986	5450	10702	8391	4367	1345	60	18	20	20
	349	2114	4628	4035	2997	595	3729	7016	6767	4616	5951	11148	1092	175	53	71	0
	364	2817	599	4705	2996	1128	1304	5821	3483	8064	5286	7250	2115	308	0	35	0
	365	1041	391	2481	1035	977	4689	1797	1516	5798	5236	2683	430	59	20	0	0
	370	1320	363	817	1486	0	248	7394	805	4742	2715	4013	212	11593	0	33	0
	385	2356	59	783	3139	59	0	2087	258	514	849	3493	611	4863	35	96	0
	390	1481	1056	2223	1223	389	139	358	97	79	0	125	22	67	19	37	0
	Total	17452	11675	20754	19415	6058	17720	34910	21653	38596	38020	36542	7823	17359	213	417	79
101-150	344	1494	11607	15981	7947	29001	9168	695	4864	449	841	5239	299	45	79	37	0
	347	983	6272	5737	10212	3247	10773	1668	5519	2410	5003	1439	221	92	18	37	0
	366	1394	9200	11118	5232	56749	18521	41420	20339	13214	4133	10215	3645	4238	52	60	0
	369	961	577	2813	6757	7286	1876	10950	9534	6810	10929	5134	1890	1205	36	0	0
	386	983	615	2749	2066	2693	812	5372	1783	3011	3320	6924	14920	6911	37	30	0
	389	821	1130	1464	5259	1140	2712	8677	1380	1150	1335	1430	447	760	41	0	0
	391	282	201	1117	1757	688	191	476	603	286	127	191	2593	445	0	0	0
	Total	6918	29602	40979	39230	100804	44053	69258	44022	27330	25688	30572	24015	13696	263	164	0
151-200	345	1432	5321	1800	6385	15264	2714	2107	13160	21498	7820	12860	2069	1496	125	54	193
	346	865	1678	1380	1125	2727	801	714	16999	6324	4058	3360	52513	760	276	130	43
	368	334	374	56	113	1880	639	1492	4250	5382	238	1270	14491	167	2269	263	63
	387	718	198	256	108	296	1419	24226	5686	189	552	2878	43939	17660	8192	1078	0
	388	361	257	190	41	393	989	488	2520	14	244	289	13603	1805	501	650	0
	392	145	44	178	5	196	218	1818	403	5	234	98	2961	528	11	27	0
	Total	3855	7870	3860	7777	20756	6780	30845	43018	33412	13146	20755	129576	22416	11374	2202	299
201-300	Total	1142	nf	nf	nf	nf	204*	nf	329	nf	nf	nf	nf	nf	3498*	26821	321	4632
301-400	Total	804	nf	nf	nf	nf	nf	nf	0	nf	nf	nf	nf	nf	144*	26	0	0
Total **			62452	91444	78804	136800	73406	193336	137303	130329	138742	107747	168602	70035	12016	2918	377
Mean no. per tow			22.62	33.12	28.54	49.55	26.59	70.03	49.74	47.21	50.26	39.03	61.07	25.37	4.35	1.06	0.14
Unadjusted total for all sampled strata			51099	91444	78561	136875	73406	193665	137300	130329	138741	107747	168604	65810	38863	3238	5009
Upper Limit			72936	113863	93294	267984	94173	255913	161283	179958	177548	126081	263989	110424	360868	7083	41022
Lower Limit			29262	69024	63828	5766	52638	131418	113317	80699	99933	89414	73220	21196	-283142	-606	-31003

Note shaded numbers are estimates for non sampled strata and only 0-200 fathom strata are used in deriving these estimates.
nf =not fished
* not all strata fished
** total and mean no. per tow include sampled and estimated values for depths to 200 fathom. Estimates were derived from a multiplicative model using survey data to 1991.

Table 17 . Cod biomass estimates (t) from research vessel surveys in NAFO Division 3L (Spring).

Depth range (fath)	Stratum number	Stratum area sq mi.	ATC 276 1978	ATC 290 1979	ATC 304-305 1980	ATC 317-318 1981	ATC 329 1982	WT 28-30 1985	WT 48 1986	WT 59-60 1987	WT 70-71 1988	WT 83 1989	WT 96 1990	WT 106-107 1991	WT 119-122 1992	WT 137-138 1993	WT 152-154 1994
31-50	350	2071	2108	13637	7124	2539	4775	31785	16344	19008	56567	22760	8359	1059	170	24	0
	363	1780	3923	11237	4182	7082	6721	14881	12152	19419	23096	8070	8270	1433	343	19	0
	371	1121	1492	2439	8148	0	789	15647	3184	4122	4005	4080	3282	25696	6	6	0
	372	2460	7015	8342	7448	7155	3978	44792	19171	22017	27917	12397	8981	883	69	56	0
	384	1120	19	3521	2480	308	231	284	3667	3681	844	549	578	381	0	41	0
	Total	8552	14557	39176	29382	17084	16494	107389	54518	68247	112429	47856	29470	29452	588	146	0
51-100	328	1519	105	518	398	0	893	74	838	1897	456	0	3577	59	0	97	0
	341	1574	1007	2468	3291	2038	8495	4735	8022	12076	16947	4772	3291	167	0	0	2
	342	585	3014	409	961	277	871	429	1639	604	307	483	509	0	2	6	2
	343	525	1791	1190	2936	946	4768	795	1502	1064	1346	1511	92	31	2	2	2
	348	2120	3551	7129	7855	1966	5709	7904	11590	33966	23118	9796	3958	229	3	8	2
	349	2114	8890	8800	7282	1321	10182	16005	27730	14008	17951	28008	1622	573	34	12	0
	364	2817	929	7884	7154	2361	3938	9837	9223	20328	13755	18200	10495	709	0	59	0
	365	1041	533	2953	2442	2090	6056	2160	3329	9791	8361	5262	1373	68	51	0	0
	370	1320	368	1046	2807	0	99	7054	3511	7679	5896	6663	980	12956	0	29	0
	385	2356	80	1118	6278	413	0	2084	424	1066	2133	3088	792	6510	41	91	0
	390	1481	796	2125	2798	500	217	261	406	503	0	197	63	367	37	29	0
	Total	17452	21064	35640	44202	11912	41228	51338	68214	102982	90270	77980	26752	21669	170	333	8
101-150	344	1494	20390	19398	10172	50712	19583	648	8032	1023	1121	5808	183	6	15	6	0
	347	983	8502	7705	16019	8043	21435	3416	10419	4919	8818	2386	312	15	22	15	0
	366	1394	7733	11509	5912	81497	21817	45178	30705	19201	7551	13832	5895	4074	35	65	0
	369	961	1000	2448	7406	9378	4959	19297	11488	11564	16889	9252	3960	1318	31	0	0
	386	983	252	2881	2361	4593	1279	3877	1906	4368	3274	6748	38420	6640	92	37	0
	389	821	1065	1098	6923	478	1664	6169	900	647	692	616	513	226	64	0	0
	391	282	356	1048	2064	1212	95	429	826	201	41	95	621	283	0	0	0
	Total	6918	39298	46087	50857	155913	70832	79014	64276	41923	38386	38737	49904	12562	259	123	0
151-200	345	1432	10700	4844	11674	29493	6060	2939	17444	28741	11340	18456	2048	2323	167	17	97
	346	865	1660	2137	2154	4307	1223	341	20427	8298	5203	4496	57484	865	213	82	18
	368	334	542	239	796	1761	809	1536	6412	7166	652	2503	18601	281	1407	195	58
	387	718	184	459	256	243	2353	21491	6555	195	520	2506	28531	9249	8121	650	0
	388	361	182	349	108	190	1321	346	1572	10	179	122	14910	1005	241	486	0
	392	145	66	189	0	128	256	2237	435	3	98	57	1162	179	10	5	0
	Total	3855	13334	8217	14988	36122	12022	28890	52845	44413	17992	28140	122736	13902	10159	1435	173
201-300	Total	1142	nf	nf	nf	225*	nf	887	nf	nf	nf	nf	nf	3434*	16712	208	3248
301-400	Total	804	nf	nf	nf	nf	nf	0	nf	nf	nf	nf	nf	258*	30	0	0
Total **			88251	129116	139428	221031	140580	266632	239860	257568	259082	192713	228864	77583	11177	2039	181
Mean wt. per tow			31.97	46.77	50.51	80.07	50.92	96.58	86.89	93.3	93.85	69.81	82.9	28.1	4.05	0.74	0.07
Unadjusted total for all sampled strata			78212	129117	139030	220979	140578	267516	239857	257566	259080	192713	228865	72416	27919	2248	3428
Upper limit			102912	155685	166966	407989	171827	338672	278798	321060	325467	226139	335403	141984	227097	4773	3012
Lower limit			53513	102549	111095	33969	109329	196360	200917	194071	192693	159288	122327	2847	-171259	-478	-23263

Note shaded numbers are estimates for non sampled strata and only 0-200 fathom strata are used in deriving these estimates.
nf =not fished
* not all strata fished
** total and mean wgt. per tow include sampled and estimated values for depths to 200 fathom. Estimates were derived from a multiplicative model using survey data to 1991.

Table 18 Average weight at age for cod by Div. from autumn research vessel surveys.

2J

Age	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
2	0.21	0.23	0.24	0.22	0.22	0.15	0.17	0.16	0.19	0.21	0.24	0.19	0.17	0.19	0.15	0.15	0.15
3	0.48	0.60	0.52	0.50	0.47	0.50	0.34	0.32	0.38	0.41	0.44	0.46	0.35	0.32	0.32	0.28	0.41
4	0.83	0.93	1.06	0.90	0.92	0.84	0.75	0.55	0.59	0.70	0.75	0.72	0.62	0.50	0.51	0.57	0.63
5	1.38	1.50	1.40	1.42	1.32	1.36	1.14	0.99	0.93	1.02	0.98	1.07	0.87	0.71	0.63	0.75	0.90
6	1.88	2.02	1.99	1.75	1.83	1.92	1.60	1.31	1.28	1.25	1.33	1.37	1.29	1.19	0.86	0.98	1.58
7	2.61	2.79	2.35	2.19	2.02	2.22	2.26	1.69	1.60	1.65	1.53	1.60	1.55	1.65	1.86	0.84	1.58
8	2.95	3.61	3.03	2.67	2.37	2.42	2.52	2.35	1.87	1.83	1.88	1.81	1.78	1.78	0	0	0
9	4.51	2.99	4.94	3.54	2.93	2.90	2.68	2.74	2.81	2.05	2.27	2.05	1.99	2.19	0	0	0
10	4.60	4.18	5.17	5.45	4.13	3.61	3.30	3.10	2.82	2.78	2.51	2.05	2.03	2.42	0	0	0
11	6.11	6.07	5.84	6.69	5.71	3.75	4.30	3.46	3.33	4.20	3.63	2.95	3.23	3.69	0	0	0
12	6.78	5.75	5.96	6.46	7.80	7.93	5.27	3.94	4.04	3.84	4.56	2.72	3.07	2.42	0	0	0

3K

Age	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
2	0.18	0.24	0.24	0.25	0.21	0.19	0.15	0.20	0.22	0.22	0.17	0.18	0.20	0.23	0.21	0.2	0.19
3	0.45	0.64	0.55	0.64	0.56	0.57	0.44	0.39	0.41	0.47	0.41	0.44	0.41	0.43	0.42	0.45	0.41
4	0.89	1.05	0.90	1.11	1.09	0.96	0.82	0.72	0.73	0.79	0.74	0.77	0.74	0.69	0.67	0.71	0.64
5	1.47	1.48	1.42	1.55	1.38	1.57	1.42	1.19	1.07	1.16	1.19	1.20	1.09	0.96	0.92	1.06	1.15
6	2.14	2.18	2.09	1.95	1.92	2.16	1.92	1.64	1.54	1.40	1.53	1.56	1.56	1.43	1.22	1.18	1.34
7	3.00	3.04	3.04	2.45	2.35	2.67	2.29	2.16	1.78	1.90	1.76	1.91	1.79	1.91	1.74	1.30	1.72
8	3.66	4.07	4.00	2.97	2.93	2.74	2.90	2.99	2.34	2.21	2.57	2.25	2.11	2.17	2.24	2.33	2.33
9	4.00	5.15	5.75	5.04	3.77	3.38	3.35	3.04	2.69	2.96	3.49	2.77	2.44	2.49	2.33	0	0
10	5.04	4.17	8.15	6.78	4.51	4.00	3.70	3.45	4.10	3.67	4.35	3.63	2.77	2.90	0	0	0
11	6.29	5.67	10.57	7.02	6.60	5.49	6.18	4.46	3.91	4.76	4.94	3.78	3.40	4.37	0	0	0
12	7.02	4.10	7.67	7.09	8.29	5.53	6.69	6.05	3.61	5.86	6.35	5.00	3.43	2.96	0	0	0

3L

Age	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
1	0.20	0.2	0.21	0.14	0.16	0.18	0.17	0.18	0.20	0.17	0.23	0.18	0.23	0.17
2	0.54	0.47	0.52	0.31	0.39	0.37	0.35	0.44	0.45	0.36	0.44	0.50	0.48	0.38
3	0.78	1.10	1.01	0.72	0.72	0.72	0.75	0.78	0.75	0.79	0.75	0.77	0.80	0.80
4	1.28	1.59	1.63	1.17	1.25	1.11	1.25	1.31	1.27	1.25	1.14	1.11	1.19	1.16
5	1.97	2.26	2.16	1.85	1.72	1.74	1.81	1.74	1.80	1.82	1.57	1.40	1.50	1.71
6	2.63	3.04	2.49	2.50	2.49	2.17	2.46	2.13	2.32	2.59	1.93	1.55	2.11	2.33
7	3.49	3.64	2.99	2.83	3.48	3.05	2.91	2.66	2.90	3.21	2.74	2.55	2.17	2.68
8	5.17	5.27	3.51	4.04	3.43	3.54	3.81	2.99	3.64	3.91	3.16	3.40	0	0
9	7.62	7.33	3.92	4.25	5.10	4.22	4.87	3.64	5.27	4.05	3.39	2.95	6.22	0
10	9.90	7.78	6.83	5.67	5.88	4.98	6.18	6.31	6.15	5.15	3.51	4.23	0	0
11	15.39	12.99	6.33	4.47	8.43	6.09	5.65	8.24	7.38	5.96	4.91	7.67	0	0

Table 19. Biomass estimates (000's t) of cod from autumn research vessel surveys in NAFO Divisions 2J, 3K and 3L. Depths to 500m -2J and 3K - and 400 ftm - 3L.

Biomass

Div.	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
2J	229	217	267	182	137	405	175	249	141	33	29	2	1	0.5
3K	178	136	176	179	86	356	123	75	291	193	126	9	3	1
3L	112	89	155	190	164	191	152	140	74	210	52	51	9	1
Total	519	442	598	551	387	952	450	464	506	436	207	62	13	2.5

Percentage

2J	44	49	45	33	35	43	39	54	28	8	14	3	8	20
3K	34	31	29	32	22	37	27	16	58	44	61	15	23	40
3L	22	20	26	34	42	20	34	30	15	48	25	82	69	40
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100

TABLE 20. MEAN NUMBERS PER TOW OF COD AT AGE FROM AUTUMN RV SURVEYS IN DIVISION 2J.

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
1	0.00	0.36	0.00	1.06	1.99	0.52	0.06	0.03	0.08	0.75	0.24	0.12	0.01	0.00	0.00	0.01
2	0.31	1.54	4.16	3.09	14.10	5.30	1.51	2.28	0.41	2.55	12.85	1.39	1.29	0.06	0.33	0.10
3	1.37	1.32	3.06	18.26	16.83	16.75	9.06	8.49	1.93	2.63	8.09	8.64	3.35	0.85	0.18	0.19
4	11.46	4.48	2.29	6.42	25.91	16.55	22.07	31.24	4.43	4.62	5.87	4.06	16.09	0.47	0.33	0.11
5	16.81	20.37	4.22	4.47	16.46	26.70	13.65	70.31	24.93	7.74	5.69	2.14	5.48	1.07	0.11	0.07
6	16.19	20.80	17.01	4.28	8.85	10.19	16.54	41.29	25.16	25.28	7.85	1.50	0.99	0.14	0.13	0.01
7	2.31	12.34	15.23	13.24	4.54	2.46	7.32	21.61	7.37	29.34	13.26	1.07	0.56	0.01	0.01	0.03
8	0.73	1.79	9.63	11.65	12.34	1.55	1.26	8.71	5.29	5.49	9.01	1.96	0.35	0.00	0.00	0.00
9	0.50	0.52	2.00	7.91	5.61	3.50	0.86	0.72	2.21	3.91	1.28	0.97	0.26	0.00	0.00	0.00
10	0.28	0.38	0.51	1.33	3.56	1.50	1.18	0.66	0.38	1.92	0.67	0.21	0.14	0.00	0.00	0.00
11	0.28	0.24	0.08	0.36	0.74	0.66	0.43	0.60	0.05	0.31	0.33	0.06	0.02	0.00	0.00	0.00
12	0.11	0.29	0.14	0.17	0.24	0.32	0.22	0.35	0.18	0.14	0.11	0.04	0.03	0.00	0.00	0.00
13	0.04	0.09	0.15	0.10	0.11	0.05	0.03	0.11	0.08	0.08	0.00	0.00	0.01	0.00	0.00	0.00
14	0.08	0.31	0.21	0.22	0.13	0.02	0.02	0.11	0.09	0.02	0.00	0.00	0.01	0.00	0.00	0.00
1+	50.47	64.82	58.68	72.55	111.40	86.10	74.21	186.50	72.57	84.78	65.25	22.16	28.59	2.60	1.09	0.52
2+	50.47	64.46	58.68	71.49	109.41	85.58	74.15	186.47	72.49	84.03	65.01	22.04	28.58	2.60	1.09	0.51
3+	50.16	62.92	54.52	68.40	95.31	80.27	72.65	184.19	72.08	81.49	52.16	20.65	27.29	2.54	0.76	0.41
4+	48.79	61.61	51.46	50.14	78.49	63.52	63.59	175.70	70.16	78.85	44.07	12.02	23.94	1.69	0.58	0.22
5+	37.33	57.12	49.17	43.72	52.57	46.97	41.52	144.46	65.72	74.23	38.20	7.96	7.84	1.22	0.25	0.11
6+	20.52	36.76	44.95	39.25	36.12	20.26	27.87	74.15	40.80	66.49	32.51	5.82	2.36	0.15	0.14	0.04

TABLE 21. MEAN NUMBERS PER TOW (ADJUSTED FOR MISSING STRATA) OF COD AT AGE FROM AUTUMN RV SURVEYS IN DIVISION 3K.

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
1	0.00	0.18	0.01	0.22	0.83	0.26	0.01	0.35	0.38	1.14	1.79	1.08	0.02	0.03	0.01	0.01
2	0.13	1.01	1.25	1.71	3.36	3.23	0.65	2.41	0.90	2.43	14.36	3.82	2.05	0.34	0.56	0.05
3	2.13	1.37	5.14	1.66	7.29	5.58	2.96	4.84	2.15	4.12	15.80	18.77	5.59	0.95	0.55	0.26
4	14.46	1.98	3.22	4.72	6.17	9.64	4.56	24.10	3.88	3.18	15.91	18.07	24.42	0.78	0.48	0.12
5	23.80	11.16	3.51	4.65	10.88	7.77	6.21	29.07	9.38	3.91	11.98	12.00	17.25	1.78	0.15	0.08
6	14.15	12.19	11.72	2.61	3.33	7.98	3.09	20.18	7.26	5.36	10.53	8.75	5.92	0.66	0.18	0.01
7	3.63	2.64	8.48	5.50	2.25	2.96	2.98	10.33	3.48	2.89	11.60	6.01	2.32	0.13	0.05	0.02
8	1.82	1.27	2.63	5.36	3.96	1.48	0.92	6.22	2.44	0.97	6.62	6.65	0.93	0.03	0.01	0.02
9	0.44	0.47	0.48	1.56	3.07	2.37	0.69	2.37	1.25	0.46	3.00	2.17	0.55	0.00	0.00	0.00
10	0.38	0.32	0.23	0.60	1.07	1.43	0.64	0.79	0.62	0.27	2.18	0.66	0.25	0.00	0.00	0.00
11	0.26	0.03	0.19	0.16	0.38	0.59	0.54	0.98	0.32	0.07	0.94	0.24	0.01	0.00	0.00	0.00
12	0.06	0.19	0.19	0.07	0.16	0.28	0.16	0.68	0.17	0.09	0.35	0.06	0.02	0.00	0.00	0.00
13	0.04	0.07	0.06	0.06	0.07	0.10	0.06	0.25	0.11	0.03	0.26	0.00	0.01	0.00	0.00	0.00
14	0.12	0.13	0.11	0.12	0.23	0.21	0.05	0.18	0.23	0.07	0.17	0.00	0.01	0.00	0.00	0.00
1+	61.43	33.02	37.22	29.01	43.04	43.88	23.52	102.75	32.58	24.99	95.49	78.29	59.34	4.70	1.99	0.57
2+	61.43	32.84	37.21	28.79	42.21	43.62	23.51	102.40	32.20	23.85	93.70	77.21	59.32	4.67	1.98	0.56
3+	61.30	31.83	35.96	27.08	38.85	40.39	22.87	99.99	31.30	21.41	79.35	73.39	57.27	4.33	1.42	0.51
4+	59.18	30.46	30.83	25.42	31.56	34.82	19.90	95.15	29.15	17.30	63.54	54.62	51.68	3.38	0.87	0.25
5+	44.71	28.48	27.60	20.70	25.38	25.17	15.34	71.05	25.27	14.12	47.63	36.55	27.26	2.60	0.39	0.13
6+	20.91	17.32	24.09	16.05	14.51	17.40	9.13	41.98	15.89	10.22	35.65	24.54	10.01	0.82	0.24	0.05

TABLE 22. MEAN NUMBERS PER TOW (ADJUSTED FOR MISSING STRATA) OF COD AT AGE FROM AUTUMN RV SURVEYS IN DIVISION 3L.

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
1	0.37	0.41	0.65	0.36	0.01	0.04	0.16	0.05	0.02	0.03	0.05	0.01	0.00	0.00
2	0.36	2.74	3.58	7.58	1.22	1.15	2.77	1.68	0.70	0.69	0.80	0.39	0.25	0.02
3	6.29	1.97	13.64	11.43	9.65	2.53	2.02	4.54	4.08	6.03	1.58	2.99	0.89	0.07
4	2.62	6.60	5.27	18.89	12.84	11.82	3.91	2.38	3.68	14.08	4.41	4.58	1.39	0.14
5	2.49	2.80	7.61	5.18	10.91	10.19	9.43	4.96	1.89	9.71	4.49	4.43	0.62	0.09
6	3.72	2.07	1.41	10.52	5.17	10.44	7.13	6.09	2.56	5.60	2.59	2.78	0.30	0.04
7	5.24	1.72	1.36	1.69	3.43	3.27	3.33	4.62	2.60	3.88	0.46	0.73	0.06	0.02
8	0.97	1.56	2.36	1.18	0.71	2.47	1.31	2.16	0.99	3.05	0.25	0.06	0.01	0.00
9	0.20	0.29	1.27	1.03	0.81	0.96	1.00	1.03	0.71	1.69	0.25	0.04	0.00	0.00
10	0.07	0.09	0.45	1.08	0.40	0.38	0.10	0.54	0.21	0.67	0.09	0.03	0.00	0.00
11	0.04	0.05	0.13	0.43	0.29	0.48	0.13	0.13	0.08	0.31	0.07	0.01	0.00	0.00
12	0.03	0.06	0.06	0.25	0.11	0.26	0.22	0.10	0.04	0.20	0.02	0.02	0.00	0.00
13	0.12	0.06	0.19	0.18	0.07	0.18	0.18	0.13	0.03	0.10	0.01	0.00	0.00	0.00
1+	22.51	20.42	37.97	59.78	45.62	44.17	31.70	28.41	17.60	46.04	15.08	16.07	3.52	0.38
2+	22.14	20.01	37.31	59.42	45.61	44.12	31.54	28.36	17.58	46.01	15.03	16.06	3.52	0.38
3+	21.78	17.27	33.73	51.85	44.39	42.97	28.77	26.68	16.89	45.32	14.22	15.67	3.27	0.36
4+	15.50	15.29	20.09	40.42	34.74	40.44	26.75	22.15	12.80	39.29	12.65	12.68	2.38	0.29
5+	12.88	8.70	14.82	21.53	21.90	28.62	22.83	19.77	9.12	25.21	8.24	8.10	0.99	0.15
6+	10.39	5.89	7.22	16.35	10.99	18.44	13.41	14.81	7.23	15.50	3.75	3.67	0.37	0.06

TABLE 23. MEAN NUMBERS PER TOW OF COD FROM AUTUMN RV SURVEYS IN DIV. 2J3KL.

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
1	0.41	0.27	0.16	0.51	1.04	0.36	0.02	0.14	0.21	0.59	0.66	0.40	0.03	0.01	0.00	0.01
2	0.32	3.00	1.59	2.49	6.09	5.57	1.10	1.85	1.56	2.14	8.25	1.91	1.34	0.29	0.37	0.05
3	1.94	2.48	5.11	5.88	12.31	10.79	7.27	4.77	2.04	3.93	8.98	10.93	3.35	1.78	0.60	0.16
4	11.78	3.83	2.74	5.93	10.65	15.23	12.35	20.70	4.03	3.20	8.30	12.95	13.97	2.30	0.83	0.13
5	16.79	13.23	3.26	3.83	10.88	11.34	10.01	31.29	13.23	5.29	6.20	8.61	9.00	2.72	0.34	0.08
6	10.53	13.31	9.67	2.79	3.88	9.59	7.28	21.29	11.61	10.57	6.52	5.64	3.31	1.42	0.22	0.02
7	2.27	4.99	8.78	5.82	2.44	2.30	4.24	10.14	4.38	10.13	8.23	3.90	1.10	0.35	0.04	0.02
8	0.92	1.19	3.66	5.31	5.35	1.37	0.92	5.26	2.67	2.58	4.84	3.98	0.50	0.04	0.01	0.01
9	0.31	0.37	0.74	2.59	2.94	2.09	0.78	1.37	1.38	1.55	1.62	1.68	0.35	0.02	0.00	0.00
10	0.26	0.23	0.23	0.57	1.42	1.30	0.67	0.58	0.34	0.79	0.98	0.55	0.16	0.01	0.00	0.00
11	0.19	0.11	0.10	0.16	0.36	0.54	0.41	0.68	0.17	0.15	0.43	0.23	0.04	0.00	0.00	0.00
12	0.06	0.16	0.11	0.09	0.14	0.28	0.15	0.42	0.19	0.11	0.16	0.12	0.02	0.01	0.00	0.00
13	0.04	0.05	0.10	0.07	0.13	0.12	0.06	0.19	0.13	0.08	0.10	0.04	0.01	0.00	0.00	0.00
1+	45.80	43.21	36.23	36.03	57.63	60.87	45.25	98.68	41.96	41.11	55.29	50.93	33.18	8.96	2.41	0.48
2+	45.39	42.94	36.08	35.52	56.58	60.51	45.23	98.54	41.74	40.53	54.62	50.53	33.15	8.94	2.41	0.47
3+	45.07	39.94	34.49	33.03	50.49	54.94	44.13	96.69	40.18	38.38	46.37	48.62	31.81	8.65	2.03	0.42
4+	43.13	37.47	29.38	27.16	38.18	44.15	36.86	91.92	38.14	34.46	37.39	37.70	28.46	6.87	1.43	0.26
5+	31.35	33.64	26.64	21.23	27.53	28.93	24.52	71.22	34.11	31.26	29.09	24.75	14.49	4.57	0.61	0.13
6+	14.57	20.41	23.38	17.40	16.66	17.59	14.50	39.93	20.88	25.97	22.89	16.14	5.49	1.85	0.27	0.05

TABLE 24. COEFFICIENTS OF VARIATION - PERCENT

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
1	18	33	34	23	46	26	64	28	38	33	22	25	56	53	100	100
2	22	39	22	23	28	17	16	18	24	12	15	16	24	19	29	96
3	17	53	22	18	19	16	20	16	15	17	23	17	28	18	29	34
4	22	38	20	14	23	16	18	24	13	21	36	21	29	29	30	26
5	26	27	24	17	26	20	16	31	16	19	44	31	27	34	38	38
6	32	28	29	19	28	15	14	35	18	18	37	38	25	32	35	63
7	33	24	29	20	24	15	12	36	18	17	32	40	28	31	26	63
8	32	21	32	18	25	14	9	33	18	14	31	41	27	31	44	50
9	25	22	28	16	22	13	9	32	16	14	36	37	26	50	100	100
10	26	24	26	11	25	12	9	29	17	14	47	35	29	33	100	100
11	23	33	23	15	26	12	10	25	16	13	46	30	26	0	100	100
12	28	26	23	26	24	13	11	30	15	14	54	32	43	100	100	100
13	27	32	20	15	7	13	13	23	13	13	71	29	97	100	100	100

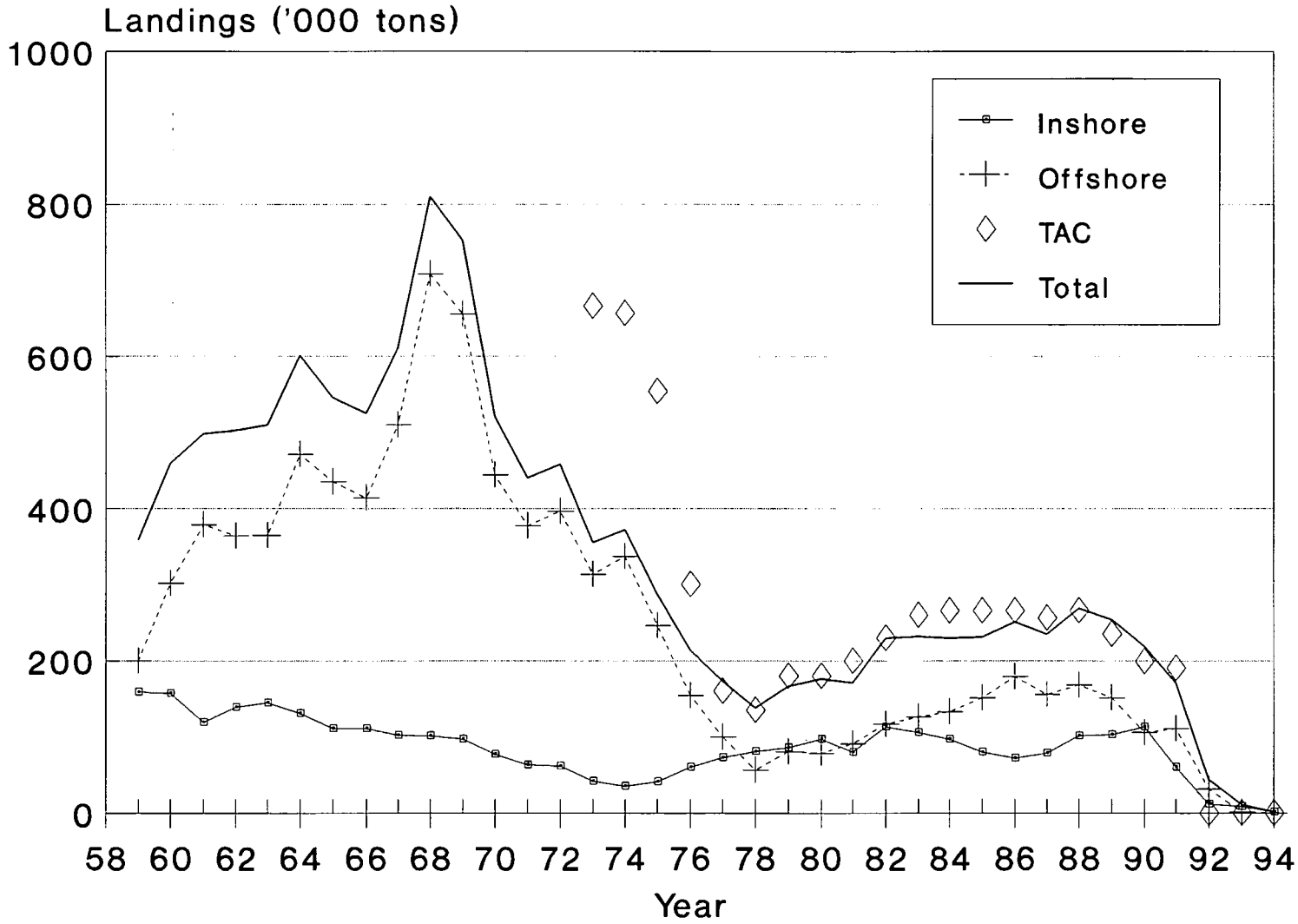


Figure 1. Cod in Divisions 2J3KL:
Inshore and offshore landings and TAC's.

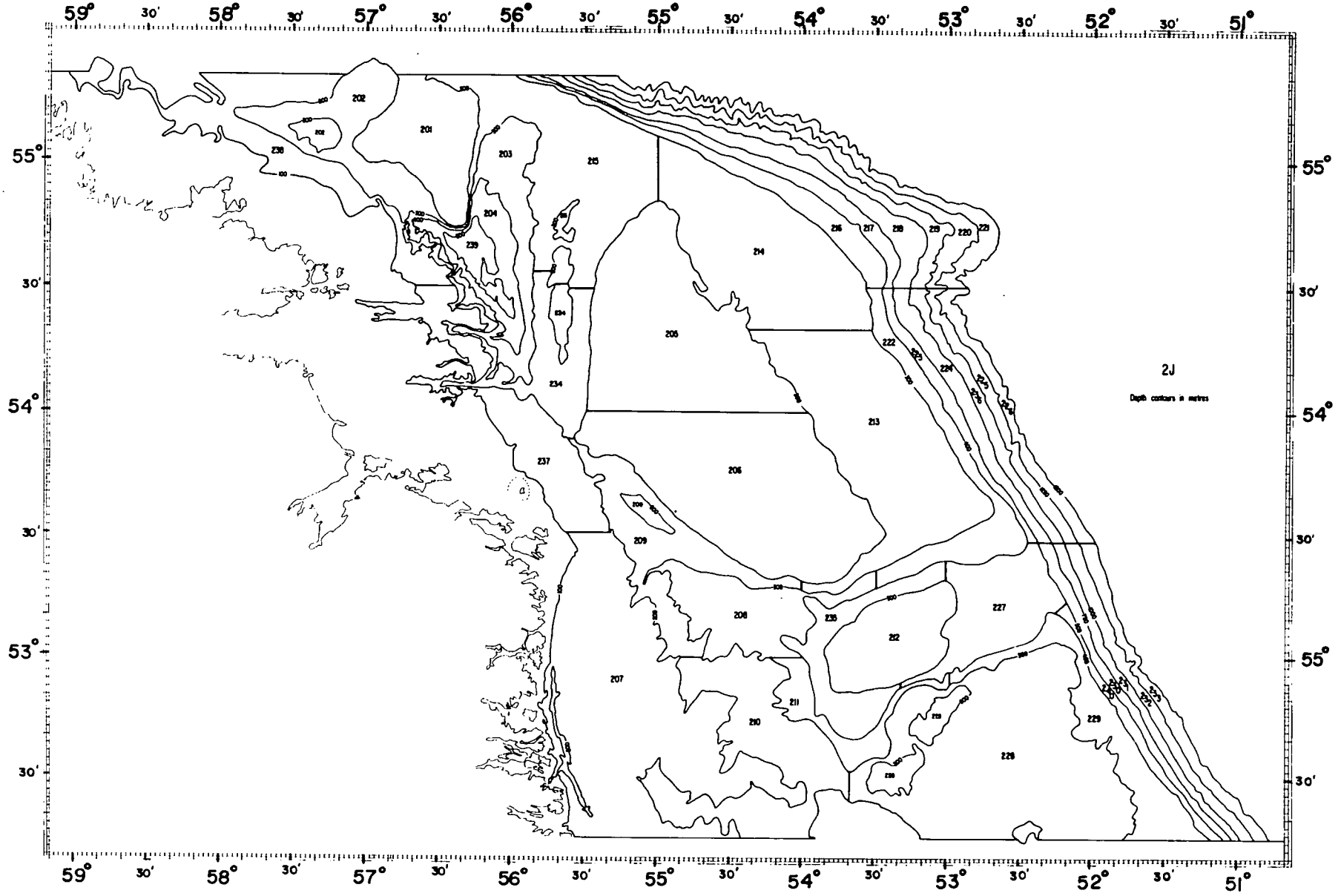


Fig.2 Area of stratification for RV surveys in NAFO division 2J.

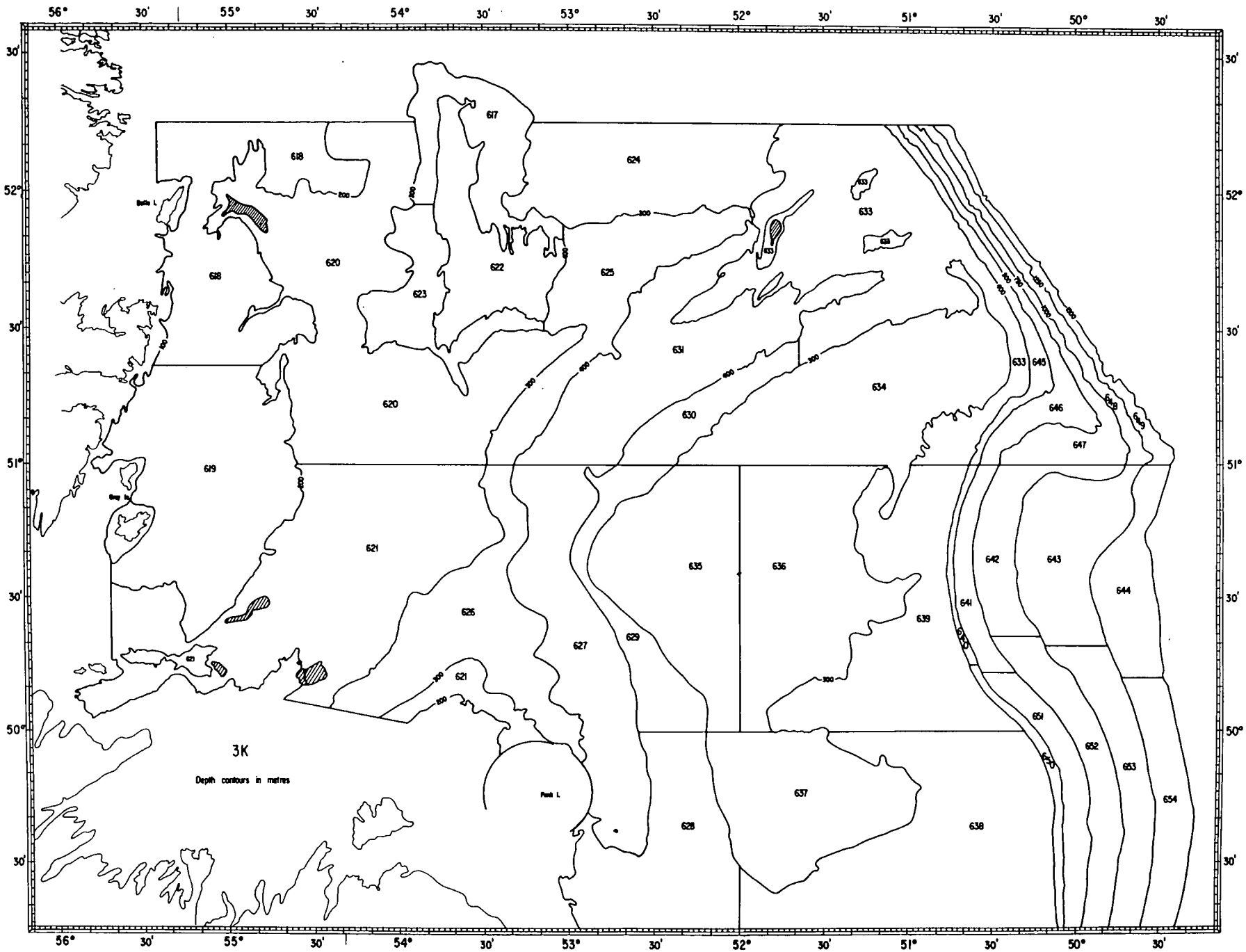


Fig.3 Area of stratification for RV surveys in NAFO division 3K.

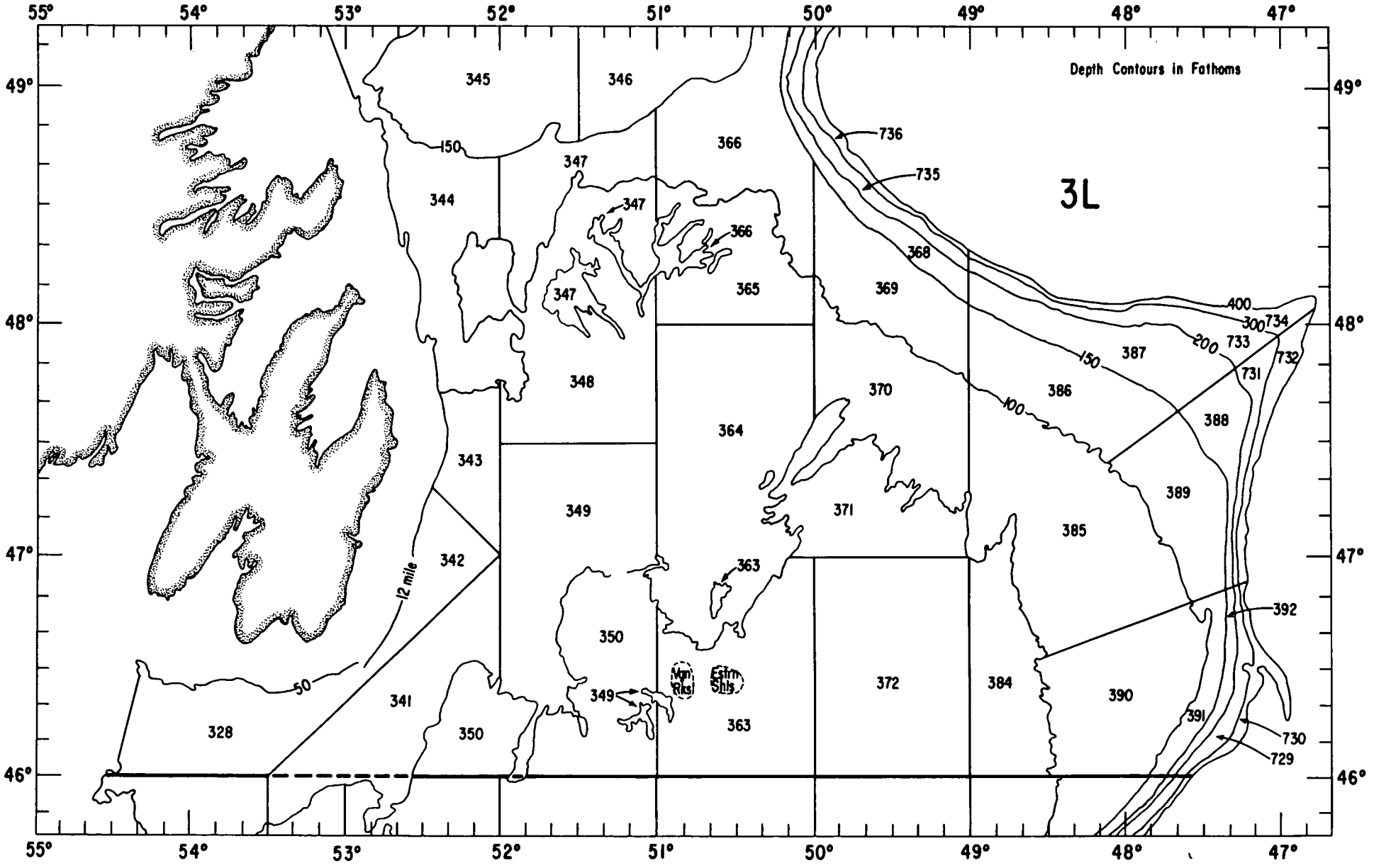


Fig.4 Area of stratification for RV surveys in NAFO division 3L.

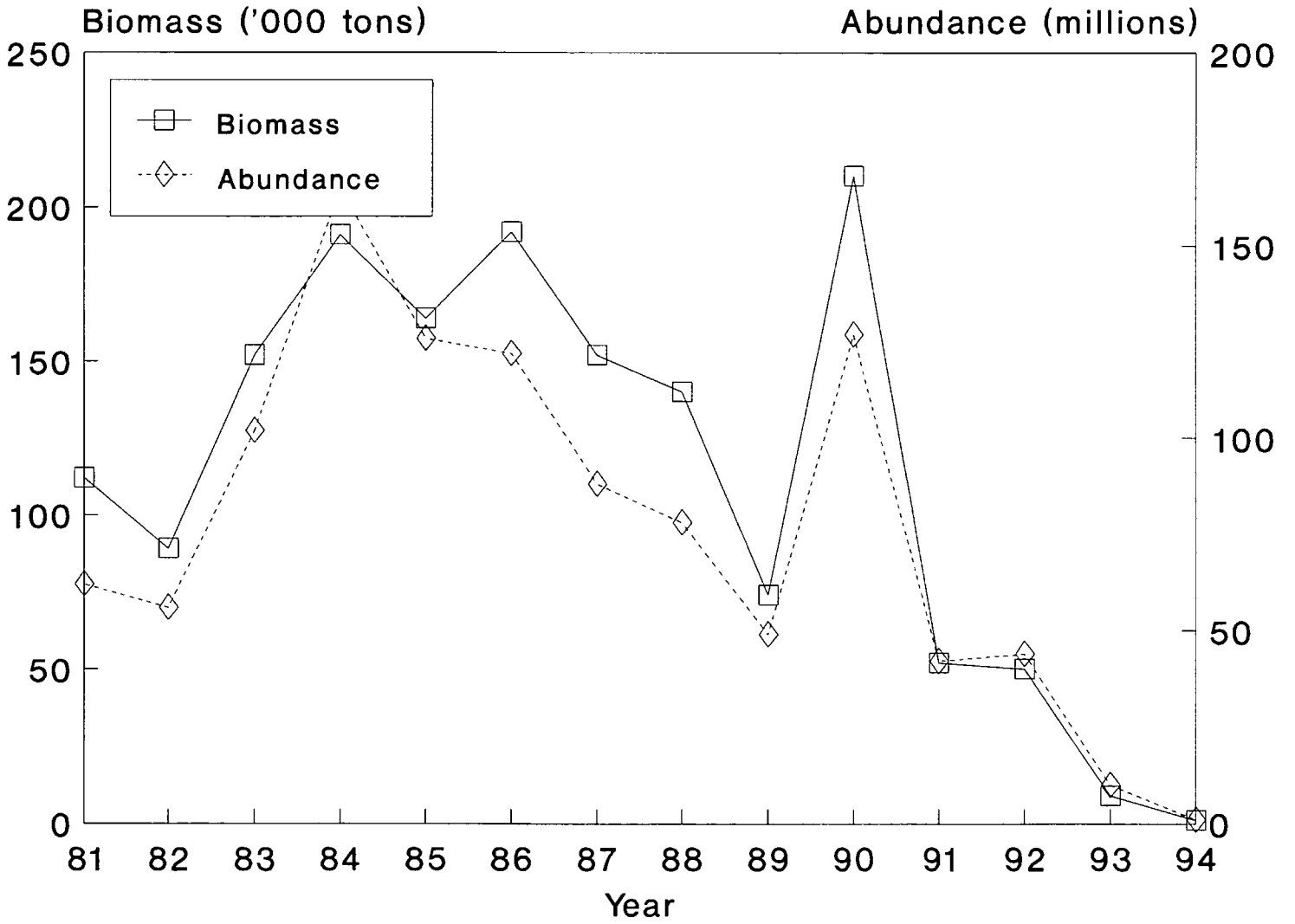


Figure 5. Biomass and abundance of cod from autumn RV surveys in Division 3L.

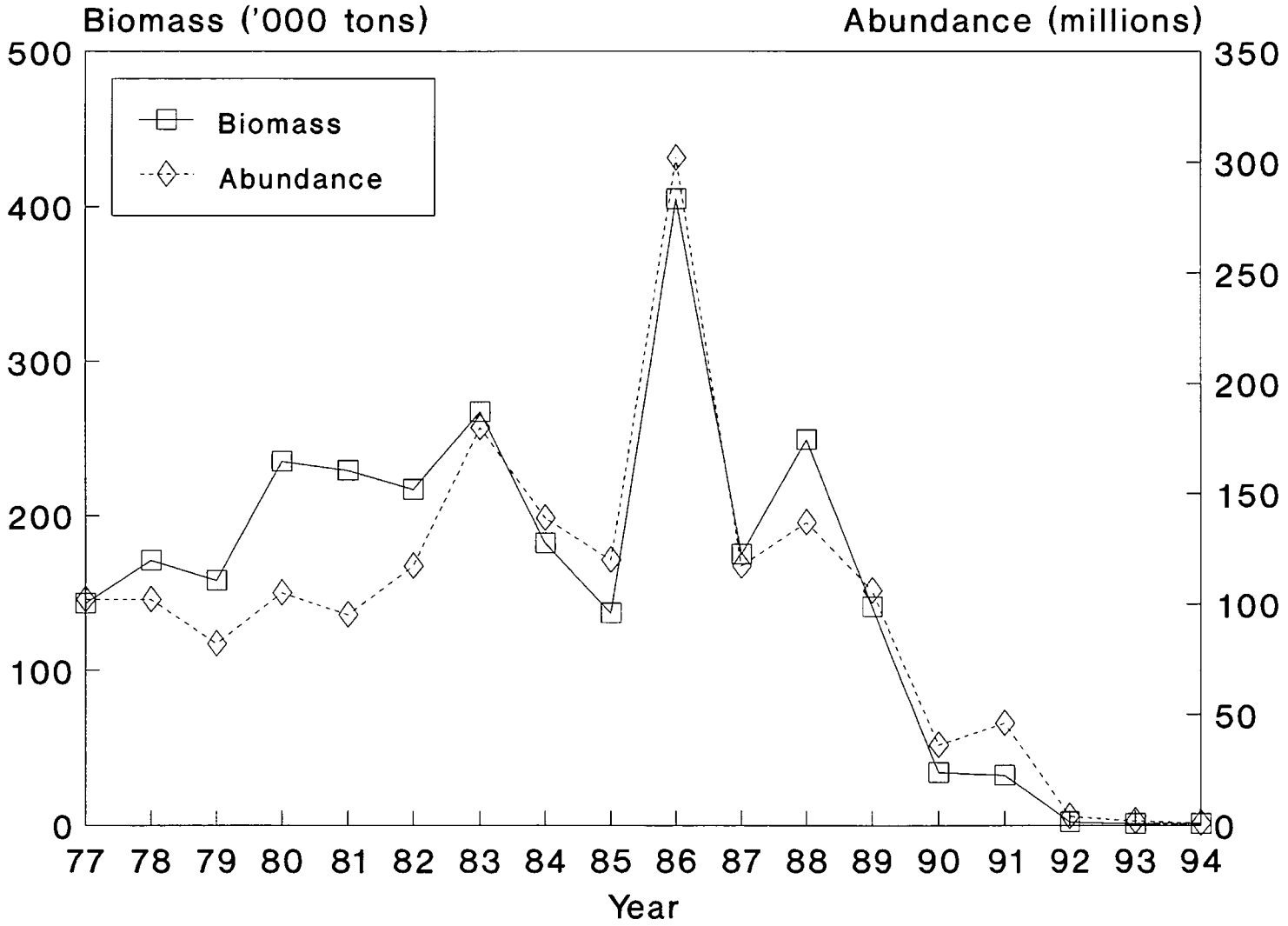


Figure 6. Biomass and abundance of cod from autumn RV surveys in Division 2J.

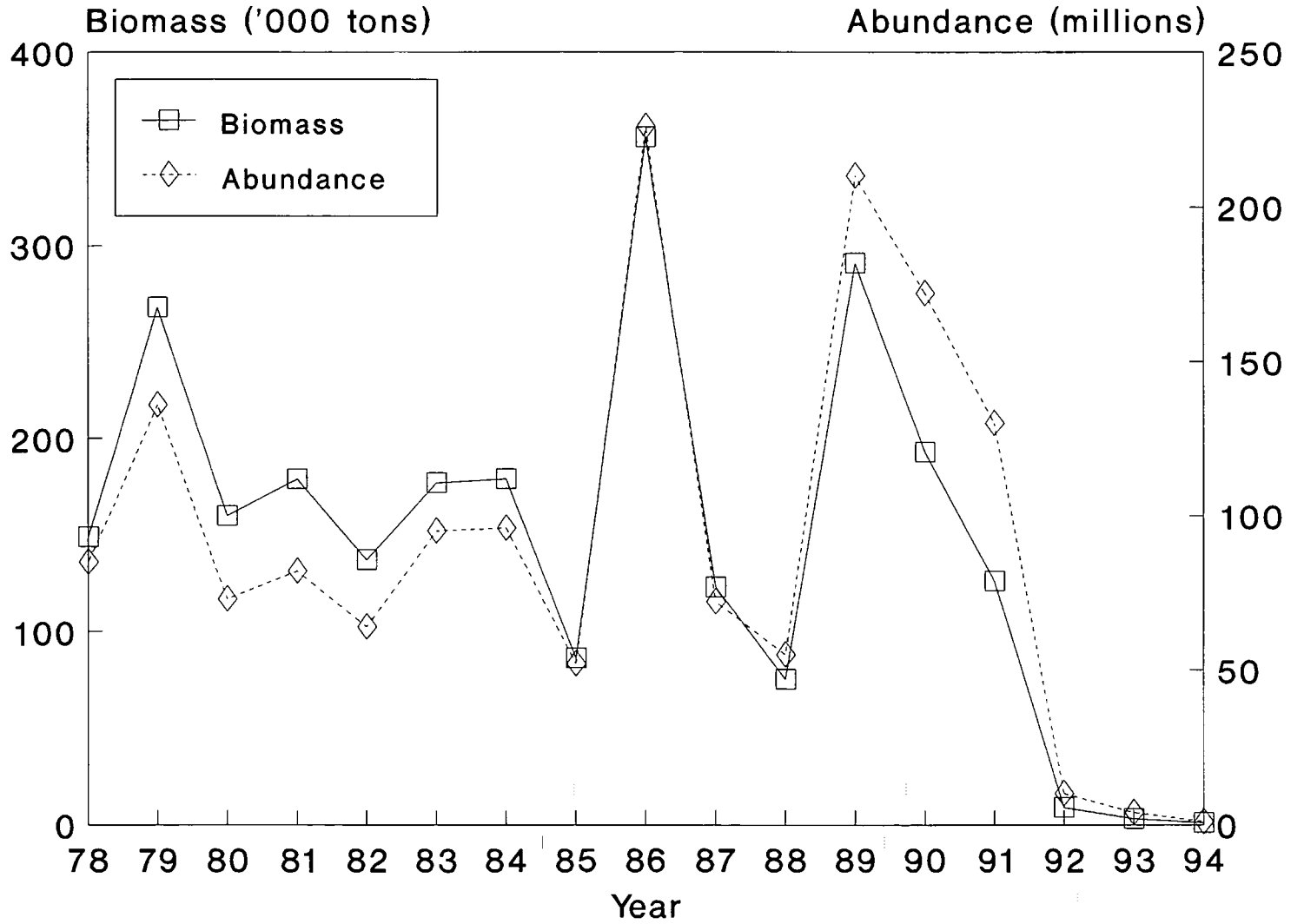


Figure 7. Biomass and abundance of cod from autumn RV surveys in Division 3K.

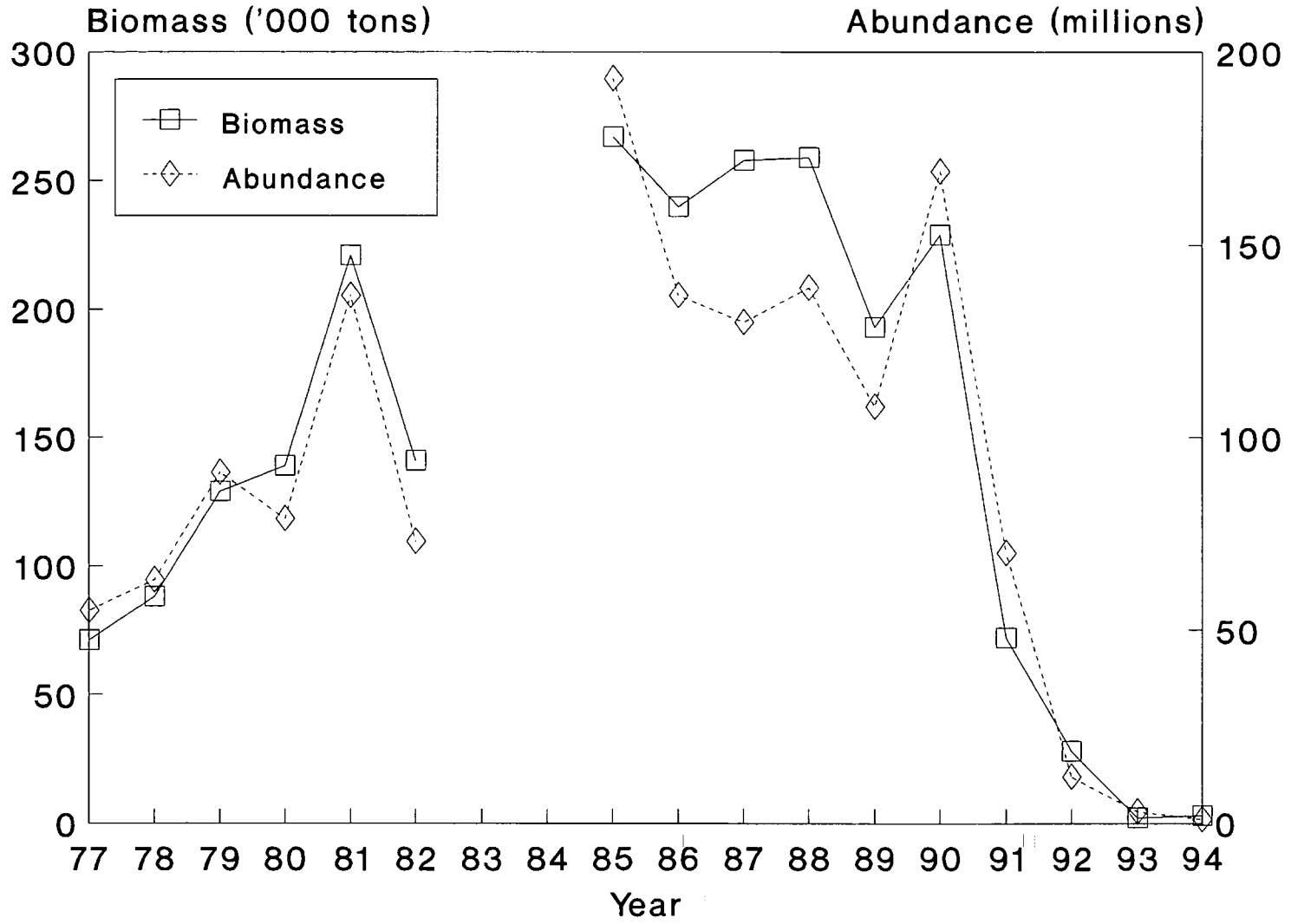


Figure 8. Biomass and abundance of cod from spring RV surveys in Division 3L.

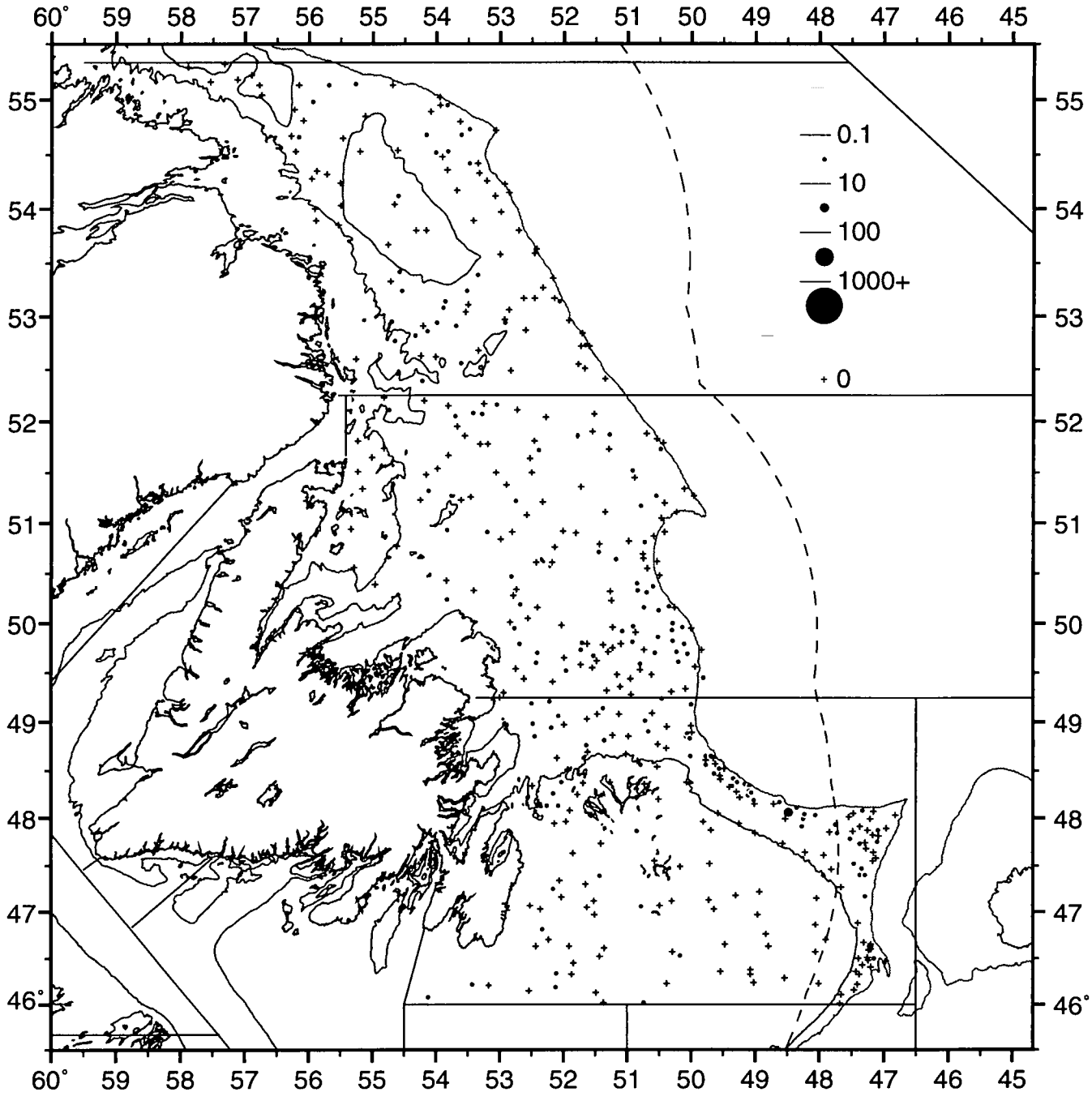


Fig 9. 1994 2J3KL Fall survey Numbers per tow

Fig. 10 Cod Average length at age

Div. 2J - Autumn surveys

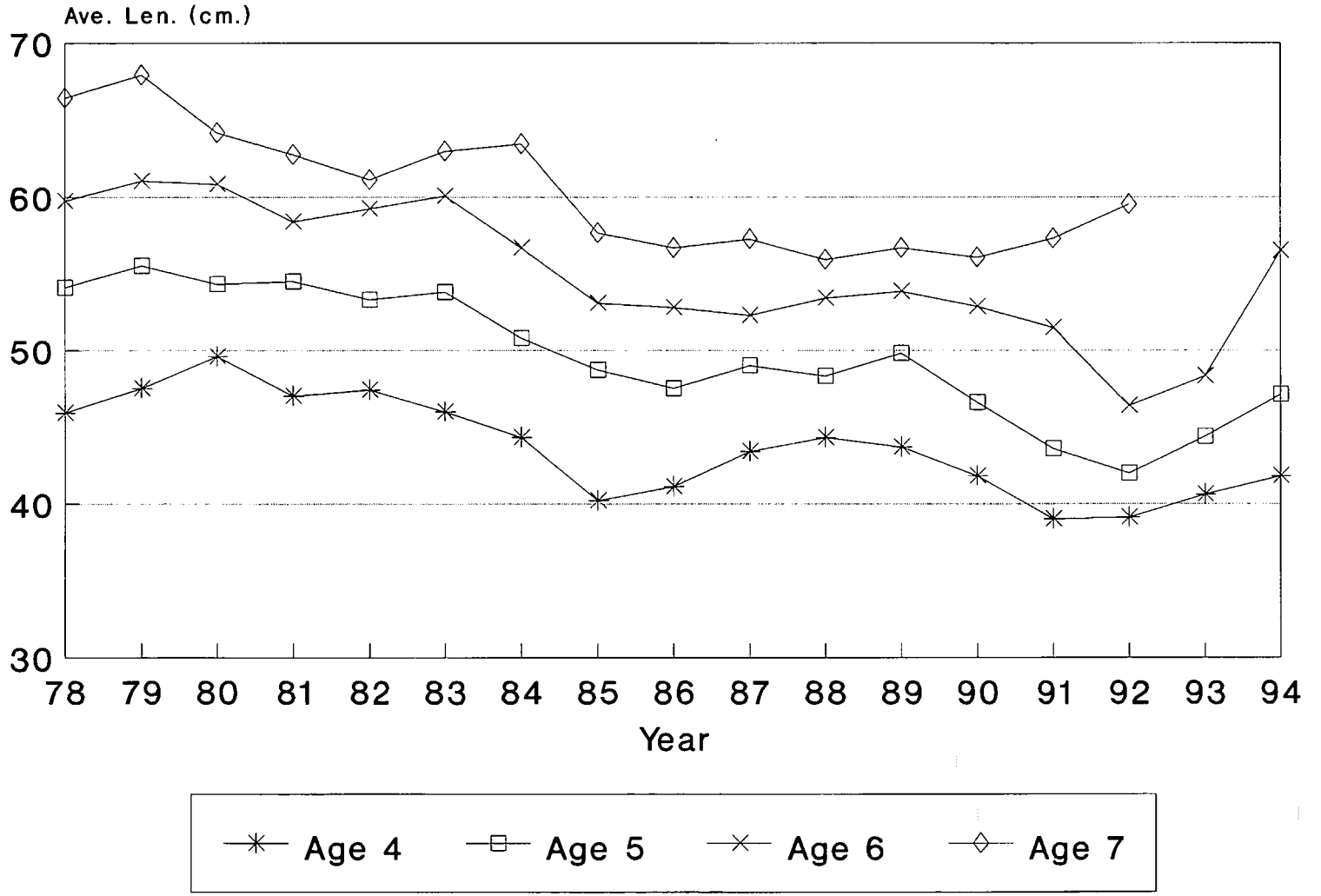


Fig. 11 Cod Average length at age

Div. 3K- Autumn surveys

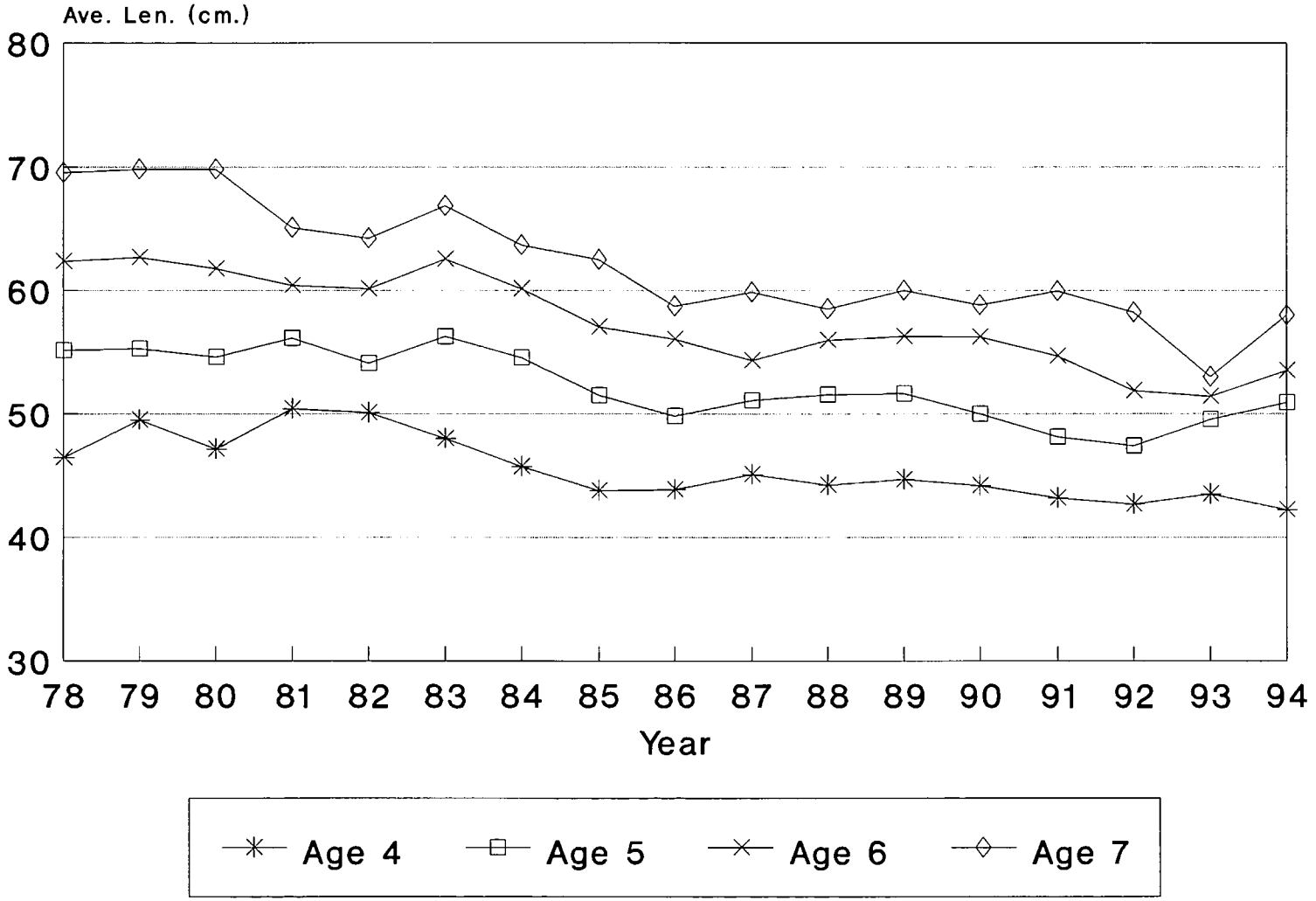
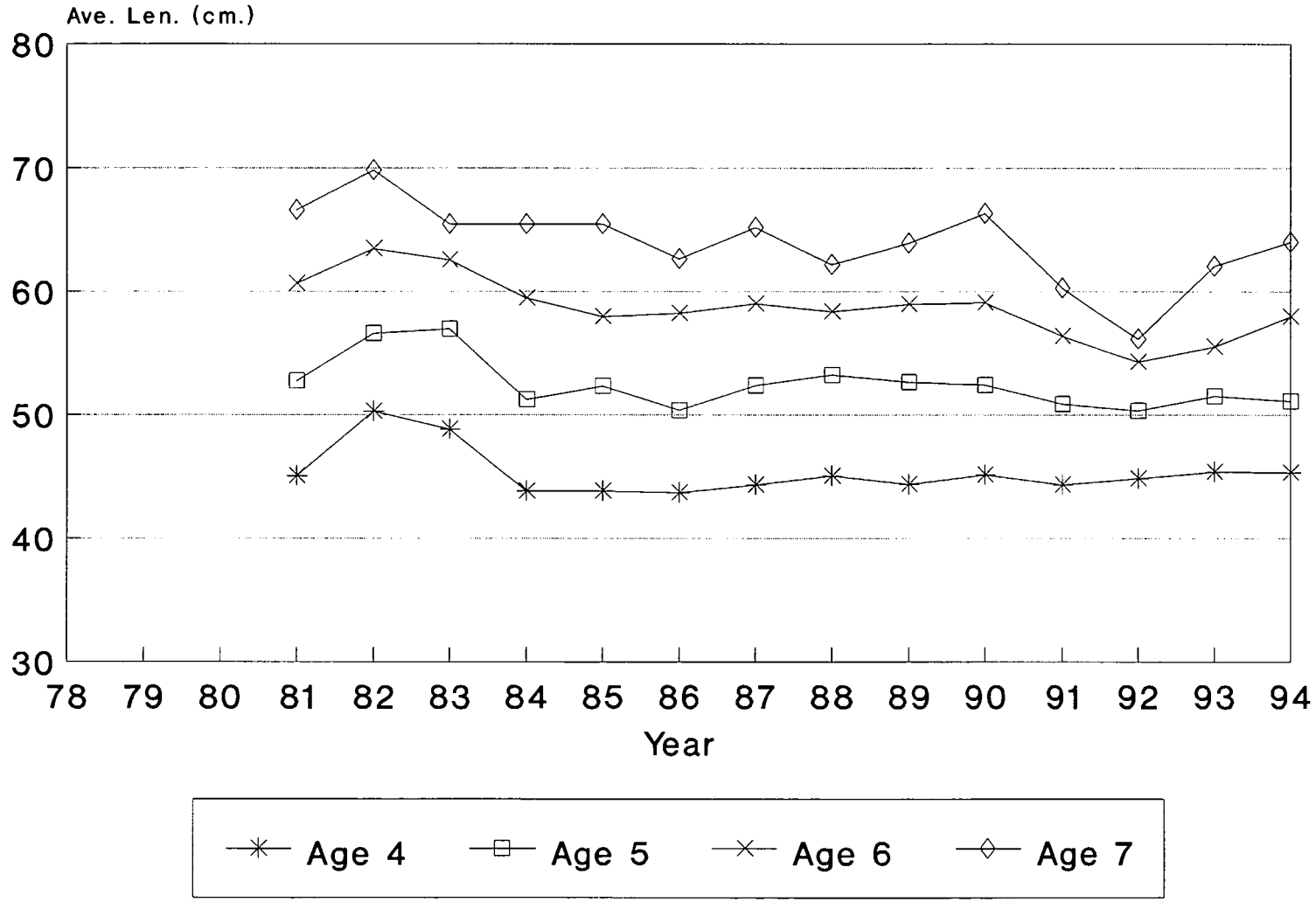


Fig. 12 Cod Average length at age

Div. 3L- Autumn surveys



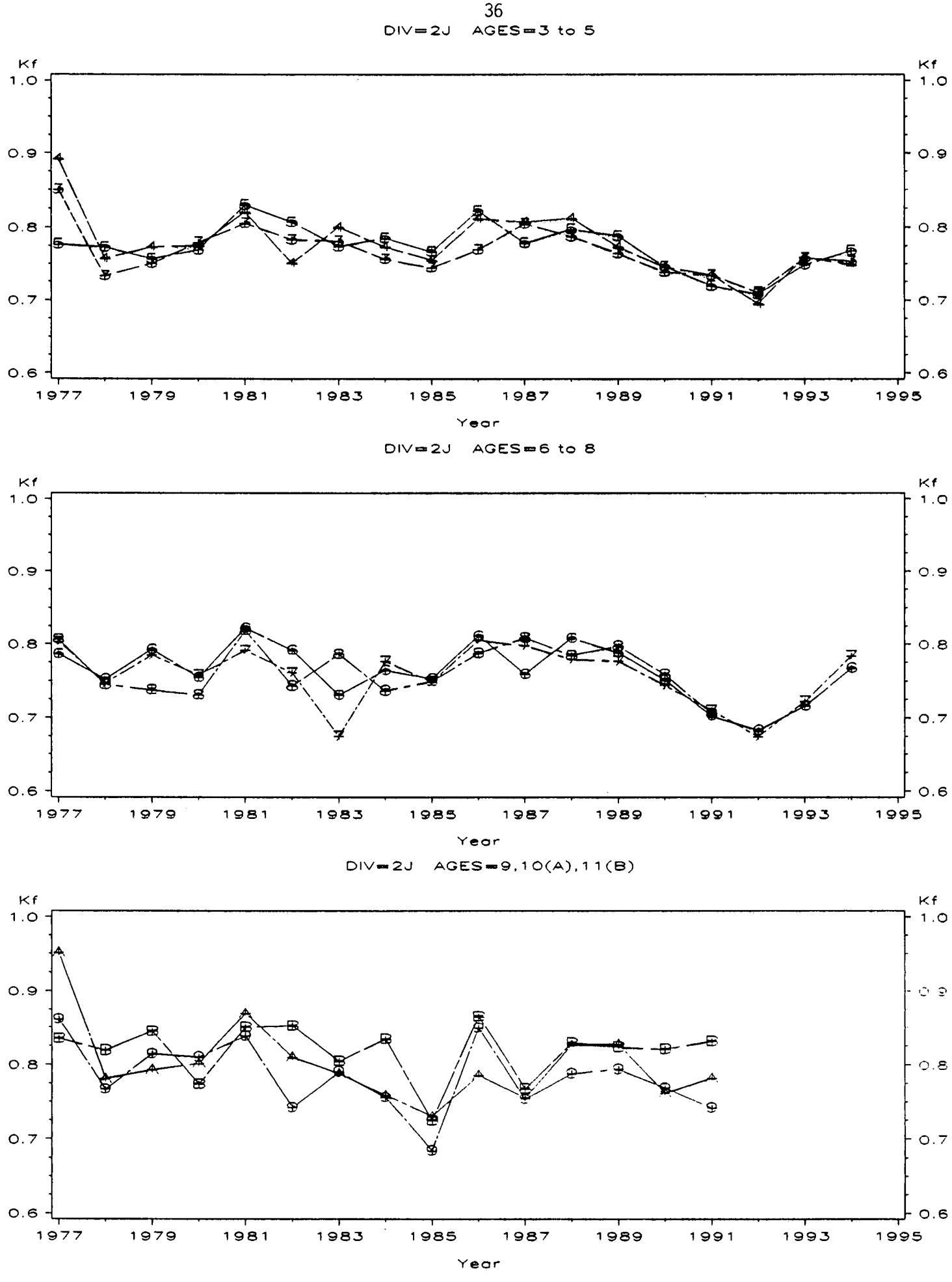


Figure 13 Annual mean condition factors (Kf) by age and year for cod in Div. 2J.

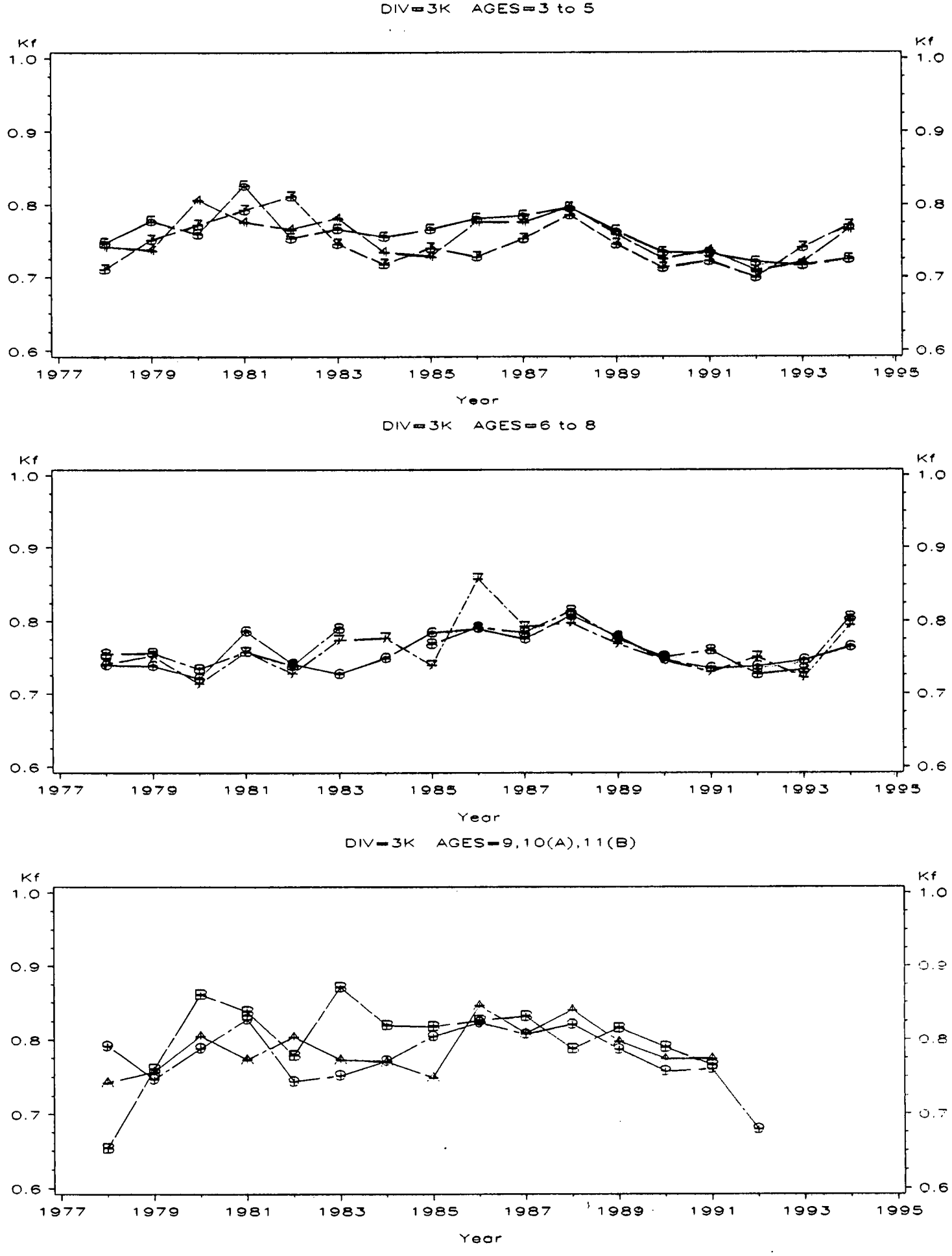


Figure 14 Annual mean condition factors (Kf) by age and year for cod in Div. 3K.

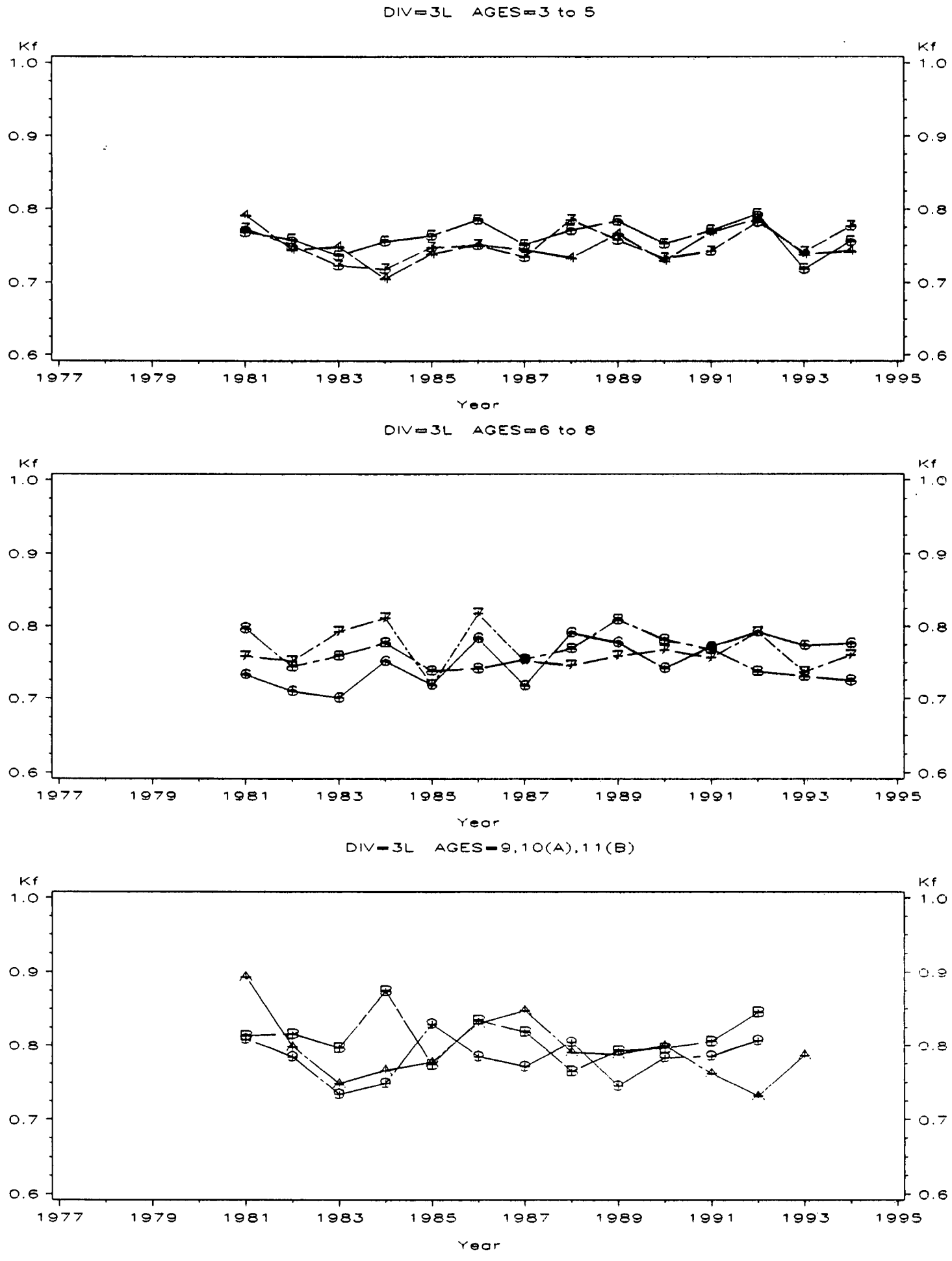


Figure 15 Annual mean condition factors (Kf) by age and year for cod in Div. 3L.