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An Assessment of the American Plaice Stock in NAFO Subarea 2 + Div. 3K

by

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ABSTRACT

The database for this stock is not sufficient to permit an analytical assessment. Catches in 1991 and 1992 were lower than at any other time in the last 30 years. Research vessel surveys indicate that the stock size is currently less than 10% of the stock size in the early to mid 1980's. Total biomass and spawning stock biomass are estimated to be well below any values observed previously. Given the relatively low nominal catches from this stock, it is unlikely that fishing mortality alone can explain the large decline in abundance. The prospects for stock rebuilding in the short to mid term are poor.

RÉSUMÉ

On ne dispose pas de suffisamment de données sur le stock de plie canadienne de la sous-zone 2 et de la division 3K de l'OPANO pour procéder à une évaluation analytique. Les prises de 1991 et de 1992 ont atteint leur niveau le plus bas des trente dernières années. Les relevés de recherche indiquent que le stock actuel représente moins de 10 p. 100 de celui de la première moitié de la décennie 80. On estime que la biomasse totale et la biomasse du stock de reproducteurs sont bien inférieures aux valeurs observées antérieurement. Compte tenu des prises nominales relativement basses dans ce stock, il est peu vraisemblable que la chute importante de l'abondance soit imputable uniquement à la mortalité due à la pêche. Les chances de reconstitution du stock à court et moyen termes sont minces.

Introduction

TAC regulation and assessment history

The first TAC for this stock was introduced in 1974, at a level of 10,000 tons. Following adjustments to this level in the late 1970's, 10,000 t was reinstated as the TAC in 1982 and kept until 1993, when it was reduced to 5,000 t (Table 1). Assessments in the early 1980's attempted VPA's on this stock (Pitt and Brodie, 1981), but were generally unsuccessful and have not been used since that time. Research vessel survey data have formed the basis for evaluation of stock status in recent years. Prior to 1993, the groundfish subcommittee of CAFSAC last reviewed this stock in 1988 (Brodie, 1988), although it was reviewed by DFO scientists in the Nfld. region (with a draft report to CAFSAC steering committee) in 1990.

Catch trends

Catches increased steadily throughout the 1960's, peaking at 12,686 t in 1970 (Table 1, Fig. 1). After the declaration of the 200 mile limit in 1977, foreign catches were greatly reduced, with the total catch from the stock exceeding 2,000 tons on only 2 occasions after 1981. Catches in the last 2 years are the lowest in the time series, with 1992 being due in part to the moratorium on the northern cod fishery. In recent years, most of the catch has come from Div. 3K, with the exception of 1989 and 1990 when a directed fishery occurred in the fall in Div. 2J (Tables 2 & 3). In most years, the inshore catch ranged between 500 and 2,000 tons, while the offshore catch has fluctuated more widely.

Catch/effort

CPUE data are available from Canadian offshore otter trawlers for the period 1976-92 (Table 4). However, in only 2 of the past 11 years has the main species plaice catch exceeded 500 t, and in many years it was negligible. Therefore these data cannot be used as index of abundance for this stock.

Catch at age and mean weights at age

Catch at age data for this stock are available for the period 1984-90, based on samples from the Canadian fisheries (Table 5). For many years prior to 1984, and for 1991 and 1992, sampling data are either non-existent or inadequate to calculate catch at age. In most years, ages 9-12 comprise the bulk of the commercial fishery, and there was a declining trend in the catch of older individuals up to 1990. As well, the mean weights at age increased at all ages in both 1989 and 1990.

Research vessel survey data

Tables 6-9 contain the results of stratified random surveys in

Div. 2G, 2H, 2J, and 3K respectively. The biomass in Div. 2G was relatively low in all surveys, although coverage was poor in most years except 1987 and 1988. Nonetheless, a decline in biomass is evident from the late 1970's to the present. In Div. 2H, the biomass also declined substantially over this period (Table 7).

In Div. 2J, where survey coverage has been virtually complete since 1981, the biomass index has declined drastically from estimates of about 90,000 tons in 1982-83 to only 6,500 and 2,400 tons in 1991 and 1992 respectively (Table 10, Fig. 2). Div. 3K shows a similar pattern, with the biomass declining from the 25,000 to 40,000 ton range in the early-mid 1980's to less than 6500 t in the 2 most recent surveys (Table 11, Fig.2).

These reductions in stock size can also be readily seen from the expanding symbol (ACON) plots of plaice distribution from the surveys in 2J and 3K (Figs. 3-10). Shifts in the depth distribution of the biomass to deeper water occurred during 1986-89 in both Divisions (Tables 10-11), followed by rapid declines to very low levels. Similar decreases in abundance have also been observed for the other stocks of A.plaice in Nfld. waters (Figs 11,12).

Tables 12 and 13 show the mean numbers per tow from the surveys in Div 2J and 3K respectively. Of interest here is the gradual reduction in the numbers of older fish caught in the surveys, consistent with the commercial fishery data. These series are characterized by relatively high Z-values beyond age 9 or 10 in most years but the values in the last 2 years, particularly in Div. 2J, are far in excess of the earlier values.

Discussion

It is clear from the RV survey data that this stock had declined to an extremely low level by the end of 1992. Catches in the commercial fishery, even before the moratorium on northern cod in 1992, had been decreasing and the catch in 1991 of 500 t was the lowest in about 30 years. Given the stock size estimated from surveys in the early to mid 1980's, and the relatively low catches in the commercial fishery since then, it is highly unlikely that fishing mortality can explain the massive declines in stock size which have occurred. Other possible explanations such as misreporting of catches or migration of fish are not plausible, given the nature of the fishery and the biology of the species. One possible explanation is increased natural mortality since the mid 1980's, corresponding with periods of extreme oceanographic conditions in the 2J3K area. However, there are no known mechanisms to relate such an increase in natural mortality with these conditions, either directly or indirectly.

Prognosis

Given the current stock size estimates from surveys, there can be no optimism in the short or medium term. Even with very low catches, the stock size continued its sharp decline from 1991 to 1992. The prospects for rebuilding in the longer term are unknown, as little is known about stock-recruitment relationships, and both the total stock size and spawning stock biomass are now far below

anything seen in the 15 year time series of RV survey estimates. There will likely be a much-reduced fishery, if any at all, on this stock for the next several years.

References

Brodie,W.B. 1988. Status of the American plaice stock in NAFO Subarea 2 and Division 3K. CAFSAC Res. Doc. 88/37, 26p.

Pitt,T.K. and W. Brodie. 1981. Stock assessment of American plaice in NAFO Subarea 2 and Division 3K. CAFSAC Res. Doc. 81/51, 17 p.

Table 1. Nominal catches (1963-92) and TACs (1974-93) of American plaice, NAFO Subarea 2 plus Division 3K. All values in metric tons.

Year	Canada			Poland	USSR	Other	Total	TAC
	Inshore	Offshore[a]	Total					
1963	116	-	116	675	627	3	1,421	
1964	95	-	95	1,678	1,268	27	3,068	
1965	224	-	224	3,195	2,155	14	5,588	
1966	228	-	228	1,860	765	96	2,949	
1967	395	-	395	1,134	1,701	361	3,591	
1968	1,023	-	1,023	1,889	2,911	128	5,951	
1969	1,689	-	1,689	867	4,129	217	6,902	
1970	3,751	-	3,751	378	8,160	397	12,686	
1971	2,486	-	2,486	233	2,597	32	5,348	
1972	1,188	9	1,197	849	6,760	315	9,121	
1973	1,368	16	1,384	225	3,011	520	5,140	
1974	462	106	568	91	4,643	318	5,620	10,000
1975	813	46	859	95	4,449	344	5,747	8,000
1976	1,741	736	2,477	118	3,373	139	6,107	8,000
1977	1,925	4,691	6,616	27	698	184	7,525	8,000
1978	1,723	1,452	3,175	138	123	86	3,522	6,000
1979	1,792	1,058	2,850	31	39	45	2,965	6,000
1980	1,140	3,746	4,886	39	26	89	5,040	6,000
1981	1,069	6,332	7,401	58	56	30	7,545	6,000
1982	576	1,265	1,841	13	8	38	1,900	10,000
1983	445	863	1,308	266	11	48	1,633	10,000
1984	559	502	1,061	81	6	27	1,175	10,000
1985	558	160	718	14	7	14	753	10,000
1986	1,007	1,903	2,910	1	39	68	3,018	10,000
1987	737	165	902	38	111	12	1,063	10,000
1988	630	252	882	41	21	9	953	10,000
1989	861	3,291	4,152	84	8	4	4,248	10,000
1990[b]	573	1,223	1,796	-	29	-	1,825	10,000
1991[b]	214	280	494	-	14	2	510	10,000
1992[b]	83	21	104	-	-	-	104	10,000
1993								5,000

[a]Includes some catches by inshore otter trawlers in some years.
[b]Provisional.

Table 2. Nominal catch by Division, American plaice in Subarea 2 plus Division 3K, 1963-92.

	2G	2H	2J	3K	Unknown	Total
1963	0	0	238	1,183		1,421
1964	0	21	1,193	1,854		3,068
1965	1	694	2,657	2,236		5,588
1966	2	102	575	2,270		2,949
1967	1	440	1,267	1,883		3,591
1968	0	32	938	4,981		5,951
1969	1	160	2,268	4,473		6,902
1970	11	103	2,128	10,444		12,686
1971	746	58	925	3,619		5,348
1972	1	196	4,818	4,106		9,121
1973	0	26	1,788	3,326		5,140
1974	0	11	938	4,671		5,620
1975	73	0	1,101	4,573		5,747
1976	24	43	645	5,395		6,107
1977	0	0	224	7,301		7,525
1978	1	49	145	3,327		3,522
1979	0	11	221	2,733		2,965
1980	0	36	142	4,862		5,040
1981	0	38	96	7,411		7,545
1982	0	108	204	1,588		1,900
1983	0	124	168	1,341		1,633
1984	0	54	92	1,029		1,175
1985	0	11	34	708		753
1986	0	4	100	2,914		3,018
1987	0	1	239	823		1,063
1988	0	50	106	797		953
1989	0	9	3,225	1,014		4,248
1990[a]	1	1	995	828		1,825
1991[a]	0	13	69	428		510
1992[a]	0	2	5	97		104

[a]Provisional.

Table 3. Nominal catch by month, American plaice in Subarea 2 plus Division 3K, 1972-92.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unk.	Total
1972	1089	924	297	2688	321	423	849	1313	334	169	13	701		9121
1973	1570	1133	106	519	232	347	491	403	181	30	20	108		5140
1974	373	371	50	1	1425	1799	116	224	141	508	340	272		5620
1975	555	768	648	331	26	161	867	847	181	124	342	897		5747
1976	1517	579	30	156	382	657	592	549	429	413	274	529		6107
1977	64	641	2778	1488	675	691	665	425	67	20	2	9		7525
1978	469	748	259	119	394	534	479	401	63	22	5	29		3522
1979	62	328	66	146	609	707	603	284	47	13	0	100		2965
1980	3	137	796	2454	643	334	352	143	93	62	1	22		5040
1981	717	524	4380	507	411	246	306	253	51	11	8	131		7545
1982	36	298	178	327	377	204	147	148	143	7	2	33		1900
1983	236	118	30	18	179	223	231	181	72	201	105	39		1633
1984	51	20	78	36	84	217	280	251	103	16	8	31		1175
1985	11	3	8	22	53	67	130	242	161	36	7	13		753
1986	62	640	1097	66	135	248	7	231	73	7	8	114		3018
1987	33	27	24	6	24	134	275	224	64	28	1	223		1063
1988	30	75	49	32	98	63	280	192	65	14	21	34		953
1989	94	21	57	32	71	174	338	236	84	1572	1434	135		4248
1990[a]	34	142	34	19	3	94	217	195	77	85	469	390	66	1825
1991[a]	152	24	11	1	9	5	52	93	40	20	74	8	21	510
1992[a]	1	0	0	18	5	14	33	24	7	2	0	0		104

[a]Provisional.

Table 4. Catch and effort, Can(N) offshore trawlers, American plaice, Subarea 2 plus Division 3K, 1976-92.

Year	Total catch (t) from stock	Main species OT catch (t)	Main species OT CPUE (t/hr)
1976	6,107	701	0.395
1977	7,525	3,628	0.402
1978	3,522	652	0.375
1979	2,965	315	0.467
1980	5,040	2,151	0.525
1981	7,545	4,998	0.970
1982	1,900	500	0.505
1983	1,633	310	0.480
1984	1,175	21	-
1985	753	13	-
1986	3,018	947	0.818
1987	1,063	5	-
1988	953	1	-
1989	4,248	1,457	0.714
1990[a]	1,825	196	-
1991[a]	510	43	-
1992[a]	104	9	-

[a]Provisional.

Table 5 . Catch at age and mean weights at age from the commercial fishery.

	1984	1985	1986	1987	1988	1989	1990
7	7	4	1	1	1	9	54
8	126	17	28	1	18	127	279
9	249	123	276	134	149	1067	553
10	341	253	1179	512	441	1629	762
11	269	305	1337	552	470	1858	709
12	205	221	854	287	321	1172	421
13	188	118	449	134	122	372	60
14	163	47	200	61	48	103	11
15	72	16	61	22	18	7	3
16	24	2	26	4	5	4	0
17	14	0	2	0	1	0	0
18	2	1	3	0	0	0	0

	1984	1985	1986	1987	1988	1989	1990
7	0.218	0.291	0.241	0.116	0.205	0.230	0.264
8	0.307	0.344	0.313	0.193	0.248	0.292	0.349
9	0.397	0.414	0.358	0.294	0.302	0.378	0.435
10	0.493	0.491	0.443	0.407	0.393	0.512	0.569
11	0.651	0.611	0.601	0.570	0.564	0.680	0.729
12	0.779	0.793	0.816	0.778	0.756	0.881	0.981
13	0.905	1.070	1.088	1.000	0.960	1.163	1.341
14	1.224	1.384	1.420	1.226	1.244	1.530	1.729
15	1.618	1.705	1.776	1.622	1.574	1.739	1.973
16	1.969	1.997	2.142	1.934	1.977	2.617	0.000
17	2.114	0.000	2.617	0.000	1.707	0.000	0.000
18	2.100	2.617	3.343	0.000	1.871	0.000	0.000

Table 6. Biomass (t) of A. plaice, by stratum, from r.v. surveys in Div. 2G.

Stratum	Depth (m)	Year-trip GA 13 1978	GA 24 1979	GA 57 1981	GA 143 1987	GA 156 1988	AN 161 1991
901	201-300	459	318	310	223	220	25
902	301-400	-	-	-	0	0	-
903	401-500	-	1	0	0	0	0
904	501-750	-	-	0	0	0	-
905	751-1000	-	-	-	-	0	-
906	1001-1250	-	-	-	0	0	-
907	1251-1500	-	-	-	-	-	-
908	201-300	100	33	0	12	8	4
909	< 200	1563	272	1184	-	-	12
910	< 200	887	174	303	-	-	0
911	201-300	142	38	104	42	0	65
912	301-400	-	-	-	0	0	-
913	401-500	-	-	-	0	0	-
914	501-750	-	-	-	0	0	-
915	751-1000	-	-	-	-	0	-
916	1001-1250	-	-	-	-	0	-
917	1251-1500	-	-	-	-	-	-
918	1251-1500	-	-	-	-	-	-
919	1001-1250	-	-	-	-	0	-
920	751-1000	-	-	-	0	0	-
921	501-750	-	0	-	0	0	-
922	401-500	0	-	0	-	-	-
923	301-400	0	-	3	0	0	-
924	201-300	52	103	71	11	32	-
925	< 200	645	200	158	-	-	-
926	201-300	-	-	-	-	10	-
927	301-400	-	-	-	0	0	-
928	401-500	-	-	-	0	0	-
929	501-750	-	0	16	0	0	-
Total biomass		3848	1140	2148	288	270	107
# sets		53	59	52	54	60	27

Table 7. Biomass (t) of A. plaice, by stratum, from r.v. surveys in Div. 2H.

Stratum	Depth (m)	Year-Trip GA 13 1978	GA 24 1979	GA 57 1981	WT 52 1986	GA 143 1987	GA 156 1988	AN 161 1991
930	< 200	2908	7614	9969	5324	672	900	39
931	201-300	577	1919	86	21	289	245	3
932	301-400	-	-	-	-	1	0	2
933	401-500	-	-	-	-	-	0	0.3
934	501-750	-	0	-	0	0	0	-
935	751-1000	-	-	-	-	0	0	-
936	1001-1250	-	-	-	-	0	0	-
937	1251-1500	-	-	-	-	-	-	-
938	1251-1500	-	-	-	-	-	-	-
939	1001-1250	-	-	-	-	0	0	-
940	751-1000	-	-	-	-	0	0	-
941	501-750	-	-	-	0	0	0	-
942	401-500	-	0	0	0	0	2	3
943	201-300	235	2099	286	47	19	844	0
944	301-400	57	353	46	124	14	12	34
945	401-500	-	143	13	-	115	29	166
946	501-750	197	442	155	-	50	16	-
947	501-750	-	58	75	-	9	0	-
948	401-500	-	-	-	-	-	-	-
949	301-400	-	-	-	-	-	-	-
950	201-300	-	-	-	-	-	-	-
951	401-500	8	36	14	-	26	4	141
952	301-400	-	18	169	-	115	74	9
953	201-300	208	1320	117	-	3360	395	106
954	< 200	452	410	3614	-	286	356	24
955	201-300	93	172	10	-	33	67	9
956	< 200	1027	370	1824	-	900	230	33
957	< 200	2271	475	1149	-	469	727	5
958	201-300	-	80	0	-	22	26	1
959	301-400	-	11	0	-	0	0	1
960	401-500	-	0	0	-	7	0	0.1
961	501-750	-	0	0	-	0	0	-
962	751-1000	-	-	-	-	0	0	-
963	1001-1250	-	-	-	-	0	0	-
964	1251-1500	-	-	-	-	-	-	-
Total biomass		8031	15522	17527	5516	6388	3927	577
# sets		51	75	83	20	121	118	48

Table 8. Mean weight of American plaice per tow, by stratum, from research vessel surveys in Division 2J. Numbers in parentheses are the number of successful 30 minute tows in each stratum. The stratified mean weight per tow, the total number of sets in each year, and the biomass estimates are given at the bottom of the table. (GA = R/V GADUS ATLANTICA.)

			Year-survey											
Depth(m)	Stratum	No. of trawlable units ('000)	1977 GA 3	1978 GA 15	1979 GA 29	1980 GA 44	1981 GA 58	1982 GA 71,72	1983 GA 86, 87,88	1984 GA 101, 102,103	1985 GA 116, 117,118	1986 GA 131, 132,133	1987 GA 145, 146,147	1988 GA 159, 160,161
101-200	201	107.117	52.7(2)	56.5(3)	69.4(2)	121.2(3)	71.2(5)	151.0(6)	81.0(6)	59.5(3)	41.2(6)	29.5(5)	47.6(6)	1.6(8)
201-300	202	33.028	45.9(2)	14.5(2)	7.0(2)	17.8(2)	18.8(2)	46.8(2)	51.5(2)	7.0(2)	7.0(2)	14.3(2)	3.6(2)	-
301-400	203	36.031	7.4(2)	-	-	16.0(2)	2.3(2)	0.9(3)	0.7(3)	1.5(2)	0.3(3)	17.8(2)	0.9(3)	0.9(2)
401-500	204	26.573	16.3(2)	-	-	-	6.9(2)	2.7(3)	9.0(3)	4.3(2)	2.9(2)	12.9(2)	4.0(2)	14.0(2)
101-200	205	136.842	75.3(4)	13.7(4)	51.7(2)	27.9(4)	74.9(8)	181.8(12)	67.1(8)	23.6(8)	31.5(8)	11.2(7)	9.7(10)	4.9(6)
101-200	206	193.816	253.3(11)	129.4(7)	31.0(8)	62.5(7)	131.0(11)	120.7(18)	213.6(14)	150.3(11)	50.8(14)	60.6(11)	27.0(14)	75.7(14)
101-200	207	168.594	72.6(5)	21.9(4)	30.0(5)	10.3(5)	22.3(9)	68.7(15)	33.7(10)	25.9(7)	21.6(13)	3.4(7)	12.3(11)	4.5(7)
301-400	208	33.629	16.9(4)	15.3(3)	25.4(2)	15.8(2)	15.0(2)	3.3(3)	3.5(2)	2.2(3)	10.1(3)	34.5(2)	4.6(2)	36.0(2)
201-300	209	120.703	54.1(7)	20.5(4)	21.9(5)	66.3(4)	52.0(6)	22.4(11)	15.8(7)	22.6(7)	21.4(9)	34.8(7)	36.1(8)	15.1(5)
201-300	210	58.100	12.8(6)	40.9(4)	18.8(2)	16.3(3)	13.4(3)	17.5(6)	272.8(2)	20.8(4)	9.1(4)	38.7(3)	2.8(4)	22.8(3)
301-400	211	24.771	8.9(2)	24.7(2)	28.6(2)	44.4(3)	1.6(2)	2.5(2)	7.5(2)	2.3(2)	10.0(3)	8.5(2)	3.4(2)	29.5(2)
501-750	212	49.843	2.2(4)	-	-	-	0.3(2)	0.1(5)	0.1(3)	0.1(3)	0.3(4)	6.7(3)	1.6(4)	30.5(2)
201-300	213	129.486	61.8(8)	48.4(4)	17.9(4)	100.2(5)	43.1(6)	45.5(10)	37.1(10)	12.0(5)	56.1(9)	52.2(9)	14.3(9)	51.3(8)
201-300	214	87.900	23.6(6)	26.6(4)	11.7(4)	11.5(3)	13.1(5)	4.0(8)	36.4(8)	39.6(4)	79.6(6)	2.7(6)	2.3(6)	17.3(6)
201-300	215	95.332	27.8(4)	59.0(5)	26.8(4)	4.0(2)	12.0(5)	4.1(9)	11.6(8)	1.5(3)	3.8(6)	3.3(5)	2.0(7)	4.5(7)
301-400	216	28.825	0.6(2)	-	2.0(2)	0.2(2)	0.5(2)	0.5(2)	0.0(3)	1.3(2)	0.3(2)	0.3(2)	1.2(2)	0.0(2)
401-500	217	20.117	0.2(3)	-	-	-	0.0(2)	0.0(2)	0.0(2)	-	0.0(2)	0.0(2)	0.7(2)	0.0(2)
501-750	218	31.527	0.0(2)	-	-	-	0.0(2)	0.0(2)	0.0(2)	-	0.0(2)	0.0(2)	0.0(2)	0.0(2)
751-1000	219	15.989	-	-	-	-	0.0(2)	-	0.0(2)	-	0.0(2)	0.0(2)	0.0(2)	0.0(2)
301-400	222	33.103	3.2(4)	2.7(3)	4.1(2)	8.0(2)	0.4(2)	2.3(3)	0.0(3)	0.2(3)	0.5(2)	0.0(2)	0.2(2)	0.1(2)
401-500	223	13.512	0.0(2)	-	-	-	0.1(2)	0.0(2)	0.0(2)	0.0(2)	0.0(2)	0.0(2)	0.0(2)	0.5(2)
501-750	224	20.267	0.0(2)	-	-	-	0.0(2)	0.0(2)	0.0(2)	0.0(2)	0.0(2)	0.0(2)	0.0(2)	0.2(2)
1001-1250	225	13.286	0.0(2)	-	-	-	-	-	-	-	-	-	-	-
401-500	227	51.494	0.6(4)	-	-	-	0.2(2)	1.0(5)	0.3(4)	0.0(3)	0.1(4)	0.4(3)	0.7(4)	0.2(3)
201-300	228	107.192	21.9(8)	-	8.3(4)	6.2(3)	8.8(6)	3.9(10)	4.5(6)	5.0(7)	9.1(7)	28.8(6)	13.3(7)	2.7(5)
301-400	229	42.561	7.0(4)	0.5(2)	1.6(2)	1.5(2)	0.1(2)	0.9(4)	1.3(4)	0.2(3)	0.1(3)	1.0(3)	0.4(3)	0.0(3)
501-750	230	17.790	0.0(3)	-	-	-	0.0(2)	0.0(2)	0.0(2)	0.0(2)	0.0(2)	0.0(2)	0.3(2)	0.0(2)
751-1000	231	13.662	0.0(2)	-	-	-	-	0.0(2)	0.0(2)	0.0(2)	0.0(2)	0.0(2)	0.0(2)	0.0(2)
01-1250	232	17.715	0.0(2)	-	-	-	-	-	-	-	-	-	-	-
201-300	234	38.133	23.6(2)	9.8(2)	6.4(2)	32.8(2)	5.0(2)	3.5(3)	14.5(3)	14.7(2)	1.7(3)	3.3(2)	1.9(3)	1.5(2)
401-500	235	31.527	14.3(4)	-	-	-	16.8(2)	1.3(3)	2.3(2)	1.2(3)	0.0(2)	8.0(2)	0.9(2)	20.8(2)
751-1000	236	9.158	0.0(2)	-	-	-	0.0(2)	0.0(2)	0.0(2)	0.0(2)	0.0(2)	0.2(2)	0.0(2)	0.0(2)
Mean (#set)			58.4(117)	44.4(53)	26.7(54)	40.0(56)	36.9(102)	50.6(157)	53.6(129)	31.6(99)	123.6(131)	21.1(109)	12.8(129)	18.9(109)
Surveyed biomass ('000 t)			104.5	57.9	38.4	59.0	65.1	89.0	95.3	53.9	41.9	37.4	22.7	32.9

		Year-survey			
Depth(m)	Stratum	1989 GA 174, 175,176	1990 GA 190, 191,192	1991 GA 208, 209,210	1992 GA 224, 225,226
101-200	201	0.2(8)	0.3(6)	0.1(3)	1.1(3)
201-300	202	0.4(2)	0.1(2)	4.0(3)	2.3(3)
301-400	203	2.5(3)	6.9(2)	2.6(3)	0.9(3)
401-500	204	72.5(2)	14.2(2)	7.9(3)	1.2(3)
101-200	205	0.5(10)	0.3(8)	0.3(2)	0.6(4)
101-200	206	3.3(13)	7.1(11)	4.2(6)	1.2(10)
101-200	207	0.2(10)	0.7(7)	0.3(2)	0.1(3)
301-400	208	143.2(2)	13.7(2)	8.8(3)	2.5(3)
201-300	209	11.6(8)	5.4(6)	1.1(7)	0.5(5)
201-300	210	14.0(4)	10.3(3)	1.7(7)	0.7(7)
301-400	211	10.4(2)	30.0(2)	5.2(5)	1.6(6)
501-750	212	0.9(4)	18.1(3)	24.6(2)	3.5(2)
201-300	213	38.7(9)	48.6(8)	6.8(14)	3.2(19)
201-300	214	148.9(6)	10.9(5)	4.9(15)	2.6(14)
201-300	215	1.6(6)	4.7(6)	2.1(15)	1.8(10)
301-400	216	2.0(2)	1.0(2)	0.7(3)	0.7(3)
401-500	217	0.0(2)	1.8(2)	2.5(3)	1.1(3)
501-750	218	0.6(2)	2.6(2)	2.2(2)	0.6(2)
751-1000	219	0.9(2)	0.0(2)	0.6(2)	1.3(2)
301-400	222	1.3(2)	3.4(2)	8.2(3)	2.6(3)
401-500	223	0.3(2)	2.0(2)	6.5(3)	1.7(3)
501-750	224	1.4(2)	0.1(2)	7.6(2)	5.0(2)
1001-1250	225	-	-	-	-
401-500	227	7.5(4)	2.4(2)	4.9(6)	1.1(6)
201-300	228	6.2(8)	4.5(6)	4.1(3)	0.4(5)
301-400	229	2.3(3)	0.8(2)	1.8(3)	1.0(3)
501-750	230	3.4(2)	0.0(2)	8.3(2)	0.0(2)
751-1000	231	0.8(2)	0.0(2)	0.1(2)	0.2(2)
01-1250	232	-	-	-	-
201-300	234	-	0.3(2)	1.2(3)	0.2(3)
401-500	235	7.5(2)	64.2(2)	5.0(3)	2.7(3)
751-1000	236	-	0.2(2)	3.0(2)	10.8(2)
Mean (#set)		17.1(125)	9.1(108)	3.7(132)	1.4(139)
Surveyed biomass ('000 t)		30.0	16.2	6.5	2.4

Table 9. Mean weight of American plaice per tow, by stratum, from research vessel surveys in Division 3K. Numbers in parentheses are the number of successful 30 minute tows in each stratum. The stratified mean weight per tow, the total numbers of sets in each year, and the biomass estimates are given at the bottom of the table.

			Year-survey											
Depth (m)	Stratum	No. of trawlable units ('000)	1978 GA 15	1978 GA29	1980 GA44	1981 GA 58,59	1982 GA 71,72	1983 GA 86, 87,88	1984 GA 101, 102,103	1985 GA 116, 117,118	1986 GA 131, 132,133	1987 GA 145, 146,147	1988 GA 159, 160,161	1989 GA 174, 175,176
101-200	618	109.218	-	-	-	-	-	-	23.3(5)	25.5(6)	3.2(5)	2.8(7)	0.3(6)	0.1(8)
101-200	619	119.202	-	-	-	-	-	-	10.7(7)	4.3(7)	0.8(5)	0.5(8)	0.3(7)	0.1(8)
201-300	620	203.349	112.9(7)	29.5(7)	50.2(9)	33.5(10)	37.9(9)	38.4(10)	51.9(13)	21.8(14)	24.7(9)	19.9(14)	1.9(12)	1.2(15)
201-300	621	214.609	92.8(7)	64.3(8)	21.0(10)	66.0(11)	29.4(14)	39.7(12)	41.7(14)	39.8(15)	10.3(14)	12.4(12)	4.5(10)	2.3(17)
401-500	622	47.441	-	-	-	9.5(2)	16.2(3)	8.3(2)	9.4(4)	1.2(4)	28.0(2)	6.1(3)	22.7(3)	29.0(3)
301-400	623	77.091	50.4(3)	16.0(3)	88.4(4)	50.2(4)	15.0(5)	23.3(6)	18.7(5)	3.3(6)	23.6(4)	19.6(5)	14.6(5)	11.8(6)
201-300	624	50.143	18.3(3)	11.3(2)	5.0(2)	25.3(2)	17.0(4)	13.9(4)	17.6(4)	16.1(4)	9.0(2)	17.8(4)	5.8(3)	2.3(3)
301-400	625	63.805	12.3(3)	7.7(3)	5.3(4)	9.9(4)	7.3(2)	16.8(3)	10.3(5)	11.6(5)	12.7(3)	8.6(3)	8.2(4)	11.0(4)
301-400	626	68.984	7.2(4)	21.2(3)	40.5(3)	58.4(5)	20.3(5)	31.8(4)	38.5(6)	17.3(5)	85.8(4)	23.6(5)	16.5(5)	18.9(5)
401-500	627	88.876	-	-	-	14.6(6)	6.1(7)	6.2(6)	12.5(8)	11.4(7)	41.7(5)	20.2(6)	31.2(5)	41.5(6)
301-400	628	81.445	5.6(5)	22.2(2)	6.6(4)	3.9(6)	2.3(6)	16.3(6)	17.0(7)	11.8(6)	7.9(4)	13.8(5)	11.5(5)	7.5(4)
301-400	629	37.457	6.8(3)	6.6(2)	8.0(3)	7.5(3)	3.3(2)	8.8(3)	5.3(4)	4.5(4)	16.9(3)	11.3(3)	10.4(2)	7.5(3)
301-400	630	40.835	-	5.4(2)	24.9(2)	8.5(2)	-	4.3(2)	4.9(3)	3.6(4)	3.4(2)	4.7(3)	2.6(3)	5.7(3)
401-500	631	90.227	-	-	-	7.4(5)	4.0(2)	3.8(5)	6.9(5)	7.9(7)	24.8(4)	20.8(6)	15.9(6)	23.5(7)
201-300	632	33.554	9.2(3)	14.1(2)	6.4(2)	8.5(2)	5.3(3)	10.2(3)	-	5.3(3)	3.5(2)	2.5(2)	15.0(2)	1.6(2)
301-400	633	163.565	5.9(5)	4.8(6)	2.3(7)	2.6(8)	3.2(7)	2.4(12)	1.7(10)	1.3(12)	14.3(8)	2.4(11)	6.3(8)	5.9(10)
201-300	634	121.454	5.5(5)	4.3(6)	4.6(5)	6.5(7)	5.3(11)	2.4(5)	4.5(7)	2.2(9)	3.8(5)	4.1(11)	6.7(6)	5.2(7)
201-300	635	95.632	10.5(5)	7.5(5)	13.8(4)	13.2(5)	16.8(5)	26.5(6)	18.8(8)	4.9(7)	7.5(6)	5.7(6)	6.1(5)	4.0(7)
201-300	636	109.218	14.2(3)	7.0(5)	4.7(5)	4.4(6)	8.3(10)	11.4(6)	14.4(8)	6.5(8)	4.7(4)	8.1(7)	8.2(6)	5.3(5)
201-300	637	84.973	7.5(4)	7.0(4)	7.3(4)	9.0(6)	16.9(7)	9.5(5)	15.6(6)	4.1(7)	7.0(4)	13.6(6)	9.7(8)	7.1(5)
301-400	638	154.557	11.8(5)	10.1(7)	10.0(6)	12.1(8)	5.6(15)	8.0(11)	5.9(10)	12.3(11)	13.9(4)	16.6(10)	10.5(8)	7.5(11)
301-400	639	109.819	6.4(5)	1.0(2)	5.2(4)	2.1(6)	3.9(10)	1.0(7)	6.0(8)	1.4(8)	5.8(6)	2.9(7)	4.5(6)	2.6(8)
401-500	640	14.863	-	-	-	0.0(2)	0.0(2)	-	0.0(2)	0.3(3)	4.1(2)	3.2(2)	2.3(2)	10.6(2)
501-750	641	43.837	-	-	-	0.0(2)	0.0(4)	0.0(3)	0.0(3)	0.3(4)	-	1.1(3)	-	-
751-1000	642	69.885	-	-	-	0.0(3)	0.0(6)	-	0.0(6)	0.0(5)	-	0.1(5)	-	-
1001-1250	643	95.031	-	-	-	-	-	-	-	-	-	-	-	-
1251-1500	644	71.611	-	-	-	-	-	-	-	-	-	-	-	-
401-500	645	15.313	-	-	-	0.0(2)	0.0(3)	0.1(2)	0.0(2)	0.1(3)	-	1.5(2)	0.9(2)	2.9(2)
501-750	646	24.996	-	-	-	0.0(2)	0.0(2)	0.3(2)	0.0(2)	0.0(3)	-	0.0(2)	-	-
751-1000	647	30.701	-	-	-	0.0(2)	0.0(2)	-	-	0.0(3)	-	-	-	-
1001-1250	648	17.415	-	-	-	-	-	-	-	-	-	-	-	-
1251-1500	649	19.742	-	-	-	-	-	-	-	-	-	-	-	-
Mean (#sets)			34.3(70)	18.3(69)	19.0(78)	18.8(121)	12.6(146)	15.9(125)	17.4(162)	11.2(180)	15.1(107)	10.3(159)	8.2(129)	7.7(151)
Surveyed biomass ('000 t)			57.3	31.4	32.5	40.2	26.5	32.2	40.0	26.5	32.9	24.0	18.0	17.0

		Year-survey		
Depth (m)	Stratum	1990 GA 190, 191,192	1991 GA 208, 209,210	1992 GA 224, 225,226
101-200	618	0.3(4)	0.0(5)	0.0(3)
101-200	619	0.1(5)	0.1(4)	0.0(3)
201-300	620	0.5(9)	0.3(14)	0.2(3)
201-300	621	0.5(11)	0.3(5)	1.6(3)
401-500	622	10.2(2)	8.2(3)	3.6(3)
301-400	623	5.2(5)	2.3(6)	4.2(3)
201-300	624	2.6(4)	2.8(2)	1.2(3)
301-400	625	1.4(4)	1.9(3)	0.2(3)
301-400	626	1.5(4)	4.3(3)	4.1(3)
401-500	627	24.8(5)	2.8(3)	2.1(3)
301-400	628	2.1(5)	3.4(3)	1.9(3)
301-400	629	4.3(2)	2.0(4)	1.2(3)
301-400	630	2.3(2)	2.9(3)	0.3(3)
401-500	631	8.4(6)	12.9(6)	1.1(3)
201-300	632	3.0(2)	1.0(10)	0.4(13)
301-400	633	2.9(11)	2.0(25)	0.6(25)
201-300	634	0.6(7)	1.8(25)	0.3(25)
201-300	635	0.7(6)	0.8(4)	0.2(3)
201-300	636	1.4(7)	1.3(3)	0.8(3)
201-300	637	1.5(5)	0.4(6)	1.3(3)
301-400	638	8.8(9)	9.0(25)	3.6(25)
301-400	639	2.3(7)	4.4(3)	0.6(25)
401-500	640	5.0(2)	1.5(3)	4.1(3)
501-750	641	16.2(2)	1.6(2)	0.2(2)
751-1000	642	5.0(3)	4.3(2)	4.5(2)
1001-1250	643	-	-	-
1251-1500	644	-	-	-
401-500	645	5.6(2)	0.5(3)	0.3(3)
501-750	646	0.8(2)	0.8(3)	0.2(3)
751-1000	647	0.5(2)	0.5(3)	0.4(3)
1001-1250	648	-	-	-
1251-1500	649	-	-	-
Mean (#sets)		3.7(135)	2.7(181)	1.3(180)
Surveyed biomass ('000 t)		8.7	6.3	3.1

Table 10. **Biomass estimates (tons) of A. plaice by stratum from research vessel surveys in**

Depth (m)	Stratum	Units ('000)	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
101-200	205	137	10304	1875	7075	3818	10249	24878	9182	3229	4311	1533	1327	671	68	41	41	82
	201	107	5645	6052	7434	12983	7627	16175	8676	6373	4413	3160	5099	171	21	32	11	118
	207	169	12240	3692	5058	1737	3760	11582	5682	4367	3642	573	2074	759	34	118	51	17
	206	194	49094	25080	6008	12114	25390	23394	41399	29131	9846	11745	5233	14672	640	1376	814	233
201-300	234	38	900	374	244	1251	191	133	553	561	65	126	72	57	0	11	46	8
	210	58	744	2376	1092	947	779	1017	15850	1208	529	2248	163	1325	813	598	99	41
	209	121	6530	2474	2643	8003	6277	2704	1907	2728	2583	4200	4357	1823	1400	652	133	60
	202	33	1516	479	231	588	621	1546	1701	231	231	472	119	0	13	3	132	76
	213	129	8002	6267	2318	12974	5581	5892	4804	1554	7264	6759	1852	6643	5011	6293	881	414
	215	95	2650	5625	2555	381	1144	391	1106	143	362	315	191	429	153	448	200	172
	228	107	2348	0	890	665	943	418	482	536	975	3087	1426	289	665	482	439	43
	214	88	2074	2338	1028	1011	1151	352	3200	3481	6997	237	202	1521	13088	958	431	229
301-400	222	33	106	89	136	265	13	76	0	7	17	0	7	3	43	113	271	86
	229	43	298	21	68	64	4	38	55	9	4	43	17	0	98	34	77	43
	216	29	17	0	58	6	14	14	0	37	9	9	35	0	58	29	20	20
	208	34	568	515	854	531	504	111	118	74	340	1160	155	1211	4816	461	296	84
	211	25	220	612	708	1100	40	62	186	57	248	211	84	731	258	743	129	40
	203	36	267	0	0	576	83	32	25	54	11	641	32	32	90	249	94	32
401-500	227	51	31	0	0	0	10	51	15	0	5	21	36	10	386	124	252	57
	235	32	451	0	0	0	530	41	73	38	0	252	28	656	236	2024	158	85
	204	27	433	0	0	0	183	72	239	114	77	343	106	372	1927	377	210	32
	223	14	0	0	0	0	1	0	0	0	0	0	0	7	4	27	88	23
	217	20	4	0	0	0	0	0	0	0	0	0	14	0	0	36	50	22
501-750	218	32	0	0	0	0	0	0	0	0	0	0	0	0	19	82	69	19
	230	18	0	0	0	0	0	0	0	0	0	0	5	0	60	0	148	0
	212	50	110	0	0	0	15	5	5	5	15	334	80	1520	45	902	1226	174
	224	20	0	0	0	0	0	0	0	0	0	0	0	4	28	2	154	101
751-1000	236	9	0	0	0	0	0	0	0	0	0	2	0	0	0	2	27	99
	231	14	0	0	0	0	0	0	0	0	0	0	0	0	11	0	1	3
	219	16	0	0	0	0	0	0	0	0	0	0	0	0	14	0	10	21
1001-1250	232	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	225	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Biomass (t)			104552	57869	38401	59012	65110	88984	95258	53937	41943	37471	22714	32905	30000	16218	6557	2432
101-200			77283	36699	25575	30650	47026	76029	64939	43100	22211	17011	13733	16272	763	1567	916	449
201-300			24764	19933	11002	25820	16686	12452	29602	10442	19006	17445	8382	12086	21143	9447	2360	1042
301-500			2395	1237	1824	2542	1384	498	711	390	710	2679	514	3022	7915	4216	1645	524
>500			110	0	0	0	15	5	5	5	15	336	95	1524	178	988	1636	417

Table 11. Mean weight (kg) of A. plaice per tow, per stratum from research vessel surveys in Div. 3K.

Depth (m)	Stratum	Units ('000)	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
101-200	618	109	0	0	0	0	0	0	2545	2785	349	306	33	11	33	0	0
	619	119	0	0	0	0	0	0	1275	513	95	60	36	12	12	12	0
201-300	620	203	22958	5999	10208	6812	7707	7809	10554	4433	5023	4047	386	244	102	61	41
	621	215	19916	13799	4507	14164	6310	8520	8949	8541	2210	2661	966	494	107	64	343
	624	50	918	567	251	1269	852	697	883	807	451	893	291	115	130	140	60
	632	34	309	473	215	285	178	342	0	178	117	84	503	54	101	34	13
	634	121	668	522	559	789	644	291	547	267	462	498	814	632	73	219	36
	635	96	1004	717	1320	1262	1607	2534	1798	469	717	545	583	383	67	77	19
	636	109	1551	765	513	481	907	1245	1573	710	513	885	896	579	153	142	87
	637	85	637	595	620	765	1436	807	1326	348	595	1156	824	603	127	34	110
301-400	623	77	3885	1233	6815	3870	1156	1796	1442	254	1819	1511	1126	910	401	177	324
	625	64	785	491	338	632	466	1072	657	740	810	549	523	702	89	121	13
	626	69	497	1462	2794	4029	1400	2194	2656	1193	5919	1628	1138	1304	103	297	283
	628	81	456	1808	538	318	187	1328	1385	961	643	1124	937	611	171	277	155
	629	37	255	247	300	281	124	330	199	169	633	423	390	281	161	75	45
	630	41	0	221	1017	347	0	176	200	147	139	192	106	233	94	118	12
	633	164	965	785	376	425	523	393	278	213	2339	393	1030	965	474	327	98
	638	155	1824	1561	1546	1870	866	1236	912	1901	2148	2566	1623	1159	1360	1391	556
	639	110	703	110	571	231	428	110	659	154	637	318	494	286	253	483	66
401-500	622	47	0	0	0	451	769	394	446	57	1328	289	1077	1376	484	389	171
	627	89	0	0	0	1298	542	551	1111	1013	3706	1795	2773	3688	2204	249	187
	631	90	0	0	0	668	361	343	623	713	2238	1877	1435	2120	758	1164	99
	640	15	0	0	0	0	0	0	0	4	61	48	34	158	74	22	61
	645	15	0	0	0	0	0	2	0	2	0	23	14	44	86	8	5
501-750	641	44	0	0	0	0	0	0	0	13	0	48	0	0	710	70	9
	646	25	0	0	0	0	0	7	0	0	0	0	0	0	20	20	5
751-1000	642	70	0	0	0	0	0	0	0	0	0	7	0	0	349	301	314
	647	31	0	0	0	0	0	0	0	0	0	0	0	0	15	15	12
Biomass (t)			57330	31356	32486	40245	26462	32176	40015	26585	32955	23924	18031	16962	8713	6287	3126
101-200			0	0	0	0	0	0	3820	3298	445	365	69	23	45	12	0
201-300			47960	23437	18192	25827	19640	22246	25628	15754	10089	10768	5263	3103	860	770	711
301-500			9369	7919	14294	14418	6822	9923	10566	7521	22421	12735	12699	13836	6713	5099	2074
>500			0	0	0	0	0	7	0	13	0	55	0	0	1095	406	341

Table 12. RV survey mean nos. per tow, 2J plaice.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.02	0.00	0.00	0.00
3	0.00	0.02	0.00	0.00	0.01	0.12	0.04	0.00	0.04	0.08	0.06	0.00	0.07	0.04	0.06	0.01
4	0.15	0.42	0.24	0.05	0.59	0.27	0.61	0.25	0.12	0.19	0.32	0.14	0.36	0.16	0.19	0.08
5	6.45	3.90	1.67	0.50	2.48	2.72	1.34	0.97	1.20	0.98	0.48	0.99	1.74	0.64	1.04	0.41
6	13.26	11.85	7.17	4.14	15.39	7.63	7.37	3.33	4.72	3.75	3.31	2.83	5.90	3.16	2.39	1.11
7	26.07	18.06	12.90	21.00	21.17	23.30	22.94	11.67	11.08	9.03	4.80	5.10	6.01	5.27	2.72	1.59
8	36.56	15.16	13.38	16.55	16.69	27.03	29.48	16.85	13.89	9.85	5.85	7.86	7.80	4.30	2.71	1.09
9	20.86	11.53	8.08	10.00	6.48	27.23	17.00	13.52	12.60	9.55	4.46	7.40	7.41	4.26	1.29	0.52
10	9.64	7.30	4.47	6.64	4.35	12.03	12.20	5.79	4.35	4.13	3.15	4.49	3.10	3.17	0.48	0.23
11	6.14	4.10	2.02	3.68	1.56	4.80	6.28	3.00	1.63	1.05	0.89	1.59	1.87	0.94	0.23	0.10
12	4.24	3.29	2.69	3.37	0.63	2.95	1.79	0.98	1.02	0.83	0.55	0.57	0.75	0.59	0.08	0.06
13	2.80	2.76	1.60	1.50	0.05	1.80	1.16	0.82	0.50	0.33	0.20	0.23	0.17	0.20	0.03	0.01
14	1.59	1.27	0.47	0.89	0.00	0.80	0.30	0.15	0.08	0.07	0.05	0.02	0.03	0.02	0.00	0.00
15	0.66	0.91	0.12	0.26	0.00	0.16	0.11	0.06	0.00	0.03	0.01	0.00	0.04	0.01	0.00	0.00
16	0.00	0.43	0.05	0.11	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
17	0.00	0.15	0.00	0.04	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1+	128.42	81.17	54.86	68.75	69.41	110.94	100.63	57.39	51.24	39.87	24.14	31.22	35.27	22.78	11.22	5.21
2+	128.42	81.17	54.86	68.75	69.41	110.94	100.63	57.39	51.24	39.87	24.14	31.22	35.27	22.78	11.22	5.21
3+	128.42	81.17	54.86	68.75	69.40	110.93	100.63	57.39	51.23	39.87	24.13	31.22	35.25	22.78	11.22	5.21
4+	128.42	81.15	54.86	68.75	69.39	110.81	100.59	57.39	51.19	39.79	24.07	31.22	35.18	22.74	11.16	5.20
5+	128.27	80.73	54.62	68.70	68.80	110.54	99.98	57.14	51.07	39.60	23.75	31.08	34.82	22.58	10.97	5.12
6+	121.82	76.83	52.95	68.20	66.32	107.82	98.64	56.17	49.87	38.62	23.27	30.09	33.08	21.94	9.93	4.71
7+	108.56	64.98	45.78	64.06	50.93	100.19	91.27	52.84	45.15	34.87	19.96	27.26	27.18	18.78	7.54	3.60
8+	82.49	46.92	32.88	43.06	29.76	76.89	68.33	41.17	34.07	25.84	15.16	22.16	21.17	13.51	4.82	2.01
9+	45.93	31.76	19.50	26.51	13.07	49.86	38.85	24.32	20.18	15.99	9.31	14.30	13.37	9.21	2.11	0.92
10+	25.07	20.23	11.42	16.51	6.59	22.63	21.85	10.80	7.58	6.44	4.85	6.90	5.96	4.95	0.82	0.40
11+	15.43	12.93	6.95	9.87	2.24	10.60	9.65	5.01	3.23	2.31	1.70	2.41	2.86	1.78	0.34	0.17
12+	9.29	8.83	4.93	6.19	0.68	5.80	3.37	2.01	1.60	1.26	0.81	0.82	0.99	0.84	0.11	0.07
13+	5.05	5.54	2.24	2.82	0.05	2.85	1.58	1.03	0.58	0.43	0.26	0.25	0.24	0.25	0.03	0.01
14+	2.25	2.78	0.64	1.32	0.00	1.05	0.42	0.21	0.08	0.10	0.06	0.02	0.07	0.05	0.00	0.00

Table 13. RV survey mean nos. per tow, 3K plaice.

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
1	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.02	0.01	0.00	0.01	0.00	0.00
2	0.00	0.00	0.01	0.00	0.02	0.01	0.06	0.16	0.08	0.03	0.16	0.07	0.00	0.01	0.00
3	0.19	0.01	0.07	0.12	0.24	0.44	0.14	0.19	1.21	0.39	0.32	0.47	0.09	0.02	0.06
4	3.20	0.32	0.10	0.18	0.43	0.61	1.44	0.60	1.79	1.96	0.80	0.96	0.34	0.45	0.13
5	8.19	1.87	0.97	0.85	0.93	2.28	2.02	1.74	2.14	2.18	3.36	1.51	0.88	1.08	0.53
6	12.05	4.10	3.28	1.82	2.29	4.19	5.76	2.52	4.05	3.47	2.87	4.07	1.54	1.69	0.98
7	10.83	5.58	8.43	6.37	4.46	7.26	5.95	4.66	4.25	3.90	2.92	3.81	2.39	1.87	1.29
8	8.01	6.08	5.93	9.08	5.97	7.46	10.57	5.21	5.35	3.99	3.08	2.42	1.80	1.28	0.85
9	6.89	4.95	4.33	5.23	4.88	3.07	5.91	4.08	4.68	3.59	2.41	2.90	1.40	1.12	0.59
10	5.76	3.60	3.67	5.60	2.54	2.38	2.85	2.04	2.37	1.38	1.31	1.56	0.74	0.55	0.30
11	3.45	1.68	2.14	1.75	1.69	0.87	1.72	0.91	0.99	0.66	0.56	0.79	0.42	0.15	0.09
12	2.96	2.14	1.71	2.36	0.82	0.91	1.18	0.97	0.79	0.43	0.29	0.53	0.19	0.10	0.04
13	2.57	1.07	0.84	1.13	0.67	0.43	0.57	0.48	0.37	0.16	0.15	0.21	0.14	0.04	0.02
14	1.33	0.35	0.54	0.48	0.33	0.23	0.25	0.10	0.15	0.11	0.10	0.08	0.01	0.03	0.01
15	1.04	0.14	0.21	0.29	0.17	0.09	0.17	0.07	0.04	0.07	0.02	0.04	0.02	0.00	0.00
16	0.53	0.12	0.08	0.20	0.05	0.02	0.04	0.03	0.00	0.03	0.00	0.01	0.00	0.00	0.00
17	0.20	0.01	0.04	0.00	0.04	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.06	0.02	0.02	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1+	67.27	32.05	32.37	35.49	25.54	30.25	38.66	23.76	28.28	22.37	18.36	19.43	9.97	8.39	4.89
2+	67.27	32.04	32.37	35.49	25.54	30.25	38.65	23.76	28.26	22.35	18.35	19.43	9.96	8.39	4.89
3+	67.27	32.04	32.36	35.49	25.52	30.24	38.59	23.60	28.18	22.32	18.19	19.36	9.96	8.38	4.89
4+	67.08	32.03	32.29	35.37	25.28	29.80	38.45	23.41	26.97	21.93	17.87	18.89	9.87	8.36	4.83
5+	63.88	31.71	32.19	35.19	24.85	29.19	37.01	22.81	25.18	19.97	17.07	17.93	9.53	7.91	4.70
6+	55.69	29.84	31.22	34.34	23.92	26.91	34.99	21.07	23.04	17.79	13.71	16.42	8.65	6.83	4.17
7+	43.64	25.74	27.94	32.52	21.63	22.72	29.23	18.55	18.99	14.32	10.84	12.35	7.11	5.14	3.19
8+	32.81	20.16	19.51	26.15	17.17	15.46	23.28	13.89	14.74	10.42	7.92	8.54	4.72	3.27	1.90
9+	24.80	14.08	13.58	17.07	11.20	8.00	12.71	8.68	9.39	6.43	4.84	6.12	2.92	1.99	1.05
10+	17.91	9.13	9.25	11.84	6.32	4.93	6.80	4.60	4.71	2.84	2.43	3.22	1.52	0.87	0.46
11+	12.15	5.53	5.58	6.24	3.78	2.55	3.95	2.56	2.34	1.46	1.12	1.66	0.78	0.32	0.16
12+	8.70	3.85	3.44	4.49	2.09	1.68	2.23	1.65	1.35	0.80	0.56	0.87	0.36	0.17	0.07
13+	5.74	1.71	1.73	2.13	1.27	0.77	1.05	0.68	0.56	0.37	0.27	0.34	0.17	0.07	0.03
14+	3.17	0.64	0.89	1.00	0.60	0.34	0.48	0.20	0.19	0.21	0.12	0.13	0.03	0.03	0.01

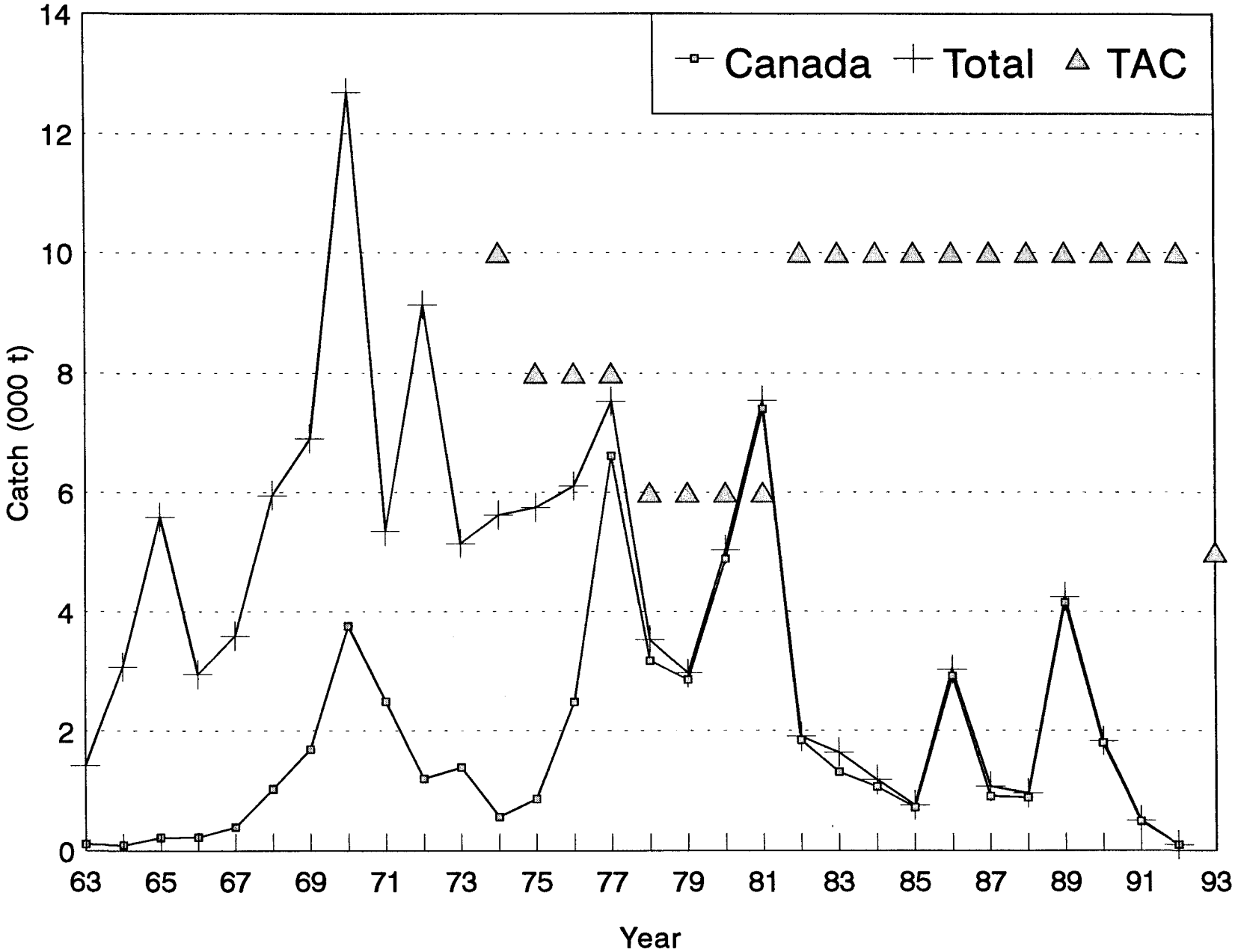

Fig.1. Catches and TAC's (000t) of A. plaice in NAFO SA 2 + Div. 3K

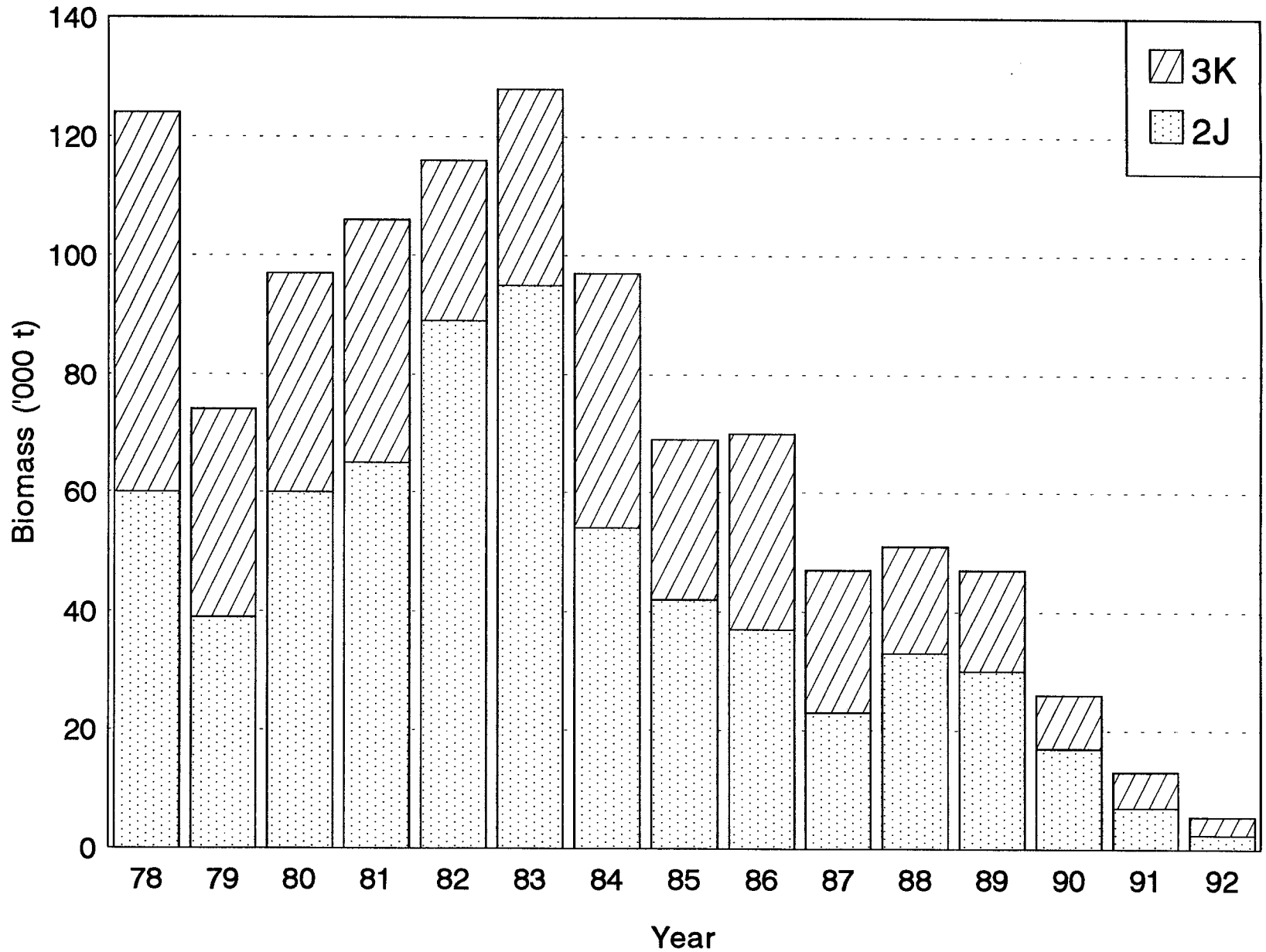

Fig. 2 . Biomass of A.plaice from RV surveys in Div. 2J and 3K.

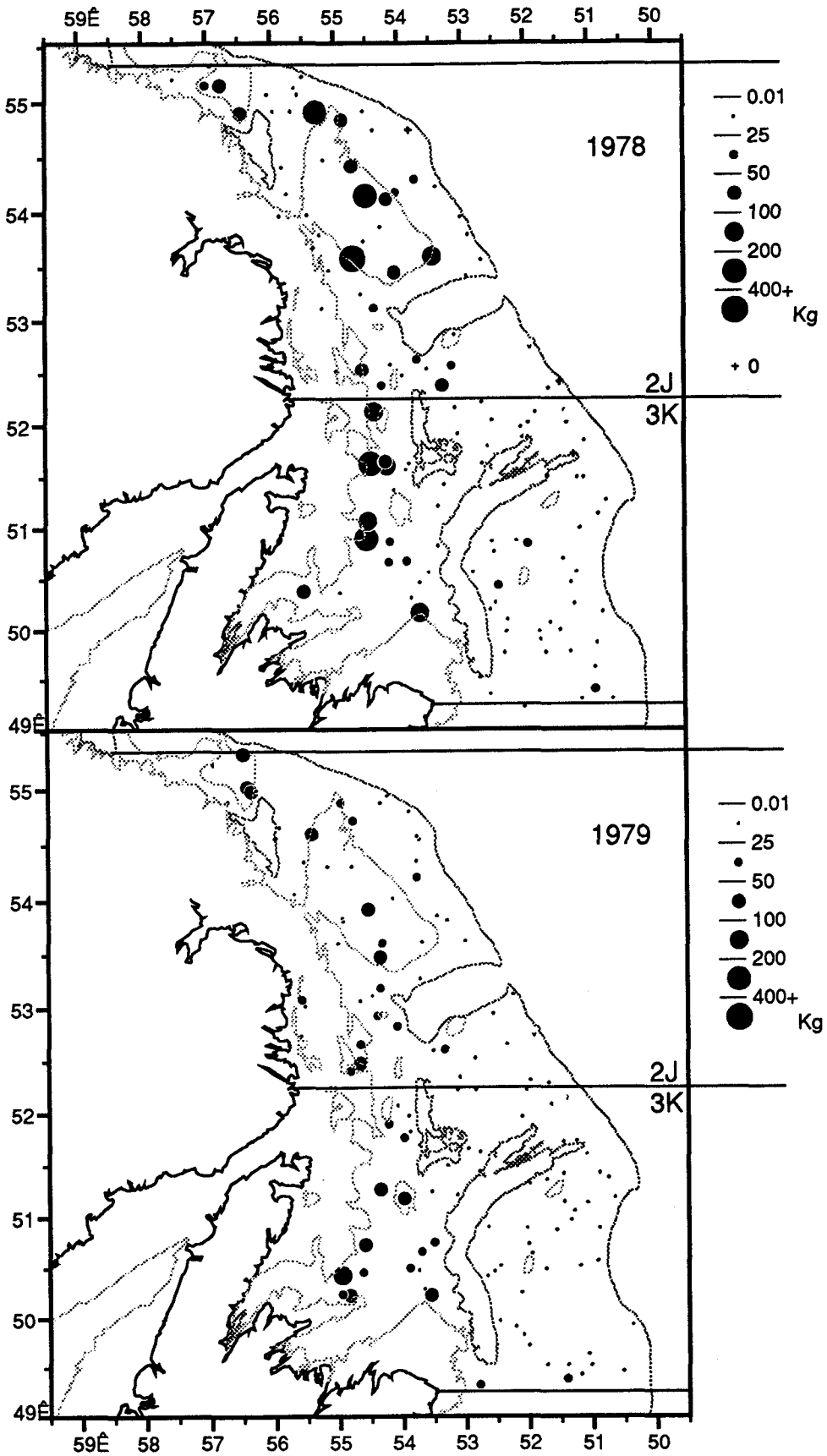

Fig. 3 Distribution of American plaice catches from 1978-1979 autumn surveys with 200m (light dotted) and 400m (dark dotted) depth contours.

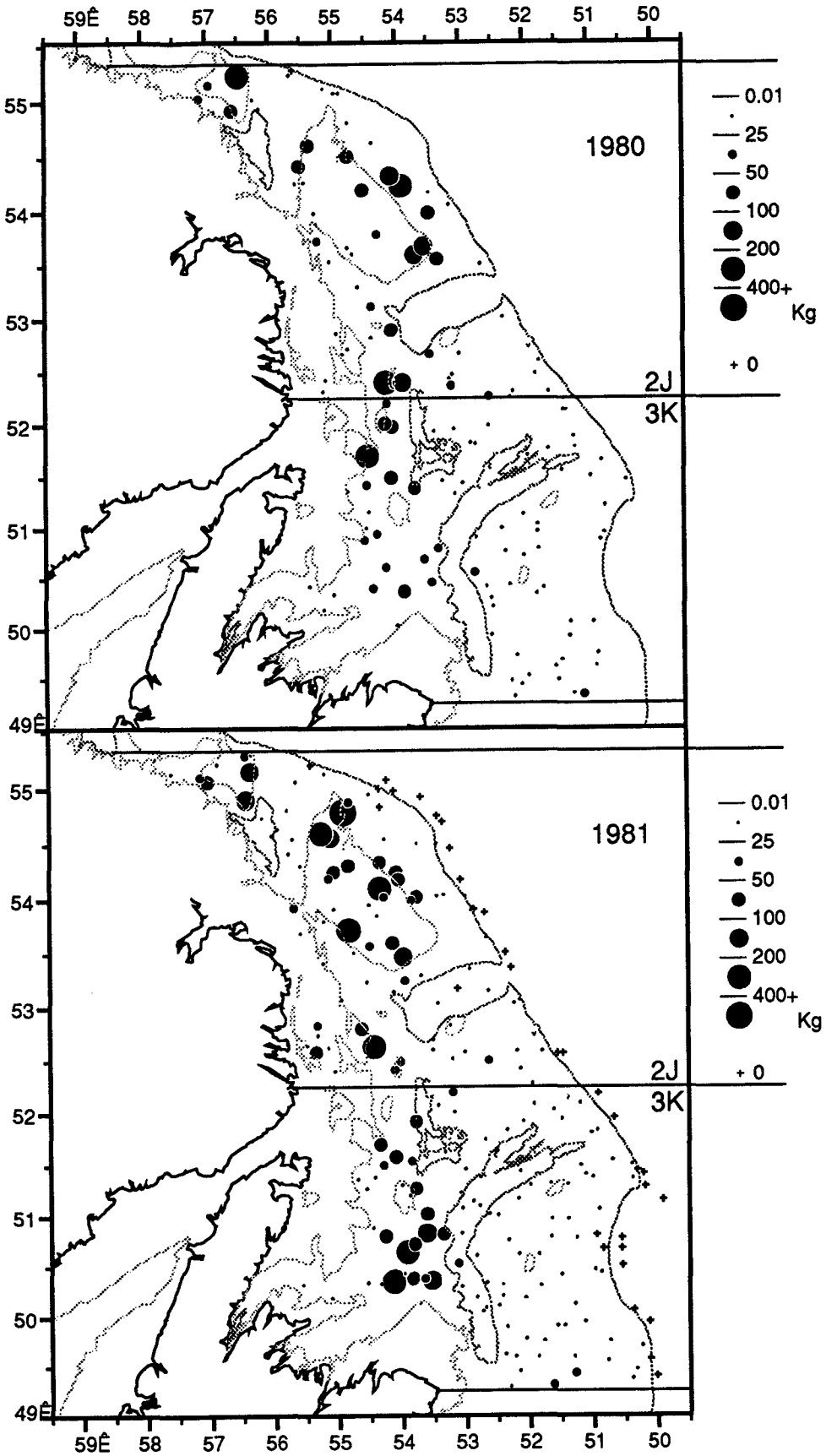

Fig. 4 Distribution of American plaice catches from 1980-1981 autumn surveys with 200m (light dotted) and 400m (dark dotted) depth contours.

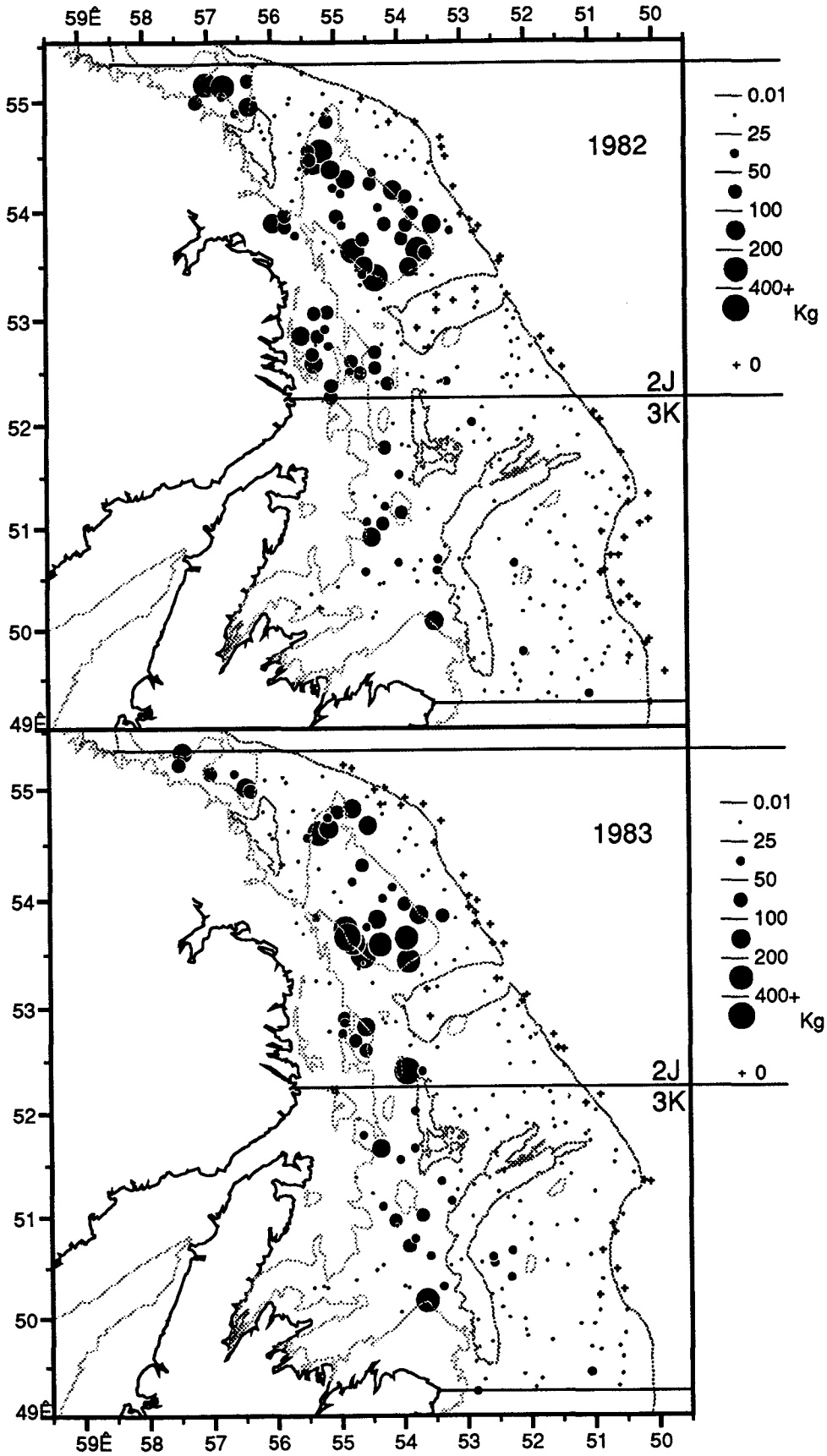

Fig. 5 Distribution of American plaice catches from 1982-1983 autumn surveys with 200m (light dotted) and 400m (dark dotted) depth contours.

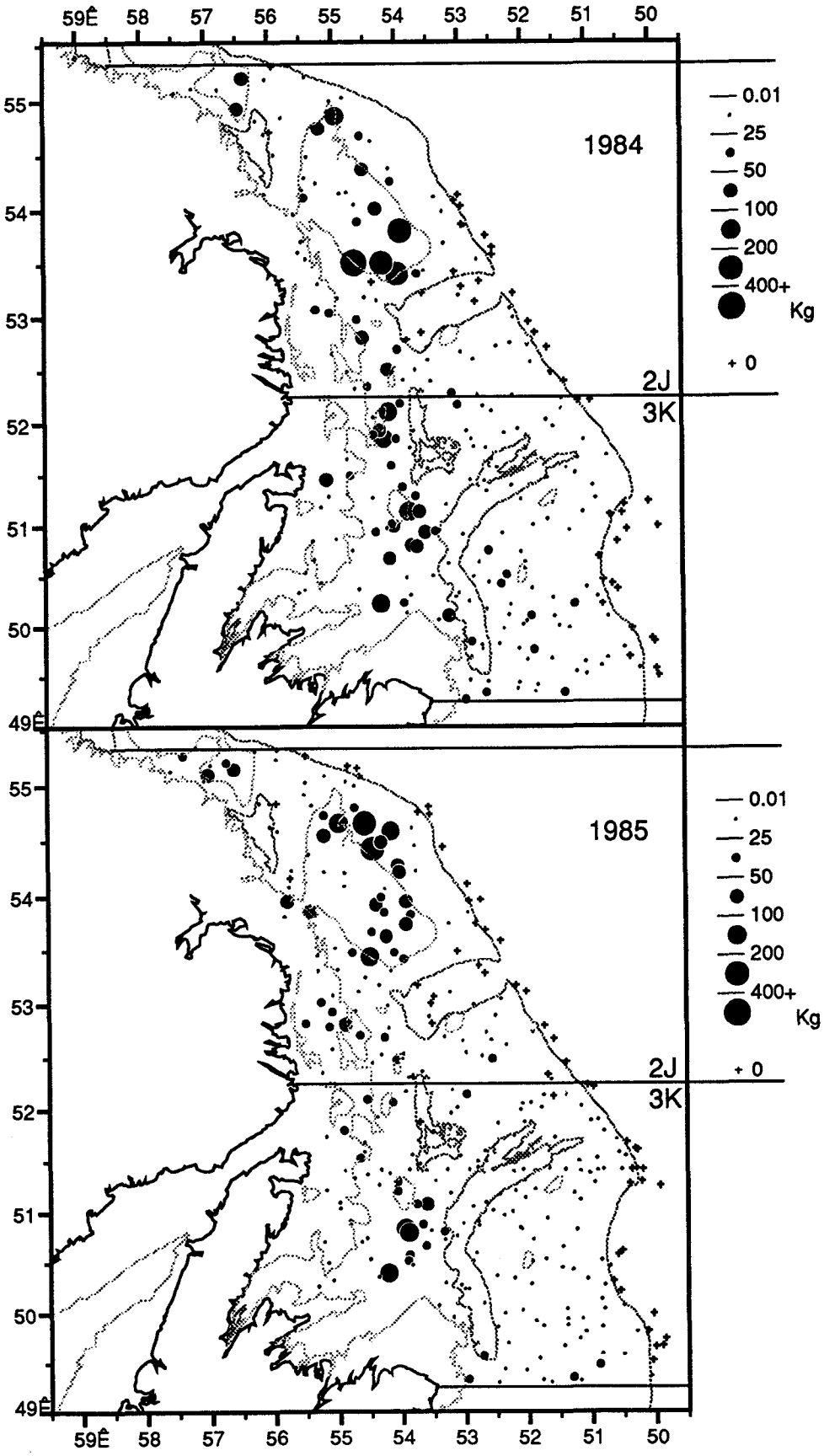

Fig. 6 Distribution of American plaice catches from 1984-1985 autumn surveys with 200m (light dotted) and 400m (dark dotted) depth contours.

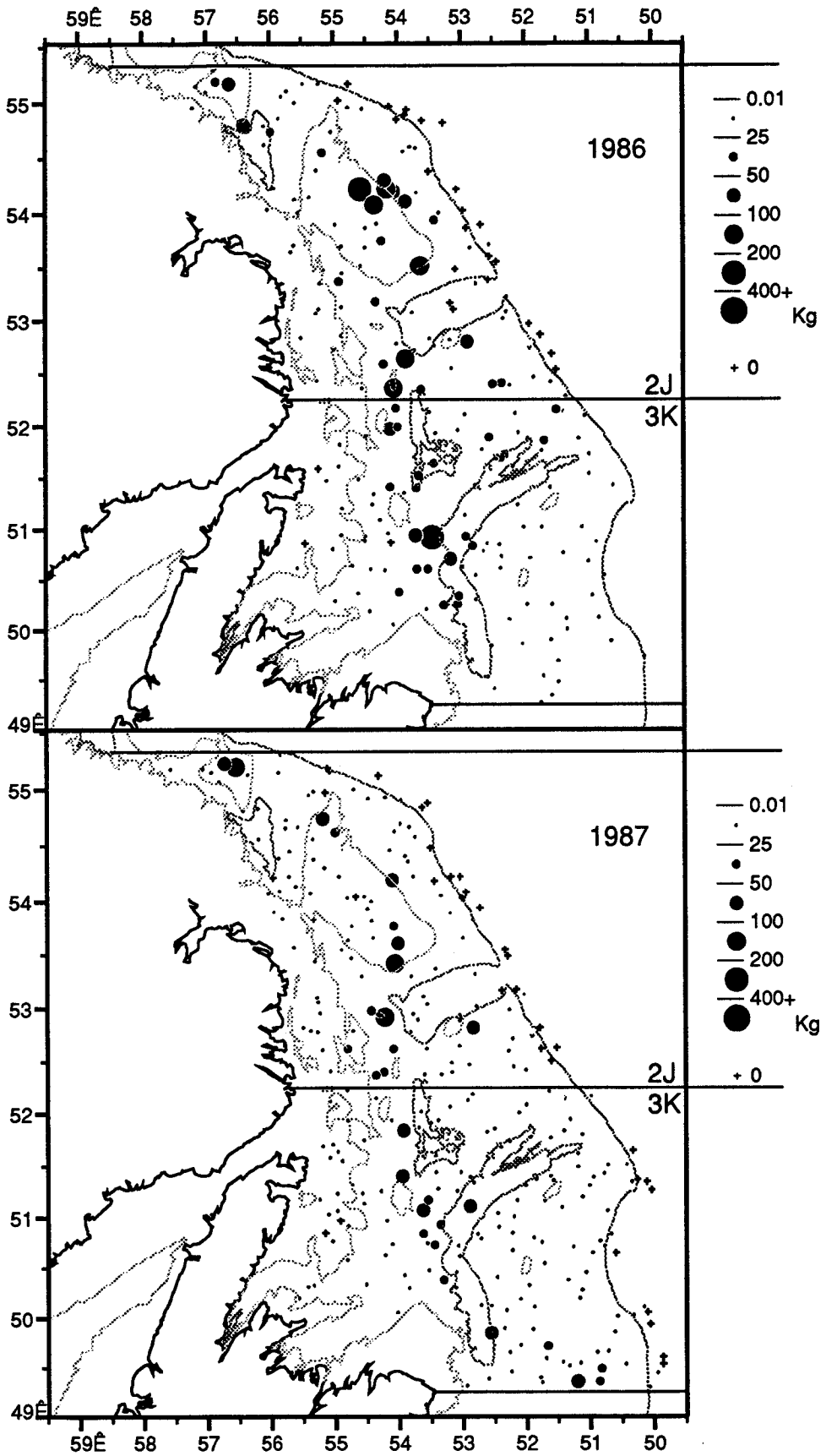

Fig. 7 Distribution of American plaice catches from 1986-1987 autumn surveys with 200m (light dotted) and 400m (dark dotted) depth contours.

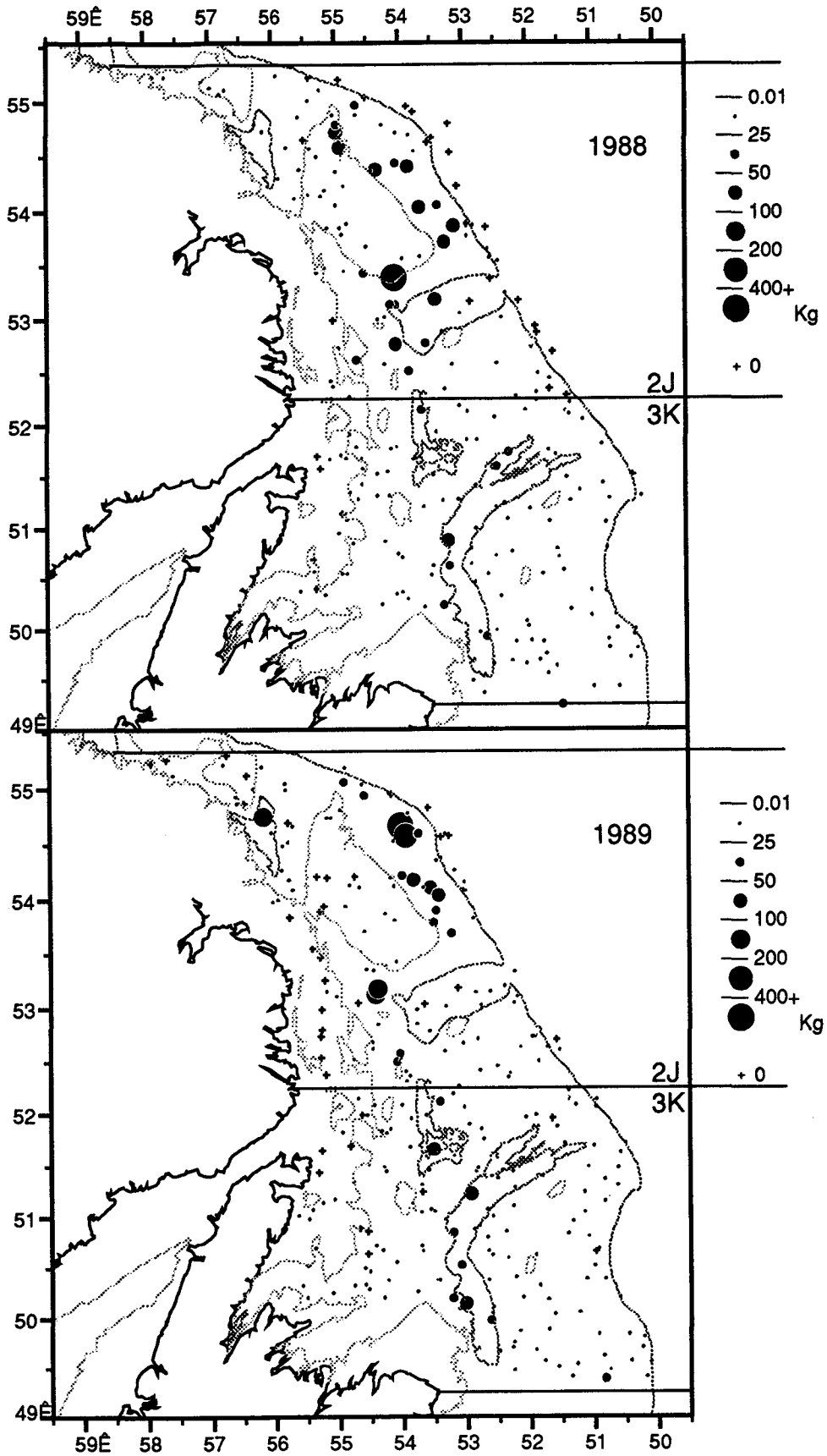

Fig. 8 Distribution of American plaice catches from 1988-1989 autumn surveys with 200m (light dotted) and 400m (dark dotted) depth contours.

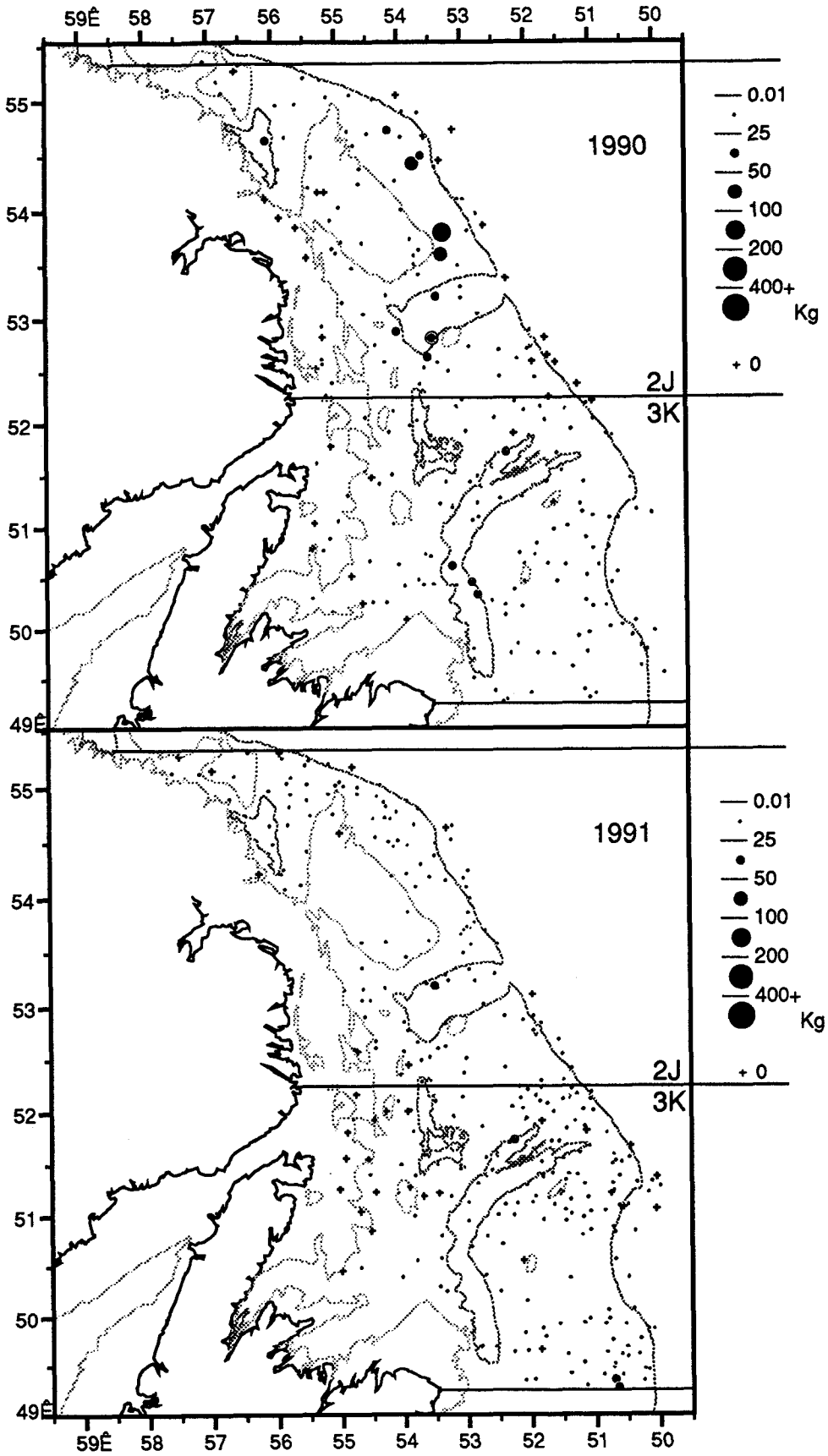

Fig. 9 Distribution of American plaice catches from 1990-1991 autumn surveys with 200m (light dotted) and 400m (dark dotted) depth contours.

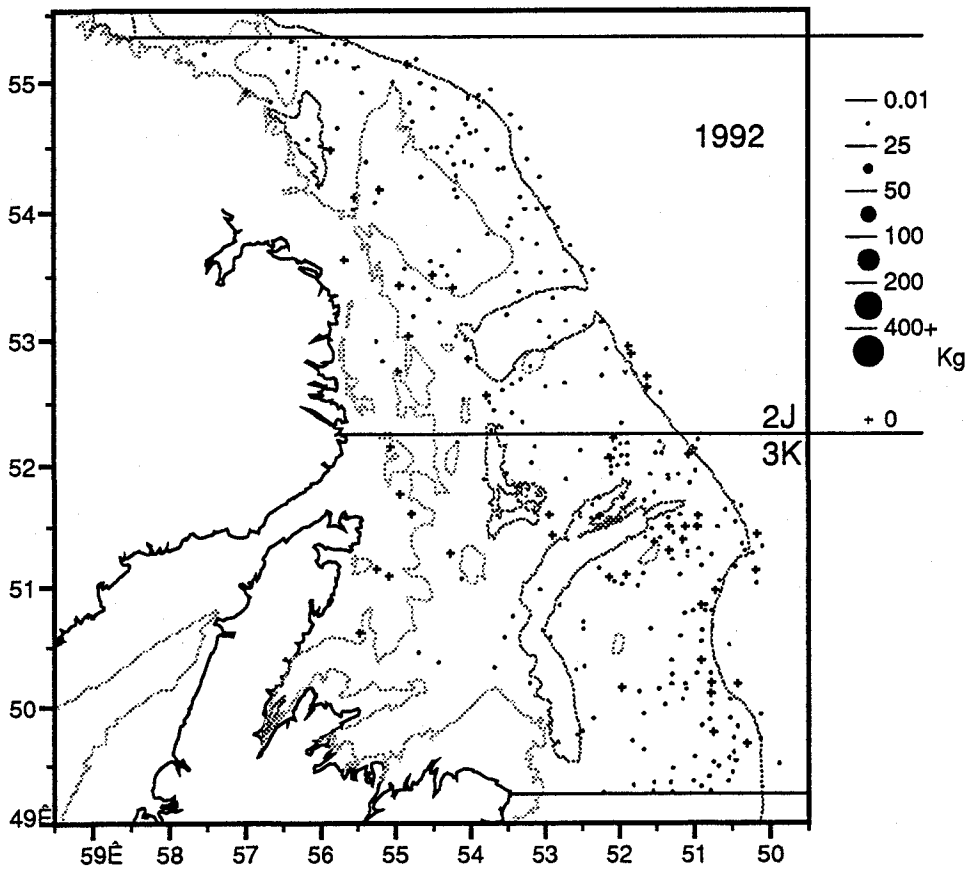

Fig. 10 Distribution of American plaice catches from the 1992 autumn survey with 200m (light dotted) and 400m (dark dotted) depth contours.

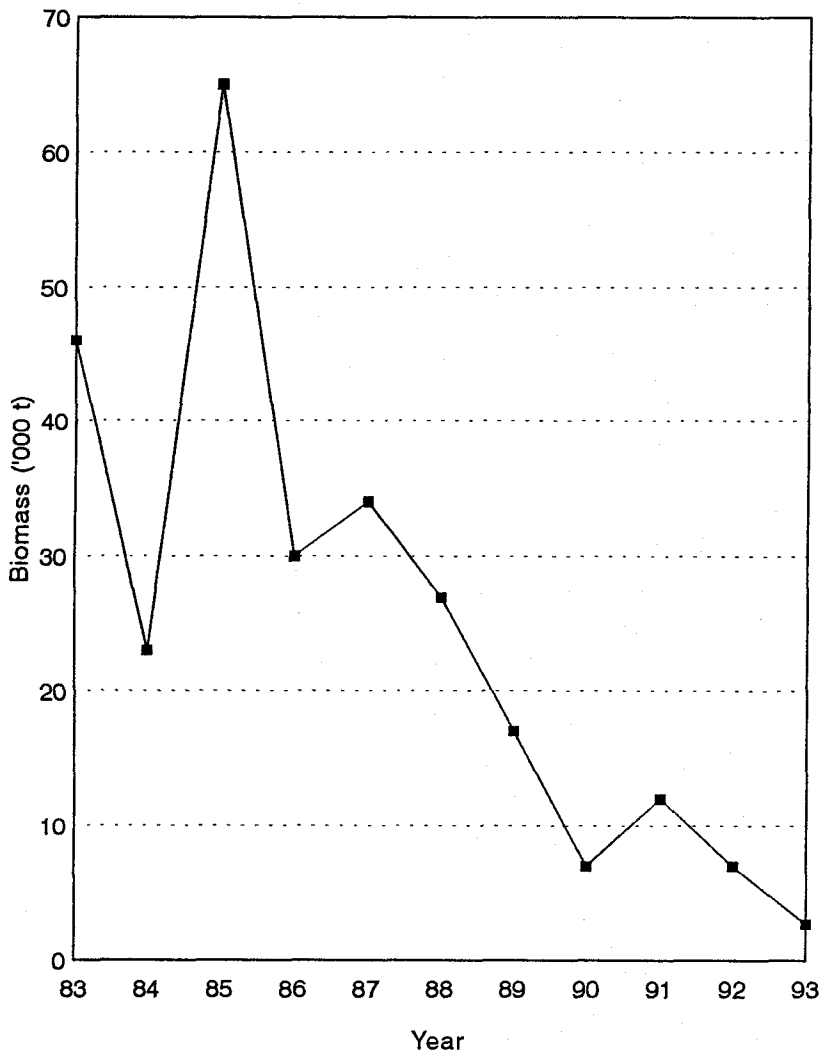

Fig.11 Biomass of A.plaice from RV surveys in Subdiv. 3Ps.

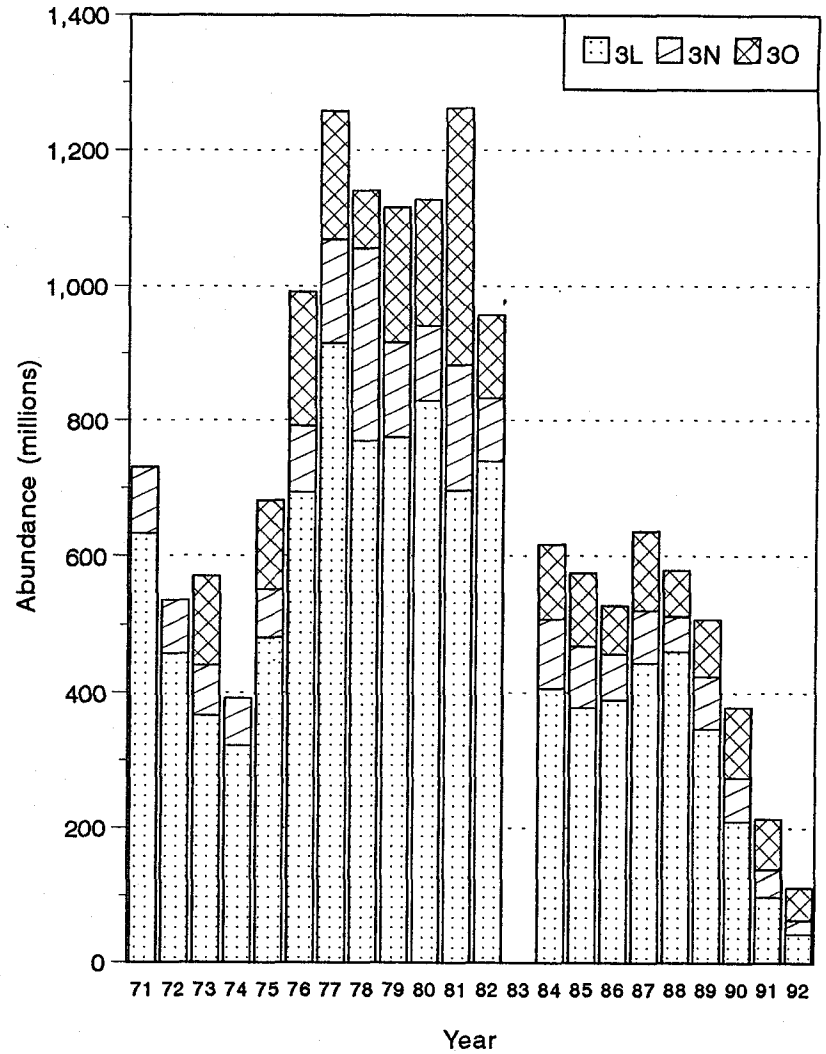

Fig.12 Abundance of A.plaice from spring RV surveys conducted by Canada in Div. 3LNO.