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An Assessment of the American Plaice Stock in Divisions 3LNO

by

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TAC regulation

This stock has been under TAC regulation since 1973 when a TAC of 60,000 t was established. From 1973-87, the TAC varied from 47,000 t to 60,000 t (Table 1) but was lowered to 33,585 t in 1988. Further reductions followed, bringing the TAC to 10,500 t in 1993. In 1994, a TAC of 4,800 t was implemented, but the Fisheries Commission of NAFO stated that no directed fisheries were to take place on this stock. There is no directed fishery in 1995.

Catch trends

Catches increased from about 20,000 t in the early 1960s to a peak of 94,000 t in 1967, were relatively stable around 45,000-50,000 t in 1973-82, then declined to 39,000 t in 1984-85 (Table 1, Fig. 1). Catches then increased to 65,000 t in 1986 and then declined steadily to about 13,000 t in 1992, which was the lowest since the 1950's. The catch for 1993 was around 17,500, with the increase coming from fleets of non-contracting parties (NCP) fishing mainly on the Tail of the Bank in the NAFO Regulatory Area (Fig. 2). The 1994 catch is estimated at 7378 t, although some estimates were as low as 2200 t. This catch was mainly taken in the NAFO Regulatory Area and is 1.5 times the TAC.

From 1977 to 1982, the catch was taken almost exclusively by Canadian vessels, but the catch by other nations increased rapidly from less than 2,000 t in 1981-82 to over 30,000 t in 1986 as new fisheries were developed in the Regulatory Area. Catches from these fleets have generally declined in recent years, as has the Canadian catch (Tables 1 and 2), although NCP catches in 1993 were an exception to this trend. Considerable doubts have arisen about some nominal catches in recent years, resulting in various catch estimates being used. These include surveillance estimates, breakdowns of unspecified flounder catches by S.Korea prior to 1991 based on reported flounder catches, and any other estimates deemed by STACFIS to be reliable. For 1993, it was estimated that catches may have been as high as 19,400 t. For 1992, catches are estimated to be 1,500 t higher than the value used in the 1993 assessment. There is also some uncertainty regarding catches prior to 1973, when large amounts of unspecified flounder catches from some nations were broken down by species based on estimates of species composition.

In 1994, the Canadian catch totalled only about 70 t (Table 3), compared to 7600 t in 1993 (Table 1). More than 70% of the Canadian catch was taken by inshore gears (Table 3) as opposed to previous years when the bulk of the catch was taken by offshore trawlers (Table 4).

Sampling from the Portuguese fishery in 1994 indicated that the bulk of the catch was comprised of ages 7-10 while the Spanish fishery took fish mainly from ages 5-9.

Canadian research vessel surveys

Spring

Stratified-random surveys have been carried out on the Grand Bank on Canadian vessels in the spring of each year from 1971 to 1994, with the exception of 1983. The stratification scheme used is shown in Figure 2.

In Div. 3L, the trawlable biomass was highest from 1978-82, then declined to a lower but stable level from 1985 to 1988. From 1989 to 1994, the index declined by at least 38% in each year, with the estimate in 1994 of 5,100 t being only 3 percent of the mean of 1985-88 (Table 5, Fig. 3). Strata 729-736 in the deep water, which had not been surveyed in this series from 1986 to 1990, accounted for less than 5% of the 1991 estimate, then increased to about 18% of the 1992 total and about 27% of the 1994 biomass (Table 6). Two stratified-random surveys of the deepwater slope in Div. 3L were carried out in 1994 and 1995, using a similar trawl with different footgear. Common strata between the two surveys gave a biomass index of 4900 t in 1994 and 8400 t in 1995 (Bowering et al 1995).

In Div. 3N, the biomass index also shows a decline in recent years, with 1992 and 1994, and preliminary 1995 estimates being the lowest points in the series (Table 7 Fig. 3), which casts some doubt on the increase seen in 1993. The preliminary estimate from the 1995 spring survey for 3N is 4100 t. There is no evidence of a pronounced movement of plaice to deeper waters, at least as far as the 732 m (400 fm) limit covered in the surveys (Table 8).

In Div. 3Ø, the biomass index has shown a consistent decline since 1990 (Fig. 3), with the 1994 and 1995 values being the lowest in the series (Table 9). The preliminary estimate from the 1995 spring survey in Div. 3O is 9600 t. As in Div. 3N, most of the trawlable biomass continues to be found in the shallower strata (Table 10).

Tables 11 to 13 show the trawable abundance at age for Div. 3L, 3N, and 3Ø respectively, with Table 14 containing the combined index. Figure 4 shows the trends in the total abundance index and Figs. 5 to 7 indicate the 95% confidence limits around the abundance estimates in Div. 3L, 3N, and 3O respectively. In all areas, trends in abundance generally track the biomass trends. The abundance of older fish in the stock continues to decline very rapidly, with the 1993 value for age 9+ abundance (a proxy for spawning stock size) being 83% lower than the 1990 value, and about 96% lower than the peak values in 1981-82. In 1992 or 1993, the abundance at each age over 3 years was the lowest ever observed. There is no ageing available for 1994, but there is no evidence from abundance at length that there is large incoming recruitment (Fig 8).

Another observation which causes concern is that from 1975 to 1987, the estimate of every cohort (10 out of 10) increased between age 7 and 8 (indicating that the fish at age 7 were not fully recruited to the survey trawl). Since 1987, the trend has been reversed, and the estimate of every cohort (6 out of 6) has decreased between these ages. This change may be an indication of a large increase in mortality. Estimates of Z have shown some indication of an increase (Myers, 1994).

Proportion of biomass north of 45 Degrees N latitude

To further investigate changes in the biomass and distribution of this stock, biomass indices from the spring surveys were divided into portions north and south of 45 degrees N latitude (Fig. 2). This showed that from 1985 to 1990, about 80-85% of the stock was located north of 45 degrees, most of which was in Div. 3L (Fig.9). With the decline in biomass, this proportion decreased, so that the values for 1993 and 1994 were around 35 to 40%. However, the decline in the proportion of biomass north of 45° was not caused solely by the drop in biomass in Div. 3L. Fig. 10 indicates that the percentage of biomass between 45 and 46° in Divs. 3N and 3O also declined, from around 50 to 60% in each Div. in 1985-91, to around 25% and 10-20% in Divs. 3O and 3N respectively in 1993-94.

The reasons for these disproportionate changes are not clear. Given previous studies which show that plaice on the Grand Bank generally do not undergo extensive migrations, the results are contrary to those one would expect from the pattern of the fishery, where a substantial portion of recent catches have come from the Tail of the Bank, south of 45 degrees. To the north in the Subarea 2 + 3K stock of A.plaice, changes in distribution have been observed in the absence of any substantial fishery.

Fall

Stratified-random surveys have been conducted in Div. 3L in the fall from 1981 to 1994, usually in October-November and Figure 11 shows the trends in the trawlable biomass and abundance indices. Declines over the time period are apparent in both indices, and like the spring series, 1994 is well below other estimates. Table 15 shows the mean catch weights on a stratified basis since 1981 and Table 16 contains the trawlable biomass estimates by stratum and depth zone for 1990-1994 only. There is no noticeable movement to deeper water in Div. 3L in the fall. Similar to the spring surveys, the 1993 abundance estimates at every age older than 4 years are the lowest in the

series (Table 17), and there are virtually no fish in the index older than 9 (only 6 % of the total 3L abundance). This compares with age 9+ percentages of 25 to 40 in the early 1980's. Prior to 1988, the pattern observed between the estimates on a cohort at ages 7 and 8 was more irregular than in the spring surveys, but from 1988 onward the estimates for 4 out of 5 cohorts have declined by 50% or more between ages 7 and 8. There is no ageing available for 1994.

Figure 12 shows a time series of abundance estimates from all surveys in Div. 3L over the period 1981-94, including the data from the spring and fall surveys discussed above. From 1990 to 1994, fall surveys were also carried out in Div. 3NO. Tables 18 and 19 give the biomass estimates by stratum and depth zone. Fig. 13 compares the total abundance estimates from the spring and fall surveys in 1990-1994 and there are a number of interesting points here. The index of total abundance for Div. 3LNO combined increased between spring and fall in each year. This spring to fall increase has not been observed consistently in Div 3L in other years (Fig. 12) and cannot be explained at present. Spring surveys in Div 3LNO have shown an 80% decrease in abundance from 1990 to 1994 while fall Div 3LNO surveys have shown a 75% decrease in abundance over the same time period.

Table 20 gives the age compositions of plaice in Div. 3N and 3O, as well as Div. 3LNO combined, from the fall surveys of 1990-1993. Again, similar to the spring surveys, the number of older fish has declined rapidly between 1990 and 1993, with age 9+ abundance decreasing by 80% in this period.

USSR/Russian RV Surveys

Results of surveys by the former Soviet Union from 1972-1991 have been discussed in detail in the previous assessments of this stock. The results agree with those of the Canadian spring surveys, indicating an increase in stock size in the late 1970's and early 1980's, followed by an almost continuous decline since 1984. Estimates in 1990 and 1991 are the lowest in the time series. Age data are available for only the period 1984-90 and were examined in the 1991 assessment of this stock. No comparable survey was conducted in 1992 and the data for 1993 and 1994 are not available at this time.

Mean weights at age from RV surveys

From 1990 onward, A.plaice sampled for otoliths during Canadian RV surveys were also weighed on an electronic balance at sea. Figs 14 and 15 show the mean weights at ages 5, 7, 9, 11, 13, and 15, by division, for the spring and fall surveys respectively. Although there are some interannual differences, there do not appear to be any consistent trends by season or division.

Age at Maturity

Estimates of proportion mature at age for females in Div 3LNO combined, were produced for each year from 1960 to 1993. Proportions mature at age were analyzed using PROBIT analysis with a logit link function (SAS Institute Inc. 1989) such that

$$p_{jk} = \frac{1}{(1+\exp(-\chi))}$$

and

$$\chi = \tau + \alpha\, age\ j + \beta\, cohort\ k + \epsilon$$

where: p_{jk} = predicted proportion mature at age j and cohort k
τ = intercept
α = age effect
β = cohort effect
ϵ = error

From the paramaterized model, the proportion mature at age 1 to 22 for cohorts occuring in years 1960 to 1993 were predicted. From these proportions mature, age at 50% maturity was estimated in each year (Fig. 16). The age at 50% maturity has been declining since the beginning of the time series with the exception of a slight increase from the late 1960's to the mid 1970's and a slight upturn at the end of the time series in the 1990's. These A_{50} estimates were highly positively correlated with the 6+ abundance from VPA over the same time period (Pearson correlation coefficient =0.84, $p<0.00001$).

Female Spawning Stock Biomass

For the period 1975 to 1993, female spawning stock biomass was calculated from data collected during spring stratified random surveys. Separate length weight relationships were calculated in each year from 1990 to 1993 and applied to the yearly mean length at age to produce weights at age for that period. For the pre 1990 time period, individual fish weights were not available so a combined 1990-1993 length weight relationship was applied to the yearly mean lengths at age for that time period. Weight at age in a given year was then multiplied by rv female abundance at age and estimated proportion mature at age in that year to produce an estimate of SSB (Fig. 17). SSB was fairly stable from 1975 to 1988 with a slight increasing trend over that time. Since 1988, SSB has declined precipitously from an estimate of about 140,000 t through the mid 1980's to the lowest in the time series in 1993 at an estimate of 11000 t.

Stock-recruitment data

Fig. 18 shows the scatterplot of stock size and recruitment data taken from spring rv data. SSB in year n was calculated as described above and recruitment is the number of fish aged 5 years in year n+5 from the same data set. There appears to be no relationship between SSB and recruitment although SSB in the 115,000 t to 135,000 t range mainly gave recruitments in the range of 15 to 25 million 5 year olds.

Catch to RV Biomass ratio

As a proxy for the exploitation rate on this stock, the ratio of catch to biomass from spring RV surveys was examined (Fig. 19). The ratio was relatively stable around 15% in the late 1970's and early 1980's, when both the biomass and catch were fairly stable. The ratio was somewhat higher from 1985-90, corresponding to increased catch levels from 1985-87, and a substantial decline in biomass from 1987-90. After 1990, the catch/biomass has been above 27 %, reflecting the sharp drop in stock biomass from 1989 onward. There are two main points from this analysis: 1) the stock began its steep decline in the mid to late 1980's, when catch/biomass was generally between 0.15 and 0.20, and 2) the values of this ratio from 1991-94 are well above those observed since 1977. This suggests that factors other than the fishery may have contributed to the stock decline, but that recent catches were excessive and probably exacerbated the decline.

Assessment

In the past, VPA-based models such as ADAPT and Laurec-Shepherd have been used to provide population estimates of American plaice in Div. 3LNO. In 1991, STACFIS concluded that there were serious problems with the VPA for this stock and rejected the results of the analysis. Despite the continuation of these problems, VPA-based assessments were used in 1992 and 1993. However, in 1994 VPA based analyses were abandoned for a variety of reasons outlined in Brodie et al 1994.

There is no doubt that this stock has declined to a small fraction of its size in the early 1980's. Despite a reduction of the fishery in Div. 3L, the decline continues to be most severe in this Division. Although there has been an increase in the proportion mature at age, the index of spawning stock biomass continues to decline as there have been large declines in the abundance of older fish. There is also no indication of good recruitment in recent years. Stock rebuilding is uncertain, even if no fisheries are permitted.

References

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Table 1. Nominal catches (t) of American plaice for NAFO Divisions 3LNO, 1960-92 and TACs from 1973 to 1994.

Year	Canada	France	Poland	USSR	South Korea[a]	Other	Total	TAC
1960	21,352	2,106	-	569	-	20	24,047	-
1961	14,903	1,473	286	1,248	-	3	17,913	-
1962	15,217	973	171	1,841	-	4	18,206	-
1963	24,591	93	457	466	-	112	25,719	-
1964	35,474	1,582	539	680	-	292	38,567	-
1965	45,365	2,056	977	4,544	-	319	53,261	-
1966	51,225	1,246	860	11,484	-	196	65,011	-
1967	54,190	1,326	3,234	35,139	-	524	94,413	-
1968	48,674	406	203	23,751	-	133	73,167	-
1969	64,815	43	34	14,493	-	52	79,437	-
1970	54,929	389	40	10,232	-	1,055	66,645	-
1971	49,394	323	370	17,173	-	628	67,888	-
1972	41,605	322	2,515	14,164	-	755	59,361	-
1973	38,586	310	1,116	12,516	-	315	52,843	60,000
1974	35,101	418	615	10,074	-	89	46,297	60,000
1975	34,015	442	537	7,682	-	545	43,221	60,000
1976	47,806	305	5	3,280	-	429	51,825	47,000
1977	42,579	31	-	1,023	-	348	43,981	47,000
1978	48,634	168	-	1,048	-	178	50,028	47,000
1979	47,131	113	-	1,190	-	135	48,569	47,000
1980	48,296	183	-	336	-	271	49,086	47,000
1981	48,177	210	-	847	-	924	50,158	55,000
1982	49,620	133	-	67	715	517	51,052	55,000
1983	35,907	41	-	170	815	1,602	38,535	55,000
1984	33,756	140	1	360	1,582	3,606[b]	39,445	55,000
1985	40,024	-	4	81	2,483	11,620[b]	54,212	49,000
1986	33,409	46	-	188	3,952	26,975[b]	64,570	55,000
1987	33,967	17	-	47	2,741	18,240	55,012	48,000
1988[c]	26,832	-	-	159	2,522	11,322[b]	40,835	33,585[d]
1989[c]	27,901	92	-	6	725	14,645[b]	43,369	30,300
1990	22,600	-	-	17	1,117	8,767[b]	32,501	24,900
1991[e]	23,203[a]	-	-	60	1,910	9,423[b]	34,596	25,800
1992[e]	9,542	-	-	-	518	1,052[b]	11,112	25,800
1993[c]	7,585	-	-	-	13	9,659[b]	17,257	10,500
1994	71	-	-	-	-	7,307[f]	7,378	4,800

[a]Includes a portion of catches reported as unspecified flounder. See text for details.
[b]Includes some catches estimated from surveillance reports.
[c]See text for details of 1993 catches.
[d]Effective TAC.
[e]Provisional.
[f]No directed fishing.

Table 2. Breakdown of catches from Table 1 listed as "other" for 1984-92.

			Other[a]				
Year	Spain	Portugal	Panama[b]	USA	Caymen Islands[b]	Misc.	Total
1984	1,622	-	1,800	-	-	184	3,606
1985	5,498	27	3,892	1,310	797	96	11,620
1986	11,882	9,240	3,756	1,506	572	19	26,975
1987	14,476	2,516	-	1,248	-	-	18,240
1988	8,956	872	-	1,379	-	115[c]	11,322
1989	10,909	583	-	1,134	-	2,019[c]	14,645
1990	294	356	-	8	-	8,109[c]	8,767
1991	786	187	-	-	-	8,450[c]	9,423
1992	412	140	-	-	-	500[c]	1,052

[a]Countries not in Tables 1 or 2.
[b]Not reported to NAFO. Catches estimated from surveillance reports.
[c]Includes some estimated catches.

Table 3. Breakdown of Canadian catches of American plaice by division, month, and gear, 1994 Div. 3LNO.

	3L			3N			3Ø				
		Gillnet									3LNO
Month	OT	Offshore	Inshore	OT	Seine	Other	OT	Seine	Gillnet	Other	Total
Jan											
Feb											
Mar									1		1
Apr							4			1	5
May			3				1				4
Jun			7								7
Jul			15	7							22
Aug			21								21
Sep			4				1				5
Oct							1				1
Nov							3				3
Dec											
Total	**0**	**0**	**50**	**7**	**0**	**0**	**10**	**0**	**1**	1	**69**

Division Totals	3L	3N	3Ø		Can (N) = 56	Can (SF) = 13
	50	7	12			
Gear Totals	**OT**	**Seine**	**GN**	**Other**		
	17	0	51	1		

Table 4 Canadian catches of A. plaice (otter trawl only), by division, from 1973 to 1993.

Year	3L	3N	3Ø	3LNO	Percentage of Canadian Catch
1973	14367	11575	9966	35908	93
1974	11745	13741	7895	33381	95
1975	11356	16306	3859	31521	93
1976	20648	17171	6383	44202	92
1977	19493	15536	3528	38557	91
1978	25574	12527	6242	44343	91
1979	23698	13923	4665	42286	90
1980	28083	14786	1893	44762	93
1981	32297	9308	1810	43415	90
1982	28204	11971	5043	45218	91
1983	19091	8677	4324	32092	89
1984	16784	10950	3312	31046	92
1985	20210	13327	3935	37472	94
1986	17461	8066	3867	29394	88
1987	21511	4396	3843	29750	88
1988	14126	5195	4441	23762	89
1989	15755	4665	4024	24444	88
1990[a]	11464	4181	3611	19256	85
1991[a]	8530	3118	7568	19216	83
1992[a]	675	376	5068	6119	64
1993[a]	6	1874	3939	5819	77

[a]Provisional

Table 5 . Mean weight (kg) of American plaice per tow, by stratum, from spring R.V. surveys in Division 3L. Numbers in parentheses are the number of successful 30-minute tows in each stratum. The stratified mean weight per tow (kg/30 min.) and the biomass estimates (t x 10^{-3}), are given at the bottom of the table.

			Year - Trip											
Depth (fm)	Stratum	No.of trawlable units	1971 ATC 187	1972 ATC 199	1973 ATC 207-209	1974 ATC 222	1975 ATC 233	1976 ATC 246	1977 ATC 262	1978 ATC 276	1979 ATC 289-291	1980 ATC 304, 305	1981 ATC 317-319	1982 ATC 327-329
51-100	328	114,023	-	-	-	-	-	-	26.9(3)	-	27.3(5)	-	52.5(2)	72.8(3)
51-100	341	118,151	-	-	48.4(3)	-	-	-	94.2(4)	43.8(4)	88.8(6)	47.0(6)	136.5(2)	146.6(5)
51-100	342	43,913	-	-	-	-	-	-	75.4(2)	72.6(2)	59.5(4)	77.0(4)	-	43.3(3)
51-100	343	39,409	-	-	-	-	-	-	103.1(2)	112.6(3)	90.2(4)	107.1(4)	177.5(2)	115.8(4)
101-150	344	112,146	-	-	-	-	-	92.3(4)	100.5(4)	62.4(4)	28.6(2)	105.5(3)	105.8(5)	58.0(4)
151-200	345	107,492	-	-	-	-	-	22.8(4)	27.1(4)	56.3(2)	8.4(4)	10.1(5)	32.5(4)	7.6(4)
151-200	346	64,931	-	-	-	-	45.9(2)	22.3(2)	8.4(3)	-	4.8(4)	2.8(3)	29.8(3)	5.3(3)
101-150	347	73,788	28.8(2)	-	-	24.5(2)	61.9(2)	151.5(3)	91.1(3)	59.3(4)	58.3(4)	102.3(5)	86.1(4)	93.0(2)
51-100	348	159,136	214.4(3)	92.3(3)	-	73.6(6)	47.5(4)	83.7(6)	211.6(6)	232.8(6)	150.2(6)	168.7(7)	89.5(7)	118.3(4)
51-100	349	158,686	281.2(3)	46.8(4)	-	17.0(4)	23.6(2)	66.6(3)	124.3(6)	65.1(6)	105.7(7)	110.8(9)	72.8(4)	125.6(6)
31- 50	350	155,458	77.9(3)	56.5(2)	33.5(4)	82.3(3)	78.1(3)	99.0(4)	40.5(4)	44.3(6)	45.5(9)	96.8(10)	114.5(3)	76.6(7)
31- 50	363	133,614	56.3(3)	111.7(3)	50.1(4)	69.8(4)	21.5(3)	90.4(4)	103.1(5)	96.8(5)	88.0(8)	77.2(5)	62.3(3)	168.0(5)
51-100	364	211,456	155.7(4)	138.8(3)	-	92.3(4)	99.4(2)	164.6(3)	236.1(7)	172.4(6)	195.5(8)	166.9(6)	172.3(3)	195.5(6)
51-100	365	78,142	192.0(3)	158.5(2)	-	43.1(3)	79.0(2)	62.4(3)	243.7(3)	243.3(2)	161.6(4)	156.1(4)	141.5(2)	88.7(3)
101-150	366	104,639	34.4(3)	-	-	63.0(3)	37.6(4)	40.8(4)	76.7(4)	-	7.2(4)	70.5(4)	20.2(3)	8.3(5)
151-200	368	25,071	0.0(2)	-	-	4.8(2)	1.1(2)	29.0(3)	0.0(3)	-	0.7(4)	0.8(2)	6.3(2)	0.5(2)
101-150	369	72,137	31.8(3)	-	-	14.2(3)	23.8(3)	52.9(4)	51.0(3)	18.6(2)	16.8(4)	13.7(3)	39.8(2)	20.5(2)
51-100	370	99,085	44.0(2)	82.5(3)	-	90.5(3)	43.3(3)	93.1(3)	162.1(3)	70.7(3)	211.7(4)	172.2(3)	54.0(2)	133.0(2)
31- 50	371	84,147	95.8(3)	91.9(2)	-	63.1(3)	-	-	93.4(3)	114.1(3)	175.8(3)	147.0(3)	177.0(2)	102.9(4)
31- 50	372	184,658	27.1(4)	36.3(3)	124.1(3)	50.4(3)	36.1(3)	47.5(3)	35.0(6)	24.5(7)	38.4(9)	39.7(6)	95.8(4)	50.8(6)
31- 50	384	84,072	87.9(3)	69.5(2)	12.4(3)	26.6(3)	-	-	54.0(2)	54.5(3)	79.0(4)	48.8(2)	60.5(2)	32.3(2)
51-100	385	176,851	139.5(4)	84.2(4)	34.5(3)	17.3(2)	72.1(4)	79.5(2)	168.0(6)	135.4(6)	102.2(7)	224.4(4)	87.3(3)	70.8(3)
101-150	386	73,788	20.9(2)	-	-	24.1(3)	22.6(3)	51.7(2)	4.8(3)	19.5(3)	11.5(4)	7.2(3)	20.8(2)	9.2(3)
151-200	387	53,896	1.2(3)	-	-	0.5(3)	0.0(2)	1.0(3)	2.5(2)	2.7(3)	1.0(4)	0.7(2)	1.0(2)	1.3(3)
151-200	388	27,098	1.4(2)	-	12.2(2)	2.6(3)	0.2(2)	13.0(2)	0.7(2)	0.3(2)	0.6(3)	0.1(2)	0.1(2)	0.4(2)
101-150	389	61,628	17.4(3)	17.0(2)	13.4(2)	14.5(3)	22.7(2)	38.8(2)	7.0(3)	8.2(3)	2.3(4)	4.8(3)	23.9(2)	4.5(2)
51-100	390	111,170	236.2(3)	30.1(3)	9.7(3)	1.6(3)	278.2(3)	-	68.1(2)	66.1(4)	93.8(5)	99.0(3)	18.5(2)	35.8(4)
101-150	391	21,168	-	24.1(2)	12.2(2)	43.3(3)	16.8(2)	-	45.4(2)	15.4(2)	17.2(4)	11.0(2)	4.3(2)	10.3(2)
151-200	392	10,884	-	-	291.9(3)	1.8(4)	2.4(2)	-	3.1(2)	1.9(3)	4.2(2)	1.5(2)	2.8(2)	0.8(2)
201-300	729	13,962	-	-	-	-	-	-	-	-	-	-	-	-
301-400	730	12,761	-	-	-	-	-	-	-	-	-	-	-	-
201-300	731	16,214	-	-	-	-	-	-	-	-	-	-	-	-
301-400	732	17,340	-	-	-	-	-	-	-	-	-	-	-	-
201-300	733	35,130	-	-	-	-	-	-	-	-	-	-	-	-
301-400	734	17,115	-	-	-	-	-	-	-	-	-	-	-	-
201-300	735	20,417	-	-	-	-	-	-	-	-	-	-	0.0(2)	-
301-400	736	13,136	-	-	-	-	-	-	-	-	-	-	-	-
401-500	737	17,040	-	-	-	-	-	-	-	-	-	-	-	-
401-500	741	16,739	-	-	-	-	-	-	-	-	-	-	-	-
401-500	745	26,122	-	-	-	-	-	-	-	-	-	-	-	-
401-500	748	11,935	-	-	-	-	-	-	-	-	-	-	-	-
Mean (#sets)			109.4(58)	79.0(38)	49.2(32)	47.1(70)	60.7(55)	76.8(64)	98.3(102)	87.1(94)	80.9(140)	95.3(115)	80.7(80)	80.4(103)
Biomass Index			232.8	135.8	53.3	101.7	124.8	163.9	271.3	213.7	223.4	252.1	221.0	222.0

Table 5 (Cont'd.)

	Year - Trip										
Stratum	1984 AN 28	1985 WT 28-30	1986 WT 48	1987 WT 58- 60	1988 WT 70, 71	1989 WT 82, 83	1990 WT 96	1991 WT 106, 107	1992 WT 119-122	1993 WT 136-138	1994 WT 152-154
328	12.5(2)	51.6(4)	51.2(9)	85.9(7)	23.3(2)	22.9(8)	71.0(7)	14.7(6)	4.8(4)	1.8(6)	0.2(6)
341	69.6(4)	40.3(9)	43.7(9)	82.5(6)	50.8(6)	31.4(8)	111.0(4)	8.2(6)	0.7(8)	1.2(6)	0.8(5)
342	60.1(4)	35.2(3)	53.5(3)	91.8(2)	94.0(2)	39.6(3)	32.5(2)	3.6(2)	0.5(3)	0.7(3)	0.7(3)
343	-	12.7(3)	48.0(4)	111.5(3)	67.0(3)	135.3(3)	27.4(3)	5.3(2)	3.1(3)	1.7(2)	0.3(2)
344	-	41.6(5)	80.3(8)	51.1(4)	83.2(6)	145.6(7)	24.4(6)	2.0(5)	1.7(6)	1.1(6)	0.2(5)
345	-	23.3(5)	16.3(7)	11.0(4)	12.9(8)	7.6(9)	6.3(4)	10.7(3)	1.7(6)	1.4(6)	2.3(5)
346	-	26.3(2)	33.1(5)	7.3(5)	8.8(4)	6.4(4)	9.4(4)	-	2.7(4)	3.9(4)	2.9(3)
347	-	42.1(5)	50.4(5)	43.5(3)	50.5(5)	63.3(6)	43.9(4)	4.1(4)	0.9(4)	2.7(4)	2.5(4)
348	-	65.1(18)	104.9(12)	130.1(8)	142.3(11)	79.2(9)	44.5(11)	7.7(8)	3.2(9)	3.0(8)	0.6(8)
349	89.5(6)	49.8(14)	58.3(14)	105.1(11)	135.9(8)	45.7(11)	29.4(9)	9.5(9)	2.8(9)	0.8(9)	0.6(8)
350	108.2(6)	98.5(12)	99.5(11)	68.7(11)	86.1(8)	61.7(11)	30.6(7)	30.8(8)	2.9(11)	1.1(9)	0.9(7)
363	92.2(5)	107.8(8)	138.4(10)	68.6(9)	97.0(7)	53.6(9)	36.1(7)	23.4(7)	3.4(9)	1.4(8)	0.3(6)
364	144.4(5)	102.3(17)	87.4(17)	164.0(15)	136.1(10)	94.4(16)	50.0(12)	18.4(11)	3.8(12)	0.8(12)	1.1(10)
365	-	54.1(7)	68.5(5)	107.9(5)	82.5(4)	88.0(6)	13.6(4)	27.8(4)	4.8(4)	1.6(5)	2.2(4)
366	-	37.6(6)	21.4(8)	14.5(7)	18.8(6)	15.3(8)	12.2(6)	-	4.0(6)	3.2(7)	3.3(5)
368	-	30.5(2)	16.5(2)	1.7(3)	2.0(2)	1.6(3)	7.6(2)	-	20.9(2)	10.0(2)	1.6(2)
369	-	71.7(5)	16.1(6)	8.4(5)	6.3(4)	12.5(6)	7.5(5)	5.0(2)	6.0(4)	1.5(5)	3.1(3)
370	-	56.6(8)	96.6(8)	69.8(7)	129.5(5)	77.3(8)	26.8(7)	22.9(6)	8.4(6)	1.5(6)	2.1(5)
371	-	107.5(7)	68.0(6)	58.3(7)	147.8(5)	108.3(6)	63.3(6)	19.8(5)	0.8(5)	1.8(5)	1.0(4)
372	63.7(5)	109.9(12)	69.6(14)	30.1(13)	58.3(11)	52.7(13)	22.8(7)	12.6(10)	2.5(10)	7.0(1)	0.4(8)
384	-	100.3(6)	114.0(6)	56.4(7)	53.9(5)	102.0(6)	8.7(4)	6.1(4)	2.8(5)	0.4(5)	0.4(4)
385	-	48.8(15)	62.8(13)	74.1(11)	46.3(10)	73.3(12)	8.5(11)	16.2(8)	6.6(10)	2.1(11)	1.6(8)
386	-	26.0(5)	9.7(6)	7.5(5)	32.5(4)	12.7(6)	14.2(5)	14.4(3)	9.7(4)	1.2(5)	1.9(4)
387	-	20.8(6)	3.0(4)	0.0(4)	1.2(4)	2.5(5)	2.1(4)	8.1(3)	10.9(3)	3.0(3)	2.1(3)
388	-	25.5(2)	11.5(2)	1.4(2)	0.9(2)	2.0(3)	0.5(2)	5.5(3)	9.7(2)	9.7(2)	2.8(2)
389	-	27.2(5)	27.7(5)	10.6(6)	19.7(3)	14.6(5)	4.8(4)	7.2(3)	3.4(3)	2.9(4)	1.8(3)
390	-	15.0(9)	14.5(8)	28.0(7)	11.1(5)	9.4(8)	6.1(5)	4.9(5)	1.5(6)	1.0(6)	1.0(5)
391	-	9.5(2)	61.0(2)	12.5(2)	27.8(2)	7.4(3)	4.8(2)	13.3(2)	2.3(2)	7.3(2)	4.0(2)
392	-	13.8(2)	9.5(2)	0.6(2)	0.9(2)	1.5(3)	3.2(2)	5.8(2)	4.3(2)	3.9(2)	2.4(2)
729	-	0.5(2)	-	-	-	-	-	2.2(2)	17.0(2)	15.6(2)	4.2(2)
730	-	0.3(2)	-	-	-	-	-	0.1(2)	3.0(2)	5.7(2)	14.4(2)
731	-	326.0(2)	-	-	-	-	-	3.4(2)	4.0(2)	6.1(2)	15.7(2)
732	-	0.3(2)	-	-	-	-	-	0.9(2)	6.3(2)	3.3(2)	0.7(2)
733	-	21.4(3)	-	-	-	-	-	0.5(2)	13.2(2)	15.3(3)	1.4(2)
734	-	1.5(3)	-	-	-	-	-	3.4(2)	1.9(2)	0.0(2)	11.8(2)
735	-	57.0(2)	-	-	-	-	-	-	63.4(2)	42.1(2)	12.3(2)
736	-	5.0(2)	-	-	-	-	-	-	16.6(2)	11.4(2)	16.9(2)
737	-	-	-	-	-	-	-	-	-	-	8.5(2)
741	-	-	-	-	-	-	-	-	-	-	0.0(2)
745	-	-	-	-	-	-	-	-	-	-	0.0(2)
748	-	-	-	-	-	-	-	-	-	-	0.4(2)
Mean (#sets)	87.4(37)	60.3(221)	63.1(211)	65.5(181)	69.9(154)	55.4(205)	29.9(156)	12.9(143)	4.5(178)	2.8(181)	1.6(160)
Biomass Index	97.9	175.1	174.1	180.9	193.0	153.0	82.6	34.5	13.0	8.1	5.1

Table 6. Biomass estimates (000 t) of A. plaice, by stratum and depth zone, from Canadian spring surveys in Div. 3L from 1985-1994. (+) indicates stratum biomass < 50 t and (-) indicates stratum not surveyed.

Depth (fm)	Stratum	Year									
		1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
31-50	350	15.3	15.5	10.7	13.4	9.6	4.8	4.8	0.5	0.2	0.1
	363	14.4	18.5	9.2	13.0	7.2	4.8	3.1	0.5	0.2	+
	371	9.0	5.7	4.9	12.4	9.1	5.3	1.7	0.1	0.2	0.1
	372	20.3	12.8	5.6	10.8	9.7	4.2	2.3	0.5	1.3	0.1
	384	8.4	9.6	4.7	4.5	8.6	0.7	0.5	0.2	+	+
	Total	67.4	62.1	35.1	54.1	44.2	19.8	12.4	1.8	1.9	0.3
51-100	328	5.9	5.8	9.8	2.6	2.6	8.1	1.7	0.5	0.2	+
	341	4.8	5.2	9.7	6.0	3.7	13.1	1.0	0.1	0.1	0.1
	342	1.5	2.3	4.0	4.1	1.7	1.4	0.2	+	+	+
	343	0.5	1.9	4.4	2.6	5.3	1.1	0.2	0.1	0.1	+
	348	10.4	16.7	20.7	22.6	12.6	7.1	1.2	0.5	0.5	0.1
	349	7.9	9.2	16.7	21.6	7.3	4.7	1.5	0.4	0.1	0.1
	364	21.6	18.5	34.7	28.8	20.0	10.6	3.9	0.8	0.2	0.2
	365	4.2	5.4	8.4	6.4	6.9	1.1	2.2	0.4	0.1	0.2
	370	5.6	9.6	6.9	12.9	7.7	2.7	2.3	0.8	0.2	0.2
	385	8.6	11.1	13.1	8.2	13.0	1.5	2.9	1.2	0.4	0.3
	390	1.7	1.6	3.1	1.2	1.0	0.7	0.5	0.2	0.1	0.1
	Total	72.7	87.3	131.2	117.0	81.8	52.1	17.6	5.0	2.0	1.6
101-150	344	4.7	9.0	5.7	9.3	16.3	2.7	0.2	0.2	0.1	+
	347	3.1	3.7	3.2	3.7	4.7	3.2	0.3	0.1	0.2	0.2
	366	3.9	2.2	1.5	2.0	1.6	1.3	-	0.4	0.3	0.4
	369	5.2	1.2	0.6	0.4	0.9	0.5	0.4	0.4	0.1	0.2
	386	1.9	0.7	0.6	2.4	0.9	1.0	1.1	0.7	0.1	0.1
	389	1.7	1.7	0.6	1.2	0.20.9	0.3	0.4	0.2	0.2	0.1
	391	0.2	1.3	0.3	0.6	0.2	0.1	0.3	+	0.2	0.1
	Total	20.7	19.8	12.5	19.6	25.5	9.1	2.7	2.0	1.2	1.1
151-200	345	2.5	1.8	1.2	1.4	0.8	0.7	1.1	0.2	0.1	0.2
	346	1.7	2.1	0.5	0.6	0.4	0.6	-	0.2	0.3	0.2
	368	0.8	0.4	+	+	+	0.2	-	0.5	0.3	+
	387	1.1	0.2	+	+	0.1	0.1	0.4	0.6	0.2	0.1
	388	0.7	0.3	+	+	+	+	0.1	0.3	0.3	0.1
	392	0.1	0.1	+	+	+	+	0.0	+	+	+
	Total	6.9	4.9	1.7	2.0	1.3	1.6	1.6	1.8	1.2	0.6
201-300	729	+	-	-	-	-	-	+	0.2	0.2	0.1
	731	5.3	-	-	-	-	-	+	0.1	0.1	0.3
	733	0.8	-	-	-	-	-	+	0.5	0.5	0.1
	735	1.2	-	-	-	-	-	-	1.3	0.9	0.3
	Total	7.3	-	-	-	-	-	+	2.1	1.7	0.8
301-400	730	+	-	-	-	-	-	+	+	0.1	0.2
	732	+	-	-	-	-	-	+	0.1	0.1	+
	734	+	-	-	-	-	-	+	+	0.0	0.2
	736	+	-	-	-	-	-	-	0.2	0.1	0.2
	Total	+	-	-	-	-	-	+	0.3	0.3	0.6
401-500	737	-	-	-	-	-	-	-	-	-	0.1
	741	-	-	-	-	-	-	-	-	-	0.0
	745	-	-	-	-	-	-	-	-	-	0.0
	748	-	-	-	-	-	-	-	-	-	+
	Total	-	-	-	-	-	-	-	-	-	0.1
Grand Total		175.0	174.1	180.5	192.7	152.8	82.6	34.3	13.0	8.3	5.1

Table 7 . Mean weight (kg) of American plaice per tow, by stratum, from spring R.V.surveys in Division 3N. Numbers in parentheses are the number of successful 30-minute tows in each stratum. The stratified mean weight per tow (kg/30 min.) and the biomass estimates (t x 10^{-3}) are given at the bottom of the table.

Depth (fm)	Stratum	No. of trawlable units	1971 ATC 187	1972 ATC 199	1973 ATC 208, 209	1974 ATC 222	1975 ATC 233	1976 ATC 245	1977 ATC 263	1978 ATC 277, 278	1979 ATC 289	1980 ATC 304	1981 ATC 319	1982 ATC 328, 329
151-200	357	12,311	-	-	0.0(2)	-	-	-	5.5(2)	-	2.4(3)	0.5(3)	0.0(2)	0.8(2)
101-150	358	16,889	-	2.4(4)	6.5(3)	-	-	-	20.0(2)	-	2.1(2)	1.8(3)	0.0(3)	3.5(2)
51-100	359	31,602	-	46.3(3)	31.3(3)	-	-	66.3(3)	114.4(2)	-	60.3(4)	36.0(4)	25.4(3)	28.5(2)
31-501	360	224,592	-	34.1(4)	-	-	23.5(4)	44.3(4)	58.8(4)	106.7(4)	60.4(9)	39.9(11)	43.3(6)	37.8(7)
31-50	361	139,094	17.3(2)	49.2(3)	25.2(4)	37.2(4)	46.3(4)	21.1(5)	22.1(3)	17.5(4)	20.3(8)	33.7(7)	-	45.5(6)
31-50	362	189,162	89.0(2)	110.4(4)	58.0(5)	40.8(4)	18.6(3)	38.7(5)	27.4(5)	27.6(4)	37.3(12)	46.5(11)	75.8(5)	46.8(8)
31-50	373	189,162	93.1(4)	55.6(4)	27.6(4)	12.1(4)	-	75.5(5)	70.5(4)	70.3(5)	35.2(11)	33.6(8)	83.4(5)	31.8(5)
31-50	374	69,885	64.7(2)	66.7(2)	45.1(4)	30.4(2)	21.3(2)	-	68.1(3)	89.9(3)	46.3(4)	54.7(3)	170.0(3)	12.4(4)
≤ 30	375	119,577	17.3(3)	15.7(3)	41.5(3)	35.6(3)	14.6(3)	-	61.3(4)	39.1(5)	17.7(5)	16.8(4)	10.5(4)	18.5(5)
≤ 30	376	112,521	-	16.3(2)	22.3(3)	-	23.6(2)	33.0(3)	59.0(3)	240.3(2)	25.4(4)	71.3(3)	22.0(4)	22.9(7)
51-100	377	7,506	-	24.5(2)	52.2(2)	19.7(3)	165.3(2)	-	236.1(2)	28.6(2)	15.9(3)	36.1(4)	215.3(3)	62.0(2)
101-150	378	10,434	23.2(2)	22.3(2)	42.7(2)	21.0(3)	-	-	7.8(2)	10.0(2)	6.9(3)	10.0(2)	3.8(2)	6.5(2)
151-200	379	7,957	-	-	0.5(2)	12.0(3)	-	-	0.2(2)	0.3(2)	4.7(3)	9.7(3)	3.5(3)	2.0(2)
151-200	380	8,707	-	0.9(2)	15.7(3)	3.4(2)	-	-	2.3(2)	-	1.5(2)	2.7(3)	0.3(3)	-
101-150	381	13,662	22.1(4)	3.6(4)	144.1(3)	19.5(4)	15.6(2)	-	15.3(2)	7.6(3)	19.1(3)	13.1(4)	5.8(3)	5.6(2)
51-100	382	48,567	23.5(3)	4.5(4)	15.4(3)	6.1(3)	-	45.6(2)	39.0(3)	32.4(3)	174.9(3)	25.5(4)	103.5(2)	56.8(2)
31-50	383	50,593	69.0(2)	59.9(2)	0.1(2)	51.8(2)	-	14.5(3)	62.7(3)	87.7(2)	25.6(3)	33.0(4)	241.7(3)	19.8(2)
201-300	723	11,635	-	-	-	-	-	-	-	-	-	-	-	-
301-400	724	9,308	-	-	-	-	-	-	-	-	-	-	-	-
201-300	725	7,882	-	-	-	-	-	-	-	-	-	-	-	-
301-400	726	5,405	-	-	-	-	-	-	-	-	-	-	-	-
201-300	727	12,010	-	-	-	-	-	-	-	-	-	-	-	-
301-400	728	11,710	-	-	-	-	-	-	-	-	-	-	-	-
401-500	752	10,059	-	-	-	-	-	-	-	-	-	-	-	-
401-500	756	7,957	-	-	-	-	-	-	-	-	-	-	-	-
401-500	760	11,560	-	-	-	-	-	-	-	-	-	-	-	-
Mean (#sets)			58.5(24)	48.3(45)	34.2(48)	29.5(37)	25.8(22)	43.9(30)	51.7(48)	75.6(41)	40.4(82)	37.8(81)	67.6(54)	32.7(60)
Biomass Index			48.6	59.5	35.1	25.2	22.6	43.1	64.5	89.4	50.6	40.7	68.4	59.9

Table 7_. (Cont'd.)

Stratum	1984 AN 27-28	1985 WT 29 AN 43	1986 WT 47	1987 WT 58, 59, 60	1988 WT WT 70	1989 WT 82	1990 WT 95, 96	1991 WT 105	1992 WT 119, 120	1993 WT 136, 137	1994 WT 152, 153
357	0.0(2)	22.3(2)	0.0(2)	-	0.0(2)	0.0(2)	0.5(2)	0.4(2)	1.5(2)	0.0(2)	4.9(2)
358	3.5(2)	180.5(2)	2.8(2)	1.5(2)	1.9(2)	0.8(2)	5.6(2)	11.6(2)	30.0(2)	7.2(2)	61.7(2)
359	51.8(2)	28.0(2)	27.0(2)	5.9(2)	3.9(2)	17.5(2)	12.9(2)	10.4(2)	17.8(2)	104.0(2)	3.6(2)
360	47.3(7)	38.2(16)	32.5(13)	15.3(15)	10.4(12)	22.2(15)	18.3(15)	15.6(12)	5.8(14)	17.7(11)	4.5(8)
361	39.0(5)	47.0(7)	22.7(10)	36.9(8)	26.5(7)	39.6(10)	39.0(9)	11.7(8)	3.3(8)	16.8(8)	23.0(5)
362	89.9(7)	66.9(11)	82.6(14)	55.4(13)	50.6(10)	56.9(13)	49.9(10)	29.8(10)	6.1(12)	10.9(9)	1.3(6)
373	66.1(7)	67.3(9)	26.4(14)	78.6(13)	44.1(10)	60.5(13)	9.5(10)	25.9(11)	3.7(10)	3.3(9)	0.9(7)
374	112.1(3)	49.5(4)	15.0(6)	36.5(5)	20.2(5)	30.8(5)	10.4(5)	15.6(5)	3.4(5)	3.8(3)	2.1(3)
375	46.2(5)	32.8(8)	45.6(8)	69.4(8)	36.8(6)	23.4(8)	24.9(8)	4.8(6)	11.9(6)	10.1(6)	3.1(4)
376	10.6(4)	21.7(7)	22.4(9)	27.4(8)	6.0(6)	19.8(8)	6.3(7)	10.9(7)	1.2(7)	10.7(6)	1.9(4)
377	319.5(2)	37.3(2)	34.0(2)	32.8(2)	26.8(2)	36.9(2)	56.3(2)	27.2(3)	19.8(2)	62.0(2)	5.7(2)
378	21.5(2)	36.5(2)	68.1(2)	7.0(2)	10.5(2)	2.1(2)	45.2(2)	11.7(3)	24.8(2)	126.5(2)	20.6(2)
379	4.5(2)	5.8(2)	1.0(2)	7.8(2)	0.1(2)	0.0(2)	0.9(2)	3.0(2)	13.0(2)	1.4(2)	7.4(2)
380	1.3(2)	10.8(2)	3.6(3)	0.0(2)	0.0(2)	2.6(2)	6.0(2)	3.7(2)	10.5(2)	13.5(2)	2.5(2)
381	53.8(2)	26.3(2)	15.3(3)	2.4(2)	5.8(2)	7.6(2)	15.7(2)	7.2(2)	10.0(2)	19.3(2)	11.3(2)
382	2.8(3)	63.4(4)	6.5(4)	50.3(3)	5.5(2)	15.7(3)	7.5(3)	1.4(2)	2.6(3)	2.0(2)	1.7(2)
383	61.5(3)	22.2(3)	19.9(4)	36.3(3)	24.0(3)	22.0(3)	56.4(2)	3.5(3)	2.1(2)	1.2(3)	0.6(2)
723	-	-	-	-	-	-	-	0.1(2)	3.0(2)	0.1(2)	1.9(2)
724	-	-	-	-	-	-	-	0.0(2)	3.9(2)	0.2(2)	2.3(2)
725	-	-	-	-	-	-	-	0.2(2)	-	0.6(2)	2.4(2)
726	-	-	-	-	-	-	-	0.9(2)	1.9(2)	5.6(2)	0.7(2)
727	-	-	-	-	-	-	-	2.8(2)	7.6(2)	16.4(2)	9.4(2)
728	-	-	-	-	-	-	-	1.1(2)	12.8(2)	15.0(2)	9.5(3)
752	-	-	-	-	-	-	-	-	-	-	11.10
756	-	-	-	-	-	-	-	-	-	-	0.60
760	-	-	-	-	-	-	-	-	-	-	0.00
Mean (#sets)	54.7(60)	47.8(85)	35.0(101)	42.6(91)	25.9(77)	34.1(94)	24.0(85)	15.2(93)	6.0(93)	13.6(85)	5.6(76)
Biomass Index	47.4	75.3	43.8	52.8	32.4	42.8	30.1	19.9	7.8	17.8	7.6

Table 8. Biomass estimates (000 t) of A. plaice, by stratum and depth zone, from Canadian spring surveys in Div. 3N from 1985-1994.

		Year									
Depth (fm)	Stratum	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
≤ 30	375	3.9	5.5	8.3	4.4	2.8	3.0	0.6	1.4	1.2	0.4
	376	2.4	2.6	3.1	0.7	2.2	0.7	1.2	0.1	1.2	0.2
	Total	**6.3**	**8.1**	**11.4**	**5.1**	**5.0**	**3.7**	**1.8**	**1.5**	**2.4**	**0.6**
31-50	360	8.6	7.3	3.4	2.3	5.0	4.1	3.5	1.3	4.0	1.0
	361	6.5	3.2	5.1	3.7	5.5	5.4	1.6	0.4	2.3	3.2
	362	12.7	15.6	10.5	9.6	10.8	9.4	5.6	1.2	2.1	0.2
	373	12.7	5.0	14.9	8.3	11.4	1.8	4.9	0.7	0.6	0.2
	374	3.5	1.3	2.6	1.4	2.2	0.7	1.1	0.2	0.3	0.1
	383	1.1	1.0	1.8	1.2	1.1	2.8	0.2	0.1	0.1	+
	Total	**45.1**	**33.4**	**38.3**	**26.5**	**36.0**	**24.2**	**16.9**	**3.9**	**9.4**	**4.7**
51-100	359	0.9	0.8	0.2	0.1	0.6	0.4	0.3	0.6	3.3	0.1
	377	0.3	0.3	0.3	0.2	0.3	0.4	0.2	0.1	0.5	+
	382	3.1	0.3	2.4	0.3	0.8	0.4	+	0.1	0.1	0.1
	Total	**4.3**	**1.4**	**2.9**	**0.6**	**1.7**	**1.2**	**0.5**	**0.8**	**3.9**	**0.2**
101-150	358	3.0	+	+	+	+	+	0.2	0.5	0.1	1.0
	378	0.4	0.7	+	0.1	+	0.5	0.1	0.3	1.3	0.2
	381	0.4	0.2	+	+	0.1	0.2	0.1	0.4	0.3	0.2
	Total	**3.8**	**0.9**	**+**	**0.1**	**0.1**	**0.7**	**0.4**	**1.2**	**1.7**	**1.4**
151-200	357	0.3	0.0	-	0.0	0.0	+	+	+	0.0	0.1
	379	+	+	+	+	0.0	+	+	0.1	+	0.1
	380	+	+	0.0	0.0	+	+	+	+	0.1	+
	Total	**0.3**	**+**	**+**	**+**	**+**	**+**	**+**	**0.1**	**0.1**	**0.2**
201-300	723	-	-	-	-	-	-	+	+	+	+
	725	-	-	-	-	-	-	+	+	+	+
	727	-	-	-	-	-	-	+	+	0.2	0.1
	Total	**-**	**-**	**-**	**-**	**-**	**-**	**+**	**+**	**0.2**	**0.1**
301-400	724	-	-	-	-	-	-	0.0	+	+	+
	726	-	-	-	-	-	-	+	+	+	+
	728	-	-	-	-	-	-	+	0.1	0.2	0.1
	Total	**-**	**-**	**-**	**-**	**-**	**-**	**+**	**0.1**	**0.2**	**0.1**
401-500	752	-	-	-	-	-	-	-	-	-	0.1
	756	-	-	-	-	-	-	-	-	-	+
	760	-	-	-	-	-	-	-	-	-	0
	Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.1**
	Grand Total	59.8	43.8	52.6	32.3	42.8	29.8	19.6	7.6	17.9	7.4

Table 9. Mean weight (kg) of American plaice per tow, by stratum, from spring R. V. surveys in Division 3Ø. Numbers in parentheses are the number of successful 30-minute tows in each stratum. The stratified mean weight per tow (kg/30 min.) and the biomass estimates (t x 10^{-3}), are given at the bottom of the table.

Depth (fm)	Stratum	No. of trawlable units	Year - Trip 1973 ATC 207, 209	1975 ATC 233	1976 ATC 245	1977 ATC 263	1978 ATC 276, 277	1979 ATC 289, 291	1980 ATC 303	1981 318, 319	1982 ATC 327, 329
51-100	329	129,185	7.8(2)	-	91.7(2)	80.2(3)	16.6(5)	61.6(6)	45.8(2)	157.0(2)	54.9(6)
31-50	330	156,809	47.6(6)	25.7(3)	26.9(3)	101.1(3)	40.0(6)	78.4(7)	22.0(2)	54.6(4)	24.2(7)
31-50	331	34,229	28.6(2)	6.4(2)	41.2(2)	-	6.8(2)	28.9(3)	28.3(2)	-	24.0(4)
51-100	332	78,592	-	23.6(2)	13.5(3)	10.3(3)	14.9(3)	12.9(4)	18.9(2)	-	16.3(4)
101-150	333	11,335	-	5.7(2)	1.6(2)	4.3(2)	2.3(3)	5.3(2)	0.1(2)	-	1.3(4)
151-200	334	6,906	-	-	0.0(2)	0.0(2)	0.0(3)	0.6(3)	0.0(2)	-	0.1(4)
151-200	335	4,354	0.5(2)	-	13.3(3)	-	7.1(2)	4.1(2)	1.5(3)	-	0.7(2)
101-150	336	9,083	4.8(3)	7.6(2)	30.9(2)	10.4(2)	6.8(2)	8.1(4)	0.3(2)	-	2.5(2)
51-100	337	71,161	16.3(3)	3.0(3)	16.3(2)	21.8(2)	30.5(2)	1.3(4)	6.5(3)	-	22.3(3)
31-50	338	142,472	38.8(5)	20.0(2)	62.7(3)	22.9(4)	7.6(5)	19.9(7)	30.2(5)	-	13.2(5)
51-100	339	43,913	152.4(2)	47.2(2)	-	-	65.5(2)	262.4(3)	-	96.5(2)	27.0(4)
31-50	340	128,810	-	20.0(3)	81.2(6)	52.1(3)	18.0(3)	59.2(7)	85.8(2)	97.3(3)	35.3(6)
31-50	351	189,162	65.7(5)	73.5(4)	56.3(4)	62.7(5)	18.5(6)	46.8(11)	76.3(10)	180.0(4)	46.3(9)
31-50	352	193,666	25.8(5)	77.9(4)	61.1(4)	17.1(5)	8.4(4)	25.5(12)	38.0(11)	-	36.6(7)
31-50	353	96,232	42.0(3)	72.0(3)	46.3(2)	42.4(3)	41.5(3)	36.0(5)	75.9(4)	-	35.0(3)
51-100	354	35,580	49.0(3)	-	32.4(3)	34.5(2)	-	17.7(4)	101.8(3)	10.8(2)	34.8(2)
101-150	355	7,732	0.5(2)	3.6(2)	7.3(2)	-	-	16.8(4)	8.5(2)	28.5(2)	14.0(2)
151-200	356	4,579	0.9(2)	-	-	-	-	11.6(2)	4.8(2)	30.5(2)	-
201-300	717	6,981	-	-	-	-	-	-	-	-	-
301-400	718	8,332	-	-	-	-	-	-	-	-	-
201-300	719	5,705	-	-	-	-	-	-	-	-	-
301-400	720	7,882	-	-	-	-	-	-	-	-	-
201-300	721	5,705	-	-	-	-	-	-	-	-	-
301-400	722	6,981	-	-	-	-	-	-	-	-	-
401-500	764	7,882	-	-	-	-	-	-	-	-	-
401-500	772	10,134	-	-	-	-	-	-	-	-	-
Mean (#sets)			41.2(45)	42.9(34)	52.2(45)	47.4(39)	21.2(51)	46.5(90)	46.5(59)	115.1(21)	31.8(74)
Biomass Index			46.1	49.1	67.6	59.2	27.5	62.5	60.1	79.2	42.4

Table 9. (Cont'd.)

Stratum	1984 AN 27	1985 AN 43	1986 WT 47	1987 WT 58, 60	1988 WT 70	1989 WT WT 82	1990 WT 94, 95	1991 WT 106, 107	1992 WT 119, 120	1993 WT 136	1994 WT 152-154
	Year - Trip										
329	25.7(5)	30.5(8)	23.4(8)	49.3(9)	8.2(7)	30.2(9)	19.4(7)	13.0(9)	3.0(8)	5.7(6)	17.2(5)
330	48.0(4)	118.4(10)	44.5(9)	56.1(11)	29.6(9)	40.1(11)	33.2(10)	29.4(11)	2.4(10)	3.4(7)	2.0(5)
331	80.2(3)	98.8(3)	11.4(4)	46.8(2)	43.8(2)	10.7(2)	-	36.5(2)	10.3(2)	42.7(2)	12.0(2)
332	6.0(2)	24.3(5)	38.8(6)	59.4(5)	5.5(4)	16.8(5)	16.9(5)	25.2(6)	20.4(5)	16.9(4)	7.1940
333	0.0(2)	0.0(2)	0.0(3)	0.4(2)	1.3(2)	0.2(2)	2.4(2)	1.0(2)	0.4(2)	0.2(2)	60.8(2)
334	0.0(2)	1.5(2)	0.4(2)	0.8(2)	0.1(2)	0.4(2)	3.9(2)	0.9(2)	2.0(2)	0.6(2)	12.2(2)
335	0.4(2)	0.7(2)	0.1(2)	0.4(2)	1.8(2)	0.1(2)	0.0(2)	3.0(3)	4.0(3)	9.8(2)	5.2(2)
336	0.0(2)	1.3(2)	0.3(2)	0.0(2)	1.8(2)	0.5(2)	0.6(2)	4.1(2)	17.5(2)	4.8(2)	34.5(2)
337	7.0(2)	15.8(5)	12.4(5)	14.3(6)	6.3(4)	10.5(5)	13.3(5)	17.5(5)	14.5(4)	4.9(2)	6.0(3)
338	60.1(5)	59.6(9)	28.5(9)	26.7(9)	50.3(8)	21.3(10)	35.9(8)	29.2(10)	19.0(6)	14.8(6)	15.9(6)
339	160.0(2)	13.9(3)	5.5(3)	68.5(3)	29.2(3)	84.0(3)	78.6(3)	30.5(3)	55.0(2)	11.2(2)	6.1(2)
340	49.5(4)	43.9(9)	35.9(7)	93.7(9)	56.1(7)	26.3(9)	55.1(9)	31.3(9)	16.5(5)	9.4(6)	3.0(5)
351	92.9(6)	73.3(9)	80.3(14)	71.1(13)	76.9(10)	57.5(13)	78.6(12)	43.0(12)	14.4(10)	12.0(9)	0.3(7)
352	27.0(7)	56.5(11)	34.2(14)	63.5(13)	52.2(11)	35.1(13)	47.4(13)	23.0(14)	30.6(8)	29.6(7)	18.9(8)
353	48.5(2)	55.5(6)	29.2(7)	44.4(6)	21.0(5)	28.7(7)	28.3(6)	8.3(7)	26.2(4)	24.7(4)	11.8(4)
354	11.8(2)	73.2(3)	9.8(3)	17.3(2)	6.0(2)	14.0(2)	10.4(2)	15.9(3)	22.7(2)	10.5(2)	6.3(2)
355	4.8(2)	20.3(2)	1.0(2)	1.8(2)	0.4(2)	13.0(2)	7.1(2)	14.8(2)	13.6(2)	1.5(2)	28.6(2)
356	4.3(2)	7.0(2)	0.0(2)	1.2(2)	1.0(2)	0.0(2)	0.5(2)	2.7(2)	12.6(2)	1.8(2)	8.7(2)
717	-	-	-	-	-	-	-	1.0(2)	0.0(2)	1.2(2)	19.6(2)
718	-	-	-	-	-	-	-	0.0(2)	0.0(2)	0.0(2)	2.1(2)
719	-	-	-	-	-	-	-	0.1(2)	1.1(2)	0.1(2)	1.5(2)
720	-	-	-	-	-	-	-	0.0(2)	0.2(2)	0.5(2)	1.9(2)
721	-	-	-	-	-	-	-	0.9(2)	1.6(2)	0.6(2)	4.4(2)
722	-	-	-	-	-	-	-	0.6(2)	1.6(2)	0.5(2)	9.2(2)
764	-	-	-	-	-	-	-	-	-	-	0.5(2)
772	-	-	-	-	-	-	-	-	-	-	4.5(2)
Mean (#sets)	48.0(56)	57.0(93)	35.9(102)	53.4(100)	37.7(84)	32.6(101)	40.4(92)	24.9(116)	16.9(91)	13.8(81)	9.7(81)
Biomass Index	64.5	48.2	71.7	50.7	76.6	43.8	52.9	34.5	23.3	19.1	13.7

Table 10. Biomass estimates (000 t) of A. plaice, by stratum and depth zone, from Canadian spring surveys in Div. 3Ø from 1985-1994.

		Year									
Depth (fm)	Stratum	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
31-50	330	18.6	7.0	8.8	4.6	6.3	5.2	4.6	0.4	0.5	0.3
	331	3.4	0.4	1.6	1.5	0.4	-	1.2	0.4	1.5	0.4
	338	8.5	4.1	3.8	7.2	3.0	5.1	4.2	2.7	2.1	2.3
	340	5.6	4.6	12.0	7.2	3.4	7.1	4.0	2.1	1.2	0.4
	351	13.9	15.2	13.2	14.5	10.9	14.9	8.1	2.7	2.3	0.1
	352	10.9	6.6	12.3	10.1	6.8	9.2	4.4	5.9	5.7	3.7
	353	5.3	2.8	4.3	2.0	2.8	2.7	0.8	2.5	2.4	1.1
	Total	**66.2**	**40.7**	**56.0**	**47.1**	**33.6**	**44.2**	**27.3**	**16.7**	**15.7**	**8.3**
51-100	329	3.9	3.0	6.4	1.1	3.9	2.5	1.7	0.4	0.72.2	2.2
	332	1.9	3.0	4.7	0.4	1.3	1.3	2.0	1.6	1.3	0.6
	337	1.1	0.9	1.0	0.4	0.7	0.9	1.2	1.0	0.3	0.4
	339	0.6	0.2	3.0	1.3	3.7	3.4	1.3	2.4	0.5	0.3
	354	2.6	0.3	0.6	0.2	0.5	0.4	0.6	0.8	0.4	0.2
	Total	**10.1**	**7.4**	**15.7**	**3.4**	**10.1**	**8.5**	**6.8**	**6.2**	**3.2**	**3.7**
101-150	333	0.0	0.0	+	+	+	+	+	+	+	0.7
	336	+	+	+	+	+	+	+	0.2	+	0.3
	355	0.2	+	+	+	0.1	+	0.1	0.1	+	0.2
	Total	**0.2**	+	+	+	**0.1**	+	**0.1**	**0.3**	+	**1.2**
151-200	334	+	+	+	+	+	+	+	+	+	0.1
	335	+	+	+	+	+	0.0	+	+	+	+
	356	+	0.0	+	+	0.0	+	+	+	+	+
	Total	+	+	+	+	+	+	+	+	+	**0.1**
201-300	717	-	-	-	-	-	-	+	0.0	+	0.2
	719	-	-	-	-	-	-	+	+	+	+
	721	-	-	-	-	-	-	+	+	+	+
	Total	-	-	-	-	-	-	+	+	+	**0.2**
301-400	718	-	-	-	-	-	-	0.0	0.0	0.0	+
	720	-	-	-	-	-	-	0.0	+	+	+
	722	-	-	-	-	-	-	+	+	+	0.1
	Total	-	-	-	-	-	-	+	+	+	**0.1**
401-500	764	-	-	-	-	-	-	-	-	-	+
	768	-	-	-	-	-	-	-	-	-	-
	772	-	-	-	-	-	-	-	-	-	+
	Total	-	-	-	-	-	-	-	-	-	+
Grand Total		**76.5**	**48.1**	**71.7**	**50.5**	**43.8**	**52.7**	**34.2**	**23.2**	**18.9**	**13.6**

TABLE 11 ABUNDANCE (MILLIONS) OF A.PLAICE FROM SPRING SURVEYS IN DIV. 3L.

AGE	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.1	0.0	0.0	0.6	0.5	0.3	0.5	0.4	1.3	0.4	0.1	0.0	0.0	0.1	0.3	0.2	0.1	0.0	0.1	0.0	0.1
3	1.6	0.3	1.0	0.2	2.3	7.4	2.4	10.7	0.9	4.1	4.1	2.6	0.0	0.5	0.2	0.6	1.0	1.0	0.2	0.2	0.1	0.1
4	9.4	10.7	8.2	3.6	3.7	14.1	10.6	15.9	12.9	7.3	4.4	9.6	0.4	1.7	1.5	2.7	4.7	4.7	3.7	0.8	0.3	0.5
5	38.7	22.3	39.4	5.5	9.8	15.0	34.5	61.0	42.0	39.9	15.7	10.6	1.5	9.2	6.5	13.2	19.2	12.3	9.6	7.1	2.8	2.0
6	58.4	50.5	45.6	21.0	27.0	16.5	70.8	70.8	71.0	77.4	45.5	30.1	16.5	29.5	40.0	50.6	58.6	49.1	18.5	16.1	5.5	7.9
7	117.1	74.6	62.3	34.7	49.7	52.1	131.4	111.7	105.3	100.7	66.2	56.5	64.5	83.2	101.1	119.5	108.9	76.3	41.2	14.7	11.7	7.1
8	62.3	77.9	38.4	49.5	91.7	116.2	207.0	170.6	168.0	200.5	178.4	120.5	97.6	97.3	94.2	124.7	104.8	83.2	45.7	19.0	8.6	4.5
9	115.9	50.0	30.2	55.0	99.3	137.0	151.1	137.6	139.8	172.8	173.1	186.8	107.7	66.5	74.5	65.0	90.8	63.5	40.9	17.9	7.4	1.9
10	52.7	53.9	40.3	57.5	87.0	144.2	155.7	105.6	123.7	113.1	106.7	152.9	60.4	42.0	35.9	35.9	32.6	26.0	28.6	9.7	3.7	1.1
11	47.8	32.4	34.6	32.4	44.5	92.0	68.0	36.3	62.6	50.1	57.7	90.5	27.7	22.9	14.7	12.1	17.8	13.4	10.0	5.7	1.5	0.5
12	44.7	34.3	29.8	28.7	32.6	54.0	45.8	25.3	27.0	32.1	23.1	39.8	17.3	11.6	9.9	10.5	10.9	7.7	5.2	3.6	0.8	0.2
13	33.6	16.0	16.2	16.9	15.8	25.7	19.0	11.2	9.9	16.6	10.6	21.5	6.5	6.7	6.4	5.0	5.5	4.3	3.3	1.4	0.3	0.1
14	23.4	12.9	11.3	9.2	8.8	7.3	7.2	7.2	5.3	6.3	3.7	10.4	3.9	3.3	2.4	2.1	3.2	2.6	1.3	0.8	0.2	0.0
15	11.7	10.6	4.3	5.4	3.9	5.6	5.4	3.0	3.3	3.7	2.9	3.3	1.6	1.8	1.4	1.1	1.8	1.8	0.9	0.5	0.1	0.0
16	8.1	7.3	2.5	1.9	3.4	2.7	3.1	1.5	1.6	2.9	2.0	2.5	0.8	1.3	0.9	0.4	0.8	0.6	0.6	0.3	0.0	0.0
17	4.6	2.4	0.5	0.3	0.9	1.9	1.4	0.8	0.7	0.8	1.1	1.3	0.4	0.3	0.2	0.1	0.2	0.2	0.3	0.1	0.0	0.0
18	2.6	0.7	1.4	0.0	0.3	0.6	0.9	0.2	0.2	0.4	0.2	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0
19	0.5	0.3	0.0	0.1	0.0	0.2	0.2	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1+	633.0	457.0	366.0	322.0	481.0	693.0	915.0	770.0	775.0	830.0	696.0	739.0	407.0	378.0	390.0	444.0	461.0	347.0	210.0	98.0	43.0	26.0
2+	633.0	456.9	366.0	322.0	481.0	693.0	915.0	770.0	774.8	829.9	695.8	739.0	407.0	378.0	390.0	443.9	461.0	347.0	210.0	98.0	43.0	26.0
3+	633.0	456.8	366.0	322.0	480.4	692.5	914.7	769.5	774.4	828.6	695.4	738.9	407.0	378.0	389.9	443.6	460.8	346.9	210.0	97.9	43.0	26.0
4+	631.4	456.5	365.0	321.8	478.1	685.1	912.3	758.8	773.5	824.5	691.3	736.3	407.0	377.5	389.7	443.0	459.8	345.9	209.8	97.7	42.9	25.9
5+	622.0	445.9	356.7	318.2	474.5	671.0	901.7	742.9	760.6	817.2	686.9	726.7	406.6	375.8	388.2	440.3	455.1	341.2	206.1	96.9	42.6	25.4
6+	583.3	423.6	317.3	312.7	464.7	656.0	867.2	681.9	718.6	777.4	671.2	716.1	405.0	366.6	381.7	427.1	435.9	328.9	196.5	89.8	39.8	23.4
7+	524.9	373.1	271.7	291.7	437.7	639.6	796.4	611.1	647.6	700.0	625.7	686.0	388.6	337.1	341.7	376.5	377.2	279.9	178.0	73.7	34.3	15.5
8+	407.8	298.6	209.4	257.0	388.0	587.5	664.9	499.4	542.2	599.3	559.5	629.5	324.0	253.9	240.6	257.0	268.4	203.6	136.8	59.1	22.6	8.4
9+	345.5	220.7	171.0	207.5	296.3	471.3	457.9	328.8	374.2	398.8	381.1	509.0	226.4	156.6	146.4	132.3	163.6	120.3	91.1	40.1	14.0	3.9
10+	229.5	170.7	140.8	152.5	197.1	334.2	306.8	191.2	234.5	226.0	208.0	322.3	118.7	90.1	71.9	67.3	72.8	56.8	50.2	22.2	6.6	2.0
11+	176.9	116.8	100.5	95.0	110.1	190.0	151.0	85.5	110.7	113.0	101.3	169.4	58.3	48.1	36.0	31.4	40.2	30.8	21.6	12.5	2.9	0.9
12+	129.1	84.3	66.0	62.6	65.6	97.9	83.0	49.2	48.1	62.8	43.6	78.9	30.7	25.2	21.3	19.3	22.4	17.4	11.6	6.8	1.4	0.4

TABLE 12 ABUNDANCE (MILLIONS) OF A.PLAICE FROM SPRING SURVEYS IN DIV. 3N.

AGE	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
1	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.2	0.1	0.0	0.9	0.2	0.1	0.4	0.4	0.1	1.0	0.6	0.1	0.1	0.1	0.9	0.2	0.3	0.1	0.0	0.0	0.0
3	2.8	0.4	0.4	0.9	4.9	3.1	1.6	5.2	1.2	0.7	4.9	1.8	1.0	1.8	0.7	3.9	2.4	2.7	1.6	0.2	0.2	0.6
4	2.9	2.3	1.0	2.6	9.7	5.6	9.5	13.9	2.8	2.1	7.5	6.6	2.5	8.2	2.9	7.2	5.5	18.5	9.6	1.8	1.4	7.3
5	4.9	5.6	5.4	5.4	8.3	12.1	14.4	42.9	11.0	6.1	5.2	7.5	5.8	8.6	7.8	7.0	6.0	10.0	24.2	9.1	2.5	8.1
6	3.2	8.6	9.5	10.2	7.6	12.1	28.6	61.1	18.6	13.0	12.2	7.9	11.4	11.3	10.2	10.6	5.4	7.9	6.2	11.4	5.6	8.5
7	11.7	5.0	11.1	11.3	13.6	12.0	25.3	69.6	29.5	26.4	41.2	8.8	14.0	9.6	9.6	10.5	5.7	6.7	3.7	3.9	5.1	9.6
8	8.0	8.4	8.2	10.6	9.3	15.0	22.3	38.3	33.3	22.2	41.9	15.9	13.3	10.7	7.6	8.8	6.2	8.6	3.4	2.6	2.1	9.2
9	13.7	10.2	5.4	7.0	5.3	9.7	18.3	17.4	18.1	17.1	30.8	17.8	14.9	10.3	7.6	8.7	5.9	8.0	4.6	2.8	1.4	3.5
10	13.7	13.6	7.9	7.3	3.0	8.9	11.8	17.8	13.7	9.5	20.3	11.5	16.7	11.0	7.2	6.2	4.7	3.5	2.8	3.0	0.7	1.7
11	12.5	8.9	9.2	5.1	2.7	4.8	9.1	7.7	5.7	4.8	8.9	6.4	7.9	8.4	4.0	3.8	2.7	2.6	2.2	1.9	0.6	1.1
12	9.3	6.5	6.4	3.3	1.5	5.1	5.2	5.2	3.0	3.4	5.3	3.7	5.2	5.0	3.3	2.9	1.9	2.2	1.4	1.1	0.4	0.4
13	4.5	4.3	4.5	3.2	1.9	3.4	2.9	2.5	1.2	1.7	3.0	1.2	3.2	2.6	2.3	2.4	1.6	1.8	1.1	1.0	0.1	0.2
14	3.0	3.2	1.3	1.2	0.8	1.8	2.1	1.3	1.0	1.2	1.0	1.7	1.8	1.6	1.2	1.8	1.1	1.4	1.2	0.6	0.1	0.2
15	2.0	1.2	1.2	1.3	0.7	2.2	1.0	1.1	0.9	0.9	1.9	0.9	1.5	1.3	1.2	1.6	1.1	1.6	1.3	0.6	0.2	0.1
16	2.0	0.9	1.0	0.5	0.5	1.3	0.7	0.3	0.4	0.7	0.9	0.9	1.4	0.4	0.7	0.9	0.5	0.6	0.8	0.4	0.2	0.1
17	0.7	0.2	1.0	0.2	0.1	0.7	0.2	0.2	0.1	0.8	0.5	0.8	0.7	0.1	0.5	0.4	0.4	0.5	0.4	0.3	0.0	0.1
18	1.6	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.4	0.4	0.3	0.0	0.1	0.2	0.2	0.2	0.2	0.1	0.0	0.0
19	0.7	0.2	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0
1+	97.0	80.0	74.0	70.0	71.0	98.0	153.0	285.0	141.0	111.0	187.0	95.0	102.0	91.0	67.0	78.0	52.0	77.0	65.0	41.0	20.7	50.7
2+	97.0	79.9	74.0	70.0	71.0	97.9	153.0	284.9	140.9	110.9	186.9	94.7	102.0	90.9	67.0	78.0	52.0	77.0	65.0	41.0	20.7	50.7
3+	97.0	79.7	73.9	70.0	70.1	97.7	152.9	284.5	140.5	110.8	185.9	94.1	101.9	90.8	66.9	77.1	51.8	76.7	64.9	41.0	20.6	50.7
4+	94.2	79.3	73.5	69.1	65.2	94.6	151.3	279.3	139.3	110.1	181.0	92.3	100.9	89.0	66.2	73.2	49.4	74.0	63.3	40.8	20.4	50.1
5+	91.3	77.0	72.6	66.5	55.4	89.0	141.8	265.5	136.5	108.0	173.4	85.7	98.3	80.8	63.3	65.9	43.8	55.5	53.7	39.0	19.0	42.8
6+	86.5	71.4	67.2	61.1	47.1	76.9	127.5	222.5	125.5	101.9	168.2	78.1	92.6	72.2	55.5	58.9	37.8	45.5	29.5	29.9	16.5	34.7
7+	83.3	62.8	57.6	50.9	39.5	64.8	98.8	161.5	106.9	88.9	156.0	70.2	81.2	60.9	45.3	48.3	32.3	37.7	23.3	18.5	10.9	26.2
8+	71.6	57.8	46.5	39.7	25.9	52.9	73.6	91.9	77.4	62.5	114.8	61.3	67.2	51.3	35.7	37.8	26.6	31.0	19.6	14.6	5.8	16.6
9+	63.6	49.4	38.3	29.1	16.6	37.9	51.3	53.6	44.1	40.4	73.0	45.4	53.9	40.7	28.2	29.1	20.4	22.4	16.1	12.0	3.7	7.4
10+	49.9	39.2	33.0	22.1	11.3	28.2	33.0	36.2	26.1	23.3	42.2	27.6	39.0	30.4	20.6	20.4	14.4	14.4	11.5	9.2	2.3	3.9
11+	36.2	25.6	25.1	14.8	8.3	19.3	21.3	18.3	12.3	13.8	21.9	16.2	22.2	19.4	13.4	14.2	9.7	11.0	8.7	6.1	1.6	2.2
12+	23.7	16.7	15.9	9.7	5.6	14.5	12.2	10.6	6.6	9.0	13.0	9.8	14.3	11.0	9.4	10.4	7.0	8.4	6.5	4.2	1.0	1.1

TABLE 13 ABUNDANCE (MILLIONS) OF A.PLAICE FROM SPRING SURVEYS IN DIV. 3O.

AGE	1973	1975	1976	1977	1978	1979	1980	1981	1982	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.4	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2	1.3	0.1	0.2	0.4	0.3	0.9	0.8	2.5	0.7	0.1	0.0	0.1	0.3	0.1	0.0	0.2	0.0	0.2	0.0
3	9.1	2.2	2.4	1.9	1.5	4.6	2.2	11.9	1.9	0.1	0.4	0.7	0.9	0.8	1.1	0.5	1.3	1.5	0.5
4	5.4	5.4	3.9	9.8	4.3	9.8	5.4	7.9	3.9	0.4	1.3	2.4	3.1	1.4	2.8	6.3	2.2	1.7	3.4
5	12.9	7.8	12.3	28.2	8.1	18.1	4.7	18.5	4.2	2.7	4.3	3.2	8.3	2.2	4.2	14.5	11.0	1.7	4.1
6	16.8	12.0	22.0	37.1	12.4	21.8	8.7	25.0	6.1	8.0	4.7	5.3	13.0	5.3	11.6	10.9	12.3	8.2	6.5
7	21.6	23.8	30.2	39.7	16.5	37.0	46.4	49.6	15.6	15.8	11.1	9.4	17.1	7.1	15.7	15.2	11.9	7.1	11.3
8	13.2	13.2	43.3	19.7	16.0	39.1	48.6	90.9	26.3	24.6	17.7	11.4	18.7	10.6	14.0	14.1	9.3	7.4	10.0
9	11.6	14.7	25.9	19.4	8.7	28.5	29.0	91.3	23.6	19.1	17.3	10.9	18.5	9.8	13.0	13.8	8.7	6.0	5.8
10	11.4	15.0	18.9	11.6	7.4	19.3	18.9	46.2	20.1	16.2	18.9	9.7	13.1	9.1	8.1	9.2	5.7	4.8	3.7
11	8.0	13.4	10.9	8.8	3.5	7.8	9.7	17.3	8.8	7.3	13.3	6.4	6.9	6.1	4.0	5.6	4.6	3.0	1.7
12	7.2	8.6	9.1	6.5	2.3	5.9	5.5	9.2	6.2	4.5	7.6	5.6	5.0	4.9	4.1	5.1	2.6	1.7	0.9
13	4.1	5.7	7.2	2.7	2.1	2.4	2.5	3.2	2.5	2.7	3.1	3.1	3.4	3.1	2.3	3.2	1.6	1.3	0.4
14	3.1	3.5	4.4	1.6	0.9	1.4	1.0	2.1	0.9	1.9	2.8	1.3	2.1	2.2	1.1	2.2	1.6	0.6	0.3
15	2.1	2.8	3.8	1.1	0.5	0.9	1.2	1.2	0.9	2.3	2.2	1.3	1.7	1.3	1.2	1.1	1.0	1.0	0.2
16	1.3	0.6	2.1	0.4	0.4	0.8	1.0	0.9	0.7	1.4	0.9	0.5	1.0	1.3	1.0	0.9	0.6	0.7	0.3
17	1.1	0.2	1.6	0.1	0.0	0.3	0.4	0.7	0.4	0.7	0.2	0.4	0.5	0.3	0.6	0.7	0.3	0.1	0.1
18	0.7	0.0	0.3	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.3	0.3	0.2	0.3	0.2	0.3	0.1
19	0.2	0.0	0.4	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.0
1+	131.0	129.0	199.0	189.0	85.0	199.0	186.0	379.0	123.0	108.0	106.0	72.0	114.0	66.0	85.0	104.0	75.0	47.4	49.3
2+	130.9	129.0	198.9	189.0	85.0	198.9	186.0	378.6	122.9	108.0	106.0	72.0	113.9	66.0	85.0	104.0	75.0	47.4	49.3
3+	129.6	128.9	198.7	188.6	84.7	198.0	185.2	376.2	122.2	107.9	106.0	71.9	113.6	65.9	85.0	103.8	75.0	47.2	49.3
4+	120.6	126.7	196.3	186.7	83.2	193.4	183.0	364.2	120.3	107.8	105.6	71.2	112.7	65.1	83.9	103.3	73.7	45.7	48.8
5+	115.2	121.3	192.4	177.0	78.9	183.6	177.6	356.4	116.4	107.4	104.3	68.8	109.6	63.7	81.1	97.0	71.5	44.0	45.4
6+	102.3	113.4	180.1	148.8	70.8	165.4	173.0	337.9	112.2	104.7	100.0	65.6	101.4	61.5	76.9	82.5	60.5	42.3	41.3
7+	85.6	101.5	158.1	111.6	58.5	143.6	164.3	312.9	106.1	96.7	95.3	60.3	88.3	56.2	65.3	71.6	48.2	34.1	34.8
8+	63.9	77.7	127.9	71.9	42.0	106.7	117.9	263.2	90.5	80.9	84.2	50.9	71.2	49.1	49.6	56.4	36.3	27.0	23.5
9+	50.8	64.5	84.6	52.2	25.9	67.6	69.4	172.4	64.2	56.2	66.5	39.5	52.5	38.5	35.6	42.3	27.1	19.6	13.5
10+	39.2	49.8	58.6	32.8	17.2	39.1	40.4	81.0	40.7	37.1	49.1	28.5	34.0	28.7	22.6	28.5	18.4	13.6	7.7
11+	27.8	34.8	39.8	21.2	9.9	19.7	21.5	34.8	20.6	20.9	30.2	18.8	20.9	19.6	14.5	19.3	12.7	8.8	4.0
12+	19.8	21.4	28.8	12.4	6.4	11.9	11.8	17.4	11.8	13.6	16.9	12.4	14.0	13.5	10.5	13.7	8.1	5.8	2.3

TABLE 14 ABUNDANCE (MILLIONS) OF A.PLAICE FROM SPRING SURVEYS IN DIV. 3LNO.

AGE	1973	1975	1976	1977	1978	1979	1980	1981	1982	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
1	0.1	0.0	0.2	0.0	0.1	0.4	0.2	0.7	0.4	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
2	1.4	1.6	0.9	0.8	1.2	1.7	2.2	3.9	1.4	0.2	0.1	0.3	1.5	0.5	0.4	0.3	0.1	0.3	0.1
3	10.5	9.4	12.9	5.9	17.4	6.7	7.0	21.0	6.3	1.1	2.7	1.6	5.4	4.2	4.8	2.3	1.7	1.8	1.2
4	14.6	18.8	23.6	29.8	34.0	25.5	14.8	19.8	20.1	3.4	11.2	6.8	13.0	11.6	26.1	19.6	4.8	3.4	11.2
5	57.7	26.0	39.4	77.1	112.0	71.2	50.7	39.5	22.3	10.0	22.1	17.5	28.5	27.5	26.4	48.3	27.1	7.0	14.2
6	71.9	46.6	50.5	136.6	144.3	111.4	99.0	82.7	44.1	35.9	45.5	55.5	74.2	69.4	68.5	35.6	39.7	19.3	22.9
7	95.1	87.1	94.3	196.4	197.8	171.8	173.4	157.0	80.9	94.3	103.9	120.1	147.1	121.7	98.7	60.1	30.5	23.9	28.0
8	59.7	114.3	174.5	249.0	224.9	240.3	271.2	311.2	162.6	135.5	125.7	113.2	152.2	121.6	105.8	63.2	30.9	18.1	23.7
9	47.2	119.2	172.7	188.8	163.7	186.3	218.8	295.2	228.1	141.8	94.1	93.0	92.2	106.5	84.5	59.3	29.4	14.8	11.2
10	59.6	104.9	172.1	179.1	130.9	156.8	141.5	173.2	184.4	93.3	71.9	52.8	55.2	46.5	37.6	40.7	18.5	9.2	6.5
11	51.7	60.6	107.7	85.9	47.5	76.2	64.6	83.9	105.7	42.9	44.6	25.1	22.8	26.6	20.0	17.8	12.2	5.1	3.3
12	43.3	42.7	68.2	57.5	32.7	35.9	41.0	37.7	49.7	26.9	24.2	18.8	18.4	17.7	14.0	11.7	7.4	2.9	1.5
13	24.9	23.3	36.2	24.6	15.8	13.5	20.7	16.8	25.2	12.4	12.4	11.8	10.8	10.2	8.4	7.7	4.0	1.7	0.7
14	15.8	13.2	13.4	10.9	9.4	7.7	8.5	6.8	13.0	7.6	7.7	4.9	6.0	6.5	5.1	4.7	3.0	0.9	0.5
15	7.6	7.5	11.6	7.5	4.6	5.1	5.8	6.0	5.1	5.4	5.3	3.9	4.4	4.2	4.6	3.3	2.1	1.3	0.3
16	4.7	4.4	6.0	4.2	2.2	2.8	4.6	3.8	4.1	3.6	2.6	2.1	2.3	2.6	2.2	2.3	1.3	0.9	0.4
17	2.6	1.2	4.2	1.7	1.0	1.1	2.0	2.3	2.5	1.8	0.6	1.1	1.0	0.9	1.3	1.4	0.7	0.1	0.2
18	2.4	0.4	1.0	1.1	0.4	0.3	0.8	0.7	0.7	0.7	0.2	0.3	0.6	0.5	0.5	0.5	0.3	0.3	0.1
19	0.5	0.1	0.6	0.2	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.0
1+	571.0	681.0	990.0	1257.0	1140.0	1115.0	1127.0	1262.0	957.0	617.0	575.0	529.0	636.0	579.0	509.0	379.0	214.0	111.1	126.0
2+	570.9	681.0	989.8	1257.0	1139.9	1114.6	1126.8	1261.3	956.6	617.0	574.9	529.0	635.8	579.0	509.0	379.0	214.0	111.1	126.0
3+	569.5	679.4	988.9	1256.2	1138.7	1112.9	1124.6	1257.5	955.2	616.8	574.8	528.7	634.3	578.5	508.6	378.7	213.9	110.8	125.9
4+	559.0	670.0	976.0	1250.3	1121.3	1106.2	1117.6	1236.5	948.9	615.7	572.1	527.1	628.9	574.3	503.8	376.4	212.2	109.0	124.7
5+	544.5	651.2	952.4	1220.5	1087.3	1080.7	1102.9	1216.7	928.8	612.3	560.9	520.3	615.8	562.6	477.8	356.8	207.3	105.6	113.5
6+	486.8	625.2	913.0	1143.4	975.3	1009.5	1052.2	1177.3	906.4	602.3	538.8	502.8	587.3	535.2	451.3	308.5	180.2	98.6	99.3
7+	414.9	578.7	862.6	1006.8	831.1	898.1	953.2	1094.5	862.3	566.4	493.3	447.3	513.1	465.8	382.8	272.9	140.5	79.3	76.4
8+	319.9	491.6	768.3	810.4	633.2	726.3	779.8	937.6	781.4	472.1	389.4	327.2	366.1	344.1	284.1	212.7	110.0	55.4	48.4
9+	260.2	377.3	593.8	561.4	408.3	486.0	508.5	626.4	618.7	336.5	263.7	214.0	213.9	222.5	178.3	149.5	79.1	37.3	24.7
10+	212.9	258.1	421.1	372.6	244.6	299.6	289.7	331.2	390.6	194.8	169.6	121.0	121.8	116.0	93.8	90.2	49.7	22.5	13.5
11+	153.4	153.2	249.0	193.5	113.7	142.8	148.2	158.0	206.1	101.5	97.7	68.2	66.5	69.5	56.2	49.5	31.3	13.3	7.0
12+	101.7	92.6	141.3	107.6	66.2	66.7	83.6	74.0	100.4	58.6	53.1	43.1	43.7	42.9	36.3	31.7	19.1	8.2	3.7

Table 15 . Mean weight (kg) of American plaice per tow, by stratum, from R.V. surveys (fall) in Division 3L. Numbers in parentheses are the number of successful 30-minute tows in each stratum. The stratified mean weight per tow (kg/30 min.) and the biomass estimates (t x 10^{-3}) are given at the bottom of the table.

Stratum	1981 ATC 323-325	1982 ATC 333, 334	1983 WT 7-9	1984 WT 16-18	1985 WT 37-39	1986 AN 72	1987 WT 65	1988 WT 78	1989 WT 87	1990 WT 101	1991 WT 113-115	1992 WT 128-130	1993 WT 144-146	1994 WT 160-162
328	-	-	-	50.1(4)	99.5(8)	90.1(6)	15.5(4)	153.0(7)	15.2(7)	9.4(5)	1.0(3)	3.1(3)	1.1(3)	1.0(3)
341	8.2(3)	18.2(4)	121.3(4)	110.8(5)	21.6(7)	16.7(7)	262.4(9)	127.2(8)	113.1(8)	21.7(6)	3.0(3)	3.7(3)	0.1(3)	0.2(3)
342	109.7(3)	44.8(3)	19.5(4)	162.5(2)	84.7(3)	4.4(3)	30.6(3)	19.2(3)	26.3(3)	194.6(2)	0.3(2)	1.5(3)	2.6(3)	0.1(3)
343	50.9(4)	-	483.2(3)	53.3(4)	932.5(3)	17.2(3)	15.7(3)	28.5(3)	1.3(3)	8.7(3)	0.3(3)	0.3(2)	0.4(3)	0.0(3)
344	227.3(4)	106.2(3)	70.7(6)	193.0(6)	93.8(9)	28.2(7)	46.3(4)	23.6(7)	124.6(7)	15.4(6)	0.9(2)	1.5(2)	1.2(2)	0.4(8)
345	10.5(4)	17.4(6)	13.6(8)	48.4(7)	24.4(9)	12.5(4)	14.8(2)	24.1(7)	21.0(7)	16.9(5)	2.4(4)	5.0(4)	7.4(3)	1.8(8)
346	13.0(3)	4.3(4)	10.8(5)	11.5(6)	6.5(5)	20.9(3)	4.3(4)	8.7(5)	11.5(4)	17.5(3)	16.1(15)	12.7(14)	6.4(11)	2.6(7)
347	324.3(3)	235.9(4)	134.7(6)	216.5(6)	52.1(4)	30.7(4)	40.3(2)	191.5(5)	70.5(5)	93.2(2)	2.9(4)	1.9(2)	1.2(4)	1.1(8)
348	114.1(6)	126.8(5)	112.3(11)	201.4(11)	43.4(14)	64.1(5)	46.7(9)	101.2(10)	45.3(9)	43.6(11)	0.8(4)	1.0(4)	-	0.8(4)
349	20.1(7)	27.5(5)	113.1(9)	81.7(14)	21.3(10)	16.8(9)	45.8(10)	77.1(9)	15.4(10)	15.5(7)	8.3(5)	0.5(5)	2.6(3)	1.3(7)
350	8.3(6)	4.3(2)	72.1(8)	128.9(12)	57.7(9)	11.5(11)	15.0(9)	56.4(10)	18.0(10)	47.4(8)	12.4(16)	4.5(4)	2.7(3)	0.9(7)
363	65.5(4)	34.3(3)	253.7(3)	54.9(8)	48.0(10)	44.3(7)	45.0(9)	37.0(10)	29.8(9)	28.5(8)	23.8(17)	10.2(25)	1.8(3)	2.0(4)
364	254.2(9)	114.7(11)	95.2(11)	254.6(10)	114.4(18)	86.0(5)	104.1(14)	87.5(14)	41.4(11)	108.0(12)	51.9(4)	9.1(5)	6.6(3)	1.6(6)
365	242.8(4)	284.0(4)	198.7(5)	67.9(4)	136.6(8)	123.5(5)	98.2(6)	91.6(5)	30.3(4)	56.3(4)	12.0(3)	7.0(3)	6.8(3)	1.3(3)
366	318.3(3)	19.3(6)	50.8(4)	39.7(11)	62.4(9)	205.5(4)	10.1(7)	67.8(7)	27.8(7)	140.4(6)	15.1(21)	9.9(24)	4.6(14)	1.1(10)
368	0.0(2)	1.5(2)	-	0.0(2)	1.4(2)	5.9(2)	2.8(2)	0.4(2)	5.3(2)	0.6(2)	39.5(6)	57.5(10)	5.2(8)	2.5(12)
369	218.5(2)	27.9(4)	129.4(6)	76.4(7)	67.3(6)	19.4(3)	35.5(4)	121.1(5)	44.3(5)	157.1(4)	176.2(9)	18.6(8)	14.3(7)	6.5(3)
370	121.0(4)	88.2(6)	121.0(6)	145.8(7)	34.3(9)	145.3(2)	61.4(6)	23.6(7)	19.5(6)	28.1(5)	13.9(3)	12.1(3)	7.2(3)	2.4(3)
371	149.9(4)	97.3(5)	180.4(5)	110.7(7)	156.9(7)	26.3(3)	61.4(5)	53.6(6)	12.6(4)	40.3(5)	16.7(3)	3.5(3)	4.3(3)	1.0(3)
372	20.3(5)	79.9(7)	102.5(4)	74.0(13)	68.3(17)	37.5(9)	58.4(13)	43.0(13)	13.9(12)	53.0(10)	28.5(26)	11.0(24)	3.5(17)	0.7(5)
384	63.2(3)	176.9(4)	105.0(3)	210.8(6)	92.6(8)	100.0(5)	111.8(6)	48.9(6)	36.8(5)	113.4(4)	40.2(18)	6.5(19)	6.3(8)	1.6(4)
385	78.5(8)	128.4(8)	107.1(5)	96.5(12)	30.0(12)	86.1(8)	127.9(9)	61.7(13)	10.4(11)	30.6(7)	11.4(5)	17.7(5)	5.3(3)	4.2(3)
386	121.8(3)	123.0(4)	-	99.0(8)	123.6(5)	31.4(4)	41.3(4)	209.5(5)	41.8(5)	36.1(4)	43.2(3)	26.7(3)	6.4(3)	4.2(3)
387	2.3(2)	0.3(3)	-	0.7(3)	0.7(4)	0.9(2)	0.7(3)	4.0(4)	0.5(3)	0.4(3)	11.2(5)	15.3(3)	6.2(3)	3.7(9)
388	-	0.0(3)	-	0.0(2)	14.0(2)	-	2.0(2)	10.0(2)	2.5(2)	2.0(2)	1.6(3)	3.1(3)	3.3(3)	3.2(7)
389	-	25.1(4)	-	103.1(6)	183.0(5)	3.9(4)	82.0(4)	49.6(4)	93.3(4)	21.7(3)	14.3(3)	6.7(3)	11.9(3)	6.1(3)
390	38.5(3)	87.8(4)	72.7(3)	89.5(3)	97.2(7)	26.8(6)	42.0(8)	18.6(8)	7.7(7)	17.5(6)	19.6(3)	24.2(3)	13.0(3)	11.3(3)
391	-	37.0(2)	25.0(2)	233.8(2)	105.8(2)	37.3(2)	24.5(2)	27.5(2)	15.5(2)	7.6(2)	43.7(3)	7.1(3)	15.8(3)	2.5(3)
392	-	5.1(2)	4.7(2)	10.5(2)	6.8(2)	0.9(2)	11.0(2)	9.0(2)	8.0(2)	13.3(2)	9.1(3)	0.8(3)	2.0(3)	0.2(3)
729	-	-	-	3.3(2)	4.5(2)	0.0(2)	-	-	-	3.2(2)	1.5(3)	0.9(2)	0.7(3)	1.3(9)
730	-	-	-	0.0(2)	0.0(2)	-	-	-	-	-	0.0(2)	0.0(2)	0.6(3)	0.0(3)
731	-	-	-	0.0(2)	1.0(2)	-	-	-	-	0.1(2)	0.1(3)	0.1(3)	0.5(3)	1.2(7)
732	-	-	-	0.0(2)	0.0(2)	-	-	-	-	0.0(2)	0.2(2)	0.6(2)	0.3(2)	1.4(3)
733	-	-	-	0.0(4)	0.7(3)	-	-	-	-	0.3(2)	0.3(3)	6.9(3)	3.7(3)	4.8(9)
734	-	-	-	0.0(3)	0.0(2)	-	-	-	-	0.0(2)	0.0(2)	0.0(2)	1.2(2)	1.0(3)
735	-	2.3(2)	-	0.0(3)	0.2(2)	20.6(2)	-	-	-	-	14.4(3)	13.2(3)	9.1(3)	5.7(11)
736	-	-	0.0(2)	-	6.8(2)	2.1(2)	-	-	-	6.4(2)	17.5(2)	8.3(2)	13.5(3)	9.5(7)
Mean (#sets)	108.2(99)	78.6(120)	110.8(125)	108.4(208)	75.7(231)	52.7(141)	61.1(165)	68.6(189)	33.7(174)	47.1(161)	19.9(219)	8.6(215)	4.9(153)	2.3(200)
Biomass (Index)	273.3	206.4	268.0	313.8	219.2	146.7	168.7	189.5	92.9	135.3	57.8	25.1	13.5	6.5

Table 16 Biomass estimates ('000 t) of A. plaice, by stratum and depth zone, from Canadian fall surveys in Div. 3L in 1990-1994.

Depth	Stratum	1990	1991	1992	1993	1994
31-50	350	7.4	1.9	0.7	0.4	0.1
	363	3.8	3.2	1.4	0.2	0.3
	371	3.4	1.4	0.3	0.4	0.1
	372	9.8	5.3	2.0	0.6	0.1
	384	9.5	3.4	0.5	0.5	0.1
	Total	**33.9**	**15.2**	**4.9**	**2.1**	**0.7**
51-100	328	1.1	0.1	0.3	0.1	0.1
	341	2.6	0.4	0.4	+	+
	342	8.5	+	0.1	0.1	+
	343	0.3	+	+	+	+
	348	6.9	0.1	0.2	-	0.1
	349	2.5	1.3	0.1	0.4	0.2
	364	22.8	11.0	1.9	1.4	0.3
	365	4.4	0.9	0.5	0.5	0.1
	370	2.8	1.4	1.2	0.7	0.2
	385	5.4	2.0	3.1	0.9	0.7
	390	1.9	2.2	2.7	1.4	1.3
	Total	**59.2**	**19.4**	**10.5**	**5.5**	**3.0**
101-150	344	1.7	0.1	0.2	0.1	+
	347	6.9	0.2	0.1	0.1	0.1
	366	14.7	1.6	1.0	0.5	0.1
	369	11.3	12.7	1.3	1.0	0.5
	386	2.7	3.2	2.0	0.5	0.3
	389	1.3	0.9	0.4	0.7	0.4
	391	0.2	0.9	0.1	0.3	0.1
	Total	**38.8**	**19.6**	**5.1**	**3.2**	**1.5**
151-200	345	1.8	0.3	0.5	0.8	0.2
	346	1.1	1.0	0.8	0.4	0.2
	368	+	1.0	1.4	0.1	0.1
	387	+	0.6	0.8	0.3	0.2
	388	0.1	+	0.1	0.1	0.1
	392	0.1	0.1	+	+	+
	Total	**3.1**	**3.0**	**3.6**	**1.7**	**0.8**
201-300	729	+	+	+	+	+
	731	+	+	+	+	+
	733	+	+	0.2	0.1	0.2
	735	-	0.3	0.3	0.2	0.1
	Total	+	**0.3**	**0.5**	**0.3**	**0.3**
301-400	730	-	0.0	0.0	+	0
	732	0.0	+	+	+	+
	734	0.0	0.0	0.0	+	+
	736	0.1	0.2	0.1	0.2	0.1
	Total	**0.1**	**0.2**	**0.1**	**0.2**	**0.1**
Grand Total		**135.1**	**57.7**	**24.7**	**13.0**	**6.4**

Table 17. Abundance index (millions) of A.plaice from fall surveys in Div. 3L.

3L

AGE	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
1	0.9	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1.1	1.8	0.2	0.0	0.0	0.8	1.4	0.3	0.0	0.1	0.1	0.0	0.2
3	8.3	5.7	2.6	0.1	0.3	1.9	2.0	3.1	1.4	1.4	0.8	0.7	1.9
4	12.4	19.6	9.8	2.9	1.6	10.5	5.1	8.1	13.2	18.1	5.4	3.0	5.6
5	22.2	35.7	52.9	18.7	14.3	33.3	24.3	30.4	23.1	47.1	23.6	12.3	11.3
6	45.0	80.2	120.9	66.0	69.2	92.6	65.9	81.1	54.6	67.8	37.2	29.3	18.0
7	176.2	142.7	218.3	181.5	170.3	92.9	100.8	110.1	64.4	78.1	30.2	21.4	16.1
8	163.7	189.9	185.7	207.4	134.2	91.8	87.8	108.7	55.2	57.4	26.9	12.5	5.6
9	139.4	110.9	89.7	122.5	93.9	53.6	62.3	66.1	24.0	46.9	20.2	5.3	2.6
10	136.4	61.1	49.8	81.2	37.3	22.6	20.2	25.8	9.3	19.7	9.7	2.9	0.9
11	58.3	30.9	20.9	32.0	16.2	9.0	11.0	10.1	5.3	9.5	4.5	1.1	0.3
12	42.2	13.6	15.2	18.8	11.2	4.8	5.6	6.0	1.9	4.8	2.8	0.9	0.1
13	16.1	4.9	9.0	9.1	5.9	2.4	3.0	3.1	1.7	3.0	1.1	0.3	0.0
14	4.5	1.9	1.4	4.3	1.9	1.1	1.4	1.6	0.6	2.1	0.8	0.1	0.0
15	1.2	2.0	1.6	2.8	1.2	0.4	0.9	1.0	0.2	0.8	0.5	0.1	0.1
16	0.3	0.8	0.8	1.2	0.5	0.1	0.2	0.3	0.2	0.3	0.1	0.0	0.0
17	0.0	0.3	0.2	0.3	0.1	0.1	0.2	0.1	0.0	0.0	0.1	0.0	0.0
1+	828.0	702.0	779.0	749.0	558.0	418.0	392.0	456.0	255.0	357.0	164.0	90.0	62.7
2+	827.1	701.9	779.0	749.0	558.0	417.9	392.0	456.0	255.0	357.0	164.0	90.0	62.7
3+	826.0	700.1	778.8	749.0	558.0	417.1	390.6	455.7	255.0	356.9	163.9	89.9	62.5
4+	817.8	694.5	776.2	748.9	557.7	415.2	388.6	452.6	253.6	355.5	163.1	89.2	60.6
5+	805.3	674.8	766.5	746.0	556.1	404.7	383.5	444.5	240.4	337.4	157.7	86.2	55.0
6+	783.1	639.1	713.6	727.3	541.8	371.4	359.2	414.1	217.3	290.3	134.1	73.9	43.7
7+	738.2	558.9	592.7	661.3	472.6	278.8	293.3	333.0	162.7	222.5	96.9	44.6	25.7
8+	562.0	416.2	374.4	479.8	302.3	185.9	192.6	222.8	98.4	144.5	66.7	23.2	9.6
9+	398.3	226.3	188.6	272.3	168.1	94.1	104.8	114.1	43.2	87.1	39.8	10.7	4.0
10+	259.0	115.4	98.9	149.8	74.3	40.5	42.4	48.0	19.2	40.2	19.5	5.4	1.4
11+	122.6	54.3	49.1	68.6	37.0	17.9	22.3	22.2	9.9	20.5	9.9	2.5	0.5
12+	64.3	23.4	28.2	36.5	20.8	8.9	11.3	12.1	4.6	11.0	5.4	1.4	0.2

Table 18. Biomass estimates ('000 t) of A. plaice, by stratum and depth zone, from Canadian fall surveys in Div. 3N in 1990-1994.

Depth	Stratum	1990	1991	1992	1993	1994
≤ 30	375	1.0	3.5	-	1.7	5.2
	376	1.9	1.3	0.6	3.3	1.6
	Total	**2.9**	**4.8**	**0.6**	**5.0**	**6.8**
31-50	360	2.9	7.0	11.6	6.7	6.3
	361	0.9	3.4	1.1	3.0	2.7
	362	5.9	10.3	4.3	1.7	0.9
	373	4.2	8.0	0.5	0.6	1.1
	374	1.4	3.3	-	0.7	0.7
	383	0.7	0.3	-	0.1	+
	Total	**16.0**	**32.3**	**17.5**	**12.8**	**11.7**
51-100	359	2.8	0.8	5.1	3.5	2.5
	377	0.2	-	0.9	0.8	0.6
	382	2.2	1.0	2.6	3.7	0.7
	Total	**5.2**	**1.8**	**8.6**	**8.0**	**3.8**
101-150	358	0.1	0.4	0.6	1.5	0.2
	378	0.5	0.4	0.4	1.4	0.3
	381	-	0.2	-	0.8	0.1
	Total	**0.6**	**1.0**	**1.0**	**3.7**	**0.6**
151-200	357	0.4	+	+	0.2	0.3
	379	+	-	+	0.3	+
	380	-	+	-	0.1	+
	Total	**0.4**	+	+	**0.6**	**0.3**
201-300	723	-	+	-	0.1	+
	725	-	-	0.1	0.4	+
	727	-	-	-	+	+
	Total	**-**	+	**0.1**	**0.5**	+
301-400	724	-	+	-	+	+
	726	-	-	-	+	+
	728	-	-	-	-	+
	Total	**-**	+	-	+	+
Grand Total		**25.1**	**39.9**	**27.8**	**30.6**	**23.2**

Table 19. Biomass estimates ('000 t) of A. plaice, by stratum and depth zone, from Canadian fall surveys in Div. 3Ø in 1990-1994.

Depth	Stratum	1990	1991	1992	1993	1994
31-50	330	11.0	7.7	7.0	2.8	0.6
	331	0.9	1.4	1.0	2.8	0.3
	338	4.9	2.6	2.8	2.6	2.4
	340	1.6	19.8	5.0	4.2	1.6
	351	11.1	5.3	1.5	3.6	0.5
	352	4.2	5.4	5.5	3.7	2.1
	353	1.3	2.0	3.4	3.7	3.3
	Total	**35.0**	**44.2**	**26.2**	**23.4**	**10.8**
51-100	329	13.8	3.4	1.6	1.1	1.1
	332	2.3	0.5	1.0	2.0	0.4
	337	1.9	1.7	0.7	1.4	1.4
	339	2.7	3.1	1.2	3.2	0.7
	354	3.9	0.9	1.0	2.0	2.0
	Total	**24.6**	**9.6**	**5.5**	**9.7**	**5.6**
101-150	333	+	+	+	+	+
	336	+	0.1	+	+	+
	355	-	0.2	+	0.3	0.1
	Total	**+**	**0.3**	**+**	**0.3**	**0.1**
151-200	334	+	0.0	+	+	+
	335	+	+	+	+	+
	356	-	+	+	0.2	0.1
	Total	**+**	**+**	**+**	**0.2**	**0.1**
201-300	717	0.0	-	-	0.0	+
	719	0.0	0.0	-	+	+
	721	-	+	-	+	+
	Total	**0.0**	**+**	**-**	**+**	**+**
301-400	718	-	-	-	0.0	0.0
	720	-	-	-	+	0.0
	722	-	0.0	-	+	+
	Total	**-**	**0.0**	**-**	**+**	**+**
Grand Total		**59.6**	**54.1**	**31.7**	**33.6**	**16.6**

Table 20. Abundance indices (millions) of A.plaice from fall surveys in Div. 3N, 3O, and 3LNO combined.

3N

AGE	1990	1991	1992	1993
1	0.2	0.1	0.3	0.0
2	2.2	0.1	0.3	0.3
3	7.5	4.6	4.3	6.7
4	18.4	10.5	9.8	25.9
5	17.0	17.1	9.0	14.0
6	5.2	25.4	11.5	9.7
7	3.4	13.7	21.1	15.4
8	1.9	6.9	14.2	7.4
9	3.5	5.1	5.5	3.7
10	1.8	5.5	4.0	1.8
11	1.3	4.0	1.9	0.8
12	0.9	3.3	1.2	0.7
13	0.9	1.8	0.9	0.4
14	0.8	2.3	0.8	0.4
15	0.8	1.4	0.7	0.2
16	0.9	0.8	0.2	0.1
17	0.3	0.6	0.3	0.0
1+	67.0	103.2	86.0	87.5
2+	66.8	103.1	85.7	87.5
3+	64.6	103.0	85.4	87.2
4+	57.1	98.4	81.1	80.5
5+	38.7	87.9	71.3	54.6
6+	21.7	70.8	62.3	40.6
7+	16.5	45.4	50.8	30.9
8+	13.1	31.7	29.7	15.5
9+	11.2	24.8	15.5	8.1
10+	7.7	19.7	10.0	4.4
11+	5.9	14.2	6.0	2.6
12+	4.6	10.2	4.1	1.8

3O

AGE	1990	1991	1992	1993
1	0.4	0.0	0.0	0.0
2	0.5	0.7	0.0	0.5
3	1.4	3.2	2.4	3.7
4	6.3	4.4	5.0	12.9
5	8.8	13.9	6.0	11.3
6	12.1	17.6	15.0	12.4
7	16.3	17.6	15.1	18.1
8	16.6	10.8	11.3	14.0
9	11.4	13.4	7.8	6.0
10	8.2	9.7	4.6	3.2
11	5.0	6.4	2.4	1.4
12	3.7	3.0	1.9	1.5
13	2.8	3.2	0.8	0.8
14	2.1	1.6	0.9	0.7
15	1.3	1.2	0.4	0.3
16	1.3	0.6	0.4	0.4
17	0.6	0.2	0.1	0.1
1+	98.8	107.5	74.1	87.3
2+	98.4	107.5	74.1	87.3
3+	97.9	106.8	74.1	86.8
4+	96.5	103.6	71.7	83.1
5+	90.2	99.2	66.7	70.2
6+	81.4	85.3	60.7	58.9
7+	69.3	67.7	45.7	46.5
8+	53.0	50.1	30.6	28.4
9+	36.4	39.3	19.3	14.4
10+	25.0	25.9	11.5	8.4
11+	16.8	16.2	6.9	5.2
12+	11.8	9.8	4.5	3.8

3LNO

AGE	1990	1991	1992	1993
1	0.6	0.1	0.3	0.0
2	2.8	0.9	0.3	1.0
3	10.3	8.6	7.4	12.3
4	42.8	20.3	17.8	44.4
5	72.9	54.6	27.3	36.6
6	85.1	80.2	55.8	40.1
7	97.8	61.5	57.6	49.6
8	75.9	44.6	38.0	27.0
9	61.8	38.7	18.6	12.3
10	29.7	24.9	11.5	5.9
11	15.8	14.9	5.4	2.5
12	9.4	9.1	4.0	2.2
13	6.7	6.1	2.0	1.3
14	5.0	4.7	1.8	1.1
15	2.9	3.1	1.2	0.6
16	2.5	1.5	0.6	0.5
17	0.9	0.9	0.4	0.1
1+	522.8	374.7	250.1	237.6
2+	522.2	374.6	249.8	237.6
3+	519.4	373.7	249.4	236.5
4+	509.1	365.1	242.0	224.3
5+	466.3	344.8	224.2	179.9
6+	393.4	290.2	196.9	143.3
7+	308.3	210.0	141.1	103.2
8+	210.6	148.5	83.5	53.5
9+	134.7	103.9	45.5	26.5
10+	72.9	65.1	26.9	14.3
11+	43.2	40.3	15.4	8.4
12+	27.4	25.4	10.0	5.8

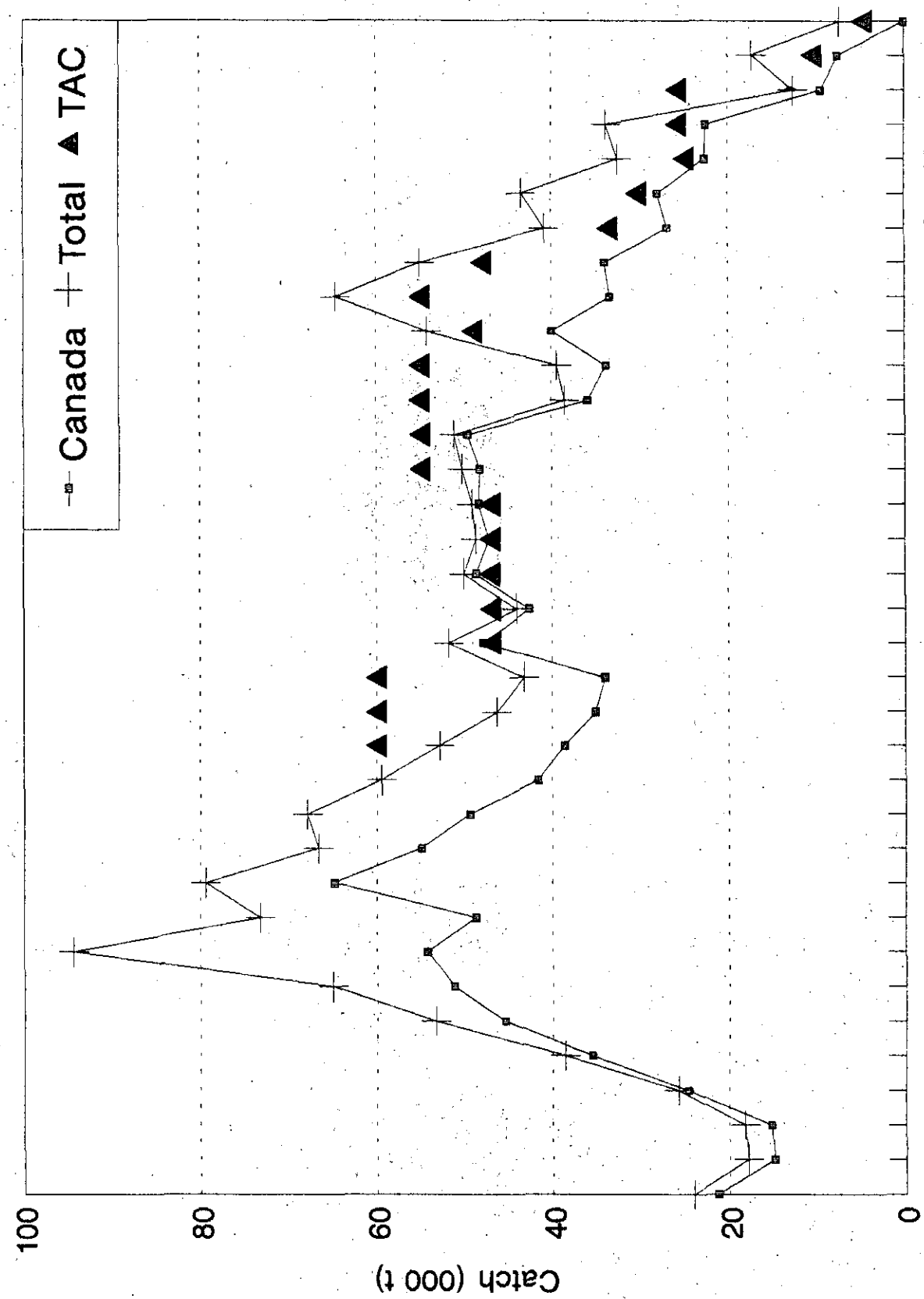

Fig. 1. Catches and TAC's of American plaice in Div. 3LNO.

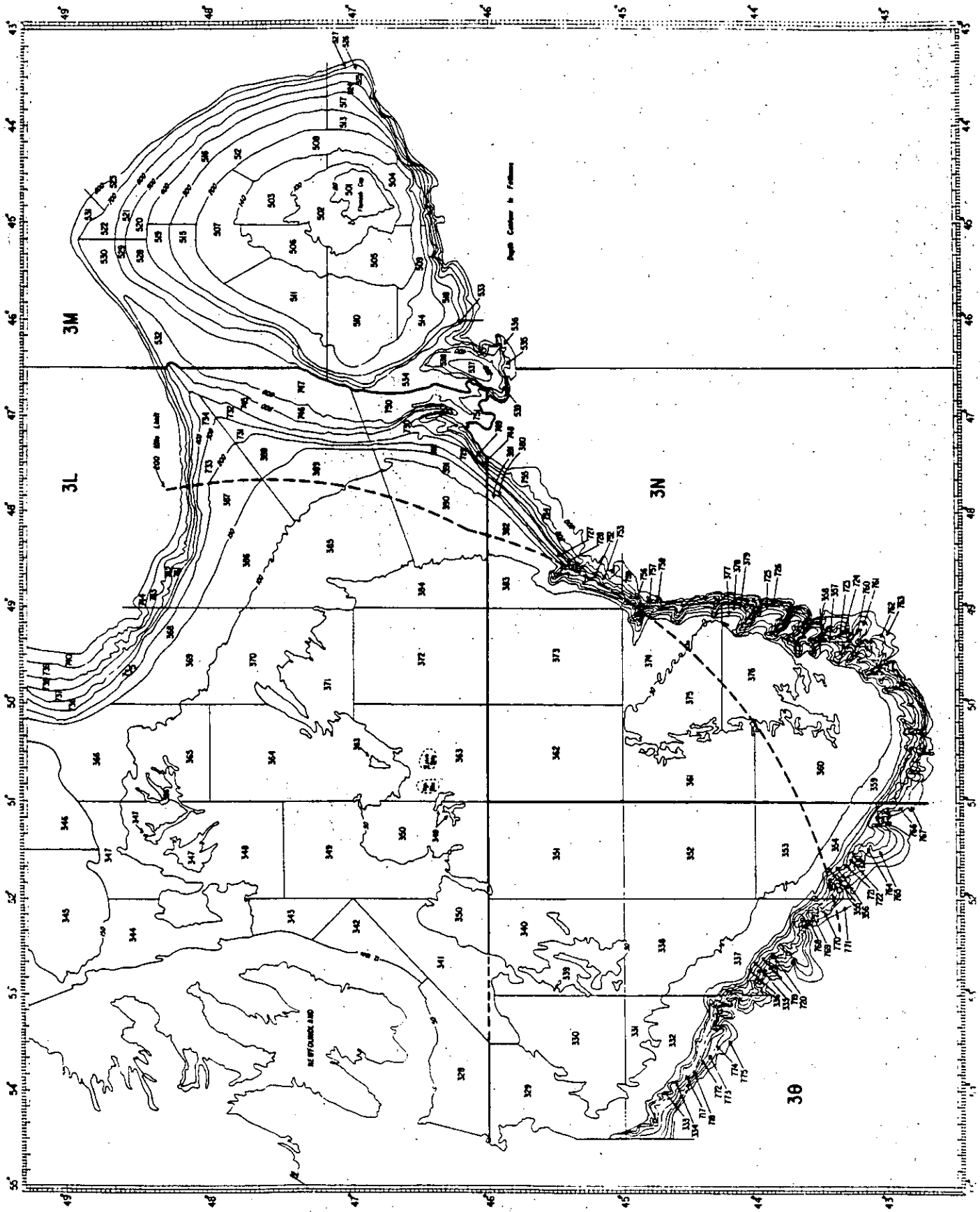

Figure 2. NAFO Div 3LMNO, showing the Canadian 200 mile limit as well as the stratification scheme used in Canadian groundfish surveys.

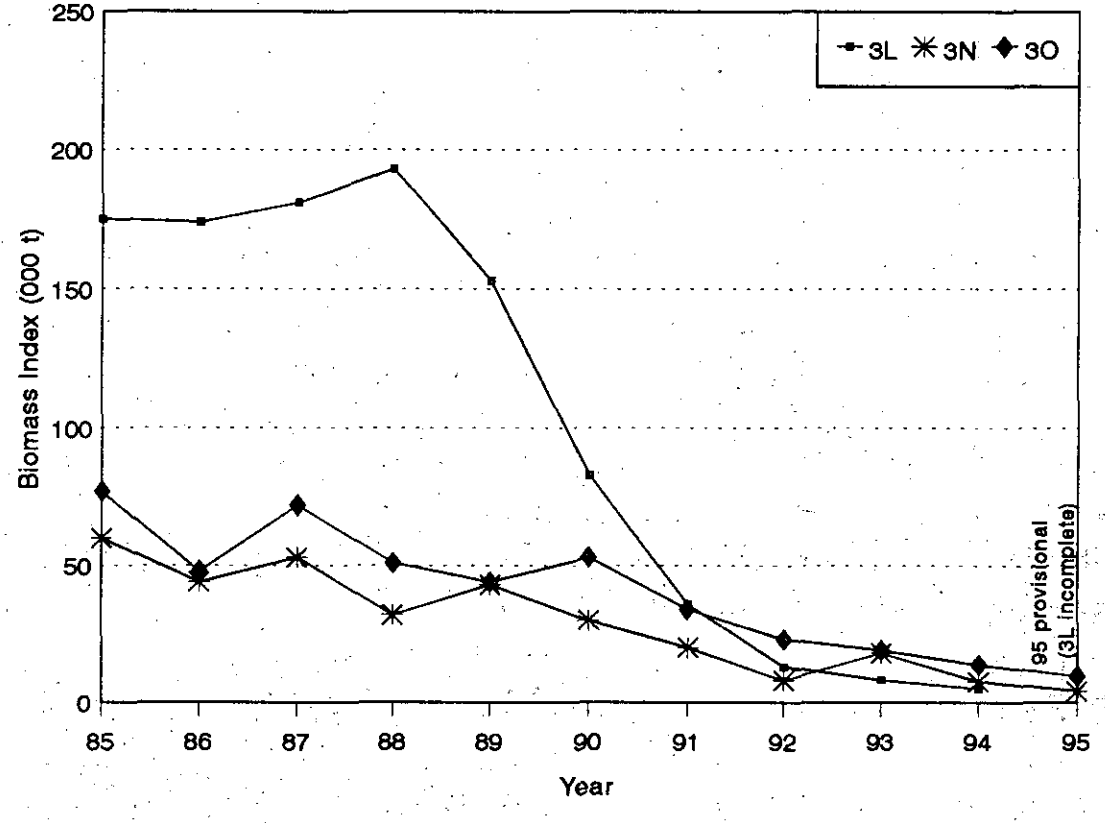

Fig 3. Biomass indices of A.plaice from spring surveys in Divisions 3L, 3N, 3O.

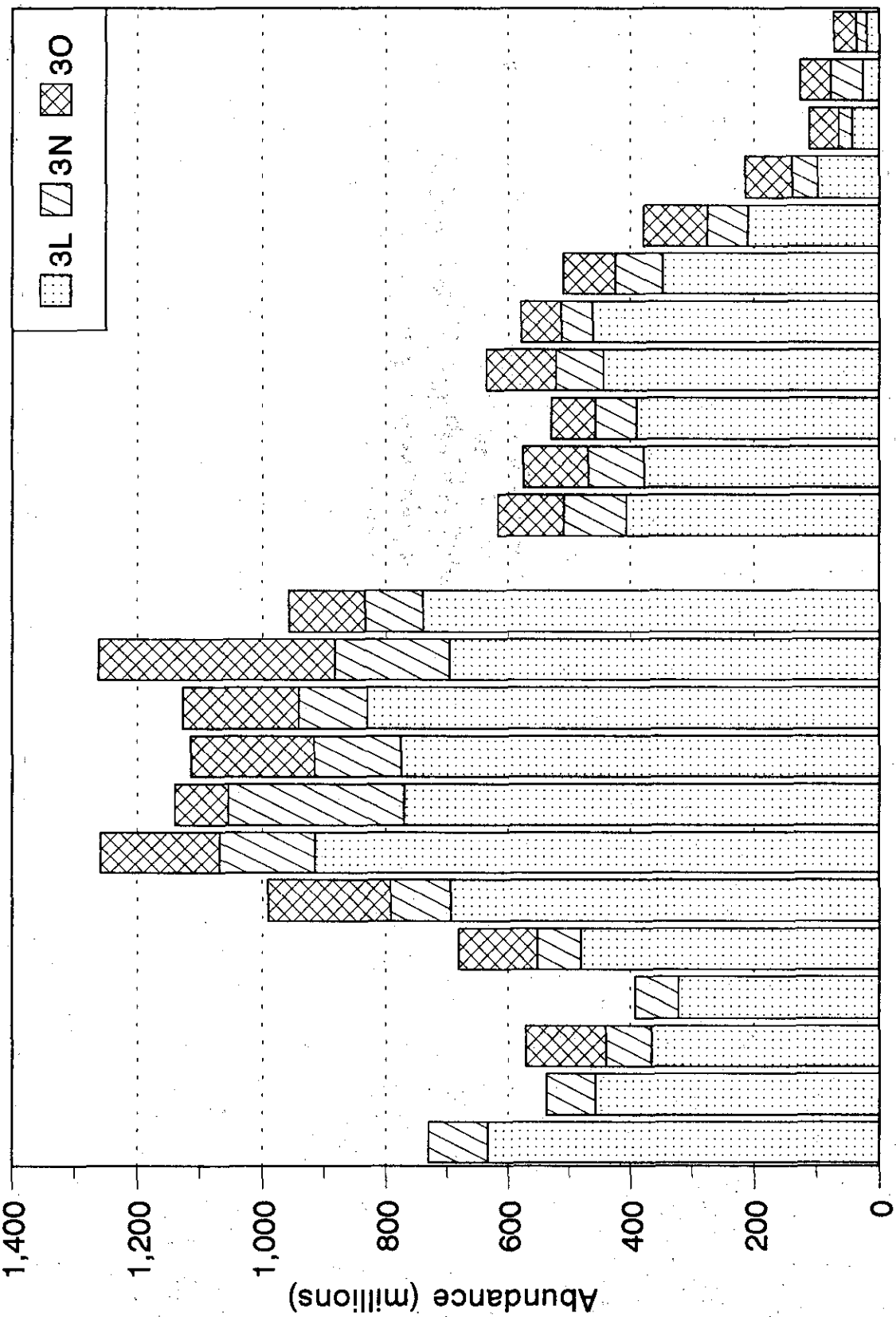

Fig. 4. Abundance of A.plaice from spring RV surveys conducted by Canada in Div. 3LNO.

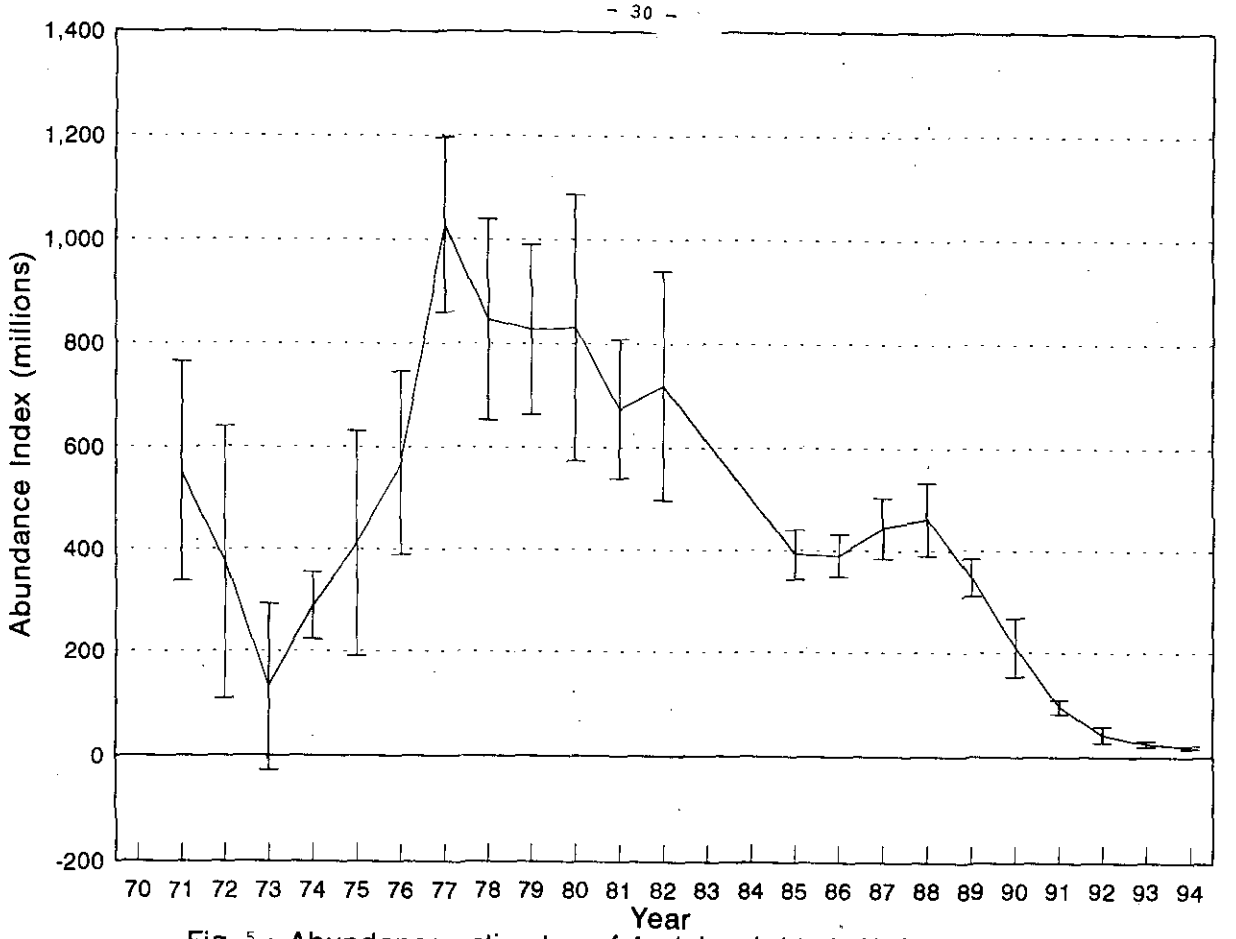

Fig. 5 : Abundance estimates of A.plaice (with 95% C.I.) from Canadian spring surveys in Div.3L.

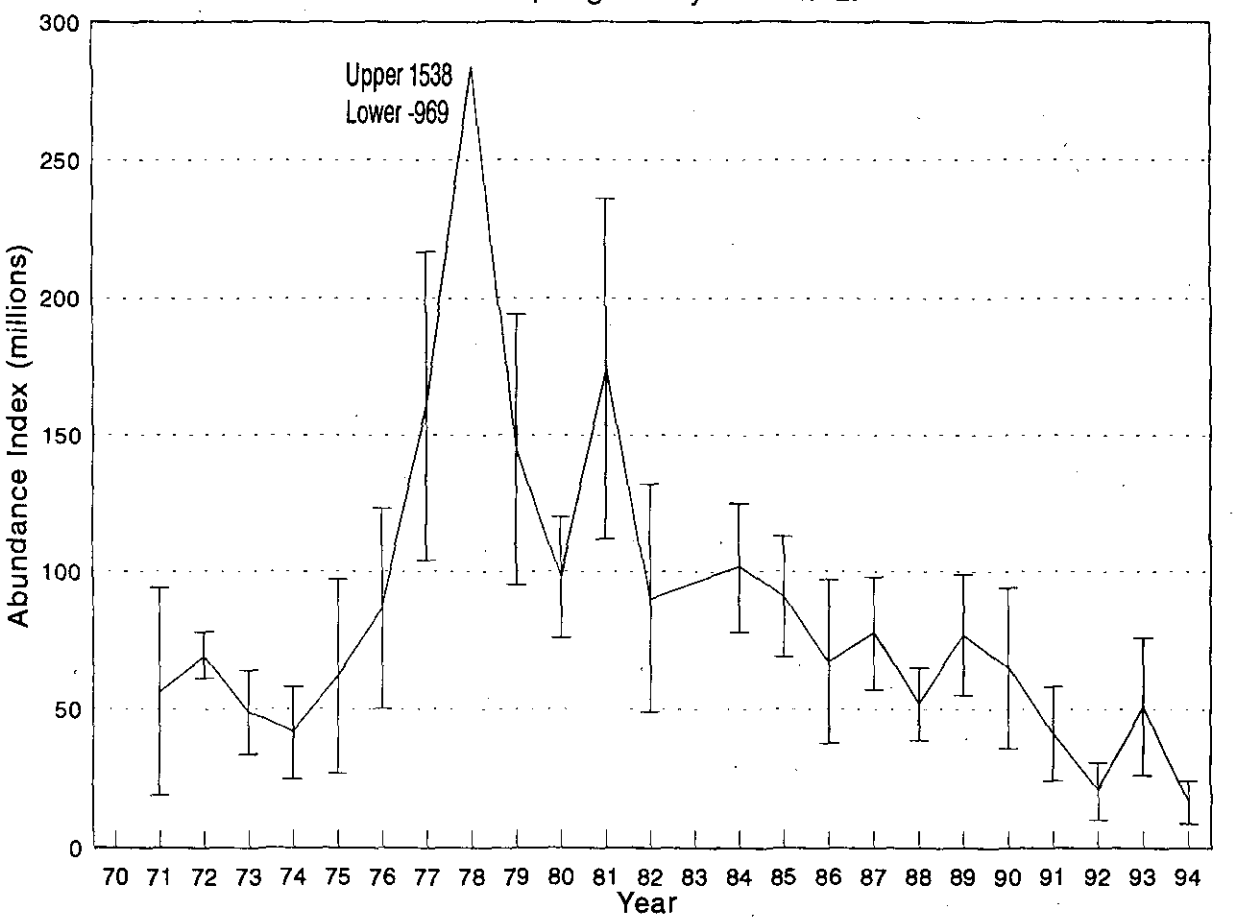

Fig 6 . Abundance estimates of A.plaice (with 95% C.I.) from Canadian spring surveys in Div.3N.

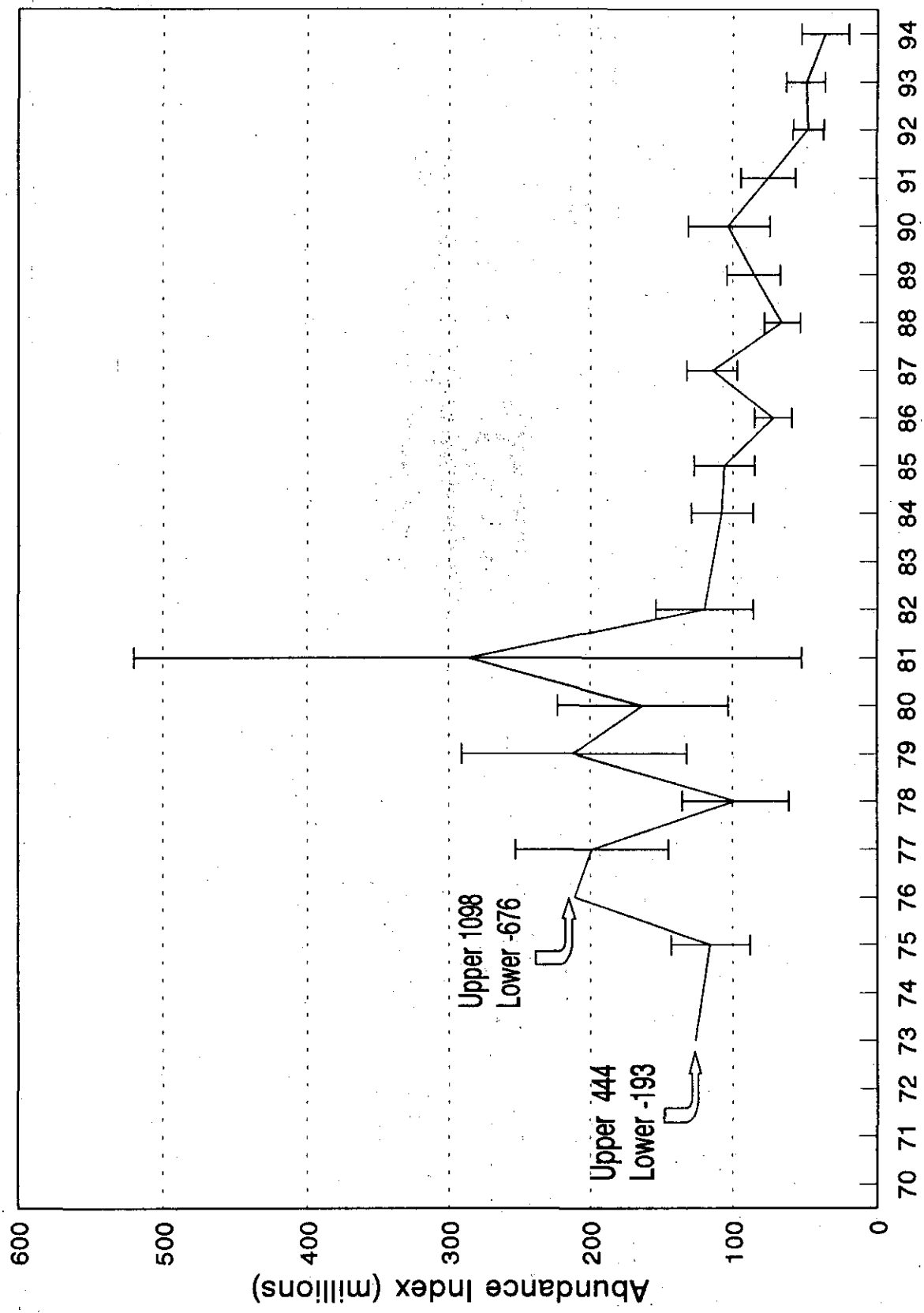

Fig. 7 . Abundance estimates of A.plaice (with 95% C.I.) from Canadian spring surveys in Div.3O.

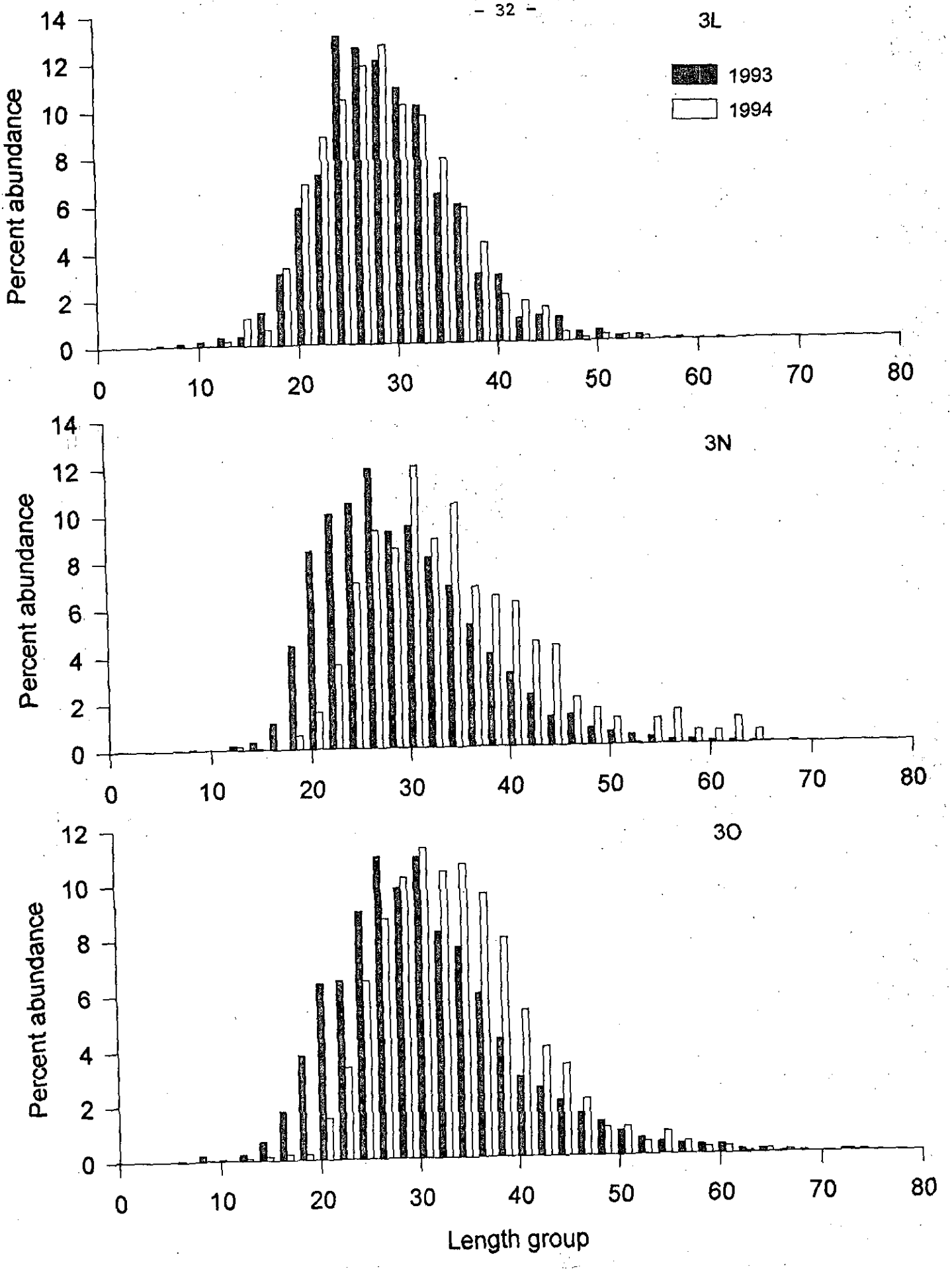

Figure 8 . Percent abundance at length by division from Canadian spring surveys in 1993 and 1994.

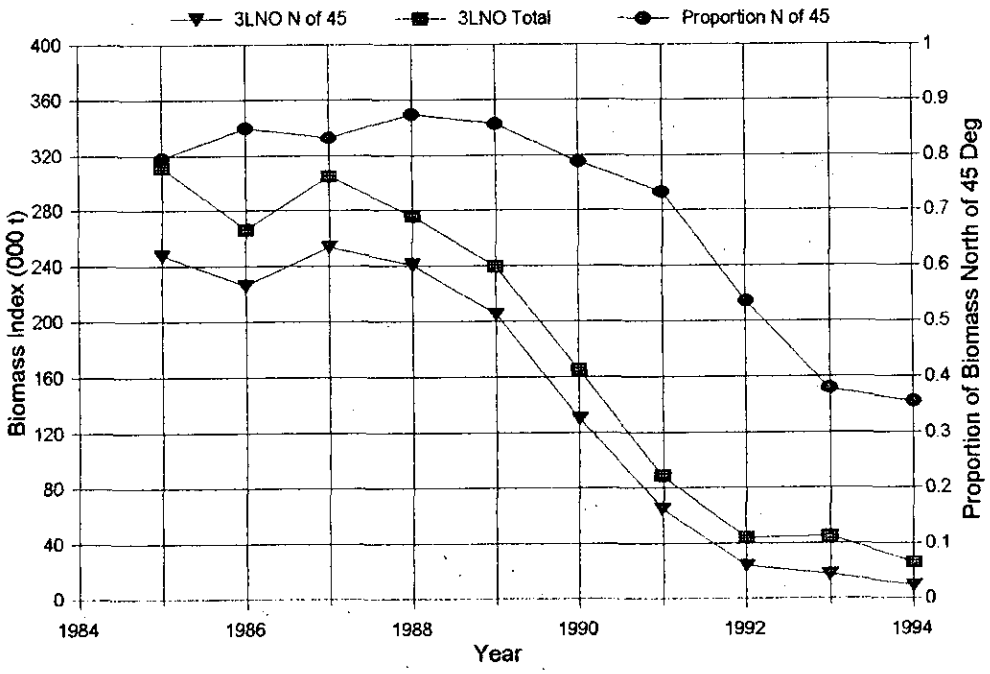

Figure 9 . Total biomass index in 3LNO, as well as the biomass *north of 45°N and the proportion of the total biomass north of 45°N* in Canadian spring rv surveys.

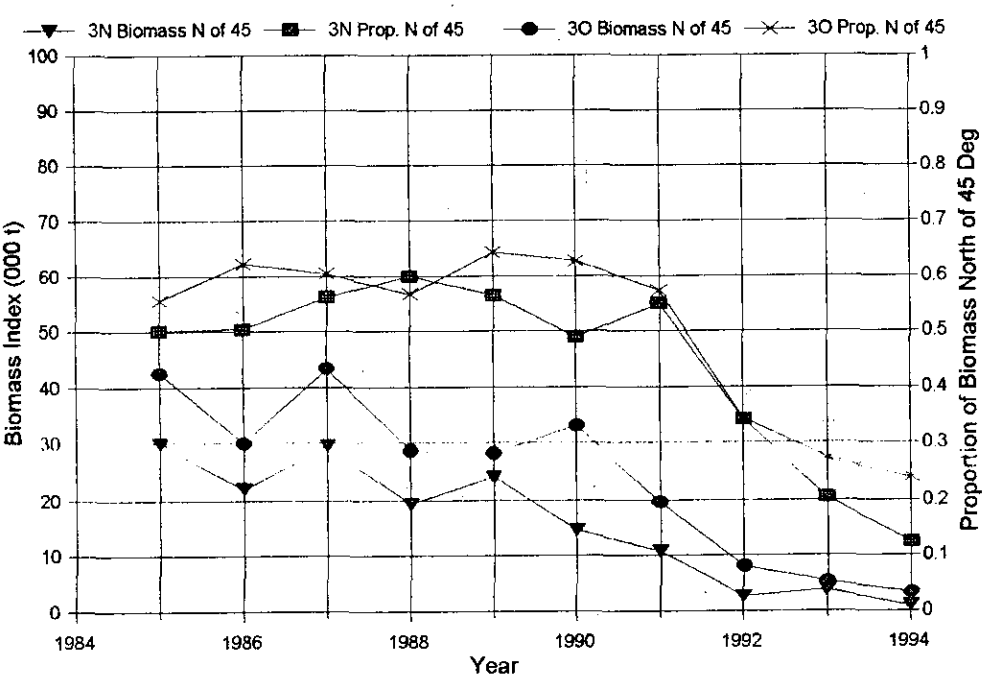

Figure 10 . Total biomass north of 45°N as well as the proportion of biomass north of the latitude in NAFO Div. 3N and 3O.

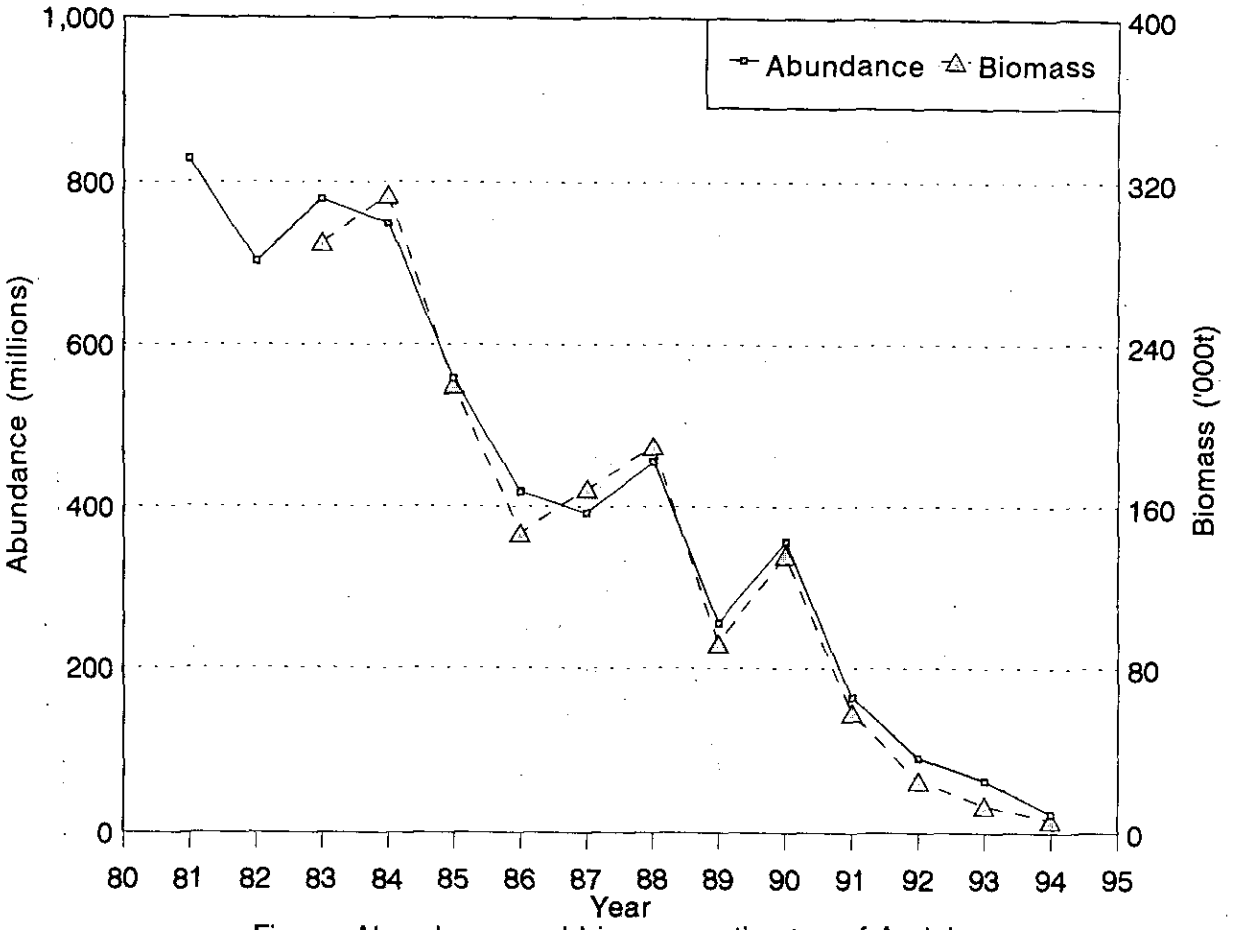

Fig. 11. Abundance and biomass estimates of A.plaice from fall RV surveys in Div. 3L.

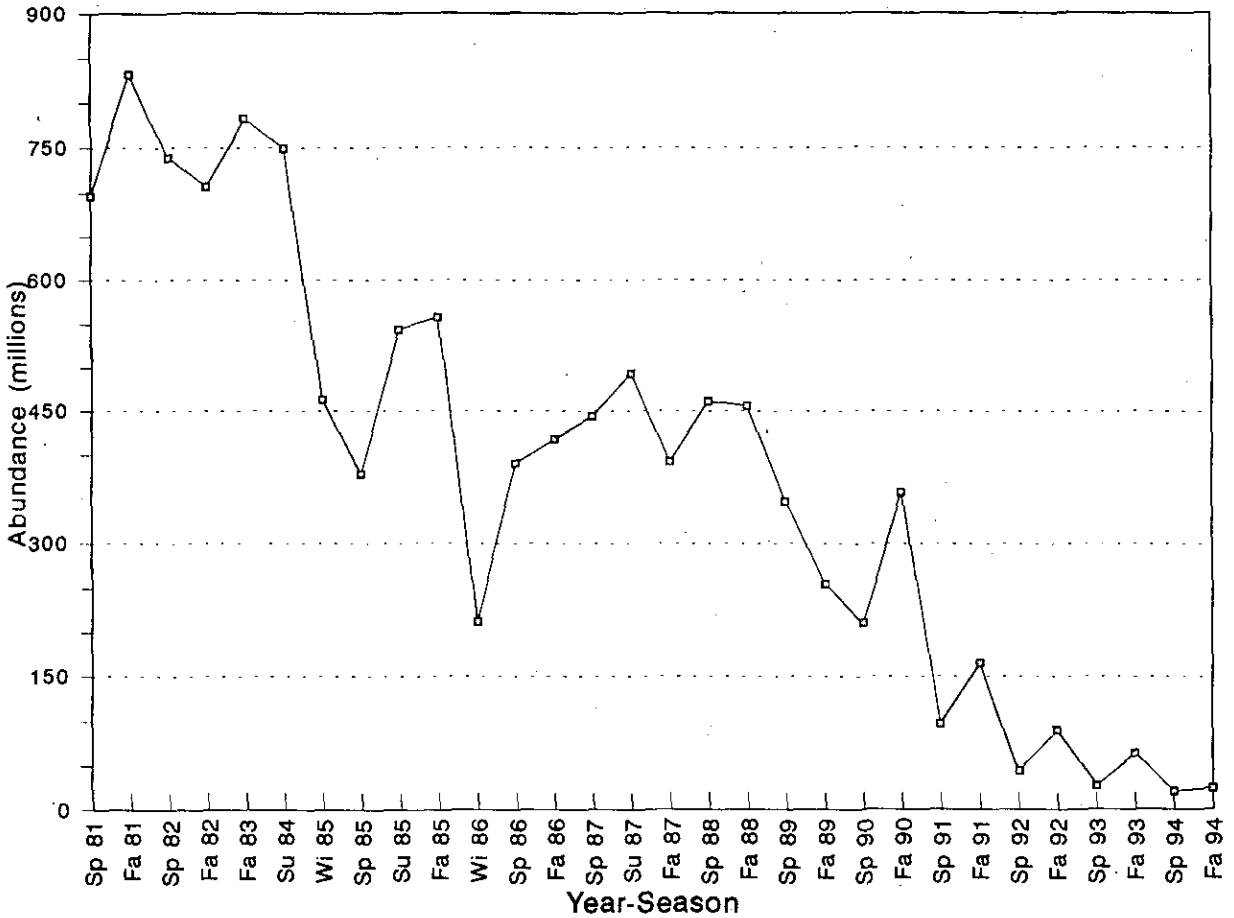

Fig. 12. Abundance of A. plaice from surveys conducted at various times in Div. 3L.

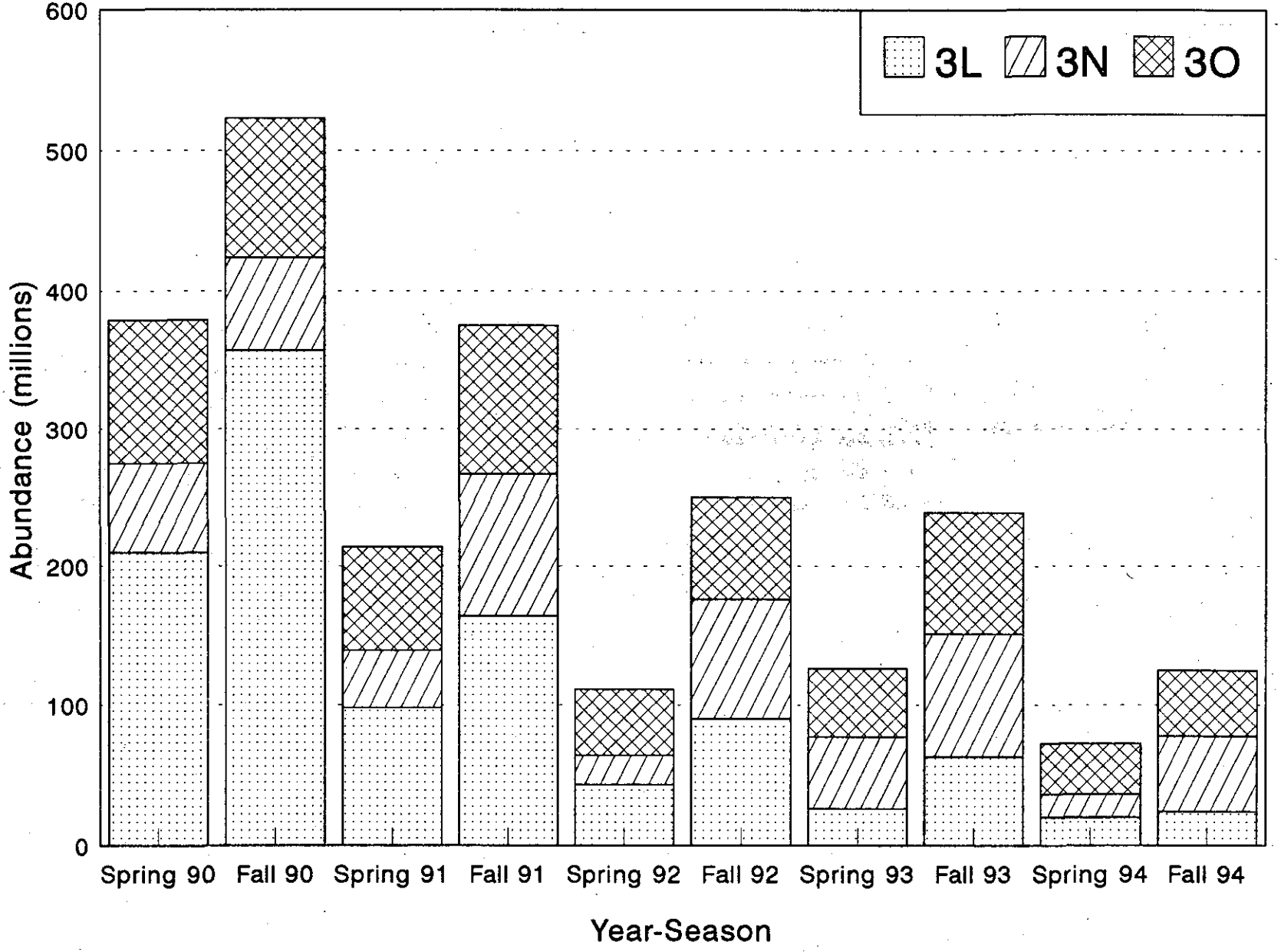

Fig.13. Abundance of A. plaice from surveys conducted during spring and fall in Div. 3L, 3N, and 3O from 1990-1994.

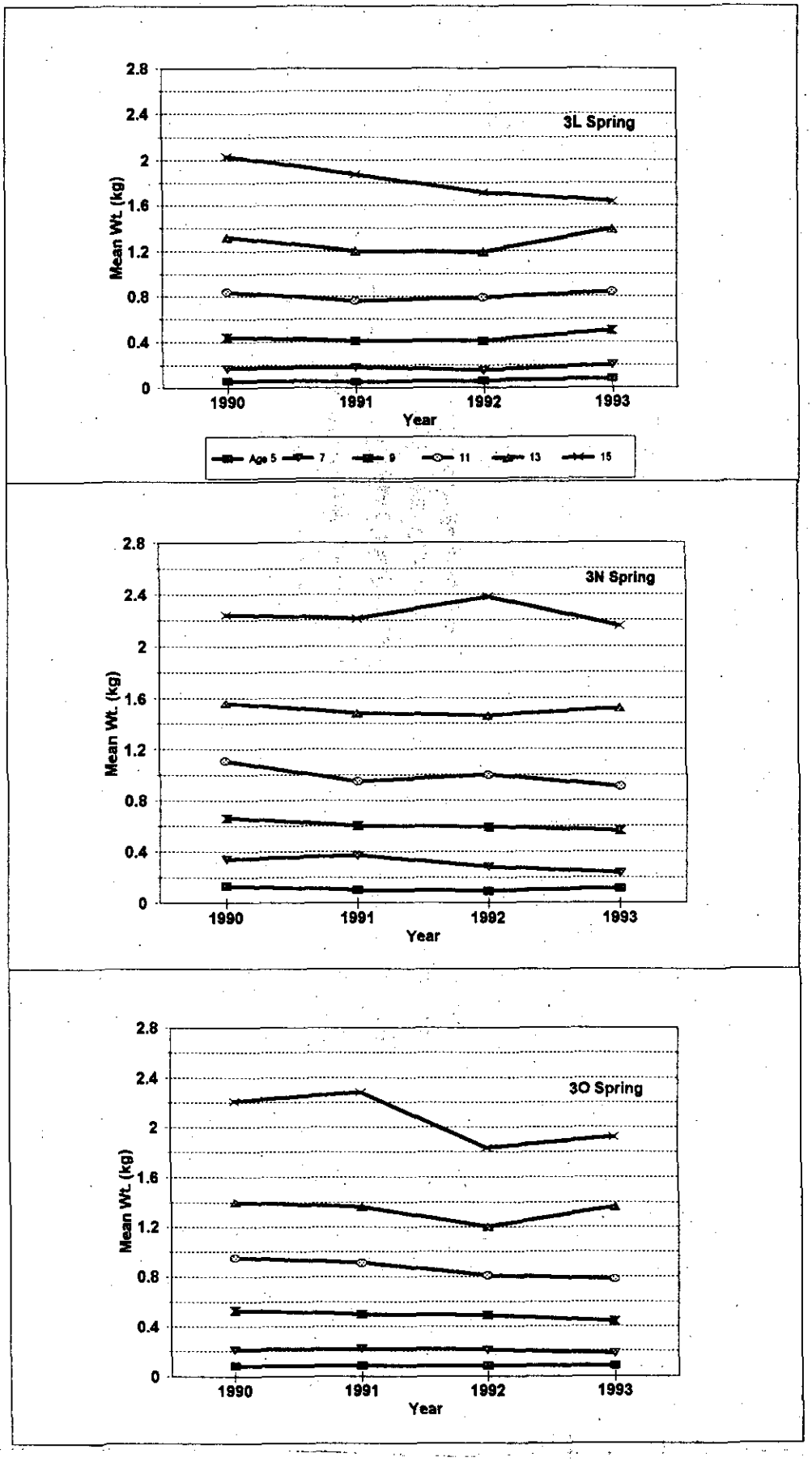

Figure 14 . Mean weight at age for selected ages from Canadian spring surveys in NAFO Div 3L, 3N and 3O.

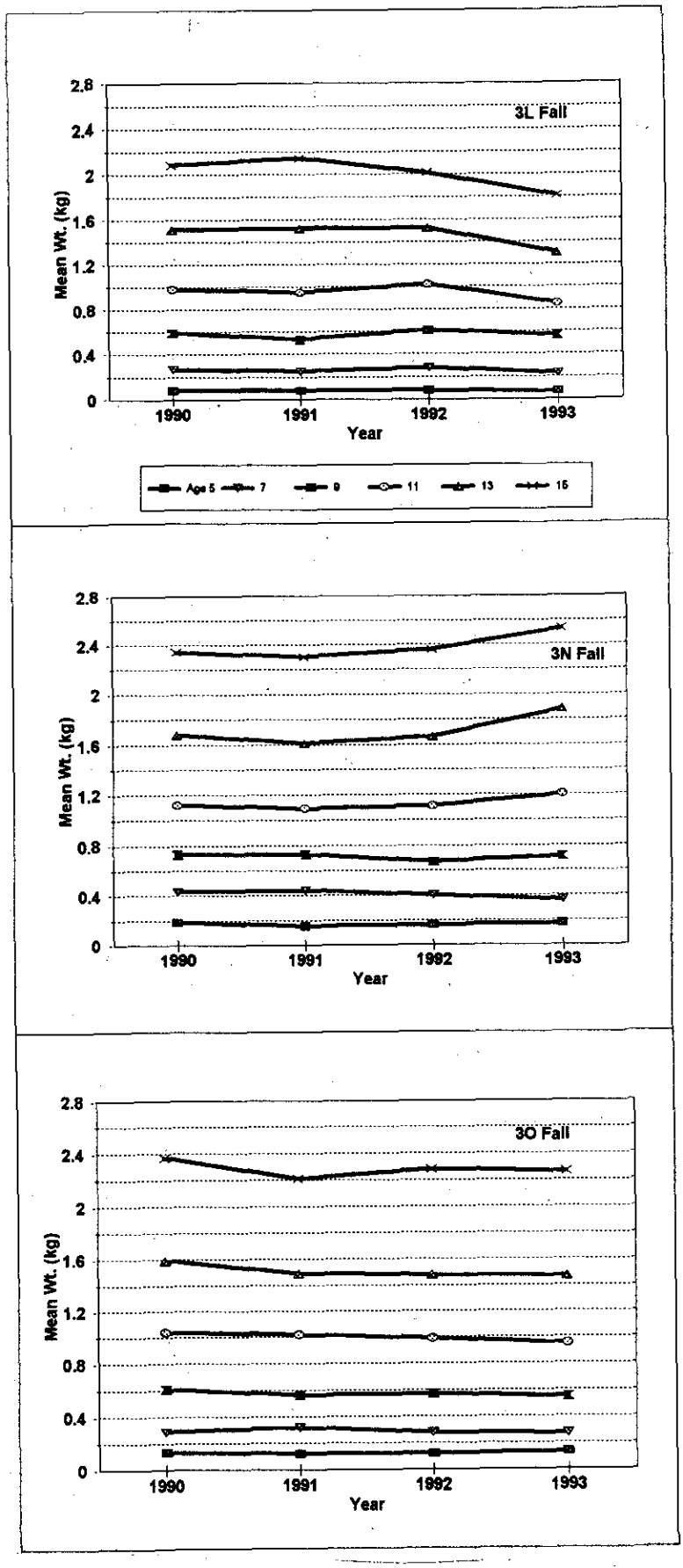

Figure 15 . Mean weight at age for selected ages from Canadian fall surveys in NAFO Div 3L, 3N and 3O.

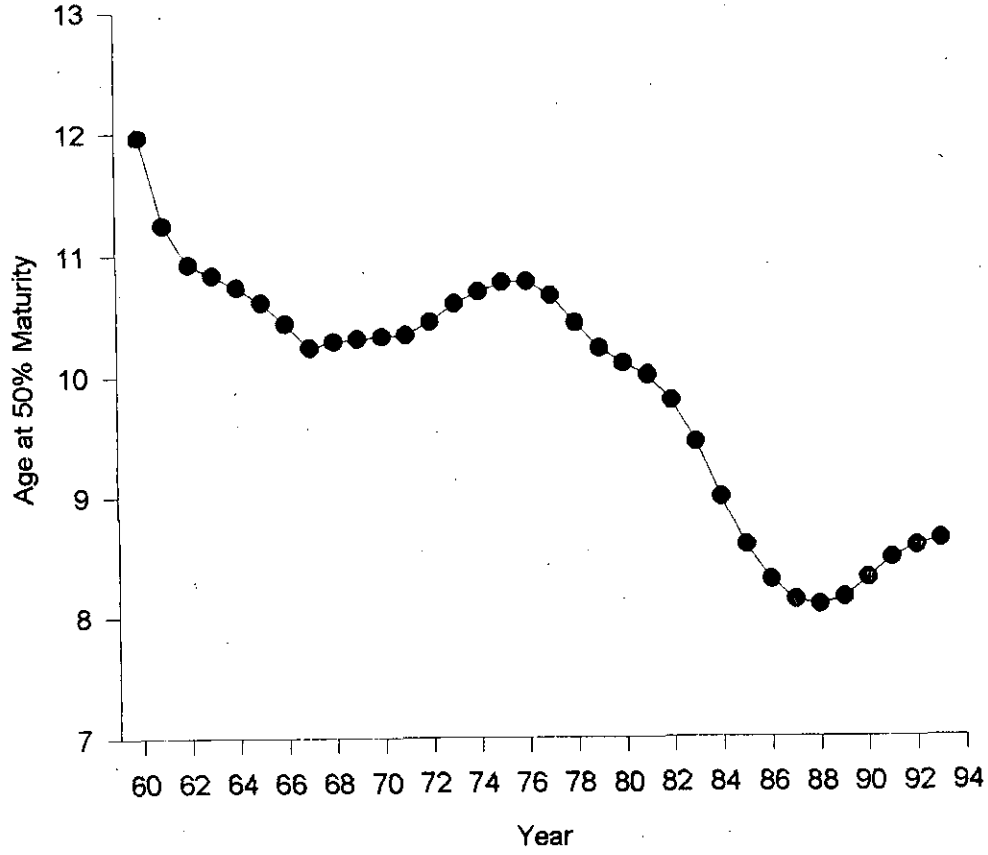

Figure 16. Age at 50% maturity for female A.plaice in Div 3LNO.

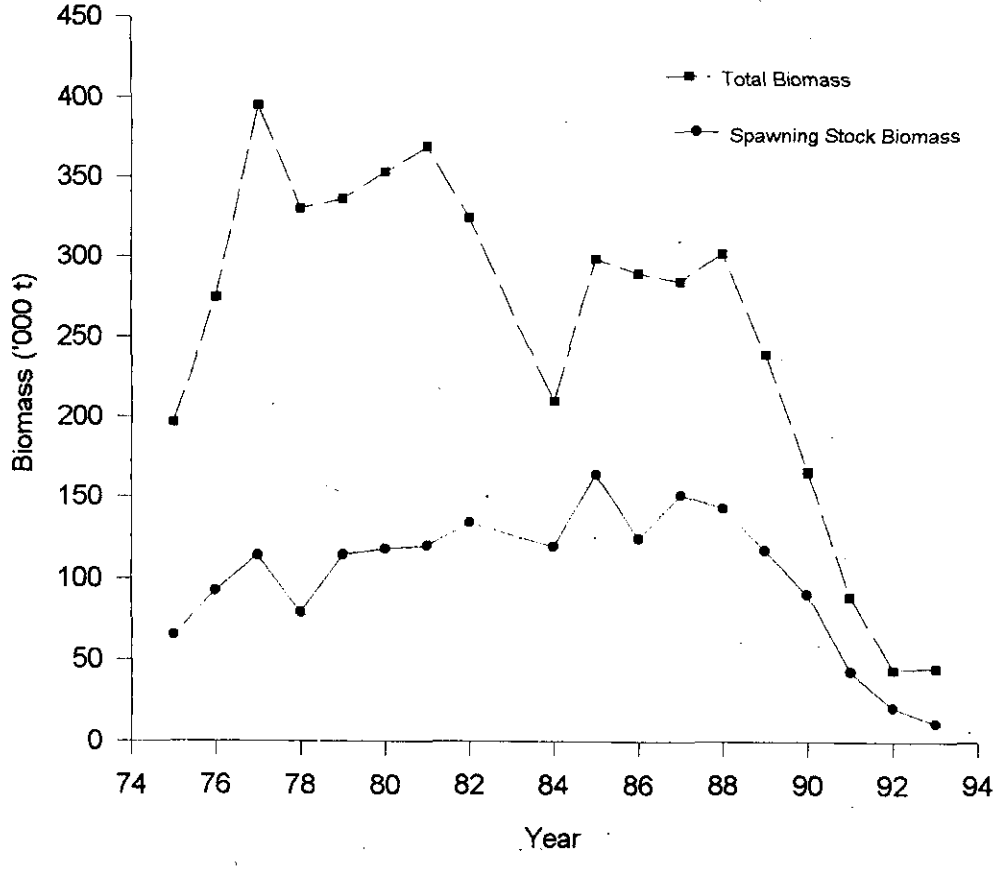

Figure 17. 3LNO A. plaice female SSB and total biomass from RV surveys

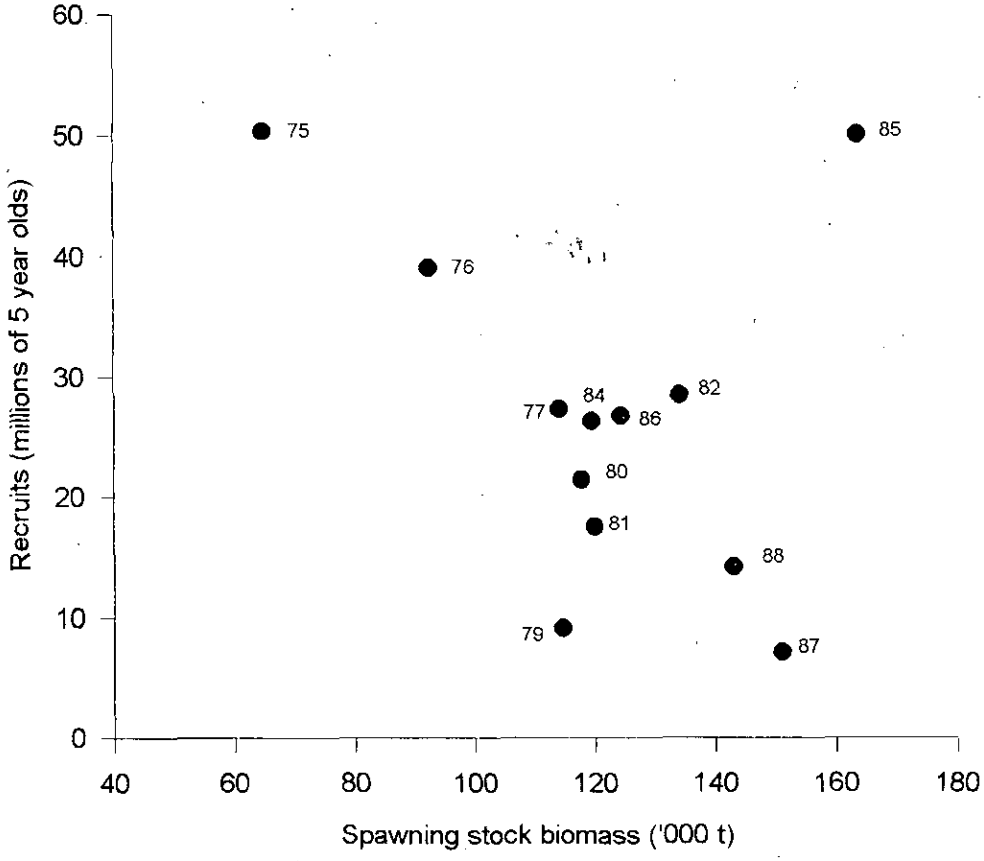

Figure 18 . Spawning stock biomass as calculated from rv surveys in year n against rv abundance at age 5 in year n+5 for A. plaice in Div 3LNO.

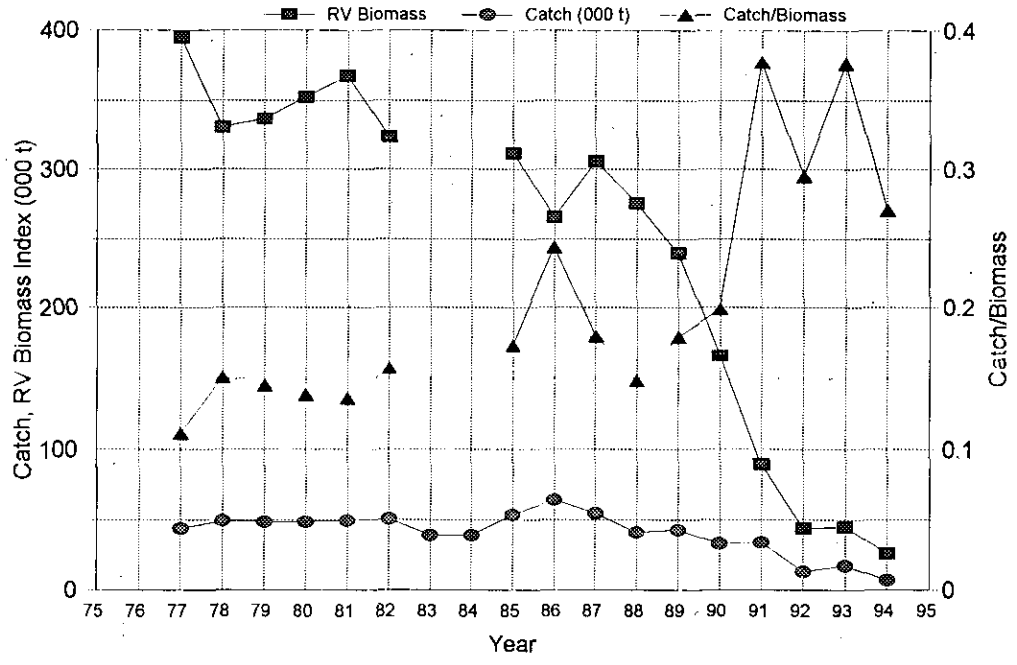

Fig.19 Comparison of catch and RV biomass index, 3LNO A.plaice