Northwest Atlantic Fisheries Organization

Serial No. N2750 NAFO SCR Doc. 96/75

SCIENTIFIC COUNCIL MEETING - JUNE 1996

An Assessment of the American Plaice Stock in Division 3LNO

by

M. J. Morgan, W. B. Brodie, S. J. Walsh, D. Power and D. Orr

Science Branch, Department of Fisheries and Oceans
P. O. Box 5667, St. John's, Newfoundland A1C 5X1

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. The quota has been set at 0 since then.

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. The catch in 1995 was 637 t.

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 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 1995, the Canadian catch totalled only about 60 t (Table 3). More than 90% 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).

Limited sampling from the Portuguese catch in 1995 indicated that the main size range from trawl catches in Div. 3N and 3O was 26-38 cm and from gillnets in Div. 3O there were three modes at 32, 42 and 48 cm (Godinho, et al. 1996). There was no information on age.

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 1995, 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 (Table 5, Fig. 3). The estimate for 1995 is slightly less than 1994 at 4,600 t. 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. This percentage has increased since then with these strata accounting for 52% of the estimate in 1995 (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 in the deep water (Bowering et al 1995).

In Div. 3N, the biomass index also shows a decline in recent years, with 1992, 1994, and 1995 estimates being the lowest points in the series (Table 7 Fig. 3), which casts some doubt on the increase seen in 1993. The estimate from the 1995 spring survey for 3N is 4100 t. There was an increase in the percentage of plaice in deepwater in 1995, with 14.6% of the estimated biomass found in strata 723-728 as opposed to 3% in 1994 (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 estimate from the 1995 spring survey in Div. 3O is 9600 t. Most of the trawlable biomass continues to be found in the shallower strata (Table 10).

Tables 11 to 13 show the trawlable abundance at age for Div. 3L, 3N, and 3Ø respectively, with Tab'e 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 1995 value for age 9+ abundance being 90% lower than the 1990 value, and about 98% lower than the peak values in 1981-82. In 1994 and 1995, the abundance at each age over 3 years was the lowest ever observed.

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.8). With the decline in biomass, this proportion decreased, so that the value for 1995 was around 35 %. Distribution maps from the last 4 surveys also indicate that more of the biomass is in the southern area (Fig. 9) compared to earlier years shown in Brodie et al. (1993).

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 10 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 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 1994 abundance estimates at almost every age older than 4 years are the lowest in the series (Table 16), and there are few fish in the index older than 9. Younger ages seem to have decreased in abundance more between 1993 and 1994 than the 9+ age group.

From 1990 to 1994, fall surveys were also carried out in Div. 3NO. Tables 17 and 18 give the biomass estimates by stratum and depth zone. Fig. 11 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.

Tables 19-21 give the age compositions of plaice in Div. 3N and 3O, as well as Div. 3LNO combined, from the fall surveys of 1990-1994. Again, similar to the spring surveys, the number of older fish has declined rapidly between 1990 and 1994, with age 9+ abundance decreasing by 85% in this period and the total abundance decreasing by 75%.

Campelen Surveys

Starting in fall 1995, surveys have been conducted using a Campelen 1800 trawl. Until a conversion factor is calculated and applied the biomass estimates from the fall 1995 and preliminary spring 1996 surveys are not comparable to the earlier series. The biomass estimates by depth zone and strata for fall 1995 in Div. 3L are given in Table 22. Tables 23-24 show the biomass by strata and depth zone for fall 1995 and spring 1996 in Div. 3N and 3O. As with the previous series in recent years, the biomass estimate in these divisions declined somewhat between fall and spring.

Juvenile surveys

Stratified-random surveys of Div. 3LNO were conducted inside the 91 m depth contour from 1985 to 1988, were extended to 183 m in the 1989 to 1991 surveys and further to 273 m in the 1992 to 1994 surveys. In both Div. 3L and 3N, the total abundance and biomass (Fig. 13) were relatively stable over the last few years. In Div. 3O, total abundance declined somewhat in 1994, but both abundance and biomass in Div 3O have been fairly stable since 1989. Age composition data were available for the time series and are shown for Div. 3L, 3N, 3O and Stratum 360 in Tables 25-28. The abundance of juveniles has been fairly stable over the time series. The 1988 and 1989 year classes continued to show some promise in the 1994 survey, but the 1991 and 1992 year classes were average at best.

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.

Spanish Surveys

In spring 1995 and 1996 bottom trawl surveys were conducted by Spain in the NAFO regulatory area of 3NO. The biomass index of plaice in commonly surveyed strata showed a large increase between the 1995 and 1996 surveys (Paz et al 1996).

Age at Maturity

Estimates of proportion mature at age for females in Div 3LNO combined, were produced for each year from 1960 to 1995. From the parameterized model, the proportion mature at age 1 to 22 for cohorts occurring in years 1960 to 1993 were predicted. From these proportions mature, age at 50% maturity was estimated in each year (Fig. 14). 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 in the early 1990's.

Female Spawning Stock Biomass

For the period 1975 to 1995, 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 1995 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. 15). 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 1995 at an estimate of 6000 t.

Stock-recruitment data

Fig. 16 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 140,000 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. 17). 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. The catch/biomass ratio again dropped to a very low level (below 5%) in 1995, reflective of the low catch in that year. 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

There is no doubt that this stock has declined to a small fraction of its size in the early 1980's. The stock has shown severe declines in all 3 divisions. It is not clear if the decline has continued in the last few years as the juvenile surveys show now trend, while the indices from the spring and fall surveys have continued to decline. 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 better than average recruitment in recent years.

References

Bowering,W.R., D.Power, and M.J.Morgan. 1995. Distribution and abundance of five major groundfish species at the continental slope of Divisions 3KLMN based upon Canadian deepwater surveys in 1991, 1994 and 1995. NAFO SCR Doc 95/51, Ser. No. N2562, 26 p.

Brodie, W.B., D.Power, and M.J. Morgan. 1993. An assessment of the American plaice stock in NAFO Divisions 3LNO. NAFO SCR Doc 93/91, Ser. No. N2277, 60 p.

Godinho, M.L., R. Alpoim, A. M. Avila de Melo, and E. Santos. 1996. Portuguese research report for 1995. NAFO SCS Doc 96/12, Ser. No. N2703, 61 p.

Paz, J., P. Duran, and E. de Cardenas. 1996. Preliminary results from the 96 Spanish bottom trawl survey in the NAFO regulatory area for Divisions 3NO. NAFO SCR Doc. 96/49, Ser. No. N2725, 8p.

Table 1. Nominal catches (t) of American plaice for NAFO Divisions 3LNO, 1960-95 and TACs from 1973 to 1995.

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	26,832	-	-	159	2,522	11,322[b]	40,835	33,585[d]
1989	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	23,240[a]	-	-	60	1,910	9,471[b]	34,681	25,800
1992	10231[a]	-	-	50	518	2,551[b]	11,112	25,800
1993[c,e]	7,585	-	-	-	13	9,659[b]	17,257	10,500
1994[e]	71	-	-	-	100	7,207[b]	7,378	4.8[f]
1995[e]	59	-	-	-	-	578[b]	637	0

[a] Includes a portion of catches reported as unspecified flounder. See text for details.
[b] Includes some catches estimated from surveillance reports.
[c] Catch may have been as high as 19,400.
[d] Effective TAC.
[e] Provisional.
[f] No directed fishing.

Table 2. Breakdown of catches from Table 1 listed as "other" for 1984-94.

			Other				
Year	Spain	Portugal	Panama[b]	USA	Caymen Islands[b]	Misc.[a]	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	-	-	-	8,498[c]	9,471
1992	412	139	-	-	-	2000[c]	2,551
1993	525	50	-	-	-	9084[c]	9659
1994	5476	630	-	575	-	526[c]	7207

[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, 1995. Div. 3LNO.

	3L			3N			3O				3LNO
		Gillnet									
Month	OT	Offshore	Inshore	OT	Seine	Other	OT	Seine	Gillnet	Other	Total
Jan											
Feb											
Mar											
Apr							2		2		4
May			4								4
Jun			9								9
Jul			13							3	16
Aug			17							2	19
Sep			4								4
Oct			1								1
Nov											
Dec											
Total	0	0	48	0	0	0	2	0	2	5	57

Division Totals 3L 48 3N 0 3O 9 Can(N)=55 Can(SF)=2

GearTotals OT 2 Seine 0 GN 50 Other 5

Table 4 Canadian catches of A. plaice (otter trawl only), by division, from 1973 to 1994.

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	11464	4181	3611	19256	85
1991[b]	8487	3153	7573	19213	83
1992[b]	684	455	5229	6368	62
1993[a]	6	1874	3939	5819	77
1994[a]	0	7	10	17	24
1995[a]	0	0	2	2	4

[a]Provisional
[b]includes unspecified flounder assumed to be A. plaice

Table 5 Mean weight (kg) of American plaice per tow, by stratum, from spring R.V. surveys in 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 ($t \times 10^{-3}$), 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	222

Table 5 Continued

	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	1995 WT 168-170
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)	0.5(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)	0.1(6)
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)	0(2)
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)	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)	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)	0.8(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)	0.4(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)	1.5(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)	0.2(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)	0.1(2)
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)	0(5)
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)	0.1(7)
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)	1.1(8)
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)	1.0(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)	1.9(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)	1.5(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)	1.0(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)	0.8(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)	0.6(5)
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(11)	0.4(8)	0.4(10)
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)	0.5(5)
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)	0.7(9)
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)	1.6(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)	3.6(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)	4.0(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)	2.7(4)
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)	0.4(7)
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)	5.4(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)	12.0(2)
729	-	0.5(2)	-	-	-	-	-	2.2(2)	17.0(2)	15.6(2)	4.2(2)	8.2(2)
730	-	0.3(2)	-	-	-	-	-	0.1(2)	3.0(2)	5.7(2)	14.4(2)	13.9(2)
731	-	326.0(2)	-	-	-	-	-	3.4(2)	4.0(2)	6.1(2)	15.7(2)	41.1(2)
732	-	0.3(2)	-	-	-	-	-	0.9(2)	6.3(2)	3.3(2)	0.7(2)	0.1(2)
733	-	21.4(3)	-	-	-	-	-	0.5(2)	13.2(2)	15.3(3)	1.4(2)	5.3(2)
734	-	1.5(3)	-	-	-	-	-	3.4(2)	1.9(2)	0.0(2)	11.8(2)	18.0(2)
735	-	57.0(2)	-	-	-	-	-	-	63.4(2)	42.1(2)	12.3(2)	21.8(2)
736	-	5.0(2)	-	-	-	-	-	-	16.6(2)	11.4(2)	16.9(2)	35.1(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)	1.6(151)
Biomass Index	97.9	175.1	174.1	180.9	193	153	82.6	34.5	13	8.1	5.1	4.6

Table 5 Biomass estimates (000 t) of A. plaice, by stratum and depth zone, from Canadian spring surveys in Div. 3L from 1985-1995. (+) indicates stratum biomass < 50 t and (-) indicates stratum not surveyed.

		Year										
Depth (fm)	Stratum	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
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	7.2	4.8	3.1	0.5	0.2	+	+
	371	9	5.7	4.9	12.4	9.1	5.3	1.7	0.1	0.2	0.1	0.1
	372	20.3	12.8	5.6	10.8	9.7	4.2	2.3	0.5	1.3	0.1	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	0.2
51-100	328	5.9	5.8	9.8	2.6	2.6	8.1	1.7	0.5	0.2	+	0.1
	341	4.8	5.2	9.7	6	3.7	13.1	1	0.1	0.1	0.1	+
	342	1.5	2.3	4	4.1	1.7	1.4	0.2	+	+	+	0
	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	10.6	3.9	0.8	0.2	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	0.1
	370	5.6	9.6	6.9	12.9	7.7	2.7	2.3	0.8	0.2	0.2	0.1
	385	8.6	11.1	13.1	8.2	13	1.5	2.9	1.2	0.4	0.3	0.1
	390	1.7	1.6	3.1	1.2	1	0.7	0.5	0.2	0.1	0.1	+
	Total	72.7	87.3	131.2	117	81.8	52.1	17.6	5	2	1.6	0.6
101-150	344	4.7	9	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	0.1
	366	3.9	2.2	1.5	2	1.6	1.3	-	0.4	0.3	0.4	0.2
	369	5.2	1.2	0.6	0.4	0.9	0.5	0.4	0.4	0.1	0.2	0.1
	386	1.9	0.7	0.6	2.4	0.9	1	1.1	0.7	0.1	0.1	0.1
	389	1.7	1.7	0.6	1.2	0.2	0.3	0.4	0.2	0.2	0.1	0.2
	391	0.2	1.3	0.3	0.6	0.2	0.1	0.3	+	0.2	0.1	0.1
	Total	20.7	19.8	12.5	19.6	25.5	9.1	2.7	2	1.2	1.1	0.8
151-200	345	2.5	1.8	1.2	1.4	0.8	0.7	1.1	0.2	0.1	0.2	0.1
	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	0.2
	388	0.7	0.3	+	+	+	+	0.1	0.3	0.3	0.1	0.1
	392	0.1	0.1	+	+	+	+	0	+	+	+	0.1
	Total	6.9	4.9	1.7	2	1.3	1.6	1.6	1.8	1.2	0.6	0.6
201-300	729	+	-	-	-	-	-	+	0.2	0.2	0.1	0.1
	731	5.3	-	-	-	-	-	+	0.1	0.1	0.3	0.7
	733	0.8	-	-	-	-	-	+	0.5	0.5	0.1	0.2
	735	1.2	-	-	-	-	-		1.3	0.9	0.3	0.4
	Total	7.3	-	-	-	-	-	+	2.1	1.7	0.8	1.4
301-400	730	+	-	-	-	-	-	+	+	0.1	0.2	0.2
	732	+	-	-	-	-	-	+	0.1	0.1	+	+
	734	+	-	-	-	-	-	+	+	0	0.2	0.3
	736	+	-	-	-	-	-		0.2	0.1	0.2	0.5
	Total	+	-	-	-	-	-	+	0.3	0.3	0.6	1
401-500	737	-	-	-	-	-	-	-	-	-	0.1	-
	741	-	-	-	-	-	-	-	-	-	0	-
	745	-	-	-	-	-	-	-	-	-	0	-
	748	-	-	-	-	-	-	-	-	-	+	-
	Total	-	-	-	-	-	-	-	-	-	0.1	-
Grand Total		175	174.1	180.5	192.7	152.8	82.6	34.3	13	8.3	5.1	4.6

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 ($t \times 10^{-3}$) 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 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

Year-Trip

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	1995 WT 168-170
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)	3.1(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)	5.3(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)	2.8(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)	4.4(12)
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)	10.8(7)
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)	0.8(10)
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)	0(10)
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)	1.1(4)
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)	2.5(6)
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)	0.3(6)
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)	2.2(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)	2.4(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)	0.7(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)	3.4(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)	3.2(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)	0.5(3)
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)	0.2(3)
723	-	-	-	-	-	-	-	0.1(2)	3.0(2)	0.1(2)	1.9(2)	9.2(2)
724	-	-	-	-	-	-	-	0.0(2)	3.9(2)	0.2(2)	2.3(2)	6.5(2)
725	-	-	-	-	-	-	-	0.2(2)	-	0.6(2)	2.4(2)	3.1(2)
726	-	-	-	-	-	-	-	0.9(2)	1.9(2)	5.6(2)	0.7(2)	2.0(2)
727	-	-	-	-	-	-	-	2.8(2)	7.6(2)	16.4(2)	9.4(2)	9.0(2)
728	-	-	-	-	-	-	-	1.1(2)	12.8(2)	15.0(2)	9.5(3)	28.1(2)
752	-	-	-	-	-	-	-	-	-	-	11.1	-
756	-	-	-	-	-	-	-	-	-	-	0.6	-
760	-	-	-	-	-	-	-	-	-	-	0	-
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)	3.1(89)
Biomass Index	47.4	75.3	43.8	52.8	32.4	42.8	30.1	19.9	7.8	17.8	7.6	4.1

Table 8 Biomass estimates (000 t) of A. plaice, by stratum and depth zone, from Canadian spring surveys in Div. 3N from 1985-1995. (+) indicates stratum biomass <50 t and (-) indicates stratum not surveyed.

		Year										
Depth (fm)	Stratum	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
≤30	375	3.9	5.5	8.3	4.4	2.8	3	0.6	1.4	1.2	0.4	0.3
	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	3.7	1.8	1.5	2.4	0.6	0.3
31-50	360	8.6	7.3	3.4	2.3	5	4.1	3.5	1.3	4	1	1
	361	6.5	3.2	5.1	3.7	5.5	5.4	1.6	0.4	2.3	3.2	1.5
	362	12.7	15.6	10.5	9.6	10.8	9.4	5.6	1.2	2.1	0.2	0.2
	373	12.7	5	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	0.1
	383	1.1	1	1.8	1.2	1.1	2.8	0.2	0.1	0.1	+	+
	Total	45.1	33.4	38.3	26.5	36	24.2	16.9	3.9	9.4	4.7	2.8
51-100	359	0.9	0.8	0.2	0.1	0.6	0.4	0.3	0.6	3.3	0.1	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	0.1
101-150	358	3	+	+	+	+	+	0.2	0.5	0.1	1	0.1
	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	0.1
151-200	357	0.3	0	-	0	0	+	+	+	0	0.1	+
	379	+	+	+	+	0	+	+	0.1	+	0.1	+
	380	+	+	0	0	+	+	+	+	0.1	+	+
	Total	0.3	+	+	+	+	+	+	0.1	0.1	0.2	0.1
201-300	723	-	-	-	-	-	-	+	+	+	+	0.1
	725	-	-	-	-	-	-	+	+	+	+	+
	727	-	-	-	-	-	-	+	+	0.2	0.1	0.1
	Total	-	-	-	-	-		+	+	0.2	0.1	0.2
301-400	724	-	-	-	-	-	-	0	+	+	+	0.1
	726	-	-	-	-	-	-	+	+	+	+	+
	728	-	-	-	-	-	-	+	0.1	0.2	0.1	0.3
	Total	-	-	-	-	-	-	+	0.1	0.2	0.1	0.4
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	4.1

Table 9 Mean weight (kg) of American plaice per tow, by stratum, from spring R.V. surveys in 3O. 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 ($t \times 10^{-3}$), are given at the bottom of the table.

Year-Trip

Depth (fm)	Stratum	No. of trawlable units	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

Year-Trip

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	1995 WT 168-170
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)	6.2(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)	1.4(7)
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)	12.8(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)	7.1(4)	7.0(4)
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)	5.0(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)	4.8(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)	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)	4.7(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)	10.7(4)
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)	6.8(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)	4.7(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)	2.0(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)	0.6(8)
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)	11.5(10)
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)	22.0(5)
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)	8.9(3)
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)	5.9(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)	10.2(2)
717	-	-	-	-	-	-	-	1.0(2)	0.0(2)	1.2(2)	19.6(2)	5.0(2)
718	-	-	-	-	-	-	-	0.0(2)	0.0(2)	0.0(2)	2.1(2)	0.0(2)
719	-	-	-	-	-	-	-	0.1(2)	1.1(2)	0.1(2)	1.5(2)	2.7(2)
720	-	-	-	-	-	-	-	0.0(2)	0.2(2)	0.5(2)	1.9(2)	0.0(2)
721	-	-	-	-	-	-	-	0.9(2)	1.6(2)	0.6(2)	4.4(2)	2.9(2)
722	-	-	-	-	-	-	-	0.6(2)	1.6(2)	0.5(2)	9.2(2)	38.6(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)	6.9(85)
Biomass Index	64.5	48.2	71.7	50.7	76.6	43.8	52.9	34.5	23.3	19.1	13.7	9.6

Tab10 Biomass estimates (000 t) of A. plaice, by stratum and depth zone, from Canadian spring surveys in Div. 3O from 1985-1995. (+) indicates stratum biomass <50 t amd (-) indicates stratum not surveyed.

		Year										
Depth (fm)	Stratum	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
31-50	330	18.6	7	8.8	4.6	6.3	5.2	4.6	0.4	0.5	0.3	0.2
	331	3.4	0.4	1.6	1.5	0.4	-	1.2	0.4	1.5	0.4	0.4
	338	8.5	4.1	3.8	7.2	3	5.1	4.2	2.7	2.1	2.3	1
	340	5.6	4.6	12	7.2	3.4	7.1	4	2.1	1.2	0.4	0.3
	351	13.9	15.2	13.2	14.5	10.9	14.9	8.1	2.7	2.3	0.1	0.1
	352	10.9	6.6	12.3	10.1	6.8	9.2	4.4	5.9	5.7	3.7	2.2
	353	5.3	2.8	4.3	2	2.8	2.7	0.8	2.5	2.4	1.1	2.1
	Total	66.2	40.7	56	47.1	33.6	44.2	27.3	16.7	15.7	8.3	6.3
51-100	329	3.9	3	6.4	1.1	3.9	2.5	1.7	0.4	0.72.2	2.2	0.8
	332	1.9	3	4.7	0.4	1.3	1.3	2	1.6	1.3	0.6	0.5
	337	1.1	0.9	1	0.4	0.7	0.9	1.2	1	0.3	0.4	0.8
	339	0.6	0.2	3	1.3	3.7	3.4	1.3	2.4	0.5	0.3	0.2
	354	2.6	0.3	0.6	0.2	0.5	0.4	0.6	0.8	0.4	0.2	0.3
	Total	10.1	7.4	15.7	3.4	10.1	8.5	6.8	6.2	3.2	3.7	2.6
101-150	333	0	0	+	+	+	+	+	+	+	0.7	0.1
	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	0.1
151-200	334	+	+	+	+	+	+	+	+	+	0.1	+
	335	+	+	+	+	+	0	+	+	+	+	+
	356	+	0	+	+	0	+	+	+	+	+	0.1
	Total	+	+	+	+	+	+	+	+	+	0.1	0.1
201-300	717	-	-	-	-	-	-	+	0	+	0.2	0.1
	719	-	-	-	-	-	-	+	+	+	+	+
	721	-	-	-	-	-	-	+	+	+	+	+
	Total	-	-	-	-	-	-	+	+	+	0.2	0.1
301-400	718	-	-	-	-	-	-	0	0	0	+	0
	720	-	-	-	-	-	-	0	+	+	+	0
	722	-	-	-	-	-	-	+	+	+	0.1	0.3
	Total	-	-	-	-	-	-	+	+	+	0.1	0.3
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	9.5

Table1 1Abundance index (millions) of A.plaice from spring surveys in Div. 3L.

Age\Year	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
1	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.10	0.20	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.10	0.00	0.00	0.58	0.48	0.30	0.50	0.40	1.30	0.40	0.10	0.00	0.00	0.10	0.30	0.20	0.10	0.00	0.12	0.00	0.05	0.00	0.00
3	1.56	0.29	1.04	0.19	2.31	7.42	2.40	10.71	0.90	4.09	4.08	2.60	0.00	0.50	0.20	0.60	1.00	1.01	0.20	0.20	0.10	0.10	0.02	0.02
4	9.44	10.65	8.25	3.58	3.65	14.07	10.60	15.87	12.90	7.28	4.38	9.60	0.44	1.70	1.50	2.70	4.70	4.72	3.70	0.81	0.30	0.50	0.50	0.04
5	38.74	22.26	39.41	5.52	9.80	15.02	34.51	61.01	42.02	39.88	15.74	10.60	1.51	9.20	6.50	13.22	19.21	12.26	9.60	7.08	2.80	2.00	1.80	0.90
6	58.40	50.47	45.58	21.01	27.00	16.45	70.82	70.83	71.03	77.37	45.53	30.10	16.49	29.50	40.00	50.58	58.64	49.05	18.50	16.07	5.50	7.90	4.00	1.50
7	117.10	74.55	62.33	34.67	49.68	52.11	131.43	111.70	105.34	100.70	66.15	56.49	64.54	83.20	101.10	119.49	108.87	76.30	41.20	14.66	11.70	7.10	5.90	3.50
8	62.30	77.91	38.37	49.49	91.66	116.20	207.05	170.63	167.97	200.50	178.43	120.48	97.61	97.30	94.20	124.70	104.77	83.23	45.70	19.01	8.60	4.50	3.90	5.70
9	115.93	49.99	30.21	55.01	99.26	137.02	151.13	137.59	139.75	172.78	173.05	186.77	107.71	66.50	74.50	65.00	90.76	63.53	40.90	17.89	7.40	1.90	2.40	4.20
10	52.66	53.92	40.28	57.52	86.96	144.25	155.73	105.65	123.75	113.06	106.70	152.88	60.37	42.00	35.90	35.86	32.62	26.04	28.60	9.70	3.70	1.10	0.79	1.90
11	47.79	32.43	34.55	32.44	44.49	92.05	68.01	36.31	62.62	50.15	57.68	90.49	27.66	22.90	14.70	12.12	17.81	13.37	10.00	5.66	1.50	0.50	0.41	0.60
12	44.68	34.25	29.78	28.67	32.57	54.01	45.81	25.30	27.01	32.10	23.11	39.79	17.29	11.60	9.90	10.52	10.91	7.74	5.20	3.64	0.80	0.20	0.08	0.10
13	33.58	16.02	16.23	16.95	15.76	25.67	19.00	11.21	9.90	16.55	10.56	21.50	6.47	6.70	6.40	5.01	5.50	4.32	3.30	1.42	0.30	0.10	0.08	0.03
14	23.36	12.86	11.29	9.20	8.84	7.32	7.20	7.24	5.30	6.28	3.69	10.40	3.90	3.30	2.40	2.10	3.20	2.61	1.30	0.81	0.20	0.03	0.03	0.00
15	11.68	10.55	4.25	5.42	3.94	5.61	5.40	2.98	3.30	3.69	2.89	3.30	1.60	1.80	1.40	1.10	1.80	1.81	0.90	0.51	0.10	0.00	0.00	0.00
16	8.08	7.29	2.52	1.94	3.36	2.66	3.10	1.49	1.60	2.89	1.99	2.50	0.80	1.30	0.90	0.40	0.80	0.60	0.60	0.30	0.03	0.01	0.00	0.00
17	4.57	2.40	0.52	0.29	0.86	1.90	1.40	0.79	0.70	0.80	1.10	1.30	0.35	0.30	0.20	0.10	0.20	0.20	0.30	0.10	0.00	0.02	0.00	0.00
18	2.63	0.67	1.39	0.00	0.29	0.57	0.90	0.20	0.20	0.40	0.20	0.10	0.18	0.10	0.10	0.10	0.00	0.10	0.00	0.02	0.00	0.00	0.00	0.00
19	0.49	0.29	0.00	0.10	0.00	0.19	0.20	0.00	0.10	0.10	0.10	0.00	0.09	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1+	632.99	457.00	366.00	322.00	481.01	693.00	914.99	770.01	774.99	830.02	695.98	739.00	407.01	378.00	390.00	444.00	460.99	346.99	210.00	98.00	43.03	26.01	19.91	18.49
6+	583.25	423.60	317.30	312.71	464.67	656.01	867.18	681.92	718.57	777.37	671.18	716.10	405.06	366.60	381.70	427.08	435.88	328.90	196.50	89.79	39.83	23.36	17.59	17.53
9+	345.45	220.67	171.02	207.54	296.33	471.25	457.88	328.76	374.23	398.80	381.07	509.03	226.42	156.60	146.40	132.31	163.60	120.32	91.10	40.05	14.03	3.86	3.79	6.83
12+	129.07	84.33	65.98	62.57	65.62	97.93	83.01	49.21	48.11	62.81	43.64	78.89	30.68	25.20	21.30	19.33	22.41	17.38	11.60	6.80	1.43	0.36	0.19	0.13

Table1 2Abundance index (millions) of A.plaice from spring surveys in Div. 3N.

Age\Year	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
1	0.00	0.10	0.00	0.00	0.00	0.10	0.00	0.10	0.10	0.10	0.10	0.30	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.20	0.10	0.00	0.93	0.19	0.10	0.40	0.40	0.10	0.99	0.60	0.10	0.10	0.10	0.91	0.20	0.30	0.10	0.00	0.02	0.03	0.00	0.00
3	2.80	0.40	0.39	0.91	4.91	3.11	1.60	5.15	1.20	0.70	4.95	1.81	1.01	1.80	0.70	3.93	2.42	2.69	1.61	0.20	0.20	0.60	0.07	0.07
4	2.89	2.30	0.96	2.63	9.72	5.64	9.48	13.88	2.81	2.10	7.52	6.63	2.54	8.19	2.90	7.25	5.54	18.53	9.59	1.81	1.40	7.30	0.20	0.39
5	4.85	5.60	5.40	5.36	8.33	12.06	14.37	42.92	11.03	6.09	5.25	7.54	5.79	8.59	7.79	7.05	6.05	9.96	24.22	9.07	2.50	8.10	2.70	2.10
6	3.17	8.60	9.54	10.17	7.59	12.06	28.64	61.06	18.55	12.99	12.18	7.94	11.37	11.29	10.18	10.57	5.44	7.87	6.16	11.38	5.60	8.50	2.40	2.80
7	11.66	5.00	11.08	11.26	13.61	11.96	25.25	69.59	29.48	26.38	41.18	8.85	14.01	9.59	9.59	10.47	5.74	6.67	3.73	3.93	5.10	9.60	3.60	2.90
8	8.02	8.40	8.19	10.62	9.35	14.97	22.26	38.26	33.29	22.18	41.87	15.88	13.30	10.69	7.59	8.76	6.25	8.57	3.43	2.62	2.10	9.20	3.10	2.10
9	13.71	10.20	5.40	6.99	5.28	9.72	18.26	17.45	18.05	17.08	30.79	17.79	14.92	10.29	7.59	8.66	5.95	7.97	4.64	2.82	1.40	3.50	2.20	1.30
10	13.71	13.60	7.90	7.26	2.96	8.94	11.78	17.84	13.74	9.49	20.29	11.46	16.75	10.99	7.19	6.24	4.74	3.49	2.83	3.02	0.70	1.70	0.70	0.45
11	12.50	8.90	9.15	5.08	2.68	4.76	9.08	7.73	5.72	4.80	8.91	6.43	7.92	8.39	3.99	3.82	2.72	2.59	2.22	1.91	0.60	1.10	0.60	0.12
12	9.33	6.50	6.36	3.27	1.48	5.06	5.19	5.15	3.01	3.40	5.35	3.72	5.18	4.99	3.30	2.92	1.91	2.19	1.41	1.11	0.40	0.40	0.12	0.03
13	4.48	4.30	4.53	3.18	1.85	3.40	2.89	2.48	1.20	1.70	2.97	1.21	3.25	2.60	2.30	2.42	1.61	1.79	1.11	1.01	0.10	0.20	0.23	0.00
14	2.98	3.20	1.35	1.18	0.83	1.75	2.10	1.29	1.00	1.20	0.99	1.71	1.83	1.60	1.20	1.81	1.11	1.39	1.21	0.60	0.10	0.20	0.30	0.00
15	1.96	1.20	1.16	1.27	0.74	2.24	1.00	1.09	0.90	0.90	1.88	0.90	1.52	1.30	1.20	1.61	1.11	1.59	1.31	0.60	0.20	0.10	0.20	0.00
16	1.96	0.90	0.96	0.45	0.46	1.26	0.70	0.30	0.40	0.70	0.89	0.90	1.42	0.40	0.70	0.91	0.50	0.60	0.81	0.40	0.20	0.10	0.09	0.00
17	0.75	0.20	0.96	0.18	0.09	0.68	0.20	0.20	0.10	0.80	0.49	0.80	0.71	0.10	0.50	0.40	0.40	0.50	0.40	0.30	0.02	0.05	0.00	0.00
18	1.59	0.20	0.29	0.09	0.09	0.10	0.10	0.10	0.00	0.20	0.40	0.40	0.30	0.00	0.10	0.20	0.20	0.20	0.20	0.10	0.02	0.03	0.00	0.00
19	0.65	0.20	0.29	0.09	0.09	0.00	0.00	0.00	0.00	0.10	0.00	0.10	0.10	0.00	0.10	0.10	0.10	0.10	0.00	0.10	0.00	0.00	0.00	0.00
1+	97.01	80.00	74.01	69.99	70.99	98.00	153.00	284.99	140.98	111.01	187.00	94.97	102.02	91.01	67.02	78.03	51.99	77.00	64.98	40.98	20.66	50.71	16.51	12.26
6+	86.47	71.40	67.16	61.09	47.10	76.90	127.45	222.54	125.44	101.92	168.19	78.09	92.58	72.23	55.53	58.89	37.78	45.52	29.46	29.90	16.54	34.68	13.54	9.70
9+	63.62	49.40	38.35	29.04	16.55	37.91	51.30	53.63	44.12	40.37	72.96	45.42	53.90	40.66	28.17	29.09	20.35	22.41	16.14	11.97	3.74	7.38	4.44	1.90
12+	23.70	16.70	15.90	9.71	5.63	14.49	12.18	10.61	6.61	9.00	12.97	9.74	14.31	10.99	9.40	10.37	6.94	8.36	6.45	4.22	1.04	1.08	0.94	0.03

Table13Abundance index (millions) of A.plaice from spring surveys in Div. 3O.

Age\Year	1973	1975	1976	1977	1978	1979	1980	1981	1982	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
1	0.10	0.00	0.10	0.00	0.00	0.10	0.00	0.38	0.10	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	1.27	0.10	0.20	0.39	0.30	0.90	0.80	2.46	0.70	0.10	0.00	0.10	0.30	0.10	0.00	0.20	0.00	0.20	0.01	0.00	0.00
3	9.06	2.22	2.39	1.87	1.49	4.61	2.19	11.94	1.90	0.10	0.40	0.70	0.90	0.80	1.10	0.51	1.31	1.50	0.50	0.05	0.05
4	5.36	5.41	3.88	9.76	4.28	9.81	5.37	7.86	3.90	0.42	1.30	2.40	3.08	1.40	2.80	6.28	2.21	1.70	3.40	0.50	0.40
5	12.87	7.83	12.33	28.18	8.07	18.13	4.68	18.48	4.20	2.70	4.30	3.20	8.26	2.20	4.20	14.50	10.97	1.70	4.10	3.10	1.80
6	16.76	11.98	21.97	37.15	12.36	21.83	8.66	25.01	6.10	8.00	4.70	5.31	13.03	5.30	11.60	10.95	12.28	8.20	6.50	6.70	4.90
7	21.64	23.77	30.22	39.71	16.54	36.96	46.38	49.65	15.59	15.80	11.11	9.41	17.11	7.10	15.70	15.20	11.88	7.10	11.30	7.90	5.20
8	13.16	13.24	43.34	19.71	16.04	39.06	48.57	90.87	26.28	24.64	17.72	11.42	18.70	10.60	14.00	14.09	9.26	7.40	10.00	8.80	5.40
9	11.60	14.69	25.94	19.41	8.67	28.54	28.96	91.34	23.58	19.13	17.32	10.92	18.50	9.80	13.00	13.79	8.66	6.00	5.80	4.90	3.80
10	11.40	14.98	18.89	11.63	7.37	19.33	18.91	46.24	20.08	16.22	18.92	9.71	13.13	9.10	8.10	9.22	5.74	4.80	3.70	1.50	1.20
11	7.99	13.43	10.93	8.77	3.49	7.81	9.65	17.34	8.79	7.28	13.31	6.41	6.86	6.10	4.00	5.58	4.63	3.00	1.70	1.10	0.50
12	7.21	8.60	9.14	6.50	2.29	5.91	5.47	9.19	6.19	4.47	7.61	5.61	4.97	4.90	4.10	5.07	2.62	1.70	0.90	0.55	0.20
13	4.09	5.70	7.16	2.66	2.09	2.40	2.49	3.22	2.50	2.70	3.10	3.10	3.38	3.10	2.30	3.24	1.61	1.30	0.40	0.32	0.02
14	3.12	3.48	4.37	1.58	0.90	1.40	1.00	2.08	0.90	1.87	2.80	1.30	2.09	2.20	1.10	2.23	1.61	0.60	0.30	0.20	0.02
15	2.14	2.80	3.78	1.08	0.50	0.90	1.19	1.23	0.90	2.29	2.20	1.30	1.69	1.30	1.20	1.12	1.01	1.00	0.20	0.07	0.00
16	1.27	0.58	2.09	0.39	0.40	0.80	1.00	0.95	0.70	1.35	0.90	0.50	0.99	1.30	1.00	0.91	0.60	0.70	0.30	0.05	0.00
17	1.07	0.19	1.59	0.10	0.00	0.30	0.40	0.66	0.40	0.73	0.20	0.40	0.50	0.30	0.60	0.71	0.30	0.10	0.10	0.00	0.00
18	0.68	0.00	0.30	0.10	0.10	0.10	0.20	0.09	0.20	0.21	0.10	0.10	0.30	0.30	0.20	0.30	0.20	0.30	0.06	0.00	0.00
19	0.19	0.00	0.40	0.00	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.10	0.10	0.10	0.00	0.10	0.10	0.06	0.01	0.00	0.00
1+	130.98	129.00	199.02	188.99	84.99	198.99	186.02	378.99	123.01	108.01	105.99	71.99	113.99	66.00	85.00	104.00	74.99	47.36	49.28	35.74	23.49
6+	102.32	113.44	180.12	148.79	70.85	165.44	172.98	337.87	112.21	104.69	99.99	65.59	101.35	61.50	76.90	82.51	60.50	42.26	41.27	32.09	21.24
9+	50.76	64.45	84.59	52.22	25.91	67.59	69.37	172.34	64.24	56.25	66.46	39.45	52.51	38.50	35.60	42.27	27.08	19.56	13.47	8.69	5.74
12+	19.77	21.35	28.83	12.41	6.38	11.91	11.85	17.42	11.79	13.62	16.91	12.41	14.02	13.50	10.50	13.68	8.05	5.76	2.27	1.19	0.24

Table14Abundance index (millions) of A.plaice from spring surveys in Div. 3LNO.

Age\Year	1973	1975	1976	1977	1978	1979	1980	1981	1982	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
1	0.10	0.00	0.20	0.00	0.10	0.40	0.20	0.68	0.40	0.00	0.10	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	1.36	1.60	0.87	0.79	1.19	1.70	2.19	3.85	1.40	0.21	0.10	0.30	1.50	0.50	0.40	0.30	0.12	0.30	0.09	0.00	0.00
3	10.49	9.43	12.91	5.87	17.36	6.71	6.98	20.97	6.31	1.12	2.70	1.60	5.42	4.22	4.79	2.32	1.71	1.80	1.20	0.14	0.14
4	14.57	18.78	23.59	29.84	34.04	25.53	14.75	19.77	20.13	3.40	11.19	6.80	13.03	11.65	26.05	19.57	4.84	3.40	11.20	1.20	0.83
5	57.67	25.96	39.41	77.06	112.00	71.17	50.65	39.46	22.33	9.99	22.09	17.49	28.52	27.46	26.42	48.32	27.12	7.00	14.20	7.60	4.80
6	71.88	46.57	50.47	136.61	144.25	111.41	99.01	82.72	44.13	35.86	45.49	55.49	74.18	69.38	68.52	35.60	39.74	19.30	22.90	13.10	9.20
7	95.05	87.05	94.28	196.39	197.83	171.78	173.45	156.98	80.93	94.34	103.90	120.10	147.07	121.72	98.67	60.14	30.47	23.90	28.00	17.40	11.60
8	59.72	114.25	174.51	249.01	224.93	240.32	271.24	311.17	162.65	135.54	125.70	113.20	152.15	121.62	105.80	63.22	30.89	18.10	23.70	15.80	13.20
9	47.21	119.22	172.69	188.81	163.71	186.35	218.82	295.18	228.15	141.76	94.11	93.00	92.16	106.50	84.50	59.33	29.37	14.80	11.20	9.50	9.30
10	59.59	104.90	172.08	179.14	130.87	156.82	141.46	173.23	184.42	93.33	71.91	52.80	55.23	46.46	37.62	40.65	18.47	9.20	6.50	2.99	3.55
11	51.70	60.60	107.74	85.87	47.53	76.15	64.60	83.93	105.71	42.85	44.60	25.10	22.81	26.63	19.96	17.80	12.21	5.10	3.30	2.11	1.22
12	43.35	42.65	68.21	57.50	32.74	35.93	40.97	37.65	49.71	26.93	24.20	18.80	18.41	17.72	14.03	11.68	7.36	2.90	1.50	0.75	0.33
13	24.86	23.31	36.23	24.56	15.78	13.51	20.74	16.75	25.20	12.42	12.40	11.80	10.81	10.22	8.42	7.65	4.03	1.70	0.70	0.63	0.05
14	15.75	13.15	13.45	10.87	9.43	7.71	8.48	6.76	13.01	7.60	7.70	4.90	6.00	6.51	5.11	4.74	3.02	0.90	0.53	0.53	0.02
15	7.55	7.48	11.62	7.48	4.56	5.11	5.78	6.00	5.10	5.40	5.30	3.90	4.40	4.21	4.60	3.33	2.12	1.30	0.30	0.27	0.00
16	4.75	4.41	6.01	4.19	2.18	2.80	4.59	3.83	4.10	3.57	2.60	2.10	2.30	2.60	2.20	2.32	1.31	0.90	0.41	0.14	0.00
17	2.56	1.15	4.17	1.70	0.99	1.10	1.99	2.25	2.50	1.79	0.60	1.10	1.00	0.90	1.30	1.41	0.71	0.10	0.17	0.00	0.00
18	2.36	0.38	0.97	1.10	0.40	0.30	0.80	0.69	0.70	0.69	0.20	0.30	0.60	0.50	0.50	0.51	0.32	0.30	0.09	0.00	0.00
19	0.48	0.09	0.59	0.20	0.10	0.20	0.30	0.10	0.10	0.19	0.10	0.20	0.20	0.20	0.10	0.10	0.20	0.10	0.01	0.00	0.00
1+	571.00	680.98	990.00	1256.99	1139.99	1115.00	1127.00	1261.97	956.98	616.99	574.99	528.98	635.99	579.00	508.99	378.99	214.01	111.10	126.00	72.16	54.24
6+	486.81	625.21	913.02	1143.43	975.30	1009.49	1052.23	1177.24	906.41	602.27	538.81	502.79	587.32	535.17	451.33	308.48	180.22	98.60	99.31	63.22	48.47
9+	260.16	377.34	593.76	561.42	408.29	485.98	508.53	626.37	618.70	336.53	263.72	214.00	213.92	222.45	178.34	149.52	79.12	37.30	24.71	16.92	14.47
12+	101.66	92.62	141.25	107.60	66.18	66.66	83.65	74.03	100.42	58.59	53.10	43.10	43.72	42.86	36.26	31.74	19.07	8.20	3.71	2.32	0.40

Table 15. 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 16 Abundance index (millions) of A.plaice from fall surveys in Div. 3L.

Age\Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
1	0.90	0.10	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	1.09	1.78	0.20	0.00	0.00	0.80	1.40	0.30	0.00	0.10	0.10	0.04	0.20	0.00
3	8.26	5.65	2.59	0.10	0.30	1.90	2.00	3.10	1.40	1.40	0.80	0.70	1.90	0.00
4	12.44	19.63	9.76	2.90	1.60	10.50	5.09	8.10	13.19	18.12	5.38	3.00	5.60	0.90
5	22.18	35.70	52.88	18.72	14.29	33.30	24.27	30.41	23.09	47.05	23.63	12.30	11.30	2.00
6	44.97	80.23	120.90	65.98	69.18	92.60	65.92	81.12	54.58	67.78	37.19	29.30	18.00	4.00
7	176.19	142.70	218.30	181.52	170.34	92.90	100.77	110.12	64.37	78.09	30.21	21.40	16.10	7.10
8	163.65	189.90	185.74	207.45	134.15	91.80	87.79	108.72	55.18	57.36	26.92	12.50	5.60	5.80
9	139.38	110.87	89.73	122.55	93.87	53.60	62.32	66.11	23.99	46.85	20.24	5.30	2.60	3.10
10	136.39	61.09	49.80	81.20	37.29	22.60	20.17	25.81	9.30	19.72	9.67	2.90	0.89	0.69
11	58.30	30.94	20.91	32.04	16.19	9.00	10.99	10.10	5.30	9.51	4.49	1.10	0.32	0.20
12	42.18	13.59	15.24	18.82	11.20	4.80	5.59	6.00	1.90	4.81	2.79	0.90	0.08	0.03
13	16.12	4.86	8.96	9.11	5.90	2.40	3.00	3.10	1.70	3.00	1.10	0.30	0.03	0.01
14	4.48	1.88	1.39	4.31	1.90	1.10	1.40	1.60	0.60	2.10	0.80	0.10	0.02	0.04
15	1.19	1.98	1.59	2.80	1.20	0.40	0.90	1.00	0.20	0.80	0.50	0.10	0.08	0.00
16	0.30	0.79	0.80	1.20	0.50	0.10	0.20	0.30	0.20	0.30	0.10	0.02	0.00	0.00
17	0.00	0.30	0.20	0.30	0.10	0.10	0.20	0.10	0.00	0.00	0.10	0.00	0.00	0.00
1+	828.02	701.99	778.99	749.00	558.01	418.00	392.01	455.99	255.00	356.99	164.02	89.96	62.72	23.87
6+	783.15	639.13	713.56	727.28	541.82	371.40	359.25	414.08	217.32	290.32	134.11	73.92	43.72	20.97
9+	398.34	226.30	188.62	272.33	168.15	94.10	104.77	114.12	43.19	87.09	39.79	10.72	4.02	4.07
12+	64.27	23.40	28.18	36.54	20.80	8.90	11.29	12.10	4.60	11.01	5.39	1.42	0.21	0.08

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

Age\Year	1990	1991	1992	1993	1994
1	0.20	0.10	0.30	0.00	0.00
2	2.20	0.10	0.30	0.30	0.00
3	7.50	4.60	4.30	6.70	1.00
4	18.40	10.50	9.80	25.90	5.90
5	17.00	17.10	9.00	14.00	14.30
6	5.20	25.40	11.50	9.70	10.10
7	3.40	13.70	21.10	15.40	9.60
8	1.90	6.90	14.20	7.40	6.00
9	3.50	5.10	5.50	3.70	4.00
10	1.80	5.50	4.00	1.80	1.10
11	1.30	4.00	1.90	0.80	0.45
12	0.90	3.30	1.20	0.66	0.50
13	0.90	1.80	0.90	0.40	0.20
14	0.80	2.30	0.80	0.40	0.40
15	0.80	1.40	0.70	0.20	0.20
16	0.90	0.80	0.20	0.10	0.00
17	0.30	0.60	0.30	0.03	0.00
1+	67.00	103.20	86.00	87.49	53.75
6+	21.70	70.80	62.30	40.59	32.55
9+	11.20	24.80	15.50	8.09	6.85
12+	4.60	10.20	4.10	1.79	1.30

Table 20 Abundance index (millions) of A.plaice from fall surveys in Div. 3O.

Age\Year	1990	1991	1992	1993	1994
1	0.40	0.00	0.00	0.00	0.00
2	0.50	0.70	0.00	0.50	0.00
3	1.40	3.20	2.40	3.70	0.14
4	6.30	4.40	5.00	12.90	1.50
5	8.80	13.90	6.00	11.30	6.30
6	12.10	17.60	15.00	12.40	9.30
7	16.30	17.60	15.10	18.10	10.60
8	16.60	10.80	11.30	14.00	11.50
9	11.40	13.40	7.80	6.00	5.30
10	8.20	9.70	4.60	3.20	2.10
11	5.00	6.40	2.40	1.40	0.86
12	3.70	3.00	1.90	1.50	0.40
13	2.80	3.20	0.80	0.84	0.30
14	2.10	1.60	0.90	0.70	0.20
15	1.30	1.20	0.40	0.30	0.06
16	1.30	0.60	0.40	0.40	0.00
17	0.60	0.20	0.10	0.10	0.00
1+	98.80	107.50	74.10	87.34	48.56
6+	81.40	85.30	60.70	58.94	40.62
9+	36.40	39.30	19.30	14.44	9.22
12+	11.80	9.80	4.50	3.84	0.96

Table 21 Abundance index (millions) of A.plaice from fall surveys in Div. 3LNO.

Age\Year	1990	1991	1992	1993	1994
1	0.60	0.10	0.30	0.00	0.00
2	2.80	0.90	0.34	1.00	0.00
3	10.30	8.60	7.40	12.30	1.14
4	42.82	20.28	17.80	44.40	8.30
5	72.85	54.63	27.30	36.60	22.60
6	85.08	80.19	55.80	40.10	23.40
7	97.79	61.51	57.60	49.60	27.30
8	75.86	44.62	38.00	27.00	23.30
9	61.75	38.74	18.60	12.30	12.40
10	29.72	24.87	11.50	5.89	3.89
11	15.81	14.89	5.40	2.52	1.51
12	9.41	9.09	4.00	2.24	0.93
13	6.70	6.10	2.00	1.27	0.51
14	5.00	4.70	1.80	1.12	0.64
15	2.90	3.10	1.20	0.58	0.26
16	2.50	1.50	0.62	0.50	0.00
17	0.90	0.90	0.40	0.13	0.00
1+	522.79	374.72	250.06	237.55	126.18
6+	393.42	290.21	196.92	143.25	94.14
9+	134.69	103.89	45.52	26.55	20.14
12+	27.41	25.39	10.02	5.84	2.34

Tab 22 Biomass estimates ('000t) of A.plaice, by stratum and depth zone, from Canadian fall survey in 3L in 1995/96 using campelen net. (+) indicates biomass <50 t (-) indicates stratum not surveyed.

Depth	Stratum	Biomass
31-50	350	0.8
	363	3.1
	371	1.2
	372	1.4
	384	1.6
	Total	8.1
51-100	328	3
	341	1.6
	342	0.6
	343	0.7
	348	3.1
	349	3.4
	364	2.8
	365	1.7
	370	2
	385	3.9
	390	1.7
	Total	24.5
101-150	344	1
	347	1.8
	366	1.6
	369	1
	386	1.8
	389	0.6
	391	0.4
	Total	8.2
151-200	345	4.1
	346	2.8
	368	0.2
	387	0.4
	388	0.3
	392	+
	Total	7.8
201-300	729	+
	731	0.2
	733	0.2
	735	0.7
	Total	1.1
301-400	730	+
	732	+
	734	0
	736	0.2
	Total	0.2
401-500	737	0.4
	738	0.6
	741	-
	745	-
	748	-
	Total	1
Grand Total		50.9

Table23 Biomass estimates ('000t) of A.plaice, by stratum and depth zone, from Canadian surveys in 3N in 1995/96 using Campelen net. (+) indicates biomass <50 t (-) indicates stratum not surveyed.

		Biomass	
Depth	Stratum	Fall 1995	Spring 1996
≤ 30	375	1.9	2.9
	376	4.7	0.8
	Total	6.6	3.7
31-50	360	22.3	8.8
	361	3.5	3.7
	362	5	2.8
	373	1.8	1.6
	374	2.4	1.1
	384	0.3	-
	Total	35.3	18
51-100	359	2.2	1
	377	0.5	0.2
	382	0.3	0.1
	Total	3	1.3
101-150	358	0.8	0.1
	378	0.1	0.1
	381	0.1	0.3
	Total	1	0.5
151-200	357	0.1	0.1
	379	+	+
	380	0.1	0.2
	Total	0.2	0.3
201-300	723	+	0.2
	725	0.1	0.1
	727	+	0.6
	Total	0.1	0.9
301-400	724	0.1	0.2
	726	+	+
	728	+	0.6
	Total	0.1	0.8
Grand Total		46.3	25.5

Table 24 Biomass estimates ('000t) of A.plaice, by stratum and depth zone, from Canadian surveys in 3O in 1995/96 using Campelen net. (+) indicates biomass <50 t (-) indicates stratum not surveyed.

		Biomass	
Depth	Stratum	Fall 1995	Spring 1996
31-50	330	7.7	3.8
	331	1.2	1.4
	338	6.6	6
	340	7.2	2.1
	351	1.7	2.9
	352	4.6	9.1
	353	5.6	7.8
	Total	34.6	33.1
51-100	329	3.2	1.5
	332	3.5	3.6
	337	2.4	4.6
	339	6.5	1.3
	354	4.5	1.6
	Total	20.1	12.6
101-150	333	+	+
	336	+	0.2
	355	0.2	0.6
	Total	0.2	0.8
151-200	334	0	0.2
	335	+	0.2
	356	0	0.1
	Total	+	0.5
201-300	717	0	0.2
	719	+	+
	721	+	0.2
	Total	+	0.4
301-400	718	0	+
	720	0	+
	722	0	1.1
	Total	0	1.1
Grand Total		54.9	48.5

Table 25 Division 3L abundance at age (Nos. X 10-6) of plaice in the 1989-94 fall juvenile surveys using the Yankee 41 shrimp trawl.

Age	1989	1990	1991	1992a	1993a b	1994a
1	4.1	2.2	4.1	1.8	1.2	1.3
2	84	28.6	63.2	157.5	85.6	27.3
3	456.9	171.4	177.5	381.2	461.2	227.3
4	486.7	476.3	405.4	450.6	517.3	437.6
5	199.7	474.9	751	640.4	523.1	676.2
6	223.5	198.1	450.3	369.7	418.7	526.8
7	220.2	194.3	216.5	210.8	108.5	435.6
8	238.9	180.8	103	103.3	44.9	207.6
9	196.2	142.1	50.9	57.9	27.4	77.7
10	70.1	77.8	42.6	21.6	6.9	14.8
11	30.2	41.9	10.9	7.1	3.3	3.1
12	13.8	19.1	6	5.3	1.6	0.5
13	4.1	5.7	4.7	2.6	0.9	0
14	1.4	1.4	2	1	0	0
15	0.5	0.6	1.8	1	0	0
16	0	0	0.3	0.8	0	0
17	0	0	0	0.5	0	0
Unknown	0.1	0.2	0	0	0	0
Total						
1+	2230.4	2015.4	2290.2	2413.1	2200.6	2635.8
5+	1198.7	1336.9	1640.0	1422.0	1135.3	1942.3
7+	775.5	663.9	438.7	411.9	193.5	739.3
1 to 5	1231.4	1153.4	1401.2	1631.5	1588.4	1369.7

a Estimates include catches in 7 new deepwater strata.
b Estimates corrected for incorrect catch ratio

Table 26 Division 3N abundance at age (Nos. X 10-6) of plaice in the 1989-94 fall juvenile surveys using the Yankee 41 shrimp trawl.

Age	1989	1990	1991	1992	1993a	1994
1	52.5	35.2	42.5	4	0.2	21.0
2	254.1	78.5	215.2	55.3	7.5	49.9
3	405.6	129.5	172.1	93.5	78.5	81.3
4	332.5	192	104.4	74.9	219.3	204.5
5	94.5	143.8	124.2	60.2	256.8	264.4
6	35.4	39	61.9	43.9	102.3	91.0
7	13.4	20	13.3	24.4	50.4	56.7
8	9.7	13.9	4.1	12.3	17.8	41.4
9	5.8	14	5.5	5.6	12.9	17.0
10	6.7	12	4.2	4.5	4.7	7.2
11	5.6	9.9	4.1	2.5	3.0	2.0
12	2.9	7.3	2.7	1.6	2.4	0.7
13	2.1	5	1.7	1.6	1.0	0.5
14	0.8	3.9	0.9	1.3	0.5	0.3
15	0.2	1.5	2	1.3	0.8	0
16	0	0.6	1.3	0.4	0.4	0
17	0	0.2	0.4	0.3	0	0
18			0.2	0.2	0	0
19	0	0	0	0.1	0	0
Unknown	0.1	0	0	0	0	0
Total						
1+	1221.9	706.3	760.7	387.9	758.5	837.9
5+	177.2	271.1	226.5	160.2	453	481.2
7+	47.3	88.3	40.4	56.1	93.9	125.8
1 to 5	1139.2	579.0	658.4	287.9	562.3	621.1

a Estimates corrected for incorrect catch ratio

Table 27 Division 3O abundance at age (Nos. X 10-6) of plaice in the 1989-94 fall juvenile surveys using the Yankee 41 shrimp trawl.

Age	1989	1990	1991	1992	1993	1994
1	83.7	41.2	2.8	8	0	44.5
2	110.5	138.3	163	228.6	13.2	38.6
3	200.7	80.5	140.3	320.7	184.1	103.1
4	141.3	159.9	91.3	254.1	325.2	214.0
5	72.7	107.8	151.2	137.8	250.6	258.0
6	57.2	44.5	83.2	124.8	160.6	206.0
7	57.7	32.5	32.5	58.5	96	109.4
8	36.5	24	36.2	25.8	45.7	42.3
9	34.2	17.1	11.4	15.5	17.9	20.3
10	22.3	15.7	11.6	8.7	8.2	8.1
11	18.8	12.8	6.6	4.9	5.2	3.0
12	10	9.4	3.7	3.8	2.7	1.6
13	3.9	5.5	3.1	2.3	2	0.3
14	3.3	2.6	1.6	2.1	1.5	0.1
15	1.8	1.1	2.2	0.7	1	0
16	0.7	0.5	1.7	1	0.3	0
17	0.2	0	1.4	0.9	0	0
18	0	0	0.2	0.5	0	0
19	0	0	0.3	0	0	0
Unknown	0	0	0	0	0	0
Total						
1+	855.5	693.4	744.3	1198.7	1114.2	1049.3
5+	319.3	273.5	346.9	387.3	591.7	649.1
7+	189.4	121.2	112.5	124.7	180.5	185.1
1 to 5	608.9	527.7	548.6	949.2	773.1	658.2

Table 28 Abundance at age (Nos. X 10-6) of plaice in Stratum 360 from the 1989-94 fall juvenile surveys using the Yankee 41 shrimp trawl.

Age	1986	1987	1988	1989	1990	1991	1992	1993a	1994
1	165.4	95.2	10.1	48.9	29.1	20.9	1.7	0	12.2
2	144.9	144.1	100.5	212.8	58.5	140.5	25.6	1.4	31.7
3	127.1	58.1	172.3	327.7	93.2	120	42.6	35.0	49.2
4	53.4	21.8	73.9	275.9	137.1	72.3	41.6	155.0	129.3
5	19.9	4.7	26.6	77.3	97.4	84.1	30.9	192.0	179.6
6	25.2	3.5	8.3	24.6	23.6	39.6	18.2	61.1	58.1
7	11.6	1.5	4.8	5.2	7.9	6.3	8.2	19.6	26.3
8	4.7	0.7	3.5	2.3	3.5	1.1	3.6	6.0	11.5
9	1.8	0.4	1.3	0.9	1.4	0.9	1.3	3.7	4.4
10	1.1	0.2	0.6	0.8	0.7	0.4	0.6	1.2	0.8
11	0.7	0.2	0.6	0.6	0.4	0.4	0.4	0.6	0.1
12	0.6	0.2	0.4	0.5	0.2	0.2	0.2	0.6	0
13	0.5	0.2	0.4	0.4	0.2	0.2	0.2	0.2	0
14	0.3	0.2	0.2	0.2	0.2	0	0	0.1	0
15	0.2	0	0	0	0	0.2	0.1	0.1	0
16	0	0	0	0	0	0.2	0	0	0
17	0	0	0	0	0	0	0	0	0
Uknown	0	0	0	0	0	0	0	0	0
Total									
1+	557.4	331	403.5	978.1	453.4	487.3	175.2	476.6	503.2
5+	66.6	11.8	46.7	112.8	135.5	133.6	63.7	285.2	280.8
7+	21.5	3.6	11.8	10.9	14.5	9.9	14.6	32.1	43.1
1 to 5	510.7	323.9	383.4	942.6	415.3	437.8	142.4	383.4	402

a Estimates corrected for incorrect catch ratio

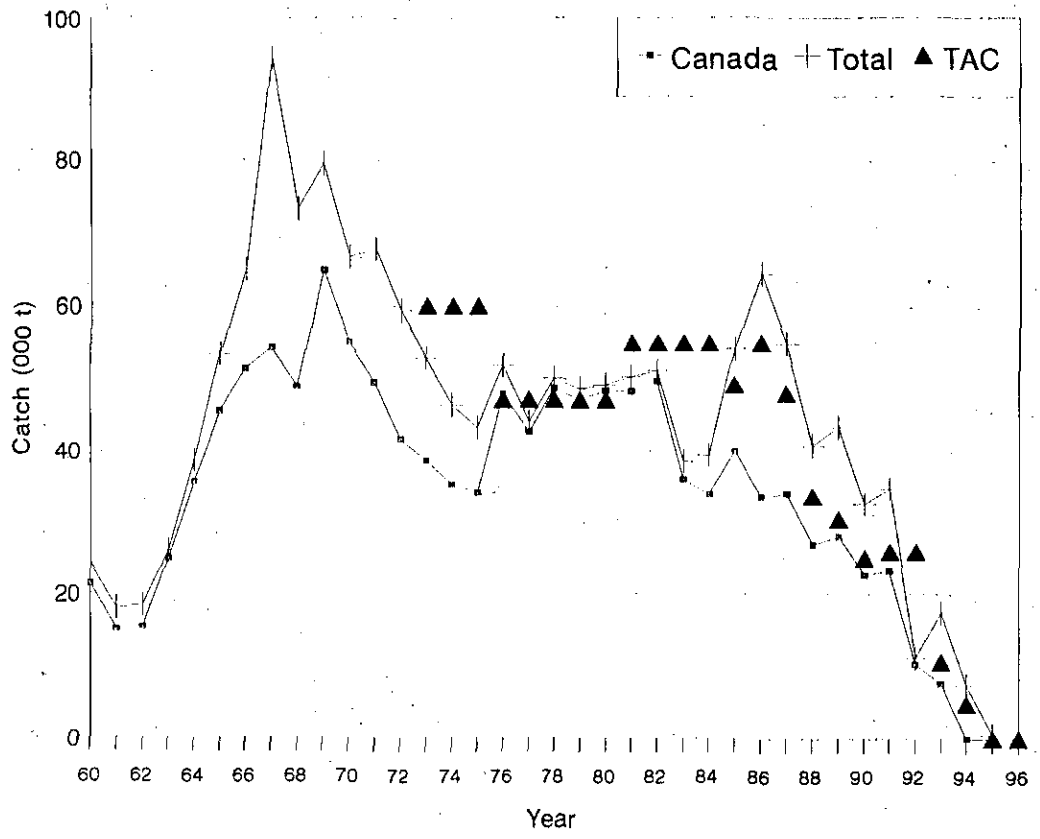

Fig. 1. Catches and TAC's of American plaice in Div. 3LNO.

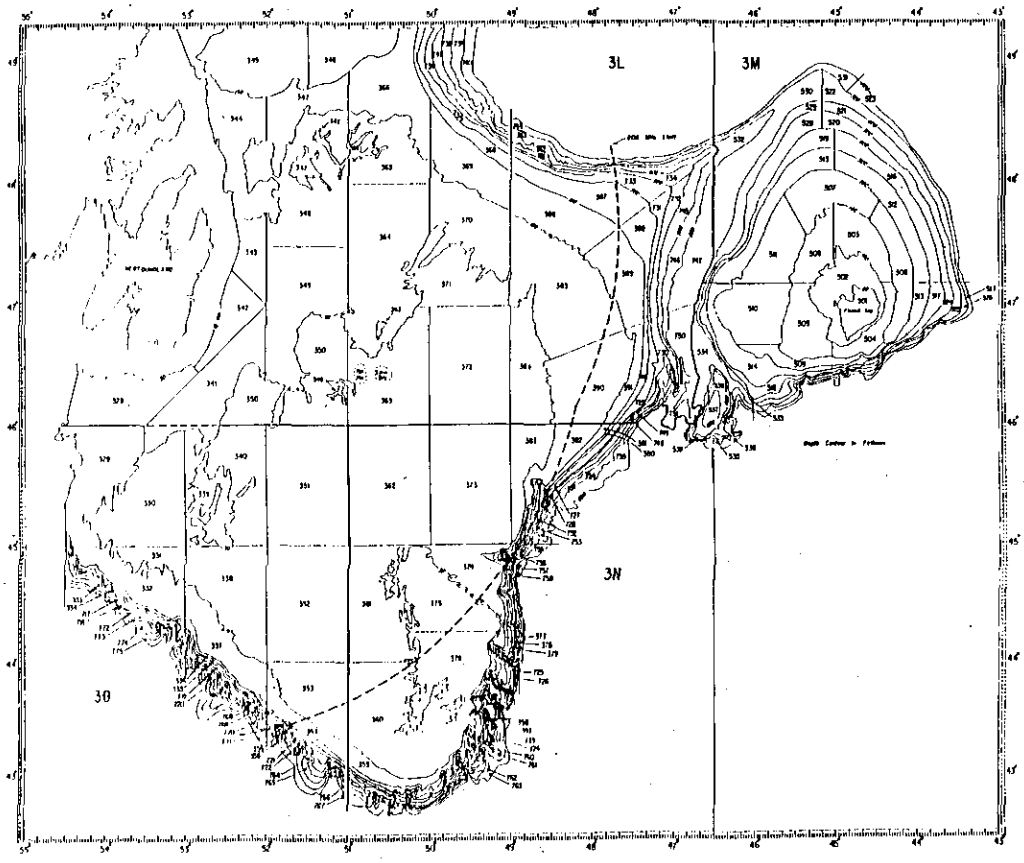

Figure 2. NAFO Div. 3LMNO, showing the Canadian 200 mile limit as well as the stratification scheme used in Canadian groundfish surveys.

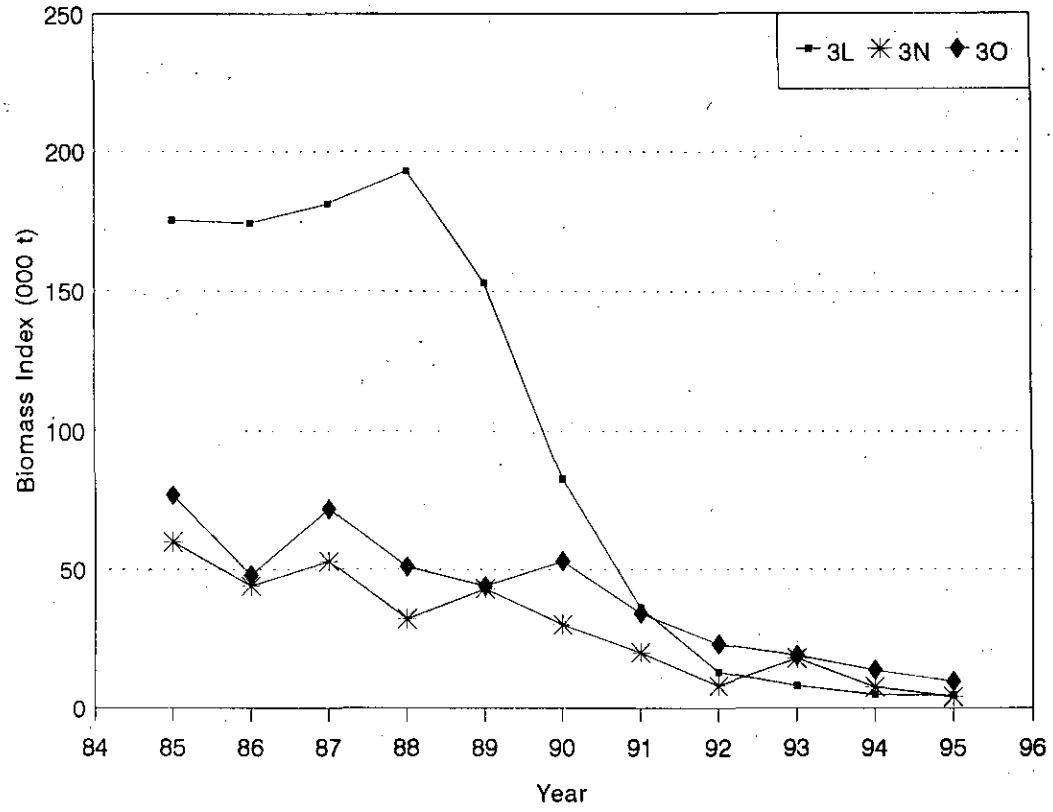

Fig. 3 Biomass indices of A.plaice from spring surveys in Divisions 3L, 3N, 3O.

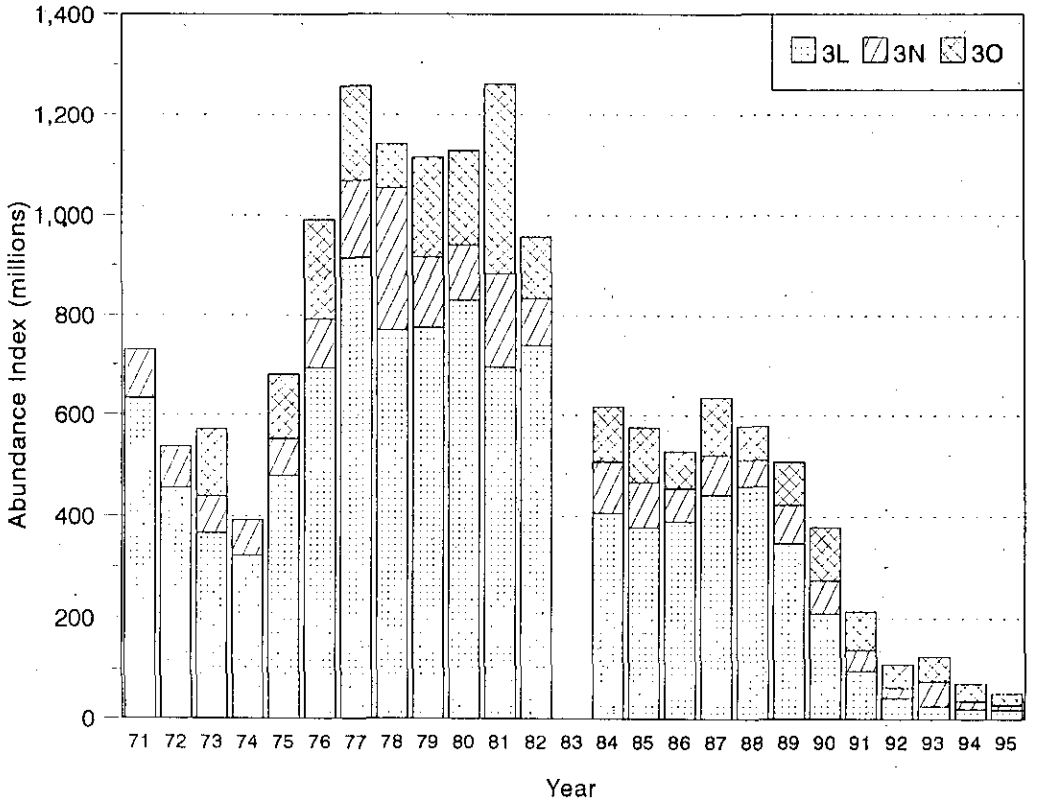

Fig. 4 . Abundance of A.plaice from spring RV surveys conducted by Canada in Div. 3LNO.

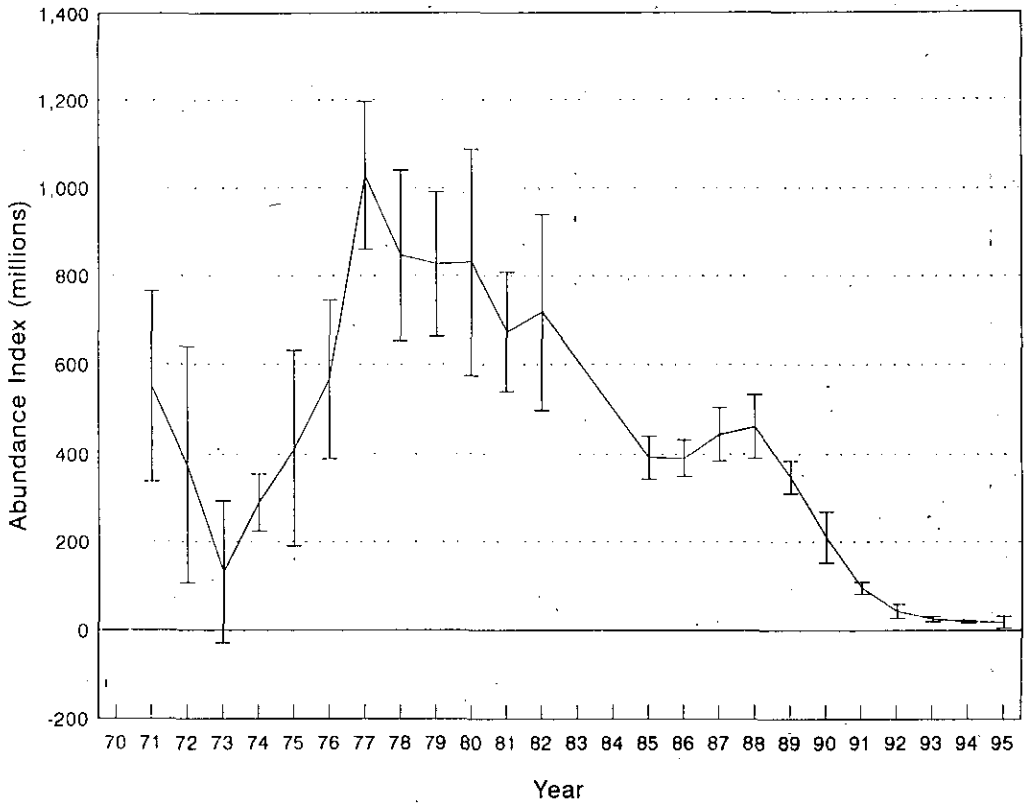

Fig. 5 . Abundance estimates of A.plaice (with approx. 95% C.I.) from Canadian spring surveys in Div.3L.

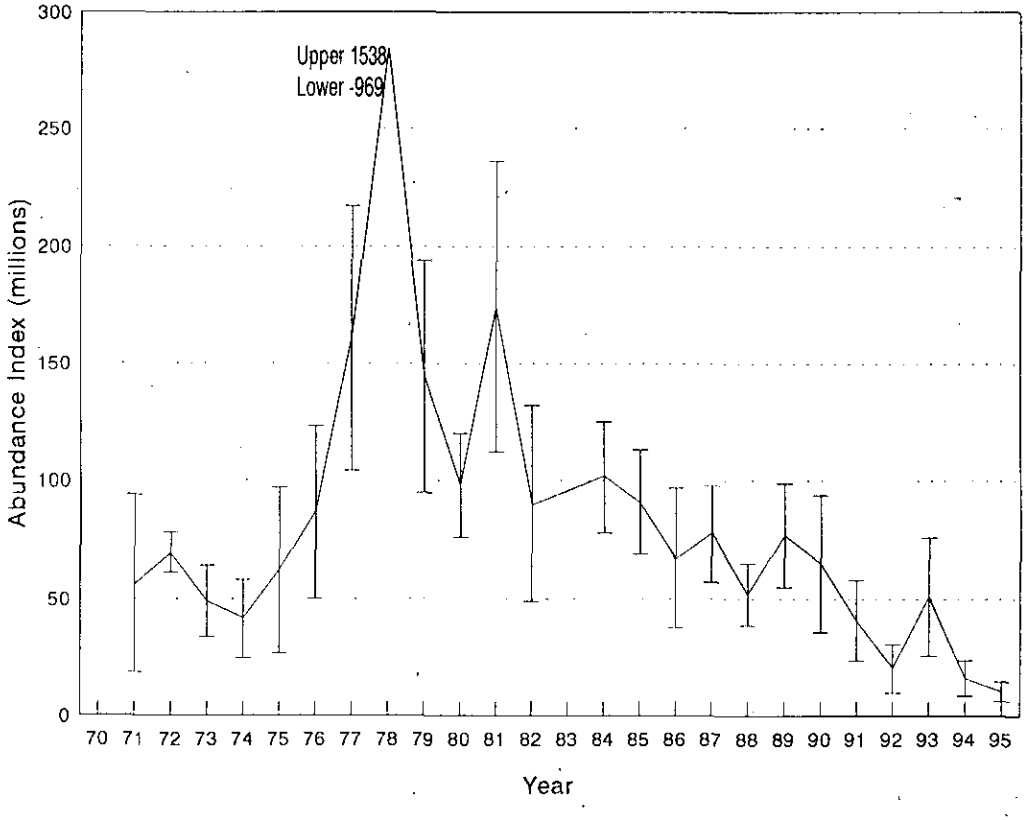

Fig. 6 . Abundance estimates of A.plaice (with approx. 95% C.I.) from Canadian spring surveys in Div.3N.

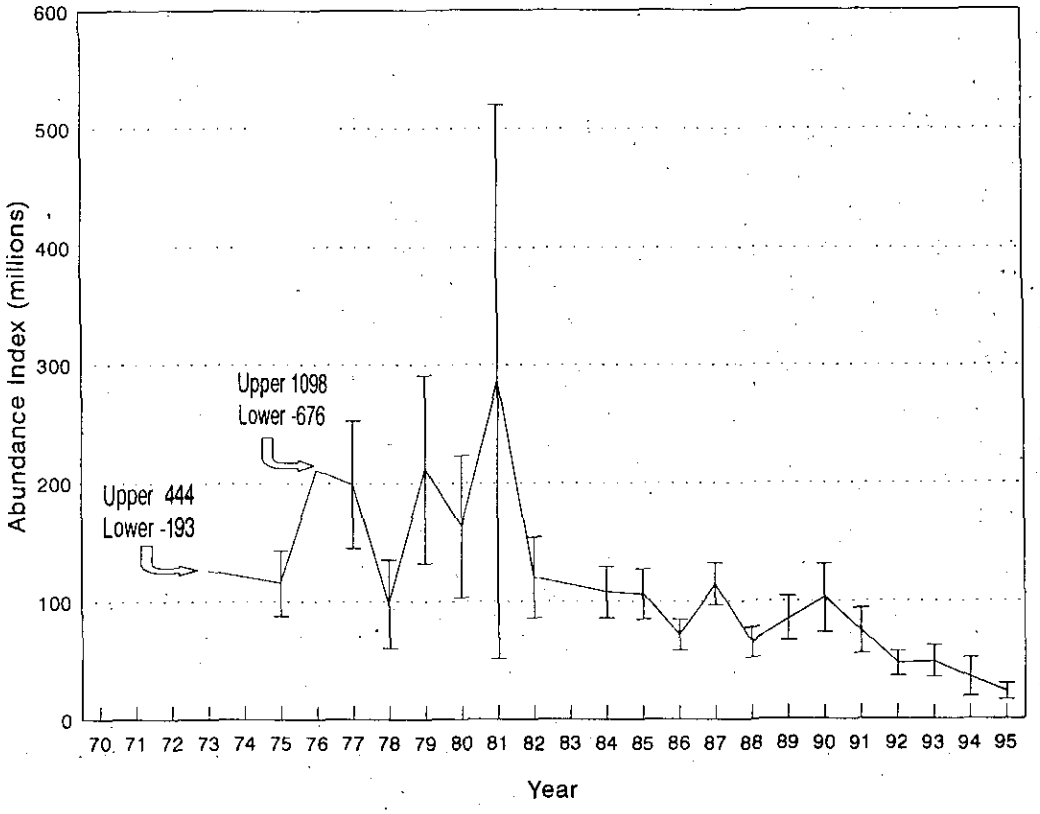

Fig. 7 . Abundance estimates of A.plaice (with approx. 95% C.I.) from Canadian spring surveys in Div.3O.

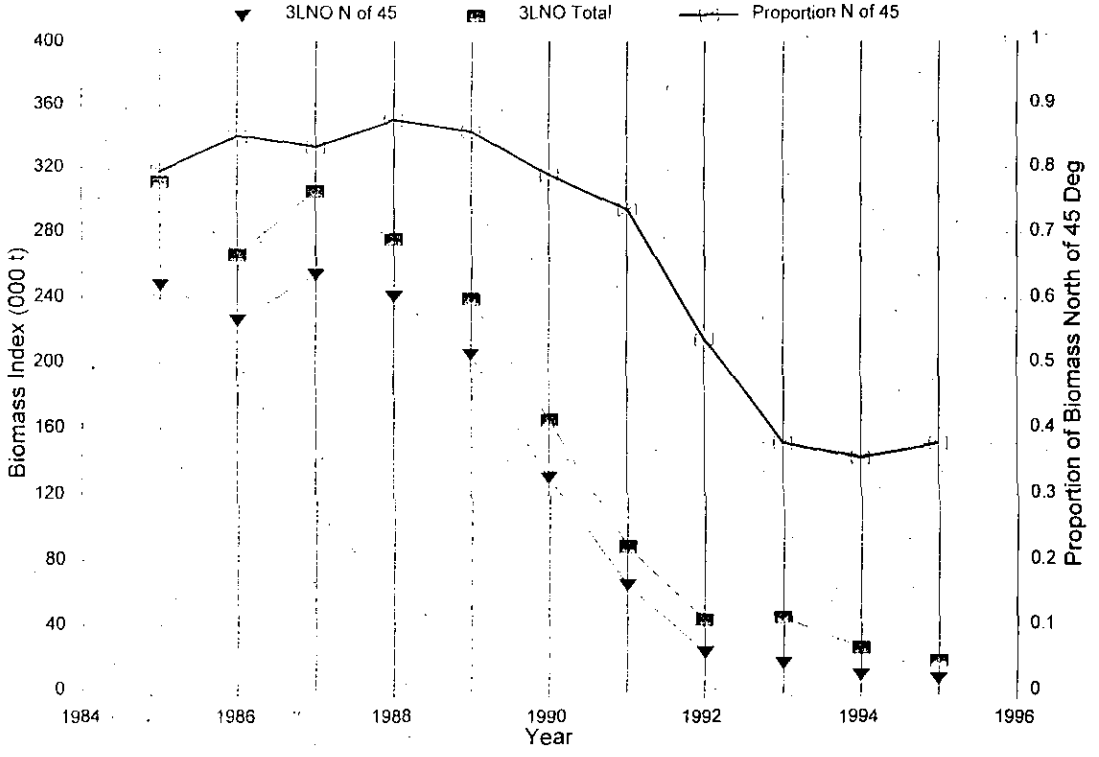

Figure 8. Total biomass index in 3LNO, as well as the biomass north of 45°N and the proportion of the total biomass north of 45°N in Canadian spring rv surveys.

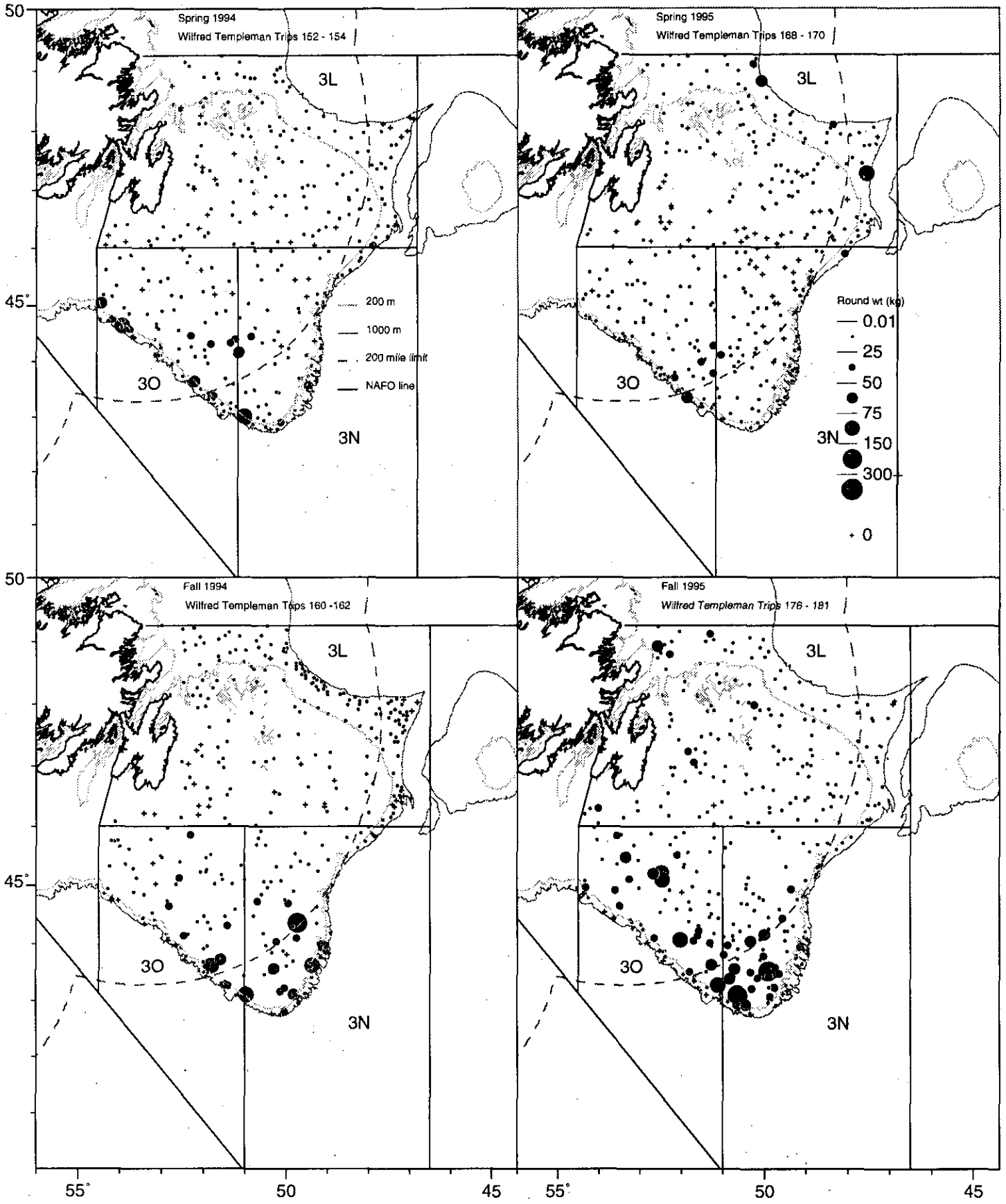

Fig. 9 American Plaice distributions on the Grand Banks from 1994 and 1995 Spring and Fall Canadian Research Vessel Surveys

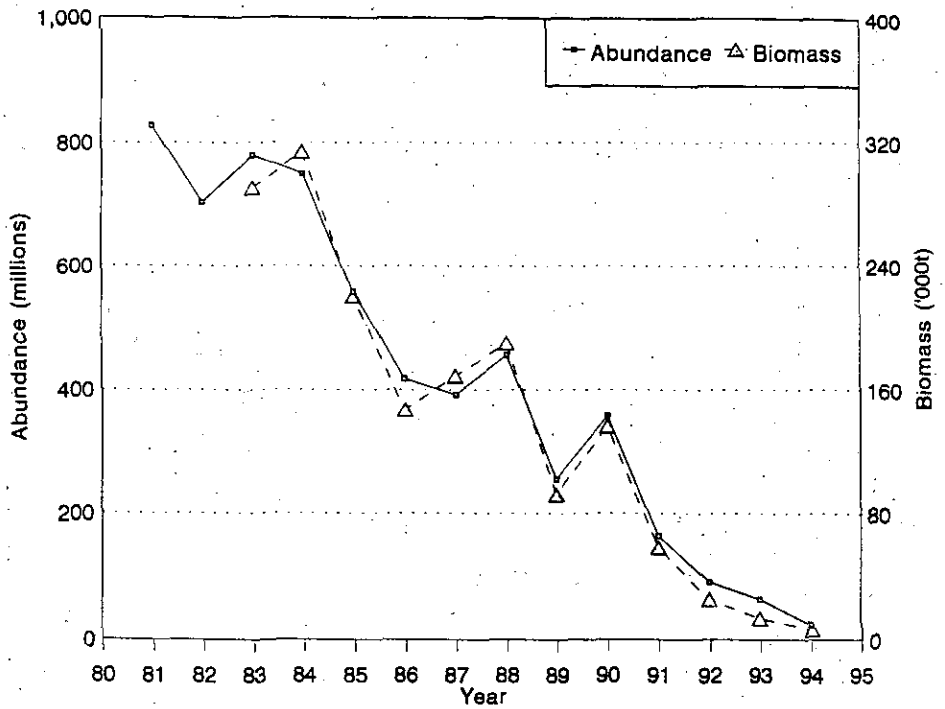

Fig 10 Abundance and biomass estimates of A.plaice from fall RV surveys in Div. 3L.

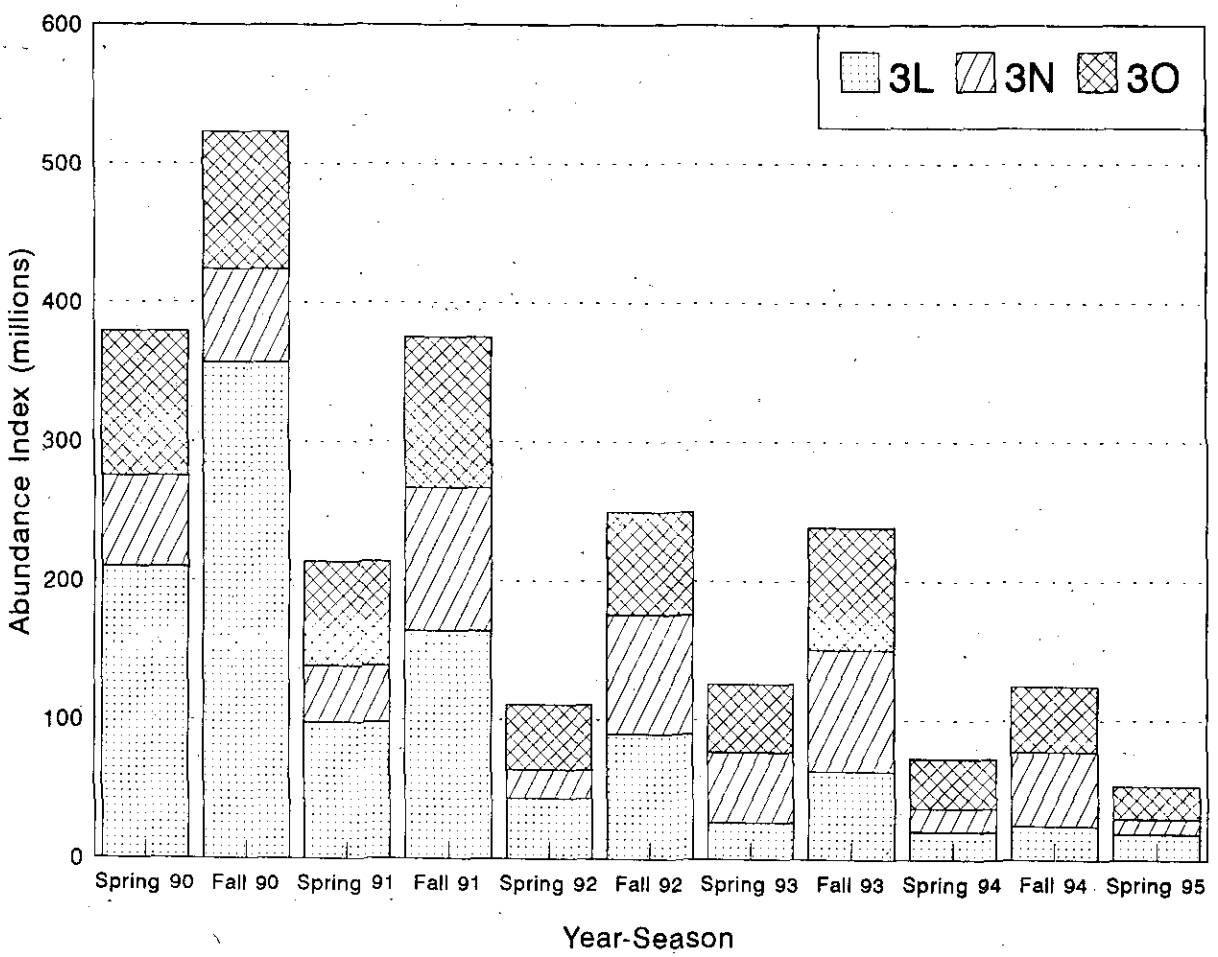

Fig. 11. Abundance of A. plaice from surveys conducted during spring and fall in Div. 3L, 3N, and 3O from 1990-1995.

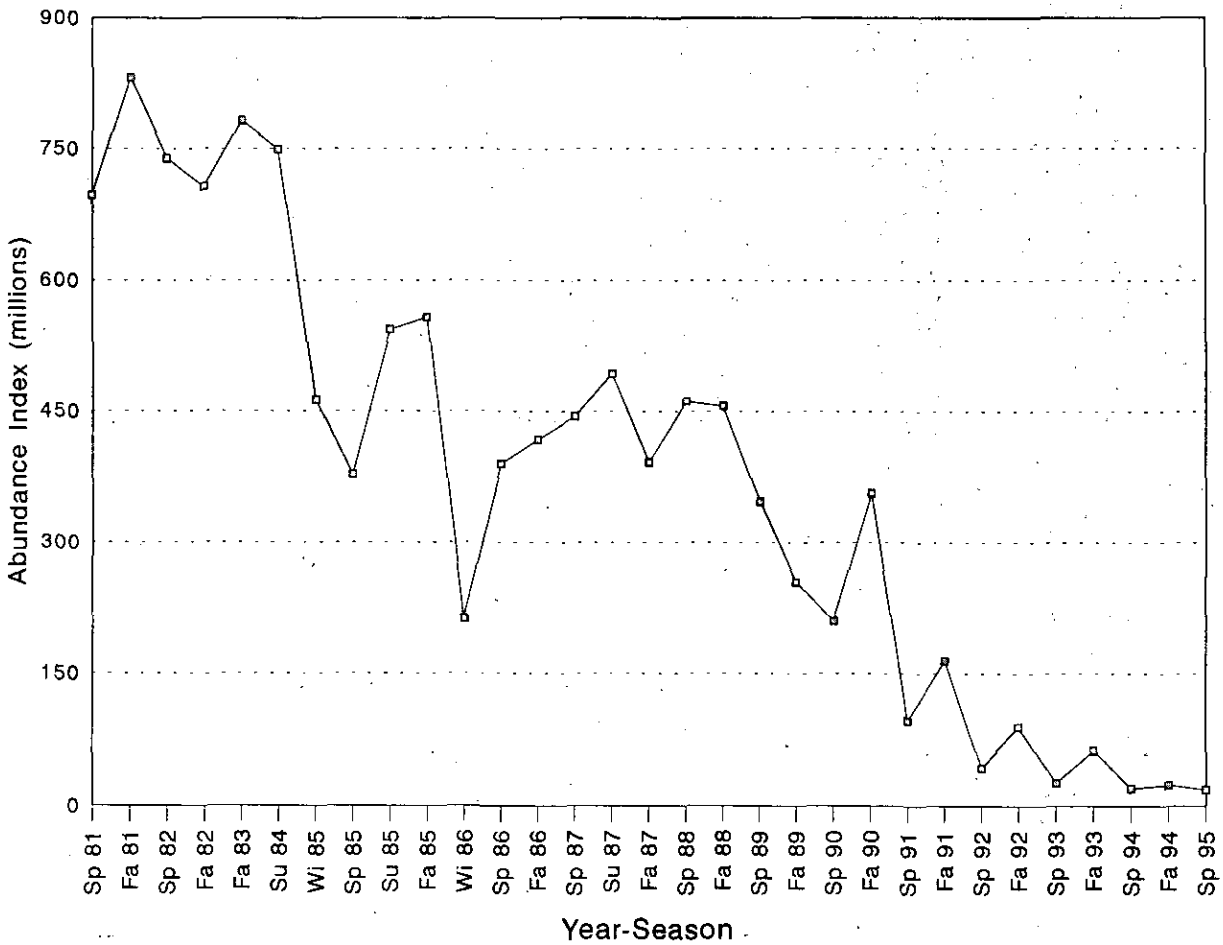

Fig.12 . Abundance of A. plaice from surveys conducted at various times in Div. 3L.

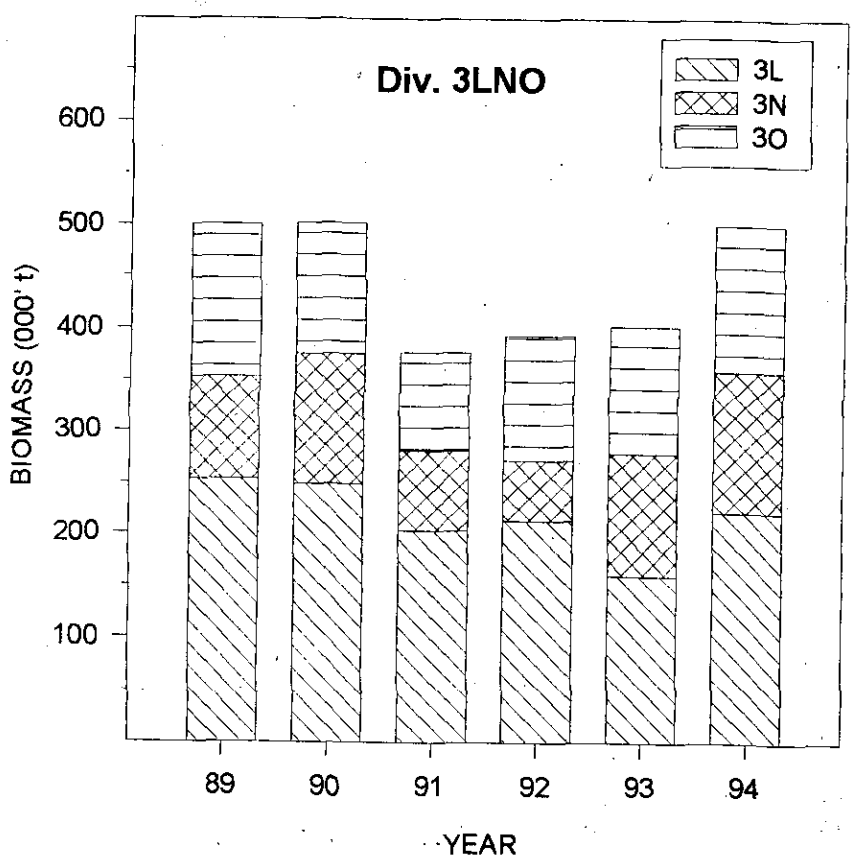

Figure13 Plaice Biomass index for NAFO Div 3L, 3N and 3O from the Canadian juvenile groundfish surveys of Div. 3LNO 1989 to 1994.

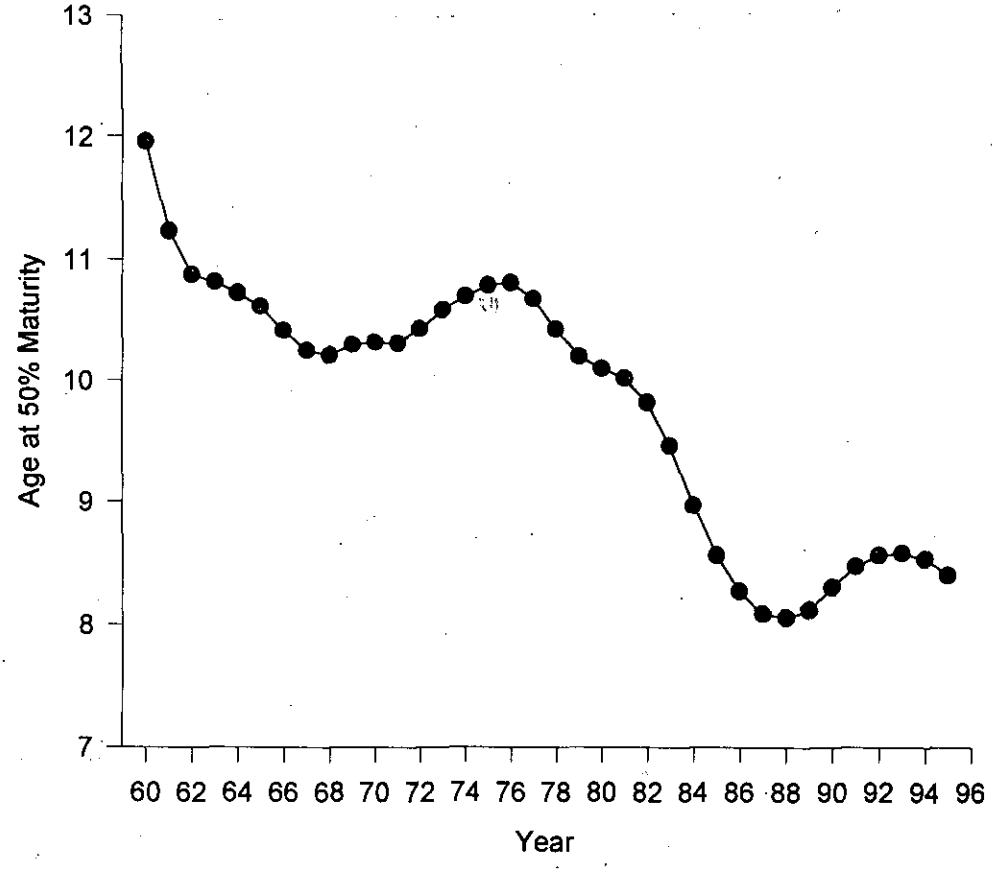

Figure 14 Age at 50% maturity for female A.plaice in Div 3LNO.

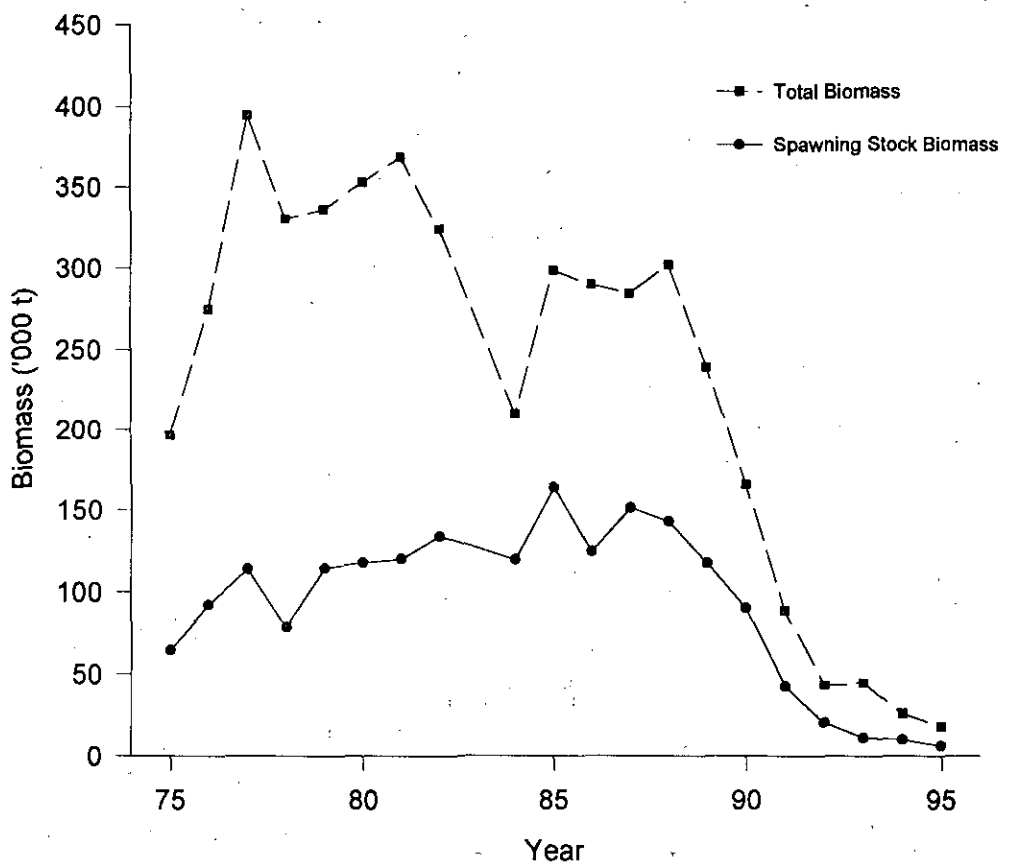

Figure15 3LNO A. plaice female SSB and total biomass from RV surveys

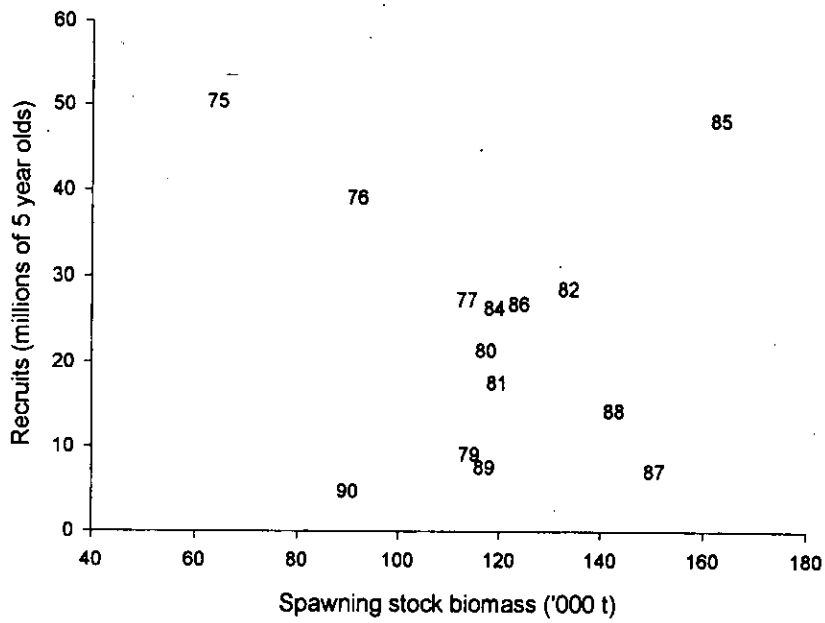

Figure 16 Spawning stock biomass as calculated from rv surveys in year n against rv abundance at age 5 in year n+5 for A. plaice in Div. 3LNO. Symbol denotes the yearclass.

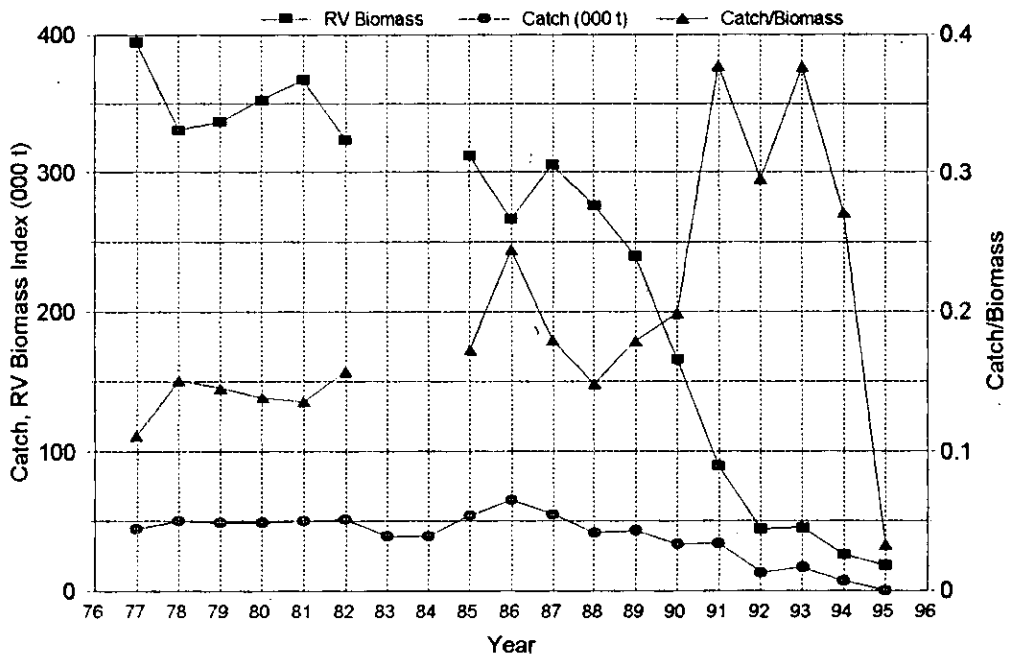

Fig. 17 Comparison of catch and RV biomass index, 3LNO A.plaice