Northwest Atlantic Fisheries Organization

Serial No. N2277 NAFO SCR Doc. 93/91

SCIENTIFIC COUNCIL MEETING - JUNE 1993

An Assessment of the Amrican Plaice Stock in NAFO Divisions 3LNO

by

W. B. Brodie, D. Power, and M. J. Morgan

Science Branch, Department of Fisheries and Oceans
P. O. Box 5667, St. John's, Newfoundland, Canada 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 and 30,300 t in 1989 following a decline in stock abundance. In 1990-92, the TAC was set at about 25,000 t , and was reduced to 10,500 t in 1993 following further decreases in stock size.

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 have subsequently declined, to about 33,000 t in 1990 and 1991. The revised catch figure of 33,817 in 1991 is about 5,400 t lower than the estimate used in the 1992 assessment, due mainly to a revision in the S.Korean catch. The catch in 1992 of 11,112 t is the lowest since the 1950's. This was due to reduced effort by Canada inside the 200-mile limit and by EEC and S.Korean fleets in the Regulatory Area.

The following table shows the catch (t) in 1992 by country:

Canada	9,542
EC Spain	412
EC Portugal	140
S.Korea	518
Other	500
Total	11,112

From 1977 to 1982, the catch was taken almost exclusively by Canadian vessels; but the catch by other nations increased rapidly from less than 2000 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 declined in recent years, as has the Canadian catch (Tables 1 and 2). 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. 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.

Table 3 indicates that the bulk of the catch has usually been taken in Div. 3L. This table also indicates that the increase in catches in the mid-1980s occurred mainly in Div. 3N, with the value in 1986 in this division being the second highest in the time series. Recent catches in the Regulatory Area continue to be mainly from Div. 3N.

In 1992, the Canadian catch totalled about 9,500 t (Table 4), which is almost 60 percent lower than the catch in each of 1990 and 1991 (Table 1). The 1992 catch by inshore gears of 325 t, mainly by gillnet, was the lowest in the 20-year time series for which catches by inshore gears were available and about half the value in 1991. One reason for this was the moratorium on the northern cod fishery in 1992, which removed much of the inshore effort

from Div. 3L from July onward. Most of the remainder of the 1992 catch was taken by otter trawl, although about 1300 t was caught by seiners, down 35 percent from 1990-1991, and about 1750 t was taken by gillnets in offshore areas (mostly in 3L), which was about double the catch of this fleet in 1991. One major difference in the Canadian fishery in 1991 and 1992 is the amount taken in Div. 3O. Table 5 shows that the otter trawl catch in Div. 3O in 1991 was the highest by Canada in this division since 1974, and virtually the entire otter trawl fishery in 1992 was conducted in this area. The otter trawl catch in Div. 3L, which ranged from 14,000 t to 32,000 t from 1975-1989, declined to only 675 t in 1992.

In 1991 and again in 1992, the directed fishery by Canada was higher in Div. 3O than in either Div. 3L or 3N (Table 6), these being the only years in which that has happened. This shift in effort also resulted in increased by-catches of yellowtail in Div. 3O (Table 7), where much of the fishery for that species also occurred. In fact, some of the fishery in this area was actually a mixed fishery for both flatfish species. This represents a substantial change from earlier years when most of the directed A.plaice fishery was in Div. 3L and most of the fishery for yellowtail took place in Div. 3N.

Catch-at-age, mean weights-at-age

Sampling was available from the Canadian (Table 8), Spanish (SCS 93/14), and Portuguese (SCS 93/15) fisheries in 1991. Table 9 shows the catch-at-age from the Canadian fishery in Div. 3L, 3N, 3O, and 3LNO combined. As in 1991, ages 7-11 comprised the majority of the catch, with the peak being age 9. The mean weights were lower at most ages in 1992 compared to 1991.

Length compositions from the Spanish and Portuguese otter trawl fisheries in Div. 3N were similar, so it was decided to apply the Portuguese age composition (based on 140 t catch by Portugal) to the total catch in the Regulatory Area of 1570 t. This includes catches by Spain, S. Korea, and catches by other non-members estimated from surveillance. This catch-at-age is shown in Table 10 and indicates that the peak age was 7 in 1992, compared to 6 in 1991. The mean weights at ages 6 to 10 agreed generally with those in the Canadian fishery, but were lower at ages 11+. This may have been due to sampling variability at older ages in the Portuguese fishery, so it was decided to use the mean weights at age from the Canadian fishery to represent the overall means in 1992.

The total catch-at-age for 1992, which is given with the rest of the catch matrix in Table 11, does not show the same bimodal pattern as in 1989 and 1990. There was less difference in the modal ages in the catch in the regulatory area versus the catch inside the Canadian 200 mile limit in 1992, as was the case in 1991. It should be noted that there is still a substantial number of fish in the catch at ages younger than 5 from 1989-1991, but not in 1992. In fact there were reductions in the catch of all ages in 1992 compared to recent years, due to the overall decline in the catch. The mean weights at age are given in Table 12 and indicate that the weights in 1992 were generally lower than in 1991. A sum-of-products check is given in Table 13. It should also be noted that the 1991 catch at age was adjusted to account for the difference in the S.Korean catch estimate used last year, resulting in downward revisions at all ages, particularly ages 5-9.

Canadian catch rates (C/E)

As in all recent assessments of this stock, a multiplicative model was used to analyze the C/E data from the Canadian offshore trawler fleet from 1956-92. These vessels have taken most of the catch from this stock over time; and in the late 1970s and early 1980s, were the only vessels for which a series of C/E data was available. Results from the model are shown in Table 14 and Figure 2. The C/E declined steadily from 1956 to 1976 and rose gradually to a relatively stable level from 1980-85. The C/E dropped sharply in 1986 and remained at this relatively low level through 1990. In 1991 the C/E declined a further 37% , followed by a drop of 39% in 1992 to a level far below any ever observed. Standardized effort in 1992 declined to the lowest level observed since the early 1960's.

An analysis of the same data from only the years 1981-1992 shows the same patterns in C/E (Fig. 3). These years were chosen because the Canadian fleet switched to a larger mesh size in 1981. Analyzing the data by NAFO Division shows that similar trends in C/E are present in each area. C/E was relatively stable in each Division from 1986 to 1990, then declined sharply in both 1991 and 1992 to the lowest observed levels (Fig. 4).

Given the major distributional changes in the fishery in 1991 and 1992, caution should be exercised in evaluating the results of the catch rate analyses. Nonetheless, it is clear that catch rates of A.plaice in the Canadian fishery in all areas of the Grand Bank in 1992 were well below any

observed in the 37 year time series for this fleet. Anecdotal information from the commercial fishery thus far in 1993 indicate that the poor catch rates are persisting.

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 1993 , with the exception of 1983. The stratification scheme used is shown in Figure 5.

In Div. 3L, the biomass index was highest from 1978-82, declined to a lower but stable level from 1985 to 1988, then declined sharply in 1991 and again in 1992 to a level which is only about 7% of the 1985-88 mean value (Table 15). Strata 729-734 in the deep water, which had not been surveyed in this series since 1985, accounted for about 5% of the 1991 estimate and about 18% of the 1992 total. There is no evidence from these surveys that A. plaice changed their distribution by moving to deeper water, at least in the spring time (Table 16). The 1993 data for Div. 3L are not yet available as the survey was still ongoing at the time this was written.

In Div. 3N, the biomass index also shows a decline in recent years, with 1992 being the lowest point by far in the series (Table 17, Fig. 6). Preliminary analysis of the 1993 survey data indicates that the biomass is similar to the value observed in 1991, and is still much lower than average. As in Div. 3L, there is no evidence of a pronounced movement of plaice to deeper waters, at least as far as the 400 fm limit covered in the surveys (Table 18).

In Div. 3Ø, the biomass index has shown a consistent decline since 1990 (Fig. 6), with the 1992 and 1993 values being the lowest in the series (Table 19). As in the other Divisions, most of the biomass continues to be found in the shallower strata (Table 20).

Tables 21-23 contain comparisons of biomass estimates on either side of the 200 mile limit in Divisions 3L, 3N, and 3O. In Divs. 3L and 3O, the proportion of the biomass in the Regulatory Area was generally 5% or less, while in Div. 3N the percentage decreased from 31 to 13 from 1985 to 1988, then increased steadily from 13 to 59 in 1993. For Div. 3LNO combined (Table 24), the percentage from 1985 to 1992 ranged from 2.6 (1988) to 9.7 (1985).

To allow comparison of the trends in abundance at age for this stock over the 1971-91 period, a multiplicative analysis of mean catch number per stratum was carried out in 1992, using the same methodology employed in the recent assessments of this stock. The resulting series is adjusted for the change in the vessel-gear used for the surveys and accounts for strata not surveyed in each year. Data for 1992 were simply appended directly to this series.

Tables 25-27 show the abundance for Div. 3L, 3N, and 3Ø respectively, with Table 28 containing the combined index. It should be noted that the data from the 1993 survey were not available on an age-by-age basis at this time. Figure 7 shows the trends in abundance for Div. 3L, 3N, and 3Ø, separately and combined and Figs. 8-10 indicate the 95% confidence limits around the abundance estimates in Div. 3L, 3N, and 3O respectively. In all areas, abundance was generally highest in the late 1970s and early 1980s as the strong year-classes of the early 1970s dominated survey catches. Abundance in 1992 was much lower than in any other year, having declined by about 45 % in each of 1991 and 1992 to a level about 10% of peak estimates in the late 1970's and early 1980's. In Div. 3L the decline is worse, with abundance in 1992 being only 5% of the peak abundance in the 1977-1980 period (Table 25). The abundance of older fish in the stock has also been declining very rapidly, with the 1991 value for age 8+ abundance being about half the 1991 value, a quarter of the 1990 estimate, and about one-sixth the estimates for 1986-1988 (Table 28). In 1992, the abundance at each age over 3 years was the lowest ever observed.

There was some evidence, from the 1989 and 1990 surveys, of improved recruitment to the stock. The 1985 year-class, shown to be strong in juvenile flatfish surveys in Div. 3NO, showed up at ages 4 and 5 in Div. 3N as the largest estimates in the time series (excluding the anomalously high values in the 1978 survey) (Table 26). However the estimate at age 6 in the 1991 survey is no better than average and the 1992 estimate at age 7 is well below average. This year-class also showed up strongly in Div. 3Ø in 1990, but showed the same pattern in 1991 and 1992 as the estimates in Div. 3N. The 1986 year-class appeared to be about average in Div. 3NO in 1991 but was below average in 1992. There is no evidence from the spring surveys in Div. 3L that the 1985 or 1986 year-classes are strong. In total, the 1985 and 1986 year-classes now appear to be below average, although the 1985 year-class is the dominant one in the 1991 and 1992 surveys (Table 28). It should be noted that 1991 is the only year in the series of spring surveys where the dominant age is less than 7 and 1992 is only the second year where the dominant age is 7. Another interesting point is that from 1990 to 1991 and again from 1991 to 1992, the abundance decreased between ages 5 and 6 by 18 and 29% respectively. In all previous years (except 1978-1979 when the

decrease was 1%), the abundance at these ages increased anywhere from 12 to 355% (mean= 131%), indicating that the fish at age 5 were not fully recruited to the survey trawl. The change in the last 2 surveys is an indication of an unusual increase in mortality.

It has been hypothesized that bottom temperatures may affect the abundance estimates of this stock, either through changing availability, natural mortality, or some other factor, although no mechanisms have been established. The recent declines in abundance as measured by the surveys coincide with very low temperatures on the Grand Bank (Brodie et al 1992). Recent experimental work (Morgan, 1992) has shown that A. plaice tolerate sudden decreases in water temperature and will survive in water as cold as -1.4°C or -1.5°C. However, the long-term effects of reduced temperature on the species are not known, nor is any relationship known between trawl catchability or increased mortality of A. plaice and bottom temperature. Further work is ongoing to determine if any such relationships exist.

In addition to the declines in abundance noted for A.plaice in Div. 3LNO, reductions in the numbers of this species in adjacent areas have also been observed. In Divs 2J+3K, the biomass index from surveys has decreased rapidly from estimates around 100,000 tons in 1980-84 to less than 6,000 tons in 1992 (Fig.11). It is highly unlikely that the fishery played a major role, with catches in this area averaging around 1500 t per year from 1983-1992. In Subdiv. 3Ps, the biomass of plaice has shown a similar downward trend since the mid-1980's. These coincident declines suggest that factors other than the fishery may have had an impact on the reduction of the A.plaice stocks in the Newfoundland area.

Fall surveys

Stratified-random surveys have been conducted in Div. 3L in the fall from 1981 to 1992, usually in October-November and Figure 12 shows the trends in the biomass and abundance indices for those fall surveys. Multiplicative models were used to adjust for missing strata in both series, using the data from 1981-91. The years 1981 and 1982 were not included in the biomass index because no conversion factors exist for catch weights between the A. T. CAMERON, which did these earlier surveys, and the W. TEMPLEMAN and A. NEEDLER, which were used for the surveys after 1982. Declines over the time period are apparent in both indices (Fig. 12), and like the spring series, 1992 is far below any other estimates. Table 29 shows the mean catch weights on a stratified basis since 1981 and Table 30 contains the biomass estimates by stratum and depth zone for 1990-1992 only. The 1985 year-class was dominant in the 1991 survey, but its value at age 6 was the lowest from 1981-1991 (Table 31). Only the 1986 year-class looks anywhere near average in the 1991 results. This year-class was the dominant one in 1992, but its value was the lowest in the series at age 6. Similar to the spring surveys, the 1992 abundance estimates at every age older than 4 years are the lowest in the series.

Figure 13 shows a time series of abundance estimates from all surveys in Div. 3L over the period 1981-92, including the data from the spring and fall surveys discussed above. From 1990 to 1992, fall surveys were also carried out in Div. 3NO. Tables 32-33 give the biomass estimates by stratum and depth zone. Fig. 14 compares the total abundance estimates from the spring and fall surveys in 1990-1992 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 (40% in 1990, 75% in 1991, and 125% in 1992.). This spring to fall increase has not been observed consistently in Div 3L in other years (Fig. 13) and cannot be explained. As well, the estimates of total abundance from the spring surveys show declines of 55% or more in each division from 1990 to 1992. However, the fall surveys do not show this pattern in Div. 3N and 3O, but only in Div. 3L. For Div. 3LNO in total, the fall surveys indicate a decine in abundance of 52% from 1990 to 1992, compared to a decrease of 71% during this period in the spring surveys.

Table 34 gives the age compositions of plaice in Div. 3N and 3O, as well as Div. 3LNO combined, from the fall surveys of 1990-1992. The 1985 and 1986 year-classes were prominent in the catches in Div. 3N in all 3 surveys, particularly in 1990 where they comprised 53% of the total abundance. These year-classes were not as dominant in Div. 3O. In Div. 3LNO combined, the 1985 year-class was the dominant one in both 1991 and 1992. Again, similar to the spring surveys, the number of older fish has declined rapidly between 1990 and 1992.

Distribution plots from spring surveys

To determine an accurate picture of the distribution of A. plaice from the spring surveys, catch weights were plotted geographically using a software package known as ACON. The data for 1978-1982 and 1984-1992 are shown in Figs. 15-18 and clearly show the drastic change in abundance over these periods. The change from 1989 to 1992 is particularly striking, and highlights the virtual disappearance of A.plaice from many areas of formerly

high abundance on the Grand Bank. As noted earlier, there is no evidence to suggest either a gradual or sudden shift in the distribution of this species to areas outside its normal distribution.

USSR 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.

AGE AT MATURITY

Maturity at age was calculated for each Division and sex from 1971 to 1992. Age, maturity and length frequency data collected from Canadian spring research vessel surveys were analyzed. For 3L and 3N there were data for every year for the time period except for 1983. For 3O there were no data for 1971, 1972, 1974 and 1983.

Otoliths were collected for ageing using a length stratified sampling scheme. A given age can straddle several length classes and the probability of being mature at a given age generally increases with length. This can result in inaccuracies in the estimation of proportion mature at age if length and catch at length are not taken into account. A formula developed by Hoenig and Morgan (in prep.) was used to correct for this length stratified sampling scheme. Note that at this time this method does not include an estimate of variance.

$$\textit{Proportion mature at age}_a = \frac{\sum_{j=1}^{n} (C_j \, P_{aj} \, P_{ajm})}{\sum_{j=1}^{n} (C_j \, P_{aj})}$$

where: C_j = estimated population number at length j
P^{aj} = proportion of age a that is length j
P^{ajm} = proportion of age a at length j that is mature
n = number of length classes

The estimated population number at length (C_j) was produced from research vessel survey length frequencies using Stratified Analysis Programs (Smith and Somerton, 1981) which weight the catch in a Stratum by the size of the stratum.

To produce combined 3LNO estimates of proportion mature at age, the estimated number mature at age for each Division was summed across NAFO Division and divided by the estimated number at age summed across each NAFO Division as follows:

$$\textit{Proportion mature at age}_a \; 3LNO = \frac{\sum_{NAFO} \sum_{j=1}^{n} (C_j \, P_{aj} \, P_{ajm})}{\sum_{NAFO} \sum_{j=1}^{n} (C_j \, P_{aj})}$$

Age at 50% maturity (A_{50}) was produced for each sex and year, for each Division seperately and for 3LNO combined using probit analysis, assuming a normal distribution. Model estimates for the probability of being mature at age were also produced using probit analysis for each sex and year for 3LNO combined. Results are given in Figs 19-21 and in Tables 35 and 36. For females the combined 3LNO estimate of A_{50} shows a decline since 1975. A comparison of the ogives of 1975 and 1992 for the combined 3LNO estimate for females shows a marked shift to the left with the females maturing at a younger age in 1992 than 1975. In 3L and 3N, estimates of A_{50} have generally been lower since the mid 1980's. In Div. 3O the estimates are more variable but are also generally lower since the mid 1980's. For males the combined

3LNO estimates of A_{50} and the 3L estimates have been lower since the mid 1980's. The estimates for the age at 50% maturity for males in Div. 3N showed some increase from 1971 to 1982, and have declined slightly since then while in Div. 3O the estimates have been variable showing no clear trend.

Both the male and female Div. 3LNO combined estimates of A_{50} were significantly correlated with the Div. 3LNO 5+ biomass estimate from the Laurec-Shepherd analysis using RV only from the 1992 assessment (females r_s=0.85 p<0.001 N=16, males r_s=0.75 p<0.001 N=16, Spearman rank correlation). The A_{50} estimates for males and females in Div 3L and 3N were significantly correlated with RV abundance estimates (3L males r_s=0.72 p<0.005 N=16, 3L females r_s=0.72 p<0.005 N=16, 3N males r_s=0.54 p<0.04 N=15, 3N females r_s=0.84 p<0.001 N=16). The A_{50} estimates for males and females in Div 3O were not correlated with abundance estimates from RV surveys (females r_s=0.44 p=0.09 N=16, males r_s=0.0 p=1.00 N=16).

Because it was not possible to separate the SPA population numbers by sex in this assessment, the maturity ogives calculated here were not applied to the population estimates at age. The assumption in recent assessments that ages 9+ represented the spawning stock is probably reasonable, as this is about the mean of the female A_{50} estimates. However, the ogives should be used if possible in the future, given the recent downward trends indicated by these data.

Sequential population analysis (ADAPT and Laurec/Shepherd)

The catch-at-age, and the abundance at ages 5 to 14 from the Canadian spring groundfish surveys, for the years from 1975-92 (except for no 1983 RV data) were used in the same formulation of the Adaptive framework that was used in the previous assessment. Given the difficulties which caused the exclusion of the Canadian C/E data from the 1992 ADAPT formulations, as well as the earlier discussion on the comparability of this C/E series in light of changes in the fishery, it was decided to eliminate these data from SPA calibrations in this assessment. Table 37 contains the results, indicating all parameter estimates to be significant, with all CV's between 0.2 and 0.33, except for age 5. Catchability coefficients show an increase to age 8 and are relatively stable after that. The residual matrix indicates year effects to be present, with 1992 showing relatively large negative residuals at all ages and 1988-1991 indicating mostly positive values. The analysis shows a steady decline in age 5+ population numbers from around 1 billion in 1975-1978 to about half that level in 1986-87, followed by a further sharp decrease to about 185 million in 1992. This analysis estimated the age 5+ population in 1991 to be 256 million fish, compared to 425 million in the 1992 assessment, a decrease of 40%.

The Laurec/Shepherd (LS) calibration technique was used with the same input data used in the Adaptive framework, except that the survey data were those for 1984 onward only (there was no survey in 1983). Table 38 contains the results of the calibration, and again the residual matrix indicates a general lack of fit, with all negative values from 1984-86 and almost all positive residuals from 1988-1991. The standard error on the catchability coefficients was between .25 and .35 for ages 8-15, increasing at the younger ages. This analysis also shows a severe decine in population size, from around 600 million in 1984-86 to about 153 million in 1991 and 94 million in 1992. The L/S analysis in the 1992 assessment gave a population estimate in 1991 of 281 million, which means that the 1993 analysis estimated the population in 1991 to be 46% lower.

Discussion/prognoses

Neither model used fits the data very well, probably because of the rapid declines in the survey index in recent years. Regardless of the analysis used, the conclusions must be basically the same - that the stock has declined significantly from the mid 1980's to the present. Concern must be expressed with the state of the spawning stock and the lower levels of recruitment in recent years. Whether or not there has been a coincidental increase in natural mortality is not clear, although evidence from the plaice stock in the adjacent northern area indicates that it is possible for a plaice stock to decline rapidly in the absence of a sustained fishery. It is also not clear what effect, if any, this may have had on the SPA. In any case, both models used in 1993 again indicate that the retrospective pattern which has plagued this assessment in the past remains a substantial problem, ie. both analyses show the 1991 population to be 40-45% lower than in the 1992 assessment. As a result of this, the 1993 ADAPT analysis estimates the population at the start of 1992 to be 56% lower than the 1991 population estimates in last year's assessment, while the 1993 L/S indicates a decline of 66% in these estimates.

Catch projections were done using the terminal year population estimates from both the L/S and ADAPT analyses, along with the mean (1990-92) weights and partial recruitment. Geometric mean (1984-90) estimates of age 5 population numbers from the 2 SPA runs were used as projected

recruitment. These projections resulted in $F_{0.1}$ catch levels in 1994 of 4800 and 9500 for L/S and ADAPT respectively. Considering the problem with the retrospective pattern, and the extremely low level of the stock, it was advised to keep the catch in 1994 at the lowest possible level, not to exceed a maximum of 4800 t. This level is about 10% of the average catch from 1978 to 1991, matching the ratio of the abundance from surveys in 1992 to the that from surveys in the late 1970's. Prospects for rebuilding the stock are unknown, as there are no data to suggest that this stock has ever been at such a low level before.

References

Brodie, W.B., J.W.Baird, and J.Morgan. 1992. An Assessment of the American plaice stock in Div. 3LNO. NAFO SCR Doc. 92/79, Ser.No. N2134, 43p.

Morgan M.J. 1992. Low-temperature tolerance of American plaice in relation to declines in abundance. Trans. Am. Fish. Soc. 121:399-402.

Table 1. Nominal catches(t) of American plaice for NAFO Divisions 3LNO, 1960-91 and TACs from 1973 to 1993.

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[c]	22,560	-	-	17	1117	8,767[b]	32,461	24,900
1991[c]	22,486	-	-	60	1910	9,361[b]	33,817	25,800
1992[c]								25,800
1993								10,500

[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 1992 catches.
[d]Effective TAC.
[e]Provisional.

Table 2. Breakdown of catches from Table 1 listed as "other" for 1984-91.

Year	Spain	Portugal	Panama[b]	USA	Caymen Islands[b]	Other[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	14,645
1990	304	357	-	10	-	8,096[c]	8,767
1991	786	186	-	-	-	8,389[c]	9,361

[a] Countries not in Tables 1 or 2, 1984 - 89 only.
[b] Not reported to NAFO. Catches estimated from surveillance reports.
[c] Includes some estimated catches.

Table 3. Breakdown of plaice nominal catches (t) in Divisions 3LNØ by Division, for the years 1960-89.

Year	Division 3L	Division 3N	Division 3Ø	Total
1960	19,397	3,912	738	24,047
1961	13,398	3,498	1,017	17,913
1962	13,584	3,923	699	18,206
1963	16,512	7,465	1,742	25,719
1964	21,391	14,587	2,589	38,567
1965	25,034	26,270	1,957	53,261
1966	18,572	34,698	11,741	65,011
1967	38,515	24,364	31,53	94,413
1968	39,126	20,038	14,003	73,167
1969	52,880	14,442	12,115	79,437
1970	39,347	21,032	6,266	66,645
1971	37,851	22,873	7,164	67,888
1972	33,330	17,387	8,644	59,361
1973	20,103	20,883	11,857	52,843
1974	16,610	21,126	8,561	46,297
1975	15,171	21,308	6,74	43,221
1976	25,122	18,623	8,080	51,825
1977	23,763	16,543	3,675	43,981
1978	30,145	13,443	6,440	50,028
1979	28,708	14,712	5,149	48,569
1980	31,717	15,119	2,250	49,086
1981	37,269	10,628	2,261	50,158
1982[a]	32,761	13,101	5,190	51,052
1983[a]	22,964	11,107	4,464	38,535
1984[a,b]	20,307	15,147	3,991	39,445
1985[a,b]	23,320	25,806	5,086	54,212
1986[a,b]	25,745	34,012	4,813	64,570
1987[a]	32,937	16,331	5,744	55,012
1988[a,b]	18,425	17,587	4,823	40,835
1989[a,b]	21,873	16,763	4,823	43,369

[a]Includes breakdown of unspecified flounder catches by S. Korea.
[b]Includes estimates of non-reported catch on the Tail of the Bank outside Canadian 200-mile limit. These catches are attributed 90%:10% to Divisions 3N:3Ø.

Table 4. Breakdown of Canadian catches of A. plaice by division, month, and gear, Div. 3LNO, 1992.

	3L					3N			3Ø				3LNO
			Gillnet										
Month	OT	Seine	Offshore	Inshore	Other	OT	Seine	GN	OT	Seine	GN	Other	Total
Jan	24	-	-	-	-	-	-	-	1	-	-	-	25
Feb	1	-	-	-	-	-	-	-	5	-	-	-	6
Mar	-	-	-	-	-	-	-	-	23	5	-	-	28
Apr	16	-	-	-	-	5	2	-	28	12	-	4	67
May	26	-	49	44	-	1	15	-	24	3	2	9	173
June	16	2	1357	118	1	9	19	-	1561	99	7	-	3189
July	147	2	242	129	1	20	308	-	1886	62	8	2	2807
Aug	272	97	1	27	-	108	230	3	733	8	7	-	1486
Sept	117	42	1	6	-	169	128	-	500	24	-	-	987
Oct	50	16	1	1	-	64	83	4	95	59	9	-	382
Nov	6	-	-	-	-	-	-	-	69	74	53	-	202
Dec	-	-	-	-	-	-	-	-	143	37	10	-	190
Total	**675**	**159**	**1651**	**325**	**2**	**376**	**785**	**7**	**5068**	**383**	**96**	**15**	**9542**

Division Totals:	3L	3N	3Ø
	2812	1168	5562

3LNO Totals:	OT	Seine	GN	Other
	6119	1327	2079	17

Table 5. Canadian catches of A. plaice (otter trawl only), by division, from 1973 to 1992.

Year	3L	3N	3Ø	3LNO
1973	14367	11575	9966	35908
1974	11745	13741	7895	33381
1975	11356	16306	3859	31521
1976	20648	17171	6383	44202
1977	19493	15536	3528	38557
1978	25574	12527	6242	44343
1979	23698	13923	4665	42286
1980	28083	14786	1893	44762
1981	32297	9308	1810	43415
1982	28204	11971	5043	45218
1983	19091	8677	4324	32092
1984	16784	10950	3312	31046
1985	20210	13327	3935	37472
1986	17461	8066	3867	29394
1987	21511	4396	3843	29750
1988	14126	5195	4441	23762
1989	15755	4665	4024	24444
1990[a]	11465	4181	3611	19257
1991[a]	8406	2940	7502	18848
1992[a]	675	376	5068	6119

[a]Provisional.

Table 6. Catches of A. plaice by Canada (N) otter trawls in the directed (main species A. plaice) fishery and their percentage of the total otter trawl catch of A. plaice by Canada.

	3L		3N		3Ø		3LNO	
Year	Directed	% total	Directed	% total	Directed	% total	Directed	% total
1973	12548	87	7479	65	6362	64	26389	73
1974	11278	96	9609	70	6722	85	27609	83
1975	10267	90	11769	72	2585	67	24621	78
1976	20132	98	15569	91	5151	81	40852	92
1977	18027	92	14085	91	2559	73	34671	90
1978	23687	93	9961	80	5067	81	38715	87
1979	20518	87	10095	73	3595	77	34208	81
1980	22639	81	11930	81	1446	76	36015	80
1981	28058	87	6069	65	1330	73	35457	82
1982	23503	83	9541	80	2928	58	35972	80
1983	12172	64	6072	70	2851	66	21095	66
1984	10318	61	6368	58	2191	66	18877	61
1985	14930	74	10594	79	1993	51	27517	73
1986	12665	73	4969	62	2167	56	19801	67
1987	14358	67	1835	42	1896	49	18089	61
1988	8385	59	3359	65	2857	64	14601	61
1989	11312	72	3371	72	2725	68	17408	71
1990	7556	66	2846	68	2942	81	13344	60
1991	6187	74	2260	77	6290	84	14737	78
1992	552	82	186	49	2832	56	3570	58

Table 7. Catches and by-catches (t) of A. plaice and yellowtail, by division, from 1982-92 for Can(N) TC 5 stern trawlers. Figures in square brackets represent the percentage of directed catch taken by division each year, and the figures in parentheses represent the by-catch rates of one species in the directed fishery for the other.

		Directed plaice fishery		Directed yellowtail fishery	
		Plaice	Yellowtail	Yellowtail	Plaice
1982	3L	22452 [67]	1106 (5)	650 [12]	416 (39)
	3N	8631 [26]	2100 (20)	4568 [86]	1979 (30)
	3Ø	2423 [7]	560 (19)	71 [2]	50 (41)
1983	3L	11986 [60]	920 (7)	477 [10]	291 (38)
	3N	5733 [29]	1120 (16)	3909 [79]	1416 (27)
	3Ø	2330 [11]	256 (10)	535 [11]	355 (40)
1984	3L	10063 [55]	800 (7)	1787 [28]	781 (30)
	3N	6042 [33]	1162 (16)	4482 [70]	1813 (29)
	3Ø	2042 [12]	85 (4)	107 [2]	53 (33)
1985	3L	14617 [55]	995 (6)	793 [12]	328 (29)
	3N	9978 [38]	1764 (15)	5385 [84]	1439 (21)
	3Ø	1917 [7]	317 (14)	222 [4]	148 (40)
1986	3L	12410 [64]	890 (7)	619 [7]	319 (34)
	3N	4767 [25]	934 (16)	7632 [88]	1666 (18)
	3Ø	2128 [11]	375 (15)	450 [5]	241 (35)
1987	3L	14089 [80]	216 (2)	198 [2]	98 (33)
	3N	1774 [10]	357 (17)	7672 [91]	1492 (16)
	3Ø	1767 [10]	358 (17)	587 [7]	296 (34)
1988	3L	8262 [58]	165 (2)	220 [4]	95 (30)
	3N	3279 [23]	392 (11)	5096 [86]	912 (15)
	3Ø	2709 [19]	430 (14)	571 [10]	310 (35)
1989	3L	11049 [66]	149 (1)	64 [4]	41 (38)
	3N	3129 [19]	428 (12)	1321 [68]	514 (28)
	3Ø	2483 [15]	437 (15)	548 [28]	321 (37)
1990	3L	7388 [57]	176 (2)	194 [9]	92 (32)
	3N	2759 [21]	427 (13)	1753 [80]	626 (26)
	3Ø	2919 [22]	238 (8)	237 [11]	131 (36)
1991	3L	6107 [43]	328 (5)	93 [3]	56 (38)
	3N	2202 [15]	295 (12)	2212 [72]	440 (17)
	3Ø	6089 [42]	1067 (15)	758 [25]	411 (35)
1992	3L	550 [16]	31 (5)	62 [2]	34 (35)
	3N	182 [5]	35 (16)	977 [25]	145 (13)
	3Ø	2782 [79]	918 (25)	2898 [73]	1205 (29)

Table 8. Samples used to calculate catch at age and mean weights at age for A. plaice in the Canadian fishery in Div. 3LNO in 1992. Numbers in parentheses are the numbers of observations and 'n' is the number of samples.

Age-length key	Length frequency	n	Catch (t)	Description
Q2, 3L (86) Q3, 3L (340)	OT, May, 3L (317)	1	86	All gears except GN, 3L. Jan-Jun
Q3, 3L (340)	DS, Aug, 3L (334)	1	2072	DS (Jul-Oct)+ GN (May-Oct), 3L,
	SS, (674)	2	62	SS, 3L, Jul-Oct
	OT, (1000)	3	592	OT, 3L, Jul-Nov
Q3, 3N (453)	OT, Sep, 3N (354)	1	383	OT + GN, 3N, Apr-Oct
	SS, Jul (308)	1	344	Seine, 3N, Apr-Jul
	SS, Aug (345)	1	127	SS, 3N, Aug
	DS, Aug (338)	1	103	DS, 3N, Aug
	SS, Sep (319)	1	211	Seine, 3N, Sep-Oct
Q2, 3Ø (912)	DS, Apr, 3Ø (333)	1	119	Seine, 3Ø, Mar-Jun
	OT, May (309)	1	94	OT + other, 3Ø, Jan-May
	Jun (2981)	9	1561	OT, 3Ø, Jun
	GN, Jun (339)	1	24	GN, 3Ø, May-Aug
Q3, 3Ø (901)	OT, Jul, 3Ø (3538)	10	1950	OT + Seine + other, 3Ø,Jul
	Aug (2350)	7	741	OT + Seine, 3Ø, Aug
	Sep (671)	2	524	OT + Seine, 3Ø, Sep
Q4, 3Ø (545)	OT, Oct, 3Ø (382)	1	95	OT, 3Ø, Oct
	Dec (747)	2	212	OT, 3Ø, Nov-Dec
	DS, Oct (347)	1	30	DS, 3Ø, Oct
	Nov (380)	1	56	DS, 3Ø, Nov-Dec
	SS, Oct (347)	1	84	SS, 3Ø, Oct-Dec
	GN, Nov (349)	1	72	GN, 3Ø, Oct-Dec

Table 9. Catch at age (000) and mean weights at age (kg) of A.plaice in the Canadian fishery in 1992 in Div. 3L, 3N, and 3O.

3L

AGE	AVERAGE WEIGHT	AVERAGE LENGTH	CATCH MEAN	CATCH STD. ERR.	CATCH C. V.
5	0.234	30.200	9	5.97	0.63
6	0.265	31.181	54	18.37	0.34
7	0.322	32.961	288	56.02	0.19
8	0.386	35.009	1023	107.32	0.10
9	0.515	38.123	1415	124.36	0.09
10	0.683	41.496	708	93.35	0.13
*11	0.909	45.278	562	73.59	0.13
*12	1.142	48.588	227	38.72	0.17
13	1.490	52.706	129	21.27	0.16
14	1.790	55.724	56	14.30	0.26
*15	2.237	59.474	20	6.52	0.32
16	2.100	58.500	3	3.46	1.07

3N

AGE	AVERAGE WEIGHT	AVERAGE LENGTH	CATCH MEAN	CATCH STD. ERR.	CATCH C. V.
5	0.241	30.500	1	1.23	1.08
6	0.306	32.619	30	8.06	0.27
7	0.401	35.382	145	17.70	0.12
8	0.493	37.654	212	22.18	0.10
9	0.690	41.639	261	26.59	0.10
10	0.872	44.741	175	22.67	0.13
11	1.021	46.972	122	17.80	0.15
12	1.285	50.361	106	13.98	0.13
*13	1.544	53.267	73	12.19	0.17
14	1.821	55.941	70	11.19	0.16
*15	2.039	57.894	32	7.29	0.23
16	2.641	62.634	20	4.30	0.22
17	3.177	66.151	10	3.09	0.33
18	3.739	69.564	2	1.29	0.79
19	3.905	70.500	2	1.29	0.74

3O

AGE	AVERAGE WEIGHT	AVERAGE LENGTH	CATCH MEAN	CATCH STD. ERR.	CATCH C. V.
5	0.227	29.777	9	4.26	0.48
* 6	0.285	31.912	268	28.74	0.11
* 7	0.354	34.058	1012	58.39	0.06
* 8	0.421	35.873	1430	73.26	0.05
9	0.555	39.012	1594	73.83	0.05
10	0.743	42.630	1053	58.03	0.06
11	0.954	46.048	672	40.93	0.06
12	1.181	49.104	428	31.53	0.07
*13	1.484	52.628	287	22.32	0.08
*14	1.796	55.743	226	17.10	0.08
*15	2.131	58.668	161	13.68	0.08
16	2.494	61.533	99	9.69	0.10
*17	2.960	64.764	64	6.85	0.11
18	3.477	68.015	38	4.89	0.13
*19	4.170	71.739	7	1.89	0.26
*20	4.692	74.500		0.00	0.02

3LNO

AGE	AVERAGE WEIGHT	AVERAGE LENGTH	CATCH MEAN	CATCH STD. ERR.	CATCH C. V.
5	0.231	30.025	19	7.44	0.38
* 6	0.284	31.861	353	35.05	0.10
* 7	0.352	33.972	1446	82.83	0.06
* 8	0.413	35.683	2665	131.82	0.05
9	0.548	38.837	3270	147.05	0.04
10	0.732	42.406	1936	112.23	0.06
*11	0.941	45.812	1356	86.07	0.06
*12	1.184	49.125	761	51.86	0.07
*13	1.494	52.744	489	33.15	0.07
*14	1.800	55.780	353	24.94	0.07
*15	2.127	58.627	213	16.82	0.08
16	2.507	61.631	122	11.15	0.09
*17	2.988	64.944	73	7.51	0.10
18	3.488	68.079	39	5.05	0.13
*19	4.120	71.501	9	2.29	0.25
*20	4.692	74.500		0.00	0.02

Table 10. Comparison of estimated catch at age of A.plaice from non-Canadian fisheries in the NAFO Regulatory Area in 1991 and 1992.

AGE	1991	1992
5	6039	129
6	11597	670
7	4901	1145
8	2622	730
9	886	349
10	697	218
11	253	151
12	145	114
13	78	87
14	71	160
15	60	56
16	39	49
17	23	17
18	0	10

TABLE 11. CATCH AT AGE (000) OF A.PLAICE IN DIV. 3LNO.

AGE	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
5	354	883	837	974	1558	1257	263	154	27	119	48	296	4407	2237	2908	12745	15134	6103	148
6	5955	3128	3907	6723	4467	6551	2977	554	314	991	397	788	9707	4941	3213	11553	7694	12152	1023
7	10475	7220	8781	8743	9195	13532	9531	2248	1814	3053	1516	2362	12556	7691	4853	11432	4489	7846	2591
8	10069	9433	19363	11730	10397	18747	12578	4786	4799	5797	3311	5652	12530	10893	7269	9652	4604	9331	3395
9	7768	9234	16597	13559	12743	14977	14111	7921	8946	8343	5853	10694	13372	15867	10123	14180	8666	7856	3618
10	9004	7903	12338	11157	13881	12506	14212	11425	12836	7707	9958	15741	13874	17640	10325	12387	8666	6589	2154
11	7086	5701	8323	6520	9938	8791	11288	13565	15801	8493	12887	14528	14246	11404	9260	8405	6452	4394	1507
12	4596	4732	5156	4257	6823	3775	8088	11872	14489	7517	8964	9233	10376	6986	6040	4972	3633	2294	875
13	3809	3788	3024	2369	3655	1843	3732	8693	7942	4588	5072	4108	5947	3076	2692	2029	1702	811	576
14	2278	2617	2309	1493	2239	714	1565	5591	4224	2480	2515	1969	2637	1303	1156	1027	945	364	513
15	1141	1461	1347	1000	1472	342	645	2938	2000	1219	1090	1235	1416	768	656	550	453	246	269
16	651	763	584	342	649	159	265	1119	641	373	404	388	542	247	267	146	80	172	171
17	267	475	245	182	212	63	87	394	206	130	93	160	162	27	38	14	12	56	90
18	80	234	65	101	107	16	25	246	96	49	15	9	35	4	1	5	3	10	49
5+	63533	57572	82876	69150	77336	83273	79367	71506	74135	50859	52123	67162	101807	83085	58801	89097	62535	58222	16982

TABLE 12. MEAN WEIGHT AT AGE (KG) OF A.PLAICE IN DIV. 3LNO.

AGE	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
5	0.210	0.213	0.207	0.209	0.195	0.209	0.209	0.209	0.256	0.298	0.270	0.212	0.122	0.230	0.170	0.101	0.149	0.200	0.231
6	0.256	0.254	0.261	0.264	0.260	0.322	0.328	0.379	0.298	0.382	0.314	0.329	0.194	0.293	0.254	0.186	0.246	0.310	0.284
7	0.339	0.348	0.346	0.357	0.353	0.374	0.408	0.406	0.360	0.473	0.382	0.430	0.277	0.398	0.343	0.261	0.345	0.418	0.352
8	0.424	0.417	0.414	0.430	0.412	0.453	0.482	0.453	0.427	0.555	0.460	0.473	0.411	0.439	0.446	0.388	0.445	0.483	0.413
9	0.578	0.564	0.557	0.614	0.512	0.551	0.541	0.487	0.485	0.658	0.551	0.549	0.548	0.497	0.489	0.488	0.554	0.608	0.548
10	0.706	0.692	0.660	0.672	0.614	0.609	0.570	0.536	0.533	0.698	0.563	0.655	0.666	0.655	0.601	0.608	0.704	0.788	0.732
11	0.912	0.896	0.829	0.878	0.768	0.702	0.650	0.551	0.596	0.697	0.654	0.820	0.776	0.843	0.774	0.806	0.913	1.014	0.941
12	1.125	1.077	1.017	1.018	0.917	0.934	0.739	0.676	0.739	0.756	0.852	1.102	0.989	1.103	1.034	1.068	1.205	1.334	1.184
13	1.372	1.318	1.142	1.231	1.184	1.228	0.982	0.792	0.976	0.959	1.128	1.472	1.296	1.395	1.369	1.446	1.624	1.812	1.494
14	1.579	1.523	1.347	1.415	1.380	1.688	1.355	1.005	1.275	1.220	1.444	1.898	1.674	1.735	1.745	1.805	1.992	2.177	1.800
15	1.975	1.777	1.661	1.782	1.694	1.910	1.758	1.305	1.594	1.551	1.987	2.341	2.065	2.221	2.226	2.259	2.206	2.193	2.127
16	2.411	2.254	2.050	2.191	2.066	2.117	1.793	1.772	2.028	2.132	2.561	2.904	2.518	2.952	2.825	2.992	2.788	2.659	2.507
17	2.647	2.538	2.263	2.323	2.276	2.336	2.224	2.116	2.322	2.370	2.851	3.270	3.030	3.345	3.645	3.885	3.422	3.057	2.988
18	2.944	2.821	2.718	2.541	2.274	3.194	2.689	2.431	2.705	2.809	3.713	4.056	4.040	3.979	4.692	4.286	3.851	3.420	3.488

TABLE 13. CATCH WEIGHT AT AGE (t) OF A.PLAICE IN DIV. 3LNO.

AGE	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
5	74	189	173	203	304	263	55	32	7	35	13	63	536	514	493	1289	2255	1221	34
6	1526	794	1019	1777	1160	2107	975	210	94	379	125	259	1883	1445	817	2153	1893	3762	291
7	3551	2510	3035	3117	3248	5067	3890	913	653	1445	579	1016	3481	3057	1662	2979	1549	3276	912
8	4265	3929	8017	5039	4280	8489	6060	2166	2047	3217	1523	2673	5150	4783	3242	3747	2049	4510	1402
9	4491	5208	9241	8329	6526	8256	7634	3859	4343	5493	3227	5872	7325	7882	4951	6926	4801	4778	1983
10	6354	5467	8139	7500	8518	7612	8106	6121	6837	5376	5609	10315	9242	11547	6203	7532	6101	5193	1577
11	6461	5109	6898	5726	7636	6173	7341	7481	9412	5919	8426	11908	11058	9614	7164	6771	5890	4454	1418
12	5170	5097	5245	4333	6255	3528	5979	8028	10701	5683	7639	10175	10262	7705	6243	5310	4378	3059	1036
13	5227	4993	3452	2916	4327	2263	3665	6885	7749	4402	5720	6046	7708	4293	3685	2933	2765	1469	861
14	3598	3986	3110	2112	3089	1205	2121	5617	5387	3025	3632	3736	4413	2260	2017	1855	1882	792	924
15	2254	2596	2238	1782	2494	653	1134	3835	3187	1891	2166	2893	2925	1706	1461	1242	999	538	572
16	1570	1720	1197	749	1341	337	475	1983	1300	795	1034	1126	1365	729	753	436	224	457	430
17	707	1206	554	423	482	147	193	834	478	308	265	525	490	91	140	54	41	172	270
18	236	660	177	257	243	51	68	598	260	138	56	35	141	15	5	21	12	34	171
5+	45483	43464	52496	44263	49903	46150	47694	48561	52455	38105	40013	56640	65978	55642	38836	43249	34839	33717	11881

TABLE 14. ANOVA RESULTS AND REGRESSION COEFFICIENTS FROM A MULTIPLICATIVE MODEL UTILIZED TO DERIVE A STANDARDIZED CATCH RATE SERIES FOR AMERICAN PLAICE IN DIV. 3LNO. (1990-1992 BASED ON PROVISIONAL DATA)

REGRESSION OF MULTIPLICATIVE MODEL

MULTIPLE R..... 0.790
MULTIPLE R SQUARED..... 0.624

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SUMS OF SQUARES	MEAN SQUARES	F-VALUE
INTERCEPT	1	4.394E1	4.394E1	
REGRESSION	51	8.266E0	1.621E-1	54.246
Country|Gear|TC (1)	2	1.044E0	5.221E-1	174.754
Division (2)	2	2.579E-1	1.289E-1	43.159
Month (3)	11	2.267E-1	2.061E-2	6.897
YEAR (4)	36	7.015E0	1.949E-1	65.222
RESIDUALS	1666	4.978E0	2.988E-3	
TOTAL	1718	5.718E1		

REGRESSION COEFFICIENTS

CATEGORY	CODE	VARIABLE	COEFFICIENT	STD. ERROR	NO. OBS.
CGY	3125	INTERCEPT	0.355	0.070	1718
Division	32				
Month	7				
Year	56				
(1)	3114	1	-0.363	0.019	480
	3124	2	-0.104	0.019	396
(2)	34	3	-0.078	0.014	619
	35	4	-0.149	0.017	458
(3)	1	5	0.073	0.035	75
	2	6	0.074	0.034	89
	3	7	-0.003	0.034	91
	4	8	-0.129	0.031	122
	5	9	-0.128	0.027	160
	6	10	-0.032	0.025	177
	8	11	-0.002	0.026	176
	9	12	-0.033	0.026	182
	10	13	-0.072	0.026	162
	11	14	-0.033	0.026	163
	12	15	-0.016	0.029	128
(4)	57	16	-0.072	0.096	13
	58	17	-0.109	0.087	16
	59	18	-0.123	0.084	17
	60	19	-0.168	0.082	18
	61	20	-0.263	0.085	16
	62	21	-0.436	0.082	19
	63	22	-0.310	0.079	22
	64	23	-0.279	0.078	33
	65	24	-0.325	0.073	55
	66	25	-0.355	0.071	68
	67	26	-0.439	0.071	70

REGRESSION COEFFICIENTS (CONTINUED)

CATEGORY	CODE	VARIABLE	COEFFICIENT	STD. ERROR	NO. OBS.
(4)	68	27	-0.741	0.073	59
	69	28	-0.886	0.072	70
	70	29	-0.923	0.073	59
	71	30	-1.012	0.074	59
	72	31	-1.032	0.074	63
	73	32	-0.938	0.073	69
	74	33	-1.157	0.074	63
	75	34	-1.210	0.074	59
	76	35	-1.233	0.072	70
	77	36	-1.195	0.074	59
	78	37	-1.141	0.072	75
	79	38	-1.041	0.073	61
	80	39	-0.883	0.073	60
	81	40	-0.885	0.074	62
	82	41	-0.884	0.074	60
	83	42	-0.810	0.075	52
	84	43	-0.929	0.078	45
	85	44	-0.847	0.076	50
	86	45	-1.151	0.076	48
	87	46	-1.202	0.078	43
	88	47	-1.184	0.077	40
	89	48	-1.190	0.078	43
	90	49	-1.163	0.079	35
	91	50	-1.632	0.079	34
	92	51	-2.125	0.091	19

(MORE)

TABLE 14. (CONTINUED)

	PREDICTED CATCH RATE					
	LN TRANSFORM		RETRANSFORMED			
YEAR	MEAN	S.E.	MEAN	S.E.	CATCH	EFFORT
1956	0.3555	0.0048	1.426	0.099	10	7
1957	0.2831	0.0058	1.325	0.101	10	8
1958	0.2467	0.0042	1.279	0.083	10	8
1959	0.2321	0.0038	1.261	0.078	10	8
1960	0.1871	0.0035	1.205	0.071	21352	17713
1961	0.0924	0.0040	1.096	0.069	14903	13594
1962	-0.0809	0.0034	0.922	0.053	15217	16502
1963	0.0457	0.0029	1.047	0.056	24591	23492
1964	0.0764	0.0027	1.080	0.056	35474	32859
1965	0.0307	0.0016	1.032	0.042	45365	43962
1966	0.0006	0.0014	1.001	0.038	51225	51153
1967	-0.0837	0.0013	0.920	0.034	54190	58870
1968	-0.3853	0.0015	0.681	0.026	48674	71497
1969	-0.5304	0.0013	0.589	0.021	64815	110066
1970	-0.5678	0.0014	0.567	0.021	54929	96841
1971	-0.6563	0.0015	0.519	0.020	49394	95140
1972	-0.6763	0.0015	0.509	0.019	41605	81758
1973	-0.5830	0.0013	0.559	0.020	35908	64272
1974	-0.8020	0.0014	0.449	0.017	33381	74376
1975	-0.8550	0.0015	0.426	0.016	31521	74059
1976	-0.8778	0.0012	0.416	0.014	44202	106237
1977	-0.8391	0.0014	0.432	0.016	38557	89157
1978	-0.7858	0.0012	0.456	0.016	44343	97206
1979	-0.6853	0.0013	0.504	0.018	42286	83837
1980	-0.5277	0.0014	0.590	0.022	44762	75810
1981	-0.5300	0.0014	0.589	0.022	43415	73698
1982	-0.5286	0.0014	0.590	0.022	45218	76652
1983	-0.4541	0.0016	0.635	0.025	32092	50504
1984	-0.5738	0.0019	0.564	0.024	31046	55075
1985	-0.4912	0.0016	0.612	0.025	37472	61197
1986	-0.7953	0.0017	0.452	0.019	29394	65066
1987	-0.8465	0.0019	0.429	0.019	29750	69328
1988	-0.8283	0.0018	0.437	0.019	23762	54369
1989	-0.8344	0.0019	0.434	0.019	24444	56272
1990	-0.8079	0.0021	0.446	0.020	19257	43179
1991	-1.2764	0.0021	0.279	0.013	18848	67514
1992	-1.7691	0.0040	0.170	0.011	6119	35909

AVERAGE C.V. FOR THE RETRANSFORMED MEAN: 0.045

NOTE: Catches from 1956-1959 are unavailable
Catches from 1960-1972 are Canadian Total Catches
Catches from 1973-1992 are Canadian Otter Trawl Catches

LEGEND FOR ANOVA RESULTS:

CODE CGT:
3114 = Can(MPLD) TC 4, Side Trawler
3124 = Can(MPLD) TC 4, Stern Trawler
3125 = Can(MPLD) TC 5, Stern Trawler

CODE DIVISION:
32 = 3L, 34 = 3N, 35 = 3O

Table 15. Mean weight (kg) of American plaice per tow, by stratum, from 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, 208 209	1974 ATC 222	1975 ATC 233	1976 ATC 246	1977 ATC 262	1978 ATC 276	1979 ATC 289, 290, 291	1980 ATC 304, 305	1981 ATC 317, 318, 319	1982 ATC 327, 328, 329	1984 AN 28
51-100	328	114,023	-	-	-	-	-	-	26.9(3)	-	27.3(5)	-	52.5(2)	72.8(3)	12.5(2)
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)	69.6(4)
51-100	342	43,913	-	-	-	-	-	-	75.4(2)	72.6(2)	59.5(4)	77.0(4)	-	43.3(3)	60.1(4)
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)	89.5(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)	108.2(6)
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)	92.2(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)	144.4(5)
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)	63.7(5)
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	-	-	-	-	-	-	-	-	-	-	-	-	-
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)	87.4(37)
Biomass			232.8	135.8	53.3	101.7	124.8	163.9	271.3	213.7	223.4	252.1	221.0	222.0	97.9

Table 15. (Cont'd.)

	Year - Trip							
Stratum	1985 WT 28, 29, 30	1986 WT 48	1987 WT 58, 59, 60	1988 WT 70, 71	1989 WT 82, 83	1990 WT 96	1991 WT 106, 107	1992 WT 119-122
328	51.6(4)	51.2(9)	85.9(7)	23.3(2)	22.9(8)	71.0(7)	14.7(6)	4.8(4)
341	40.3(9)	43.7(9)	82.5(6)	50.8(6)	31.4(8)	111.0(4)	8.2(6)	0.7(8)
342	35.2(3)	53.5(3)	91.8(2)	94.0(2)	39.6(3)	32.5(2)	3.6(2)	0.5(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)
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)
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)
346	26.3(2)	33.1(5)	7.3(5)	8.8(4)	6.4(4)	9.4(4)	-	2.7(4)
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)
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)
349	49.8(14)	58.3(14)	105.1(11)	135.9(8)	45.7(11)	29.4(9)	9.5(9)	2.8(9)
350	98.5(12)	99.5(11)	68.7(11)	86.1(8)	61.7(11)	30.6(7)	30.8(8)	2.9(11)
363	107.8(8)	138.4(10)	68.6(9)	97.0(7)	53.6(9)	36.1(7)	23.4(7)	3.4(9)
364	102.3(17)	87.4(17)	164.0(15)	136.1(10)	94.4(16)	50.0(12)	18.4(11)	3.8(12)
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)
366	37.6(6)	21.4(8)	14.5(7)	18.8(6)	15.3(8)	12.2(6)	-	4.0(6)
368	30.5(2)	16.5(2)	1.7(3)	2.0(2)	1.6(3)	7.6(2)	-	20.9(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)
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)
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)
372	109.9(12)	69.6(14)	30.1(13)	58.3(11)	52.7(13)	22.8(7)	12.6(10)	2.5(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)
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)
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)
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)
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)
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)
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)
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)
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)
729	0.5(2)	-	-	-	-	-	2.2(2)	17.0(2)
730	0.3(2)	-	-	-	-	-	0.1(2)	3.0(2)
731	326.0(2)	-	-	-	-	-	3.4(2)	4.0(2)
732	0.3(2)	-	-	-	-	-	0.9(2)	6.3(2)
733	21.4(3)	-	-	-	-	-	0.5(2)	13.2(2)
734	1.5(3)	-	-	-	-	-	3.4(2)	1.9(2)
735	57.0(2)	-	-	-	-	-	-	63.4(2)
736	5.0(2)	-	-	-	-	-	-	16.6(2)
Mean (#sets)	60.3(221)	63.1(211)	65.5(181)	69.9(154)	55.4(205)	29.9(156)	12.9(143)	4.5(178)
Biomass	175.1	174.1	180.9	193.0	153.0	82.6	34.5	13.0

Table 16. Biomass estimates (000 t) of A. plaice, by stratum and depth zone, from Canadian spring surveys in Div. 3L from 1985-1993. (+) indicates stratum biomass < 50 t and (-) indicates stratum not surveyed.

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

Table 17. Mean weight (kg) of American plaice per tow, by stratum, from 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	1984 AN 27-28	1985 WT 29 AN 43
151-200	357	12,311	-	-	0.0(2)	-	-	-	5.5(2)	-	2.4(3)	0.5(3)	0.0(2)	0.8(2)	0.0(2)	22.3(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)	3.5(2)	180.5(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)	51.8(2)	28.0(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)	47.3(7)	38.2(16)
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)	39.0(5)	47.0(7)
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)	89.9(7)	66.9(11)
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)	66.1(7)	67.3(9)
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)	112.1(3)	49.5(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)	46.2(5)	32.8(8)
≤ 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)	10.6(4)	21.7(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)	319.5(2)	37.3(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)	21.5(2)	36.5(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)	4.5(2)	5.8(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)	-	1.3(2)	10.8(2)
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)	53.8(2)	26.3(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)	2.8(3)	63.4(4)
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)	61.5(3)	22.2(3)
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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)	54.7(60)	47.8(85)
Biomass			48.6	59.5	35.1	25.2	22.6	43.1	64.5	89.4	50.6	40.7	68.4	59.9	47.4	75.3

Table 17. (Cont'd.)

Stratum	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
357	0.0(2)	-	0.0(2)	0.0(2)	0.5(2)	0.4(2)	1.5(2)	0.0(2)
358	2.8(2)	1.5(2)	1.9(2)	0.8(2)	5.6(2)	11.6(2)	30.0(2)	7.2(2)
359	27.0(2)	5.9(2)	3.9(2)	17.5(2)	12.9(2)	10.4(2)	17.8(2)	104.0(2)
360	32.5(13)	15.3(15)	10.4(12)	22.2(15)	18.3(15)	15.6(12)	5.8(14)	17.7(11)
361	22.7(10)	36.9(8)	26.5(7)	39.6(10)	39.0(9)	11.7(8)	3.3(8)	18.2(7)
362	82.6(14)	55.4(13)	50.6(10)	56.9(13)	49.9(10)	29.8(10)	6.1(12)	10.9(9)
373	26.4(14)	78.6(13)	44.1(10)	60.5(13)	9.5(10)	25.9(11)	3.7(10)	3.3(9)
374	15.0(6)	36.5(5)	20.2(5)	30.8(5)	10.4(5)	15.6(5)	3.4(5)	3.8(3)
375	45.6(8)	69.4(8)	36.8(6)	23.4(8)	24.9(8)	4.8(6)	11.9(6)	10.1(6)
376	22.4(9)	27.4(8)	6.0(6)	19.8(8)	6.3(7)	10.9(7)	1.2(7)	10.7(6)
377	34.0(2)	32.8(2)	26.8(2)	36.9(2)	56.3(2)	27.2(3)	19.8(2)	60.0(2)
378	68.1(2)	7.0(2)	10.5(2)	2.1(2)	45.2(2)	11.7(3)	24.8(2)	126.5(2)
379	1.0(2)	7.8(2)	0.1(2)	0.0(2)	0.9(2)	3.0(2)	13.0(2)	1.4(2)
380	3.6(3)	0.0(2)	0.0(2)	2.6(2)	6.0(2)	3.7(2)	10.5(2)	13.5(2)
381	15.3(3)	2.4(2)	5.8(2)	7.6(2)	15.7(2)	7.2(2)	10.0(2)	19.3(2)
382	6.5(4)	50.3(3)	5.5(2)	15.7(3)	7.5(3)	1.4(2)	2.6(3)	2.0(2)
383	19.9(4)	36.3(3)	24.0(3)	22.0(3)	56.4(2)	3.5(3)	2.1(2)	1.2(3)
723	-	-	-	-	-	0.1(2)	3.0(2)	0.1(2)
724	-	-	-	-	-	0.0(2)	3.9(2)	0.2(2)
725	-	-	-	-	-	0.2(2)	-	0.6(2)
726	-	-	-	-	-	0.9(2)	1.9(2)	5.3(2)
727	-	-	-	-	-	2.8(2)	7.6(2)	16.4(2)
728	-	-	-	-	-	1.1(2)	12.8(2)	14.5(2)
Mean (#sets)	35.0(101)	42.6(91)	25.9(77)	34.1(94)	24.0(85)	15.2(93)	6.0 (93)	- (84)
Biomass	43.8	52.8	32.4	42.8	30.1	19.9	7.8	17.9

*Preliminary analysis.

Table 18. Biomass estimates (000 t) of A. plaice, by stratum and depth zone, from Canadian spring surveys in Div. 3N from 1985-1993.

Depth (fm)	Stratum	Year 1985	1986	1987	1988	1989	1990	1991	1992	1993*
≤ 30	375	3.9	5.5	8.3	4.4	2.8	3.0	0.6	1.4	1.2
	376	2.4	2.6	3.1	0.7	2.2	0.7	1.2	0.2	0.1	1.2
	Total	**6.3**	**8.1**	**11.4**	**5.1**	**5.0**	**3.7**	**1.8**	**1.5**	**2.4**
31-50	360	8.6	7.3	3.4	2.3	5.0	4.1	3.5	1.3	4.0
	361	6.5	3.2	5.1	3.7	5.5	5.4	1.6	0.4	2.5
	362	12.7	15.6	10.5	9.6	10.8	9.4	5.6	1.2	2.1
	373	12.7	5.0	14.9	8.3	11.4	1.8	4.9	0.7	0.6
	374	3.5	1.3	2.6	1.4	2.2	0.7	1.1	0.2	0.3
	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**	**9.6**
51-100	359	0.9	0.8	0.2	0.1	0.6	0.4	0.3	0.6	3.3
	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
	Total	**4.3**	**1.4**	**2.9**	**0.6**	**1.7**	**1.2**	**0.5**	**0.8**	**3.9**
101-150	358	3.0	+	+	+	+	+	0.2	0.5	+
	378	0.4	0.7	+	0.1	+	0.5	0.1	0.3	1.3
	381	0.4	0.2	+	+	0.1	0.2	0.1	0.4	0.3
	Total	**3.8**	**0.9**	**+**	**0.1**	**0.1**	**0.7**	**0.4**	**1.2**	**1.6**
151-200	357	0.3	0.0	-	0.0	0.0	+	+	+	0
	379	+	+	+	+	0.0	+	+	0.1	+
	380	+	+	0.0	0.0	+	+	+	+	0.1
	Total	**0.3**	**+**	**+**	**+**	**+**	**+**	**+**	**0.1**	**0.1**
201-300	723	-	-	-	-	-	-	+	+	+
	725	-	-	-	-	-	-	+	+	+
	727	-	-	-	-	-	-	+	+	0.2
	Total	-	-	-	-	-	-	+	+	**0.2**
301-400	724	-	-	-	-	-	-	0.0	+	+
	726	-	-	-	-	-	-	+	+	+
	728	-	-	-	-	-	-	+	0.1	0.2
	Total	-	-	-	-	-	-	+	**0.1**	**0.2**
	Grand Total	59.8	43.8	52.6	32.3	42.8	29.8	19.6	7.6	18.0

*Preliminary analysis.

Table 19. Mean weight (kg) of American plaice per tow, by stratum, from 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.

			Year - Trip													
Depth (fm)	Stratum	No. of trawlable units	1973 ATC 207, 208, 209	1975 ATC ATC 233	1976 ATC 289, ATC 245	1977 ATC 263	1978 ATC 276, 277	1979 ATC 327, 290, 291	1980 WT 58, ATC 303	1981 318, 319	1982 328, 329	1984 AN 27	1985 AN 43	1986 WT 47	1987 59, 60	1988 WT 70
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)	25.7(5)	30.5(8)	23.4(8)	49.3(9)	8.2(7)
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)	48.0(4)	118.4(10)	44.5(9)	56.1(11)	29.6(9)
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)	80.2(3)	98.8(3)	11.4(4)	46.8(2)	43.8(2)
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)	6.0(2)	24.3(5)	38.8(6)	59.4(5)	5.5(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)	0.0(2)	0.0(2)	0.0(3)	0.4(2)	1.3(2)
151-200	334	6,906	-	-	0.0(2)	0.0(2)	0.0(3)	0.6(3)	0.0(2)	-	0.1(4)	0.0(2)	1.5(2)	0.4(2)	0.8(2)	0.1(2)
151-200	335	4,354	0.5(2)	-	13.3(3)	-	7.1(2)	4.1(2)	1.5(3)	-	0.7(2)	0.4(2)	0.7(2)	0.1(2)	0.4(2)	1.8(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)	0.0(2)	1.3(2)	0.3(2)	0.0(2)	1.8(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)	7.0(2)	15.8(5)	12.4(5)	14.3(6)	6.3(4)
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)	60.1(5)	59.6(9)	28.5(9)	26.7(9)	50.3(8)
51-100	339	43,913	152.4(2)	47.2(2)	-	-	65.5(2)	262.4(3)	-	96.5(2)	27.0(4)	160.0(2)	13.9(3)	5.5(3)	68.5(3)	29.2(3)
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)	49.5(4)	43.9(9)	35.9(7)	93.7(9)	56.1(7)
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)	92.9(6)	73.3(9)	80.3(14)	71.1(13)	76.9(10)
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)	27.0(7)	56.5(11)	34.2(14)	63.5(13)	52.2(11)
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)	48.5(2)	55.5(6)	29.2(7)	44.4(6)	21.0(5)
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)	11.8(2)	73.2(3)	9.8(3)	17.3(2)	6.0(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)	4.8(2)	20.3(2)	1.0(2)	1.8(2)	0.4(2)
151-200	356	4,579	0.9(2)	-	-	-	-	11.6(2)	4.8(2)	30.5(2)	-	4.3(2)	7.0(2)	0.0(2)	1.2(2)	1.0(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	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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)	48.0(56)	57.0(93)	35.9(102)	53.4(100)	37.7(84)
Biomass			46.1	49.1	67.6	59.2	27.5	62.5	60.1	79.2	42.4	64.5	48.2	71.7	50.7	76.6

Table 19. (Cont'd.)

Stratum	Year - Trip 1989 WT WT 82	1990 WT 94, 95	1991 WT 106, 107	1992 119, 120	1993[a] WT 136
329	30.2(9)	19.4(7)	13.0(9)	3.0(8)	5.7(6)
330	40.1(11)	33.2(10)	29.4(11)	2.4(10)	3.4(7)
331	10.7(2)	-	36.5(2)	10.3(2)	42.7(2)
332	16.8(5)	16.9(5)	25.2(6)	20.4(5)	16.9(4)
333	0.2(2)	2.4(2)	1.0(2)	0.4(2)	0.2(2)
334	0.4(2)	3.9(2)	0.9(2)	2.0(2)	0.6(2)
335	0.1(2)	0.0(2)	3.0(3)	4.0(3)	9.9(2)
336	0.5(2)	0.6(2)	4.1(2)	17.5(2)	4.7(2)
337	10.5(5)	13.3(5)	17.5(5)	14.5(4)	4.8(2)
338	21.3(10)	35.9(8)	29.2(10)	19.0(6)	14.8(6)
339	84.0(3)	78.6(3)	30.5(3)	55.0(2)	11.2(2)
340	26.3(9)	55.1(9)	31.3(9)	16.5(5)	9.4(6)
351	57.5(13)	78.6(12)	43.0(12)	14.4(10)	11.4(9)
352	35.1(13)	47.4(13)	23.0(14)	30.6(8)	29.6(7)
353	28.7(7)	28.3(6)	8.3(7)	26.2(4)	24.7(4)
354	14.0(2)	10.4(2)	15.9(3)	22.7(2)	10.5(2)
355	13.0(2)	7.1(2)	14.8(2)	13.6(2)	1.4(2)
356	0.0(2)	0.5(2)	2.7(2)	12.6(2)	1.7(2)
717	-	-	1.0(2)	0.0(2)	1.1(2)
718	-	-	0.0(2)	0.0(2)	0.0(2)
719	-	-	0.1(2)	1.1(2)	0.2(2)
720	-	-	0.0(2)	0.2(2)	0.5(2)
721	-	-	0.9(2)	1.6(2)	0.7(2)
722	-	-	0.6(2)	1.6(2)	0.4(2)
Mean (#sets)	32.6(101)	40.4(92)	24.9(116)	16.9(91)	. (81)
Biomass	43.8	52.9	34.5	23.3	19.0

[a]Preliminary analysis.

Table 20. Biomass estimates (000 t) of A. plaice, by stratum and depth zone, from Canadian spring surveys in Div. 3Ø from 1985 - 1993.

Depth (fm)	Stratum	Year 1985	1986	1987	1988	1989	1990	1991	1992	1993[a]
31-50	330	18.6	7.0	8.8	4.6	6.3	5.2	4.6	0.4	0.5
	331	3.4	0.4	1.6	1.5	0.4	-	1.2	0.4	1.5
	338	8.5	4.1	3.8	7.2	3.0	5.1	4.2	2.7	2.1
	340	5.6	4.6	12.0	7.2	3.4	7.1	4.0	2.1	1.2
	351	13.9	15.2	13.2	14.5	10.9	14.9	8.1	2.7	2.2
	352	10.9	6.6	12.3	10.1	6.8	9.2	4.4	5.9	5.7
	353	5.3	2.8	4.3	2.0	2.8	2.7	0.8	2.5	2.4
	Total	**66.2**	**40.7**	**56.0**	**47.1**	**33.6**	**44.2**	**27.3**	**16.7**	**15.6**
51-100	329	3.9	3.0	6.4	1.1	3.9	2.5	1.7	0.4	0.7
	332	1.9	3.0	4.7	0.4	1.3	1.3	2.0	1.6	1.3
	337	1.1	0.9	1.0	0.4	0.7	0.9	1.2	1.0	0.3
	339	0.6	0.2	3.0	1.3	3.7	3.4	1.3	2.4	0.5
	354	2.6	0.3	0.6	0.2	0.5	0.4	0.6	0.8	0.4
	Total	**10.1**	**7.4**	**15.7**	**3.4**	**10.1**	**8.5**	**6.8**	**6.2**	**3.2**
101-150	333	0.0	0.0	+	+	+	+	+	+	+
	336	+	+	+	+	+	+	+	0.2	+
	355	0.2	+	+	+	0.1	+	0.1	0.1	+
	Total	**0.2**	**+**	**+**	**+**	**0.1**	**+**	**0.1**	**0.3**	**+**
151-200	334	+	+	+	+	+	+	+	+	+
	335	+	+	+	+	+	0.0	+	+	+
	356	+	0.0	+	+	0.0	+	+	+	+
	Total	**+**	**+**	**+**	**+**	**+**	**+**	**+**	**+**	**+**
201-300	717	-	-	-	-	-	-	+	0.0	+
	719	-	-	-	-	-	-	+	+	+
	721	-	-	-	-	-	-	+	+	+
	Total	**-**	**-**	**-**	**-**	**-**	**-**	**+**	**+**	**+**
301-400	718	-	-	-	-	-	-	0.0	0.0	0.0
	720	-	-	-	-	-	-	0.0	+	+
	722	-	-	-	-	-	-	+	+	+
	Total	**-**	**-**	**-**	**-**	**-**	**-**	**+**	**+**	**+**
Grand Total		76.5	48.1	71.7	50.5	43.8	52.7	34.2	23.2	18.8

[a]Preliminary analysis.

Table 21. Biomass ('000 t) of A. plaice outside the 200-mile limit in Div. 3L, as estimated by Canadian spring surveys, 1985-92.

Stratum	% Outside	1985	1986	1987	1988	1989	1990	1991	1992
385	5	0.4	0.6	0.7	0.4	0.6	+	0.1	0.1
390	55	0.9	0.9	1.7	0.7	0.6	0.4	0.3	0.1
389	62	1.0	1.0	0.4	0.7	0.6	0.2	0.2	0.1
391	100	0.2	1.3	0.3	0.6	0.2	0.1	0.3	+
387	37	0.4	+	+	+	+	+	0.1	0.2
388	99	0.7	0.3	+	+	+	+	0.1	0.3
392	100	0.1	0.1	+	+	+	+	0.0	+
729	100	+	-	-	-	-	-	+	0.2
731	100	5.3	-	-	-	-	-	+	0.1
733	50	0.4	-	-	-	-	-	+	0.2
730	100	+	-	-	-	-	-	+	+
732	100	+	-	-	-	-	-	+	0.1
734	67	+	-	-	-	-	-	+	+
Biomass outside		9.4	4.2	3.1	2.4	2.0	0.7	1.1	1.4
Total 3L Biomass		175.0	174.1	180.5	192.7	152.8	82.6	34.3	13.0
% Biomass outside		5.4	2.4	1.7	1.2	1.3	0.8	3.2	10.8

Table 22. Biomass ('000 t) of A. plaice outside the 200-mile limit in Div. 3N, as estimated by Canadian spring surveys, 1985-93.

Stratum	% Outside	1985	1986	1987	1988	1989	1990	1991	1992	1993[a]
357	100	0.3	0.0	+	0.0	0.0	+	+	+	0.0
358	100	3.0	+	+	+	+	+	0.2	0.5	+
359	100	0.9	0.8	0.2	0.1	0.6	0.4	0.3	0.6	3.3
360	93	8.0	6.8	3.2	2.1	4.6	3.8	3.3	1.2	3.7
374	23	0.8	0.3	0.6	0.3	0.5	0.2	0.2	+	0.1
375	17	0.7	0.9	1.4	0.7	0.5	0.5	0.1	0.2	0.2
376	89	2.1	2.3	2.8	0.6	2.0	0.6	1.1	0.1	1.1
377	100	0.3	0.3	0.3	0.2	0.3	0.4	0.2	0.1	0.5
378	100	0.4	0.7	+	0.1	+	0.5	0.1	0.3	1.3
379	100	+	+	+	+	0.0	+	+	0.1	+
380	83	+	+	0.0	0.0	+	+	+	+	0.1
381	79	0.3	0.2	+	+	+	0.2	+	0.3	0.2
382	53	1.6	0.2	1.3	0.2	0.4	0.2	+	0.1	0.1
Biomass outside		18.4	12.5	9.8	4.3	8.9	6.8	5.5	3.5	10.6
Total 3N biomass		59.8	43.8	52.6	32.3	42.8	29.8	19.6	7.8	17.9
% Biomass outside		30.8	28.5	18.6	13.3	20.8	22.8	28.1	44.9	59.2

[a]Preliminary analysis.

Table 23. Biomass ('000 t) of A. plaice outside the 200-mile limit in Div. 3Ø, as estimated by Canadian spring surveys, 1985-93.

Stratum	% Outside	1985	1986	1987	1988	1989	1990	1991	1992	1993[a]
353	21	1.1	0.6	0.9	0.4	0.6	0.6	0.2	0.5	0.5
354	52	1.3	0.2	0.3	0.1	0.3	0.2	0.3	0.4	0.2
355	72	0.1	+	+	+	+	+	+	+	+
356	77	+	0.0	+	+	0.0	+	+	+	+
Biomass outside		2.5	0.8	1.2	0.5	0.9	0.8	0.5	0.9	0.7
Total 3Ø biomass		76.5	48.1	71.7	50.5	43.8	52.7	34.2	23.3	19.0
% Biomass outside		3.3	1.7	1.7	1.0	2.1	1.5	1.5	3.9	3.7

[a]Preliminary analysis.

Table 24. Summary of A. plaice biomass estimates outside 200-mile limit, from Canadian spring surveys, 1985-92.

		Biomass outside	Biomass total	% Outside
1985	3L	9.4	175.0	5.4
	3N	18.4	59.8	30.8
	3Ø	2.5	76.5	3.3
	3LNO	30.3	311.3	9.7
1986	3L	4.2	174.1	2.4
	3N	12.5	43.8	28.5
	3Ø	0.8	48.1	1.7
	3LNO	17.5	266.0	6.6
1987	3L	3.1	180.5	1.7
	3N	9.8	52.6	18.6
	3Ø	1.2	71.7	1.7
	3LNO	14.1	304.8	4.6
1988	3L	2.4	192.7	1.2
	3N	4.3	32.3	13.3
	3Ø	0.5	50.5	1.0
	3LNO	7.2	275.5	2.6
1989	3L	2.0	152.8	1.3
	3N	8.9	42.8	20.8
	3Ø	0.9	43.8	2.1
	3LNO	11.8	239.4	4.9
1990	3L	0.7	82.6	0.8
	3N	6.8	29.8	22.8
	3Ø	0.8	52.7	1.5
	3LNO	8.3	165.1	5.0
1991	3L	1.1	34.3	3.2
	3N	5.5	19.6	28.1
	3Ø	0.5	34.2	1.5
	3LNO	7.1	88.1	8.1
1992	3L	1.4	13.0	10.8
	3N	3.5	7.8	44.9
	3Ø	0.9	23.3	3.9
	3LNO	5.8	44.1	7.6

TABLE 25. 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	199
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.
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.
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.
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.
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.
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.
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.
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.
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
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
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
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
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
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
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
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.
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.
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.
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.
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.
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.
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.
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.
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+	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
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
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
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
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
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
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

TABLE 26 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
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
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
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
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
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
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
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
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	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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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

TABLE 27 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
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
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
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
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
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
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
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
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	14.8	14.1	9.3	7.4
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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

TABLE 28 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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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

Table 29. 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 323 324, 325	1982 ATC 333, 334	1983 WT 7, 8, 9	1984 WT 16, 17, 18	1985 WT 37, 38, 39	1986 AN 72	1987 WT 65	1988 WT 78	1989 WT 87	1990 WT 101	1991 WT 113-115	1992 WT 128-130
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
729	-	-	-	3.3(2)	4.5(2)	0.0(2)	-	-	-	3.2(2)	1.5(3)	0.9(2)
730	-	-	-	0.0(2)	0.0(2)	-	-	-	-	-	0.0(2)	0.0(2)
731	-	-	-	0.0(2)	1.0(2)	-	-	-	-	0.1(2)	0.1(3)	0.1(3)
732	-	-	-	0.0(2)	0.0(2)	-	-	-	-	0.0(2)	0.2(2)	0.6(2)
733	-	-	-	0.0(4)	0.7(3)	-	-	-	-	0.3(2)	0.3(3)	6.9(3)
734	-	-	-	0.0(3)	0.0(2)	-	-	-	-	0.0(2)	0.0(2)	0.0(2)
735	-	2.3(2)	-	0.0(3)	0.2(2)	20.6(2)	-	-	-	-	14.4(3)	13.2(3)
736	-	-	0.0(2)	-	6.8(2)	2.1(2)	-	-	-	6.4(2)	17.5(2)	8.3(2)
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)
Biomass (Total)	273.3	206.4	268.0	313.8	219.2	146.7	168.7	189.5	92.9	135.3	57.8	25.1

Table 30. Biomass estimates ('000 t) of A. plaice, by stratum and depth zone, from Canadian fall surveys in Div. 3L in 1990 - 1992.

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

TABLE 31 ABUNDANCE (MILLIONS) OF A.PLAICE FROM FALL SURVEYS IN 3L.

AGE	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
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
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
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
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	22.2	35.7	52.9	18.7	14.3	33.3	24.3	30.4	23.1	47.1	23.6	12.3
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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+	398.3	226.3	188.6	272.3	168.1	94.1	104.8	114.1	43.2	87.1	39.8	10.7
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
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
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

Table 32. Biomass estimates ('000 t) of A. plaice, by stratum and depth zone, from Canadian fall surveys in Div. 3N in 1990 - 1992.

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

Table 33. Biomass estimates ('000 t) of A. plaice, by stratum and depth zone, from Canadian fall surveys in Div. 3Ø in 1990 - 1992.

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

TABLE 34 ABUNDANCE (MILLIONS) OF A.PLAICE FROM FALL SURVEYS IN 3N, 3O AND 3LNO FROM 1990-92.

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

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

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

Table 35. Age at 50% maturity for female and male A.plaice in Div. 3L, 3N and 3O.

A_{50} DIVISION AND SEX BY YEAR						
YEAR	3L		3N		3O	
	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE
1971	10.61	6.15	8.98	4.98	--	--
1972	10.93	5.90	8.95	5.27	--	--
1973	9.81	5.53	9.34	5.04	9.39	5.43
1974	11.09	5.67	9.56	4.82	--	--
1975	11.61	6.88	8.51	5.03	10.02	5.30
1976	10.99	6.46	9.89	4.70	11.20	6.23
1977	11.17	6.35	9.23	4.57	7.93	4.72
1978	10.15	5.51	11.23	5.94	10.88	7.25
1979	10.00	6.10	10.78	5.95	10.45	5.21
1980	10.73	6.54	9.68	5.72	11.13	6.63
1981	9.85	6.25	9.46	6.00	10.70	6.12
1982	10.42	6.70	10.01	5.38	10.30	5.12
1984	8.50	5.06	9.14	5.42	8.80	5.43
1985	8.40	4.86	9.04	5.03	9.49	5.37
1986	8.43	5.01	9.02	4.98	8.83	5.06
1987	7.99	5.62	8.91	5.26	8.07	5.37
1988	7.78	3.76	8.45	5.20	9.30	5.97
1989	7.92	3.98	7.85	3.64	8.98	5.76
1990	7.74	4.47	8.00	4.94	9.02	5.74
1991	8.71	4.73	8.30	2.90?	8.89	5.46
1992	7.95	4.03	8.47	5.08	8.98	5.40

Table 36. Age at 50% maturity for female and male A.plaice in Div. 3LNO.

A_{50} BY YEAR AND SEX DIVISIONS COMBINED		
YEAR	FEMALES	MALES
1973	9.56	5.40
1975	11.26	6.08
1976	10.96	5.98
1977	10.98	5.50
1978	10.39	5.76
1979	10.12	5.86
1980	10.71	6.41
1981	9.98	6.12
1982	10.36	6.11
1984	8.70	5.28
1985	8.66	4.99
1986	8.53	5.03
1987	8.08	5.50
1988	8.01	4.50
1989	8.09	4.05
1990	8.12	4.90
1991	8.71	4.63
1992	8.49	4.93

Table 37. Results of sequential population analysis on A.plaice in Div. 3LNO from 1975-92 using the Adaptive framework.

3LNO AMERICAN PLAICE 6/08/93 23:05
APPROXIMATE STATISTICS ASSUMING LINEARITY NEAR SOLUTION

ORTHOGONALITY OFFSET..... 0.001352
MEAN SQUARE RESIDUALS 0.196421

PARAMETER	AGE	ESTIMATE	STD. ERR.	T-STAT	C.V.
NUMBERS					
	5	29102	13283	2.191	0.456
	6	56187	18521	3.034	0.330
	7	46240	13583	3.404	0.294
	8	19497	5379	3.625	0.276
	9	14753	3979	3.708	0.270
	10	9842	2753	3.576	0.280
	11	4960	1455	3.408	0.293
	12	2572	761	3.379	0.296
	13	1356	373	3.639	0.275
	14	866	180	4.814	0.208
INDEX 1: RVMAT					
	5	2.67E-4	3.06E-5	8.721	0.115
	6	5.86E-4	6.56E-5	8.932	0.112
	7	1.20E-3	1.33E-4	9.012	0.111
	8	1.93E-3	2.14E-4	9.047	0.111
	9	2.27E-3	2.50E-4	9.061	0.110
	10	2.34E-3	2.57E-4	9.072	0.110
	11	2.03E-3	2.25E-4	9.033	0.111
	12	2.40E-3	2.67E-4	8.992	0.111
	13	2.51E-3	2.81E-4	8.921	0.112
	14	2.74E-3	3.11E-4	8.798	0.114

LOG RESIDUALS FROM RVMAT 10/ 6/93

	1975	1976	1977	1978	1979	1980	1981	1982	1984	1985	1986	1987	1988	1989	1990	1991	1992
5	-1.005	-0.537	0.314	0.758	0.389	0.099	-0.051	-0.629	-1.264	-0.336	-0.261	0.394	0.403	0.515	0.764	0.447	0.000
6	-0.958	-0.915	0.138	0.370	0.191	0.147	0.005	-0.523	-0.637	-0.331	0.054	0.661	0.741	0.869	0.432	0.178	-0.422
7	-0.855	-0.731	-0.034	0.041	0.097	0.182	0.115	-0.519	-0.272	-0.072	0.208	0.629	0.731	0.756	0.411	0.017	-0.704
8	-0.602	-0.344	0.033	-0.114	0.065	0.392	0.551	-0.095	-0.143	-0.223	-0.163	0.337	0.294	0.506	0.269	-0.241	-0.522
9	-0.194	0.005	-0.072	-0.228	-0.142	0.180	0.641	0.371	-0.082	-0.357	-0.332	-0.053	0.257	0.303	0.346	-0.092	-0.550
10	0.238	0.562	0.434	-0.079	0.069	-0.058	0.308	0.537	-0.190	-0.373	-0.487	-0.292	-0.166	-0.149	0.339	-0.022	-0.671
11	0.373	0.907	0.475	-0.284	-0.058	-0.241	0.038	0.506	-0.361	-0.227	-0.600	-0.496	-0.090	-0.062	0.203	0.286	-0.369
12	0.393	0.883	0.684	-0.106	-0.273	-0.368	-0.341	0.095	-0.278	-0.375	-0.338	-0.198	-0.015	0.059	0.327	0.262	-0.409
13	0.159	0.815	0.417	0.011	-0.511	-0.424	-0.591	0.105	-0.378	-0.297	-0.069	0.106	0.086	0.124	0.484	0.227	-0.264
14	0.151	0.257	0.182	0.109	-0.201	-0.628	-0.794	0.090	-0.215	-0.083	-0.276	0.330	0.483	0.183	0.392	0.334	-0.317

SUM OF RV RESIDUALS : 6.238317205E-7 MEAN RESIDUAL : 3.66959836E-9

Table 37. Cont.

POPULATION NUMBERS (000S) 10/ 6/93

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
5	293876	279436	233497	218061	200271	190090	171898	173356	156541	146454	128111	96418	80838	77606	72748	101923	75234	29050
6	230624	239806	228026	190290	177123	162831	155395	140599	141907	128057	119863	104621	74952	64160	60907	48029	69754	56075
7	193349	185989	192801	180609	151754	139089	130621	126725	114828	115287	104485	97422	76873	56894	49623	39412	32361	46114
8	124515	151768	144329	149941	139550	112002	105252	104909	102112	91251	93017	83408	68401	55980	42190	30284	28207	19396
9	75824	93409	106736	107553	113354	97291	80318	81843	81550	78357	71714	71042	56951	46145	39255	25808	20629	14651
10	43739	53724	61460	75120	76527	79255	66887	58592	58912	59219	58857	49038	46065	32271	28621	19309	13288	9781
11	26039	28659	32822	40224	48943	51339	52029	44424	36356	41260	39474	33946	27595	21754	17078	12225	7967	4918
12	16141	16160	15933	20973	23940	32117	31819	30323	22074	22081	22120	19173	14902	12274	9431	6377	4171	2547
13	11105	8933	8566	9193	10997	16185	18976	15309	11717	11271	9968	9756	6309	5879	4584	3223	1934	1340
14	6236	5665	4578	4869	4220	7336	9874	7671	5348	5441	4639	4444	2606	2382	2378	1917	1098	850
15	3330	2738	2549	2397	1961	2809	4590	3025	2458	2134	2179	2017	1253	955	904	1017	715	570
16	1674	1404	1023	1182	631	1296	1716	1100	667	910	761	666	370	331	188	243	423	363
17	1330	681	621	528	380	372	821	392	320	209	379	272	55	79	29	22	126	191
5+	1027782	1068372	1032940	1000939	949651	892010	830196	788268	734792	701931	655568	572222	457170	376709	327938	289791	255907	185845

3LNO AMERICAN PLAICE

FISHING MORTALITY 10/ 6/93

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
5	0.003	0.003	0.005	0.008	0.007	0.002	0.001	0.000	0.001	0.000	0.003	0.052	0.031	0.042	0.215	0.179	0.094	0.006
6	0.015	0.018	0.033	0.026	0.042	0.020	0.004	0.002	0.008	0.003	0.007	0.108	0.076	0.057	0.235	0.195	0.214	0.020
7	0.042	0.054	0.051	0.058	0.104	0.079	0.019	0.016	0.030	0.015	0.025	0.154	0.117	0.099	0.294	0.135	0.312	0.064
8	0.087	0.152	0.094	0.080	0.161	0.133	0.052	0.052	0.065	0.041	0.070	0.182	0.194	0.155	0.291	0.184	0.455	0.214
9	0.145	0.219	0.151	0.140	0.158	0.175	0.115	0.129	0.120	0.086	0.180	0.233	0.368	0.278	0.510	0.464	0.546	0.316
10	0.223	0.293	0.224	0.228	0.199	0.221	0.209	0.277	0.156	0.206	0.350	0.375	0.550	0.436	0.651	0.685	0.794	0.277
11	0.277	0.387	0.248	0.319	0.221	0.278	0.340	0.499	0.299	0.423	0.522	0.623	0.610	0.636	0.785	0.875	0.940	0.409
12	0.392	0.435	0.350	0.446	0.191	0.326	0.532	0.751	0.472	0.595	0.619	0.912	0.730	0.785	0.874	0.993	0.936	0.472
13	0.473	0.469	0.365	0.579	0.205	0.294	0.706	0.852	0.567	0.688	0.608	1.120	0.774	0.705	0.672	0.877	0.622	0.634
14	0.623	0.599	0.447	0.710	0.207	0.269	0.983	0.938	0.719	0.715	0.633	1.066	0.804	0.769	0.649	0.787	0.456	1.065
15	0.663	0.785	0.569	1.135	0.214	0.293	1.229	1.312	0.794	0.831	0.985	1.496	1.132	1.424	1.115	0.677	0.478	0.723
16	0.700	0.616	0.461	0.934	0.327	0.256	1.275	1.033	0.962	0.675	0.827	2.296	1.342	2.219	1.931	0.456	0.596	0.723
17	0.496	0.501	0.387	0.578	0.201	0.296	0.740	0.847	0.586	0.666	0.620	1.033	0.769	0.753	0.732	0.886	0.671	0.723

Table 38. Results of sequential population analysis on A.plaice in Div. 3LNO from 1984-92 using the Laurec/Shepherd method.

3LNO plaice

RV data from file PLAICERV.DAT

Disaggregated Qs
Log transformation
No trend in Q (mean used)

Terminal Fs estimated using Laurec-Shepherd

Tuning converged after 8 iterations

Total of the absolute F residuals for all ages in the
last year, between iterations 7 and 8 = .000

Regression weights
, 1.000, 1.000, 1.000, 1.000, 1.000, 1.000, 1.000, 1.000, 1.000

Oldest age F = 1.000*average of 3 younger ages.

Fishing mortalities

Age,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992
5,	.000,	.003,	.054,	.035,	.051,	.284,	.349,	.210,	.008
6,	.003,	.007,	.111,	.079,	.065,	.292,	.278,	.524,	.049
7,	.015,	.026,	.156,	.121,	.103,	.346,	.176,	.507,	.199
8,	.042,	.071,	.184,	.197,	.160,	.305,	.228,	.661,	.429
9,	.087,	.183,	.237,	.374,	.284,	.531,	.494,	.752,	.586
10,	.207,	.354,	.382,	.559,	.446,	.669,	.736,	.892,	.474
11,	.426,	.525,	.630,	.625,	.652,	.812,	.926,	1.107,	.519
12,	.599,	.622,	.912,	.745,	.820,	.918,	1.074,	1.079,	.685
13,	.696,	.614,	1.118,	.777,	.735,	.738,	.988,	.750,	.909
14,	.726,	.649,	1.076,	.807,	.775,	.706,	.965,	.586,	1.891
15,	.886,	1.012,	1.567,	1.162,	1.411,	1.130,	.802,	.731,	1.244
16,	.792,	.966,	2.510,	1.646,	2.468,	1.817,	.472,	.843,	2.250
17,	.801,	.876,	1.718,	1.205,	1.551,	1.217,	.746,	.720,	1.795

Log catchability residuals

Fleet : rvnos

Age ,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992
5 ,	-1.60,	-.66,	-.58,	.18,	.24,	.44,	1.08,	.90,	.00
6 ,	-1.08,	-.77,	-.38,	.24,	.42,	.62,	.33,	.61,	.00
7 ,	-.69,	-.48,	-.21,	.23,	.34,	.49,	.25,	.07,	.00
8 ,	-.30,	-.38,	-.32,	.19,	.16,	.38,	.31,	-.05,	.00
9 ,	-.13,	-.40,	-.38,	-.10,	.22,	.28,	.34,	.16,	.00
10 ,	-.04,	-.22,	-.33,	-.15,	-.01,	.00,	.54,	.21,	.00
11 ,	-.21,	-.09,	-.46,	-.34,	.07,	.10,	.38,	.56,	.00
12 ,	-.23,	-.33,	-.32,	-.15,	.06,	.13,	.42,	.43,	.00
13 ,	-.46,	-.37,	-.19,	.02,	.04,	.13,	.51,	.32,	.00
14 ,	-.41,	-.27,	-.51,	.11,	.27,	.05,	.37,	.38,	.00
15 ,	-.31,	-.33,	-.33,	.10,	.41,	.45,	-.03,	.04,	.00
16 ,	-.52,	-.60,	-.20,	.26,	.71,	.84,	.14,	-.62,	.00

SUMMARY STATISTICS FOR AGE 5

Fleet	Pred. q	SE(q)	Partial F	Raised F	SLOPE	SE Slope	INTRCPT	SE Intrcpt
1	-7.88	.879	.0004	.0080	.244E+00	.690E-01	-7.877	.278

Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio
.008	.879	0.000	.879	0.000

SUMMARY STATISTICS FOR AGE 6

Fleet	Pred. q	SE(q)	Partial F	Raised F	SLOPE	SE Slope	INTRCPT	SE Intrcpt
1	-6.98	.646	.0009	.0491	.171E+00	.546E-01	-6.983	.204

Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio
.049	.646	0.000	.646	0.000

SUMMARY STATISTICS FOR AGE 7

Fleet	Pred. q	SE(q)	Partial F	Raised F	SLOPE	SE Slope	INTRCPT	SE Intrcpt
1	-6.30	.412	.0018	.1991	.928E-01	.409E-01	-6.300	.130

Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio
.199	.412	0.000	.412	0.000

SUMMARY STATISTICS FOR AGE 8

Fleet	Pred. q	SE(q)	Partial F	Raised F	SLOPE	SE Slope	INTRCPT	SE Intrcpt
1	-6.08	.297	.0023	.4293	.605E-01	.314E-01	-6.080	.094

Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio
.429	.297	0.000	.297	0.000

SUMMARY STATISTICS FOR AGE 9

Fleet	Pred. q	SE(q)	Partial F	Raised F	SLOPE	SE Slope	INTRCPT	SE Intrcpt
1	-6.03	.287	.0024	.5864	.666E-01	.280E-01	-6.033	.091

Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio
.586	.287	0.000	.287	0.000

SUMMARY STATISTICS FOR AGE 10

Fleet	Pred. q	SE(q)	Partial F	Raised F	SLOPE	SE Slope	INTRCPT	SE Intrcpt
1	-6.20	.268	.0020	.4739	.560E-01	.279E-01	-6.203	.085

Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio
.474	.268	0.000	.268	0.000

Table 38. Cont.

SUMMARY STATISTICS FOR AGE 11

Fleet	Pred. q	SE(q)	Partial F	Raised F	SLOPE	SE Slope	INTRCPT	SE Intrcpt
1	-6.35	.343	.0018	.5186	.816E-01	.326E-01	-6.345	.108

Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio
.519	.343	0.000	.343	0.000

SUMMARY STATISTICS FOR AGE 12

Fleet	Pred. q	SE(q)	Partial F	Raised F	SLOPE	SE Slope	INTRCPT	SE Intrcpt
1	-6.09	.304	.0023	.6854	.828E-01	.247E-01	-6.087	.096

Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio
.685	.304	0.000	.304	0.000

SUMMARY STATISTICS FOR AGE 13

Fleet	Pred. q	SE(q)	Partial F	Raised F	SLOPE	SE Slope	INTRCPT	SE Intrcpt
1	-5.92	.326	.0027	.9092	.902E-01	.256E-01	-5.921	.103

Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio
.909	.326	0.000	.326	0.000

SUMMARY STATISTICS FOR AGE 14

Fleet	Pred. q	SE(q)	Partial F	Raised F	SLOPE	SE Slope	INTRCPT	SE Intrcpt
1	-5.71	.347	.0033	1.8906	.880E-01	.310E-01	-5.709	.110

Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio
1.891	.347	0.000	.347	0.000

SUMMARY STATISTICS FOR AGE 15

Fleet	Pred. q	SE(q)	Partial F	Raised F	SLOPE	SE Slope	INTRCPT	SE Intrcpt
1	-5.11	.311	.0060	1.2438	.550E-01	.350E-01	-5.114	.098

Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio
1.244	.311	0.000	.311	0.000

SUMMARY STATISTICS FOR AGE 16

Fleet	Pred. q	SE(q)	Partial F	Raised F	SLOPE	SE Slope	INTRCPT	SE Intrcpt
1	-4.44	.571	.0118	2.2504	.545E-01	.718E-01	-4.436	.180

Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio
2.250	.571	0.000	.571	0.000

Table 38. Cont.

Run title : 3LNO plaice

At 9/06/1993 23:54

Traditional vpa Terminal Fs estimated using Laurec-Shepherd

Fishing mortality (F) at age

YEAR,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	FBAR 90-92
AGE										
5,	.0004,	.0026,	.0537,	.0355,	.0510,	.2844,	.3487,	.2099,	.0080,	.1889,
6,	.0035,	.0074,	.1112,	.0785,	.0654,	.2917,	.2779,	.5244,	.0491,	.2838,
7,	.0149,	.0257,	.1563,	.1208,	.1031,	.3460,	.1756,	.5066,	.1991,	.2937,
8,	.0416,	.0706,	.1843,	.1974,	.1603,	.3051,	.2278,	.6605,	.4293,	.4392,
9,	.0873,	.1830,	.2367,	.3740,	.2841,	.5308,	.4944,	.7524,	.5864,	.6111,
10,	.2073,	.3541,	.3816,	.5586,	.4463,	.6693,	.7360,	.8919,	.4739,	.7006,
11,	.4258,	.5248,	.6304,	.6247,	.6521,	.8118,	.9257,	1.1073,	.5186,	.8505,
12,	.5985,	.6219,	.9118,	.7447,	.8201,	.9176,	1.0737,	1.0791,	.6854,	.9460,
13,	.6963,	.6135,	1.1182,	.7771,	.7351,	.7382,	.9883,	.7504,	.9092,	.8826,
14,	.7256,	.6491,	1.0763,	.8069,	.7753,	.7056,	.9651,	.5860,	1.8906,	1.1472,
15,	.8864,	1.0118,	1.5672,	1.1616,	1.4108,	1.1297,	.8016,	.7312,	1.2438,	.9255,
16,	.7919,	.9660,	2.5099,	1.6464,	2.4684,	1.8170,	.4717,	.8431,	2.2504,	1.1884,
17,	.8013,	.8756,	1.7178,	1.2050,	1.5515,	1.2174,	.7462,	.7201,	1.7949,	1.0870,
FBAR 7-15,	.4093,	.4505,	.6959,	.5962,	.5986,	.6838,	.7098,	.7850,	.7707,	

Stock number at age (start of year) Numbers*10**-3

YEAR,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	GMST 84-89	AMST 84-89
AGE												
5,	143598,	124397,	92896,	70757,	64453,	56538,	56386,	35436,	20438,	0,	86806,	92106,
6,	125791,	117524,	101580,	72079,	55911,	50145,	34831,	32573,	23518,	16600,	81976,	87172,
7,	113298,	102631,	95509,	74415,	54556,	42877,	30669,	21599,	15786,	18332,	76040,	80548,
8,	89551,	91392,	81894,	66883,	53992,	40290,	24837,	21067,	10655,	10592,	67844,	70667,
9,	77162,	70330,	69726,	55765,	44952,	37656,	24312,	16192,	8910,	5679,	57387,	59265,
10,	58485,	57896,	47950,	45055,	31412,	27702,	18133,	12140,	6247,	4058,	43050,	44750,
11,	40715,	38919,	33265,	26804,	21099,	16460,	11614,	7112,	4074,	3184,	28084,	29544,
12,	21744,	21775,	18854,	14499,	11750,	8999,	5984,	3768,	1924,	1986,	15466,	16270,
13,	11030,	9785,	9573,	6202,	5637,	4237,	2943,	1674,	1049,	794,	7314,	7744,
14,	5314,	4501,	4337,	2562,	2334,	2213,	1658,	897,	647,	346,	3334,	3544,
15,	2016,	2106,	1926,	1210,	936,	880,	895,	517,	409,	80,	1419,	1512,
16,	804,	680,	627,	329,	310,	187,	233,	329,	204,	96,	432,	490,
17,	184,	298,	212,	42,	52,	22,	25,	119,	116,	18,	90,	135,
TOTAL,	689693,	642234,	558349,	436602,	347394,	288205,	212519,	153422,	93977,	61764,		

Table 38. Cont.

Stock biomass at age (start of year) Tonnes

YEAR,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,
AGE									
5,	38771,	26372,	11333,	16274,	10957,	5710,	8402,	7087,	4721,
6,	39499,	38666,	19707,	21119,	14201,	9327,	8568,	10098,	6679,
7,	43280,	44131,	26456,	29617,	18713,	11191,	10581,	9028,	5557,
8,	41194,	43228,	33659,	29362,	24080,	15633,	11052,	10175,	4401,
9,	42516,	38611,	38210,	27715,	21981,	18376,	13469,	9844,	4883,
10,	32927,	37922,	31935,	29511,	18879,	16843,	12765,	9567,	4573,
11,	26628,	31914,	25814,	22596,	16331,	13267,	10603,	7211,	3834,
12,	18526,	23996,	18647,	15993,	12149,	9611,	7211,	5026,	2278,
13,	12442,	14403,	12406,	8652,	7717,	6126,	4780,	3034,	1567,
14,	7674,	8543,	7261,	4445,	4074,	3994,	3303,	1953,	1165,
15,	4006,	4930,	3976,	2688,	2083,	1988,	1973,	1134,	869,
16,	2060,	1976,	1579,	971,	876,	559,	649,	874,	511,
17,	524,	975,	642,	140,	189,	84,	85,	364,	346,
TOTALBIO,	310046,	315667,	231623,	209082,	152231,	112709,	93442,	75395,	41383,

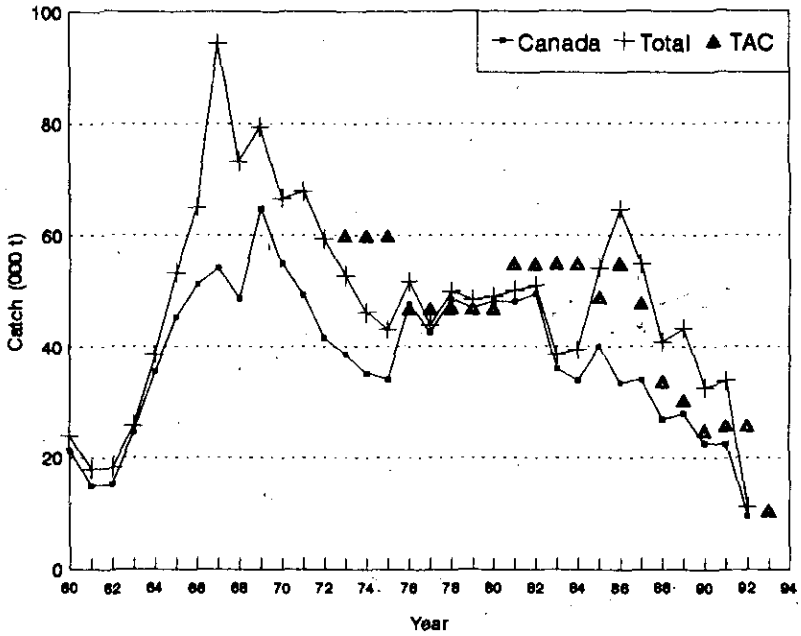

Fig. 1. Catches and TAC's of American plaice in Div. 3LNO.

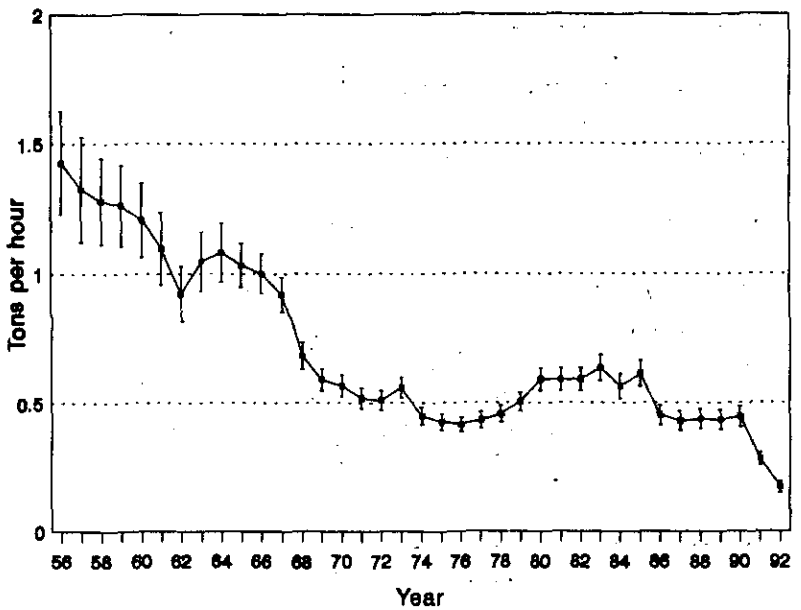

Fig. 2 Standardized CPUE with approximate 95% confidence intervals for American plaice from 1956-1992.

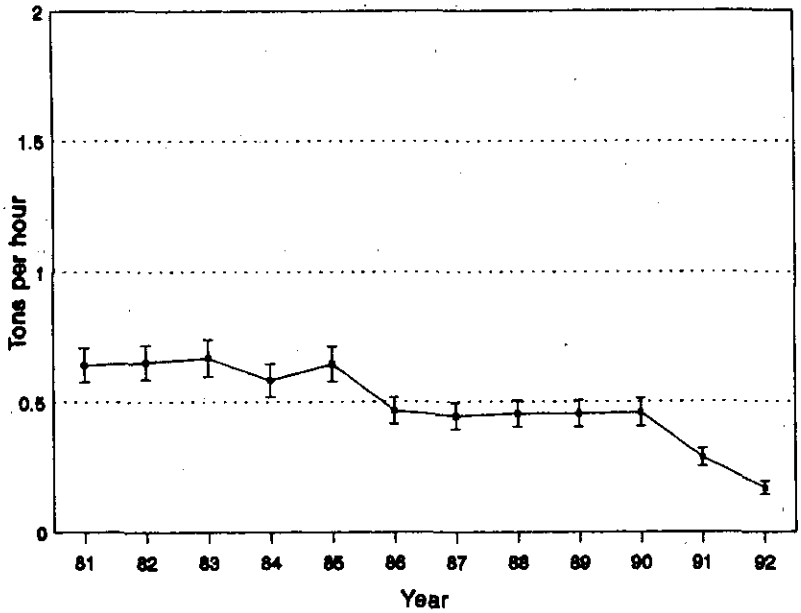

Fig. 3 Standardized CPUE with approximate 95% confidence intervals for American plaice in Div. 3LNO from 1981-1992.

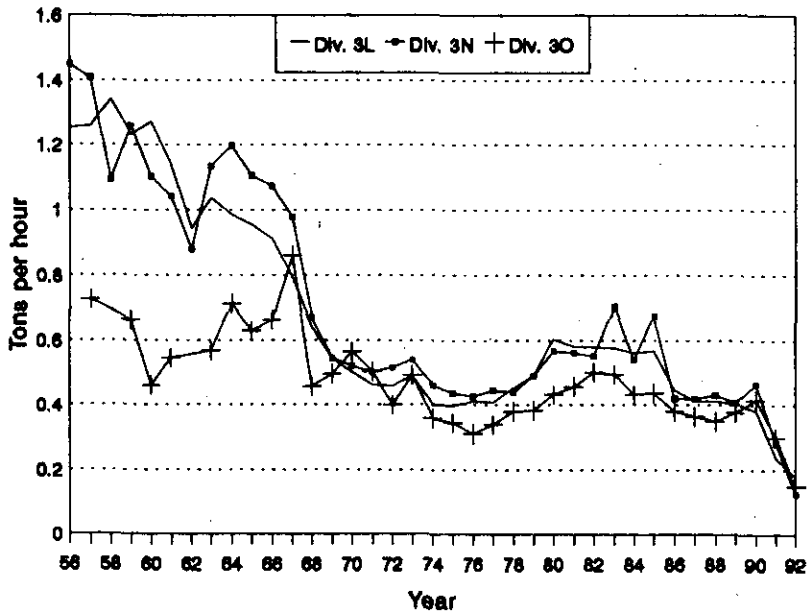

Fig. 4. Standardized CPUE, by Division, for A.plaice from 1956-92.

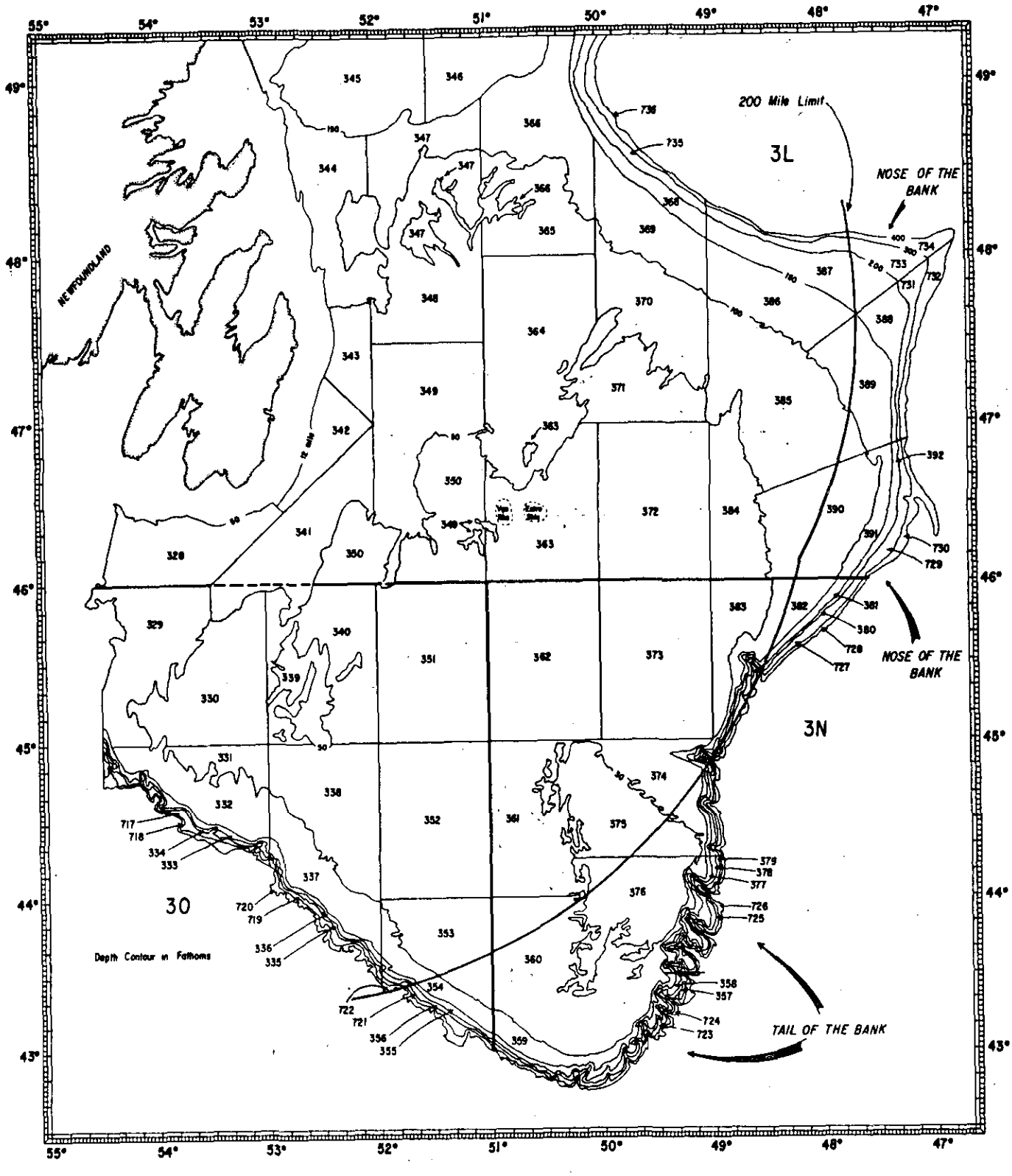

Fig. 5 Grand Banks, NAFO Div. 3LNO, showing the Canadian 200 mile limit in relation to the Nose and Tail of the Bank as well as the stratification scheme used in Canadian groundfish surveys.

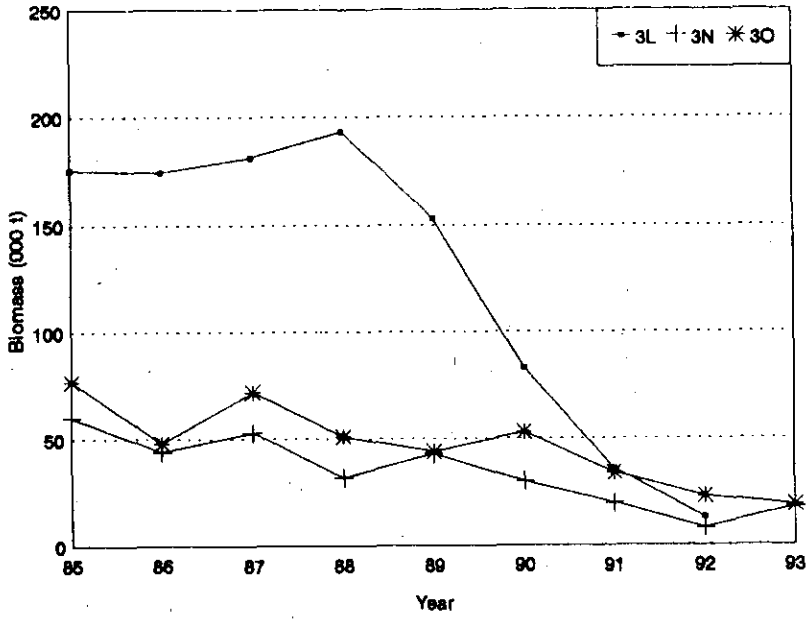

Fig. 6. Biomass indices of A.plaice from spring surveys in Divisions 3L, 3N, 3O.

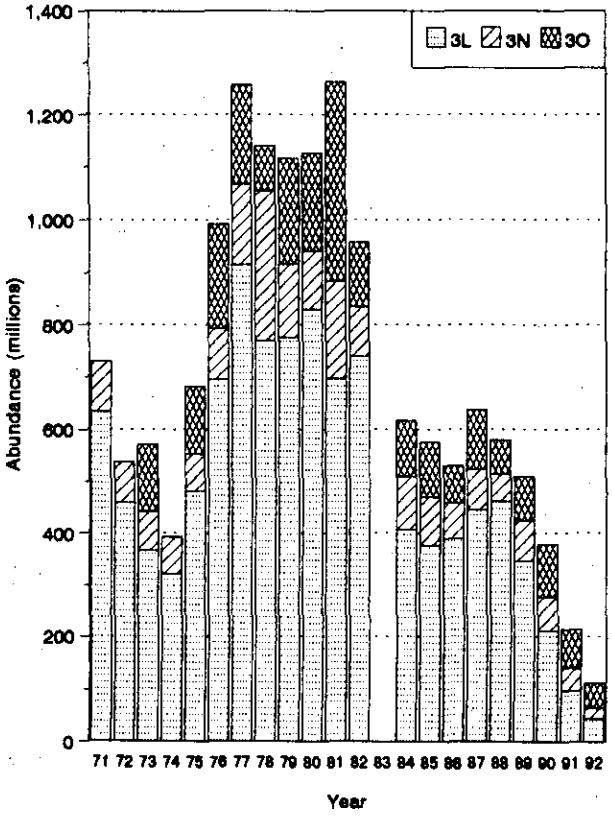

Fig. 7. Abundance of A.plaice from spring RV surveys conducted by Canada in Div. 3LNO.

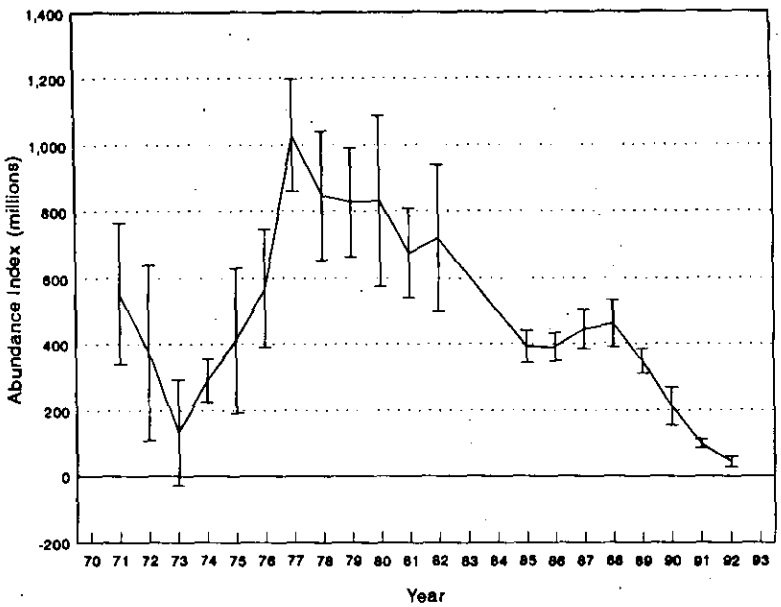

Fig. 8 Abundance estimates of A.plaice (with 95% C.I.) from Canadian spring surveys in Div.3L.

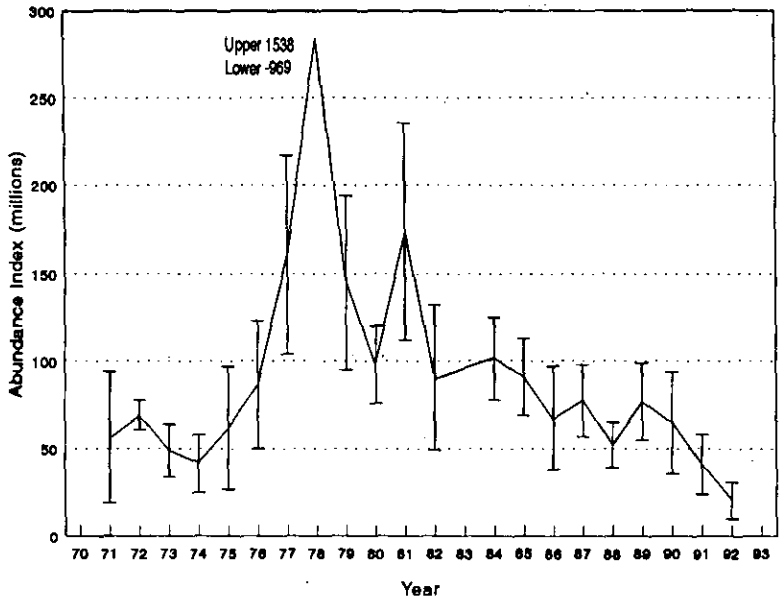

Fig. 9 Abundance estimates of A.plaice (with 95% C.I.) from Canadian spring surveys in Div.3N.

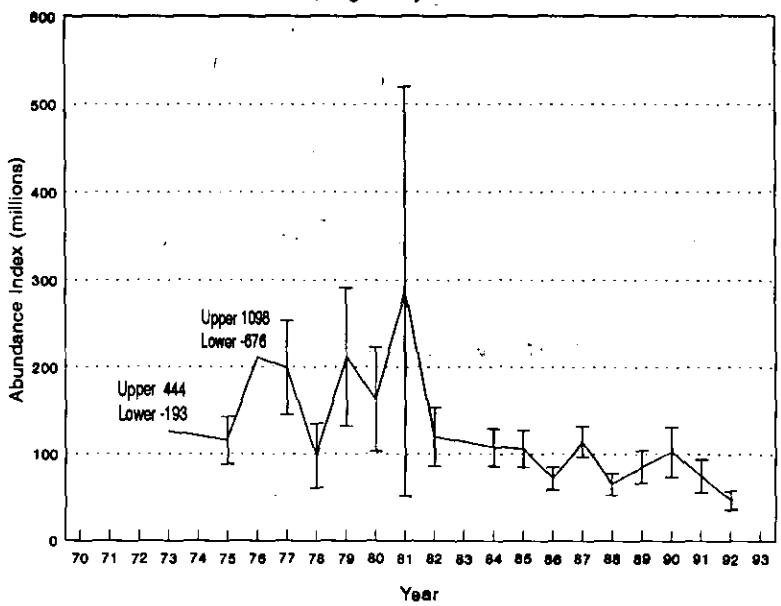

Fig 10 Abundance estimates of A.plaice (with 95% C.I.) from Canadian spring surveys in Div.3O.

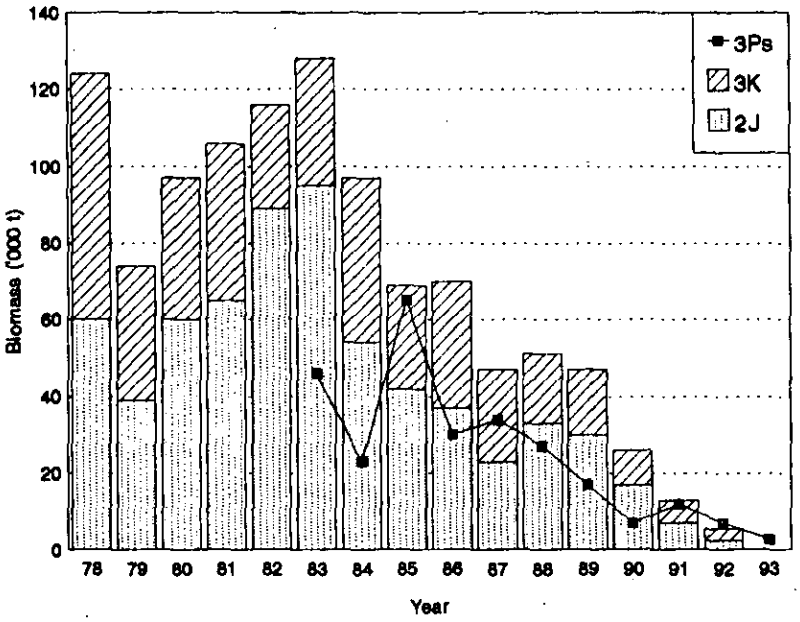

Fig. 11. Biomass of A.plaice from RV surveys in Div. 2J and 3K and Subdiv 3Ps.

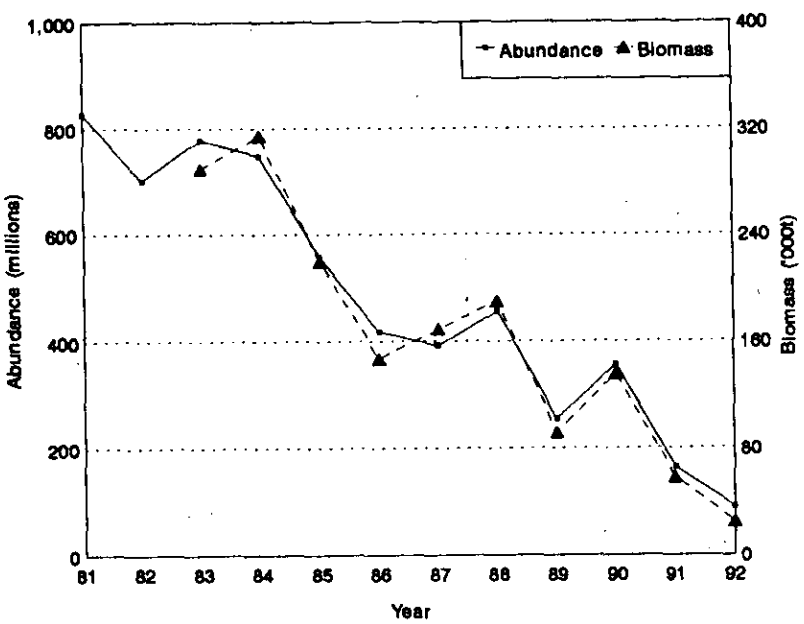

Fig. 12. Abundance and biomass estimates of A.plaice from fall RV surveys in Div. 3L.

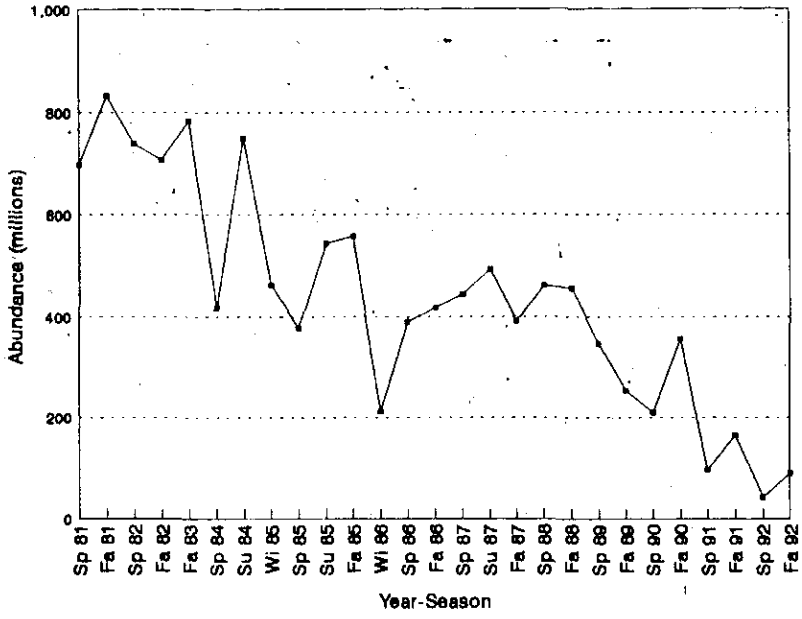

Fig. 13. Abundance of A. plaice from surveys conducted at various times in Div. 3L.

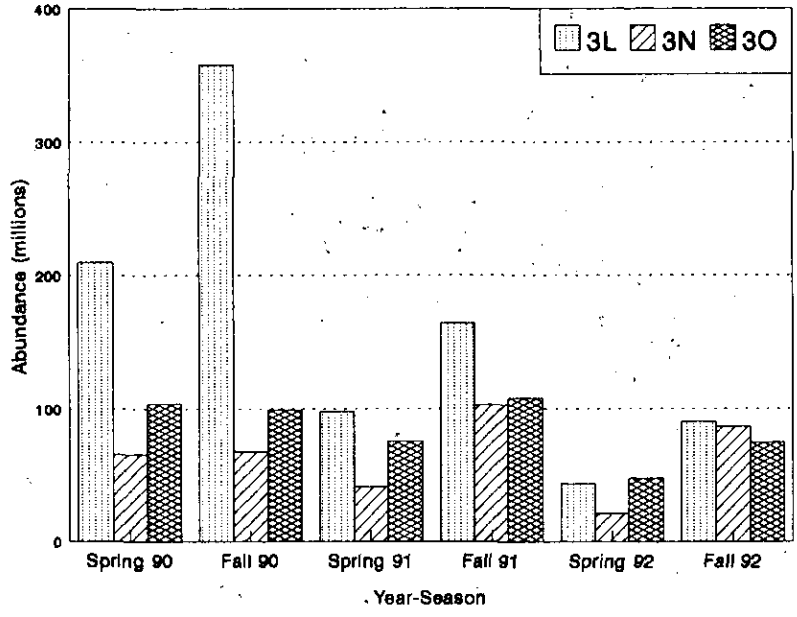

Fig. 14. Abundance of A. plaice from surveys conducted during spring and fall in Div. 3L, 3N, and 3O from 1990-1992.

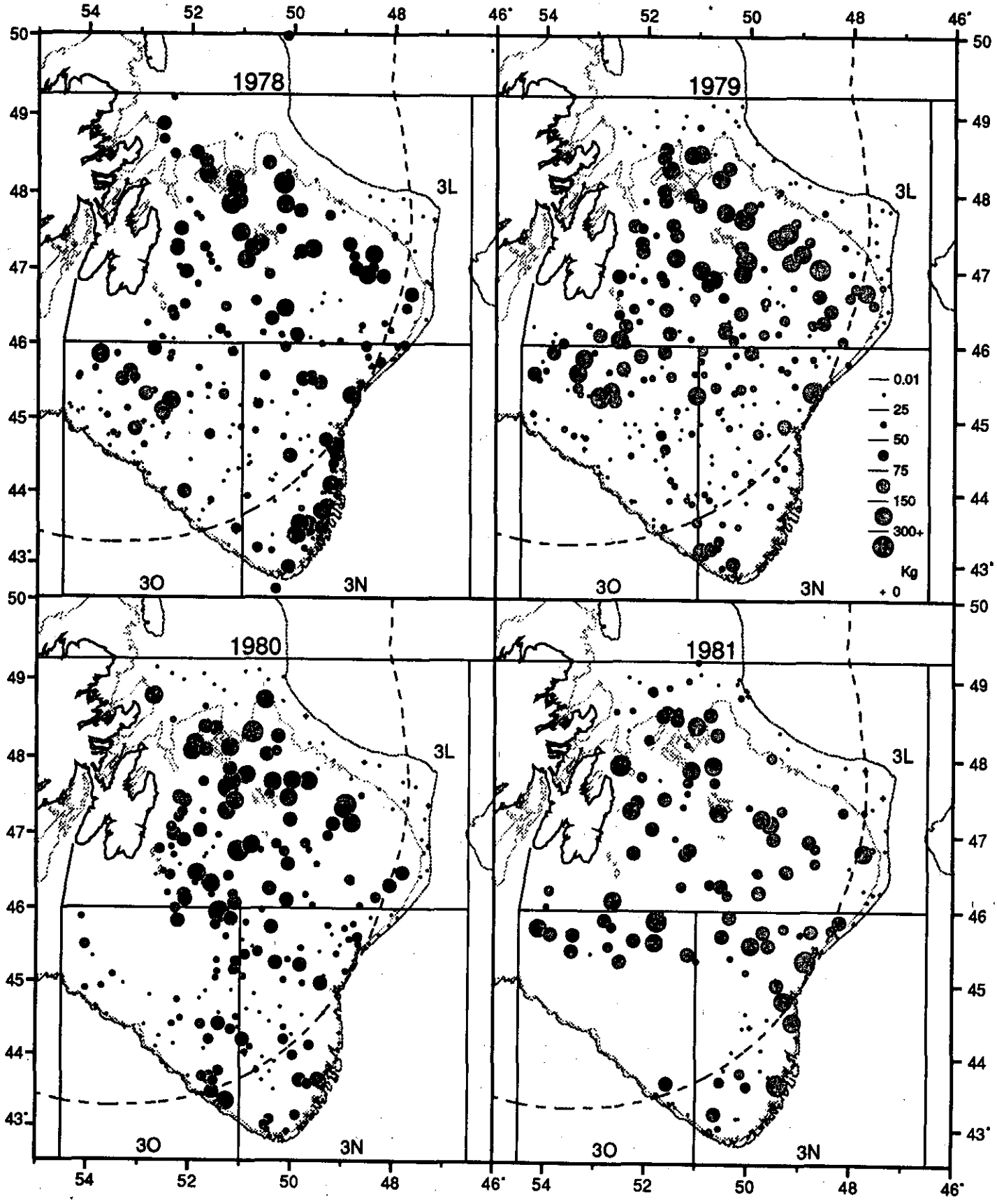

Fig. 15 Distribution of American plaice catches (Kg. per standard tow) from 1978-1981 Canadian spring surveys to Div. 3LNO showing 200m (light dotted) and 400m (dark dotted) depth contours. Dashed line represents division between the Canadian economic zone and the NAFO Regulatory area.

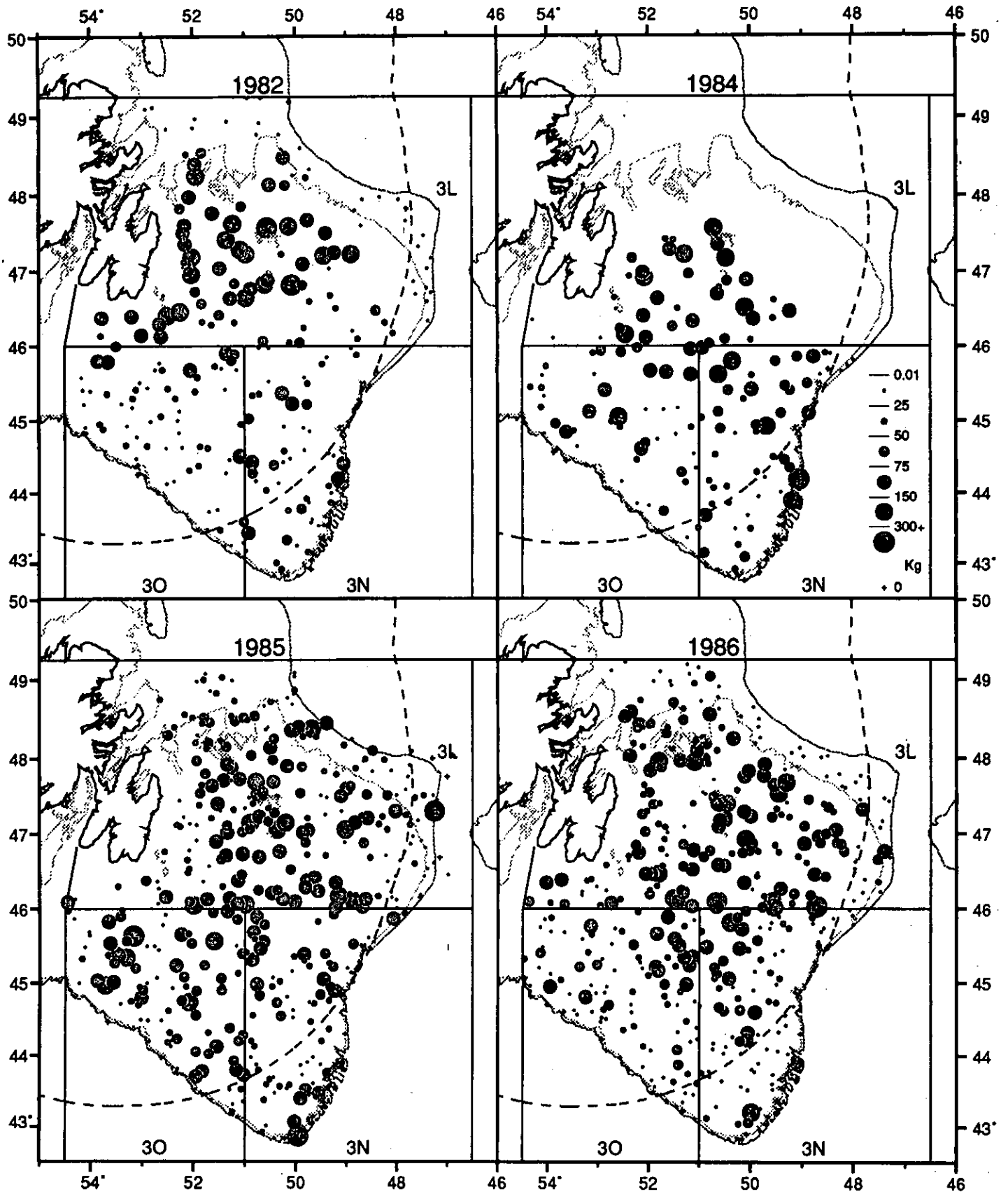

Fig. 16 Distribution of American plaice catches (Kg. per standard tow) from 1982-1986 Canadian spring surveys to Div. 3LNO showing 200m (light dotted) and 400m (dark dotted) depth contours. Dashed line represents division between the Canadian economic zone and the NAFO Regulatory area.

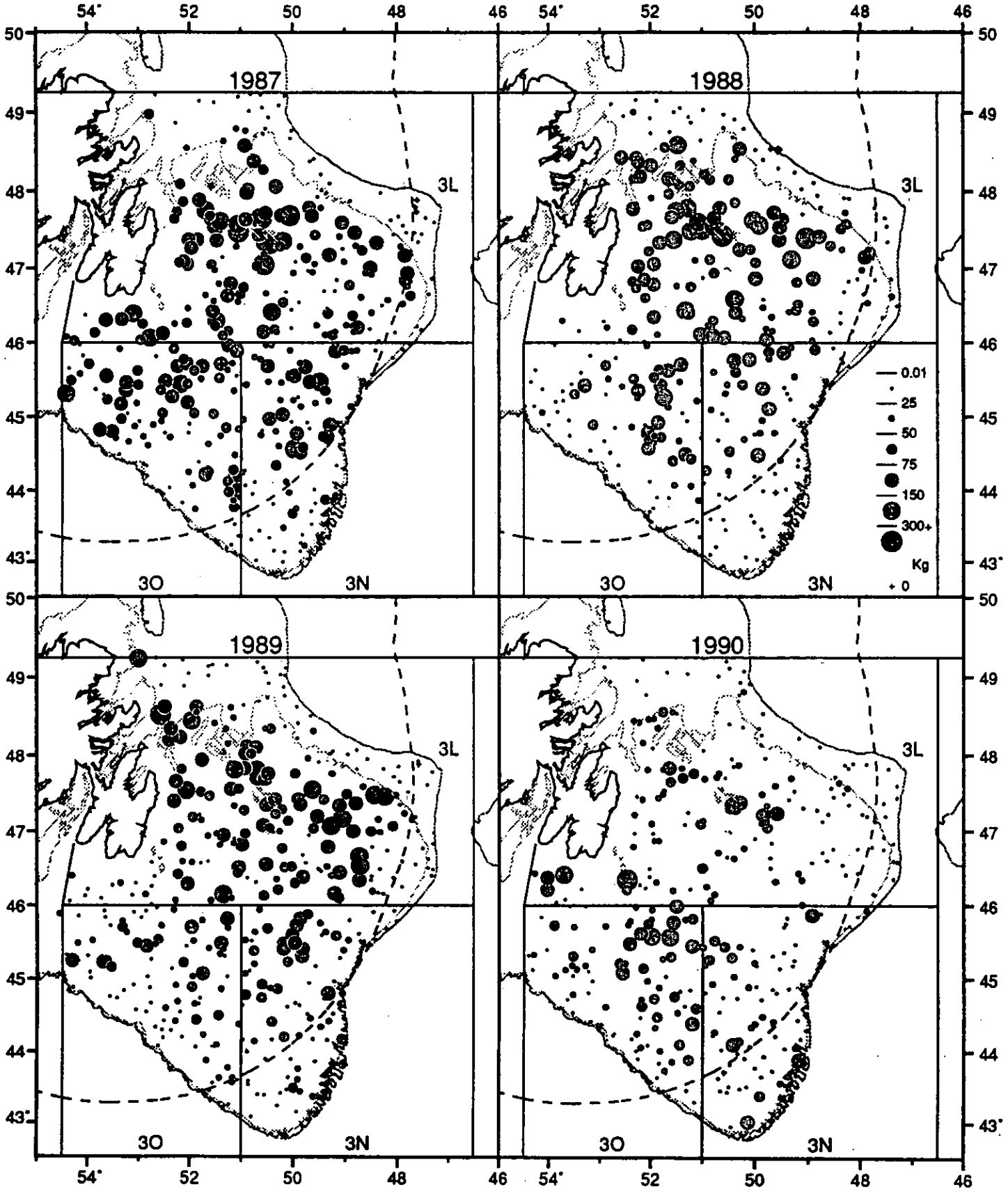

Fig. 17 Distribution of American plaice catches (Kg. per standard tow) from 1987-1990 Canadian spring surveys to Div. 3LNO showing 200m (light dotted) and 400m (dark dotted) depth contours. Dashed line represents division between the Canadian economic zone and the NAFO Regulatory area.

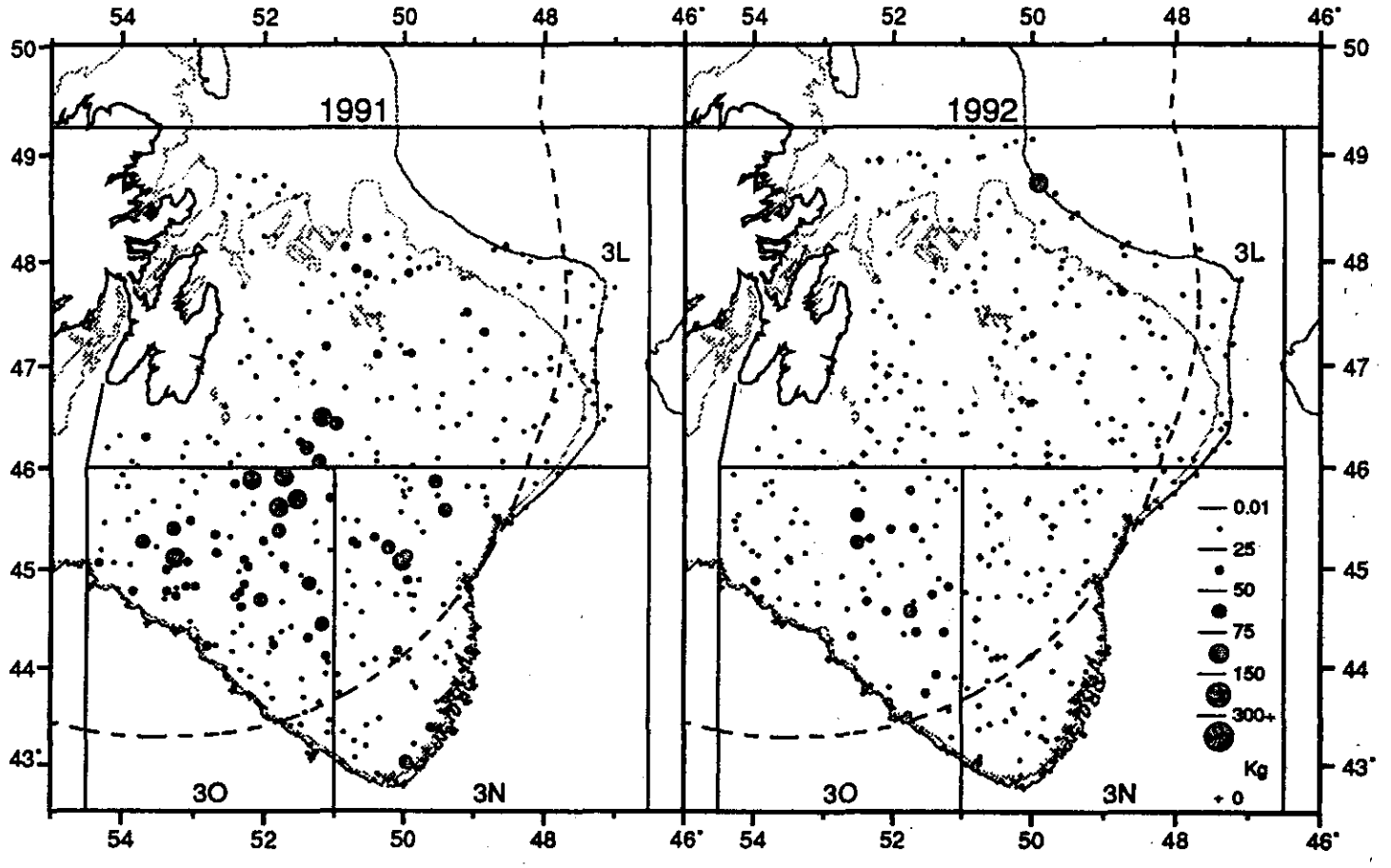

Fig. 18 Distribution of American plaice catches (Kg. per standard tow) from 1991-1992 Canadian spring surveys to Div. 3LNO showing 200m (light dotted) and 400m (dark dotted) depth contours. Dashed line represents division between the Canadian economic zone and the NAFO Regulatory area.

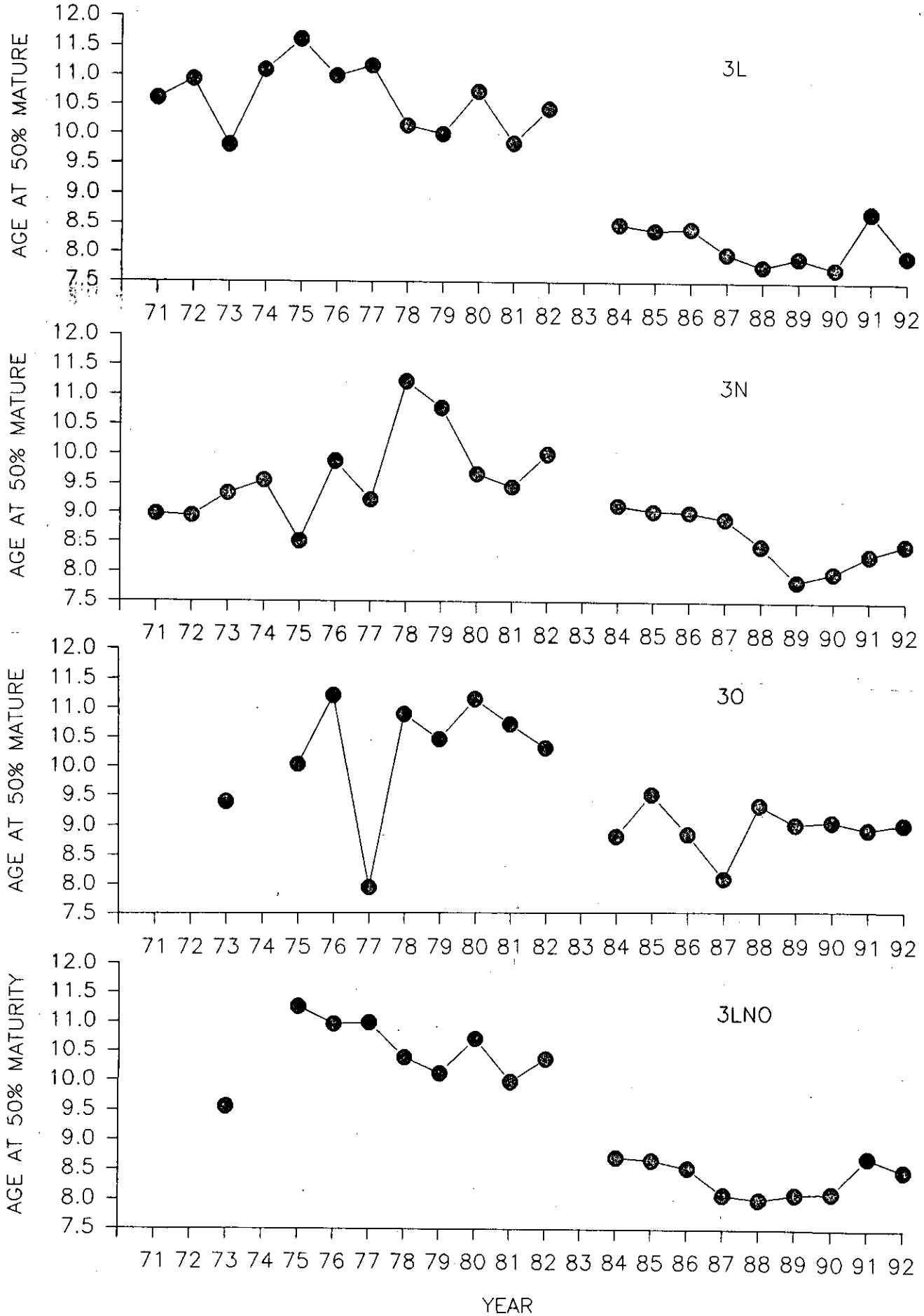

Fig. 19. Age at 50% maturity of female A.plaice in Div. 3L, 3N, 3O, and 3LNO.

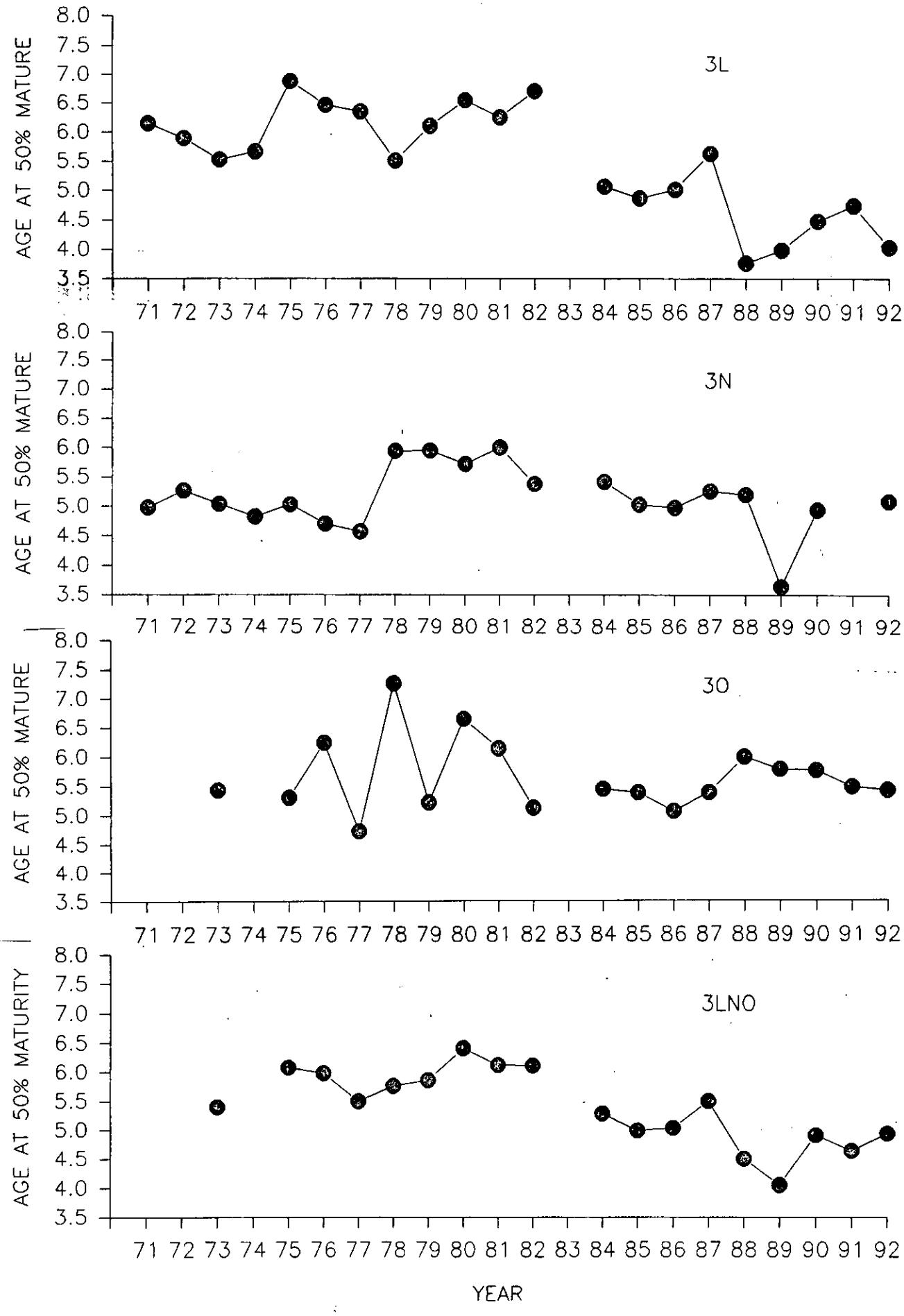

Fig. 20. Age at 50% maturity of male A.plaice in Div. 3L, 3N, 3O, and 3LNO.

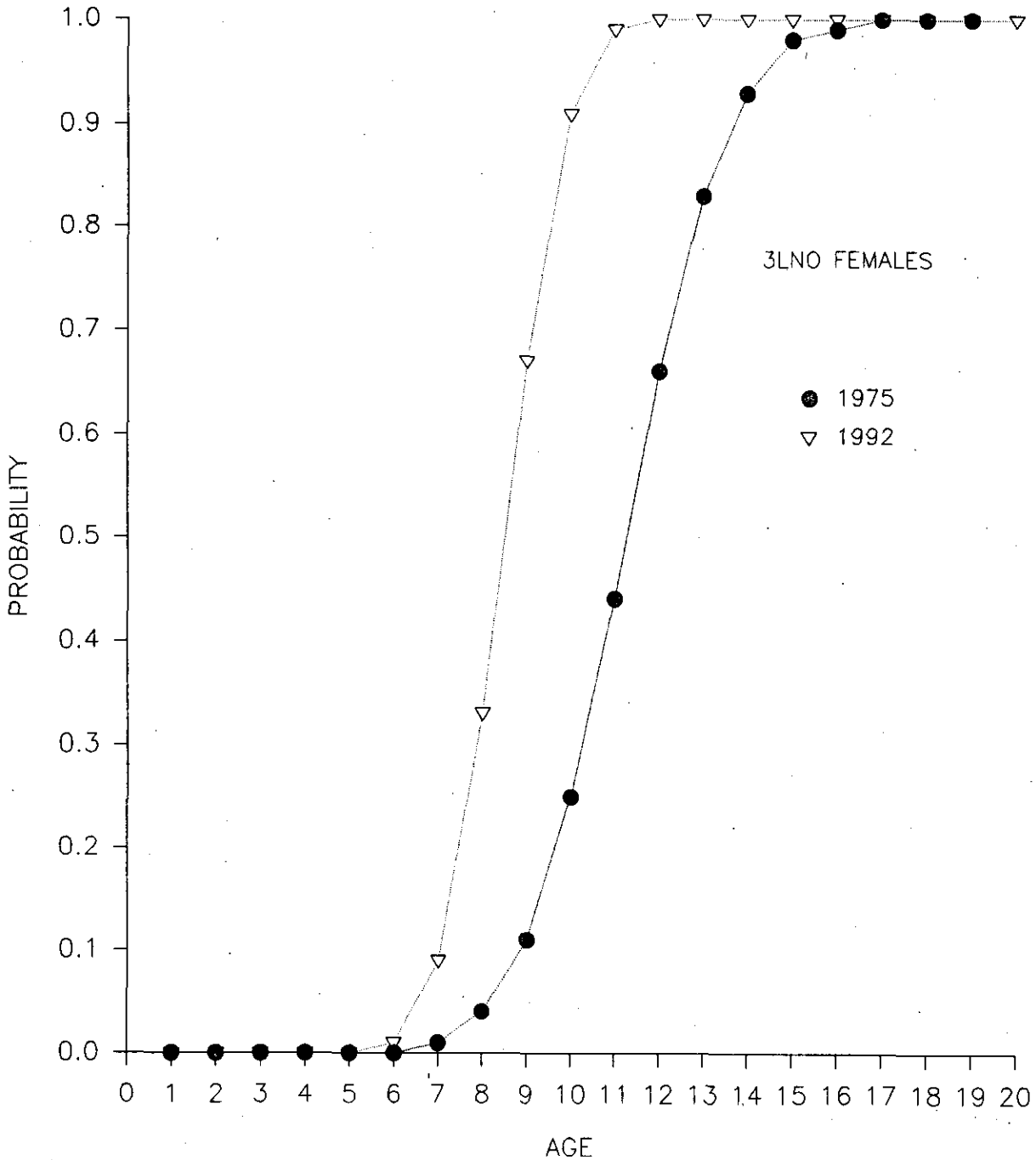

Fig. 21. Comparison of the maturity ogives of female A.plaice in Div. 3LNO in 1975 and 1992.