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# An Update of the Status of 4X Flatfish Stocks

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**Abstract**

Up to and including 1993, flounders in 4VWX were managed as one stock complex with a TAC of 14,000 t. In 1994, the management unit was divided into an eastern (4VW) and a western (4X) component and the overall TAC was reduced to 10,000 t with 4,500 t allocated to 4X and 5,500 t to 4VW, based on catch history. Winter flounder was included in the western component. The 1995 management plan set a TAC of 7,500 t which was partitioned between 4VW and 4X, giving the eastern component a TAC of 4,125 t and the western component a TAC of 3,375 t. ITQs for flatfish were implemented in August 1994 in 4X, and Eastern Nova Scotia (ENS) ITQ licence holders were given the option to choose an ITQ system or a competitive fishery for flounder in 1995. Landings data continue to be unreliable with unspecified flounder making up 45% of the total flounder landings in 4X. Stock status evaluations were based on sampling the commercial landings for size composition, the commercial catch rate and effort for combined flounders, and survey abundance indices and size compositions by species.

Total landings for flatfish in 4X for 1995 amounted to 2,538 t, a decrease from 3,277 t taken in the 1994 fishery. Commercial catch rates for all flounders combined remained relatively stable, while total effort declined since 1992. Survey abundance for 4X winter flounder is still relatively high, although according to Industry reports it has declined in recent years, in localized areas. The situation for witch flounder includes a low weight per tow, fewer large fish in the population, and declining average weight. As well, landings declined even though witch commands a much higher price than other flounders. The American plaice and yellowtail resources appear to be stable or increasing. Although flounder abundance, with the exception of witch, does not appear to be declining, the extent of the decline in witch suggests protective measures are warranted. As well, the declines in local populations of winter flounder suggests a management plan that recognizes the existence of several population units is essential.

## Résumé

Jusqu'à 1993 inclusivement, les plies des divisions 4VWX étaient considérées comme un complexe de stocks, administré en vertu d'un TAC de 14 000 t. En 1994, l'unité de gestion a été divisée en deux parties: la composante de l'est (4VW) et celle de l'ouest (4X); le TAC total a été réduit à 10 000 t, 4 500 t étant attribuées à 4X et 5 500 t à 4VW, d'après les antécédents de prises. De plus, la plie rouge a été incluse dans la composante de l'ouest. Le plan de gestion de 1995 incluait un TAC de 7 500 t qui a été divisé entre 4VW et 4X, soit 4 125 t pour la composante de l'est et 3 375 t pour celle de l'ouest. Des QIT ont été adoptés pour les poissons plats en août 1994 dans la division 4X, et les titulaires de permis de pêche des plies avec QIT de l'est de la Nouvelle-Écosse (ENS) ont eu la possibilité de choisir entre un régime de QIT ou une pêche pratiquée en concurrence en 1995. Les données sur les débarquements continuent d'être peu fiables, puisque des plies non identifiées composent 39 % des débarquements totaux de plies dans 4VW et 45 % dans 4X. L'état des stocks a été évalué à partir des échantillons de débarquements commerciaux prélevés en vue de mesurer la composition par taille des espèces, les taux de prises commerciales et l'effort pour toutes les plies, ainsi que les indices d'abondance des relevés et la composition par taille, selon les espèces.

Le total des débarquements de poissons plats dans la division 4X en 1995 s'est chiffré à 2 538 t, soit une baisse par rapport aux 3 277 t de 1994. Les taux de prises commerciales de toutes les plies combinées sont demeurés relativement stables, tandis que l'effort total a diminué depuis 1992. L'abondance des prises de plie rouge dans la division 4X selon le relevé est encore relativement élevée, bien que, selon les rapports de l'industrie, elle ait diminué ces dernières années dans certaines zones localisées. La situation de la plie grise révèle un faible poids par trait, un nombre inférieur de gros poissons au sein de la population et une baisse du poids moyen. En outre, les débarquements ont diminué, même si la plie grise obtient un bien meilleur prix que les autres plies. La plie canadienne et la limande à queue jaune semblent stables ou en hausse. Même si l'abondance des plies, exception faite de la plie grise, ne semble pas diminuer, l'ampleur de la baisse de la plie grise semble justifier des mesures de protection. De plus, la diminution des populations locales de plie rouge montre qu'il serait essentiel d'élaborer un plan de gestion qui tienne compte de l'existence de plusieurs unités de population.

## INTRODUCTION

Four species of flatfish, excluding halibut, are exploited commercially in 4X . These include:

American plaice (Hippoglossoides platessoides)
Yellowtail flounder (Limanda ferruginea)
Witch flounder (Glyptocephalus cynoglossus)
Winter flounder (Pseudopleuronectes americanus)

Of these, only plaice, yellowtail, and witch were under quota management between 1973 and 1993. An initial combined flatfish TAC of 32,000 t for 4VWX flounder was established in 1973, based on yield per recruit calculations (Halliday 1973) and reduced to 28,000 t in 1976 (Halliday 1976). A TAC of 14,000 t was established in 1978 in response to the removal of the foreign fishing effort (Anon. 1977). Subsequent examinations of the stock status through to 1985 did not provide a basis for modification of the TAC. FRCC advice for 1994 was to maintain the 14,000 t TAC.

Based on the analysis of biological parameters (Neilson *et al.* unpublished) it was recommended that the flatfish stock complex be divided into a western (4X) and an eastern (4VW) stock component. Industry was in agreement with new stock components for 1994, especially with the imminent implementation of ITQs. Science and industry also supported the inclusion of winter flounder under quota management and the reduction of the TAC from 14,000 to 10,000 t in 1994, to reflect the decrease in overall landings by all fleet sectors since the mid 1980s. The reduced TAC was also put in place to prevent increased effort in 1994 due to the 4VW cod moratorium. As these actions significantly altered the previous management of the 4VWX flounder stocks, a review of the fleet sector shares was initiated in 1994. In the interim period (January 1 - March 31, 1994) the fleet operated on a quota cap, which was based on their 1991-1993 catch average, from January 1 - March 31. The ITQ fleet held the position that the TAC be divided among the different fleet sectors based on catch history (due to their dependence on the fishery since 1986), while the offshore insisted that traditional quota shares be maintained.

After the fleet sector review, the traditional sharing formula (established in the groundfish Management Plan for the 4VWX quota) was upheld and applied to the area quotas for the original three species, i.e. plaice, witch and yellowtail (PWY) (51% offshore and 49% inshore) in each area. This excluded winter flounder as it had not previously been under quota management. As this species had historically been fished only by the inshore in 4X, the entire amount was allocated to the inshore fleets. Thus, the Scotian Shelf TAC was composed of 7,000 t of plaice, witch and yellowtail and a 3,000 t 4X winter flounder quota (based on catch history) totalling 10,000 t for 4VWX. This was then further divided, using catch history, into the 5,500 t in 4VW consisting of PWY and the remaining 4,500 t for 4X consisted of 1,500 t PWY and 3,000 t of winter flounder. The 1,500 t in 4X of PWY was allocated using traditional shares. The remaining 3,000 t for winter flounder was allocated only to the inshore. Only traditional shares were used to allocate the 5,500 t in 4VW for all fleet sectors. Winter flounder is not fished to any great extent in 4VW and was not put under quota in 1994.

The new quotas in each area for the ITQ fleet were 3,614 t in 4X and 2,088 t in 4VW. For 4X this quota approximated their traditional catch but for the ITQ fleet in 4VW it represented only about 60% of their recent landings. ITQs for 4X flatfish were implemented in August 1994.

The 1995 Management Plan was set at a TAC of 7,500 T which was again partitioned between 4X and 4VW giving the western component a TAC of 3,375 t . For 1996 the FRCC recommended maintaining the status quo in 4X.

**Data Problems**

Management of the four species together under one TAC reflects the fact that it has to date, been impossible to obtain reliable statistics on landings for each species. A system initiated in the late 1960s, which assigned landings to species based on regional keys, which equated local names with official ones was abandoned in 1991 as being outdated. However, the system which replaced it (ITQ logs and dockside monitoring of landings) was not successful in assigning landings to individual species except in a very limited way, because landings were not separated at weighout or were misidentified by the weighmaster (e.g. American plaice were called flounder). Separation by species, although requested formally by Statistics Branch in 1993 (letter to ITQ holders and weighmasters) was never enforced. The absence of reliable landing statistics makes it impossible to determine the level of exploitation for each species.

For 1994, the FRCC recommended that more effort be put into obtaining better landings data by species and area. While the official move to separate stock areas and the implementation of ITQs addressed some of the problems, landings data by species, for flatfish are still considered to be unreliable. With the failure of the ITQ and weighmaster system to effectively capture the required landings information, it will be necessary to make it mandatory for fishermen to separate flounder by species.

An improvement occurred in the 1995 flounder fishery and unspecified flounder made up only 45% of the total compared to up to 80% in previous years.

**4X Flatfish**

**Description of the Fishery**

Total landings of 4X flatfish increased to 6,015 t in 1990 and then declined to 2,538 t in 1995 (Table 1, and Figs.1, 2). Table 2 gives a breakdown of landings for each species by country since 1961. Canada is the major exploiter of the resource while the USA accounted for a small portion of the landings prior to 1984. Unspecified flounder made up between 60% and 80% of the 4X landings in recent years, however in 1995 this dropped to 45%. This shift is likely due to better identification by both fishermen and weighmasters and through more separation of flounder by some plants.

Figures 3 to 12, give the recorded landings by area, species and, gear and Tables, 3, 4 and 5 the recorded landings by area, season, gear, and tonnage class. However, because the species breakdown is not considered reliable this information can be discussed only in terms of total flounder landings by area.

Total landings of flatfish in 4X for 1995 amounted to 2,538 t, a decrease from 3,277 t taken in the 1994 fishery. Unspecified flounder made up 45% of the total flatfish landings in 4X down from 67% in 1994. Flatfish landings by the mobile gear <65' fleet declined by about 20% from 3,052 t in 1994 to 2,472 t in 1994. The <65' mobile gear fleet are responsible for over 90% of the total flatfish landings in 4X.

Offshore landings have been insignificant in 4X since the early 1980s (i.e. less than 100 t annually). Fixed gear landings in 4X decreased from 214 t in 1994 to 52 t in 1995. Landings by both longline and gillnet vessels declined significantly.

Discussions with industry participants indicated that the reason for not catching the entire 1995 quota could be due to some redirection of effort by the <65' mobile gear fleet to the yellowtail fishery on Georges Bank. Witch flounder continues to be a concern to the ITQ fleet with both larger concentrations and larger fish more difficult to find. Concern was also expressed by industry of declines in localized populations of winter flounder.

Landings to March 27, 1996, from quota reports for 4X, show a preliminary catch of 300 t taken by the <65' mobile fleet. In the same time period in 1995 the ITQ fleet landed about 450t . This slow start to the 1996 fishery may be related to the 10% bycatch restrictions on non traditional species, market conditions, the continued lower quotas in other groundfish, etc.

**Management**

The 4X flatfish fishery is currently regulated by quotas on the following gear sectors: 1) fixed gear <65'; 2) mobile gear <45' Generalist; 3) mobile gear < 65' ITQ fleet; 4) mobile gear 65-100', and 5) vessels >100'. Because the flatfish fishery has been a bycatch fishery in the past, trip limits and specific licence conditions were not required to manage the fishery. Flatfish in 4X were put under the ITQ program in August of 1994. Allocations for the gear sectors for the 1995 fishery are given in Table 6. The inshore mobile gear fleets took over 90% of their quota as did the midshore while the offshore fleet took only 7% of their allocation and much of that was taken by inshore vessels fishing under the Temporary Vessel Replacement Plan (TVRP).

**Research Survey Data 4X**

**Winter Flounder**

**Survey Catch Rates and Distribution**

The summer RV survey (1970-1995) stratified mean numbers per tow for 4X winter flounder

exhibited an overall increasing trend from the late 1970s to the early 1990s. A stable period was observed through the early 1980s with a subsequent increasing trend to 1992, and the 1993 to 1995 estimates have declined (Table 7 and Fig. 13) but are above the long term mean. Mean weights per tow and minimum biomass estimates exhibit a similar trend (Tables 7, 8 and Fig. 14). It should be noted that the summer survey does not cover the inshore portion of 4X, which is believed to contain a large portion of the winter flounder stock.

Examining the survey mean weight per tow divided by the mean number per tow, suggests that the mean weight of winter flounder in 4X has remained relatively stable or declined slightly after a significant decline observed in the late 1970's (Fig. 15).

The summer survey distribution of winter flounder appears to be restricted to the Browns Bank area and the Bay of Fundy (Fig. 16). Catch rates on Brown's Bank were higher than in 1994. It is uncertain whether there is mixing between these two areas. Cooperative tagging studies with industry were initiated to determine the extent of the movement of winter flounder. However few returns have been recorded out of the 600 fish tagged to date.

**Length Frequencies**

Survey length frequency distributions (1970-1995) indicated a high abundance of < 35 cm fish which increased in the mid 1980s and has remained stable since. This is supported by a considerable increase in the < 20 cm group in the mid 1980s which also remains high. (Fig. 17) . The number of winter flounder > 45 cm has declined over time and the proportion of fish >35 cm has declined based on the population growth due to recruitment. To examine the recent size composition, survey length frequency distributions for 1995 were compared to the 1990-1994 average. No significant changes were noted.

**Witch Flounder**

**Survey Catch Rates and Distribution**

The summer RV survey (1970-1995) stratified mean numbers per tow for 4X witch flounder were highly variable through the 1970s. Since the early 1980s, the survey has shown a declining trend (Table 7, Fig. 18). The stratified mean weights per tow and minimum biomass estimates in 4X also show a declining trend since 1980 and both the numbers and weights in recent years are below the long-term mean (Tables 7, 8, Fig. 19). The small increase in numbers per tow since 1992 as well as the length distribution indicates some incoming recruitment. To provide a view of the abundance of larger and smaller fish in the 4X area, an estimate of the mean weight of witch flounder was examined by dividing the mean weight per tow by the mean numbers per tow. Results indicated that the mean weight has been generally between 600 and 800 gm. For 1992 and 1993 mean weight dropped below 500 gm, and in 1995 the second lowest value in the series was observed (Fig. 20).

Summer survey distributions of witch flounder abundance indicated that they are widely

distributed in 4X, and in low concentrations. The 1995 distribution was similar to 1994 (Fig. 21).

**Length Frequency**

Survey length frequency distributions (1970-1995) indicated that far fewer large witch flounder have been caught in recent years (Fig. 22). The 1995 survey length frequency distributions were compared to the 1990-1994 average. Since 1990, although the survey caught more <20 cm fish in 1995, the number of fish >45 cm has declined and in 1995 are virtually absent from the population. Fish in the 35-40 size range increased in abundance in the 1995 survey and likely account for the shift to a slightly larger size in the commercial length frequency.

**Yellowtail**

**Survey Catch Rates and Distribution**

The summer RV survey abundance estimates (1970-1995) for 4X yellowtail flounder have increased since the early 1980s. Mean numbers and weights reached a peak in 1994 and have remained at relatively high levels in 1995. (Table 7, 8 and Figs. 23, 24). The mean weight per fish for yellowtail has remained relatively stable over the time series (Fig. 25)

Yellowtail survey distribution in 4X is generally limited to the Browns Bank area and the mouth of the Bay of Fundy. No significant changes in distribution were noted in the 1995 survey (Fig. 26).

**Length Frequencies**

Survey length frequency distributions (1970-1995) are highly variable and may be reflective of the low catch rates (Fig. 27). The 1995 survey length frequencies were compared to the recent 1990-1994 average. The 1995 survey size composition suggest an increase in yellowtail >30 cm, and decreased numbers in the 20-30 cm range .

**American Plaice**

**Survey Catch Rates and Distribution**

American plaice survey abundance estimates in 4X were relatively stable over the entire time series; mean numbers indicate a variable but increasing trend since the early 1970s with the 1995 value among the highest in the series (Tables 7, 8, and Figs. 28, 29). As a result of the increase in numbers and relative stability in weight per tow, the mean weight per fish for plaice has gradually declined since the early 1980s (Fig. 30).

The summer survey distributions show a similar pattern to earlier years with small concentrations

between Browns Bank and Roseway, as well as the Bay of Fundy (Fig. 31).

**Length Frequencies**

Survey length frequency distributions (1970-1995) show little change in recent years; however, there are currently fewer large plaice in the population when compared to the 1970s and 1980s. (Fig. 32). The 1995 distributions were compared to the 1990-1994 average. Little change was seen in size composition except for the presence of relatively large numbers of small (<10 cm) plaice .

**Commercial data**

**Commercial Catch Rates**

Directed catches for all stocks comprising the 4X flatfish complex are variable and often at very low levels. The landings with effort, for each species were examined for the 1989 to 1995 time period. Identified landings in some years were less than 5 t. With the bycatch nature of the fishery (though less so as other stocks decline), the increasing problem with unspecified flounder and the change in the way the statistics are reported, the use of commercial catch rates for individual species in evaluating the status of the flatfish stocks are likely of limited value. Catch rates were derived for the individual flounder species and combined flounder, for the whole year for mobile gear <65'. This approach was used to circumvent the problems with species identification. Commercial catch rates for all 4X flounders combined declined between 1989 and 1992 and has remained stable since then, while total effort declined significantly since 1992 (Table 9 and Figs. 33a,). In 1989 the 4X fishery was closed in June resulting in both low catch and effort in that year. Effort on flatfish increased to 1992 possibly due to the introduction of ITQs, and interest by the ITQ fleet in developing a catch history in flatfish. For witch flounder, catch rates increased between 1989 and 1991 with effort relatively stable. In 1992, coincident with high landings catch rate declined and effort increased significantly (Fig. 33b). Catch rate has continued to decline while effort after the peak in 1992 has declined back to pre 1992 levels while catches declined sharply. Reports from 1994 indicated that a redirection of effort to Georges Bank yellowtail may have occurred, however in 1995, given the reduced 400 t quota, this should not have been a major factor. Industry indicated that restrictions in other fisheries (e.g. quota, closed areas) may have impacted the fleets ability to fish flounder.

**Fishery Distribution**

Distribution was examined using available log information, that included the lat and longs of the catch (Figs. 34 to 38). Unfortunately, most of this information pertains to unspecified flounder and only a small subset to individual species. If these subsets can be considered representative of the commercial distribution in 4X it would suggest that winter flounder are fished around the Browns Bank area up into the Bay of Fundy. However, unspecified flounder distributions, corroborated by industry indicate that winter flounder is fished in many small bays and inlets around the coast, especially in the inshore portion of the Bay of Fundy. The fishery distribution

of witch flounder is more wide spread and industry indicated that the fishery occurred predominantly in depths greater than 100 fathoms. There is very little directed fishing for plaice or yellowtail in 4X.

**Fishery Length Frequencies**

Commercial length frequencies for winter and witch flounder were examined for 1990 to 1995 and 1993-1995 for American plaice. Sampling for winter flounder was inadequate in 1994, however improved in 1995 (Table 10). With the addition of the 1995 length frequencies, the apparent shift toward smaller fish observed in 1993 and 1994, is not sustained (Fig. 39). Some variation is noted from year to year as cohorts move through the fishery. Plaice represent a small portion of the landings and the short time series of commercial length frequencies available is based on only one or two samples. Yellowtail also represents a small portion of the landings and a time series of commercial length frequencies was not available. Overall in the 1990s, while some variation was noted, no sustained trends were observed. Comparing the survey and commercial length distributions indicated that while both winter and witch flounder were caught at size ranges observed in the survey distribution, plaice were caught generally outside the size range commonly observed in the survey. Industry comments indicated that discarding was not a problem in the 4X flatfish fishery despite the discrepancy observed in the survey and commercial size frequencies.

**Conclusions**

The 1995 catch allocation to the major participants in the 4X flounder fishery (i.e. the <65' mobile gear fleet) did not restrict their fishing activities, but nonetheless landings declined by about 20% from the 1994 level. Industry indicated that restrictions in other fisheries (e.g. quota, closed areas) may have impacted the fleets ability to fish flounder. Catch rate for all combined flatfish remained relatively stable, however catch rate for witch flounder has declined since 1991. Reduced landings may be accounted for primarily by a reduction in overall effort, however witch effort did not decline even though industry indicated some difficulty in catching both witch and winter flounder in some areas. Reports in 1994 indicated a redirection of effort to Georges Bank yellowtail, however given the 400 t quota limit on Georges Bank yellowtail in 1995, redirection of effort to this species should not have been a big factor, as most participants fished only one trip for Georges Bank yellowtail.

Abundance of the primary species fished in the area, winter flounder, and also the two species of minor importance, plaice and yellowtail, appears to be stable, although winter flounder has declined since 1993. Witch flounder, however continues to decline in abundance. The size distribution has been relatively stable in the 1990-1995 period although for witch and to a lesser extent winter flounder there has been a significant decline in the abundance of large fish in the 1990s. Some industry groups have expressed concern about some localized winter flounder stocks, and have indicated that good concentrations of large witch flounder are increasingly hard to find.

**Prognosis**

Overall, resource prospects for 1997 remain reasonable for most of the 4X flounder resource. With the exception of witch flounder, resource status does not appear to have deteriorated and some recruitment was noted. The TAC of 3,375 t in 1996 should maintain effort at the 1994 level, and could even result in some further reduction, if, as in 1995, the entire quota is not taken.

However as previously noted witch flounder provides an exception , and the extent of the declines in survey abundance, commercial landings, catch rates and size range suggest protective measures directed at witch flounder are warranted for the 1997 fishery. Continued catches in the order of 300-400 t will likely cause a continuation of this downward trend. Innovative management may be required to limit effort on witch flounder while still permitting fishing for other flounders.

Some industry groups continue to express concern about some localized winter flounder stocks. As was stated last year, given that these winter flounder populations are highly localized, and the extent of mixing is unclear, every effort should be made to distribute catch among these populations. Consideration should also be given to developing a management plan that recognizes the possibility of several population units that may be changing abundance at different rates.

Separation of flatfish by species continues to be a problem, and should be resolved by enforcing the separation of flatfish as a condition of licence. The less desirable alternative is to try and use information provided by the subsequent plant weighout by species. Currently this information is not provided to Statistics Branch. Perhaps the DMP could be used to facilitate the collection of species weights from the plants.

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Table 1. Official Reported* Landings of 4X Flatfish by Species.

| | 4X | | | | | |
|---|---|---|---|---|---|---|
| | Winter Flounder | Witch Flounder | Plaice | Yellowtail Flounder | Unspecified** | Total |
| 1961 | 699 | 59 | 198 | 9 | 25 | 990 |
| 1962 | 449 | 61 | 242 | 24 | 120 | 896 |
| 1963 | 614 | 75 | 250 | 84 | - | 1023 |
| 1964 | 1280 | 257 | 512 | 150 | - | 2199 |
| 1965 | 1128 | 421 | 694 | 224 | - | 2467 |
| 1966 | 1257 | 224 | 726 | 166 | - | 2373 |
| 1967 | 902 | 383 | 1106 | 225 | - | 2616 |
| 1968 | 1143 | 735 | 946 | 205 | 1 | 3030 |
| 1969 | 1400 | 792 | 870 | 201 | - | 3263 |
| 1970 | 1478 | 807 | 635 | 326 | 2 | 3248 |
| 1971 | 1483 | 1141 | 545 | 218 | 1 | 3388 |
| 1972 | 825 | 698 | 566 | 164 | 681 | 2934 |
| 1973 | 774 | 535 | 339 | 139 | 806 | 2593 |
| 1974 | 974 | 498 | 458 | 236 | 716 | 2882 |
| 1975 | 670 | 331 | 296 | 213 | 834 | 2344 |
| 1976 | 717 | 341 | 309 | 230 | 496 | 2093 |
| 1977 | 1022 | 421 | 449 | 302 | 898 | 3092 |
| 1978 | 884 | 188 | 512 | 387 | 1027 | 2998 |
| 1979 | 847 | 290 | 828 | 291 | 1212 | 3468 |
| 1980 | 1134 | 331 | 682 | 255 | 1858 | 4259 |
| 1981 | 1411 | 462 | 514 | 227 | 1556 | 4170 |
| 1982 | 1144 | 583 | 377 | 212 | 1763 | 4079 |
| 1983 | 915 | 659 | 584 | 321 | 2023 | 4502 |
| 1984 | 877 | 593 | 335 | 172 | 1995 | 3972 |
| 1985 | 795 | 525 | 317 | 73 | 2200 | 3910 |
| 1986 | 1034 | 631 | 592 | 111 | 3234 | 5602 |
| 1987 | 1044 | 492 | 262 | 109 | 2380 | 4287 |
| 1988 | 1460 | 541 | 366 | 79 | 2205 | 4651 |
| 1989 | 1289 | 527 | 481 | 50 | 976 | 3323 |
| 1990 | 1881 | 643 | 469 | 79 | 2943 | 6015 |
| 1991 | 602 | 605 | 988 | 144 | 3445 | 5784 |
| 1992 | 564 | 824 | 413 | 118 | 3940 | 5859 |
| 1993 | 343 | 373 | 9 | 54 | 3232 | 4011 |
| 1994 | 520 | 391 | 82 | 95 | 2189 | 3277 |
| 1995 | 923 | 306 | 27 | 133 | 1149 | 2538 |

* Landings by species are not considered reliable, due to lack of consistent species separation.

** Any mixture of winter, witch, yellowtail or American plaice.

Table 2. Official Reported Landings for 4X (includes 5Y).

| | Winter Flounder | | | | | Witch Flounder | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Canada | USA | Russia | Other | Total | Canada | USA | Russia | Other | Total |
| 1961 | 696 | 3 | - | - | 699 | 36 | 23 | - | - | 59 |
| 1962 | 443 | 6 | - | - | 449 | 24 | 37 | - | - | 61 |
| 1963 | 586 | 28 | - | - | 614 | 29 | 46 | - | - | 75 |
| 1964 | 1251 | 29 | - | - | 1280 | 187 | 70 | 316 | - | 257 |
| 1965 | 1103 | 4 | 21 | - | 1128 | 56 | 49 | 124 | - | 421 |
| 1966 | 937 | 8 | 312 | - | 1257 | 80 | 20 | - | - | 224 |
| 1967 | 884 | 18 | - | - | 902 | 291 | 92 | 12 | - | 383 |
| 1968 | 1115 | 13 | 15 | - | 1143 | 694 | 29 | 7 | 1 | 735 |
| 1969 | 1388 | 7 | 5 | - | 1400 | 756 | 28 | - | - | 792 |
| 1970 | 1470 | 8 | - | - | 1478 | 760 | 47 | 317 | - | 807 |
| 1971 | 1418 | 6 | 59 | - | 1483 | 775 | 49 | 95 | - | 1141 |
| 1972 | 792 | 13 | 20 | - | 825 | 563 | 40 | 120 | - | 698 |
| 1973 | 633 | 2 | 139 | - | 774 | 383 | 32 | 97 | - | 535 |
| 1974 | 751 | 7 | 216 | - | 974 | 373 | 28 | 13 | 4 | 498 |
| 1975 | 615 | 45 | 10 | - | 670 | 281 | 33 | 27 | - | 331 |
| 1976 | 696 | 13 | 8 | - | 717 | 285 | 29 | 6 | - | 341 |
| 1977 | 1009 | 13 | - | - | 1022 | 402 | 13 | - | - | 421 |
| 1978 | 879 | 5 | - | - | 884 | 172 | 16 | - | - | 188 |
| 1979 | 844 | 3 | - | - | 847 | 283 | 7 | - | - | 290 |
| 1980 | 1133 | 1 | - | - | 1134 | 320 | 11 | - | - | 331 |
| 1981 | 1411 | - | - | - | 1411 | 421 | 41 | - | - | 462 |
| 1982 | 1139 | 5 | - | - | 1144 | 527 | 56 | - | - | 583 |
| 1983 | 912 | 3 | - | - | 915 | 482 | 177 | - | - | 659 |
| 1984 | 870 | 7 | - | - | 877 | 431 | 162 | - | - | 593 |
| 1985 | 794 | 1 | - | - | 795 | 452 | 73 | - | - | 525 |
| 1986 | 1031 | 3 | - | - | 1034 | 553 | 78 | - | - | 631 |
| 1987 | 1024 | 20 | - | - | 1044 | 472 | 20 | - | - | 492 |
| 1988 | 1459 | 1 | - | - | 1460 | 529 | 12 | - | - | 541 |
| 1989 | 1289 | - | - | - | 1289 | 524 | 3 | - | - | 527 |
| 1990 | 1885 | 1 | - | - | 1886 | 638 | 7 | - | - | 645 |
| 1991 | 602 | 1 | - | - | 603 | 602 | 3 | - | - | 605 |
| 1992 | 564 | - | - | - | 564 | 828 | 1 | - | - | 829 |
| 1993[1] | 343 | - | - | - | 343 | 373 | - | - | - | 373 |
| 1994[1] | 520 | - | - | - | 520 | 391 | - | - | - | 391 |
| 1995[1] | 923 | - | - | - | 923 | 306 | - | - | - | 306 |

[1] Foreign catch is provisional, from International Observer Program and NAFO Circular Letters.

Note: Data from 1991 onward, is from DFO Statistics Branch.

Table 2 (Continued). Official Reported Landings for 4X (includes 5Y).

| | American Plaice | | | | | Yellowtail Flounder | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Canada | USA | Russia | Other | Total | Canada | USA | Russia | Other | Total |
| 1961 | 151 | 47 | - | - | 198 | - | 9 | - | -- | 9 |
| 1962 | 187 | 55 | - | - | 242 | 4 | 20 | - | - | 24 |
| 1963 | 150 | 100 | - | - | 250 | 25 | 30 | 29 | - | 84 |
| 1964 | 335 | 176 | - | 1 | 512 | 57 | 36 | 57 | - | 150 |
| 1965 | 289 | 170 | 235 | - | 694 | 83 | 20 | 121 | - | 224 |
| 1966 | 447 | 107 | 172 | - | 726 | 58 | 14 | 94 | - | 166 |
| 1967 | 945 | 161 | - | - | 1106 | 196 | 29 | - | - | 225 |
| 1968 | 867 | 67 | 10 | 2 | 946 | 173 | 23 | 9 | - | 205 |
| 1969 | 815 | 51 | 4 | - | 870 | 180 | 19 | 2 | - | 201 |
| 1970 | 578 | 50 | 7 | - | 635 | 212 | 20 | 94 | - | 326 |
| 1971 | 425 | 67 | 53 | - | 545 | 208 | 10 | - | - | 218 |
| 1972 | 476 | 33 | 57 | - | 566 | 154 | 4 | 6 | - | 164 |
| 1973 | 273 | 6 | 60 | - | 339 | 121 | 1 | 17 | - | 139 |
| 1974 | 303 | 9 | 146 | - | 458 | 215 | 3 | 18 | - | 236 |
| 1975 | 262 | 30 | 4 | - | 296 | 174 | 35 | - | 4 | 213 |
| 1976 | 238 | 26 | 45 | - | 309 | 218 | 12 | - | - | 230 |
| 1977 | 414 | 35 | - | - | 449 | 289 | 13 | - | - | 302 |
| 1978 | 489 | 20 | 3 | - | 512 | 384 | 3 | - | - | 387 |
| 1979 | 818 | 10 | - | - | 828 | 289 | 2 | - | - | 291 |
| 1980 | 666 | 15 | - | - | 681 | 251 | 4 | - | - | 255 |
| 1981 | 437 | 77 | - | - | 514 | 225 | 2 | - | - | 227 |
| 1982 | 311 | 66 | - | - | 377 | 211 | 1 | - | - | 212 |
| 1983 | 480 | 104 | - | - | 584 | 320 | 1 | - | - | 321 |
| 1984 | 220 | 115 | - | - | 335 | 165 | 7 | - | - | 172 |
| 1985 | 282 | 35 | - | - | 317 | 73 | - | - | - | 73 |
| 1986 | 560 | 32 | - | - | 592 | 111 | - | - | - | 111 |
| 1987 | 251 | 11 | - | - | 262 | 109 | - | - | - | 109 |
| 1988 | 362 | 4 | - | - | 366 | 79 | - | - | - | 79 |
| 1989 | 480 | 1 | - | - | 481 | 50 | - | - | - | 50 |
| 1990 | 464 | 6 | - | - | 470 | 78 | 1 | - | - | 79 |
| 1991 | 980 | 4 | - | 4 | 988 | 144 | - | - | - | 144 |
| 1992 | 414 | 3 | 1 | 5 | 423 | 118 | - | - | - | 118 |
| 1993[1] | 9 | - | - | - | 9 | 54 | - | - | - | 54 |
| 1994[1] | 82 | - | - | - | 82 | 95 | - | - | - | 95 |
| 1995[1] | 27 | - | - | - | 27 | 133 | - | - | - | 133 |

[1] Foreign catch is provisional, from International Observer Program and NAFO Circular Letters.

Note: Data from 1991 onward, is from DFO Statistics Branch.

Table 3a. American Plaice reported landings for divisions 4VWX, includes 5Y.

| Year | 4V | 4W | 4X | Total |
|---|---|---|---|---|
| 1970 | 5242 | 2481 | 635 | 8358 |
| 1971 | 7765 | 5991 | 545 | 14301 |
| 1972 | 6912 | 3175 | 566 | 10653 |
| 1973 | 8686 | 3407 | 339 | 12432 |
| 1974 | 11363 | 4951 | 458 | 16772 |
| 1975 | 7336 | 4115 | 296 | 11747 |
| 1976 | 8488 | 2350 | 309 | 11147 |
| 1977 | 6716 | 592 | 449 | 7757 |
| 1978 | 5501 | 743 | 512 | 6756 |
| 1979 | 5028 | 498 | 828 | 6354 |
| 1980 | 6293 | 598 | 681 | 7572 |
| 1981 | 5677 | 581 | 514 | 6772 |
| 1982 | 4920 | 400 | 377 | 5697 |
| 1983 | 5095 | 428 | 584 | 6107 |
| 1984 | 5509 | 284 | 335 | 6128 |
| 1985 | 3915 | 205 | 317 | 4437 |
| 1986 | 2792 | 298 | 592 | 3682 |
| 1987 | 4224 | 399 | 262 | 4885 |
| 1988 | 2758 | 329 | 366 | 3453 |
| 1989 | 2966 | 399 | 481 | 3846 |
| 1990 | 1679 | 240 | 470 | 2389 |
| 1991 | 186 | 192 | 988 | 1366 |
| 1992 | 447 | 131 | 423 | 1001 |
| 1993[1] | 39 | 84 | 9 | 132 |
| 1994[1] | 96 | 9 | 82 | 187 |
| 1995[1] | 359 | 0 | 27 | 386 |

Table 3b. Witch Flounder reported landings for divisions 4VWX, includes 5Y.

| Year | 4V | 4W | 4X | Total |
|---|---|---|---|---|
| 1970 | 3282 | 1959 | 807 | 6048 |
| 1971 | 5640 | 11083 | 1141 | 17864 |
| 1972 | 4894 | 5759 | 698 | 11351 |
| 1973 | 6572 | 6862 | 535 | 13969 |
| 1974 | 4913 | 2004 | 498 | 7415 |
| 1975 | 3284 | 5307 | 331 | 8922 |
| 1976 | 2718 | 2683 | 341 | 5742 |
| 1977 | 1555 | 455 | 421 | 2431 |
| 1978 | 1540 | 563 | 188 | 2291 |
| 1979 | 1572 | 209 | 290 | 2071 |
| 1980 | 1801 | 189 | 331 | 2321 |
| 1981 | 1123 | 156 | 462 | 1741 |
| 1982 | 789 | 101 | 583 | 1473 |
| 1983 | 878 | 126 | 659 | 1663 |
| 1984 | 1191 | 149 | 593 | 1933 |
| 1985 | 1633 | 113 | 525 | 2271 |
| 1986 | 2221 | 162 | 631 | 3014 |
| 1987 | 2554 | 171 | 492 | 3217 |
| 1988 | 2185 | 221 | 541 | 2947 |
| 1989 | 1610 | 155 | 527 | 2292 |
| 1990 | 1158 | 146 | 645 | 1949 |
| 1991 | 1288 | 38 | 605 | 1931 |
| 1992 | 941 | 90 | 829 | 1860 |
| 1993[1] | 513 | 19 | 373 | 905 |
| 1994[1] | 271 | 4 | 391 | 666 |
| 1995[1] | 309 | 6 | 306 | 621 |

[1] Foreign catch is provisional, from International Observer Program and NAFO Circular Letters.

Note: Data from 1991 onward, is from DFO Statistics Branch.

Table 3c. Yellowtail Flounder reported landings for divisions 4VWX.

| Year | 4V | 4W | 4X | Total |
|---|---|---|---|---|
| 1970 | 670 | 2686 | 326 | 3682 |
| 1971 | 889 | 668 | 218 | 1775 |
| 1972 | 697 | 624 | 164 | 1485 |
| 1973 | 980 | 394 | 139 | 1513 |
| 1974 | 573 | 130 | 236 | 939 |
| 1975 | 1103 | 254 | 213 | 1570 |
| 1976 | 473 | 201 | 230 | 904 |
| 1977 | 1101 | 40 | 302 | 1443 |
| 1978 | 1085 | 156 | 387 | 1628 |
| 1979 | 1655 | 144 | 291 | 2090 |
| 1980 | 2158 | 78 | 255 | 2491 |
| 1981 | 2539 | 123 | 227 | 2889 |
| 1982 | 2360 | 51 | 212 | 2623 |
| 1983 | 2043 | 59 | 321 | 2423 |
| 1984 | 2239 | 51 | 172 | 2462 |
| 1985 | 932 | 15 | 73 | 1020 |
| 1986 | 672 | 22 | 111 | 805 |
| 1987 | 947 | 94 | 109 | 1150 |
| 1988 | 942 | 47 | 79 | 1068 |
| 1989 | 1385 | 74 | 50 | 1509 |
| 1990 | 2815 | 116 | 79 | 3010 |
| 1991 | 1313 | 18 | 144 | 1475 |
| 1992 | 1357 | 16 | 118 | 1491 |
| 1993[1] | 1641 | 6 | 54 | 1701 |
| 1994[1] | 1031 | 4 | 95 | 1130 |
| 1995[1] | 732 | 3 | 133 | 868 |

Table 3d. Winter Flounder reported landings for divisions 4VWX.

| Year | 4V | 4W | 4X | Total |
|---|---|---|---|---|
| 1970 | 8 | 44 | 1478 | 1530 |
| 1971 | 237 | 1364 | 1483 | 3084 |
| 1972 | 78 | 551 | 825 | 1454 |
| 1973 | 480 | 655 | 774 | 1909 |
| 1974 | 777 | 1005 | 974 | 2756 |
| 1975 | 179 | 525 | 670 | 1374 |
| 1976 | 235 | 345 | 717 | 1297 |
| 1977 | 226 | 9 | 1022 | 1257 |
| 1978 | 186 | 137 | 884 | 1207 |
| 1979 | 228 | 13 | 847 | 1088 |
| 1980 | 30 | 10 | 1134 | 1174 |
| 1981 | 26 | 11 | 1411 | 1448 |
| 1982 | 82 | 10 | 1144 | 1236 |
| 1983 | 72 | 8 | 915 | 995 |
| 1984 | 2 | 5 | 877 | 884 |
| 1985 | 27 | 2 | 795 | 824 |
| 1986 | 2 | 4 | 1034 | 1040 |
| 1987 | 9 | 3 | 1044 | 1056 |
| 1988 | 97 | 15 | 1460 | 1572 |
| 1989 | 147 | 40 | 1289 | 1476 |
| 1990 | 70 | 8 | 1886 | 1964 |
| 1991 | 28 | 16 | 602 | 646 |
| 1992 | 2 | 3 | 564 | 569 |
| 1993[1] | 0 | 2 | 343 | 345 |
| 1994[1] | 0 | 2 | 520 | 522 |
| 1995[1] | 0 | 0 | 922 | 922 |

[1] Foreign catch is provisional, from International Observer Program and NAFO Circular Letters.

Note: Data from 1991 onward, is from DFO Statistics Branch.

Table 3e. Unspecified* Flounder reported landings for divisions 4VWX.

| Year | 4V | 4W | 4X | Total |
|---|---|---|---|---|
| 1970 | 7 | 2 | 2 | 11 |
| 1971 | - | - | 1 | 1 |
| 1972 | 42 | 1 | 681 | 724 |
| 1973 | 64 | 112 | 806 | 982 |
| 1974 | 99 | 2 | 716 | 817 |
| 1975 | 5 | 283 | 834 | 1122 |
| 1976 | 61 | 486 | 496 | 1043 |
| 1977 | 27 | 19 | 898 | 944 |
| 1978 | 5 | 28 | 1027 | 1060 |
| 1979 | 40 | 51 | 1212 | 1303 |
| 1980 | 23 | 6 | 1858 | 1887 |
| 1981 | 17 | 4 | 1556 | 1577 |
| 1982 | 4 | 7 | 1763 | 1774 |
| 1983 | 30 | 20 | 2023 | 2073 |
| 1984 | 6 | 2 | 1995 | 2003 |
| 1985 | 3 | 7 | 2200 | 2210 |
| 1986 | 46 | 22 | 3234 | 3302 |
| 1987 | 33 | 9 | 2380 | 2422 |
| 1988 | 70 | 19 | 2205 | 2294 |
| 1989 | 15 | 78 | 976 | 1069 |
| 1990 | 10 | 22 | 3012 | 3044 |
| 1991 | 1275 | 206 | 3445 | 4926 |
| 1992 | 1798 | 85 | 3958 | 5841 |
| 1993[1] | 1618 | 37 | 3232 | 4887 |
| 1994[1] | 1400 | 8 | 2189 | 3597 |
| 1995[1] | 909 | 6 | 1144 | 2059 |

* Any mixture of winter, witch, yellowtail and American plaice.

[1] Foreign catch is provisional, from International Observer Program and NAFO Circular Letters.

Note: Data from 1991 onward, is from DFO Statistics Branch.

Table 4. Reported landings by quarter of year for Div. 4X.

| | Winter Flounder | | | | | Witch Flounder | | | | | American Plaice | | | | | Yellowtail Flounder | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1st Quart. | 2nd Quart. | 3rd Quart. | 4th Quart. | Total | 1st Quart. | 2nd Quart. | 3rd Quart. | 4th Quart. | Total | 1st Quart. | 2nd Quart. | 3rd Quart. | 4th Quart. | Total | 1st Quart. | 2nd Quart. | 3rd Quart. | 4th Quart. | Total |
| 1970 | 51 | 660 | 513 | 246 | 1470 | 119 | 371 | 122 | 148 | 760 | 101 | 192 | 111 | 174 | 578 | 28 | 89 | 44 | 51 | 212 |
| 1971 | 13 | 712 | 511 | 182 | 1418 | 148 | 283 | 251 | 93 | 775 | 61 | 175 | 81 | 108 | 425 | 20 | 77 | 74 | 37 | 208 |
| 1972 | 0 | 272 | 421 | 99 | 792 | 52 | 263 | 209 | 39 | 563 | 84 | 170 | 131 | 91 | 476 | 12 | 58 | 71 | 13 | 154 |
| 1973 | 1 | 304 | 266 | 62 | 633 | 113 | 150 | 98 | 22 | 383 | 67 | 71 | 64 | 71 | 273 | 30 | 29 | 53 | 9 | 121 |
| 1974 | 1 | 273 | 337 | 140 | 751 | 27 | 171 | 140 | 35 | 373 | 10 | 76 | 76 | 141 | 303 | 12 | 58 | 107 | 38 | 215 |
| 1975 | 6 | 243 | 274 | 92 | 615 | 33 | 130 | 55 | 63 | 281 | 5 | 55 | 115 | 87 | 262 | 14 | 41 | 93 | 26 | 174 |
| 1976 | 11 | 255 | 340 | 90 | 696 | 60 | 84 | 104 | 37 | 285 | 48 | 62 | 44 | 84 | 238 | 15 | 76 | 107 | 20 | 218 |
| 1977 | 16 | 392 | 436 | 165 | 1009 | 140 | 108 | 69 | 85 | 402 | 85 | 137 | 120 | 72 | 414 | 37 | 114 | 111 | 27 | 289 |
| 1978 | 9 | 272 | 411 | 187 | 879 | 57 | 61 | 21 | 33 | 172 | 48 | 84 | 260 | 97 | 489 | 30 | 170 | 135 | 49 | 384 |
| 1979 | 18 | 163 | 516 | 147 | 844 | 61 | 94 | 47 | 81 | 283 | 46 | 354 | 308 | 110 | 818 | 22 | 118 | 102 | 47 | 289 |
| 1980 | 25 | 449 | 489 | 170 | 1133 | 88 | 71 | 83 | 78 | 320 | 52 | 213 | 315 | 86 | 666 | 37 | 112 | 78 | 24 | 251 |
| 1981 | 8 | 426 | 754 | 223 | 1411 | 71 | 83 | 140 | 127 | 421 | 72 | 173 | 164 | 28 | 437 | 18 | 73 | 108 | 26 | 225 |
| 1982 | 78 | 367 | 575 | 119 | 1139 | 57 | 154 | 147 | 169 | 527 | 34 | 96 | 123 | 58 | 311 | 36 | 54 | 77 | 44 | 211 |
| 1983 | 37 | 282 | 482 | 111 | 912 | 86 | 164 | 166 | 66 | 482 | 89 | 204 | 141 | 46 | 480 | 50 | 106 | 118 | 46 | 320 |
| 1984 | 72 | 322 | 401 | 75 | 870 | 64 | 141 | 180 | 46 | 431 | 42 | 66 | 86 | 26 | 220 | 38 | 61 | 52 | 14 | 165 |
| 1985 | 25 | 290 | 421 | 58 | 794 | 95 | 131 | 150 | 76 | 452 | 64 | 96 | 78 | 44 | 282 | 27 | 24 | 20 | 2 | 73 |
| 1986 | 52 | 252 | 623 | 104 | 1031 | 106 | 105 | 214 | 128 | 553 | 49 | 183 | 248 | 80 | 560 | 23 | 31 | 24 | 33 | 111 |
| 1987 | 15 | 404 | 521 | 84 | 1024 | 134 | 129 | 116 | 93 | 472 | 65 | 110 | 58 | 18 | 251 | 22 | 42 | 33 | 12 | 109 |
| 1988 | 67 | 401 | 770 | 221 | 1459 | 142 | 126 | 132 | 129 | 529 | 60 | 117 | 142 | 43 | 362 | 21 | 21 | 28 | 9 | 79 |
| 1989 | 191 | 497 | 456 | 145 | 1289 | 246 | 209 | 40 | 29 | 524 | 181 | 237 | 54 | 8 | 480 | 5 | 34 | 6 | 5 | 50 |
| 1990 | 406 | 496 | 572 | 411 | 1885 | 181 | 128 | 241 | 88 | 638 | 134 | 158 | 143 | 29 | 464 | 12 | 11 | 34 | 21 | 78 |
| 1991 | 76 | 85 | 158 | 283 | 602 | 292 | 126 | 66 | 118 | 602 | 3 | 166 | 411 | 400 | 980 | 4 | 33 | 51 | 56 | 144 |
| 1992 | 114 | 157 | 159 | 134 | 564 | 360 | 206 | 115 | 147 | 828 | 58 | 185 | 87 | 84 | 414 | 7 | 45 | 39 | 27 | 118 |
| 1993[1] | 26 | 117 | 145 | 55 | 343 | 189 | 110 | 42 | 32 | 373 | - | - | 9 | 16 | 9 | 6 | 18 | 19 | 10 | 53 |
| 1994[1] | 19 | 115 | 118 | 269 | 521 | 144 | 110 | 48 | 88 | 390 | 4 | 16 | 46 | - | 82 | 3 | 26 | 27 | 40 | 96 |
| 1995[1] | - | - | - | - | - | 185 | 58 | 36 | 27 | 306 | 1 | 14 | 10 | 2 | 27 | 14 | 44 | 51 | 24 | 133 |

[1] Foreign catch is provisional, from International Observer Program and NAFO Circular Letters.

Note: Data from 1991 onward, is from DFO Statistics Branch.

Table 5a. Nominal flatfish landings for mobile gear in division 4X for Canada (Maritimes, Quebec and Newfoundland).

| | OTB TC 0 - 3 | | | | | | OTB TC 4+ | | | | | | Scottish & Danish Seine[2] | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Plaice | Witch Flounder | Yellow Tail | Winter Flounder | Unspec. Flounder | Total | Plaice | Witch Flounder | Yellow Tail | Winter Flounder | Unspec. Flounder | Total | Plaice | Witch Flounder | Yellow Tail | Winter Flounder | Unspec. Flounder | Total |
| 1970 | 356 | 314 | 122 | 1406 | - | 2198 | 187 | 103 | 60 | 27 | - | 377 | 4 | 320 | 19 | - | - | 343 |
| 1971 | 203 | 274 | 94 | 1309 | - | 1880 | 173 | 185 | 87 | 15 | - | 460 | 8 | 304 | 19 | 1 | - | 332 |
| 1972 | 195 | 46 | 48 | 722 | 677 | 1688 | 225 | 99 | 47 | 4 | 4 | 379 | 1 | 405 | 51 | - | - | 457 |
| 1973 | 129 | 40 | 36 | 562 | 795 | 1562 | 94 | 80 | 18 | - | 9 | 201 | - | 263 | 50 | 1 | - | 314 |
| 1974 | 158 | 42 | 115 | 699 | 699 | 1713 | 73 | 43 | 28 | 7 | 5 | 156 | 1 | 278 | 39 | 1 | - | 319 |
| 1975 | 130 | 52 | 86 | 550 | 812 | 1630 | 86 | 55 | 15 | 9 | 15 | 180 | - | 152 | 25 | 4 | 3 | 184 |
| 1976 | 83 | 61 | 145 | 641 | 463 | 1393 | 112 | 55 | 11 | 2 | 5 | 185 | 3 | 168 | 38 | 13 | 5 | 227 |
| 1977 | 214 | 94 | 127 | 850 | 878 | 2163 | 135 | 101 | 49 | 18 | - | 303 | 14 | 198 | 25 | 2 | 17 | 256 |
| 1978 | 247 | 47 | 187 | 762 | 1014 | 2257 | 82 | 48 | 73 | 27 | - | 230 | 42 | 73 | 8 | - | 7 | 130 |
| 1979 | 559 | 52 | 208 | 718 | 1181 | 2718 | 106 | 110 | 4 | 4 | 16 | 240 | 18 | 117 | 34 | 9 | 2 | 180 |
| 1980 | 458 | 183 | 184 | 924 | 1804 | 3553 | 96 | 94 | 11 | 26 | 3 | 230 | 2 | 37 | 18 | 1 | - | 58 |
| 1981 | 317 | 277 | 155 | 1287 | 1547 | 3583 | 28 | 28 | - | 5 | - | 61 | 2 | 70 | 21 | - | - | 93 |
| 1982 | 225 | 301 | 180 | 1035 | 1697 | 3438 | 18 | 49 | 11 | 11 | 1 | 90 | 6 | 88 | 11 | 2 | 2 | 109 |
| 1983 | 304 | 248 | 207 | 802 | 1979 | 3540 | 28 | 52 | 2 | 6 | 19 | 107 | 9 | 122 | 22 | - | 3 | 156 |
| 1984 | 181 | 307 | 126 | 724 | 1939 | 3277 | 4 | 3 | - | - | 8 | 15 | - | 102 | 14 | - | - | 116 |
| 1985 | 244 | 247 | 36 | 696 | 2190 | 3413 | 9 | 10 | 2 | 2 | 8 | 31 | 2 | 168 | 26 | 7 | - | 203 |
| 1986 | 482 | 349 | 66 | 935 | 3223 | 5055 | 1 | 6 | - | - | - | 7 | 5 | 173 | 21 | - | - | 199 |
| 1987 | 207 | 310 | 47 | 879 | 2374 | 3817 | 5 | 5 | 3 | - | - | 13 | 6 | 135 | 36 | - | - | 177 |
| 1988 | 321 | 381 | 63 | 1341 | 2188 | 4294 | 1 | 7 | 1 | - | - | 9 | 1 | 122 | 13 | 4 | - | 140 |
| 1989 | 443 | 397 | 29 | 1185 | 953 | 3007 | 2 | 8 | 0 | 4 | - | 14 | 5 | 104 | 13 | 9 | - | 131 |
| 1990 | 410 | 545 | 70 | 1710 | 3006 | 5741 | 15 | 0 | 0 | 2 | - | 17 | 1 | 51 | 2 | 2 | - | 56 |
| 1991[1] | 967 | 398 | 130 | 593 | 3278 | 5366 | 4 | 14 | 1 | 3 | 23 | 45 | 1 | 182 | 5 | 1 | 14 | 203 |
| 1992[1] | 411 | 676 | 107 | 556 | 3645 | 5395 | 2 | 9 | 1 | 5 | 11 | 28 | 0 | 141 | 1 | 0 | 12 | 154 |
| 1993[1] | - | 248 | 38 | 283 | 3130 | 3699 | 9 | 2 | - | 2 | 4 | 17 | - | 122 | 4 | 1 | 5 | 132 |
| 1994[1] | 71 | 287 | 74 | 497 | 2018 | 2947 | 1 | 4 | - | 1 | 6 | 12 | - | 90 | - | - | 15 | 105 |
| 1995[1] | 25 | 255 | 115 | 898 | 1120 | 2413 | 0 | 2 | 0 | 1 | 11 | 14 | - | 47 | 2 | 9 | 1 | 59 |

[1] Data from DFO Statistics Branch.
[2] All tonnage classes combined.

5b. Nominal flatfish landings for fixed gear in division 4X for Canada (Maritimes, Quebec and Newfoundland).

| | 4X | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LL, LHP[2] | | | | | | GN AND OTHER[2] | | | | | |
| Year | Plaice | Witch Flounder | Yellow Tail | Winter Flounder | Unspec. Flounder | Total | Plaice | Witch Flounder | Yellow Tail | Winter Flounder | Unspec. Flounder | Total |
| 1970 | 27 | - | 9 | 23 | - | 59 | 4 | 23 | 2 | 14 | - | 43 |
| 1971 | 32 | 10 | 8 | 33 | - | 83 | 9 | 2 | - | 60 | - | 71 |
| 1972 | 26 | - | 6 | 39 | - | 71 | 29 | 13 | 2 | 27 | - | 71 |
| 1973 | 33 | - | 16 | 37 | - | 86 | 17 | - | 1 | 33 | - | 51 |
| 1974 | 63 | 1 | 30 | 1 | - | 95 | 8 | 9 | 3 | 43 | - | 63 |
| 1975 | 41 | 22 | 48 | 12 | 1 | 124 | 5 | - | - | 40 | 3 | 48 |
| 1976 | 32 | - | 24 | 23 | 21 | 100 | 8 | 1 | - | 17 | 2 | 28 |
| 1977 | 22 | 8 | 13 | 40 | 2 | 85 | 29 | 1 | 75 | 99 | 1 | 205 |
| 1978 | 51 | 3 | 11 | 37 | 4 | 106 | 67 | 1 | 105 | 53 | - | 226 |
| 1979 | 74 | 2 | 37 | 40 | 13 | 166 | 61 | 2 | 6 | 73 | - | 142 |
| 1980 | 38 | 4 | 11 | 46 | 44 | 143 | 72 | 2 | 27 | 136 | 7 | 244 |
| 1981 | 75 | 16 | 4 | 57 | 8 | 160 | 15 | 30 | 45 | 62 | 1 | 153 |
| 1982 | 41 | 51 | 9 | 33 | 2 | 136 | 21 | 38 | - | 58 | 61 | 178 |
| 1983 | 69 | 15 | 22 | 16 | - | 122 | 70 | 45 | 67 | 88 | 20 | 290 |
| 1984 | 24 | 2 | 11 | 40 | 1 | 78 | 11 | 17 | 14 | 106 | 45 | 193 |
| 1985 | 20 | 9 | 3 | 13 | 1 | 46 | 7 | 18 | 6 | 76 | 1 | 108 |
| 1986 | 44 | 10 | 11 | 4 | 2 | 71 | 28 | 15 | 13 | 92 | - | 148 |
| 1987 | 13 | 22 | 23 | 68 | - | 126 | 20 | - | - | 77 | 1 | 98 |
| 1988 | 24 | 5 | 2 | 16 | - | 47 | 15 | 14 | - | 98 | 17 | 144 |
| 1989 | 9 | 0 | 2 | 31 | 6 | 48 | 19 | 12 | 5 | 57 | 17 | 110 |
| 1990 | 11 | 0 | 1 | 40 | - | 52 | 27 | 42 | 5 | 131 | 6 | 211 |
| 1991[1] | 7 | 0 | 2 | 0 | 4 | 13 | 0 | 8 | 5 | 4 | 123 | 140 |
| 1992[1] | 0 | 0 | 9 | - | 144 | 153 | 2 | 2 | 1 | 3 | 147 | 155 |
| 1993[1] | - | - | 10 | 49 | 16 | 75 | - | 1 | 1 | 8 | 78 | 88 |
| 1994[1] | - | 2 | 16 | 1 | 114 | 133 | 9 | 8 | 6 | 22 | 36 | 81 |
| 1995[1] | 0 | 6 | 16 | - | 1 | 17 | 1 | 3 | 1 | 15 | 15 | 35 |

(1) Data from DFO Statistics Branch.
(2) All tonnage classes combined.

Table 6. Management table for 4X flatfish 1995.

| Year | Fleet | Allocation | Reported catch | % Taken |
|---|---|---|---|---|
| 1995 | Fixed < 65' | 75 | 26 | 35 |
| | Generalist < 45' (April 1 - Dec. 31) | 337 | 335 | 99 |
| | Mobile <65' ITQ (April 1 - Dec. 31) | 2373 | 2082 | 88 |
| | Mobile 65-100' | 15 | 14 | 93 |
| | Vessels > 100' | 575 | 38 | 7 |

Table 7. Mean numbers/tow, mean weights/tow and standard errors for 4X flatfish for 1970 - 1995 (Summer Survey).

| | Mean Numbers per Tow and Standard Errors | | | | | | | | Mean Weights per Tow and Standard Errors | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Winter Flounder | | Witch Flounder | | Plaice | | Yellowtail Flounder | | Winter Flounder | | Witch Flounder | | Plaice | | Yellowtail Flounder | |
| Year | Mean #/Tow | Standard Error | Mean #/Tow | Standard Error | Mean #/Tow | Standard Error | Mean #/Tow | Standard Error | Mean Wts/Tow | Standard Error | Mean Wts/Tow | Standard Error | Mean Wts/Tow | Standard Error | Mean Wts/Tow | Standard Error |
| 1970 | 0.31 | (0.09) | 2.10 | (0.75) | 13.07 | (10.68) | 0.40 | (0.20) | 0.21 | (0.16) | 1.42 | (0.63) | 3.74 | (2.80) | 0.15 | (0.11) |
| 1971 | 0.29 | (0.16) | 0.92 | (0.41) | 6.44 | (2.72) | 0.56 | (0.29) | 0.13 | (0.12) | 0.59 | (0.28) | 1.85 | (0.88) | 0.15 | (0.11) |
| 1972 | 0.24 | (0.04) | 3.20 | (0.86) | 5.66 | (1.94) | 1.64 | (0.95) | 0.11 | (0.02) | 2.25 | (0.66) | 1.66 | (0.64) | 0.31 | (0.15) |
| 1973 | 0.54 | (0.24) | 4.88 | (1.52) | 5.02 | (1.28) | 0.26 | (0.07) | 0.26 | (0.12) | 3.29 | (0.83) | 2.07 | (0.67) | 0.07 | (0.03) |
| 1974 | 1.04 | (0.67) | 3.42 | (1.13) | 13.47 | (3.19) | 0.35 | (0.18) | 0.47 | (0.31) | 2.36 | (0.67) | 3.76 | (0.89) | 0.14 | (0.07) |
| 1975 | 0.60 | (0.14) | 1.97 | (0.33) | 4.51 | (1.00) | 0.43 | (0.11) | 0.39 | (0.10) | 1.83 | (0.31) | 1.45 | (0.28) | 0.19 | (0.06) |
| 1976 | 0.68 | (0.19) | 1.14 | (0.28) | 1.80 | (0.39) | 1.54 | (1.32) | 0.42 | (0.16) | 0.71 | (0.21) | 0.54 | (0.13) | 0.44 | (0.38) |
| 1977 | 1.34 | (0.54) | 4.47 | (2.45) | 1.94 | (0.49) | 0.45 | (0.09) | 1.34 | (0.54) | 3.37 | (1.57) | 0.75 | (0.21) | 0.45 | (0.09) |
| 1978 | 0.32 | (0.15) | 2.37 | (0.56) | 5.21 | (0.85) | 0.44 | (0.19) | 0.30 | (0.11) | 1.96 | (0.51) | 1.27 | (0.33) | 0.18 | (0.09) |
| 1979 | 3.91 | (2.15) | 0.94 | (0.31) | 3.72 | (0.90) | 2.05 | (0.69) | 2.34 | (1.46) | 0.70 | (0.19) | 1.37 | (0.46) | 0.50 | (0.13) |
| 1980 | 2.06 | (0.79) | 1.40 | (0.25) | 6.13 | (1.70) | 1.74 | (1.10) | 1.28 | (0.51) | 1.23 | (0.24) | 2.79 | (0.85) | 0.99 | (0.64) |
| 1981 | 3.35 | (1.12) | 3.60 | (1.32) | 4.46 | (1.13) | 1.48 | (0.73) | 2.16 | (0.70) | 2.25 | (0.61) | 1.42 | (0.47) | 0.85 | (0.50) |
| 1982 | 4.32 | (2.07) | 3.63 | (1.48) | 8.15 | (2.31) | 1.61 | (0.56) | 2.61 | (1.19) | 1.88 | (0.50) | 2.37 | (0.69) | 0.42 | (0.15) |
| 1983 | 2.69 | (1.93) | 2.28 | (0.70) | 6.01 | (0.81) | 0.15 | (0.07) | 0.95 | (0.60) | 1.77 | (0.76) | 1.87 | (0.38) | 0.07 | (0.03) |
| 1984 | 4.01 | (1.34) | 4.87 | (1.20) | 8.57 | (2.27) | 0.93 | (0.28) | 2.22 | (0.70) | 2.77 | (0.84) | 2.62 | (0.77) | 0.19 | (0.08) |
| 1985 | 1.88 | (0.49) | 1.40 | (0.35) | 4.62 | (1.55) | 0.27 | (0.17) | 0.76 | (0.27) | 0.93 | (0.27) | 1.08 | (0.40) | 0.16 | (0.09) |
| 1986 | 3.42 | (1.03) | 2.55 | (0.83) | 7.63 | (2.72) | 1.32 | (0.54) | 1.79 | (0.49) | 1.44 | (0.37) | 1.35 | (0.53) | 0.38 | (0.17) |
| 1987 | 5.60 | (1.48) | 1.10 | (0.23) | 7.67 | (1.55) | 0.67 | (0.35) | 1.75 | (0.37) | 0.74 | (0.15) | 1.69 | (0.37) | 0.17 | (0.08) |
| 1988 | 7.08 | (2.05) | 1.60 | (0.56) | 11.31 | (4.07) | 2.77 | (1.61) | 3.54 | (0.82) | 0.93 | (0.35) | 1.89 | (0.62) | 0.89 | (0.52) |
| 1989 | 6.57 | (1.47) | 1.70 | (0.57) | 8.37 | (1.81) | 1.28 | (0.75) | 2.90 | (0.72) | 1.06 | (0.33) | 1.39 | (0.33) | 0.29 | (0.15) |
| 1990 | 8.98 | (4.76) | 0.77 | (0.30) | 2.87 | (0.73) | 0.66 | (0.21) | 4.41 | (2.32) | 0.39 | (0.15) | 0.76 | (0.19) | 0.20 | (0.09) |
| 1991 | 6.07 | (1.63) | 1.94 | (1.01) | 8.08 | (3.59) | 2.16 | (1.08) | 3.09 | (0.78) | 0.79 | (0.25) | 1.22 | (0.47) | 0.53 | (0.24) |
| 1992 | 10.29 | (2.15) | 0.61 | (0.20) | 9.33 | (3.29) | 1.77 | (0.72) | 4.14 | (0.87) | 0.30 | (0.14) | 2.17 | (0.76) | 0.48 | (0.18) |
| 1993 | 5.44 | (1.67) | 1.47 | (0.39) | 5.26 | (1.45) | 1.85 | (0.63) | 2.04 | (1.67) | 0.70 | (0.31) | 0.86 | (0.31) | 0.46 | (0.15) |
| 1994 | 5.44 | (1.99) | 2.13 | (0.73) | 14.35 | (3.62) | 4.66 | (1.44) | 1.97 | (0.73) | 0.61 | (0.23) | 1.94 | (0.45) | 0.94 | (0.29) |
| 1995 | 6.38 | (1.49) | 1.59 | (0.45) | 10.14 | (2.20) | 2.02 | (0.53) | 2.79 | (0.70) | 0.45 | (0.17) | 1.71 | (0.34) | 0.48 | (0.11) |

Table 8. Minimum Biomass (t) estimates for Southwest Nova Scotia (4X).

| | Plaice | Yellowtail | Witch | Winter |
|---|---|---|---|---|
| 1970 | 5889 | 228 | 2354 | 328 |
| 1971 | 2916 | 240 | 877 | 202 |
| 1972 | 2615 | 493 | 3545 | 170 |
| 1973 | 3249 | 103 | 5176 | 415 |
| 1974 | 5918 | 219 | 3720 | 747 |
| 1975 | 2273 | 298 | 2876 | 620 |
| 1976 | 857 | 686 | 1090 | 666 |
| 1977 | 1177 | 700 | 5306 | 2106 |
| 1978 | 1996 | 278 | 2991 | 355 |
| 1979 | 1856 | 786 | 1452 | 3677 |
| 1980 | 4394 | 1556 | 1927 | 2020 |
| 1981 | 2231 | 1330 | 3532 | 3404 |
| 1982 | 3735 | 668 | 2959 | 4103 |
| 1983 | 2935 | 108 | 2779 | 1491 |
| 1984 | 4082 | 296 | 4316 | 3453 |
| 1985 | 1695 | 251 | 1459 | 1195 |
| 1986 | 2118 | 602 | 2262 | 2813 |
| 1987 | 2659 | 262 | 1161 | 2750 |
| 1988 | 2973 | 1400 | 1460 | 5560 |
| 1989 | 2191 | 460 | 1660 | 4560 |
| 1990 | 1192 | 307 | 606 | 6935 |
| 1991 | 1924 | 836 | 1236 | 4857 |
| 1992 | 3417 | 752 | 467 | 6512 |
| 1993 | 1359 | 726 | 1093 | 3211 |
| 1994 | 3043 | 1477 | 967 | 3093 |
| 1995 | 2687 | 761 | 706 | 4395 |

Table 9. Flatfish individual and combined CPUE for OTBs and DS TC 1-3 where one or any flatfish species was main species.

| | Plaice | Yellowtail | Witch Flounder | Winter Flounder | Unspecified | Any Flatfish (MS) |
|---|---|---|---|---|---|---|
| 4X | | | | | | |
| 1989 | .156 | | .086 | .008 | .137 | .131 |
| 1990 | .087 | .055 | .093 | .120 | .112 | .113 |
| 1991 | .092 | .065 | .102 | .101 | .083 | .088 |
| 1992 | .067 | .059 | .085 | .077 | .071 | .073 |
| 1993 | - | .041 | .064 | .066 | .060 | .061 |
| 1994 | .056 | .041 | .063 | .065 | .055 | .059 |
| 1995 | .035 | .037 | .045 | .079 | .053 | .060 |

Table 10. Mobile gear commercial samples for 4X.

| 4X | | | | |
|---|---|---|---|---|
| | Winter | Witch | Yellowtail | Plaice |
| 1990 | 2 | - | - | - |
| 1991 | 3 | 5 | - | - |
| 1992 | 4 | 3 | - | - |
| 1993 | 9 | 2 | - | 1 |
| 1994 | 1 | 8 | - | 2 |
| 1995 | 8 | 4 | - | 1 |

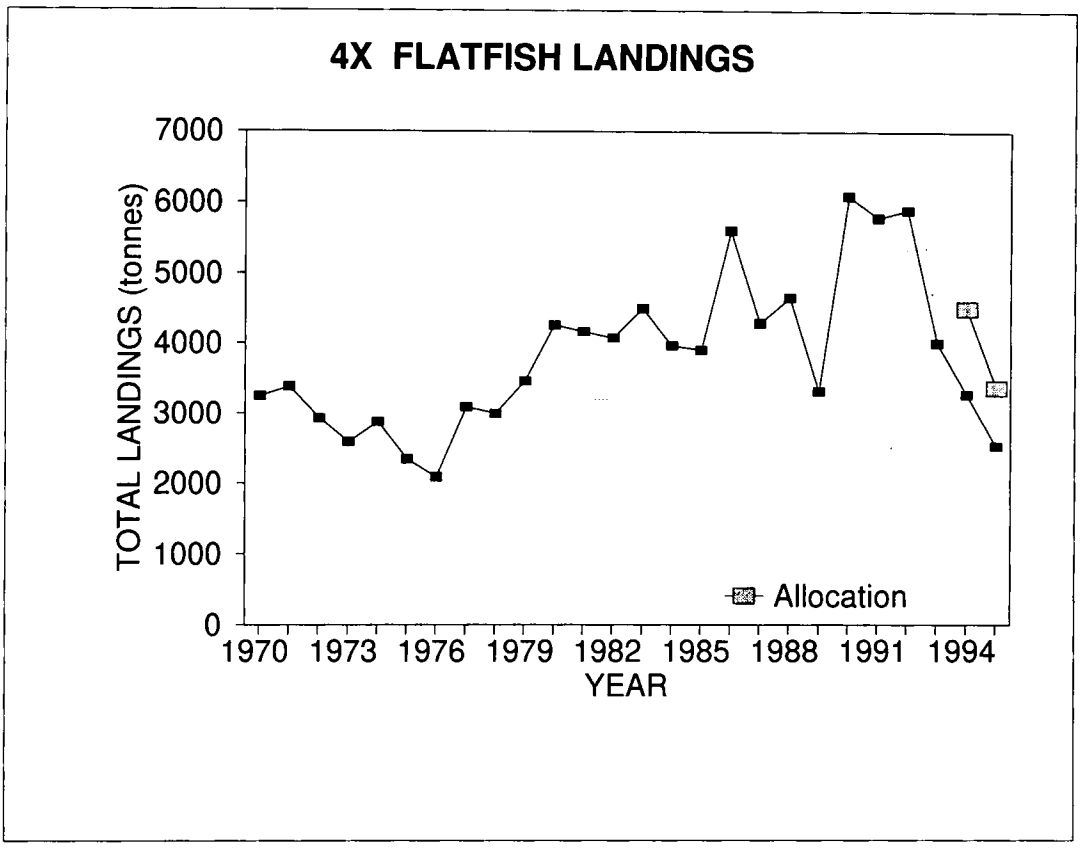

4X FLATFISH LANDINGS
TOTAL LANDINGS (tonnes)
7000
6000
5000
4000
3000
2000
1000
0
1970 1973 1976 1979 1982 1985 1988 1991 1994
YEAR
Allocation

Fig. 1.

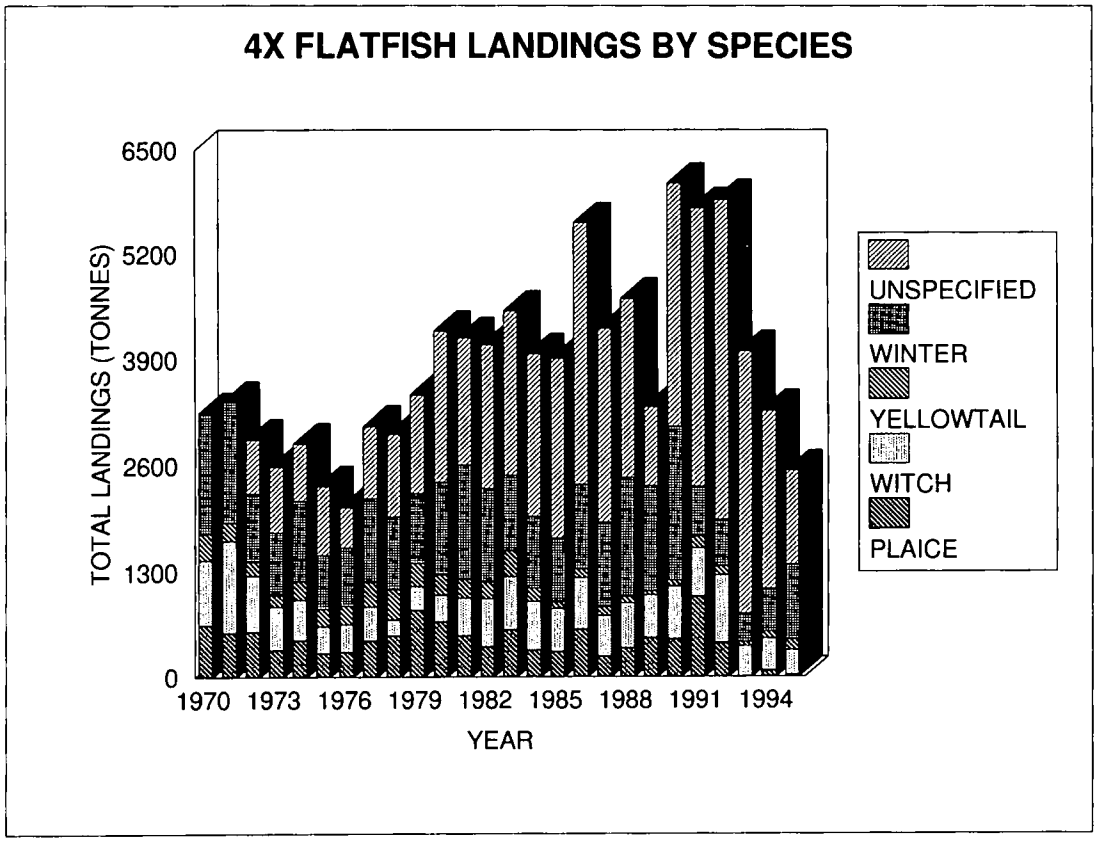

4X FLATFISH LANDINGS BY SPECIES
TOTAL LANDINGS (TONNES)
6500
5200
3900
2600
1300
0
1970 1973 1976 1979 1982 1985 1988 1991 1994
YEAR
UNSPECIFIED
WINTER
YELLOWTAIL
WITCH
PLAICE

Fig. 2.

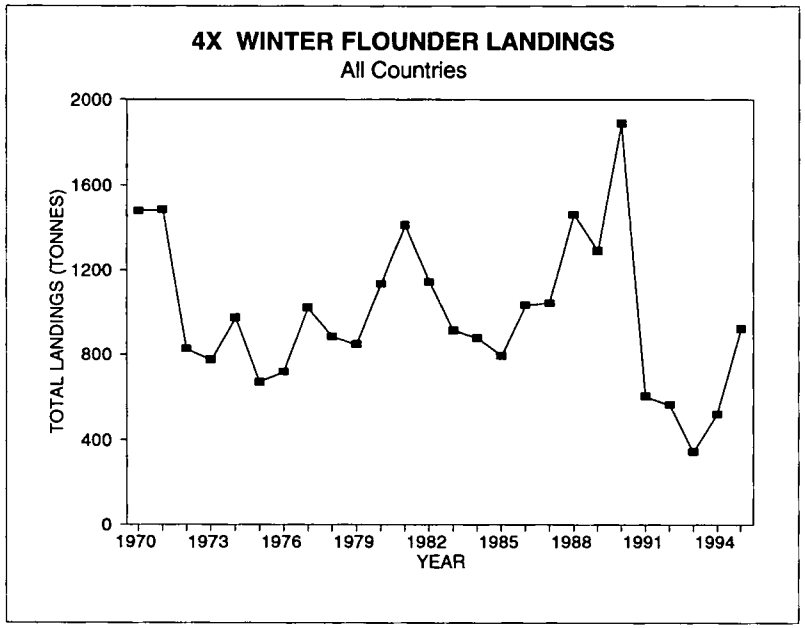



Fig. 3.

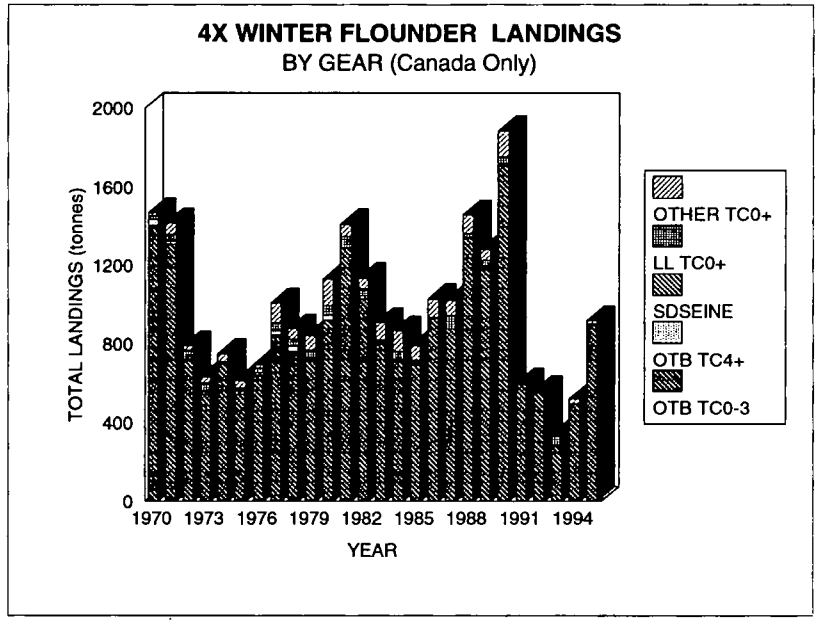



Fig. 4.



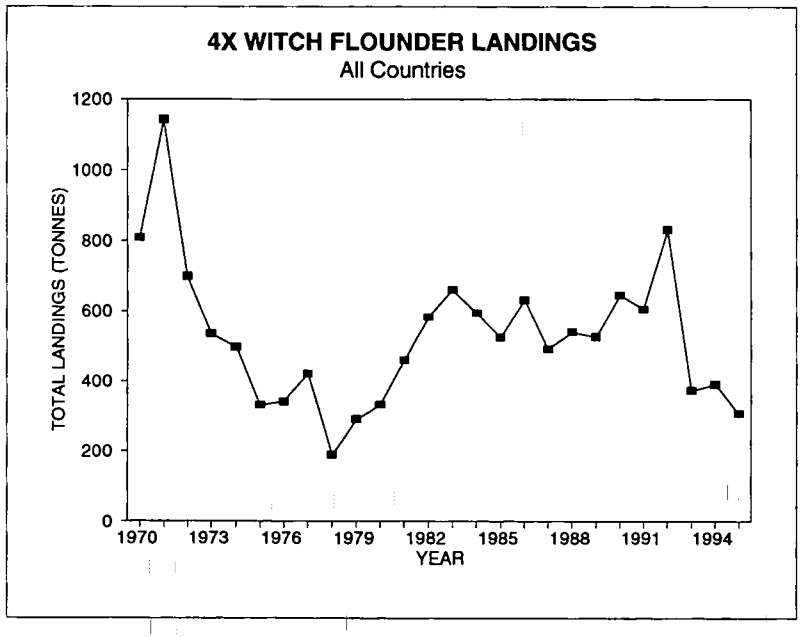



Fig. 5.

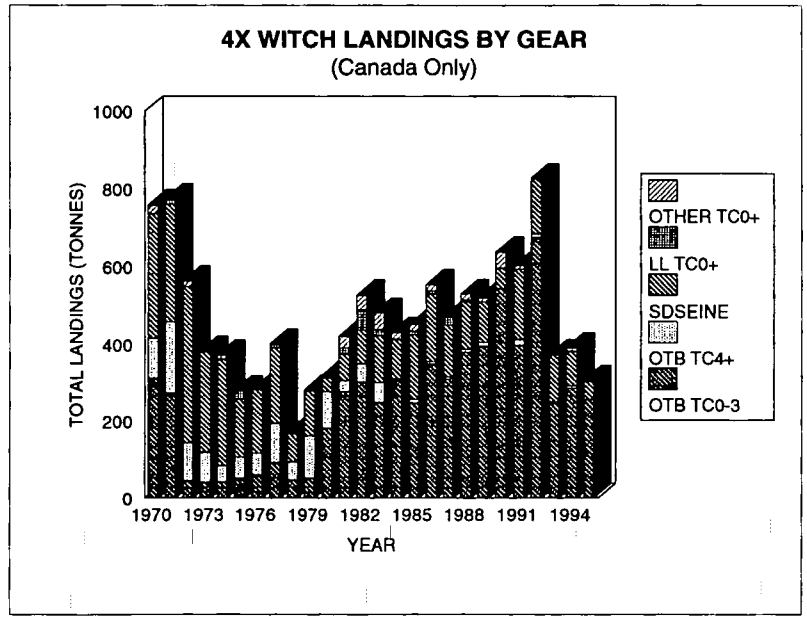



Fig. 6.

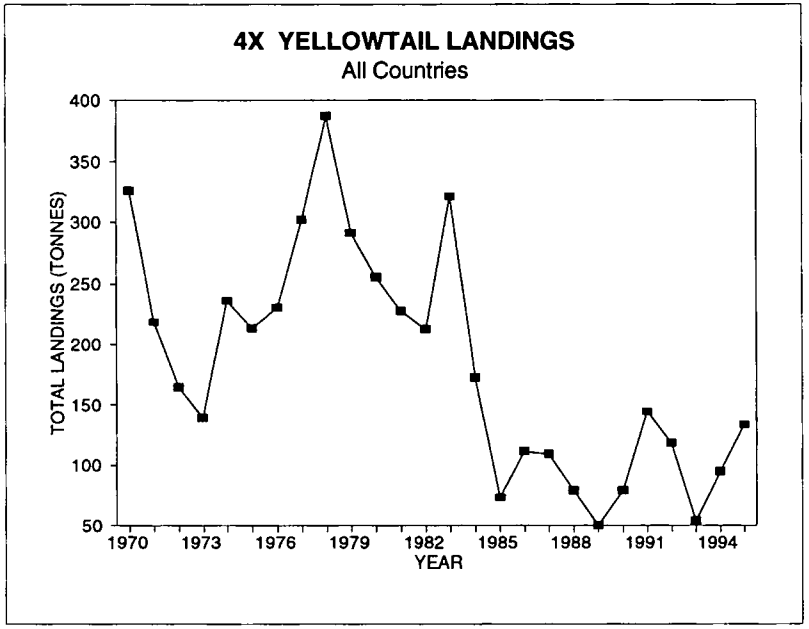



Fig. 7.

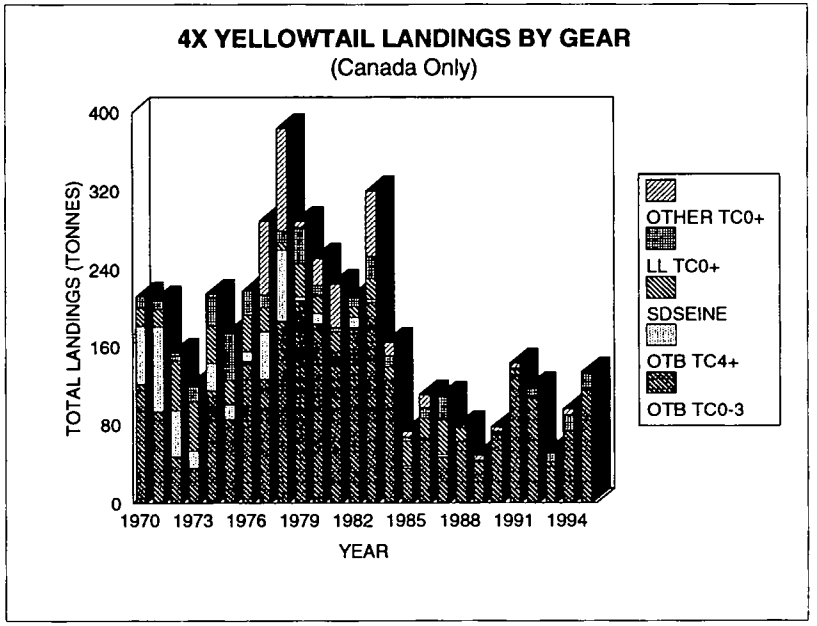



Fig. 8.



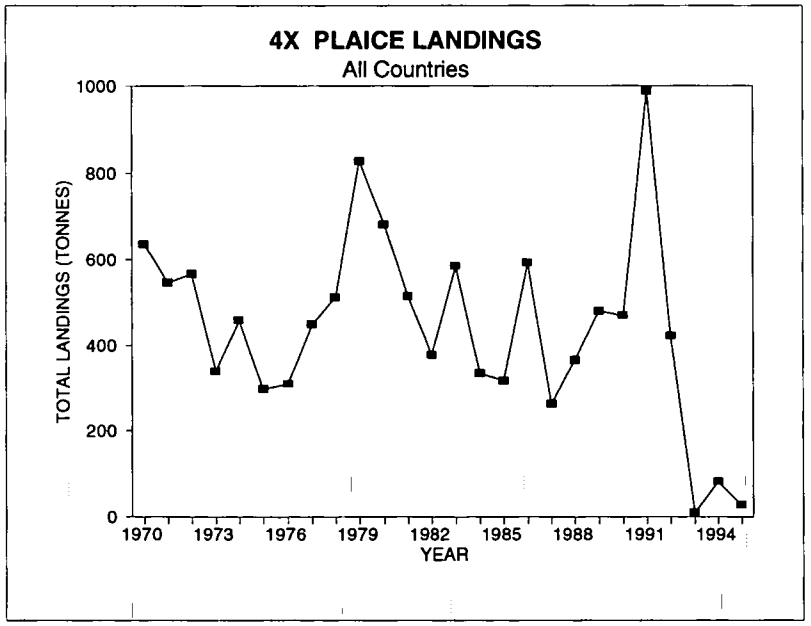



Fig. 9.

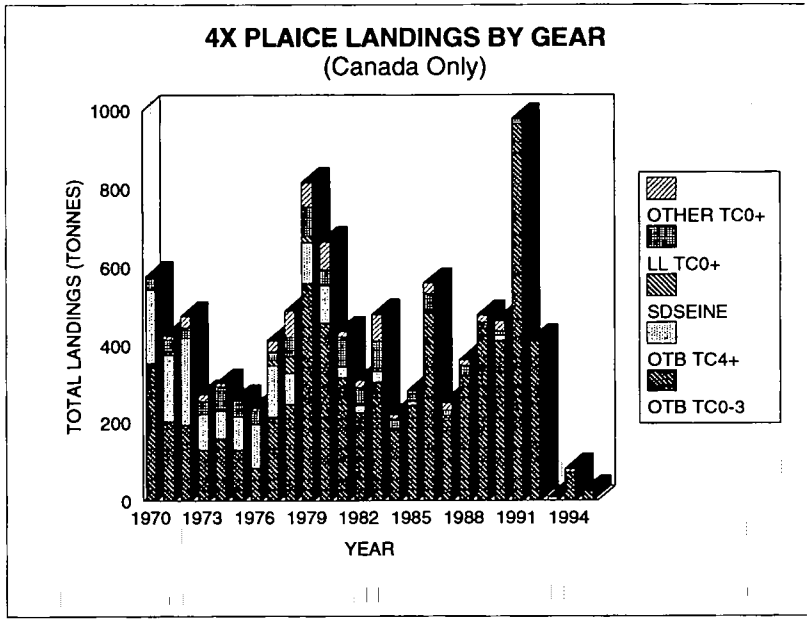



Fig. 10.

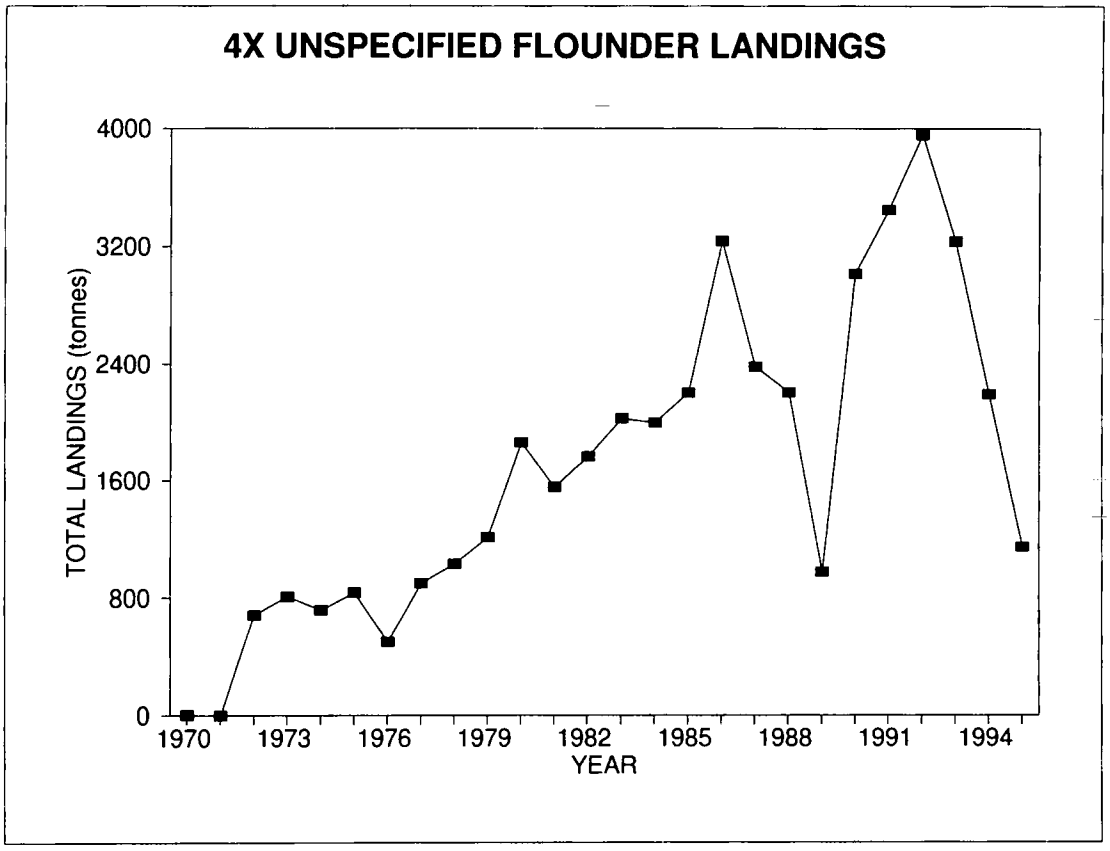

4X UNSPECIFIED FLOUNDER LANDINGS
TOTAL LANDINGS (tonnes)
4000
3200
2400
1600
800
0
1970
1973
1976
1979
1982
1985
1988
1991
1994
YEAR

Fig. 11.

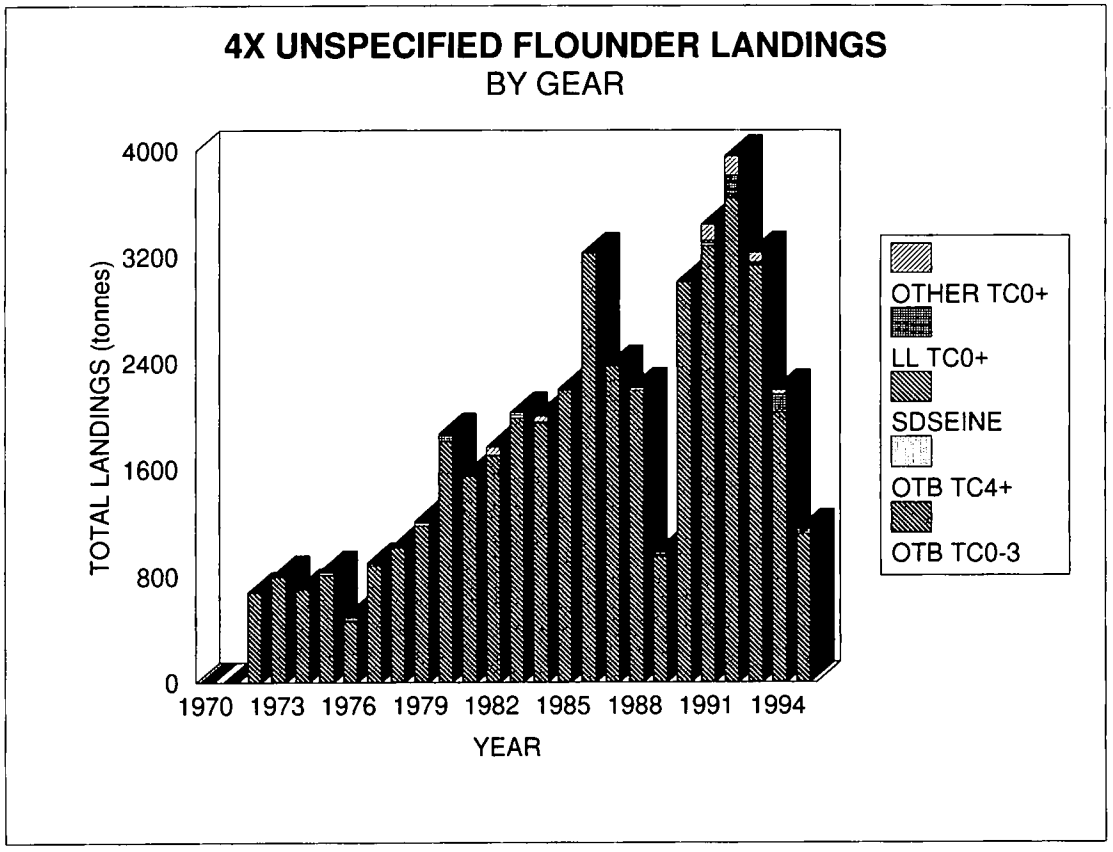

4X UNSPECIFIED FLOUNDER LANDINGS
BY GEAR
TOTAL LANDINGS (tonnes)
4000
3200
2400
1600
800
0
1970 1973 1976 1979 1982 1985 1988 1991 1994
YEAR
OTHER TC0+
LL TC0+
SDSEINE
OTB TC4+
OTB TC0-3

Fig. 12.

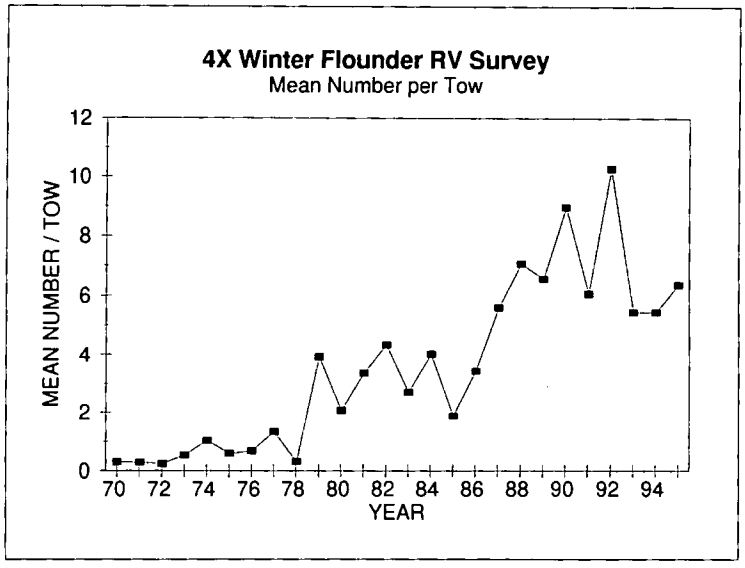



Fig. 13.

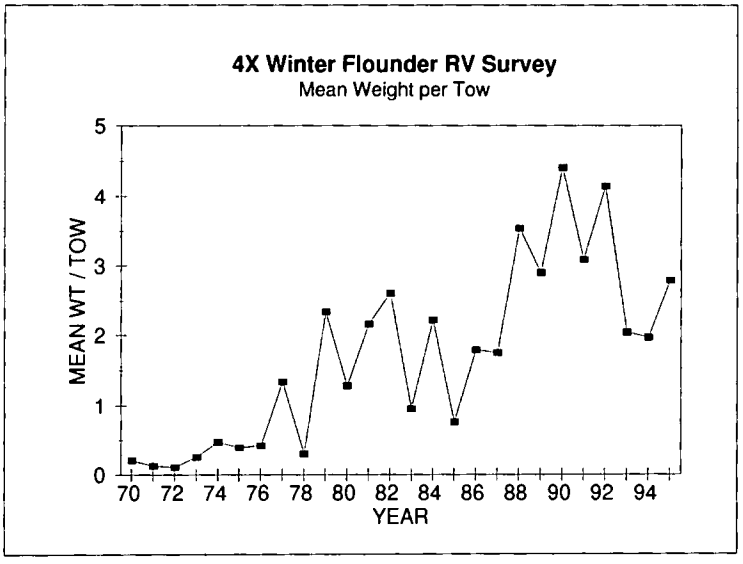



Fig. 14.

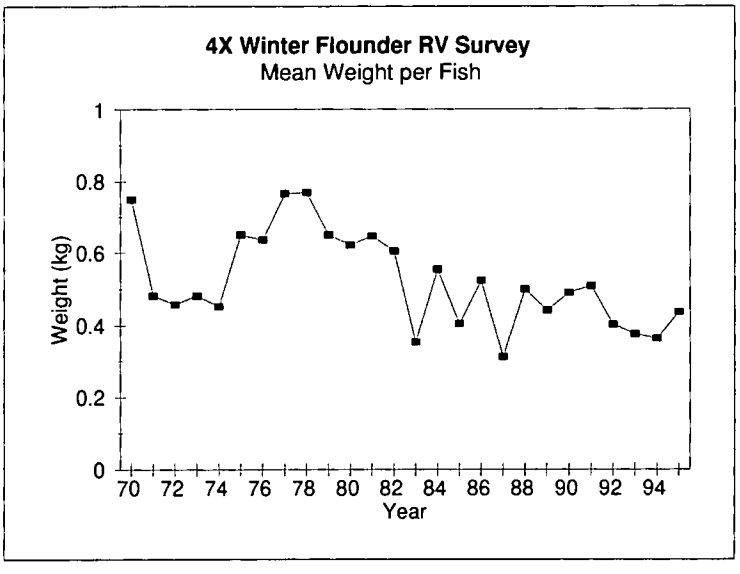
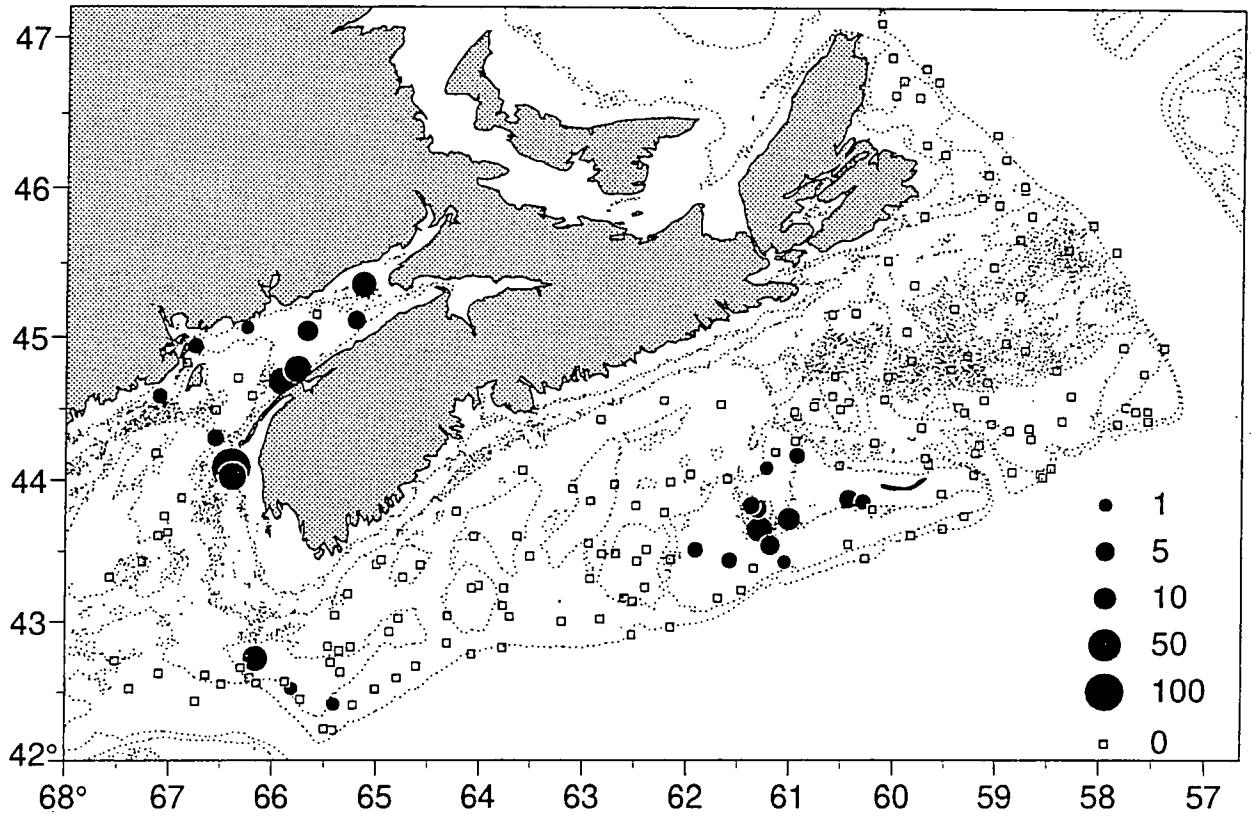
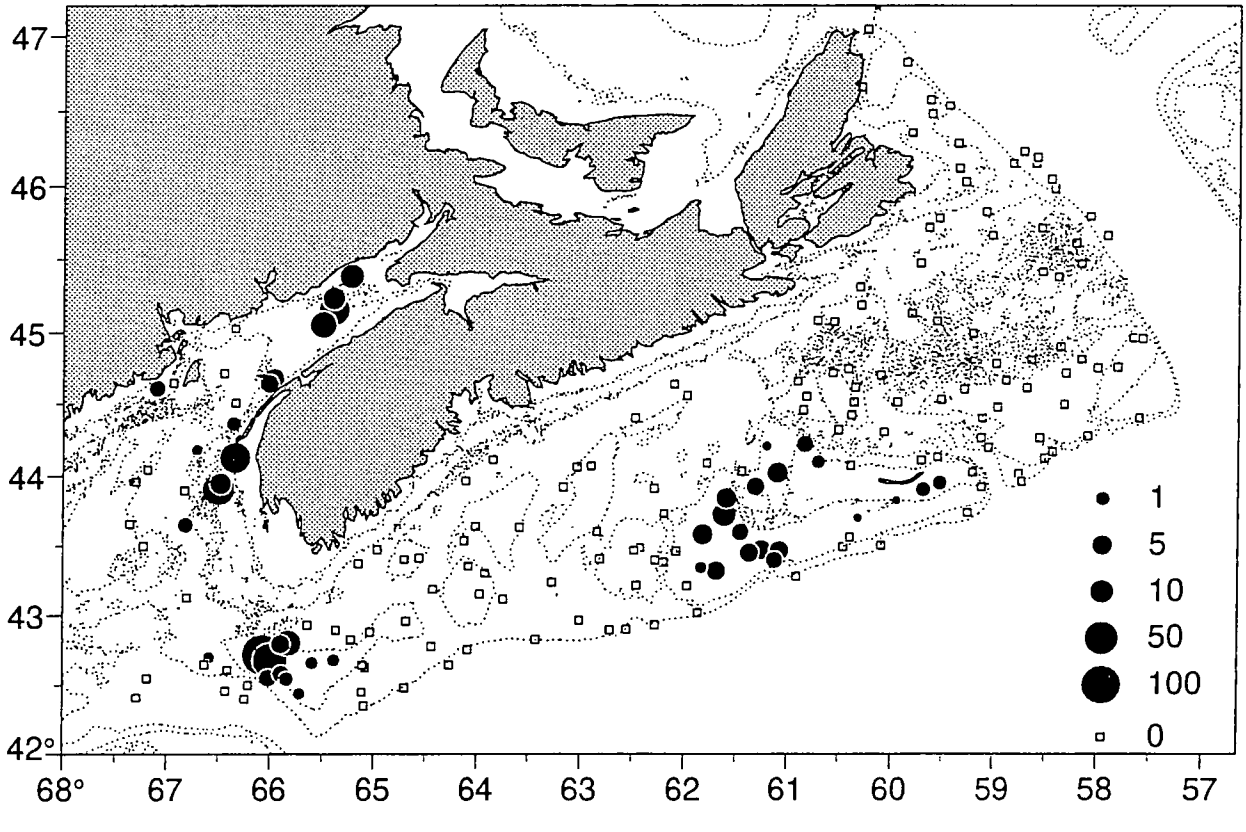



Fig. 15.




Summer Groundfish Survey 4VWX Winter Flounder Biomass (kg/tow) July 1994




Summer Groundfish Survey 4VWX Winter Flounder Biomass (kg/tow) July 1995

Fig. 16.

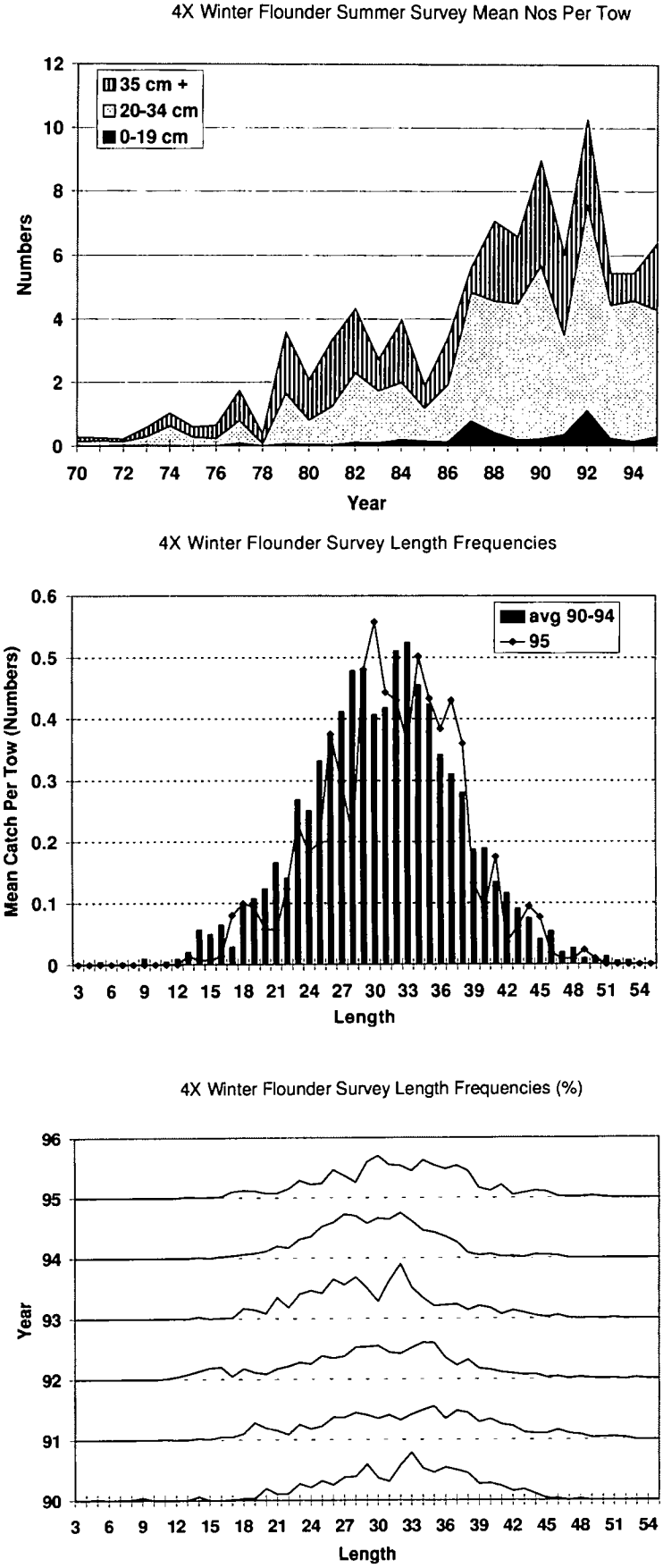

4X Winter Flounder Summer Survey Mean Nos Per Tow
35 cm +
20-34 cm
0-19 cm
Numbers
Year
4X Winter Flounder Survey Length Frequencies
avg 90-94
95
Mean Catch Per Tow (Numbers)
Length
4X Winter Flounder Survey Length Frequencies (%)
Year
Length

Fig. 17.

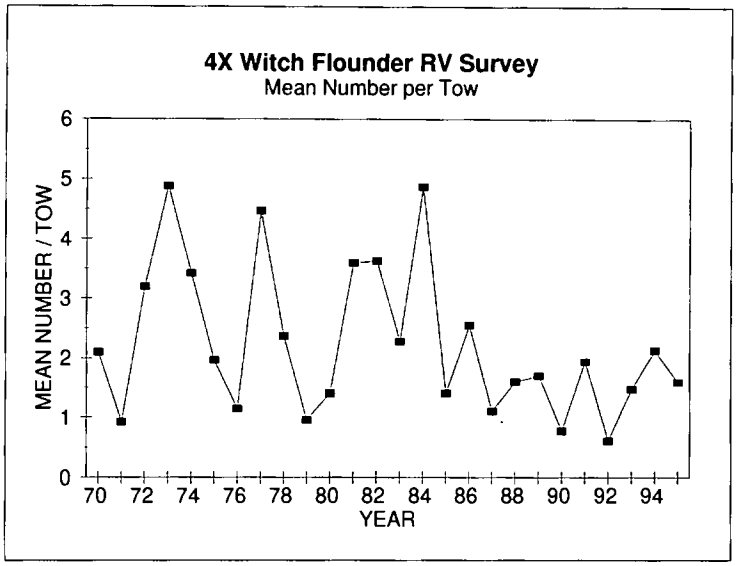



Fig. 18.

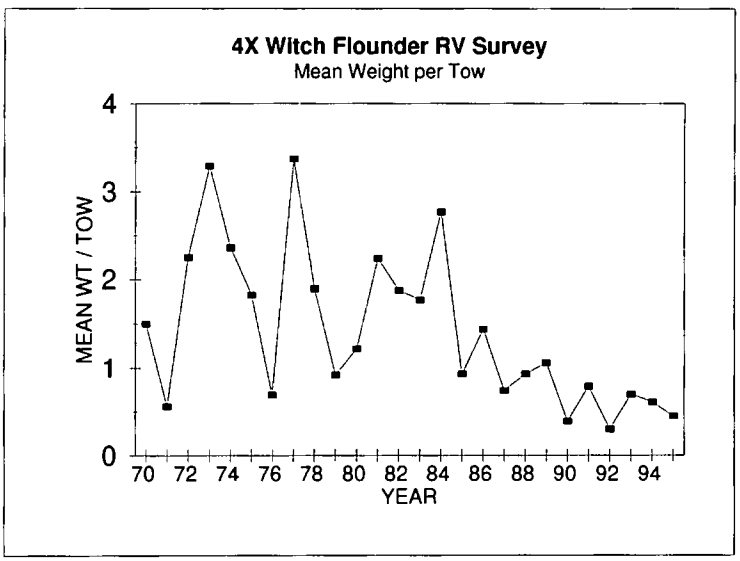



Fig. 19.

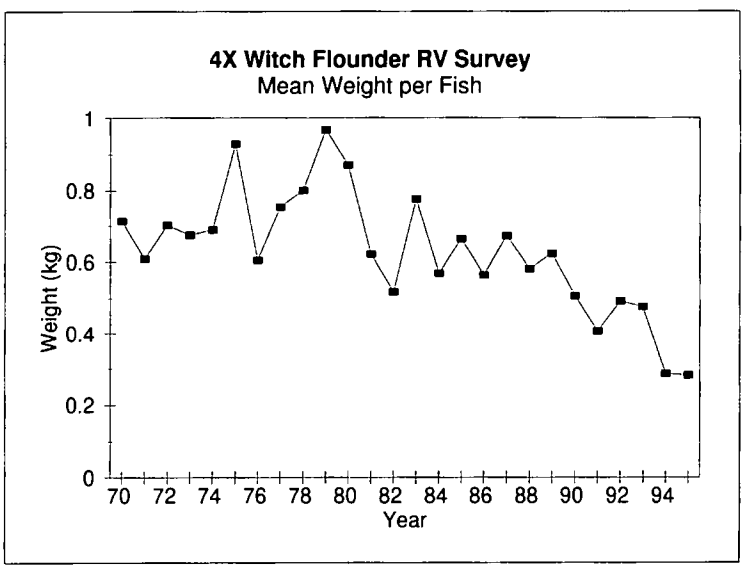
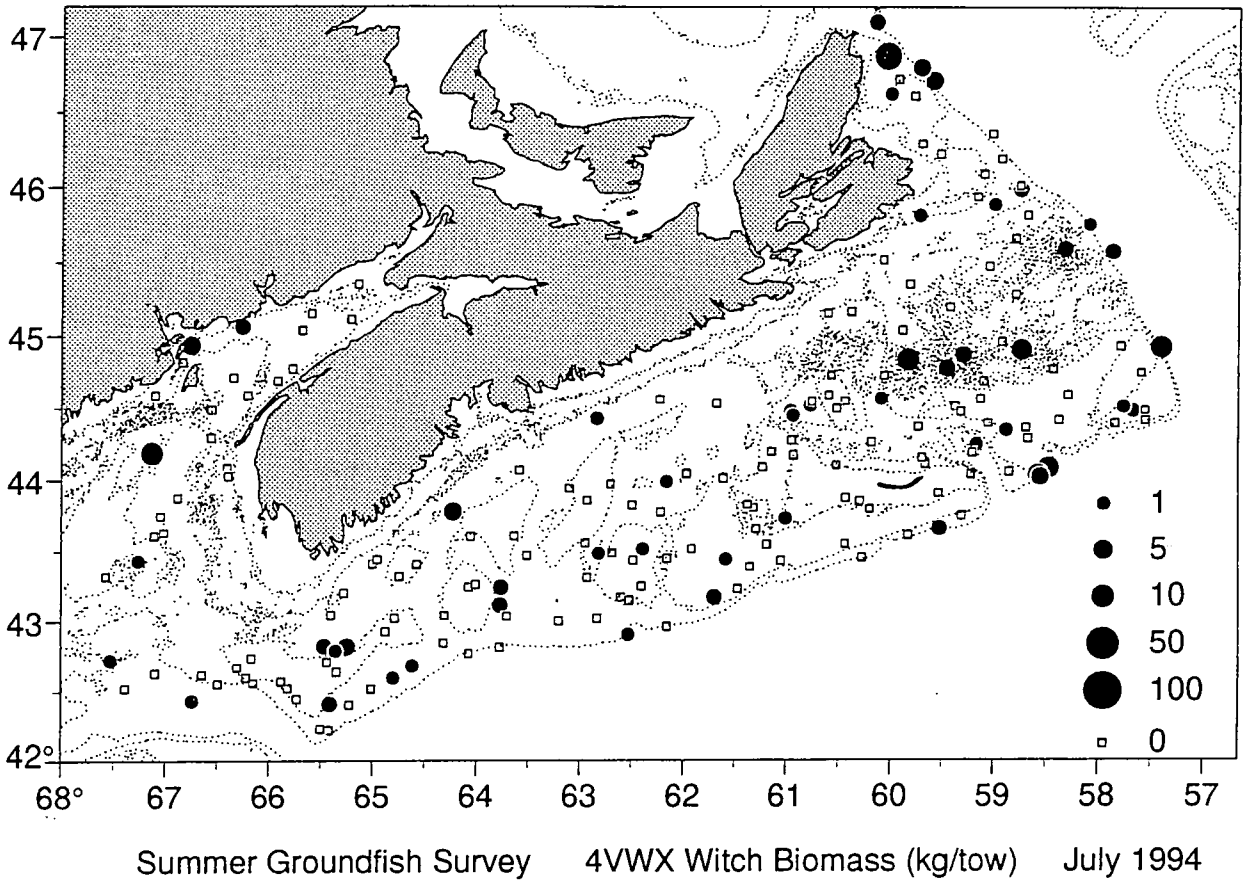



Fig. 20.


47
46
45
44
43
42°
68°
67
66
65
64
63
62
61
60
59
58
57
1
5
10
50
100
0
Summer Groundfish Survey 4VWX Witch Biomass (kg/tow) July 1994

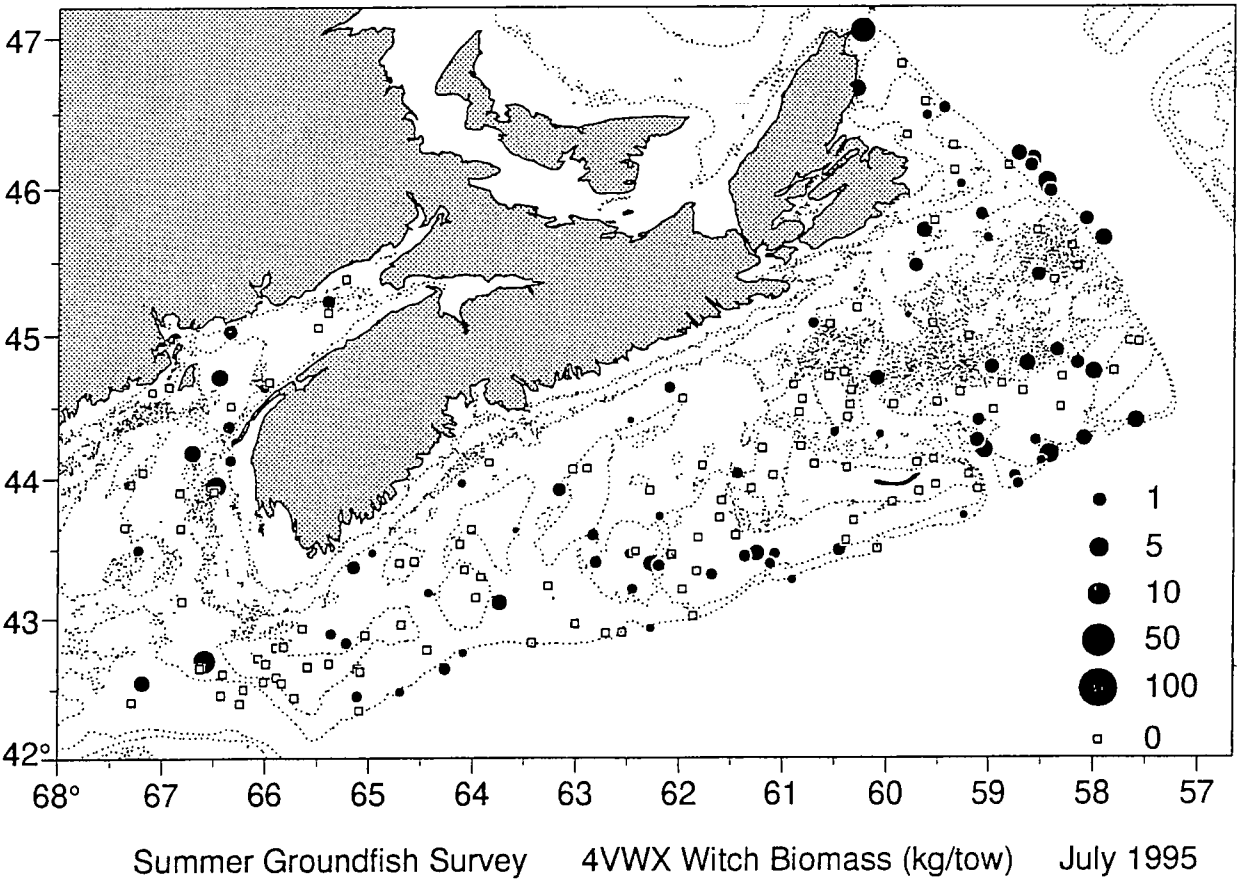
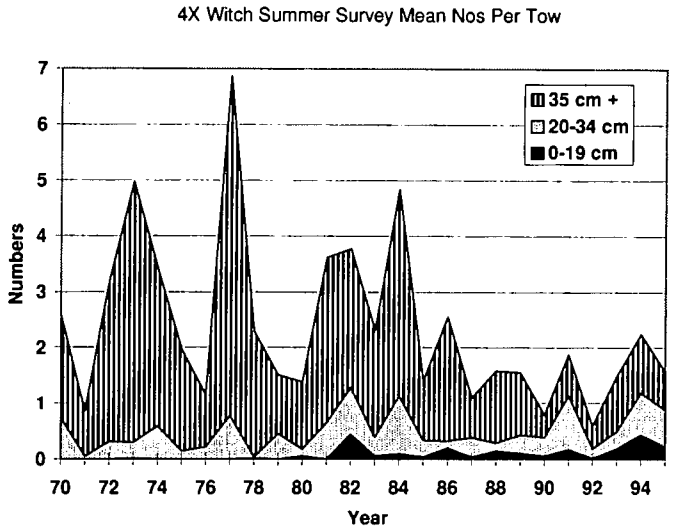
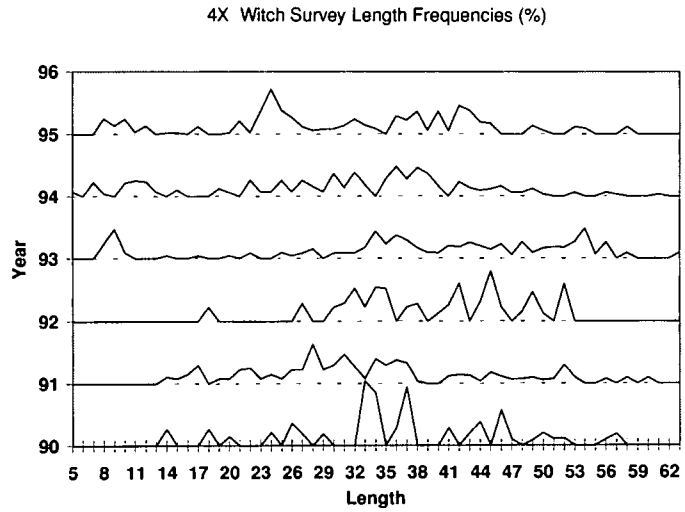

47
46
45
44
43
42°
68°
67
66
65
64
63
62
61
60
59
58
57
1
5
10
50
100
0
Summer Groundfish Survey 4VWX Witch Biomass (kg/tow) July 1995

Fig. 21.


4X Witch Summer Survey Mean Nos Per Tow
35 cm +
20-34 cm
0-19 cm
Numbers
0
1
2
3
4
5
6
7
70 72 74 76 78 80 82 84 86 88 90 92 94
Year


4X Witch Survey Length Frequencies (%)
Year
90
91
92
93
94
95
96
5 8 11 14 17 20 23 26 29 32 35 38 41 44 47 50 53 56 59 62
Length

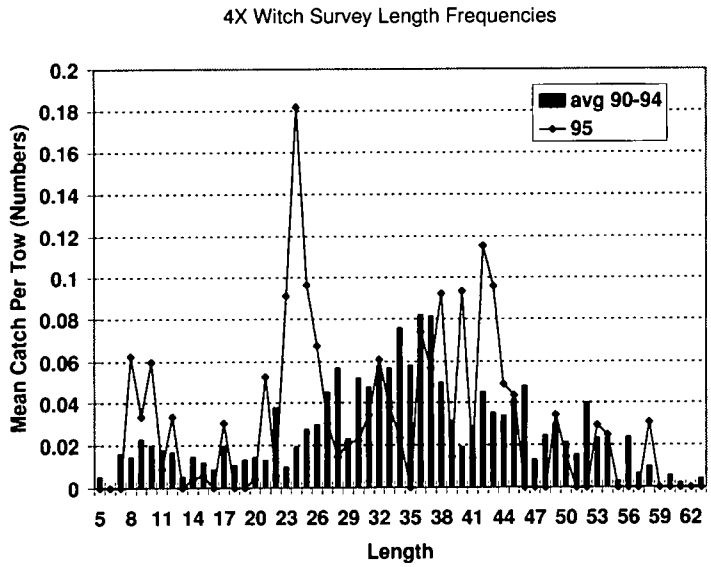

4X Witch Survey Length Frequencies
avg 90-94
95
Mean Catch Per Tow (Numbers)
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
0.2
5 8 11 14 17 20 23 26 29 32 35 38 41 44 47 50 53 56 59 62
Length

Fig. 22.

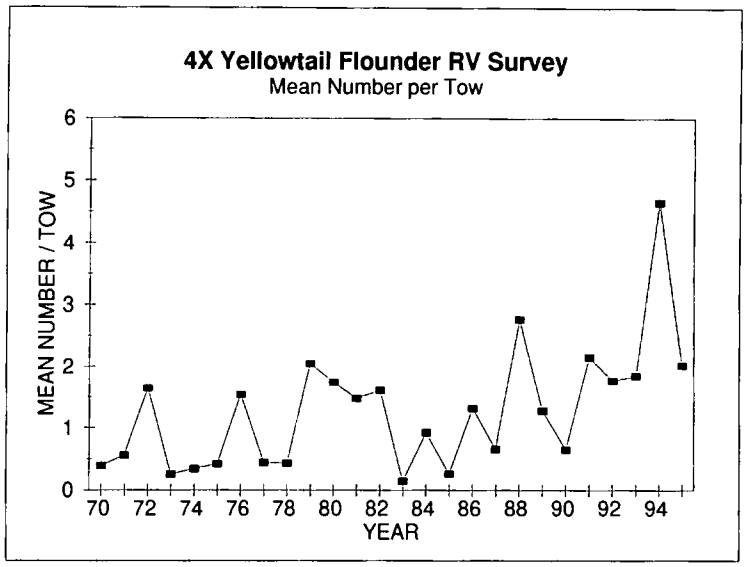



Fig. 23.

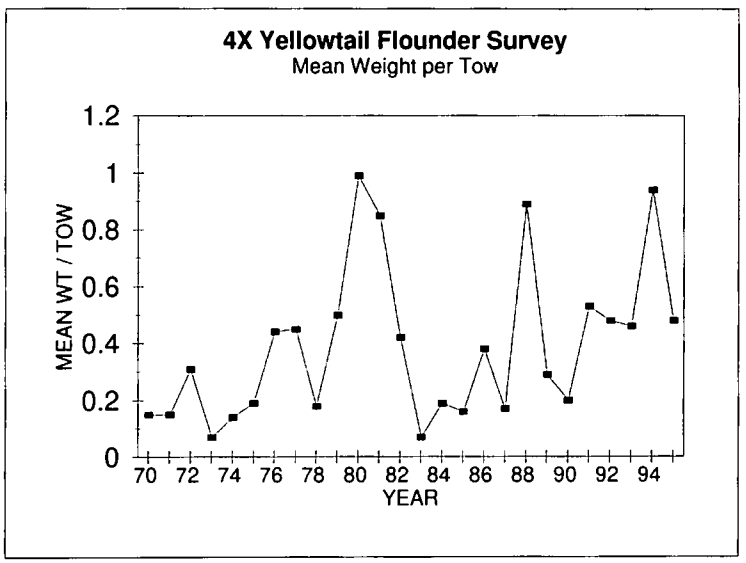



Fig. 24.

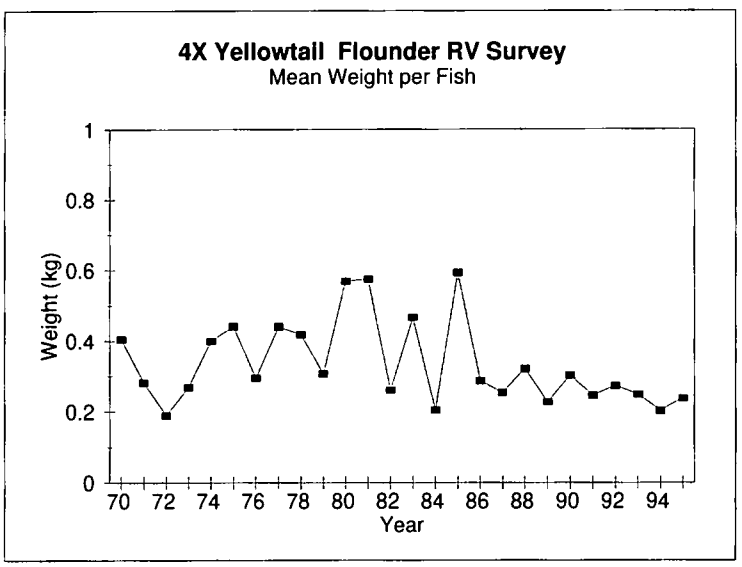
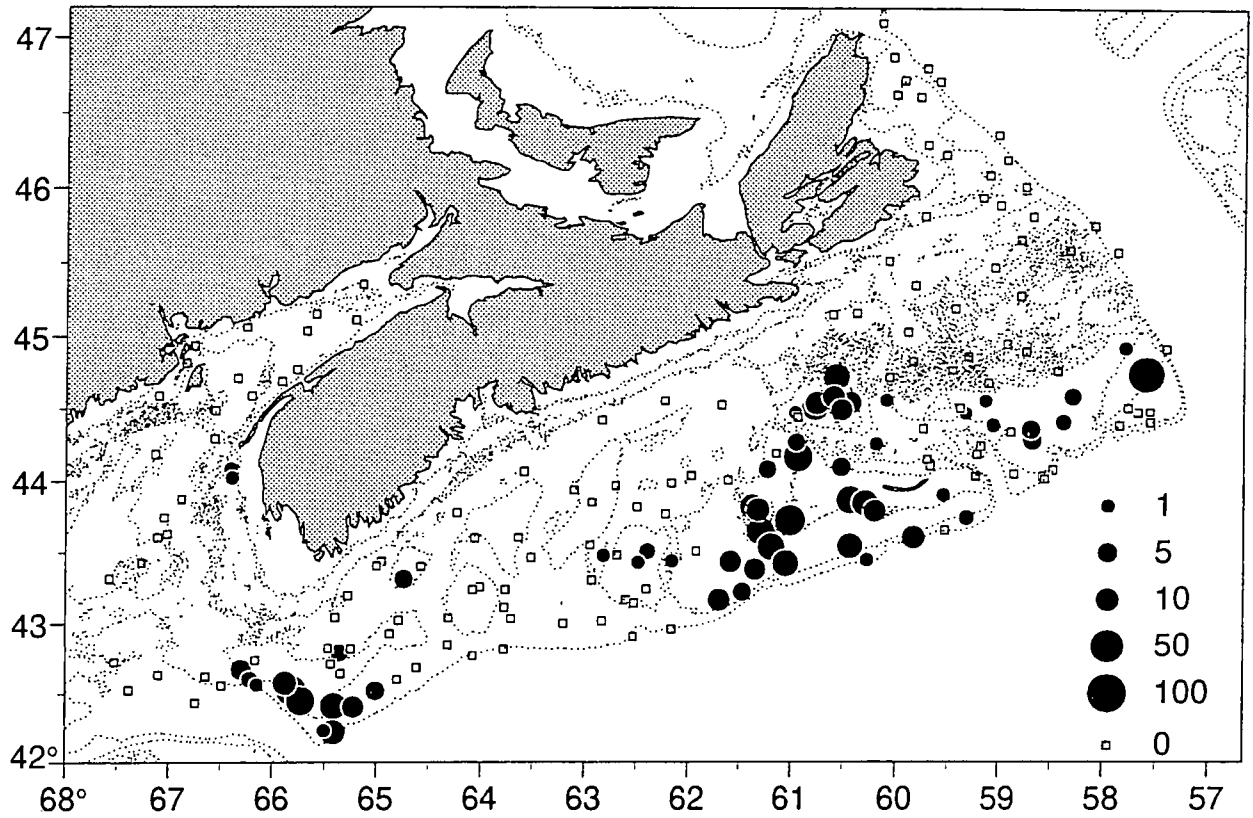
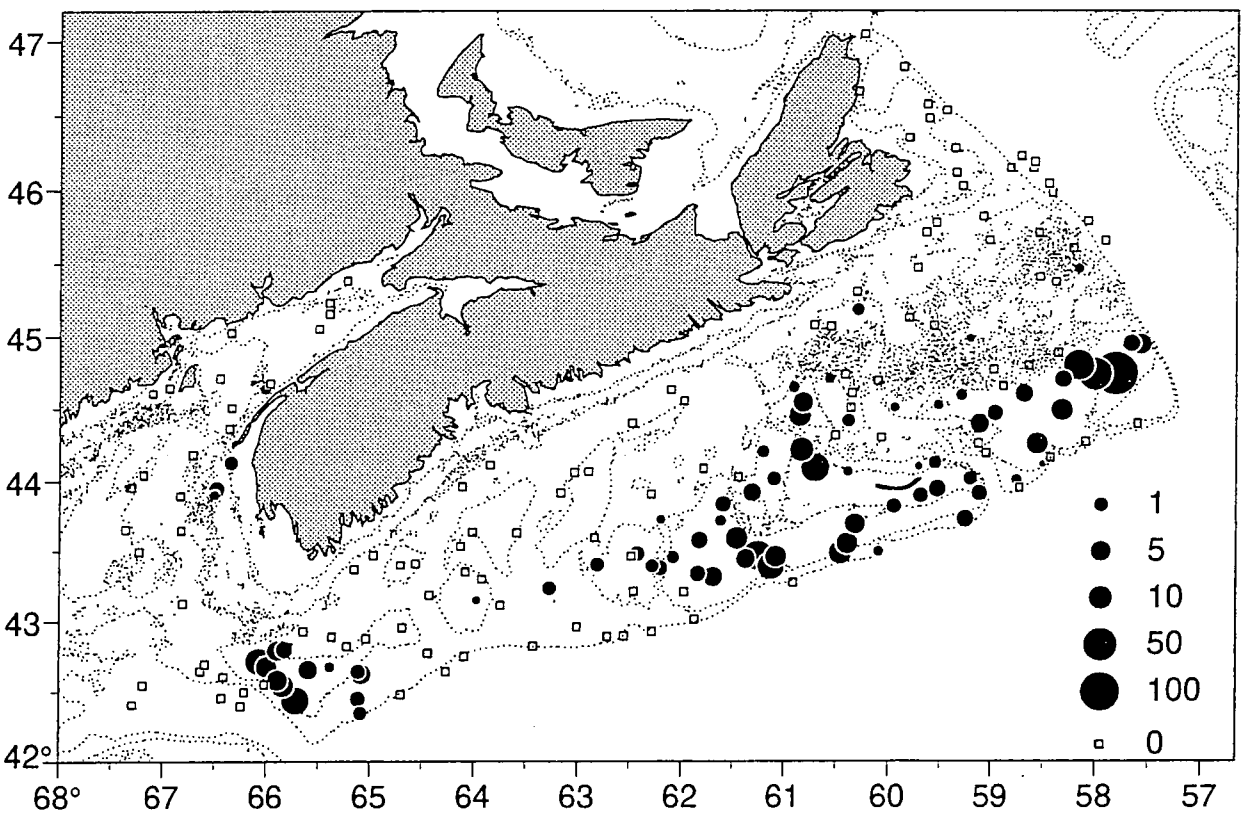



Fig. 25.

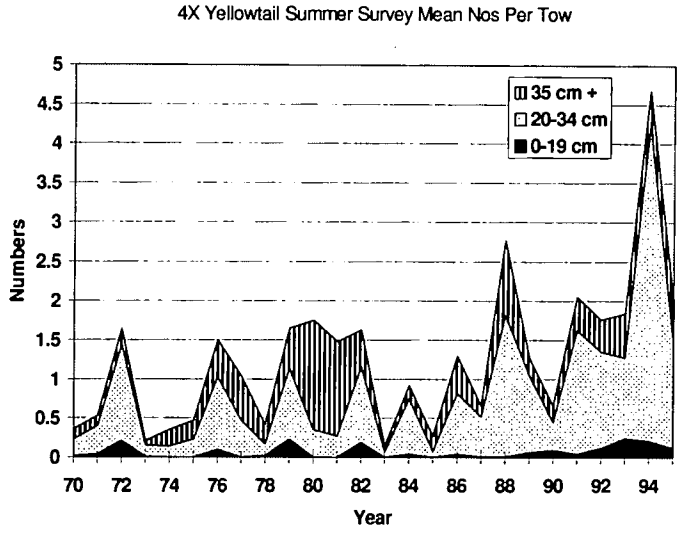


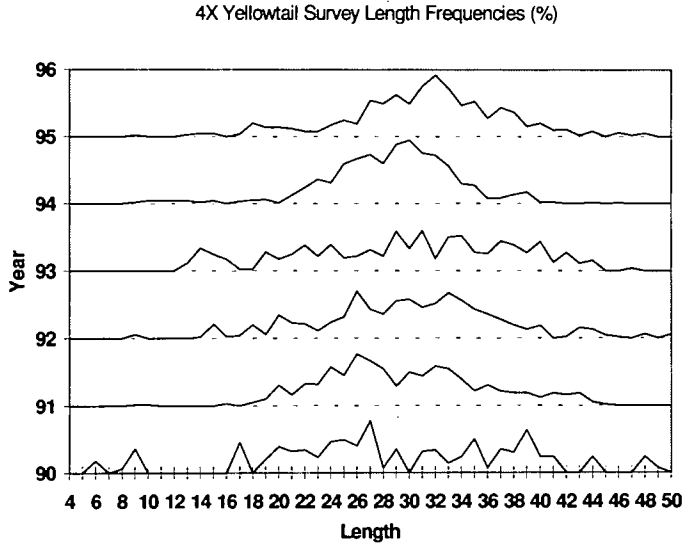

Summer Groundfish Survey 4VWX Yellowtail Biomass (kg/tow) July 1994




Summer Groundfish Survey 4VWX Yellowtail Biomass (kg/tow) July 1995

Fig. 26.


4X Yellowtail Summer Survey Mean Nos Per Tow
35 cm +
20-34 cm
0-19 cm
Numbers
Year


4X Yellowtail Survey Length Frequencies (%)
Year
Length

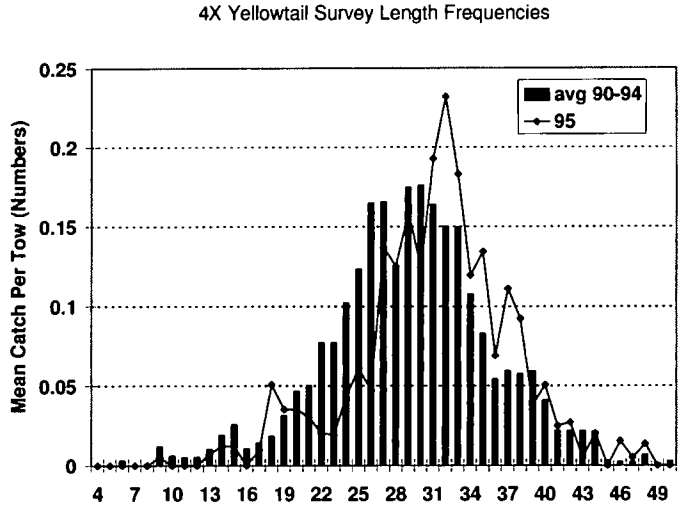

4X Yellowtail Survey Length Frequencies
avg 90-94
95
Mean Catch Per Tow (Numbers)

Fig. 27.

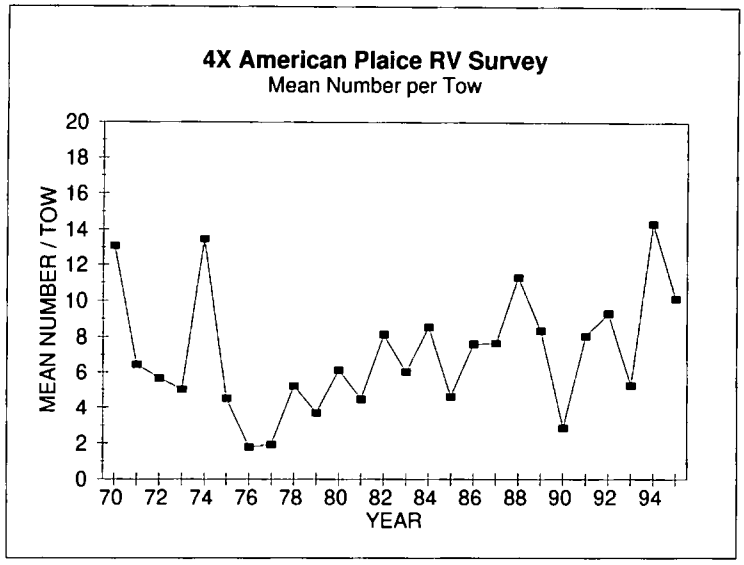



Fig. 28.

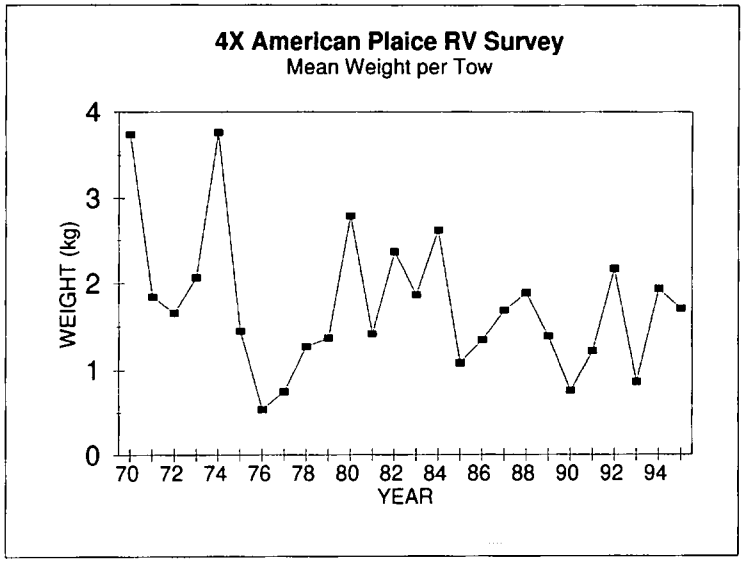



Fig. 29.

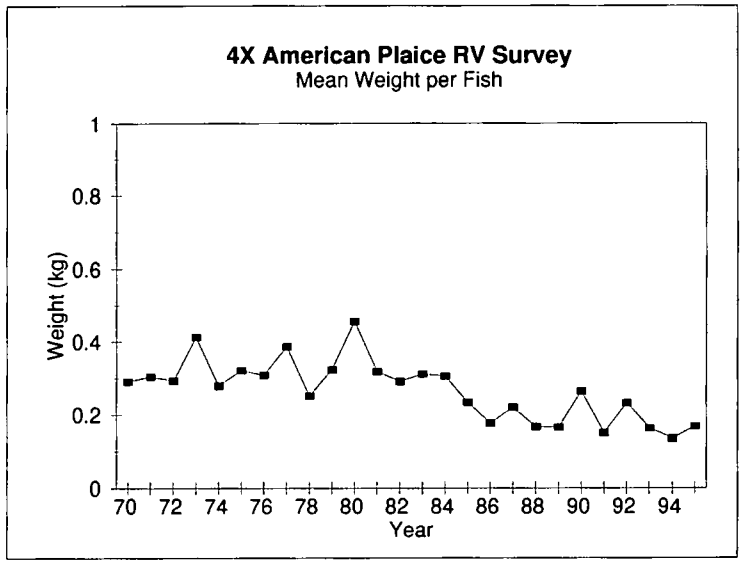
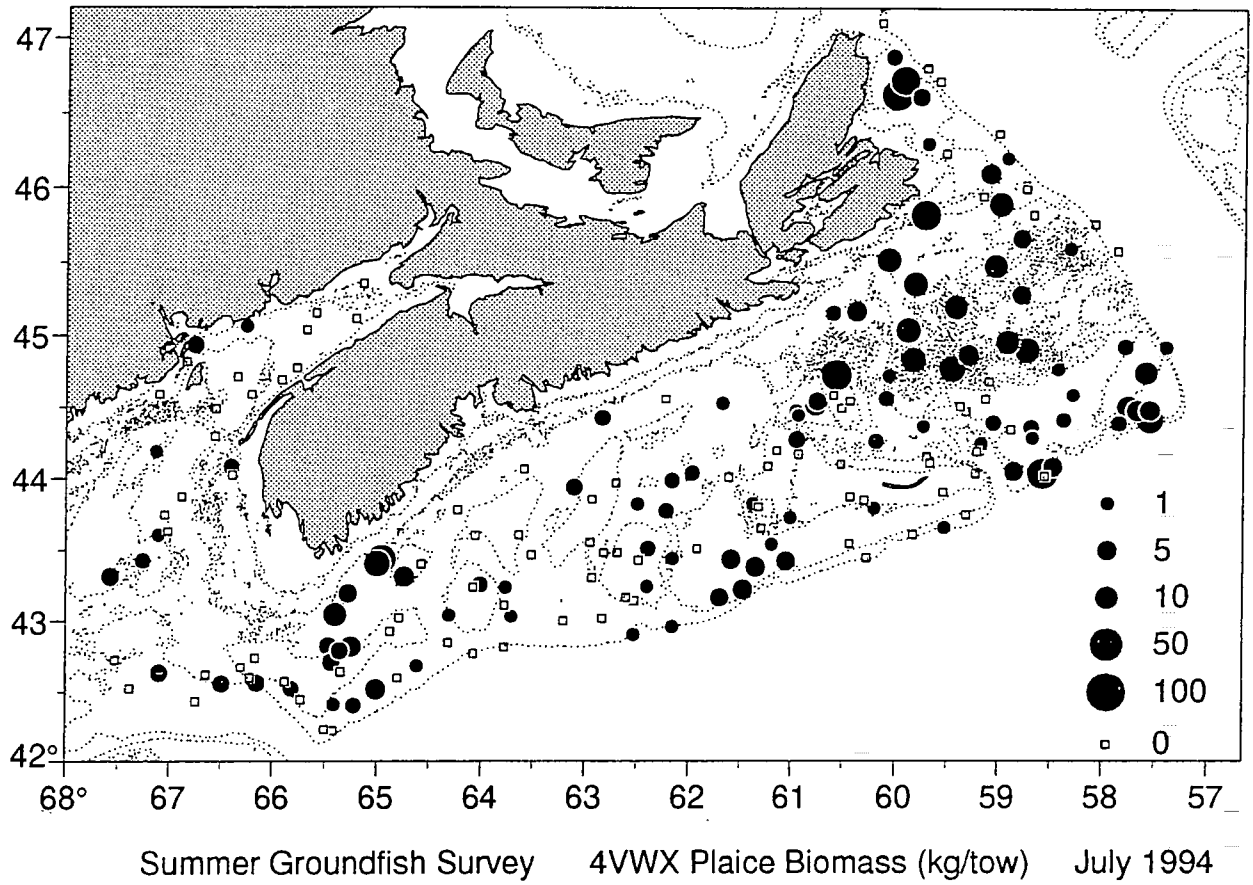



Fig. 30.


47
46
45
44
43
42°
68°
67
66
65
64
63
62
61
60
59
58
57
1
5
10
50
100
0
Summer Groundfish Survey 4VWX Plaice Biomass (kg/tow) July 1994

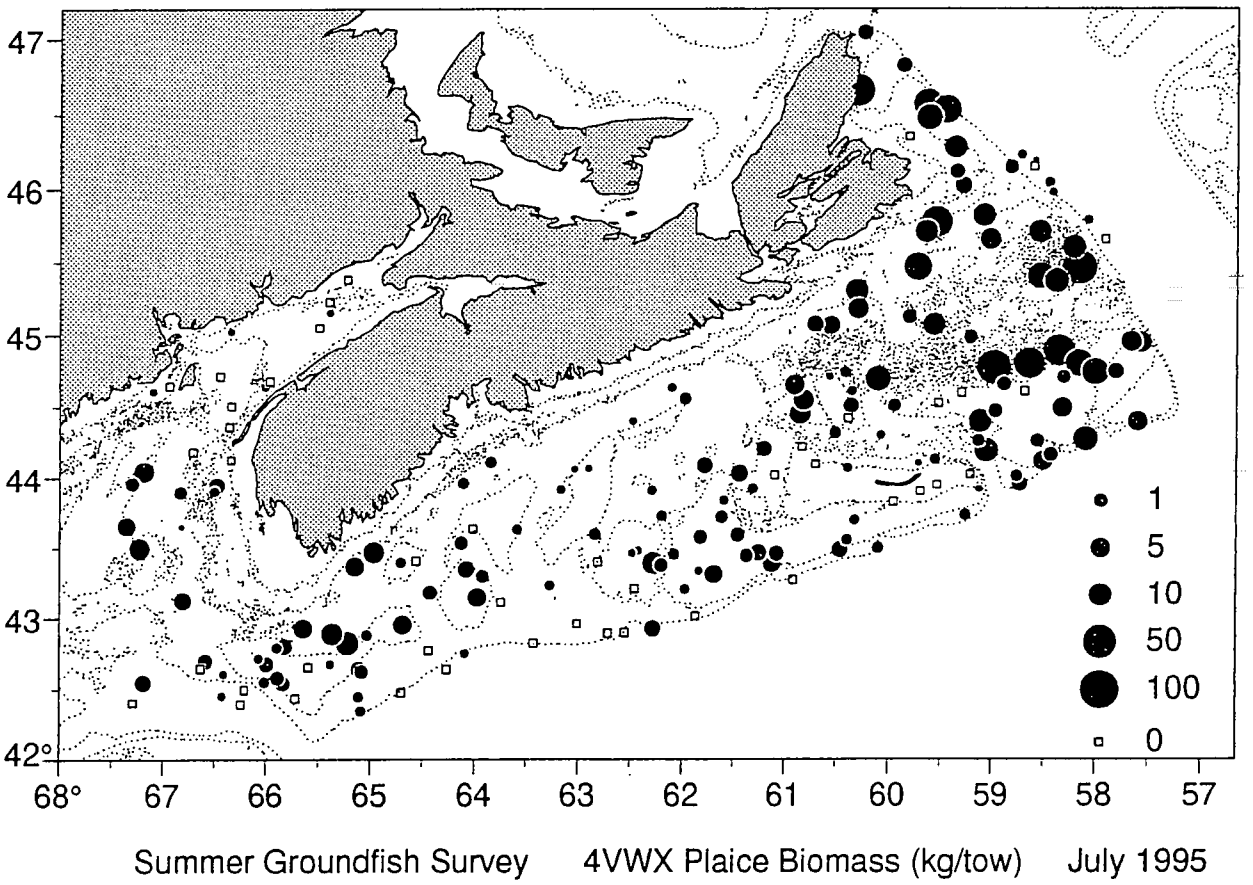
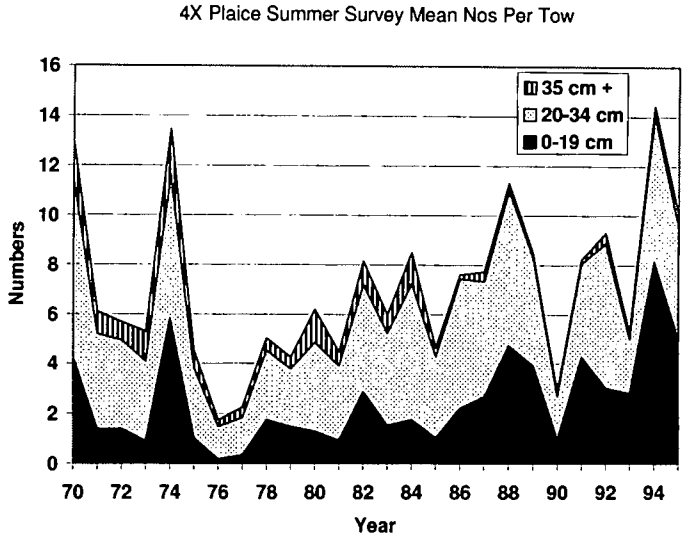
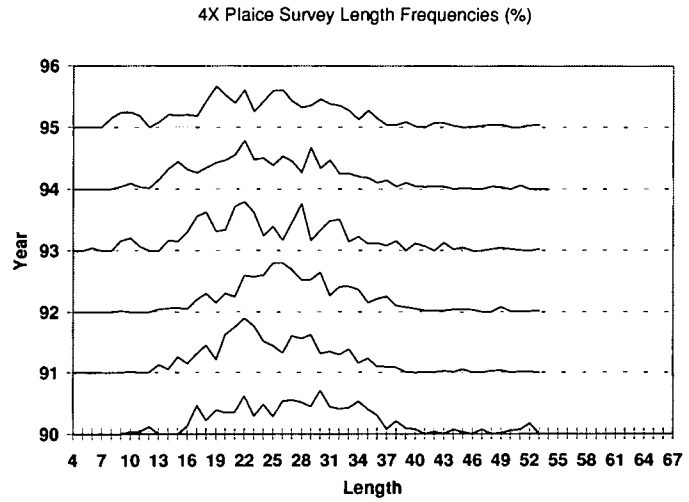

47
46
45
44
43
42°
68°
67
66
65
64
63
62
61
60
59
58
57
1
5
10
50
100
0
Summer Groundfish Survey 4VWX Plaice Biomass (kg/tow) July 1995

Fig. 31.


4X Plaice Summer Survey Mean Nos Per Tow
35 cm +
20-34 cm
0-19 cm
Numbers
Year
0
2
4
6
8
10
12
14
16
70 72 74 76 78 80 82 84 86 88 90 92 94


4X Plaice Survey Length Frequencies (%)
Year
Length
90
91
92
93
94
95
96
4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67

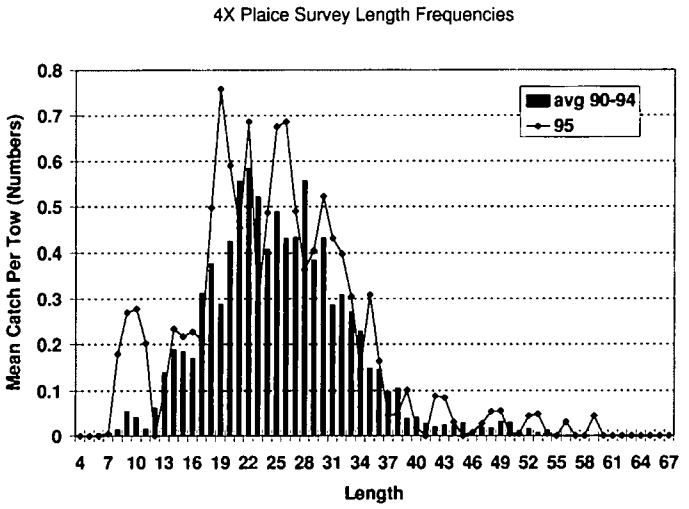

4X Plaice Survey Length Frequencies
avg 90-94
95
Mean Catch Per Tow (Numbers)
Length
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67

Fig. 32.

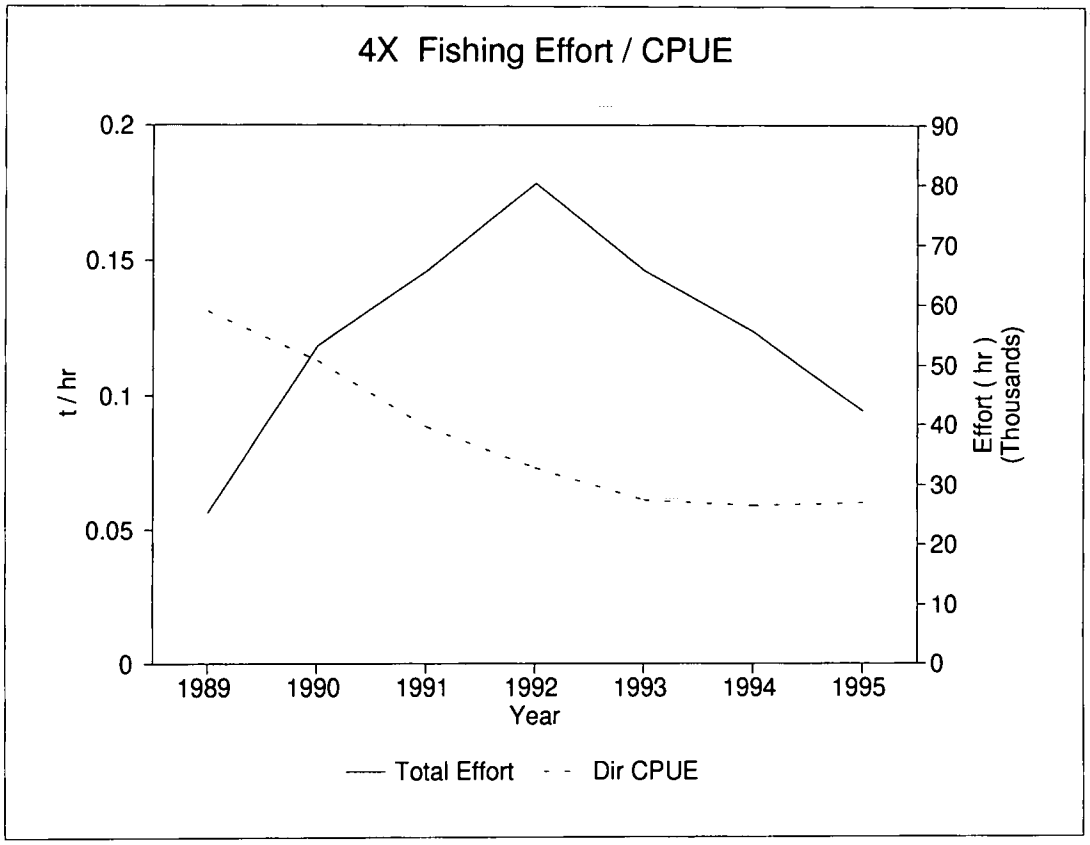



Fig. 33a.

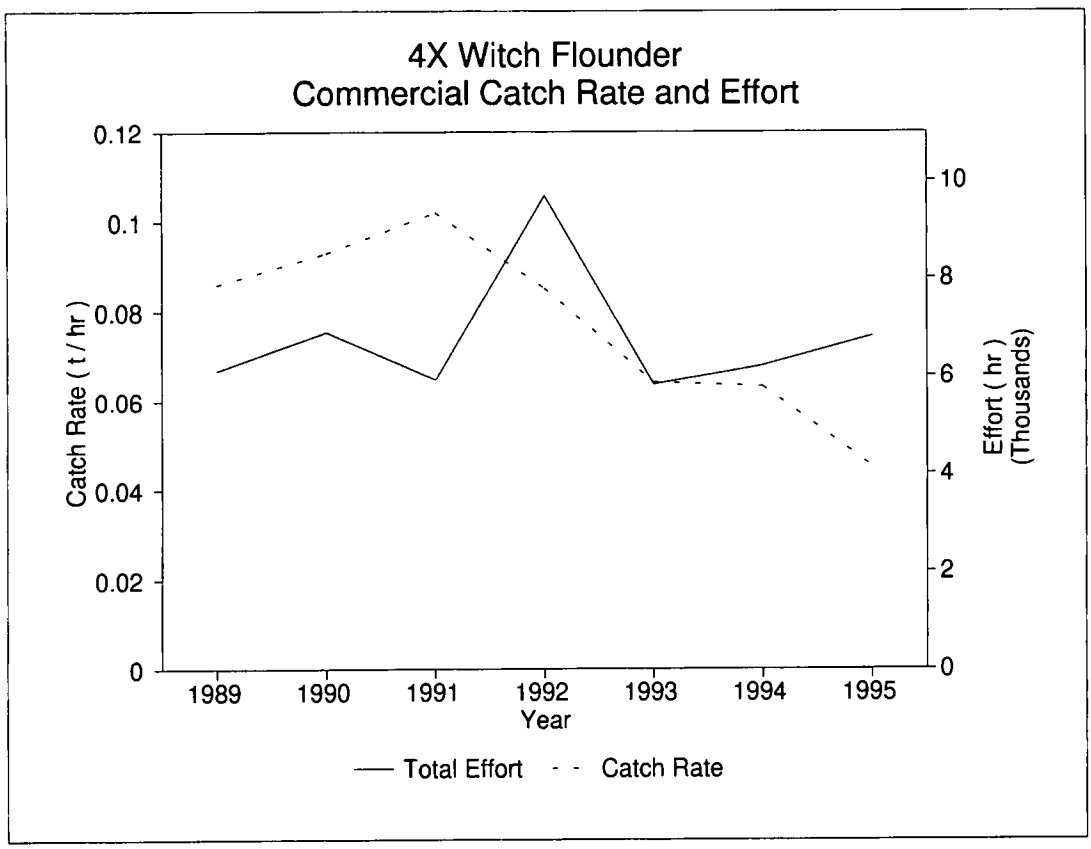



Fig. 33b.

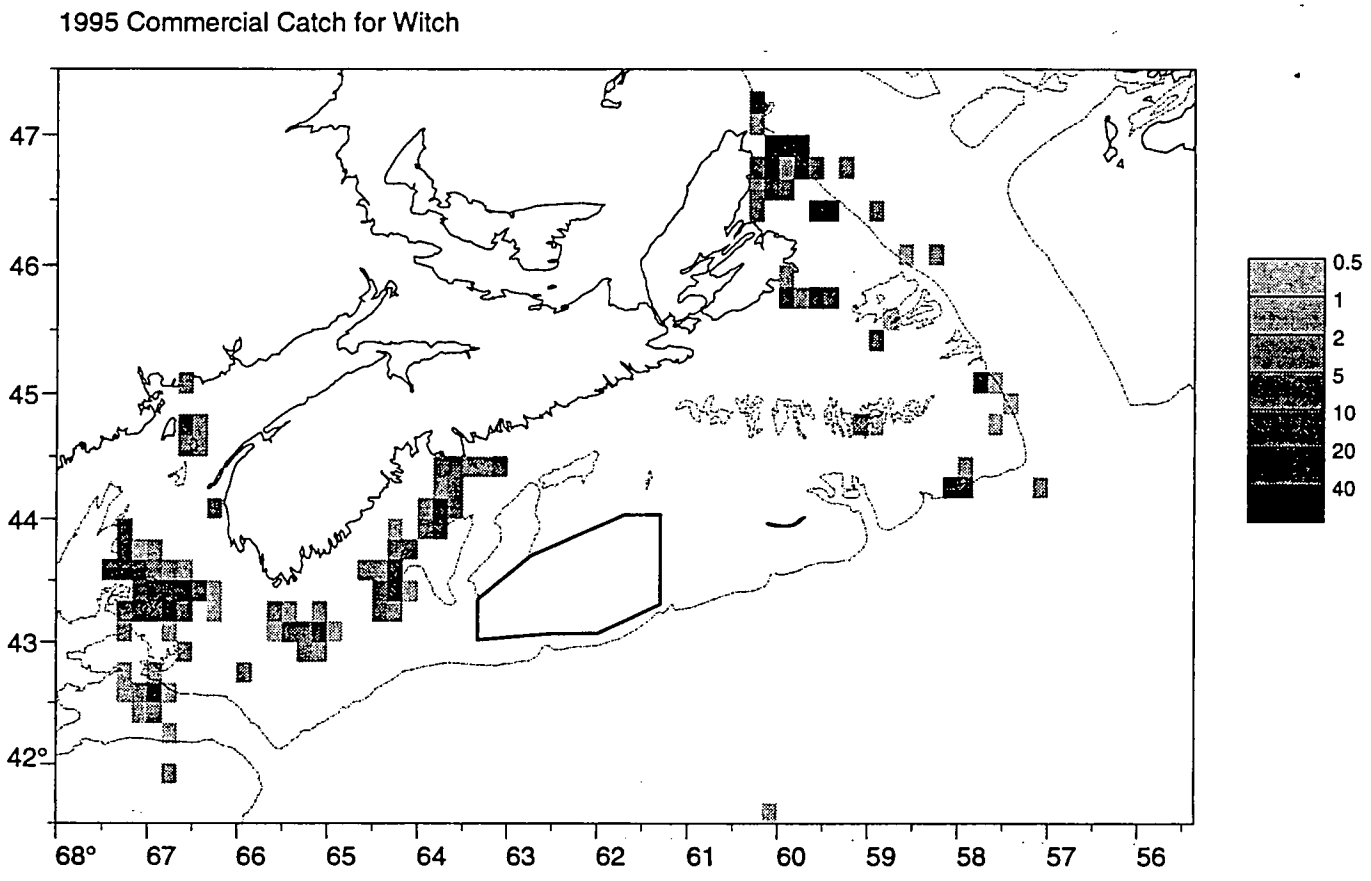

1995 Commercial Catch for Witch
47
46
45
44
43
42°
68°
67
66
65
64
63
62
61
60
59
58
57
56
0.5
1
2
5
10
20
40

Fig. 34.

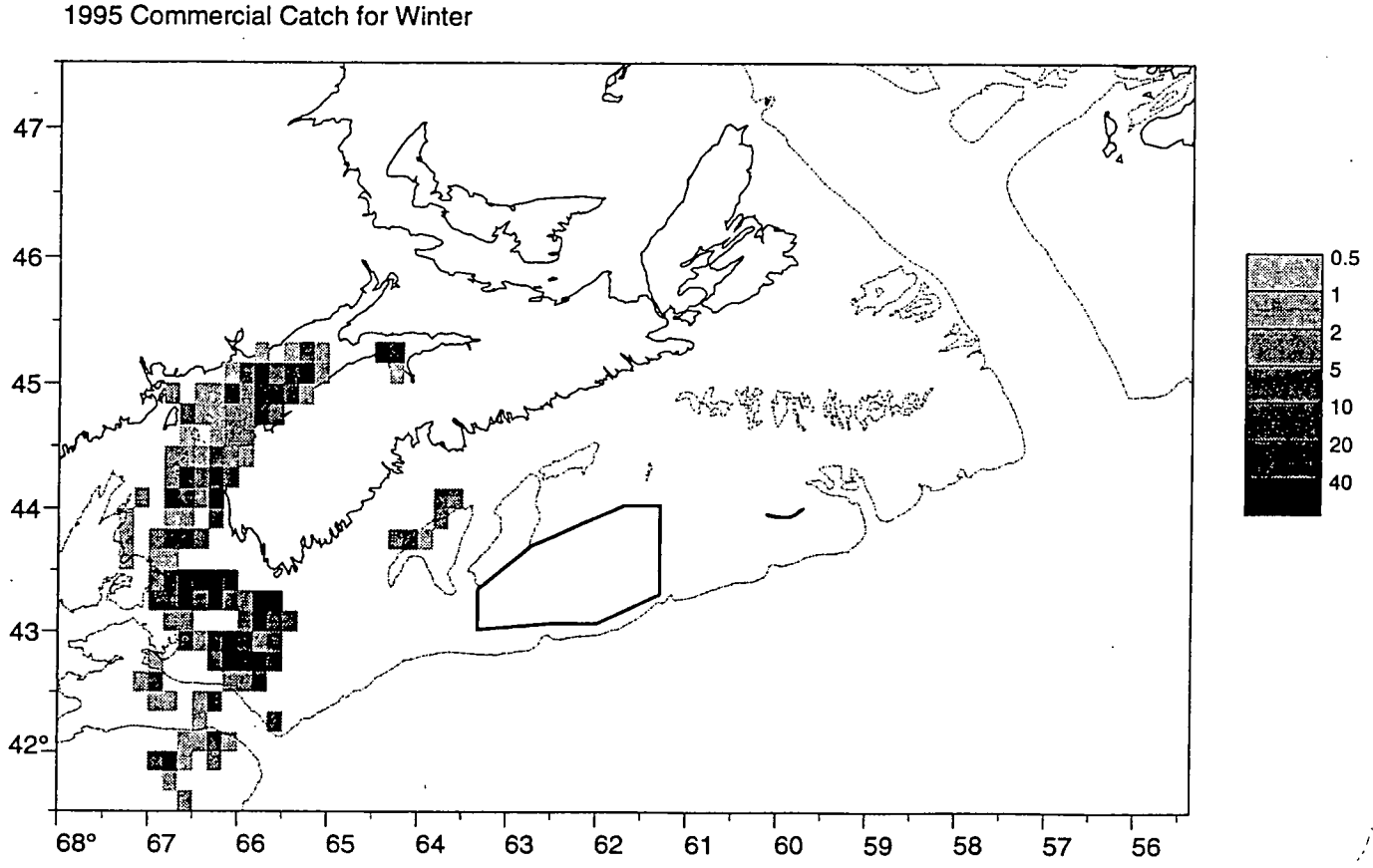

1995 Commercial Catch for Winter
47
46
45
44
43
42°
68°
67
66
65
64
63
62
61
60
59
58
57
56
0.5
1
2
5
10
20
40

Fig. 35.

1995 Commercial Catch for Plaice

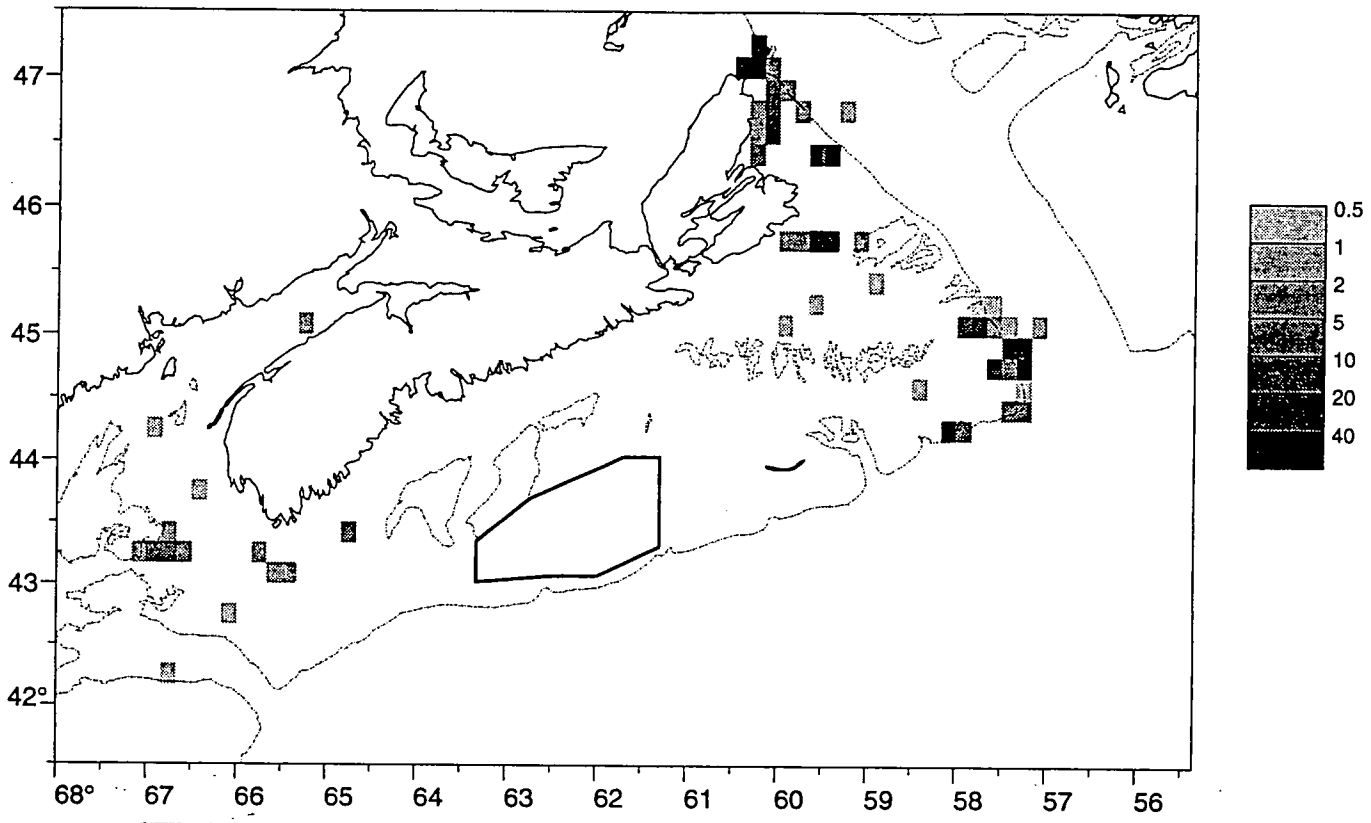



Fig. 36.

1995 Commercial Catch for Yellowtail

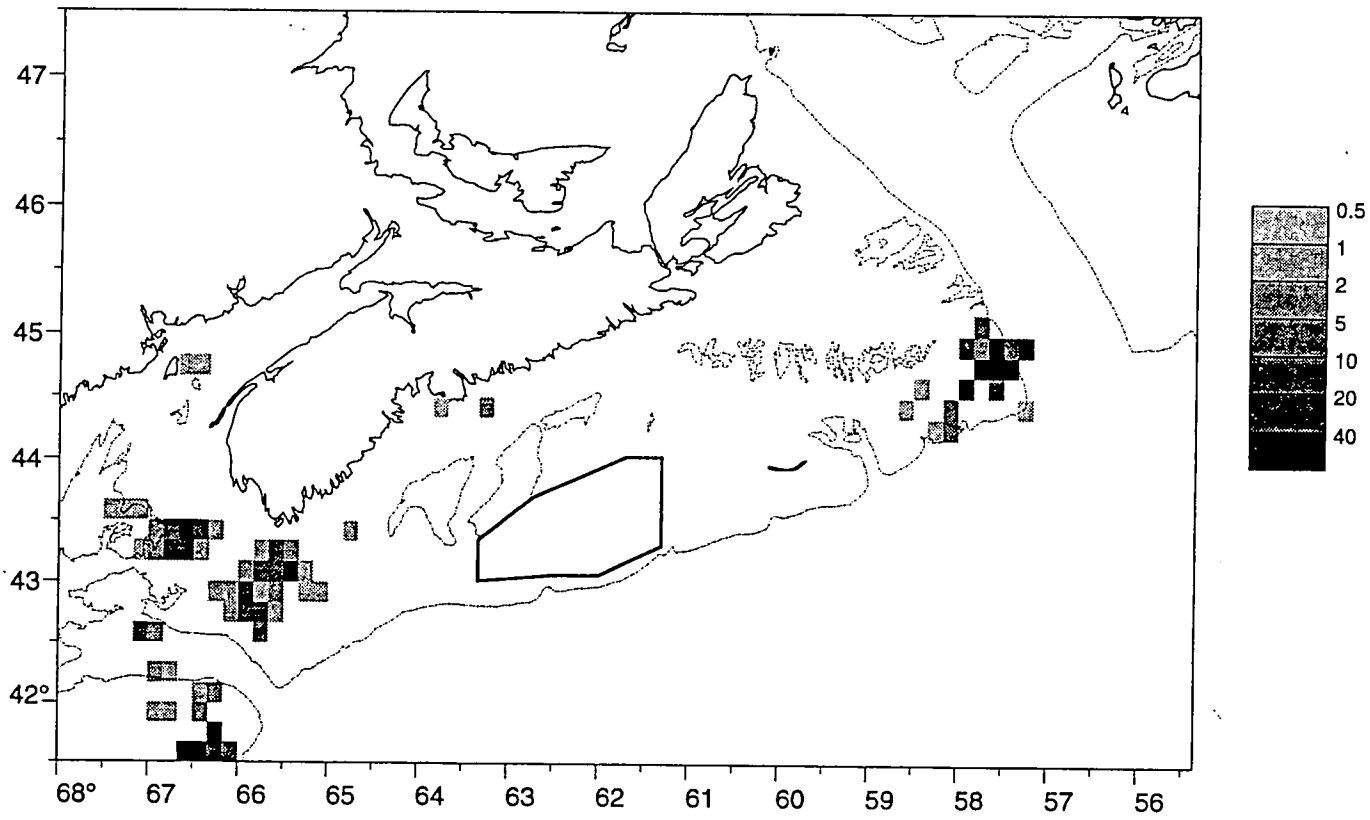



Fig. 37.

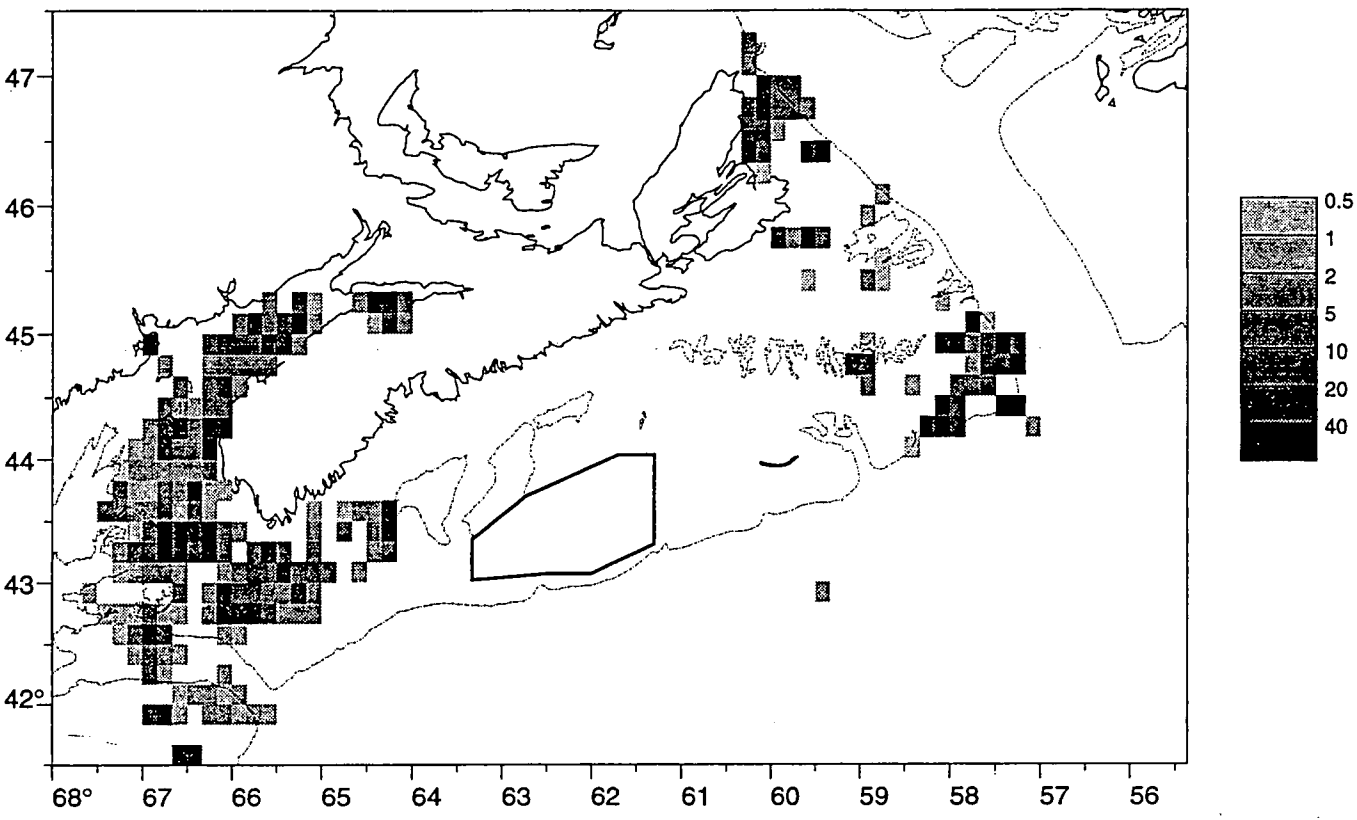
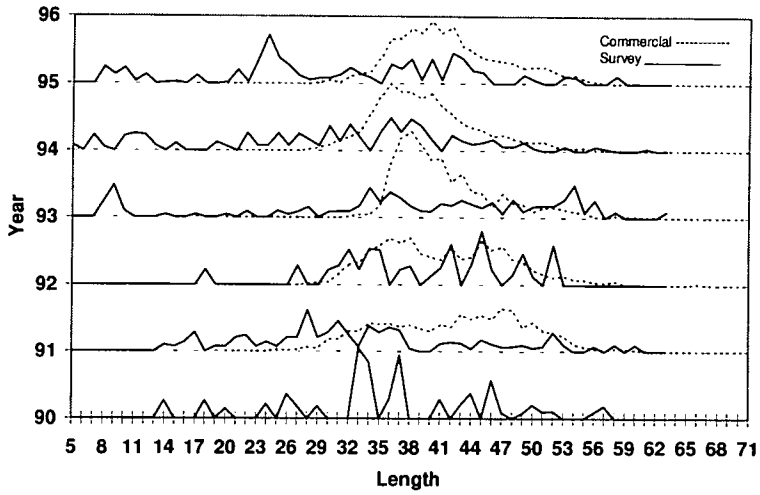
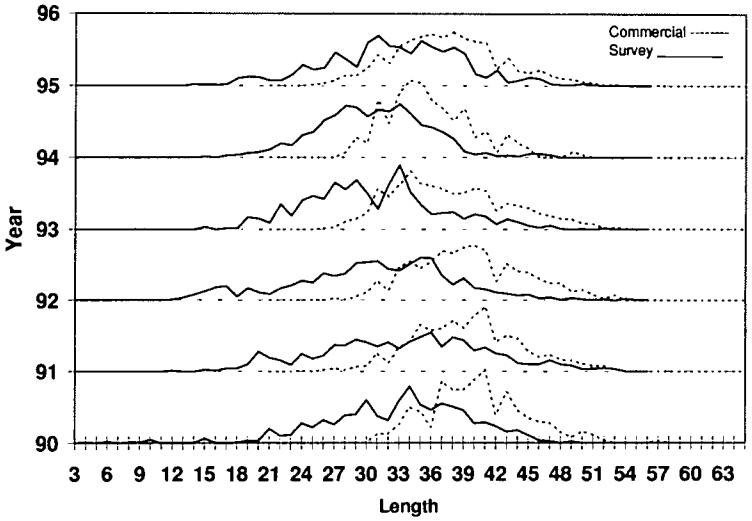

1995 Commercial Catch for Unspecified
47
46
45
44
43
42°
68°
67
66
65
64
63
62
61
60
59
58
57
56
0.5
1
2
5
10
20
40

Fig. 38.

4X Witch Flounder Length Frequencies




4X Winter Flounder Length Frequencies




4X Plaice Length Frequencies

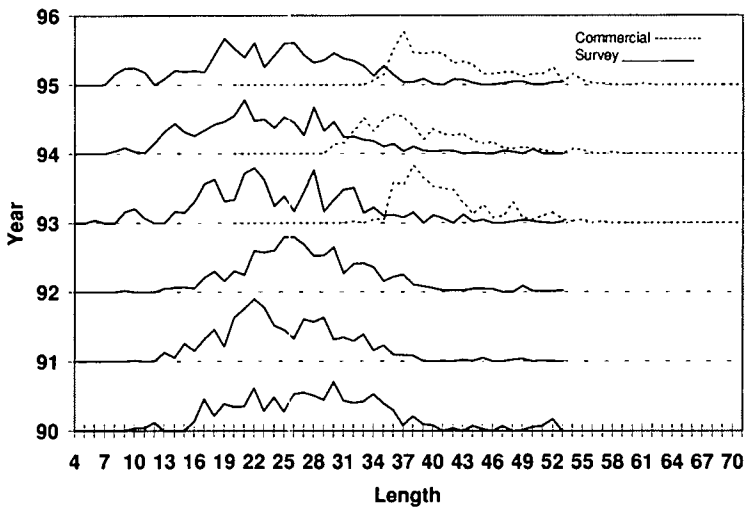



Fig. 39.