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An Update on the Status of
4VW and 4X Flatfish Stocks

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ABSTRACT

Total landings of flatfish (American plaice, yellowtail and witch flounder) on the Scotian Shelf ranged between 6000-8000 t in recent years. The TAC was established at 14,000 t in 1978 and has remained at that level since although it has never been attained. Overall flatfish resources (including winter flounder) are thought to be under increasing fishing pressure due to the introduction of ITQs in 1991 and the decline in other groundfish resources. Because of the method of apportioning catch by Statistical district prior to 1991 and the amount of unspecified flounder currently being reported, landings of individual species are considered inaccurate and should be treated with caution. The 1992 landings of unspecified flounder were the highest in the time series. The absence of reliable catch data makes it difficult to estimate exploitation on these resources. Summer survey estimates in 4VW indicate that American plaice, yellowtail and witch flounder abundance is relatively stable or increasing slightly while spring survey estimates give a more pessimistic view of these stocks. In the 4X area, survey estimates indicate that abundance is low but stable for American plaice and yellowtail flounder but declining for witch flounder. Winter flounder although not currently under quota regulation is increasing in abundance in both areas although being a more coastal species a portion of the fishery is outside the survey area. With the change in management unit for flatfish (4VW, 4X) and the possible introduction of ITQs in 1994 precautionary TACs should be established for flatfish, including winter flounder in the new areas. As well steps should be taken to ensure that correct landing statistics are available for all individual flounder species.

RESUME

Ces dernières années, les débarquements totaux de poissons plats (plie canadienne, limande à queue jaune et plie grise) sur le plateau néo-écossais ont été de l'ordre de 6 000 à 8 000 tonnes. Le TPA a été fixé à 14 000 t en 1978 et est resté inchangé depuis, quoiqu'il n'ait jamais été atteint. On croit que l'ensemble des stocks de poissons plats (y compris de plie rouge) sont sous l'effet d'une plus grande pression de pêche en raison de l'introduction des QIT en 1991 et du déclin des autres poissons de fond. On considère que les chiffres des débarquements par espèce ne sont pas fiables et doivent être utilisés avec précaution du fait de la répartition des prises par district statistique avant 1991 et de la quantité d'espèces de poissons plats non précisées actuellement déclarée. En 1992, les débarquements d'espèces de poissons plats non précisées étaient les plus élevés de la série chronologique. Il est difficile d'estimer l'exploitation de la ressource à cause de l'absence de données fiables sur les prises. Selon les estimations établies d'après le relevé de recherche d'été dans 4VW, l'abondance de la plie canadienne, de la limande à queue jaune et de la plie grise est relativement stable ou légèrement à la hausse, mais le relevé de recherche de printemps donne une image plus pessimiste de l'état des stocks. Dans 4X, les estimations fondées sur les relevés de recherche révèlent une abondance faible mais stable dans le cas de la plie canadienne et de la limande à queue jaune, et en recul pour ce qui est de la plie grise. La plie rouge, qui n'est pas visé par la réglementation sur les quotas, est en abondance croissante dans les deux zones. Précisons, toutefois, qu'il s'agit d'une espèce plus côtière et que de ce fait une partie de la pêche se déroule hors des zones considérées. Compte tenu de la modification des unités de gestion des poissons plats (4VW, 4X) et de l'introduction possible de QIT en 1994, on devrait établir des TPA préventifs pour les poissons plats, y compris la plie rouge, dans les nouvelles unités. De plus, il conviendrait de prendre des mesures pour faire en sorte que l'on puisse disposer de statistiques exactes sur les débarquements de chaque espèce de poisson plat.

INTRODUCTION

This document presents the first analysis of the status of the flatfish resources on the Scotian Shelf since 1985. Emphasis was placed on the assimilation of raw data using the new stock definition for each species. However given the lack of reliable catch information it was not possible at this time to determine exploitation rates for these resources.

Four species of flatfish, excluding halibut, are exploited commercially on the Scotian Shelf (4VWX). 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 are under quota management. An initial TAC of 32,000 t was established in 1973 based on yield per recruit calculations (Halliday 1973) and reduced to 28,000 t in 1978 (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 assessment of the stock complex through to 1985 were not able to advise a modification to the TAC. Thus, at the present time the 14,000 t TAC remains in effect. Winter flounder is included here for information purposes pertaining to the proposed introduction of a flatfish ITQ which may include all commercial flounder. This regulation is being contemplated in order to prevent a tendency to shift effort to non-quota species or to misreport quota species elsewhere.

Upon examination of flatfish stock structure based on ichthyoplankton survey data and the distribution of mature females (Neilson *et al.* 1988), it was suggested that separate updates or assessments be done for 4VW plaice, yellowtail and witch flounder in 4VWX. With increasing interest in flatfish exploitation as an alternative to the traditional (declining) fisheries, biological parameters were examined by Neilson (unpublished) in order to establish the foundation for more rational management of the flatfish resource. Trends in landings by division, trends in RV catch rates, ichthyoplankton survey information and tagging data were all examined. As a result, the resource was split into two management units along the 4X and 4VW boundaries. However, contrary to this decision, they are currently managed as one stock across the whole area. This is inappropriate and steps should be taken to ensure that the flatfish resources are managed separately by area.

With the implementation of ITQs on the Scotian Shelf for cod, haddock and pollock and the general decline in quotas, there is some concern that the mobile gear fleets have increased their effort on the flatfish stocks in order to: a) develop a catch history in anticipation of flatfish going under the ITQ system b) to supplement their ITQs or EAs in light of these declining quotas.

1994 will probably see the implementation of ITQs for flatfish with catch histories now ready to be mailed to all flounder fishermen. This move toward ITQs raises many questions and many of the details remain undecided. The tendency on the part of ITQ committee is towards one

flatfish ITQ for each area regardless of species. 4X fishermen want to see winter flounder included while 4VW fishermen are relatively unconcerned about winter flounder. With the former 14,000 t TAC (flatfish 4VWX) no longer applicable to the new management units and stocks, what criteria should be used to establish ITQ levels? The flounder fishery traditionally lands between 10,000 and 12,000 t including the quota regulated species, winter and non-specified flounder. Winter and non-specified flounder accounted for over 6,000 t in the 1992 fishery. The TAC has never been reached and landings have declined from a high in 1980 of 11,000t to between 6,000 and 8,000 t in recent years. Advice has been requested by industry as to an appropriate precautionary TAC for winter flounder. Industry (ITQs) appear willing to support a 4X and a 4VW management unit for flatfish but indicate an unwillingness to separate by species. Through education and consultations with industry it may be possible to work out a mutually acceptable solution.

Landings data for flatfish are considered to be unreliable. In the past, especially in the mid to late 1980s, high landings of non-quota species can be partially attributed to misreporting of cod, haddock and pollock as flatfish. Generally, if there is no price differential flatfish are often sold as flounder with no species designation. Only witch flounder usually commands a higher price. Identification can also be a problem, flounder is either unspecified or mis-specified by species. The problem of unidentified flounders has been with us for a long time. It was examined by Neilson *et al.* (1988), where he noted that the problem occurred mainly in 4X. One of the main reasons for reporting flounder against a single TAC was the inability to assign species to catch. In the early years this was especially true of the foreign fleets and various methods were used to assign species to catch (Halliday 1973). Currently, fishermen have many reasons for not wanting to assign species to catch. These include time, space on board, no price differential, no space on the log, identification problems, etc. As well, unidentified flounder is not reported against the quota except for the < 45' mobile vessels in 4VW. The problem of unidentified flounder will have to be addressed if we ever expect to manage this valuable resource.

Description of the Fishery

Total landings of Scotian Shelf flatfish increased from 11,000 t in 1961 to 55,000 in 1968 and ranged from 20,000 - 33,000 t in the 1969 to 1976 period with Canada and the USSR the major exploiters of the resource (Table 1, Fig 1). Since 1977 only Canada has exploited the resource in a significant way, with total flatfish landings ranging from 15,000 t in 1980 to 10,500 t in 1992 and for the species under quota ranging between 11,000 t in 1980 to between 6,000 and 8,000 t in recent years (Table 2). The TAC has never been taken (Fig. 2). However, landings of unspecified flounder have risen steadily to now where they are over half of the reported landings. Including unspecified flounder in the total flatfish landings, the catch would have been relatively constant during 1985-1992 at about 11,000 t.

The rather dramatic rise in 1991-92 is partly due to a change in the way statistics are collected. Unidentified flounders in 4VW and 4X are now being recorded as non-specified flounder. Prior to 1991 some of the unidentified flounder landed in 4VW and 4X were assigned a species code based on statistical district landed (Fig. 3). For example if unidentified flounder were landed in districts 1-22, they were assigned the code for American plaice. If landed in districts 32-44, they

would be assigned the code for winter flounder or would be considered mixed flounder depending on if the landing was reported from an offshore area. However, with the implementation of the new ITQ log book which included the purchase slip (plant purchase slips which did in fact separate some flounders were no longer required) it was noted that more and more flounders were not being identified on the purchase slip. Rather than continue with the old system in light of this change, Statistics Branch decided to report what was actually recorded on the purchase slip rather than to arbitrarily assign species codes. However, because the weightout is considered accurate information, even though flounder is not weighed out by species, any estimated species breakdown recorded on a log is currently not used by statistics. If we can determine how accurate the log estimates are, i.e. through port sampling, plant weightouts etc., we may be able to incorporate this information into the statistics system.

Table 3 gives the breakdown by division for each species and Figure 4 shows the total landings for the new stock definition (4VW, 4X).

American plaice in 4VW accounts for the highest proportion of plaice landings on the Scotian Shelf (Fig. 5). However, with the change in reporting, 1991 and 1992 show a dramatic decline making it difficult to relate these years to those of previous years. Although fish are taken throughout the year, the spring and summer appear to be the most active (Table 4). The majority of the landings are taken by the large trawlers and seiners (Table 5a, Fig 6a). For the large trawlers, landings have increased (1991 and 1992 unspecified flounder are probably plaice for the most part) possibly due to a more directed plaice fishery in the face of declining cod resources. However although variable, with the exception of 1989 for both the small trawlers and the seiners, landings are declining. In the past 4VW longliners accounted for a significant portion of the landings (Table 5c); however, they were apparently recorded as unspecified flounder and are no longer recorded as American plaice by Statistics Branch or these vessels are no longer fishing.

4X American plaice landings indicate a significant increase in 1991 (967 t) which may be due to the introduction of ITQs. Generally plaice landings in 4X have been in the 200-400 t range since 1977 (Fig. 5). Again although fish are landed throughout the year, the spring and summer appear to be the most active (Table 4a). Small trawlers accounted for most of the 4X landings (Table 5b, Fig. 6b).

Historically **4VW witch flounder** have been fished predominately by both the Canadian and Soviet fleets. Landings peaked between 15,000 and 20,000 t in the late 1960s and early 1970s (Fig. 7). Landings declined through to 1976 and coincident with the removal of the Soviet fleet, 1977 4VW landings dropped from 5401 t to 2010 t with landings in 4W dropping from 2686 t in 1976 to 455 t in 1977 and have continued to decline to the present (Table 3b). 1992 landings in 4VW have declined to a low of 1,023 t. Seasonal breakdowns indicate a year round fishery with spring and summer most active (Table 4b) with seiners the dominant fleet (Table 5a, Fig 8a).

Historically, **4X witch flounder** have been fished by Canada with incidental catches taken by both Soviet and American fleets. Landings since 1970 have generally been below 1000 t averaging approximately 550 t except in the late 1970s (Fig. 7). 1992 landings of 824 t were the

highest since 1971 (Table 3b). Although generally a year round fishery, in recent years 4X appears to have shifted to a more predominately winter fishery (Table 4b) with small trawlers the most important fleet in the 4X fishery (Table 5b Fig. 8b). Witch flounder landings in both 4VW and 4X are considered to be the most reliable of all the flatfish because of the high price differential. Witch flounder can command over three dollars per lb during the winter months.

4VW Yellowtail flounder were fished by both Canadian and Soviet fleets until 1977. The Canadian fishery takes place predominantly in 4V (Table 3c). Landings rose after extension of jurisdiction to a high of 2662 t in 1981 then dropped through the mid 1980s. Landings have been relatively stable since 1989 at about 1,300 t with the exception of the 1990 landing of 2931 t, the highest in the time series (Fig. 9). Industry information suggests that this was due to aggregations of yellowtail around a clam dredging operation on Banquereau. Seasonal breakdowns (Table 4c), indicate a predominantly summer fishery prosecuted by seiners and large trawlers (Fig. 10a). Depending on the location of yellowtail aggregations, small mobile gear vessels fish as either draggers or seiners thus resulting in variable landing patterns (Table 5a).

Landings of **yellowtail flounder** in 4X have generally been below 300 t. since 1970 (Fig. 9). Seasonal breakdowns indicate a year round fishery with a bias toward the summer months, (Table 4c). Yellowtail are generally taken by small trawlers as a by-catch in other directed fisheries (Table 5b, Fig. 10b). Increased landings by the small dragger fleet in 4X (1989-1991) may be related to the introduction of ITQs (Table 5a).

Winter flounder are prosecuted almost entirely in 4X (Table 3d, Fig. 11). Canadian landings in 4X reached a low in 1985 of 823 t increasing to 1,959 t in 1990 and dropping to 569 t in 1992 (Table 4d). This rather precipitous decline may in part be due to the change in how landing statistics are reported although unspecified landings in 4X did not increase to the same extent as winter flounder landings declined since 1990. Winter flounder are fished all year round with a bias toward a summer fishery. They are fished almost entirely by small trawlers (Table 5b, Fig. 12b).

Landings of **4VW winter flounder** have generally been less than 100 t since 1980 (Table 3d, Fig. 11). In the early 1970s landing statistics indicated a significant fishery prosecuted by the Russian fleet as well as a modest Canadian fishery using small mobile gear (Table 2d, 5a, Fig. 12a). In recent years winter flounder is a bycatch fishery taken in 4V during the summer by small mobile gear vessels directing for other flounders (Table 4d). No significant catches are landed from 4W though "reported" landings were higher in 4W than 4V in the early 1970s. As well most of the 4VW survey abundance is located in 4W.

In the past, unspecified flounders were landed primarily in 4X, and were thought to be mostly winter flounder; however, with the change in reporting by statistics, the landings of unspecified flounder in 4VW has risen sharply during 1991 and 1992 (Table 4e, Fig. 13). Unspecified flounders are landed by small trawlers in 4X and by large trawlers and seiners in 4VW (Fig. 14a, 14b). Unspecified flounders in 4VW are thought to be largely a mixture of plaice and yellowtail flounder.

Management

The flatfish fishery is currently a competitive fishery regulated by allocations to six gear sectors: 1) fixed gear <45'; 2) fixed gear 45-65'; 3) mobile gear <45'; 4) mobile gear 45-65'; 5) mobile gear 65-100', and 6) vessels >100'. Because the flatfish fishery has been generally a bycatch fishery, trip limits and specific licence conditions have not been required (Table 6). Flatfish may come under the ITQ program for 1994.

Catch at Age

Catch at age information for flatfish is not available. Ageing for yellowtail, witch and winter flounder was discontinued in 1985 due to difficulties in conducting SPAs in past assessments (Neilson and Perley 1985). The intention at that time was to concentrate ageing efforts on American plaice in order to conduct a more detailed analytical assessment of 4V plaice. Since 1988 no ageing has been done for American plaice and commercial sampling for length frequencies has been relatively limited for all flatfish species.

Research Surveys

Catch Rates

The summer RV survey (1970-1992) stratified mean numbers per tow for 4VW plaice were relatively stable through the early 1980s then declined to a series low in 1988. Since then, abundance increased but declined in 1992 (Table 7, Fig 15a). The spring 4VW survey (1986-1993) mean numbers per tow for American plaice have declined since 1990 (Fig. 16a). The magnitude of the numbers per tow is lower in the spring survey by about half. From time to time the estimation of abundance from the March survey has been complicated by missing strata due to the presence of ice in the survey area.

The summer RV survey stratified mean numbers per tow for 4X American plaice were low, increasing to 1982 and have been relatively stable since (Table 7, Fig. 15a). There is no spring survey in the 4X area.

The summer RV survey stratified mean numbers per tow (Fig. 15b) for 4VW witch flounder were low but relatively stable over the entire time series (1970-1992), except for a single high point in 1974 associated with a high standard error (Table 7). The 4VW spring survey abundance declined from 1987 to a low level in 1990 and remained stable to 1993 (Fig. 16b). Missing strata due to ice conditions may have complicated the estimation of abundance during the spring survey.

The summer RV survey stratified mean numbers per tow for 4X witch flounder were highly variable in the 1970s. Since the early 1980s the survey has shown a declining trend to the present, with the 1992 point the lowest in the 22 year time series (Table 7, Fig. 15b).

The summer RV survey stratified mean numbers per tow for 4VW yellowtail flounder declined in the late 1970s, remaining stable through the 1980s and have shown an increasing trend since (Table 7, Fig. 15c). The 4VW spring survey abundance decreased between 1988 and 1992, however the 1992 point may be anomalously low with large catches of yellowtail being caught in very deep water (Fig. 16c) (*Pers. Comm.* S. Smith). Again, from time to time the estimation of abundance from the March survey has been complicated by missing strata due to the presence of ice in the survey area.

For 4X yellowtail flounder, the RV survey stratified mean numbers per tow have been very low but indicate a small increasing trend since the late 1980s.

Winter flounder stratified mean numbers per tow in 4X have shown an increasing trend since the late 1970s with a stable period through the mid 1980s and an increasing trend to the present with the 1992 numbers, the series high (Fig. 15d). However the summer survey does not cover the inshore portion of 4X which is thought to contain a large portion of the winter flounder abundance. In 4VW numbers were low to 1983 and have been stable or increasing since. In the spring survey, numbers per tow for winter flounder ranged between 0 and .17 and are not presented.

Distribution

Distribution maps of flatfish abundance aggregated by five and three year periods are presented in Fig. 17. American plaice catches 1990-1992 suggest an increased abundance to the west of Sable Island compared to earlier years. As well, data from the spring 4VW survey indicates that strata 409 is an area of relatively high plaice abundance (Fig. 18). Witch flounder shows no real change in summer distribution over time. The spring 4VW survey indicates that strata 405 and 402 generally contain the highest abundance. 4VW yellowtail flounder catches suggest a possible change in the distribution between 4V and 4W while in the 4X area yellowtail abundance appears to be increasing in the Browns Bank area. The spring 4VW survey indicates that strata 408 and 409 have the highest abundance in any given year. Winter flounder also appear to show some increase in abundance to the west of Sable Island in recent years. Numbers per tow from the spring 4VW survey, although very low, support this with strata 409 and 408 having the highest catches.

Length frequencies from the summer RV surveys in recent years are presented in Fig. 19. No substantial changes in the size compositions of the various species were noted with the exception of American plaice where females >60 cm appear less frequently in the catch than in previous years.

Commercial Catch Rates

Directed catches for all stocks comprising the 4VW and 4X complex are variable and often at very low levels. The directed catches for all species examined, with the exception of American plaice, were either very low or non-existent over the time series. Directed catch with effort information is available only for American plaice, 1970-1992, using stern otter trawlers all

tonnage classes for all months in 4VW. Even using this broad base of observations, directed catches in some years were less than 15 t. With the bycatch nature of the fishery, the ever increasing problem with unspecified flounder and the change in the way the statistics are reported, the use of commercial catch rates in assessing the status of the flatfish stocks should not be considered reliable over the time series.

As well, differences were noted in the calculation of mainspecies and associated effort between Zonal, Regional and NAFO data. As these differences could not be reconciled in the time frame allowed, they will be investigated further.

Prognosis

American plaice, witch and yellowtail flounder in 4VWX have been managed as a species complex with a single flatfish TAC since the mid-1970s. In 1992 CAFSAC recommended that it would be more appropriate to assess the species separately and that the stocks be separated into 4X and 4VW management units. It was also noted that landings by species were required in order to assess these individual stocks. The 1992 landings of unspecified flounder were the highest in the time series, in part due to the introduction of the ITQ log and purchase slip combination as well as the change in the reporting of statistics. However, landings in this category have always been high preventing any analysis of the commercial landings. This unspecified category must be partitioned to species in order to provide useful information on the individual stocks.

Winter flounder is also caught on the Scotian Shelf. Because it is not under quota regulation, it is vulnerable to a shift in fishing effort or to misreporting by species as a result of changes in management or decreases in other groundfish. Winter flounder is currently increasing in the 4X area although being a more coastal species, a portion of the fishery is outside the survey area. Because it was considered a coastal species and outside of the NAFO convention area it was not considered when other flatfish species were put under quota regulation.

With the change in the management unit for flatfish the former 4VWX flatfish TAC of 14,000 t is no longer valid. Precautionary TACs should be established for flatfish in the new areas. A precautionary TAC should also be established for winter flounder in the 4X area. These precautionary TACs should be developed in consultation with Industry. As well a mechanism should be put in place to ensure correct landings statistics are available for all individual flounder species.

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Table 1. Total landings (t) for 4VWX flatfish.

Year	American Plaice	Witch Flounder	Yellowtail Flounder	Winter Flounder	Flatfish (Unspec.)	TOTAL
1961	1582	5077	2917	837	262	10675
1962	1727	5838	3503	576	881	12525
1963	2309	7486	3972	696	-	14463
1964	3082	8629	5399	1311	194	18615
1965	8198	12943	6104	1339	90	28674
1966	14206	14512	4851	1346	30	34945
1967	10770	7816	5196	944	-	24726
1968	19265	21682	13128	1181	30	55286
1969	13735	14093	3826	1416	2	33072
1970	8358	6048	3682	1530	11	19629
1971	14301	17864	1775	3084	1	37025
1972	10653	11351	1485	1454	724	25667
1973	12432	13969	1513	1909	982	30805
1974	16772	7415	939	2756	817	28699
1975	11747	8922	1570	1374	1122	24735
1976	11147	5742	904	1297	1043	20133
1977	7757	2431	1443	1257	944	13832
1978	6756	2291	1628	1207	1060	12942
1979	6354	2071	2090	1088	1303	12906
1980	7572	2321	2491	1174	1887	15445
1981	6772	1741	2889	1448	1577	14427
1982	5697	1473	2623	1236	1774	12803
1983	6107	1663	2423	995	2073	13261
1984	6128	1933	2462	884	2003	13410
1985	4437	2271	1020	824	2210	10762
1986	3682	3014	805	1040	3302	11843
1987	4885	3217	1150	1056	2422	12730
1988	3453	2947	1068	1572	2294	11334
1989	3846	2292	1509	1476	1069	10192
1990 ⁽¹⁾	2383	1939	3010	1960	2970	12262
1991 ⁽¹⁾	1366	1931	1475	646	4926	10344
1992 ⁽¹⁾	⁽²⁾ 876	⁽²⁾ 1847	⁽²⁾ 1491	⁽²⁾ 569	⁽²⁾ 5828	10599

⁽¹⁾ Data from DFO Statistics Branch; provisional data for countries other than Canada.⁽²⁾ Foreign catch not available.

Table 2a. American Plaice landings (t) by country for divs. 4VWX.

Year	Canada	USA	Russia	Other	Total
1961	1509	73	-	-	1582
1962	1642	85	-	-	1727
1963	2108	117	84	-	2309
1964	2838	194	4	46	3082
1965	5542	179	2383	94	8198
1966	9113	110	4963	20	14206
1967	10524	162	82	2	10770
1968	9828	67	9256	114	19265
1969	9300	51	4308	76	13735
1970	6303	55	1896	104	8358
1971	7513	70	6700	18	14301
1972	6855	56	3610	132	10653
1973	5146	8	7200	78	12432
1974	6967	13	9727	65	16772
1975	6623	40	5030	54	11747
1976	6932	27	4102	86	11147
1977	7659	35	48	15	7757
1978	6679	20	32	25	6756
1979	6329	10	13	2	6354
1980	7490	15	26	41	7572
1981	6586	77	68	41	6772
1982	5621	66	6	4	5697
1983	5963	104	32	8	6107
1984	5939	115	65	9	6128
1985	4365	35	-	37	4437
1986	3621	32	6	23	3682
1987	4852	11	14	8	4885
1988	3423	4	17	9	3453
1989	3834	1	4	7	3846
1990 ⁽¹⁾	2311	6	46	20	2383
1991 ⁽¹⁾	1217	4	113	32	1366
1992 ⁽¹⁾	876	(2)	(2)	(2)	876

⁽¹⁾ Data from DFO Statistics Branch; provisional data for countries other than Canada.⁽²⁾ Foreign catch not available.

Table 2b. Witch Flounder landings (t) by country for divs. 4VWX.

Year	Canada	USA	Russia	Other	Total
1961	4951	126	-	-	5077
1962	5638	200	-	-	5838
1963	6972	170	344	-	7486
1964	8406	189	34	-	8629
1965	7710	94	5139	-	12943
1966	7046	20	7446	-	14512
1967	7496	92	227	1	7816
1968	8772	29	12829	52	21682
1969	6671	28	7345	49	14093
1970	4920	55	1059	14	6048
1971	6816	64	10978	6	17864
1972	5909	120	5207	115	11351
1973	5854	45	8020	50	13969
1974	5830	55	1441	89	7415
1975	3406	33	5432	51	8922
1976	2466	30	3237	9	5742
1977	2307	13	104	7	2431
1978	2139	16	134	2	2291
1979	2057	7	3	4	2071
1980	2298	11	3	9	2321
1981	1687	41	-	13	1741
1982	1411	56	2	4	1473
1983	1473	177	12	1	1663
1984	1737	162	28	6	1933
1985	2133	73	57	8	2271
1986	2882	78	54	-	3014
1987	3150	20	41	6	3217
1988	2823	12	111	1	2947
1989	2289	3	-	-	2292
1990 ⁽¹⁾	1932	7	-	-	1939
1991 ⁽¹⁾	1925	3	1	2	1931
1992 ⁽¹⁾	1847	(2)	(2)	(2)	1847

⁽¹⁾ Data from DFO Statistics Branch; provisional data for countries other than Canada.⁽²⁾ Foreign catch not available.

Table 2c. Yellowtail Flounder landings (t) by country for divs. 4VWX.

Year	Canada	USA	Russia	Other	Total
1961	2908	9	-	-	2917
1962	3483	20	-	-	3503
1963	3784	30	158	-	3972
1964	5288	36	75	-	5399
1965	5378	21	705	-	6104
1966	3770	14	1067	-	4851
1967	5152	29	15	-	5196
1968	5377	23	7717	11	13128
1969	2563	19	1244	-	3826
1970	947	21	2708	6	3682
1971	1033	12	728	2	1775
1972	1007	4	445	29	1485
1973	424	1	1030	58	1513
1974	593	3	137	206	939
1975	1083	64	400	23	1570
1976	610	12	281	1	904
1977	1424	13	-	6	1443
1978	1610	3	-	15	1628
1979	2088	2	-	-	2090
1980	2486	4	-	1	2491
1981	2881	2	-	6	2889
1982	2620	1	-	2	2623
1983	2422	1	-	-	2423
1984	2449	7	-	6	2462
1985	1014	-	-	6	1020
1986	805	-	-	-	805
1987	1150	-	-	-	1150
1988	1067	-	-	1	1068
1989	1509	-	-	-	1509
1990 ⁽¹⁾	3008	1	-	1	3010
1991 ⁽¹⁾	1472	-	3	-	1475
1992 ⁽¹⁾	1491	∞	∞	∞	1491

⁽¹⁾ Data from DFO Statistics Branch; provisional data for countries other than Canada.
^(∞) Foreign catch not available.

Table 2d. Winter Flounder landings (t) by country for divs. 4VWX.

Year	Canada	USA	Russia	Other	Total
1961	834	3	-	-	837
1962	570	6	-	-	576
1963	668	28	-	-	696
1964	1282	29	-	-	1311
1965	1237	5	97	-	1339
1966	997	8	341	-	1346
1967	926	18	-	-	944
1968	1128	13	40	-	1181
1969	1392	7	17	-	1416
1970	1480	8	42	-	1530
1971	1430	7	1647	-	3084
1972	824	13	617	-	1454
1973	904	2	1003	-	1909
1974	1321	7	1428	-	2756
1975	802	45	527	-	1374
1976	908	13	376	-	1297
1977	1244	13	-	-	1257
1978	1202	5	-	-	1207
1979	1085	3	-	-	1088
1980	1173	1	-	-	1174
1981	1448	-	-	-	1448
1982	1231	5	-	-	1236
1983	992	3	-	-	995
1984	877	7	-	-	884
1985	823	1	-	-	824
1986	1037	3	-	-	1040
1987	1036	20	-	-	1056
1988	1571	1	-	-	1572
1989	1476	-	-	-	1476
1990 ⁽¹⁾	1959	1	-	-	1960
1991 ⁽¹⁾	645	1	-	-	646
1992 ⁽¹⁾	569	∞	∞	∞	569

⁽¹⁾ Data from DFO Statistics Branch; provisional data for countries other than Canada.
^(∞) Foreign catch not available.

Table 2e. Unspecified Flounder landings (t) by country for divs. 4VWX.

Year	Canada	USA	Russia	Other	Total
1961	234	-	28	-	262
1962	205	5	671	-	881
1963	-	-	-	-	-
1964	-	-	-	194	194
1965	-	-	-	90	90
1966	-	-	-	30	30
1967	-	-	-	-	-
1968	-	-	-	30	30
1969	-	-	-	2	2
1970	-	-	-	11	11
1971	-	-	-	1	1
1972	714	-	-	10	724
1973	805	-	-	177	982
1974	724	-	-	93	817
1975	842	-	-	280	1122
1976	558	-	-	485	1043
1977	933	-	-	11	944
1978	1055	-	-	5	1060
1979	1302	-	-	1	1303
1980	1881	-	-	6	1887
1981	1576	-	-	1	1577
1982	1771	-	-	3	1774
1983	2054	2	-	17	2073
1984	2001	2	-	-	2003
1985	2204	-	-	6	2210
1986	3283	9	-	10	3302
1987	2415	5	-	2	2422
1988	2294	-	-	-	2294
1989	1069	-	-	-	1069
1990 ⁽¹⁾	2963	-	-	7	2970
1991 ⁽¹⁾	4856	-	57	13	4926
1992 ⁽¹⁾	∞5816	-	12	-	5828

⁽¹⁾ Data from DFO Statistics Branch; provisional data for countries other than Canada.
^(∞) Newfoundland data not available.

Table 3a. American Plaice landings for divisions 4VWX.

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 ⁽¹⁾	1673	241	469	2383
1991 ⁽¹⁾	186	192	988	1366
1992 ⁽¹⁾	447	16	413	876

Table 3b. Witch Flounder landings for divisions 4VWX.

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 ⁽¹⁾	1150	146	643	1939
1991 ⁽¹⁾	1288	38	605	1931
1992 ⁽¹⁾	941	82	824	1847

⁽¹⁾ Data from DFO Statistics Branch; provisional data for countries other than Canada.

Table 3c. Yellowtail Flounder 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 ⁽¹⁾	2815	116	79	3010
1991 ⁽¹⁾	1313	18	144	1475
1992 ⁽¹⁾	1357	16	118	1491

Table 3d. Winter Flounder 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 ⁽¹⁾	71	8	1881	1960
1991 ⁽¹⁾	28	16	602	646
1992 ⁽¹⁾	2	3	564	569

Table 3e. Unspecified Flounder 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 ⁽¹⁾	5	22	2943	2970
1991 ⁽¹⁾	1275	206	3445	4926
1992 ⁽¹⁾	1795	81	3952	5828

(1) Data from DFO Statistics Branch; provisional data for countries other than Canada.

Table 4a. American Plaice landings by quarter of year, division and country.

Canada (Maritimes and Quebec)

Year	4V					4W					4X					Canadian 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	2791	745	487	1006	5029	220	186	142	148	696	101	192	111	174	578	6303
1971	2688	1892	711	1036	6327	238	138	229	156	761	61	175	81	108	425	7513
1972	2649	2032	440	502	5623	219	192	277	68	756	84	170	131	91	476	6855
1973	1765	1176	479	813	4233	205	153	208	74	640	67	71	64	71	273	5146
1974	3197	1992	452	571	6212	65	121	218	48	452	10	76	76	141	303	6967
1975	2764	1685	796	508	5753	133	197	239	39	608	5	55	115	87	262	6623
1976	2041	1809	1295	1124	6269	89	119	162	55	425	48	62	44	84	238	6932
1977	1407	2541	1942	811	6701	88	185	199	72	544	85	137	120	72	414	7659
1978	830	2655	1382	607	5474	54	260	304	98	716	48	84	260	97	489	6679
1979	979	1573	1123	1349	5024	32	293	144	18	487	46	354	308	110	818	6329
1980	1195	2379	1567	1113	6254	51	279	191	49	570	52	213	315	86	666	7490
1981	1265	1705	1402	1261	5633	37	264	162	53	516	72	173	164	28	437	6586
1982	641	1573	1643	1059	4916	13	154	195	32	394	34	96	123	58	311	5621
1983	936	1799	1874	485	5094	8	210	148	23	389	89	204	141	46	480	5963
1984	575	2050	1722	1162	5509	7	105	74	24	210	42	66	86	26	220	5939
1985	681	980	1668	580	3909	2	63	96	13	174	64	96	78	44	282	4365
1986	349	1139	864	440	2792	8	96	115	50	269	49	183	248	80	560	3621
1987	1361	1369	964	530	4224	20	137	162	58	377	65	110	58	18	251	4852
1988	395	1123	968	272	2758	30	95	149	29	303	60	117	142	43	362	3423
1989	375	1109	1286	193	2963	11	103	203	74	391	181	237	54	8	480	3834
1990 ⁽¹⁾	446	567	479	181	1673	9	61	91	14	175	129	158	142	34	463	2311
1991 ⁽¹⁾	73	97	11	5	186	2	5	28	16	51	3	166	411	400	980	1217
1992 ⁽¹⁾	100	120	131	96	447	-	16	0	0	16	58	185	86	84	413	876

⁽¹⁾ Data from DFO Statistics Branch; provisional data for countries other than Canada.

Table 4b. Witch Flounder landings by quarter of year, division and country.

Canada (Maritimes and Quebec)

Year	4V					4W					4X					Canadian 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	1257	872	409	728	3266	295	296	148	155	894	119	371	122	148	760	4920
1971	1676	1526	422	601	4225	672	554	291	299	1816	148	283	251	93	775	6816
1972	2093	1221	305	360	3979	648	256	241	222	1367	52	263	209	39	563	5909
1973	1592	1408	279	412	3691	700	591	177	312	1780	113	150	98	22	383	5854
1974	2896	1120	413	276	4705	205	185	128	234	752	27	171	140	35	373	5830
1975	907	837	292	206	2242	257	458	53	115	883	33	130	55	63	281	3406
1976	749	649	241	185	1824	64	122	76	95	357	60	84	104	37	285	2466
1977	614	459	265	145	1483	152	131	79	60	422	140	108	69	85	402	2307
1978	595	508	272	156	1531	83	240	95	18	436	57	61	21	33	172	2139
1979	573	405	319	271	1568	72	130	2	2	206	61	94	47	81	283	2057
1980	608	660	316	208	1792	50	78	25	33	186	88	71	83	78	320	2298
1981	368	380	256	106	1110	30	92	9	25	156	71	83	140	127	421	1687
1982	158	301	195	133	787	11	16	40	30	97	57	154	147	169	527	1411
1983	133	286	314	144	877	19	55	25	15	114	86	164	166	66	482	1473
1984	119	354	455	259	1187	20	50	37	12	119	64	141	180	46	431	1737
1985	171	516	661	281	1629	6	12	19	15	52	95	131	150	76	452	2133
1986	358	1036	624	203	2221	15	27	23	43	108	106	105	214	128	553	2882
1987	428	1018	682	425	2553	0	39	39	47	125	134	129	116	93	472	3150
1988	281	1104	548	252	2185	25	43	25	16	109	142	126	132	129	529	2823
1989	214	861	363	172	1610	10	79	38	28	155	246	209	40	29	524	2289
1990 ⁽¹⁾	100	595	392	63	1150	12	78	43	13	146	182	120	243	91	636	1932
1991 ⁽¹⁾	217	674	245	150	1286	6	14	14	3	37	292	126	66	118	602	1925
1992 ⁽¹⁾	73	517	222	129	941	5	58	16	3	82	357	206	115	146	824	1847

⁽¹⁾ Data from DFO Statistics Branch; provisional data for countries other than Canada.

Table 4c. Yellowtail Flounder landings by quarter of year, division and country.

Canada (Maritimes and Quebec)

Year	4V					4W					4X					Canadian 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	217	87	146	88	538	95	69	11	22	197	28	89	44	51	212	947
1971	77	519	74	57	727	24	25	29	20	98	20	77	74	37	208	1033
1972	29	382	66	8	485	296	17	23	32	368	12	58	71	13	154	1007
1973	3	206	11	1	221	52	12	8	10	82	30	29	53	9	121	424
1974	23	303	29	2	357	3	4	9	5	21	12	58	107	38	215	593
1975	1	690	194	8	893	-	15	1	-	16	14	41	93	26	174	1083
1976	1	50	188	137	376	0	2	8	6	16	15	76	107	20	218	610
1977	11	503	478	103	1095	8	18	3	11	40	37	114	111	27	289	1424
1978	3	555	303	210	1071	9	33	34	79	155	30	170	135	49	384	1610
1979	0	540	695	425	1655	2	89	28	25	144	22	118	102	47	289	2088
1980	0	1085	661	411	2157	1	31	38	8	78	37	112	78	24	251	2486
1981	3	827	1410	293	2533	8	80	26	9	123	18	73	108	26	225	2881
1982	2	1033	920	405	2360	11	17	5	16	49	36	54	77	44	211	2620
1983	2	1047	977	17	2043	11	34	7	7	59	50	106	118	46	320	2422
1984	133	1192	765	149	2239	12	25	8	0	45	38	61	52	14	165	2449
1985	8	154	624	146	932	3	3	1	2	9	27	24	20	2	73	1014
1986	4	352	227	89	672	0	7	14	1	22	23	31	24	33	111	805
1987	4	404	441	98	947	0	32	60	2	94	22	42	33	12	109	1150
1988	5	287	518	132	942	3	4	31	8	46	21	21	28	9	79	1067
1989	6	403	790	186	1385	0	24	29	21	74	5	34	6	5	50	1509
1990 ⁽¹⁾	5	428	2018	364	2815	1	17	84	13	115	15	7	29	27	78	3008
1991 ⁽¹⁾	1	198	882	232	1313	1	1	9	4	15	4	33	51	56	144	1472
1992 ⁽¹⁾	2	153	1116	86	1357	1	8	6	1	16	7	45	39	27	118	1491

⁽¹⁾ Data from DFO Statistics Branch; provisional data for countries other than Canada.

Table 4d. Winter Flounder landings by quarter of year, division and country.
Canada (Maritimes and Quebec)

Year	4V					4W					4X					Canadian 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	1	1	5	1	8	-	-	1	1	2	51	660	513	246	1470	1480
1971	-	-	5	3	8	-	1	-	3	4	13	712	511	182	1418	1430
1972	2	0	2	12	16	8	0	0	8	16	0	272	421	99	792	824
1973	0	21	174	75	270	0	0	0	1	1	1	304	266	62	633	904
1974	0	122	339	10	471	0	0	31	68	99	1	273	337	140	751	1321
1975	-	7	118	3	128	-	6	44	9	59	6	243	274	92	615	802
1976	0	14	156	23	193	0	1	9	9	19	11	255	340	90	696	908
1977	0	6	220	0	226	4	2	2	1	9	16	392	436	165	1009	1244
1978	1	3	147	35	186	3	3	124	7	137	9	272	411	187	879	1202
1979	1	3	145	79	228	0	5	8	0	13	18	163	516	147	844	1085
1980	0	5	23	2	30	1	3	0	6	10	25	449	489	170	1133	1173
1981	0	9	2	15	26	4	4	1	2	11	8	426	754	223	1411	1448
1982	1	37	40	4	82	3	4	3	0	10	78	367	575	119	1139	1231
1983	46	13	3	10	72	1	4	3	0	8	37	282	482	111	912	992
1984	1	1	0	-	2	1	1	0	3	5	72	322	401	75	870	877
1985	0	1	26	0	27	0	1	1	0	2	25	290	421	58	794	823
1986	0	0	2	0	2	1	0	1	2	4	52	252	623	104	1031	1037
1987	0	1	1	7	9	0	1	2	0	3	15	404	521	84	1024	1036
1988	0	84	13	0	97	2	3	2	8	15	67	401	770	221	1459	1571
1989	0	9	133	5	147	1	12	14	13	40	191	497	456	145	1289	1476
1990 ⁽¹⁾	-	3	50	18	71	2	4	0	2	8	406	490	570	414	1880	1959
1991 ⁽¹⁾	-	2	18	8	28	0	0	9	6	15	76	85	158	283	602	645
1992 ⁽¹⁾	1	0	1	0	2	-	1	0	2	3	114	157	159	134	564	569

⁽¹⁾ Data from DFO Statistics Branch; provisional data for countries other than Canada.

Table 4e. Unspecified Flounder landings by quarter and year, division and country.
Canada (Maritimes and Quebec)

Year	4V						4W						4X					Total	Canadian Total	
	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	UK	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	UK	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	UK			
1970	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1971	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1972	3	30	0	0	-	33	-	-	-	-	-	-	9	239	300	133	-	681	714	
1973	0	1	0	0	-	1	-	-	-	-	-	-	12	237	373	182	-	804	805	
1974	0	8	0	0	-	8	-	-	-	-	-	-	9	274	272	161	-	716	724	
1975	-	1	-	-	-	1	-	5	-	2	-	7	7	328	379	120	-	834	842	
1976	0	1	60	0	-	61	1	0	0	0	-	1	18	193	241	44	-	496	558	
1977	0	0	27	0	-	27	0	2	5	1	-	8	22	380	387	109	-	898	933	
1978	0	5	0	0	-	5	0	14	6	5	-	25	7	522	461	35	-	1025	1055	
1979	2	34	4	0	-	40	0	27	16	7	-	50	37	413	387	375	-	1212	1302	
1980	4	15	4	0	-	23	-	-	-	-	-	-	75	817	823	143	-	1858	1881	
1981	0	4	13	0	-	17	1	2	0	0	-	3	86	392	854	224	-	1556	1576	
1982	3	0	1	0	-	4	3	0	1	0	-	4	39	652	687	385	-	1763	1771	
1983	1	21	8	0	-	30	1	2	0	-	-	3	63	614	788	556	-	2021	2054	
1984	0	0	0	6	-	6	1	1	0	0	-	2	74	480	1127	312	-	1993	2001	
1985	0	2	1	0	-	3	0	0	0	1	-	1	124	784	858	434	-	2200	2204	
1986	3	25	13	3	-	44	0	9	0	5	-	14	209	742	1694	580	-	3225	3283	
1987	0	25	7	1	-	33	0	6	0	1	-	7	164	585	1007	619	-	2375	2415	
1988	18	41	9	2	-	70	11	0	3	5	-	19	323	842	610	430	-	2205	2294	
1989	1	5	9	-	-	15	-	22	29	27	-	78	319	483	127	47	-	976	1069	
1990 ⁽¹⁾⁽²⁾	-	1	4	-	-	5	8	2	3	2	-	15	369	486	1260	828	-	2943	2963	
1991 ⁽¹⁾⁽²⁾	341	447	306	181	-	1275	3	35	80	21	-	139	826	1043	1004	569	-	3442	4856	
1992 ⁽¹⁾⁽²⁾	185	603	531	476	-	1795	5	38	24	14	-	81	432	1097	1583	828	-	3940	5816	

⁽¹⁾ Data from DFO Statistics Branch; provisional data for countries other than Canada.

⁽²⁾ Newfoundland data was not available.

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

Year	OTB TC 0 - 3						OTB TC 4+						Scottish & Danish Seine ⁽²⁾					
	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	79	93	-	4	-	176	4921	2290	716	4	-	7931	441	1765	17	2	-	2225
1971	251	263	-	-	-	514	5714	3650	785	5	-	10154	628	2126	37	1	-	2792
1972	132	46	-	10	-	188	5277	4038	836	18	33	10202	405	1257	12	1	-	1675
1973	127	90	-	235	1	453	3722	3889	278	1	-	7890	546	1464	21	1	-	2032
1974	209	9	-	461	-	679	5277	4174	359	-	8	9818	658	1221	17	97	9	2002
1975	139	4	1	137	-	281	4782	2033	855	-	6	7676	760	995	15	28	2	1800
1976	244	12	-	148	-	404	4832	1231	369	27	61	6520	1311	869	23	2	1	2206
1977	257	55	26	158	14	510	4933	901	992	2	7	6835	1632	838	116	4	12	2602
1978	263	38	5	281	10	597	3967	948	1051	10	8	5984	1300	930	84	8	12	2334
1979	210	15	19	199	13	456	3936	909	1659	1	7	6512	898	792	114	9	19	1832
1980	283	11	69	7	-	370	4476	1058	1874	6	15	7429	1580	866	281	20	8	2755
1981	186	53	92	7	3	341	4242	630	2401	22	-	7295	970	564	153	8	-	1695
1982	515	21	205	2	3	746	3002	346	2148	83	4	5583	760	511	51	5	1	1328
1983	453	12	67	-	3	535	2992	288	1860	73	24	5237	1065	678	165	7	4	1919
1984	429	30	156	1	4	620	3252	239	1802	2	-	5295	1303	1017	299	3	3	2625
1985	181	24	45	20	-	270	2398	423	597	3	1	3422	747	1200	220	4	-	2171
1986	438	163	113	2	43	759	1053	590	330	3	3	1979	682	1531	106	-	10	2329
1987	455	164	62	-	31	712	2293	666	437	-	-	3396	717	1776	103	9	-	2605
1988	530	105	91	75	42	843	908	702	297	-	1	1908	744	1405	130	29	37	2345
1989	1041	186	880	92	74	2273	615	232	213	0	-	1060	989	1299	291	80	4	2663
1990 ⁽¹⁾	541	117	2150	58	15	2881	603	267	212	0	-	1082	382	894	514	15	1	1806
1991 ⁽¹⁾	19	72	514	15	157	777	136	402	209	5	630	1382	80	837	558	23	459	1957
1992 ⁽¹⁾	13	32	215	1	131	392	395	271	279	2	943	1890	53	711	849	1	640	2254

⁽¹⁾ Data from DFO Statistics Branch.

⁽²⁾ All tonnage classes combined.

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

Year	OTB TC 0 - 3						OTB TC 4+						Scottish & Danish Seine ⁽²⁾					
	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	-	-	342
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 ⁽¹⁾	402	535	68	1701	2937	5643	16	2	0	2	-	20	1	52	3	2	-	58
1991 ⁽¹⁾	967	398	130	593	3278	5366	4	14	1	3	23	45	1	182	5	1	14	203
1992 ⁽¹⁾	410	675	107	556	3643	5391	1	8	1	5	10	25	0	139	1	0	12	152

⁽¹⁾ Data from DFO Statistics Branch.

⁽²⁾ All tonnage classes combined.

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

Year	4VW											4X												
	LL, LHP ⁽²⁾						GN AND OTHER ⁽²⁾					LL, LHP ⁽²⁾						GN AND OTHER ⁽²⁾						
	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	Plaice	Witch Flounder	Yellow Tail	Winter Flounder	Unspec. Flounder	Total
1970	245	3	2	-	-	250	39	9	-	-	-	48	27	-	9	23	-	59	4	23	2	14	-	43
1971	443	-	3	4	-	450	52	2	-	2	-	56	32	10	8	33	-	83	9	2	-	60	-	71
1972	484	1	5	-	-	490	81	4	-	3	-	88	26	-	6	39	-	71	29	13	2	27	-	71
1973	402	-	4	2	-	408	76	28	-	32	-	136	33	-	16	37	-	86	17	-	1	33	-	51
1974	335	2	2	1	-	340	185	51	-	11	3	250	63	1	30	1	-	95	8	9	3	43	-	63
1975	342	19	1	2	-	364	338	74	37	20	-	469	41	22	48	12	1	124	5	-	-	40	3	48
1976	204	31	-	18	-	253	103	38	-	17	-	158	32	-	24	23	21	100	8	1	-	17	2	28
1977	333	93	1	-	-	427	90	18	-	71	2	181	22	8	13	40	2	85	29	1	75	99	1	205
1978	348	21	7	13	-	389	312	30	79	11	-	432	51	3	11	37	4	106	67	1	105	53	-	226
1979	392	46	6	30	49	523	75	12	1	2	2	92	74	2	37	40	13	166	61	2	6	73	-	142
1980	454	33	5	6	-	498	31	10	6	1	-	48	38	4	11	46	44	143	72	2	27	136	7	244
1981	734	19	9	-	17	779	17	-	1	-	-	18	75	16	4	57	8	160	15	30	45	62	1	153
1982	1022	6	5	2	-	1035	11	-	-	-	-	11	41	51	9	33	2	136	21	38	-	58	61	178
1983	955	10	10	-	2	977	18	3	-	-	-	21	69	15	22	16	-	122	70	45	67	88	20	290
1984	720	7	27	-	1	755	15	13	-	1	-	29	24	2	11	40	1	78	11	17	14	106	45	193
1985	739	31	79	1	-	850	18	3	-	1	3	25	20	9	3	13	1	46	7	18	6	76	1	108
1986	800	27	133	-	1	961	88	18	12	1	1	120	44	10	11	4	2	71	28	15	13	92	-	148
1987	1025	39	230	-	8	1302	111	33	209	3	1	357	13	22	23	68	-	126	20	-	-	77	1	98
1988	754	44	270	6	5	1079	125	38	200	2	4	369	24	5	2	16	-	47	15	14	-	98	17	144
1989	696	6	49	14	4	769	35	40	24	1	-	100	9	0	2	31	6	48	19	12	5	57	17	110
1990 ⁽¹⁾	303	4	39	1	1	348	19	14	14	4	3	54	13	1	2	40	-	56	31	46	5	134	6	222
1991 ⁽¹⁾	1	3	41	0	126	171	1	10	8	1	42	62	7	0	2	0	4	13	0	8	5	4	123	140
1992 ⁽¹⁾	0	4	29	0	133	166	2	5	1	1	29	38	-	0	9	-	128	137	2	2	1	3	147	155

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

Table 6. Management table for 4VWX flatfish ⁽¹⁾ 1992 (Allocations and Catch).

Year	Fleet	Allocations (t)	(Quota Reports) Reported catch (t)	Percent Taken (%)
1992	Fixed Gear <45'	790	40	5
	Fixed Gear 45-65'	135	2	1
	Mobile Gear <45'	3330	2320	70
	Mobile Gear 45-65'	2395	779	33
	Mobile Gear 65-100'	257	45	17
	All vessels >100'	7093	2009	28

⁽¹⁾ Only plaice, yellowtail and witch flounder are under quota management - winter and unspecified flounder catch is not reported against the quota, except for <45' mobile vessels in 4VW.

Table 7. Mean numbers/tow and standard errors for 4VW and 4X flatfish for 1970 - 1992.

(Summer Survey)

Year	Mean #/Tow								Standard Error							
	4VW				4X				4VW				4X			
	Plaice	Yellow-tail Flounder	Witch Flounder	Winter* Flounder	Plaice	Yellow-tail Flounder	Witch Flounder	Winter Flounder	Plaice	Yellow-tail Flounder	Witch Flounder	Winter* Flounder	Plaice	Yellow-tail Flounder	Witch Flounder	Winter Flounder
1970	50.18	32.10	4.91	0.54	13.07	.40	2.10	.31	6.69	9.69	0.82	1.03	10.68	.20	.75	.09
1971	47.55	27.01	6.06	1.3	6.44	.56	.92	.29	16.68	7.36	1.99	0.6	2.72	.29	.41	.16
1972	42.33	28.43	3.04	3.18	5.66	1.64	3.20	.24	8.18	5.37	0.87	2.54	1.94	.95	.86	.04
1973	36.43	29.29	8.79	1.42	5.02	.26	4.88	.54	6.69	7.80	4.08	1.13	1.28	.07	1.52	.24
1974	71.42	42.51	19.27	0.98	13.47	.35	3.42	1.04	11.44	10.35	12.60	0.67	3.19	.18	1.13	.67
1975	53.07	48.17	5.33	1.15	4.51	.43	1.97	.60	10.61	18.55	1.47	0.6	1.00	.11	.33	.14
1976	59.05	34.24	3.28	0.34	1.80	1.54	1.14	.68	21.51	7.43	0.80	0.18	.39	1.32	.28	.19
1977	34.72	79.06	3.55	0.68	1.94	.45	4.47	1.34	6.83	32.66	0.68	0.22	.49	.09	2.45	.54
1978	38.22	19.88	3.15	0.2	5.21	.44	2.37	.32	9.04	5.81	0.84	0.12	.85	.19	.56	.15
1979	57.65	29.94	1.64	0.18	3.72	2.05	.95	3.91	6.80	6.07	0.48	0.14	.90	.69	.31	2.15
1980	57.49	20.09	3.44	0.55	6.13	1.74	1.40	2.06	21.40	3.91	1.25	0.28	1.70	1.10	.25	.79
1981	50.69	29.86	3.78	0.29	4.46	1.48	3.60	3.35	10.93	4.45	0.81	0.09	1.13	.73	1.32	1.12
1982	49.29	40.24	3.44	0.85	8.15	1.61	3.63	4.32	7.57	13.64	0.56	0.42	2.31	.56	1.48	2.07
1983	49.03	18.05	3.91	0.2	6.01	.15	2.28	2.69	11.39	2.64	1.26	0.09	.81	.07	.70	1.93
1984	52.25	21.85	2.69	2.33	8.57	.93	4.87	4.01	11.98	4.50	0.84	1.03	2.27	.28	1.20	1.34
1985	41.36	22.79	4.56	2.31	4.62	.27	1.40	1.88	9.44	3.24	1.30	0.94	1.55	.17	.35	.49
1986	36.28	18.47	5.68	1.63	7.63	1.32	2.55	3.42	6.46	3.52	1.39	0.67	2.72	.54	.83	1.03
1987	32.83	24.88	2.28	2	7.67	.67	1.10	5.60	5.81	8.80	0.40	0.86	1.55	.35	.23	1.48
1988	28.32	18.21	2.96	1.67	11.31	2.77	1.60	7.08	4.69	1.92	0.44	0.58	4.07	1.61	.56	2.05
1989	37.73	22.22	6.08	2.13	8.37	1.28	1.70	6.57	10.96	3.07	2.16	0.73	1.81	.75	.57	1.47
1990	43.61	33.42	2.03	4.69	2.87	.66	.77	8.98	8.20	7.09	0.41	1.38	.73	.21	.30	4.76
1991	51.21	39.28	3.27	7.59	8.08	2.16	1.94	6.07	7.65	11.71	0.65	2.39	3.59	1.08	1.01	1.63
1992	29.97	31.31	2.97	1.74	9.33	1.77	.61	10.29	3.23	6.67	.77	.48	3.29	.72	.20	2.15

* No 4V data

TOTAL CATCH BY SPECIES

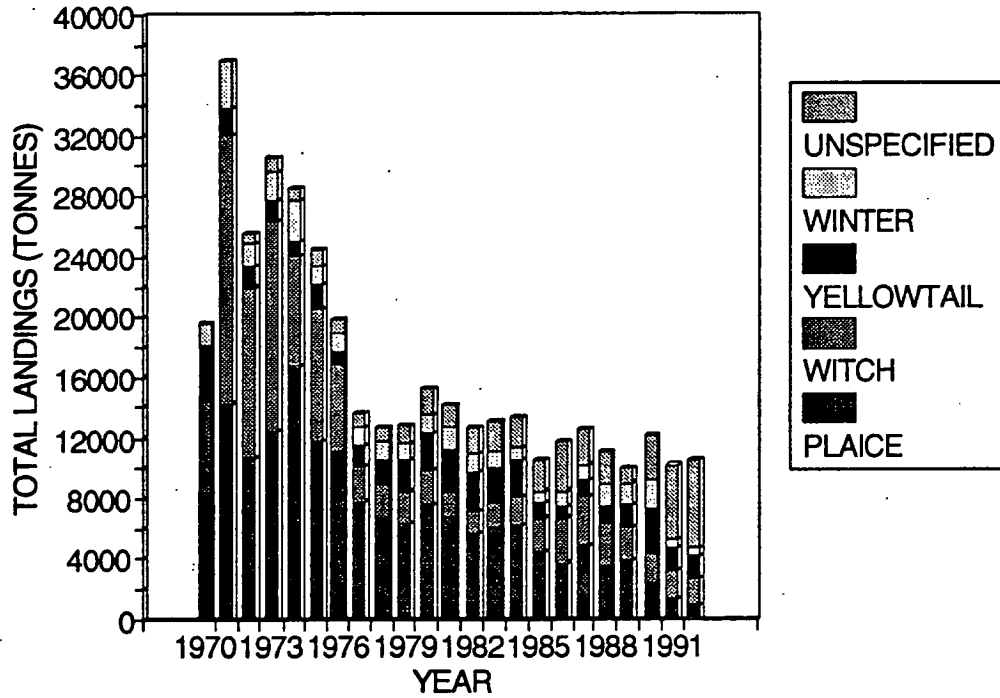


Figure 1. Total catch of flatfish by species.

PLAICE WITCH AND YELLOWTAIL LANDINGS (COMBINED CATCH)

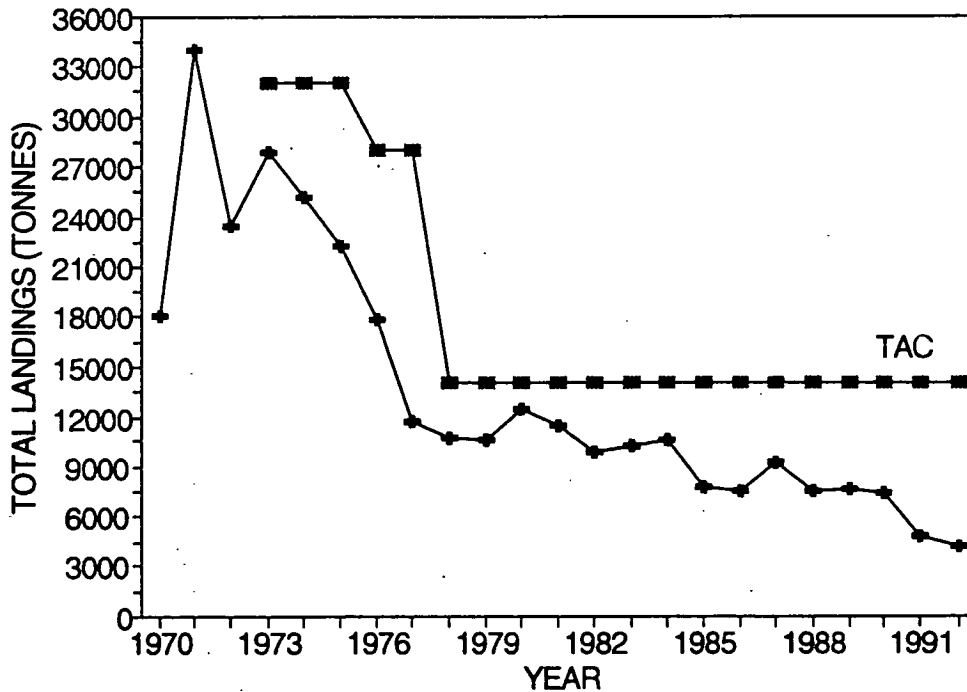


Figure 2. Combined catch of quota species (plaice,witch and yellowtail).

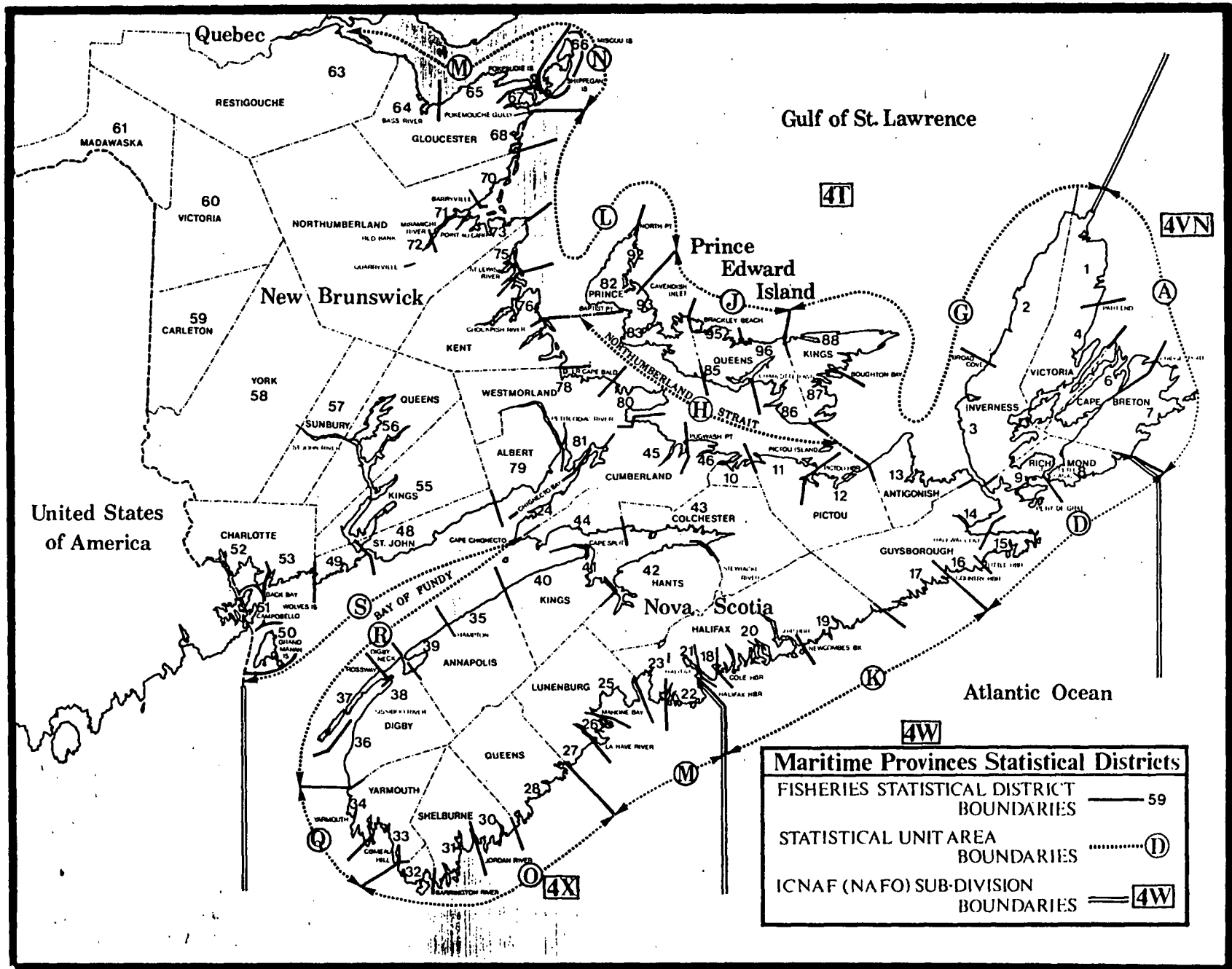
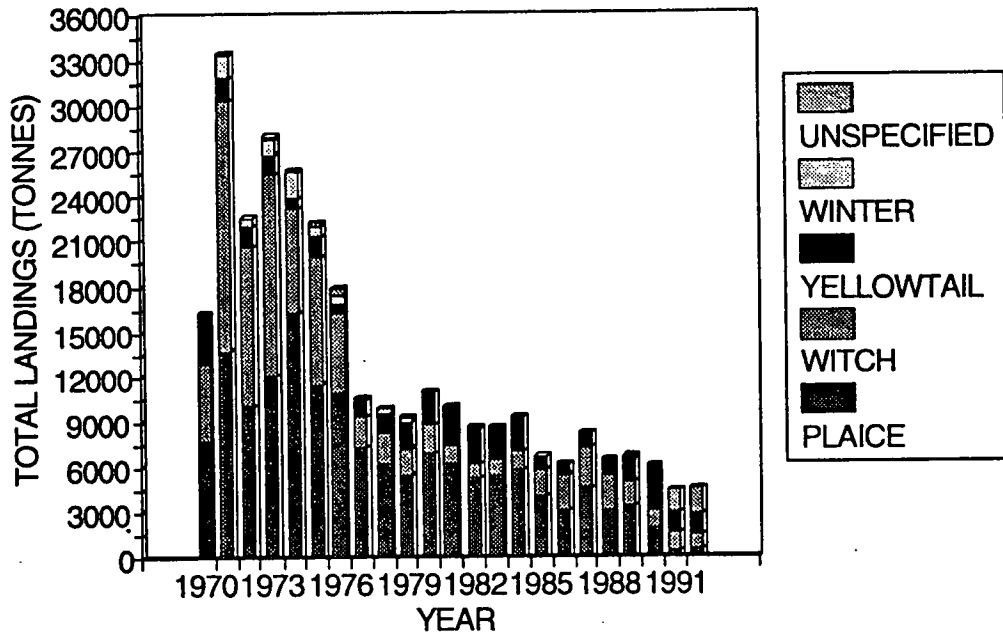


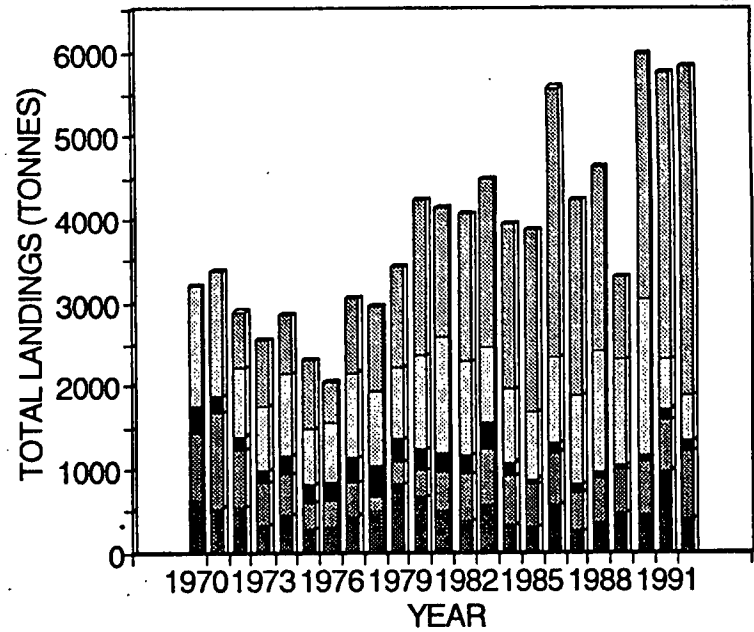
Figure 3. Statistical district map.

Figure 4. Flatfish landings by species and combined for 4VW and 4X.

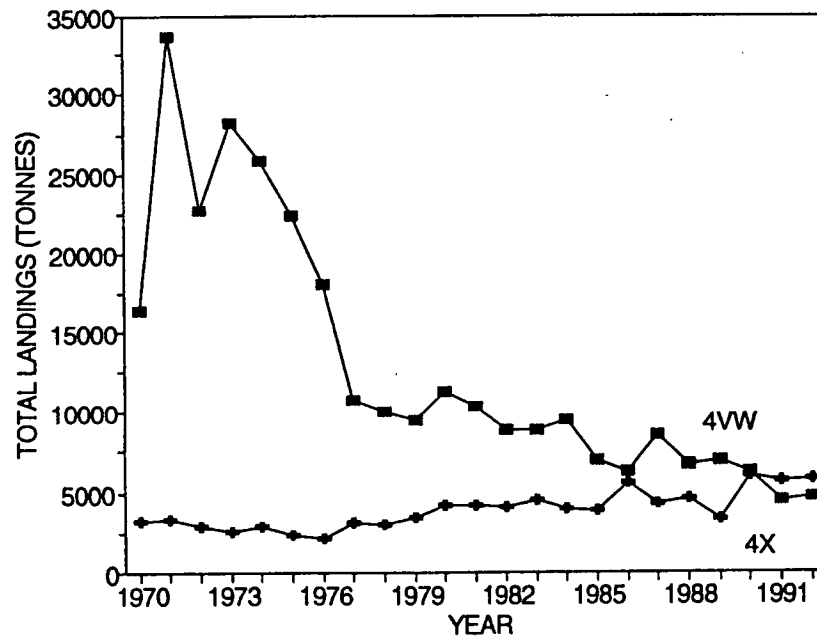
TOTAL FLATFISH LANDINGS BY SPECIES AND AREA 4VW



TOTAL FLATFISH LANDINGS BY SPECIES AND AREA 4X



TOTAL FLATFISH LANDINGS FOR 4VW AND 4X



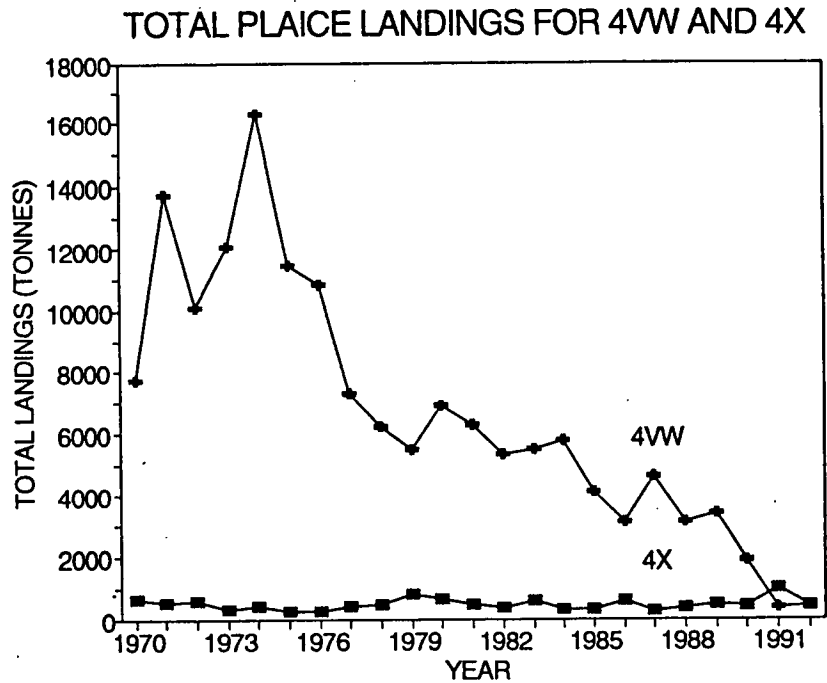


Figure 5. Total plaice landings by area.

PLAICE LANDINGS BY GEAR FOR 4VW

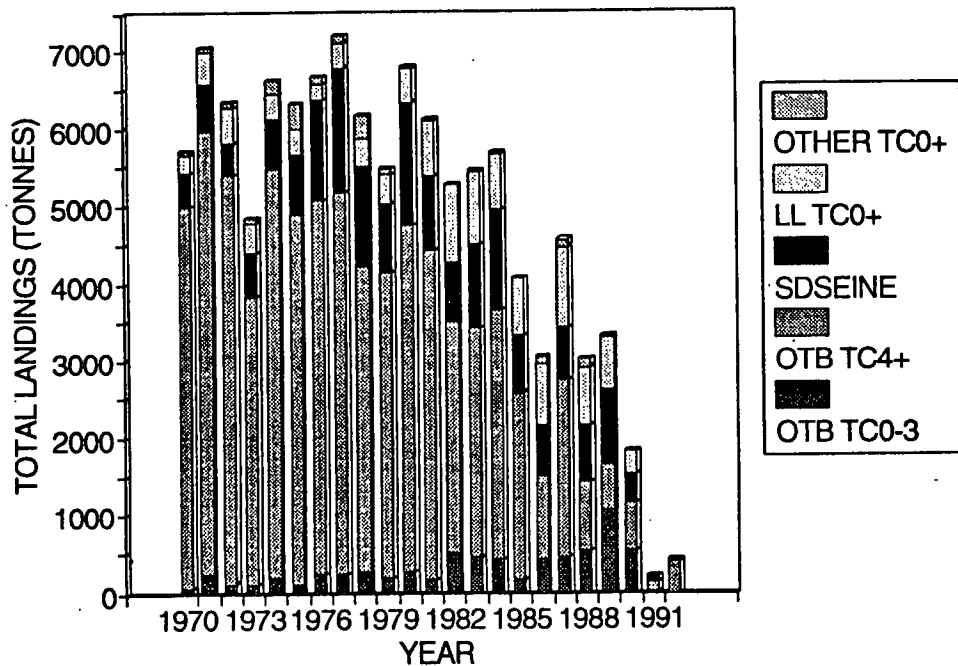


Figure 6a. Total plaice landings by gear for 4VW.

PLAICE LANDINGS BY GEAR FOR 4X

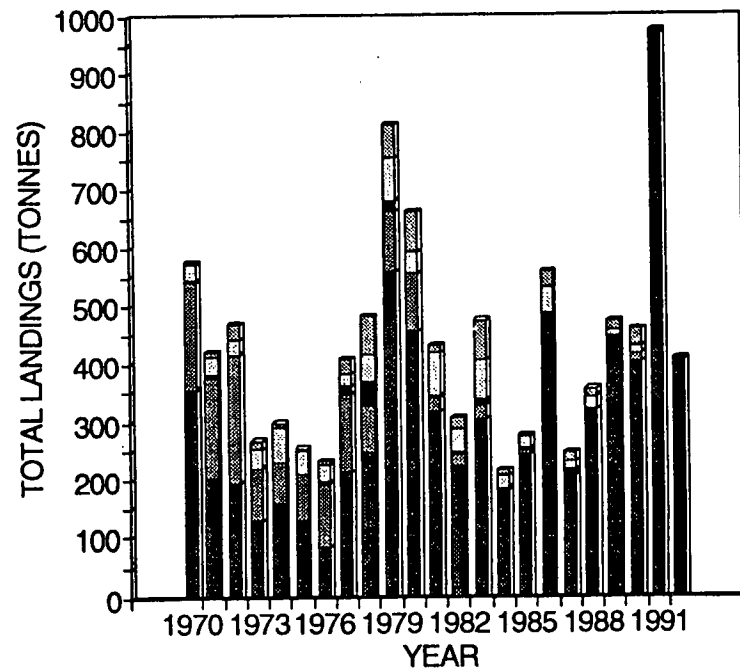


Figure 6b. Total plaice landings by gear for 4X.

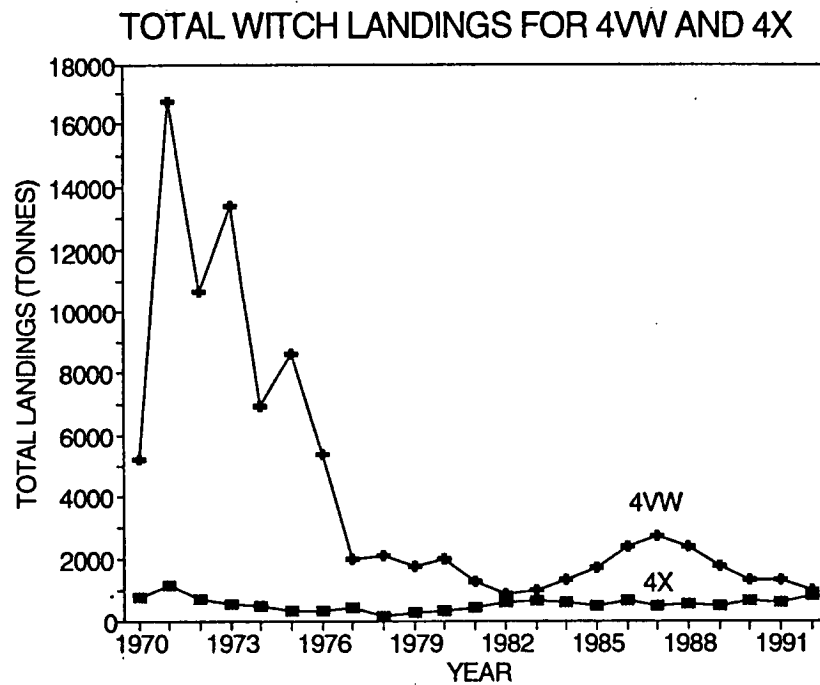


Figure 7. Total witch landings by area.

WITCH LANDINGS BY GEAR FOR 4VW

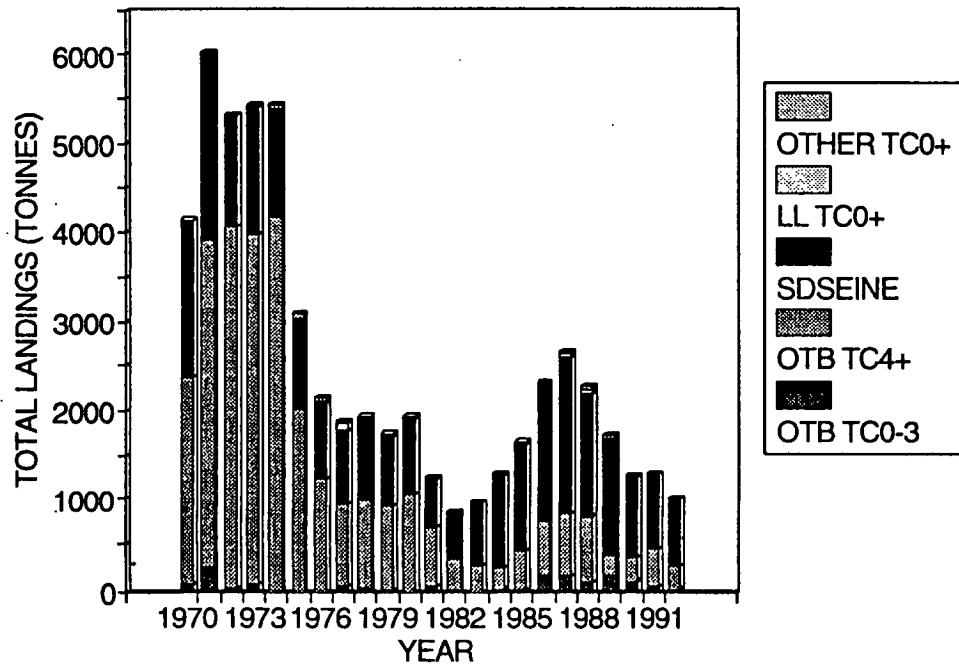


Figure 8a. Total witch landings by gear for 4VW.

WITCH LANDINGS BY GEAR FOR 4X

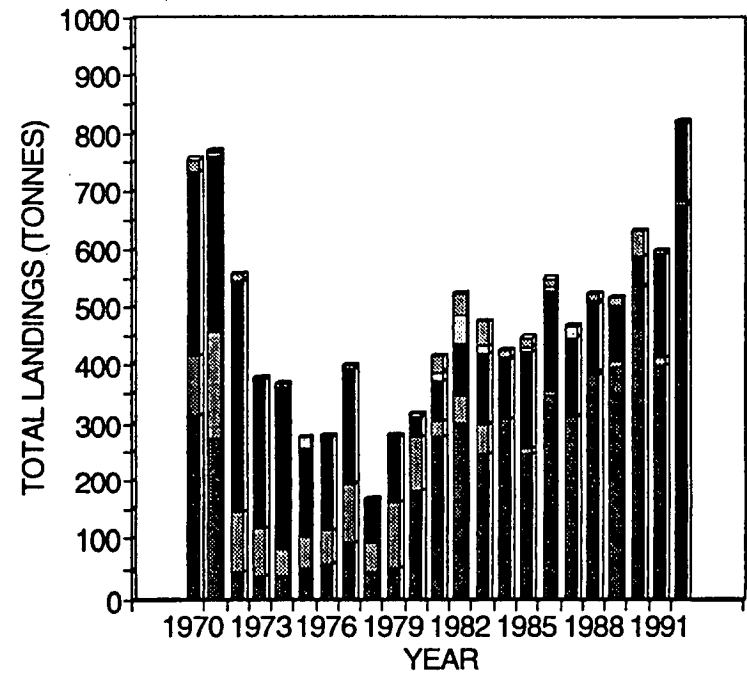


Figure 8b. Total witch landings by gear for 4X.

TOTAL YELLOWTAIL LANDINGS FOR 4VW AND 4X

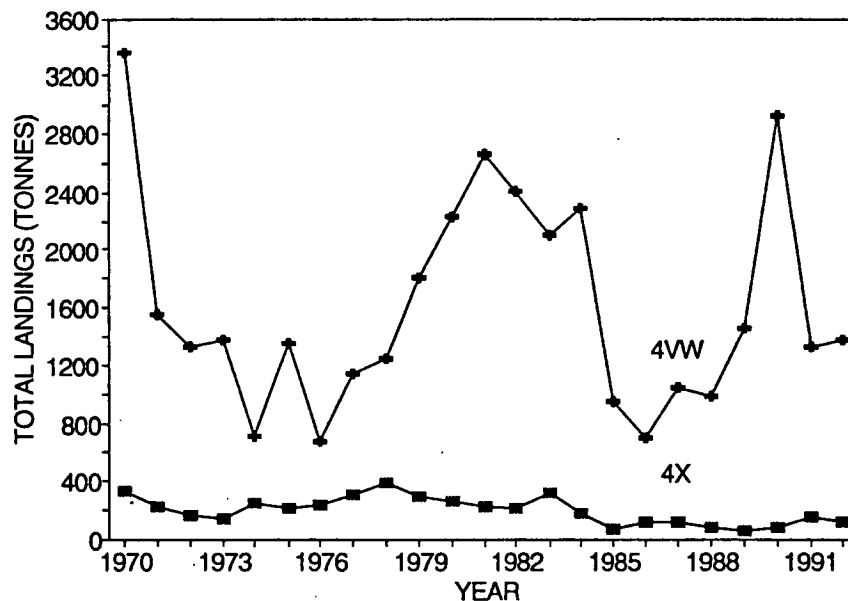


Figure 9. Total yellowtail landings by area.

YELLOWTAIL LANDINGS BY GEAR FOR 4VW

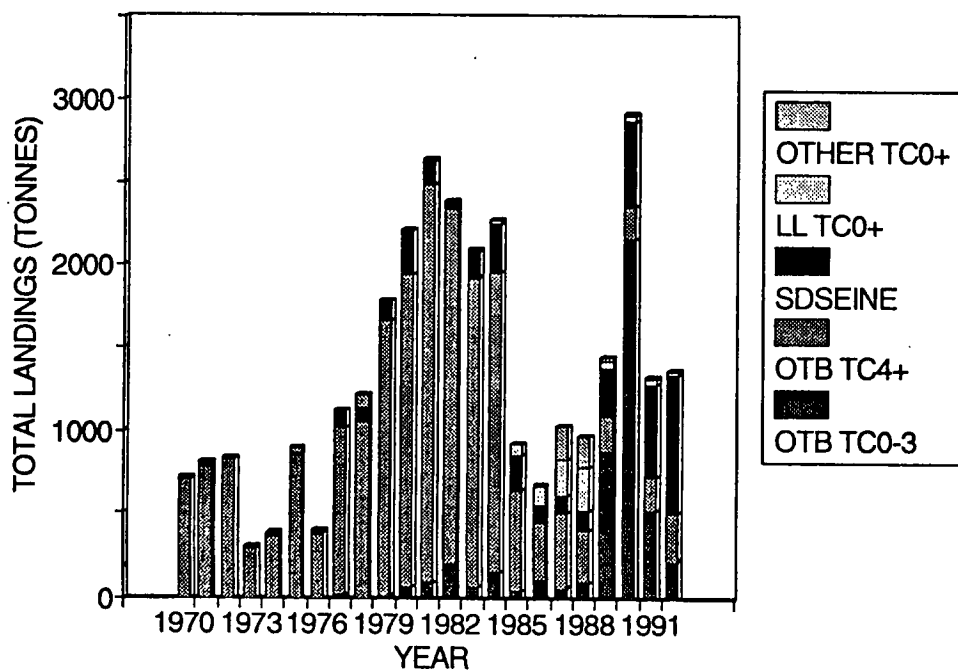


Figure 10a. Total yellowtail landings by gear for 4VW.

YELLOWTAIL LANDINGS BY GEAR FOR 4X

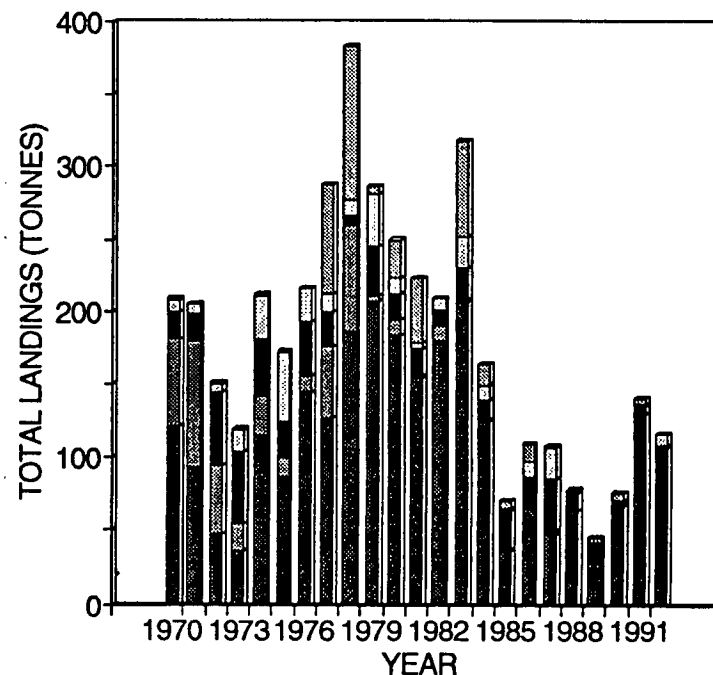


Figure 10b. Total yellowtail landings by gear for 4X.

TOTAL WINTER FLOUNDER LANDINGS
FOR 4VW AND 4X

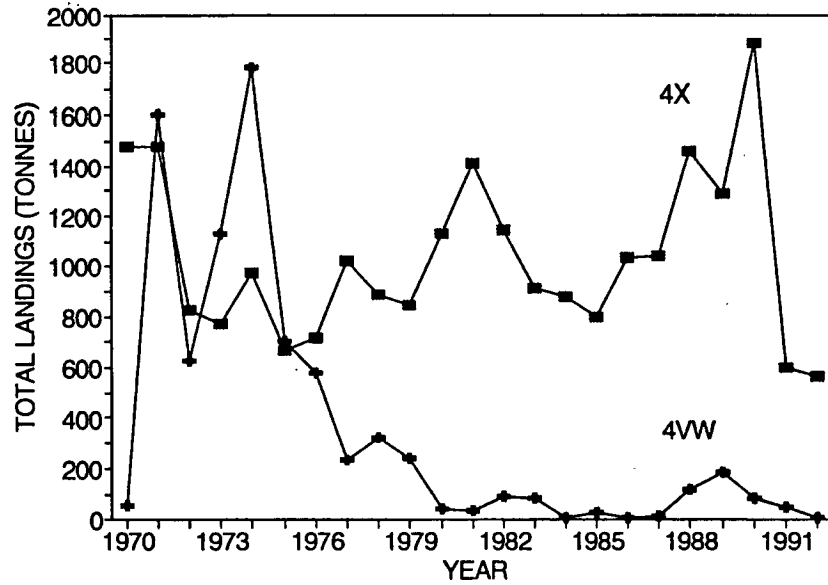


Figure 11. Total winter flounder landings by area.

WINTER FLOUNDER
LANDINGS BY GEAR FOR 4VW

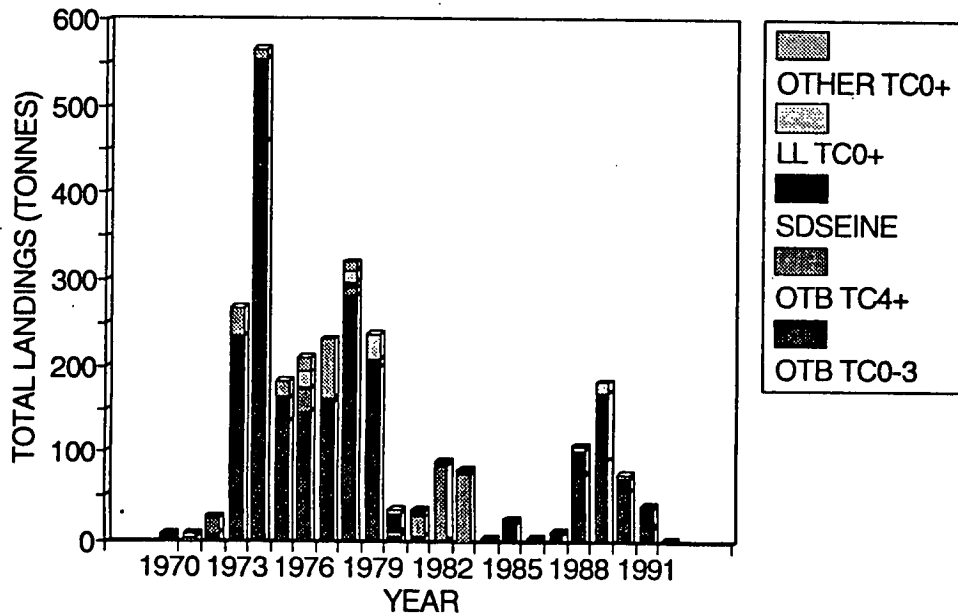


Figure 12a. Total winter flounder landings by gear for 4VW.

WINTER FLOUNDER
LANDINGS BY GEAR FOR 4X

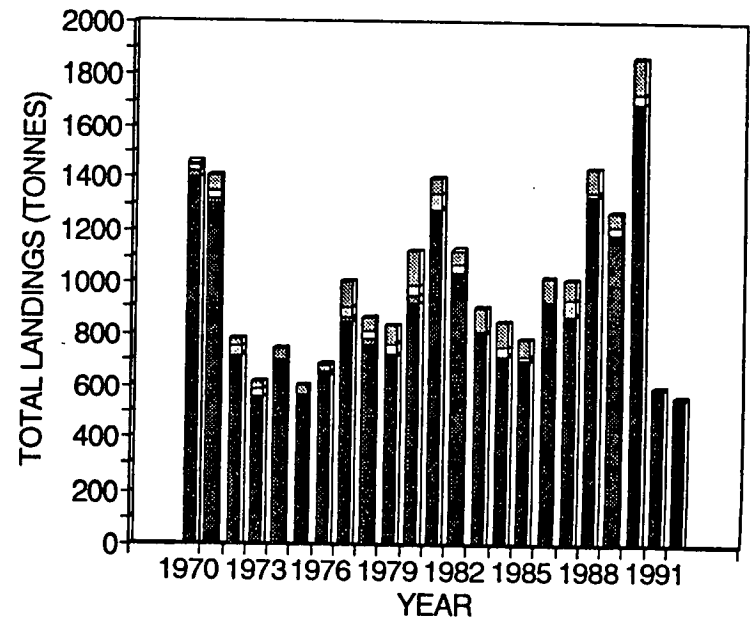


Figure 12b. Total winter flounder landings by gear for 4V

TOTAL UNSPECIFIED FLOUNDER LANDINGS FOR 4VW AND 4X

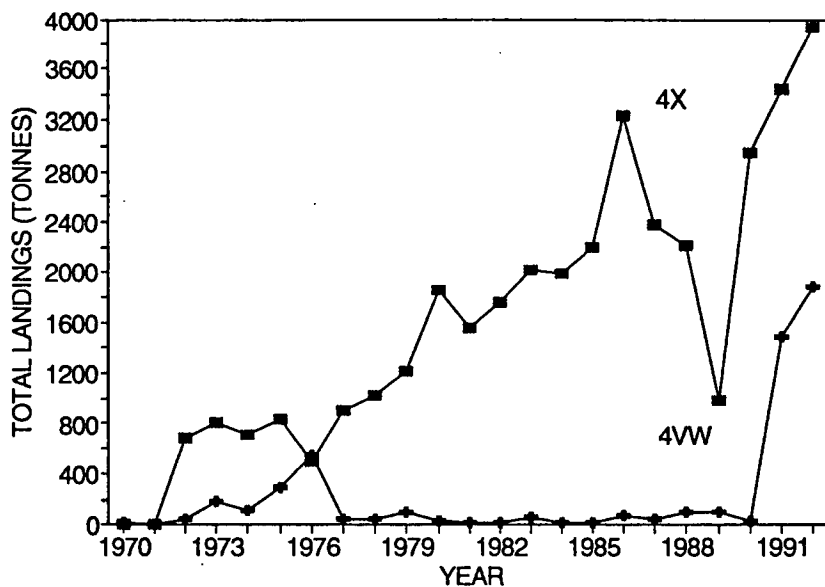
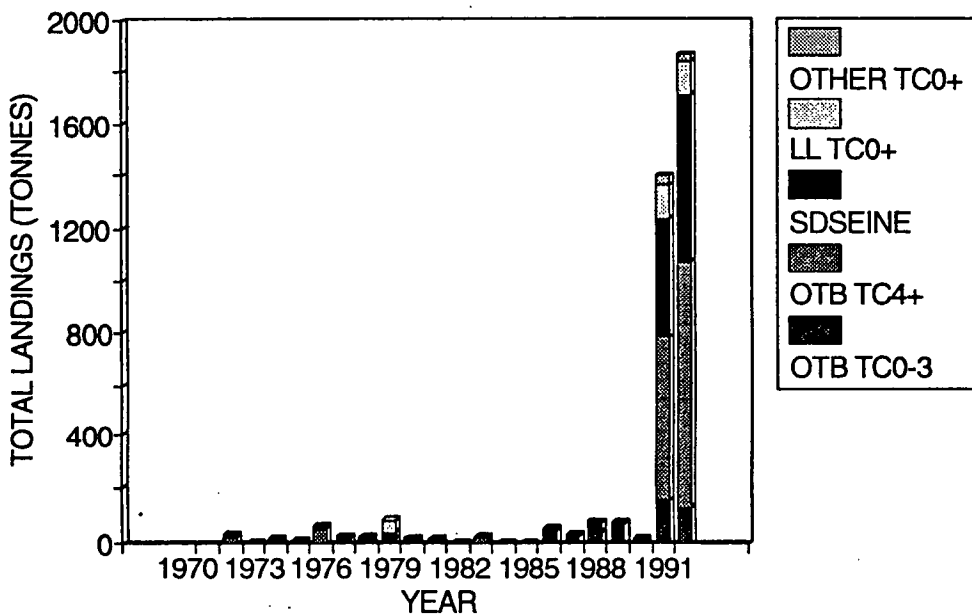


Figure 13. Total unspecified flounder landings by area.

UNSPECIFIED FLOUNDER LANDINGS BY GEAR FOR 4VW



UNSPECIFIED FLOUNDER LANDINGS BY GEAR FOR 4X

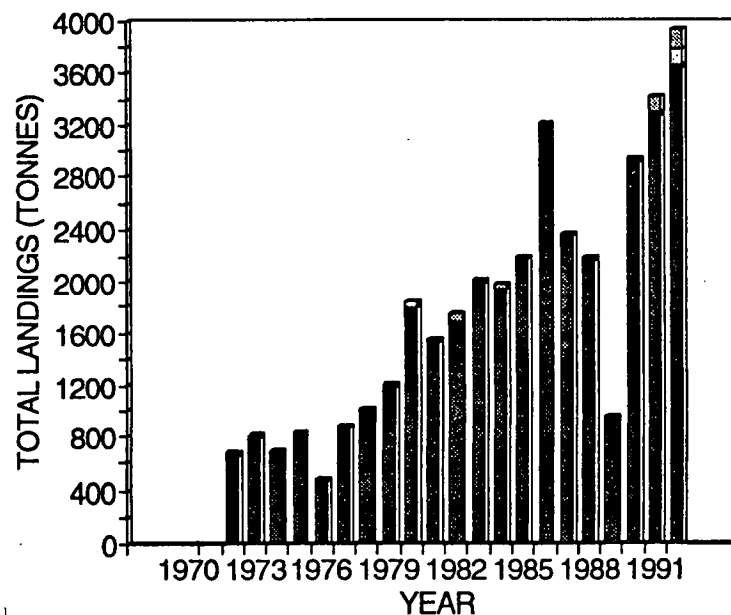


Figure 14a. Total unspecified flounder landings by gear for 4VW.

Figure 14b. Total unspecified flounder landings by gear for 4X.

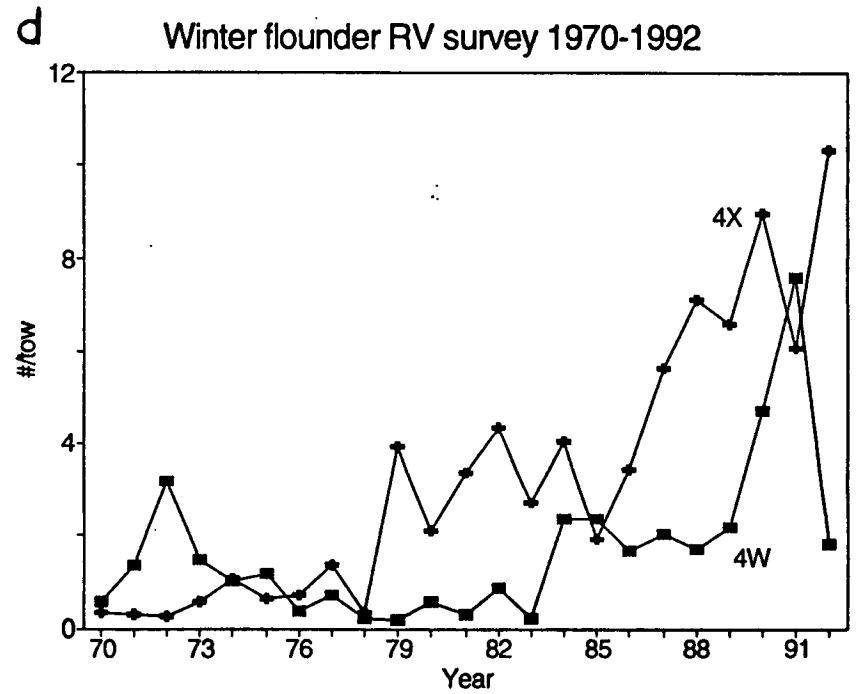
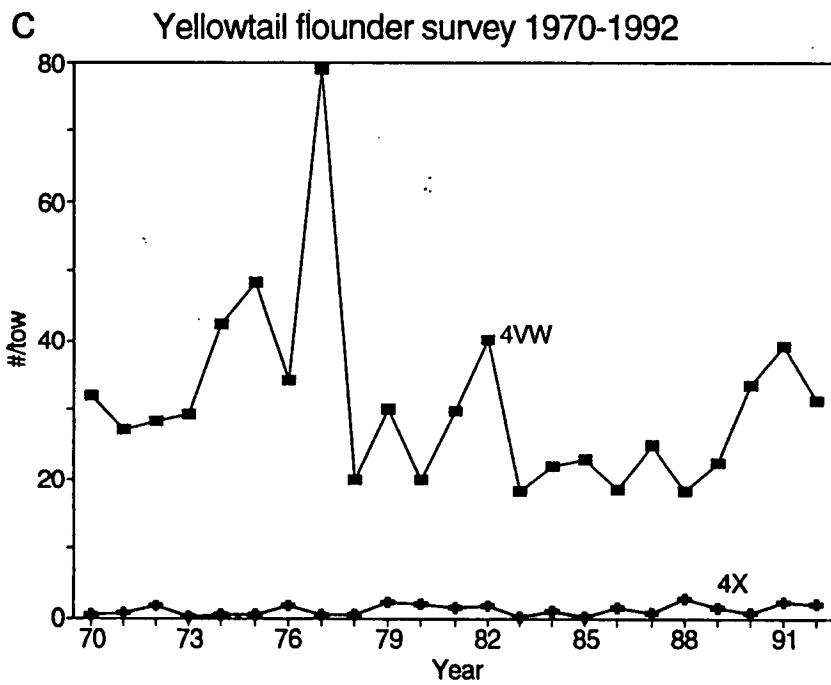
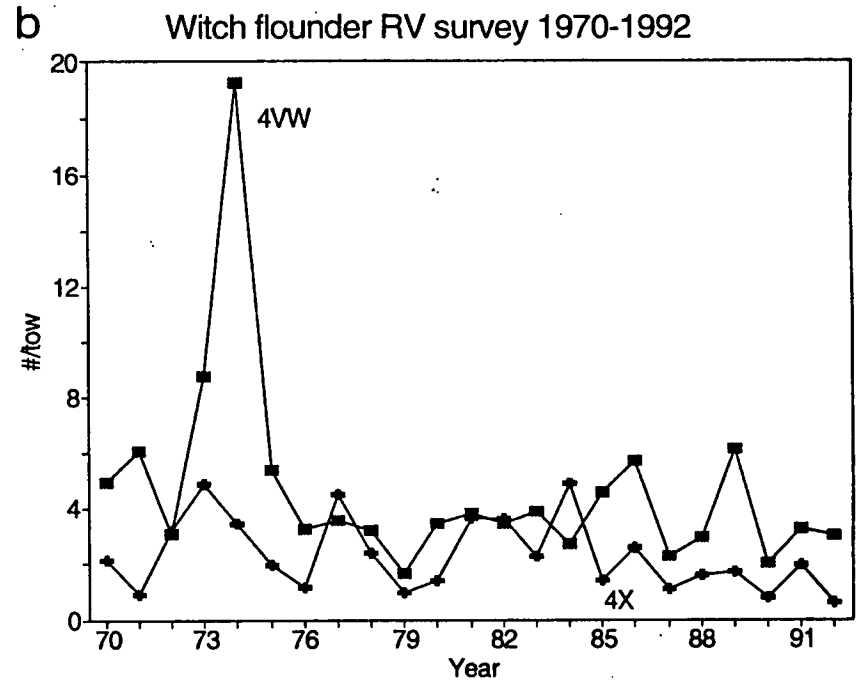
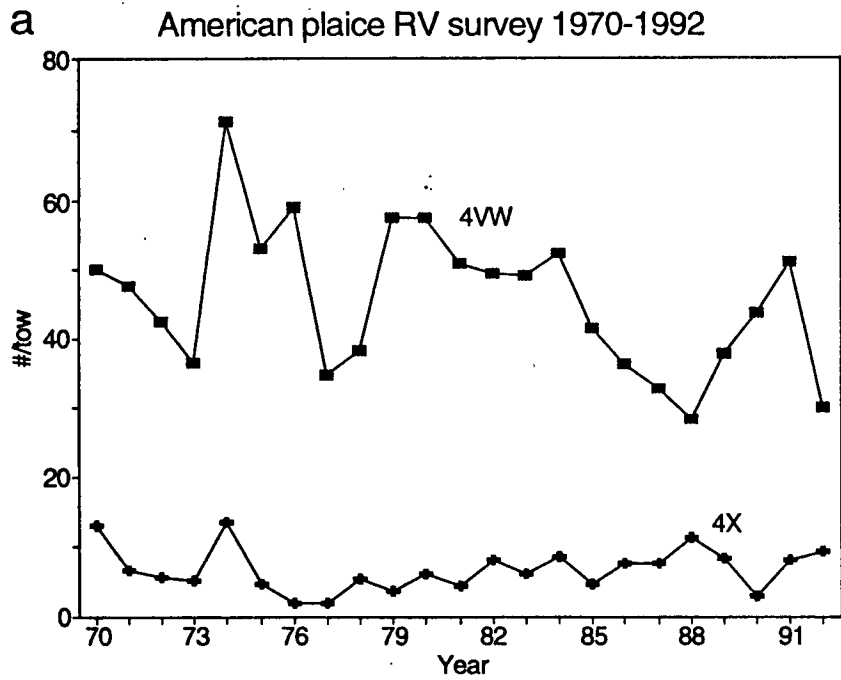


Figure 15. (a,b,c,d) Flatfish survey numbers from summer research surveys

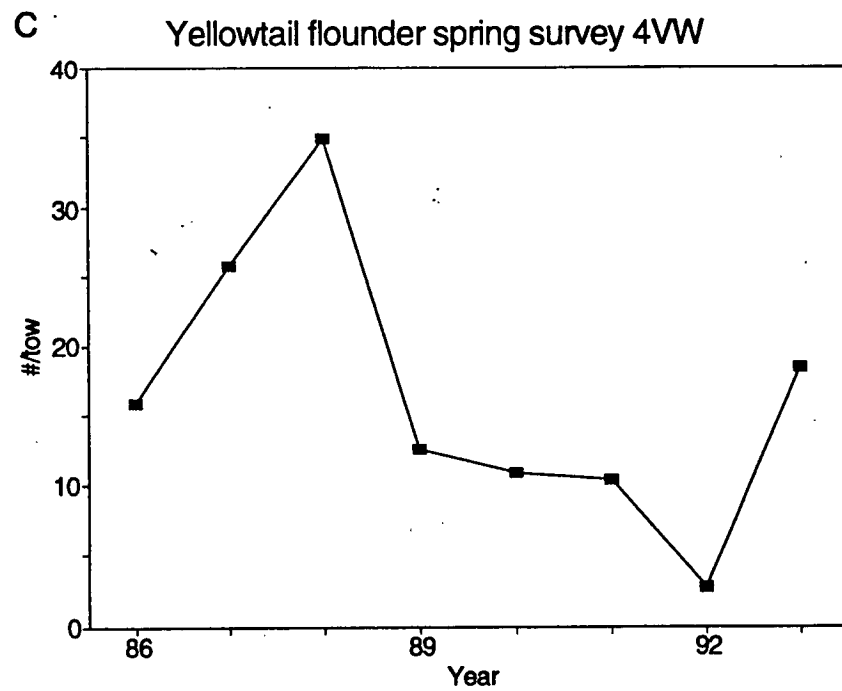
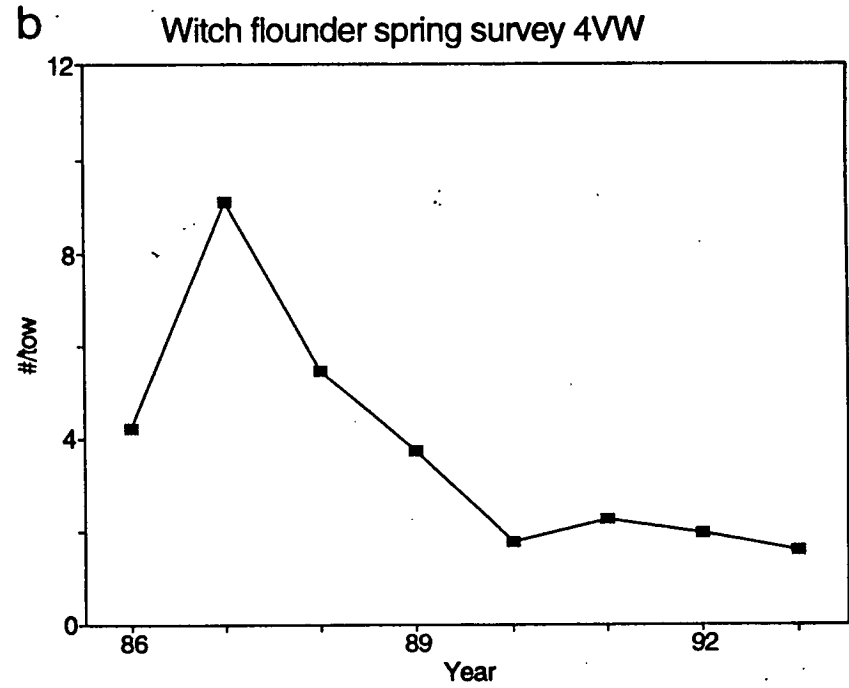
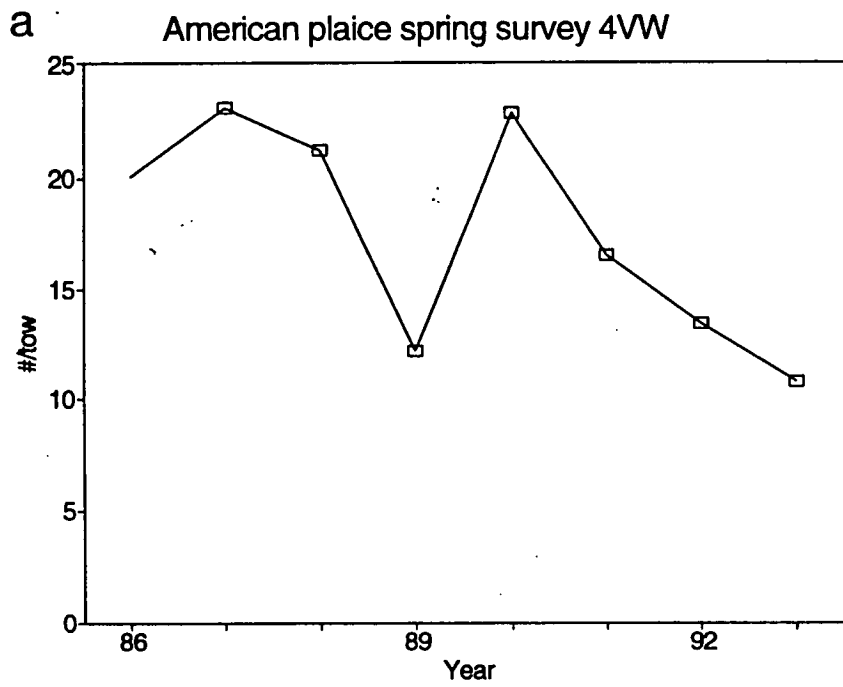
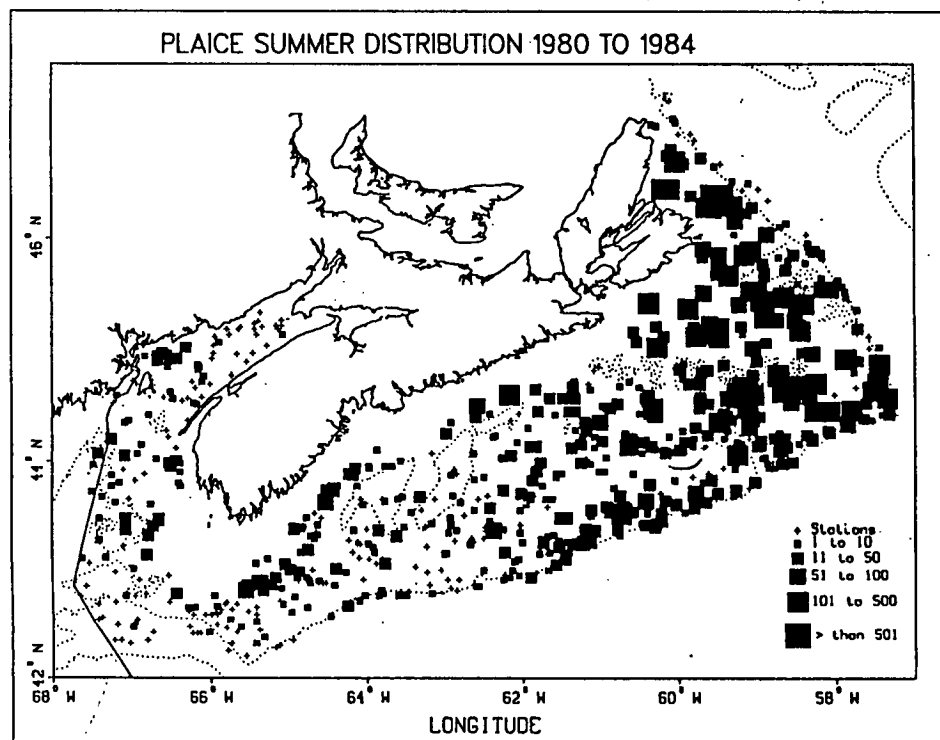
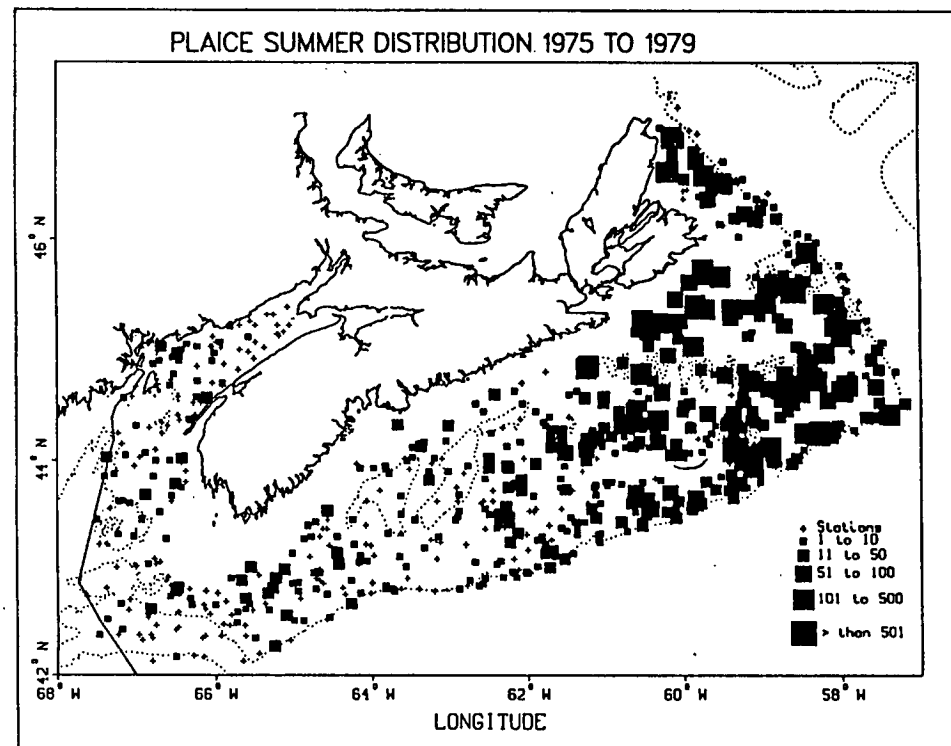
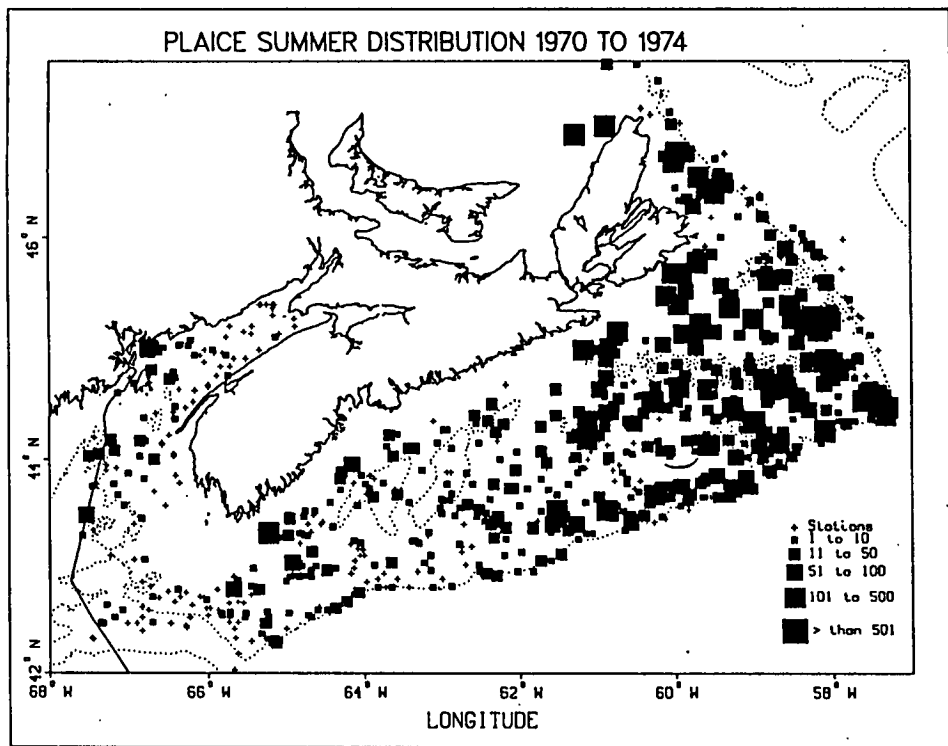


Figure 16.(a,b,c). Flatfish survey numbers from spring 4VSW research surveys.

Figure 17. Summer RV survey catches (#s/tow) 1970 - 1992.



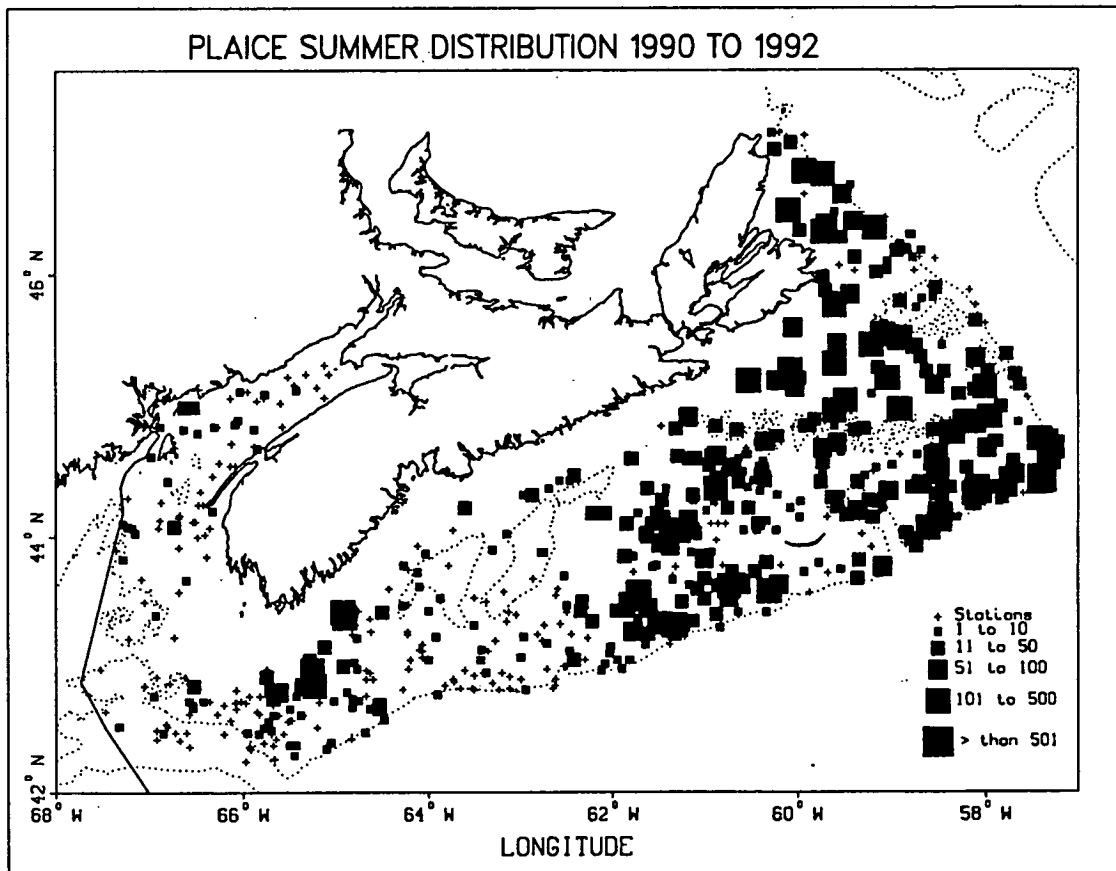
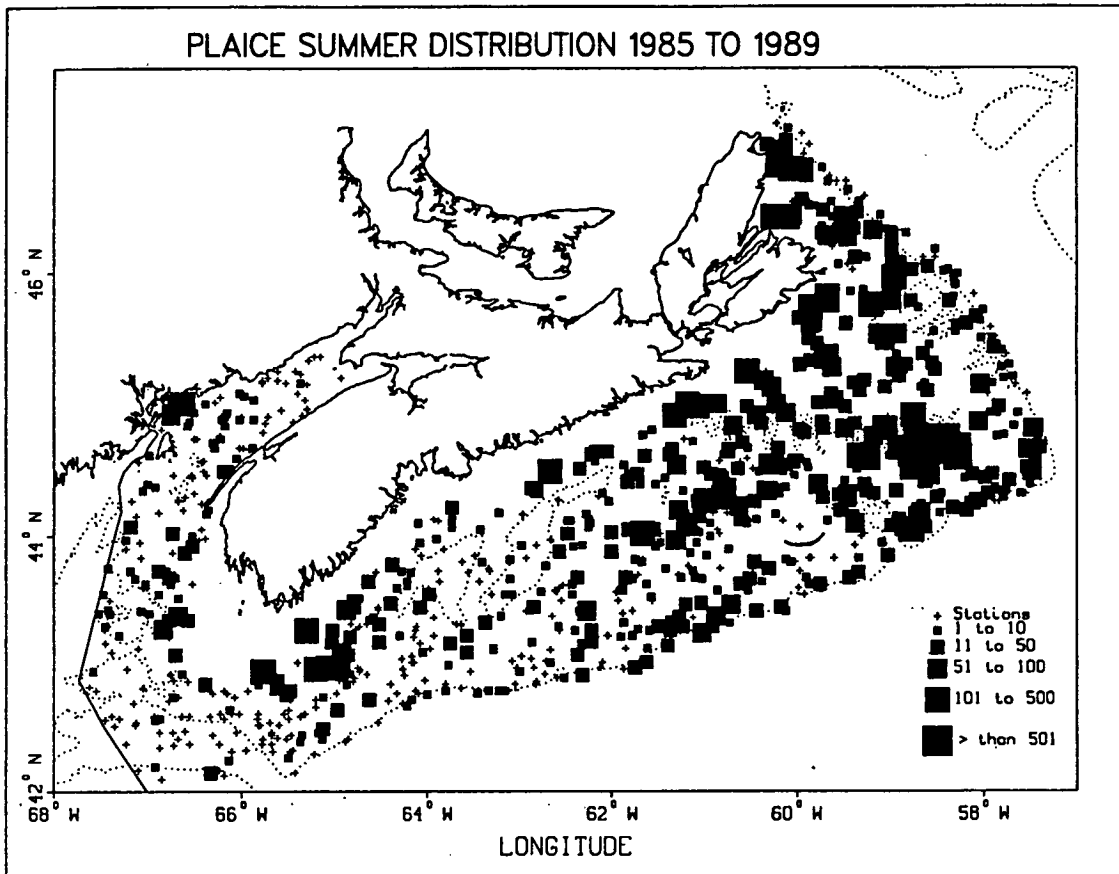


Figure 17. (continued)

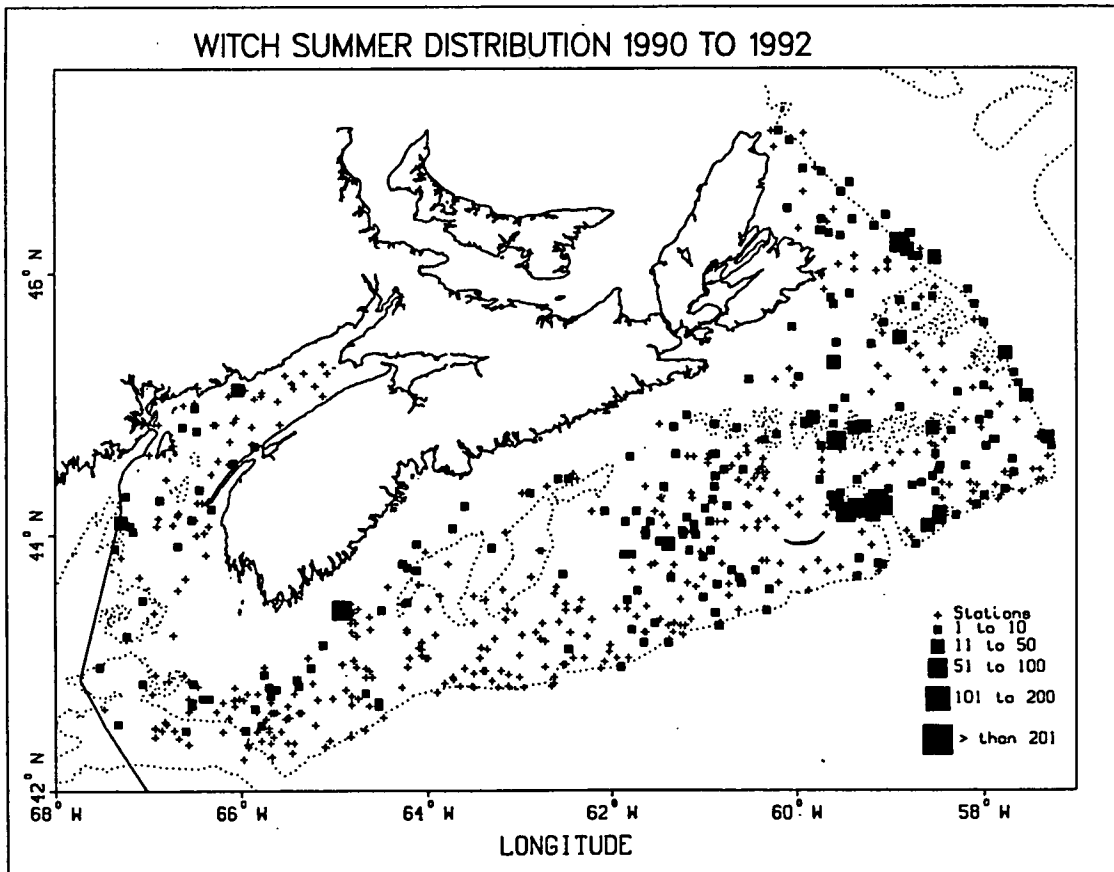
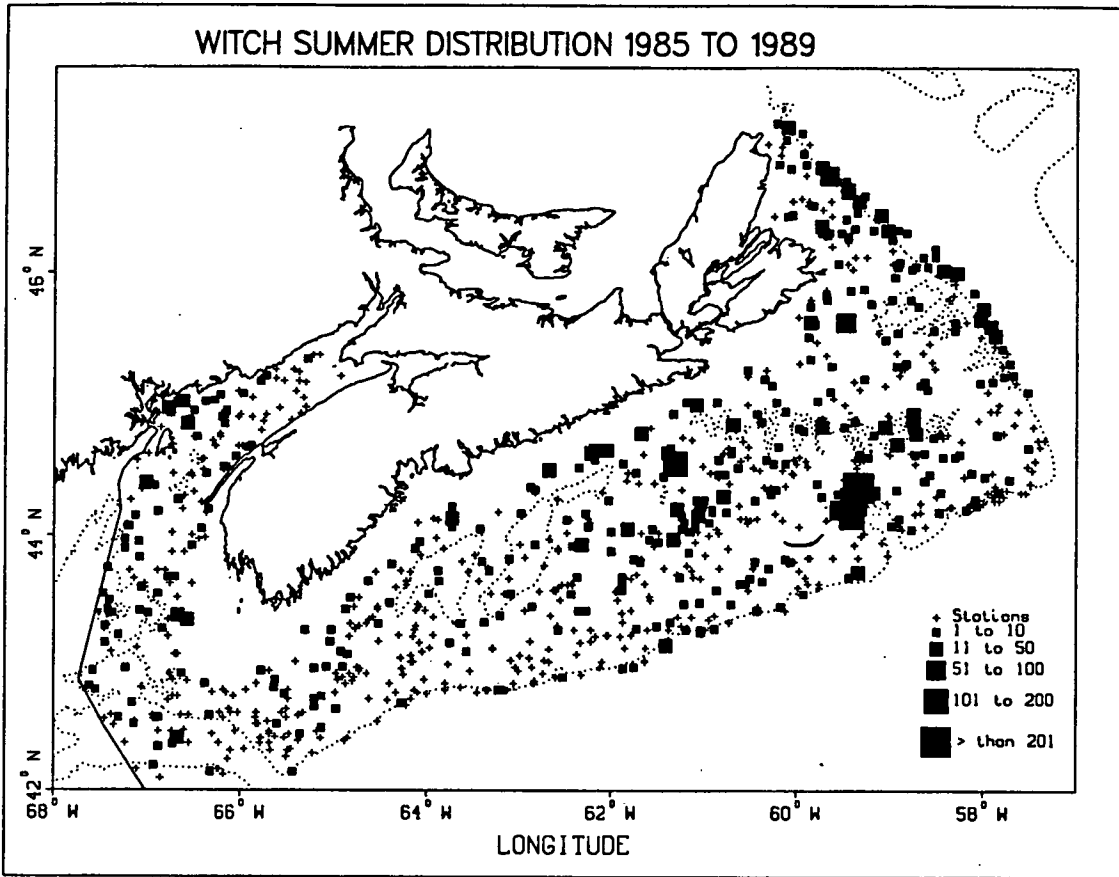


Figure 17. (continued)

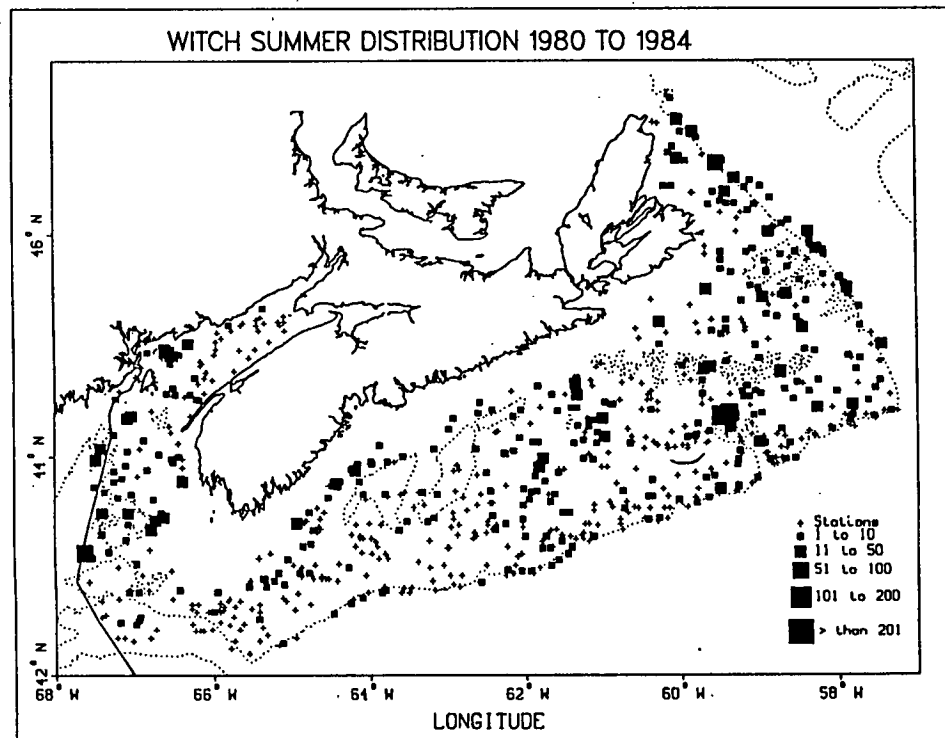
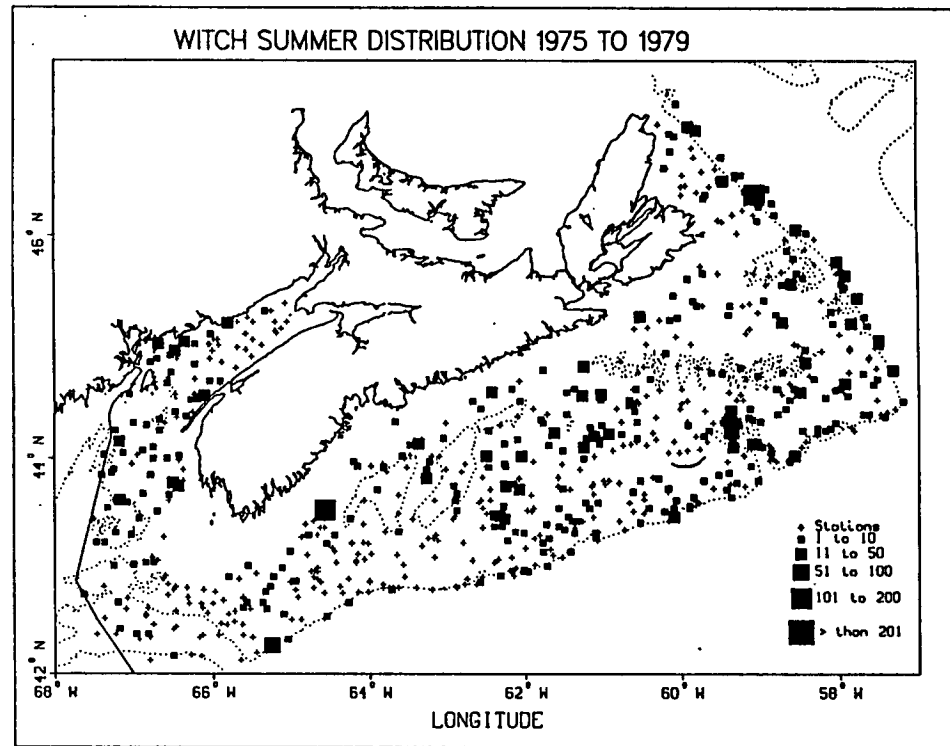
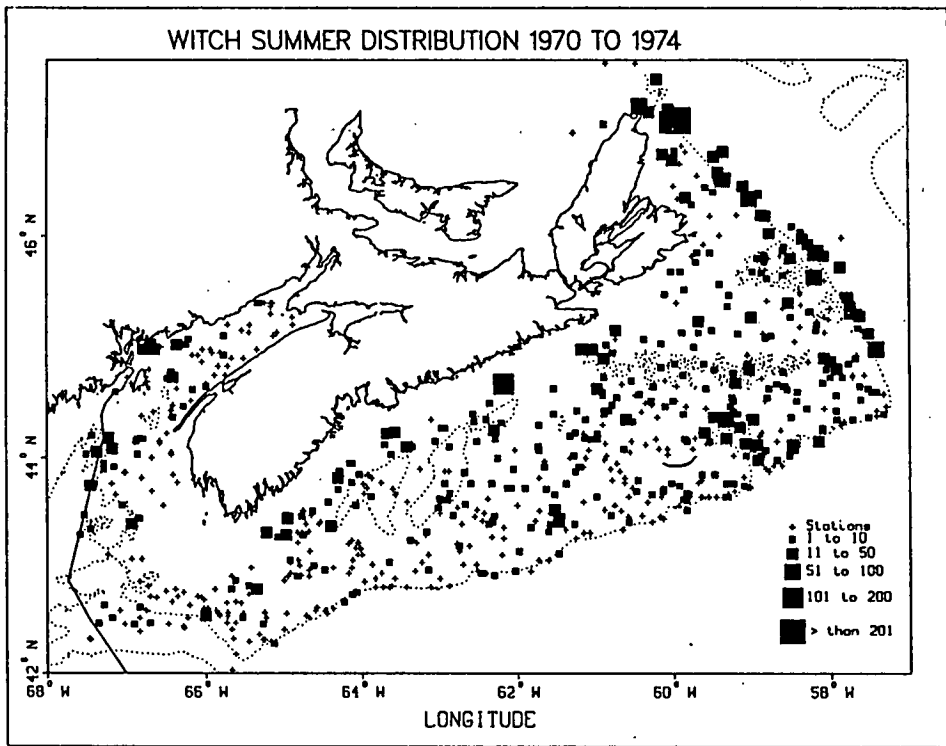


Figure 17.(continued)

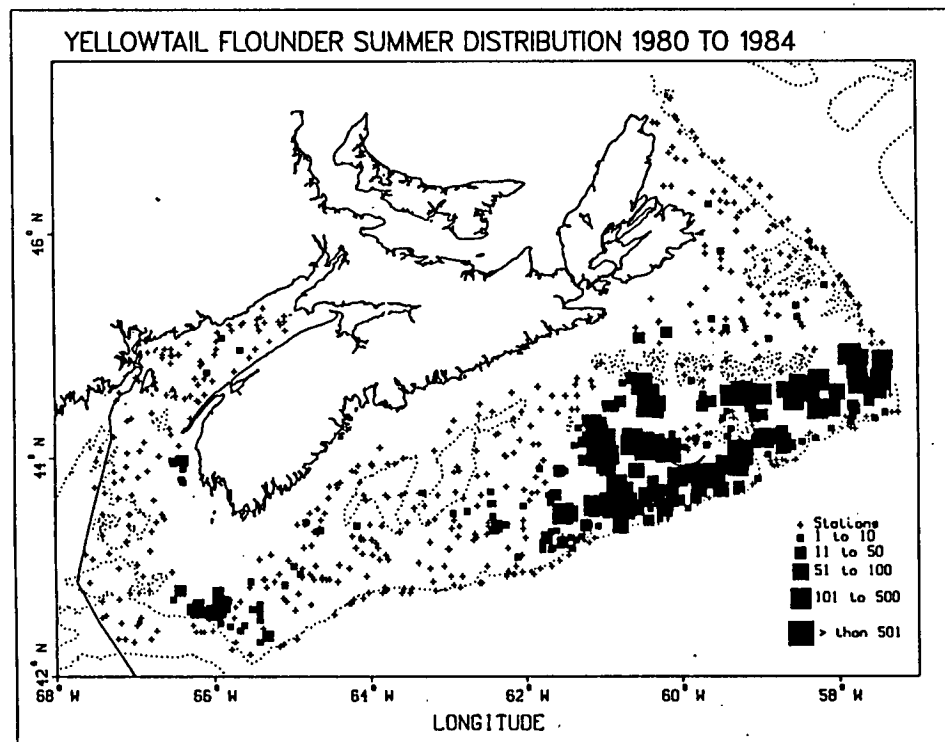
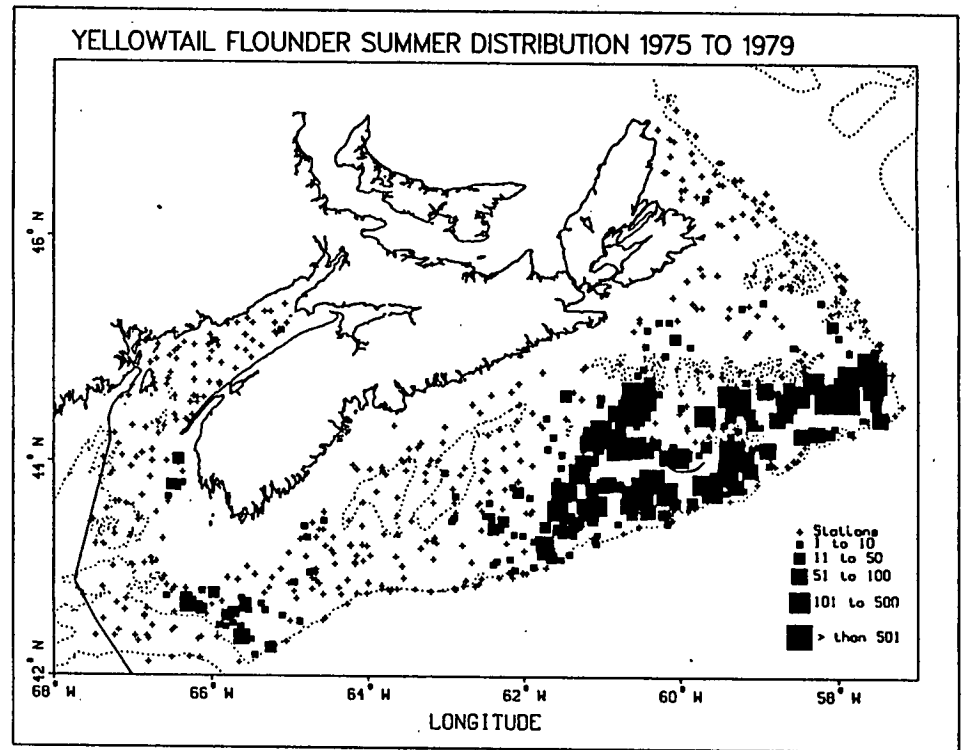
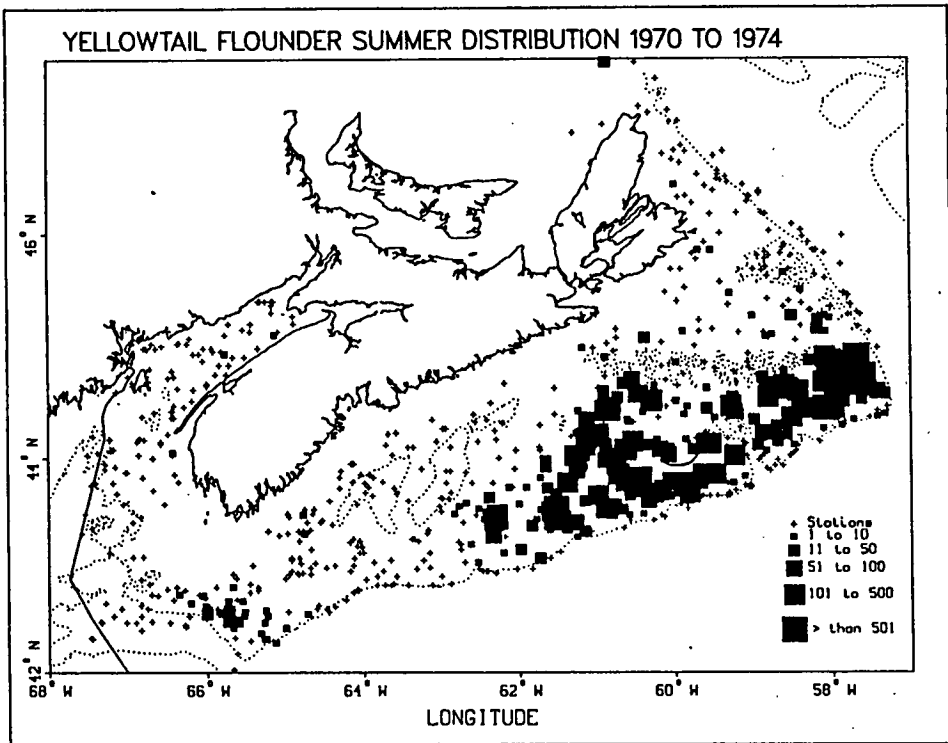


Figure 17. (continued)

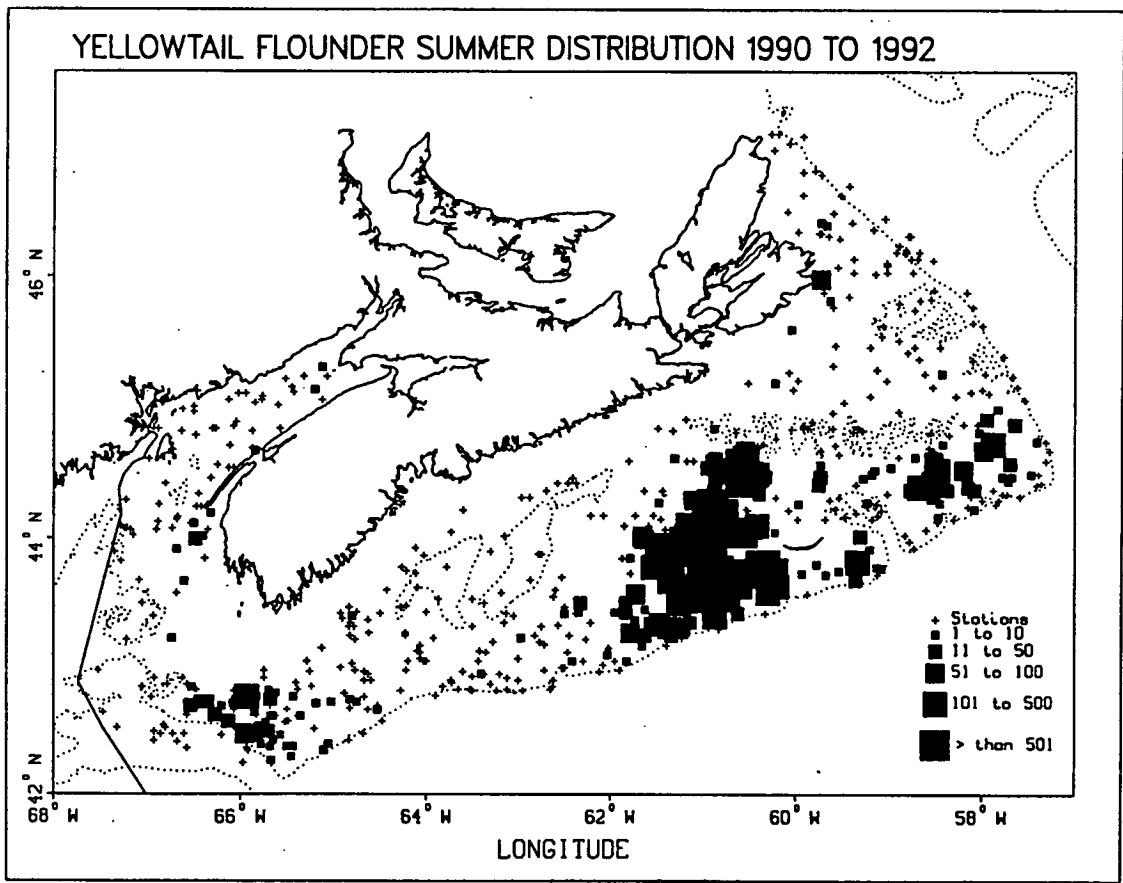
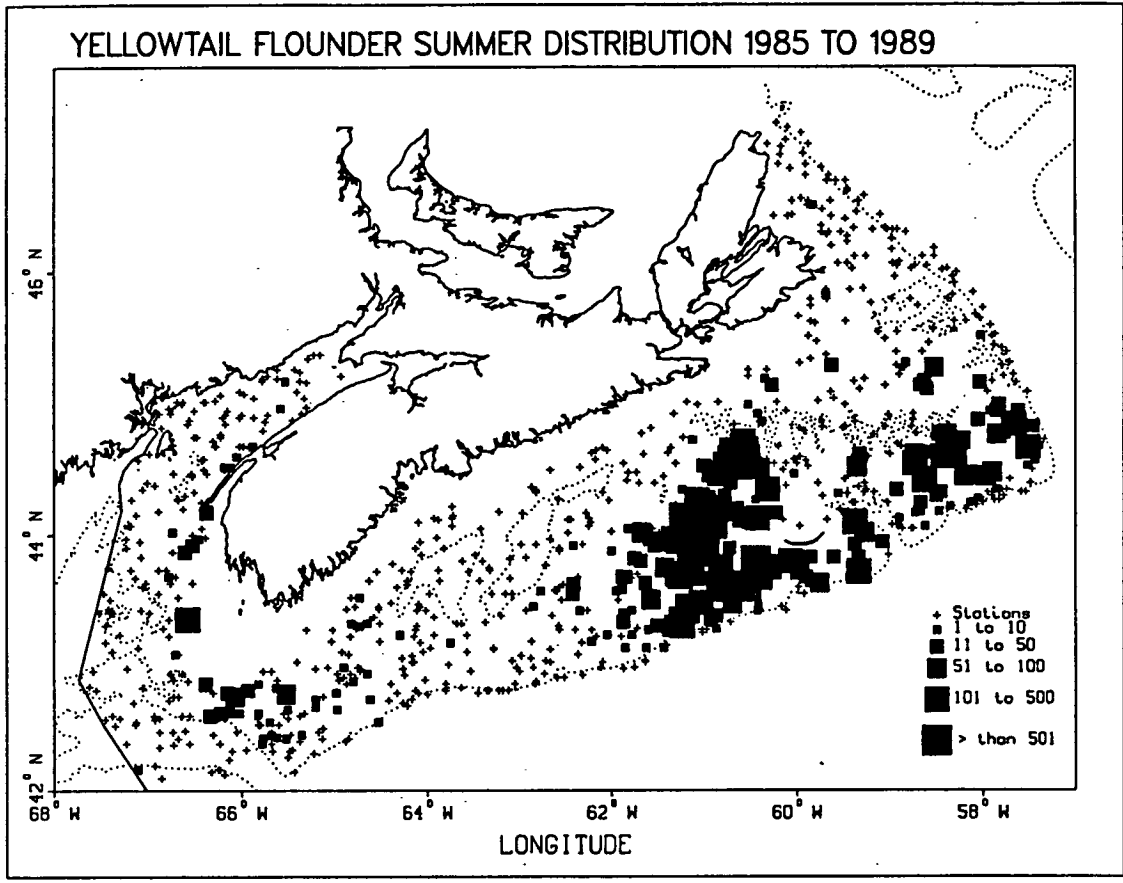
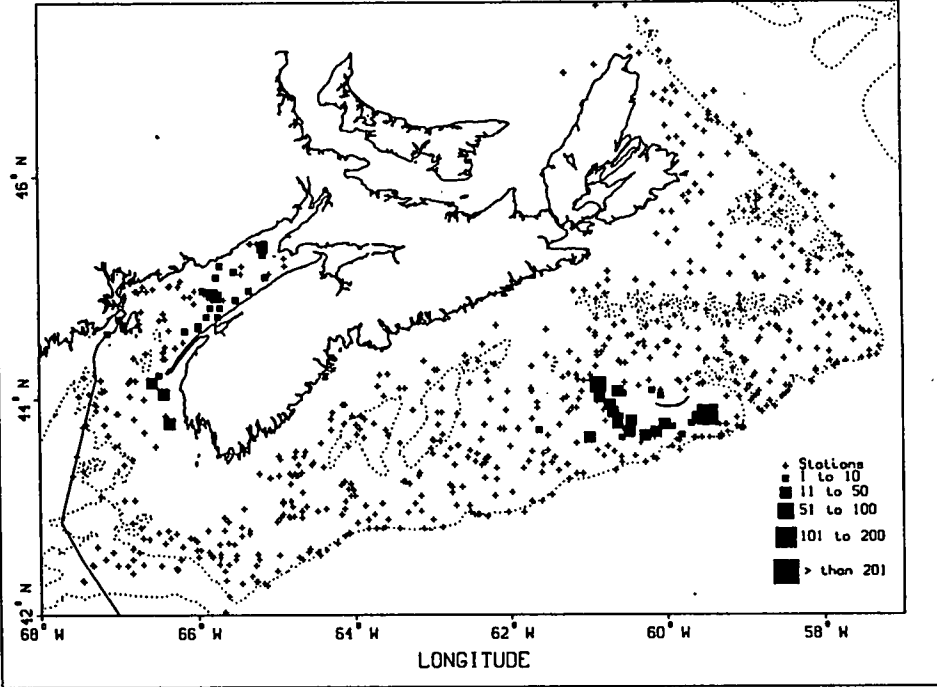
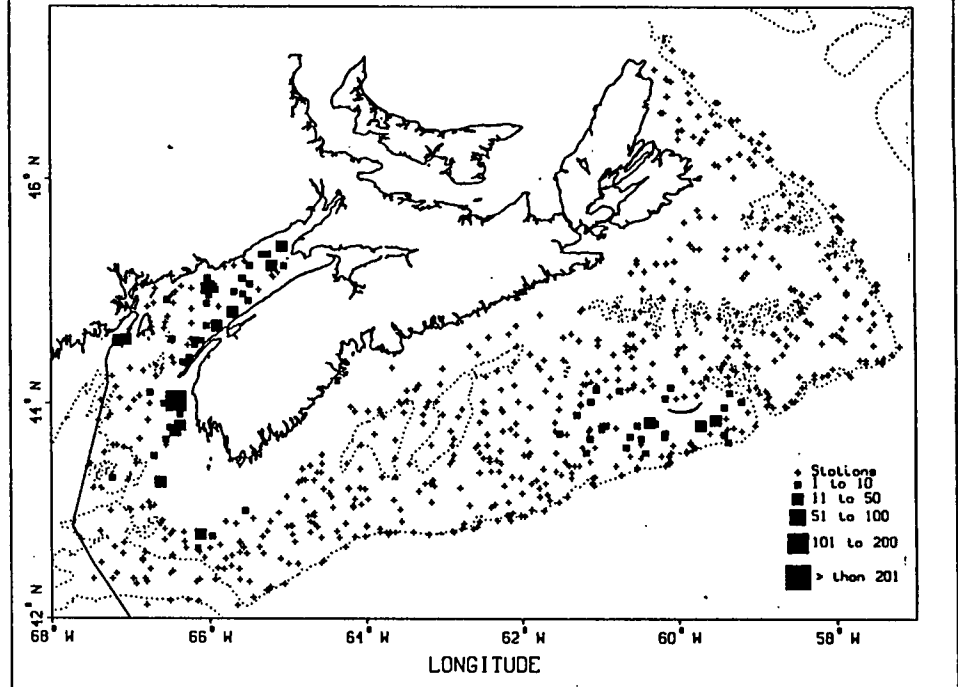


Figure 17. (continued)

WINTER FLOUNDER SUMMER DISTRIBUTION 1970 TO 1974



WINTER FLOUNDER SUMMER DISTRIBUTION 1975 TO 1979



WINTER FLOUNDER SUMMER DISTRIBUTION 1980 TO 1984

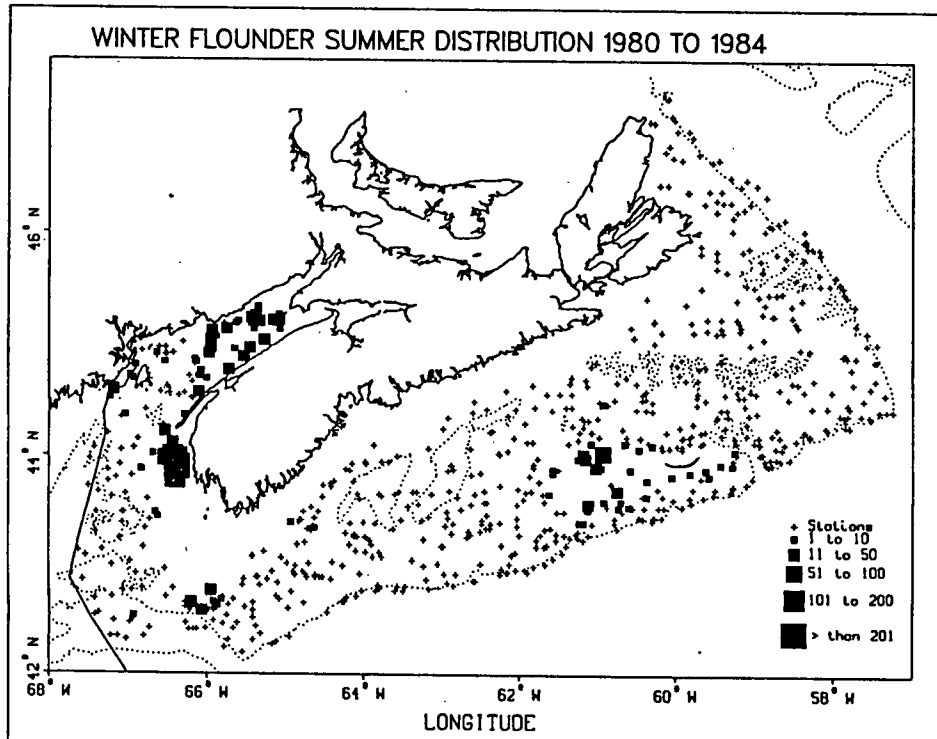


Figure 17. (continued)

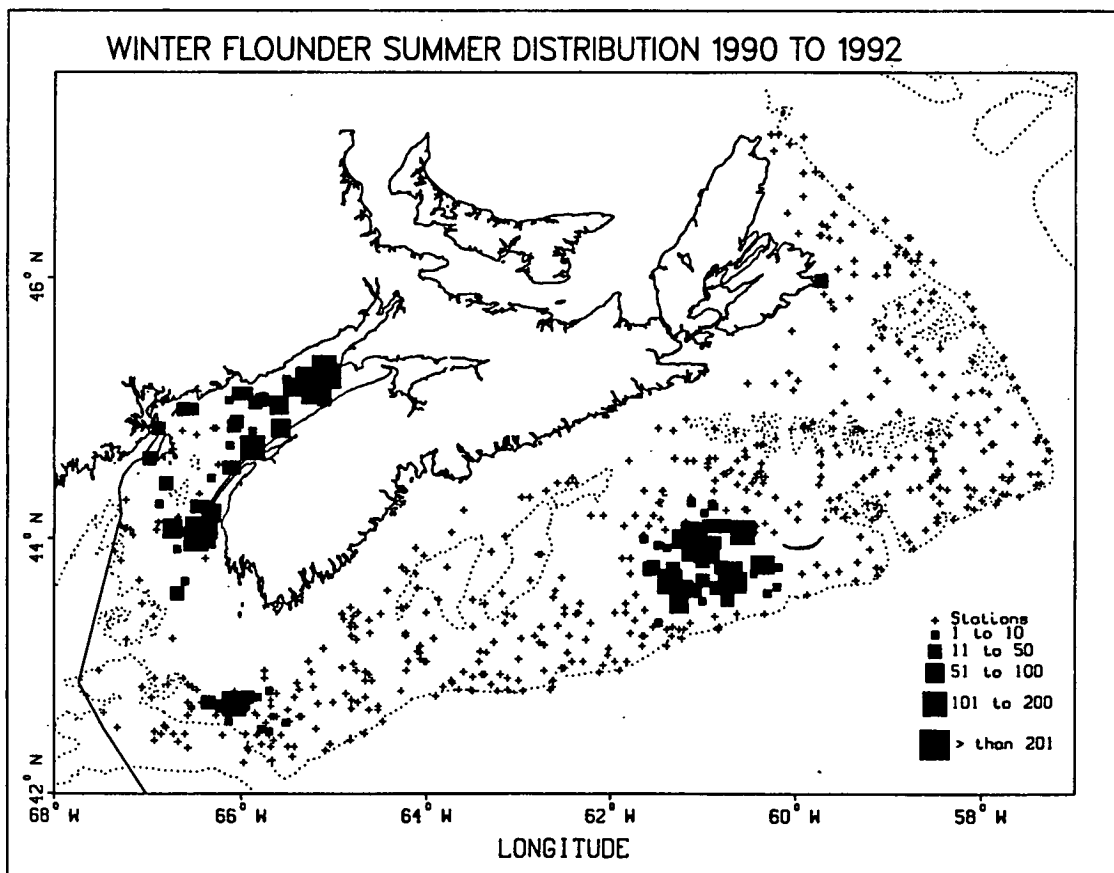
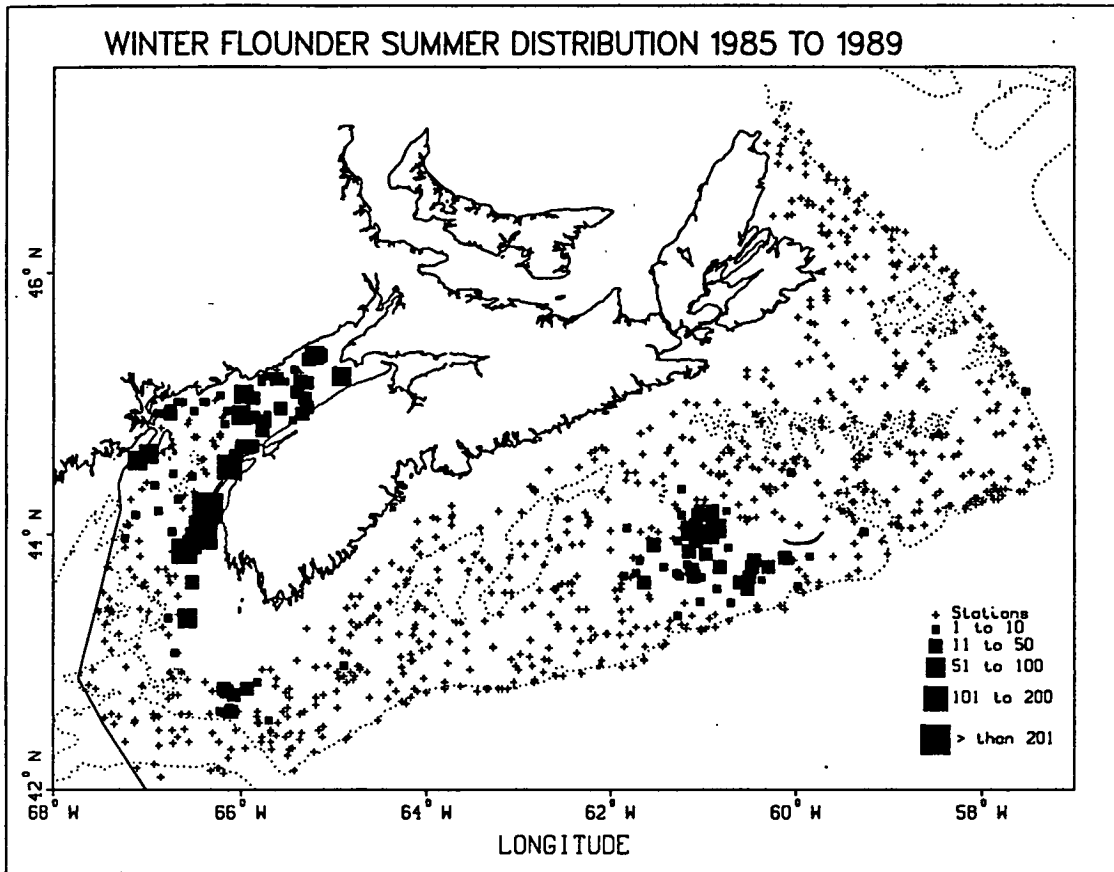


Figure 17. (continued)

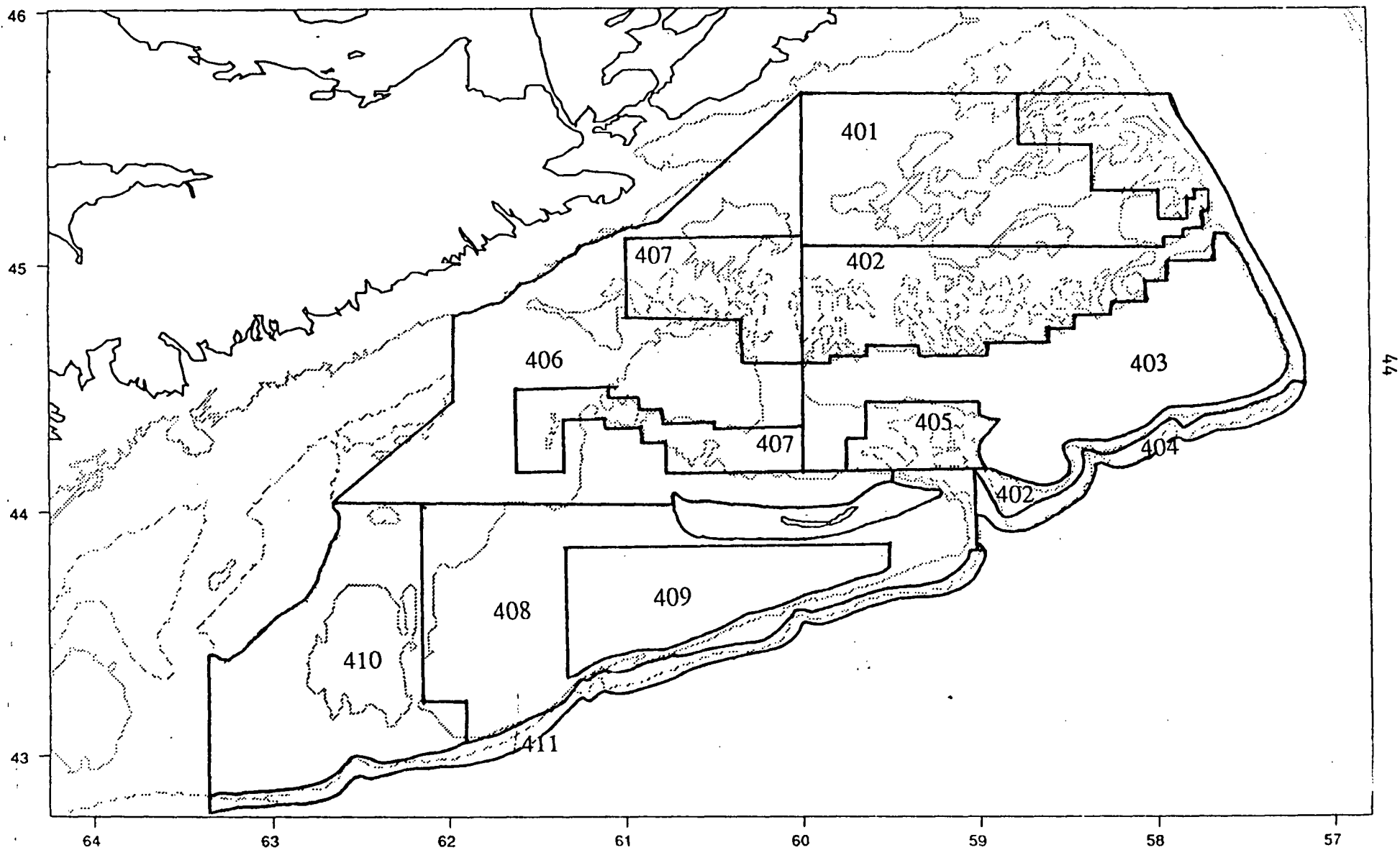
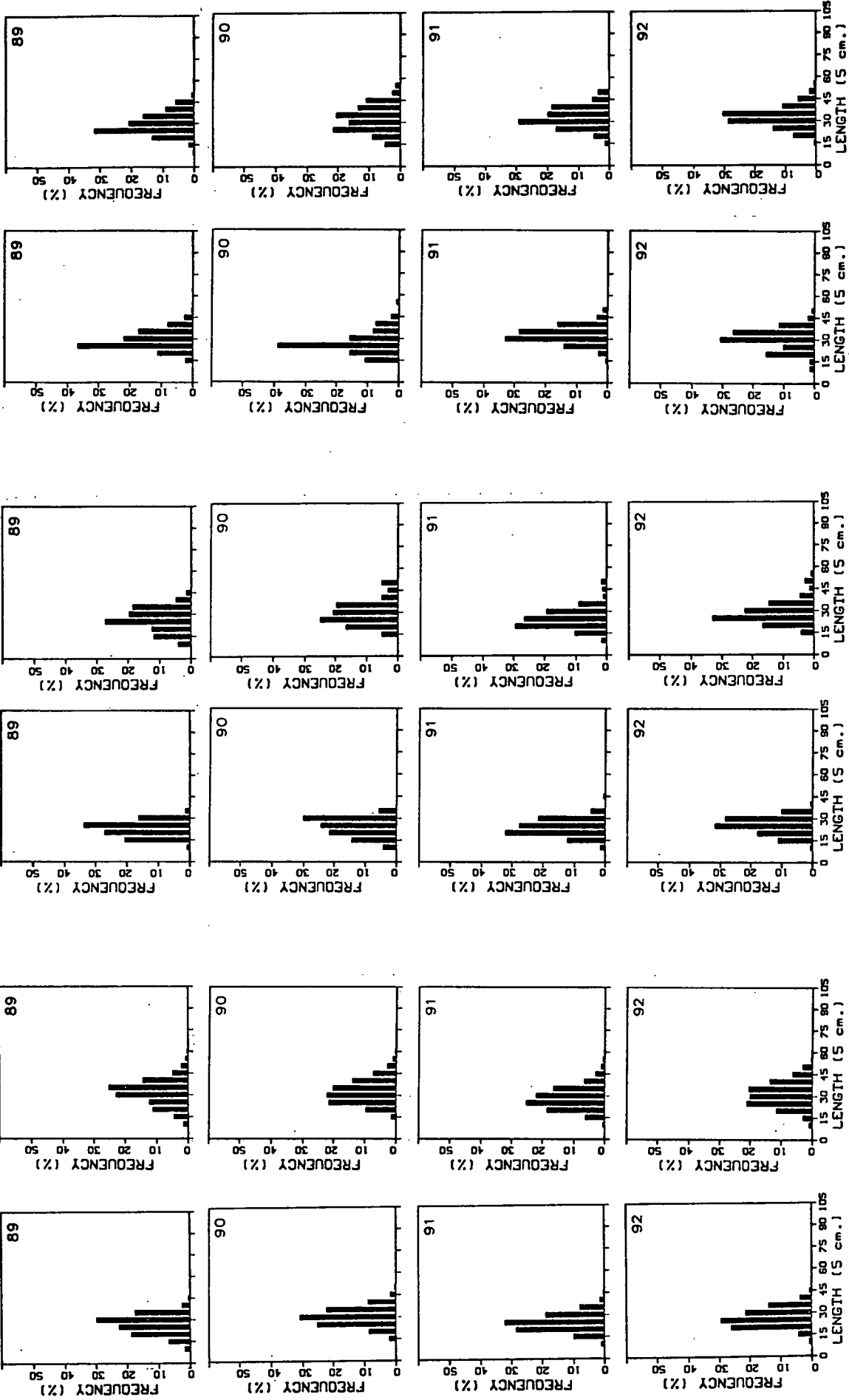


Figure 18. Strata from the 4VSW spring research survey.

WITCH 4WV

PLAICE 4K

PLAICE 4WV



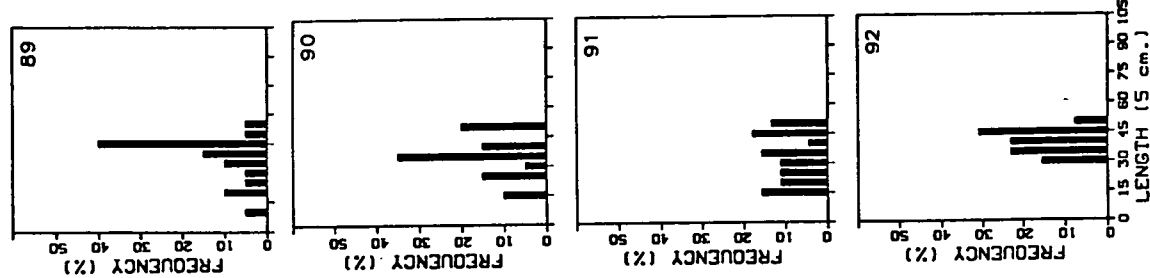
Male Female Male Female Male Female Male Female

Figure 19. Length frequencies from summer research vessel surveys for flatfish.

WITCH 4X

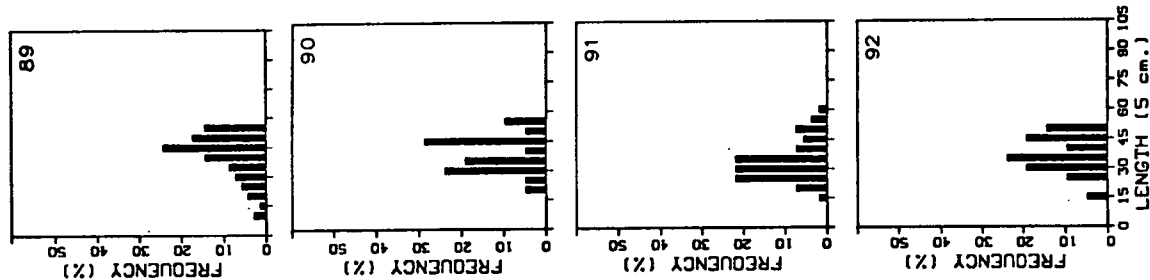
YELLOWTAIL 4VW

YELLOWTAIL 4X



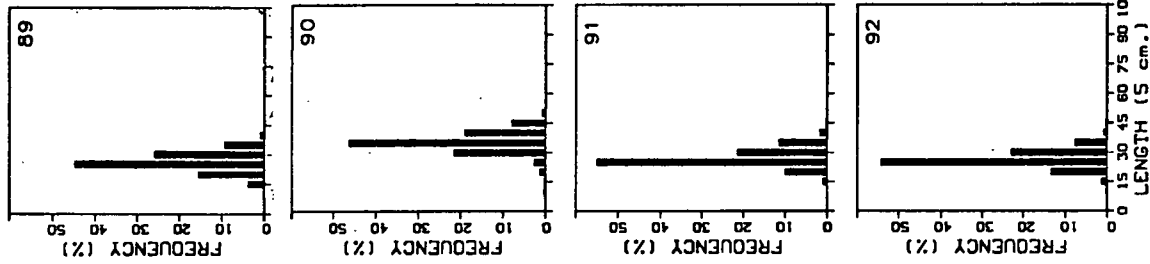
Male

Female



Male

Female



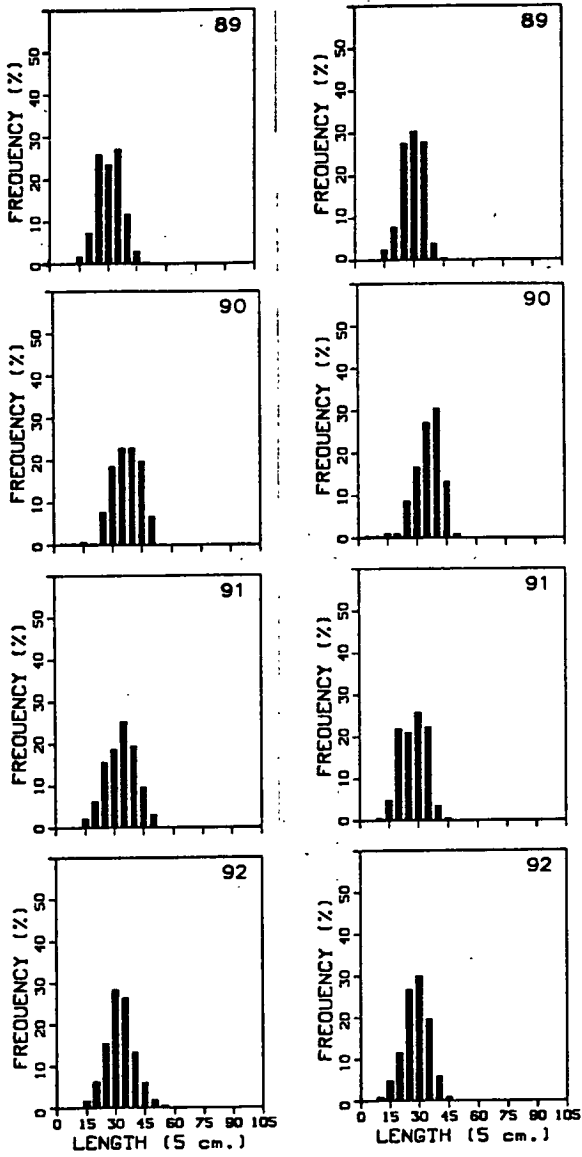
Male

Female

Figure 19. (continued)

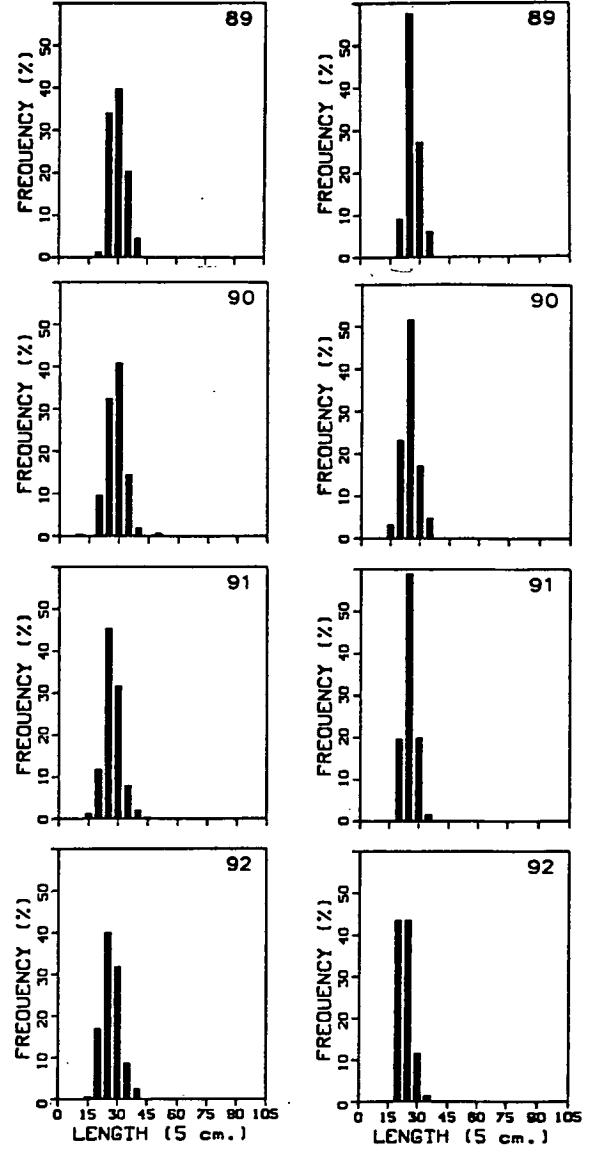
WINTER FLOUNDER 4VW

WINTER FLOUNDER 4X



Male

Female



Male

Female

Figure 19. (continued)