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Status of Atlantic Salmon (Salmo salar L.) Stocks of SFAs 1-11, Newfoundland Region, 1993

by

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Abstract

The five-year moratorium on the commercial Atlantic salmon fishery in insular Newfoundland entered its second year in 1993. The moratorium placed on the Northern Cod Fishery in 1992, which should have eliminated by-catch of Atlantic salmon in cod fishing gear in Salmon Fishing Areas (SFAs) 1-11, also continued in 1993. The commercial catch of small salmon in Labrador in 1993 was the lowest on record, that of large salmon the second lowest, and for the fourth consecutive year, quotas were not caught. In both 1992 and 1993, it is possible that fish once taken in the commercial fishery in SFA 3 and to a lesser extent in SFAs 4-7 contributed to catches in Labrador; in the past Labrador-origin Atlantic salmon have been intercepted in these SFAs. Some of the decreases in commercial catches in both 1992 and 1993 could have been due to reductions in licensed effort resulting from the voluntary license buy-back program. Recreational catches of small and large salmon in Labrador in 1993 were below the means and continued declining trends that started in 1988. Overall trends in commercial and recreational catches, catch rates observed for the Nain Region, and catches of small salmon at West Greenland with a river age greater than 3 years, all suggest continued low abundance of both small and large salmon in Labrador. In insular Newfoundland, the overall recreational catch of small salmon increased relative to the 1984-89 and 1986-91 means. The overall increase however was due mainly to the contribution of northeast coast rivers (SFAs 3-5); catches in the remmaining SFAs particularly along the south coast (SFAs 9-11) were generally below average. A nonparametric randomization ratio test showed that collectively for all rivers with counting facilities, there was a significant increase in counts of both small and large salmon during the moratorium years of 1992 and 1993 compared to the five-year period immediately preceeding the moratorium. The overall increase for each component however was due mainly to the influence of northeast coast (SFAs 4-5) rivers. For most counting facilities, counts of small salmon similar to or greater than those observed in 1992 and 1993 occurred in some pre-salmon moratorium years. There are indications the total population size of small salmon in 1992 and 1993 was low relative to years prior to the moratorium, especially the early 1980s. Smolt-to-adult survival back to the river for two south coast rivers in 1992 and 1993 was as low or lower than for pre-salmon moratorium years. This is suggestive of high or above average natural mortality at sea affecting returns in both 1992 and 1993, at least for these stocks. Low index of smolt condition for these same rivers in 1991 and 1992 was associated with low sea survival, suggesting a possible freshwater influence on sea survival. With respect to large salmon, for several counting facilities there were years in the past when counts were higher. The proportion of large salmon observed in 1993 decreased from 1992 at 8 out of 14 counting facilities and in some cases reverted back to pre-salmon moratorium levels.

Résumé

Le moratoire quinquennal sur la pêche commerciale du saumon de l'Atlantique dans l'île de Terre-Neuve était en vigueur pour la deuxième année de suite en 1993. Le moratoire sur la pêche de la morue du Nord, qui aurait dû éliminer les prises accidentelles de saumon de l'Atlantique par les engins de pêche de la morue dans les zones de pêche du saumon (ZPS) 1 à 11, était lui aussi en vigueur. En 1993 au Labrador, les prises commerciales de petit saumon ont été les plus basses jamais connues, celles de grand saumon ne les devançant que d'une place; pour la quatrième année de suite, la totalité des quotas n'a pas été capturée. Il est possible qu'en 1992 et en 1993 le poisson qui était autrefois pris par les pêcheurs commerciaux dans la ZPS 3 et, dans une moindre mesure, dans les ZPS 4 à 7, ait contribué aux prises des pêcheurs du Labrador, car on a déjà intercepté du saumon originaire du Labrador dans ces ZPS. Une partie de la diminution des prises commerciales en 1992 et en 1993 pourrait être attribuable à une réduction de l'effort de pêche des titulaires de permis à la suite du programme de rachat volontaire des permis. Les prises de petit et de grand saumon par les pêcheurs sportifs au Labrador en 1993 ont été inférieures aux moyennes, continuant de suivre la tendance à la baisse amorcée en 1988. Les tendances générales des prises des pêcheurs commerciaux et des pêcheurs sportifs, les taux de prises observés dans la région de Nain et les prises de petits saumons ayant passé plus de trois ans en eau douce à l'ouest du Groenland suggèrent que le niveau d'abondance du petit comme du grand saumon reste faible au Labrador. Dans l'île de Terre-Neuve, les prises globales de petit saumon par les pêcheurs sportifs ont augmenté par rapport aux moyennes de 1984-1989 et de 1986-1991. Cette hausse générale est due toutefois aux captures dans les rivières du nord-est (ZPS 3 à 5); dans les autres ZPS, en particulier celles de la côte sud (ZPS 9 à 11), les prises ont été dans l'ensemble inférieures à la moyenne. Un test de randomisation non paramétrique a révélé que si l'on considère collectivement toutes les rivières dotées d'installations de dénombrement, le nombre de petits et de grands saumons a considérablement augmenté en 1992 et en 1993, soit depuis l'entrée en vigueur du moratoire, par rapport aux résultats des cinq années qui ont précédé ce dernier. Dans le cas du petit comme dans celui du grand saumon, la hausse générale est imputable essentiellement aux rivières de la côte nord-est (ZPS 4 et 5). Le nombre de petits saumons recensé à la plupart des barrières de dénombrement en 1992 et 1993 était égal ou inférieur à celui des années qui ont précédé le moratoire. Il semble que l'ampleur de la population totale de petit saumon en 1992 et 1993 était faible par rapport aux années qui ont précédé le moratoire, particulièrement le début de la décennie 1980. Le taux de survie du stade de saumoneau à celui d'adulte retournant dans sa rivière été aussi faible ou plus faible que celui des années préalables au moratoire sur la pêche du saumon dans au moins deux rivières de la côte sud en 1992 et en 1993. Cela permet de conclure que les montaisons de 1992 et 1993 ont souffert d'une mortalité naturelle en mer élevée ou supérieure à la moyenne, du moins en ce qui concerne les stocks de ces deux rivières. Le faible indice de saumoneaux dans ces rivières en 1991 et 1992 avait été associé à un faible taux de survie en mer, que l'on croyait réduit par les effets possibles des conditions de l'eau douce. Pour ce qui est du nombre de grands saumons recensés à plusieurs barrières de dénombrement, il était inférieur aux résultats obtenus certaines années. La proportion de grands saumons enregistrée en 1993 était en recul dans huit installations sur quatorze par rapport aux chiffres de 1992, équivalant dans certains cas à ce qu'elle était avant le moratoire sur la pêche commerciale du saumon.

Introduction

This paper presents the general status of Atlantic salmon stocks in Salmon Fishing Areas (SFAs) 1-11 of the Newfoundland Region (Fig. 1) in 1993. Catch and effort data for the commercial (Labrador only) and recreational fisheries and counts of Atlantic salmon at fishways and counting fences are examined in relation to historical data and management measures in effect in 1992 and 1993.

MANAGEMENT MEASURES

In 1992, a five-year moratorium was placed on the commercial fishery in insular Newfoundland, while in Labrador, fishing continued under quota or allowance catch. In addition, a commercial license retirement program went into effect in both insular Newfoundland and Labrador. The moratorium continued in 1993 and restrictions on commercial catches in Labrador remained in effect. The implementation of the moratorium on commercial fishing in 1992 followed a major management plan introduced in 1984 (O'Connell et al. 1992a), elements of which were continued into the quota years of 1990 and 1991 and the 1992 and 1993 moratorium years. These regulations continue a long standing history of implementation of management programs to prevent stock declines and allow populations to rebuild (May 1993).

Commercial fishery

Quotas/allowance catches (t) for SFAs 1 and 2 in Labrador in 1993 and since they were first introduced in 1990 were as follows:

YEAR	SFA			
	1*	2	2A	2B
1990	80	200		
1991	80	200	65	135
1992	80	180	60	120
1993	80	90	27	63

*Allowance catch

In 1993, as in previous years, it was illegal to retain Atlantic salmon caught as by-catch and the mandatory carcass tagging program remained in effect. The commercial fishery opened on June 5 and closed on October 15.

The number of commercial fishers in Labrador for the period 1984-91 ranged from 511 to 626; the number remaining in 1992 and 1993 were 297 and 162, respectively.

Recreational fishery

In the recreational fishery, a quota on the number of fish that could be retained was introduced for the first time in each SFA in 1992. The quota was assigned for each SFA as a whole and not administered on an individual river basis. The quota was in effect in each SFA from the beginning of the season until it was caught, following which, only hook-and-release fishing was permitted. In 1993, the quota was split to cover two time periods in insular Newfoundland. The first time period, which accounted for most of the quota, was from the opening of the angling season until July 31; the second period was between August 1 and the end of the season. The number of fish assigned to each quota period was done on the basis of the historical proportion of total season catch taken prior to and after July 31. Only hook-and-release fishing was permitted after each portion of the quota was caught. In Labrador, there was a single quota in each SFA in 1993. Quotas in 1993 were as follows:

SFA	Quota (No. of fish)			
	Labrador	Insular Newfoundland		
		Up to July 31	From Aug. 1	Total
1	800			800
2	2800			2800
3		1040	260	1300
4		3360	1440	4800
5		1500	500	2000
6		150	100	250
7		35	15	50
8		35	15	50
9		1125	125	1250
10		585	65	650
11		2790	310	3100

The maximum number of fish that could be retained per day in 1993 decreased from two to one. The maximum number of fish that could be hooked and released remained at four; anglers could continue to hook and release after the bag limit of one retained fish per day was reached. The season bag limit for retained fish remained at

eight and there was a mandatory release of large salmon in insular Newfoundland but not in Labrador. In Labrador, out of the total season bag limit of eight fish, anglers could retain only four large salmon in 1993, compared to eight in 1992. On a river-specific basis, Conne River was closed to angling in 1993, although a Native food fishery was allowed on this stock under a 500 fish quota.

Methods

Commercial and recreational fishery catch and effort data and fishway and counting fence data were added to that presented in O'Connell et al. (1993). For the Labrador commercial fishery, data were compiled by the Fisheries Statistics and Systems Branch of the Department of Fisheries and Oceans (DFO) in the manner described by Ash and O'Connell (1987a,b).

Recreational fishing effort was presented as rod days, defined as any day or part of a day on which an angler fishes.

Means and 95% confidence intervals for ratios were calculated according to Cochran (1977).

Impacts of the commercial fishery moratorium on river escapements were assessed by analyzing recreational fishery data and counts of small and large salmon at fishways and counting fences. With respect to counts, two years of data are now available. A nonparametric randomization ratio test was proposed by the North Atlantic Salmon Working Group of the International Council for the Exploration of the Sea (Anon. 1993) as a nonparametric statistical means of evaluating short-term changes in salmon abundance such as this. The method consisted of computing the ratio of the means of counts for two periods of time (pre-moratorium and moratorium peiods) to determine if the observed value is simply a random ordering of observations achieved by chance, or if the observed value is unlikely (Anon. 1993). The latter could imply a true change in abundance. Following the terminology of Rago (1993), let Y_{kt} be the abundance (count) of salmon at index site 'k' and time 't'. The pre-moratorium period consists of 'm' observations while the moratorium period has 'n' observations. R_o is the ratio of the means for the two periods:

$$R_o = \frac{\sum_{k=1}^{K} \sum_{t=m+1}^{m+n_k} \frac{Y_{k,t}}{n_k}}{\sum_{k=1}^{K} \sum_{t=1}^{m_k} \frac{Y_{k,t}}{m_k}}$$

Data from ten rivers (Exploits River - Bishop's Falls, Gander River, Middle Brook, Terra Nova River, Rocky River, Northeast River (Placentia), Biscay Bay River, Northeast Brook (Trepassey), Colinet River, and Conne River) were used. Partial counts were omitted except if they occurred in 1992 or 1993. Separate analyses were carried out on south coast rivers (SFAs 9-11) and northeast coast rivers (SFAs 4 and 5) with the exclusion of counts from Gander River and Bishop's Falls. The ratio test was used to compare returns of small and large salmon separately for the five-year period prior to the moratorium (1987-91) with returns in 1992 and 1993. Two thousand permutations of the data were run.

As described last year (O'Connell et al. 1993), an index of fishing effort is available for the commercial Atlantic salmon fishery at Nain, north Labrador (SFA 1), and is defined as person-weeks fished (Dempson and Shears 1992). This is a shore-set fixed surface gillnet fishery largely carried out at traditional fishing berths. Catch and effort data from four subareas (Dog Island, Black Island, Kigalpaits, and Cutthroat, which contribute 92% of the Nain Fishing Region total salmon catch, were analyzed using a multiplicative model (Gavaris 1980) to account for differences in catch rates among year, subarea and week:

$$Y_{ijk} = \mu + \alpha_i + \beta_j + \gamma_k + (\alpha\gamma)_{ik} + \epsilon_{ijk}$$

where Y_{ijk} is the standardized catch rate, α_i, β_j, and γ_k are class variables year, week, and subarea, $(\alpha\gamma)_{ik}$ is an interaction term between year and subarea, and ϵ_{ijk} is the error term. The regression of ln catch rate for the period 1977-93 was initially fitted using SAS Reg procedures (SAS 1985) to avail of various diagnostic techniques. Back-transformed standardized catch rates were obtained using a bias correction process which was also run in SAS.

Results and Discussion

THE LABRADOR COMMERCIAL FISHERY

As was the case for 1990, 1991, and 1992 the commercial fishery in 1993 in both SFAs of Labrador lasted the entire fishing season without quotas being caught. Therefore, catches presented in Tables 1-3 for 1990-93 can be compared directly with pre-quota years.

The commercial catch of small salmon (7 t) in SFA 1 in 1993 (Table 1 and Fig. 2a) decreased from 1992 (61%) and the 1984-89 (77%) and 1986-91 (71%) means. The catch of large salmon in 1993 (17 t) also declined from 1992 and the means (64, 76, and 72%, respectively) (Table 1 and Fig. 2b). In SFA 2 (Table 2 and Fig. 2a), the 1993 catch of small salmon (22 t) decreased from 1992 and

the means (12, 72, and 72%, respectively). The catch of large salmon (45 t) in 1993 in SFA 2 (Table 2 and Fig. 2b) also declined from 1992 (53%) and the 1984-89 (69%) and 1986-91 (67%) means. For SFAs 1 and 2 combined (Table 3 and Fig. 2a), the catch of small salmon (29 t) in 1993 decreased from 1992 and both means (33, 73, and 72% respectively). Large salmon catch (62 t) also declined from 1992 and the means (57, 72, and 68%, respectively) (Table 3 and Fig. 2b).

Total commercial catch (21 t) in SFA 1 in 1993 (Table 1 and Fig. 2c) decreased from 1992 (68%) and the 1984-89 (79%) and 1986-91 (75%) means (below the lower limit of the 95% confidence interval of each mean). Likewise, for SFA 2 (Table 2 and Fig. 2c), the catch in 1993 (78 t) decreased from 1992 and the means (36, 65, and 64%, respectively) and was below the lower limit of the 95% confidence interval of each mean. For SFAs 1 and 2 combined (Table 3 and Fig. 2c), total catch (99 t) decreased from 1992 by 47% and from each mean by 70% (1984-89) and 67% (1986-91); the 1993 catch was well below the lower limit of the 95% interval of each mean.

The percentage of quota (total catch) caught in 1993 and also for 1990-92 was as follows:

YEAR	SFA 1	SFA 2	SFAS 1 & 2
1990	65	64	64
1991	13	38	31
1992	83	67	72
1993	26	46	40

The percentage for 1993 was the second lowest since the institution of quotas.

Nain Fishing Region

Landings of Atlantic salmon from the Nain Fishing Region, SFA 1, are available since 1977 (Dempson and Shears 1993). This catch series is the only one from which an index of fishing effort, and hence catch rate as an index of abundance, was obtainable. Catches have ranged from a high of 60 t in 1980 (all subareas) to a low of 2 t in 1993. Over the 15 year period 1977-91, the Nain Fishing Region represented about 31% of the total SFA 1 catch of Atlantic salmon, and catches at Nain were associated with landings from the rest of Labrador ($r^2 = 0.63$, $P = 0.004$, $N = 15$). Catches from all subareas averaged about 30 $t \cdot y^{-1}$ until 1990. During the past three years (1991-93) landings have fallen drastically averaging only 2.4 $t \cdot y^{-1}$. Landings of salmon from the Cutthroat subarea dominated the

catch series averaging about 52% of the total landings at 15 $t \cdot y^{-1}$ until 1989.

The regression of ln catch rate for the period 1977-93 explained 66% of the variation in the data (Table 4). All main effects were significant as was the interaction between year and subarea (Table 4). Highest catch rates occurred in standard week 30 (July 23-29) followed by weeks 31 and 32 (July 30 - August 12). The interaction term indicates that salmon abundance was not consistent among subareas over time. In the general sense, however, the Dog Island, Kiglapaits, and Black Island subareas showed similar temporal patterns (Fig. 3). Catch rates declined from 1977 to 1979 followed by an increased abundance in 1980. Abundance then fluctuated in a downward trend into the mid-1980s followed by increases culminatting in relatively high catch rates in 1989. This was followed by a rapid decline in abundance with the lowest levels occurring in recent years. One small exception to the above pattern was at Kiglapaits in 1982. In that year salmon abundance was the highest over the 17 year time series.

The Cutthroat subarea, which as mentioned above accounts for over 50% of the total salmon catch at Nain, differed from the others with respect to the temporal variation in salmon abundance. Here, abundance of salmon has been quite variable (Fig. 3). High abundance occurred in 1981, 1984, and again as observed in the other subareas, in 1989. However, the rapid decline in salmon abundance following the 1989 fishery also occurred at Cutthroat. In all four subareas, effort was among the lowest recorded in 1992 and 1993. As such, the limited distribution of effort, and subsequent interpretation of catch rate trends must be viewed with caution in that low effort directed towards salmon may be insufficient to reflect true abundance patterns in recent years.

Atlantic salmon caught at Nain are for the most part not from 'local' area rivers. Most of the salmon are believed to originate from rivers in central and southern Labrador with some contributions from Newfoundland, the maritime provinces and Quebec (Reddin and Dempson 1986). As such, the overall catch rate data are assumed to reflect a generalized pattern of salmon abundance along the Labrador coast. Catch rate variation among the Nain subareas likely reflects the varying movement patterns of salmon as they migrate past local headlands and outer islands areas.

Commercial Catches of Large Salmon in Labrador (SFAs 1 and 2 Combined) and Catches of Small Salmon with River Age greater than 3 years at West Greenland

As indicated earlier, Atlantic salmon harvested in the Labrador commercial fishery in general are believed to be primarily of Labrador origin (Pippy 1982; Reddin and Dempson 1986). Data from Reddin and Porter (1988) indicated the river age of large

salmon in SFAs 1 and 2 is primarily greater than 3 years. The average river age for salmon stocks in the northwest Atlantic increases from south to north (Templeman 1967; Lear and Misra 1978). Large salmon with river ages greater than 3 years are principally from stocks in Labrador and the Quebec North Shore (Reddin and Porter 1988).

Landings of large salmon in Labrador in 1973-92 (SFAs 1-2 and SFA 14b combined) in year t were significantly correlated (r^2 = 0.57; df = 17; P = 0.0002) with landings at West Greenland of North American-origin small salmon with river age greater than 3 years in year t-1 (Fig. 4). The time series of landings, for small and large salmon in SFAs 1, 2, and 14b combined and North American-origin small salmon with a river age of greater than 3 years at West Greenland were all tri-modal with declining trends (Fig. 5). The slope of the declining trend for the commercial catch of small salmon was not significant (r^2 = 0.17; df = 17; P = 0.08) (Fig. 5a); however, there has been a substantial decline in landings since 1981. The relationship between large salmon and year was significant (r^2 = 0.72; df = 18; P = 0.0001) (Fig 5b) as was the relationship between North American-origin small salmon with river age greater than 3 years and time (r^2 = 0.43; df = 22; P = 0.0005) (Fig. 5c).

The significant relationship between catches of large salmon in Labrador and catches at West Greenland of North American-origin small salmon with river age greater than 3 years, indicates that as the abundance of a smolt class changes there is a corresponding change in the recruitment to the fisheries (Anon. 1991). The decline in catches of large salmon in Labrador and North American-origin small salmon of river age greater than 3 years at West Greenland is indicative of a decrease in population size.

RECREATIONAL FISHERY AND COUNTS AT COUNTING FACILITIES

Recreational catches of grilse and large salmon, effort, and catch per unit of effort (CPUE) for Labrador (SFAs 1-2 combined), insular Newfoundland (SFAs 3-11 combined), and SFAs 1-11 combined are presented in Appendix 1a-c. Data for each individual SFA are shown in Appendix 1d-n. Catches for all years prior to 1992 represent retained fish for the entire angling season, when there was no mandatory release of small salmon. Recreational catches (sum of retained and released fish) for the entire season, effort and catch per unit of effort (CPUE) are presented in Table 5. For insular Newfoundland, numbers of large salmon released are not included in CPUE. For 1992, there was no estimate of released fish during the period of retention of catch and hence comparisons with 1993 are not valid. In Table 6, catch (retained plus released fish), effort, and CPUE for 1993 are expressed as percentage change in relation to the means for 1984-89 and 1986-91. For insular Newfoundland, 1987 was not included in the means because in that

year drought conditions resulted in the closure of most rivers to angling for the greater part of the angling season.

Retained catch and effort up to the time the first portion of the quota was caught in each SFA are shown in Tables 7 and 8, respectively. In Labrador, as stated above, there was a single season quota. Calculation of CPUE in terms of retained fish only was not possible since effort figures apply to both retained and released fish collectively. Percentage change in retained catch and effort up to the time the first portion of the quota was caught in each SFA in 1993 in relation to the means to the same date for 1984-89 and 1986-91, is presented in Tables 9 and 10, respectively. Comparisons with 1992 are not valid since closure dates for retention of fish in that year were different. As above, data for 1987 were not included in the means for insular Newfoundland.

Labrador (SFAs 1 and 2 combined)

The total number of small salmon (retained plus released fish) caught in 1993 (2840) (Table 5) was similar to the 1984-89 and 1986-91 means (Table 6). The catch of large salmon (197) decreased from the means (43 and 37%, respectively); the catch was below the lower limit of the 95% confidence interval of the 1984-89 mean but within the limits of the 1986-91 mean. Total effort (applies to retained plus released fish and to retained fish alone) in 1993 increased over the means (within the confidence limits) but there was a decrease in CPUE (below the lower limit of the 1984-89 mean and within the limits of the 1986-91 mean).

In contrast to 1992, the quota for retained fish was not reached in both SFAs in Labrador in 1993, hence direct comparison with years prior to 1992 is possible. The number of small salmon (1461) retained (Table 7 and Fig. 6) was below both means (49 and 48%, respectively) and below the lower limit of the 95% confidence interval of each mean. In Fig. 6, retained catches up to the time quotas were caught in 1992 are also shown. The catch of small salmon in 1993 was lower than the partial season catch of 1992. The retained catch of large salmon (136) was also below the means (61 and 56%, respectively) and the lower confidence limits; however, the partial season catch in 1992 was well above 1993 and the means.

Fig. 7 shows total retained recreational catch (small and large combined), effort, and CPUE in 1993 compared to the means and years since 1974. Effort expenditure in 1993 continued to be above average while the opposite applied to CPUE.

Insular Newfoundland (SFAs 3-11 combined)

The catch (retained plus released fish) of small salmon (28361) in 1993 (Table 5 and Fig. 8) increased over both the 1984-89 and 1986-91 means (28 and 61%, respectively) (Table 6); the catch was within the limits of the 95% confidence interval of the

1984-89 mean but exceeded the upper limit of the 1986-91 mean. Effort increased over both means (within the confidence interval of the 1984-89 mean but above the upper limit of the 1986-91 mean) as did CPUE (similar to the upper confidence limits of each mean).

The number of small salmon retained during the first quota period (12012) (Table 7) increased over both means (11 and 39%, respectively) (Table 9); the increases were within the limits of the 95% confidence interval of each mean. Effort (Table 8) also increased over both means (27 and 43%, respectively) during this period (exceeded the upper confidence limit of each mean) (Table 10).

The total number of small salmon retained for both quota periods combined in SFAs 3-11 in 1993 was 16405 which compares to 12271 in 1992 (Fig. 9). Quotas in 1992 and 1993 constrained catches at levels below the 1984-89 and 1986-91 means.

Analysis by SFA

Labrador

SFA 1: Total catches of small and large salmon and effort in 1993 were below the lower limit of the 95% confidence interval of each mean; CPUE declined from both means and was similar the lower limit of the 95% conficence interval for the 1986-91 mean.

In terms of retained fish during the first quota period, catches of small and large salmon were below the lower confidence limits of the means. The highest proportions of retained small and large salmon and effort expenditure in SFA 1 came from Big River (Fig. 10).

SFA 2: The total catch of small salmon increased over both means and was similar to the upper limit of the 95% confidence interval of each mean. The catch of large salmon was below the means but within the confidence limits. Effort exceeded the upper confidence limit of each mean but there was a corresponding decrease in CPUE (below the lower confidence limit of the 1984-89 mean and within the limits of the 1986-91 mean).

The number of small salmon retained in 1993 decreased from the means (similar to the lower confidence limit of the 1984-89 mean but below that of the 1986-91 mean). The number of large salmon retained likewise decreased (below the lower confidence limit of each mean). The Eagle River accounted for most of the effort and catch of both small and large salmon in SFA 2 (Fig. 10).

Insular Newfoundland

SFA 3: Total catch of small salmon increased substantially over the means (exceeded the upper confidence of each mean) as did effort and CPUE.

The number of small salmon retained during the first quota period increased above the upper confidence limit of each mean. Effort during the retention period also increased over the means (exceeded the upper limits). Most of the catch and effort was attributable to Main River (Sop's Arm) (Fig. 11).

SFA 4: The total catch of small salmon increased over both means (was similar to the upper confidence limit of the 1984-89 mean and exceeded the upper limit of the 1986-91 mean). Effort also increased over the means (within the confidence limits) while CPUE exceeded the upper confidence limit of each mean.

The retained catch of small salmon and effort during the first quota period both exceeded the upper confidence limit of each mean. The highest proportions of catch and effort were contributed by the Exploits and Gander rivers (Fig. 11).

Counts of small (Table 11 and Fig. 12) and large salmon (Table 12 and Fig. 13) are available for fishways located in Exploits River (Bishop's Falls and Great Rattling Brook) and Salmon Brook (Gander River) and a counting fence installed just above head of tide in the main stem of Gander River. Table 13 shows counts in 1993 expressed as percentage change in relation to 1992 and the 1984-89 and 1986-91 means. Counts of small salmon at Bishop's Falls and Great Rattling Brook in 1993 increased over 1992 and the means. The count of small salmon at the Gander River counting fence also increased over 1992 and years prior to 1992. It should be pointed out the count in 1992 was partial in that the installation of the counting fence was delayed until July 1 as a result of high water conditions. An estimated 1105 small salmon entered the river prior to completion of the fence (not included in the value presented in Table 11). The count of small salmon at the Salmon Brook fishway in 1993 increased over 1992 and the means. Counts of large salmon at Bishop's Falls and Great Rattling Brook in 1993 increased over 1992. Counts at the Gander River counting fence and at Salmon Brook in 1993 decreased from 1992 being most pronounced for the former; counts at both facilities however, remained above the means. An estimated 330 large salmon entered the Gander River prior to counting fence installation in 1992 (not included in value in Table 12). The proportion of large salmon at Bishop's Falls in 1993 increased slightly over 1992 and the means while at Great Rattling Brook, there was a decline from 1992 but both 1992 and 1993 were above the means (Table 14). The proportion of large salmon at the Gander River counting fence in 1993 decreased markedly from 1992 and was slightly less than for years prior to 1992; the proportion for Salmon Brook also decreased from 1992 but remained above the means.

SFA 5: The total catch of small salmon increased over the means (within the confidence limits). Effort also increased over the means (within the confidence limits of the 1984-89 mean but above the upper limit of the 1986-91 mean) while CPUE increased

marginally over the 1984-89 mean and was similar to the 1986-91 mean.

The number of small salmon retained and effort expenditure during the first quota period both exceeded the upper confidence limit of each mean. Terra Nova River and Indian Bay Brook accounted for most of the catches and effort followed by Gambo Brook and Middle Brook (Fig. 11).

Fishways in SFA 5 are located in Middle Brook and Terra Nova River (upper and lower). Counts of grilse (Table 11 and Fig. 14) at these fishways in 1993 increased over 1992 and the means with the increase for upper Terra Nova being the least pronounced (Table 13). Counts of large salmon (Table 12 and Fig. 15) increased over 1992 and the means for Middle Brook and lower Terra Nova while for upper Terra Nova the count declined from 1992 and but remained above the means (Table 13). The proportion of large salmon increased over 1992 and the means for Middle Brook while for upper and lower Terra Nova the proportion declined from 1992 but remained above the means (Table 14). The counts of small and large salmon for lower Terra Nova in 1993 were incomplete due to fish bypassing the fishway. This was due to the washout of the diversion dam above the fishway and unusually high water levels. The proportion of large salmon in Middle Brook in 1993 increased over 1992 while the reverse was true for the lower and upper Terra Nova fishways (Table 14). Proportions in 1993 however remained well above mean levels.

SFA 6: The total catch of small salmon increased over each mean while effort was similar to the means (both within the confidence limits); CPUE also increased over the means and likewise was within the confidence limits.

The total number of small salmon retained and effort expended during the first quota period both exceeded the upper limit of the confidence interval of each mean. Champneys River and Popes Harbour River accounted for most of the catch and effort (Fig. 11).

SFA 7: Total catch of small salmon decreased from both the 1984-89 mean (below the lower confidence limit) and the 1986-91 mean (within the confidence limits). Effort decreased from the 1984-89 mean but increased over the 1986-91 mean (within the confidence limits of each mean); CPUE decreased from both means (within the confidence limits).

The retained catch of small salmon during the first quota period decreased from both means (within the confidence limits) while efort showed an increase (exceeded the upper confidence limit of each mean). North River accounted for the highest proportion of catch and effort (Fig. 11).

SFA 8: The total catch of small salmon decreased from the 1984-89 mean (below the lower confidence limit) and the 1986-91 mean (within the confidence limits). Effort decreased from the 1984-89 mean but increased over the 1986-91 mean (within the confidence limits of each mean). CPUE was below the lower limit of the 1984-89 mean and also decreased from the 1986-91 mean (within the limits).

The number of small salmon retained during the first quota period decreased from both means (below the lower confidnce limit of the 1984-89 mean and within the limits of the 1986-91 mean). Effort increased over both means (within the confidence limits). Renews River acounted for most of the catch and effort (Fig. 11).

SFA 9: The total catch of small salmon decreased slightly from the 1984-89 mean and showed a marginal improvement over the 1986-91 mean (within the confidence limits of each mean). Effort increased over the upper confidence limit of each mean; CPUE was below the lower limit of the 1984-89 mean and withinn that of the 1986-91 mean.

The retention period for small salmon in this SFA lasted the entire season (i.e., the quota was not caught). The total number of retained fish decreased from each mean (within the confidence limits). Effort expenditure was above the upper limit of the confidence interval. Most of the catch and effort expenditure was attributable to Salmonier River (Fig. 16).

A number of counting fences (Biscay Bay River, Northeast Brook, Trepassey, and Colinet River) and a fishway (Rocky River) have been operated in SFA 9 over the years. The count of small salmon (Table 11 and Fig. 17) in Rocky River in 1993 increased over 1992 and both the 1984-89 and 1986-91 means (Table 13). The number of small salmon entering Northeast Brook (Trepassey and Colinet River increased over 1992 but remained below the means. The count in Biscay Bay River was below 1992 and both means. Numbers of large salmon (Table 12 and Fig. 18) entering Biscay Bay and Rocky rivers increased over 1992 and both means. For Colinet River, numbers of large salmon declined from 1992 and the means while in Northeast Brook (Trepassey) there was an increase over 1992 but a decrease from the means. It should be noted that the counts of grilse and large salmon for Biscay Bay River in both 1992 and 1993 are partial due to water flowing over the counting fence in early July for a period of approximately 24 hours each year. An estimated 100-200 fish could have escaped upstream undetected during these high water periods in both years. The proportion of large salmon in 1993 increased over 1992 for all rivers except Colinet River with the increase being most pronounced for Biscay Bay River (Table 14). The proportion for Rocky and Biscay Bay rivers remained well above the means while that of Colinet River and Northeast Brook were similar or declined from the means.

SFA 10: The total catch of small salmon increased over the means (within the confidence limits) as did effort (above the upper confidence limit of each mean); CPUE decreased from each mean (below the lower limit of the 1984-89 mean and within the limits of the 1986-91 mean).

The number of small salmon retained during the first quota period decreased slightly from the 1984-89 mean but increased over the 1986-91 mean (within the confidence limits). Effort exceeded the upper confidence limit of each mean. Cape Roger River, Bay De L'Eau River, and Northeast River (Placentia) accounted for most of the catches and effort expenditure (Fig. 16).

The count of small salmon (Table 11 and Fig. 19) at the Fishway in Northeast River (Placentia) in 1993 decreased slightly from 1992 but remained above the means (Table 13). The count of large salmon (Table 12 and Fig. 20) increased over 1991 and both means. The proportion of large salmon also increased over 1992 and the means (Table 14).

SFA 11: Total catch of small salmon derceased from both means (within the confidence limits) as did effort (below the lower limit of the 1984-89 mean and within the limits of the 1986-91 mean); CPUE decreased from the 1984-89 mean and increased slightly over the 1986-91 mean (within the limits).

The number of small salmon retained and effort expenditure during the first quota period decreased from both means (both below the lower confidence limit of the 1984-89 mean and within the limits of the 1986-91 mean). Garnish River and Grandy River accounted for most of the catch and effort expenditure (Fig. 16).

The count of small salmon (Table 11 and Fig. 21) at the Grand Bank Brook fishway was incomplete but still showed a marked increase over 1992 (Table 13). The count of large salmon (Table 12 and Fig. 22) in Grand Bank Brook decreased from 1992. Counts of small and large salmon at the Conne River counting fence were below 1992 and both means.

COUNTS AT COUNTING FACILITIES - AN OVERALL SUMMARY

Results of the nonparametric ratio test (Table 15) suggest the probability of the observed ratio of 1.89 for returns of small salmon is about 0.0085. This implies that, collectively over all rivers, there was a significant increase in small salmon returns during the moratorium years compared to the previous five-year period. In this formulation of the ratio test, larger rivers with higher counts contribute more to the ratio than smaller rivers. Thus, in the present case, the substantial increases observed at Gander and Exploits rivers in 1993 influenced the overall results more than those of, say, Middle Brook. A sepatate analysis of south coast rivers (Rocky River, Northeast River (Placentia),

Biscay Bay River, Northeast Brook (Trepassey), Colinet River, and Conne River) (Table 15), indicates that for this region, there was no significant improvement in returns of small salmon during the first two moratorium years (P = 0.893). For the northeast coast, even with the exclusion of counts from Bishop's Falls and Gander River, significant collective increases were obtained for Terra Nova River and Middle Brook (P = 0.0085).

Returns of large salmon for all rivers collectively also increased significantly during the two moratorium years (P = 0.0045) (Table 15). The collective improvement was again driven by improvements to northeast coast rivers. South coast rivers when treated as a group did not show a significant improvement (P =0.727). Considering only Terra Nova River and Middle Brook, counts in 1992 and 1993 increased significantly over the previous five years (P = 0.001).

COMMENTS AND CONCLUSIONS

The 1984-89 mean used above for comparisons corresponds to years under major management changes in the commercial fishery in the Newfoundland Region (see O'Connell et al. 1992a). In 1990 and 1991, the commercial fishery in both insular Newfoundland and Labrador was controlled by a quota in each SFA (O'Connell et al. 1992b). The mix of management measures in effect during 1984-89 on the one hand and the imposition of commercial quotas in 1990 and 1991 on the other, should be kept in mind when making evaluations based on the more recent 1986-91 mean. In 1992, in addition to the closure of the commercial Atlantic salmon fishery, a moratorium on the Northern Cod Fishery was implemented in early July which should have resulted in the elimination by-catch in cod fishing gear in SFAs 1-9. The cod moratorium continued in 1993.

Recent management changes in the recreational fishery, specifically the implementation and changing of quotas in SFAs along with mandatory hook-and-release fishing, and changing daily and seasonal bag limits, has seriously compromised the usefulness of angling data in terms of comparability with the past, especially when used as indices of abundance. Adding hook-and-release fish to retained fish, and comparing this total to retained fish for years prior to 1992, assumes the amount of effort expended applies equally to hook-and-release and retained fish. Reports from user groups suggest less effort was directed towards hook-and-release fishing. With respect to retained catch during the first quota period, there is evidence to suggest a 'rush for fish' occurred, based on the substantial increase in effort, and this was most pronounced in SFAs 3-5 (Tables 8 and 9). This pattern of effort expenditure was not evident during the retention period in 1992 (O'Connell et al. 1993). An additional caution associated with the use of angling catches during the first retention period as indices of abundance, is the fact there were differences among SFAs in the times quotas were caught. In this regard, differences in annual

timing of runs into rivers could confound historical comparisons, for example, notable delays in adult migration occurred in 1991 (Dempson et al. 1992). In the interpretation of trends and drawing of conclusions with respect to abundance in SFAs 3-11, more weight should be placed on information obtained from counting facilities than from recreational fishery data. In Labrador, recreational catches have historically constituted only a small proportion of the total catches (recreational plus commercial) and therefore a cautious approach must be taken in the interpretation of trends as representative of abundance.

Labrador

In Labrador, for the fourth year in a row, the quota was not caught in the commercial fishery. The percentage of the quota taken in 1993 decreased from the high recorded in 1992 and was the second lowest on record, in spite of 1993 being the second year of the salmon and cod moratoria. In both 1992 and 1993, it is possible that fish once taken in the commercial fishery in SFA 3 and to a lesser extent in SFAs 4-7, contributed to catches in Labrador. In the past Labrador-origin Atlantic salmon have been intercepted in these SFAs. Total commercial catch in 1993 was the second lowest on record (Fig. 2). Some of the declines in 1992 and 1993 might have been due to the reductions in effort.

Overall trends in the recreational fishery, the analysis of catch rates presented for the Nain Region, and trends in the catches of small and large salmon in Labrador and small salmon at West Greenland with a river age greater than 3 years, all suggest a recent, continuing period of low abundance of both small and large salmon. The overall decline in abundance is a matter of serious concern and efforts to provide increased spawning escapements should continue, particularly with respect to large salmon, which contribute substantially to egg deposition in Labrador.

Insular Newfoundland

In spite of the difficulties associated with the comparability of angling data outlined above, there is a suggestion the overall increase in catch of small salmon in SFAs 3-11 in 1993 was due mainly to the contribution of northeast coast rivers (SFAs 3-5). Catches in the remaining SFAs, particularly along the south coast (SFAs 9-11) showed little improvement over pre-salmon moratorium years and in fact decreased in most cases.

An analysis of returns to counting facilities also showed that overall increases for small salmon in 1992 and 1993 were due mainly to rivers in SFAs 4 and 5. However, it is also evident that for most counting facilities (including Gander River as evidenced by Salmon Brook) in all SFAs, counts of small salmon similar to or greater than those of 1992 and 1993 have occurred in certain pre-

salmon moratorium years. Smolt-to-adult survival back to the river in 1992 for Northeast Brook, Trepassey (SFA 10) and Conne River (SFA 11) was lower than for pre-salmon moratorium years (Table 16). While there was an improvement for both rivers in 1993, survival was still as low as when there was a commercial fishery. This is suggestive of high or above average natural mortality at sea in both 1992 and 1993 for these rivers and probably for southern Newfoundland rivers in general. Conne River, in contrast to the other rivers under consideration, is characterized by early runs of grilse (since 1986, 70-80% of the run has been complete by early July). The implementation of the 1984 management plan, which delayed the opening of the commercial fishery from mid-May to June 5, should have had a more noticeable impact on Conne River returns than the moratorium. With respect to returns in 1992, environmental conditions at sea in the spring and early summer of 1991 were the most severe on record (Narayanan et al. 1994) which suggests that high mortality could have occurred at the smolt/post-smolt stage . It is possible that marine conditions conducive to low survival were operant on the 1992 smolt class as well. A recent study by Dempson and O'Connell (1994) showed a positive relationship between an index of smolt condition and sea survival for smolts leaving both Conne River and Northeast Brook. Low index of condition of smolts in 1991 and 1992 was associated with low sea survival. This suggests a possible freshwater influence on smolt survival.

Levels of recreational catch and returns to counting facilities suggest the total population size of small salmon in 1992 and 1993 was low relative to pre-salmon moratorium years. An analysis of trends in estimated total population size for Gander River, Middle Brook, Biscay Bay River, and Conne River (Reddin et al. 1994) also supports this conclusion.

While returns of large salmon showed an overall improvement in 1993, for several facilities there were years in the past when returns were higher. The proportion of large salmon returning in 1993 decreased from 1992 in eight out of fourteen counting facilities (Table 14). Most of the fish classified as large salmon ($\geq$ 63 cm in length) in rivers in SFAs 3-11 are repeat (consecutive) spawning grilse (Table 17). Of these, 20% have multiple spawning marks. The alternate spawning grilse and virgin large salmon were confined almost exclusively to the Exploits, Gander, and Terra Nova rivers. This information, which is for all rivers and years combined, came from sampling recreational catches (prior to 1984), broodstock at incubation facilities, and fish passing through counting facilities. A large portion of the information on lifestage composition of small salmon since 1984 came from sampling of recreational catches. A comparison of the lifestage composition and corresponding information on size for small salmon (< 63 cm) sampled during broodstock allocation at the Noel Paul's Brook (tributary of the Exploits River) incubation facility with those caught in the recreational fishery in the Exploits River, is

presented in Table 18. For the years 1983, 1985 and 1986, results from both sampling regimes were reasonably close with respect to proportions of various life stages, although it appears the recreational fishery had selected for larger fish. Information from recreational sampling for other rivers for years prior to 1992 is presented in Table 19. Overall, except for Terra Nova River and Biscay Bay River, the proportion of consecutive spawning grilse in returns was around 10% or less and most were of a size that precluded their entry into the large salmon size category. Thus it appears that high expectations that a large proportion of small salmon entering a river in year i will come back as large salmon in year i+1 are unfounded. It is possible that more fish that eventually reach the large category will to return in future, as a result of the closure of the commercial salmon which selected for larger fish.

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Table 1. Summary of Atlantic salmon commercial catch data for Salmon Fishing Area 1, 1974-1993. Weight in metric tonnes. Also shown is percentage change for 1993 in relation to 1992 and the 1984-89 and 1986-91 means.

SALMON FISHING AREA 1

YEAR	SMALL WEIGHT	SMALL NUMBER	LARGE WEIGHT	LARGE NUMBER	TOTAL WEIGHT	TOTAL NUMBER
1974	19	9848	68	13866	87	23714
1975	66	34937	123	28601	190	63538
1976	37	17589	174	38555	211	56144
1977	36	17796	138	28158	174	45954
1978	33	17095	145	30824	177	47919
1979	21	9712	93	21291	114	31003
1980	50	22501	144	28750	193	51251
1981	45	21596	182	36147	227	57743
1982	37	18478	113	24192	150	42670
1983	31	15964	86	19403	117	35367
1984	24	11474	55	11726	79	23200
1985	29	15400	60	13252	89	28652
1986	36	17779	97	19152	133	36931
1987	27	13714	87	18257	115	31971
1988	37	19641	59	12621	97	32262
1989	26	13233	73	16261	99	29494
1990	16	8736	36	7313	52	16049
1991	3	1410	7	1369	10	2779
1992	18	9588	47	9981	66	19569
1993*	7	3895	17	3824	25	7719
$\bar{X}$ 84-89	29.83	15206.83	71.83	15211.50	102.00	30418.33
S.D.	5.42	3045.45	17.05	3117.79	19.30	4567.35
95% LCL	24.15	12010.31	53.94	11939.05	81.75	25624.42
95% UCL	35.52	18403.36	89.72	18483.95	122.25	35212.25
$\bar{X}$ 86-91	24.17	12418.83	59.83	12495.50	84.33	24914.33
S.D.	12.89	6602.86	33.62	6962.13	45.29	12943.92
95% LCL	10.64	5488.43	24.54	5188.01	36.80	11328.31
95% UCL	37.70	19349.24	95.13	19802.99	131.87	38500.36
%Change, 1993 vs:						
1992	-61	-59	-64	-62	-62	-61
$\bar{X}$ 84-89	-77	-74	-76	-75	-75	-75
$\bar{X}$ 86-91	-71	-69	-72	-69	-70	-69

* Preliminary data.

Table 2. Summary of Atlantic salmon commercial catch data for Salmon Fishing Area 2, 1974-1993. Weight in metric tonnes. Also shown is percentage change for 1993 in relation to 1992 and the 1984-89 and 1986-91 means.

SALMON FISHING AREA 2

YEAR	SMALL WEIGHT	SMALL NUMBER	LARGE WEIGHT	LARGE NUMBER	TOTAL WEIGHT	TOTAL NUMBER
1974	75	37145	456	93036	530	130181
1975	110	57560	306	71168	415	128728
1976	100	47468	349	77796	450	125264
1977	81	40539	343	70158	425	110697
1978	23	12535	230	48934	253	61469
1979	60	28808	120	27073	180	55881
1980	159	72485	435	87067	595	159552
1981	179	86426	356	68581	536	155007
1982	107	53592	249	53085	356	106677
1983	60	30185	153	33320	213	63505
1984	24	11695	115	25258	138	36953
1985	46	24499	76	16789	122	41288
1986	90	45321	174	34071	264	79392
1987	128	64351	240	49799	367	114150
1988	107	56381	153	32386	260	88767
1989	69	34200	121	26836	190	61036
1990	43	20699	85	17316	127	38015
1991	40	20055	36	7679	76	27734
1992	25	13336	96	19608	121	32944
1993*	22	11694	45	9494	67	21188
$\bar{X}$ 84-89	77.33	39407.83	146.50	30856.50	223.50	70264.33
S.D.	38.74	19812.18	56.84	11107.59	91.98	29617.73
95% LCL	36.67	18612.85	86.84	19197.90	126.96	39177.38
95% UCL	117.99	60202.82	206.16	42515.10	320.04	101351.29
$\bar{X}$ 86-91	79.50	40167.83	134.83	28014.50	214.00	68182.33
S.D.	35.27	18403.39	71.23	14558.40	105.08	32433.37
95% LCL	42.48	20851.52	60.07	12733.91	103.70	34140.06
95% UCL	116.52	59484.15	209.59	43295.09	324.30	102224.60
%Change, 1993 vs:						
1992	-12	-12	-53	-52	-45	-36
$\bar{X}$ 84-89	-72	-70	-69	-69	-70	-70
$\bar{X}$ 86-91	-72	-71	-67	-66	-69	-69

* Preliminary data.

Table 3. Summary of Atlantic salmon commercial catch data for Labrador (SFAs 1-2), 1974-1993. Weight in metric tonnes. Also shown is percentage change for 1993 in relation to 1992 and the 1984-89 and 1986-91 means.

LABRADOR (SFAs 1-2)

YEAR	SMALL WEIGHT	SMALL NUMBER	LARGE WEIGHT	LARGE NUMBER	TOTAL WEIGHT	TOTAL NUMBER
1974	94	46993	524	106902	617	153895
1975	176	92497	429	99769	605	192266
1976	137	65057	523	116351	661	181408
1977	117	58335	481	98316	599	156651
1978	56	29630	375	79758	430	109388
1979	81	38520	213	48364	294	86884
1980	209	94986	579	115817	788	210803
1981	224	108022	538	104728	763	212750
1982	144	72070	362	77277	506	149347
1983	91	46149	239	52723	330	98872
1984	48	23169	170	36984	217	60153
1985	75	39899	136	30041	211	69940
1986	126	63100	271	53223	397	116323
1987	155	78065	327	68056	482	146121
1988	144	76022	212	45007	357	121029
1989	95	47433	194	43097	289	90530
1990	59	29435	121	24629	179	54064
1991	43	21465	43	9048	86	30513
1992	43	22924	143	29589	187	52513
1993*	29	15589	62	13318	92	28907
$\bar{X}$ 84-89	107.17	54614.67	218.33	46068.00	325.50	100682.67
S.D.	41.67	21620.13	69.76	13296.64	106.59	32906.16
95% LCL	63.43	31922.04	145.12	32111.77	213.62	66144.15
95% UCL	150.91	77307.29	291.55	60024.23	437.38	135221.18
$\bar{X}$ 86-91	103.67	52586.67	194.67	40510.00	298.33	93096.67
S.D.	45.85	23832.79	102.05	20925.49	145.82	43767.82
95% LCL	55.54	27571.62	87.56	18546.47	145.28	47157.69
95% UCL	151.79	77601.71	301.78	62473.53	451.39	139035.65
%Change, 1993 vs:						
1992	-33	-32	-57	-55	-51	-45
X 84-89	-73	-71	-72	-71	-72	-71
$\bar{X}$ 86-91	-72	-70	-68	-67	-69	-69

* Preliminary data.

Table 4. Results of analyses of the regression of ln catch rate for Atlantic salmon from the Nain Fishing Region of Labrador, SFA 1, 1977-93.

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: CUE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	78	181.03909522	2.32101404	9.16	0.0	0.656419	12.6929
ERROR	374	94.75910850	0.25336660		ROOT MSE		CUE MEAN
CORRECTED TOTAL	452	275.79820373			0.50335534		3.96563497

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
YY	16	56.87686598	14.03	0.0001	16	67.50914656	16.65	0.0001
WK	12	43.37509951	14.27	0.0001	12	44.23930606	14.55	0.0001
ZN	3	42.26674465	55.61	0.0001	3	48.40935453	63.69	0.0001
YY*ZN	47	38.52038508	3.23	0.0001	47	38.52038508	3.23	0.0001

Table 5. Atlantic Salmon recreational catch (retained + released), effort, and catch per unit of effort (CPUE) data for 1993 for each SFA, Labrador (SFAs 1-2), and insular Newfoundland (SFAs 3-11). The 1984-89 and 1986-91 means are included; 95% Confidence Intervals are in parentheses.

	Effort (rod days)			Small salmon (< 63 cm.)			Large Salmon (≥ 63 cm.)			CPUE**		
SFA	1993	$\bar{x}$ 84-89*	$\bar{x}$ 86-91*	1993	$\bar{x}$ 84-89*	$\bar{x}$ 86-91*	1993	$\bar{x}$ 84-89*	$\bar{x}$ 86-91*	1993	$\bar{x}$ 84-89*	$\bar{x}$ 86-91*
Labrador												
1	292	1116.2	1076.7	202	861.0	742.2	24	157.0	113.8	0.77	0.91	0.80
		(324.4)	(344.5)		(365.7)	(499.0)		(36.7)	(61.0)		(0.12)	(0.33)
2	3730	2455.7	2745.5	2638	2017.5	2045.8	173	190.8	198.0	0.75	0.90	0.82
		(517.0)	(270.3)		(637.3)	(633.2)		(103.5)	(102.5)		(0.15)	(0.25)
1 - 2	4022	3571.8	3822.2	2840	2878.5	2788.0	197	347.8	311.8	0.76	0.90	0.81
		(761.3)	(553.5)		(905.9)	(1088.0)		(104.2)	(160.9)		(0.11)	(0.26)
Insular Nf.												
3	4384	2136.8	2547.0	4065	1115.4	1260.0	152			0.93	0.52	0.49
		(756.5)	(1157.0)		(527.4)	(611.3)					(0.09)	(0.13)
4	30958	28158.4	24472.4	12956	9004.6	6697.2	158			0.42	0.32	0.27
		(7877.0)	(6574.0)		(3876.4)	(3372.6)					(0.06)	(0.08)
5	12949	10528.0	8725.0	4099	3164.6	2819.6	107			0.32	0.30	0.32
		(2841.9)	(2694.4)		(1410.4)	(1528.5)					(0.10)	(0.08)
6	2784	2884.2	2731.2	404	372.2	328.0	9			0.15	0.13	0.12
		(573.2)	(848.9)		(109.8)	(139.9)					(0.05)	(0.04)
7	1107	1317.4	1008.4	61	100.8	76.2	0			0.06	0.08	0.08
		(481.6)	(524.4)		(28.5)	(47.3)					(0.03)	(0.04)
8	458	493.6	434.6	55	99.6	82.6	0			0.12	0.20	0.19
		(196.9)	(196.7)		(30.0)	(57.2)					(0.05)	(0.09)
9	10344	8228.4	7545.0	1582	1800.0	1482.4	15			0.15	0.22	0.20
		(1318.6)	(1179.9)		(583.5)	(810.2)					(0.05)	(0.08)
10	7656	5908.4	4806.4	1391	1271.6	928.0	26			0.18	0.22	0.19
		(1133.7)	(1529.7)		(318.4)	(592.6)					(0.03)	(0.06)
11	11280	14136.8	12350.8	3748	5276.2	3967.6	43			0.33	0.37	0.32
		(1975.2)	(3784.9)		(1845.1)	(1897.6)					(0.09)	(0.06)
3 - 11	81920	73792.0	64620.8	28361	22205.0	17641.6	510			0.35	0.30	0.27
		(14436.0)	(14662.1)		(7517.6)	(7915.1)					(0.05)	(0.06)

*1987 not included in SFAs 3-11.

**1993 CPUE for SFAs 3-11 is based on small salmon (retained + released) only.

Table 6. Recreational catch (retained + released), effort, and catch per unit effort in 1993 for each SFA, Labrador (SFAs 1-2), and insular Newfoundland (SFAs 3-11), expressed as percentage change in relation to the 1984-89 and the 1986-91 means.

	Effort (rod days)		Sm. salmon (< 63 cm.)		Lg. salmon (≥ 63cm.)		CPUE	
SFA	$\bar{x}$ 84-89*	x 86-91*	x 84-89*	x 86-91*	$\bar{x}$ 84-89*	$\bar{x}$ 86-91*	$\bar{x}$ 84-89*	$\bar{x}$ 86-91*
Labrador								
1	-74	-73	-77	-73	-85	-79	-15	-3
2	52	36	31	29	-9	-13	-16	-8
1 - 2	13	5	-1	2	-43	-37	-16	-7
Insular Nf.								
3	105	72	264	223			78	89
4	10	27	44	93			31	55
5	23	48	30	45			6	-1
6	-3	2	9	23			12	21
7	-16	10	-39	-20			-31	-31
8	-7	5	-45	-33			-40	-37
9	26	37	-12	7			-30	-24
10	30	59	9	50			-17	-4
11	-20	-9	-29	-6			-10	4
3 - 11	11	27	28	61			15	28

*1987 not included in SFAs 3-11.

Table 7. Retained recreational catch to date of closure of the first quota period in 1993 for SFAs 3 - 11 separately and combined in insular Newfoundland, and for SFAs 1 and 2 separately and combined in Labrador, where there was a single quota period for the entire angling season.

			Small salmon (< 63 cm.)							Large salmon (≥ 63 cm.)						
SFA	Quota to July 31**	Last day fished	1993	Mean 84-89*	LCL	UCL	Mean 86-91*	LCL	UCL	1993	Mean 84-89	LCL	UCL	Mean 86-91	LCL	UCL
Labrador																
1	800	Sept 26	86	861.0	495.2	1226.8	742.2	243.1	1241.3	5	157.0	120.3	193.7	113.8	52.8	174.9
2	2800	Sept 19	1375	2017.5	1380.1	2654.9	2045.8	1412.6	2679.1	131	190.8	87.3	294.4	198.0	95.5	300.5
1 - 2	3600		1461	2878.5	1972.4	3784.6	2788.0	1699.8	3876.2	136	347.8	243.6	452.0	311.8	150.9	472.8
Insular Nf.																
3	1040	July 4	1162	233.6	8.9	458.3	304.8	92.1	517.5							
4	3360	July 11	4171	2580.6	1498.5	3662.7	2025.2	555.5	3494.9							
5	1500	July 8	1567	639.8	214.9	1064.7	623.6	124.5	1122.7							
6	150	July 21	242	145.8	92.6	199.0	120.2	52.1	188.3							
7	35	July 21	38	44.8	27.1	62.5	39.8	19.0	60.6							
8	35	July 21	40	57.4	43.9	70.9	48.8	14.8	82.8							
9***	1125	Sept 6	1431	1798.0	1214.0	2382.0	1482.2	672.0	2292.4							
10	585	July 9	629	659.6	393.8	925.4	512.0	114.8	909.2							
11	2790	July 22	2732	4671.0	3038.5	6303.5	3461.6	1733.7	5189.5							
3-11	10620		12012	10830.6	7558.9	14102.3	8618.2	3729.4	13507.0							

* 1987 Not included in SFAs 3-11
**Except in Labrador where there was one quota for the season.
***Quota to July 31 not caught in SFA 9.

Table 8. Effort to the date of closure of the recreational fishery for the retention of Atlantic salmon in the first quota period in 1993 for SFAs 3 - 11 separately and combined in insular Newfoundland, and SFAs 1 and 2 separately and combined in Labrador.

SFA	Last day fished	Effort (rod days)						
		1993	Mean 84-89*	LCL	UCL	Mean 86-91*	LCL	UCL
Labrador								
1	Sept 26	292	1116.0	791.4	1440.6	1076.7	732.1	1421.2
2	Sept 19	3730	2455.7	1938.6	2972.7	2745.5	2475.2	3015.8
1 - 2		4022	3571.7	2810.0	4333.3	3822.2	3268.6	4375.7
Insular Nf.								
3	July 4	2002	524.4	244.2	804.6	633.4	385.8	881.0
4	July 11	14096	9384.6	7876.6	10892.6	8274.2	5330.2	11218.2
5	July 8	5322	2388.8	1740.7	3036.9	2066.8	1227.1	2906.5
6	July 21	1792	1298.0	970.3	1625.7	1245.8	894.4	1597.2
7	July 21	878	628.4	398.6	858.2	537.8	285.4	790.2
8	July 21	335	289.6	179.1	400.1	258.4	134.6	382.2
9	Sept 6	10344	8163.2	6888.3	9438.1	7522.6	6339.3	8705.9
10	July 9	3759	2600.8	2120.5	3081.1	2391.6	1549.5	3233.7
11	July 22	8712	11816.4	10229.2	13403.6	10018.2	6794.9	13241.5
3 - 11		47240	37094.2	32642.4	41546.0	32948.8	23828.8	42068.8

*1987 not included in SFAs 3-11.

Table 9. Percentage change in retained catch up to the time the first portion of the quota was caught in each SFA, in 1993, in relation to mean catch to the same date for 1984-89 and 1986-91.

	Small salmon (< 63 cm)		Large salmon (≥ 63 cm)	
SFA	Mean 84-89*	Mean 86-91*	Mean 84-89	Mean 86-91
Labrador				
1	-90	-88	-97	-96
2	-32	-33	-31	-34
1 - 2	-49	-48	-61	-56
Insular Nf.				
3	397	281		
4	62	106		
5	145	151		
6	66	101		
7	-15	-5		
8	-30	-18		
9	-20	-3		
10	-5	23		
11	-42	-21		
3 -11	11	39		

*1987 not included in SFAs 3-11.

Table 10. Percentage change in effort up to the time the first portion of the quota was caught in each SFA, in 1993, in relation to mean effort to the same date for 1984-89 and 1986-91.

	Effort (rod days)	
SFA	Mean 84-89*	Mean 86-91*
Labrador		
1	-74	-73
2	52	36
1 - 2	13	5
Insular Nf.		
3	282	216
4	50	70
5	123	157
6	38	44
7	40	63
8	16	30
9	27	38
10	45	57
11	-26	-13
3 -11	27	43

*1987 not included in SFAs 3-11.

Table 11. Counts of small salmon from fishways and counting fences in insular Newfoundland 1955-93 by Salmon Fishing Area (SFA); also shown are means ($\bar{X}$), 95% confidence intervals (CI), and coefficients of variation (CV). Partial counts are in parentheses and are not included in means.

	Fishways									Counting Fences				
	SFA 4			SFA 5			SFA 9	SFA 10	SFA 11	SFA 4	SFA 9			SFA 11
Year	1A	1B	2	3	4	5	6	7	8	9	10	11	12	13
1955						53								
1956				(323)	558	32								
1957			642	(28)	141	21								
1958			1072	(344)	677	10								
1959	(886)		591	(294)	394	62								
1960	1013	94	291		490	86								
1961	839	319	41		318	74								
1962		1037			496	284								
1963	1202	491			551	372								
1964		1752			418	246								
1965	1228	587			484	334								
1966	(829)	942			368	134								
1967	1372	822			606	367								
1968		1334			714	409		(57)						
1969	979	892			660	463								
1970		1023			755	561								
1971	961	902	731		579	316		159						
1972	794	(495)	540	838	609	331		236						
1973	205		971	(1079)	455	340		(399)						
1974	2538		857	(770)		162		223						
1975	9218	5531		(1119)		778		(86)						
1976	3991	2935				335		294						
1977	6148	4300				371								
1978	3790	2704	755	1403	810	436		390						
1979	6715	3925	(404)	(1350)	569	455		454						
1980		4597	997	1712	843	420		433						
1981	(8114)	4264	2459	2414	1115	619		(334)						
1982	(7605)	2796	1425	1281	963	625		(86)					133	
1983		(2952)	978	1195	1210	853		233			2330		272	
1984	17219	(6300)	1081	1379	1233	904		419			2430	89	359	
1985	16652	5985	1663	904	1557	960		384			(1377)	124	170	
1986	9697	3072	1064	1036	1051	726		725	211		2516	158	296	7515
1987	9014	2327	(493)	914	974	570	80	(325)	(155)		(1302)	91	368	9687
1988	8974	3433	1562	772	1737	795	313	543	149		1695	97	(205)	7118
1989	7192	1694	596	496	1138	668	168	706	175	7743	(889)	62	441	4469
1990	6629	1057	(328)	745	1149	(410)	401	551	208	7520	1657	71	(307)	4321
1991	5245	1060	245	562	873	(311)	211	353	(46)	6445	394	99	218	2086
1992	12538	3520	1168	1182	1443	886	237	921	101	(17306)	(1298)	49	251	1973
1993	21319	5615	1560	1959	(2713)	962	292	847	(182)	25905	(1045)	79	276	2355
1984-89														
$\bar{X}$	11458	3302.2	1193.2	916.8	1281.7	770.5	187.0	555.4	178.3		2213.7	103.5	326.8	7197.3
95% CI	4541.5	2040.4	534.9	306.4	316.3	153.6	292.3	195.9	77.3		1121.0	34.9	126.2	3406.1
CV	37.76	49.77	36.11	31.84	23.51	18.99	62.92	28.41	17.46		20.38	32.11	31.10	29.75
N	6	5	5	6	6	6	3	5	3		3	6	5	4
1986-91														
$\bar{X}$	7791.8	2107.2	866.8	754.2	1153.7	689.8	234.6	575.6	185.8	7236.0	1565.5	96.3	330.8	5866.0
95% CI	1800.9	1060.8	910.3	214.6	319.1	151.5	155.5	186.8	46.8	1724.2	1393.4	35.3	152.2	2875.0
CV	22.02	47.96	66.01	27.11	26.35	13.81	53.38	26.14	15.85	9.59	55.94	34.92	28.93	46.69
N	6	6	4	6	6	4	5	5	4	3	4	6	4	6

1. Exploits River
   (a) Bishop's Falls
   (b) Gt. Rattling Brook
2. Gander River (Salmon Brook)
3. Middle Brook
4. L. Terra Nova River
5. U. Terra Nova River
6. Rocky River
7. Northeast River (Placentia)
8. Grand Bank Brook
9. Gander River
10. Biscay Bay River
11. Northeast Brook (Trepassey)
12. Colinet River
13. Conne River

Table 12. Counts of large salmon from fishways and counting fences in insular Newfoundland 1955-93 by Salmon Fishing Area (SFA); also shown are means ($\bar{X}$), 95% confidence intervals (CI), and coefficients of variation (CV). Partial counts are in parentheses and are not included in means.

	Fishways									Counting Fences				
	SFA 4			SFA 5			SFA 9	SFA 10	SFA 11	SFA 4	SFA 9			SFA 11
Year	1A	1B	2	3	4	5	6	7	8	9	10	11	12	13
1955						24								
1956				(56)	37	44								
1957			323	(2)	41	1								
1958			491	(229)	195	0								
1959	(119)		290	(14)	67	0								
1960	157	9	183		216	0								
1961	118	53	15		100	1								
1962		31			277	4								
1963	65	37			320	34								
1964		116			298	18								
1965	203	190			255	51								
1966	(506)	470			220	2								
1967	710	382			359	43								
1968		687			376	28		(11)						
1969	498	290			391	136								
1970		199			469	172								
1971	300	261	494		279	121		21						
1972	113	(234)	54	10	348	200		34						
1973	89		135	(9)	303	223		(64)						
1974	411		9	(77)		121		9						
1975	1439	505		(9)		52		(36)						
1976	460	117				37		56						
1977	581	271				262								
1978	303	81	52	16	20	89		32						
1979	277	124	(6)	(54)	170	30		37						
1980		426	15	91	39	17		34						
1981	(1695)	514	33	39	90	28		(62)						
1982	(181)	122	18	20	19	8		(36)					116	
1983		(302)	12	75	57	76		22			88		43	
1984	529	(111)	38	57	107	98		44			83	33	97	
1985	183	38	26	27	112	60		0			(21)	41	42	
1986	355	174	12	15	140	58		39	4		101	30	31	397
1987	310	41	(9)	19	56	38	1	(16)	(2)		(106)	30	55	498
1988	147	10	24	14	206	45	6	11	2		61	19	(16)	418
1989	89	14	24	19	142	51	9	15	7	473	(104)	18	81	319
1990	122	15	(7)	13	144	(34)	17	25	15	508	71	9	(50)	361
1991	99	40	2	14	114	(26)	16	8	(7)	670	35	13	18	87
1992	314	242	101	43	270	224	46	46	35	(3850)	(49)	10	74	154
1993	627	312	87	87	(470)	173	72	65	(6)	1734	(116)	17	39	98
1984-89														
$\bar{X}$	268.8	55.4	24.8	25.2	127.2	58.3	5.3	21.8	4.3		81.7	28.5	61.2	408.0
95% CI	170.1	84.1	11.5	17.1	52.1	22.1	10.0	23.4	6.3		49.8	9.2	34.0	117.1
CV	60.29	122.26	37.22	64.58	39.00	36.13	75.78	86.64	58.08		24.53	30.65	44.69	18.03
N	6	5	5	6	6	6	3	5	3		3	6	5	4
1986-91														
$\bar{X}$	187.0	49.0	15.5	15.7	133.7	48.0	9.8	19.6	7.0	550.3	67.0	19.8	46.3	346.7
95% CI	121.1	65.8	16.9	2.8	51.1	13.6	8.4	15.6	9.1	261.1	43.4	9.1	44.2	147.6
CV	61.68	128.01	68.58	16.97	36.45	17.76	68.98	64.29	81.65	19.10	40.71	43.66	60.06	40.57
N	6	6	4	6	6	4	5	5	4	3	4	6	4	6

1. Exploits River
   (a) Bishop's Falls
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2. Gander River (Salmon Brook)
3. Middle Brook
4. L. Terra Nova River
5. U. Terra Nova River
6. Rocky River
7. Northeast River (Placentia)
8. Grand Bank Brook
9. Gander River
10. Biscay Bay River
11. Northeast Brook (Trepassey)
12. Colinet River
13. Conne River

Table 13. Counts of small and large salmon from fishways and counting fences in insular Newfoundland for 1993 expressed as percentage change in relation to 1992, the 1984-89 mean and the 1986-91 mean.

	Small salmon			Large salmon		
	1992	$\bar{x}$1984-89	$\bar{x}$1986-91	1992	$\bar{x}$1984-89	$\bar{x}$1986-91
FISHWAYS						
SFA 4						
Bishops Falls (Exploits River)	70	86	174	100	133	235
Gt. Rattling Rrook (Exploits River)	60	70	166	29	463	537
Salmon Brook (Gander River)	34	31	80	-14	251	461
SFA 5						
Middle Brook	66	114	160	102	245	454
Lower Terra Nova River**	88	112	135	74	269	252
Upper Terra Nova River	9	25	39	-23	197	260
SFA 9						
Rocky River	23	56	24	57	1258	635
SFA 10						
Northeast River (Placentia)	-8	53	47	41	198	232
SFA 11						
Grand Bank Brook**	80	2	-2	-83	40	-14
COUNTING FENCES						
SFA 4						
Gander River*	50		258	-55		215
SFA 9						
Biscay Bay River* **	-19	-53	-33	137	42	73
Northeast Brook (Trepassey)	61	-24	-18	70	-40	-14
Colinet River	10	-16	-17	-47	-36	-16
SFA 11						
Conne River	19	-67	-60	-36	-76	-72

*Partial count in 1992 (see text).
**Partial count in 1993 (see text).

Table 14. Proportion of large salmon at counting facilities in insular Newfoundland in 1992 and 1993,as well as the 1984-89 and 1986-91 means.

	Proportion of large salmon			
Counting facility	$\bar{x}$ 84-89	$\bar{x}$ 86-91	1992	1993
Exploits River (Bishops Falls)	0.023	0.023	0.024	0.029
Exploits River (Gt. Rattling Bk)	0.016	0.023	0.064	0.053
Gander River (counting fence)		0.071	0.182	0.063
Gander River (Salmon Brook)	0.020	0.018	0.080	0.053
Middle Brook	0.027	0.020	0.035	0.043
Terra Nova River (Lower)	0.090	0.104	0.158	0.148
Terra Nova River (Upper)	0.070	0.065	0.202	0.152
Rocky River	0.028	0.040	0.163	0.198
Northeast River (Placentia)	0.038	0.033	0.048	0.071
Grand Bank Brook	0.024	0.036	0.257	0.032
Biscay Bay River	0.036	0.041	0.036	0.100
Northeast Brook (Trepassey)	0.216	0.171	0.169	0.177
Colinet River	0.158	0.123	0.228	0.124
Conne River	0.054	0.056	0.072	0.040

Table 15. Results of ratio randomization tests of counts of small and large Atlantic salmon in 1992 and 1993 compared with 1987-91. Number of simulations was 2000.

Category	Observed ratio R_o	Minimum simulated value	Maximum simulated value	Significance level for R_o
Small salmon				
- all rivers	1.89210	0.39123	2.19233	0.0085
- south coast	0.61487	0.37985	2.10220	0.8930
- northeast coast*	1.94898	0.56465	2.09326	0.0085
Large salmon				
- all rivers	3.04458	0.24472	3.29004	0.0045
- south coast	0.80467	0.21810	2.11822	0.7265
- northeast coast*	2.93522	0.34830	2.93522	0.0010

* Terra Nova River and Middle Brook only. Excludes salmon counts from Bishop's Falls (Exploits River) and Gander River.

Table 16. Atlantic salmon smolt-to-adult survival (back to the river) for Northeast Brook, Trepassey (SFA 9) and Conne River (SFA 11).

Year (i)	Northeast Brook			Conne River[1]		
	Smolts year i	Sm. sal. year i+1	% Surv.	Smolts year i	Sm. sal. year i+1	% Surv.
1986	1117	91	8.2			
1987	1404	97	6.9	74585	7627	10.2
1988	1692	62	3.7	68692	4968	7.6
1989	1708	71	4.2	73724	5383	7.3
1990	1902	99	5.2	56943	2410	4.2
1991	1911	49	2.6	74645	2523	3.4
1992	1674	79	4.7	68208	2703	4.0

[1]Includes Native food fishery.

Table 17. Frequency of lifestages and corresponding fork length information for large salmon (≥ 63 cm) caught in the recreational fishery (years prior to 1984) and sampled at incubation and counting facilities in various rivers in SFAs 4-10. Data are for all years all rivers combined.

Lifestage	Freq.	%	Fork length (cm)			
			Mean	Min.	Max.	N
CSG	115	42.8	67.1	63.0	82.6	114
ASG	57	21.2	70.4	64.4	80.2	57
VG	52	19.3	65.3	63.0	74.0	52
VLS	45	16.7	68.1	63.0	75.0	45

VG = virgin grilse; CSG = consecutive spawning grilse; ASG = alternate spawning grilse; VLS = virgin large salmon.

Table 18. Frequency of lifestages and corresponding fork length information for small salmon (< 63 cm) caught in the recreational fishery and for those sampled at the Noel Paul's Brook tributary incubation facility, Exploits River in 1983, 1985, and 1986.

Year	Lifestage	Freq.	%	Fork length (cm)			
				Mean	Min.	Max.	N
Recreational fishery							
1983	VG	572	95.7	52.5	40.0	61.0	565
	CSG	26	4.3	57.2	49.0	61.0	22
1985	VG	590	97.0	53.3	38.0	62.0	589
	CSG	17	2.8	56.4	42.0	61.0	17
	VLS	1	0.2				
1986	VG	299	95.5	52.9	39.0	62.0	298
	CSG	14	4.5	58.4	48.0	62.5	14
Incubation facility							
1983	VG	941	94.2	50.5	35.5	60.5	941
	CSG	57	5.7	54.8	50.0	60.5	57
	VLS	1	0.1	54.0			
1985	VG	3169	97.4	50.8	37.0	62.5	3169
	CSG	79	2.4	54.0	48.0	62.8	79
	VLS	7	0.2	57.5	51.0	62.5	7
1986	VG	237	92.6	52.0	41.1	62.2	237
	CSG	18	7.0	57.9	44.3	62.9	18
	VLS	1	0.4	60.5			1

VG = virgin grilse; CSG = consecutive spawning grilse; VLS = virgin large salmon.

Table 19. Frequency of lifestages and corresponding fork length information for small salmon (< 63 cm) caught in the recreational fishery in various rivers in SFAs 4-10 for years prior to 1992. Data are for all years combined for each river.

Lifestage	Freq.	%	Fork length (cm)			
			Mean	Min.	Max.	N
Gander River (SFA 4)						
VG	1317	95.9	52.2	39.0	62.5	1295
CSG	57	4.1	54.9	46.0	62.1	57
Middle Brook (SFA 5)						
VG	517	89.7	50.0	33.9	61.0	488
CSG	59	10.3	54.6	41.7	62.0	59
Terra Nova River (SFA 5)						
VG	828	84.4	50.6	38.0	61.5	785
CSG	151	15.4	54.7	41.6	62.0	142
ASG	2	0.2	59.5	58.0	61.0	2
Biscay River (SFA 10)						
VG	528	85.6	51.7	41.3	62.0	515
CSG	89	14.4	56.6	49.5	62.9	89
Northeast River, Placentia (SFA 10)						
VG	481	94.0	52.8	39.4	58.5	450
CSG	31	6.0	54.0	45.5	60.0	29

VG = virgin grilse; CSG = consecutive spawning grilse; ASG = alternate spawning grilse.

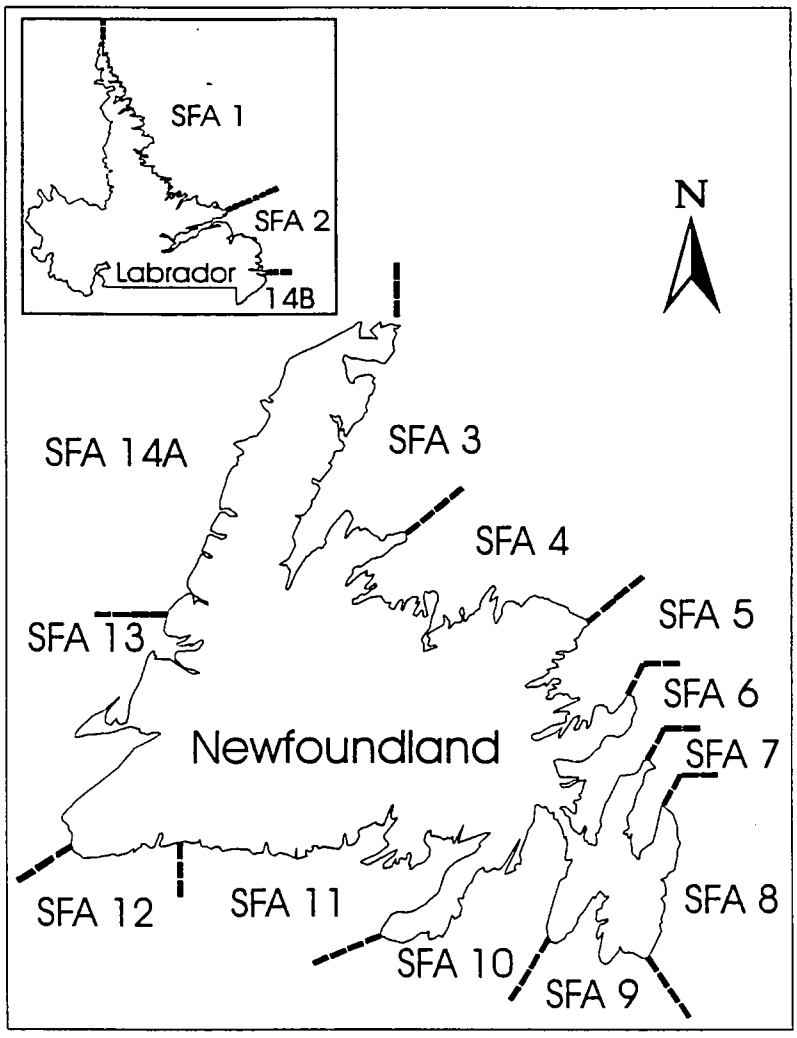


Fig. 1. Map showing the 14 Salmon Fishing Areas of the Newfoundland Region.

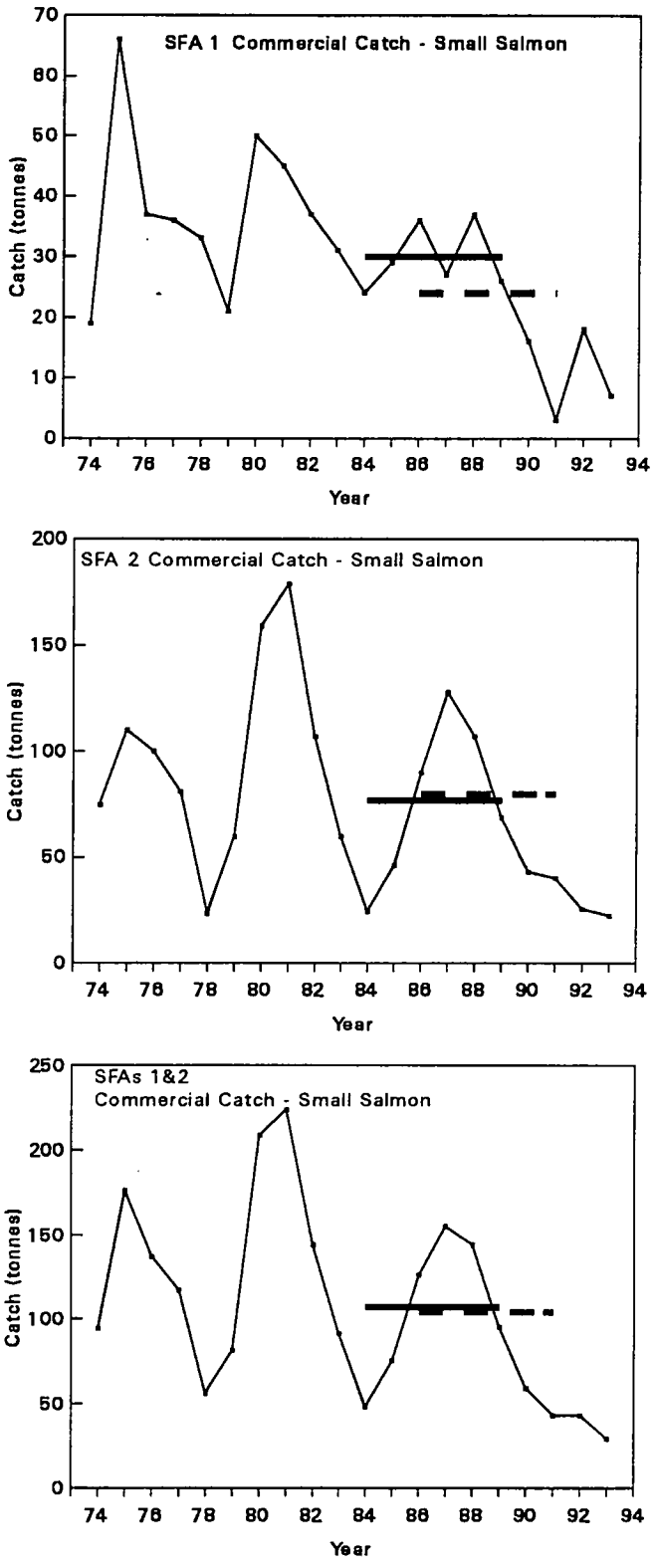


Fig. 2a. Commercial catch of small salmon (tonnes) for SFAs 1 and 2 separately and combined, Labrador, 1974-93. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean.

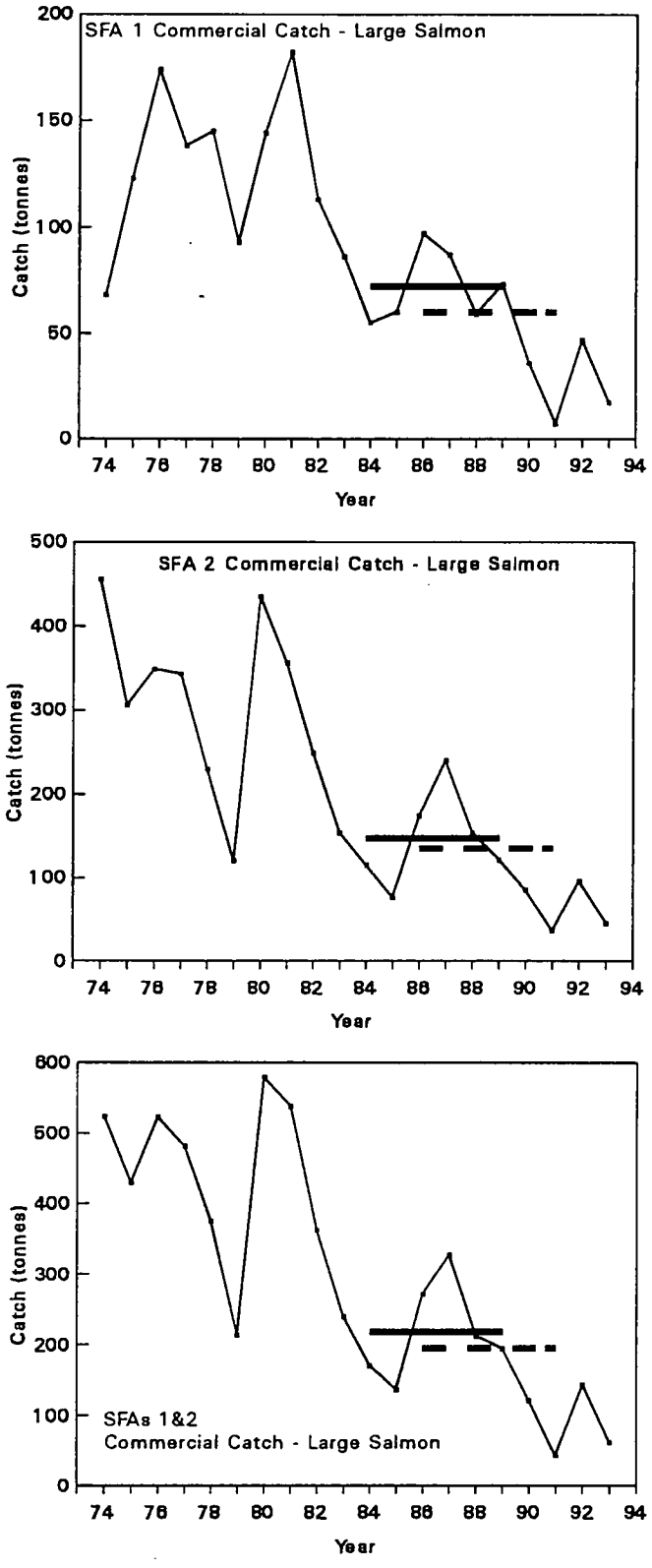


Fig. 2b. Commercial catch of large salmon (tonnes) for SFAs 1 and 2 separately and combined, Labrador, 1974-93. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean.

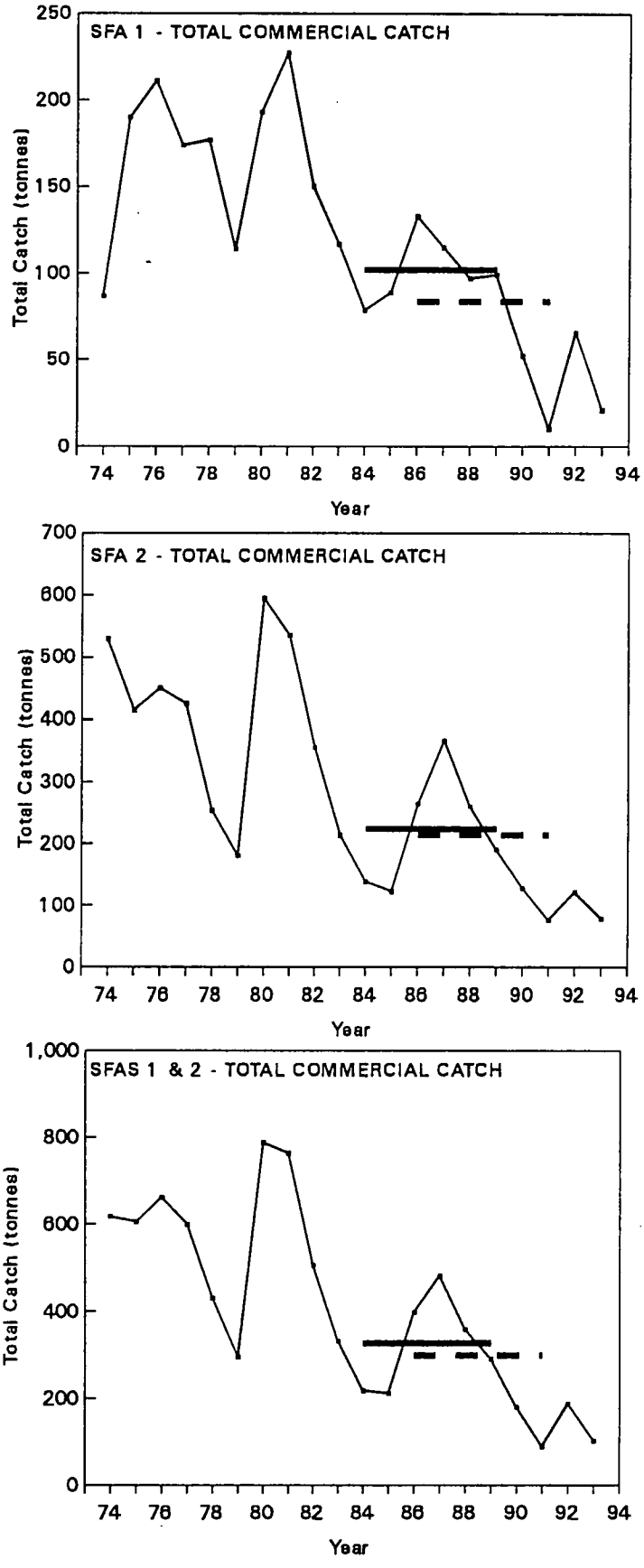
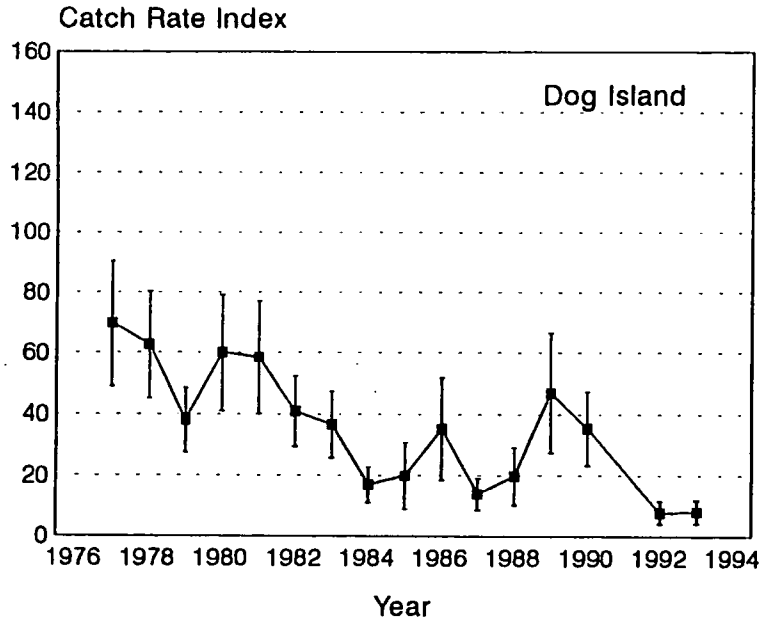
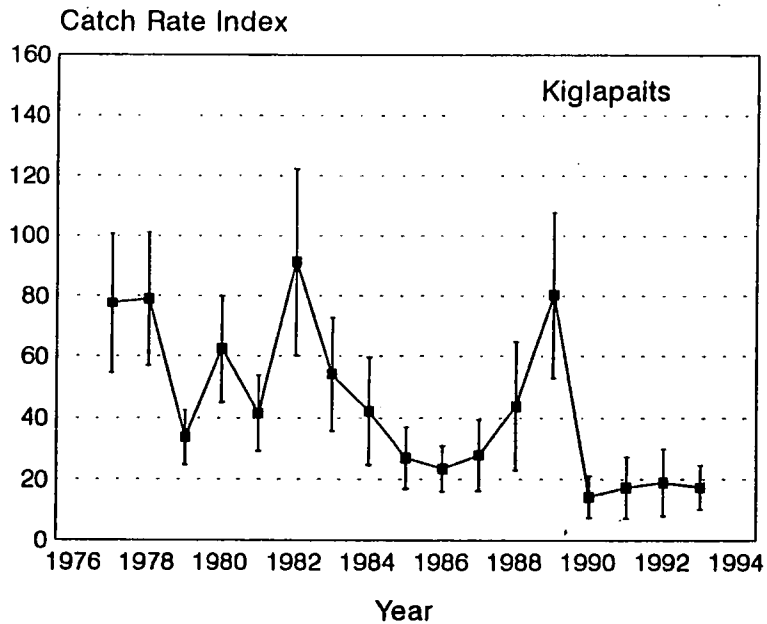
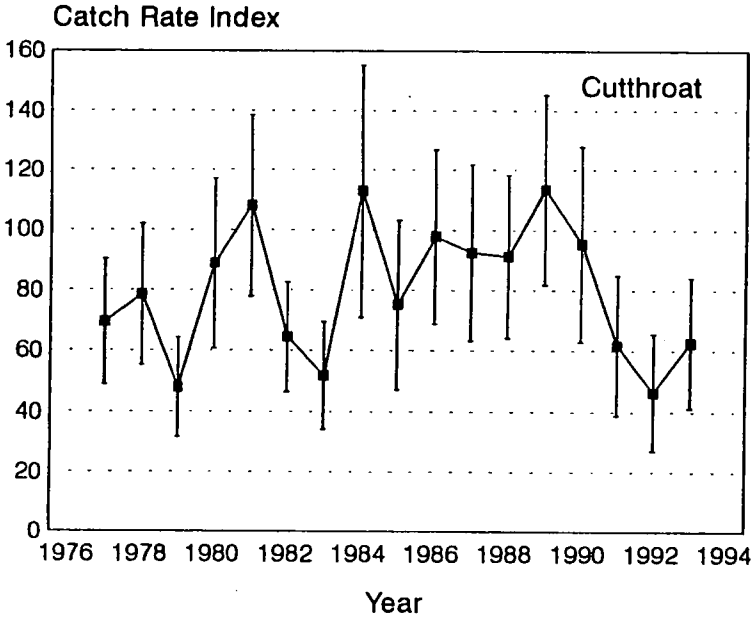


Fig. 2c. Total commercial catch (tonnes) for SFAs 1 and 2 separately and combined, Labrador, 1974-93. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean.







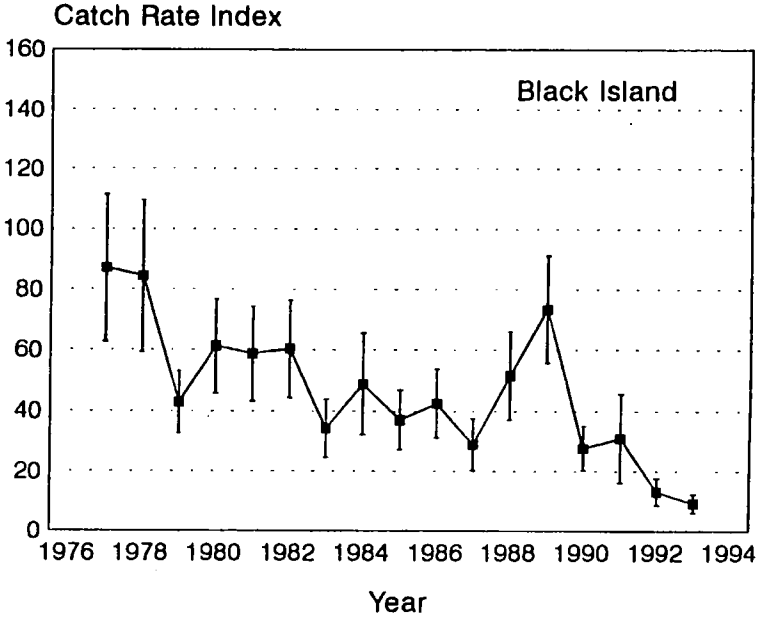


Fig. 3. Trends in the Atlantic salmon commercial catch rate index from four subareas within the Nain Fishing Region of northern Labrador, 1977-93. Vertical lines indicate 90% confidence intervals.

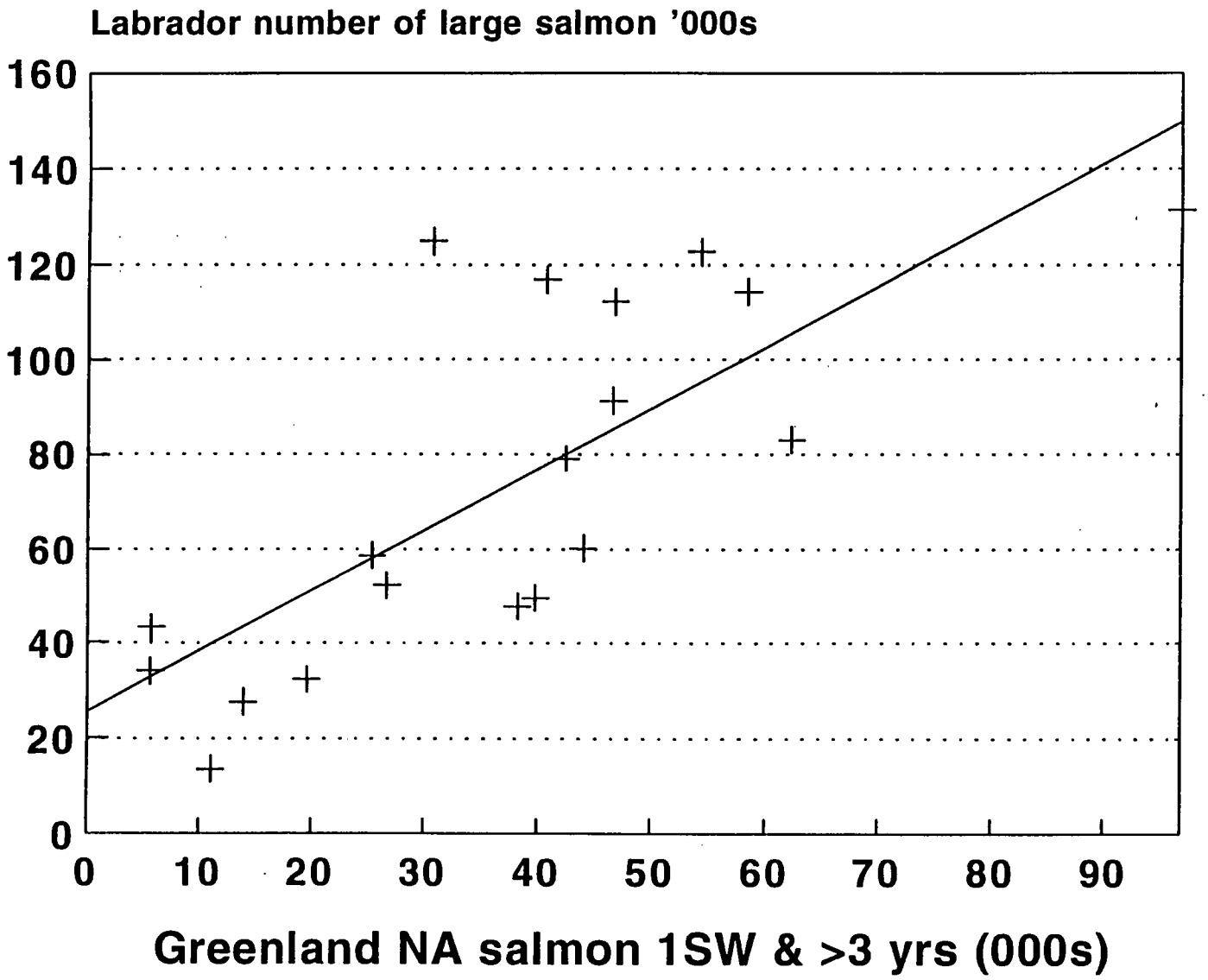


Fig. 4. Regression of commercial catches of large salmon in SFAs 1, 2, and 14B combined on catches at West Greenland of North American-origin small salmon with river age > 3 years, (1973-92) and of the same smolt class.

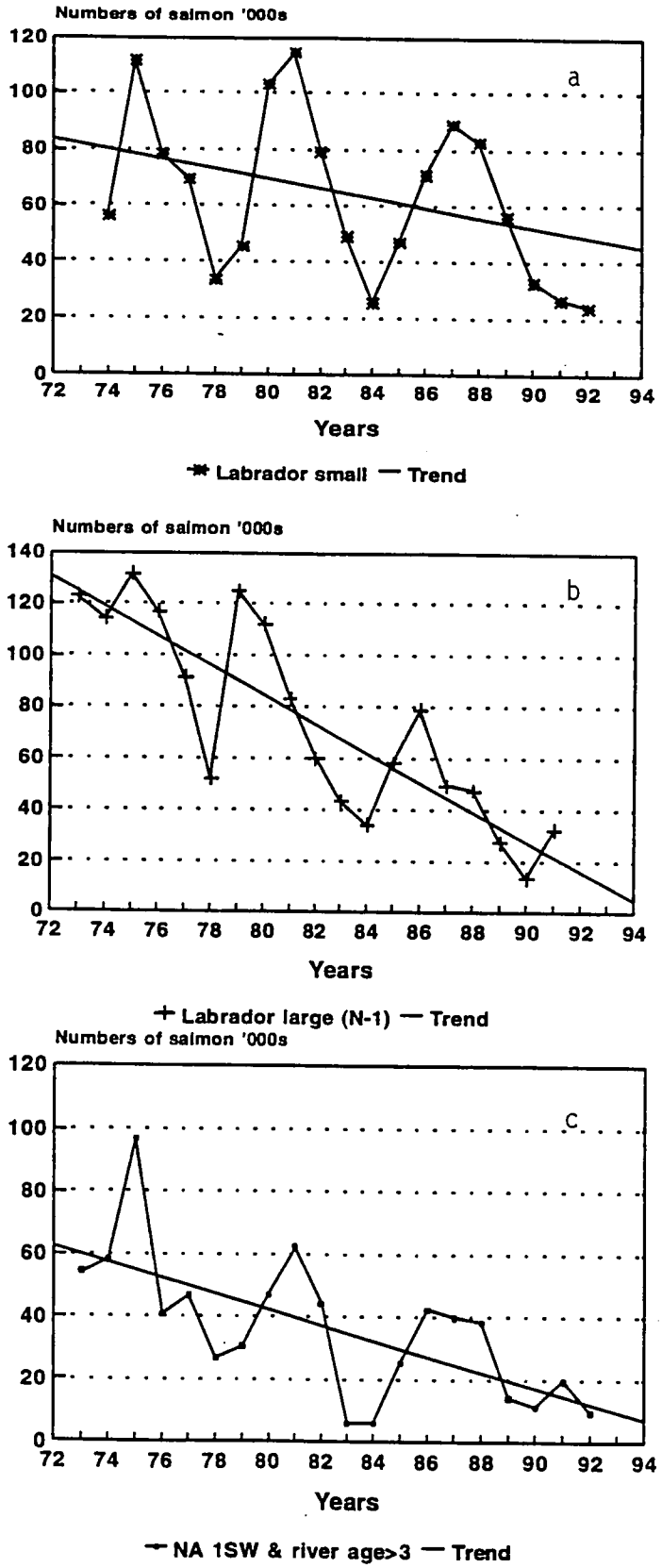


Fig. 5. Commercial catches and trend lines for: a) small salmon in SFAs 1, 2, and 14B combined; b) large salmon in SFAs 1, 2, and 14B combined; and c) North American-origin small salmon with river age greater than 3 years in West Greenland. Large salmon are lagged (t-1) so that catches of the same smolt class are shown in the same year.

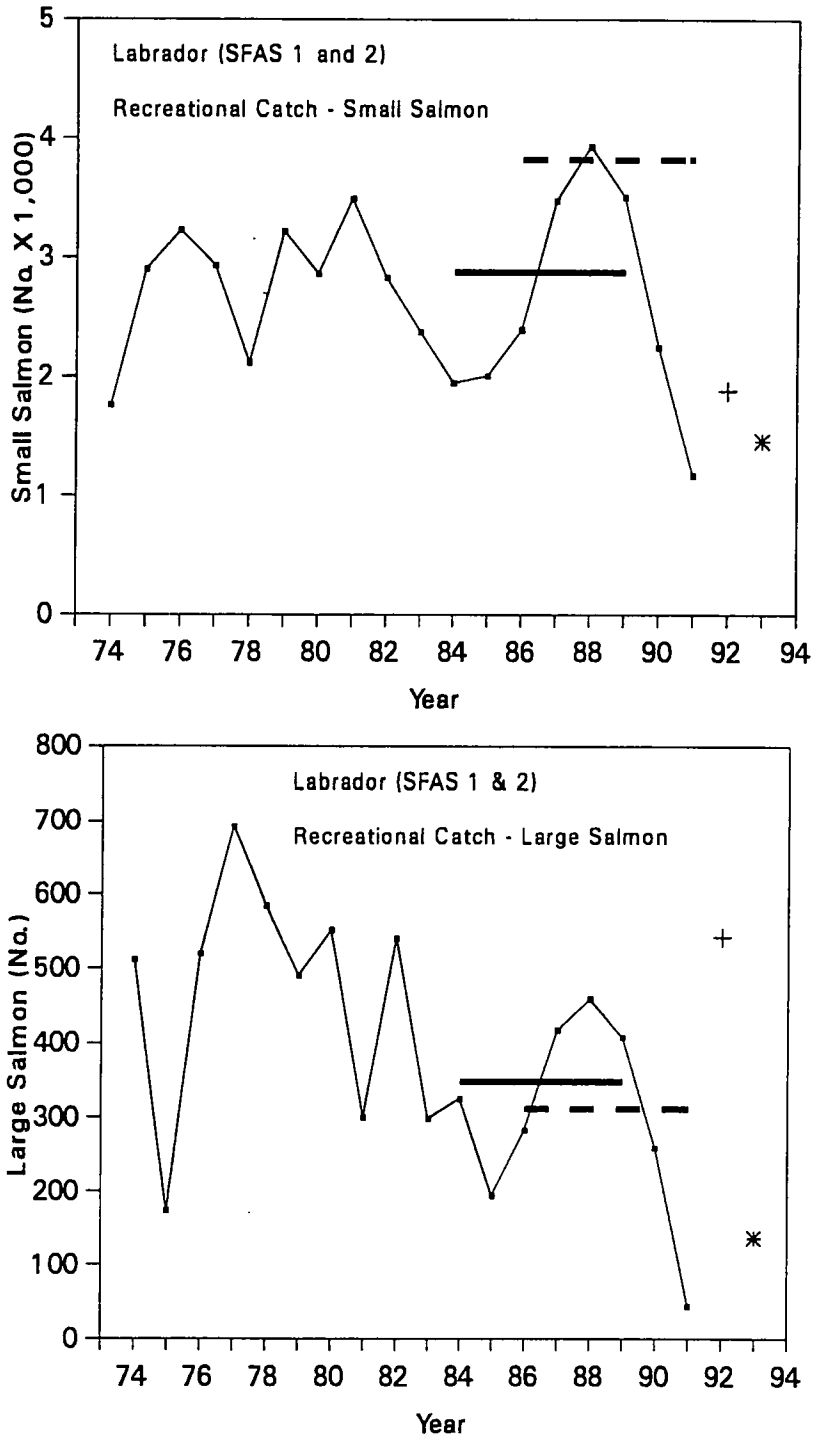


Fig. 6. Recreational catches (retained) of small and large salmon for SFAs 1 and 2 combined, Labrador, 1974-93. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. Catches for 1993 (*) are for the entire angling season; those of 1992 (+) are retained catches up to the time quotas were taken.

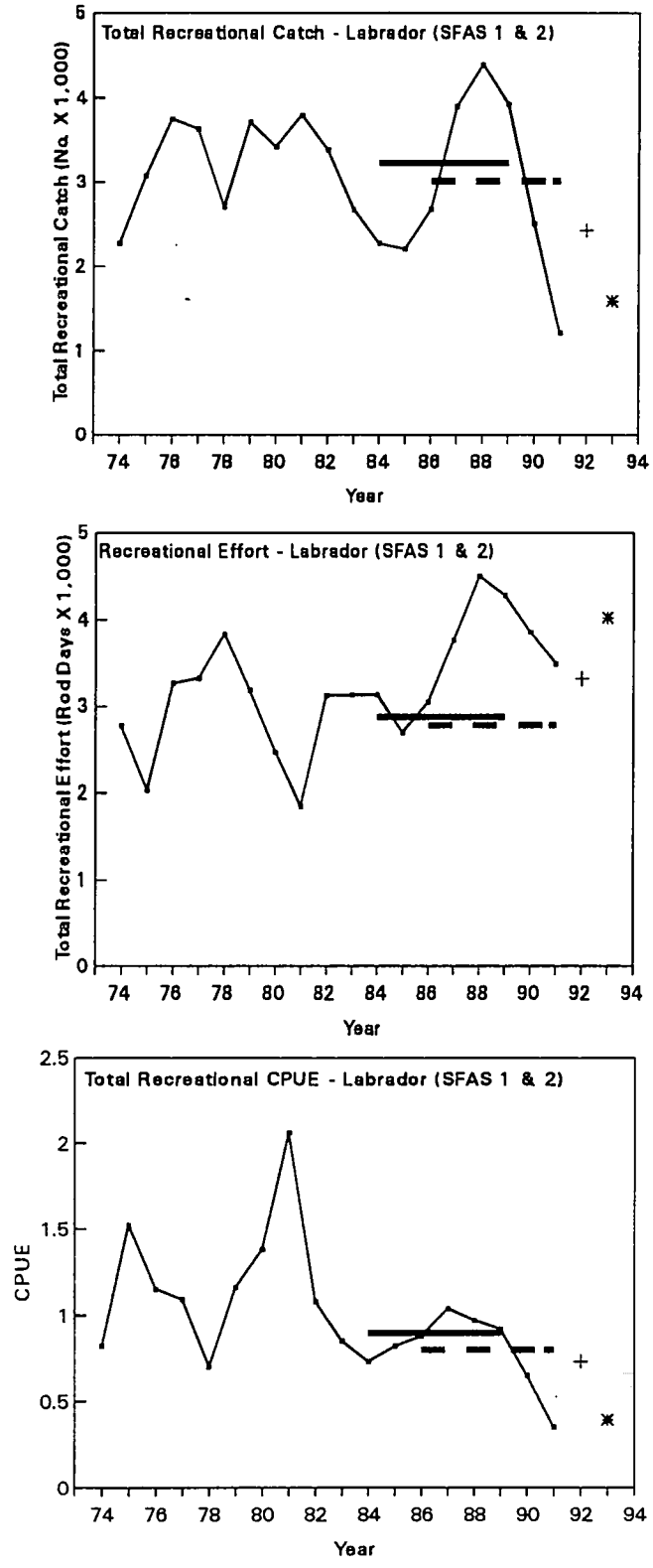


Fig. 7. Total retained recreational catch (small and large combined), effort, and catch per unit of effort (CPUE) for SFAs 1 and 2 combined, Labrador, 1974-93. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. Data for 1993 (*) are for the entire angling season; those of 1992 (+) correspond to retained catches up to the time quotas were taken.

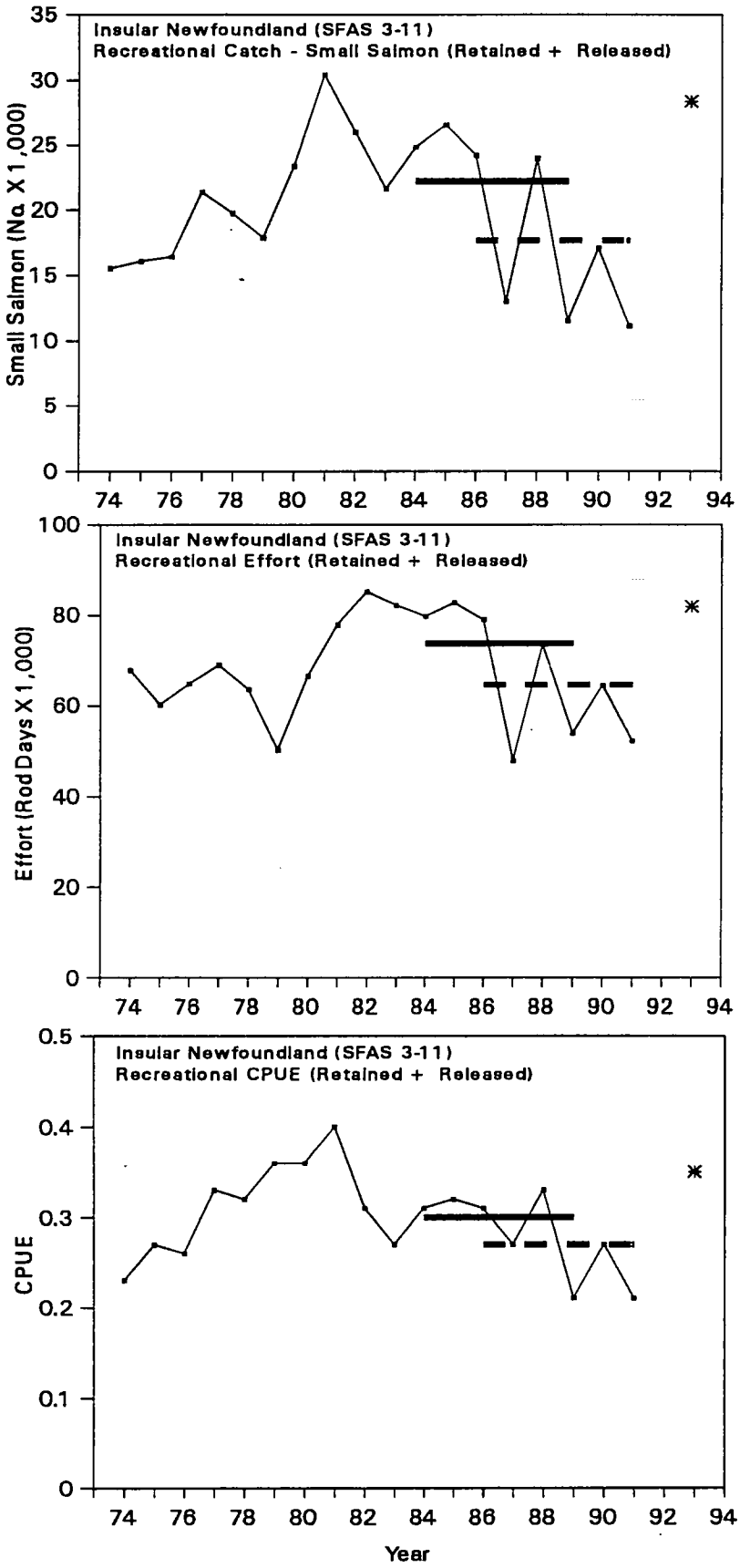


Fig. 8. Recreational catch (retained plus released fish) of small salmon, effort, and catch per unit of effort (CPUE) in 1993 (all denoted by the symbol *) for SFAs 3-11, insular Newfoundland, compared to years prior to 1992 and the 1984-89 (solid horizontal line) and 1986-91 (broken horizontal line) means.

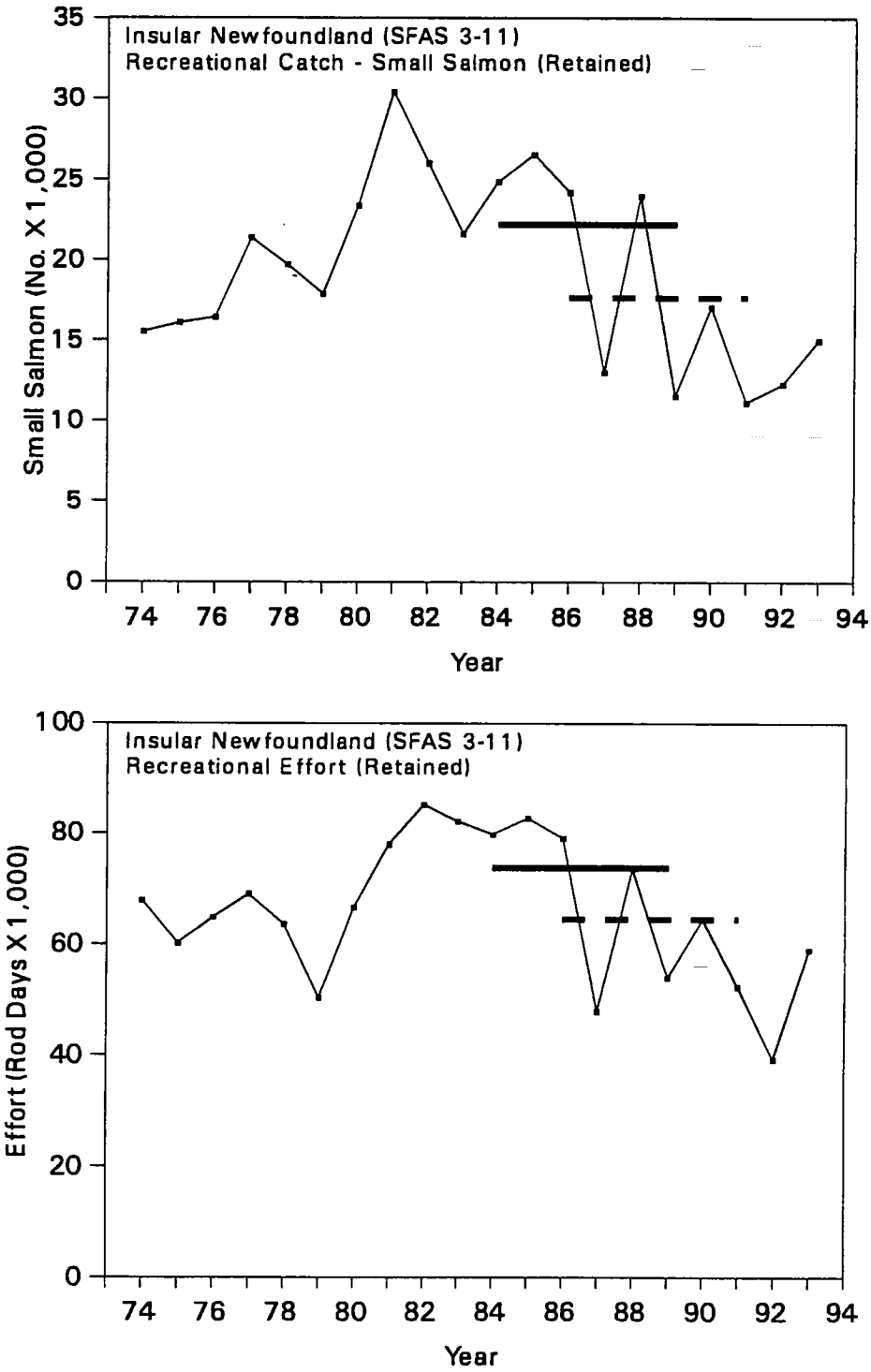


Fig. 9. Total numbers of small salmon retained and associated effort in 1993 compared to means to the same dates of closure to retention in 1984-89 (solid horizontal line) and 1986-91 (broken horizontal line). Data prior to 1992 are for the entire season.

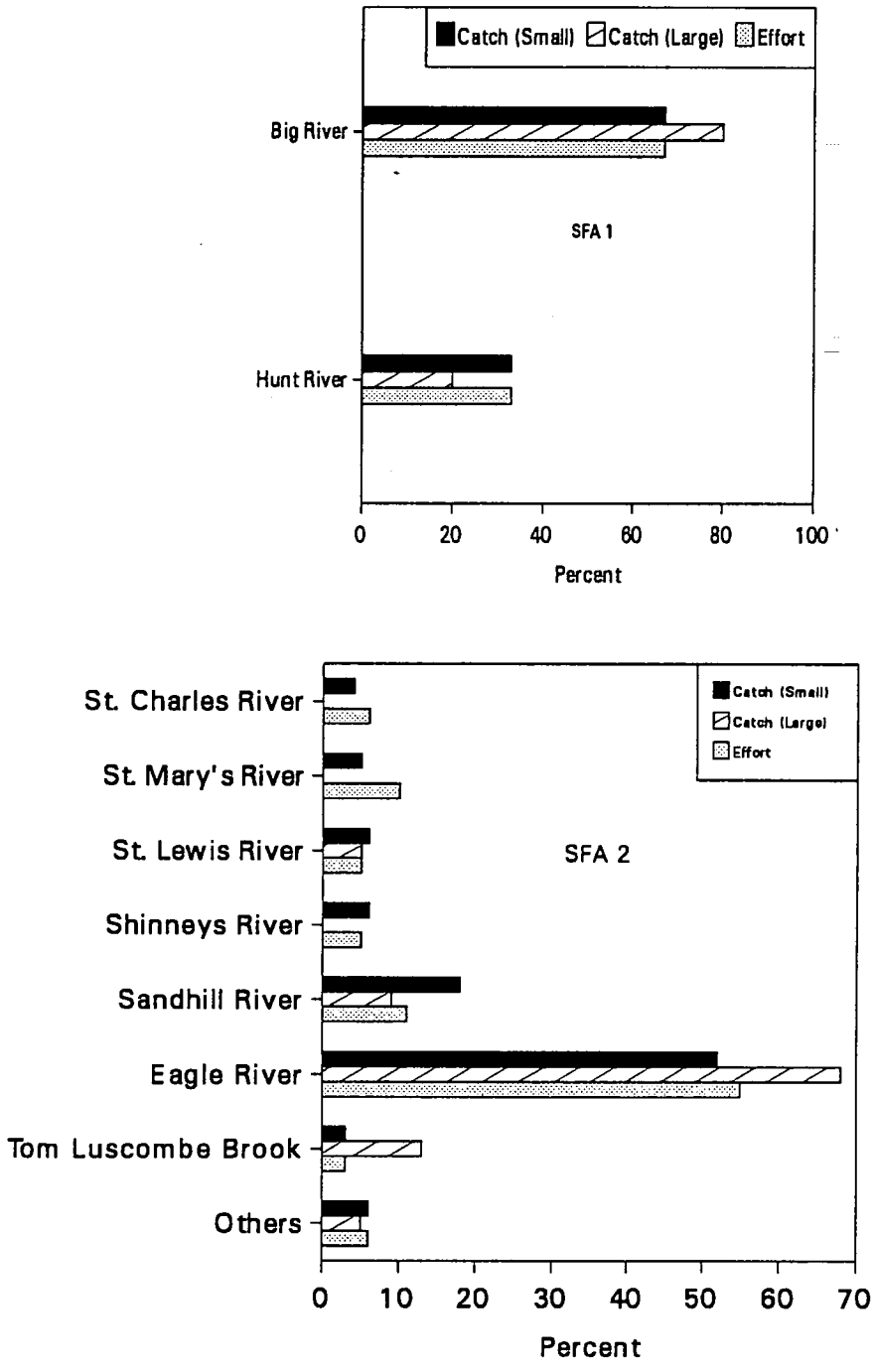


Fig. 10. Percentage of retained SFA catch of small and large salmon and effort expenditure attained by various rivers in SFAs 1 and 2, Labrador in 1993.

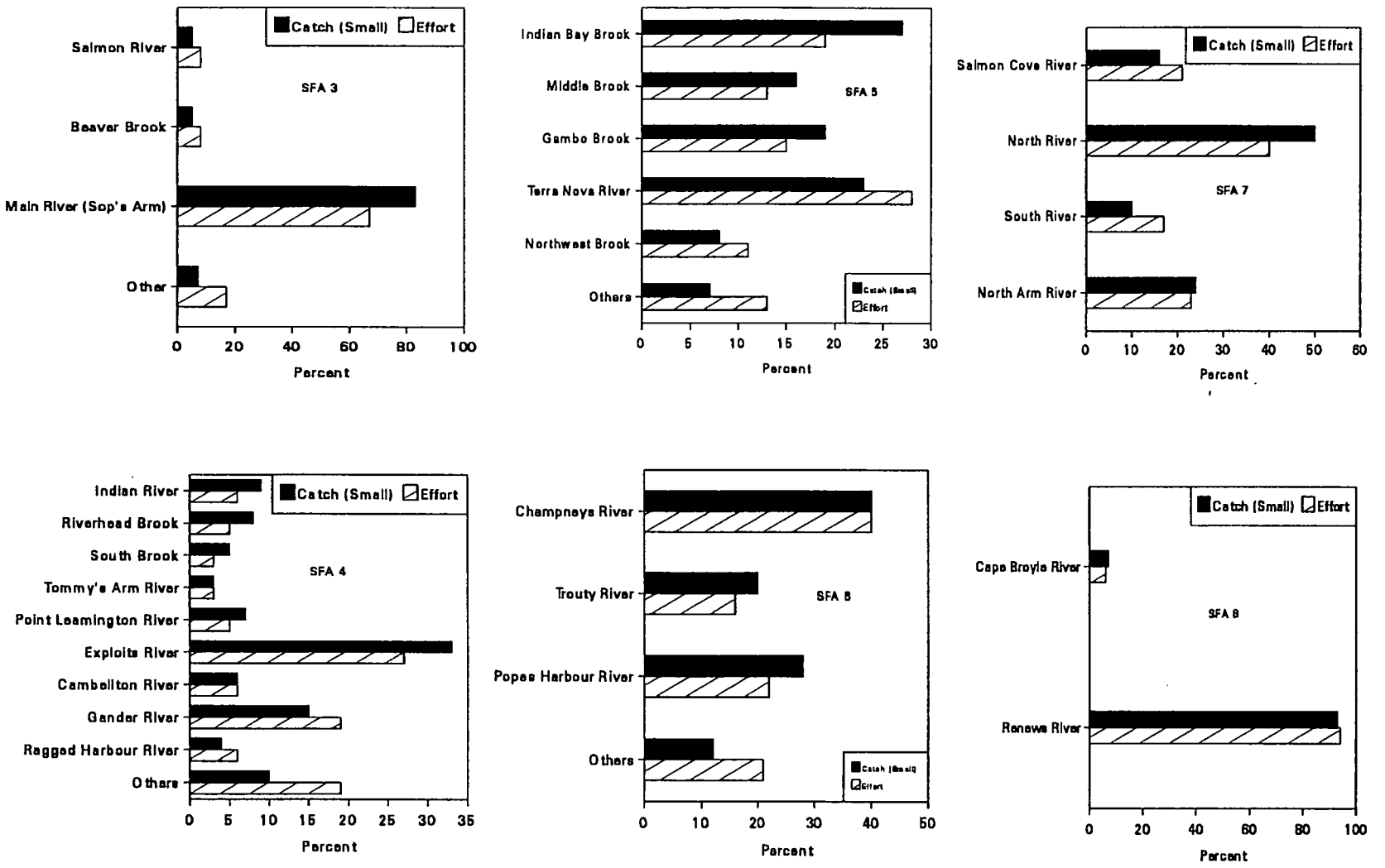
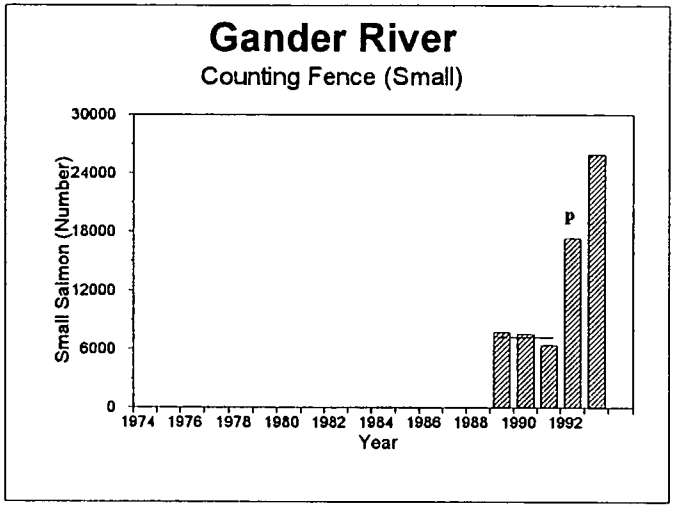
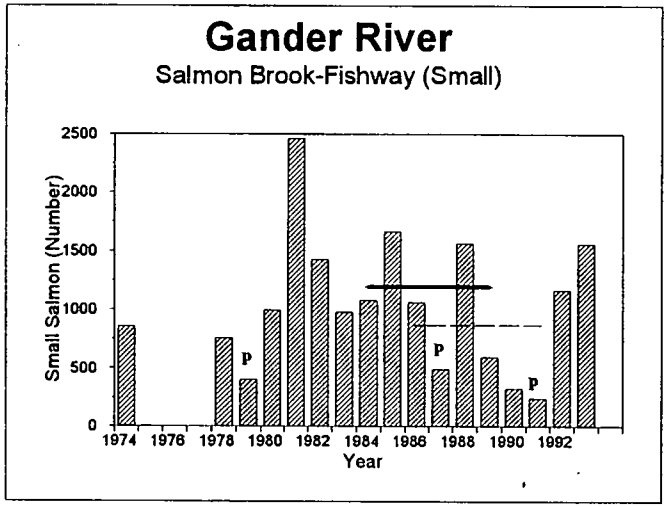
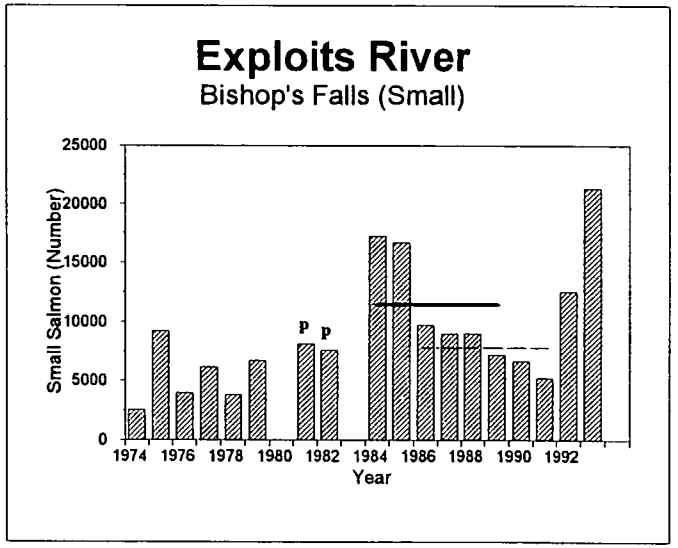


Fig. 11. Percentage of retained SFA catch of small salmon and effort expenditure up to the time of closure of the first quota period attained by various rivers in SFAs 3-8, insular Newfoundland in 1993.







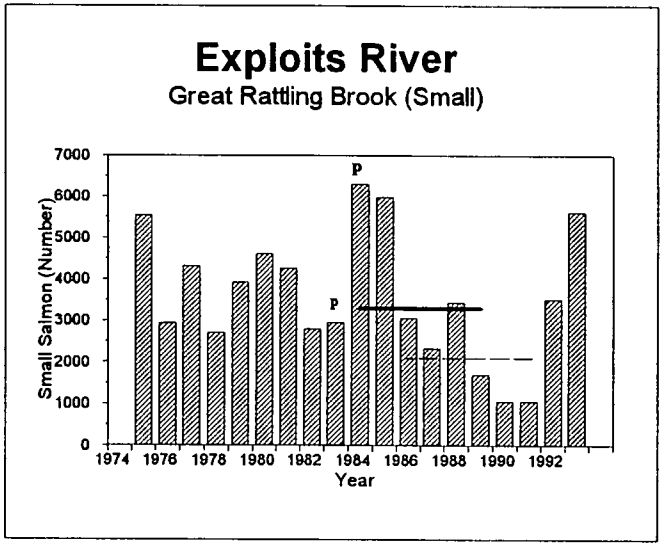
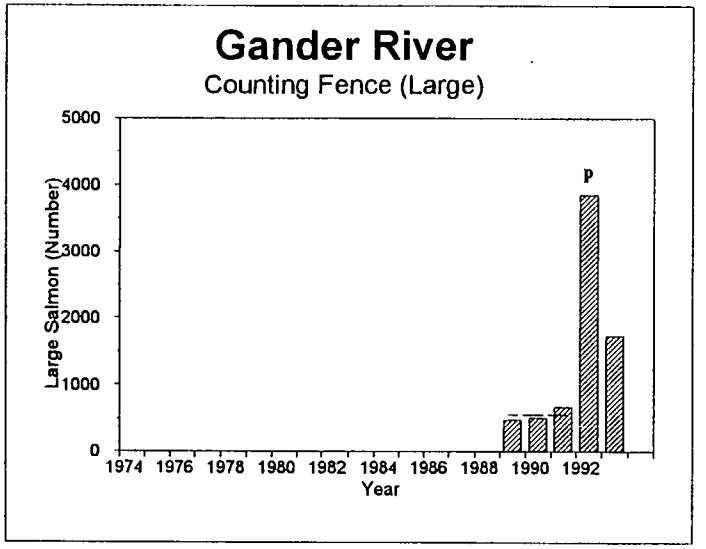
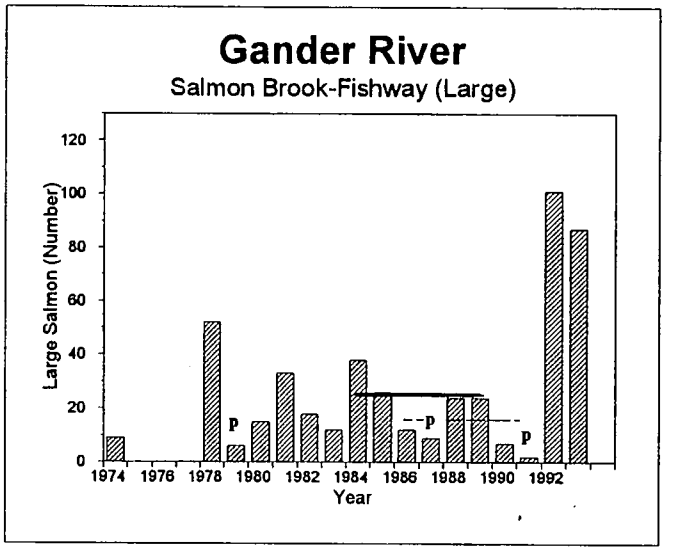
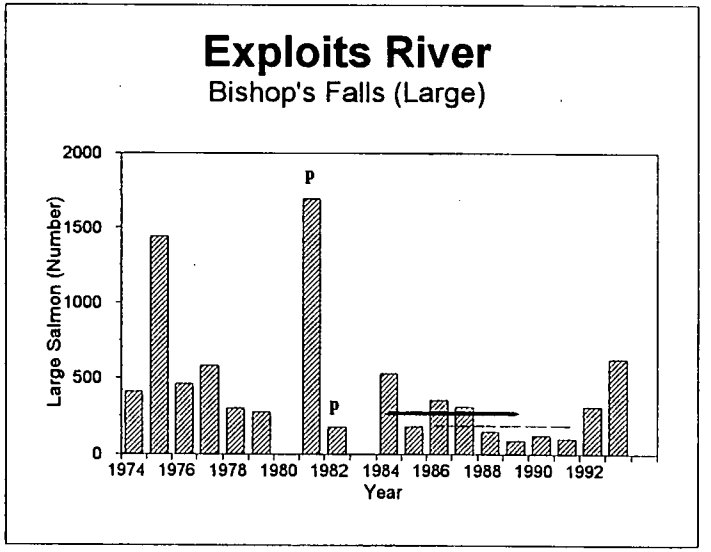


Fig. 12. Counts of small salmon at the Gander River counting fence and at the fishway located on the Salmon Brook tributary, and at the Bishop's Falls fishway on the main stem of the Exploits River and the fishway on the Great Rattling Brook tributary, SFA 4. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial counts, not included in means.







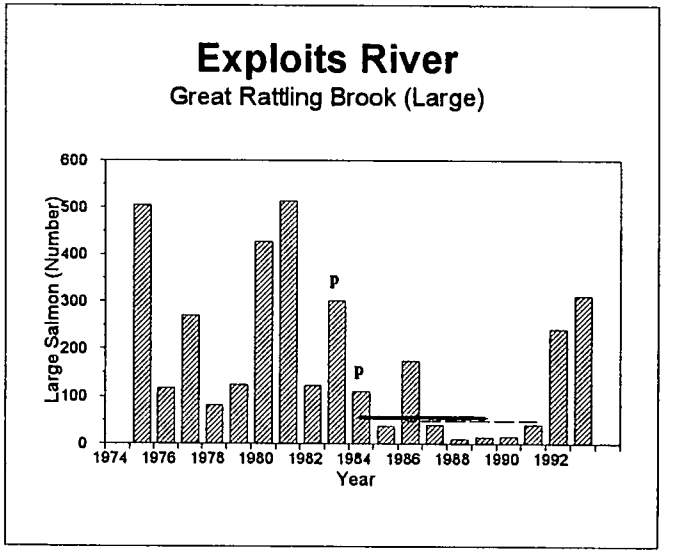
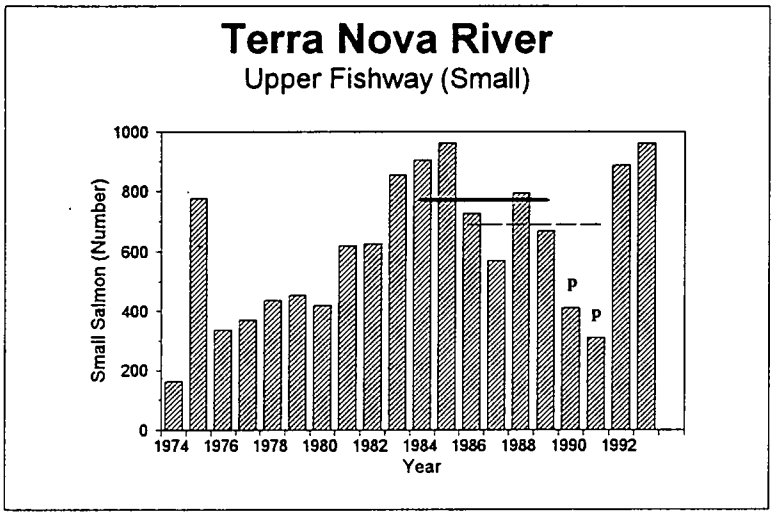
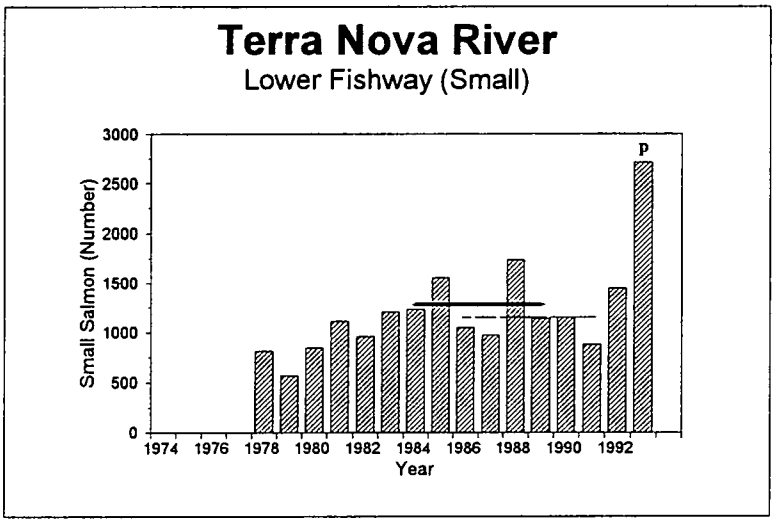


Fig. 13. Counts of large salmon at the Gander River counting fence and at the fishway located on the Salmon Brook tributary, and at the Bishop's Falls fishway on the main stem of the Exploits River and the fishway on the Great Rattling Brook tributary, SFA 4. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial counts, not included in means.





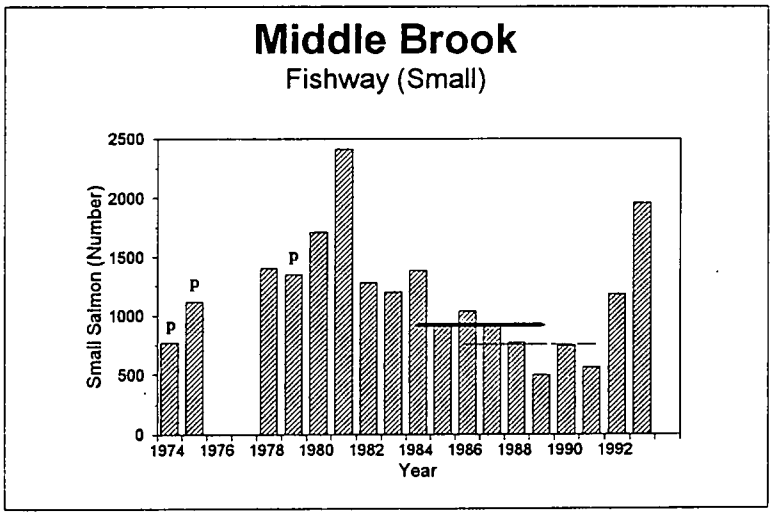
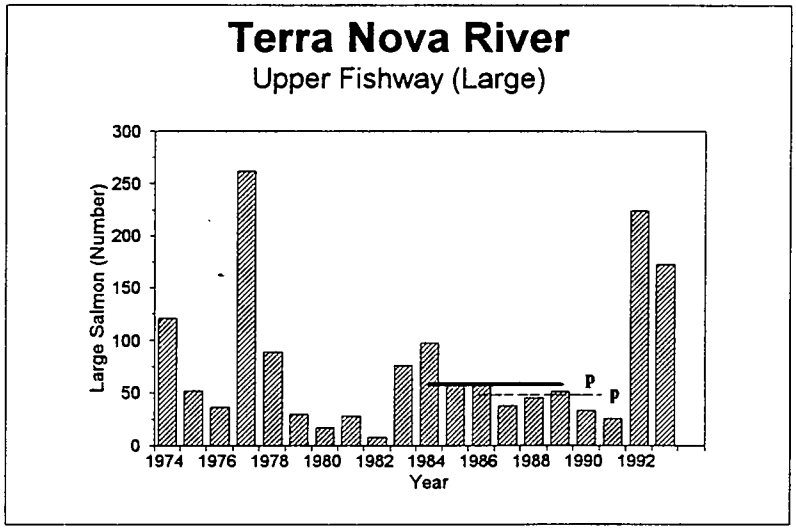
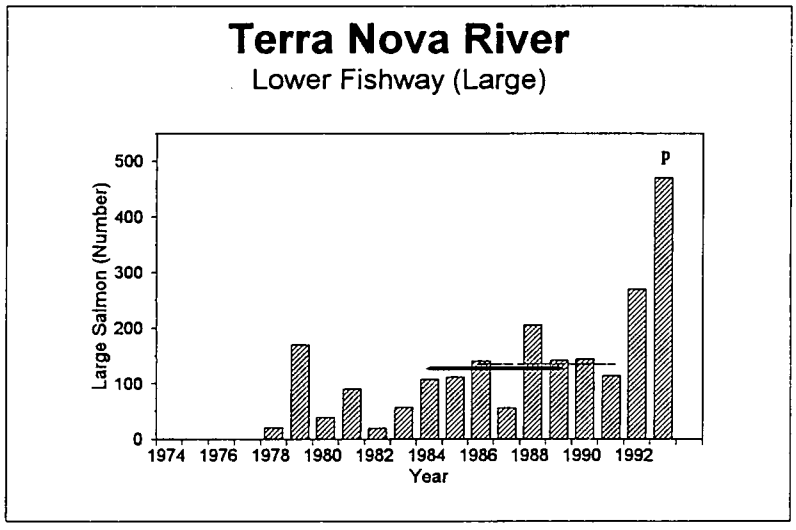


Fig. 14. Counts of small salmon at the upper and lower fishways on Terra Nova River and the Middle Brook fishway, SFA 5. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial counts, not included in means.





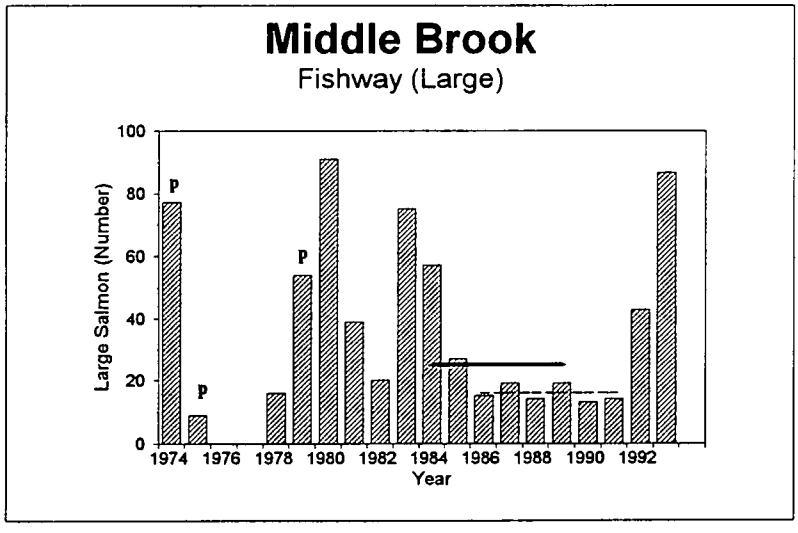


Fig. 15. Counts of large salmon at the upper and lower fishways on Terra Nova River and the Middle Brook fishway, SFA 5. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial counts, not included in means.

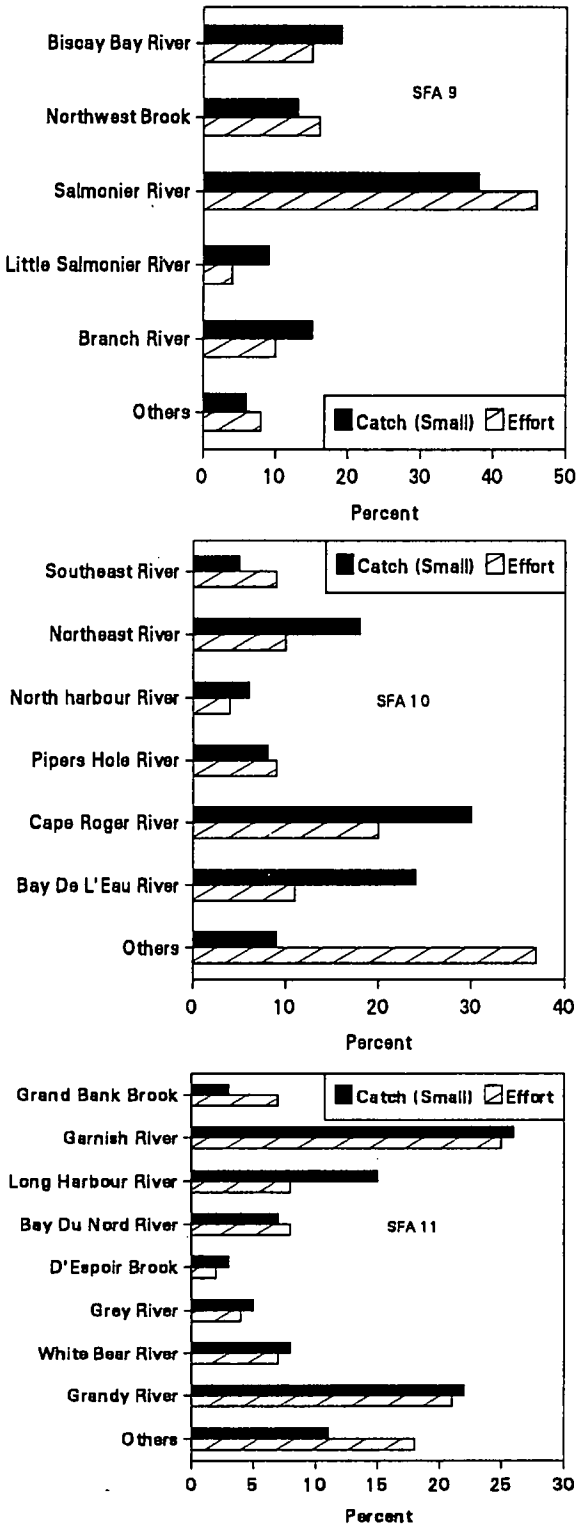
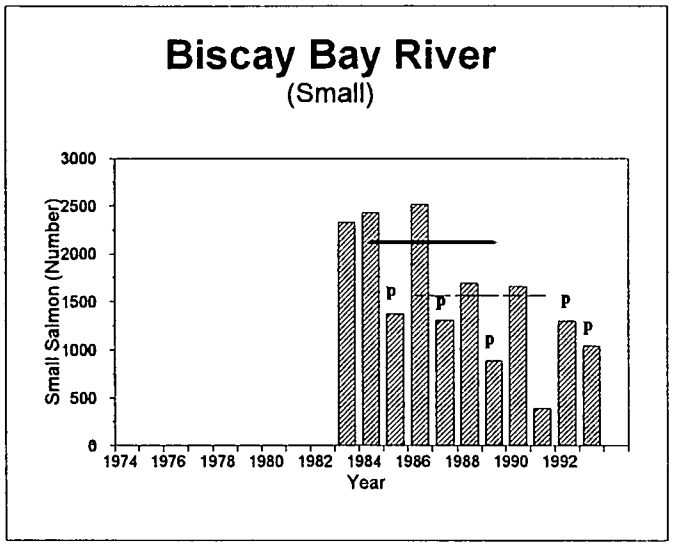
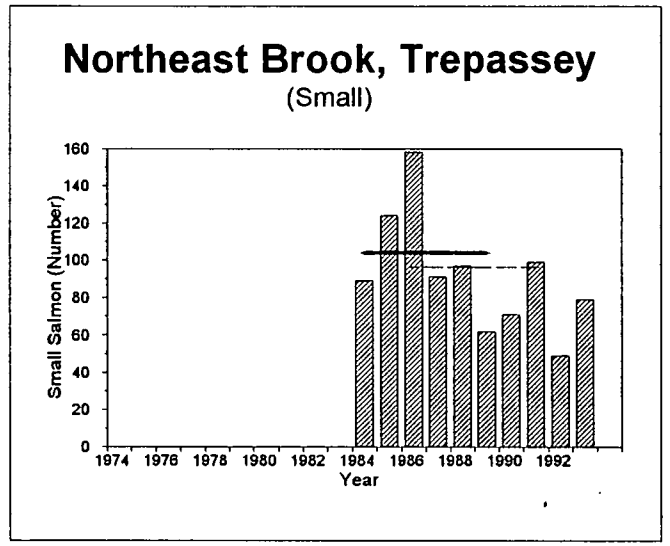
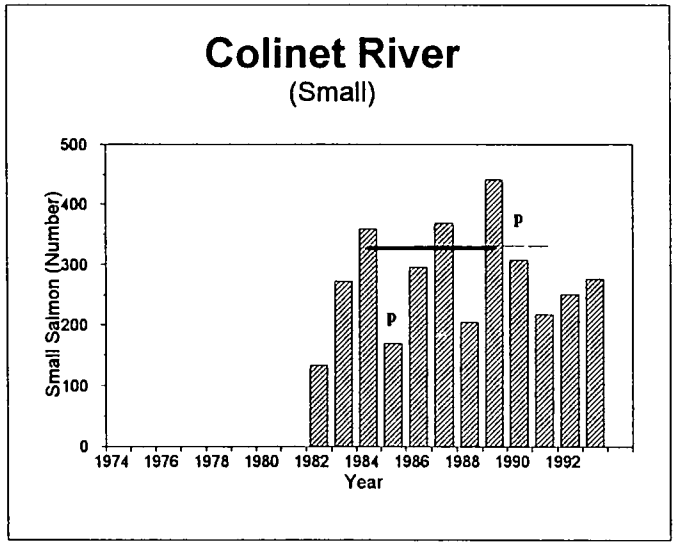


Fig. 16. Percentage of retained SFA catch of small salmon and effort expenditure up to the time of closure of the first quota period attained by various rivers in SFAs 9-11, insular Newfoundland in 1993.







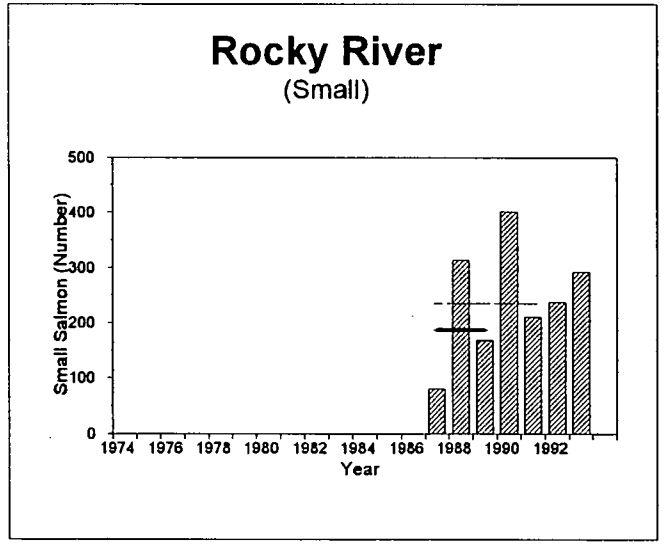
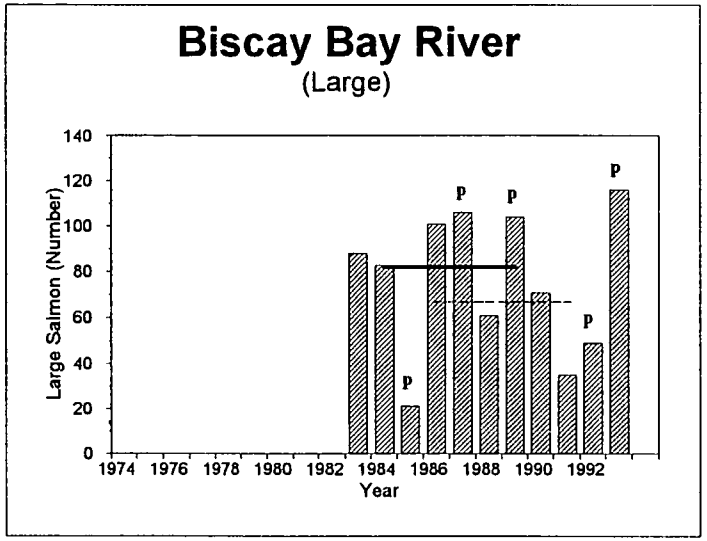
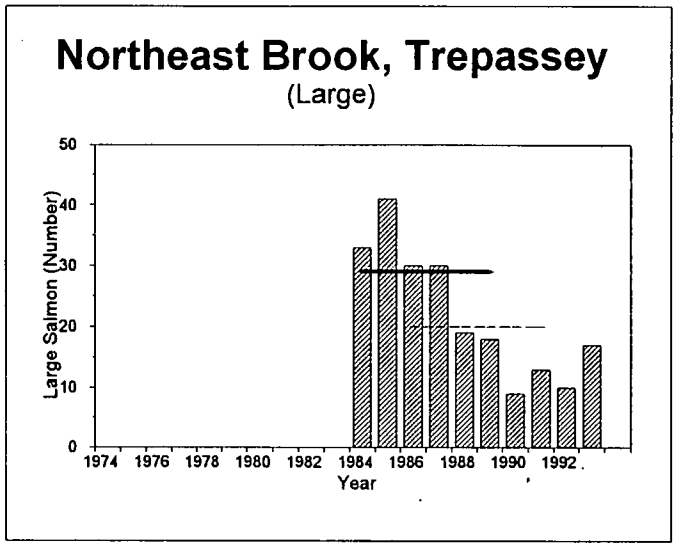
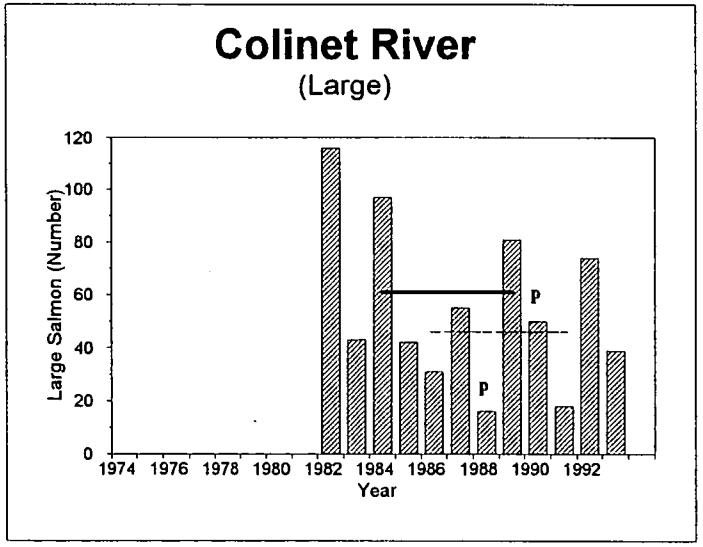


Fig. 17. Counts of small salmon at counting fences for Biscay Bay River, Northeast Brook (Trepassey), and Colinet River and the Rocky River fishway, SFA 9. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial counts, not included in means.







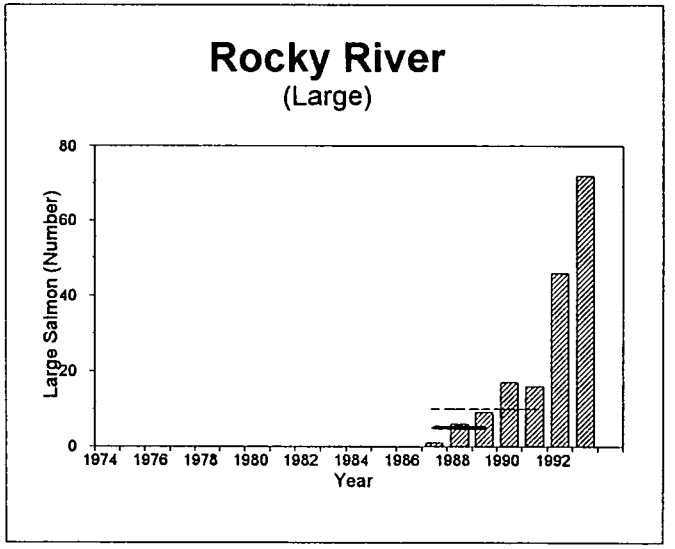


Fig. 18. Counts of large salmon at counting fences for Biscay Bay River, Northeast Brook (Trepassey), and Colinet River and the Rocky River fishway, SFA 9. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial counts, not included in means.

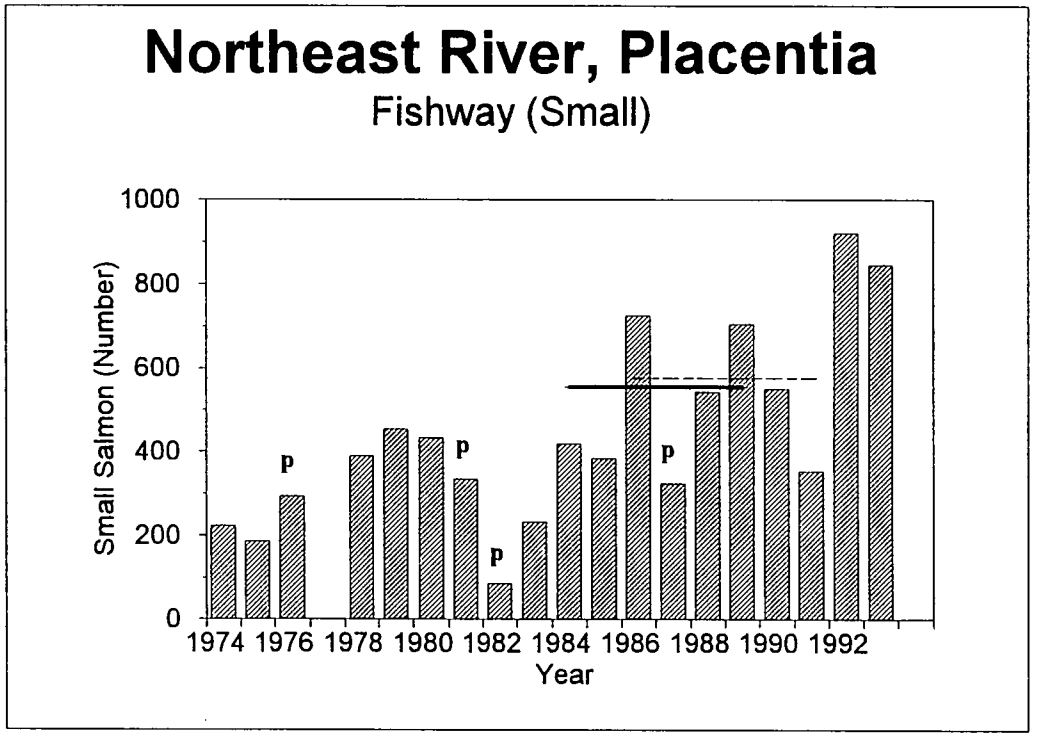


Fig. 19. Counts of small salmon at the Northeast River, Placentia fishway, SFA 10. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial counts, not included in means.

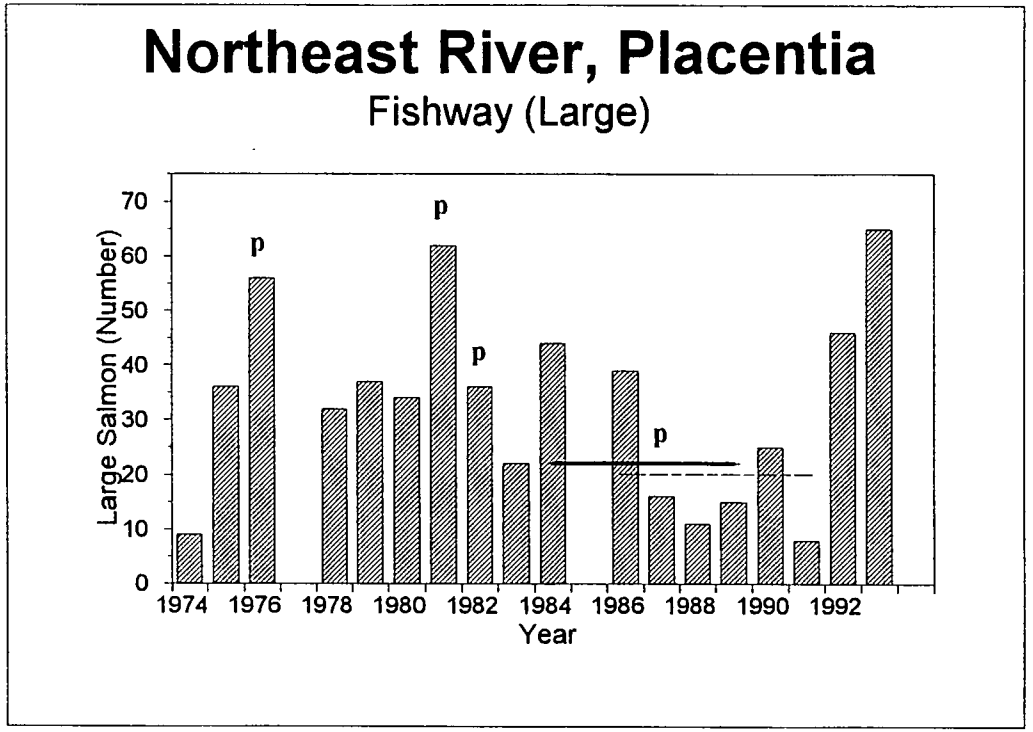
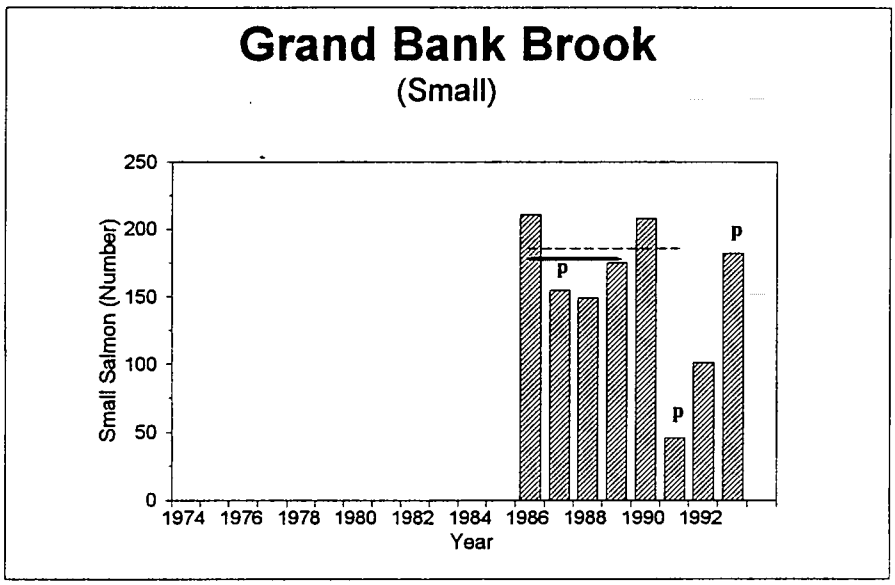


Fig. 20. Counts of large salmon at the Northeast River , Placentia fishway, SFA 10. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial counts, not included in means.



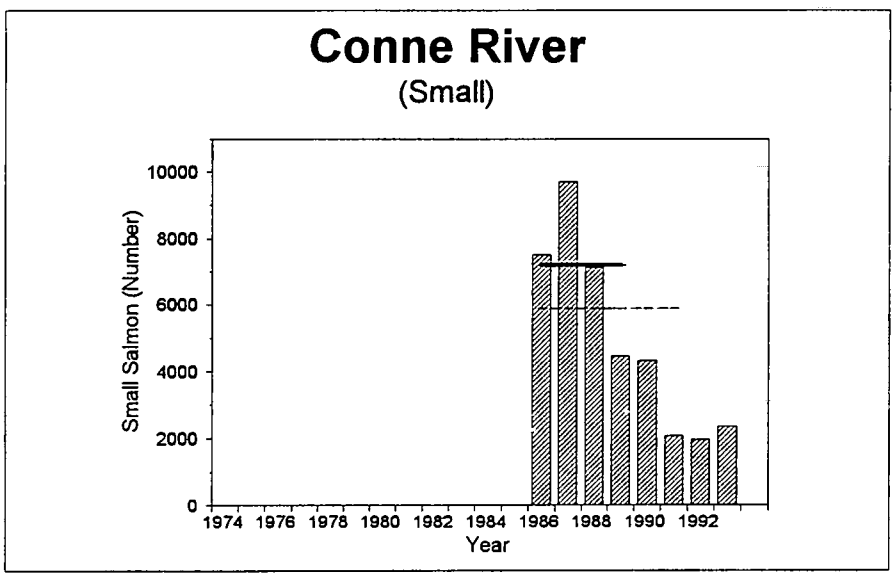
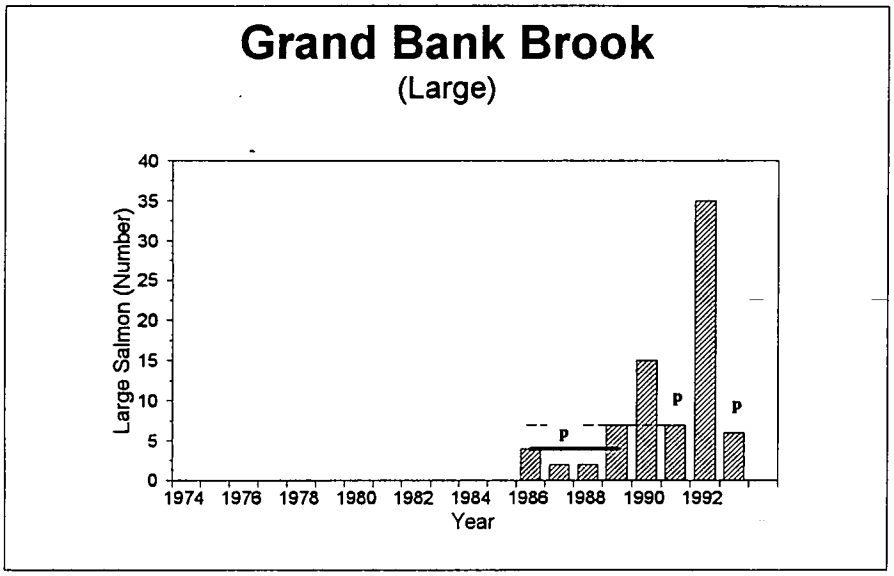


Fig. 21. Counts of small salmon at the Grand Bank Brook fishway and the Conne River counting fence, SFA 11. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial counts, not included in means.



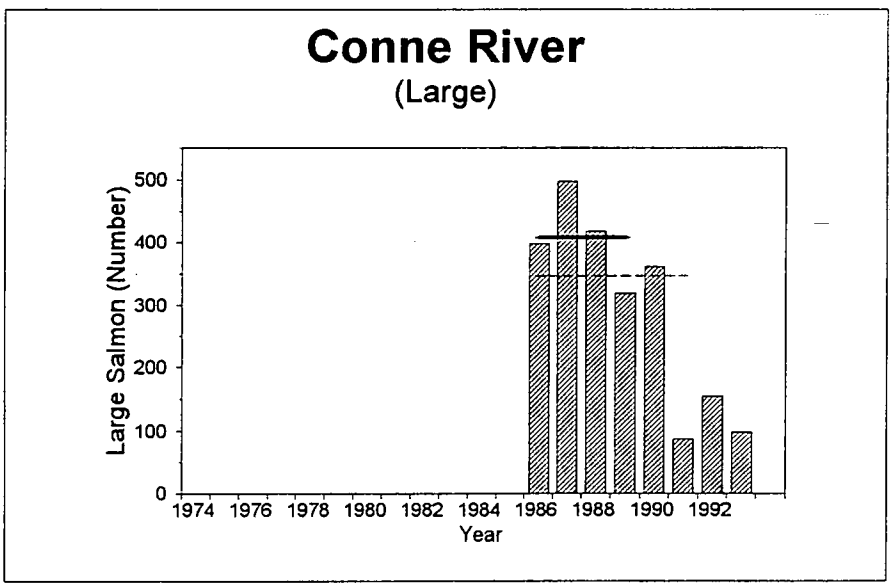


Fig. 22. Counts of large salmon at the Grand Bank Brook fishway and the Conne River counting fence, SFA 11. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial counts, not included in means.

Appendix 1a. Atlantic salmon recreational fishery catch and effort data for SFAs 1 and 2 combined, Labrador, 1974-93. Ret. = retained fish; Rel. = released fish.

YEAR	EFFORT ROD DAYS	SMALL (<63CM) RET.	SMALL (<63CM) REL.	SMALL (<63CM) TOT.	LARGE (≥63CM) RET.	LARGE (≥63CM) REL.	LARGE (≥63CM) TOT.	TOTAL (SMALL+LARGE) RET.	TOTAL (SMALL+LARGE) REL.	TOTAL (SMALL+LARGE) TOT.	CPUE
1974	2779	1761	.	1761	512	.	512	2273	.	2273	0.82
1975	2029	2903	.	2903	173	.	173	3076	.	3076	1.52
1976	3259	3228	.	3228	520	.	520	3748	.	3748	1.15
1977	3316	2932	.	2932	693	.	693	3625	.	3625	1.09
1978	3835	2118	.	2118	584	.	584	2702	.	2702	0.70
1979	3184	3217	.	3217	490	.	490	3707	.	3707	1.16
1980	2472	2862	.	2862	552	.	552	3414	.	3414	1.38
1981	1845	3493	.	3493	300	.	300	3793	.	3793	2.06
1982	3121	2833	.	2833	541	.	541	3374	.	3374	1.08
1983	3128	2372	.	2372	298	.	298	2670	.	2670	0.85
1984	3131	1948	.	1948	325	.	325	2273	.	2273	0.73
1985	2702	2009	.	2009	194	.	194	2203	.	2203	0.82
1986	3051	2393	.	2393	283	.	283	2676	.	2676	0.88
1987	3761	3479	.	3479	418	.	418	3897	.	3897	1.04
1988	4504	3931	.	3931	459	.	459	4390	.	4390	0.97
1989	4282	3511	.	3511	408	.	408	3919	.	3919	0.92
1990	3852	2243	.	2243	259	.	259	2502	.	2502	0.65
1991	3483	1171	.	1171	44	.	44	1215	.	1215	0.35
1992	3712	1882	187	2069	543	10	553	2425	197	2622	0.71
1993	4022	1461	1379	2840	136	61	197	1597	1440	3037	0.76
MEANS, 95% CONFIDENCE LIMITS, N'S:											
84-89	3571.8	2878.5	.	2878.5	347.8	.	347.8	3226.3	.	3226.3	0.90
95%CL	761.3	905.9	.	905.9	104.2	.	104.2	1000.3	.	1000.3	0.11
N	6	6	0	6	6	0	6	6	0	6	6
86-91	3822.2	2788.0	.	2788.0	311.8	.	311.8	3099.8	.	3099.8	0.81
95%CL	553.5	1088.0	.	1088.0	160.9	.	160.9	1247.1	.	1247.1	0.26
N	6	6	0	6	6	0	6	6	0	6	6

IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
CPUE IS BASED ON RETAINED+RELEASED FISH FOR 1992 AND 1993 AND ON RETAINED FISH ONLY PRIOR TO 1992.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1b. Atlantic salmon recreational fishery catch and effort data for SFAs 3-11 combined, insular Newfoundland, 1974-93. Ret. = retained fish; Rel. = released fish.

YEAR	EFFORT ROD DAYS	SMALL (<63CM) RET.	SMALL (<63CM) REL.	SMALL (<63CM) TOT.	LARGE (≥63CM) RET.	LARGE (≥63CM) REL.	LARGE (≥63CM) TOT.	TOTAL (SMALL+LARGE) RET.	TOTAL (SMALL+LARGE) REL.	TOTAL (SMALL+LARGE) TOT.	CPUE
1974	67894	15518	.	15518	171	.	171	15689	.	15689	0.23
1975	60191	16059	.	16059	245	.	245	16304	.	16304	0.27
1976	64853	16402	.	16402	320	.	320	16722	.	16722	0.26
1977	69057	21375	.	21375	1186	.	1186	22561	.	22561	0.33
1978	63599	19723	.	19723	616	.	616	20339	.	20339	0.32
1979	50199	17849	.	17849	379	.	379	18228	.	18228	0.36
1980	66625	23373	.	23373	720	.	720	24093	.	24093	0.36
1981	77884	30428	.	30428	552	.	552	30980	.	30980	0.40
1982	85200	25987	.	25987	531	.	531	26518	.	26518	0.31
1983	82167	21616	.	21616	695	.	695	22311	.	22311	0.27
1984	79740	24831	.	24831	47	.	47	24878	.	24878	0.31
1985	82783	26527	.	26527	*	*	*	26527	.	26527	0.32
1986	79009	24182	.	24182	*	*	*	24182	.	24182	0.31
1987	47809	13013	.	13013	*	*	*	13013	.	13013	0.27
1988	73566	23960	.	23960	*	*	*	23960	.	23960	0.33
1989	53862	11525	.	11525	*	*	*	11525	.	11525	0.21
1990	64494	17409	.	17409	*	*	*	17409	.	17409	0.27
1991	52173	11132	.	11132	*	*	*	11132	.	11132	0.21
1992	54354	12271	4105	16376	0	19	19	12271	4124	16395	0.30
1993	81920	14944	13417	28361	0	510	510	14944	13927	28871	0.35
MEANS, 95% CONFIDENCE LIMITS, N'S:											
84-89	73792.0	22205.0	.	22205.0	47.0	.	47.0	22214.4	.	22214.4	0.30
95%CL	14436.0	7517.6	.	7517.6	.	.	.	7524.0	.	7524.0	0.05
N	5	5	0	5	1	0	1	5	0	5	5
86-91	64620.8	17641.6	.	17641.6	.	.	.	17641.6	.	17641.6	0.27
95%CL	14662.1	7915.1	.	7915.1	.	.	.	7915.1	.	7915.1	0.06
N	5	5	0	5	0	0	0	5	0	5	5

1987 DATA NOT INCLUDED IN MEAN.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
CPUE IS BASED ON RETAINED+RELEASED FISH FOR 1992 AND 1993 AND ON RETAINED FISH ONLY PRIOR TO 1992.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1c. Atlantic salmon recreational fishery catch and effort data for SFAs 1-11 combined, 1974-93. Ret. = retained fish; Rel. = released fish.

YEAR	EFFORT ROD DAYS	SMALL (<63CM) RET.	SMALL (<63CM) REL.	SMALL (<63CM) TOT.	LARGE (≥63CM) RET.	LARGE (≥63CM) REL.	LARGE (≥63CM) TOT.	TOTAL (SMALL+LARGE) RET.	TOTAL (SMALL+LARGE) REL.	TOTAL (SMALL+LARGE) TOT.	CPUE
1974	70673	17279	.	17279	683	.	683	17962	.	17962	0.25
1975	62220	18962	.	18962	418	.	418	19380	.	19380	0.31
1976	68112	19630	.	19630	840	.	840	20470	.	20470	0.30
1977	72373	24307	.	24307	1879	.	1879	26186	.	26186	0.36
1978	67434	21841	.	21841	1200	.	1200	23041	.	23041	0.34
1979	53383	21066	.	21066	869	.	869	21935	.	21935	0.41
1980	69097	26235	.	26235	1272	.	1272	27507	.	27507	0.40
1981	79729	33921	.	33921	852	.	852	34773	.	34773	0.44
1982	88321	28820	.	28820	1072	.	1072	29892	.	29892	0.34
1983	85295	23988	.	23988	993	.	993	24981	.	24981	0.29
1984	82871	26779	.	26779	372	.	372	27151	.	27151	0.33
1985	85485	28536	.	28536	194	.	194	28730	.	28730	0.34
1986	82060	26575	.	26575	283	.	283	26858	.	26858	0.33
1987	51570	16492	.	16492	418	.	418	16910	.	16910	0.33
1988	78070	27891	.	27891	459	.	459	28350	.	28350	0.36
1989	58144	15036	.	15036	408	.	408	15444	.	15444	0.27
1990	68346	19652	.	19652	259	.	259	19911	.	19911	0.29
1991	55656	12303	.	12303	44	.	44	12347	.	12347	0.22
1992	58066	14153	4292	18445	543	29	572	14696	4321	19017	0.33
1993	85942	16405	14796	31201	136	571	707	16541	15367	31908	0.37
MEANS, 95% CONFIDENCE LIMITS, N'S:											
84-89	65065.2	21382.7	.	21382.7	355.7	.	355.7	21738.3	.	21738.3	0.33
95%CL	33179.7	10603.3	.	10603.3	103.9	.	103.9	10557.5	.	10557.5	0.04
N	6	6	0	6	6	0	6	6	0	6	6
86-91	57672.8	17489.3	.	17489.3	311.8	.	311.8	17801.2	.	17801.2	0.31
95%CL	29813.8	9671.1	.	9671.1	160.9	.	160.9	9691.1	.	9691.1	0.06
N	6	6	0	6	6	0	6	6	0	6	6

1987 DATA NOT INCLUDED IN MEAN.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
CPUE IS BASED ON RETAINED+RELEASED FISH FOR 1992 AND 1993 AND ON RETAINED FISH ONLY PRIOR TO 1992.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1d. Atlantic salmon recreational fishery catch and effort data for SFA 1, Labrador, 1974-93. Ret. = retained fish; Rel. = released fish.

YEAR	EFFORT ROD DAYS	SMALL (<63CM) RET.	SMALL (<63CM) REL.	SMALL (<63CM) TOT.	LARGE (>63CM) RET.	LARGE (>63CM) REL.	LARGE (>63CM) TOT.	TOTAL (SMALL+LARGE) RET.	TOTAL (SMALL+LARGE) REL.	TOTAL (SMALL+LARGE) TOT.	CPUE
1974	801	347	.	347	311	.	311	658	.	658	0.82
1975	245	379	.	379	117	.	117	496	.	496	2.02
1976	928	891	.	891	368	.	368	1259	.	1259	1.36
1977	809	688	.	688	533	.	533	1221	.	1221	1.51
1978	694	875	.	875	432	.	432	1307	.	1307	1.88
1979	1367	905	.	905	430	.	430	1335	.	1335	0.98
1980	780	704	.	704	232	.	232	936	.	936	1.20
1981	414	660	.	660	195	.	195	855	.	855	2.07
1982	831	834	.	834	379	.	379	1213	.	1213	1.46
1983	763	488	.	488	137	.	137	625	.	625	0.82
1984	1074	702	.	702	222	.	222	924	.	924	0.86
1985	946	642	.	642	135	.	135	777	.	777	0.82
1986	741	421	.	421	129	.	129	550	.	550	0.74
1987	1011	854	.	854	141	.	141	995	.	995	0.98
1988	1629	1278	.	1278	171	.	171	1449	.	1449	0.89
1989	1296	1269	.	1269	144	.	144	1413	.	1413	1.09
1990	895	523	.	523	90	.	90	613	.	613	0.68
1991	888	108	.	108	8	.	8	116	.	116	0.13
1992	709	164	4	168	286	0	286	450	4	454	0.64
1993	292	86	116	202	5	19	24	91	135	226	0.77
MEANS, 95% CONFIDENCE LIMITS, N'S:											
84-89	1116.2	861.0	.	861.0	157.0	.	157.0	1018.0	.	1018.0	0.91
95%CL	324.4	365.7	.	365.7	36.7	.	36.7	372.0	.	372.0	0.12
N	6	6	0	6	6	0	6	6	0	6	6
86-91	1076.7	742.2	.	742.2	113.8	.	113.8	856.0	.	856.0	0.80
95%CL	344.5	499.0	.	499.0	61.0	.	61.0	551.6	.	551.6	0.33
N	6	6	0	6	6	0	6	6	0	6	6

IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
CPUE IS BASED ON RETAINED+RELEASED FISH FOR 1992 AND 1993 AND ON RETAINED FISH ONLY PRIOR TO 1992.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1e. Atlantic salmon recreational fishery catch and effort data for SFA 2, Labrador, 1974-93. Ret. = retained fish; Rel. = released fish.

YEAR	EFFORT ROD DAYS	SMALL (<63CM) RET.	SMALL (<63CM) REL.	SMALL (<63CM) TOT.	LARGE (≥63CM) RET.	LARGE (≥63CM) REL.	LARGE (≥63CM) TOT.	TOTAL (SMALL+LARGE) RET.	TOTAL (SMALL+LARGE) REL.	TOTAL (SMALL+LARGE) TOT.	CPUE
1974	1978	1414	.	1414	201	.	201	1615	.	1615	0.82
1975	1784	2524	.	2524	56	.	56	2580	.	2580	1.45
1976	2331	2337	.	2337	152	.	152	2489	.	2489	1.07
1977	2507	2244	.	2244	160	.	160	2404	.	2404	0.96
1978	3141	1243	.	1243	152	.	152	1395	.	1395	0.44
1979	1817	2312	.	2312	60	.	60	2372	.	2372	1.31
1980	1692	2158	.	2158	320	.	320	2478	.	2478	1.46
1981	1431	2833	.	2833	105	.	105	2938	.	2938	2.05
1982	2290	1999	.	1999	162	.	162	2161	.	2161	0.94
1983	2365	1884	.	1884	161	.	161	2045	.	2045	0.86
1984	2057	1246	.	1246	103	.	103	1349	.	1349	0.66
1985	1756	1367	.	1367	59	.	59	1426	.	1426	0.81
1986	2310	1972	.	1972	154	.	154	2126	.	2126	0.92
1987	2750	2625	.	2625	277	.	277	2902	.	2902	1.06
1988	2875	2653	.	2653	288	.	288	2941	.	2941	1.02
1989	2986	2242	.	2242	264	.	264	2506	.	2506	0.84
1990	2957	1720	.	1720	169	.	169	1889	.	1889	0.64
1991	2595	1063	.	1063	36	.	36	1099	.	1099	0.42
1992	3003	1718	183	1901	257	10	267	1975	193	2168	0.72
1993	3730	1375	1263	2638	131	42	173	1506	1305	2811	0.75
MEANS, 95% CONFIDENCE LIMITS, N'S:											
84-89	2455.7	2017.5	.	2017.5	190.8	.	190.8	2208.3	.	2208.3	0.90
95%CL	517.0	637.3	.	637.3	103.5	.	103.5	736.7	.	736.7	0.15
N	6	6	0	6	6	0	6	6	0	6	6
86-91	2745.5	2045.8	.	2045.8	198.0	.	198.0	2243.8	.	2243.8	0.82
95%CL	270.3	633.2	.	633.2	102.5	.	102.5	732.9	.	732.9	0.25
N	6	6	0	6	6	0	6	6	0	6	6

IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
CPUE IS BASED ON RETAINED+RELEASED FISH FOR 1992 AND 1993 AND ON RETAINED FISH ONLY PRIOR TO 1992.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1f. Atlantic salmon recreational fishery catch and effort data for SFA 3, insular Newfoundland, 1974-93. Ret. = retained fish; Rel. = released fish.

YEAR	EFFORT ROD DAYS	SMALL (<63CM) RET.	SMALL (<63CM) REL.	SMALL (<63CM) TOT.	LARGE (>63CM) RET.	LARGE (>63CM) REL.	LARGE (>63CM) TOT.	TOTAL (SMALL+LARGE) RET.	TOTAL (SMALL+LARGE) REL.	TOTAL (SMALL+LARGE) TOT.	CPUE
1974	1890	839	.	839	4	.	4	843	.	843	0.45
1975	1948	1107	.	1107	0	.	0	1107	.	1107	0.57
1976	2284	947	.	947	1	.	1	948	.	948	0.42
1977	2249	1530	.	1530	4	.	4	1534	.	1534	0.68
1978	2030	758	.	758	1	.	1	759	.	759	0.37
1979	2514	2040	.	2040	0	.	0	2040	.	2040	0.81
1980	2585	1743	.	1743	37	.	37	1780	.	1780	0.69
1981	3113	2358	.	2358	3	.	3	2361	.	2361	0.76
1982	3907	2634	.	2634	88	.	88	2722	.	2722	0.70
1983	4075	1617	.	1617	2	.	2	1619	.	1619	0.40
1984	2248	1001	.	1001	0	.	0	1001	.	1001	0.45
1985	2355	1310	.	1310	*	*	*	1310	.	1310	0.56
1986	1430	772	.	772	*	*	*	772	.	772	0.54
1987	1121	563	.	563	*	*	*	563	.	563	0.50
1988	2979	1756	.	1756	*	*	*	1756	.	1756	0.59
1989	1672	738	.	738	*	*	*	738	.	738	0.44
1990	3159	1718	.	1718	*	*	*	1718	.	1718	0.54
1991	3495	1316	.	1316	*	*	*	1316	.	1316	0.38
1992	3961	1562	120	1682	*	5	5	1562	125	1687	0.43
1993	4384	1480	2585	4065	*	152	152	1480	2737	4217	0.96
MEANS, 95% CONFIDENCE LIMITS, N'S:											
84-89	2136.8	1115.4	.	1115.4	0.0	.	0.0	1115.4	.	1115.4	0.52
95%CL	756.5	527.4	.	527.4	.	.	.	527.4	.	527.4	0.09
N	5	5	0	5	1	0	1	5	0	5	5
86-91	2547.0	1260.0	.	1260.0	.	.	.	1260.0	.	1260.0	0.49
95%CL	1157.0	611.3	.	611.3	.	.	.	611.3	.	611.3	0.13
N	5	5	0	5	0	0	0	5	0	5	5

1987 DATA NOT INCLUDED IN MEAN.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
CPUE IS BASED ON RETAINED+RELEASED FISH FOR 1992 AND 1993 AND ON RETAINED FISH ONLY PRIOR TO 1992.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1g. Atlantic salmon recreational fishery catch and effort data for SFA 4, insular Newfoundland, 1974-93. Ret. = retained fish; Rel. = released fish.

YEAR	EFFORT ROD DAYS	SMALL (<63CM) RET.	SMALL (<63CM) REL.	SMALL (<63CM) TOT.	LARGE (≥63CM) RET.	LARGE (≥63CM) REL.	LARGE (≥63CM) TOT.	TOTAL (SMALL+LARGE) RET.	TOTAL (SMALL+LARGE) REL.	TOTAL (SMALL+LARGE) TOT.	CPUE
1974	22038	5373	.	5373	82	.	82	5455	.	5455	0.25
1975	22384	5943	.	5943	166	.	166	6109	.	6109	0.27
1976	24787	6683	.	6683	188	.	188	6871	.	6871	0.28
1977	28117	8396	.	8396	1086	.	1086	9482	.	9482	0.34
1978	24131	8774	.	8774	502	.	502	9276	.	9276	0.38
1979	21496	8026	.	8026	327	.	327	8353	.	8353	0.39
1980	25172	9414	.	9414	507	.	507	9921	.	9921	0.39
1981	32282	13536	.	13536	361	.	361	13897	.	13897	0.43
1982	32929	9973	.	9973	258	.	258	10231	.	10231	0.31
1983	26649	8954	.	8954	297	.	297	9251	.	9251	0.35
1984	29633	9900	.	9900	15	.	15	9915	.	9915	0.33
1985	34329	12190	.	12190	*	*	*	12190	.	12190	0.36
1986	31650	9293	.	9293	*	*	*	9293	.	9293	0.29
1987	18564	5453	.	5453	*	*	*	5453	.	5453	0.29
1988	27413	9854	.	9854	*	*	*	9854	.	9854	0.36
1989	17767	3786	.	3786	*	*	*	3786	.	3786	0.21
1990	23533	5661	.	5661	*	*	*	5661	.	5661	0.24
1991	21999	4892	.	4892	*	*	*	4892	.	4892	0.22
1992	19485	5290	1515	6805	*	5	5	5290	1520	6810	0.35
1993	30958	5724	7232	12956	*	158	158	5724	7390	13114	0.42
MEANS, 95% CONFIDENCE LIMITS, N'S:											
84-89	28158.4	9004.6	.	9004.6	15.0	.	15.0	9007.6	.	9007.6	0.32
95%CL	7877.0	3876.4	.	3876.4	.	.	.	3877.8	.	3877.8	0.06
N	5	5	0	5	1	0	1	5	0	5	5
86-91	24472.4	6697.2	.	6697.2	.	.	.	6697.2	.	6697.2	0.27
95%CL	6574.0	3372.6	.	3372.6	.	.	.	3372.6	.	3372.6	0.08
N	5	5	0	5	0	0	0	5	0	5	5

1987 DATA NOT INCLUDED IN MEAN.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
CPUE IS BASED ON RETAINED+RELEASED FISH FOR 1992 AND 1993 AND ON RETAINED FISH ONLY PRIOR TO 1992.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1h. Atlantic salmon recreational fishery catch and effort data for SFA 5, insular Newfoundland, 1974-93. Ret. = retained fish; Rel. = released fish.

YEAR	EFFORT ROD DAYS	SMALL (<63CM) RET.	SMALL (<63CM) REL.	SMALL (<63CM) TOT.	LARGE (≥63CM) RET.	LARGE (≥63CM) REL.	LARGE (≥63CM) TOT.	TOTAL (SMALL+LARGE) RET.	TOTAL (SMALL+LARGE) REL.	TOTAL (SMALL+LARGE) TOT.	CPUE
1974	9335	1637	.	1637	21	.	21	1658	.	1658	0.18
1975	7527	1988	.	1988	23	.	23	2011	.	2011	0.27
1976	6975	1898	.	1898	65	.	65	1963	.	1963	0.28
1977	10572	4616	.	4616	44	.	44	4660	.	4660	0.44
1978	9108	2858	.	2858	28	.	28	2886	.	2886	0.32
1979	3926	1331	.	1331	20	.	20	1351	.	1351	0.34
1980	8155	2702	.	2702	29	.	29	2731	.	2731	0.33
1981	8863	3488	.	3488	35	.	35	3523	.	3523	0.40
1982	9935	2433	.	2433	53	.	53	2486	.	2486	0.25
1983	10195	2357	.	2357	170	.	170	2527	.	2527	0.25
1984	12403	2703	.	2703	1	.	1	2704	.	2704	0.22
1985	11613	3484	.	3484	*	*	*	3484	.	3484	0.30
1986	11510	4053	.	4053	*	*	*	4053	.	4053	0.35
1987	5267	1664	.	1664	*	*	*	1664	.	1664	0.32
1988	10497	4166	.	4166	*	*	*	4166	.	4166	0.40
1989	6617	1417	.	1417	*	*	*	1417	.	1417	0.21
1990	7999	2414	.	2414	*	*	*	2414	.	2414	0.30
1991	7002	2048	.	2048	*	*	*	2048	.	2048	0.29
1992	9230	1941	728	2669	*	1	1	1941	729	2670	0.29
1993	12949	2091	2008	4099	*	107	107	2091	2115	4206	0.32
MEANS, 95% CONFIDENCE LIMITS, N'S:											
84-89	10528.0	3164.6	.	3164.6	1.0	.	1.0	3164.8	.	3164.8	0.30
95%CL	2841.9	1410.4	.	1410.4	.	.	.	1410.3	.	1410.3	0.10
N	5	5	0	5	1	0	1	5	0	5	5
86-91	8725.0	2819.6	.	2819.6	.	.	.	2819.6	.	2819.6	0.32
95%CL	2694.4	1528.5	.	1528.5	.	.	.	1528.5	.	1528.5	0.08
N	5	5	0	5	0	0	0	5	0	5	5

1987 DATA NOT INCLUDED IN MEAN.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
CPUE IS BASED ON RETAINED+RELEASED FISH FOR 1992 AND 1993 AND ON RETAINED FISH ONLY PRIOR TO 1992.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1i. Atlantic salmon recreational fishery catch and effort data for SFA 6, insular Newfoundland, 1974-93. Ret. = retained fish; Rel. = released fish.

YEAR	EFFORT ROD DAYS	SMALL (<63CM) RET.	SMALL (<63CM) REL.	SMALL (<63CM) TOT.	LARGE (≥63CM) RET.	LARGE (≥63CM) REL.	LARGE (≥63CM) TOT.	TOTAL (SMALL+LARGE) RET.	TOTAL (SMALL+LARGE) REL.	TOTAL (SMALL+LARGE) TOT.	CPUE
1974	2685	303	.	303	1	.	1	304	.	304	0.11
1975	1851	94	.	94	1	.	1	95	.	95	0.05
1976	2864	247	.	247	2	.	2	249	.	249	0.09
1977	1869	401	.	401	19	.	19	420	.	420	0.22
1978	2237	296	.	296	7	.	7	303	.	303	0.14
1979	1766	244	.	244	2	.	2	246	.	246	0.14
1980	2807	320	.	320	14	.	14	334	.	334	0.12
1981	3406	605	.	605	29	.	29	634	.	634	0.19
1982	3031	288	.	288	17	.	17	305	.	305	0.10
1983	3684	296	.	296	10	.	10	306	.	306	0.08
1984	3218	312	.	312	5	.	5	317	.	317	0.10
1985	2256	429	.	429	*	*	*	429	.	429	0.19
1986	2596	445	.	445	*	*	*	445	.	445	0.17
1987	1306	137	.	137	*	*	*	137	.	137	0.10
1988	3392	429	.	429	*	*	*	429	.	429	0.13
1989	2959	246	.	246	*	*	*	246	.	246	0.08
1990	3089	334	.	334	*	*	*	334	.	334	0.11
1991	1620	186	.	186	*	*	*	186	.	186	0.11
1992	2265	230	10	240	*	0	0	230	10	240	0.11
1993	2784	323	81	404	*	9	9	323	90	413	0.15
MEANS, 95% CONFIDENCE LIMITS, N'S:											
84-89	2884.2	372.2	.	372.2	5.0	.	5.0	373.2	.	373.2	0.13
95%CL	573.2	109.8	.	109.8	.	.	.	108.8	.	108.8	0.05
N	5	5	0	5	1	0	1	5	0	5	5
86-91	2731.2	328.0	.	328.0	.	.	.	328.0	.	328.0	0.12
95%CL	848.9	139.9	.	139.9	.	.	.	139.9	.	139.9	0.04
N	5	5	0	5	0	0	0	5	0	5	5

1987 DATA NOT INCLUDED IN MEAN.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
CPUE IS BASED ON RETAINED+RELEASED FISH FOR 1992 AND 1993 AND ON RETAINED FISH ONLY PRIOR TO 1992.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1j. Atlantic salmon recreational fishery catch and effort data for SFA 7, insular Newfoundland, 1974-93. Ret. = retained fish; Rel. = released fish.

YEAR	EFFORT ROD DAYS	SMALL (<63CM) RET.	SMALL (<63CM) REL.	SMALL (<63CM) TOT.	LARGE (>63CM) RET.	LARGE (>63CM) REL.	LARGE (>63CM) TOT.	TOTAL (SMALL+LARGE) RET.	TOTAL (SMALL+LARGE) REL.	TOTAL (SMALL+LARGE) TOT.	CPUE
1974	2019	133	.	133	2	.	2	135	.	135	0.07
1975	1436	40	.	40	0	.	0	40	.	40	0.03
1976	1128	30	.	30	0	.	0	30	.	30	0.03
1977	1775	78	.	78	1	.	1	79	.	79	0.04
1978	1786	99	.	99	1	.	1	100	.	100	0.06
1979	1332	125	.	125	0	.	0	125	.	125	0.09
1980	1546	102	.	102	1	.	1	103	.	103	0.07
1981	1348	123	.	123	2	.	2	125	.	125	0.09
1982	1621	155	.	155	10	.	10	165	.	165	0.10
1983	1804	139	.	139	34	.	34	173	.	173	0.10
1984	1381	96	.	96	4	.	4	100	.	100	0.07
1985	1635	112	.	112	*	*	*	112	.	112	0.07
1986	700	102	.	102	*	*	*	102	.	102	0.15
1987	632	28	.	28	*	*	*	28	.	28	0.04
1988	1645	128	.	128	*	*	*	128	.	128	0.08
1989	1226	66	.	66	*	*	*	66	.	66	0.05
1990	827	49	.	49	*	*	*	49	.	49	0.06
1991	644	36	.	36	*	*	*	36	.	36	0.06
1992	1313	40	0	40	*	0	0	40	0	40	0.03
1993	1107	58	3	61	*	0	0	58	3	61	0.06
MEANS, 95% CONFIDENCE LIMITS, N'S:											
84-89	1317.4	100.8	.	100.8	4.0	.	4.0	101.6	.	101.6	0.08
95%CL	481.6	28.5	.	28.5	.	.	.	28.3	.	28.3	0.03
N	5	5	0	5	1	0	1	5	0	5	5
86-91	1008.4	76.2	.	76.2	.	.	.	76.2	.	76.2	0.08
95%CL	524.4	47.3	.	47.3	.	.	.	47.3	.	47.3	0.04
N	5	5	0	5	0	0	0	5	0	5	5

1987 DATA NOT INCLUDED IN MEAN.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
CPUE IS BASED ON RETAINED+RELEASED FISH FOR 1992 AND 1993 AND ON RETAINED FISH ONLY PRIOR TO 1992.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1k. Atlantic salmon recreational fishery catch and effort data for SFA 8, insular Newfoundland, 1974-93. Ret. = retained fish; Rel. = released fish.

YEAR	EFFORT ROD DAYS	SMALL (<63CM) RET.	SMALL (<63CM) REL.	SMALL (<63CM) TOT.	LARGE (≥63CM) RET.	LARGE (≥63CM) REL.	LARGE (≥63CM) TOT.	TOTAL (SMALL+LARGE) RET.	TOTAL (SMALL+LARGE) REL.	TOTAL (SMALL+LARGE) TOT.	CPUE
1974	659	51	.	51	0	.	0	51	.	51	0.08
1975	527	87	.	87	0	.	0	87	.	87	0.17
1976	514	80	.	80	0	.	0	80	.	80	0.16
1977	530	81	.	81	0	.	0	81	.	81	0.15
1978	269	44	.	44	0	.	0	44	.	44	0.16
1979	331	100	.	100	0	.	0	100	.	100	0.30
1980	316	120	.	120	0	.	0	120	.	120	0.38
1981	384	77	.	77	0	.	0	77	.	77	0.20
1982	538	85	.	85	9	.	9	94	.	94	0.17
1983	414	41	.	41	5	.	5	46	.	46	0.11
1984	357	79	.	79	0	.	0	79	.	79	0.22
1985	611	103	.	103	*	*	*	103	.	103	0.17
1986	696	138	.	138	*	*	*	138	.	138	0.20
1987	268	43	.	43	*	*	*	43	.	43	0.16
1988	474	79	.	79	*	*	*	79	.	79	0.17
1989	330	99	.	99	*	*	*	99	.	99	0.30
1990	349	86	.	86	*	*	*	86	.	86	0.25
1991	324	11	.	11	*	*	*	11	.	11	0.03
1992	.	.	.	.	*	.	.	.	.	.	.
1993	458	53	2	55	*	0	0	53	2	55	0.12
MEANS, 95% CONFIDENCE LIMITS, N'S:											
84-89	493.6	99.6	.	99.6	0.0	.	0.0	99.6	.	99.6	0.20
95%CL	196.9	30.0	.	30.0	.	.	.	30.0	.	30.0	0.05
N	5	5	0	5	1	0	1	5	0	5	5
86-91	434.6	82.6	.	82.6	.	.	.	82.6	.	82.6	0.19
95%CL	196.7	57.2	.	57.2	.	.	.	57.2	.	57.2	0.09
N	5	5	0	5	0	0	0	5	0	5	5

1987 DATA NOT INCLUDED IN MEAN.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
CPUE IS BASED ON RETAINED+RELEASED FISH FOR 1992 AND 1993 AND ON RETAINED FISH ONLY PRIOR TO 1992.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 11. Atlantic salmon recreational fishery catch and effort data for SFA 9, insular Newfoundland, 1974-93. Ret. = retained fish; Rel. = released fish.

YEAR	EFFORT ROD DAYS	SMALL (<63CM) RET.	SMALL (<63CM) REL.	SMALL (<63CM) TOT.	LARGE (≥63CM) RET.	LARGE (≥63CM) REL.	LARGE (≥63CM) TOT.	TOTAL (SMALL+LARGE) RET.	TOTAL (SMALL+LARGE) REL.	TOTAL (SMALL+LARGE) TOT.	CPUE
1974	9162	1494	.	1494	9	.	9	1503	.	1503	0.16
1975	10046	1872	.	1872	6	.	6	1878	.	1878	0.19
1976	8809	1623	.	1623	12	.	12	1635	.	1635	0.19
1977	8766	1080	.	1080	9	.	9	1089	.	1089	0.12
1978	7224	1303	.	1303	17	.	17	1320	.	1320	0.18
1979	5859	1704	.	1704	15	.	15	1719	.	1719	0.29
1980	6446	2379	.	2379	61	.	61	2440	.	2440	0.38
1981	6343	1862	.	1862	52	.	52	1914	.	1914	0.30
1982	8574	1825	.	1825	33	.	33	1858	.	1858	0.22
1983	10754	2303	.	2303	71	.	71	2374	.	2374	0.22
1984	8754	2264	.	2264	5	.	5	2269	.	2269	0.26
1985	9385	1750	.	1750	*	*	*	1750	.	1750	0.19
1986	8807	2298	.	2298	*	*	*	2298	.	2298	0.26
1987	5994	867	.	867	*	*	*	867	.	867	0.14
1988	7157	1373	.	1373	*	*	*	1373	.	1373	0.19
1989	7039	1315	.	1315	*	*	*	1315	.	1315	0.19
1990	8240	1866	.	1866	*	*	*	1866	.	1866	0.23
1991	6482	560	.	560	*	*	*	560	.	560	0.09
1992	6177	690	196	886	*	1	1	690	197	887	0.14
1993	10344	1431	151	1582	*	15	15	1431	166	1597	0.15
MEANS, 95% CONFIDENCE LIMITS, N'S:											
84-89	8228.4	1800.0	.	1800.0	5.0	.	5.0	1801.0	.	1801.0	0.22
95%CL	1318.6	583.5	.	583.5	.	.	.	585.0	.	585.0	0.05
N	5	5	0	5	1	0	1	5	0	5	5
86-91	7545.0	1482.4	.	1482.4	.	.	.	1482.4	.	1482.4	0.20
95%CL	1179.9	810.2	.	810.2	.	.	.	810.2	.	810.2	0.08
N	5	5	0	5	0	0	0	5	0	5	5

1987 DATA NOT INCLUDED IN MEAN.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
CPUE IS BASED ON RETAINED+RELEASED FISH FOR 1992 AND 1993 AND ON RETAINED FISH ONLY PRIOR TO 1992.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1m. Atlantic salmon recreational fishery catch and effort data for SFA 10, insular Newfoundland, 1974-93. Ret. = retained fish; Rel. = released fish.

YEAR	EFFORT ROD DAYS	SMALL (<63CM) RET.	SMALL (<63CM) REL.	SMALL (<63CM) TOT.	LARGE (≥63CM) RET.	LARGE (≥63CM) REL.	LARGE (≥63CM) TOT.	TOTAL (SMALL+LARGE) RET.	TOTAL (SMALL+LARGE) REL.	TOTAL (SMALL+LARGE) TOT.	CPUE
1974	10987	1212	.	1212	14	.	14	1226	.	1226	0.11
1975	5999	427	.	427	9	.	9	436	.	436	0.07
1976	8811	730	.	730	10	.	10	740	.	740	0.08
1977	7213	1097	.	1097	5	.	5	1102	.	1102	0.15
1978	8764	1595	.	1595	42	.	42	1637	.	1637	0.19
1979	6405	849	.	849	8	.	8	857	.	857	0.13
1980	9588	1524	.	1524	27	.	27	1551	.	1551	0.16
1981	9309	1317	.	1317	29	.	29	1346	.	1346	0.14
1982	9331	1256	.	1256	10	.	10	1266	.	1266	0.14
1983	9173	1140	.	1140	79	.	79	1219	.	1219	0.13
1984	6361	1457	.	1457	2	.	2	1459	.	1459	0.23
1985	6887	1326	.	1326	*	*	*	1326	.	1326	0.19
1986	6387	1535	.	1535	*	*	*	1535	.	1535	0.24
1987	3348	429	.	429	*	*	*	429	.	429	0.13
1988	5198	1142	.	1142	*	*	*	1142	.	1142	0.22
1989	4709	898	.	898	*	*	*	898	.	898	0.19
1990	4778	835	.	835	*	*	*	835	.	835	0.17
1991	2960	230	.	230	*	*	*	230	.	230	0.08
1992	3422	245	497	742	*	6	6	245	503	748	0.22
1993	7656	700	691	1391	*	26	26	700	717	1417	0.19
MEANS, 95% CONFIDENCE LIMITS, N'S:											
84-89	5908.4	1271.6	.	1271.6	2.0	.	2.0	1272.0	.	1272.0	0.22
95%CL	1133.7	318.4	.	318.4	.	.	.	318.9	.	318.9	0.03
N	5	5	0	5	1	0	1	5	0	5	5
86-91	4806.4	928.0	.	928.0	.	.	.	928.0	.	928.0	0.19
95%CL	1529.7	592.6	.	592.6	.	.	.	592.6	.	592.6	0.06
N	5	5	0	5	0	0	0	5	0	5	5

1987 DATA NOT INCLUDED IN MEAN.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
CPUE IS BASED ON RETAINED+RELEASED FISH FOR 1992 AND 1993 AND ON RETAINED FISH ONLY PRIOR TO 1992.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1n. Atlantic salmon recreational fishery catch and effort data for SFA 11, insular Newfoundland, 1974-93. Ret. = retained fish; Rel. = released fish.

YEAR	EFFORT ROD DAYS	SMALL (<63CM) RET.	SMALL (<63CM) REL.	SMALL (<63CM) TOT.	LARGE (≥63CM) RET.	LARGE (≥63CM) REL.	LARGE (≥63CM) TOT.	TOTAL (SMALL+LARGE) RET.	TOTAL (SMALL+LARGE) REL.	TOTAL (SMALL+LARGE) TOT.	CPUE
1974	9119	4476	.	4476	38	.	38	4514	.	4514	0.50
1975	8473	4501	.	4501	40	.	40	4541	.	4541	0.54
1976	8681	4164	.	4164	42	.	42	4206	.	4206	0.48
1977	7966	4096	.	4096	18	.	18	4114	.	4114	0.52
1978	8050	3996	.	3996	18	.	18	4014	.	4014	0.50
1979	6570	3430	.	3430	7	.	7	3437	.	3437	0.52
1980	10010	5069	.	5069	44	.	44	5113	.	5113	0.51
1981	12836	7062	.	7062	41	.	41	7103	.	7103	0.55
1982	15334	7338	.	7338	53	.	53	7391	.	7391	0.48
1983	15419	4769	.	4769	27	.	27	4796	.	4796	0.31
1984	15385	7019	.	7019	15	.	15	7034	.	7034	0.46
1985	13712	5823	.	5823	*	*	*	5823	.	5823	0.42
1986	15233	5546	.	5546	*	*	*	5546	.	5546	0.36
1987	11309	3829	.	3829	*	*	*	3829	.	3829	0.34
1988	14811	5033	.	5033	*	*	*	5033	.	5033	0.34
1989	11543	2960	.	2960	*	*	*	2960	.	2960	0.26
1990	12520	4446	.	4446	*	*	*	4446	.	4446	0.36
1991	7647	1853	.	1853	*	*	*	1853	.	1853	0.24
1992	8501	2273	1039	3312	*	1	1	2273	1040	3313	0.39
1993	11280	3084	664	3748	*	43	43	3084	707	3791	0.34
MEANS, 95% CONFIDENCE LIMITS, N'S:											
84-89	14136.8	5276.2	.	5276.2	15.0	.	15.0	5279.2	.	5279.2	0.37
95%CL	1975.2	1845.1	.	1845.1	.	.	.	1850.6	.	1850.6	0.09
N	5	5	0	5	1	0	1	5	0	5	5
86-91	12350.8	3967.6	.	3967.6	.	.	.	3967.6	.	3967.6	0.32
95%CL	3784.9	1897.6	.	1897.6	.	.	.	1897.6	.	1897.6	0.06
N	5	5	0	5	0	0	0	5	0	5	5

1987 DATA NOT INCLUDED IN MEAN.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
CPUE IS BASED ON RETAINED+RELEASED FISH FOR 1992 AND 1993 AND ON RETAINED FISH ONLY PRIOR TO 1992.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.