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## **Status of Atlantic Salmon (*Salmo salar* L.) Stocks of the Newfoundland Region, 1994**

by

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### Abstract

The five-year moratorium on the commercial Atlantic salmon fishery in insular Newfoundland entered its third year in 1994. There were also further reductions in effort and quotas in Labrador. 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) 1-9, continued in 1994. A moratorium on cod fishing was also introduced in SFAs 11-14A in August 1993 which continued in 1994. Although there appears to have been some improvement in returns of small and large salmon for SFAs 1 and 2 in Labrador in the past few years, estimated total population sizes were low compared to the late 1970s and early 1980s, years when there was a substantial commercial fishery. There was a marked decline in recreational catches of small and large salmon in southern Labrador (SFA 14B) in 1994 and the commercial fishery quota was not caught. Commercial and recreational catches (retained plus released fish) of small and large salmon and recreational catch rates were among the lowest on record in 1990 and 1991 in Labrador, and if indicative of spawning escapements, future returns could be low relative to 1994 should natural survival rates remain the same. Many rivers in SFAs 6-10 in insular Newfoundland were closed to angling for most of July in 1994 due to low water levels and high water temperatures. Recreational catches (retained plus released fish) of small salmon and catch rates during the moratorium years 1992-94 increased over the 1984-89 and 1986-91 means for Northern Peninsula and Eastern (SFAs 14A, 3-8) rivers, but were comparable to or lower than levels observed in some pre-salmon moratorium years. Also, although counts of small salmon at several counting facilities were significantly higher in 1992-94 than in 1986-91, counts similar to or greater than those of 1992-94 occurred in certain pre-salmon moratorium years. Returns of small salmon to counting facilities for SFAs 9-11 (South) in 1992-94 were low relative to pre-salmon moratorium years. Smolt-to-adult survival back to the river for Northeast Brook, Trepassey improved in 1994 but remained as low as when there was a commercial fishery. The situation for Conne River worsened. This is suggestive of high or above average natural mortality at sea in 1992-94 for these rivers and probably for southern Newfoundland rivers in general. Recreational catches (retained plus released fish) for SFAs 12-13 (Southwest) during the salmon moratorium years were well below those recorded for several pre-moratorium years. Low returns to rivers in SFA 13 (St. George's Bay) resulted in the closure of rivers to angling after August 8. Levels of recreational catches and returns to counting facilities, in the absence of commercial fisheries, suggest overall population sizes of small salmon for insular Newfoundland in 1992-94 were low relative to pre-salmon moratorium years. Angling data and counts of small salmon at several counting facilities indicate that in general, spawning escapements were low during 1989-91. This suggests that returns to Northern Peninsula and Eastern rivers in 1995 could be lower than in 1992-94 and returns to South and Southwest rivers could continue at the low levels indicative of the past few years, if natural survival rates remain the same. Returns of large salmon in insular Newfoundland in 1992-94 increased over the 1986-91 mean overall, but there were pre-salmon moratorium years when returns were higher.

## Résumé

Le moratoire quinquennal sur la pêche commerciale du saumon de l'Atlantique dans l'île de Terre-Neuve en arrivait à sa troisième année d'existence en 1994. Au Labrador, il s'accompagnait d'autres réductions de l'effort et des quotas. Le moratoire imposé en 1992 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 9, demeurait lui aussi en vigueur en 1994. Était également en vigueur un autre moratoire sur la pêche de la morue, imposé dans les ZPS 11-14A en août 1993. Quoiqu'il semble y avoir une certaine amélioration dans les montaisons de petits et de grands saumons dans les ZPS 1 et 2 (Labrador) ces dernières années, les estimations d'effectif total étaient basses comparativement à la fin des années 1970 et au début des années 1980, années durant lesquelles existait une importante pêche commerciale. Les prises de petits et de grands saumons par les pêcheurs sportifs dans le sud du Labrador (ZPS 14B) en 1994 accusaient une nette diminution, et le quota de la pêche commerciale n'a pas été capturé. Les prises commerciales et sportives (prises gardées plus prises remises à l'eau) étaient parmi les plus basses enregistrées en 1990 et 1991 au Labrador. Si elles sont révélatrices des échappées de reproducteurs et que les taux de survie naturelle restent les mêmes, les montaisons futures pourraient être faibles par rapport à celles de 1994. Dans de nombreuses rivières des ZPS 6 à 10, dans l'île de Terre-Neuve, la pêche sportive était fermée durant la plus grande partie de juillet 1994, en raison des faibles niveaux d'eau et des températures élevées de cette dernière. Les prises sportives (prises gardées plus prises remises à l'eau) de petits saumons et les taux de prises au cours des trois premières années du moratoire (1992-1994) ont augmenté par rapport aux moyennes de 1984-1989 et de 1986-1991 dans les rivières de la péninsule nord et de l'est (ZPS 14A, 3-8), mais étaient comparables ou inférieures aux résultats obtenus durant certaines des années qui ont précédé le moratoire sur la pêche du saumon. Par ailleurs, quoiqu'en plusieurs endroits les dénombrements de petits saumons aient été très supérieurs à ceux de 1992-1994 et 1986-1991, des dénombrements du même ordre, voire plus élevés, avaient été obtenus au cours de certaines des années qui ont précédé le moratoire sur la pêche du saumon. Les montaisons de petits saumons aux installations de dénombrement des ZPS 9-11 (sud) en 1992-1994 étaient basses par rapport à celles des années ayant précédé le moratoire. Le taux de survie du stade de saumoneau à celui d'adulte retournant à sa rivière s'est amélioré en 1994 pour ce qui est du ruisseau Northeast, Trepassey, mais demeurait aussi faible qu'à l'époque de la pêche commerciale. Dans le cas de la rivière Conne, la situation a empiré. Cela dénote une mortalité naturelle en mer élevée ou supérieure à la moyenne en ce qui concerne les stocks de ces deux rivières et probablement ceux des rivières de l'ensemble du sud de Terre-Neuve. Depuis le début du moratoire sur la pêche du saumon, les prises de la pêche sportive (prises gardées plus prises remises à l'eau) dans les ZPS 12-13 (sud-ouest) ont été bien inférieures à celles obtenues durant plusieurs des années qui ont précédé le moratoire. Les faibles montaisons dans les rivières de la ZPS 13 (baie St. George) ont entraîné la fermeture de la pêche sportive dans ces rivières après le 8 août. Les résultats de la pêche sportive et les montaisons aux installations de dénombrement, en l'absence de pêche commerciale, révèlent que, dans l'ensemble, l'effectif des petits saumons dans l'île de Terre-Neuve de 1992 à 1994 était faible par rapport aux années qui ont précédé le moratoire. Selon les données de la pêche sportive et des dénombrements en plusieurs endroits, il apparaît aussi que les échappées de reproducteurs étaient généralement faibles de 1989 à 1991. Il en ressort que, si les taux de survie naturelle demeurent inchangés, les montaisons dans les rivières de la péninsule nord et de l'est en 1995 pourraient être inférieures à celles de 1992-1994, et que les montaisons dans les rivières du sud et du sud-ouest pourraient rester aussi basses que celles des quelques dernières années. Les montaisons de grands saumons dans l'île de Terre-Neuve en 1992-1994 ont augmenté par rapport à la moyenne générale de 1986-1991, mais on a connu des montaisons plus élevées au cours des années qui ont précédé le moratoire sur la pêche du saumon.

## Introduction

This paper presents the general status of Atlantic salmon stocks of the Newfoundland Region in 1994 (Fig. 1). 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 1994. Previously, 1983-93, assessments for Salmon Fishing Areas (SFAs) 12-14 were presented in separate documents.

## 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 implementation of the moratorium on commercial fishing in 1992 followed a major management plan introduced in 1984 (O'Connell *et al.* 1992a; May 1993; Mullins and Caines MS 1994), elements of which were continued into the quota years of 1990 and 1991 and the 1992-94 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, 2, and 14B in Labrador in 1994 and since they were first introduced in 1990 were as follows:

YEAR	SFA				
	1*	2	2A	2B	14B
1990	80	200			50+10**
1991	80	200	65	135	15
1992	80	180	60	120	13
1993	80	90	27	63	8
1994	24	60	20	40	8

\* Allowance catch.

\*\*The 1990 quota of 50 t was for all of SFA 14; there was also a supplementary quota of 10 t for SFA 14B.

In 1994, 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 numbers of commercial fishers for each SFA in Labrador and for SFAs combined for the period 1974-94 are shown in Table 1. Each fisher was licensed to fish 366 m of gear.

### Recreational fishery

In 1992 and 1993, the number of fish that could be retained in each SFA was limited by quota. The quota was assigned for each SFA as a whole and not administered on an individual river basis. Only hook-and-release fishing was permitted after the quota was caught in each SFA. Quotas were eliminated in 1994. In insular Newfoundland, the season bag limit for the retention of small salmon in 1994 decreased from eight to six, three to be caught prior to July 31 and three after that date. After the bag limit of three was reached in each time period, hook-and-release fishing only was permitted. As in previous years, the retention of large salmon was not permitted in insular Newfoundland. In Labrador, there was no division of the bag limit before and after July 31. The season bag limit for large salmon was reduced from four to two. In both insular Newfoundland and Labrador, the maximum number of fish that could be retained per day increased to two. 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.

On a river-specific basis, Conne River (SFA 11) was closed to angling in 1994 and there was no First Peoples' food fishery. Rocky River and Colinet River in SFA 9 were also closed. In SFA 13, seven rivers were managed by river-specific quotas; the same applied to three rivers in SFA 14A. Only hook-and-release fishing was permitted after river quotas were caught.

Seventy-two rivers throughout insular Newfoundland were closed to angling for varying periods in 1994 due to high water temperatures and low water levels (Table 2). Most of the rivers affected and the longest closure periods were mainly in SFAs 6-10. In SFA 13, eight rivers were closed (Table 2) after an in-season review in July, which indicated total returns for 1994 would be less than 50% of target requirement.

For the five-year period immediately preceeding the commercial salmon fishery moratorium, the average number of recreational fishery licenses sold in Newfoundland and Labrador was 24493. Maximum license sales were recorded in 1988 (26445). By comparison, sales during the moratorium years were 25718 (1992), 26508 (1993), and approximately 23,000 (1994).

### *PUBLIC CONSULTATIONS*

In 1994, in addition to the usual consultative and advisory meetings involving organized user groups and representatives of the Provincial Government, the Department of Fisheries and Oceans

held several meetings with the public at large throughout Newfoundland and Labrador. The purpose of these meetings was to give the general public the opportunity to input into the stock assessment process. A description of the process and highlights and opinions expressed at each meeting are presented in Appendix 1.

## 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.* (MS 1994) and Mullins and Caines (MS 1994). For the Labrador commercial fishery, data were compiled by the Statistics and Informatics Branch of the Department of Fisheries and Oceans (DFO) in the manner described by Ash and O'Connell (1987a and b).

The monitoring of Labrador commercial fishery quotas in 1994 was similar to 1991-93. Landings were deducted from the quota of the SFA containing the fishers home port. However, for comparison with previous years when there were no quotas, landings in quota years were compiled by place landed. Commercial catches in the communities of Carrol's Cove, Camp Islands, and Cape Charles were deducted from the quota for northern Labrador (SFA 2, north of Cape Charles) in 1992-94. However, these catches were included as part of the SFA 14B catch statistics, as in previous years.

Recreational fishery data were compiled as described by Ash and O'Connell (1987a and b) and Mullins and Claytor (1989). Catch statistics for both retained and released small salmon were used in 1992-94. For SFAs 12-14, catch information for released large salmon has been available since 1985. 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, three years of data are now available for the moratorium period. 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. MS 1993) as a 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 periods) to determine if the observed value is simply a random ordering of observations achieved by chance, or if the observed value is unlikely (Anon. MS 1993). The latter could imply a true change in abundance. Following the terminology of Rago (MS 1993), let  $Y_{k,t}$  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.  $R_0$  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 eleven rivers (Torrent River, Western Arm Brook, Exploits River (Bishop's Falls), Gander River (counting fence), Middle Brook, Terra Nova River, Biscay Bay River, Northeast Brook (Trepassey), Rocky River, Northeast River (Placentia), and Conne River) were used. Separate analyses were carried out on south coast rivers (SFAs 9-11) and Northern Peninsula and Eastern rivers (SFAs 14B, 4, and 5). The ratio test was used to compare returns of small and large salmon separately for the pre-moratorium period 1986-91 with returns in 1992-94. Two thousand permutations of the data were run.

Counts of small and large salmon for these rivers were also compared on an individual river basis. Comparisons of mean counts were made between the same moratorium and pre-moratorium periods using the GLM Procedure of SAS (SAS Institute 1985). Analyses were performed on rank transformed data (Conover 1980; Conover and Iman 1981) using the Rank Procedure of SAS.

For a number of rivers, partial counts of small and large salmon for certain years were adjusted to total counts. The rivers involved were Gander River and Salmon Brook (O'Connell *et al.* MS 1995a), Biscay Bay River (O'Connell *et al.* MS 1995b), and Sandhill River (Reddin *et al.* MS 1995).

As described in past years (O'Connell *et al.* MS 1993, MS 1994), 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 MS 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, Kiglapaits, 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 years and weeks:

$$Y_{ij} = \mu + \alpha_i + \beta_j + \epsilon_{ij}$$

where  $Y_{ij}$  is the response variable, standardized catch rate,  $\alpha_i$  and  $\beta_j$  are class variables year and week, respectively, and  $\epsilon_{ij}$  is the error term. For this analysis, the original four subareas were collapsed into two: Dog Island with Black Island, and Kiglapaits with Cutthroat, and analysed separately. Weeks were collapsed as follows: Standard Weeks 27-29 were grouped and also weeks 34 to the end of the season. The regression of ln catch rate for the period 1977-94 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.

Analyses were conducted to determine if large salmon (2SW) stocks in SFAs 1 and 2, Labrador, were subject to recruitment overfishing. Sutherland (1990) and Anon. (MS 1994) defined recruitment overfishing as a level of fishing mortality that reduces the ability of a population to persist. Two forms were listed:

- 1) Spawning target overfishing, which is a reduction in spawning numbers below target levels as a result of fishing activities;
- 2) Spawner overfishing, which is failure of a cohort of spawners to replace itself as a result of fishing.

One way of evaluating Atlantic salmon stocks for both of these conditions is through the examination of spawner-to-spawner relationships. Estimated numbers of spawners obtained from parental spawning cohorts of a sea-age group were traced backward over all years in which fish of the same sea age returned, beginning with the estimate of the number of spawners for the current year. Data sets were examined to see if numbers of spawners, which were made up of a range of chronological ages, were sufficient to replace the weighted sum of parents of the same sea age. The appropriate weighting for historical spawners was determined from the average smolt-age distribution. In order to conclude that overfishing was the sole cause of failure to produce enough spawners in successive generations, natural mortality was assumed to be constant over the time series. For some rivers, natural mortality has been shown to be variable (see below). This technique, the necessary lags, target spawning requirement for SFAs 1 and 2, and river-age distributions for each SFA, are found in Anon. (MS 1994). Catch series information was updated for the present analyses.

## Results and Discussion

### *THE LABRADOR COMMERCIAL FISHERY*

The commercial catch of small salmon (7 t) in SFA 1 in 1994 (Table 3 and Fig. 2a) was the same as in 1993 and it decreased from the 1984-89 (77%) and 1986-91 (71%) means. The catch of large salmon in 1994 (16 t) declined from 1993 and the means (6, 78, and 73%, respectively) (Table 3 and Fig. 2b). In SFA 2 (Table 4 and Fig. 2a), the 1994 catch of small salmon (9 t) decreased from 1993 and the means (61, 88, and 89%, respectively). The catch of large salmon (54 t) in 1994 in SFA 2 (Table 4 and Fig. 2b) increased over 1993 (17%) but remained below the 1984-89 (63%) and 1986-91 (60%) means. In SFA 14B, the catch of small salmon (2 t) (Table 5 and Fig. 2a) in 1994 was identical to that of 1993 which was below both means (86 and 87%, respectively). The catch of large salmon (4 t) in SFA 14B (Table 5 and Fig. 2b) was below 1993 (76%) and both means (86%). For all SFAs in Labrador combined (Table 6 and Fig. 2a), the catch of small salmon (18 t) in 1994 decreased from 1993 (44%) and both means (85%). Large salmon catch (74 t) also declined from 1993 and the means (8, 70, and 67%, respectively) (Table 6 and Fig. 2b). In all cases above, catches of both small and large salmon in 1994 were below the lower limit of the 95% confidence interval of both means.



Total commercial catch (22 t) in SFA 1 in 1994 (Table 3 and Fig. 2c) decreased from 1993 (12%) and the 1984-89 (78%) and 1986-91 (74%) means. Likewise, for SFA 2 (Table 4 and Fig. 2c), the catch in 1994 (64 t) decreased from 1993 and the means (6, 71, and 70%, respectively). In SFA 14B, total catch (6 t) was below 1993 (68%) and both means (86%) (Table 5 and Fig. 2c). For all of Labrador (Table 6 and Fig. 2c), total catch (92 t) in 1994 decreased from 1993 by 18% and from the means by 75% (1984-89) and 73% (1986-91). For all SFAs separately and combined, total catches in 1994 were the lowest recorded and all were below the lower limit of the 95% confidence interval of each mean.

The percentage of quota caught and quotas (in parentheses) in 1990-94 were as follows:

YEAR	SFA 1	SFA 2	SFA 14B	SFAS 1, 2, & 14B
1990	65 (80)	64 (200)	38 (60)	59 (260)
1991	13 (80)	38 (200)	227 (15)	41 (295)
1992	83 (80)	67 (200)	131 (13)	75 (273)
1993	31 (80)	76 (90)	238 (8)	63 (178)
1994	92 (24)	107 (60)	75 (8)	100 (92)

In 1994, the quota was nearly caught in SFA 1 and exceeded in SFA 2; the quota was not caught in SFA 14B. It should be noted that quotas in 1993 (except for SFA 1) and to a greater extent in 1994, were substantially lower than in previous years.

Large salmon with river ages greater than 3 years are principally from stocks in Labrador and the Quebec North Shore (Reddin and Porter MS 1988). Commercial landings (No.) of large salmon in Labrador in 1974-93 (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. 3). 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. 4). The declining trend for small salmon was significant ( $r^2 = 0.31$ ;  $df = 19$ ;  $P = 0.01$ ) (Fig. 4a). The relationship between large salmon and year was significant ( $r^2 = 0.77$ ;  $df = 19$ ;  $P = 0.0001$ ) (Fig 4b) as was the relationship between North American-origin small salmon with river age greater than 3 years and time ( $r^2 = 0.43$ ;  $df = 18$ ;  $P = 0.0005$ ) (Fig. 4c).

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 recruitment to the fisheries (Anon. MS 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.

Landings of Atlantic salmon from the Nain Fishing Region, SFA 1, are available since 1977 (Dempson and Shears MS 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 ranged from a high of 60 t in 1980 (all subareas) to a low of 2 t in 1993 and again in 1994. 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  $30 \text{ t} \cdot \text{y}^{-1}$  until 1990. During the past four years (1991-94) landings fell drastically, averaging only  $2.3 \text{ t} \cdot \text{y}^{-1}$ . Landings of salmon from the Kiglapaits-Cutthroat subarea dominated the catch series, averaging about 63% of the total landings at  $19 \text{ t} \cdot \text{y}^{-1}$  until 1989.

The regression of  $\ln$  catch rate for the period 1977-94 explained 50% of the variation in the data for the Dog Island-Black Island area ( $F = 10.26$ ;  $P = 0.0001$ ) (Table 7). Catch rates for the Dog Island-Black Island area declined from 1977 to 1979 followed by an increased abundance in 1980. Abundance then declined until 1987 (Fig. 5). Abundance increased until 1989 but again declined rapidly up to 1993. In 1994, however, catch rates increased suggestive of higher abundance, but were still well below the long-term average (Fig. 5).

In the more northern Kiglapaits-Cutthroat area, only 25% of the variation in catch rates was explained by the model ( $F = 2.82$ ;  $P = 0.0001$ ) (Table 7). Catch rates were quite variable (Fig. 5). The highest catch rate occurred in 1989 but this was also followed by a rapid decline in Abundance with the lowest levels occurring in recent years (Fig. 5). In both combined area groups (Dog Island-Black Island, Kiglapaits-Cutthroat), effort was among the lowest recorded during the past four years (1991-94), especially in 1994 for the Kiglapaits-Cutthroat area. The limited distribution of effort and subsequent interpretation of catch-rate trends must be viewed with caution in that low effort directed towards Atlantic 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). 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 varying patterns of movement of salmon as they migrate past local headlands and outer islands.

#### *RECRUITMENT OVERFISHING, LABRADOR STOCKS*

For SFA 1, estimated numbers of large salmon (2SW) spawners were always less than numbers of parents, i.e., were below the replacement (diagonal) line (Fig. 6). Numbers of spawners were well below target requirement in all years. Except for 1993 and 1994, numbers of spawners in

SFA 2 were also below the replacement line (Fig. 7) and substantially below target requirement for all years.

### *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, and 14B combined), insular Newfoundland (SFAs 3-14A combined), and insular Newfoundland and Labrador combined, 1974-94, are presented in Appendix 2a-c. Data for insular Newfoundland were also rolled into three subdivisions, Northern Peninsula and Eastern (SFAs 14A and 3-8), South (SFAs 9-11), and Southwest (SFAs 12-13) and are shown in Appendix 2d-f. Data for each individual SFA are shown in Appendix 2g-u. Catches for all years prior to 1992 represent retained fish for the entire angling season, when there was no mandatory release of small salmon. Total catches (sum of retained and released fish), effort and catch per unit of effort (CPUE) for individual SFAs and the various combinations of SFAs for the moratorium years 1992-94 and the 1984-89 and 1986-91 means, are presented in Table 8. For insular Newfoundland, except for Southwest (SFAs 12-13), numbers of large salmon released were not included in CPUE for years prior to 1992. For 1992, there was no estimate of released fish and associated effort during the period of retention of catch and hence direct comparisons with 1993 and 1994 should be viewed with caution. In Table 9, catch (retained plus released fish), effort, and CPUE for 1994 are expressed as percentage change in relation to 1992, 1993, and the means for 1984-89 and 1986-91. For insular Newfoundland, Northern Peninsula and Eastern, South, and individual SFAs 3-11, 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 season.

Retained catches for 1992-94 and the 1984-89 and 1986-91 means for each SFA and combinations of SFAs are shown in Table 10. Percentage change in retained catch in 1994 in relation to 1992, 1993, and the means, is presented in Table 11. As above, data for 1987 were not included in the means for the areas indicated.

#### **Labrador (SFAs 1, 2, and 14B combined)**

The total catch of small salmon (retained plus released fish) in 1994 (Table 8 and Fig. 8) increased over 1992, 1993 and the 1984-89 and 1986-91 means (just within the 95% confidence interval (CI) of each mean) (Table 9). The catch of large salmon was similar to 1992, and increased over 1993 and the means (exceeded the upper 95% confidence limit (CL) of each mean). Effort in 1994 increased over 1992 and 1993 and both means (exceeded the upper CL of each mean). CPUE in 1994 increased over 1992, 1993 and both means (within the CI of each mean).

The number of small salmon retained in 1994 (Table 10 and Fig. 8) was similar to that of 1992 and 1993 but was below the lower CL of each mean (Table 11 and Fig. 9). The retained catch of large salmon increased over 1993, decreased from 1992 and the 1984-89 mean (within the CI of each mean), and was similar to the 1986-91 mean. It should be pointed out that in 1993 the quota for retained fish was not caught in any of the SFAs of Labrador.

**SFA 1:** The total catch of small salmon in 1994 increased over 1992, 1993 and both means (within the CI each mean). Total catch of large salmon decreased from 1992 but increased over 1993 and the 1984-89 (within the CI of each mean) and 1986-91 (exceeded the upper CL) means. Effort increased over 1992 and 1993 but was below the means (within the CI of each mean). CPUE increased over 1992 and both means (exceeded the upper CL of each mean).

The number of small salmon retained in 1994 increased over 1992 and 1993 but declined from the 1984-89 (below the lower CL) and 1986-91 (within the CI) means. The number of large salmon retained increased over 1993 but decreased from 1992 and the 1984-89 (below the lower CL) and 1986-91 (within the CI) means.

**SFA 2:** The total catch of small salmon in 1994 increased over 1992, 1993 and both means (exceeded the upper CL of each mean). A similar pattern was followed by large salmon. Effort was similar to 1993 but exceeded 1992 and the upper CL of each mean. CPUE increased over 1992, 1993, and both means (above the upper CL of each mean).

The number of small salmon retained in 1994 was similar to 1992, increased over 1993, but was below the means (within the CI of each mean). The retained catch of large salmon increased over 1992, 1993, and the means (within the CI).

A counting fence was operated in Sandhill River in 1994 for the first time since 1973. The count of small salmon in 1994 (Table 12) was slightly higher than that for 1972 which was the lowest for the period 1970-73. The count of large salmon (Table 13) was substantially higher than any recorded in 1970-73. The proportion of large salmon in 1994 was 0.263 which compares to an average of 0.073 for 1970-73.

**SFA 14B:** The total catch of small salmon in 1994 decreased from 1992, 1993, and both means (below the lower CL of each mean). The same applied to the catch of large salmon, except the decline from each mean was within the limits of the CI. Effort increased over 1992, 1993, and both means (above the upper CL of each mean) while CPUE was the opposite.

The retained catch of small salmon in 1994 decreased from 1992, 1993, and both means (below the lower CL); the same trend was true for large salmon but the decline was within the 95% CI of both means.

Counting fences were operated in Forteau River and L'Anse-au-Loup River for the first time in 1994. Counts of small and large salmon are provided in Tables 11 and 12, respectively.

#### **Insular Newfoundland (SFAs 3-14A combined)**

The total catch of small salmon in 1994 (Table 8 and Fig. 10) decreased from 1993 but increased over 1992 and both means (within the CI of each mean) (Table 9). Effort increased over

1992, 1993, and both means (above the upper CL of each mean). CPUE decreased from 1992, 1993, and the 1984-89 mean (within the CI) and was similar to the 1986-91 mean.

The number of small salmon retained in 1994 (Table 10 and Fig. 10) increased over 1992 and 1993, decreased from the 1984-89 mean (within the CI), and was similar to the 1986-91 mean (Table 11 and Fig. 11).

#### **Northern Peninsula and Eastern (SFAs 14A, 3-8 combined)**

The total catch of small salmon in 1994 (Table 8 and Fig. 12) was similar to 1993 and increased over 1992 and both means (exceeded the upper CL of each mean) (Table 9). Effort increased over 1992, 1993, and the upper CL of each mean. CPUE decreased from 1993 but was similar to 1992 and the means.

The 1994 retained catch of small salmon (Table 10 and Fig. 12) increased over 1992, 1993, and both means (within the CI of each mean) (Table 11 and Fig. 11).

**SFA 14A:** The total catch of small salmon in 1994 decreased slightly from 1993, was similar to 1992, and increased over both means (within the CI of each mean). The number of large salmon released in 1994 increased over 1992, 1993, and the upper CL of each mean. Effort increased over 1992, 1993, and both means (exceeded the upper CL of each mean). CPUE decreased from 1992 and 1993 but was similar to both means.

The number of small salmon retained in 1994 increased over 1993 and was similar to that of 1992 and the means.

Neither of the three individual river quotas was reached in 1994. Quotas and catches for each river were as follows:

River	Quota	1994	1993	1992	1991	1990	1989
Lomond R.	350	325	281	357*	328	386*	270
Watson's Bk.	50	30	20	49*	6	36	6
Pincent's Bk.	10	2	2	0	3	10*	6

\*Quota reached.

Adult salmon counting facilities are located in Lomond River, Torrent River, and Western Arm Brook. The count of small salmon at the Lomond River fishway in 1994 increased over 1992, 1993, and both means (exceeded the upper CL of each mean) (Table 12 and Fig. 13). The count of large salmon decreased from 1992, increased over 1993, and increased over the means (above the upper CL) (Table 13 and Fig. 14). The count of small salmon at the Torrent River fishway in 1994

decreased from 1993 but increased over 1992 and the means (exceeded the upper CL) (Table 12 and Fig. 13). The count of large salmon increased over 1992 and 1993 and exceeded the upper CL of each mean (Table 13 and Fig. 14). At the counting fence in Western Arm Brook, the count of small salmon in 1994 was similar to that of 1993 and increased over 1992 and the upper CL of each mean (Table 12 and Fig. 13). The count of large salmon increased over 1992 and 1993 and exceeded the upper CL of each mean (Table 13 and Fig. 14). The proportion of large salmon for Lomond River in 1994 was similar to 1993 and the means but below 1992; for Torrent River and Western Arm Brook, the proportion of large salmon in 1994 was higher than for 1992, 1993, and the means (Table 14 and Fig. 15).

**SFA 3:** Total catch of small salmon and effort in 1994 increased over 1992 and 1993 means and exceeded the upper CL of each mean. CPUE decreased from 1993 but increased over 1992 and the means (exceeded the upper CL).

The number of small salmon retained in 1994 increased over 1992, 1993, and the upper CL of each mean.

**SFA 4:** The total catch of small salmon in 1994 decreased slightly from 1993 but increased over 1992 and the 1984-89 (within the CI) and 1986-91 (similar to the upper CL) means. Effort increased over 1992, 1993, and the upper CL of each mean. CPUE decreased from 1992, 1993, and the 1984-89 mean (within the CI) and was similar to the mean for 1986-91.

Counts of small (Table 12 and Fig. 16) and large salmon (Table 13 and Fig. 17) are available for fishways located in the Exploits River (Bishop's Falls and Great Rattling Brook) and Salmon Brook (Gander River) and counting fences in Gander River and Campbellton River. Data are available for Campbellton River for 1993 and 1994. The count of small salmon for Campbellton River in 1994 decreased from 1993 while the opposite applied to large salmon. At Bishop's Falls, the count of small salmon in 1994 decreased from 1993 but increased over 1992 and the upper CL of each mean. The count of large salmon increased over 1992, 1993, and the upper CL of each mean. At Great Rattling Brook, the count of small salmon in 1994 decreased from 1992, 1993, and the 1984-89 mean (within the CI) and increased over the 1986-91 mean (within the CI). The count of large salmon increased over 1992, 1993 and the upper CL of each mean. The count of small salmon at the Gander River counting fence decreased from 1993, was similar to 1992, and increased over the upper CL of the mean. The count of large salmon decreased from 1992 and 1993 but remained above the upper CL of the mean. The count of small salmon at Salmon Brook in 1994 decreased from 1992, 1993, and the 1984-89 mean (within the CI), and increased over the 1986-91 mean (within the CI). The count of large salmon was similar to 1993, decreased from 1992, and increased over the upper CL of each mean. The proportion of large salmon for Bishop's Falls and Great Rattling Brook in 1994 increased over 1992, 1993, and the means (Table 14 and Fig. 18). The proportion for Salmon Brook was similar to 1992 but increased over 1993 and the means. At the Gander River counting fence, the proportion of large salmon in 1994 decreased from 1992 and was slightly less than than for 1993 and the mean.

**SFA 5:** The total catch of small salmon in 1994 was similar to 1993 and increased over 1992 and the means (within the CI). Effort increased over 1992, 1993, and the upper CI of each mean while the reverse was true for CPUE.

The number of small salmon retained increased over 1992, 1993, and the 1986-91 mean (within the CI) and was similar to the 1984-89 mean.

Counts of grilse (Table 12 and Fig. 19) and large salmon (Table 13 and Fig. 20 ) are available from fishways in Middle Brook and Terra Nova River (upper and lower). The count of small salmon at Middle Brook in 1994 decreased from 1993 but increased over 1992 and the upper CL of each mean. The count of large salmon was similar to 1993 and increased over 1992 and the upper CL of each mean. At the lower Terra Nova River fishway, the count of small salmon in 1994 decreased from 1993 and increased over 1992 and the means (within the CI of the 1984-89 mean but exceeded the upper CL of the 1986-91 mean). The count of large salmon decreased from 1992 and 1993 but remained above the upper CL of each mean. The counts of small and large salmon for the lower Terra Nova River 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. At the upper Terra Nova River fishway, the count of small salmon in 1994 increased over 1992, 1993, and the upper CL of each mean. The count of large salmon was similar to 1993, decreased from 1992, but exceeded the upper CL of each mean. The proportion of large salmon for Middle Brook in 1994 increased over 1992, 1993, and the means (Table 14 and Fig. 21). The proportion for both Terra Nova River fishways decreased from 1992 and 1993 but was above the means.

**SFA 6:** The total catch of small salmon in 1994 increased over 1992 but decreased from 1993 and the means (within the CI). Effort and CPUE displayed a similar pattern

The number of small salmon retained in 1994 was similar to 1992 and decreased from 1993 and the 1984-89 (below the lower CL) and 1986-91 (within the CI) means.

**SFA 7:** Total catch of small salmon in 1994 increased over 1992 and 1993 but decreased from the 1984-89 (below the lower CL) and 1986-91 (within the CI) means. Effort was similar to 1993, decreased from 1992 and the 1984-89 mean (within the CI), and increased over the 1986-91 mean (within the CI). CPUE increased over 1992 and 1993 but decreased from the means (within the CI).

The retained catch of small salmon in 1994 increased over 1992 and 1993 but decreased from the 1984-89 (below the lower CL) and 1986-91 (within the CI) means.

**SFA 8:** The total catch of small salmon in 1994 was similar to 1993 but decreased from the 1984-89 mean (below the lower CL) and the 1986-91 mean (within the CI). Effort decreased from 1993 and the 1984-89 (below the lower CL) and 1986-91 mean (within the CI) means. CPUE increased over 1993 and the means (within the CI).

The number of small salmon retained in 1994 increased slightly over 1993 but decreased from the 1984-89 (below the lower CL) and 1986-91 (within the CI) means.

#### **South (SFAs 9-11)**

The total catch of small salmon in 1994 (Table 8 and Fig. 22) was similar to 1992 but decreased from 1993 and the 1984-89 (below the lower CL) and 1986-91 (within the CI) means (Table 9). Effort decreased from 1993 and the 1984-89 mean (within the CI), was similar to the 1986-91 mean, and increased over 1992. CPUE decreased from 1992, 1993, and the 1984-89 (below the lower CL) and 1986-91 (within the CI) means.

The retained catch of small salmon in 1994 (Table 10 and Fig. 22) increased over 1992 but decreased from 1993 and the 1984-89 (below the lower CL) and 1986-91 (within the CI) means (Table 11 and Fig. 11).

**SFA 9:** The total catch of small salmon in 1994 was similar to 1992 but decreased from 1993 and the 1984-89 (below the lower CL) and 1986-91 (within the CI) means. Effort increased over 1992, was similar to the 1986-91 mean, and decreased from 1993 and the 1984-89 mean (within the CI). CPUE decreased from 1992, 1993, and the 1984-89 (below the lower CL) and 1986-91 (within the CI) means.

The number of small salmon retained in 1994 increased over 1992 but decreased from 1993 and the 1984-89 (below the lower CL) and 1986-91 (within the CI) means. In 1993, the retention period for small salmon in this SFA lasted the entire season (i.e., the quota was not caught).

Counts of small salmon (Table 12 and Fig. 23) and large salmon (Table 12 and Fig. 24) were provided by counting fences (Biscay Bay River and Northeast Brook, Trepassey) and a fishway (Rocky River). The count of small salmon for Biscay Bay River in 1994 increased over 1992, 1993, and the 1986-91 mean (within the CI) but decreased from the 1984-89 mean (within the CI). The count of large salmon increased over 1992 but decreased from 1993 and the means (within the CI). The number of small salmon entering Northeast Brook, Trepassey in 1994 increased over 1992 and 1993 and was similar to the means. The count of large salmon increased over 1992 but declined from 1993 and the 1984-89 (below the lower CL) and 1986-91 (within the CI) means. The count of small salmon for Rocky River in 1994 decreased from 1992, 1993, and the means (within the CI). The count of large salmon decreased from 1992 and 1993 but increased over the 1984-89 (above the upper CL) and 1986-91 (within the CI) means. The proportion of large salmon for Biscay Bay River in 1994 (Table 14 and Fig. 25) decreased from 1993 and was comparable to 1992 and the means. The proportion for Northeast Brook, Trepassey was the lowest on record. The proportion for Rocky River decreased from 1992 and 1993 but was above the means.

**SFA 10:** The total catch of small salmon in 1994 decreased from 1993 and the 1984-89 mean (within the CI) and increased over 1992 and the 1986-91 mean (within the CI). Effort decreased



from 1993 but increased over 1992 and the 1984-89 (within the CI) and 1986-91 (above the upper CL) means. CPUE decreased from 1992, 1993, and the 1984-89 (below the lower CI) and 1986-91 (within the CI) means.

The number of small salmon retained in 1994 increased over 1992 and 1993, was similar to the 1986-91 mean, but decreased from the 1984-89 mean (below the lower CL).

The count of small salmon (Table 12 and Fig. 26) at the Fishway in Northeast River (Placentia) in 1994 decreased from 1992 and 1993 but increased over the means (within the CI). The count of large salmon (Table 13 and Fig. 27) increased over 1992, 1993, and the means (above the upper CL). The proportion of large salmon for Northeast River in 1994 increased over 1992, 1993, and the means (Table 14 and Fig. 28).

**SFA 11:** Total catch of small salmon decreased from 1992, 1993, and the 1984-89 (below the lower CL) and 1986-91 (within the CI) means. Effort was similar to 1993, increased over 1992, but decreased from the 1984-89 (below the lower CL) and 1986-91 (within the CI) means. CPUE decreased from 1992, 1993, and the means (within the CI of each mean).

The number of small salmon retained in 1994 was similar to 1992 but decreased from 1993 and the 1984-89 (below the lower CL) and 1986-91 (within the CI) means.

The count of small salmon (Table 12 and Fig. 29) at the Conne River counting fence was below 1992, 1993, and the lower CL of each mean. The count of large salmon (Table 13 and Fig. 30) was similar to 1993 but below 1992 and the lower CL of each mean. The proportion of large salmon for Conne River in 1994 decreased from 1992 but increased over 1993 and the means (Table 14 and Fig. 31).

### **Southwest (SFAs 12-13)**

The total catch of small salmon in 1994 (Table 8 and Fig. 32) decreased from 1992, 1993, and the means (within the CI of each mean) (Table 9). The number of large salmon released was similar to 1992 but increased over 1993 and the means (above the upper CL of each mean). Effort decreased from 1992, 1993, and the means (within the CI of each mean). CPUE followed a similar pattern to effort although the magnitude of differences was less.

The number of small salmon retained in 1994 (Table 10 and Fig. 32) decreased from 1992, 1993, and the means (below the lower CL of each mean) (Table 11 and Fig. 11).

**SFA 12:** The total catch of small salmon in 1994 decreased from 1992, 1993, and the means (within the CI of each mean). The number of large salmon released decreased from 1992 but increased over 1993 and the means (within the CI of the 1984-89 mean but above the upper CL of the 1986-91 mean). Effort was similar to 1992 and the 1986-91 mean and decreased from 1993 and

the 1984-89 mean (within the CI). CPUE was the same as in 1993 but decreased from 1992 and the means (within the CI of each mean).

The number of small salmon retained in 1994 decreased from 1992, 1993, and the means (below the lower CL of the 1984-89 mean but within the CI of the 1986-91 mean).

**SFA 13:** The total catch of small salmon for 1994 decreased from 1992, 1993, and the means (within the CI of each mean). The number of large salmon released was similar to 1992 and increased over 1993 and the upper CL of the means. Effort and CPUE decreased slightly from 1992, 1993, and the means (within the CI of each mean).

The retained catch of small salmon decreased from 1992, 1993 and the lower CL of each mean. The quota for retained small salmon was not caught in 1993.

The only river quotas reached in 1994 were for Fischell's River and Fox Island River. Individual river quotas and catches for SFA 13, 1989-94, were as follows:

River	Quota	1994	1993	1992	1991	1990	1989
Barachois R.	175	154	230*	263*	68	138	79
Fischell's Bk.	200	216*	157	133	157	116	17
Flat Bay R.	250	128	173	211	251*	277*	130
Harry's R.	350	153	319	311	370*	706*	324
Fox Island R.	50	55*	52*	52*	56*	91*	38
Serpentine R.	150	116	150*	176*	132	131	107

\*Quota reached.

A counting fence was operated in Highlands River in 1992 and 1993; prior to this, counts were available for 1980-82. The count of small salmon (Table 12) in 1994 was similar to 1993 and higher than any for the period 1980-82. The count of large salmon (Table 13) increased over 1993 and was substantially higher than any recorded in 1980-82. The proportion of large salmon for 1994 was 0.505 which compares to 0.363 for 1993 and 0.312 for the period 1980-82.

Counts of small (Table 12 and Fig. 33) and large (Table 13 and Fig. 34) salmon were also available for Humber River and Pinchgut Brook. The estimated return of small salmon for Humber River in 1994 determined through a mark-recapture study (Mullins *et al.* MS 1995), decreased from 1992 and 1993 and the pre-moratorium year 1990, but increased over 1991. The count of large salmon in 1994 decreased from 1993 but increased over all other years. The counts of small and large salmon for Pinchgut Brook in 1994 were similar to 1993 but increased over 1992. The proportion

of large salmon for Humber River in 1994 decreased from 1992 but increased over remaining years (Fig. 35). The proportion for Pinchgut Brook increased over 1992 and 1993.

#### *COUNTS AT COUNTING FACILITIES - AN OVERALL SUMMARY*

Results of the nonparametric ratio test (Table 15) suggest the probability of the observed ratio of 1.77 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 1992-94 compared to the pre-moratorium period 1986-91. A separate analysis of Northern Peninsula and Eastern rivers (Torrent River, Western Arm Brook, Exploits River, Gander River, Middle Brook, and Terra Nova River) gave a similar result ( $P = 0.0000$ ). For South division rivers (Biscay Bay River, Northeast Brook (Trepassey), Northeast River (Placentia), and Conne River), there was no significant improvement in returns of small salmon for moratorium years over pre-moratorium years ( $P = 0.9685$ ). Returns of large salmon for all rivers collectively also increased significantly during the three moratorium years ( $P = 0.0120$ ) as did those of Northern Peninsula and Eastern rivers ( $P = 0.0000$ ) (Table 15). The result for South rivers was not significant ( $P = 0.9225$ ). Some of the strongest declines in returns of small and large salmon in recent years for South rivers occurred in Conne River. If the count of large salmon for Conne River is omitted from the analysis, a significant result is obtained ( $P = 0.0165$ ). Omitting Conne River small salmon, however, still produces a non-significant result ( $P = 0.3195$ ).

The results of comparisons of mean counts of small and large salmon for the same moratorium and pre-moratorium periods on an individual river basis are shown in Table 16. The outcome was similar to that of the separate collective analysis for Northern Peninsula and Eastern and South divisions presented above. It should be noted that except for small and large salmon for Northeast River (Placentia) and large salmon for Rocky River, the direction of change was negative.

#### *EFFECTS OF BAG LIMIT SPLIT ON DISTRIBUTION OF CATCH AND EFFORT*

During consultations with the general public, an opinion was expressed that the split in the season bag limit of three fish prior to and after July 31, was in effect, a season limit of three fish. Anglers contended that historically considerably less effort was expended after July 31 than prior to that date. Table 17 shows this to be the case. A related opinion was that the split would result in an increase in effort after July 31 in an attempt by anglers to retain the remaining three fish. In SFAs 3 and 4, the proportion effort expended after July 31 in 1994 increased over the mean for 1984-91 (it surpassed the maximum for SFA 3 and was similar to the maximum for SFA 4), while for SFA 5, there was little change from the mean (Table 17). For SFAs 6-10, there were substantial increases in proportion of effort after July 31 in 1994 compared to the means, but it must be remembered that rivers in these areas were closed for most of July due to high water temperatures and low water levels. There was a substantial increase in proportion of effort (exceeded the mean and maximum) after July 31 in SFA 11. For SFAs 12-14A, there were increases over the means but they were within the range observed for 1984-91. Traditionally, salmon are not known to enter rivers in these SFAs later in the season. Also rivers in SFA 13 were open only to hook-and-release fishing after August

8. It appears therefore that there was a redistribution of effort into the post-July 31 period for SFAs 3, 4, and 11.

The redistribution of effort for SFA 4 did not translate into an increase in proportion of catch while for SFA 11 it did. The increased proportions of catch for SFAs 6-10 after July 31 reflect the river closures in July.

#### *SMOLT-TO-ADULT SURVIVAL*

Smolt-to-adult survival of 5.4% for 1994 (adult year) for Northeast Brook (Trepassey) (SFA 9) increased over 1993 and was the highest since 1988 (Table 18). That of Conne River (SFA 10) was the lowest recorded to date (2.7%). A study by Dempson and O'Connell (MS 1994) showed a positive relationship between an index of smolt condition and sea survival for smolts leaving both Conne River and Northeast Brook. Based on condition of smolts in 1993, survival to adults in 1994 was predicted to be  $5.25 \pm 1.23\%$  for Northeast Brook and  $6.68 \pm 1.61\%$  for Conne River. Various factors that may have contributed to low returns for Conne River are discussed separately (Dempson and Reddin MS 1995). Those factors that were associated with decreased returns included decreased condition of smolts, possible losses due to legal and illegal interceptory fisheries, and changes in available marine habitat.

Smolt-to-adult survival for Campbellton River (SFA 4) in 1994 was 9.05% (Appendix 3). Results of a tagging study indicated that 23.8% of the small salmon returning to Campbellton River were previous spawners which were excluded from the survival calculations. The corrected survival rate after removal of previous spawners was 7.0%.

The number of small salmon returning to the Western Arm Brook counting fence in 1994 was anticipated to be 13% below the 1993 count based on a 13% decrease in the smolt count from 1992 to 1993. The actual return in 1994 was 7.4% above the 1993 returns as a result of the 16% increase in sea-survival of smolts compared to 1993 (Table 18). The 1994 smolt count was 31% below the count in 1993. Assuming that sea-survival in 1995 will be similar to 1994 (7.1%), returns of small salmon to the river in 1995 are anticipated to be 31% below returns in 1994.

#### **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 (O'Connell *et al.* MS 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.* MS 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 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 1994. In August 1993, a moratorium was placed on cod fishing in SFAs 11-14A which remained in effect in 1994. In spite of these moratoria, in 1993 field crews noted that net-marked Atlantic salmon were showing up at counting facilities. In 1994, an attempt was made to quantify the incidence of net-marked fish in Gander (O'Connell *et al.* MS 1995a), Campbellton (O'Connell *et al.* MS 1995b), and Conne (Dempson *et al.* MS 1995) rivers. Of the fish examined at counting fences in these rivers, the incidence of net scarring observed was 16.1, 6.2, and 18.6%, respectively.

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. In the interpretation of trends and drawing of conclusions with respect to abundance, most weight is 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

Although the commercial fishery quota for all of Labrador was caught in 1994, this quota was considerably diminished from previous years. Since the overall commercial quota was not caught in years prior to 1994, data for these years (1990-93) can be used as indices of abundance, although the decreases in licensed effort could have resulted in somewhat lower catches. In 1994, the quota was exceeded slightly in SFA 2 but not attained in SFAs 1 and 14B. In 1992-94, 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 areas. In spite of this and the recent reductions in the commercial fishery, compared to 1992-94, river escapements of small and large salmon for Labrador as a whole, as indicated by commercial and recreational fishery data, have been as high or higher in the past. This and an analysis of trends in estimated total population sizes of small and large salmon for Sandhill River (Reddin *et al.* MS 1995), suggest that population sizes of small and large salmon have declined overall in Labrador in recent years. This conclusion is corroborated by the relationships of parents to future spawners, catch rates at Nain, and trends in catches of small and large salmon in Labrador and small salmon with a sea age greater than three years at West Greenland. Low population sizes of small and large salmon in 1994 correspond to years of above average commercial and recreational fishery catches in 1987 and 1988. Recreational catches and catch rates in 1990 and 1991 might be indicative of below average spawning escapements, which could contribute to lower future returns relative to 1994, should natural survival rates remain the same. It should be pointed out that low catches in 1991 could have been due in part

to a delay in the entry of fish into rivers as a result of severe sea-ice conditions throughout much of the summer.

Even though there appears to have been some improvement in returns in the past few years, the present low population sizes of small and large salmon compared to the late 1970s and early 1980s, years when there was a substantial commercial fishery, is a matter of serious concern. The marked decline in recreational catches of small and large salmon in SFA 14B in 1994, and the fact that the commercial quota for this area was not caught, is of particular concern. Consequently, exploitation of Labrador stocks and in particular the large salmon component, which contributes substantially to egg deposition, should be as low as possible.

### **Insular Newfoundland**

As a result of the closure of many rivers in SFAs 6-10 during the height of the angling season, comparison of angling data for 1994 for all of insular Newfoundland (SFAs 3-14A combined) and for South (SFAs 9-11) with past years, is not appropriate. Since the contribution to Northern Peninsula and Eastern (SFAs 14A, 3-8) total catch by SFAs 6-8 has been relatively small, it is valid to make historical comparisons for rivers in this area. Total catches (retained plus released fish) and CPUE in moratorium years 1992-94 for Northern Peninsula and Eastern rivers were comparable to or lower than levels observed in some pre-salmon moratorium years. Also, at several counting facilities (including Gander River as evidenced by Salmon Brook), although counts of small salmon in 1992-94 were significantly above the 1986-91 mean, counts similar to or greater than those of 1992-94 have occurred in certain pre-salmon moratorium years.

Returns of small salmon to counting facilities for South (SFAs 9-11) in 1992-94 were low relative to pre-salmon moratorium years. While smolt-to-adult survival back to the river for Northeast Brook, Trepassey (SFA 9) improved in 1994, it was still as low as when there was a commercial fishery. The situation for Conne River worsened. This is suggestive of high or above average natural mortality at sea in 1992-94 for these rivers and probably for southern Newfoundland rivers in general. Since 1987, smolt production for Conne River and Northeast Brook (except for 1994) was relatively stable. 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.

Catches of small salmon for Southwest (SFAs 12-13) during moratorium years were well below those recorded for several pre-moratorium years. Low returns to rivers in SFA 13 (St. George's Bay) resulted in closures to angling after August 8. Approximately 10% of total season retained catch of small salmon was historically taken after this closure date, which must be kept in mind when comparing 1994 with previous years. Counts of small salmon for Humber River in 1992 and 1993 increased over the two pre-moratorium years but not in 1994. Reasons for the lack of improvement in returns of small salmon to SFAs 12 and 13 during the commercial salmon fishery

moratorium are unclear. Opinions expressed during public consultations were that clear-cutting of forest areas along several rivers in St. George's Bay and poaching may have played a significant role. Stocks in SFAs 12 and 13 were not expected to benefit as much from the moratorium as other areas of insular Newfoundland because these stocks were subjected to a shorter commercial fishery season in 1978, which should have resulted in lower exploitation. Typically, Atlantic salmon enter rivers in SFAs 12 and 13 in late May and early June. The change in the commercial fishing season opening date from May 18 to June 5 in 1984 in other areas of insular Newfoundland should have reduced the interception of fish destined for SFAs 12 and 13. Also, the closure of the SFA 12 commercial fishery in 1984 should have further reduced exploitation on these stocks. Consequently, the number of fish available for release into freshwater during the moratorium years would be lower than for some other areas.

Levels of recreational catch and returns to counting facilities, in the absence of commercial fisheries, suggest the overall total population sizes of small salmon for insular Newfoundland in 1992-94 were low relative to pre-salmon moratorium years. An analysis of trends in estimated total population sizes of small salmon for Gander River (O'Connell *et al.* MS 1995a), Middle Brook and Biscay Bay River (O'Connell *et al.* MS 1995b), Conne River (Dempson *et al.* MS 1995), and Humber River (Mullins and Reddin MS 1995) for the period 1974-94, supports this conclusion. Angling data and counts of small salmon at several counting facilities indicate that in general spawning escapements were low during 1989-91. This suggests that returns to Northern Peninsula and Eastern rivers in 1995-96 could be lower than in 1992-94 and returns to South and Southwest rivers could continue at the low levels indicative of the past few years, if natural survival rates remain the same. It should be noted that, although returns to some rivers have increased since the commercial fishery moratorium, no new adults have yet been produced. Eggs laid in 1992 will not return as adults until at least 1997 and even later in more northern areas. It should be kept in mind that a single season of extreme low water levels could negatively influence survival of juvenile fish. For example, the low water levels in western Newfoundland in 1989 may have had a negative impact on adult salmon returns in 1994 similar to low water conditions in 1987 in other parts of the island.

An objective of the split in the recreational fishery bag limit (three fish before and after July 31) was to constrain overall retained catch to a level similar to that achieved by quotas in 1992 and 1993. The total number of small salmon retained for all of insular Newfoundland in 1994 was 28949 which compares to 23127 in 1992 and 24693 in 1993. The 1994 catch, however, is without the usual contribution of rivers in SFAs 6-10 which were closed to angling during most of July. The number of small salmon retained in Northern Peninsula and Eastern rivers in 1994 increased by approximately 50% over 1992 and 1993. It appears that the 1994 Management Plan did not achieve its objective on limiting exploitation to 1992 and 1993 levels and spawning escapements decreased accordingly.

Effort expenditure in 1994 for insular Newfoundland as a whole was the highest on record. This was driven by the increase in Northern Peninsula and Eastern rivers since the remaining divisions showed declines. Some of this increase might have been redirected from areas with closures in July.

While returns of large salmon showed an overall improvement in 1992-94 compared to the 1986-91 mean, for several Northern Peninsula and Eastern and South counting facilities, there were pre-salmon moratorium years when returns were higher. Numbers of large salmon released in SFAs 12, 13, and 14A during the moratorium years showed a marked increase over the means overall but there were comparable catches in the late 1970s and early 1980s. For all Northern and Eastern counting facilities except Lomond River and Gander River, proportions of large salmon in all three years of the moratorium were higher than the 1984-89 and 1986-91 means. This was also the case for three out of five South counting facilities.

In 1994, detailed stock assessments were carried out for nineteen rivers with counting facilities, spread throughout the Newfoundland Region. Target egg deposition requirement was met in eight of these rivers (Appendix 4).

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Table 1. The number of licensed commercial Atlantic salmon fishers for SFAs 1, 2, 14B and Labrador total, 1974-1994.

Year	Salmon Fishing Area			Labrador Total
	1	2	14B	
1974	108	323	137	568
1975	187	421	121	729
1976	179	464	119	762
1977	196	432	122	750
1978	290	403	125	818
1979	272	410	128	810
1980	271	352	116	739
1981	266	350	115	731
1982	262	339	115	716
1983	273	417	111	801
1984	248	378	101	727
1985	234	351	89	674
1986	212	356	61	629
1987	213	362	61	636
1988	182	361	61	604
1989	196	353	61	610
1990	150	361	59	570
1991	157	355	58	570
1992	147	294	54	495
1993	112	159	17	288
1994	47	156	13	216

Table 2. Opening and closure dates of the Atlantic salmon recreational fishery for each SFA, and variations by river, 1994.

**SFA 1 June 25 - Sept 18****SFA 2 June 25 - Sept 11****SFA 3 June 18 - Sept 5**

River	Close dates	Reason for closure
Wild Cove Brook	July 22 - 25	Low water levels
Western Arm Brook	"	"
Southern Arm Brook	"	"
Baie Berte Brook	"	"
Woodstock River	"	"

**SFA 4 June 18 - Sept 5****Indian River June 18 - August 28****Exploits River June 18 - August 28**

Northwest Arm Brook	July 22 - 25	Low water levels
Western Arm Brook	"	"
Pt. Leamington River	"	"
Charles Brook	"	"
Northern Arm River	"	"
Peters River	"	"
Stoney Brook (Exploits River)	"	"
Campbellton river	"	"
Soulis Brook (Gander River)	"	"
Northwest Gander	"	"
Southwest Gander	"	"

**SFA 5 June 18 - Sept 5****Terra Nova River June 18 - Aug 28**

Northwest Brook (Port Blandford)	July 16 - 25	Low water levels
Southwest Brook	"	"
Salmon Brook	"	"

**SFA 6 June 18 - Sept 5**

Salmon Cove River (Champneys)	July 16 - 25	Low water levels
Trouty River	"	"
Popes Harbour River	"	"
Shoal Harbour River	"	"
Deer Harbour River	July 7 - 25	"
Bellevue River	July 7 - 26	"

**SFA 7 June 18 - Sept 5**

Salmon Cove River	July 7 - 26	Low water levels
North River	"	"
South River	"	"
North Arm River (Holyrood)	July 7 - Sept 5	"

**SFA 8 June 18 - Sept 5**

Renews River	July 7 - 26	Low water levels
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**SFA 9 June 18 - Sept 5**

Biscay Bay River	July 7 - 26	Low water levels
Northwest Brook (Trepassey)	"	"
Peters River	"	"
Salmonier River	"	"
North Harbour River	"	"
Little Salmonier River	"	"
Big Barachois Brook	"	"
Branch River	"	"

Table 2. Cont'd.

**SFA 10 June 18 - Sept 5****Southeast River, Placentia June 18 - Aug 28****Northeast River, Placentia June 18 - Aug 28****Tides Brook June 18 - Aug 28**

Great Barasway Brook	July 7 - 26	Low water levels
Southeast River (Placentia)	"	"
Northeast River (Placentia)	July 7 - Aug 4	"
Come By Chance River	"	"
North Harbour River (PB)	July 14 - Aug 1	"
Watsons Brook	July 14 - Sept 5	"
Black River	July 14 - 26	"
Pipers Hole River	"	"
Cape Roger River	July 14 - Aug 5	"
Nonsuch Brook	"	"
Baie De Leau River	"	"
Red Harbour River	"	"
Northwest Brook (Mortier)	July 14 - 26	"
Tides Brook	"	"
Big Salmonier River (Burin)	"	"
Little St. Lawrence River	"	"
Lawn River	"	"
Taylor's Bay Brook	"	"
Salmonier River (Lamaline)	"	"
Piercey's Brook	"	"

**SFA 11 June 18 - Sept 5****Garnish River June 18 - Aug 28**

Grand Bank Brook	July 14 - 26	Low water levels
Garnish River	"	"

**SFA 12 June 4 - Sept 5**

Lapole River	Aug 30 - Sept 5	Low water levels
East Bay Brook (Lapole)	"	"
Farmers Arm River	"	"
Garia River	"	"
Burnt Island River	"	"
Isle Aux Morts River	"	"
Grand Bay River	"	"
Northwest Brook, Grand Bay	"	"

**SFA 13 June 4 - Sept 5****Little Codroy River June 11 - Sept 5****Little Barachois Brook June 11 - Sept 5****Harry's River June 11 - Sept 5****Adies Lake, Humber River June 4 - July 31****Goose Arm River June 11 - Sept 5**

Bear Cove River	Aug 30 - Sept 5	Low water levels
Little Codroy River	Aug 27 - Sept 5	"
Grand Codroy River	"	"
Crabbes River	Aug 9 - Sept 5	Anticipated low returns - H & R only
Barachois River	"	"
Robinsons River	"	"
Fishells Brook	Aug 8 - Sept 5	Quota (200) taken. H & R only
Flat Bay Brook	"	Anticipated low returns - H & R only
Little Barachois Brook	"	"
Southwest & Bottom Brook	"	"
Harry's River	"	"
Fox Island River	"	Quota (50) taken. H & R only
Serpentine River	Aug 8 - 26	Anticipated low returns - H & R only
	Aug 27 - Sept 5	( Low water levels, no H & R)

**SFA 14A June 11 - Sept 5****Torrent River opened when 1000 fish passed through the fishway (July 25 - Sept 5)****St. Genevieve River June 4 - Sept 5****Parker River July 23 - Sept 5****SFA 14B June 4 - Sept 18**

Pinware River	Aug 28 - Sept 18	Anticipated low returns - H & R only.
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Table 3. Summary of Atlantic salmon commercial catch data for Salmon Fishing Area 1, 1974-1994. Weight in metric tonnes. Also shown is percentage change for 1994 in relation to 1993 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	QUOTA WEIGHT
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	80**
1993	7	3893	17	3825	25	7718	80**
1994*	7	3214	16	3343	22	6557	24**
$\bar{X}$ 84-89	29.8	15206.8	71.8	15211.5	102.0	30418.3	
S.D.	5.4	3045.4	17.0	3117.8	19.3	4567.3	
95% LCL	24.1	12010.3	53.9	11939.0	81.7	25624.4	
95% UCL	35.5	18403.4	89.7	18484.0	122.3	35212.3	
$\bar{X}$ 86-91	24.2	12418.8	59.8	12495.5	84.3	24914.3	
S.D.	12.9	6602.9	33.6	6962.1	45.3	12943.9	
95% LCL	10.6	5488.4	24.5	5188.0	36.8	11328.3	
95% UCL	37.7	19349.2	95.1	19803.0	131.9	38500.4	
%Change, 1994 vs:							
1993	0	-17	-6	-13	-12	-15	
$\bar{X}$ 84-89	-77	-79	-78	-78	-78	-78	
$\bar{X}$ 86-91	-71	-74	-73	-73	-74	-74	

\* Preliminary data.

\*\*Allowance catch

Table 4. Summary of Atlantic salmon commercial catch data for Salmon Fishing Area 2, 1974-1994. Weight in metric tonnes. Also shown is percentage change for 1994 in relation to 1993 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	QUOTA WEIGHT
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	180
1993	23	12037	46	9651	68	21688	90
1994*	9	4492	54	11013	64	15505	60
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$\bar{X}$ 84-89	77.3	39407.8	146.5	30856.5	223.5	70264.3	
S.D.	38.7	19812.2	56.8	11107.6	92.0	29617.7	
95% LCL	36.7	18612.8	86.8	19197.9	127.0	39177.4	
95% UCL	118.0	60202.8	206.2	42515.1	320.0	101351.3	
<hr/>							
$\bar{X}$ 86-91	79.5	40167.8	134.8	28014.5	214.0	68182.3	
S.D.	35.3	18403.4	71.2	14558.4	105.1	32433.4	
95% LCL	42.5	20851.5	60.1	12733.9	103.7	34140.1	
95% UCL	116.5	59484.1	209.6	43295.1	324.3	102224.6	
<hr/>							
%Change, 1994 vs:							
1993	-61	-63	17	14	-6	-29	
$\bar{X}$ 84-89	-88	-89	-63	-64	-71	-78	
$\bar{X}$ 86-91	-89	-89	-60	-61	-70	-77	

\* Preliminary data.

Table 5. Summary of Atlantic salmon commercial catch data for Salmon Fishing Area 14B, 1974-1994. Weight in metric tonnes. Also shown is percentage change for 1994 in relation to 1993 and the 1984-89 and 1986-91 means.

## SALMON FISHING AREA 14B

YEAR	SMALL WEIGHT	SMALL NUMBER	LARGE WEIGHT	LARGE NUMBER	TOTAL WEIGHT	TOTAL NUMBER	QUOTA WEIGHT
1974	19	9328	78	15863	96	25191	
1975	37	19294	63	14752	100	34046	
1976	28	13152	68	15189	96	28341	
1977	23	11267	91	18664	114	29931	
1978	8	4026	55	11715	63	15741	
1979	15	7194	17	3874	32	11068	
1980	19	8493	46	9138	65	17631	
1981	14	6658	38	7606	52	14264	
1982	15	7379	27	5966	42	13345	
1983	7	3292	33	7489	40	10781	
1984	5	2421	30	6218	35	8639	
1985	11	7460	16	3954	27	11414	
1986	15	8296	26	5342	41	13638	
1987	23	11389	58	11114	81	22503	
1988	15	7087	23	4591	38	11678	
1989	19	9053	22	4646	41	13699	
1990	8	3592	15	2858	23	6450	
1991	11	5303	23	4417	34	9720	
1992	3	1325	14	2752	17	4077	13
1993	2	1144	17	3620	19	4764	8
1994*	2	802	4	857	6	1659	8
$\bar{X}$ 84-89	14.7	7617.7	29.2	5977.5	43.8	13595.2	
S.D.	6.3	2968.3	14.9	2631.9	18.9	4740.4	
95% LCL	8.1	4502.1	13.6	3215.0	24.0	8619.6	
95% UCL	21.2	10733.3	44.8	8740.0	63.7	18570.8	
$\bar{X}$ 86-91	15.2	7453.3	27.8	5494.7	43.0	12948.0	
S.D.	5.4	2772.2	15.2	2872.3	19.8	5414.7	
95% LCL	9.5	4543.6	11.9	2479.9	22.2	7264.7	
95% UCL	20.8	10363.1	43.8	8509.4	63.8	18631.3	
%Change, 1994 vs:							
1993	0	-30	-76	-76	-68	-65	
$\bar{X}$ 84-89	-86	-89	-86	-86	-86	-88	
$\bar{X}$ 86-91	-87	-89	-86	-84	-86	-87	

\* Preliminary data.



Table 6. Summary of Atlantic salmon commercial catch data for Labrador (Salmon Fishing Areas 1, 2, & 14B), 1974-1994. Weight in metric tonnes. Also shown is percentage change for 1994 in relation to 1993 and the 1984-89 and 1986-91 means.

## LABRADOR (SFAs 1, 2 &amp; 14B )

YEAR	SMALL WEIGHT	SMALL NUMBER	LARGE WEIGHT	LARGE NUMBER	TOTAL WEIGHT	TOTAL NUMBER	QUOTA WEIGHT
1974	113	56321	602	122765	713	179086	
1975	213	111791	492	114521	705	226312	
1976	165	78209	591	131540	757	209749	
1977	140	69602	572	116980	713	186582	
1978	64	33656	430	91473	493	125129	
1979	96	45714	230	52238	326	97952	
1980	228	103479	625	124955	853	228434	
1981	238	114680	576	112334	815	227014	
1982	159	79449	389	83243	548	162692	
1983	98	49441	272	60212	370	109653	
1984	53	25590	200	43202	252	68792	
1985	86	47359	152	33995	238	81354	
1986	141	71396	297	58565	438	129961	
1987	178	89454	385	79170	563	168624	
1988	159	83109	235	49598	395	132707	
1989	114	56486	216	47743	330	104229	
1990	67	33027	136	27487	202	60514	
1991	54	26768	66	13465	120	40233	
1992	46	24249	157	32341	204	56590	273
1993	32	17074	80	17096	112	34170	178
1994*	18	8508	74	15213	92	23721	92
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$\bar{X}$ 84-89	121.8	62232.3	247.5	52045.5	369.3	114277.8	
S.D.	46.9	23907.0	82.3	15535.6	122.8	36859.2	
95% LCL	72.6	37139.4	161.1	35739.3	240.4	75590.1	
95% UCL	171.0	87325.3	333.9	68351.7	498.3	152965.5	
<hr/>							
$\bar{X}$ 86-91	118.8	60040.0	222.5	46004.7	341.3	106044.7	
S.D.	50.0	25983.4	113.3	23131.7	161.2	48180.0	
95% LCL	66.3	32767.7	103.6	21725.5	172.2	55474.6	
95% UCL	171.4	87312.3	341.4	70283.8	510.5	156614.7	
<hr/>							
%Change, 1994 vs:							
1993	-44	-50	-8	-11	-18	-31	
$\bar{X}$ 84-89	-85	-86	-70	-71	-75	-79	
$\bar{X}$ 86-91	-85	-86	-67	-67	-73	-78	

\* Preliminary data.

Table 7. Results of the analyses of ln catch rate for Atlantic salmon from the Nain Fishing Region of Labrador, SFA 1, 1977-94.

AREA=Dog/Black Island

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: CUE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.	
MODEL	22	71.60843017	3.25492864	10.26	0.0001	0.496329	15.0758	
ERROR	229	72.66762461	0.31732587		ROOT MSE		CUE MEAN	
CORRECTED TOTAL	251	144.27605478			0.56331685		3.73656723	
SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
YY	17	55.75074760	10.33	0.0001	17	60.69919426	11.25	0.0001
WEEK	5	15.85768257	9.99	0.0001	5	15.85768257	9.99	0.0001

AREA=Kiglapait/Cutthroat

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: CUE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.	
MODEL	22	28.60270167	1.30012280	2.82	0.0001	0.246098	16.1219	
ERROR	190	87.62236434	0.46117034		ROOT MSE		CUE MEAN	
CORRECTED TOTAL	212	116.22506601			0.67909524		4.21225926	
SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
YY	17	17.92738548	2.29	0.0037	17	18.18124127	2.32	0.0032
WEEK	5	10.67531618	4.63	0.0005	5	10.67531618	4.63	0.0005

Table 8. Atlantic salmon recreational catch (retained + released), effort, and catch per unit of effort (CPUE) data for 1992-1994 for each SFA, Labrador (SFAs 1 - 14B), Northern Peninsula and Eastern (SFAs 14A & 3 - 8), South (SFAs 9 - 11), Southwest (SFAs 12 - 13) and Insular Newfoundland (SFAs 3 - 14A). The 1984-89 and 1986-91 means are included; 95% Confidence Intervals are in parentheses.

SFA	Effort (rod days)					Small salmon (< 63 cm.)					Large Salmon (>= 63 cm.)					CPUE***				
	1994	1993	1992	$\bar{X}_{84-89}^*$	$\bar{X}_{86-91}^*$	1994	1993	1992**	$\bar{X}_{84-89}^*$	$\bar{X}_{86-91}^*$	1994	1993	1992**	$\bar{X}_{84-89}^*$	$\bar{X}_{86-91}^*$	1994	1993	1992	$\bar{X}_{84-89}^*$	$\bar{X}_{86-91}^*$
<b>Labrador (1, 2 &amp; 14B)</b>	10297	9318	8342	8222 (1490)	8711 (1051)	5392	4301	2989	4179 (1214)	4112 (1341)	765	469	791	513 (153)	454 (229)	0.60	0.51	0.45	0.57 (0.08)	0.52 (0.13)
1	848	292	709	1116 (324)	1077 (345)	1157	202	168	861 (366)	742 (499)	181	24	286	157 (37)	114 (61)	1.58	0.77	0.64	0.91 (0.12)	0.80 (0.33)
2	3540	3730	3003	2456 (517)	2746 (270)	3456	2638	1901	2018 (637)	2046 (633)	472	173	267	191 (104)	198 (103)	1.11	0.75	0.72	0.90 (0.15)	0.82 (0.25)
14B	5909	5296	4630	4650 (770)	4888 (582)	779	1461	920	1300 (375)	1324 (355)	112	272	238	165 (78)	142 (91)	0.15	0.33	0.25	0.32 (0.07)	0.30 (0.07)
<b>Northern Peninsula &amp; Eastern (14A &amp; 3-8)</b>	93859	70498	53371	61630 (10344)	56102 (10526)	27059	27547	16745	18454 (6426)	15887 (6707)	1014	802	380			0.30	0.40	0.32	0.30 (0.06)	0.28 (0.07)
14A	21046	17858	17117	15937 (1934)	15997 (1807)	5526	5907	5309	4601 (1128)	4623 (1164)	475	376	369	79 (56)	102 (54)	0.29	0.35	0.33	0.29 (0.06)	0.30 (0.06)
3	7715	4384	3961	2137 (756)	2547 (1157)	5158	4065	1682	1115 (527)	1260 (611)	404	152	5			0.72	0.96	0.43	0.52 (0.09)	0.49 (0.13)
4	43242	30958	19485	28158 (7876)	24472 (6573)	12079	12956	6805	9005 (3876)	6697 (3372)	79	158	5			0.28	0.42	0.35	0.32 (0.06)	0.27 (0.08)
5	18000	12949	9230	10528 (2841)	8725 (2694)	3905	4099	2669	3165 (1410)	2820 (1528)	52	107	1			0.22	0.32	0.29	0.30 (0.10)	0.32 (0.08)
6	2429	2784	2265	2884 (573)	2731 (849)	262	404	240	372 (110)	328 (140)	4	9	0			0.11	0.15	0.11	0.13 (0.05)	0.12 (0.04)
7	1162	1107	1313	1317 (482)	1008 (524)	71	61	40	101 (28)	76 (47)	0	0	0			0.06	0.06	0.03	0.08 (0.03)	0.08 (0.04)
8	265	458		494 (197)	435 (197)	58	55		100 (30)	83 (57)	0	0				0.22	0.12		0.20 (0.05)	0.19 (0.09)
<b>South (9 - 11)</b>	25073	29280	18100	28274 (3855)	24702 (6192)	4972	6721	4940	8348 (2619)	6378 (3187)	61	84	8			0.20	0.23	0.27	0.30 (0.06)	0.26 (0.07)
9	7154	10344	6177	8228 (1318)	7545 (1180)	922	1582	886	1800 (583)	1482 (810)	2	15	1			0.13	0.15	0.14	0.22 (0.05)	0.20 (0.08)
10	7028	7656	3422	5908 (1134)	4806 (1529)	1096	1391	742	1272 (318)	928 (592)	21	26	6			0.16	0.19	0.22	0.22 (0.03)	0.19 (0.06)
11	10891	11280	8501	14137 (1975)	12351 (3784)	2954	3748	3312	5276 (1845)	3968 (1897)	38	43	1			0.27	0.34	0.39	0.37 (0.09)	0.32 (0.06)
<b>Southwest (12 - 13)</b>	22576	25883	24460	25167 (3171)	25003 (3164)	5298	6828	7075	7431 (2382)	6973 (2145)	977	754	1025	388 (203)	375 (212)	0.28	0.29	0.33	0.31 (0.07)	0.29 (0.06)
12	2853	3362	2831	3203 (649)	2955 (543)	730	900	1105	1127 (506)	873 (314)	48	22	78	32 (20)	23 (9)	0.27	0.27	0.42	0.36 (0.13)	0.30 (0.08)
13	19723	22521	21629	21964 (2815)	22049 (2715)	4568	5928	5970	6305 (1979)	6099 (1862)	929	732	947	356 (198)	352 (204)	0.28	0.30	0.32	0.30 (0.06)	0.29 (0.06)
<b>Insular Nf. (3-14A)</b>	141508	125661	95931	115484 (16883)	106188 (19617)	37329	41096	28760	34350 (11147)	29262 (11995)	2052	1640	1413			0.28	0.34	0.31	0.30 (0.06)	0.28 (0.07)

\*1987 is not included in SFAs 3-11, Northern Peninsula & Eastern, South, and Insular Nf.

\*\*1992 for SFAs 3 - 11 is incomplete. Released fish were recorded only when river was closed to retention.

\*\*\*CPUE for 1992-1994 is based on small + large (retained + released). The means are based on small retained fish only for SFAs 3 - 11, Northern Peninsula & Eastern, South, and Insular Nf.

Table 9. Atlantic salmon recreational catch (retained + released), effort, and catch per unit effort in 1994 for each SFA, Labrador ( SFAs 1, 2 & 14B), Northern Peninsula & Eastern (SFAs 14A & 3-8), South (SFAs 9-11), Southwest (SFAs 12-13) and Insular Nf. (SFAs 3-14A), expressed as percentage change in relation to 1992, 1993, and the 1984-89 and 1986-91 means.

SFA	Effort (rod days)				Small salmon (< 63 cm.)				Large salmon (>= 63 cm.)				CPUE			
	1993	1992	$\bar{X}$ 84-89*	$\bar{X}$ 86-91*	1993	1992	$\bar{X}$ 84-89*	$\bar{X}$ 86-91*	1993	1992	$\bar{X}$ 84-89*	$\bar{X}$ 86-91*	1993	1992	$\bar{X}$ 84-89*	$\bar{X}$ 86-91*
<b>Labrador (1, 2 &amp; 14B)</b>	11	23	25	18	25	80	29	31	63	-3	49	69	17	32	5	14
1	190	20	-24	-21	473	589	34	56	654	-37	15	59	104	146	73	98
2	-5	18	44	29	31	82	71	69	173	77	147	138	47	54	23	36
14B	12	28	27	21	-47	-15	-40	-41	-59	-53	-32	-21	-54	-40	-52	-50
<b>Northern Peninsula &amp; Eastern (14A &amp; 3-8)</b>	33	76	52	67	-2	62	47	70	26				-26	-7	-1	5
14A	18	23	32	32	-6	4	20	20	26	29	501	366	-19	-14	-3	-3
3	76	95	261	203	27	207	362	309	166				-25	69	38	46
4	40	122	54	77	-7	78	34	80	-50				-34	-20	-12	3
5	39	95	71	106	-5	46	23	38	-51				-32	-24	-27	-32
6	-13	7	-16	-11	-35	9	-30	-20	-56				-26	3	-15	-9
7	5	-12	-12	15	16	78	-30	-7					11	101	-20	-19
8	-42		-46	-39	5		-42	-30					82		8	15
<b>South (9 - 11)</b>	-14	39	-11	2	-26	1	-40	-22	-27				-14	-27	-32	-22
9	-31	16	-13	-5	-42	4	-49	-38	-87				-16	-10	-41	-34
10	-8	105	19	46	-21	48	-14	18	-19				-14	-27	-26	-18
11	-3	28	-23	-12	-21	-11	-44	-26	-12				-18	-30	-26	-14
<b>Southwest (12 - 13)</b>	-13	-8	-10	-10	-22	-25	-29	-24	30	-5	152	161	-5	-16	-11	-5
12	-15	1	-11	-3	-19	-34	-35	-16	118	-38	51	109	-1	-35	-25	-10
13	-12	-9	-10	-11	-23	-23	-28	-25	27	-2	161	164	-6	-13	-8	-5
<b>Insular Nf. (3-14A)</b>	13	48	23	33	-9	30	9	28	25	45			-18	-12	-8	-1

\*1987 is not included in SFAs 3-11, Northern Peninsula & Eastern, South, and Insular Nf.

Table 10. Atlantic salmon recreational catch (retained only), 1992-1994 for each SFA, Labrador (SFAs 1 - 14B), Northern Peninsula and Eastern (SFAs 14A & 3-8), South (SFAs 9 - 11), Southwest (SFAs 12 - 13) and Insular Newfoundland (SFAs 3 - 14A). The 1984-89 and 1986-91 means are included; 95% confidence intervals are in parentheses.

SFA	Small salmon (< 63 cm.)					Large Salmon (>= 63 cm.)				
	1994	1993	1992	$\bar{X}$ 84-89*	$\bar{X}$ 86-91*	1994	1993	1992	$\bar{X}$ 84-89*	$\bar{X}$ 86-91*
<b>Labrador (1, 2 &amp; 14B)</b>	2657	2508	2738	4179	4112	474	378	781	513	454
				(1214)	(1341)				(153)	(229)
1	293	86	164	861	742	86	5	286	157	114
				(366)	(499)				(37)	(61)
2	1671	1375	1718	2018	2046	287	131	257	191	198
				(637)	(633)				(104)	(103)
14B	693	1047	856	1300	1324	101	242	238	165	142
				(375)	(355)				(78)	(91)
<b>Northern Peninsula &amp; Eastern (14A &amp; 3-8)</b>	20679	13634	13841	18454	15887					
				(6426)	(6707)					
14A	4429	3905	4778	4601	4623					
				(1128)	(1164)					
3	3314	1480	1562	1115	1260					
				(527)	(611)					
4	9351	5724	5290	9005	6697					
				(3876)	(3372)					
5	3216	2091	1941	3165	2820					
				(1410)	(1528)					
6	241	323	230	372	328					
				(110)	(140)					
7	71	58	40	101	76					
				(28)	(47)					
8	57	53	.	100	83					
				(30)	(57)					
<b>South (9 - 11)</b>	4055	5215	3208	8348	6378					
				(2619)	(3187)					
9	829	1431	690	1800	1482					
				(583)	(810)					
10	946	700	245	1272	928					
				(318)	(592)					
11	2280	3084	2273	5276	3968					
				(1845)	(1897)					
<b>Southwest (12 - 13)</b>	4225	5844	6078	7431	6973					
				(2382)	(2145)					
12	593	745	639	1127	873					
				(506)	(314)					
13	3632	5099	5439	6305	6099					
				(1979)	(1862)					
<b>Insular Nf. (3-14A)</b>	28959	24693	23127	34350	29262					
				(11147)	(11995)					

\*1987 is not included in SFAs 3-11, Northern Peninsula & Eastern, South, and Insular Nf.

Table 11. Atlantic salmon recreational catch (retained only) in 1994 for each SFA, Labrador ( SFAs 1, 2 & 14B), Northern Peninsula & Eastern (SFAs 14A & 3-8), South (9-11), Southwest (12-13), and Insular Nf. (3-14A), expressed as percentage change in relation to 1992, 1993, and the 1984-89 and 1986-91 means.

SFA	Small salmon (< 63 cm.)				Large Salmon (>= 63 cm.)			
	1993	1992	$\bar{X}$ 84-89*	$\bar{X}$ 86-91*	1993	1992	$\bar{X}$ 84-89*	$\bar{X}$ 86-91*
<b>Labrador (1, 2 &amp; 14B)</b>	6	-3	-36	-35	25	-39	-8	5
1	241	79	-66	-61	1620	-70	-45	-24
2	22	-3	-17	-18	119	12	50	45
14B	-34	-19	-47	-48	-58	-58	-39	-29
<b>Northern Peninsula &amp; Eastern (14A &amp; 3-8)</b>	52	49	12	30				
14A	13	-7	-4	-4				
3	124	112	197	163				
4	63	77	4	40				
5	54	66	2	14				
6	-25	5	-35	-27				
7	22	78	-30	-7				
8	8		-43	-31				
<b>South ( 9 - 11 )</b>	-22	26	-51	-36				
9	-42	20	-54	-44				
10	35	286	-26	2				
11	-26	0	-57	-43				
<b>Southwest ( 12 - 13 )</b>	-28	-30	-43	-39				
12	-20	-7	-47	-32				
13	-29	-33	-42	-40				
<b>Insular Nf. ( 3-14A )</b>	17	25	-16	-1				

\*1987 is not included in SFAs 3-11, Northern Peninsula & Eastern, South, and Insular Nf.

Table 12. Counts of small salmon from fishways and counting fences in Newfoundland and Labrador 1955-94 by Salmon Fishing Area (SFA). Also shown are means ( $\bar{X}$ ), coefficients of variation (CV), 95% confidence limits (UCL and LCL), and percentage change for 1994 in relation to 1992, 1993, and the 84-89 and 86-91 means. Partial counts are in parentheses and are not included in statistical calculations. Adjusted counts are bold and in italics.

Year	SFA 2	SFA 4				SFA 5			SFA 9		SFA 10	SFA 11	SFA 13			SFA 14A			SFA 14B			
	1	2(a)	2(b)	3	4(a)	4(b)	5	6(a)	6(b)	7	8	9	10	11	12	13	14	15	16	17	18	19
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					680	483													
1970	3800		1023					755	561													
1971	3484	981	902		731			579	316				159					6	54	427		
1972	1901	794	(495)		540		838	609	331				236					30	64	309		
1973	4584	205			971		(1079)	455	340				(399)					108	96	555		
1974		2538			857		(770)		162				223					41	38	399		
1975		9218	5531				(1119)		778				(186)					1	191	631		
1976		3991	2935						335				294					132	341	520		
1977		6148	4300						371									192	789	341		
1978		3790	2704		755		1403	810	436				390					117	971	285		
1979		6715	3925		(404)		(1350)	569	455				454					195	1984	1578		
1980			4597		997		1712	843	420				433					301	792	430		
1981		(8114)	4264		2459		2414	1115	619				334		82			110	2101	447		
1982		(7605)	2796		1425		1281	963	625				86		100			275	2112	387		
1983			(2952)		978		1195	1210	853	2330			233					220	2007	1141		
1984		17219	(6300)		1081		1379	1233	904	2430	89		419					440	1805	120		
1985		16852	5985		1663		904	1557	960	1665	124		384					190	1553	416		
1986		9897	3072		1064		1036	1051	726	2516	158		725	7515				354	2815	525		
1987		9014	2327		493		914	974	570	1302	91		325	9687				355	2505	378		
1988		8974	3433		1562		772	1737	795	1695	97	313	543	7118				437	2075	251		
1989		7192	1694		596	7743	496	1138	668	912	62	168	706	4469					1369	455		
1990		6629	1057		345	7520	745	1149	(410)	1657	71	401	551	4321		12216			2296	322		
1991		5245	1060		245	6445	562	873	(311)	394	99	211	353	2088		5724			1415	233		
1992		12538	3520		1168	18179	1182	1443	886	1442	49	237	921	1973		222	17571	435	2347	480		
1993		21319	5615	4001	1580	25905	1959	(2713)	962	1107	79	292	847	2355	137	576	18477	526	4009	947		
1994	2006	16168	2563	2857	968	18080	1513	1571	1178	1592	99	158	677	1533	145	562	7995	701	3592	954	228	14
X 84-89		11458.0	3302.2		1076.5		916.8	1281.7	770.5	1753.3	103.5	187.0	517.0	7197.3				355.2	2020.3	357.5		
CV		37.8	49.8		44.6		31.8	23.5	19.0	35.7	32.1	62.9	32.8	29.7				28.6	27.6	41.3		
95% UCL		15999.5	5342.6		1580.1		1223.2	1597.9	924.1	2410.9	138.4	479.3	695.0	10603.3				481.2	2606.3	512.6		
95% LCL		6916.5	1261.8		572.9		610.4	965.4	616.9	1095.8	68.6	-105.3	339.0	3791.2				229.2	1434.4	202.4		
N		6	5		6		6	6	6	6	6	3	6	4				5	6	6		
X 86-91		7791.8	2107.2		717.5	7238.0	754.2	1153.7	689.8	1412.7	96.3	234.6	533.8	5866.0				382.0	2079.2	360.7		
CV		22.0	48.0		70.0	9.6	27.1	28.4	13.8	51.6	34.9	53.4	31.7	46.7				12.5	28.2	31.9		
95% UCL		9592.7	3168.0		1244.5	8960.2	968.7	1472.8	841.3	2177.9	131.6	390.1	711.3	8741.0				500.3	2693.9	481.3		
95% LCL		5991.0	1046.4		190.5	5511.8	539.6	834.6	538.2	647.5	61.0	79.1	358.4	2991.0				263.7	1464.4	240.1		
N		6	6		6	3	6	6	4	6	6	5	6	6				3	6	6		
% change, 1994 vs:																						
1993		-24	-54	-29	-38	-30	-23	-42	22	52	25	-46	-20	-35	6	-2	-57	33	-10	1		
1992		29	-27		-17	4	28	9	33	23	102	-33	-26	-22		153	-54	61	53	99		
X 84-89		41	-22		-10		65	23	53	-9	-4	-16	31	-79				97	78	167		
X 86-91		107	22		35	150	101	36	71	13	3	-33	27	-74				84	73	165		

1. Sandhill River counting fence

2. Exploits River

(a) Bishop's Falls fishway

(b) Gt. Rattling Brook fishway

3. Campbellton River counting fence

4. Gander River

(a) Salmon Brook fishway

(b) Gander River counting fence

5. Middle Brook fishway

6. Terra Nova River

(a) Lower fishway

(b) Upper fishway

7. Biscay Bay River counting fence

8. Northeast Brook (Trepassey) counting fence

9. Rocky River fishway

10. Northeast River (Placentia) fishway

11. Conne River counting fence

12. Highlands River counting fence

13. Pinchgut Brook counting fence

14. Humber River mark-recapture

15. Lomond River fishway

16. Torrent River fishway

17. Western Arm Brook counting fence

18. Forteau River counting fence

19. L'Anse Au Loup River counting fence

Table 13. Counts of large salmon from fishways and counting fences in Newfoundland and Labrador 1955-94 by Salmon Fishing Area (SFA). Also shown are means ( $\bar{X}$ ), coefficients of variation (CV), 95% confidence limits (UCL and LCL), and percentage change for 1994 in relation to 1992, 1993, and the 84-89 and 86-91 means. Partial counts are in parentheses and are not included in statistical calculations. Adjusted counts are bold and in italics.

	SFA 2	SFA 4				SFA 5		SFA 9			SFA 10	SFA 11	SFA 13			SFA 14A			SFA 14B			
Year	1	2(a)	2(b)	3	4(a)	4(b)	5	6(a)	6(b)	7	8	9	10	11	12	13	14	15	16	17	18	19
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		(508)	470					220	2													
1967		710	382					359	43													
1968			687					376	28				(11)									
1969		498	290					391	136													
1970	138		199					469	172													
1971	266	300	261		494			279	121				21					0	4			
1972	<b>168</b>	113	(234)		54		10	348	200				34					15	3		9	
1973	<b>491</b>	89			135		(9)	303	223				(64)					110	12		30	
1974		411			9		(77)		121				9					33	3		4	
1975		1439	505				(9)		52				(36)					0	25		1	
1976		460	117						37				56					11	47		0	
1977		581	271						262									11	33		3	
1978		303	81		52		16	20	89				32					12	21		1	
1979		277	124		(6)		(54)	170	30				37					1	39		0	
1980			426		15		91	39	17				34		55			19	63		3	
1981		(1695)	514		33		39	90	28				62		29			50	97		1	
1982		(181)	122		18		20	19	8				36		56			16	523		3	
1983			(302)		12		75	57	76	88			22					7	442		4	
1984		529	(111)		38		57	107	98	83	33		44					47	288		0	
1985		183	38		26		27	112	60	<b>25</b>	41		0					14	30		2	
1986		355	174		12		15	140	58	101	30		39		397			32	92		0	
1987		310	41		9		19	56	38	106	30	1	16		498			11	68		1	
1988		147	10		24		14	206	45	61	19	6	11		418			21	44		1	
1989		89	14		24	473	19	142	51	<b>107</b>	18	9	15		319				60		0	
1990		122	15		<b>8</b>	508	13	144	(34)	71	9	17	25		361		855		82		0	
1991		99	40		2	670	14	114	(26)	35	13	16	8		87				73		1	
1992		314	242		101	<b>4162</b>	43	270	224	<b>51</b>	10	46	46		154	5	2945	80	169		8	
1993		627	312	145	87	1734	87	(470)	173	<b>120</b>	17	72	65		98	78	43	636	34	222		8
1994	<b>715</b>	916	339	191	83	1072	90	242	172	68	15	19	70	100	148	47	1030	50	331	31	74	4
$\bar{X}$ 84-89		268.8	55.4		22.2		25.2	127.2	58.3	80.5	28.5	5.3	20.8	408.0				25.0	97.0		0.7	
CV		60.3	122.3		47.3		64.6	39.0	36.1	40.2	30.6	75.8	81.9	18.0				58.9	98.9		122.5	
95% UCL		439.0	139.5		33.2		42.2	179.2	80.5	114.5	37.7	15.4	38.7	525.1				43.3	197.7		1.5	
95% LCL		98.7	-28.7		11.2		8.1	75.1	36.2	46.5	19.3	-4.7	2.9	290.9				6.7	-3.7		-0.2	
N		6	5		6		6	6	6	6	6	3	6	4				5	6		6	
$\bar{X}$ 86-91		187.0	49.0		13.2	550.3	15.7	133.7	48.0	80.2	19.8	9.8	19.0	346.7				21.3	69.8		0.5	
CV		61.7	128.0		68.3	19.1	17.0	36.4	17.8	36.6	43.7	69.0	59.8	40.6				49.2	24.1		109.5	
95% UCL		308.1	114.8		22.6	811.4	18.5	184.8	61.6	111.0	28.9	18.2	30.9	494.3				47.4	87.5		1.1	
95% LCL		65.9	-16.8		3.7	289.2	12.9	82.5	34.4	49.3	10.7	1.4	7.1	199.0				-4.8	52.2		-0.1	
N		6	6		6	3	6	6	4	6	6	5	6	6				3	6		6	
% change, 1994 vs:																						
1993		46	9	32	-5	-38	3	-49	-1	-41	-12	-74	8	2	90	9	62	47	49		288	
1992		192	40		-18	-72	109	-10	-23	39	50	-59	52	-35		840	-65	-38	96		288	
$\bar{X}$ 84-89		241	512		274		258	90	195	-16	-47	256	236	-75				100	241		4550	
$\bar{X}$ 86-91		390	592		530	95	474	81	258	-15	-24	94	268	-71				134	374		6100	

- |                                     |                                    |   |   |
|-------------------------------------|------------------------------------|---|---|
| 1. Sandhill River counting fence    |                                    |   |   |
| 2. Exploits River                   | (b) Gander River counting fence    | 8. Northeast River (Trepassey) counting fence | 14. Humber River mark-recapture         |
| (a) Bishop's Falls fishway          | 5. Middle Brook fishway            | 9. Rocky River fishway                        | 15. Lomond River fishway                |
| (b) Gt. Rattling Brook fishway      | 6. Terra Nova River                | 10. Northeast River (Placentia) fishway       | 16. Torrent River fishway               |
| 3. Campbellton River counting fence | (a) Lower fishway                  | 11. Conne River counting fence                | 17. Western Arm Brook counting fence    |
| 4. Gander River                     | (b) Upper fishway                  | 12. Highlands River counting fence            | 18. Forteau River counting fence        |
| (a) Salmon Brook fishway            | 7. Biscay Bay River counting fence | 13. Pinchgut Brook counting fence             | 19. L'Anse Au Loup River counting fence |



Table 14. Proportion of large salmon at counting facilities in Newfoundland in 1992-94, and the 1984-89 and 1986-91 means.

Counting facility	Proportion of large salmon				
	$\bar{X}$ 84-89	$\bar{X}$ 86-91	1992	1993	1994
<b><u>SFA 2</u></b>					
Sandhill River					0.263
<b><u>SFA 4</u></b>					
Exploits River (Bishop's Falls)	0.023	0.023	0.024	0.029	0.054
Exploits River (Gt. Rattling Bk.)	0.016	0.023	0.064	0.053	0.117
Gander River (Salmon Bk.)	0.020	0.018	0.080	0.053	0.079
Gander River (counting fence)		0.071	0.186	0.063	0.056
<b><u>SFA 5</u></b>					
Middle Brook	0.027	0.020	0.035	0.043	0.056
Terra Nova River (Lower)	0.090	0.104	0.158	0.148	0.133
Terra Nova River (Upper)	0.070	0.065	0.202	0.152	0.127
<b><u>SFA 9</u></b>					
Biscay Bay River	0.044	0.054	0.034	0.098	0.041
Northeast Brook (Trepassey)	0.216	0.171	0.169	0.177	0.132
Rocky River	0.028	0.040	0.163	0.198	0.107
<b><u>SFA 10</u></b>					
Northeast River (Placentia)	0.039	0.034	0.048	0.071	0.094
<b><u>SFA 11</u></b>					
Conne River	0.054	0.056	0.072	0.040	0.061
<b><u>SFA 13</u></b>					
Pinchgut Brook			0.022	0.069	0.077
Humber River			0.144	0.033	0.114
<b><u>SFA 14A</u></b>					
Lomond River	0.066	0.053	0.155	0.061	0.067
Torrent River	0.046	0.032	0.067	0.052	0.084
Western Arm Brook	0.002	0.001	0.016	0.008	0.031
<b><u>SFA 14B</u></b>					
Forteau River					0.245

Table 15. Results of ratio randomization tests of counts of small and large Atlantic salmon for 1992-1994 (moratorium) compared with 1986-91 (Pre-moratorium). Number of simulations was 2000.

Category	Observed ratio $R_0$	Minimum simulated value	Maximum simulated value	Significance level for $R_0$
<b>Small salmon</b>				
- All rivers	1.7678	0.4501	1.9052	0.0017
- Northern Peninsula and Eastern	2.3208	0.3994	2.1367	0.0000
- South	0.5432	0.4106	2.1981	0.9685
<b>Large salmon</b>				
- All rivers	2.7194	0.3024	3.1514	0.0120
- Northern Peninsula and Eastern	3.7604	0.2025	3.6390	0.0000
- South	0.9225	0.3863	1.9498	0.9225

Table 16. Comparison (t-test) of mean counts of small and large salmon during moratorium years 1992-94 with means for the pre-moratorium period 1986-91. The direction of change in the moratorium means relative to the pre-moratorium means is denoted by + (increase) or - (decrease).

River	Small			Large		
	(+/-)	t	P	(+/-)	t	P
<b>SFA 4</b>						
Exploits River	+	3.81	0.0066	+	2.83	0.0255
Gander River	+	3.67	0.0213	+	3.67	0.0213
<b>SFA 5</b>						
Middle Brook	+	3.81	0.0066	+	3.91	0.0058
Terra Nova River (Lower)	+	2.20	0.0639	+	3.81	0.0066
<b>SFA 9</b>						
Biscay Bay River	-	0.24	0.8153	-	0.00	1.0000
Northeast Brook, Trepassey	-	0.62	0.5531	-	1.04	0.3317
Rocky River	-	0.14	0.8946	+	3.87	0.0082
<b>SFA 10</b>						
Northeast River, Placentia	+	2.20	0.0639	+	3.81	0.0066
<b>SFA 11</b>						
Conne River	-	2.83	0.0255	-	1.73	0.1269
<b>SFA 14A</b>						
Torrent River	+	2.20	0.0639	+	3.81	0.0066
Western Arm Brook	+	2.83	0.0255	+	4.35	0.0034

Table 17. Percent total season small salmon retained and Effort (rod days), for each SFA after July 31 for 1994 and the 1984-91 mean. Also shown are maximum and minimum values, and percentage change for 1994 vs. the 1984-89 mean.

SFA	% Sm salmon after July 31					% Effort after July 31				
	1994	$\bar{X}$ 84-91	Max.	Min.	% Change 1994 vs. $\bar{X}$	1994	$\bar{X}$ 84-91	Max.	Min.	% Change 1994 vs. $\bar{X}$
3	31.6	23.0	32	15	37	33.9	22.5	25	18	51
4	27.9	26.2	40	15	6	33.9	26.6	36	17	27
5	27.5	28.2	52	6	-3	31.5	29.5	42	6	7
6	62.2	38.8	54	9	60	48.1	34.4	41	11	40
7	52.1	32.7	64	0	59	50.9	33.0	50	0	54
8	64.9	24.5	73	2	165	51.7	24.7	43	3	109
9	43.6	10.0	21	1	336	36.9	14.2	23	1	161
10	37.0	13.5	35	1	174	35.7	19.7	29	6	81
11	15.7	6.4	14	5	145	22.2	9.5	15	5	133
12	7.3	6.3	13	2	15	18.0	13.2	21	10	36
13	17.2	20.2	30	11	-15	24.1	21.4	30	14	13
14A	25.6	26.4	33	17	-3	34.7	28.4	41	21	22

Table 18. Atlantic salmon smolt-to-adult survival (back to the river) for Northeast Brook, Trepassey (SFA 9), Conne River (SFA 11), and Western Arm Brook (SFA14A).

Year (i)	Northeast Brook			Conne River <sup>1</sup>			Western Arm Brook		
	Smolts year i	Sm. sal. year i + 1	% Surv.	Smolts year i	Sm. sal. year i + 1	% Surv.	Smolts year i	Sm. sal. year i + 1	% Surv.
1971							5735	406	7.1
1972							11905	798	6.7
1973							8484	523	6.2
1974							11854	639	5.4
1975							9600	552	5.8
1976							6232	352	5.6
1977							9899	307	3.1
1978							13071	1578	12.1
1979							8349	460	5.5
1980							15665	488	3.1
1981							13981	460	3.3
1982							12477	1141	9.1
1983							10552	235	2.2
1984							20653	514	2.5
1985							13417	525	3.9
1986	1117	91	8.1				17719	437	2.5
1987	1404	97	6.9	74585	7627	10.2	17029	422	2.5
1988	1692	62	3.7	68692	4968	7.2	15321	455	3.0
1989	1708	71	4.2	73724	5383	7.3	11407	322	2.8
1990	1902	99	5.2	56943	2410	4.2	10563	233	2.2
1991	1911	49	2.6	74645	2523	3.4	13453	480	3.6
1992	1674	79	4.7	68208	2703	4.0	15405	947	6.1
1993	1849	99	5.4	55765	1533	2.7	13435	954	7.1
1994	944			60762			9284		

<sup>1</sup>Includes Native food fishery.

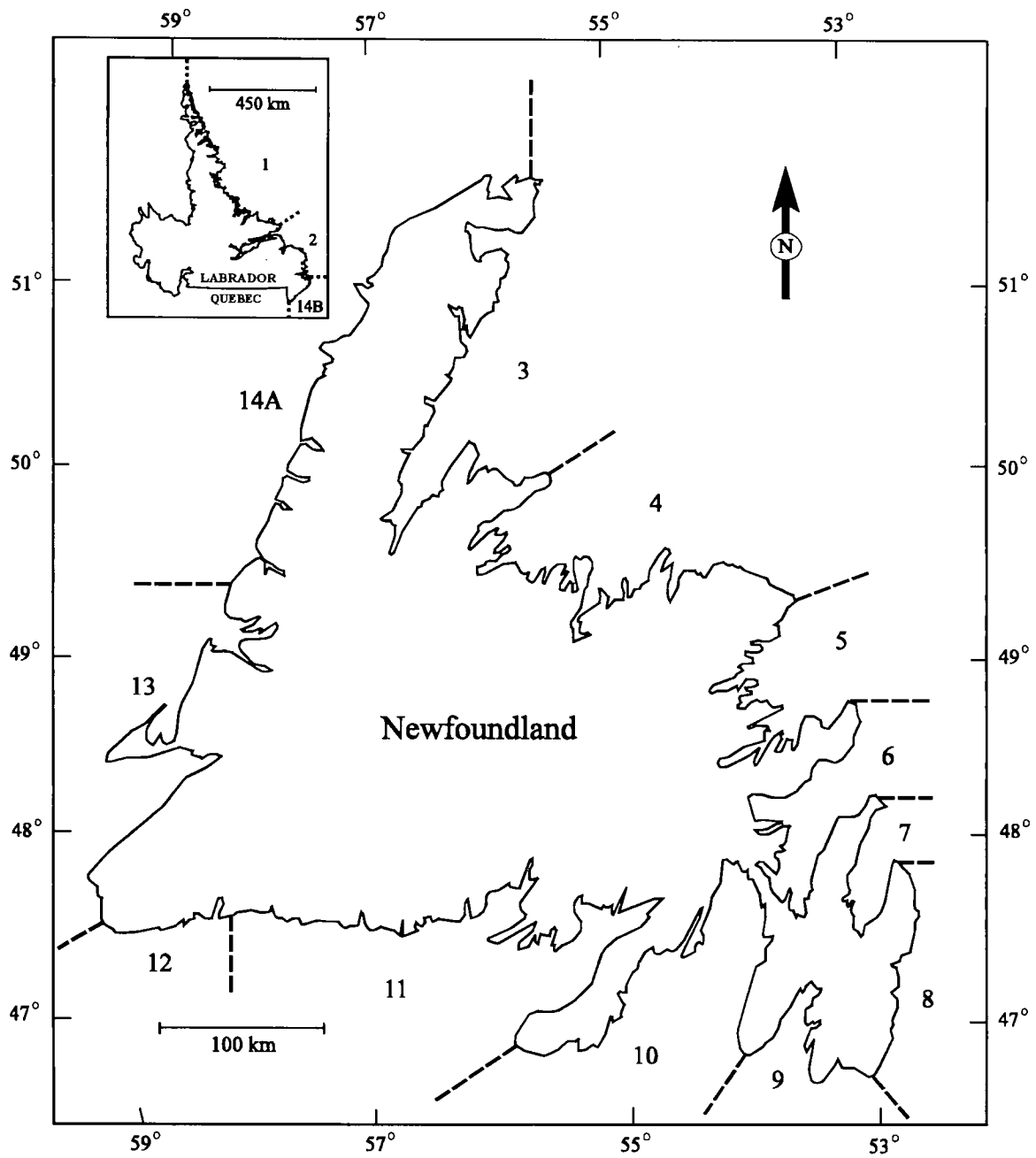


Fig. 1. Map showing the 14 Salmon Fishing Areas of the Newfoundland Region.

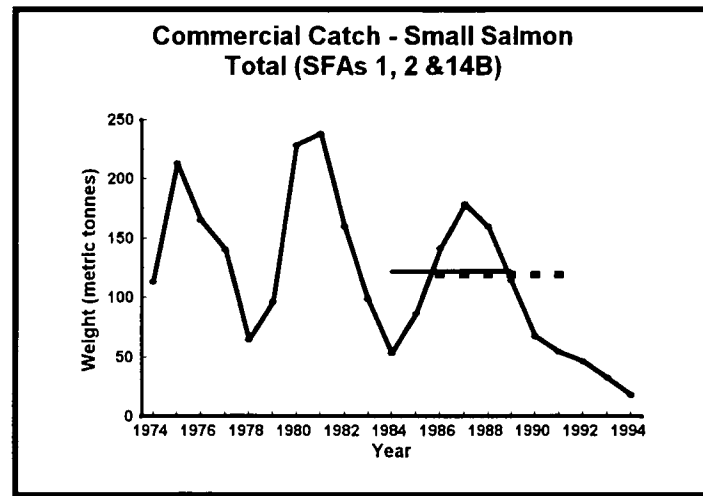
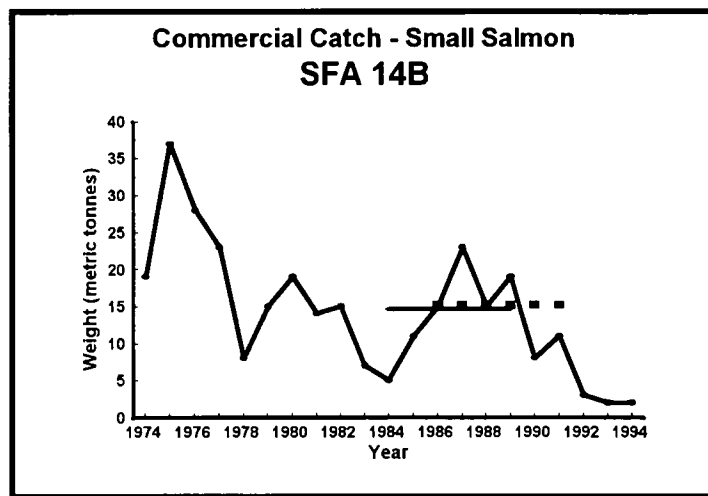
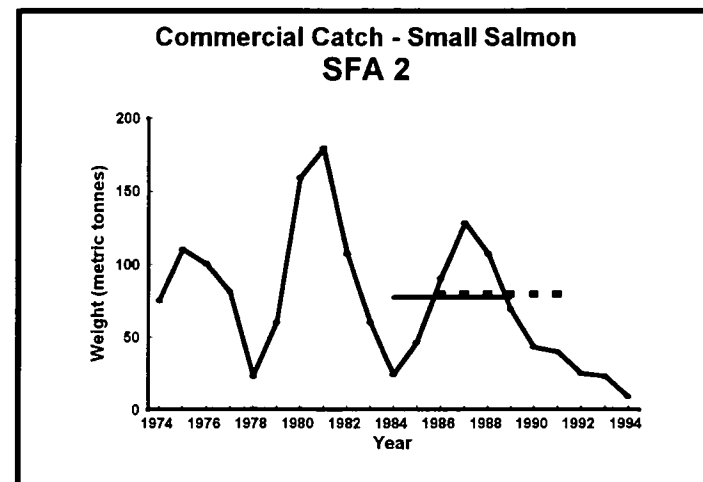
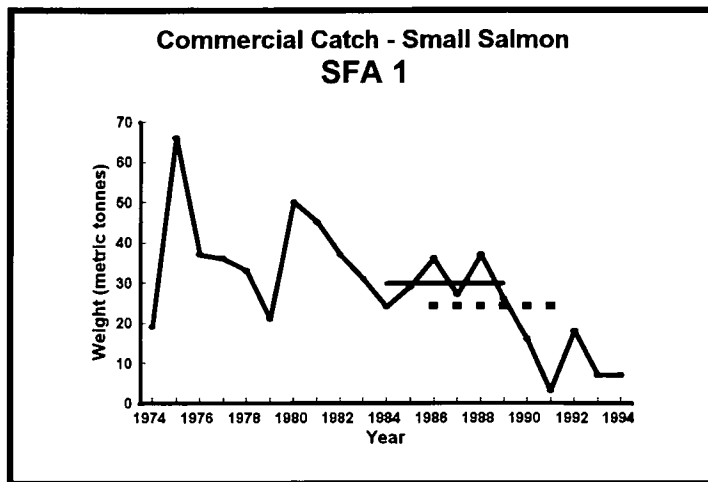


Fig. 2a. Commercial catch of small salmon (tonnes) for SFAs 1, 2, and 14B separately and combined, Labrador, 1974-1994. The solid horizontal line represents the 1984-1989 mean and the broken line the 1986-1991 mean.

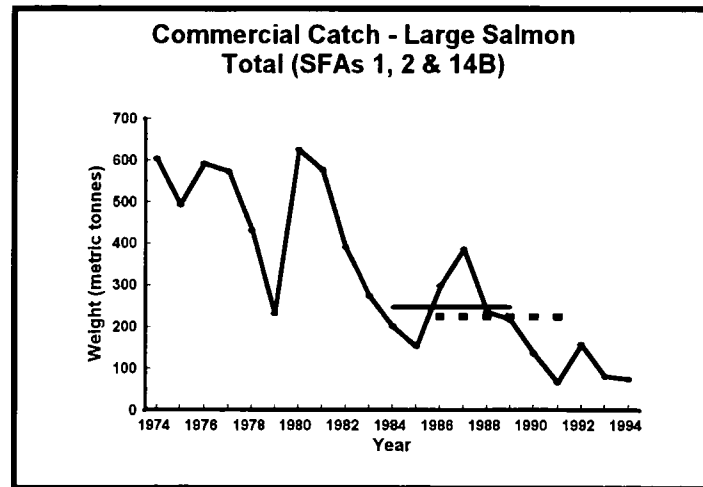
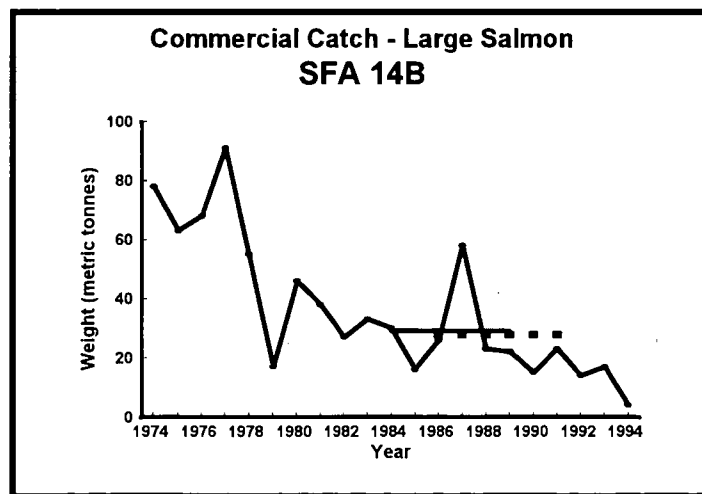
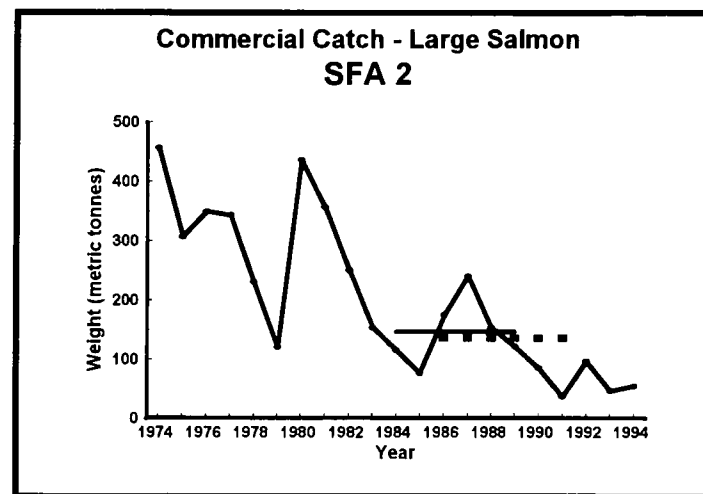
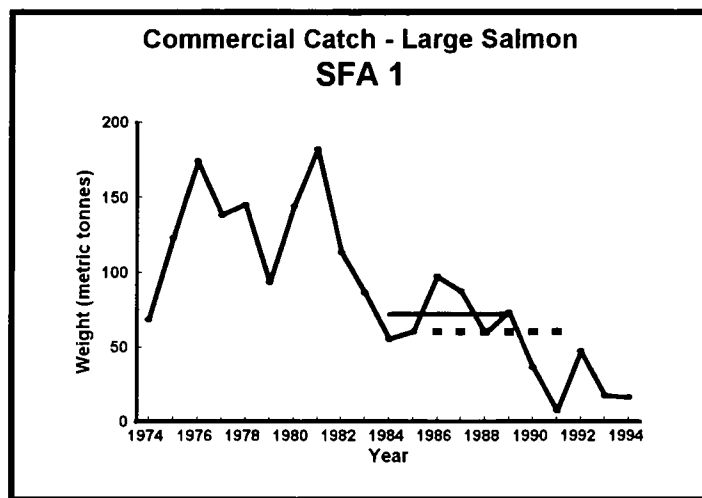


Fig. 2b. Commercial catch of large salmon (tonnes) for SFAs 1, 2, and 14B separately and combined, Labrador, 1974-1994. The solid horizontal line represents the 1984-1989 mean and the broken line the 1986-1991 mean.



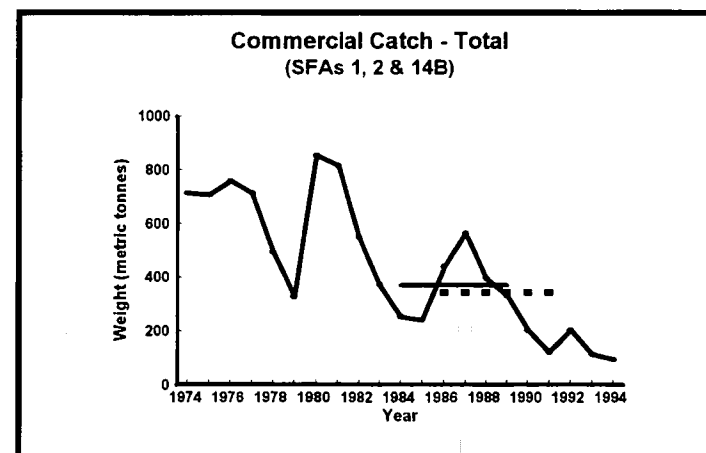
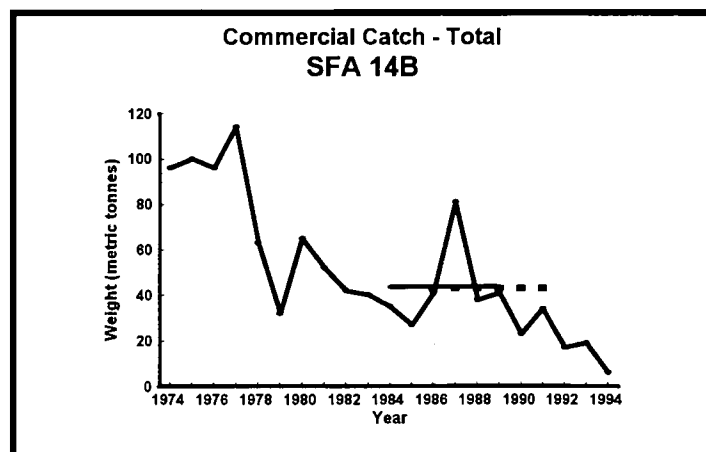
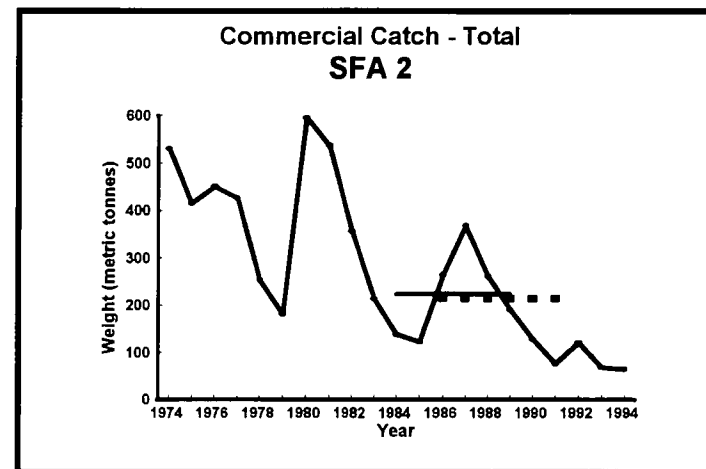
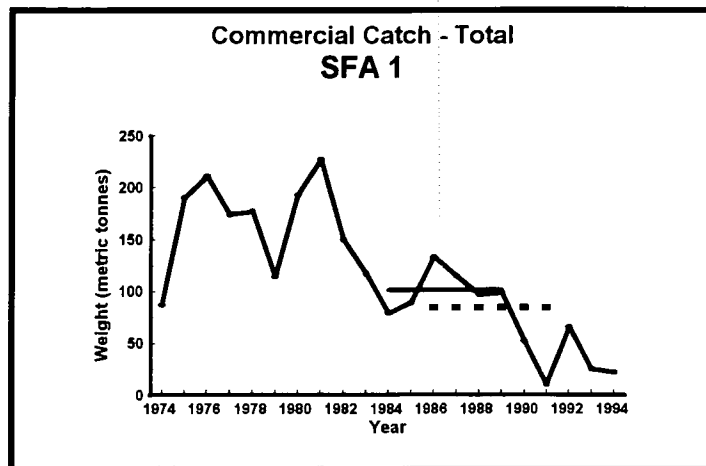


Fig. 2c. Total commercial catch (tonnes) for SFAs 1, 2, and 14B separately and combined, Labrador, 1974-1994. The solid horizontal line represents the 1984-1989 mean and the broken line the 1986-1991 mean.

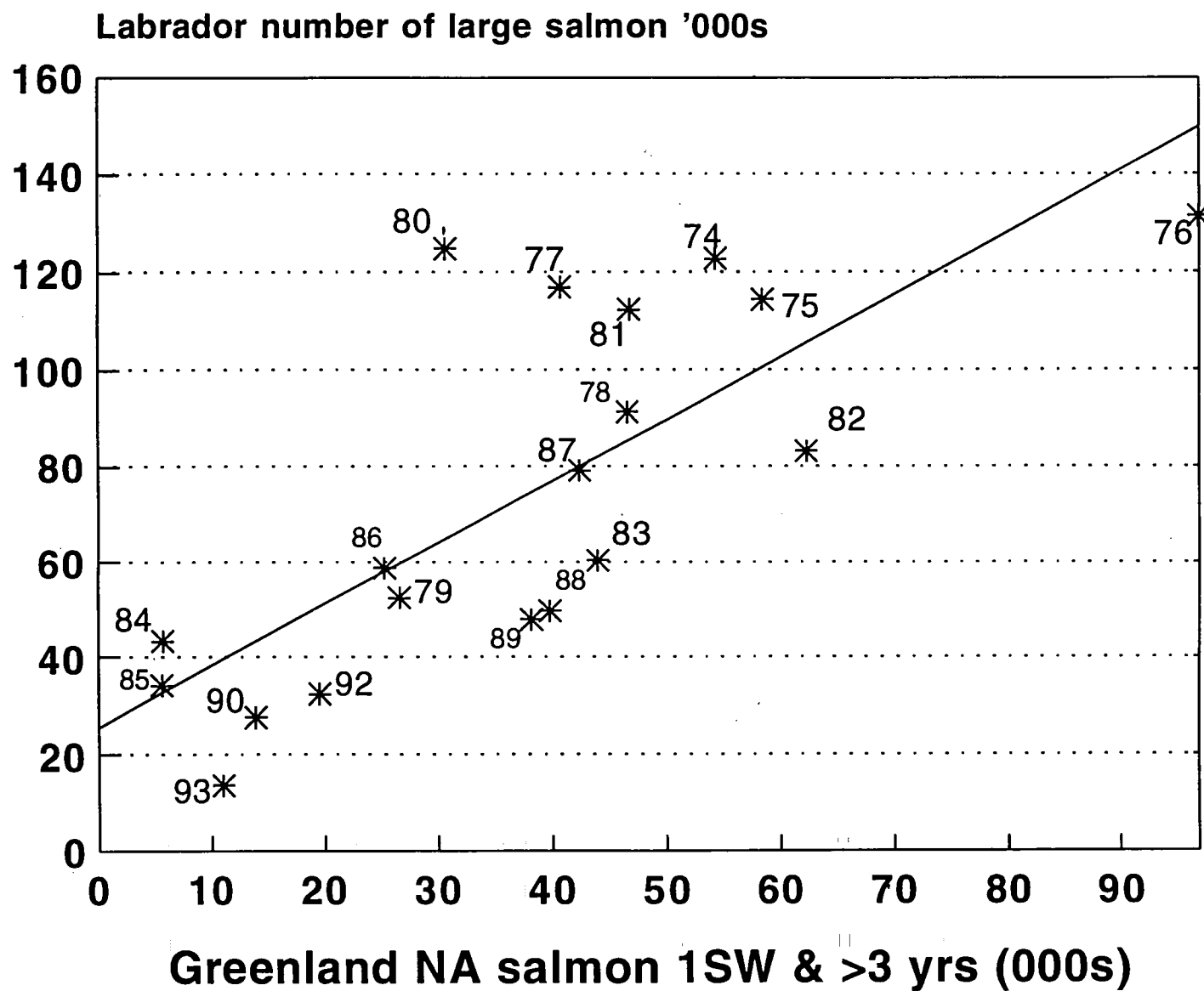


Fig. 3. Regression of commercial catches of large salmon in SFAs 1, 2, and 14B combined on catches at West Greenland of North American-origin small salmon with river age > 3 years, 1974-93, and of the same smolt class.

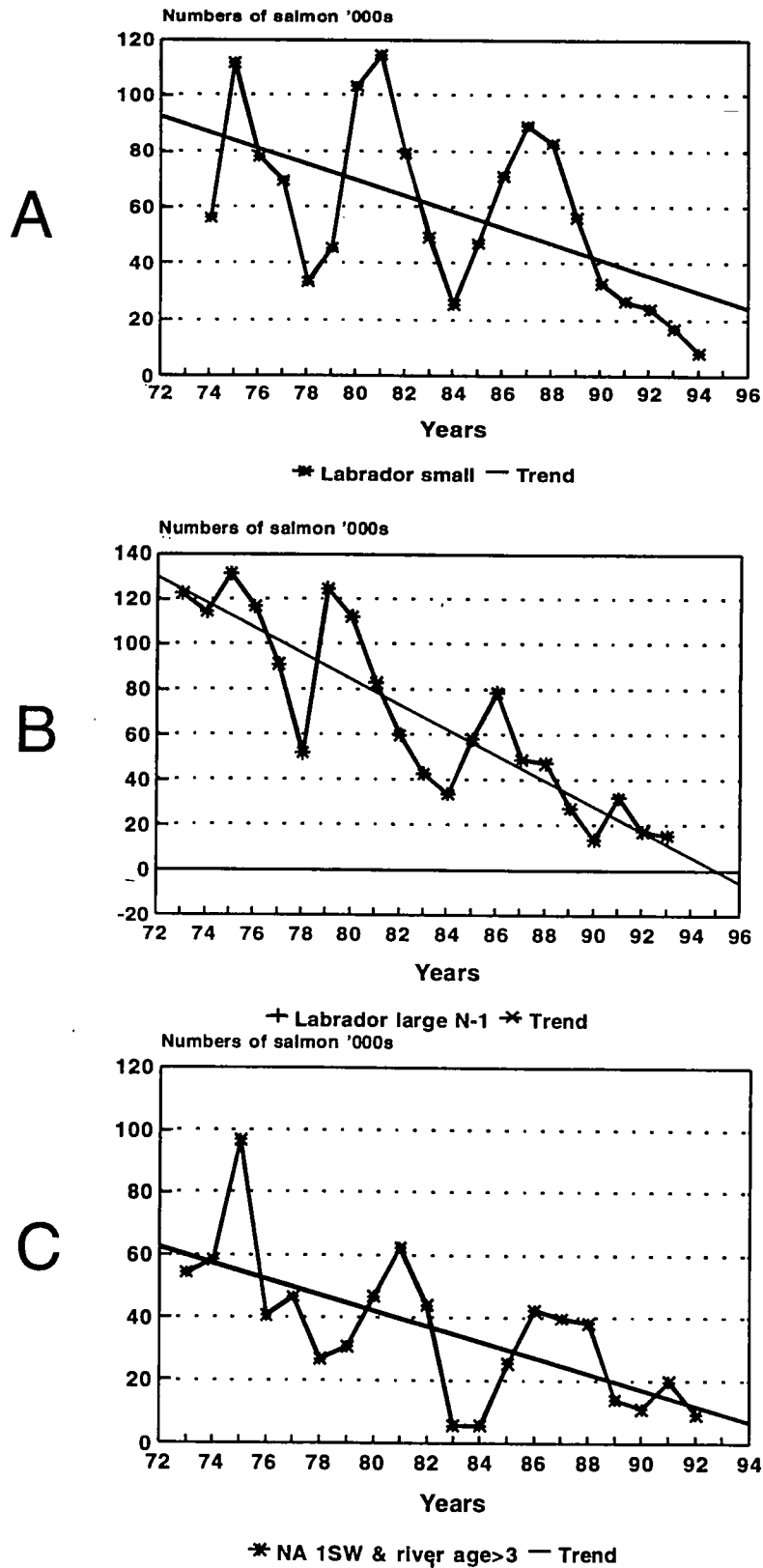


Fig. 4. Commercial catches and trend lines for: a) small salmon in SFAs 1, 2, and 14B combined; b) large salmon in SFAs 1, 2, and 14B combined; c) North American small salmon with river age > 3 years at West Greenland. Large salmon are lagged (t-1) so that catches of the same smolt class are shown in the same year.

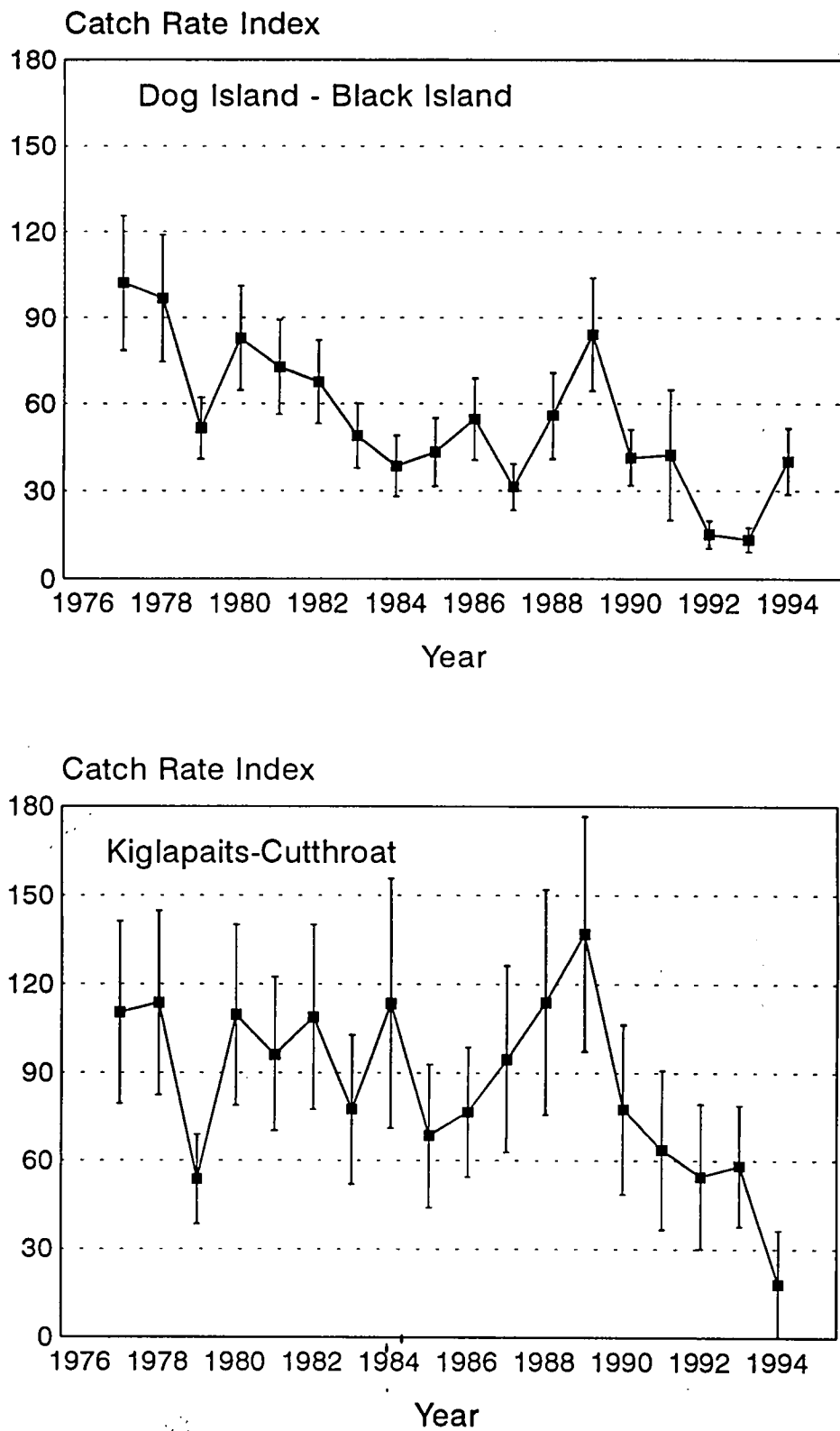


Fig. 5. Trends in the Atlantic salmon commercial catch rate index from two combinations of subareas within the Nain Fishing Region of northern Labrador, 1977-94. Vertical lines indicate 90% confidence interval.

## Labrador 2SW salmon in SFA 1 Parents to future spawners

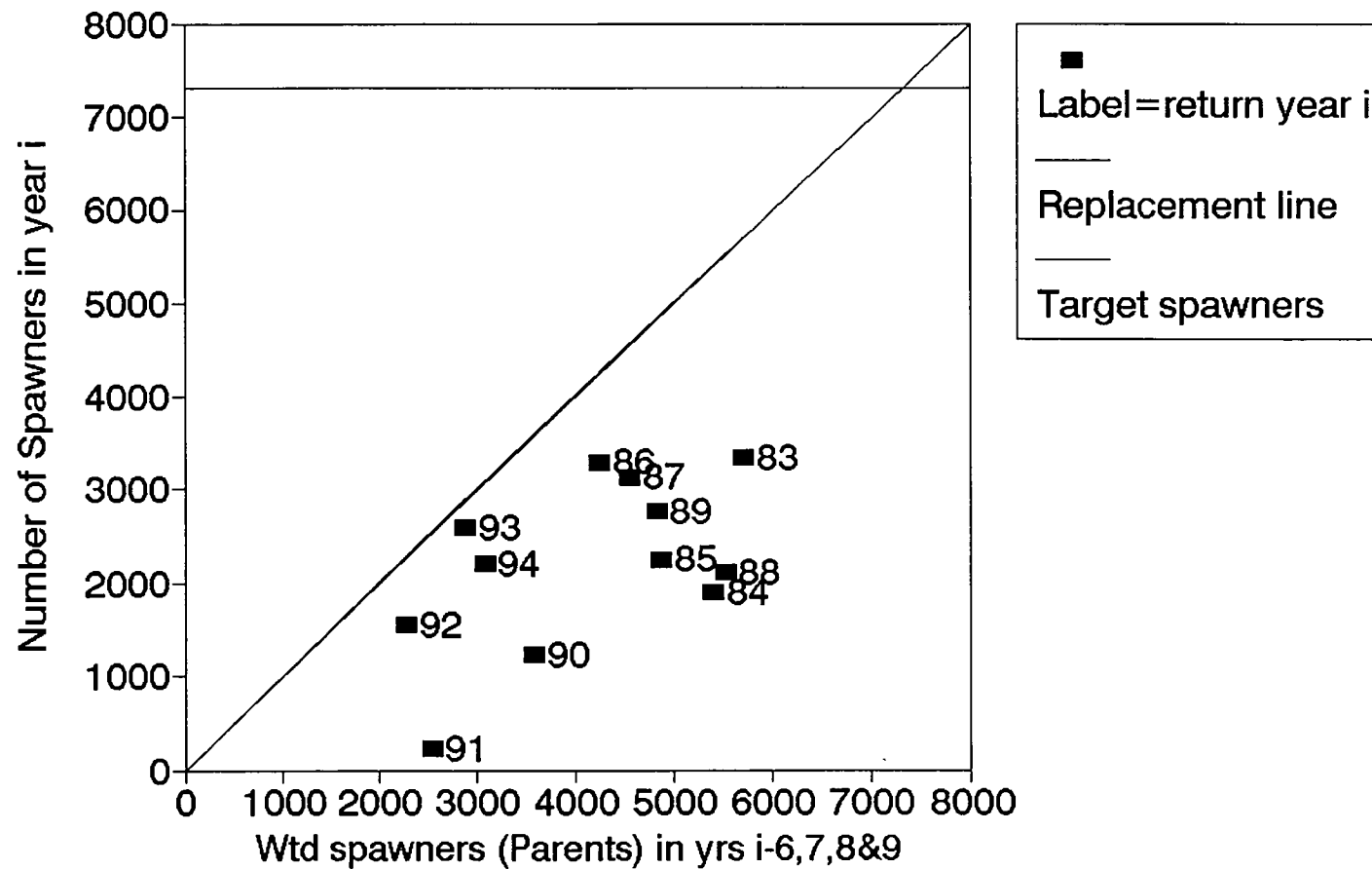


Fig. 6. The relationship between parents and spawners (after exploitation), the replacement (diagonal) line, and target spawning requirement for large salmon for SFA 1, Labrador, 1983-94.

# Labrador 2SW salmon in SFA 2 Parents to future spawners

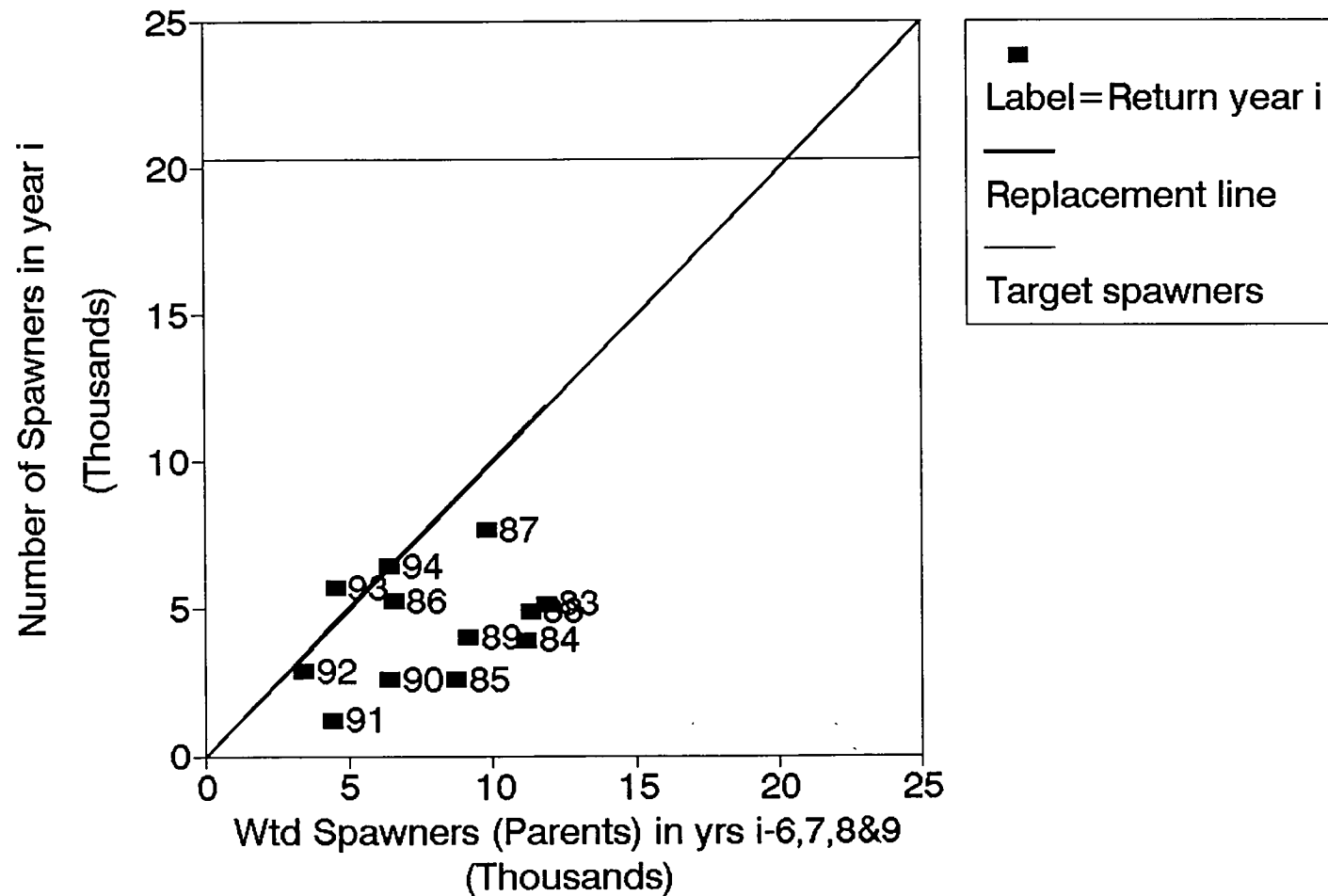


Fig. 7. The relationship between parents and spawners (after exploitation), the replacement (diagonal) line, and target spawning requirement for large salmon for SFA 2, Labrador, 1983-94.

## Labrador (SFAs 1, 2 & 14B)

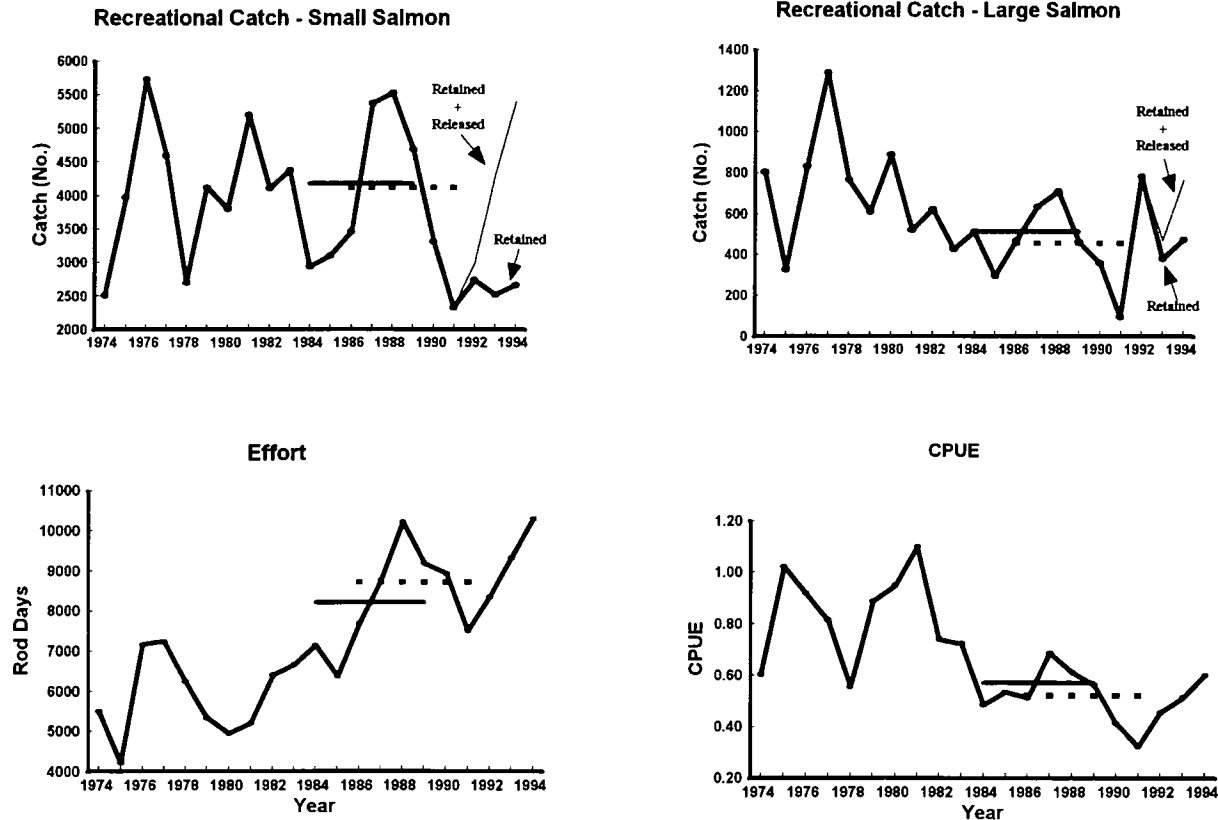


Fig. 8. Recreational catch of small and large salmon (retained, 1974-94; retained plus released, 1992-94), effort, and catch per unit of effort (CPUE), 1974-1994 for Labrador (SFAs 1, 2 & 14B). The solid horizontal line represents the 1984-89 mean the broken horizontal line the 1986-91 mean.

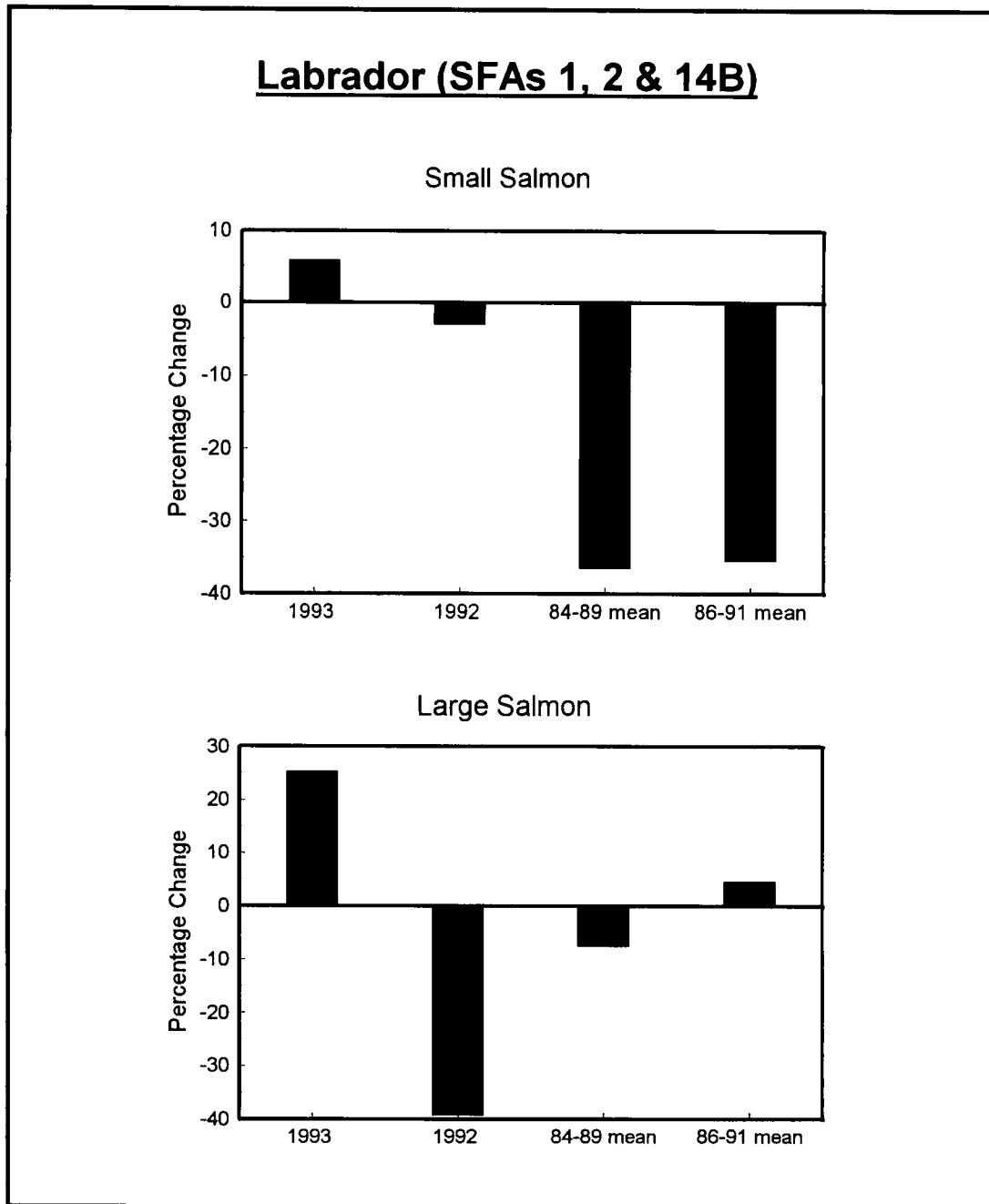
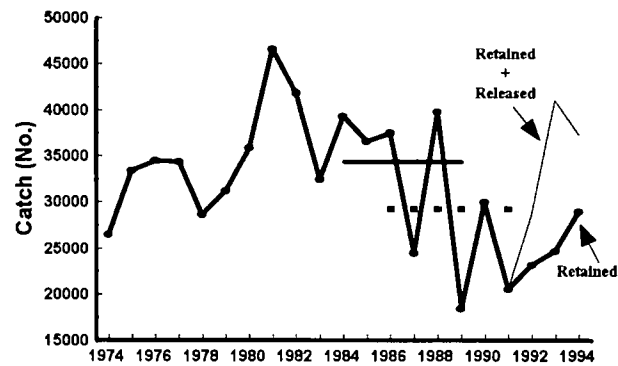


Fig. 9. Percentage change in recreational catch (retained) of small and large salmon in 1994 compared to 1993, the 1984-89 mean and the 1986-91 mean for Labrador (SFAs 1, 2 & 14B).

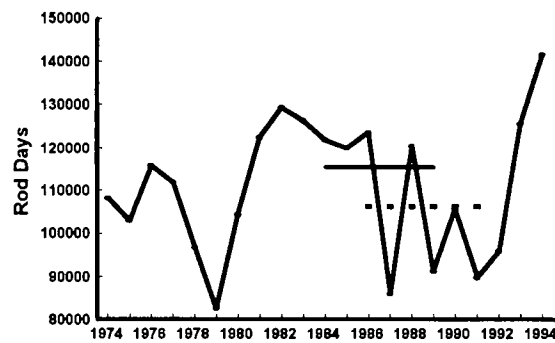


## Insular Newfoundland (SFAs 3 - 14A)

### Recreational Catch - Small Salmon



### Effort



### CPUE

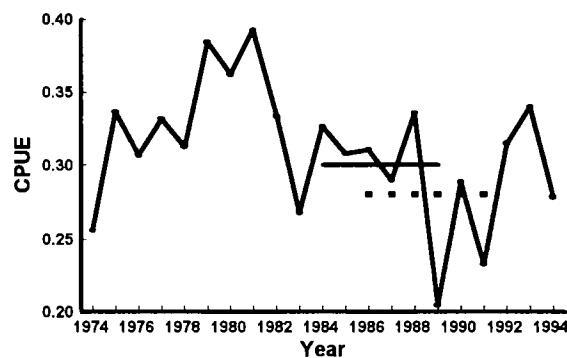


Fig. 10. Recreational catch of small salmon (retained, 1974-94; retained plus released, 1992-94), effort and catch per unit of effort (CPUE), 1974-1994, for Insular Newfoundland (SFAs 3 - 14A). The solid horizontal line represents the 1984-89 mean and the broken horizontal line the 1986-91 mean.

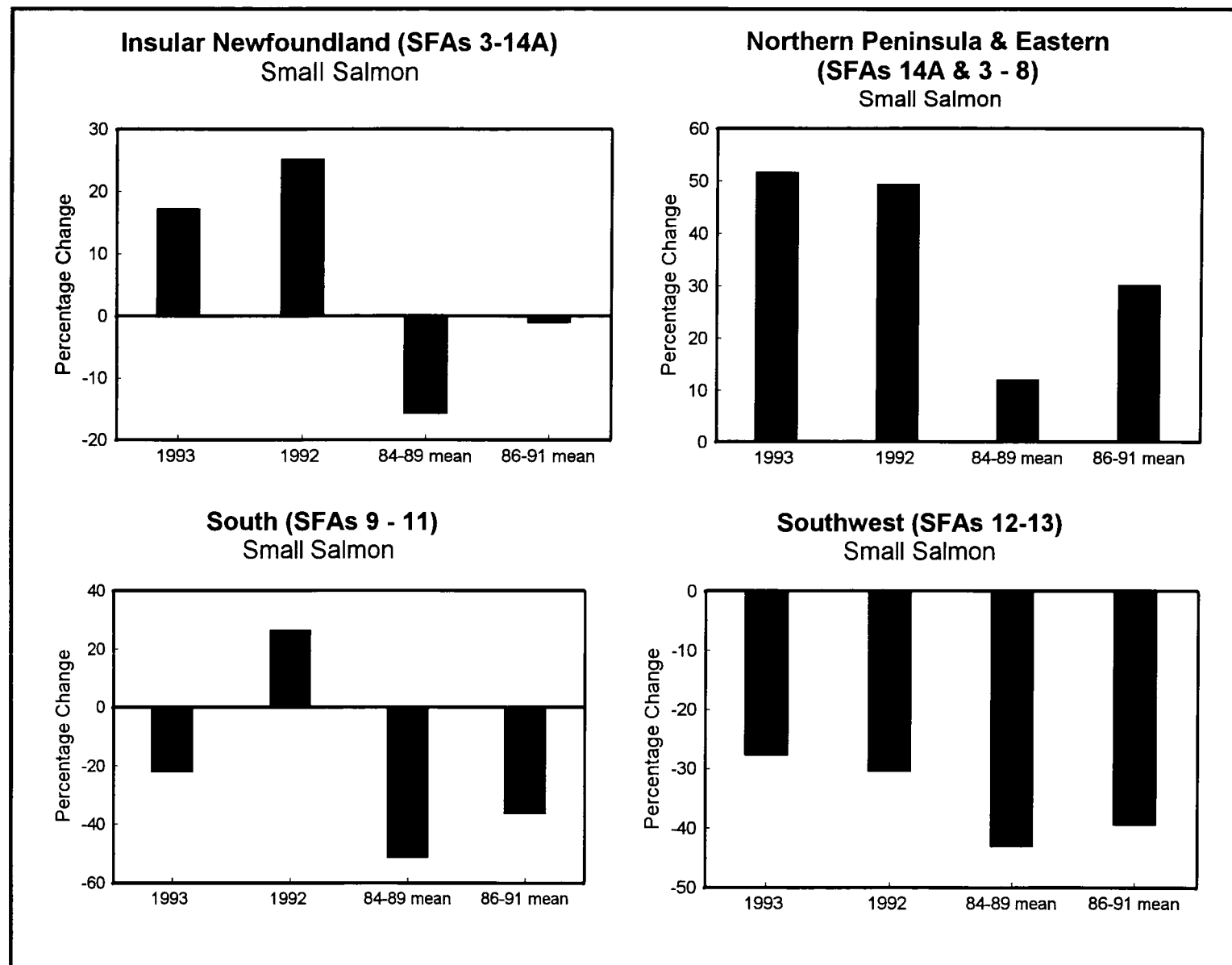


Fig. 11. Percentage change in recreational catch (retained) for small salmon in 1994 compared to 1993, the 1984-89 mean and the 1986-91 mean for Insular Newfoundland (SFAs 3 - 14A), Northern Peninsula & Eastern (SFAs 14A & 3 - 8), South (SFAs 9 - 11) and Southwest (SFAs 12 - 13).

## Northern Peninsula & Eastern (SFAs 14A & 3-8)

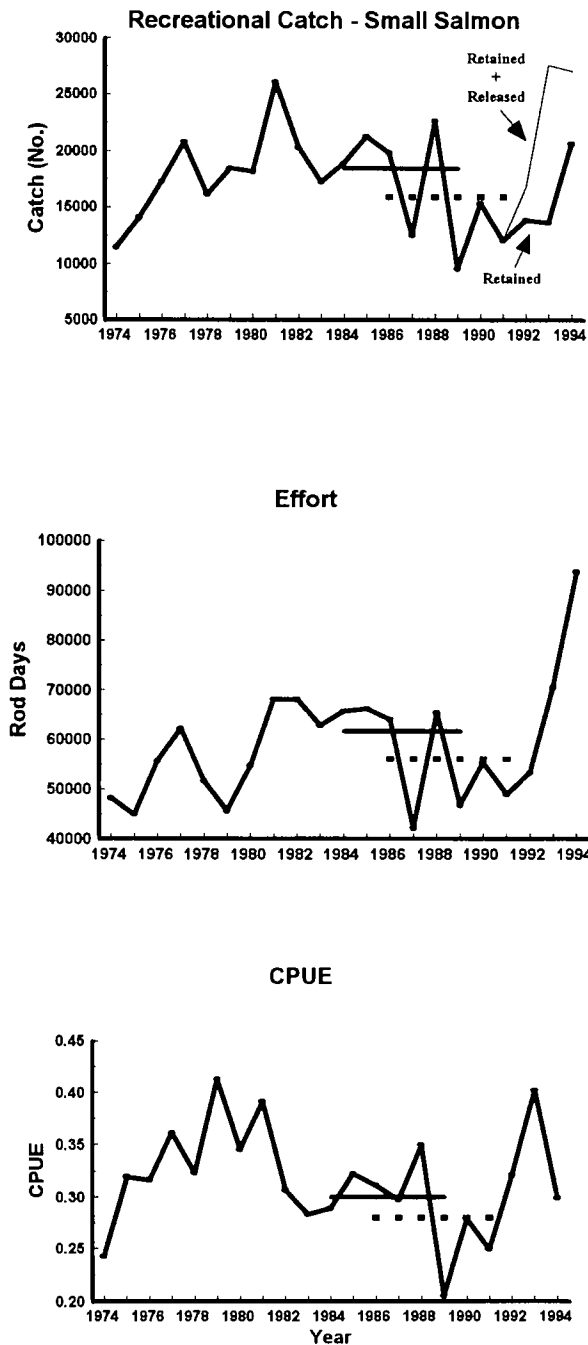


Fig. 12. Recreational catch of small salmon (retained, 1974-94; retained plus released, 1992-94), effort, and catch per unit of effort (CPUE), 1974-1994, for Northern Peninsula & Eastern (SFAs 14A & 3-8). The solid horizontal line represents the 1984-89 mean and the broken horizontal line the 1986-91 mean.

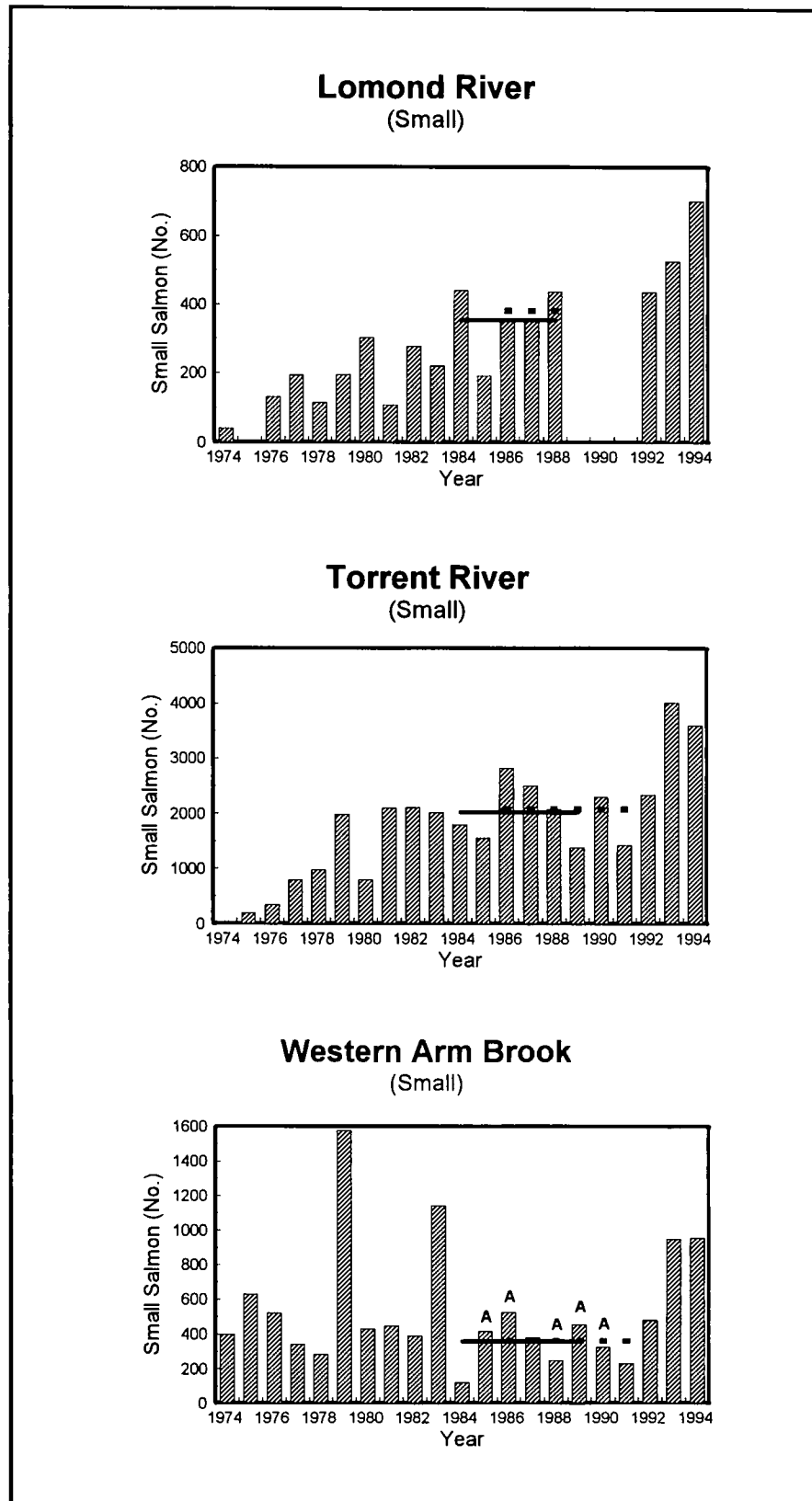


Fig. 13. Counts of small salmon at fishways in Lomond River and Torrent River and at the counting fence in Western Arm Brook, SFA 14A. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. A = adjusted count.

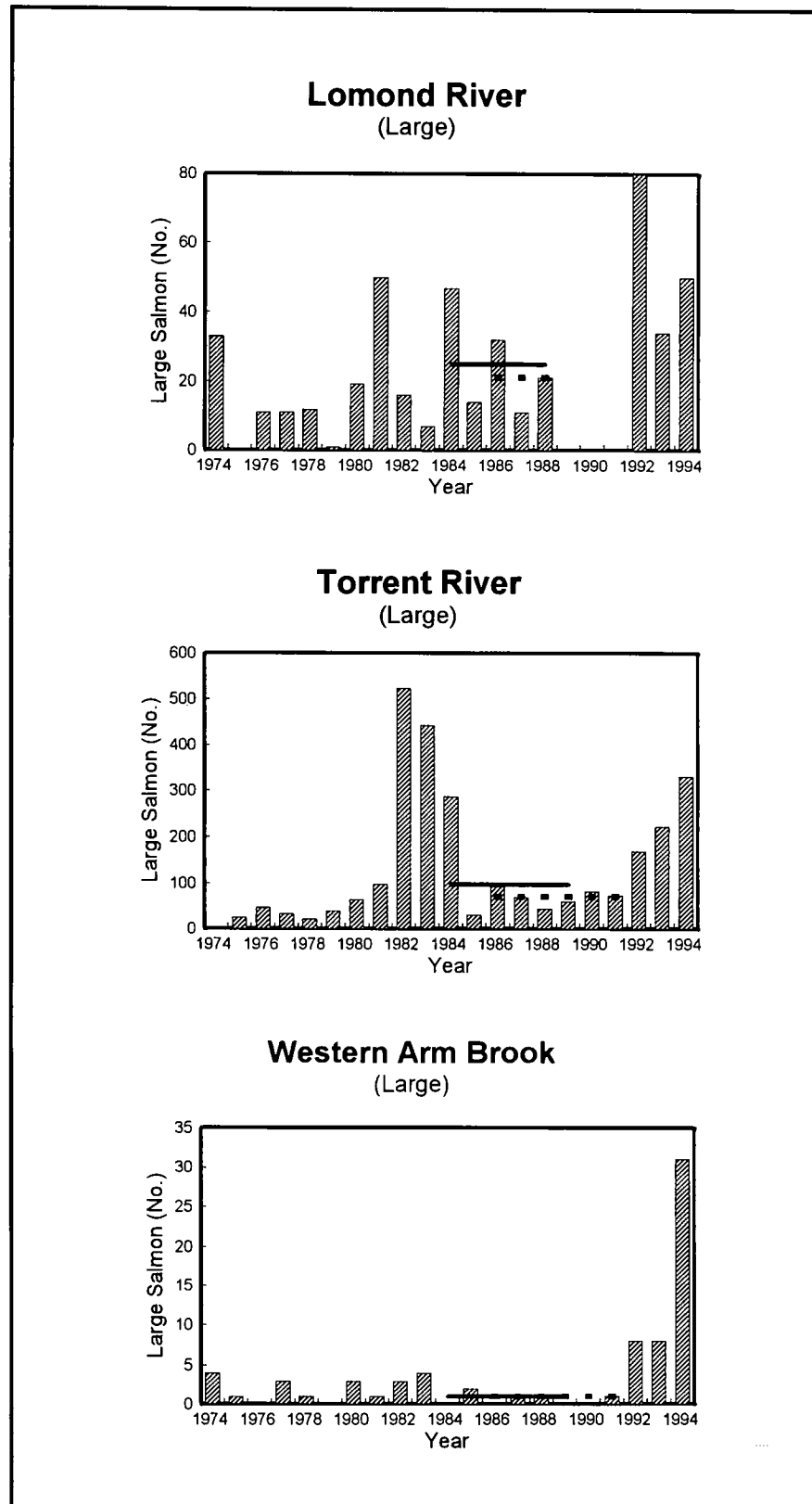


Fig. 14. Counts of large salmon at fishways in Lomond River and Torrent River and at the counting fence in Western Arm Brook, SFA 14A. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean.

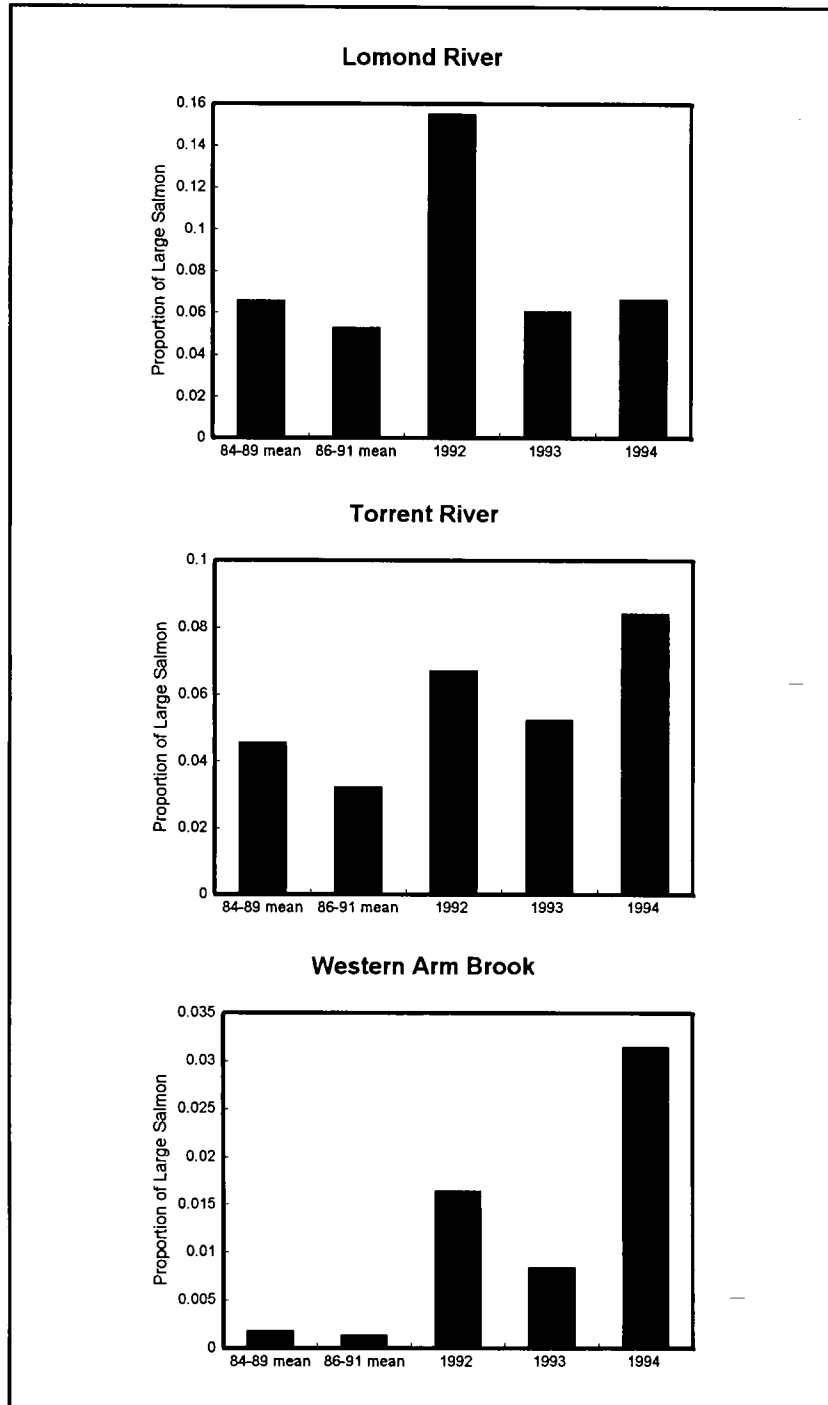


Fig. 15. Proportion of large salmon for Lomond River, Torrent River, and Western Arm Brook, SFA 14A, 1992-1994, and the 84-89 and 86-91 means.

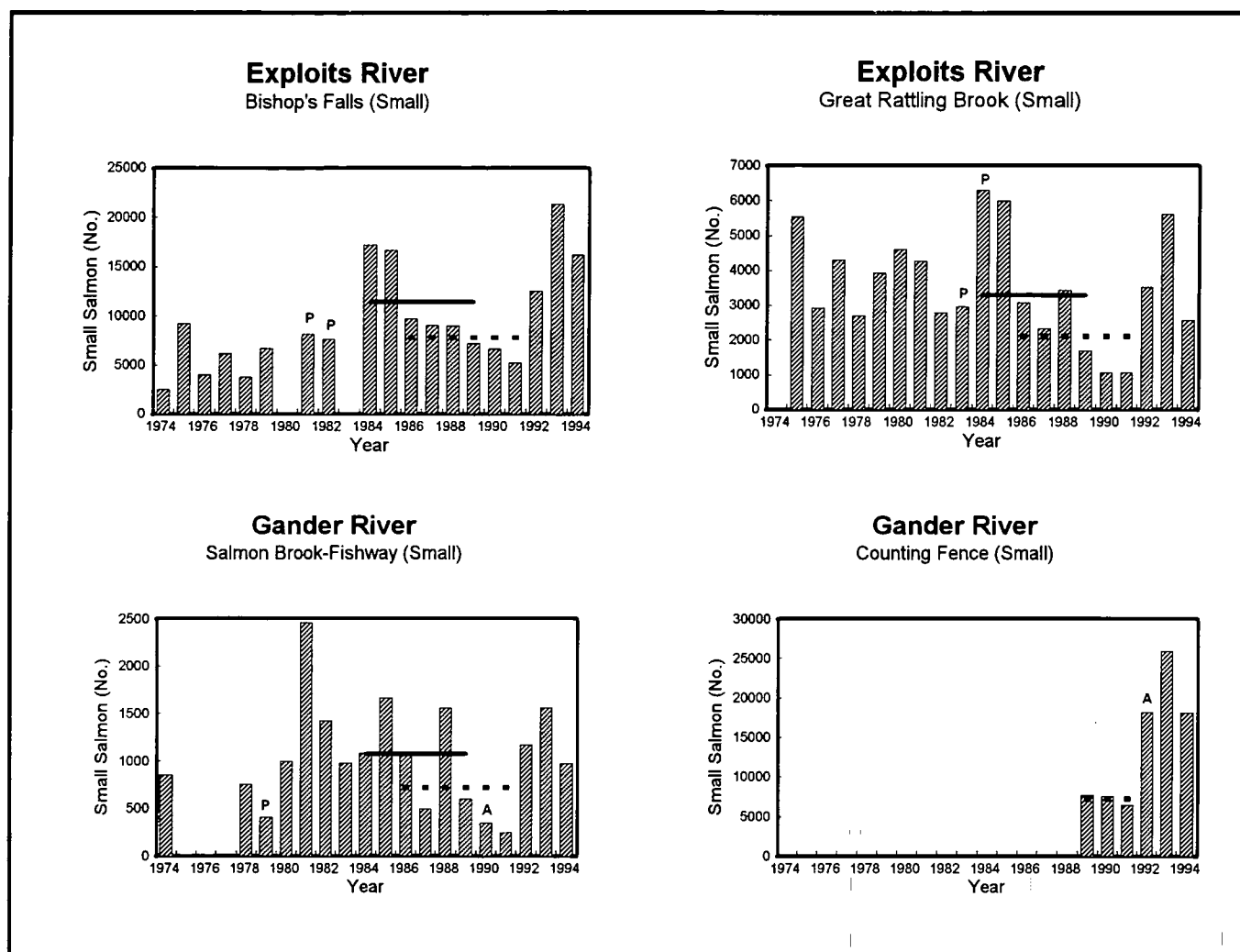


Fig. 16. Counts of small salmon at the Bishop's Falls fishway (main stem of the Exploits River) and the fishway in the Great Rattling Brook tributary, and at the Gander River counting fence and the fishway located in the Salmon Brook tributary, SFA 4. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. A = adjusted count; P = partial count, not included in means.

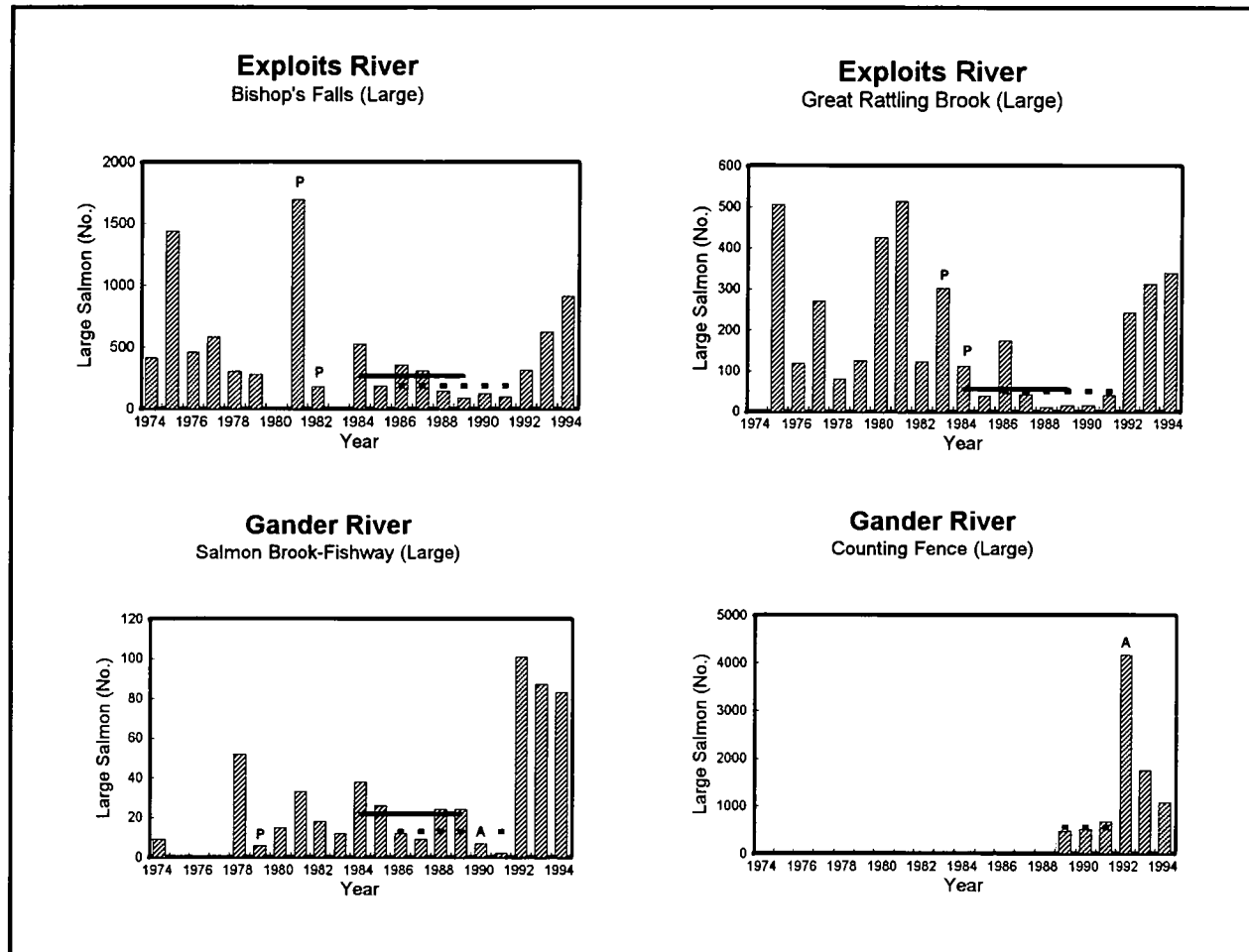


Fig. 17. Counts of large salmon at the Bishop's Falls fishway (main stem of the Exploits River) and the fishway in the Great Rattling Brook tributary, and at the Gander River counting fence and the fishway located in the Salmon Brook tributary, SFA 4. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. A = adjusted count; P=partial count, not included in means.



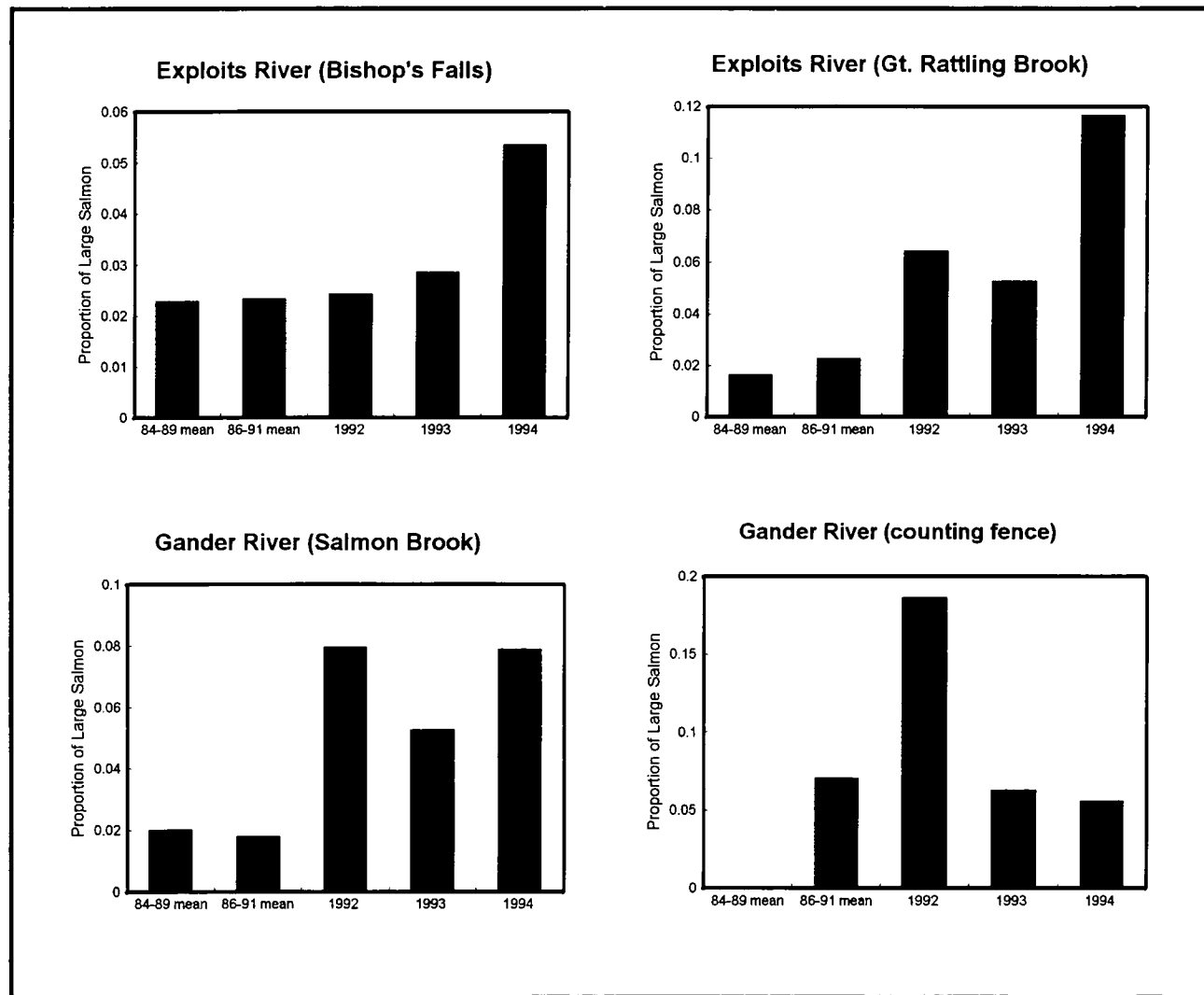


Fig. 18. Proportion of large salmon for Exploits River (Bishop's Falls), Great Rattling Brook tributary, Gander River counting fence and the Salmon Brook tributary, SFA 4, 1992-1994, and the 84-89 and 86-91 means.

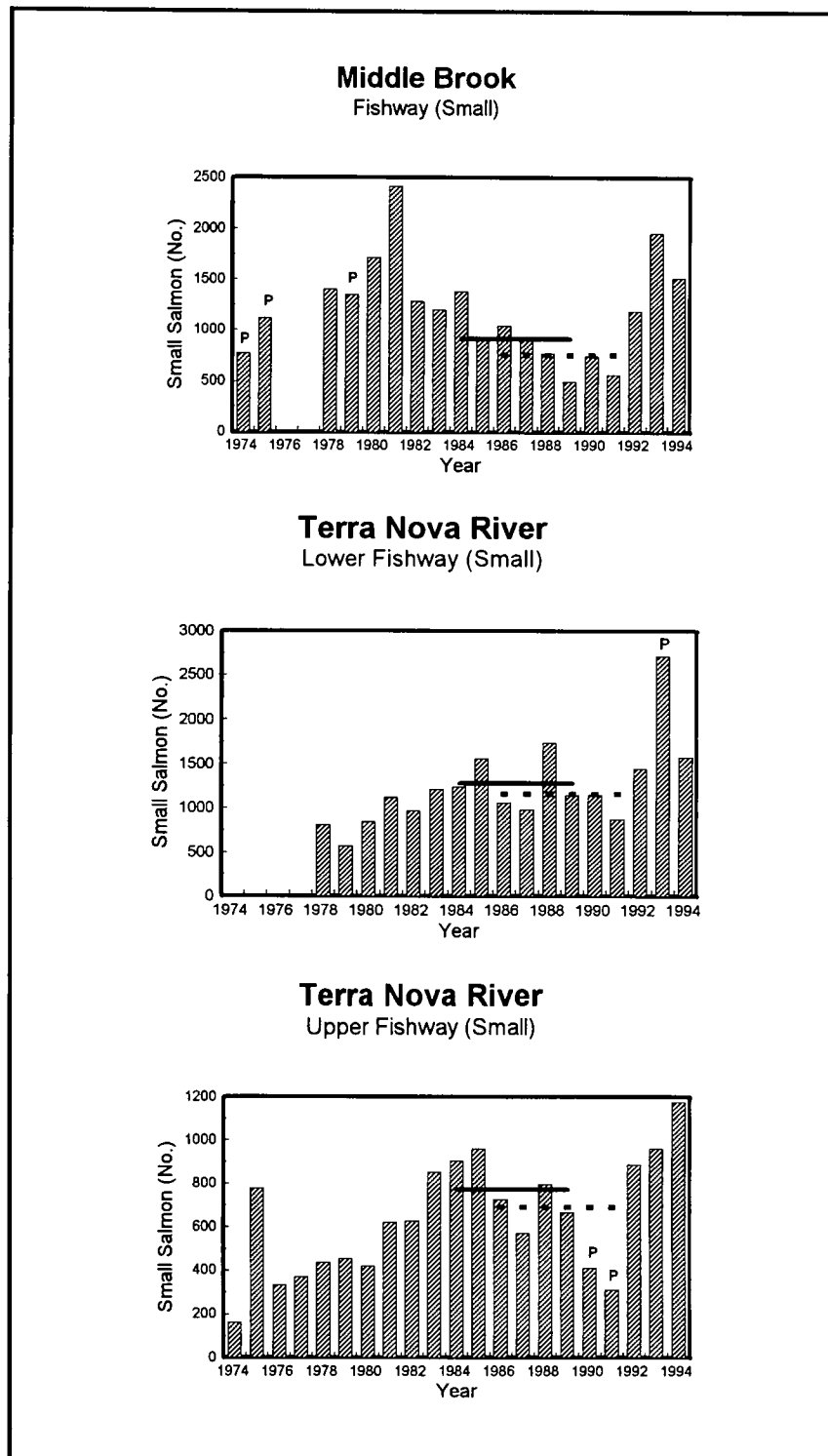


Fig. 19. Counts of small salmon at the Middle Brook fishway, and at the lower and upper fishways in Terra Nova River, SFA 5. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P=partial count, not included in means.

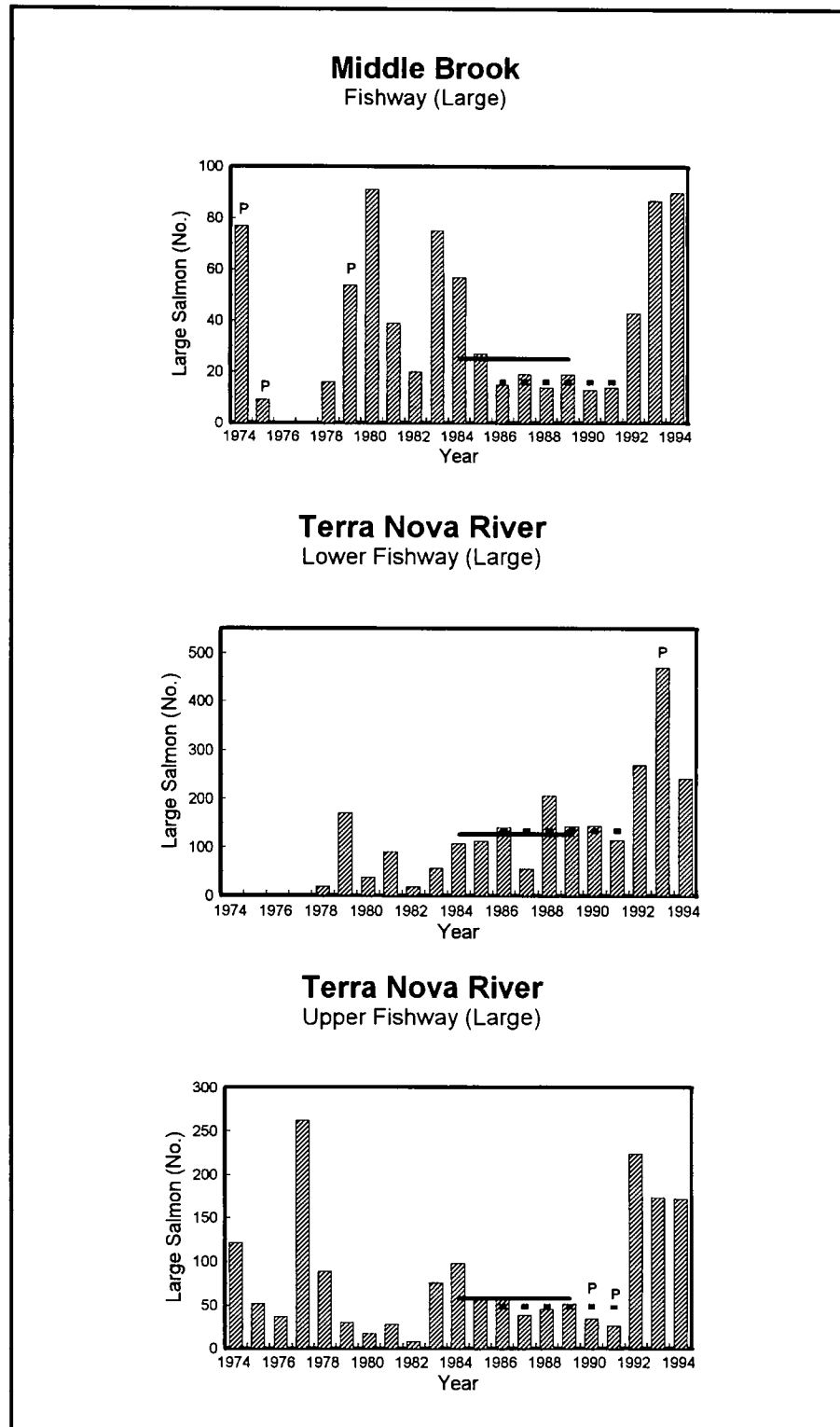


Fig. 20. Counts of large salmon at the Middle Brook fishway and at the lower and upper fishways in Terra Nova River, SFA 5. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P=partial count, not included in means.

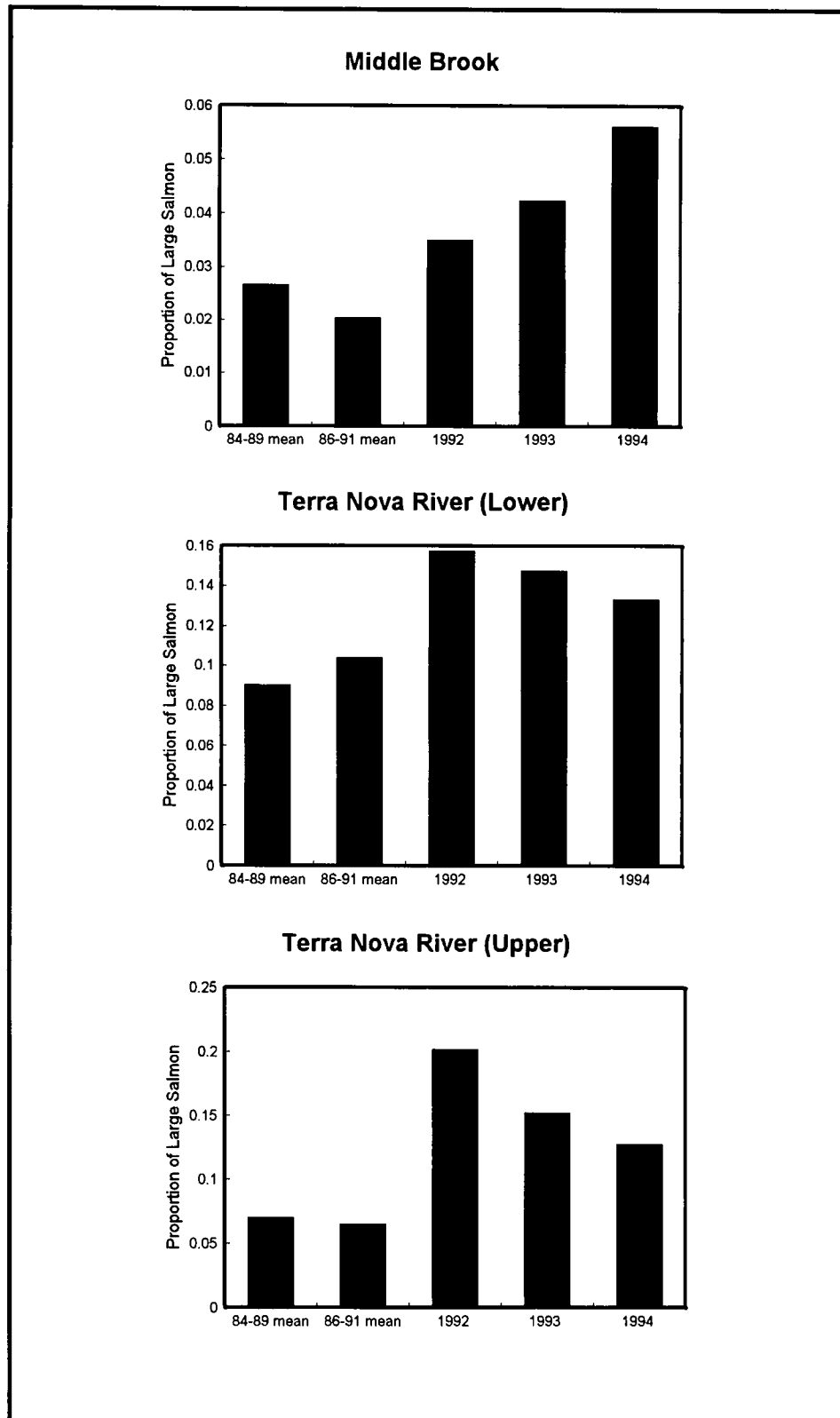


Fig. 21. Proportion of large salmon for Middle Brook and the lower and upper Terra Nova River, SFA 5, 1992-1994, and the 84-89 and 86-91 means.

### South (SFAs 9 - 11)

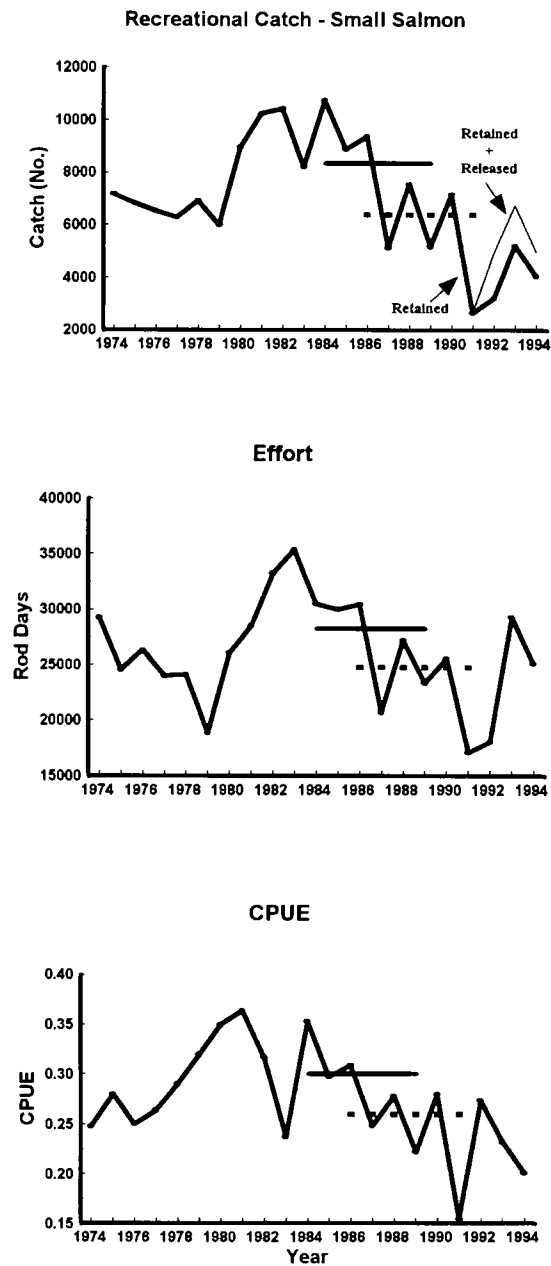


Fig. 22. Recreational catch of small salmon (retained, 1974-94; retained plus released, 1992-94), effort, and catch per unit of effort (CPUE), 1974-1994, for South (SFAs 9 - 11). The solid horizontal line represents the 1984-89 mean and the broken horizontal line the 1986-91 mean.

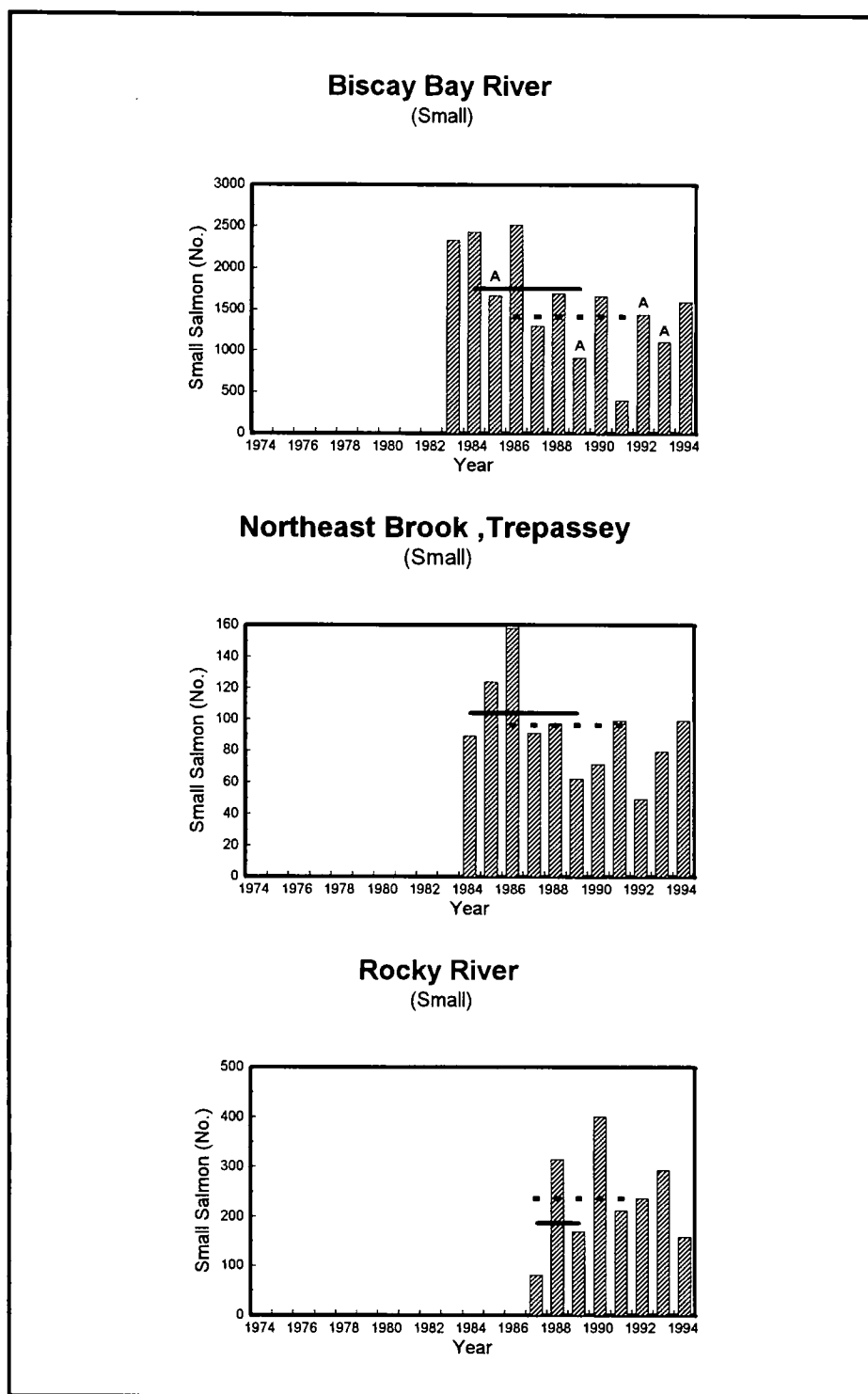


Fig. 23. Counts of small salmon at counting fences in Biscay Bay River and Northeast Brook (Trepassey) and at the fishway in Rocky River, SFA 9. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. A = adjusted count.

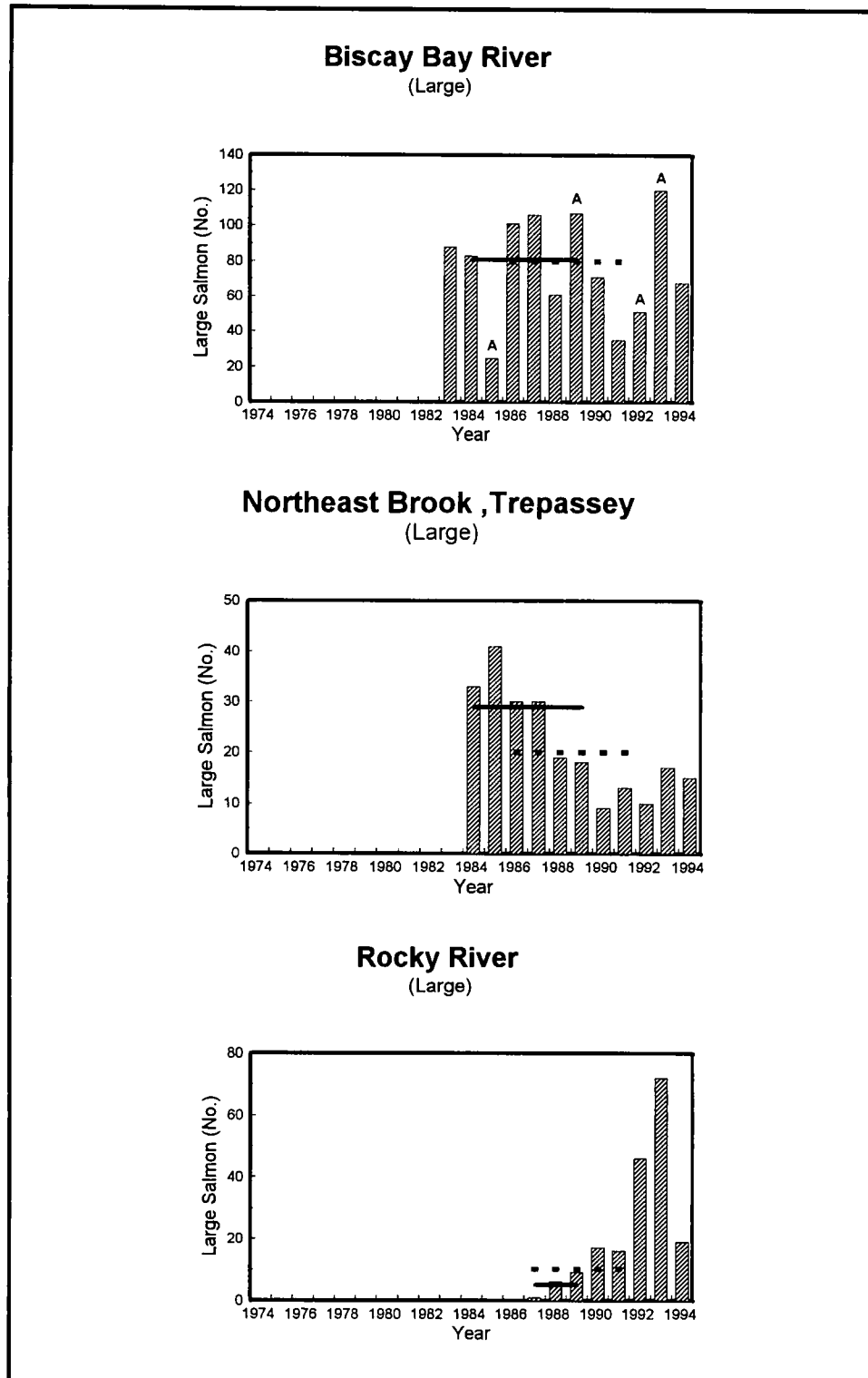


Fig. 24. Counts of large salmon at counting fences in Biscay Bay River and Northeast Brook (Trepassey) and at the fishway in Rocky River, SFA 9. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. A = adjusted count.

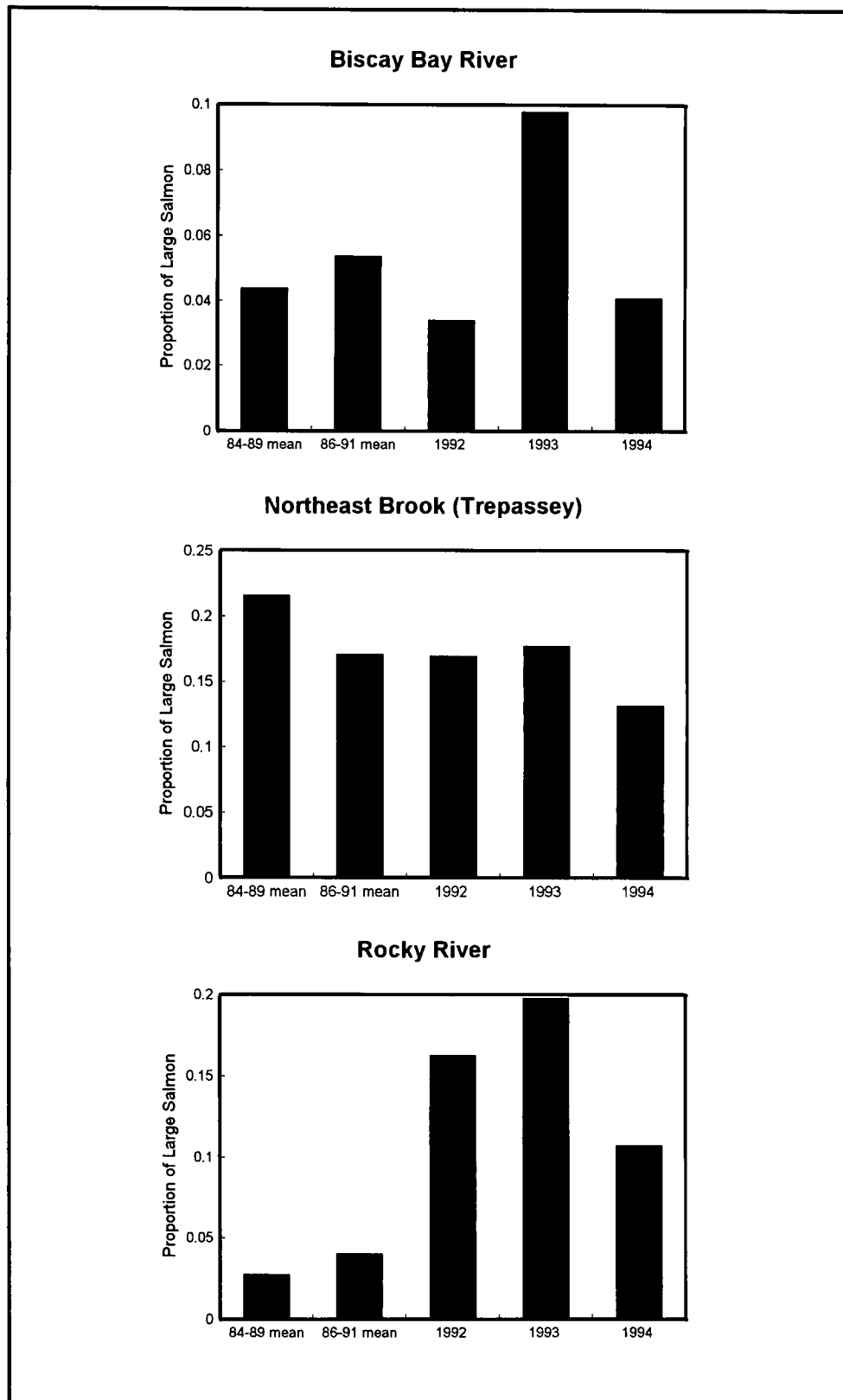


Fig. 25. Proportion of large salmon for Biscay Bay River, Northeast Brook (Trepassey), and Rocky River, SFA 9, 1992-1994, and the 84-89 and 86-91 means.



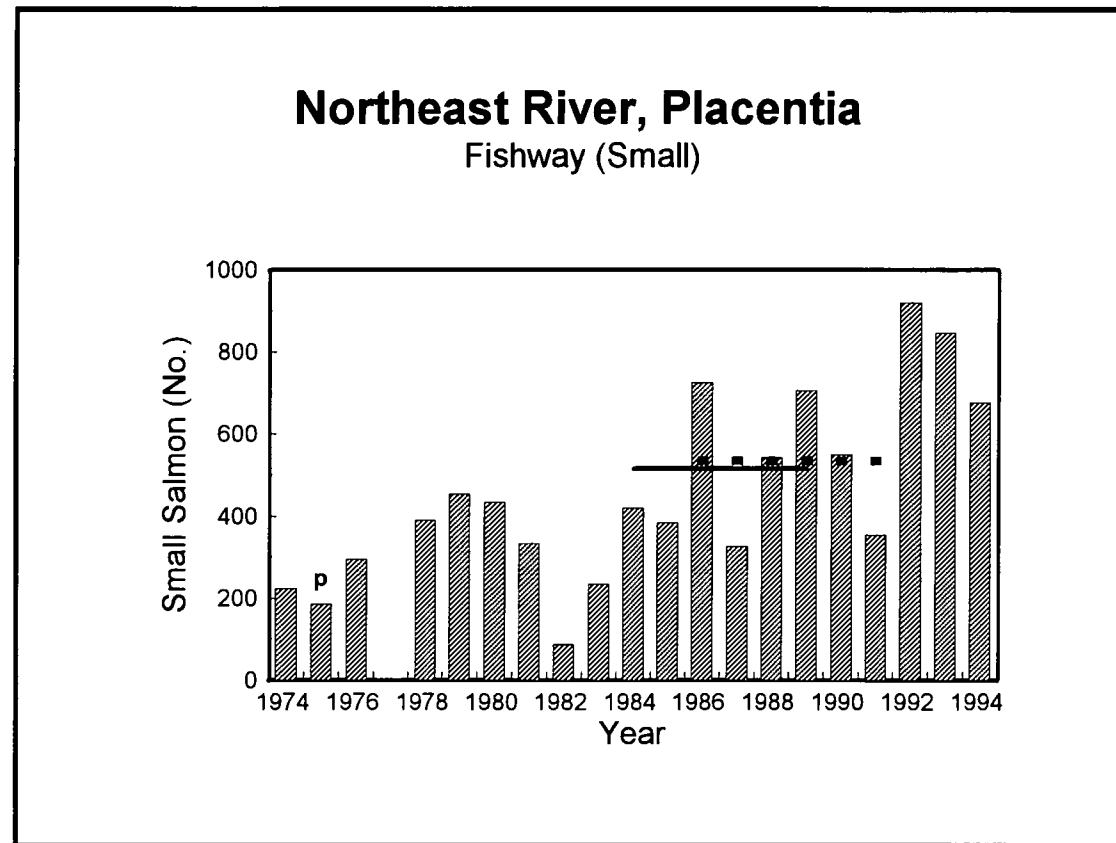


Fig. 26. Counts of small salmon at the Northeast River (Placentia) fishway, SFA 10. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P=partial count.

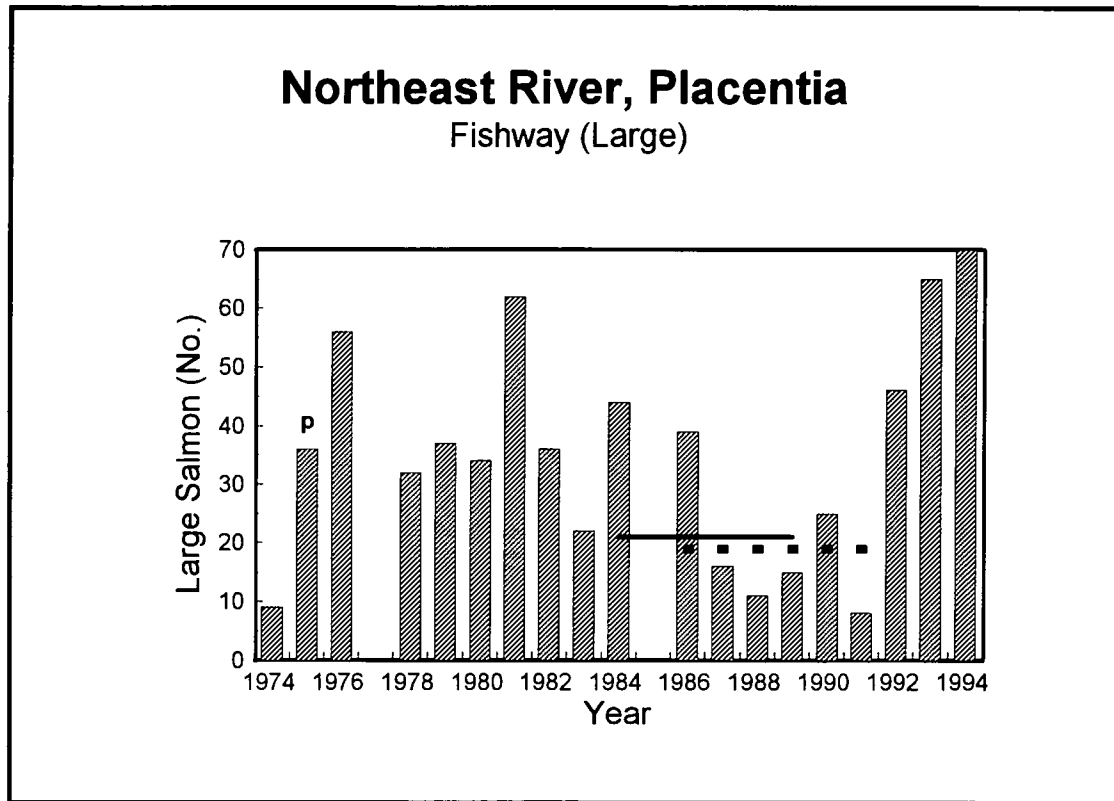


Fig. 27. Counts of large salmon at the Northeast River (Placentia) fishway, SFA 10. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P=partial count.

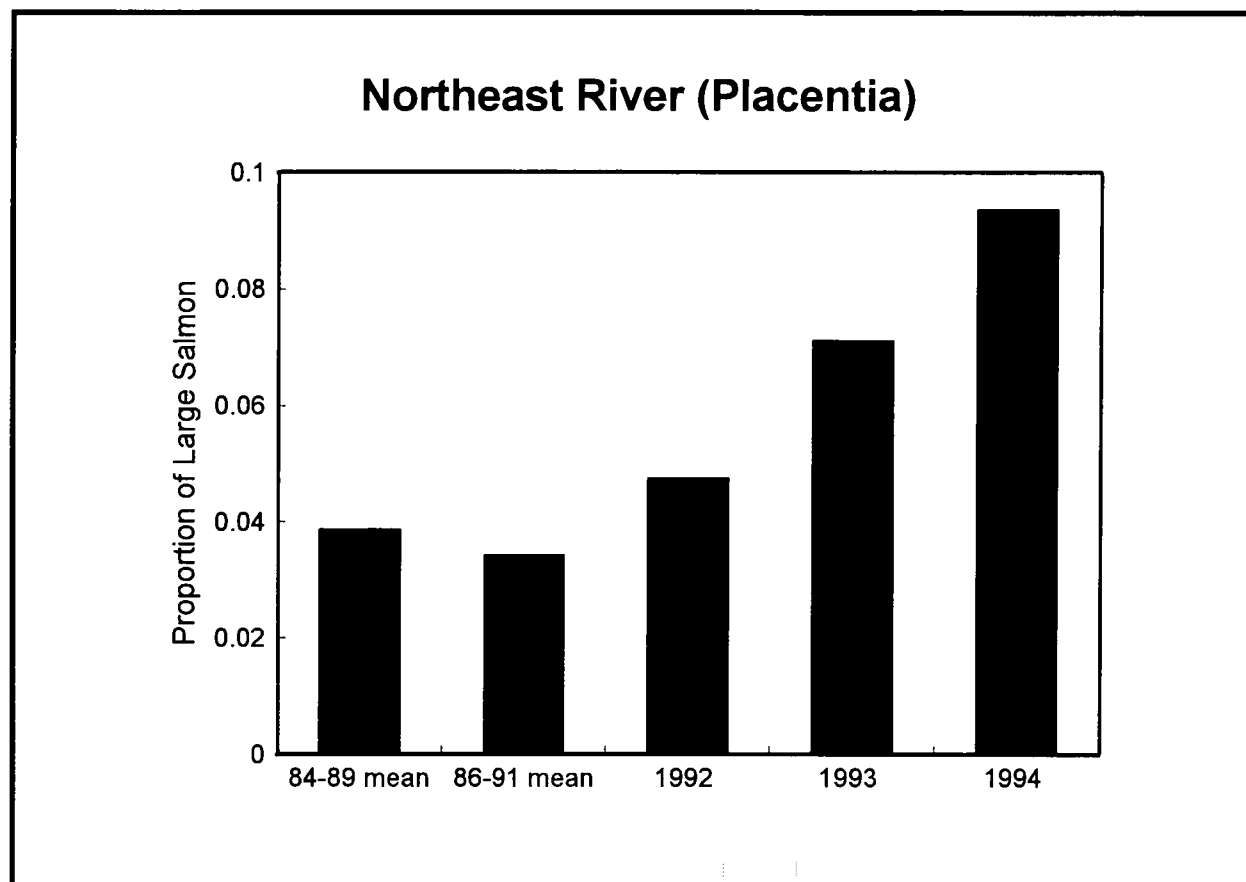


Fig. 28. Proportion of large salmon for Northeast River (Placentia), SFA 10, 1992-1994 and the 84-89 and 86-91 means.

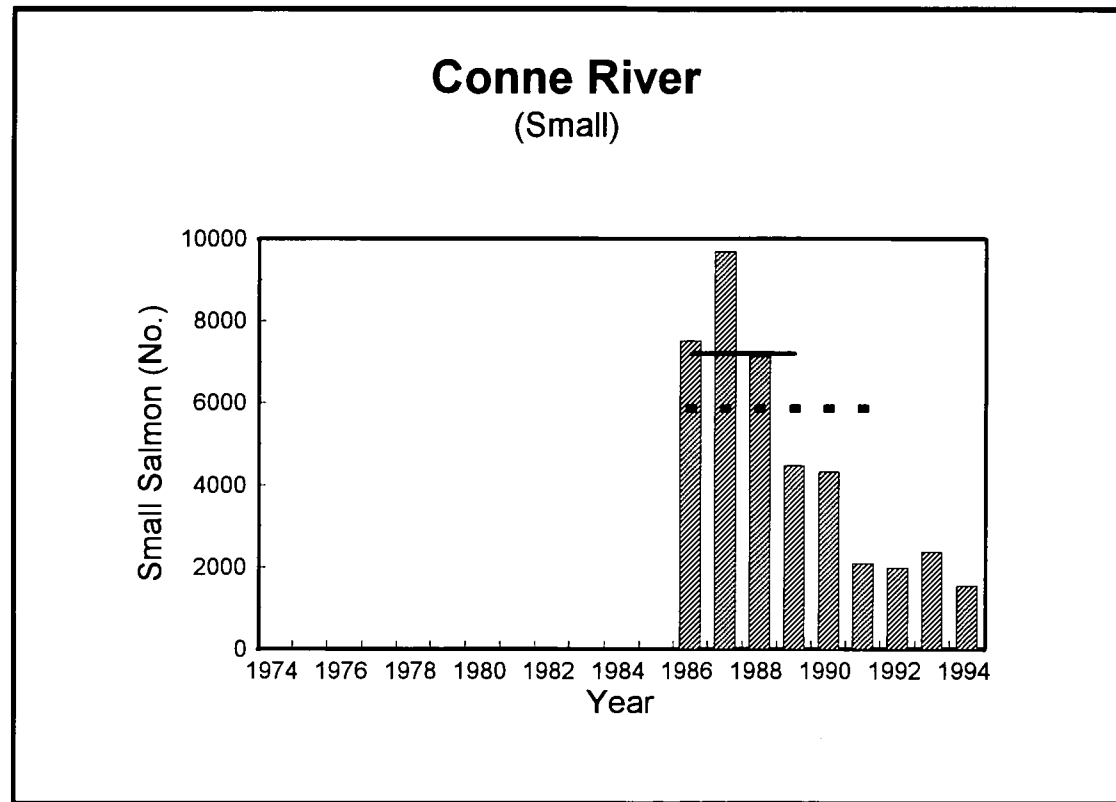


Fig. 29. Counts of small salmon at the Conne River counting fence, SFA 11. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean.

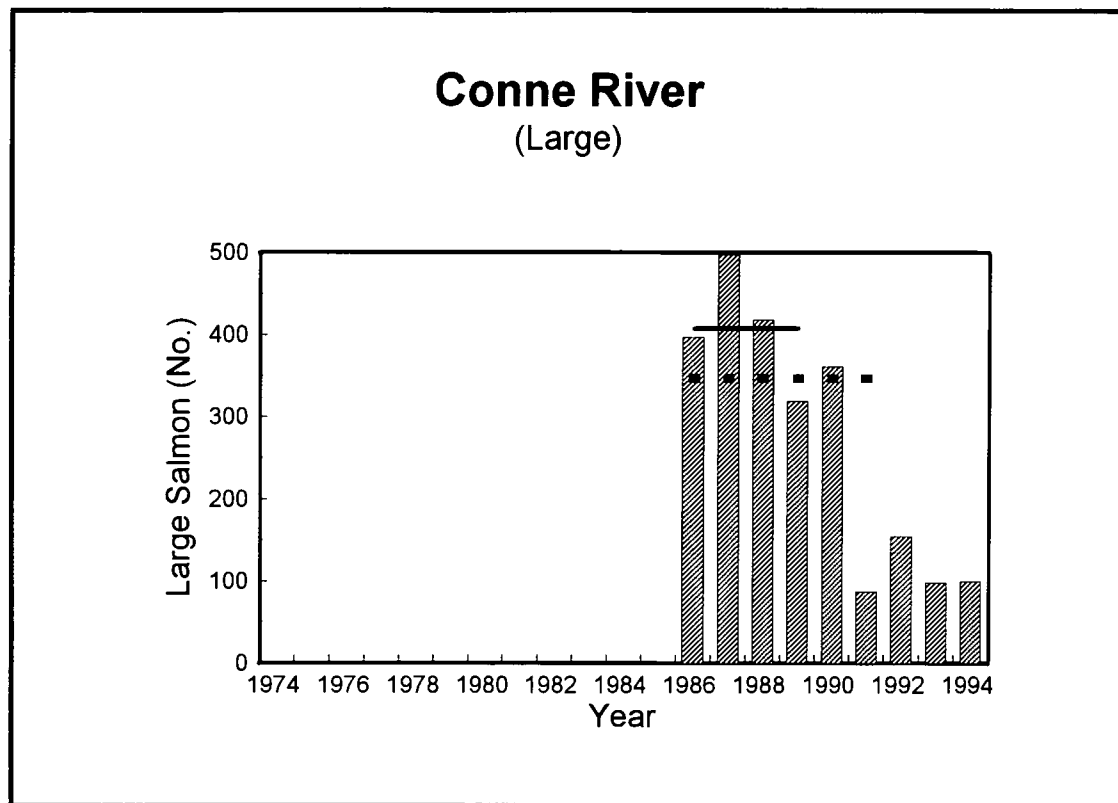


Fig. 30. Counts of large salmon at the Conne River counting fence, SFA 11. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean.

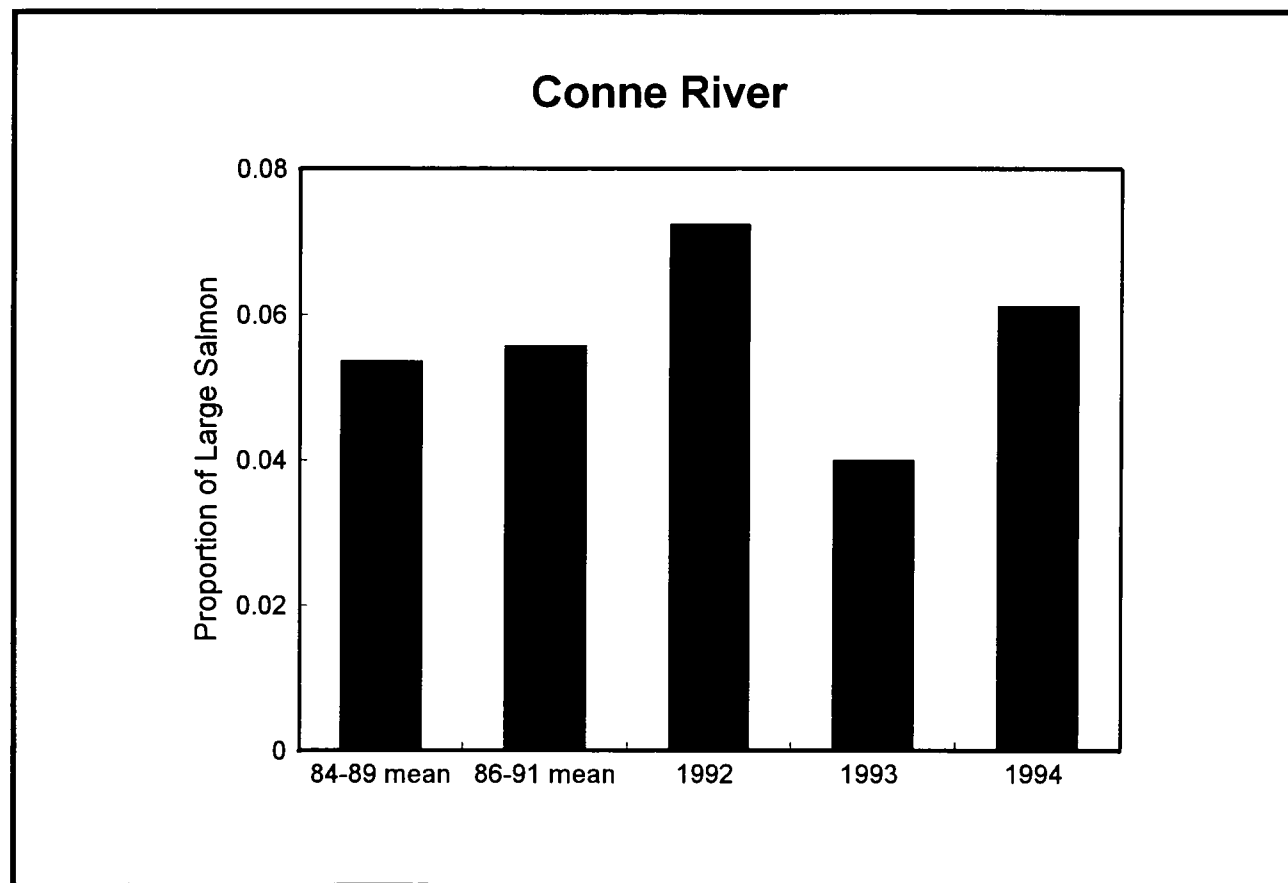


Fig. 31. Proportion of large salmon for Conne River, SFA 11, 1992-1994 and the 84-89 and 86-91 means.

## Southwest (SFAs 12 - 13)

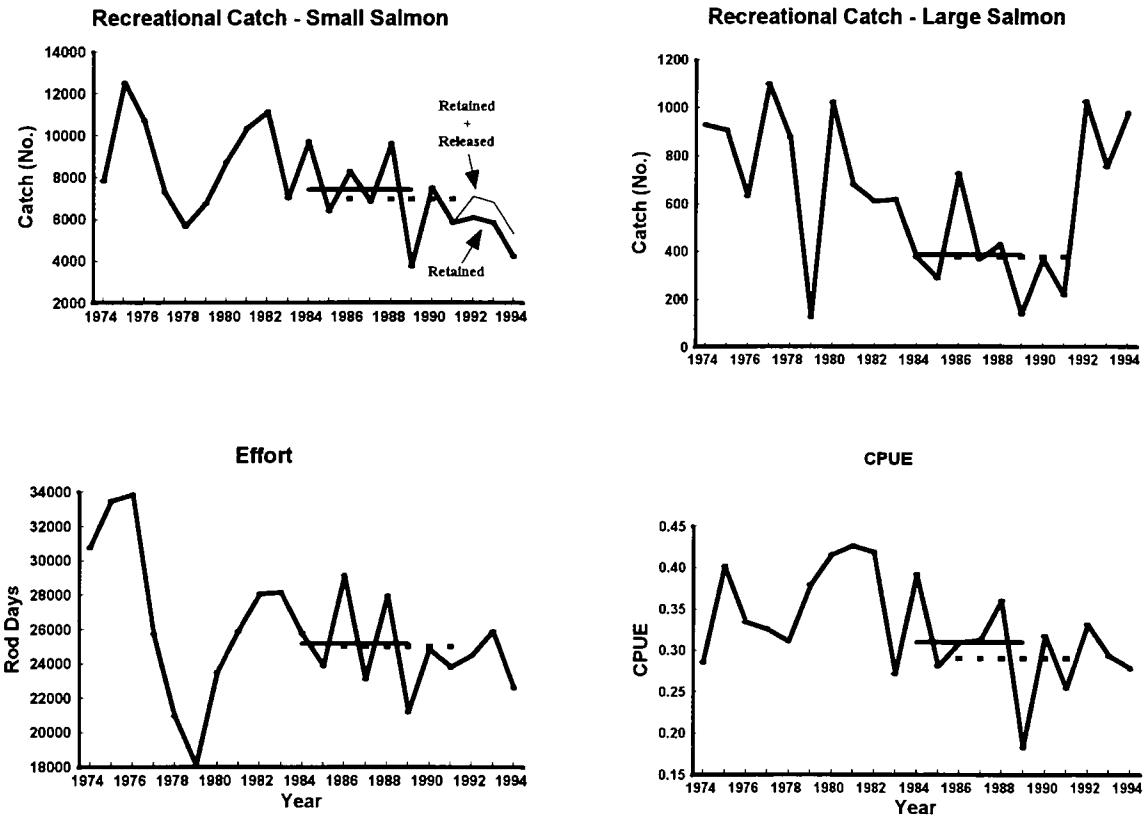


Fig. 32. Recreational catch of small salmon (retained, 1974-94; retained plus released, 1992-94), effort, and catch per unit of effort (CPUE), 1974-1994 for Southwest (SFAs 12 - 13). The catch of large salmon prior to 1985 is retained and for 1985-94 is released. The solid horizontal line represents the 1984-89 mean and the broken horizontal line the 1986-91 mean.

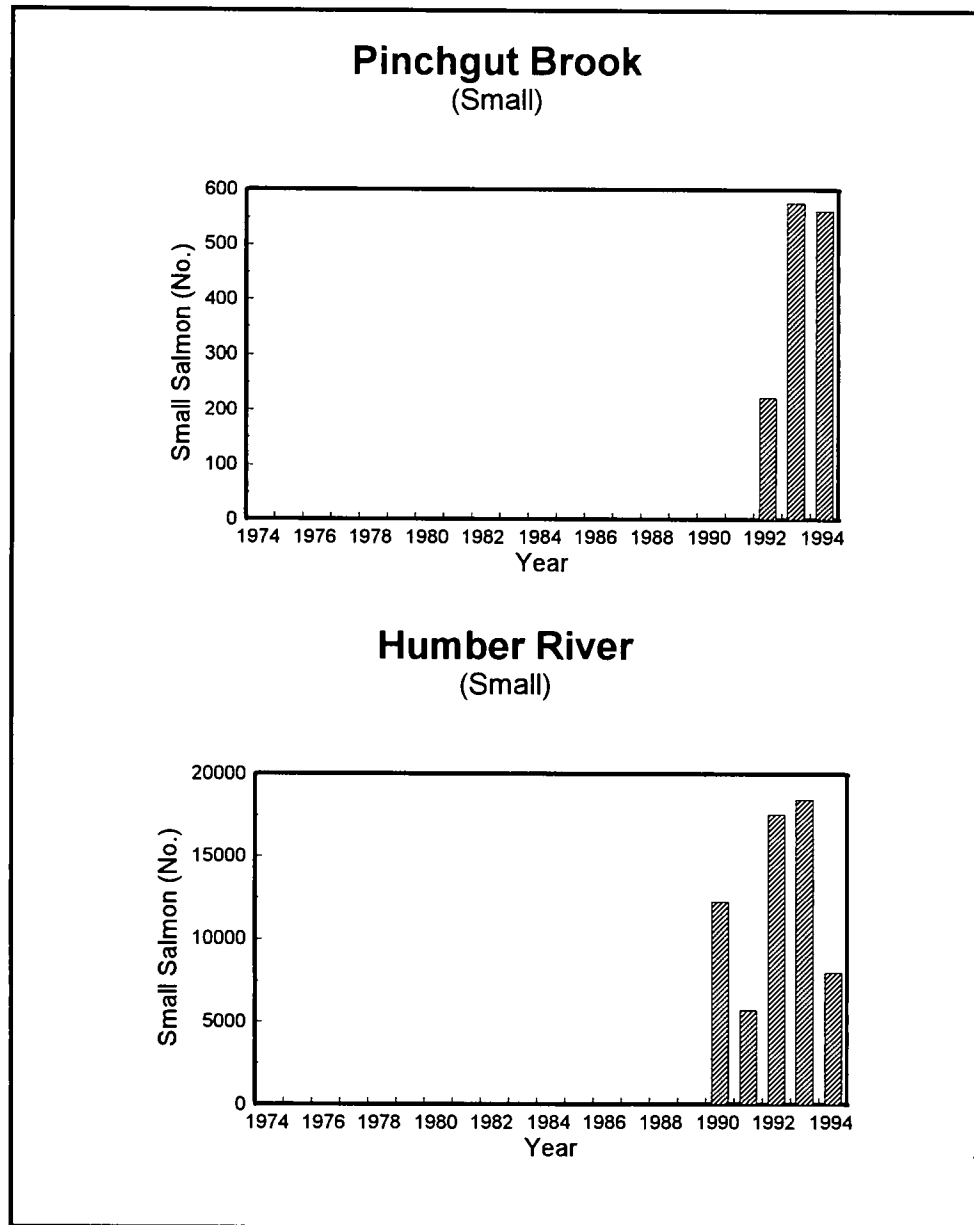


Fig. 33. Counts of small salmon at the Pinchgut Brook counting fence and from the mark-recapture study in Humber River, SFA 13.



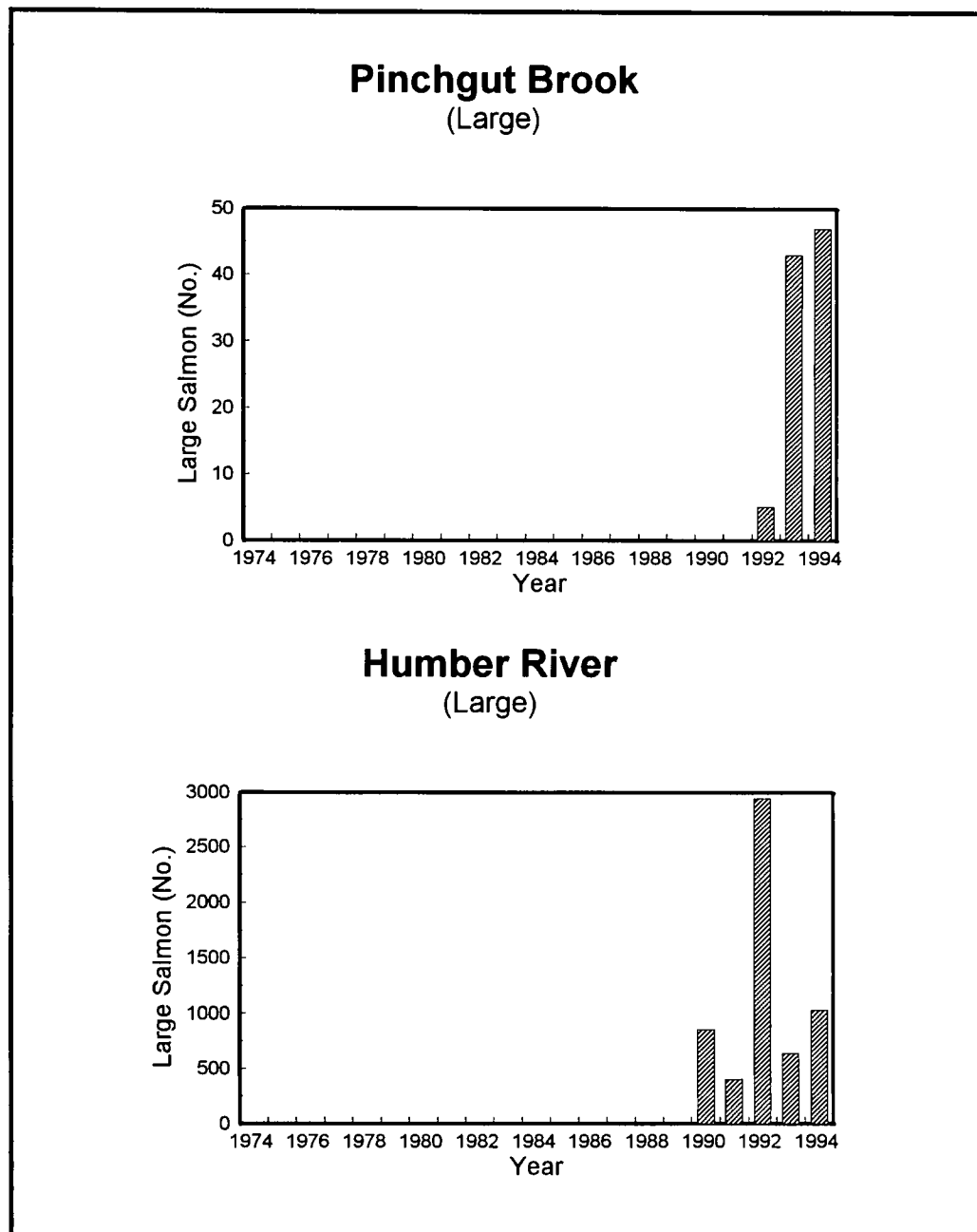


Fig. 34. Counts of large salmon at the Pinchgut Brook counting fence and from the mark-recapture study in Humber River, SFA 13.

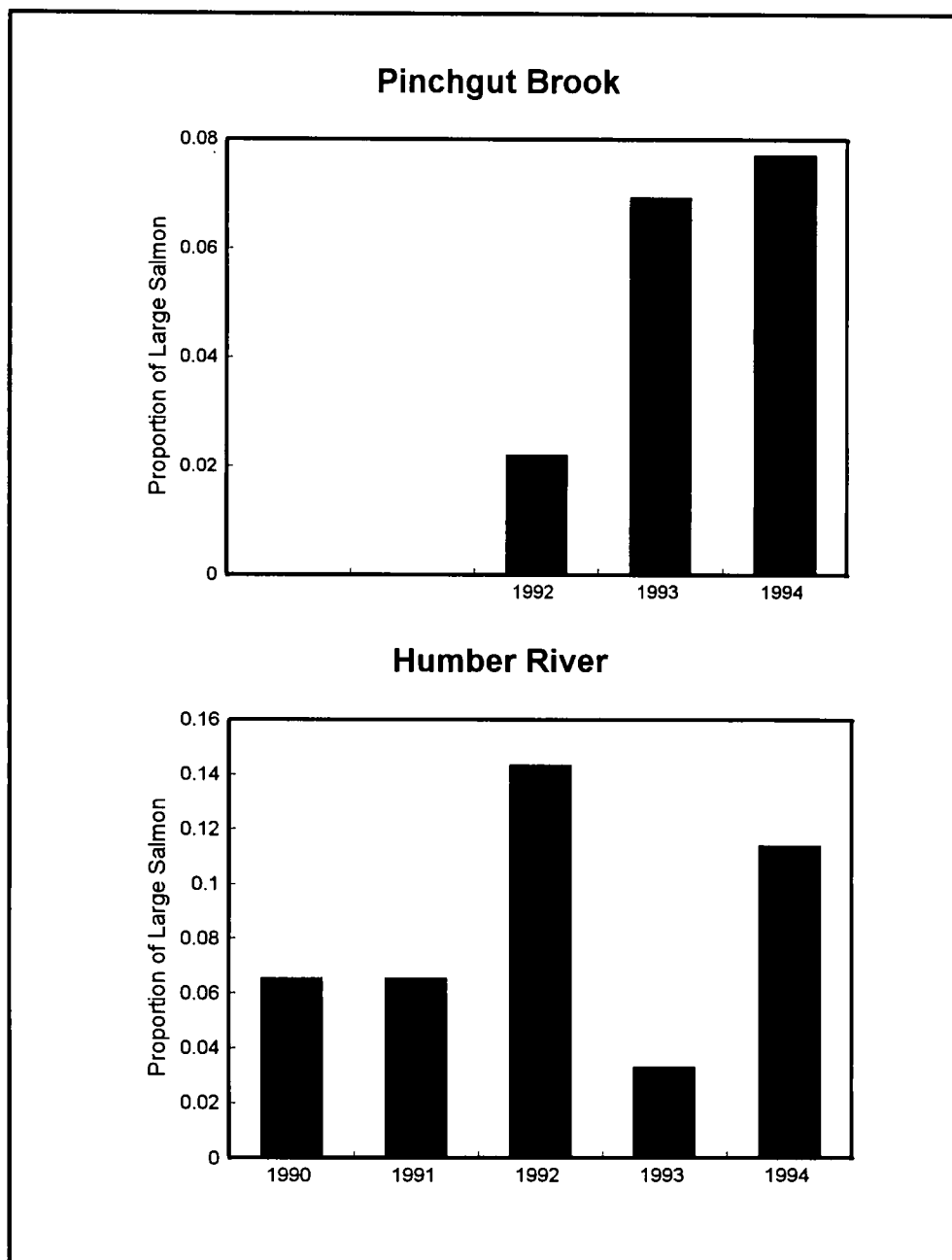


Fig. 35. Proportion of large salmon for Pinchgut Brook and Humber River, SFA 13, 1990-1994.

## Appendix 1

### THE RESULTS OF DFO - PUBLIC MEETINGS ON 1994 ATLANTIC SALMON ASSESSMENTS IN NEWFOUNDLAND & LABRADOR

**Purpose:** to allow the public to have input into the stock assessment process.

**Background:** Science Branch augmented 1994 stock assessments by incorporating the knowledge of anglers and fishers through a series of public meetings which provided the opportunity for public input. This process provided fishers the opportunity to review the information available to assess the status of salmon stocks in 1994 and to provide information to biologists on their observations regarding the state of the resource. Each meeting began with a brief presentation by DFO biologists showing information on catch statistics and counts at enumeration facilities in the local area; then the proceedings were opened for public comment and input.

**Information from fishers:** the questions asked were,

- what were the effects of 1994 water levels and water temperatures on angling success?
- what were your perceptions of abundance of salmon in 1994?
- have angling habits changed with the introduction of hook & release?
- how did the 1994 management plan affect angling effort and success? and,
- what information do you have on long-term population size?

#### **Public Meeting Locations & Attendance, 1994:**

LOCATION	DATE	DFO	ANGLERS & ANGLER REPRESENTATIVES	TOTAL
St. John's	Oct. 17	7	10	17
Gander	Oct. 18	4	15	19
Stephenville	Oct. 18	7	20	27
Plum Point	Oct. 19	7	22	29
Forteau	Oct. 20	5	13	18
Corner Brook	Oct. 24	4	41	45

## ST. JOHN'S, OCTOBER 17, 1994

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### 1. Effect of 1994 water levels and water temperatures on angling success.

#### *General*

- Overall it was felt that effort was redistributed from Avalon Peninsula rivers to other rivers on the island and in southern Labrador.

#### *Specific*

- Low water levels decreased the number of angling spots in a given river and concentrated effort.
- Salmonier River, Branch River, and North Harbour River: water levels were low in all three rivers from nearly the start of the angling season to the end.
- Most anglers felt that catchability was lower in 1994 due to low water levels and high temperatures.

### 2. Abundance of salmon in 1994.

#### *General*

- there was low abundance of salmon in southern Labrador in 1994.

#### *Specific*

- Salmonier River, Branch River, and North Harbour River: when Salmonier River reopened for angling towards the latter part of July, it appeared that a lot of salmon moved into the river at that time. The same applied to North Harbour River where salmon were also noted during the extended season for brown trout. Anglers felt that salmon held off from entering Avalon rivers to await favourable water conditions.

### 3. Changes in angling habits due to hook and release.

#### *General*

- Opinion ranged from "its part of the psyche now" to "it is not popular in Newfoundland and that a released fish will not survive, so you might as well kill it and have done with it".
- Some felt that if done properly, hook and release is effective; however, more education is needed in this regard.

- Most felt that not as much effort was put into hook-and-release fishing as for retention and agreed that this is a confounding factor in historical comparisons involving angling data.
- One person felt that most people prefer retention of salmon and that they will practice hook and release only when they have a pool or section of river to themselves.

### *Specific*

- Gander River: one person made the observation that it appeared that more people were practicing hook-and-release fishing on this river in 1994.

#### **4. Effect of the 1994 management plan on angling effort and success.**

- It was the general conclusion that the 3:3 seasonal bag limit tag system (3 fish prior to and 3 fish after July 31) did not result in a rush for fish. Thus, 1994 catch and effort data are not comparable to that of 1992-93 when it is generally felt that angling effort was redirected to the earlier part of the season.
- Anglers expended more effort in August in 1994 than in the past, in an attempt to get the 3 post-July 31 fish.

#### **5. Information on long-term population size in local area.**

- No information was forthcoming at this meeting.

#### **6. Other.**

- There was considerable interest in the contribution of repeat spawners to spawning escapements since the commercial fishery moratorium and possible causes of low survival of kelts in recent years; also concerns were expressed regarding the general low smolt-adult-survival experienced during commercial salmon fishery moratorium years.

## **GANDER, OCTOBER 17, 1994**

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#### **1. Effect of 1994 water levels and water temperatures on angling success.**

- Exploits River: this is a regulated watershed and water levels do not fluctuate to the same extent as on unregulated rivers.
- Gander River: the effects of low water levels are not felt in the lower reaches of Gander River to the same extent as other rivers because of its size and the presence of four large ponds on the main stem; also, Gander Lake water influences water temperatures in the upper reaches of the main stem.

- Campbellton River: there was poor angling success due to low water levels and high water temperatures.
- Grey River: one person reported fishing to be very good the first few days of the season but this ended when water levels rose substantially and remained high for the next eight days or so.
- Humber River: there was a report that fishing for large salmon was very good in August when water levels were high and temperatures cooler.

## **2. Abundance of salmon in 1994.**

### *General*

- Some people felt that abundance in 1994 was down overall from 1993.

### *Specific*

- Gander River: catch rates for Gander River in 1994 were lower than in 1993 in their opinion. There was good fishing in the Northwest Gander River in August.
- Exploits River: it was noted that returns to the Middle Exploits increased in 1994 while returns to Great Rattling Brook decreased, and the distinction was made that the Middle Exploits is an enhanced stock while Great Rattling is a natural stock.
- Grand Codroy River: one person reported that fishing in this river was very poor in 1994.
- Eagle River: fishing in this river was very good in 1994, especially for large salmon.

## **3. Changes in angling habits due to hook and release.**

### *General*

- It was felt that it could take a decade to get hook and release entrenched in Newfoundland and Labrador, especially for young people just entering the fishery.
- The length of time a fish is played is more important than whether a barbed or barbless hook is used.
- The major concern with hook and release is mortality and impacts on estimates of spawning escapement; one person saw his first dead fish in Long Harbour River this year.
- Most anglers in Newfoundland are meat hunters.

*Specific*

- Gander River: there was no sharp decline in the number of anglers on the river in 1994 as occurred in 1992 and 1993 when the river was closed to retention of catch.
- Campbellton River: people stopped fishing after the pre-July 31 quota of 3 retained fish was taken and did not hook and release in the remainder of July, but fished again in August for the remaining 3 fish for retention.

**4. Effect of the 1994 management plan on angling effort and success.**

- Some people indicated the Management Plan did not affect their usual pattern of angling while others felt that more effort was expended in August compared to previous years in order to catch the retention quota for that month.

**5. Information on long-term population size in local area.***Specific*

- Gander River: it was felt that run sizes to the Gander River were higher in the past and that fishing in 1993 was as good as any experienced in these earlier years. Several persons who had fished Gander River over a period of 30 years noted that population trends shown during the meeting were in general similar to their recollections in that population size was much higher in earlier years and that populations varied greatly from year to year.

## STEPHENVILLE, OCTOBER 18, 1994

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**1. Effect of 1994 water levels and water temperatures on angling success.***General*

- Some people suggested that there were lots of fish in SFA 13 in 1994 but they did not show up in the angling statistics because water levels were too high for fishing.
- Water levels went up in late July and angling success went down.

*Specific*

- Little Barachois Brook: water levels were extremely low in 1994.
- Southwest Brook: water levels were good in 1994.

## 2. Abundance of salmon in 1994.

### *Specific*

- Robinson's River: there were no fish in 1994 even when water levels were good. There were more large fish in 1993. This was the poorest year for Robinsons in 6-7 years.
- Middle Barachois: there were few fish early in the season in 1994. There was an extremely large run of herring size salmon around June 25 every year or two and also in Southwest in 1994.
- Flat Bay River: there is a bad poaching problem which reduces the estimated number of spawners.
- Grandy's Brook: this stock appears to be doing better than other south coast rivers such as Conne River.
- Barachois Brook: there were a lot of salmon in this river in 1994.
- Southwest Brook: fishing was good for a few days in early August. Abundance was low in 1994. There were good numbers of large fish in 1993 but lower numbers in 1994.
- Harry's River: good catches were reported from Dhoon Lodge. There seemed to be more fish in Harry's River this year (large and small) compared to previous years. Harry's was probably the exception for Bay St. George rivers. There is a lot of poaching inside the gut which would have affected returns to Harry's and Southwest Brook.

## 3. Change in angling habits due to hook and release.

### *General*

- Most people do not practice hook and release.

### *Specific*

- Southwest and Bottom: the number of fish hooked and released in 1994 was low compared to previous years.
- Robinson's River: there was a good run of grilse during June 20-28. There were not as many fishermen in 1994 because of hook and release.

## 4. Effect of the 1994 management plan on angling effort and success.

- There has traditionally been very little angling in St. George's Bay rivers in August so having three tags in August would have affected the catch more than in other rivers with later runs.



- Misinterpretation of regulations (i.e., hook and release permitted with or without possession of at least one tag) resulted in reduced effort in 1994.
- SFA 14B: the reduction in bag limits for large salmon from 4 to 2 in SFA 14B rivers resulted in lower catches in 1994.

#### **5. Information on long-term population size in local area.**

- No information was provided at this meeting.

#### **6. Other**

- Some rivers such as Humber and Robinsons have a late run of salmon which would not be counted at the counting facilities resulting in under-estimation of spawning escapements from fence counts and angling catches.
- Fish enter some St. George's Bay rivers like Southwest Brook in May, before the recreational fishery and might not be picked up by anglers because they move to the upper parts of the watershed.
- Most grilse in rivers in SFA 13 are males.
- A lot of small parr about 2-3 inches in length were seen by anglers.
- In general anglers felt that in some rivers angling statistics did not reflect catches in 1994.

### **PLUM POINT, OCTOBER19, 1994**

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#### **1. Effects of 1994 water levels and water temperatures on angling success.**

##### *General*

- Water levels were moderate in July.
- Water warmed up in August and fishing was not as good as which temperatures were cooler.

##### *Specific*

- Pinware River: water temperatures were cold in 1994 compared to previous years.
- St. Genevieve River: water levels were low at times.

## **2. Abundance of salmon in 1994.**

### *General*

- CPUE may look worse than it really is because of a larger number of novice fishermen on the rivers. Many people who are out of work because of the cod fishery closure are buying salmon angling licences.

### *Specific*

- St. Genevieve River: water levels were low in 1988 and 1994 resulting in fewer fish entering the river.
- Pinware River: large salmon usually enter the river early in the season but few fish were seen this year compared to previous years. Salmon numbers are declining in the Pinware. The fishery was a disaster this year compared to other years.
- SFA 3: there were lots of fish in 1994 in Main Brook, West Brook, Roddickton River, and Cloud River.

## **3. Changes in angling habits due to hook and release.**

- Few people fished in this area during the hook and release fishery in 1992-94. There is not much interest in hook and release but it is increasing.
- There is no way of telling whether or not a fish is caught multiple times.
- Hook and release is causing an increase in effort because novice anglers who don't mind hook and release, fish all day for something to do.

## **4. Effect of the 1994 management plan on angling effort and success.**

- The season split in tags did not change the time that most anglers started fishing because one could still hook and release.
- The season split in tags may have kept tourists away in 1994 because it was not worth the time and money to come for 3 fish.
- Most of the angling effort in this area was in July not August.
- Most people were not aware that they did not have to keep one tag in order to hook and release. This change in fishing regulations could have been communicated to anglers better than it was.

## **5. Information on long-term population size in local area.**

### *General*

- Salmon stocks were higher in the 1970s and lower now.

### *Specific*

- St. Genevieve River: there were more and bigger fish than in previous years.

## **FORTEAU, OCTOBER 20, 1994**

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### **1. Effects of 1994 water levels and water temperatures on angling success.**

- Water levels were perfect in 1994 but low in 1993.

### **2. Abundance of salmon in 1994.**

#### *General*

- One commercial fisherman commented that the eggs in large salmon that he caught in 1994 in SFA 14B were small compared to what he saw in other years. He also indicated that most of the fish he caught were large salmon. Hardly any small salmon were landed. Catches in the commercial fishery dropped off quickly in the third week of June. The same was observed in the fishery in Red Bay. The salmon were there when the season opened but dropped off after a few weeks and there were few caught after that. There were 13 commercial licences in SFA 14B in 1994; 2 or 3 licence holders did not fish in 1994 according to the local fisheries officer.

#### *Specific*

- Forteau River: angling catch statistics were lower than the number actually caught. Angling in the past 10 years was better than in 1994. It was noted that there were some catches of slinks outside of the signs in Forteau River, which could affect returns of repeat spawners. There were no catches early in the season indicating that fish did not enter the river early. Large numbers of salmon caught in trout nets up north affect returns to Forteau River.
- Pinware River: angling statistics were lower than the number actually caught. Angling in the past 10 years was better than in 1994. Large numbers of seagulls were observed in the lower Pinware River and the lakes compared to previous years. They could be feeding on salmon parr because there is no fish offal at the fish plants since the closure of the cod fishery.

### **3. Changes in angling habits due to hook and release.**

- People were concerned about hook-and-release fishing and the mortalities from it in 1994.

### **4. Effect of the 1994 management plan on angling effort and success.**

- There was a general feeling that people did not fish as much because of the lower quota in 1994.

### **5. Information on long-term population size in local area.**

- Salmon stocks were higher in the 1970s and lower now.

## **CORNER BROOK, OCTOBER 24, 1994**

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### **1. Effects of 1994 water levels and water temperatures on angling success.**

- Humber River: water levels were excellent in 1994 with some fluctuation at Big Falls, but good overall.
- Southwest Brook: water levels were good in 1994.

### **2. Abundance of salmon in 1994.**

#### *General*

- Salmon enter St. George's Bay rivers as early as May. Therefore, catch statistics cannot reflect total abundance of salmon because recreational fishing opens in early June.
- In general, it was pointed out by SPAWN that salmon stocks in St. George's Bay rivers were low.
- The fact that there is less poaching in St. George's Bay rivers in recent years compared to the 1970s may be because there are fewer fish now than in the past.

#### *Specific*

- Humber River: there were more fish in 1994 than in 1989 and number of fish in 1994 was similar to 1993. There were more fish at Big Falls in 1994 than in 1993. Fishing was good in 1994 at Big Falls. Catch levels indicated by the recreational catch statistics are generally too low. Catches at Big Falls were not all recorded by the creel survey clerks because some people sneaked fish out without tags. Some fishermen felt 1994 was a poorer year compared to 1993.

- Southwest Brook: fishing was better in June 1994 compared to 1993 but fewer large fish were seen. After mid-July, there were few if any fresh fish in the river. Therefore, fishing was worse in July and August 1994 than in previous years. There was no evidence of netted salmon. There are serious poaching problems in Southwest. Bottom Brook had a very low population this year.
- Harry's River: if the large salmon in Harry's are not going through the Pinchgut fence then they must be spawning in other tributaries. Angling statistics do not indicate the level of returns to the river in 1994. One angler said he hooked 21 fish in Harry's River this year which was one half the total catch reported by catch statistics. Few fish were seen at Home Pool in Pinchgut Brook in 1994.
- Robinson's River: "she's gone b'y she's gone".
- Barachois Brook: it is doing better recently. This is an early river with one run of fish early in the season.

### **3. Change in angling habits due to hook and release.**

- Humber River: some anglers reported a lot of salmon were seen floating downstream at Big Falls which were attributed to hook-and-release mortalities. Others thought that these fish may have been killed from hitting the rocks below the falls rather than from hook and release. Some people also commented that they had seen no dead fish at Big Falls.

### **4. Effect of the 1994 management plan on angling effort and success.**

- The seasonal tag split impacted on catches in 1994 since most fish in St. George's Bay rivers are traditionally caught before July 31. The season split would have meant only two fishing trips for experienced anglers.

### **5. Information on long-term population size in local area.**

- no information was forthcoming at this meeting.

## **SUMMARY**

### **1. Effect of 1994 water levels and water temperatures on angling success:**

- Most anglers felt that catchability was lower in 1994 due to low water levels and high water temperatures. The exceptions to this seemed to be some rivers in St. George's Bay, Humber River, Exploits River, Gander River, and rivers in Labrador.
- Low water levels and high water temperatures were reported for the northeast coast, Avalon Peninsula, the northwest coast, and SFA 14B rivers in southern Labrador.

- Overall it was felt that river closures due to extreme low water/high temperatures redistributed fishing effort from Avalon Peninsula rivers to other rivers on the island and in southern Labrador.

## **2. Abundance of salmon in 1994:**

- Anglers felt that salmon held off entering Avalon Peninsula rivers due to high water temperatures.
- The abundance of salmon was low in southern Labrador in 1994.
- Several fishermen commented that anglers could not determine absolute stock abundance.

## **3. Change in angling habits due to hook and release:**

- Hook-and-release fishing has increased over the years and is a confounding factor in comparisons involving historical angling data.
- Many anglers feel mortalities due to hook and release are high enough to affect assessment results.

## **4. Effect of the 1994 management plan on angling effort and success:**

- It was the general conclusion that the 3:3 seasonal bag limit tag system (3 fish prior to and after July 31) eliminated the rush for fish noted in the 1992-93 seasons. Thus, 1994 catch and effort data are not comparable to that of 1992-93 but is more similar to previous years.
- Anglers expended more effort in August in 1994 than in the past, in an attempt to get the 3 post-July 31 fish.
- The seasonal tag split reduced the number of salmon caught overall because some rivers do not have salmon accessible to anglers in August.

## **5. Information on long-term population size in local area:**

- Run sizes in many rivers were reported to have been higher in the past, similar to population trends analysis.

- Fish enter some St. George's Bay rivers like Southwest Brook in May before the recreational fishery and might not be picked up by anglers because they move to the upper parts of the watershed before the season opens.

**6. Other:**

- In general, anglers felt that DFO catch and effort statistics for angling are not accurate, generally being too low.

Appendix 2a. Atlantic salmon recreational fishery catch and effort data for Labrador (SFAs 1, 2, &14B), 1974-1994. Ret. = retained fish; Rel. = released fish.

Year	Effort	Small (<63 cm)			Large ( ≥63 cm)			Total (Small + Large)			CPUE
	Rod Days	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
1974	5492	2501	.	2501	803	.	803	3304	.	3304	0.60
1975	4209	3972	.	3972	327	.	327	4299	.	4299	1.02
1976	7155	5726	.	5726	830	.	830	6556	.	6556	0.92
1977	7234	4594	.	4594	1286	.	1286	5880	.	5880	0.81
1978	6248	2691	.	2691	767	.	767	3458	.	3458	0.55
1979	5333	4118	.	4118	609	.	609	4727	.	4727	0.89
1980	4948	3800	.	3800	889	.	889	4689	.	4689	0.95
1981	5198	5191	.	5191	520	.	520	5711	.	5711	1.10
1982	6400	4104	.	4104	621	.	621	4725	.	4725	0.74
1983	6657	4372	.	4372	428	.	428	4800	.	4800	0.72
1984	7128	2935	.	2935	510	.	510	3445	.	3445	0.48
1985	6366	3101	.	3101	294	.	294	3395	.	3395	0.53
1986	7694	3464	.	3464	467	.	467	3931	.	3931	0.51
1987	8754	5366	.	5366	633	.	633	5999	.	5999	0.69
1988	10211	5523	.	5523	710	.	710	6233	.	6233	0.61
1989	9177	4684	.	4684	461	.	461	5145	.	5145	0.56
1990	8927	3309	.	3309	357	.	357	3666	.	3666	0.41
1991	7500	2323	.	2323	93	.	93	2416	.	2416	0.32
1992	8342	2738	251	2989	781	10	791	3519	261	3780	0.45
1993	9318	2508	1793	4301	378	91	469	2886	1884	4770	0.51
1994	10297	2657	2735	5392	474	291	765	3131	3026	6157	0.60

Means, 95% Confidence Limits, N's:

84-89 $\bar{X}$	8222	4179	.	4179	513	.	513	4691	.	4691	0.57
95% CL	1490	1214	.	1214	153	.	153	1336	.	1336	0.08
N	6	6	0	6	6	0	6	6	0	6	6
86-91 $\bar{X}$	8711	4112	.	4112	454	.	454	4565	.	4565	0.52
95% CL	1051	1341	.	1341	229	.	229	1557	.	1557	0.13
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.



Appendix 2b. Atlantic salmon recreational fishery catch and effort data for insular Newfoundland (SFAs 3 - 14A), 1974-1994. Ret = retained fish; Rel. = released fish.

Year	Effort Rod Days	Small (<63 cm)			Large ( ≥63 cm)			Total (Small + Large)			CPUE
		Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
1974	108199	26485	.	26485	1213	.	1213	27698	.	27698	0.26
1975	102907	33390	.	33390	1241	.	1241	34631	.	34631	0.34
1976	115847	34463	.	34463	1051	.	1051	35514	.	35514	0.31
1977	111836	34352	.	34352	2755	.	2755	37107	.	37107	0.33
1978	96659	28619	.	28619	1563	.	1563	30182	.	30182	0.31
1979	82578	31169	.	31169	561	.	561	31730	.	31730	0.38
1980	104332	35849	.	35849	1922	.	1922	37771	.	37771	0.36
1981	122479	46670	.	46670	1369	.	1369	48039	.	48039	0.39
1982	129369	41871	.	41871	1248	.	1248	43119	.	43119	0.33
1983	126308	32420	.	32420	1382	.	1382	33802	.	33802	0.27
1984	121979	39331	.	39331	511	.	511	39842	.	39842	0.33
1985	120049	36604	.	36604	*	316	316	36604	316	36920	0.31
1986	123611	37513	.	37513	*	826	826	37513	826	38339	0.31
1987	85969	24480	.	24480	*	410	410	24480	410	24890	0.29
1988	120497	39841	.	39841	*	600	600	39841	600	40441	0.34
1989	91286	18462	.	18462	*	183	183	18462	183	18645	0.20
1990	105736	29967	.	29967	*	503	503	29967	503	30470	0.29
1991	89812	20529	.	20529	*	336	336	20529	336	20865	0.23
1992	95931	23127	5633	28760	*	1413	1413	23127	7046	30173	0.31
1993	125661	24693	16403	41096	*	1640	1640	24693	18043	42736	0.34
1994	141508	28959	8370	37329	*	2052	2052	28959	10422	39381	0.28

Means, 95% Confidence Limits, N's:

84-89 $\bar{X}$	115484	34350	.	34350	.	481	487	34452	481	34837	0.30
95% CL	16883	11147	.	11147	.	459	310	11238	459	11365	0.06
N	5	5	0	5	0	4	5	5	4	5	5
86-91 $\bar{X}$	106188	29262	.	29262	.	490	490	29262	490	29752	0.28
95% CL	19617	11995	.	11995	.	306	306	11995	306	12272	0.07
N	5	5	0	5	0	5	5	5	5	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 2c. Atlantic salmon recreational fishery catch and effort data for Newfoundland and Labrador combined (SFAs 1 - 14B), 1974-1994. Ret = retained fish; Rel. = released fish.

Year	Effort Rod Days	Small (<63 cm)			Large ( ≥63 cm)			Total (Small + Large)			CPUE
		Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
1974	113691	28986	.	28986	2016	.	2016	31002	.	31002	0.27
1975	107116	37362	.	37362	1568	.	1568	38930	.	38930	0.36
1976	123002	40189	.	40189	1881	.	1881	42070	.	42070	0.34
1977	119070	38946	.	38946	4041	.	4041	42987	.	42987	0.36
1978	102907	31310	.	31310	2330	.	2330	33640	.	33640	0.33
1979	87911	35287	.	35287	1170	.	1170	36457	.	36457	0.41
1980	109280	39649	.	39649	2811	.	2811	42460	.	42460	0.39
1981	127677	51861	.	51861	1889	.	1889	53750	.	53750	0.42
1982	135769	45975	.	45975	1869	.	1869	47844	.	47844	0.35
1983	132965	36792	.	36792	1810	.	1810	38602	.	38602	0.29
1984	129107	42266	.	42266	1021	.	1021	43287	.	43287	0.34
1985	126415	39705	.	39705	294	316	610	39999	316	40315	0.32
1986	131305	40977	.	40977	467	826	1293	41444	826	42270	0.32
1987	94723	29846	.	29846	633	410	1043	30479	410	30889	0.33
1988	130708	45364	.	45364	710	600	1310	46074	600	46674	0.36
1989	100463	23146	.	23146	461	183	644	23607	183	23790	0.24
1990	114663	33276	.	33276	357	503	860	33633	503	34136	0.30
1991	97312	22852	.	22852	93	336	429	22945	336	23281	0.24
1992	104273	25865	5884	31749	781	1423	2204	26646	7307	33953	0.33
1993	134979	27201	18196	45397	378	1731	2109	27579	19927	47506	0.35
1994	151805	31616	11105	42721	474	2343	2817	32090	13448	45538	0.30

Means, 95% Confidence Limits, N's:

84-89 $\bar{X}$	123600	38292	.	38292	.	481	976	38882	481	39267	0.32
95% CL	16228	10830	.	10830	.	459	420	10969	459	11116	0.05
N	5	5	0	5	0	4	5	5	4	5	5
86-91 $\bar{X}$	114890	33123	.	33123	.	490	907	33541	490	34030	0.30
95% CL	19988	12669	.	12669	.	306	485	12879	306	13141	0.06
N	5	5	0	5	0	5	5	5	5	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 2d. Atlantic salmon recreational fishery catch and effort data for Northern Peninsula & Eastern (SFAs 3 - 8 & 14A), 1974-1994. Ret = retained fish; Rel. = released fish.

Year	Effort Rod Days	Small (<63 cm)			Large (≥63 cm)			Total (Small + Large)			CPUE
		Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
1974	48195	11456	.	11456	223	.	223	11679	.	11679	0.24
1975	44932	14077	.	14077	280	.	280	14357	.	14357	0.32
1976	55698	17266	.	17266	356	.	356	17622	.	17622	0.32
1977	62179	20809	.	20809	1626	.	1626	22435	.	22435	0.36
1978	51630	16070	.	16070	611	.	611	16681	.	16681	0.32
1979	45650	18444	.	18444	408	.	408	18852	.	18852	0.41
1980	54800	18144	.	18144	768	.	768	18912	.	18912	0.35
1981	68114	26069	.	26069	567	.	567	26636	.	26636	0.39
1982	68074	20331	.	20331	542	.	542	20873	.	20873	0.31
1983	62841	17204	.	17204	587	.	587	17791	.	17791	0.28
1984	65737	18898	.	18898	112	.	112	19010	.	19010	0.29
1985	66206	21306	.	21306	*	29	29	21306	29	21335	0.32
1986	64047	19850	.	19850	*	102	102	19850	102	19952	0.31
1987	42219	12508	.	12508	*	41	41	12508	41	12549	0.30
1988	65368	22663	.	22663	*	171	171	22663	171	22834	0.35
1989	46794	9555	.	9555	*	44	44	9555	44	9599	0.21
1990	55369	15312	.	15312	*	136	136	15312	136	15448	0.28
1991	48934	12054	.	12054	*	117	117	12054	117	12171	0.25
1992	53371	13841	2904	16745	*	380	380	13841	3284	17125	0.32
1993	70498	13634	13913	27547	*	802	802	13634	14715	28349	0.40
1994	93859	20679	6380	27059	*	1014	1014	20679	7394	28073	0.30

Means, 95% Confidence Limits, N's:

84-89 $\bar{X}$	61630	18454	.	18454	.	87	92	18477	87	18546	0.30
95% CL	10345	6427	.	6427	.	103	71	6430	103	6463	0.06
N	5	5	0	5	0	4	5	5	4	5	5
86-91 $\bar{X}$	56102	15887	.	15887	.	114	114	15887	114	16001	0.29
95% CL	10526	6707	.	6707	.	58	58	6707	58	6750	0.07
N	5	5	0	5	0	5	5	5	5	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 2e. Atlantic salmon recreational fishery catch and effort data for South (SFAs 9 - 11), 1974-1994. Ret = retained fish; Rel. = released fish.

Year	Effort Rod Days	Small (<63 cm)			Large (≥63 cm)			Total (Small + Large)			CPUE
		Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
1974	29268	7182	.	7182	61	.	61	7243	.	7243	0.25
1975	24518	6800	.	6800	55	.	55	6855	.	6855	0.28
1976	26301	6517	.	6517	64	.	64	6581	.	6581	0.25
1977	23945	6273	.	6273	32	.	32	6305	.	6305	0.26
1978	24038	6894	.	6894	77	.	77	6971	.	6971	0.29
1979	18834	5983	.	5983	30	.	30	6013	.	6013	0.32
1980	26044	8972	.	8972	132	.	132	9104	.	9104	0.35
1981	28488	10241	.	10241	122	.	122	10363	.	10363	0.36
1982	33239	10419	.	10419	96	.	96	10515	.	10515	0.32
1983	35346	8212	.	8212	177	.	177	8389	.	8389	0.24
1984	30500	10740	.	10740	22	.	22	10762	.	10762	0.35
1985	29984	8899	.	8899	*	.	*	8899	.	8899	0.30
1986	30427	9379	.	9379	*	.	*	9379	.	9379	0.31
1987	20651	5125	.	5125	*	.	*	5125	.	5125	0.25
1988	27166	7548	.	7548	*	.	*	7548	.	7548	0.28
1989	23291	5173	.	5173	*	.	*	5173	.	5173	0.22
1990	25538	7147	.	7147	*	.	*	7147	.	7147	0.28
1991	17089	2643	.	2643	*	.	*	2643	.	2643	0.15
1992	18100	3208	1732	4940	*	8	8	3208	1740	4948	0.27
1993	29280	5215	1506	6721	*	84	84	5215	1590	6805	0.23
1994	25073	4055	917	4972	*	61	61	4055	978	5033	0.20

Means, 95% Confidence Limits, N's:

84-89 $\bar{X}$	28274	8348	.	8348	.	.	.	8352	.	8352	0.30
95% CL	3855	2620	.	2620	.	.	.	2627	.	2627	0.06
N	5	5	0	5	0	0	0	5	0	5	5
86-91 $\bar{X}$	24702	6378	.	6378	.	.	.	6378	.	6378	0.26
95% CL	6192	3187	.	3187	.	.	.	3187	.	3187	0.07
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 2f. Atlantic salmon recreational fishery catch and effort data for Southwest (SFAs 12 & 13), 1974-1994. Ret. = retained fish; Rel. = released fish.

Year	Effort Rod Days	Small (<63 cm)			Large (≥63 cm)			Total (Small + Large)			CPUE
		Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
1974	30736	7847	.	7847	929	.	929	8776	.	8776	0.29
1975	33457	12513	.	12513	906	.	906	13419	.	13419	0.40
1976	33848	10680	.	10680	631	.	631	11311	.	11311	0.33
1977	25712	7270	.	7270	1097	.	1097	8367	.	8367	0.33
1978	20991	5655	.	5655	875	.	875	6530	.	6530	0.31
1979	18094	6742	.	6742	123	.	123	6865	.	6865	0.38
1980	23488	8733	.	8733	1022	.	1022	9755	.	9755	0.42
1981	25877	10360	.	10360	680	.	680	11040	.	11040	0.43
1982	28056	11121	.	11121	610	.	610	11731	.	11731	0.42
1983	28121	7004	.	7004	618	.	618	7622	.	7622	0.27
1984	25742	9693	.	9693	377	.	377	10070	.	10070	0.39
1985	23859	6399	.	6399	*	287	287	6399	287	6686	0.28
1986	29137	8284	.	8284	*	724	724	8284	724	9008	0.31
1987	23099	6847	.	6847	*	369	369	6847	369	7216	0.31
1988	27963	9630	.	9630	*	429	429	9630	429	10059	0.36
1989	21201	3734	.	3734	*	139	139	3734	139	3873	0.18
1990	24829	7508	.	7508	*	367	367	7508	367	7875	0.32
1991	23789	5832	.	5832	*	219	219	5832	219	6051	0.25
1992	24460	6078	997	7075	*	1025	1025	6078	2022	8100	0.33
1993	25883	5844	984	6828	*	754	754	5844	1738	7582	0.29
1994	22576	4225	1073	5298	*	977	977	4225	2050	6275	0.28
Means, 95% Confidence Limits, N's:											
84-89 $\bar{X}$	25167	7431	.	7431	.	390	388	7494	390	7819	0.31
95% CL	3171	2382	.	2382	.	269	203	2465	269	2515	0.07
N	6	6	0	6	0	5	6	6	5	6	6
86-91 $\bar{X}$	25003	6973	.	6973	.	375	375	6973	375	7347	0.29
95% CL	3164	2145	.	2145	.	212	212	2145	212	2307	0.06
N	6	6	0	6	0	6	6	6	6	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.

Appendix 2g. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 1, Labrador, 1974-1994. Ret. = retained fish; Rel. = released fish.

Year	Effort	Small (<63 cm)			Large (≥63 cm)			Total (Small + Large)			CPUE
	Rod Days	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
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
1994	848	293	864	1157	86	95	181	379	959	1338	1.58

Means, 95% Confidence Limits, N's:

84-89 $\bar{X}$	1116	861	.	861	157	.	157	1018	.	1018	0.91
95% CL	324	366	.	366	37	.	37	372	.	372	0.12
N	6	6	0	6	6	0	6	6	0	6	6
86-91 $\bar{X}$	1077	742	.	742	114	.	114	856	.	856	0.80
95% CL	345	499	.	499	61	.	61	552	.	552	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.

Appendix 2h. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 2, Labrador, 1974-1994. Ret. = retained fish; Rel. = released fish.

Effort		Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			CPUE
Year	Rod Days	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
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
1994	3540	1671	1785	3456	287	185	472	1958	1970	3928	1.11
Means, 95% Confidence Limits, N's:											
84-89 $\bar{X}$	2456	2018	.	2018	191	.	191	2208	.	2208	0.90
95% CL	517	637	.	637	104	.	104	737	.	737	0.15
N	6	6	0	6	6	0	6	6	0	6	6
86-91 $\bar{X}$	2746	2046	.	2046	198	.	198	2244	.	2244	0.82
95% CL	270	633	.	633	103	.	103	733	.	733	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.

Appendix 2i. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 3, insular Newfoundland, 1974-1994.  
Ret. = retained fish; Rel. = released fish.

Effort		Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			CPUE
Year	Rod Days	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
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
1994	7715	3314	1844	5158	*	404	404	3314	2248	5562	0.72
Means, 95% Confidence Limits, N's:											
84-89 $\bar{X}$	2137	1115	.	1115	.	.	.	1115	.	1115	0.52
95% CL	756	527	.	527	.	.	.	527	.	527	0.09
N	5	5	0	5	0	0	0	5	0	5	5
86-91 $\bar{X}$	2547	1260	.	1260	.	.	.	1260	.	1260	0.49
95% CL	1157	611	.	611	.	.	.	611	.	611	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 2j. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 4, insular Newfoundland, 1974-1994.  
Ret. = retained fish; Rel. = released fish.

Year	Effort Rod Days	Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			CPUE
		Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
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
1994	43242	9351	2728	12079	*	79	79	9351	2807	12158	0.28

Means, 95% Confidence Limits, N's:

84-89 $\bar{X}$	28158	9005	.	9005	.	.	.	9008	.	9008	0.32
95% CL	7876	3876	.	3876	.	.	.	3877	.	3877	0.06
N	5	5	0	5	0	0	0	5	0	5	5
86-91 $\bar{X}$	24472	6697	.	6697	.	.	.	6697	.	6697	0.27
95% CL	6573	3372	.	3372	.	.	.	3372	.	3372	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 2k. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 5, insular Newfoundland, 1974-1994.  
Ret. = retained fish; Rel. = released fish.

Effort		Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			CPUE
Year	Rod Days	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
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
1994	18000	3216	689	3905	*	52	52	3216	741	3957	0.22
Means, 95% Confidence Limits, N's:											
84-89 $\bar{X}$	10528	3165	.	3165	.	.	.	3165	.	3165	0.30
95% CL	2841	1410	.	1410	.	.	.	1410	.	1410	0.10
N	5	5	0	5	0	0	0	5	0	5	5
86-91 $\bar{X}$	8725	2820	.	2820	.	.	.	2820	.	2820	0.32
95% CL	2694	1528	.	1528	.	.	.	1528	.	1528	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 2I. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 6, insular Newfoundland, 1974-1994.  
Ret. = retained fish; Rel. = released fish.

Year	Effort Rod Days	Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			CPUE
		Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
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
1994	2429	241	21	262	*	4	4	241	25	266	0.11

Means, 95% Confidence Limits, N's:

84-89 $\bar{X}$	2884	372	.	372	.	.	.	373	.	373	0.13
95% CL	573	110	.	110	.	.	.	109	.	109	0.05
N	5	5	0	5	0	0	0	5	0	5	5
86-91 $\bar{X}$	2731	328	.	328	.	.	.	328	.	328	0.12
95% CL	849	140	.	140	.	.	.	140	.	140	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 2m. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 7, insular Newfoundland, 1974-1994.  
Ret. = retained fish; Rel. = released fish.

Year	Effort Rod Days	Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			CPUE
		Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
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
1994	1162	71	0	71	*	0	0	71	0	71	0.06

Means, 95% Confidence Limits, N's:

84-89 $\bar{X}$	1317	101	.	101	.	.	.	102	.	102	0.08
95% CL	482	28	.	28	.	.	.	28	.	28	0.03
N	5	5	0	5	0	0	0	5	0	5	5
86-91 $\bar{X}$	1008	76	.	76	.	.	.	76	.	76	0.08
95% CL	524	47	.	47	.	.	.	47	.	47	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 2n. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 8, insular Newfoundland, 1974-1994.  
Ret. = retained fish; Rel. = released fish.

Effort		Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			CPUE
Year	Rod Days	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
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
1994	265	57	1	58	*	0	0	57	1	58	0.22

Means, 95% Confidence Limits, N's:

84-89 $\bar{X}$	494	100	.	100	.	.	.	100	.	100	0.20
95% CL	197	30	.	30	.	.	.	30	.	30	0.05
N	5	5	0	5	0	0	0	5	0	5	5
86-91 $\bar{X}$	435	83	.	83	.	.	.	83	.	83	0.19
95% CL	197	57	.	57	.	.	.	57	.	57	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 2o. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 9, insular Newfoundland, 1974-1994.  
Ret. = retained fish; Rel. = released fish.

Year	Effort Rod Days	Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			CPUE
		Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
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
1994	7154	829	93	922	*	2	2	829	95	924	0.13

Means, 95% Confidence Limits, N's:

84-89 $\bar{X}$	8228	1800	.	1800	.	.	.	1801	.	1801	0.22
95% CL	1318	583	.	583	.	.	.	585	.	585	0.05
N	5	5	0	5	0	0	0	5	0	5	5
86-91 $\bar{X}$	7545	1482	.	1482	.	.	.	1482	.	1482	0.20
95% CL	1180	810	.	810	.	.	.	810	.	810	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 2p. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 10, insular Newfoundland, 1974-1994.  
Ret. = retained fish; Rel. = released fish.

Year	Effort	Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			CPUE
	Rod Days	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
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
1994	7028	946	150	1096	*	21	21	946	171	1117	0.16

Means, 95% Confidence Limits, N's:

84-89 $\bar{X}$	5908	1272	.	1272	.	.	.	1272	.	1272	0.22
95% CL	1134	318	.	318	.	.	.	319	.	319	0.03
N	5	5	0	5	0	0	0	5	0	5	5
86-91 $\bar{X}$	4806	928	.	928	.	.	.	928	.	928	0.19
95% CL	1529	592	.	592	.	.	.	592	.	592	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 2q. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 11, insular Newfoundland, 1974-1994.  
Ret. = retained fish; Rel. = released fish.

Year	Effort Rod Days	Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			CPUE
		Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
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
1994	10891	2280	674	2954	*	38	38	2280	712	2992	0.27

Means, 95% Confidence Limits, N's:

84-89 $\bar{X}$	14137	5276	.	5276	.	.	.	5279	.	5279	0.37
95% CL	1975	1845	.	1845	.	.	.	1850	.	1850	0.09
N	5	5	0	5	0	0	0	5	0	5	5
86-91 $\bar{X}$	12351	3968	.	3968	.	.	.	3968	.	3968	0.32
95% CL	3784	1897	.	1897	.	.	.	1897	.	1897	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 2r. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 12, insular Newfoundland, 1974-1994.  
Ret. = retained fish; Rel. = released fish.

Effort		Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			CPUE
Year	Rod Days	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
1974	1423	658	.	658	13	.	13	671	.	671	0.47
1975	1204	510	.	510	20	.	20	530	.	530	0.44
1976	926	297	.	297	5	.	5	302	.	302	0.33
1977	1238	558	.	558	48	.	48	606	.	606	0.49
1978	1305	366	.	366	20	.	20	386	.	386	0.30
1979	1711	733	.	733	10	.	10	743	.	743	0.43
1980	2175	820	.	820	29	.	29	849	.	849	0.39
1981	2038	1060	.	1060	17	.	17	1077	.	1077	0.53
1982	2810	1555	.	1555	15	.	15	1570	.	1570	0.56
1983	2648	667	.	667	8	.	8	675	.	675	0.25
1984	3590	1922	.	1922	68	.	68	1990	.	1990	0.55
1985	3722	1097	.	1097	*	30	30	1097	30	1127	0.30
1986	3430	938	.	938	*	33	33	938	33	971	0.28
1987	2212	829	.	829	*	27	27	829	27	856	0.39
1988	3607	1413	.	1413	*	23	23	1413	23	1436	0.40
1989	2657	560	.	560	*	10	10	560	10	570	0.21
1990	3060	856	.	856	*	30	30	856	30	886	0.29
1991	2761	644	.	644	*	15	15	644	15	659	0.24
1992	2831	639	466	1105	*	78	78	639	544	1183	0.42
1993	3362	745	155	900	*	22	22	745	177	922	0.27
1994	2853	593	137	730	*	48	48	593	185	778	0.27

Means, 95% Confidence Limits, N's:

84-89 $\bar{X}$	3203	1127	.	1127	.	25	32	1138	25	1158	0.36
95% CL	649	506	.	506	.	11	20	530	11	523	0.13
N	6	6	0	6	0	5	6	6	5	6	6
86-91 $\bar{X}$	2955	873	.	873	.	23	23	873	23	896	0.30
95% CL	543	314	.	314	.	9	9	314	9	319	0.08
N	6	6	0	6	0	6	6	6	6	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 2s. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 13, insular Newfoundland, 1974-1994.  
Ret. = retained fish; Rel. = released fish.

Year	Effort	Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			CPUE
	Rod Days	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
1974	29313	7189	.	7189	916	.	916	8105	.	8105	0.28
1975	32253	12003	.	12003	886	.	886	12889	.	12889	0.40
1976	32922	10383	.	10383	626	.	626	11009	.	11009	0.33
1977	24474	6712	.	6712	1049	.	1049	7761	.	7761	0.32
1978	19686	5289	.	5289	855	.	855	6144	.	6144	0.31
1979	16383	6009	.	6009	113	.	113	6122	.	6122	0.37
1980	21313	7913	.	7913	993	.	993	8906	.	8906	0.42
1981	23839	9300	.	9300	663	.	663	9963	.	9963	0.42
1982	25246	9566	.	9566	595	.	595	10161	.	10161	0.40
1983	25473	6337	.	6337	610	.	610	6947	.	6947	0.27
1984	22152	7771	.	7771	309	.	309	8080	.	8080	0.36
1985	20137	5302	.	5302	*	257	257	5302	257	5559	0.28
1986	25707	7346	.	7346	*	691	691	7346	691	8037	0.31
1987	20887	6018	.	6018	*	342	342	6018	342	6360	0.30
1988	24356	8217	.	8217	*	406	406	8217	406	8623	0.35
1989	18544	3174	.	3174	*	129	129	3174	129	3303	0.18
1990	21769	6652	.	6652	*	337	337	6652	337	6989	0.32
1991	21028	5188	.	5188	*	204	204	5188	204	5392	0.26
1992	21629	5439	531	5970	*	947	947	5439	1478	6917	0.32
1993	22521	5099	829	5928	*	732	732	5099	1561	6660	0.30
1994	19723	3632	936	4568	*	929	929	3632	1865	5497	0.28

Means, 95% Confidence Limits, N's:

84-89 $\bar{X}$	21964	6305	.	6305	.	365	356	6356	365	6660	0.30
95% CL	2815	1979	.	1979	.	260	198	2033	260	2117	0.06
N	6	6	0	6	0	5	6	6	5	6	6
86-91 $\bar{X}$	22049	6099	.	6099	.	352	352	6099	352	6451	0.29
95% CL	2715	1862	.	1862	.	204	204	1862	204	2022	0.06
N	6	6	0	6	0	6	6	6	6	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 2t. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 14A, insular Newfoundland, 1974-1994.  
Ret. = retained fish; Rel. = released fish.

Year	Effort Rod Days	Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			CPUE
		Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
1974	9569	3120	.	3120	113	.	113	3233	.	3233	0.34
1975	9259	4818	.	4818	90	.	90	4908	.	4908	0.53
1976	17146	7381	.	7381	100	.	100	7481	.	7481	0.44
1977	17067	5707	.	5707	472	.	472	6179	.	6179	0.36
1978	12069	3241	.	3241	72	.	72	3313	.	3313	0.27
1979	14285	6578	.	6578	59	.	59	6637	.	6637	0.46
1980	14219	3743	.	3743	180	.	180	3923	.	3923	0.28
1981	18718	5882	.	5882	137	.	137	6019	.	6019	0.32
1982	16113	4763	.	4763	107	.	107	4870	.	4870	0.30
1983	16020	3800	.	3800	69	.	69	3869	.	3869	0.24
1984	16497	4807	.	4807	87	.	87	4894	.	4894	0.30
1985	13407	3678	.	3678	*	29	29	3678	29	3707	0.28
1986	15465	5047	.	5047	*	102	102	5047	102	5149	0.33
1987	15061	4620	.	4620	*	41	41	4620	41	4661	0.31
1988	18968	6251	.	6251	*	171	171	6251	171	6422	0.34
1989	16223	3203	.	3203	*	44	44	3203	44	3247	0.20
1990	16413	5050	.	5050	*	136	136	5050	136	5186	0.32
1991	13850	3565	.	3565	*	117	117	3565	117	3682	0.27
1992	17117	4778	531	5309	*	369	369	4778	900	5678	0.33
1993	17858	3905	2002	5907	*	376	376	3905	2378	6283	0.35
1994	21046	4429	1097	5526	*	475	475	4429	1572	6001	0.29

Means, 95% Confidence Limits, N's:

84-89 $\bar{X}$	15937	4601	.	4601	.	77	79	4616	77	4680	0.29
95% CL	1934	1128	.	1128	.	74	56	1132	74	1178	0.06
N	6	6	0	6	0	5	6	6	5	6	6
86-91 $\bar{X}$	15997	4623	.	4623	.	102	102	4623	102	4725	0.30
95% CL	1807	1164	.	1164	.	54	54	1164	54	1201	0.06
N	6	6	0	6	0	6	6	6	6	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 2u. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 14B, Labrador, 1974-1994.  
Ret. = retained fish; Rel. = released fish.

Year	Effort Rod Days	Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			CPUE
		Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
1974	2713	740	.	740	291	.	291	1031	.	1031	0.38
1975	2180	1069	.	1069	154	.	154	1223	.	1223	0.56
1976	3896	2498	.	2498	310	.	310	2808	.	2808	0.72
1977	3918	1662	.	1662	593	.	593	2255	.	2255	0.58
1978	2413	573	.	573	183	.	183	756	.	756	0.31
1979	2149	901	.	901	119	.	119	1020	.	1020	0.47
1980	2476	938	.	938	337	.	337	1275	.	1275	0.51
1981	3353	1698	.	1698	220	.	220	1918	.	1918	0.57
1982	3279	1271	.	1271	80	.	80	1351	.	1351	0.41
1983	3529	2000	.	2000	130	.	130	2130	.	2130	0.60
1984	3997	987	.	987	185	.	185	1172	.	1172	0.29
1985	3664	1092	.	1092	100	.	100	1192	.	1192	0.33
1986	4643	1071	.	1071	184	.	184	1255	.	1255	0.27
1987	4993	1887	.	1887	215	.	215	2102	.	2102	0.42
1988	5707	1592	.	1592	251	.	251	1843	.	1843	0.32
1989	4895	1173	.	1173	53	.	53	1226	.	1226	0.25
1990	5075	1066	.	1066	98	.	98	1164	.	1164	0.23
1991	4017	1152	.	1152	49	.	49	1201	.	1201	0.30
1992	4630	856	64	920	238	.	238	1094	64	1158	0.25
1993	5296	1047	414	1461	242	30	272	1289	444	1733	0.33
1994	5909	693	86	779	101	11	112	794	97	891	0.15

Means, 95% Confidence Limits, N's:

84-89 $\bar{X}$	4650	1300	.	1300	165	.	165	1465	.	1465	0.32
95% CL	770	375	.	375	78	.	78	423	.	423	0.07
N	6	6	0	6	6	0	6	6	0	6	6
86-91 $\bar{X}$	4888	1324	.	1324	142	.	142	1465	.	1465	0.30
95% CL	582	355	.	355	91	.	91	423	.	423	0.07
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.

### Appendix 3

#### Sea-Survival-Rates for Campbellton River Salmon

##### Sea survival rates for 1993 smolt class

Smolt count - 1993	31,577
Adult count (small only) - 1994	2,857
Sea survival rate - 1993	$2,857 / 31,577 = 9.05\%$

##### Previous spawners:

Kelts (downstream) - 1994	2,838
Tagged kelts (downstream) - 1994	942
Ratio untagged:tagged (total)	$2,838 / 942 = 3.01$
Overwintering survival - 1993/94	$2,838 / 4,146 = 68.5\%$

The following table is a summary of the estimated numbers of previous spawners in the small and large categories:

	UPSTREAM MIGRANTS			% Previous spawners
	Tagged	Est. previous spawners	Total '94	
Small	190	572	2857	20.0
Large	51	154	191	80.6
Total	241	726	3048	23.8

##### Sea survival rates with correction for previous spawners:

Smolt count - 93	31,577
Upstream grilse - 94	2,285 (2,857-572)
Corrected sea survival - 93	$2,285 / 31,577 = 7.2\%$
Previous spawners survival 3 mo.	$726 / 2,838 = 25.6\%$

Appendix 4. Newfoundland Region summary of the percent egg deposition requirement attained for various rivers during the five-year period prior to the commercial salmon fishery moratorium (1987-91) and the three years during the moratorium (1992-94).

SFA	River	1987	1988	1989	1990	1991	1992	1993	1994
2	Sandhill								54-78
4	Exploits:								
	-Lower	65	61	48	47	35	79	109	93
	-Middle	9	12	14	12	14	20	23	27
	-Upper	97	125	119	88	0	2	6	7
	Gander			35	36	33	112	136	89
	Campbellton							274	208
5	Terra Nova	15	30	20	20	16	29	53	31
	Middle Brook	90	66	50	75	51	142	218	171
9	Biscay Bay	119	127	89	128	39	131	90	133
	Rocky	23	36	20	47	26	32	41	30
10	Northeast Placentia	152	209	277	251	161	440	418	343
11	Conne	214	159	103	112	51	51	61	40
	Little*	51	30	61	105	47	54	82	38
13	Pinchgut (Harry's)			137	383	108	42	146	182
	Highlands							52	86
	Humber	61	80	24	60	27	117	96	40
	Flat Bay								20
14 A	Lomond	56	70				121	118	143
	Torrent	201	266	225	221	176	314	538	530
	Western Arm Brook	103	72	144	114	68	151	288	292
14 B	Forteau								62-96

\* Colonization program at Little River. Eggs removed from most adult returns, incubated, and fry subsequently stocked into the system. Target achieved includes natural egg deposition and fry stocking egg equivalents.