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Status of Atlantic Salmon (Salmo salar L.) Stocks of the Newfoundland Region, 1992

by

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Abstract

In 1992, a moratorium was placed on the commercial Atlantic salmon fishery in insular Newfoundland while Labrador was exempt from this major management change. A moratorium was also placed on the Northern Cod Fishery in early July affecting Salmon Fishing Areas (SFAs) 1-9, which should have eliminated by-catch of Atlantic salmon in cod fishing gear. Quotas were introduced in the recreational fishery in each SFA for the first time in 1992. In Labrador, commercial catches of both small and large salmon in 1992 were below average and for the third year in a row, quotas were not caught. The retained catch of grilse in the Labrador recreational fishery, up to the time quotas were taken, increased over 1991 but remained below average, while the catch of large salmon increased over 1991 and the means (catches of both components in 1991 were among the lowest on record). The abundance of both small and large salmon in Labrador in 1992 appears to have been low. In insular Newfoundland, recreational catches of grilse, up to the time quotas were caught, and counts at counting facilities increased over 1991 (catches and counts in 1991 were among the lowest on record). Recreational catches however were below average in all SFAs except 3, 4, and 5; counts of grilse were above average along the east and northeast coasts but below average along the south coast. At most counting facilities, counts of grilse similar to or greater than those observed for 1992 have occurred in pre-salmon moratorium years. Low marine survival could have contributed to low escapements of grilse in 1992. Smolt-to-adult survival in two south coast rivers in 1992 was lower than for pre-salmon moratorium years. Environmental conditions at sea in the spring and early summer of 1991 were the most severe on record which suggests that heavy mortality could have occurred at the smolt/post-smolt stage. Counts of large salmon in insular Newfoundland in 1992 increased over 1991 at most facilities; counts were above average at all facilities except those along the south coast. At most facilities, counts of large salmon greater than those observed in 1992 were encountered in pre-salmon morartorium years.

Résumé

En 1992, on a décrété un moratoire sur la pêche commerciale du saumon de l'Atlantique dans l'île de Terre-Neuve (Le Labrador n'était donc pas visé par cette nouvelle mesure de gestion importante). À compter du début de juillet, la pêche de la morue du nord a fait elle aussi l'objet d'un moratoire. Celui-ci touchait les zones de pêche du saumon (ZPS) 1 à 9, puisqu'on pouvait s'attendre à ce qu'il élimine les risques de prises accidentelles de saumon de l'Atlantique par les engins de pêche de la morue. Des quotas ont été imposés aux pêcheurs sportifs de chaque ZPS pour la première fois en 1992. Au Labrador, en 1992, les prises commerciales de petit et de gros saumon ont été inférieures à la moyenne et pour la troisième année de suite, la totalité des quotas n'a pas été capturée. Dans cette partie de la province, jusqu'à la capture de la totalité des quotas les prises de madeleineaux gardées par les pêcheurs ont augmenté par rapport à 1991, mais sont restées inférieures à la moyenne, tandis que les prises de gros saumon ont elles aussi augmenté par rapport à l'année précédente et aux moyennes (en 1991, les prises de madeleineaux et de gros saumon figuraient parmi les plus basses de toutes). Il semble que l'abondance de petit et de gros saumon au Labrador en 1992 ait été faible. En revanche, dans l'île de Terre-Neuve, la quantité de madeleineaux pris par les pêcheurs sportifs jusqu'à la capture de la totalité des quotas et les chiffres obtenus aux barrières de dénombrement ont augmenté par rapport à 1991 (année où ils étaient parmi les plus bas). Les prises des pêcheurs sportifs ont toutefois été inférieures à la moyenne dans toutes les zones de pêche du saumon, sauf dans les ZPS 3, 4 et 5; les dénombrements de madeleineaux se sont situés au-dessus de la moyenne le long des côtes est et nord-est, mais en dessous de celle-ci le long de la côte sud. Le nombre de madeleineaux recensé à la plupart des barrières de dénombrement en 1992 était supérieur ou égal à ceux des années qui ont précédé le moratoire. Un faible taux de survie en mer a pu contribuer à une baisse des échappées de madeleineaux en 1992. La survie du stade de saumoneau à celui d'adulte dans deux rivières de la côte sud était en recul par rapport aux années ayant précédé le moratoire. Il se peut que les conditions environnementales extrêmement rigoureuses (les pires à ce jour) ayant sévi en mer au printemps et au début de l'été 1991 aient occasionné une forte mortalité au stade de saumoneau et au stade suivant. Le nombre de gros saumons recensés à la plupart des barrières de dénombrement de l'île de Terre-Neuve en 1992 a augmenté par rapport à 1991; les dénombrements étaient supérieurs à la moyenne partout, sauf le long de la côte sud. Précisons, toutefois, que les dénombrements de gros saumon était plus élevés dans la plupart des cas dans les années qui ont précédé le moratoire.

Introduction

This paper presents the status of Atlantic salmon stocks of the Newfoundland Region (Fig. 1) in 1992. Catch and effort data for the commercial and recreational fisheries and counts of salmon at fishways (Newfoundland) are examined in relation to historical data and the 1992 Management Plan.

The most significant change to date in the management of Atlantic salmon in the Newfoundland Region occurred in 1992. A five-year moratorium was placed on the commercial fishery in the insular Newfoundland portion of the region 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 quotas (t) for each Salmon Fishing Area (SFA) in Labrador since they were first introduced in 1990 were as follows:

SFA	1990	1991	1992
1*	80	80	80
2	200	200 (2A=65; 2B=135)	180 (2A=60; 2B=120)

*Allowance catch

Otherwise, regulations were the same as in 1991. 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.

Quotas were introduced in the recreational fishery in each SFA for the first time in 1992. The quotas were as follows:

SFA	Quota (No. of fish)
1	442
2	2160
3	1300
4	4800
5	2000
6	200
7	40
8	Closed
9	600
10	200
11	1700

The quota was assigned for each SFA as a whole and not administered on an individual river basis, the only exception being Conne River in SFA 11. The season bag limit was reduced from ten to eight fish. After the quota was caught in each SFA, hook and release fishing only was permitted. Otherwise, regulations were the same as in 1991. Specifically, there was a mandatory release of large salmon in insular Newfoundland but not in Labrador. The maximum number of fish that could be retained per day was two and the maximum number that could be hooked and released was four. Angling ceased for the day when one or the other limit was attained. The mandatory carcass tagging program remained in effect. On a river specific basis, recreational catch in Conne River was limited to a quota of 330 fish.

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. (1992a). Effort in the commercial fishery was presented as the number of gear units (91.5 m of gill net or salmon trap) licensed to prosecute the fishery. Recreational fishing effort was presented as rod days (defined as any day or part thereof on which an angler fishes).

Data collection, the calculation of mean weights of small and large salmon in the commercial fishery, the partitioning of unsized catch into the small and large categories, and the estimation of numbers of small and large salmon followed procedures outlined in Ash and O'Connell (1987a,b).

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

As described last year (O'Connell et al. 1992a), an index of fishing effort is available for the commercial Atlantic salmon fishery at Nain, Labrador (SFA 1), and is defined as person-weeks fished (Dempson and Shears 1992). Catch and effort data from four subareas (Dog Island, Black Island, Kiglapaits, and Cutthroat), which contribute 92% of the Nain Fishing Region total catch, were analyzed using a multiplicative model (Gavaris 1980) to account for differences in catch rates among year, week, and subarea. The regression of ln catch rate for the period 1977 to 1992 was initially fitted using SAS Reg procedures (SAS 1985) to avail of various diagnostic techniques. Standardized catch rates and effort were obtained using the STANDAR (APL) version of the multiplicative analysis program.

Results and Discussion

THE LABRADOR COMMERCIAL FISHERY

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

The catch of small salmon in SFA 1 in 1992 increased over 1991 (150%) but decreased from the 1984-89 (74%) and 1986-91 (66%) means (Table 1). The catch of large salmon in SFA 1 increased over 1991 (220%) but declined from both means (69 and 62%, respectively). Catches of both small and large salmon were below the lower limit of the 95% confidence interval of the 1984-89 mean but similar to the lower limit of the 1986-91 mean.

In SFA 2 (Table 2), the catch of small salmon in 1992 decreased from 1991 (22%) and the 1984-89 (64%) and 1986-91 (64%) means (below the lower limit of the 95% confidence interval of each mean). The catch of large salmon increased over 1991 (161%) but remained below the means (41 and 35%, respectively); the catch was just below the lower limit of the 95% confidence interval of the 1984-89 mean and within the limits of the 1986-91 mean.

For the entire Labrador portion of the Newfoundland Region (Table 3), there was a decline in the catch of small salmon from 1991 (14%) and the 1984-89 (65%) and 1986-91 (64%) means (below the lower limit of the 95% confidence interval of both means). The catch of large salmon increased over 1991 (167%) but decreased from the means (47 and 41%, respectively); catch was below the lower limit of the 95% confidence interval of the 1984-89 mean but within the limits of the 1986-91 mean.

Nain Fishing Region

Landings of Atlantic salmon from the Nain fishing region, SFA 1, are available since 1977 (Dempson and Shears 1992). Catches have ranged from a high of 60 t in 1980 to a low of 3 t in 1991 and 1992. Over the 15 year period 1977-91, the Nain 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 ($r^2 = 0.63$, $P = 0.004$, $N = 15$). While salmon landings in areas to the south of Nain (Makkovik, Postville, and Hopedale) increased to over 20 t in 1992 (unofficial figure) from about 4 t in 1991, landings at Nain were consistent with 1991 at only 3 t. Environmental conditions at Nain were also consistent with 1991 although ice conditions in southern Labrador were much improved over 1991.

The regression of ln catch rate for the period 1977-92 explained 51% of the variation in the data (P = 0.0001) (Table 4). Highest catch rates occurred in week 30 (July 23-29) followed by weeks 31 and 32 (July 30-August 12). The Cutthroat subarea had the highest catch rates over the time series examined. Low catch in 1991 was associated with the lowest standardized effort recorded (Table 5). In 1992, effort was again low but catch rate dropped suggesting an overall low abundance of salmon along this area of the coast. As indicated above, environmental conditions at Nain in 1992 were comparable with 1991. In general, the results of the multiplicative analysis suggest that abundance of salmon at Nain has been quite variable over time (Fig. 2.) and, with the exception of 1988 and 1989, in a general decline. Patterns observed in recent years may be a reflection of poor conditions conducive for fishing corresponding to an overall low effort directed to salmon.

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

Atlantic salmon harvested in the Labrador commercial fishery are believed to be primarily of Labrador origin (Pippy 1982). Data from Reddin and Porter (1988) indicated that the river age of large salmon in SFAs 1 and 2 is primarily > 3 years. The average river age for salmon stocks in the northwest Atlantic increases from south to north (Templeman 1967; Lear and Misra 1978). Large salmon with river ages > 3 years are principally from stocks in Labrador and the Quebec North Shore (Reddin and Porter 1988).

Landings of large salmon in Labrador (SFAs 1+2) in year t were significantly correlated ($r^2 = 0.63$; P = 0.0001) with landings at West Greenland of North American-origin small salmon with river age > 3 years in year t-1 (Fig. 3). The time series of landings, 1973-91, for small and large salmon in SFAs 1 + 2 and North American-origin small salmon with a river age of > 3 years at West Greenland were all tri-modal with declining trends (Fig. 4). The slope of the declining trend for the commercial catch of small salmon was not significant ($r^2 = 0.20$; P = 0.06) (Fig. 4a); however, there has been a substantial decline in landings since 1981. The relationship between large salmon in SFAs 1+2 and year was significant ($r^2 = 0.63$; P = 0.0001) (Fig 4b) as was the relationship between North American-origin small salmon with river age > 3 years and time ($r^2 = 0.39$; P = 0.001) (Fig. 4c).

The significant relationship between the catches of large salmon in Labrador and the catches at West Greenland of North American-origin small salmon with river age > 3 years, indicates

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

RECREATIONAL FISHERY AND COUNTS AT COUNTING FACILITIES

Recreational catches of grilse and large salmon, effort, and catch per unit of effort (CPUE) for Labrador, insular Newfoundland, and the entire region are presented in Appendix 1a-c. Data for each individual SFA are shown in Appendix 1d-n. These figures represent retained fish for the entire angling season for all years prior to 1992. As stated earlier, the recreational fishery for retention of grilse in 1992 closed when the quota for each SFA was caught. Closure dates for each SFA are presented in Table 6. The values in the Appendices labelled 'After Quota' are estimates of the number of fish hooked and released **after** the quota was caught.

The data presented in Appendix 1a-n are useful as a means of assessing the effectiveness of quotas in limiting catch. Since the retention of grilse in 1992 was only permitted for a portion of the angling season, this information cannot be used for comparisons with previous years in the context of indices of abundance. However, such comparisons are possible using cumulative catch, effort, and catch per unit of effort (CPUE) up to the time the quota was caught in each SFA (Table 6). In Table 7, catch, effort, and CPUE to date of closure of the fishery in 1992 is expressed as percentage change in relation to 1991 and the 1984-89 and 1986-91 means. For insular Newfoundland, 1987 is not included in the means because in that year drought conditions resulted in the closure of most rivers to angling for the greater part of the angling season. Tables 6 and 7 will be used in the treatment to follow.

Labrador

The number of grilse retained in Labrador (1882) (Table 6) increased over 1991 (192%) but remained below the 1984-89 (26%) and 1986-91 (22%) means (Table 7); the catch was within the limits of the 95% confidence interval of each mean. The catch of large salmon (543) improved over 1991 and both means (1451, 74, and 96%, respectively), exceeding the upper limit of the 95% confidence interval of each mean. Effort increased marginally over 1991 and the means. CPUE increased over 1991 but remained below the means. The total numbers of grilse and large salmon retained under quota in Labrador in 1992 surpassed those of 1991 when catch was unrestricted.

Insular Newfoundland

In insular Newfoundland, the number of grilse retained (12271) increased over 1991 (186%), decreased slightly from the 1984-89 mean (6%), and improved over the 1986-91 mean (17%); the catch was within the limits of the 95% confidence interval of each mean. Effort and CPUE increased over 1991 with only marginal changes relative to the means. As in Labrador, the total catch of grilse under quota in 1992 was better than in 1991 when no restrictions applied.

Analysis by SFA

Labrador

SFA 1: The catch of grilse in 1992 increased over 1991 but remained below the means (below the lower limit of the 95% confidence interval of each mean). The catch of large salmon increased over 1991 and both means (exceeded the upper limit of the 95% confidence interval of each mean). Effort increased over 1991 but was similar to the means; CPUE increased over 1991 but decreased from the means.

SFA 2: The catch of grilse increased over 1991 but remained average (within the limits of the 95% confidence interval of each mean). The catch of large salmon showed an overall improvement, being similar to the upper limit of the 95% confidence interval of each mean. Effort increased over 1991 and both means while for CPUE there was an increase over 1991 with a decline from the means.

Insular Newfoundland

SFA 3: The catch of grilse and effort expended increased over 1991 and both means; catch exceeded the upper limit of the 95% confidence interval of each mean. CPUE increased over 1991, was similar to the 1984-89 mean, and increased over the 1986-91 mean.

SFA 4: The catch of grilse increased over 1991 and the 1986-91 mean and was similar to the 1984-89 mean (within the limits of the 95% confidence interval of each mean). Effort increased over 1991, declined from the 1984-89 mean and was similar to the 1986-91 mean; CPUE increased over 1991 and both means.

Counts of grilse (Fig. 5 and Table 8) and large salmon (Fig. 6 and Table 9) are available for fishways located in Exploits River (Bishop's Falls and Great Rattling Brook) and Salmon Brook (Gander River) and a counting fence installed just above head of tide in the main stem of Gander River. Table 10

shows counts in 1991 expressed as percentage change in relation to 1991 and the 1984-89 and 1986-91 means. Counts of grilse at Bishop's Falls on the main stem of the Exploits River and at Great Rattling Brook tributary in 1992 increased over 1991 and the means with the increase over the 1984-89 mean being the less pronounced. The count of grilse at the Gander River counting fence increased markedly over previous years. This count however was partial in that the installation of the counting fence was delayed until July 1 as a result of high water conditions. An estimated 1020 grilse entered the river prior to completion of the fence (not included in the value presented in Table 8). The count of grilse at the Salmon Brook fishway increased over 1991 and the 1986-91 mean and was similar to the 1984-89 mean. Counts of large salmon increased over 1991 and both means at all counting facilities. An estimated 304 large salmon entered the Gander River prior to counting fence installation (not included in value in Table 9).

SFA 5: The catch of grilse and effort expenditure increased over 1991 and the means (catch was within the limits of the 95% confidence interval of each mean). CPUE increased over 1991 and the 1984-89 mean but remained the same as the 1986-91 mean.

Fishways in SFA 5 are located in Middle Brook and Terra Nova River (upper and lower). Counts of grilse (Fig. 7 and Table 8) at these fishways increased over 1991 and the means with the changes from the 1984-89 mean being the least pronounced (Table 10). Counts of large salmon (Fig. 8 and Table 9) increased over 1991 and both means at all fishways (Table 10).

SFA 6: The catch of grilse increased over 1991, decreased from the 1984-89 mean, and was similar to the 1986-91 mean (within the limits of the 95% confidence interval of each mean). Effort and CPUE increased over 1991 and declined marginally from the means.

SFA 7: Grilse catch increased over 1991 but was below the means; the catch was below the lower limit of the 95% confidence interval of the 1984-89 mean and within the limits of the 1986-91 mean. Effort increased over 1991 and both means while CPUE increased over 1991 but decreased from the means.

SFA 8: This area was closed to angling in 1992.

SFA 9: The catch of grilse increased over 1991 but was below both means (similar to the lower limit of the 95% confidence interval of the 1984-89 mean and within the limits of the 1986-91 mean). Effort was similar to 1991 and the means; CPUE increased over 1991 but decreased from the means.

A number of counting fences (Biscay Bay River, Northeast Brook, Trepassey, and Colinet River) and a fishway (Rocky River) have been operated in SFA 9 over the years. The count of grilse (Fig. 9 and Table 8) in Biscay Bay River increased over 1991 but decreased from the means (Table 10). The number of grilse entering Northeast Brook decreased from 1991 and both means. In Colinet River the count improved marginally over 1991 but remained below the means. Rocky River showed a marginal improvement over 1991, an increase over the 1984-89 mean, and remained similar to the 1986-91 mean. Numbers of large salmon (Fig. 10 and Table 9) entering Colinet and Rocky rivers increased over 1991 and both means with the increase for the latter river being the most pronounced (Table 10). The number of large salmon in Biscay River increased over 1991 but decreased from the means. In Northeast Brook there was a decline from 1991 and both means. It should be noted that the counts of grilse and large salmon for Biscay Bay River are partial due to a counting fence washout in early July.

SFA 10: The catch of grilse, effort, and CPUE decreased from 1991 and both means. Catch was similar to the lower limit of the 95% confidence interval of the 1984-89 mean but within the limits of the 1986-91 mean.

Counts of grilse (Fig. 11 and Table 8) and large salmon (Fig. 12 and Table 9) at the Northeast River, Placentia fishway increased over 1991 and both means (Table 10).

SFA 11: The catch of grilse increased over 1991, decreased from the 1984-89 mean, and remained similar to the 1986-91 mean (within the limits of the 95% confidence interval of each mean). Effort increased over 1991 but was below the means. CPUE increased over 1991, was similar to the 1984-89 mean, and increased marginally over the 1986-91 mean.

The number of grilse (Fig. 13 and Table 8) at the Grand Bank Brook fishway increased over 1991 and decreased from the means (Table 10). The count in Conne River was similar to 1991 but below the means. The count of large salmon (Fig. 14 and Table 9) in Grand Bank Brook increased over 1991 and the means while that of Conne River increased over 1991 but decreased from the means (Table 10).

Comments and Conclusions

The 1984-89 mean used above for comparisons corresponds to years under major management changes in the commercial fishery in the Newfoundland Region (see O'Connell et al. 1992b). 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.

1992a). The mix of management measures in effect during 1984-89 on the one hand and the imposition of commercial quotas in 1990 and 1991 on the other, should be kept in mind when making evaluations based on the more recent 1986-91 mean. In 1992, in addition to the closure of the commercial Atlantic salmon fishery, a moratorium on the Northern Cod Fishery was implemented in early July which should have resulted in the elimination by-catch in cod fishing gear in SFAs 1-9.

In Labrador, for the third year in a row, the quota was not caught in the commercial fishery. In 1992, 58% of the quota was taken which compares to 64% in 1990 and 31% in 1991. In 1992, it is possible that fish normally taken in the commercial fishery in SFA 3 and to a lesser extent in SFAs 4-7, contributed to catches in Labrador. In the past Labrador-origin Atlantic salmon have been intercepted in these SFAs. While the recreational catch of grilse in 1992 improved substantially over 1991 it declined in relation to the means. It should be noted however that the catch in 1991 was one of the lowest on record. The low catch of small salmon in the commercial fishery coupled with less than average catches of grilse in the recreational fishery suggest abundance was low in 1992. The commercial catch of large salmon remained low in 1992 although an improvement was noted in the recreational fishery. The magnitude of catch in the commercial fishery however suggests that the overall abundance of large salmon in Labrador was low in 1992. The analysis of catch rates presented above corroborates the conclusions of low abundance as does the analysis of trends in the catches of large salmon in Labrador and small salmon at West Greenland with a river age > 3 years.

In insular Newfoundland, recreational catches of grilse up to the time quotas for retained fish were reached and counts at fishways increased over 1991 (catches and counts in 1991 were among the lowest on record). With respect to the means, catches of grilse decreased in all SFAs except 3, 4, and 5 while counts of grilse increased along the northeast and east coasts but decreased along the south coast. At most counting facilities, it is evident that counts of grilse similar to or greater than those observed in 1992 have occurred in pre-salmon moratorium years. Smolt-to-adult survival back to the river in 1992 for Northeast Brook, Trepassey (SFA 10) and Conne River (SFA 11) was lower than for pre-salmon moratorium years (Table 11), suggesting that heavy natural mortality occurred at sea. 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. Environmental conditions at sea in the spring and early summer of 1991 were the most severe

on record which suggests that heavy mortality could have occurred at the smolt/post-smolt stage (Narayanan et al. 1993). Given this, had there been a commercial fishery in 1992, runs of grilse probably could have been as low or lower than observed in 1991.

Except for Northeast Brook, Trepassey, counts of large salmon increased over 1991; in relation to the means, increases occurred for all rivers except Biscay Bay River (SFA 9), Northeast Brook, Trepassey, and Conne River. At most counting facilities, counts of large salmon similar to or greater than those of 1992 have occurred in pre-salmon moratorium years. Most of the fish classified as large salmon in rivers in the insular Newfoundland portion of the Newfoundland Region are repeat (successive) spawning grilse. The low escepements of large salmon in 1992 therefore could be related to low escapements of grilse in 1991.

Angling catches up to the time the quota was caught in each SFA used in terms of indices of abundance should be viewed with caution. There were differences among SFAs in the times quotas were caught (e.g., July 4 in SFA 10, July 24 in SFAs 3 and 4, August 28 in SFA 1). Of particlar concern are differences in the annual timing of runs into rivers which could confound historical comparisons, for example, notable delays in adult migration occurred in 1991 (Dempson et al. 1992).

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References

Anon. 1991. Report of the working group on North Atlantic salmon. ICES C.M. 1991/Assess:12. 157 p.

Ash, E.G.M., and M. F. O'Connell. 1987a. Atlantic salmon fishery in Newfoundland and Labrador, commercial and recreational, 1984. Can. Data Rep. Fish. Aquat. Sci. 658: v + 294 p.

Ash, E.G.M., and M. F. O'Connell. 1987b. Atlantic salmon fishery in Newfoundland and Labrador, commercial and recreational, 1985. Can. Data Rep. Fish. Aquat. Sci. 672: v + 284 p.

Cochran, W. G. 1977. Sampling techniques. John Wiley & Sons, Inc. 428 p.

Dempson, J. B., and M. Shears. 1992. Summary of catch statistics by sub-area and assessment unit for the northern Labrador Arctic charr and Atlantic salmon fisheries in 1990. CAFSAC Res. Doc. 91/30. 29 p.

Dempson, J. B., D. G. Reddin, M. F. O'Connell, and T. R. Porter. 1992. Methods for in-season evaluation of salmon abundance. CAFSAC Res. Doc. 92/8. 11 p.

Gavaris, S. 1980. Use of the multiplicative model to estimate catch rate and effort from commercial data. Can. J. Fish. Aquat. Sci. 37: 2272-2275.

Lear, W. H., and R. K. Misra. 1978. Clinal variation in scale characters of Atlantic salmon (Salmo salar) based on discriminant function analysis. J. Fish. Res. Board Can. 35:43-47.

Narayanan, S., J. Carscadden, J. B. Dempson, M. F. O'Connell, S. Prinsberg, D. G. Reddin, and N. Shackall. 1993. Marine climate off Newfoundland and its influence on salmon and capelin. Can. Spec. Publ. Fish. Aquat. Sci. In Press.

O'Connell, M. F., J. B. Dempson, T. R. Porter, D. G. Reddin, E.G.M. Ash, and N. M. Cochrane. 1992a. Status of Atlantic

salmon (Salmo salar L.) stocks of the Newfoundland Region. CAFSAC Res. Doc. 92/22. 56 p.

O'Connell, M. F., J. B. Dempson, and D. G. Reddin. 1992b. Evaluation of the impacts of major management changes in the the Atlantic salmon (Salmo salar L.) fisheries of Newfoundland and Labrador, Canada, 1984-1988. ICES J. mar. Sci.: 49-69.

Pippy, J. (Chairman) 1982. Report of the working group on the interception of mainland salmon in Newfoundland. Can. MS Rep. Fish. Aquat.Sci. 1654: x + 196 p.

Reddin, D. G., and T. R. Porter. 1988. Harvest estimates of MSW salmon with river age of three years and younger. ICES C.M. 1988/M:12. 14 p.

SAS Institute. 1985. SAS user's guide: statistics, version 5, edition. SAS Institute Inc., Cary, North Carolina.

Templeman, W. 1967. Atlantic salmon from the Labrador Sea and off West Greenland, taken during A. T. Cameron cruise, July -August 1965. ICNAF Res. Bull. 4: 4-40.

Table 1. Summary of Atlantic salmon commercial catch data for Salmon Fishing Area 1, 1974-1992. Weight in metric tonnes.

SALMON FISHING AREA 1

YEAR	SMALL WEIGHT	SMALL NUMBER	LARGE WEIGHT	LARGE NUMBER	TOTAL WEIGHT	TOTAL NUMBER	PERCENT SMALL(W)	PERCENT SMALL(N)
1974	12	6211	35	7113	47	13324	25.53	46.62
1975	42	22105	76	17603	118	39708	35.59	55.67
1976	30	14124	139	30882	169	45006	17.75	31.38
1977	25	12363	98	20046	123	32409	20.33	38.15
1978	28	14530	124	26321	151	40851	18.54	35.57
1979	16	7419	72	16444	88	23863	18.18	31.09
1980	41	18587	112	22337	153	40924	26.80	45.42
1981	20	9616	123	24853	143	34469	13.99	27.90
1982	18	9174	66	14006	84	23180	21.43	39.58
1983	20	9907	61	13239	81	23146	24.69	42.80
1984	16	7683	32	6832	48	14515	33.33	52.93
1985	21	11054	51	11349	72	22403	29.17	49.34
1986	24	11794	65	12821	89	24615	26.97	47.91
1987	12	6248	62	13080	75	19328	16.00	32.33
1988	22	11682	42	9020	65	20702	33.85	56.43
1989	20	10041	56	12497	76	22538	26.32	44.55
1990	8	4486	22	4468	30	8954	26.67	50.10
1991	2	919	5	1034	7	1953	28.57	47.06
1992	5	2574	16	3547	20	6121	25.00	42.05
MEANS,STANDARD DEVIATIONS AND CONFIDENCE INTERVALS (1984-1989):								
MEAN:	19.17	9750.33	51.33	10933.17	70.83	20683.50	*27.06	*47.14
S.D.:	4.40	2290.51	12.52	2500.84	13.64	3513.99	* 2.58	* 3.21
95% LCL:	14.55	7346.20	38.20	8308.27	56.51	16995.19	*22.01	*40.85
95% UCL:	23.79	12154.47	64.47	13558.07	85.15	24371.81	*32.11	*53.43
MEANS,STANDARD DEVIATIONS AND CONFIDENCE INTERVALS (1986-1991):								
MEAN:	14.67	7528.33	42.00	8820.00	57.00	16348.33	*25.73	*46.05
S.D.:	8.73	4389.55	24.06	5045.35	31.63	8903.76	* 2.91	* 3.87
95% LCL:	5.50	2921.04	16.75	3524.37	23.80	7002.89	*20.03	*38.47
95% UCL:	23.83	12135.63	67.25	14115.63	90.20	25693.77	*31.43	*53.62

NOTE: FLAGGED VALUES INDICATE CALCULATIONS OBTAINED USING RATIO ESTIMATORS

Table 2. Summary of Atlantic salmon commercial catch data for Salmon Fishing Area 2, 1974-1992. Weight in metric tonnes.

SALMON FISHING AREA 2

YEAR	SMALL WEIGHT	SMALL NUMBER	LARGE WEIGHT	LARGE NUMBER	TOTAL WEIGHT	TOTAL NUMBER	PERCENT SMALL(W)	PERCENT SMALL(N)
1974	82	40782	489	99789	570	140571	14.39	29.01
1975	134	70392	353	82166	487	152558	27.52	46.14
1976	107	50933	384	85469	492	136402	21.75	37.34
1977	92	45972	383	78270	476	124242	19.33	37.00
1978	28	15100	251	53437	279	68537	10.04	22.03
1979	65	31101	141	31920	206	63021	31.55	49.35
1980	168	76399	467	93480	635	169879	26.46	44.97
1981	204	98406	415	79875	620	178281	32.90	55.20
1982	126	62896	296	63271	422	126167	29.86	49.85
1983	71	36242	178	39484	249	75726	28.51	47.86
1984	32	15486	138	30152	169	45638	18.93	33.93
1985	54	28845	85	18692	139	47537	38.85	60.68
1986	102	51306	206	40402	308	91708	33.12	55.94
1987	143	71817	265	54976	407	126793	35.14	56.64
1988	122	64340	170	35987	292	100327	41.78	64.13
1989	75	37392	138	30600	213	67992	35.21	54.99
1990	51	24949	99	20161	149	45110	34.23	55.31
1991	41	20546	38	8014	79	28560	51.90	71.94
1992	32	16289	99	20292	132	36581	24.24	44.53
MEANS,STANDARD DEVIATIONS AND CONFIDENCE INTERVALS (1984-1989):								
MEAN:	88.00	44864.33	167.00	35134.83	254.67	79999.17	*34.55	*56.08
S.D.:	42.04	21553.58	62.51	12148.26	99.90	31995.73	* 2.19	* 2.58
95% LCL:	43.87	22241.56	101.38	22383.94	149.81	46416.24	*30.26	*51.02
95% UCL:	132.13	67487.11	232.62	47885.73	359.52	113582.09	*38.85	*61.14
MEANS,STANDARD DEVIATIONS AND CONFIDENCE INTERVALS (1986-1991):								
MEAN:	89.00	45058.33	152.67	31690.00	241.33	76748.33	*36.88	*58.71
S.D.:	40.29	20932.53	80.01	16317.23	118.44	36562.24	* 1.65	* 1.78
95% LCL:	46.71	23087.41	68.69	14563.33	117.02	38372.37	*33.64	*55.22
95% UCL:	131.29	67029.25	236.64	48816.67	365.65	115124.29	*40.11	*62.19

NOTE: FLAGGED VALUES INDICATE CALCULATIONS OBTAINED USING RATIO ESTIMATORS

Table 3. Summary of Atlantic salmon commercial catch data for Labrador (NFLD Region), 1974-1992. Weight in metric tonnes.

LABRADOR (NFLD REGION)

YEAR	SMALL WEIGHT	SMALL NUMBER	LARGE WEIGHT	LARGE NUMBER	TOTAL WEIGHT	TOTAL NUMBER	PERCENT SMALL(W)	PERCENT SMALL(N)
1974	94	46993	524	106902	617	153895	15.24	30.54
1975	176	92497	429	99769	605	192266	29.09	48.11
1976	137	65057	523	116351	661	181408	20.73	35.86
1977	117	58335	481	98316	599	156651	19.53	37.24
1978	56	29630	375	79758	430	109388	13.02	27.09
1979	81	38520	213	48364	294	86884	27.55	44.33
1980	209	94986	579	115817	788	210803	26.52	45.06
1981	224	108022	538	104728	763	212750	29.36	50.77
1982	144	72070	362	77277	506	149347	28.46	48.26
1983	91	46149	239	52723	330	98872	27.58	46.68
1984	48	23169	170	36984	217	60153	22.12	38.52
1985	75	39899	136	30041	211	69940	35.55	57.05
1986	126	63100	271	53223	397	116323	31.74	54.25
1987	155	78065	327	68056	482	146121	32.16	53.42
1988	144	76022	212	45007	357	121029	40.34	62.81
1989	95	47433	194	43097	289	90530	32.87	52.39
1990	59	29435	121	24629	179	54064	32.96	54.44
1991	43	21465	43	9048	86	30513	50.00	70.35
1992	37	18863	115	23839	152	42702	24.34	44.17
MEANS,STANDARD DEVIATIONS AND CONFIDENCE INTERVALS (1984-1989):								
MEAN:	107.17	54614.67	218.33	46068.00	325.50	100682.67	*32.92	*54.24
S.D.:	41.67	21620.13	69.76	13296.64	106.59	32906.16	* 1.97	* 2.37
95% LCL:	63.43	31922.04	145.12	32111.77	213.62	66144.15	*29.06	*49.60
95% UCL:	150.91	77307.29	291.55	60024.23	437.38	135221.18	*36.79	*58.88
MEANS,STANDARD DEVIATIONS AND CONFIDENCE INTERVALS (1986-1991):								
MEAN:	103.67	52586.67	194.67	40510.00	298.33	93096.67	*34.75	*56.49
S.D.:	45.85	23832.79	102.05	20925.49	145.82	43767.82	* 1.70	* 1.91
95% LCL:	55.54	27571.62	87.56	18546.47	145.28	47157.69	*31.42	*52.75
95% UCL:	151.79	77601.71	301.78	62473.53	451.39	139035.65	*38.08	*60.22

NOTE: FLAGGED VALUES INDICATE CALCULATIONS OBTAINED USING RATIO ESTIMATORS

Table 4. Regression coefficients from the regression of ln catch rate for Atlantic salmon from the Nain Fishing Region of Labrador, SFA 1, 1977-1992.

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: CUE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	30	123.61596300	4.12053210	14.05	0.0	0.511259	13.5395
ERROR	403	118.17153490	0.29322962		ROOT MSE		CUE MEAN
CORRECTED TOTAL	433	241.78749790			0.54150680		3.99944545

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
YY	15	45.04816805	10.24	0.0001	15	50.41569929	11.46	0.0001
ZN	3	35.90038617	40.81	0.0001	3	34.79298902	39.55	0.0001
WK	12	42.66740879	12.13	0.0001	12	42.66740879	12.13	0.0001

PARAMETER ESTIMATES

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|
INTERCEP	1	4.64486902	0.12677973	36.637	0.0001
YY78	1	0.0005247325	0.13242235	0.004	0.9968
YY79	1	-0.617493	0.13231614	-4.667	0.0001
YY80	1	-0.128974	0.13309717	-0.969	0.3331
YY81	1	-0.206023	0.13556025	-1.520	0.1293
YY82	1	-0.258258	0.13274740	-1.945	0.0524
YY83	1	-0.567816	0.13829955	-4.106	0.0001
YY84	1	-0.553128	0.15200021	-3.639	0.0003
YY85	1	-0.722307	0.15075431	-4.791	0.0001
YY86	1	-0.567957	0.14004580	-4.056	0.0001
YY87	1	-0.813456	0.14653729	-5.551	0.0001
YY88	1	-0.418755	0.14848000	-2.820	0.0050
YY89	1	-0.0130793	0.13853389	-0.094	0.9248
YY90	1	-0.737415	0.14598387	-5.051	0.0001
YY91	1	-0.844699	0.19812775	-4.263	0.0001
YY92	1	-1.47748	0.17005521	-8.688	0.0001
ZN2	1	-0.262877	0.07623497	-3.448	0.0006
ZN3	1	-0.0720437	0.07462091	-0.965	0.3349
ZN4	1	0.53583250	0.07110695	7.536	0.0001
WK27	1	-1.17943	0.22341100	-5.279	0.0001
WK28	1	-0.533852	0.14729891	-3.624	0.0003
WK29	1	-0.0810107	0.11576711	-0.700	0.4845
WK30	1	0.12012796	0.10592458	1.134	0.2574
WK32	1	-0.0147429	0.10209216	-0.144	0.8853
WK33	1	-0.319549	0.10258276	-3.115	0.0020
WK34	1	-0.375844	0.10549658	-3.563	0.0004
WK35	1	-0.728881	0.11078552	-6.579	0.0001
WK36	1	-0.755209	0.12459358	-6.061	0.0001
WK37	1	-0.719479	0.16161268	-4.452	0.0001
WK38	1	-0.699026	0.18245061	-3.831	0.0001
WK39	1	-0.557527	0.32918334	-1.694	0.0911

Table 5. Commercial landings of Atlantic salmon for four subareas within the Nain fishing region, 1977-92, along with standardized catch rates.

Year	Catch (kg)	C/E	SE	Effort
1977	37641	120	15	315
1978	43757	120	15	366
1979	29689	65	8	460
1980	58470	105	13	556
1981	43330	97	12	445
1982	30454	92	12	330
1983	18038	68	9	266
1984	12527	69	10	183
1985	13614	58	8	235
1986	19122	68	9	282
1987	13828	53	7	261
1988	19352	78	11	246
1989	28302	118	15	240
1990	12172	57	8	213
1991	2487	51	10	49
1992	2451	27	4	90

Table 6. Cumulative catch, effort, and catch per unit of effort (CPUE) to the date of closure of the recreational fishery for the retention of Atlantic salmon in each SFA, in 1992.

SFA	Quota	Date quota Caught	Grilse (<63 cm)								Large Salmon (≥63 cm)							
			1992	1991	Mean 84-89*	LCL	UCL	Mean 86-91*	LCL	UCL	1992	1991	Mean 84-89	LCL	UCL	Mean 86-91	LCL	UCL
1	442	Aug 28	164	79	857.5	487.3	1227.7	734.5	225.0	1244.0	286	8	152.7	115.9	189.5	111.5	50.7	172.3
2	2160	Aug 08	1718	565	1689.7	1109.3	2270.0	1671.8	994.4	2349.2	257	27	159.2	68.0	250.3	165.2	73.2	257.1
NF Reg. (Lab.)			1882	644	2547.2	1678.7	3415.6	2406.3	1263.6	3549.1	543	35	311.8	213.9	409.7	276.7	127.3	426.0
3	1300	July 24	1562	704	787.0	380.0	1194.0	854.2	413.4	1295.0								
4	4800	July 24	5290	1932	5541.6	3426.1	7657.1	4124.6	1669.7	6579.5								
5	2000	July 19	1941	461	1407.0	643.0	2171.0	1355.0	449.8	2260.2								
6	200	Aug 09	230	106	288.0	204.7	371.3	238.8	114.2	363.4								
7	40	Aug 04	40	11	71.6	47.4	95.8	55.0	16.2	93.8								
8	Closed																	
9	600	July 13	690	347	1193.6	692.3	1694.9	1079.4	457.1	1701.7								
10	200	July 04	245	34	486.0	249.9	722.1	378.8	63.4	694.2								
11	1700	July 05	2273	692	3300.0	2125.6	4474.4	2385.2	1038.0	3732.4								
NF Reg. (Ins.)			12271	4287	13074.8	9068.2	17081.4	10471.0	4882.2	16059.8								

*1987 Not included in SFAs 3-11

SFA	Date quota Caught	Effort(rod days)								CPUE							
		1992	1991	Mean 84-89*	LCL	UCL	Mean 86-91*	LCL	UCL	1992	1991	Mean 84-89*	LCL	UCL	Mean 86-91*	LCL	UCL
1	Aug 28	675	835	1094.0	745.2	1442.8	1052.2	681.3	1423.0	0.67	0.10	0.92	0.81	1.04	0.80	0.48	1.13
2	Aug 08	2636	1808	2008.0	1528.1	2487.9	2174.5	1845.2	2503.8	0.75	0.33	0.92	0.76	1.08	0.84	0.57	1.12
NF Reg. (Lab.)		3311	2643	3102.0	2342.6	3861.4	3226.7	2566.0	3887.3	0.73	0.26	0.92	0.82	1.02	0.83	0.55	1.11
3	July 24	2884	2262	1498.8	989.8	2007.8	1746.2	1038.0	2454.4	0.54	0.31	0.53	0.38	0.67	0.49	0.29	0.68
4	July 24	15097	10316	17575.6	14144.2	21007.0	14895.4	10791.0	18999.8	0.35	0.19	0.32	0.24	0.39	0.28	0.18	0.38
5	July 19	5830	2395	4801.2	3760.5	5841.9	4070.8	2616.4	5525.2	0.33	0.19	0.29	0.15	0.43	0.33	0.22	0.45
6	Aug 09	2028	1135	2160.4	1706.8	2654.0	2037.0	1351.4	2722.6	0.11	0.09	0.13	0.07	0.19	0.12	0.07	0.17
7	Aug 04	1070	325	885.0	550.6	1219.4	710.6	300.9	1120.3	0.04	0.03	0.08	0.05	0.12	0.08	0.03	0.12
8	Closed																
9	July 13	4956	4561	4976.4	4469.0	5483.8	4942.2	4320.7	5563.7	0.14	0.08	0.24	0.15	0.33	0.22	0.11	0.32
10	July 04	1520	1091	1961.0	1580.4	2341.6	1851.0	1227.1	2474.9	0.16	0.03	0.25	0.15	0.34	0.20	0.10	0.31
11	July 05	5857	3439	8106.0	7117.1	9094.9	6842.8	4367.0	9318.6	0.39	0.20	0.41	0.31	0.51	0.35	0.26	0.43
NF Reg. (Ins.)		39242	25524	41984.4	36219.4	47749.4	37096.0	28023.4	46168.6	0.31	0.17	0.31	0.25	0.37	0.28	0.20	0.36

*1987 Not included in SFAs 3-11

Table 7. Percentage change in cumulative recreational catch, effort, and catch per unit of effort (CPUE) to the date of closure of the recreational fishery for the retention of Atlantic salmon in each SFA in 1992, in releation to 1991 and the 1984-89 and 1986-91 means.

	Grilse (>63 cm)			Large Salmon (≤63 cm)		
SFA	1991	Mean 84-89*	Mean 86-91*	1991	Mean 84-89	Mean 86-91
1	107.6	-80.9	-77.7	3475.0	87.3	156.5
2	204.1	1.7	2.8	851.9	61.5	55.6
NF Reg. (Lab.)	192.2	-26.1	-21.8	1451.4	74.1	96.3
3	121.9	98.5	82.9			
4	173.8	-4.5	28.3			
5	321.0	38.0	43.2			
6	117.0	-20.1	-3.7			
7	263.6	-44.1	-27.3			
8						
9	98.8	-42.2	-36.1			
10	620.6	-49.6	-35.3			
11	228.5	-31.1	-4.7			
NF Reg. (Ins.)	186.2	-6.1	17.2			

*1987 Not included in SFAs 3-11.

	Effort (rod days)			CPUE		
SFA	1991	Mean 84-89*	Mean 86-91*	1991	Mean 84-89*	Mean 86-91*
1	-19.2	-38.3	-35.8	570.0	-27.2	-16.3
2	45.8	31.3	21.2	127.3	-18.5	-10.7
Nf Reg. (Lab.)	25.3	6.7	2.6	180.8	-20.7	-12.0
3	27.5	92.4	65.2	74.2	1.9	10.2
4	46.3	-14.1	1.4	84.2	9.4	25.0
5	143.4	21.4	43.2	73.7	13.8	0.0
6	78.7	-7.0	-0.4	22.2	-15.4	-8.3
7	229.2	20.9	50.6	33.3	-50.0	-50.0
8						
9	8.7	-0.4	0.3	75.0	-41.7	-36.4
10	39.3	-22.5	-17.9	433.3	-36.0	-20.0
11	70.3	-27.7	-14.4	95.0	-4.9	11.4
Nf Reg. (Ins.)	53.7	-6.5	5.8	82.4	0.0	10.7

*1987 Not included in SFAs 3-11.

Table 8. Counts of grilse from fishways and counting fences in insular Newfoundland 1955-92 by Salmon Fishing Area (SFA); also shown are means ($\bar{X}$), 95% confidence intervals (CI), and coefficients of variation (CV). Partial counts are in parentheses and are not included in means.

	Fishways									Counting Fences				
	SFA 4			SFA 5			SFA 9	SFA 10	SFA 11	SFA 4	SFA 9			SFA 11
Year	1A	1B	2	3	4	5	6	7	8	9	10	11	12	13
1955						53								
1956				(323)	558	32								
1957			642	(28)	141	21								
1958			1072	(344)	677	10								
1959	(886)		591	(294)	394	62								
1960	1013	94	291		490	86								
1961	839	319	41		318	74								
1962		1037			496	284								
1963	1202	491			551	372								
1964		1752			418	246								
1965	1228	587			484	334								
1966	(829)	942			368	134								
1967	1372	822			606	367								
1968		1334			714	409		(57)						
1969	979	892			660	463								
1970		1023			755	561								
1971	961	902	731		579	316		159						
1972	794	(495)	540	838	609	331		236						
1973	205		971	(1079)	455	340		(399)						
1974	2538		857	(770)		162		223						
1975	9218	5531		(1119)		778		(186)						
1976	3991	2935				335		294						
1977	6148	4300				371								
1978	3790	2704	755	1403	810	436		390						
1979	6715	3925	(404)	(1350)	569	455		454						
1980		4597	997	1712	843	420		433						
1981	(8114)	4264	2459	2414	1115	619		(334)						
1982	(7605)	2796	1425	1281	963	625		(86)					133	
1983		(2952)	978	1195	1210	853		233			2330		272	
1984	17219	(6300)	1081	1379	1233	904		419			2430	89	359	
1985	16652	5985	1663	904	1557	960		384			(1377)	124	170	
1986	9697	3072	1064	1036	1051	726		725	211		2516	158	296	7515
1987	9014	2327	(493)	914	974	570	80	(325)	(155)		(1302)	91	368	9687
1988	8974	3433	1562	772	1737	795	313	543	149		1695	97	(205)	7118
1989	7192	1694	596	496	1138	668	168	706	175	7743	(889)	62	441	4469
1990	6629	1057	(328)	745	1149	(410)	401	551	208	7520	1657	71	(307)	4321
1991	5245	1060	245	562	873	(311)	211	353	(46)	6445	394	99	218	2086
1992	12538	3520	1168	1182	1443	886	237	921	101	(17296)	(1298)	49	249	1973
1984-89														
$\bar{X}$	11458	3302.2	1193.2	916.8	1281.7	770.5	187.0	555.4	178.3		2213.7	103.5	326.8	7197.3
95% CI	4541.5	2040.4	534.9	306.4	316.3	153.6	292.3	195.9	77.3		1121.0	34.9	126.2	3406.1
CV	37.76	49.77	36.11	31.84	23.51	18.99	62.92	28.41	17.46		20.38	32.11	31.10	29.75
N	6	5	5	6	6	6	3	5	3		3	6	5	4
1986-91														
$\bar{X}$	7791.8	2107.2	866.8	754.2	1153.7	689.8	234.6	575.6	185.8	7236.0	1565.5	96.3	330.8	5866.0
95% CI	1800.9	1060.8	910.3	214.6	319.1	151.5	155.5	186.8	46.8	1724.2	1393.4	35.3	152.2	2875.0
CV	22.02	47.96	66.01	27.11	26.35	13.81	53.38	26.14	15.85	9.59	55.94	34.92	28.93	46.69
N	6	6	4	6	6	4	5	5	4	3	4	6	4	6

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

Table 9. Counts of large salmon from fishways and counting fences in insular Newfoundland 1955-92 by Salmon Fishing Area (SFA); also shown are ($\bar{X}$), 95% confidence intervals (CI), and coefficients of variation (CV). Partial counts are in parentheses and are not included in means.

	Fishways									Counting Fences				
	SFA 4			SFA 5			SFA 9	SFA 10	SFA 11	SFA 4	SFA 9			SFA 11
Year	1A	1B	2	3	4	5	6	7	8	9	10	11	12	13
1955						24								
1956				(56)	37	44								
1957			323	(2)	41	1								
1958			491	(229)	195	0								
1959	(119)		290	(14)	67	0								
1960	157	9	183		216	0								
1961	118	53	15		100	1								
1962		31			277	4								
1963	65	37			320	34								
1964		116			298	18								
1965	203	190			255	51								
1966	(506)	470			220	2								
1967	710	382			359	43								
1968		687			376	28		(11)						
1969	498	290			391	136								
1970		199			469	172								
1971	300	261	494		279	121		21						
1972	113	(234)	54	10	348	200		34						
1973	89		135	(9)	303	223		(64)						
1974	411		9	(77)		121		9						
1975	1439	505		(9)		52		(36)						
1976	460	117				37		56						
1977	581	271				262								
1978	303	81	52	16	20	89		32						
1979	277	124	(6)	(54)	170	30		37						
1980		426	15	91	39	17		34						
1981	(1695)	514	33	39	90	28		(62)						
1982	(181)	122	18	20	19	8		(36)					116	
1983		(302)	12	75	57	76		22			88		43	
1984	529	(111)	38	57	107	98		44			83	33	97	
1985	183	38	26	27	112	60		0			(21)	41	42	
1986	355	174	12	15	140	58		39	4		101	30	31	397
1987	310	41	(9)	19	56	38	1	(16)	(2)		(106)	30	55	498
1988	147	10	24	14	206	45	6	11	2		61	19	(16)	418
1989	89	14	24	19	142	51	9	15	7	473	(104)	18	81	319
1990	122	15	(7)	13	144	(34)	17	25	15	508	71	9	(50)	361
1991	99	40	2	14	114	(26)	16	8	(7)	670	35	13	18	87
1992	314	242	101	43	270	224	46	46	35	(3850)	(49)	10	78	154
1984-89														
$\bar{X}$	268.8	55.4	24.8	25.2	127.2	58.3	5.3	21.8	4.3		81.7	28.5	61.2	408.0
95% CI	170.1	84.1	11.5	17.1	52.1	22.1	10.0	23.4	6.3		49.8	9.2	34.0	117.1
CV	60.29	122.26	37.22	64.58	39.00	36.13	75.78	86.64	58.08		24.53	30.65	44.69	18.03
N	6	5	5	6	6	6	3	5	3		3	6	5	4
1986-91														
$\bar{X}$	187.0	49.0	15.5	15.7	133.7	48.0	9.8	19.6	7.0	550.3	67.0	19.8	46.3	346.7
95% CI	121.1	65.8	16.9	2.8	51.1	13.6	8.4	15.6	9.1	261.1	43.4	9.1	44.2	147.6
CV	61.68	128.01	68.58	16.97	36.45	17.76	68.98	64.29	81.65	19.10	40.71	43.66	60.06	40.57
N	6	6	4	6	6	4	5	5	4	3	4	6	4	6

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

Table 10. Counts of grilse and large salmon from fishways and counting fences in insular Newfoundland for 1992 expressed as percentage change in relation to 1991, the 1984-89 mean and the 1986-91 mean.

	Grilse			Large salmon		
	1991	$\bar{x}$ 1984-89	$\bar{x}$ 1986-91	1991	$\bar{x}$ 1984-89	$\bar{x}$ 1986-91
FISHWAYS						
SFA 4						
Bishops Falls (Exploits River)	139	9	61	217	17	68
Gt. Rattling Brook (Exploits River)	232	6	67	505	337	394
Salmon Brook	377	-2	35	4950	307	552
SFA 5						
Middle Brook	110	29	57	207	71	174
Lower Terra Nova River	65	12	25	137	112	102
Upper Terra Nova River[a]	185	15	28	761	284	367
SFA 9						
Rocky River	12	27	1	187	768	369
SFA 10						
Northeast River (Placentia)	161	66	60	475	111	135
SFA 11						
Grand Bank Brook[a]	119	-43	-46	400	714	400
COUNTING FENCES						
SFA 4						
Gander River[b]	168		139	475		600
SFA 9						
Biscay Bay River[b]	229	-41	-17	40	-40	-27
Northeast Brook (Trepassey)	-50	-53	-49	-23	-65	-49
Colinet River	14	-24	-25	333	27	69
SFA 11						
Conne River	-5	-72	-66	77	-62	-56

[a]Partial count in 1991 (see text).

[b]Partial count in 1992 (see text)

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

Year	Northeast Brook			Conne River[1]		
	Smolts year i	Grilse year i+1	% Survival	Smolts year i	Grilse year i+1	% Survival
1986	1117	91	8.2			
1987	1404	97	6.9	74585	7627	10.2
1988	1692	62	3.7	68692	4968	7.6
1989	1708	71	4.2	73724	5383	7.3
1990	1902	99	5.2	56943	2410	4.2
1991	1905	49	2.6	74645	2523	3.4

[1]Includes Native food fishery.

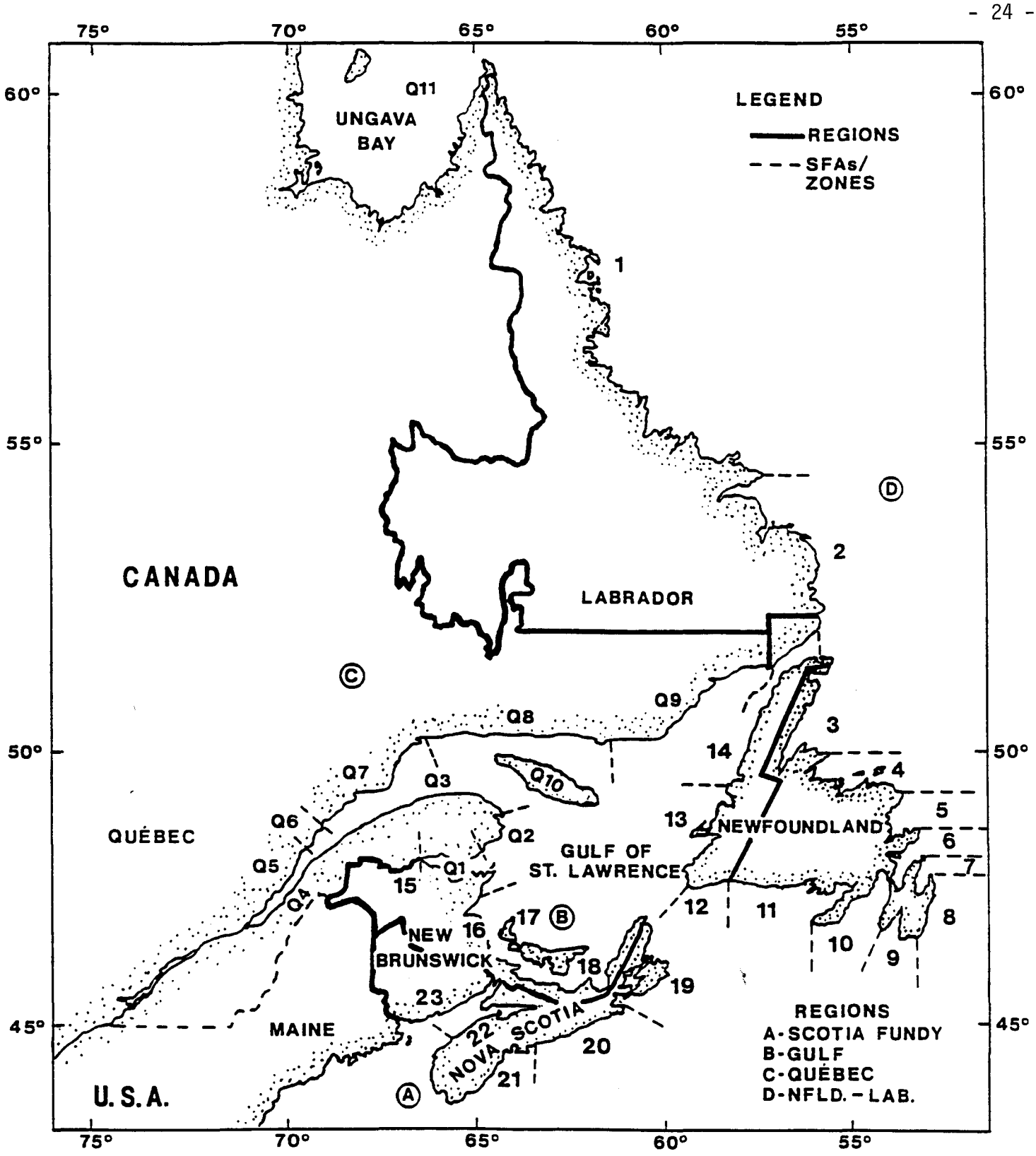


Fig. 1. Map of Atlantic Provinces of Canada showing Salmon Fishing Areas (SFAs) 1-23, Salmon Management Zones of Quebec (Qs) 1-11, and regional boundaries. The Newfoundland Region is comprised of SFAs 1-11.

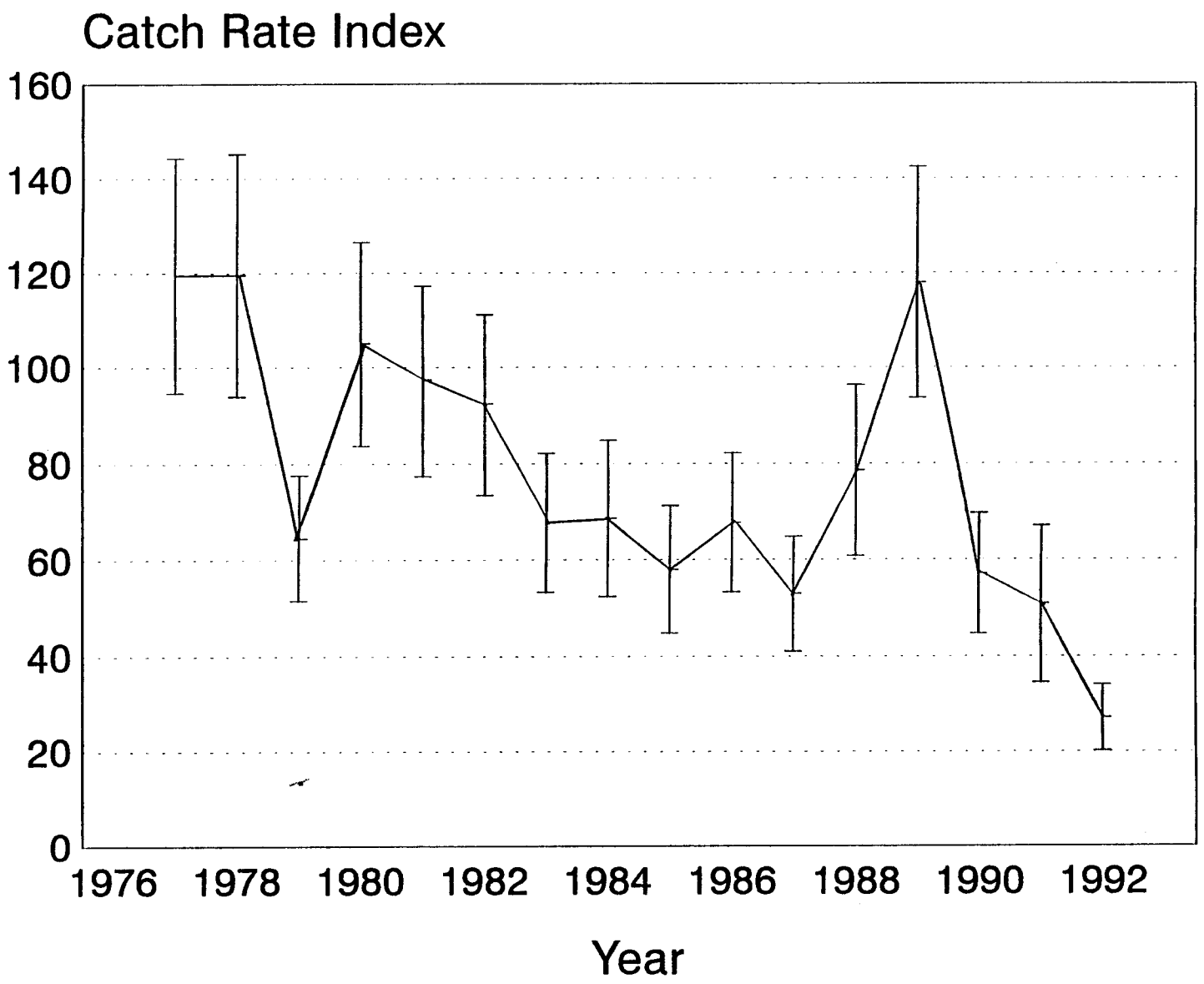


Fig. 2. Catch rate index for the Nain Fishing Region Atlantic salmon catch, with 90% CI, for the years 1977-1992.

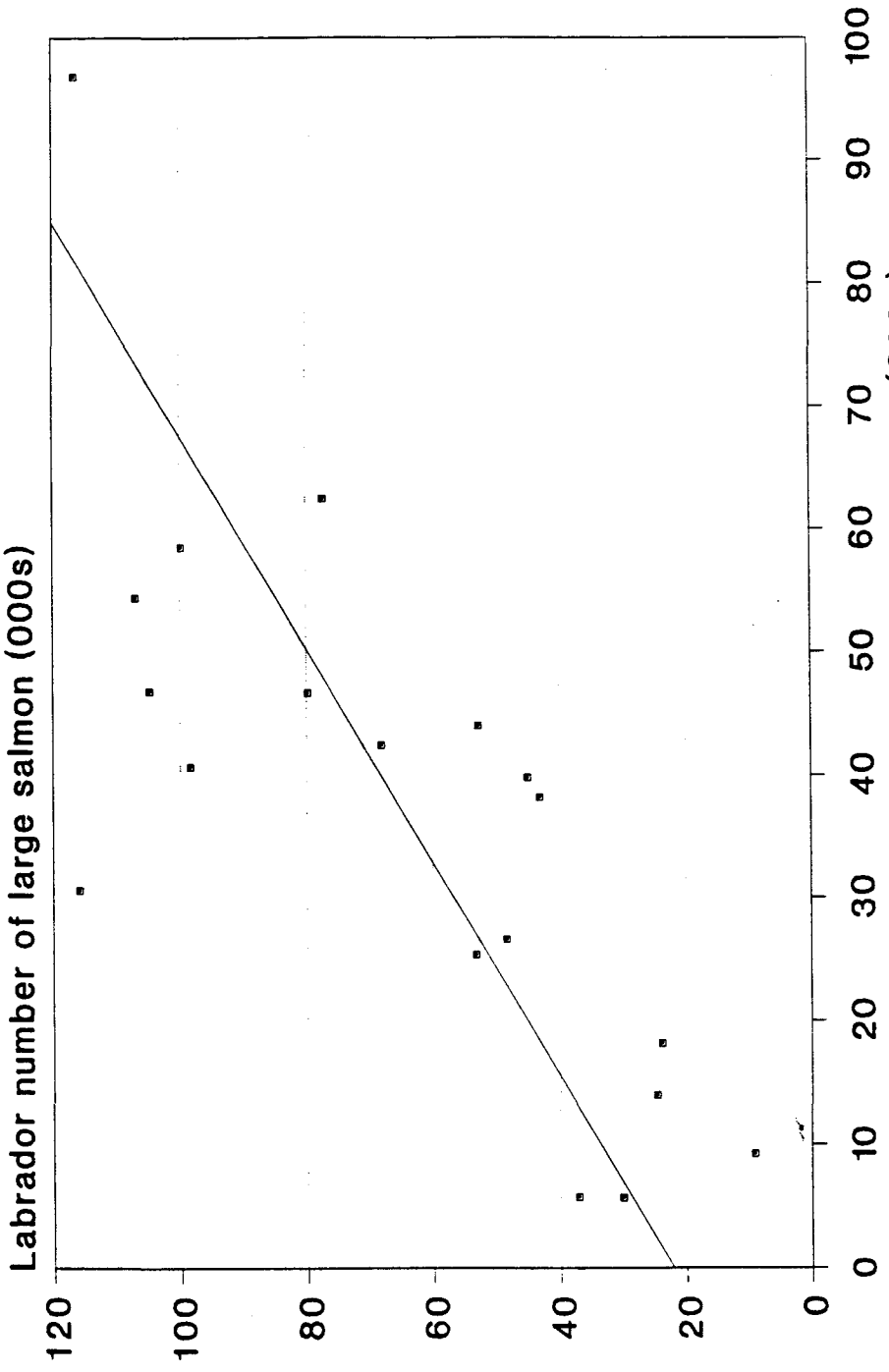


Fig. 3. Regression of the commercial catches of large salmon in SFAs 1+2 on catches at West Greenland, of North American-origin small salmon with river age >3 years, (1973-92) and of the same smolt-class.

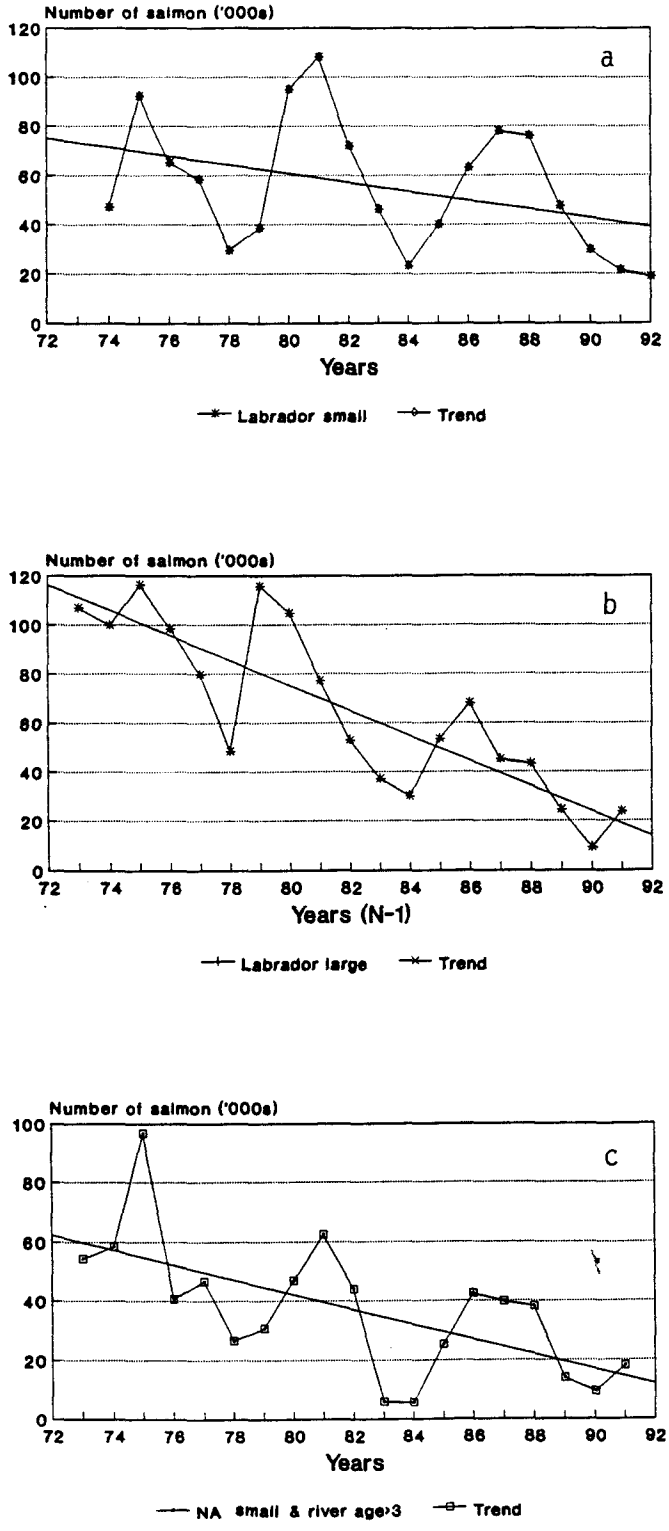


Fig. 4. Commercial catches and trend lines for: a) small salmon in SFAs 1+2; b) large salmon in SFAs 1+2; and c) North American-origin small salmon with river age >3 years, in West Greenland. Large salmon are lagged (t-1), so that the catches of salmon of the same smolt-class are shown in the same year.

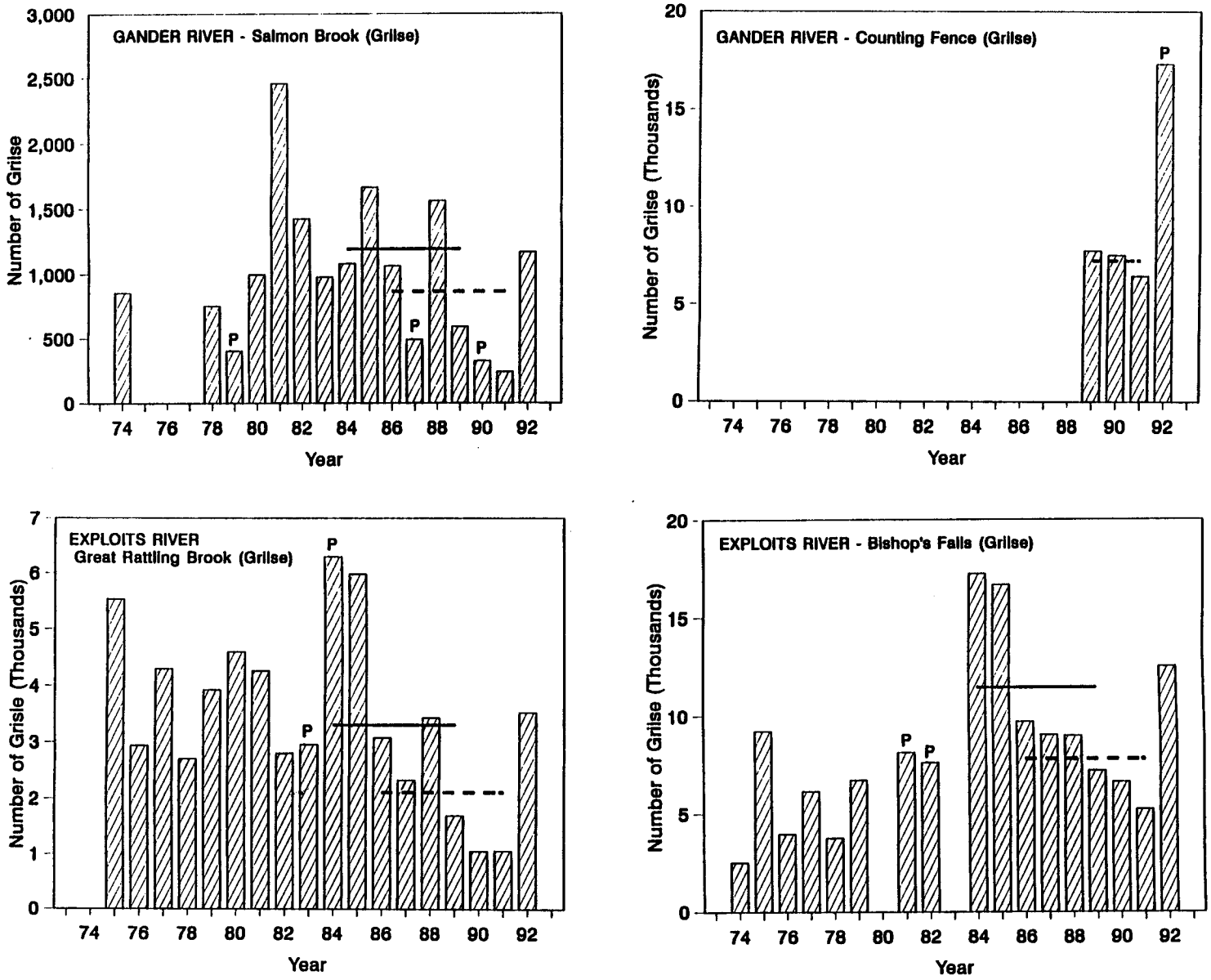


Fig. 5. Counts of grilse at the Gander River counting fence and at the fishway located on the Salmon Brook tributary, and at the Bishop's Falls fishway on the main stem of the Exploits River and the fishway on the Great Rattling Brook tributary, SFA 4. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial count.

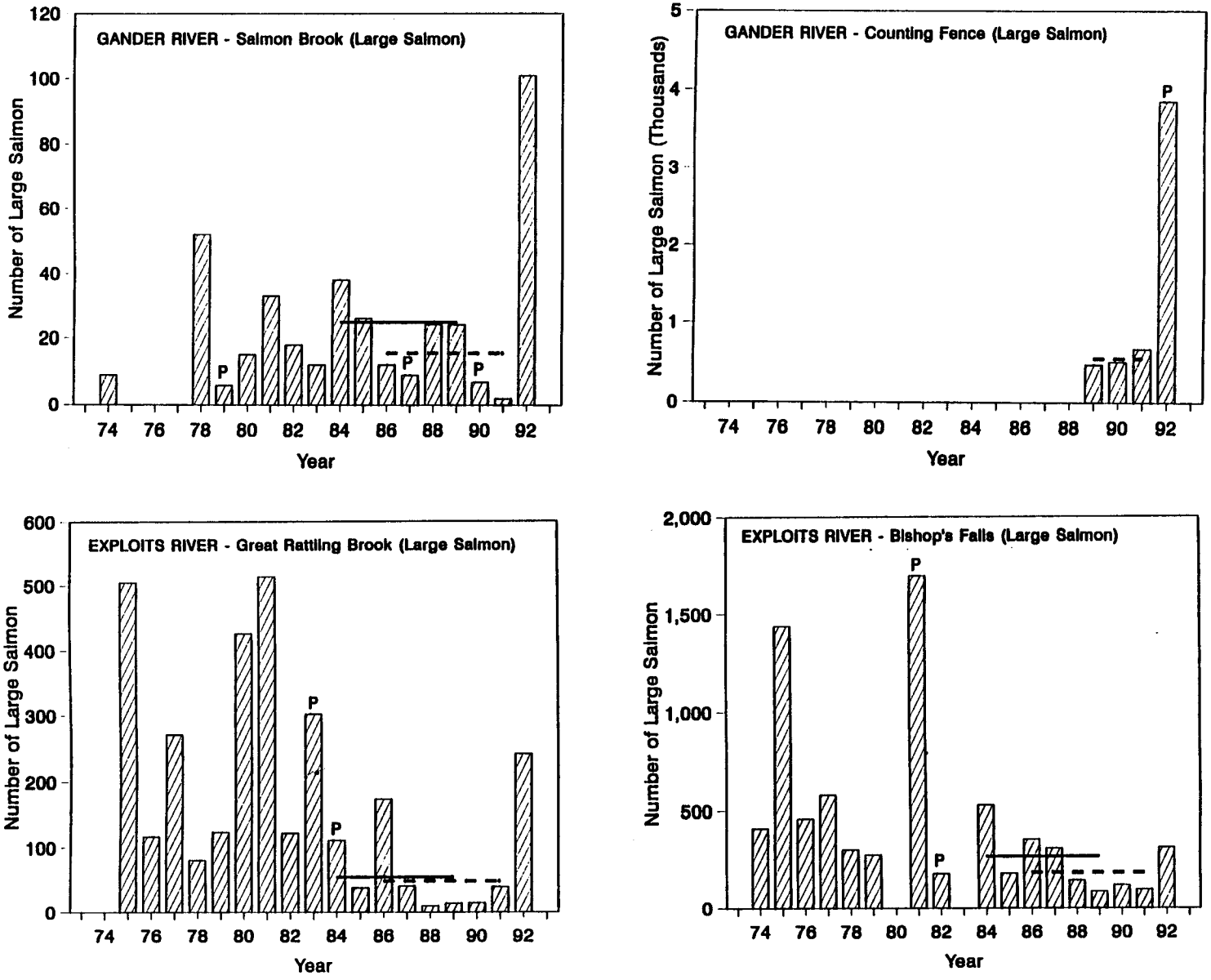


Fig. 6. Counts of large salmon at the Gander River counting fence and at the fishway located on the Salmon Brook tributary, and at the Bishop's Falls fishway on the main stem of the Exploits River and the fishway on the Great Rattling Brook tributary, SFA 4. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial count.

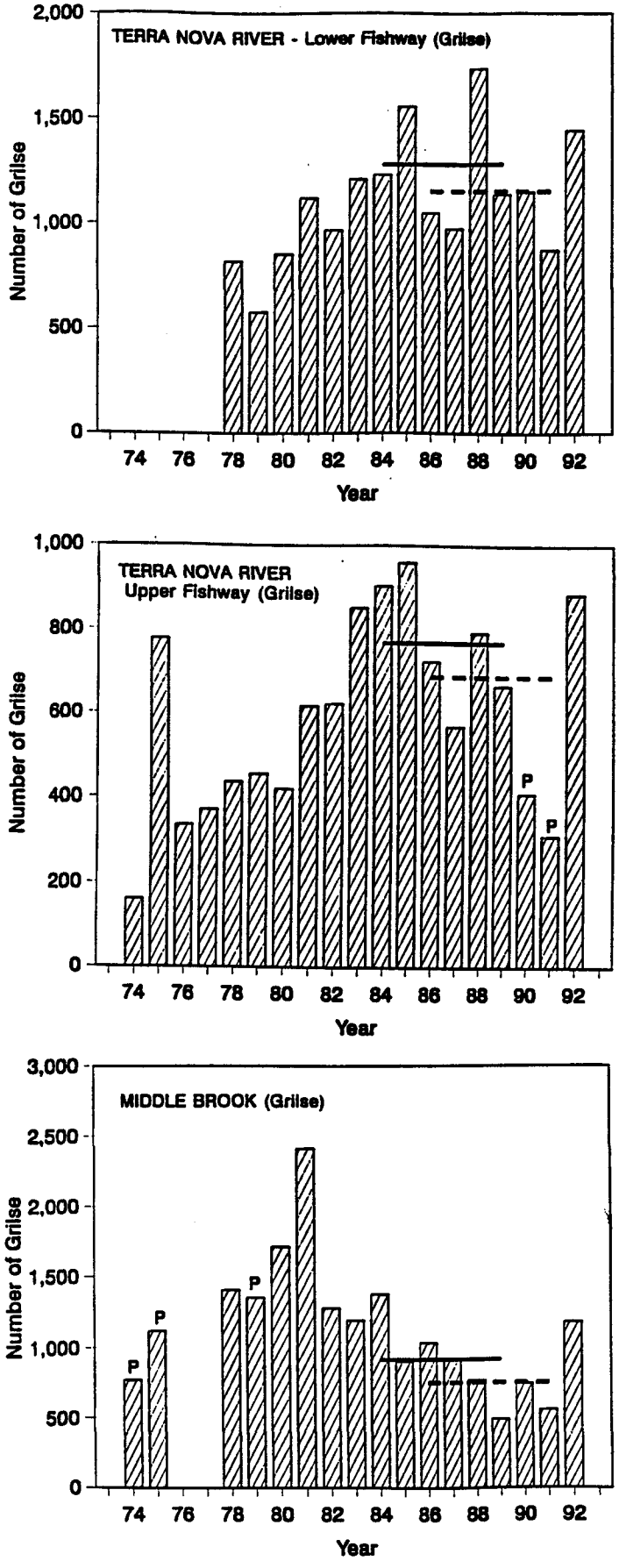


Fig. 7. Counts of grilse at the upper and lower fishways on Terra Nova River and the fishway on Middle Brook, SFA 5. The solid line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial count.

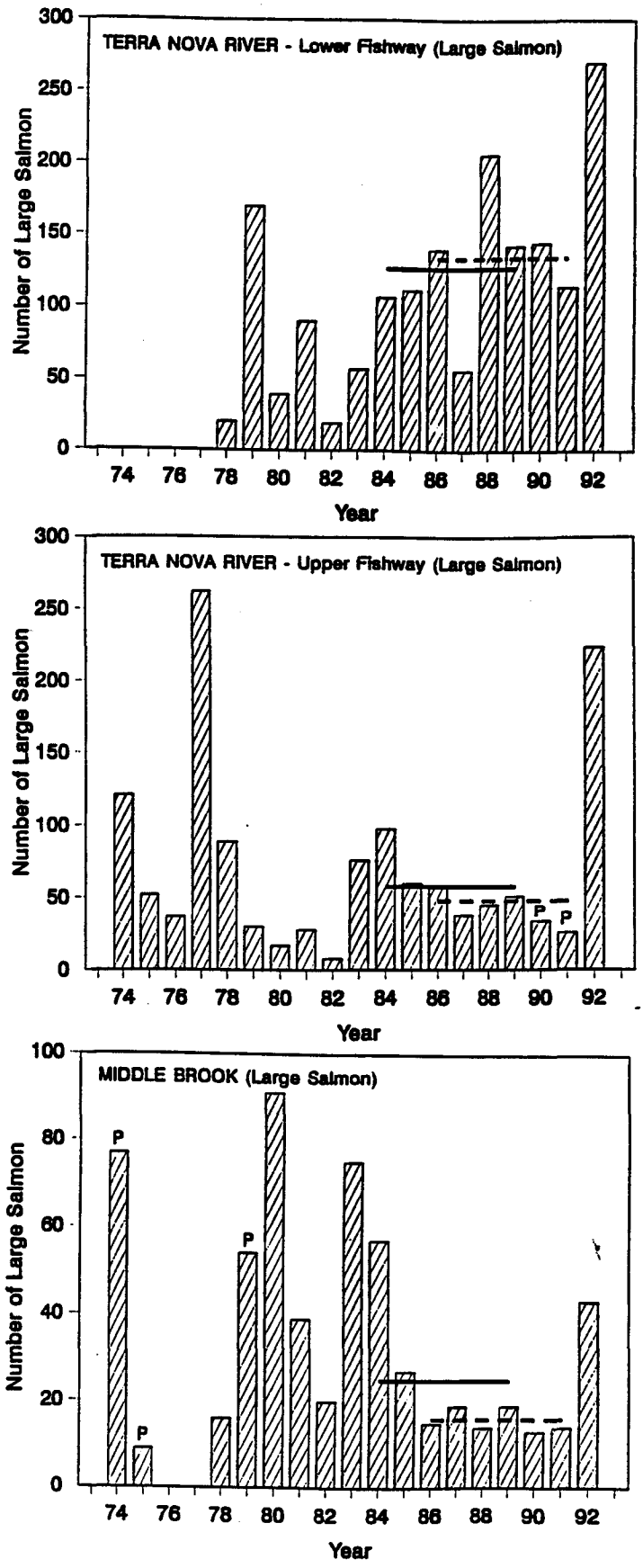


Fig. 8. Counts of large salmon at the upper and lower fishways on Terra Nova River and the fishway on Middle Brook, SFA 5. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial count.

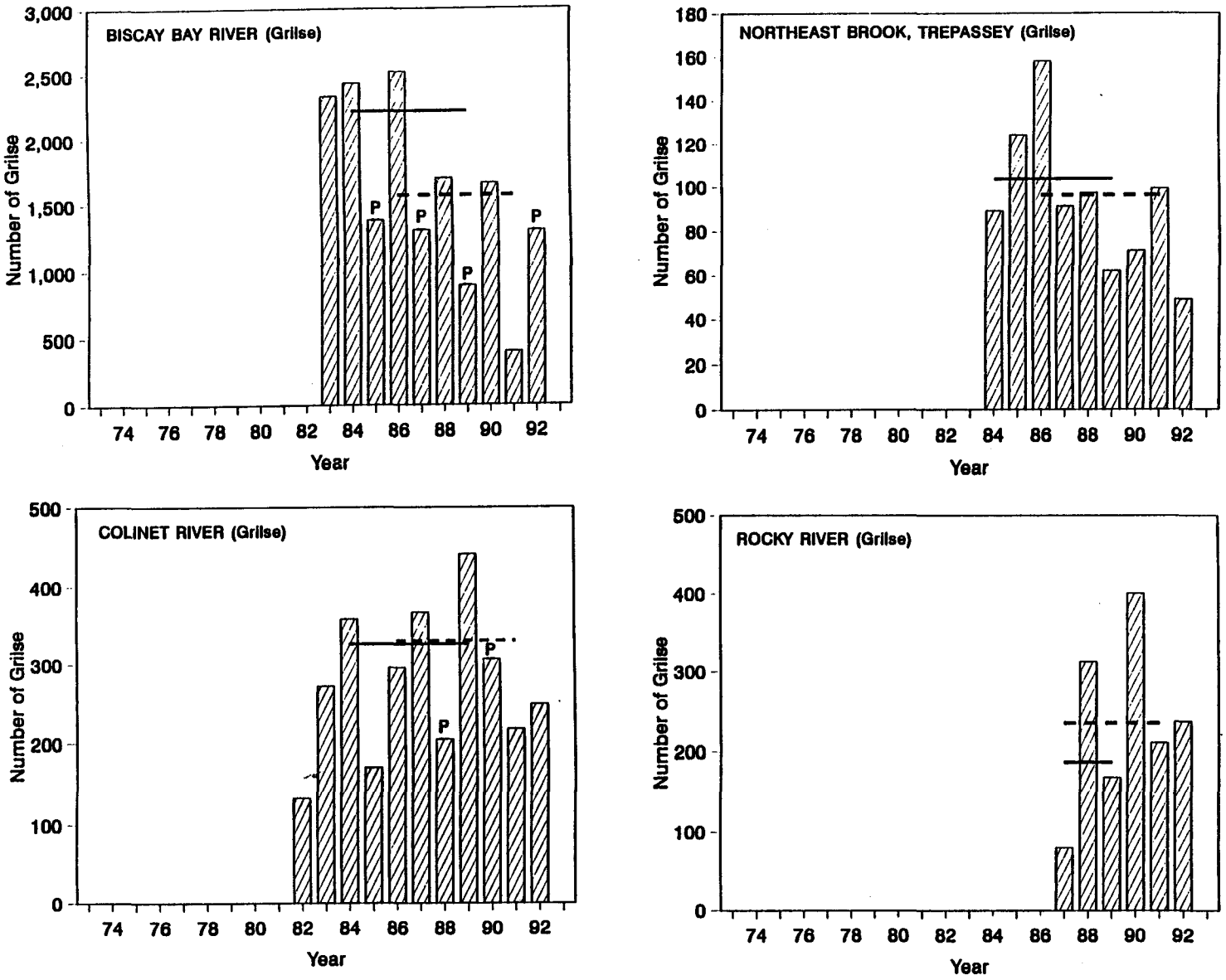


Fig. 9. Counts of grilse at counting fences for Biscay Bay River, Northeast Brook (Trepassey), and Colinet River and the Rocky River fishway, SFA 9. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial count.

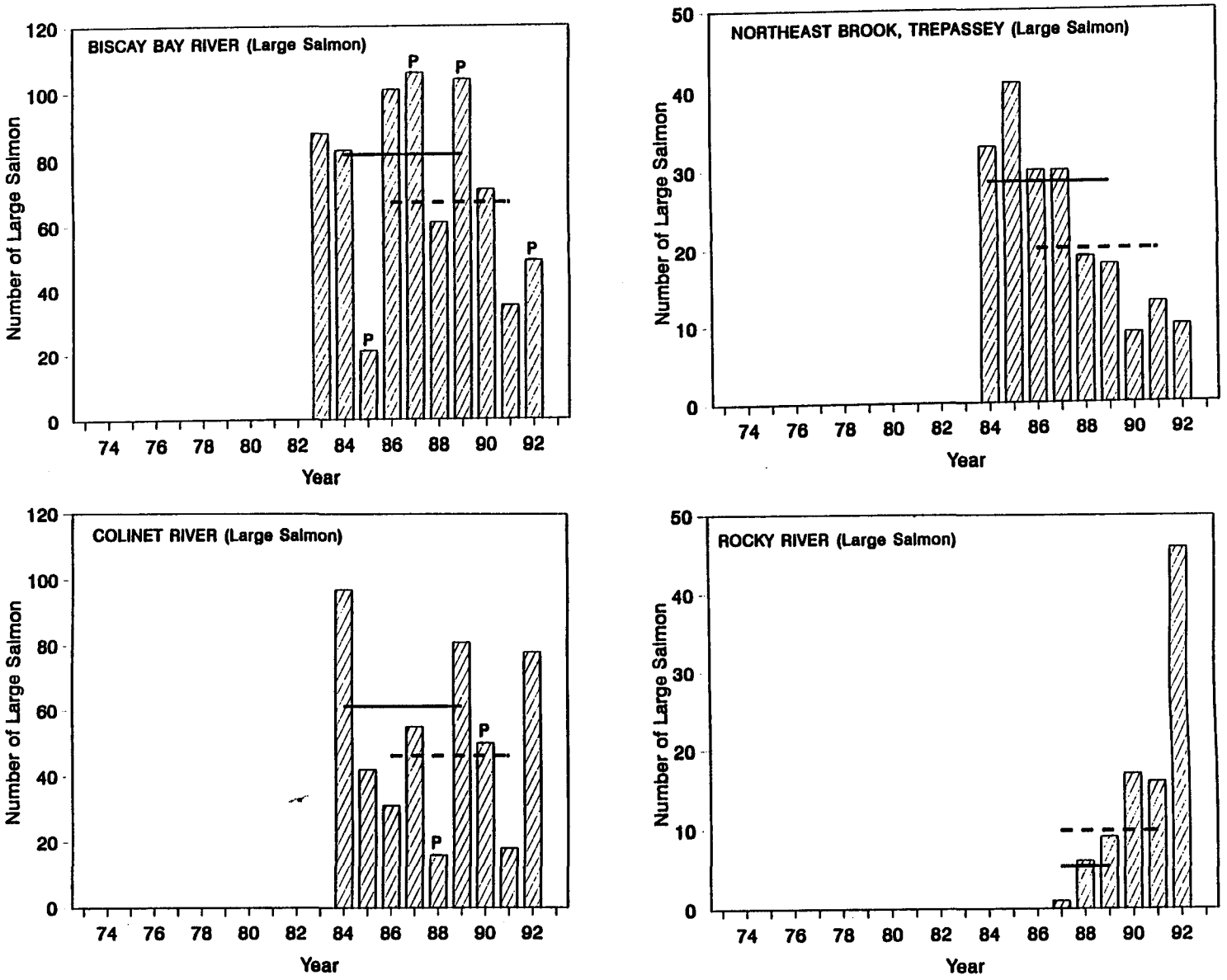


Fig. 10. Counts of large salmon at counting fences for Biscay Bay River, Northeast Brook (Trepassey), and Colinet River and the Rocky River fishway, SFA 9. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial count.

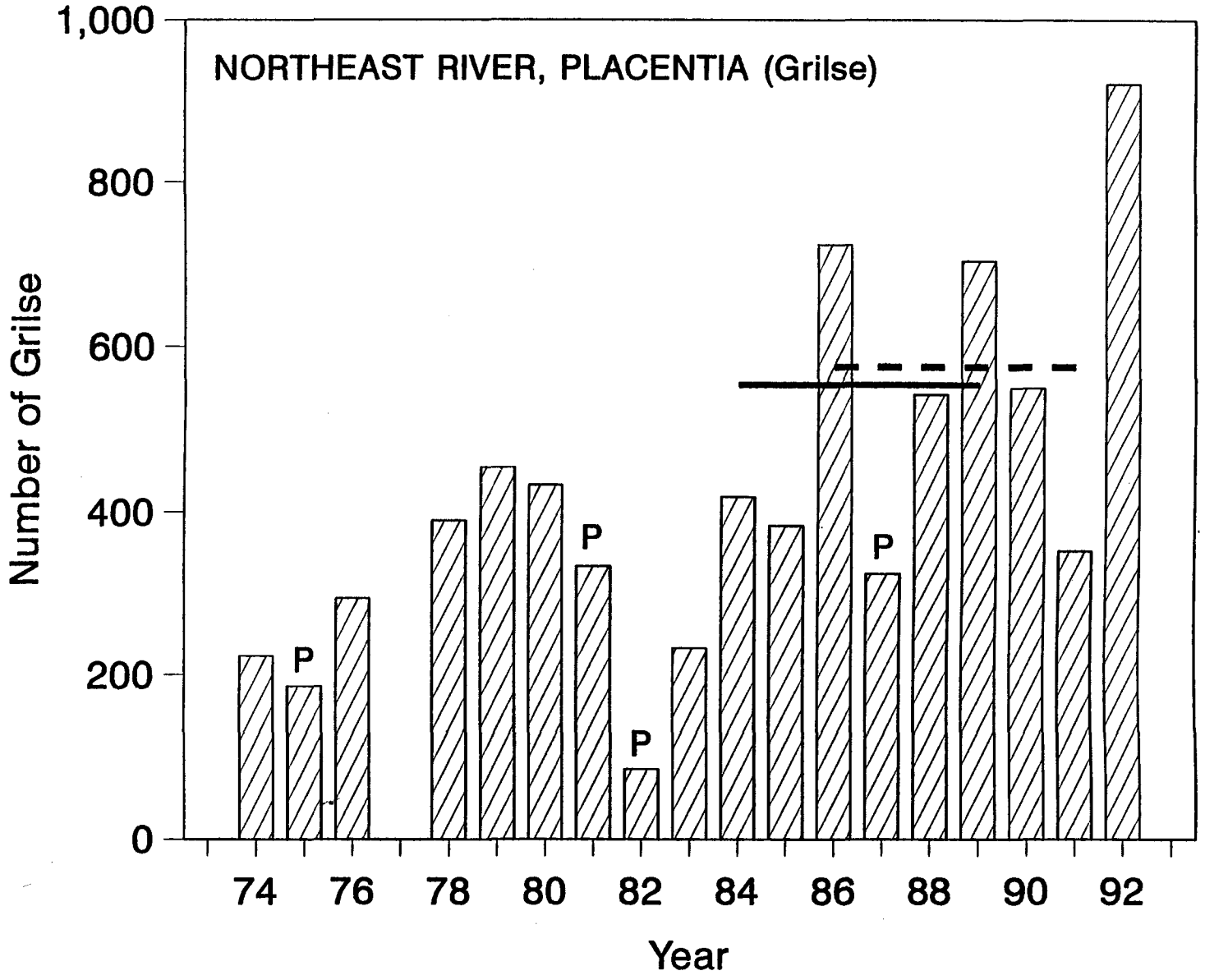


Fig. 11. Counts of grilse at the Northeast River, Placentia fishway, SFA 10. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial count.

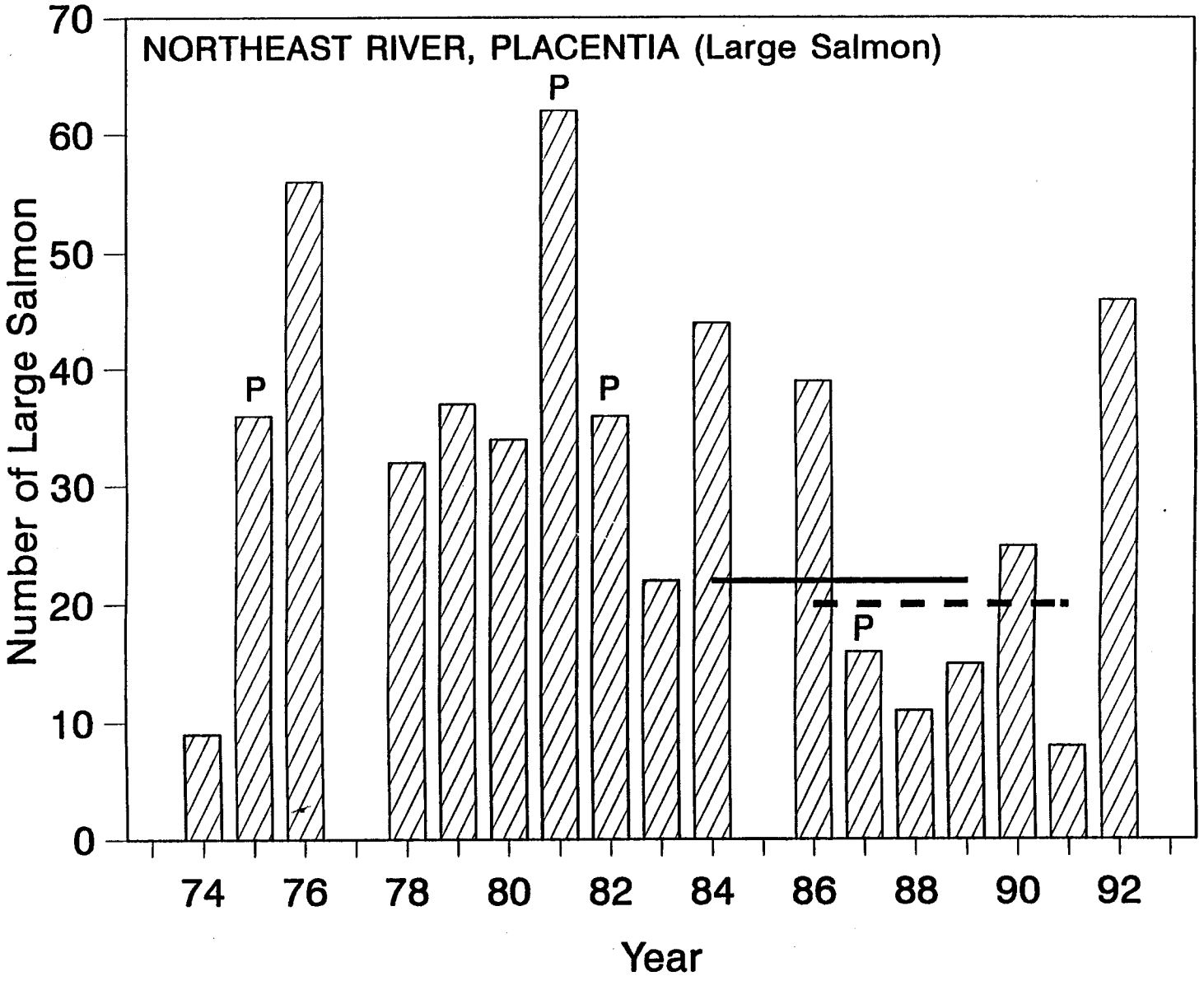
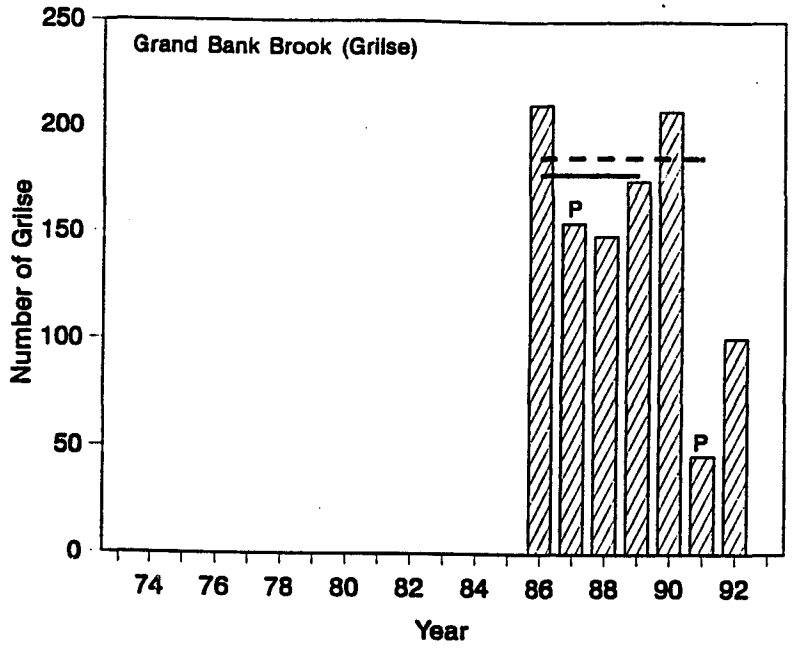


Fig. 12. Counts of large salmon at the Northeast River, Placentia fishway, SFA 10. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial count.



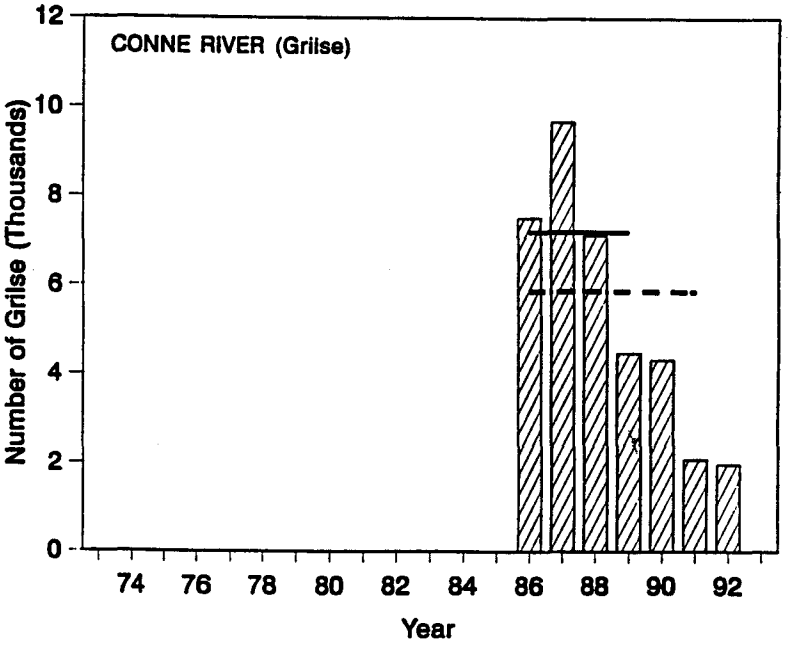


Fig. 13. Counts of grilse at the Grand Bank Brook fishway and the Conne River counting fence, SFA 11. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial count.

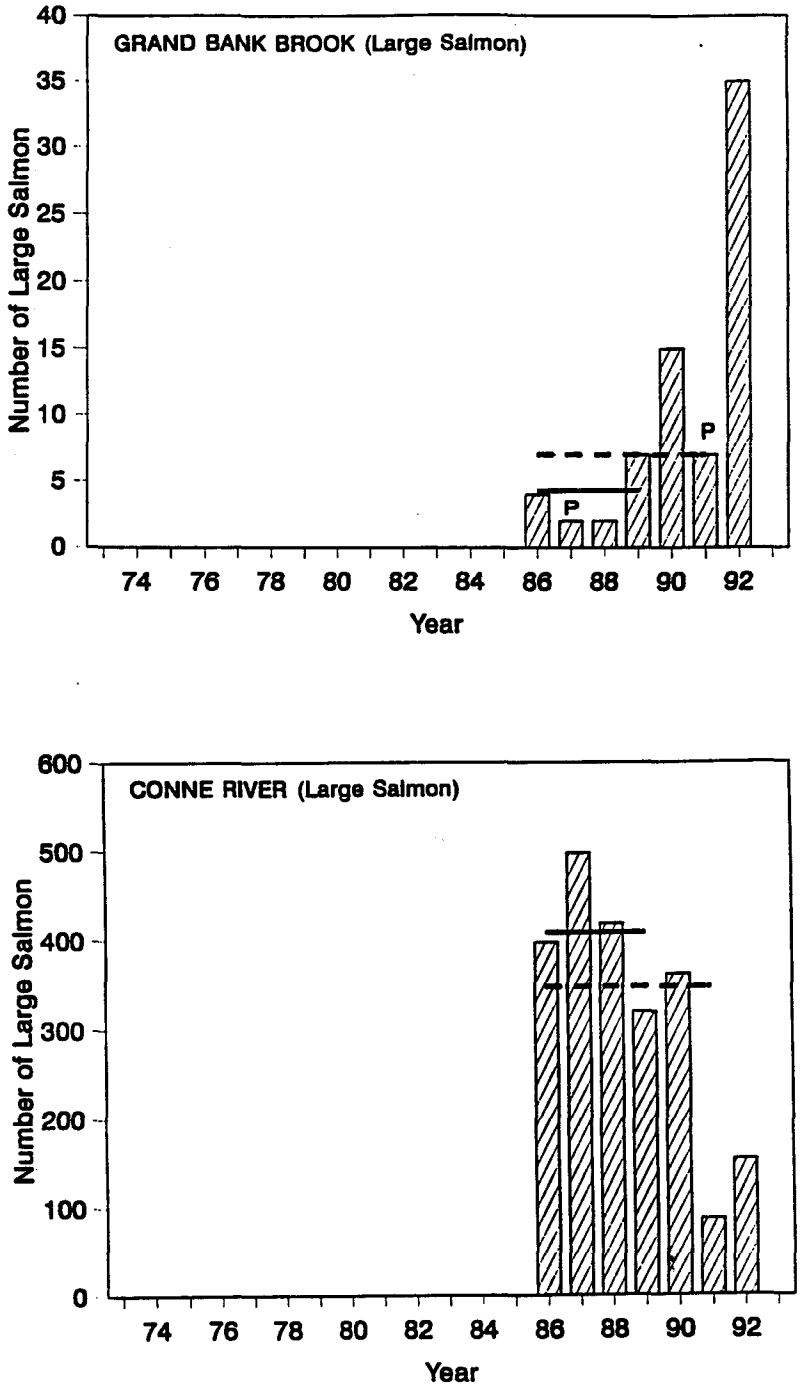


Fig. 14. Counts of large salmon at the Grand Bank Brook fishway and the Conne River counting fence, SFA 11. The solid horizontal line represents the 1984-89 mean and the broken line the 1986-91 mean. P = partial count.

Appendix 1a. Summary of Atlantic salmon recreational catch and effort data for Newfoundland Region (Labrador), 1953-92. After quota refers to the number of fish hooked and released after the quota was caught.

NEWFOUNDLAND REGION (LABRADOR)

YEAR	EFFORT ROD DAYS	GRILSE <63 CM	SALMON ≥63 CM	TOTAL CATCH	CPUE	PERCENT GRILSE
1953	.	.	.	.	.	.
1954	100	350	150	500	5.00	.
1955	198	125	8	133	0.67	98
1956	101	20	0	20	0.20	100
1957	342	1022	49	1071	3.13	29
1958	366	849	20	869	2.37	98
1959	500	823	37	860	1.72	96
1960	399	558	39	597	1.50	95
1961	634	713	126	839	1.32	82
1962	611	764	58	822	1.35	92
1963	694	1372	58	1430	2.06	93
1964	1583	1916	121	2037	1.29	92
1965	1826	1544	236	1780	0.97	89
1966	2280	1978	362	2340	1.03	81
1967	1436	1085	195	1280	0.89	91
1968	1821	2131	309	2440	1.34	78
1969	1619	1612	120	1732	1.07	95
1970	2750	2447	241	2688	0.98	87
1971	2639	3007	239	3246	1.23	91
1972	2808	2524	344	2868	1.02	90
1973	5228	6061	577	6638	1.27	81
1974	2779	1761	512	2273	0.82	92
1975	2029	2903	173	3076	1.52	91
1976	3259	3228	520	3748	1.15	85
1977	3316	2932	693	3625	1.09	82
1978	3835	2118	584	2702	0.70	83
1979	3184	3217	490	3707	1.16	81
1980	2472	2862	552	3414	1.38	85
1981	1845	3493	300	3793	2.06	91
1982	3121	2833	541	3374	1.08	87
1983	3128	2372	298	2670	0.85	90
1984	3131	1948	325	2273	0.73	88
1985	2702	2009	194	2203	0.82	91
1986	3051	2393	283	2676	0.88	88
1987	3761	3479	418	3897	1.04	85
1988	4504	3931	459	4390	0.97	88
1989	4282	3511	408	3919	0.92	91
1990	3852	2243	259	2502	0.65	93
1991	3483	1171	44	1215	0.35	98
1992	3311	1882	543	2425	0.73	68
AFTER QUOTA		187	10	197		
MEANS, 95% CONFIDENCE LIMITS, N'S:						
84-89	3571.8	2878.5	347.8	3226.3	0.90	89
$\bar{X}\pm$95%CL	±761.3	±905.9	±104.2	±1000.3	±0.11	±2.21
N	6	6	6	6	6	6
86-91	3822.2	2788.0	311.8	3099.8	0.81	90
$\bar{X}\pm$95%CL	±553.5	±1088.0	±160.9	±1247.1	±0.26	±3.94
N	6	6	6	6	6	6

PERCENT GRILSE IS CALCULATED BY SMOLT CLASS.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1b. Summary of Atlantic salmon recreational catch and effort data for Newfoundland Region (Insular), 1953-92. After quota refers to the number of fish hooked and released after the quota was caught.

NEWFOUNDLAND REGION (INSULAR)

YEAR	EFFORT ROD DAYS	GRILSE <63 CM	SALMON ≥63 CM	TOTAL CATCH	CPUE	PERCENT GRILSE
1953	27955	7519	707	8226	0.29	.
1954	16974	3071	559	3630	0.21	93
1955	11183	4704	394	5098	0.46	89
1956	33532	7660	609	8269	0.25	89
1957	17514	7927	690	8617	0.49	92
1958	16593	9178	876	10054	0.61	90
1959	17570	7972	713	8685	0.49	93
1960	17530	6732	634	7366	0.42	93
1961	13730	4476	302	4778	0.35	96
1962	21641	9201	711	9912	0.46	86
1963	26824	10122	551	10673	0.40	94
1964	34886	15435	846	16281	0.47	92
1965	34083	11895	548	12443	0.37	97
1966	34073	13361	384	13745	0.40	97
1967	38067	9391	178	9569	0.25	99
1968	40004	16244	372	16616	0.42	96
1969	40347	16181	289	16470	0.41	98
1970	38933	15485	180	15665	0.40	99
1971	38417	12933	218	13151	0.34	99
1972	33487	12656	142	12798	0.38	99
1973	46180	19286	164	19450	0.42	99
1974	67894	15518	171	15689	0.23	99
1975	60191	16059	245	16304	0.27	98
1976	64853	16402	320	16722	0.26	98
1977	69057	21375	1186	22561	0.33	93
1978	63599	19723	616	20339	0.32	97
1979	50199	17849	379	18228	0.36	98
1980	66625	23373	720	24093	0.36	96
1981	77884	30428	552	30980	0.40	98
1982	85200	25987	531	26518	0.31	98
1983	82167	21616	695	22311	0.27	97
1984	79740	24831	47	24878	0.31	100
1985	82783	26527	*	26527	0.32	100
1986	79009	24182	*	24182	0.31	100
1987	47809	13013	*	13013	0.27	100
1988	73566	23960	*	23960	0.33	100
1989	53862	11525	*	11525	0.21	100
1990	64494	17409	*	17409	0.27	100
1991	52173	11132	*	11132	0.21	100
1992	39242	12271	*	12271	0.31	100
AFTER QUOTA		4105	*	4124		
MEANS, 95% CONFIDENCE LIMITS, N'S:						
84-89	73792.0	22205.0	47.0	22214.4	0.30	100
$\bar{X}\pm$95%CL	±14436.0	±7517.6	.	±7524.0	±0.05	±0.12
N	5	5	1	5	5	5
86-91	64620.8	17641.6	.	17641.6	0.27	100
$\bar{X}\pm$95%CL	±14662.1	±7915.1	.	±7915.1	±0.06	±0.00
N	5	5	.	5	5	5

1987 DATA NOT INCLUDED IN MEAN.
PERCENT GRILSE IS CALCULATED BY SMOLT CLASS.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1c. Summary of Atlantic salmon recreational catch and effort data for the entire Newfoundland Region, 1953-92. After quota refers to the number of fish hooked and released after the quota was caught.

NEWFOUNDLAND REGION (TOTAL)

YEAR	EFFORT ROD DAYS	GRILSE <63 CM	SALMON ≥63 CM	TOTAL CATCH	CPUE	PERCENT GRILSE
1953	27955	7519	707	8226	0.29	.
1954	17074	3421	709	4130	0.24	91
1955	11381	4829	402	5231	0.46	89
1956	33633	7680	609	8289	0.25	89
1957	17856	8949	739	9688	0.54	91
1958	16959	10027	896	10923	0.64	91
1959	18070	8795	750	9545	0.53	93
1960	17929	7290	673	7963	0.44	93
1961	14364	5189	428	5617	0.39	94
1962	22252	9965	769	10734	0.48	87
1963	27518	11494	609	12103	0.44	94
1964	36469	17351	967	18318	0.50	92
1965	35909	13439	784	14223	0.40	96
1966	36353	15339	746	16085	0.44	95
1967	39503	10476	373	10849	0.27	98
1968	41825	18375	681	19056	0.46	94
1969	41966	17793	409	18202	0.43	98
1970	41683	17932	421	18353	0.44	98
1971	41056	15940	457	16397	0.40	98
1972	36295	15180	486	15666	0.43	97
1973	51408	25347	741	26088	0.51	95
1974	70673	17279	683	17962	0.25	97
1975	62220	18962	418	19380	0.31	98
1976	68112	19630	840	20470	0.30	96
1977	72373	24307	1879	26186	0.36	91
1978	67434	21841	1200	23041	0.34	95
1979	53383	21066	869	21935	0.41	96
1980	69097	26235	1272	27507	0.40	94
1981	79729	33921	852	34773	0.44	97
1982	88321	28820	1072	29892	0.34	97
1983	85295	23988	993	24981	0.29	97
1984	82871	26779	372	27151	0.33	98
1985	85485	28536	194	28730	0.34	99
1986	82060	26575	283	26858	0.33	99
1987	51570	16492	418	16910	0.33	98
1988	78070	27891	459	28350	0.36	97
1989	58144	15036	408	15444	0.27	99
1990	68346	19652	259	19911	0.29	98
1991	55656	12303	44	12347	0.22	100
1992	42553	14153	543	14696	0.35	96
AFTER QUOTA		4292	29	4321		
MEANS, 95% CONFIDENCE LIMITS, N'S:						
84-89	77326.0	24963.4	343.2	25306.6	0.33	99
$\bar{X}\pm$95%CL	±13717.9	±6962.8	±130.7	±6915.0	±0.04	±0.77
N	5	5	5	5	5	5
86-91	68455.2	20291.4	290.6	20582.0	0.30	99
$\bar{X}\pm$95%CL	±14529.2	±8536.8	±200.2	±8656.0	±0.07	±0.97
N	5	5	5	5	5	5

1987 DATA NOT INCLUDED IN MEAN.
PERCENT GRILSE IS CALCULATED BY SMOLT CLASS.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1d. Summary of Atlantic salmon recreational catch and effort data for Salmon Fishing Area 1, 1953-92. After Quota refers to the number of fish hooked and released after the quota was caught.

SALMON FISHING AREA :01

YEAR	EFFORT ROD DAYS	GRILSE <63 CM	SALMON ≥63 CM	TOTAL CATCH	CPUE	PERCENT GRILSE
1953	.	.	.	.	.	.
1954	.	.	.	.	.	.
1955	.	.	.	.	.	.
1956	.	.	.	.	.	.
1957	.	.	.	.	.	.
1958	.	.	.	.	.	.
1959	.	.	.	.	.	.
1960	.	.	.	.	.	.
1961	.	.	.	.	.	.
1962	.	.	.	.	.	.
1963	.	.	.	.	.	.
1964	44	18	3	21	0.48	.
1965	278	57	75	132	0.47	19
1966	397	367	252	619	1.56	18
1967	468	119	106	225	0.48	78
1968	748	192	222	414	0.55	35
1969	.	.	.	.	.	100
1970	735	442	170	612	0.83	.
1971	739	518	120	638	0.86	79
1972	1003	909	209	1118	1.11	71
1973	1064	1015	128	1143	1.07	88
1974	801	347	311	658	0.82	77
1975	245	379	117	496	2.02	75
1976	928	891	368	1259	1.36	51
1977	809	688	533	1221	1.51	63
1978	694	875	432	1307	1.88	61
1979	1367	905	430	1335	0.98	67
1980	780	704	232	936	1.20	80
1981	414	660	195	855	2.07	78
1982	831	834	379	1213	1.46	64
1983	763	488	137	625	0.82	86
1984	1074	702	222	924	0.86	69
1985	946	642	135	777	0.82	84
1986	741	421	129	550	0.74	83
1987	1011	854	141	995	0.98	75
1988	1629	1278	171	1449	0.89	83
1989	1296	1269	144	1413	1.09	90
1990	895	523	90	613	0.68	93
1991	888	108	8	116	0.13	98
1992	675	164	286	450	0.67	27
AFTER QUOTA		4	0	4		
MEANS, 95% CONFIDENCE LIMITS, N'S:						
84-89	1116.2	861.0	157.0	1018.0	0.91	82.32
$\bar{X}\pm$95%CL	±324.4	±365.7	±36.7	±372.0	±0.12	±8.00
N	6	6	6	6	6	6
86-91	1076.7	742.2	113.8	856.0	0.80	87.95
$\bar{X}\pm$95%CL	±344.5	±499.0	±61.0	±551.6	±0.33	±6.71
N	6	6	6	6	6	6

PERCENT GRILSE IS CALCULATED BY SMOLT CLASS.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1e. Summary of Atlantic salmon recreational catch and effort data for Salmon Fishing Area 2, 1953-92. After Quota refers to the number of fish hooked and released after the quota was caught.

SALMON FISHING AREA :02

YEAR	EFFORT ROD DAYS	GRILSE <63 CM	SALMON ≥63 CM	TOTAL CATCH	CPUE	PERCENT GRILSE
1953	.	.	.	.	.	.
1954	100	350	150	500	5.00	.
1955	198	125	8	133	0.67	98
1956	101	20	0	20	0.20	100
1957	342	1022	49	1071	3.13	29
1958	366	849	20	869	2.37	98
1959	500	823	37	860	1.72	96
1960	399	558	39	597	1.50	95
1961	634	713	126	839	1.32	82
1962	611	764	58	822	1.35	92
1963	694	1372	58	1430	2.06	93
1964	1539	1898	118	2016	1.31	92
1965	1548	1487	161	1648	1.06	92
1966	1883	1611	110	1721	0.91	93
1967	968	966	89	1055	1.09	95
1968	1073	1939	87	2026	1.89	92
1969	1619	1612	120	1732	1.07	94
1970	2015	2005	71	2076	1.03	96
1971	1900	2489	119	2608	1.37	94
1972	1805	1615	135	1750	0.97	95
1973	4164	5046	449	5495	1.32	78
1974	1978	1414	201	1615	0.82	96
1975	1784	2524	56	2580	1.45	96
1976	2331	2337	152	2489	1.07	94
1977	2507	2244	160	2404	0.96	94
1978	3141	1243	152	1395	0.44	94
1979	1817	2312	60	2372	1.31	95
1980	1692	2158	320	2478	1.46	88
1981	1431	2833	105	2938	2.05	95
1982	2290	1999	162	2161	0.94	95
1983	2365	1884	161	2045	0.86	93
1984	2057	1246	103	1349	0.66	95
1985	1756	1367	59	1426	0.81	95
1986	2310	1972	154	2126	0.92	90
1987	2750	2625	277	2902	1.06	88
1988	2875	2653	288	2941	1.02	90
1989	2986	2242	264	2506	0.84	91
1990	2957	1720	169	1889	0.64	93
1991	2595	1063	36	1099	0.42	98
1992	2636	1718	257	1975	0.75	81
AFTER QUOTA		183	10	193		
MEANS, 95% CONFIDENCE LIMITS, N'S:						
84-89	2455.7	2017.5	190.8	2208.3	0.90	91.12
$\bar{X}\pm$95%CL	±517.0	±637.3	±103.5	±736.7	±0.15	±2.75
N	6	6	6	6	6	6
86-91	2745.5	2045.8	198.0	2243.8	0.82	91.37
$\bar{X}\pm$95%CL	±270.3	±633.2	±102.5	±732.9	±0.25	±3.15
N	6	6	6	6	6	6

PERCENT GRILSE IS CALCULATED BY SMOLT CLASS.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1f. Summary of Atlantic salmon recreational catch and effort data for Salmon Fishing Area 3, 1953-92. After Quota refers to the number of fish hooked and released after the quota was caught.

SALMON FISHING AREA :03

YEAR	EFFORT ROD DAYS	GRILSE <63 CM	SALMON ≥63 CM	TOTAL CATCH	CPUE	PERCENT GRILSE
1953	77	58	8	66	0.86	.
1954	134	33	0	33	0.25	100
1955	36	11	0	11	0.31	100
1956	164	70	0	70	0.43	100
1957	68	47	0	47	0.69	100
1958	49	23	0	23	0.47	100
1959	82	14	0	14	0.17	100
1960	45	23	0	23	0.51	100
1961	160	58	1	59	0.37	96
1962	186	92	0	92	0.49	100
1963	353	190	0	190	0.54	100
1964	653	368	0	368	0.56	100
1965	889	677	4	681	0.77	99
1966	2298	1190	21	1211	0.53	97
1967	1725	459	2	461	0.27	100
1968	1801	1243	27	1270	0.71	94
1969	2118	945	45	990	0.47	97
1970	1207	784	1	785	0.65	100
1971	1175	742	11	753	0.64	99
1972	1195	498	0	498	0.42	100
1973	1667	1188	2	1190	0.71	100
1974	1890	839	4	843	0.45	100
1975	1948	1107	0	1107	0.57	100
1976	2284	947	1	948	0.42	100
1977	2249	1530	4	1534	0.68	100
1978	2030	758	1	759	0.37	100
1979	2514	2040	0	2040	0.81	100
1980	2585	1743	37	1780	0.69	98
1981	3113	2358	3	2361	0.76	100
1982	3907	2634	88	2722	0.70	96
1983	4075	1617	2	1619	0.40	100
1984	2248	1001	0	1001	0.45	100
1985	2355	1310	*	1310	0.56	100
1986	1430	772	*	772	0.54	100
1987	1121	563	*	563	0.50	100
1988	2979	1756	*	1756	0.59	100
1989	1672	738	*	738	0.44	100
1990	3159	1718	*	1718	0.54	100
1991	3495	1316	*	1316	0.38	100
1992	2884	1562	*	1562	0.54	100
AFTER QUOTA		120	*	125		
MEANS, 95% CONFIDENCE LIMITS, N'S:						
84-89	2136.8	1115.4	0.0	1115.4	0.52	100.00
$\bar{X}\pm$95%CL	±756.5	±527.4	.	±527.4	±0.09	±0.00
N	5	5	1	5	5	5
86-91	2547.0	1260.0	.	1260.0	0.49	100.00
$\bar{X}\pm$95%CL	±1157.0	±611.3	.	±611.3	±0.13	±0.00
N	5	5	.	5	5	5

1987 DATA NOT INCLUDED IN MEAN.
PERCENT GRILSE IS CALCULATED BY SMOLT CLASS.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1g. Summary of Atlantic salmon recreational catch and effort data for Salmon Fishing Area 4, 1953-92. After Quota refers to the number of fish hooked and released after the quota was caught.

SALMON FISHING AREA :04

YEAR	EFFORT ROD DAYS	GRILSE <63 CM	SALMON ≥63 CM	TOTAL CATCH	CPUE	PERCENT GRILSE
1953	8630	2984	501	3485	0.40	.
1954	7344	1172	428	1600	0.22	87
1955	5125	2367	249	2616	0.51	82
1956	10672	3892	458	4350	0.41	84
1957	8789	4423	527	4950	0.56	88
1958	5888	4364	637	5001	0.85	87
1959	6321	3700	520	4220	0.67	89
1960	7051	3441	509	3950	0.56	88
1961	5277	2118	162	2280	0.43	96
1962	8842	4397	482	4879	0.55	81
1963	10910	3710	332	4042	0.37	93
1964	15608	7237	680	7917	0.51	85
1965	13749	4233	318	4551	0.33	96
1966	15249	6433	194	6627	0.43	96
1967	13915	4163	63	4226	0.30	99
1968	15318	5938	201	6139	0.40	95
1969	13807	4024	114	4138	0.30	98
1970	15759	4849	47	4896	0.31	99
1971	11379	3783	58	3841	0.34	99
1972	10778	3444	24	3468	0.32	99
1973	14544	6710	49	6759	0.46	99
1974	22038	5373	82	5455	0.25	99
1975	22384	5943	166	6109	0.27	97
1976	24787	6683	188	6871	0.28	97
1977	28117	8396	1086	9482	0.34	86
1978	24131	8774	502	9276	0.38	94
1979	21496	8026	327	8353	0.39	96
1980	25172	9414	507	9921	0.39	94
1981	32282	13536	361	13897	0.43	96
1982	32929	9973	258	10231	0.31	98
1983	26649	8954	297	9251	0.35	97
1984	29633	9900	15	9915	0.33	100
1985	34329	12190	*	12190	0.36	100
1986	31650	9293	*	9293	0.29	100
1987	18564	5453	*	5453	0.29	100
1988	27413	9854	*	9854	0.36	100
1989	17767	3786	*	3786	0.21	100
1990	23533	5661	*	5661	0.24	100
1991	21999	4892	*	4892	0.22	100
1992	15097	5290	*	5290	0.35	100
AFTER QUOTA		1515	*	1520		
MEANS, 95% CONFIDENCE LIMITS, N'S:						
84-89	28158.4	9004.6	15.0	9007.6	0.32	99.97
$\bar{X}\pm$95%CL	±7877.0	±3876.4	.	±3877.8	±0.06	±0.09
N	5	5	1	5	5	5
86-91	24472.4	6697.2	.	6697.2	0.27	100.00
$\bar{X}\pm$95%CL	±6574.0	±3372.6	.	±3372.6	±0.08	±0.00
N	5	5	.	5	5	5

1987 DATA NOT INCLUDED IN MEAN.
PERCENT GRILSE IS CALCULATED BY SMOLT CLASS.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1h. Summary of Atlantic salmon recreational catch and effort data for Salmon Fishing Area 5, 1953-92. After Quota refers to the number of fish hooked and released after the quota was caught.

SALMON FISHING AREA :05

YEAR	EFFORT ROD DAYS	GRILSE <63 CM	SALMON ≥63 CM	TOTAL CATCH	CPUE	PERCENT GRILSE
1953	6209	1099	37	1136	0.18	.
1954	3302	499	29	528	0.16	97
1955	1764	815	35	850	0.48	93
1956	12072	1077	62	1139	0.09	93
1957	2326	822	44	866	0.37	96
1958	2719	1384	40	1424	0.52	95
1959	3063	1125	43	1168	0.38	97
1960	2580	767	14	781	0.30	99
1961	2185	409	36	445	0.20	96
1962	2639	973	62	1035	0.39	87
1963	4519	1546	61	1607	0.36	94
1964	4877	2376	63	2439	0.50	96
1965	5231	1803	33	1836	0.35	99
1966	4281	1431	35	1466	0.34	98
1967	3754	1569	25	1594	0.42	98
1968	3732	2226	44	2270	0.61	97
1969	5769	2605	27	2632	0.46	99
1970	3189	2226	35	2261	0.71	99
1971	5963	1680	38	1718	0.29	98
1972	2015	1895	20	1915	0.95	99
1973	3894	2112	12	2124	0.55	99
1974	9335	1637	21	1658	0.18	99
1975	7527	1988	23	2011	0.27	99
1976	6975	1898	65	1963	0.28	97
1977	10572	4616	44	4660	0.44	98
1978	9108	2858	28	2886	0.32	99
1979	3926	1331	20	1351	0.34	99
1980	8155	2702	29	2731	0.33	98
1981	8863	3488	35	3523	0.40	99
1982	9935	2433	53	2486	0.25	99
1983	10195	2357	170	2527	0.25	93
1984	12403	2703	1	2704	0.22	100
1985	11613	3484	*	3484	0.30	100
1986	11510	4053	*	4053	0.35	100
1987	5267	1664	*	1664	0.32	100
1988	10497	4166	*	4166	0.40	100
1989	6617	1417	*	1417	0.21	100
1990	7999	2414	*	2414	0.30	100
1991	7002	2048	*	2048	0.29	100
1992	5830	1941	*	1941	0.33	100
AFTER QUOTA		728	*	729		
MEANS, 95% CONFIDENCE LIMITS, N'S:						
84-89	10528.0	3164.6	1.0	3164.8	0.30	99.99
$\bar{X}\pm$95%CL	±2841.9	±1410.4	.	±1410.3	±0.10	±0.02
N	5	5	1	5	5	5
86-91	8725.0	2819.6	.	2819.6	0.32	100.00
$\bar{X}\pm$95%CL	±2694.4	±1528.5	.	±1528.5	±0.08	±0.00
N	5	5	.	5	5	5

1987 DATA NOT INCLUDED IN MEAN.
PERCENT GRILSE IS CALCULATED BY SMOLT CLASS.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1i. Summary of Atlantic salmon recreational catch and effort data for Salmon Fishing Area 6, 1953-92. After Quota refers to the number of fish hooked and released after the quota was caught.

SALMON FISHING AREA :06

YEAR	EFFORT ROD DAYS	GRILSE <63 CM	SALMON ≥63 CM	TOTAL CATCH	CPUE	PERCENT GRILSE
1953	6513	118	0	118	0.02	0
1954	2515	44	0	44	0.02	100
1955	628	92	0	92	0.15	100
1956	4402	92	2	94	0.02	98
1957	805	87	0	87	0.11	100
1958	592	115	0	115	0.19	100
1959	535	55	0	55	0.10	100
1960	547	54	0	54	0.10	100
1961	512	19	0	19	0.04	100
1962	575	53	0	53	0.09	100
1963	837	93	1	94	0.11	98
1964	978	92	0	92	0.09	100
1965	871	85	3	88	0.10	97
1966	935	90	0	90	0.10	100
1967	1480	89	0	89	0.06	100
1968	1126	120	0	120	0.11	100
1969	917	106	0	106	0.12	100
1970	650	84	3	87	0.13	97
1971	710	55	1	56	0.08	99
1972	1345	119	0	119	0.09	100
1973	1683	250	0	250	0.15	100
1974	2685	303	1	304	0.11	100
1975	1851	94	1	95	0.05	100
1976	2864	247	2	249	0.09	98
1977	1869	401	19	420	0.22	93
1978	2237	296	7	303	0.14	98
1979	1766	244	2	246	0.14	99
1980	2807	320	14	334	0.12	95
1981	3406	605	29	634	0.19	92
1982	3031	288	17	305	0.10	97
1983	3684	296	10	306	0.08	97
1984	3218	312	5	317	0.10	98
1985	2256	429	*	429	0.19	100
1986	2596	445	*	445	0.17	100
1987	1306	137	*	137	0.10	100
1988	3392	429	*	429	0.13	100
1989	2959	246	*	246	0.08	100
1990	3089	334	*	334	0.11	100
1991	1620	186	*	186	0.11	100
1992	2028	230	*	230	0.11	100
AFTER QUOTA		10	*	10		
MEANS, 95% CONFIDENCE LIMITS, N'S:						
$\bar{X}$ 84-89	2884.2	372.2	5.0	373.2	0.13	99.69
$\bar{X}$±95%CL	±573.2	±109.8	.	±108.8	±0.05	±0.89
N	5	5	1	5	5	5
$\bar{X}$ 86-91	2731.2	328.0	.	328.0	0.12	100.00
$\bar{X}$±95%CL	±848.9	±139.9	.	±139.9	±0.04	±0.00
N	5	5	.	5	5	5

1987 DATA NOT INCLUDED IN MEAN.
PERCENT GRILSE IS CALCULATED BY SMOLT CLASS.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1j. Summary of Atlantic salmon recreational catch and effort data for Salmon Fishing Area 7, 1953-92. After Quota refers to the number of fish hooked and released after the quota was caught.

SALMON FISHING AREA :07

YEAR	EFFORT ROD DAYS	GRILSE <63 CM	SALMON ≥63 CM	TOTAL CATCH	CPUE	PERCENT GRILSE
1953	244	43	0	43	0.18	0
1954	41	5	0	5	0.12	100
1955	7	0	0	0	0.00	100
1956	307	27	1	28	0.09	0
1957	59	24	1	25	0.42	96
1958	72	19	0	19	0.26	100
1959	134	13	0	13	0.10	100
1960	128	25	1	26	0.20	93
1961	54	7	2	9	0.17	93
1962	.	.	.	.	.	100
1963	275	36	0	36	0.13	0
1964	660	59	0	59	0.09	100
1965	762	165	1	166	0.22	98
1966	647	97	0	97	0.15	100
1967	997	78	0	78	0.08	100
1968	829	31	1	32	0.04	99
1969	1216	33	0	33	0.03	100
1970	1103	20	1	21	0.02	97
1971	1295	40	0	40	0.03	100
1972	875	61	0	61	0.07	100
1973	1167	131	0	131	0.11	100
1974	2019	133	2	135	0.07	98
1975	1436	40	0	40	0.03	100
1976	1128	30	0	30	0.03	100
1977	1775	78	1	79	0.04	97
1978	1786	99	1	100	0.06	99
1979	1332	125	0	125	0.09	100
1980	1546	102	1	103	0.07	99
1981	1348	123	2	125	0.09	98
1982	1621	155	10	165	0.10	92
1983	1804	139	34	173	0.10	82
1984	1381	96	4	100	0.07	97
1985	1635	112	*	112	0.07	100
1986	700	102	*	102	0.15	100
1987	632	28	*	28	0.04	100
1988	1645	128	*	128	0.08	100
1989	1226	66	*	66	0.05	100
1990	827	49	*	49	0.06	100
1991	644	36	*	36	0.06	100
1992	1070	40	*	40	0.04	100
AFTER QUOTA		0	*	0		
MEANS, 95% CONFIDENCE LIMITS, N'S:						
$\bar{X}$ 84-89	1317.4	100.8	4.0	101.6	0.08	99.21
$\bar{X}\pm$95%CL	±481.6	±28.5	.	±28.3	±0.03	±2.00
N	5	5	1	5	5	5
$\bar{X}$ 86-91	1008.4	76.2	.	76.2	0.08	100.00
$\bar{X}\pm$95%CL	±524.4	±47.3	.	±47.3	±0.04	±0.00
N	5	5	.	5	5	5

1987 DATA NOT INCLUDED IN MEAN.
PERCENT GRILSE IS CALCULATED BY SMOLT CLASS.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1k. Summary of Atlantic salmon recreational catch and effort data for Salmon Fishing Area 8, 1953-92. After Quota refers to the number of fish hooked and released after the quota was caught.

SALMON FISHING AREA :08

YEAR	EFFORT ROD DAYS	GRILSE <63 CM	SALMON ≥63 CM	TOTAL CATCH	CPUE	PERCENT GRILSE
1953	50	6	0	6	0.12	0
1954	.	.	.	.	.	100
1955	.	.	.	.	.	.
1956	.	.	.	.	.	.
1957	.	.	.	.	.	.
1958	.	.	.	.	.	.
1959	.	.	.	.	.	.
1960	.	.	.	.	.	.
1961	.	.	.	.	.	.
1962	.	.	.	.	.	.
1963	.	.	.	.	.	.
1964	.	.	.	.	.	.
1965	17	44	6	50	2.94	.
1966	100	32	2	34	0.34	96
1967	.	.	.	.	.	100
1968	166	22	0	22	0.13	0
1969	16	12	0	12	0.75	100
1970	.	.	.	.	.	100
1971	290	25	9	34	0.12	.
1972	270	28	0	28	0.10	100
1973	410	94	4	98	0.24	88
1974	659	51	0	51	0.08	100
1975	527	87	0	87	0.17	100
1976	514	80	0	80	0.16	100
1977	530	81	0	81	0.15	100
1978	269	44	0	44	0.16	100
1979	331	100	0	100	0.30	100
1980	316	120	0	120	0.38	100
1981	384	77	0	77	0.20	100
1982	538	85	9	94	0.17	90
1983	414	41	5	46	0.11	94
1984	357	79	0	79	0.22	100
1985	611	103	*	103	0.17	100
1986	696	138	*	138	0.20	100
1987	268	43	*	43	0.16	100
1988	474	79	*	79	0.17	100
1989	330	99	*	99	0.30	100
1990	349	86	*	86	0.25	100
1991	324	11	*	11	0.03	100
1992	.	.	*	.	.	100
AFTER QUOTA		.	*	.		
MEANS, 95% CONFIDENCE LIMITS, N'S:						
84-89	493.6	99.6	0.0	99.6	0.20	100.00
$\bar{X}\pm$95%CL	±196.9	±30.0	.	±30.0	±0.05	±0.00
N	5	5	1	5	5	5
86-91	434.6	82.6	.	82.6	0.19	100.00
$\bar{X}\pm$95%CL	±196.7	±57.2	.	±57.2	±0.09	±0.00
N	5	5	.	5	5	5

1987 DATA NOT INCLUDED IN MEAN.
PERCENT GRILSE IS CALCULATED BY SMOLT CLASS.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 11. Summary of Atlantic salmon recreational catch and effort data for Salmon Fishing Area 9, 1953-92. After Quota refers to the number of fish hooked and released after the quota was caught.

SALMON FISHING AREA :09

YEAR	EFFORT ROD DAYS	GRILSE <63 CM	SALMON ≥63 CM	TOTAL CATCH	CPUE	PERCENT GRILSE
1953	3012	1954	44	1998	0.66	.
1954	1712	617	32	649	0.38	98
1955	1701	673	36	709	0.42	94
1956	2411	1319	22	1341	0.56	97
1957	2602	1355	48	1403	0.54	96
1958	3094	1350	51	1401	0.45	96
1959	3557	1447	52	1499	0.42	96
1960	4223	937	46	983	0.23	97
1961	2681	705	17	722	0.27	98
1962	3685	1002	38	1040	0.28	95
1963	4311	1620	48	1668	0.39	95
1964	6044	1295	23	1318	0.22	99
1965	5214	1852	76	1928	0.37	94
1966	3416	822	13	835	0.24	99
1967	7421	900	17	917	0.12	98
1968	5264	1105	1	1106	0.21	100
1969	6976	1422	9	1431	0.21	99
1970	7701	1893	12	1905	0.25	99
1971	6704	1620	19	1639	0.24	99
1972	5633	1139	8	1147	0.20	100
1973	7660	2160	20	2180	0.28	98
1974	9162	1494	9	1503	0.16	100
1975	10046	1872	6	1878	0.19	100
1976	8809	1623	12	1635	0.19	99
1977	8766	1080	9	1089	0.12	99
1978	7224	1303	17	1320	0.18	98
1979	5859	1704	15	1719	0.29	99
1980	6446	2379	61	2440	0.38	97
1981	6343	1862	52	1914	0.30	98
1982	8574	1825	33	1858	0.22	98
1983	10754	2303	71	2374	0.22	96
1984	8754	2264	5	2269	0.26	100
1985	9385	1750	*	1750	0.19	100
1986	8807	2298	*	2298	0.26	100
1987	5994	867	*	867	0.14	100
1988	7157	1373	*	1373	0.19	100
1989	7039	1315	*	1315	0.19	100
1990	8240	1866	*	1866	0.23	100
1991	6482	560	*	560	0.09	100
1992	4956	690	*	690	0.14	100
AFTER QUOTA		196	*	197		
MEANS, 95% CONFIDENCE LIMITS, N'S:						
84-89	8228.4	1800.0	5.0	1801.0	0.22	99.94
$\bar{X}\pm$95%CL	±1318.6	±583.5	.	±585.0	±0.05	±0.15
N	5	5	1	5	5	5
86-91	7545.0	1482.4	.	1482.4	0.20	100.00
$\bar{X}\pm$95%CL	±1179.9	±810.2	.	±810.2	±0.08	±0.00
N	5	5	.	5	5	5

1987 DATA NOT INCLUDED IN MEAN.
PERCENT GRILSE IS CALCULATED BY SMOLT CLASS.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1m. Summary of Atlantic salmon recreational catch and effort data for Salmon Fishing Area 10, 1953-92. After Quota refers to the number of fish hooked and released after the quota was caught.

SALMON FISHING AREA :10

YEAR	EFFORT ROD DAYS	GRILSE <63 CM	SALMON ≥63 CM	TOTAL CATCH	CPUE	PERCENT GRILSE
1953	2216	712	44	756	0.34	.
1954	1486	356	37	393	0.26	95
1955	1584	306	29	335	0.21	92
1956	2814	425	14	439	0.16	96
1957	2064	484	30	514	0.25	93
1958	3046	1043	65	1108	0.36	88
1959	2525	657	33	690	0.27	97
1960	2197	511	23	534	0.24	97
1961	1507	236	2	238	0.16	100
1962	3658	679	68	747	0.20	78
1963	3785	1058	38	1096	0.29	95
1964	3507	1408	18	1426	0.41	98
1965	4591	875	43	918	0.20	97
1966	4334	820	22	842	0.19	98
1967	4942	333	4	337	0.07	100
1968	6641	1387	6	1393	0.21	98
1969	3800	979	29	1008	0.27	98
1970	3899	601	7	608	0.16	99
1971	4796	928	17	945	0.20	97
1972	5841	567	4	571	0.10	100
1973	8714	1785	42	1827	0.21	93
1974	10987	1212	14	1226	0.11	99
1975	5999	427	9	436	0.07	99
1976	8811	730	10	740	0.08	98
1977	7213	1097	5	1102	0.15	99
1978	8764	1595	42	1637	0.19	96
1979	6405	849	8	857	0.13	100
1980	9588	1524	27	1551	0.16	97
1981	9309	1317	29	1346	0.14	98
1982	9331	1256	10	1266	0.14	99
1983	9173	1140	79	1219	0.13	94
1984	6361	1457	2	1459	0.23	100
1985	6887	1326	*	1326	0.19	100
1986	6387	1535	*	1535	0.24	100
1987	3348	429	*	429	0.13	100
1988	5198	1142	*	1142	0.22	100
1989	4709	898	*	898	0.19	100
1990	4778	835	*	835	0.17	100
1991	2960	230	*	230	0.08	100
1992	1520	245	*	245	0.16	100
AFTER QUOTA		497	*	503		
MEANS, 95% CONFIDENCE LIMITS, N'S:						
84-89	5908.4	1271.6	2.0	1272.0	0.22	99.96
$\bar{X}\pm$95%CL	±1133.7	±318.4	.	±318.9	±0.03	±0.10
N	5	5	1	5	5	5
86-91	4806.4	928.0	.	928.0	0.19	100.00
$\bar{X}\pm$95%CL	±1529.7	±592.6	.	±592.6	±0.06	±0.00
N	5	5	.	5	5	5

1987 DATA NOT INCLUDED IN MEAN.
PERCENT GRILSE IS CALCULATED BY SMOLT CLASS.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

Appendix 1n. Summary of Atlantic salmon recreational catch and effort data for Salmon Fishing Area 11, 1953-92. After Quota refers to the number of fish hooked and released after the quota was caught.

SALMON FISHING AREA :11

YEAR	EFFORT ROD DAYS	GRILSE <63 CM	SALMON ≥63 CM	TOTAL CATCH	CPUE	PERCENT GRILSE
1953	1004	545	73	618	0.62	.
1954	440	345	33	378	0.86	94
1955	338	440	45	485	1.43	88
1956	690	758	50	808	1.17	90
1957	801	685	40	725	0.91	95
1958	1133	880	83	963	0.85	89
1959	1353	961	65	1026	0.76	93
1960	759	974	41	1015	1.34	96
1961	1354	924	82	1006	0.74	92
1962	2056	2005	61	2066	1.00	94
1963	1834	1869	71	1940	1.06	97
1964	2559	2600	62	2662	1.04	97
1965	2759	2161	64	2225	0.81	98
1966	2813	2446	97	2543	0.90	96
1967	3833	1800	67	1867	0.49	97
1968	5127	4172	92	4264	0.83	95
1969	5728	6055	65	6120	1.07	98
1970	5425	5028	74	5102	0.94	99
1971	6105	4060	65	4125	0.68	99
1972	5535	4905	86	4991	0.90	98
1973	6441	4856	35	4891	0.76	99
1974	9119	4476	38	4514	0.50	99
1975	8473	4501	40	4541	0.54	99
1976	8681	4164	42	4206	0.48	99
1977	7966	4096	18	4114	0.52	100
1978	8050	3996	18	4014	0.50	100
1979	6570	3430	7	3437	0.52	100
1980	10010	5069	44	5113	0.51	99
1981	12836	7062	41	7103	0.55	99
1982	15334	7338	53	7391	0.48	99
1983	15419	4769	27	4796	0.31	100
1984	15385	7019	15	7034	0.46	100
1985	13712	5823	*	5823	0.42	100
1986	15233	5546	*	5546	0.36	100
1987	11309	3829	*	3829	0.34	100
1988	14811	5033	*	5033	0.34	100
1989	11543	2960	*	2960	0.26	100
1990	12520	4446	*	4446	0.36	100
1991	7647	1853	*	1853	0.24	100
1992	5857	2273	*	2273	0.39	100
AFTER QUOTA		1039	*	1040		
MEANS, 95% CONFIDENCE LIMITS, N'S:						
84-89	14136.8	5276.2	15.0	5279.2	0.37	99.94
$\bar{X}\pm$95%CL	±1975.2	±1845.1	.	±1850.6	±0.09	±0.16
N	5	5	1	5	5	5
86-91	12350.8	3967.6	.	3967.6	0.32	100.00
$\bar{X}\pm$95%CL	±3784.9	±1897.6	.	±1897.6	±0.06	±0.00
N	5	5	.	5	5	5

1987 DATA NOT INCLUDED IN MEAN.
PERCENT GRILSE IS CALCULATED BY SMOLT CLASS.
IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.
* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.