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**Status report for northern Labrador
Arctic charr stocks in 1994**

by

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Abstract

Catch and effort statistics for the northern Labrador Arctic charr fishery in 1994 are summarized. Total northern Labrador charr landings of 31 t were the lowest on record since 1974 and 68% below the previous 10-year mean of 98 t. Charr landings from the Nain fishing region totaled 29 t or 94% of the northern Labrador catch. Within the Nain fishing region, effort was the lowest recorded for the Nain and Voisey stock units. Much of the reduced effort is attributable to the licence buy-out. Catch rates, however, increased in all stock units particularly at Okak where virtually no exploitation has occurred during the past three years. Landings of Arctic charr from the Okak assessment unit during 1994 represented 37% of the overall catch from the Nain fishing region, while the Nain unit contributed 30%. Coincident with the reduction in commercial fishing licences has been an increase by 142% in food fishing licences over 1993. Information on timing of the fisheries, catch- and weight-at-age along with an index of condition are provided for the three main stock units to complement previous studies. A brief summary is also provided on the experimental fisheries at Saglek Fiord where in 1994, Arctic charr from three rivers were harvested.

Résumé

On présente un sommaire des statistiques sur les prises et l'effort de pêche de l'omble chevalier dans le nord du Labrador en 1994. Les débarquements totaux pour cette région, soit 31 t, sont les plus bas enregistrés depuis 1974 et sont inférieurs de 68 % à la moyenne des dix dernières années (98 t). Les débarquements d'omble chevalier provenant de la zone de pêche de Nain s'établissaient à 29 t, ce qui représente 94 % des prises de tout le nord du Labrador. Dans la zone de Nain, l'effort dans les unités de stock de Nain et de Voisey était le plus bas enregistré à ce jour. Une bonne partie de la baisse de l'effort est attribuable au rachat des permis. Les taux de prises ont cependant augmenté dans toutes les unités de stock, particulièrement à Okak où il n'y avait pratiquement pas eu de pêche depuis trois ans. En 1994, les débarquements d'omble chevalier de l'unité d'évaluation d'Okak représentaient 37% des prises totales de la zone de pêche de Nain, tandis que ceux de l'unité de Nain représentaient 30 % du total. En même temps que les permis de pêche commerciale ont été réduits, le nombre de permis de pêche de subsistance s'est accru de 142 % par rapport à 1993. Pour compléter les études antérieures, on présente également des renseignements au sujet de la période de pêche et des prises et du poids selon l'âge, ainsi qu'un index des conditions dans les trois principales unités de stock. Est aussi inclus un bref résumé sur la pêche expérimentale dans le fjord Saglek, où on a récolté de l'omble chevalier dans trois rivières en 1994.

Introduction

Continuous records of commercial landings of anadromous Arctic charr (Salvelinus alpinus) from the northern Labrador coast are available since 1944. Catch statistics from the Nain and Makkovik Fishing Regions, and from subareas within the Nain Fishing Region (Fig. 1) exist since 1974. From 1977 to 1982 more than 200 t per year of Arctic charr were caught in northern Labrador but during the previous five years (1989-93) annual landings averaged only 82 t. The highest landings on record were 252 t in 1981. Prior to 1994, the lowest landings during the past 30 years was 38 t and occurred in 1993.

Much of the decline in landings in the Nain fishing region during the past eight years can be attributed to a reduction in fishing effort. However, individual assessments of the Voisey and Nain stock units have indicated that stock sizes in the early 1990's were below levels estimated for the late 1970's and early 1980's (Dempson 1992, 1993a). In recent years, the Labrador Inuit Association (LIA) has explored the feasibility of developing in-river fisheries for Arctic charr in some of the northern fiord subareas. These fisheries could provide selective harvests on some charr stocks while at the same time providing an opportunity for direct evidence of actual spawning escapements.

This paper summarizes catch statistics information for the 1994 northern Labrador Arctic charr fishery and updates previous reports (summarized in Dempson and Shears 1991, 1992, 1994 and Dempson 1993b) which have examined landings in the commercial fishery. Data from experimental in-river fisheries in 1994 are also summarized.

Noteworthy events or changes in 1994

The following summarizes noteworthy events occurring in 1994:

- total allowable catch reduced by 32% for the Nain stock unit;
- extension of the commercial salmon licence by-out to north coast residents reduced the number of licenced fisherpersons at Nain by 50% over 1993 and 70% from 1992;
- with the reduction in commercial licences there was a corresponding increase in food fishing licences by 90% over 1993 at Nain and an increase by 142% for all north coast communities (Postville, Makkovik, Hopedale, Davis Inlet, Nain);
- experimental fisheries were carried out on three Saglek Fiord rivers;
- a creel survey was carried out for the first time by the LIA at Nain Bay during the spring food fishery.

Methods

Information on commercial landings of Arctic charr from the Nain fishing region was obtained through purchase slips prepared by Statistics and Informatics Branch of the Department of Fisheries and Oceans and processed by Salmon and Charr Section of the Salmonid and Habitat Sciences Division. Information on landings from the Makkovik region were obtained directly from records provided by the Makkovik fish plant. Purchase slips from the Nain fishing region included the following information: name of the fisherperson, licence number, area where the fish were caught, date, weight of fish (by species) landed, and number of fish caught. Landed gutted head-on catches were converted to round weight (in kilograms) using the conversion factor: gutted head-on weight $\times 1.22 =$ round weight (Dempson 1984). Catch per unit effort estimates in this document, expressed in terms of kilograms per person-week fished, follow the traditional values used in past reports and were derived from the method initiated by Coady and Best (1976). These unstandardized values are included for comparative purposes with past reports.

A multiplicative model (Gavaris 1980) was used to standardize catch rates for each stock unit and account for differences among years and weeks:

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

where, Y_{ij} is the response variable, standardized catch rate, α_i and β_j are class variables year and week respectively, and ϵ_{ij} is the error term. For this analysis, weeks were collapsed into eight intervals as follows: standard weeks 24-26 were grouped, as were weeks 27-28, 33-34, and weeks 35 to the end of the season. Other weeks remained as before. For the Nain and Okak stock units, inshore and offshore zones were treated separately. These fisheries are carried out using shore-set surface gill nets, often in traditional fishing berths. The regression of \ln catch rate for the period 1977 to 1994 was initially fitted using SAS REG procedures (SAS 1985) to avail of the various diagnostics techniques. Back-transformed standardized catch rates were subsequently obtained using a bias correction process also run in SAS.

Information on length, weight and age (otolith) of Arctic charr caught in the commercial fishery was obtained as fish were processed at the Nain Fish Plant. A two-stage stratified sampling program was carried out. Samples are identified from individual subareas which form component parts of stock units (Dempson and Kristofferson 1987).

Analyses of fish condition, by stock unit, followed the same methods as last year (Dempson and Shears 1994) which used the approach described by Winters and Wheeler (1994). A general linear model (\log_e transformed) was used to examine the response of fish weight, standardized to a common length, to various factors as:

$$Y_{ijk} = \mu + \alpha_i + \beta_j + (\alpha\beta)_{ij} + b \cdot Z_{ijk} + \epsilon_{ijk}$$

where, Y_{ijk} = the response variable, charr weight (gutted, head-on), α_i and β_j are class variables month and year, respectively, $(\alpha\beta)_{ij}$ is an interaction term between month and year, Z_{ijk} is the covariate fork length, and ϵ_{ijk} is the error term associated with individual observations. With respect to the month variable, July refers to fish caught in June and July, while August includes both August and September. This model was used to calculate adjusted mean weights by year, standardized to the covariate.

Results and Discussion

Total northern Labrador Arctic charr landings - overview

Figure 2 illustrates the commercial landings of Arctic charr from 1944 to 1994. Also shown are the landings from the Nain and Makkovik fishing regions since 1974. During the past 21 years, the Nain region has contributed 85% of the total northern Labrador catch of Arctic charr averaging 118 t per year. Commercial landings from both regions in 1994 totaled only 31 t, and was 59% and 68% below the previous five (76 t, 1989-93) and ten year (139 t, 1984-93) means (Table 1). Individually, landings in the Nain fishing region of 29 t in 1994 declined by 13% from 1993. The 1994 catch was 54% and 64% below previous five (64 t, 1989-93) and ten year (82 t, 1984-93) means. The number of people fishing was relatively consistent from 1987-92 but dropped considerably in 1993. A further reduction by 50% occurred in 1994 as a result of the extension of the commercial salmon licence by-out to north coast residents. Effort (unstandardized) in terms of person-weeks fished in 1994 was 46% less than in 1993 and was the lowest value recorded since 1974 (Appendix 1). It has declined by 85% from the 1981-85 average.

Charr landings from the Makkovik region in 1994 decreased by 62% from the previous year and totaled only 1.78 t. The highest landings in the Makkovik region, 39 t, occurred in 1982. In previous years concern had been expressed about low catches and the amount of small charr being caught at Makkovik, Postville, and Hopedale (Unpublished Annual Report by Fishery Officer Eric Andersen, Makkovik, Labrador). Concerns pertain equally to the local food fisheries for charr.

An experimental fishery occurred in three Saglek Fiord rivers in 1994. The total catch retained for harvest was 2.1 t. A summary of harvests from experimental river fisheries for 1994 and prior years is provided in Table 2.

Appendix 1 provides an updated summary of catch and effort statistics for all subareas within the Nain fishing region from 1974 to 1994 (experimental harvests are not included in the appendix - refer to Table 2). Some of these subareas form component parts of larger assessment or stock units. The Nain fishing region is composed of three primary assessment units (Voisey, Nain, and Okak) in addition to other subareas which are not, at present, component parts of larger assessment units or stock complexes. These primary assessment units have contributed an average of 80% of the commercial production of Arctic charr from the Nain fishing region over the period 1974-91.

With the reduction in commercial salmon and charr fishing licences in north Labrador, there was a corresponding increase in food fishing licences in 1994. A comparison with past years follows:

Community	No. of food licences					
	1980	1982	1987	1988	1993	1994
Postville	12	7	10	8	22	48
Makkovik	19	14	15	8	13	40
Hopedale	7	12	22	14	16	51
Davis Inlet	5	5	1	1	6	10
Nain	10	7	3	16	21	40
TOTAL	53	45	51	47	78	189

At Nain, this increase was 90% over the previous year and for all north coast communities a 142% increase from 1993. Accurate information on the amount of Arctic charr harvested by food fishing nets is unknown. However, according to the local Fisheries Officer at Nain, 5.5 tonnes could be a minimum estimate over the entire fishing season for that community (N. Anderson, Nain, Labrador, pers. communication).

Individual stock unit summaries

Voisey Stock Unit

V.1 Commercial landings and catch rates

The Voisey stock unit is made up of Voisey Bay and the Antons subareas (Fig. 1). Annual landings have ranged from 4 to 41 t (mean = 18 t, 1974-94), and over this interval have contributed 16% of the commercial catch of charr from the Nain fishing region (Table 3). The highest catches occurred during the late 1970's (Fig. 3), the lowest catch of 3.3 t was in 1994. The Total Allowable Catches (TAC) listed in Table 3 for 1979 to 1984 applied only to the Voisey Bay subarea. A TAC of 14 t was maintained for 1994.

Landings of Arctic charr from the Voisey assessment unit during 1994 totaled 3.3 t, and represented 11% of the overall catch from the Nain fishing region during 1994 (Table 3). This was a decline in the stock unit catch of 61% from the previous year. Effort, however, decreased by 69%. The combination of effort reduction and a drop in the reference level catch (TAC) by 40% from the mid-1980s have contributed to an overall decrease in the amount of charr harvested from this stock unit.

With respect to the standardized catch rates, the regression of \ln catch rate for the period 1977-94 explained 41% of the variation in the data ($P = 0.0001$). Highest catch rates occurred in the late 1970's, 1983, and again in 1989-90 (Fig. 3). Even in 1992 the catch rate was moderately high. The catch rate in 1993, however, was the third lowest recorded while the catch rate increased somewhat in 1994. Standardized effort was the lowest recorded in 1994 (Table 4).

V.2 Timing of the commercial fishery

Normally, peak runs of Arctic charr to rivers in the Nain area occur during early August (Dempson and Green 1985). Variability in catches and catch rates must also be considered in the context of run timing to local rivers. This is because some or many fish could potentially not be available for capture depending upon the timing of the commercial fishery in relation to the timing of the runs back into fresh water. Figure 4 illustrates the timing of the fishery for the Voisey stock unit from 1977-94. The median date of the catch (50th percentile) from 1977-90 was day 199 (July 18). Landings in 1991 were about one week later than average, but catch timing during the past two years has been similar to the mean.

V.3 Catch at age

Catch at age data are available since 1977 (Table 5). Typically, four age classes (ages 7-10) make up 85% of the catch. Charr are first recruited into the fishery at age 6 and ages over 12 contribute little. The 1986 and 1987 year classes (year of hatching) represented by 7 and 8 year old fish were the most abundant in 1994 contributing 51% of the catch. Mean age of the catch has ranged from a high of 9.3 years in both 1990 and 1991 to a low of 8.0 years in 1993. In general, mean age of the catch has varied little over time (mean = 8.7 yrs, coefficient of variation (CV) = 4.2%).

Analytical sequential population analyses were not carried out on the most recent data. As noted above, effort during the past several years has been among the lowest recorded and thus there is little basis for an adequate catch rate series from which to calibrate the sequential population analyses.

V.4 Weight at age, length distribution, and condition

Weight at age was derived from length-weight relationships obtained from sampling the commercial fishery as explained in past years (Dempson 1990). A comparison of the recorded total landings for 1993 with the cross product total (sum of the matrix of estimated numbers at age x matrix of weight at age) agreed quite well with the discrepancy between the two of about 0.4%. As identified in previous years, weight at age has declined over time (Table 6). Weights at age were among the lowest recorded in 1994.

Length composition data were available from over 58,000 charr from the Voisey stock unit. Modal size has remained in the 50 cm interval (Fig. 5) but mean length has declined in recent years. Fish greater than 60 cm in size are now contributing proportionally less than in the past.

Overall mean weight of charr harvested in the Voisey stock unit has also declined over time (Table 6). Regression of mean weight of the catch (Wt) on year (Y) from 1980 to 1994 was highly significant ($Wt = 62.178 - 0.030 \cdot Y$, $r^2 = 0.554$, $N = 15$, $F = 16.13$, $P = 0.0015$) and indicated a decrease of about 0.030 kg (30 g) per year (Fig. 6). Comparison of the estimated values for 1980 and 1993 indicated a 20.5% drop.

Analysis of condition was consistent with that reported last year (Dempson and Shears 1994). Condition of charr varies over years and fish caught in August have a greater condition than those captured in July (Fig. 7). Notwithstanding the low estimates for July 1985 and 1986, condition has generally been the lowest recorded in recent years, with 1994 the lowest yet.

Nain Stock Unit

N.1 Commercial landings and catch rates

The Nain stock unit consists of an inshore zone made up of Anaktalik Bay, Nain Bay, Tikkoatokak Bay, and Webb Bay subareas, and an offshore island zone made up of the Dog Island and Black Island subareas (Fig. 1). Annual landings have ranged from 13 to 76 t (mean = 45 t, 1974-94), and over this interval have contributed 40% of the commercial catch of charr from the Nain fishing region (Table 7). The highest catches occurred during the late 1970's and early 1980's (Fig. 8), with the lowest catch of 9 t in 1994. The TACs listed in Table 7 for 1979 to 1983 applied to the specific subareas of Anaktalik Bay and Nain-Tikkoatokak Bay only. In 1984 and 1985, an offshore component was included in the TAC. The quota area catch (QAC) in Table 7 summarizes landings for those subareas specifically under quota restrictions only, prior to the derivation of the stock units in 1986. Since 1986, the TAC has applied to the entire stock unit.

Science advice for 1993 recommended a reduction in the reference level catch from 47 t to 32 t. However, the management plan for 1993 maintained the TAC at 47 t but it was lowered for the 1994 season.

Landings of Arctic charr from the Nain assessment unit during 1994 totaled 8.8 t and represented 30% of the overall catch from the Nain fishing region during 1994 (Table 7). This was a decline in the stock unit catch of 34% from the previous year. Effort also decreased by 51%. A summary of landings partitioned by inshore and offshore fishing zones is presented in Table 8. The combination of effort reduction and a drop in reference level catches (TACs) have contributed to an overall decrease in the amount of charr harvested from this stock unit.

With respect to the standardized catch rates, separate analyses were done for inshore and offshore fishing zones. For the inshore zone, the regression of ln catch rate for the period 1977-94 explained 59% of the variation in the data ($P = 0.0001$). Highest catch rates occurred in the late 1970's and early 1980's and have generally declined over time with a slight increase in 1994 (Table 9, Fig. 8). Catch rates were the lowest recorded from 1991-1993. Standardized effort was also the lowest recorded in 1994 (Table 9).

For the offshore zone, the regression of ln catch rate for the period 1977-94 explained 66% of the variation ($P = 0.0001$). The catch rate in 1994, while 39% less than the 1984-90 average, was still 27% greater than the 1977-83 average. Standardized effort was the lowest recorded in 1994 (Table 9).

Spring food fishery at Nain Bay

The Nain stock unit is where the domestic or spring food fishery largely occurs. This fishery is targeted on charr as they migrate to sea. Efforts in the past, both by DFO and more recently by the Labrador Inuit Association (LIA), have failed to quantify the amount of charr taken annually in this food fishery. This unaccounted for harvest has not been factored into the commercial landings or catch at age estimates. Removals from the spring food fishery could be more significant in recent years (ex. 1991-93) when overall commercial landings have averaged only 16 t•y⁻¹ in contrast to the 1977-90 period when commercial landings averaged over 54 t•y⁻¹.

The LIA has expressed concern about this fishery. In an attempt to quantify the spring harvest at Nain Bay, the LIA conducted a creel survey in 1994. The survey began April 30 and ended June 5. Full coverage was provided on weekends with one additional day during the week surveyed (surveyor on site as long as people were fishing). No attempt was made to extrapolate results to other weekdays that were not directly surveyed. Thus, the information provided by the LIA represents a minimum estimate of the number of fish caught during 1994. This estimate was obtained both by direct observation of numbers of fish caught and by anglers volunteering information on their catches. The number of charr caught and retained was estimated to be 2558 with 172 fish released.

N.2 Timing of the commercial fishery

Figure 4 illustrates the timing of the fishery for the Nain stock unit from 1977-94. The median date of the catch from 1977-90 was day 207 (July 26). Landings in 1991 were three weeks later than this average (median day 229, August 17), while in 1992 landings were about four weeks later (day 234, August 22) and compressed over a rather short interval (Fig. 4). The 1994 fishery was about a week later (median day 215, August 3) than the 14-year (1977-90) average.

Further insight can be gained by examining the timing within the respective inshore and offshore fishing zones (Fig. 9). On average over the 14-year period 1977-90, the median timing of the catch in the offshore zone (day 217, Aug. 5) was about 13 days later than the inshore zone (day 204, July 23). With respect to the inshore zone, median timing of the 1991-93 fisheries has been 21 to 31 days later than the 1977-90 average. For the offshore zone, timing in 1991 and 1992 was about 2 weeks later, but for 1993 the median date of the catch was actually 6 days earlier (Fig. 9). In 1994, the inshore fishery was two weeks later than the 1977-90

average but earlier than fisheries occurring in 1991-93. The 1994 offshore fishery was the earliest on record (Fig. 9). Both fisheries were compressed over a shorter interval of time in relation to earlier years.

N.3 Catch at age

Catch at age data are available since 1977 (Table 10). Typically, four age classes (ages 7-10) make up 82% of the catch. Charr are first recruited into the fishery at age 6 and ages over 12 contribute little to the fishery. The 1985 and 1986 year classes (year of hatching) represented by 8 and 9 year old fish were the most abundant in 1994 contributing 61% of the catch. Mean age of the catch has ranged from a high of 9.8 years in 1982 to a low of 8.5 years in 1977. In general, mean age of the catch has varied little over time ($\bar{x} = 9.0$ yrs, CV = 4.2%).

Sequential population analyses were not carried out on the most recent data. As noted above, effort has been among the lowest recorded in recent years and thus there is little basis for an adequate catch rate series from which to calibrate the sequential population analyses.

N.4 Weight at age, length distribution, and condition

Weight at age was derived from length-weight relationships obtained from sampling the commercial fishery as explained in past years (Dempson 1990). A comparison of the recorded total landings for 1993 with the cross product total (sum of the matrix of estimated numbers at age x matrix of weights at age) agreed quite well with the discrepancy between the two of about 0.5%. As identified in previous years, weight at age has declined over time (Table 11). In contrast with the Voisey unit, weight at most ages increased in 1994 from that observed in 1992 and 1993. Part of the reason for the overall decline in mean weight in recent years (to 1993) could be directly related to the timing of the fishery. As noted earlier, larger charr return to the rivers first with fish returning to freshwater as early as the second week of July (Dempson and Green 1985). During the past several years, the median timing of the Nain stock unit fishery has been up to three and four weeks later in comparison with 'average' timing over a 14-year period.

In addition to the timing of the fishery, several other factors may have contributed to the smaller size of fish in the catch. With the decline in the catch of salmon at Nain in recent years ($\bar{x} = 20$ t, 1985-89, versus $\bar{x} = 2.4$ t, 1991-93), there has been proportionally more 114 mm mesh gill nets used rather than both 114 and 127 mm mesh nets. The extent of the trade-off in gear

size among years, however, is unknown. In the later part of August, some gear has been set close to river mouths in some bays. When set in these locations where there is a strong influence of both tide and river current, the nets are stretched more and are effectively fishing as a smaller mesh gear.

Length composition data were available from over 109,000 charr from the Nain stock unit. From 1980-1985, modal size was in the 50 and 52 cm length intervals (Fig. 10) but has shifted to the 48 and 50 cm length groups in 1986 and to the 46 and 48 cm intervals since 1992. Mean length has also declined over time and fish greater than 60 cm in length are contributing proportionally less than in the past.

Overall mean weight of charr harvested in the Nain stock unit has also declined over time (Table 11). Regression of mean weight of the catch (Wt) on year (Y) from 1980 to 1994 was highly significant ($Wt = 60.790 - 0.030 \cdot Y$, $r^2 = 0.747$, $N = 15$, $F = 38.463$, $P = 0.0001$) and, similar to the Voisey unit, indicated a decrease of about 0.030 kg (30 g) per year (Fig. 6). Comparison of the estimated values for 1980 and 1993 indicated a 21.3% drop.

Analysis of condition was consistent with that reported last year (Dempson and Shears 1994). Condition of charr varies over years and fish caught in August have a greater condition than those captured in July (Fig. 7). Lowest values occurred in 1991-93 but, in contrast with Arctic charr from the Voisey unit, condition has been increasing since 1992 (Fig. 7).

Okak Stock Unit

0.1 Commercial landings and catch rates

The Okak stock unit consists of an inshore component made up of Okak Bay and an offshore island zone made up of the Cutthroat subarea (Fig. 1). Annual landings have ranged from only 180 kg in 1992 to a high of 76 t in 1978 (mean = 28 t, 1974-94), and over this interval have contributed 22% of the commercial catch of charr from the Nain fishing region (Table 12). The highest catches occurred during the late 1970's and early 1980's (Fig. 11), with the lowest catches in 1992 and 1993. The Total Allowable Catches (TAC) listed in Table 12 for 1981 to 1985 applied only to the Okak Bay subarea. A TAC of 31 t was maintained for 1994.

Landings of Arctic charr from the Okak assessment unit during 1994 totaled 10.9 t. No fishing occurred within Okak Bay in 1992 and 1993 while only 4 t was harvested in 1991. Little effort has been directed to the offshore Cutthroat subarea since 1990 and no fishing occurred in this offshore zone in 1994.

With respect to the standardized catch rates, separate analyses were done for inshore and offshore fishing zones. For the inshore zone, the regression of \ln catch rate for the period 1977-91, and 1994, explained 61% of the variation in the data. Highest catch rates occurred in the late 1970's and early 1980's with a moderately high value in 1990 (Table 13, Fig. 11). The lowest catch rates were in 1985, 1988 and 1989. The low effort in 1981, 1982 and 1984 was directly related to the expanded fisheries in the northern fiord subareas of Hebron and Saglek. Catch rate increased substantially in 1994 to the second highest value recorded (Fig. 11). This may be a reflection of the lack of fishing in Okak Bay for a three year period and may attest to the merits of 'pulse' or rotational fisheries.

Even though catch rates improved dramatically in 1994, we caution that with the extreme low effort in the past several years, interpretation of the commercial catch rate series as an index of stock abundance could be questionable.

0.2 Timing of the commercial fishery

Figure 4 illustrates the timing of the fishery for the Okak stock unit from 1977-94. The median date of the catch from 1977-90 was at day 222 (August 10). While landings in 1991 were about 9 days later than this average (median day 231, August 19), the 1992 and 1993 fisheries, albeit rather limited, occurred earlier than the median date (Fig. 4). Timing of the 1994 fishery was average.

0.3 Catch at age

Catch at age data are available since 1977 (Table 14). Until about 1988, four age classes (ages 8-11) made up 77% of the catch. This declined to about 71% in 1989-91. The youngest charr caught in the Okak fishery are age 6 but these are generally few in number. Okak charr age distribution is generally more variable than the Voisey or Nain stock units and the mean age of the fish is often older. As indicated above, there was been virtually no fishery in the Okak stock unit in 1992 and 1993. Estimated numbers at age, therefore, may not be representative for these years as sampling was rather sparse. Data are included, however, for completeness. The 1985 and 1986 year classes (year of hatching) represented by 8 and 9 year old fish were the most abundant in 1994 contributing 55% of the catch.

Analytical sequential population analyses have not carried out on the Okak stock unit in recent years. Calibration attempts in past years were the least successful for the Okak unit. The limited effort directed towards the Okak unit since 1991 precluded any attempts to estimate stock size using rigorous analytical sequential population models.

0.4 Weight at age, length distribution, and condition

Weights at age were derived in a manner consistent with the other stock units. A comparison of the recorded total landings with the cross product total (sum of the matrix of estimated numbers at age x matrix of weights at age) has agreed quite well in the past with the discrepancy between the two of only 0.8% in 1994. Weight at age has been more consistent than in the other two major stock units, and has not experienced the same degree of decline over time (Table 15). The limited data for 1992 and 1993 preclude any comment of events in recent years.

Length composition data were available from over 59,000 charr from the Okak stock unit. Modal size has remained in the 48 and 50 cm length intervals (Fig. 12) with little change in mean length since 1984. No noticeable change in length composition has resulted from the limited exploitation over the past three years.

Overall mean weight of charr harvested in the Okak stock unit has also declined over time (Table 15). Regression of mean weight of the catch (Wt) on year (Y) from 1980 to 1994 was significant ($Wt = 33.108 - 0.016 \cdot Y$, $r^2 = 0.414$, $N = 15$, $F = 9.172$, $P = 0.0097$) but, in contrast with the Voisey and Nain units, indicated a decrease of only 0.016 kg (16 g) per year (Fig. 6). Comparison of the estimated values for 1980 and 1993 indicated a 12.0% drop.

Analysis of condition was consistent with that reported last year (Dempson and Shears 1994). Condition of charr varies over years and fish caught in August have a greater condition than those captured in July (Fig. 7). Lowest values for August occurred in 1992-93 and in July of 1992. In contrast with Arctic charr from the Voisey unit, condition increased dramatically in 1994 (Fig. 7).

Experimental in-river fisheries - Saqlek Fiord

A summary of harvests from specific experimental river fisheries carried out in the Nain fishing region are provided in Table 2. In 1994, three rivers were fished as a cooperative project among the LIA, DFO Industry Development Division, and DFO Science Branch: Southwest Arm Brook, North Arm Brook, and Pangertok Inlet River. The latter river was fished in 1991 while Southwest Arm Brook was fished in 1992. These fisheries were still considered experimental in the sense that the logistics of conducting this type of a fishery was still foremost in the design of the projects. The logistics referred to include problems associated with gear type and design, in-river holding facilities for the charr selected for harvest, on-site processing and transportation of fish from the river to a collector boat, and subsequent transportation to the Nain fish plant.

Fishing began at Pangertok Inlet River on July 25 and ended August 17. At North Arm Brook fishing occurred from July 26-August 18. Owing to high water conditions, fishing traps were not installed and fishing did not begin until August 5 at Southwest Arm Brook. Harvesting ended on August 21.

Arctic charr captured were classified into two groups on the basis of size: fish < 45 cm fork length were noncommercial fish while charr \geq 45 cm were commercial sized. Numbers of fish caught by day are illustrated in Fig. 13. Information from the 1992 fishery at Southwest Arm Brook is included for comparison.

At Pangertok Inlet River, 2763 charr were caught; 1104 (40%) of which were commercial size (Fig. 14). Fifteen percent of the total run ($N = 402$), or 40% of the commercial sized fish were retained for harvest. Similarly at North Arm Brook, 1270 charr were caught; 637 (50%) of which were commercial size (Fig. 14). Here, 24% ($N = 305$) of the total run or 48% of the commercial sized fish were kept for harvest. Finally, at Southwest Arm Brook 7926 charr were caught; 3151 (40%) were of commercial size. Only 8% ($N = 627$) of the total run or 20% of the commercial sized fish at Southwest Arm were retained for harvest.

In total for all three rivers, 11,959 charr were caught. In contrast, over 31,000 fish were counted at Southwest Arm Brook in 1992 over an 18 day period (Aug. 5-20). Several scenarios could explain the large discrepancy in numbers of fish between the two years. First, return charr migrations could have been unusually late in 1994. Many of the fish caught in 1992, particularly during the latter part of the fishery, were fish < 35 cm in size. This is consistent with the pattern of migration observed in other Labrador rivers (Dempson and Kristofferson 1987) where the smaller nonmaturing charr enter the river later than the larger maturing individuals. In 1994, few fish < 35 cm in length were encountered, many commercial sized charr were still included in the daily catches, and charr were observed in large numbers in the lower parts of the rivers and in the immediate estuary when the individual river harvest projects were terminated.

Second, upstream runs could have been early with most of the fish already in the river by the time harvesting gear was installed in the rivers. However, angling and river observations while travelling up and down the brooks yielded few fish prior to the completion of the in-river traps and initiation of fishing. Third, at Pangertok and Southwest Arm brooks, charr could have escaped over or under the leaders. However, at North Arm Brook where a conventional conduit fish counting fence was used, no charr could have escaped upstream past the device and yet the total run was still low. This suggests that this may not have been the case in the other two rivers as well. Alternatively, many charr may have remained in freshwater and not migrated to sea in 1994. We note

that a small commercial fishery occurred in the Saglek Fiord in 1993. The total catch, however, was only 3.2 t and thus commercial exploitation and overharvesting can be ruled out.

Conclusions

Much of the decline in Arctic charr landings in the Nain fishing region during the past nine years can be attributed to a continued decline in effort directed towards the fishery. As acknowledged earlier, assessments of several of the stock units have also indicated that stock sizes have also declined over time and were below levels during the late 1970's and early 1980s. This in itself could also have contributed to the trend for diminished landings. Stock sizes were estimated using sequential population analyses (SPA) calibrated with commercial catch rate information. The latter may not be entirely appropriate as a calibration tool. Particularly in recent years, effort has been extremely low and thus the spatial coverage of fishing may be insufficient to draw conclusive results with respect to overall stock abundance. It has also been pointed out in the past that independent estimates of stock size were not available either to calibrate SPA runs, or to provide actual census information on current stock sizes returning to north Labrador rivers (Dempson 1993b).

The salmon licence buy-out was extended to north coastal fisherpersons in August of 1993. This effectively removed a number of fisherpersons from actively participating in subsequent years as the 'buy-out' considered both commercial charr and salmon fishing. The decline in directed commercial effort may have been balanced to some degree with the substantive increase in food fishing licences. Quantification of the food fishery harvests, both during the spring and throughout the summer, is needed in order to evaluate fully the utilization of the resource in the context of conservation.

The Nain stock unit will continue to receive most of the directed effort in subsequent years a fact also acknowledged by the Nain fisherpersons committee. This is due to the importance of the spring food fishery, particularly at Nain Bay, and the proximity of this entire stock unit to the local fish plant; collector boats are not necessary. With the reported minimum spring food fishery catch of 2558 fish, this would increase the known harvest of charr from the Nain stock unit by about 40%. The addition of the 'estimated' harvest by food fishing nets throughout the summer could effectively double the amount of charr that are harvested in this stock unit over that accounted for solely by the commercial fishery.

The trend for a decline in mean weight of charr is of major concern. The estimates for the Voisey and Nain stock units of a decline of about 30 g per year since 1980 are similar to those reported by Ricker (1981) for some species of Pacific salmon

(Oncorhynchus spp.) and is consistent with growth overfishing of a stock (Gulland 1983; Sutherland 1990). Speculation as to the long term selective influence of the Labrador commercial gill net fishery for Arctic charr is reported in Dempson (1995).

Viable fisheries directed towards Arctic charr are still possible in northern Labrador. Fisheries occurring within the inner bays and fiords will, for the most part, intercept few salmon. Many of the areas to the north of Okak Bay are underutilized. Fisheries in these areas have not been undertaken on a continuous basis and could conceivably provide alternatives for rotational fisheries or river-specific harvesting programs. The need for river specific information is imperative. Speculation regarding patterns observed in the commercial fishery should be coupled with direct information on variability in run timing and variability in true abundance.

Reference level catches (TACs) have not been restrictive in recent years given the substantive reduction in commercial effort. In view of the general trend for a decrease in fish size, these TACs could be reexamined in the context of current fishing practises. It is noted, however, that there was a reluctance by the Nain fisherpersons committee to have the TAC lowered for the Nain stock unit in 1994. Continued cooperation and consultation is imperative.

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Table 1. Summary of northern Labrador Arctic charr landings (kg round) by fishing region, 1974-94.

Year	Nain Fishing Region				Makkovik Fishing Region			Total Catch
	Catch	No. of Fishermen	Fathoms of gear licensed	Catch as % of total	Catch	No. of Fishermen	Fathoms of gear licensed	
1974	120414	66		81	28133			148547
1975	44118	85		82	9542			53660
1976	134898	101		90	15645			150543
1977	186165	128		88	24205			210370
1978	213915	131	21340	86	34387	149	29300	248302
1979	175263	142	21320	82	37693	110	21225	212956
1980	167991	128	23960	83	35561	154	30635	203552
1981	231221	122	21700	92	20733	154	30990	251954
1982	203012	118	23600	84	39163	141	28200	242175
1983	149732	119	24400	84	29100	148	29600	178832
1984	123045	115	23000	83	24792	147	29400	147837
1985	107120	95	19000	76	33945	132	26400	141065
1986	99963	79	15800	88	13888	109	21800	113851
1987	97379	72	14400	91	9965	130	26000	107344
1988	74010	63	12600	83	14819	120	24000	88829
1989	85970	72	14400	85	14808	126	25200	100778
1990	86292	67	13400	86	13509	103	20600	99801
1991	54614	65	13000	78	15137	96	19200	69751
1992	60754	62	12400	82	13044	96	19200	73798
1993	33562	36	7200	88	4622	90	18000	38184
1994	29345	18	3600	94	1778	18	3600	31123
Avg. 1989-93	64238				12224			76462
Avg. 1984-93	82271				15853			98124
Avg. 1974-94	118037			85	20689			138726

For 1985, Makkovik Region, catch includes 6788 kg from spring fishery in Postville area.
 Catch for Nain Fishing Region includes in-river harvest in 1989, 1991, 1992, and 1994, and the trap net fishery at Nachvak Fiord in 1986.

Table 2. Summary of Arctic charr landings (kg-round) from various experimental fisheries in northern Labrador.

Year	Area	Type of Fishery		
		Trap-net	River gill net	In-river trap
1986	Nachvak Fiord	1777		
1989	Voisey Bay		169	
	Nain Bay		345	
	Tikkoatokak Bay		473	
	Webb Bay		146	
1991	Saglek Fiord			159
1992	Saglek Fiord			2201
1994	Saglek Fiord			2114

* Note these catches are included in the overall summary in Table 1 but are not included in Appendix 1.

Table 3. Catch (kg-round) and effort (person-weeks) statistics for the Voisey assessment unit from 1974 to 1994. Quota area catch (QAC) refers to the landings from those subareas specifically under TAC regulation only, prior to the derivation of assessment units in 1985. CUE is unstandardized.

Year	TAC	QAC	Catch	Effort	CUE	% Offshore	Unit as % of Nain Region Total
1974			29180			31	24
1975			3727			94	8
1976			14652	57	257	21	11
1977			24108	75	321	9	13
1978			36991	102	363	11	17
1979	22500	21880	40590	116	350	47	23
1980	22500	11557	19694	82	240	42	12
1981	16100	16325	23810	90	265	33	10
1982		2688	13309	60	222	45	7
1983	16100	2953	25593	80	320	89	17
1984	16100	8133	20873	101	207	62	17
1985	23400		15648	57	275	91	15
1986	23400		16655	82	203	82	17
1987	17000		21242	101	210	41	22
1988	17000		14037	52	270	60	19
1989	17000		11019	32	344	100	13
1990	17000		19895	69	288	64	23
1991	17000		10971	60	183	26	20
1992	14000		9284	39	238	96	15
1993	14000		8461	48	176	23	25
1994	14000		3335	15	222	5	11
Avg. 1989-93			11926				
Avg. 1984-93			14809				
Avg. 1974-94			18242				

TAC applied only to Voisey Bay subarea from 1979 to 1984.

Table 4. Standardized catch rates (C/E, kg/person-week fished) with standard error (SE) and estimated effort for the Vosley Stock Unit Arctic charr fishery, 1977-94

Year	C/E	SE	Effort
1977	319	54	76
1978	377	62	98
1979	423	69	96
1980	307	52	64
1981	312	50	76
1982	211	35	63
1983	445	79	57
1984	270	43	77
1985	343	56	46
1986	260	41	64
1987	279	55	76
1988	310	49	45
1989	376	70	29
1990	338	60	59
1991	195	32	56
1992	322	64	29
1993	249	46	34
1994	267	50	13

Table 5. Estimated catch at age from the commercial Arctic charr fishery in the Voisey stock unit, 1977-1994.

CATCH AT AGE																		
AGE	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
6	318	619	475	154	68	316	1045	291	1	44	8	140	68	17	9	364	494	188
7	2085	4374	4914	803	915	755	2947	2891	1917	351	1312	1638	911	1110	909	1198	2088	602
8	4030	5372	7928	3386	2571	1566	3410	3254	3066	3230	2813	2319	1445	2865	1047	1034	1344	647
9	2086	2330	3382	4140	4803	2346	3449	2238	3242	3888	4420	1465	1520	2945	1625	1511	1025	487
10	1237	1236	1163	1424	2359	1226	1611	1392	433	1400	2029	1440	1135	1827	1257	1099	574	374
11	600	1141	634	500	941	657	1084	753	324	686	966	771	702	1083	691	480	237	99
12	389	380	212	238	406	65	827	414	233	244	280	289	245	588	362	241	98	22
13	212	380	159	159	41	13	147	355	64	149	38	28	107	440	155	30	10	5
14	108	334	55	28	19	27	45	83	55	123	57	43	183	136	89	5	6	5
6+	11065	16166	18922	10832	12123	6971	14565	11671	9335	10615	11923	8133	6316	11011	6144	5973	5896	2429
7+	10747	15547	18447	10678	12055	6655	13520	11380	9334	10571	11915	7993	6248	10994	6135	5609	5402	2241

Table 6: Average weight at age (kg-round) from the Voisey stock unit commercial catch of Arctic charr, 1977-94.

AVERAGE WEIGHT AT AGE																		
AGE	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
6	1.53	1.53	1.53	1.03	0.93	1.20	1.33	1.25	1.05	1.07	1.03	1.23	1.27	1.12	1.11	1.17	0.98	0.88
7	1.77	1.77	1.77	1.24	1.26	1.46	1.54	1.53	1.39	1.21	1.41	1.50	1.43	1.48	1.47	1.32	1.30	1.19
8	2.07	2.07	2.07	1.60	1.77	1.70	1.64	1.71	1.63	1.44	1.73	1.69	1.68	1.70	1.64	1.44	1.50	1.39
9	2.60	2.60	2.60	1.89	2.04	2.02	1.89	1.93	1.77	1.64	1.80	1.78	1.79	1.83	1.79	1.62	1.58	1.50
10	2.78	2.78	2.78	2.19	2.17	2.20	2.04	2.06	1.98	1.72	1.95	1.89	1.95	1.94	1.84	1.70	1.73	1.58
11	2.94	2.94	2.94	2.42	2.30	2.49	2.18	2.14	1.99	1.90	2.02	1.98	2.06	2.01	2.01	1.90	1.85	1.72
12	3.24	3.24	3.24	2.49	2.37	2.33	2.10	2.32	2.18	1.90	1.92	1.88	1.90	1.98	2.01	1.97	1.92	2.41
13	2.60	2.60	2.60	2.70	3.36	2.83	2.20	1.91	2.26	1.97	2.31	2.23	2.04	1.90	2.01	2.51	2.74	2.55
14	2.76	2.76	2.76	3.73	2.76	3.42	2.55	1.82	2.26	1.45	1.58	1.45	1.90	2.29	2.15	0.00	2.59	2.20

MEAN AGE OF INDIVIDUALS IN CATCH

Age	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
	8.62	8.50	8.20	8.86	9.09	8.84	8.63	8.66	8.51	8.97	8.98	8.77	9.18	9.28	9.31	8.70	8.01	8.29

MEAN WEIGHT OF INDIVIDUALS IN CATCH

Weight	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
	2.28	2.21	2.17	1.83	1.98	1.94	1.78	1.79	1.68	1.58	1.79	1.73	1.78	1.81	1.77	1.57	1.32	1.39

Table 7. Catch (kg) and effort (person-weeks) statistics for the Nain assessment unit from 1974 to 1994. Quota area catch (QAC) refers to the landings from those subareas specifically under TAC regulation only, prior to the derivation of assessment units in 1986. CUE is unstandardized.

Year	TAC	QAC	Catch	Effort	CUE	% Offshore	Unit as % of Nain Region Total
1974			37745			18	31
1975			33830			8	77
1976			53313	196	272	5	40
1977			76255	291	262	7	41
1978			73763	314	235	4	34
1979	61000	52832	66844	336	199	18	38
1980	61000	50176	75055	390	192	30	45
1981	37160	37223	65632	278	236	24	28
1982	43600	39119	55617	235	237	22	27
1983	51000	19102	51202	289	177	34	34
1984	43200	29063	38900	244	159	37	32
1985	30500	36019	41158	252	163	48	38
1986	43000		37095	185	201	56	37
1987	47000		45872	200	229	61	47
1988	47000		38295	229	167	62	52
1989	47000		51465	183	281	41	61
1990	47000		45275	188	241	62	52
1991	47000		15892	149	107	10	29
1992	47000		19555	131	149	46	32
1993	47000		13410	116	116	58	40
1994	32000		8825	69	128	48	30
Avg. 1989-93			29119				
Avg. 1984-93			34692				
Avg. 1974-94			45000				

TAC applied only to Anaktalik Bay and Tikkoatokak Bay from 1979 to 1983 (1983 also includes 5 t for Nain Bay) but includes an offshore component from 1984 to 1985.

Table 8. Summary of catch and effort statistics for the Nain stock unit, 1974-94. Quotas and landings are in kg round weight, effort is expressed as person-weeks fished. Refer to text for information on quotas and quota area catch. CUE = unstandardized catch per unit effort.

Year	Inshore			Offshore				Total			Quota Area Catch	
	Catch	Effort	CUE	Catch	Effort	CUE	% Catch offshore	Catch	Effort*	CUE		TAC
1974	30822			6923			18.1	37745				
1975	31076			2754			8.1	33830				
1976	50813	146	348	2500	52	48	4.7	53313	196	272		
1977	70908	183	387	5347	114	47	7	76255	291	262		
1978	70465	212	332	3298	106	31	4.5	73763	314	235		
1979	54967	189	291	11877	152	78	17.8	66844	336	199	61000	52832
1980	52328	183	286	22727	215	106	30.3	75055	390	192	61000	50176
1981	49956	157	318	15676	131	120	23.9	65632	278	236	37160	37223
1982	43108	119	362	12509	117	107	22.2	55617	235	237	43660	39119
1983	33603	147	229	17599	149	118	34.4	51202	289	177	51000	19102
1984	24558	131	187	14342	128	112	36.9	38900	244	159	43200	29063
1985	21527	125	172	19631	130	151	47.7	41158	252	163	30500	36019
1986	16347	91	180	20748	101	205	55.9	37095	185	201	43000	
1987	17840	71	251	28032	135	208	61.1	45872	200	229	47000	
1988	14535	90	162	23759	149	159	62.1	38295	229	167	47000	
1989	30449	103	296	21016	87	242	40.8	51465	183	281	47000	
1990	17069	88	194	28205	108	261	62.3	45275	188	241	47000	
1991	10162	102	100	5730	50	115	36.1	15892	149	107	47000	
1992	10504	71	148	9051	60	151	46.3	19555	131	149	47000	
1993	5591	60	93	7819	59	133	58.3	13410	116	116	47000	
1994	4592	31	148	4232	38	111	48.0	8825	69	128	32000	

* Total effort should be equal to or less than the sum of the inshore and offshore effort.

Table 9. Standardized catch rates (C/E, kg/person-week fished) with standard error (SE) and estimated effort for the Nain stock unit, 1977-94.

Year	Inshore Unit			Offshore Unit		
	C/E	SE	Effort	C/E	SE	Effort
1977	668	164	106	65	15	82
1978	670	182	105	52	12	64
1979	686	187	80	134	31	88
1980	476	103	110	168	37	136
1981	501	111	100	197	45	80
1982	634	137	68	187	43	67
1983	347	73	97	206	45	86
1984	349	77	70	246	51	58
1985	324	69	66	297	63	66
1986	231	50	71	305	69	68
1987	383	81	47	293	62	96
1988	211	44	69	223	47	107
1989	235	51	130	400	88	53
1990	259	56	66	319	68	88
1991	161	35	63	223	56	27
1992	131	32	80	220	50	41
1993	136	29	41	193	44	40
1994	245	63	19	183	44	23

Table 10. Estimated catch at age from the commercial Arctic charr fishery in the Nain stock unit, 1977-94.

CATCH AT AGE																		
AGE	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
6	2003	371	430	75	145	83	470	182	103	210	483	204	903	459	203	269	83	92
7	9250	6703	4306	960	2118	977	2791	2612	2463	4129	5462	6288	4750	4726	1365	3195	1982	999
8	12453	13122	11568	10519	6877	4782	5842	4619	6506	7713	6293	7166	9707	6115	2085	3809	2874	2087
9	7630	7984	9593	16342	15435	7255	6996	5671	4722	5862	7548	4688	8464	8844	2631	3166	2525	1628
10	5052	4406	4208	8345	9787	7987	4177	4374	4111	2857	4498	3607	3785	4681	2175	2574	1596	859
11	2454	2367	2168	4077	3746	4936	4357	2173	2494	1284	2013	1631	2853	1908	874	905	469	282
12	988	1688	1573	1340	991	2976	2762	1495	1605	625	1375	650	1234	927	444	422	296	94
13	358	312	418	813	304	561	600	738	901	240	898	324	665	378	183	241	171	39
14	180	272	312	522	151	451	557	281	534	199	306	136	277	137	92	48	49	20
15	1	118	34	43	42	59	70	96	322	205	357	52	28	186	48	32	38	24
16	1	97	14	1	13	46	27	57	93	50	180	20	6	1	36	1	0	3
17	1	1	1	66	10	23	95	89	21	42	37	40	1	1	2	1	2	0
6+	40371	37441	34625	43103	39619	30136	28744	22387	23875	23416	29450	24806	32673	28363	10138	14663	10085	6127
7+	38368	37070	34195	43028	39474	30053	28274	22205	23772	23206	28967	24602	31770	27904	9935	14394	10002	6035

Table 11. Average weight at age (kg-round) from the Nain stock unit commercial catch of Arctic charr, 1977-94.

AVERAGE WEIGHT AT AGE																		
AGE	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
6	0.89	1.31	1.37	0.89	0.79	1.13	1.27	1.18	1.10	1.15	1.14	1.13	1.16	1.17	1.29	0.94	0.80	0.96
7	1.28	1.71	1.52	1.20	1.18	1.37	1.56	1.40	1.43	1.37	1.33	1.38	1.38	1.42	1.38	1.20	1.16	1.25
8	1.77	1.86	1.85	1.52	1.51	1.68	1.66	1.63	1.65	1.56	1.53	1.55	1.56	1.50	1.54	1.33	1.31	1.44
9	2.07	2.24	2.02	1.78	1.70	1.84	1.84	1.78	1.78	1.69	1.62	1.63	1.63	1.66	1.59	1.37	1.39	1.51
10	2.59	2.41	2.08	1.93	1.76	1.89	1.88	1.88	1.83	1.69	1.65	1.64	1.71	1.76	1.63	1.41	1.42	1.58
11	2.86	2.35	2.18	1.83	1.78	1.93	1.88	1.87	1.81	1.68	1.68	1.67	1.68	1.68	1.71	1.54	1.50	1.47
12	2.74	2.67	2.41	1.91	1.80	1.96	1.92	1.89	1.83	1.70	1.71	1.71	1.64	1.77	1.70	1.44	1.52	1.55
13	3.16	3.34	2.25	1.93	1.74	2.11	1.96	1.93	1.82	1.95	1.68	1.70	1.69	1.65	1.76	1.49	1.38	1.86
14	3.28	2.88	1.94	1.97	1.72	1.93	1.77	2.07	1.90	1.79	1.74	1.44	1.74	1.75	1.65	1.52	1.24	1.75
15	2.65	2.65	2.65	2.71	2.87	2.26	1.84	1.84	1.89	1.61	1.80	1.68	1.97	1.46	1.66	1.93	1.46	1.52
16	2.15	2.15	2.15	2.15	3.88	2.69	2.05	1.46	1.53	1.71	1.61	1.75	2.56	1.97	1.47	1.87	0.00	2.20
17	2.45	2.45	2.45	4.43	2.45	2.69	2.28	1.91	1.64	1.64	2.03	1.75	1.64	1.81	4.65	2.38	3.63	0.00

MEAN AGE OF INDIVIDUALS IN CATCH																		
AGE	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
	8.46	8.75	8.87	9.34	9.28	9.83	9.52	9.40	9.47	8.77	9.10	8.65	8.86	8.92	9.16	8.73	8.75	8.64

MEAN WEIGHT OF INDIVIDUALS IN CATCH																		
Weight	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
	1.88	2.06	1.93	1.75	1.66	1.85	1.79	1.74	1.73	1.59	1.56	1.55	1.58	1.60	1.57	1.34	1.33	1.44

Table 12. Catch (kg) and effort (person-weeks) statistics for the Okak assessment unit from 1974 to 1994. Quota area catch (QAC) refers to the landings from those subareas specifically under TAC regulation only, prior to the derivation of assessment units in 1986. CUE is unstandardized.

Year	TAC	QAC	Catch	Effort	CUE	% Offshore	Unit as % of Nain Region Total
1974			46891			27	39
1975			5057			53	11
1976			25338	148	171	30	19
1977			42392	243	174	37	23
1978			76024	352	216	54	36
1979			43261	283	153	41	25
1980			49035	253	194	66	29
1981	27300	11049	47541	202	235	78	21
1982	27300	9031	34171	186	184	75	17
1983	21000	30732	48978	286	171	39	33
1984	27000	13864	18146	94	193	25	15
1985	27000	24746	33261	208	160	26	31
1986	42000		28896	172	168	30	29
1987	43000		19649	134	147	20	20
1988	31000		17450	136	128	28	24
1989	31000		16563	163	102	10	20
1990	31000		16125	100	161	22	19
1991	31000		4432	31	143	7	8
1992	31000		180	13	14	100	<1
1993	31000		578	9	64	100	2
1994	31000		10866	23	472	0	37
Avg. 1989-93			7576				
Avg. 1984-93			15528				
Avg. 1974-94			27849				

Table 13. Standardized catch rates (C/E, kg/person-week fished) with standard error (SE) and estimated effort for the Okak stock unit, 1977-94.

Year	Inshore Unit			Offshore Unit		
	C/E	SE	Effort	C/E	SE	Effort
1977	376	95	73	176	42	88
1978	353	116	102	208	52	197
1979	286	70	92	125	29	144
1980	251	65	69	218	50	148
1981	311	86	36	235	54	159
1982	372	115	24	197	45	130
1983	278	68	110	201	45	95
1984	422	139	33	137	32	34
1985	146	38	170	131	32	65
1986	218	54	93	146	38	60
1987	199	52	79	78	19	50
1988	164	42	77	73	17	66
1989	149	38	101	39	10	40
1990	346	94	36	105	29	35
1991	233	85	18	21	6	15
1992				22	6	8
1993				132	39	4
1994	408	117	27			

Table 14. Estimated catch at age from the commercial Arctic charr fishery in the Okak stock unit, 1977-1994.

CATCH AT AGE																		
AGE	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
6	84	205	1	130	39	93	475	220	17	41	42	150	190	80	22	0	9	112
7	139	2465	1989	638	526	713	1762	1202	2675	2056	1008	1007	1760	1474	577	3	99	1045
8	417	8163	7462	5631	2135	2760	4471	2047	4948	6333	1636	1822	1829	2667	778	18	120	1917
9	1084	5494	4997	9175	7166	4167	5787	1885	5385	5197	3686	2977	2058	2108	693	31	122	1815
10	2667	5594	3299	6487	7615	3848	5601	1621	2740	3291	3247	2241	1718	1267	332	26	62	986
11	3388	3747	1954	2863	4673	3622	5169	1937	2936	1261	1371	1492	1714	1234	164	11	6	623
12	5417	3953	878	1382	1330	1542	4075	1290	987	875	395	772	865	556	122	18	10	275
13	2278	2773	761	407	1044	444	1643	1034	740	562	299	187	296	261	68	7	0	43
14	1694	514	527	350	459	342	658	514	768	148	166	125	139	94	23	0	0	0
15	1472	1027	410	262	359	183	307	192	103	170	85	13	52	92	0	0	0	7
16	832	308	351	90	44	57	107	111	75	8	34	32	56	0	23	0	0	0
17	277	567	399	178	223	114	68	123	123	3	2	1	16	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	0	0
6+	19749	34810	23028	27593	25613	17885	30123	12176	21497	19945	11971	10819	10700	9856	2802	114	428	6823
7+	19665	34605	23027	27463	25574	17792	29648	11956	21480	19904	11929	10669	10510	9776	2780	114	419	6711

Table 15. Average weight at age (kg-round) from the Okak stock unit commercial catch of Arctic charr, 1977-94.

AVERAGE WEIGHT AT AGE																		
AGE	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
6	1.21	1.21	1.21	1.02	1.29	1.13	1.15	1.16	1.12	1.06	1.14	1.16	1.26	1.13	1.32	0	0.88	1.03
7	1.48	1.48	1.48	1.20	1.24	1.38	1.25	1.26	1.27	1.32	1.30	1.33	1.32	1.40	1.48	1.15	1.03	1.27
8	1.66	1.66	1.66	1.59	1.51	1.58	1.43	1.41	1.45	1.50	1.43	1.37	1.47	1.55	1.51	1.57	1.29	1.47
9	1.85	1.85	1.85	1.77	1.73	1.66	1.56	1.46	1.52	1.64	1.58	1.53	1.51	1.69	1.57	1.41	1.51	1.74
10	1.98	1.98	1.98	1.81	1.93	1.75	1.66	1.58	1.67	1.73	1.64	1.60	1.65	1.79	1.80	1.64	1.62	1.9
11	2.02	2.02	2.02	1.89	1.89	1.76	1.69	1.52	1.61	1.85	1.64	1.63	1.66	1.76	1.83	1.84	2.32	1.78
12	2.36	2.36	2.36	2.05	1.93	1.94	1.76	1.62	1.90	1.85	1.75	1.76	1.77	1.88	1.66	1.63	2.30	1.74
13	2.30	2.30	2.30	2.47	2.10	2.01	1.73	1.64	1.77	1.77	1.87	1.85	1.86	1.74	1.72	1.84		1.2
14	2.38	2.38	2.38	2.10	1.87	2.02	1.52	1.68	1.66	1.72	1.97	1.74	1.99	1.84	1.63			
15	2.48	2.48	2.48	1.83	1.93	2.18	1.81	1.76	2.04	1.60	2.04	2.31	1.89	1.63				3.2
16	2.30	2.30	2.30	2.82	1.54	1.65	1.70	1.66	1.89	2.72	2.48	1.91	1.76		1.63			
17	2.30	2.30	2.30	2.37	2.39	2.56	2.73	2.10	2.07				2.17					
18	2.30	2.30	2.30	2.58	3.17	1.84	2.07		3.16	1.68			2.30					
19	2.30	2.30	2.30	2.69			2.07	1.43	1.37					1.84				

MEAN AGE OF INDIVIDUALS IN CATCH																		
AGE	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
	12.00	10.08	9.53	9.58	10.11	9.96	10.05	10.14	9.47	9.10	9.82	9.46	9.43	9.19	8.85	9.93	8.44	8.84

MEAN WEIGHT OF INDIVIDUALS IN CATCH																		
Weight	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
	2.20	1.95	1.86	1.77	1.83	1.72	1.60	1.51	1.54	1.60	1.58	1.53	1.56	1.64	1.58	1.58	1.37	1.59

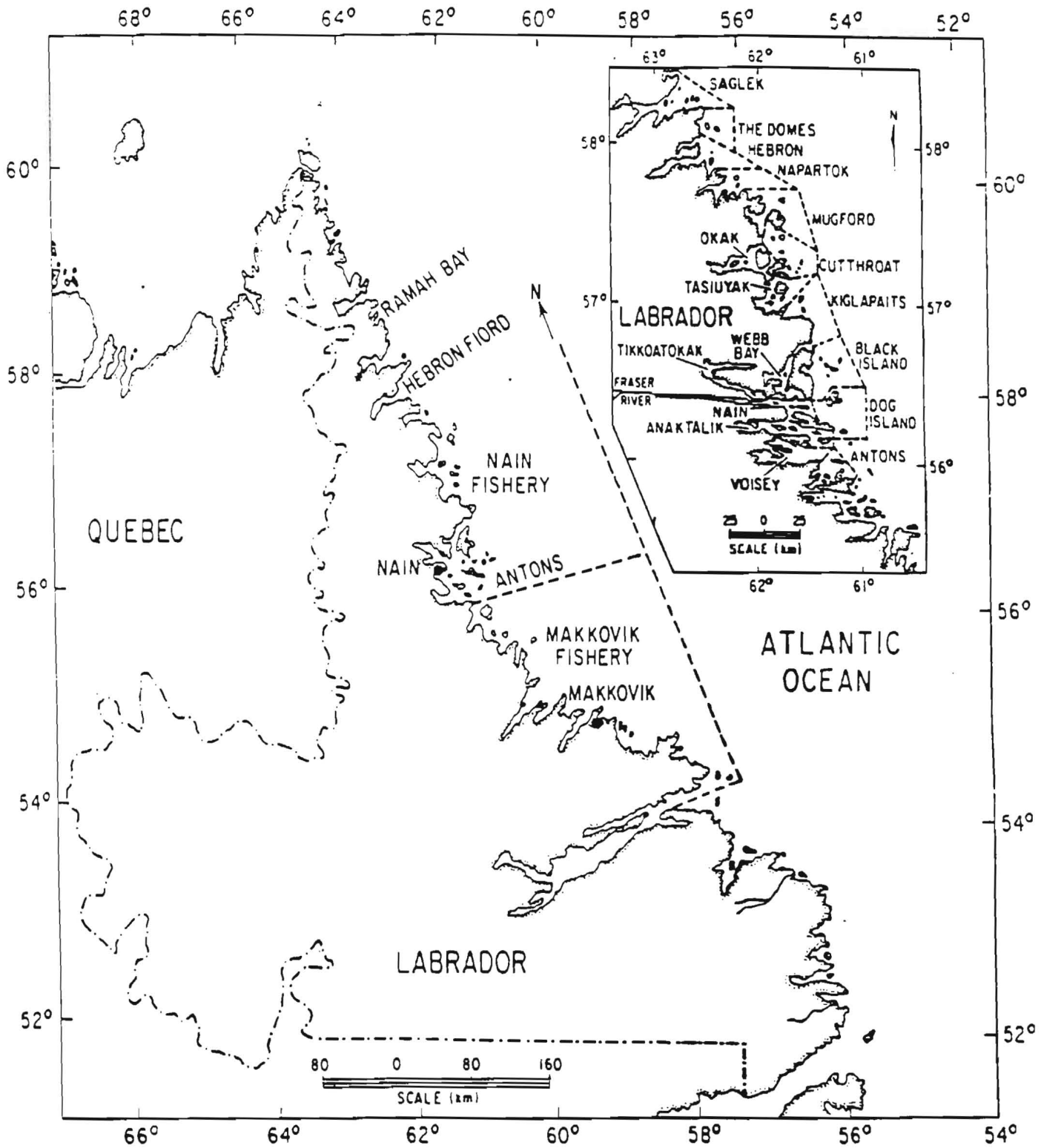


Fig. 1. Location of the Nain and Makkovik Fishing Regions in northern Labrador. Insert illustrates the location of subareas within the Nain Fishing Region.

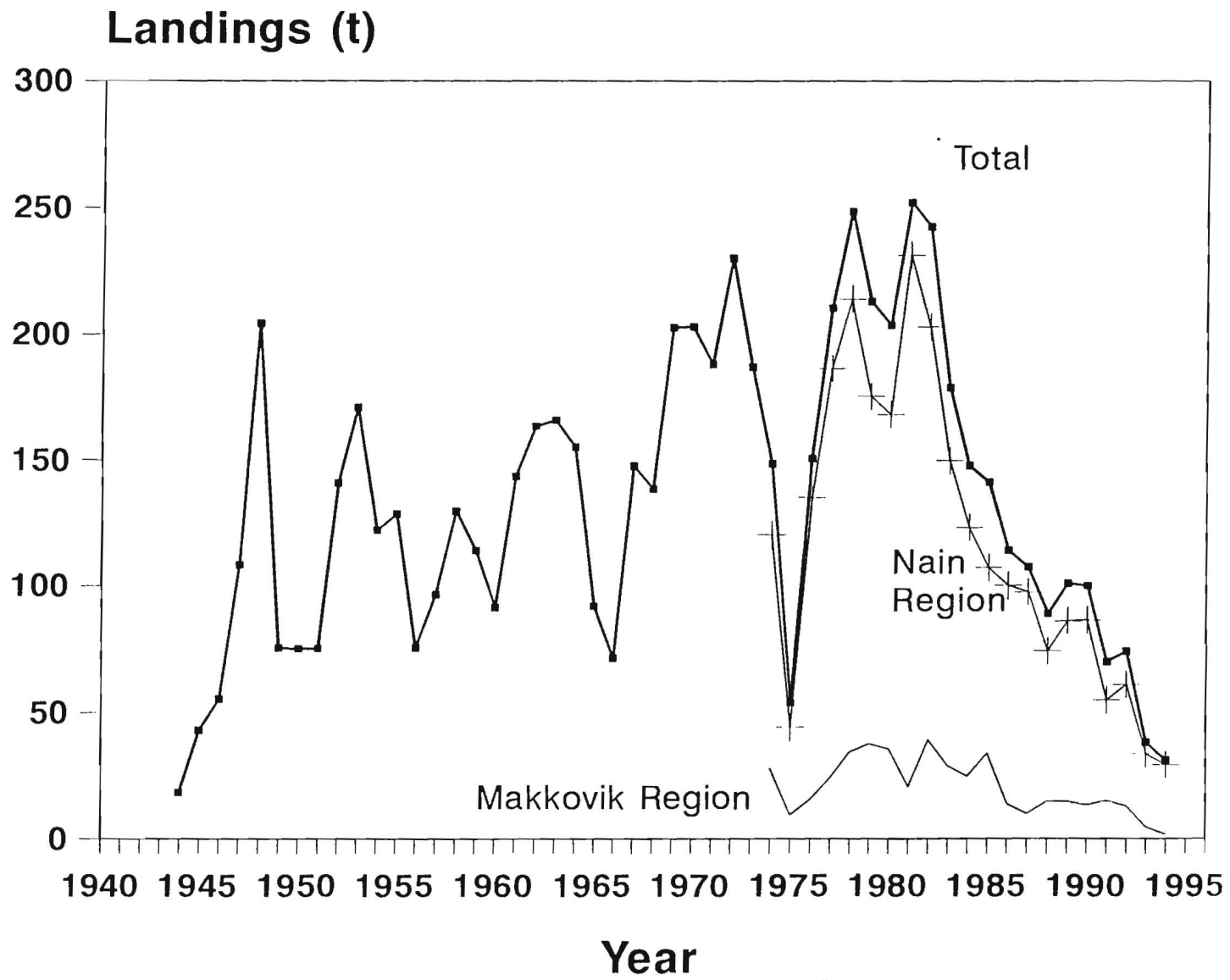


Fig. 2. Summary of northern Labrador Arctic charr landings (tonnes), 1944-94.

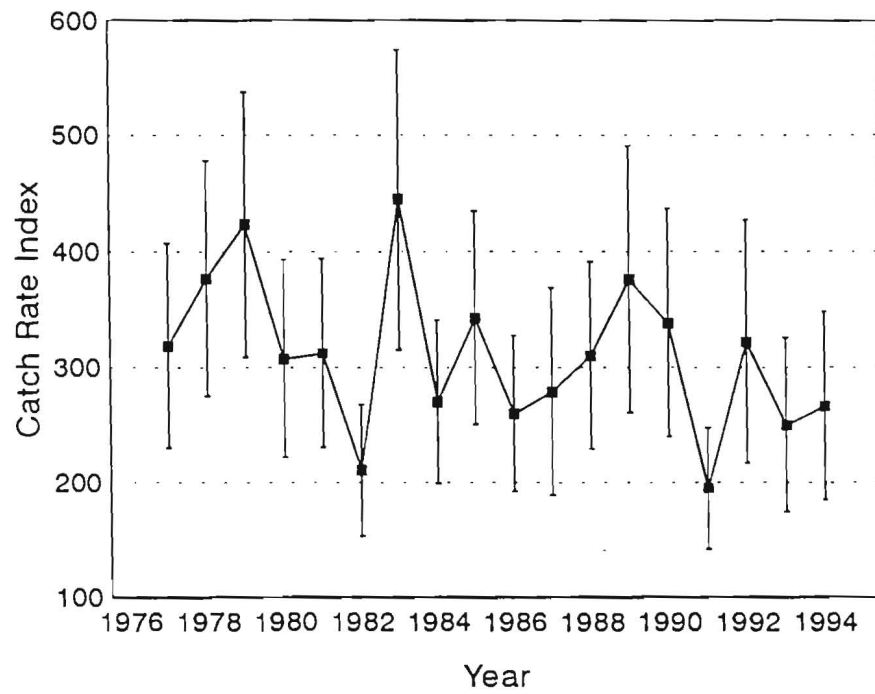
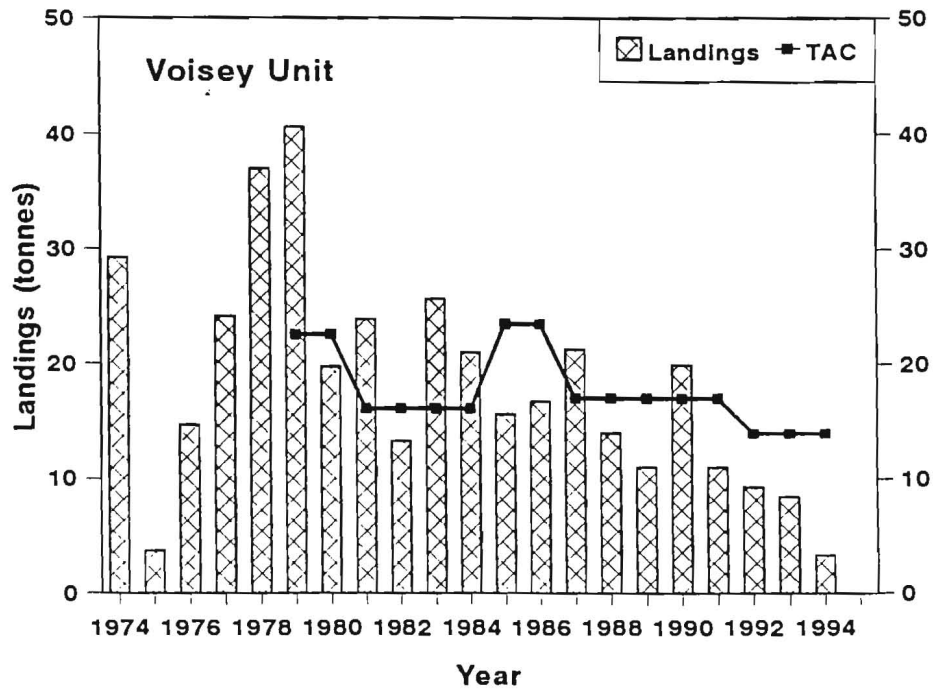


Fig. 3. Commercial landings of anadromous Arctic charr from the Voisey stock unit, 1974-94, in relation to the total allowable catch (upper panel), and estimated commercial catch rates (kg/person-week fished, lower panel). Vertical lines represent \pm one standard error about the mean.

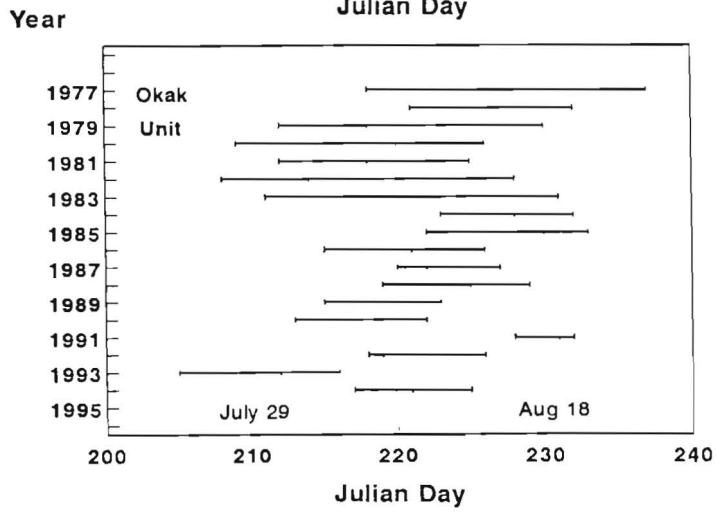
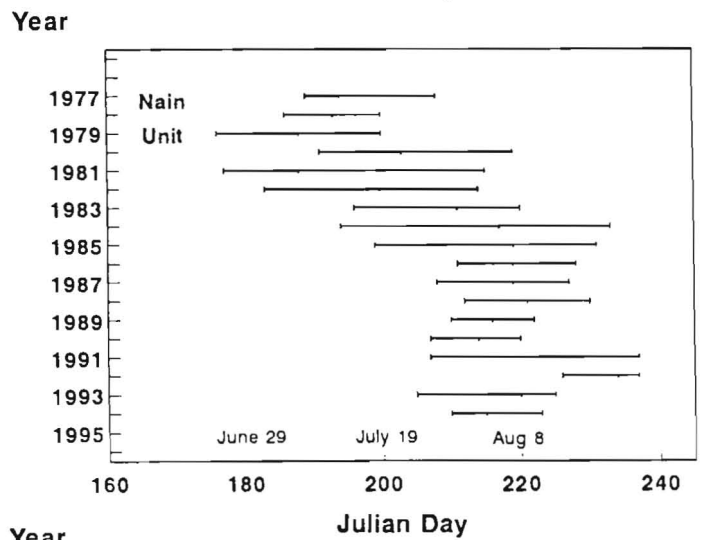
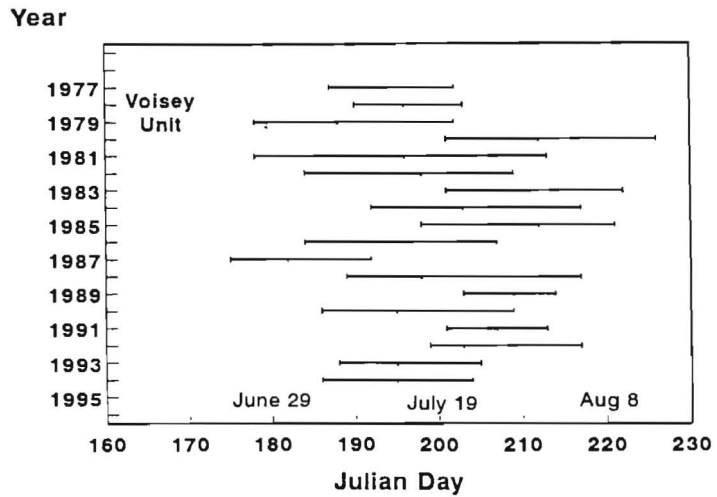


Fig. 4. Commercial catch timing of the Voisey, Nain, and Okak stock unit Arctic charr fisheries, 1977-94. The median data (50%), along with the 25th and 75th percentiles are illustrated.

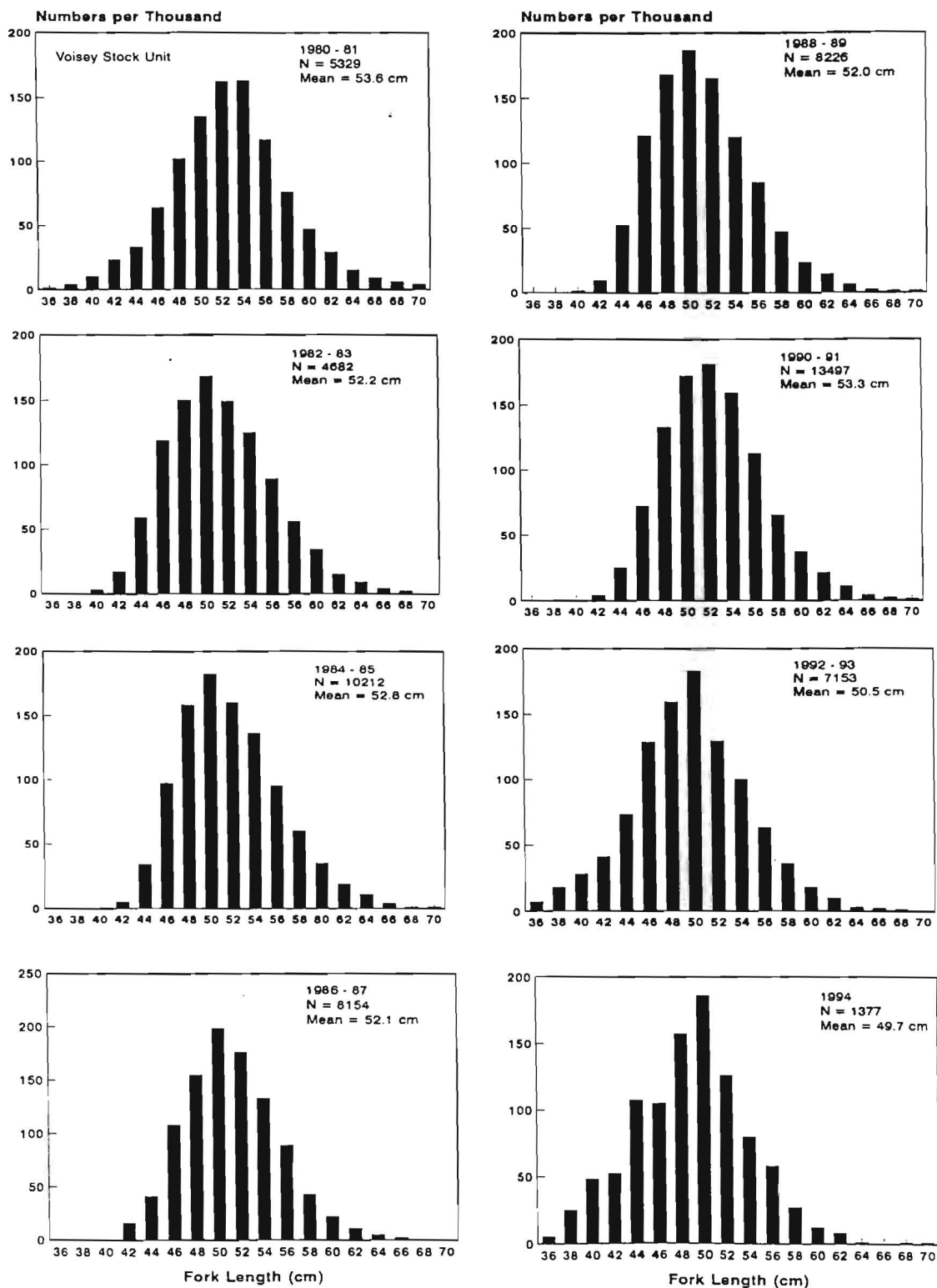


Fig. 5. Length-frequency distributions of the commercial catch of anadromous Arctic charr from the Voisey stock unit, in two year intervals from 1980-81 to 1994.

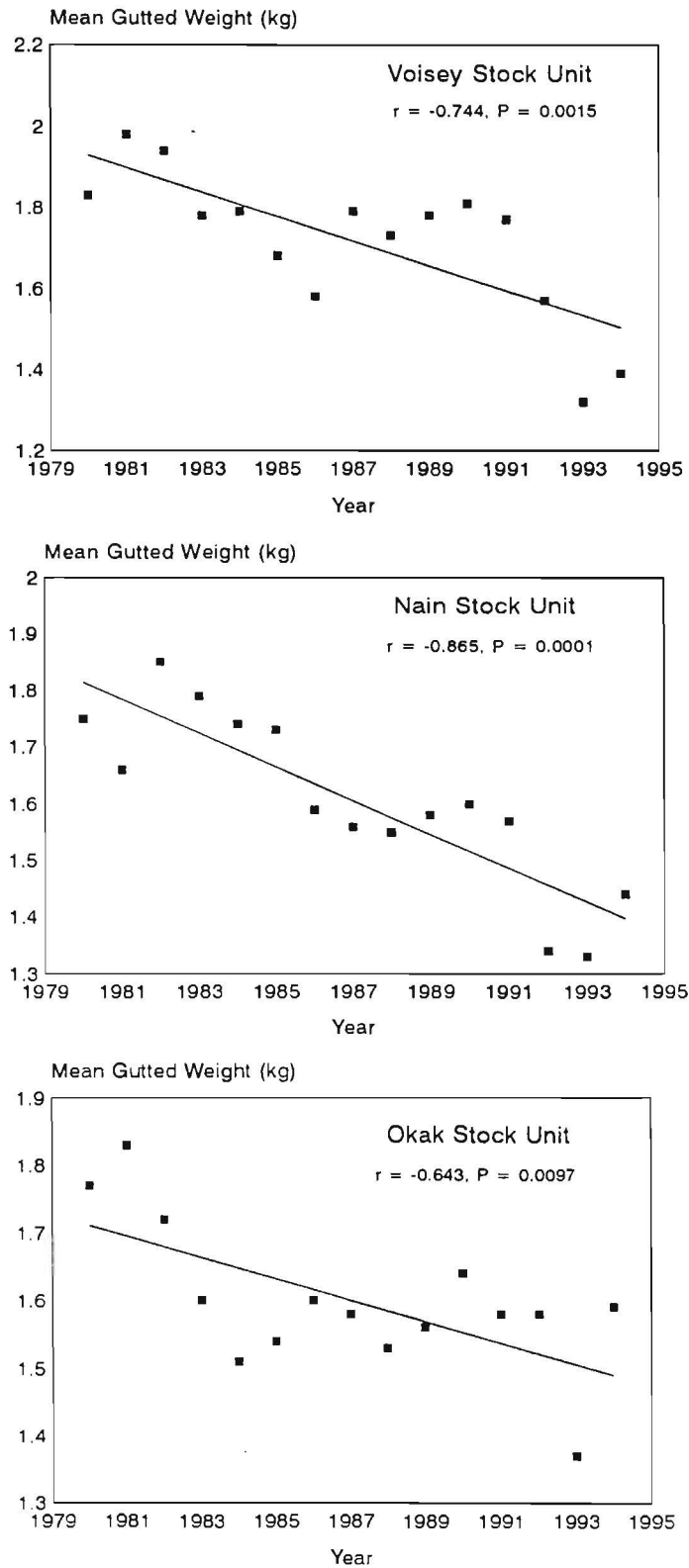


Fig. 6. Change in gutted weight of Arctic charr from the Voisey, Nain, and Okak stock units, 1980-94.

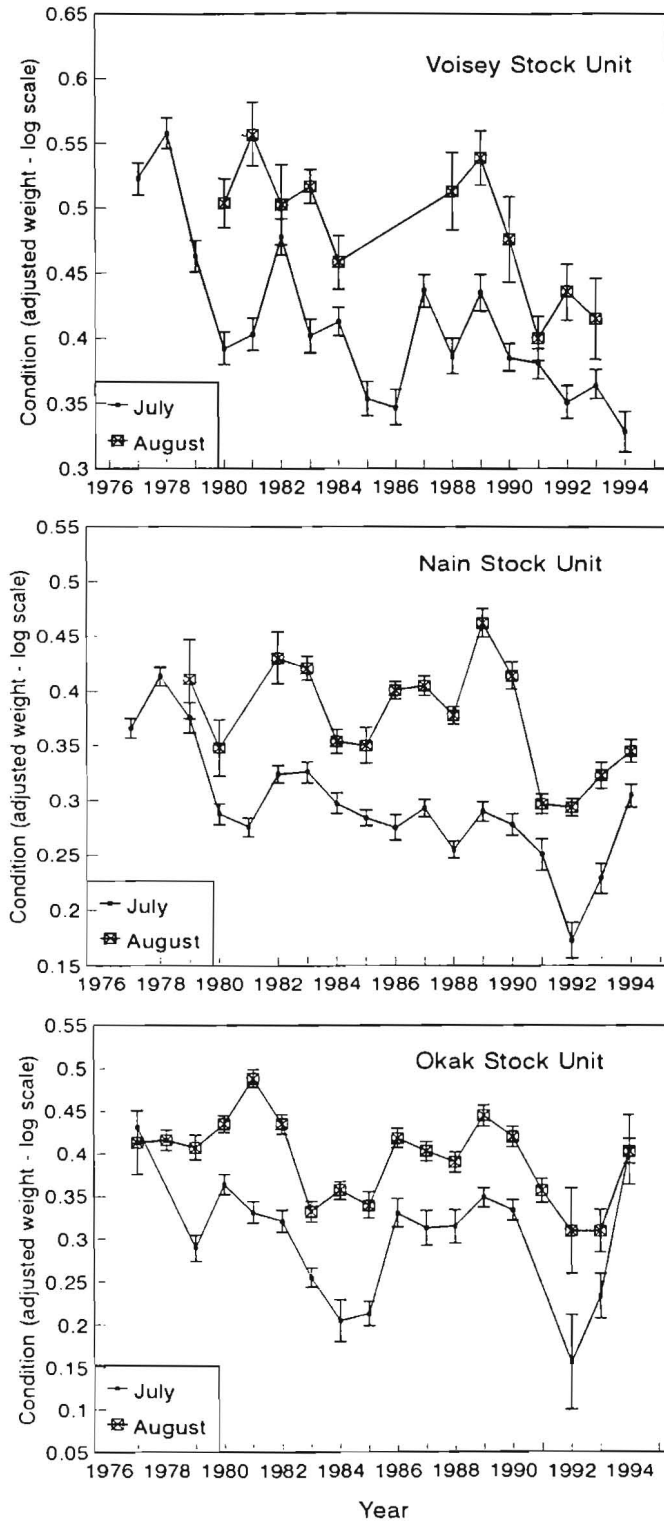


Fig. 7. Temporal variation in condition of Arctic charr from the Voisey, Nain, and Okak stock units, 1977-94. July and August months are shown separately. The vertical lines represent \pm two standard errors about the mean.

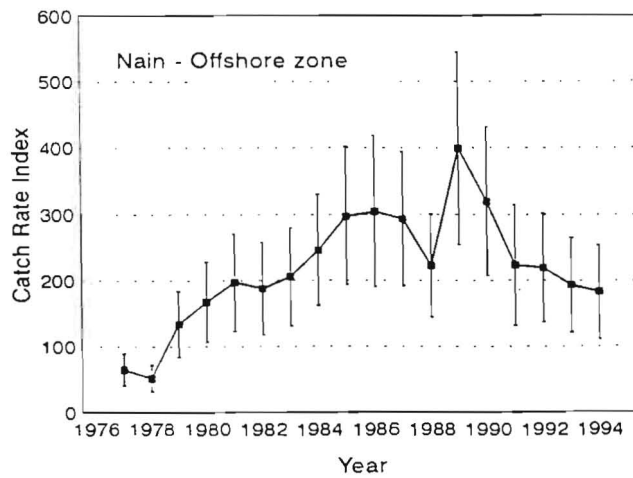
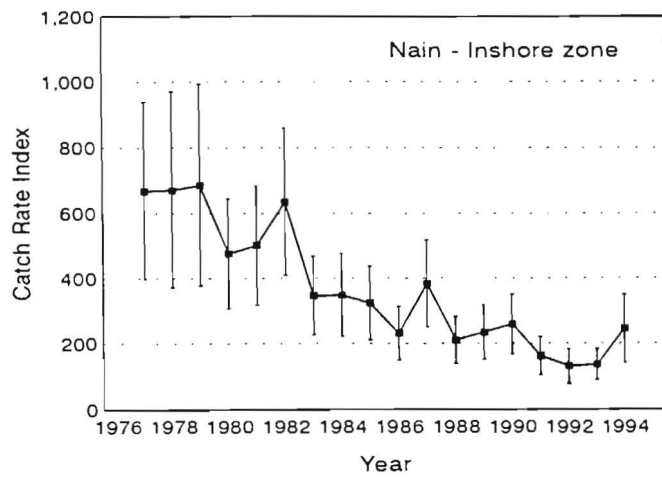
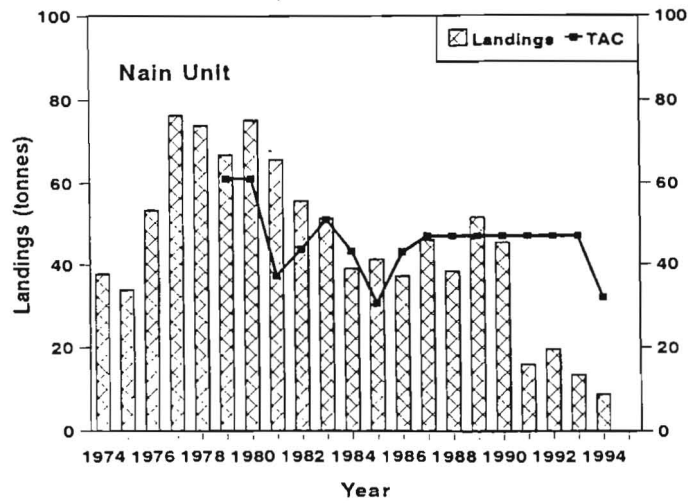
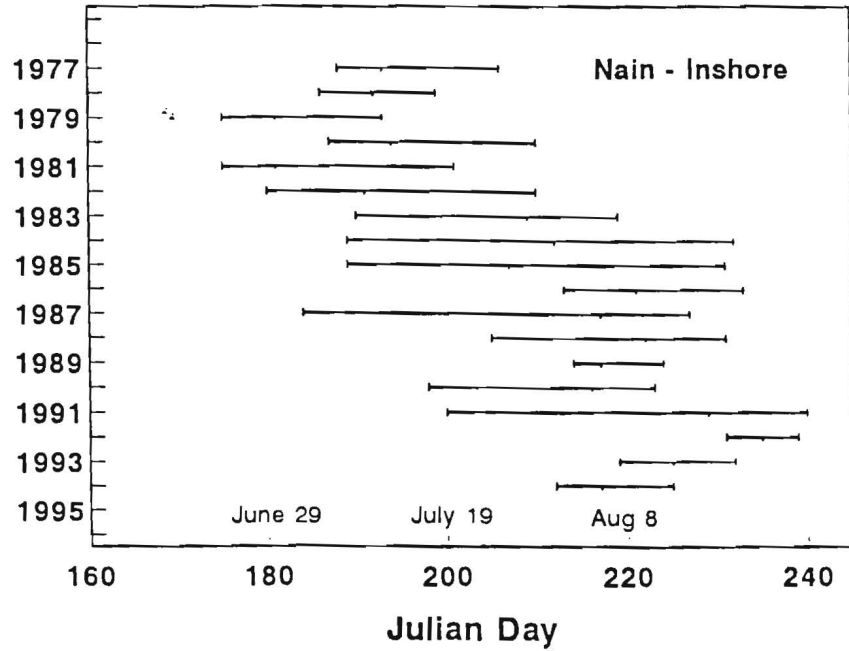


Fig. 8. Commercial landings of anadromous Arctic charr from the Nain stock unit, 1974-94, in relation to the total allowable catch (upper panel), and estimated commercial catch rates (kg/person-week fished) for inshore and offshore fishing zones (middle and lower panels). Vertical lines represent \pm one standard error about the mean.

Year



Year

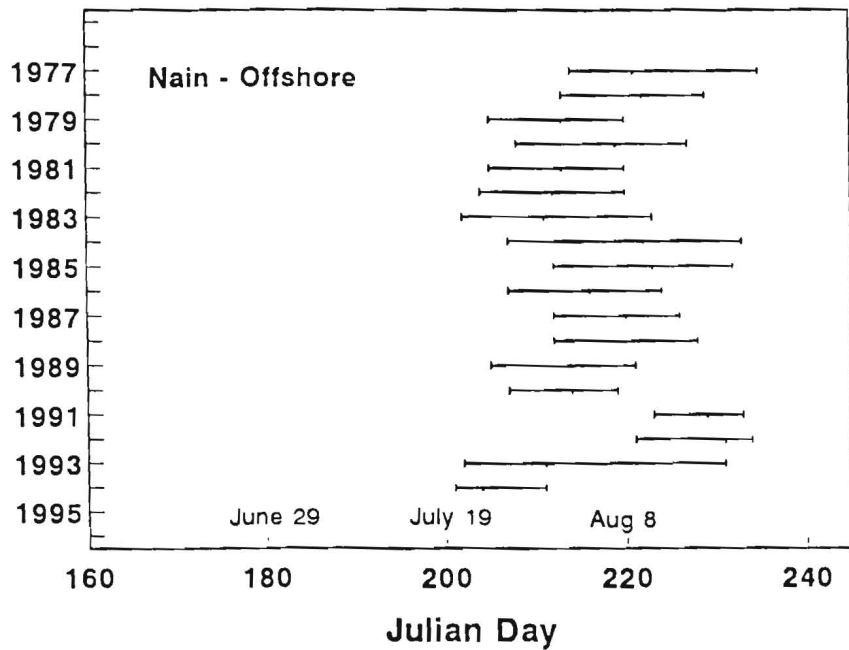


Fig. 9. Commercial catch timing of the Nain stock unit Arctic charr fishery for inshore and offshore fishing zones, 1977-94. The median date (50%), along with the 25th and 75th percentiles are illustrated.

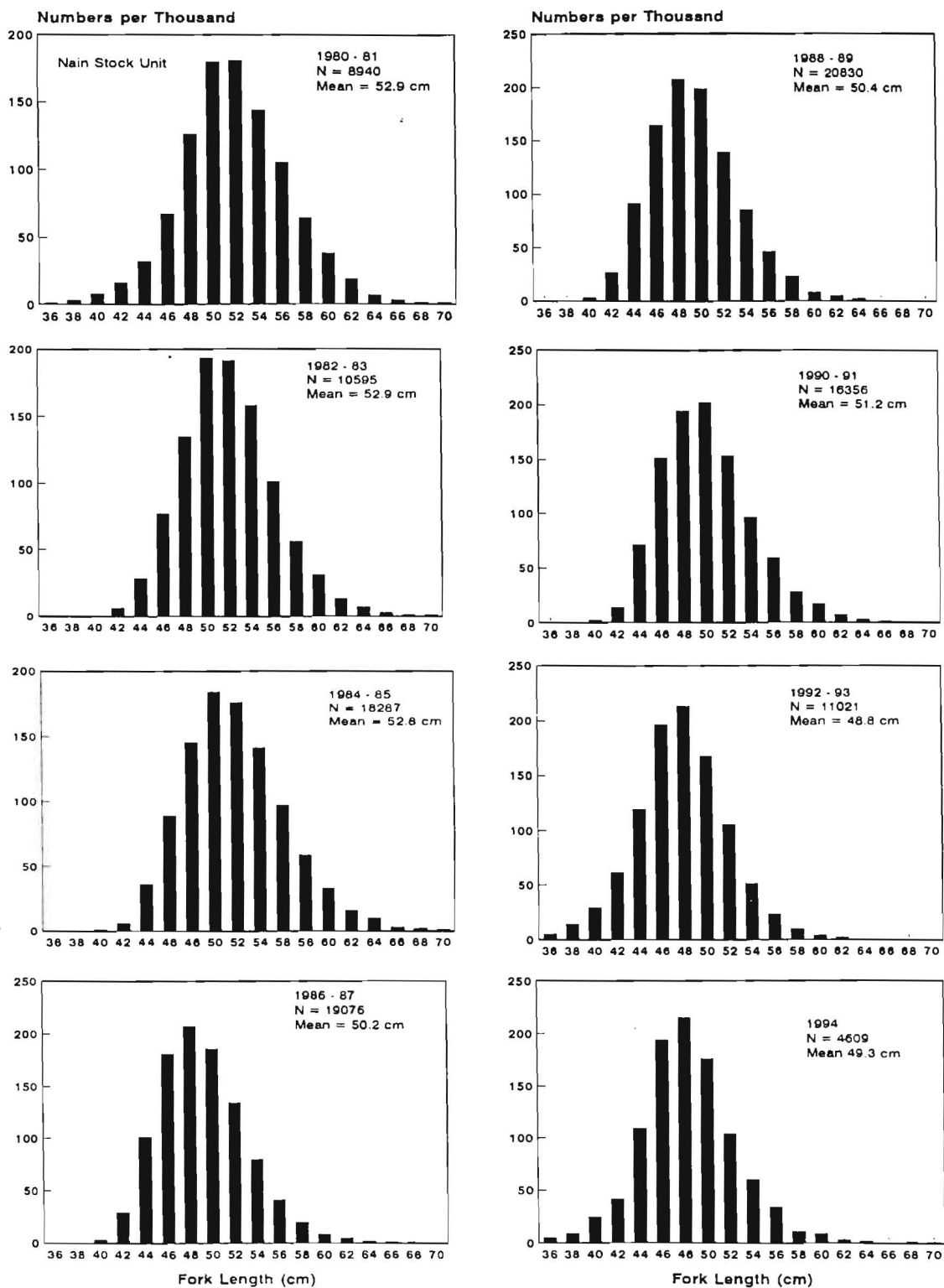


Fig. 10. Length-frequency distributions of the commercial catch of anadromous Arctic charr from the Nain stock unit, in two year intervals from 1980-81 to 1994.

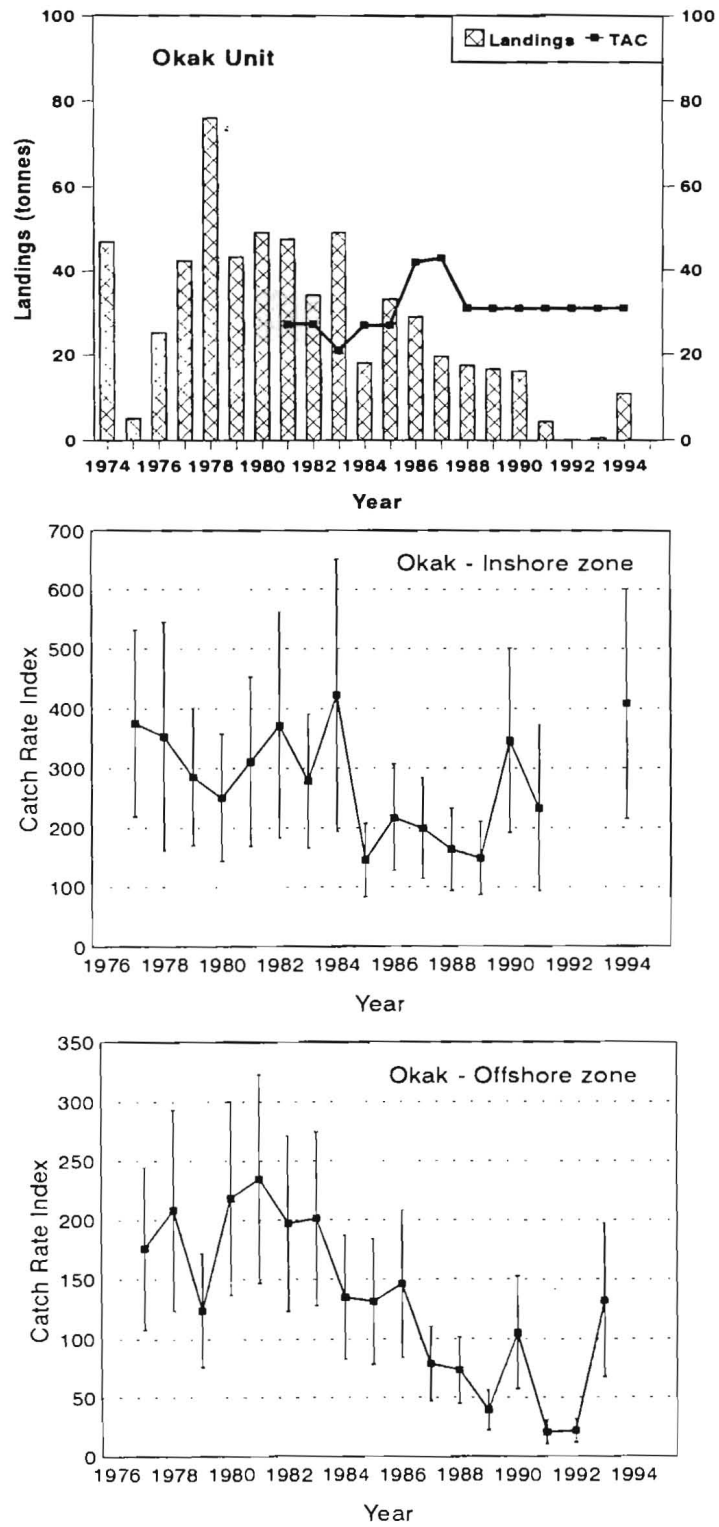


Fig. 11. Commercial landings of anadromous Arctic charr from the Okak stock unit, 1974-94, in relation to the total allowable catch (upper panel), and estimated commercial catch rates (kg/person-week fished) for inshore and offshore fishing zones (middle and lower panels). Vertical lines represent \pm one standard error about the mean.

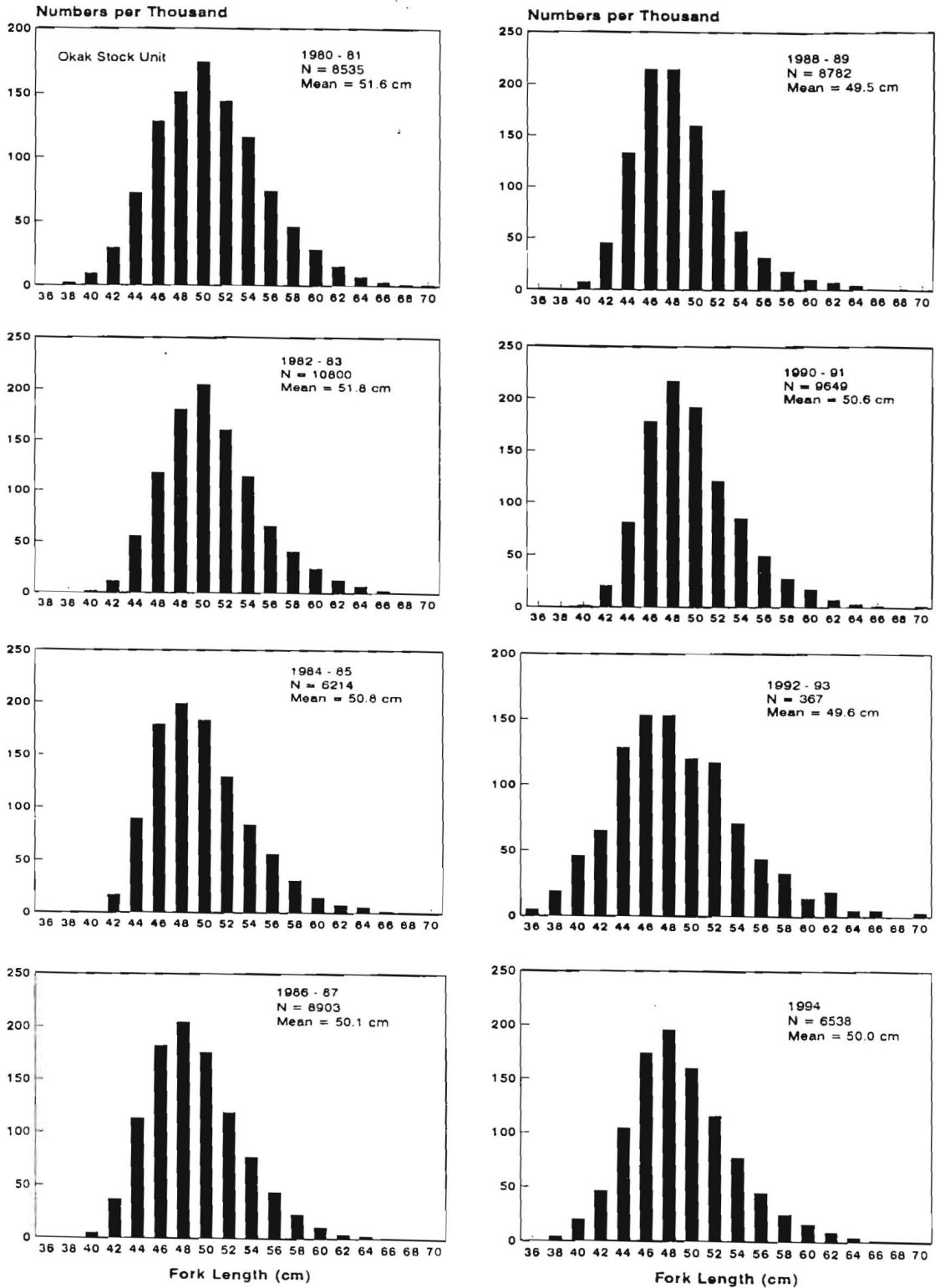


Fig. 12. Length-frequency distributions of the commercial catch of anadromous Arctic charr from the Okak stock unit, in two year intervals from 1980-81 to 1994.

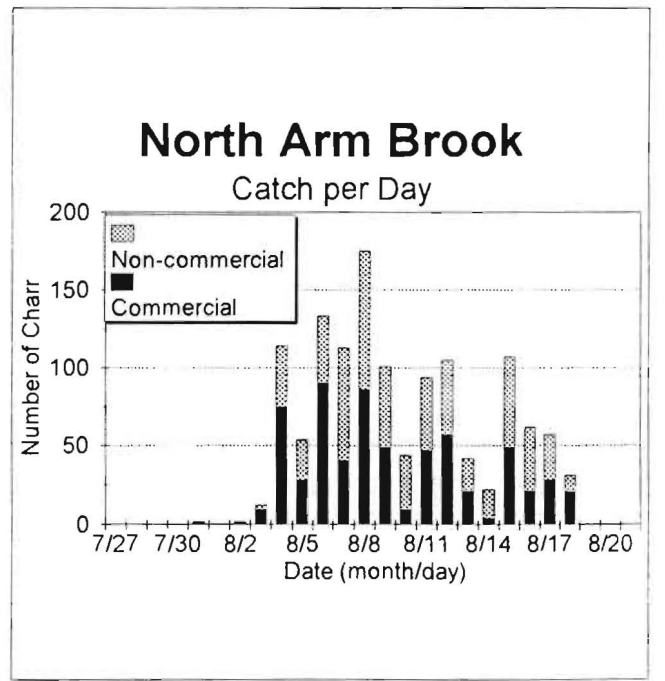
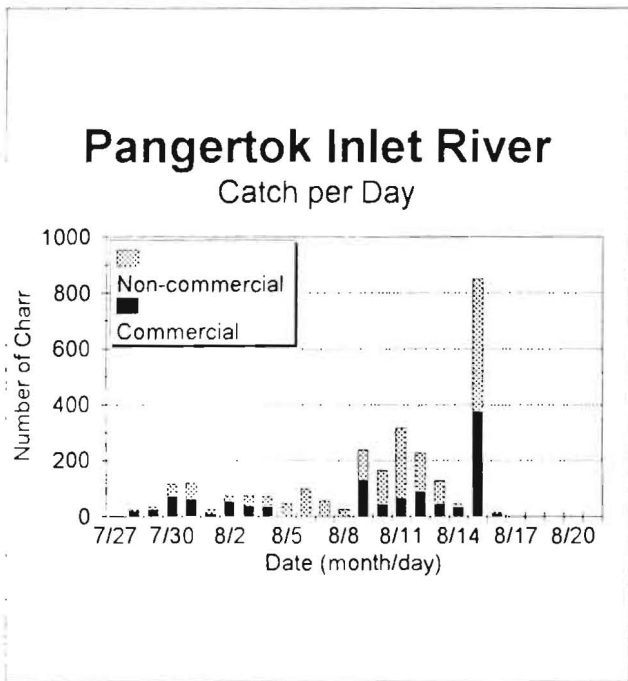
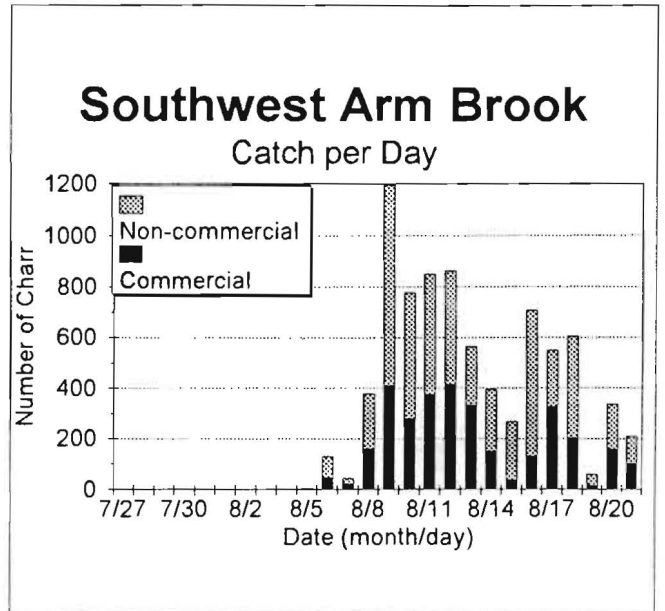
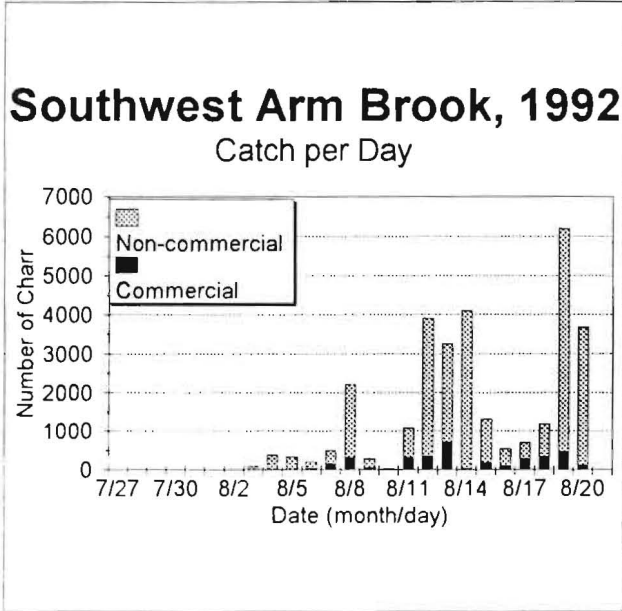


Figure 13. Number of Arctic charr caught by day from the 3 Saglek rivers fished during 1992 and 1994.

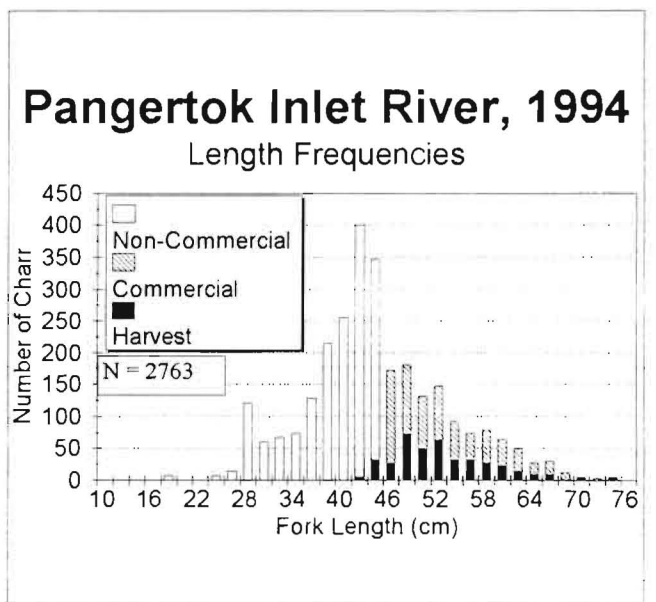
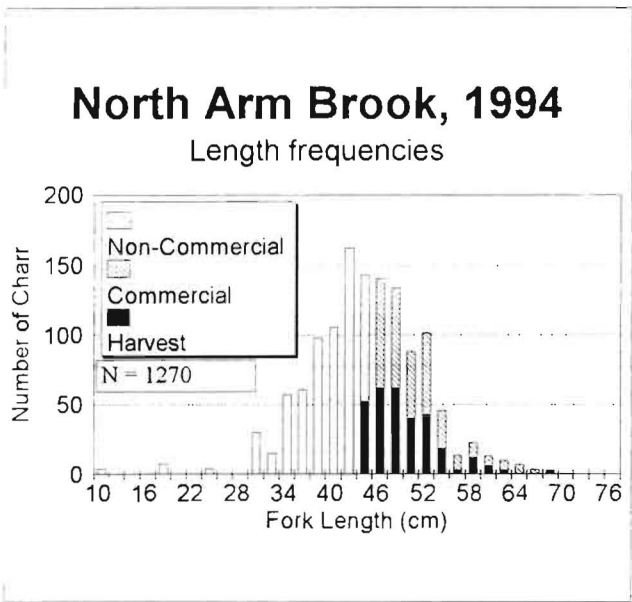
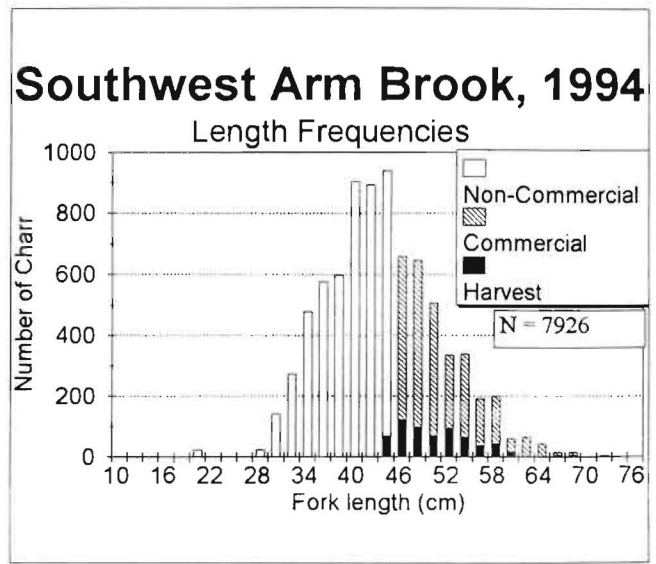
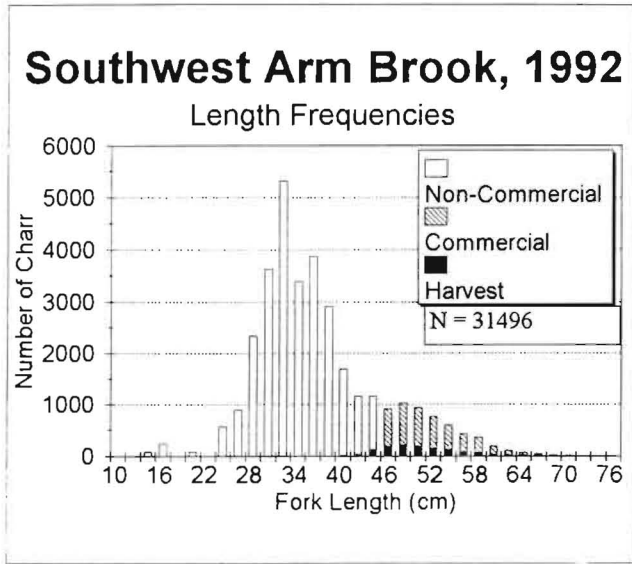


Figure 14 . Length Frequencies from Charr Captured during the 1992 and 1994 Experimental Fisheries.

APPENDIX 1, ARCTIC CHARR CATCH STATISTICS, 1974-1994.
SUMMARY OF CATCH AND EFFORT DATA FOR THE MAIN FISHING REGION

AREA=ANTONS

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS											
CATCH (KG)	9135	3489	3172	2111	4011	19371	8460	7870	6191	23062	13099
EFFORT (PERSON-WKS)	34	20	6	20	17	63	32	38	24	63	82
C/E (KG)	269	174	529	106	236	307	264	207	258	366	160
% > 2.3 KG			21	24	28	22	14	13	12	9	7
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS											
CATCH (KG)	14212	13589	8611	8460	11019	12659	2813	413	1904	180	
EFFORT (PERSON-WKS)	51	67	55	29	32	45	20	6	11	2	
C/E (KG)	279	203	157	292	344	281	141	69	173	90	
% > 2.3 KG											

AREA=VOISEY BAY

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS						22500	22500	16100	16100	16000	16000
CATCH (KG)	20045	238	12232	22488	33597	21880	11557	16325	7688	2953	8113
EFFORT (PERSON-WKS)	64	2	45	56	85	59	52	53	38	17	24
C/E (KG)	313	119	272	402	395	371	222	308	202	174	338
% > 2.3 KG			42	35	34	32	17	16	17	17	16
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS	23400										
CATCH (KG)	1435	3065	12630	5577		7236	8158	8851	6558	3155	
EFFORT (PERSON-WKS)	6	22	54	26		24	43	36	38	13	
C/E (KG)	239	139	234	215		301	190	246	173	243	
% > 2.3 KG											

AREA=ANAKTAKLIK BAY

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS						21500	21500	8660	8660	11000	6100
CATCH (KG)	7821	2548	14670	21604	13075	14913	8045	9157	10836	2359	3980
EFFORT (PERSON-WKS)	28	10	45	63	55	76	53	32	27	24	34
C/E (KG)	279	255	326	343	238	196	152	286	401	98	117
% > 2.3 KG			36	38	27	20	12	10	11	11	12
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS	8400		5000	5000	5000	5000	5000	5000	5000	5000	5000
CATCH (KG)	7477	180	2002	1075	1175	454	1484	70	230	19	
EFFORT (PERSON-WKS)	39	7	18	12	13	5	17	3	6	1	
C/E (KG)	192	26	111	90	90	91	87	23	38	19	
% > 2.3 KG											

APPENDIX 1, ARCTIC CHARR CATCH STATISTICS, 1974-1994.
SUMMARY OF CATCH AND EFFORT DATA FOR THE NAIN FISHING REGION

----- AREA=DOG ISLAND -----											
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS											
CATCH (KG)	2659	653	212	2039	386	1440	3048	1516	1105	6858	6666
EFFORT (PERSON-WKS)	38	40	11	49	25	61	86	37	38	62	66
C/E (KG)	70	16	19	42	15	24	35	41	29	111	101
% > 2.3 KG			11	9	8	15	11	14	7	8	10
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS											
CATCH (KG)	6882	3289	16881	11735	2794	7219	1240	2134	2218	1485	
EFFORT (PERSON-WKS)	62	32	86	88	27	44	14	16	18	14	
C/E (KG)	111	103	196	133	103	164	89	133	123	106	
% > 2.3 KG											
----- AREA=NAIN BAY -----											
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS										5000	
CATCH (KG)	12461		3119	8464				5450	85	532	1886
EFFORT (PERSON-WKS)	37		10	28				29	1	8	15
C/E (KG)	337		312	302				188	85	67	126
% > 2.3 KG			16	15				4		2	6
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS											
CATCH (KG)	2667	6437	3806	5179	20734	10265	4039	4762	2346	3349	
EFFORT (PERSON-WKS)	32	39	15	33	61	61	59	45	33	23	
C/E (KG)	83	165	254	157	340	168	68	106	71	146	
% > 2.3 KG											
----- AREA=TIKKOATOKAK BAY -----											
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS						39500	39500	28500	35000	35000	26000
CATCH (KG)	9960	27695	31568	39483	55061	37919	42131	28066	28283	16211	8618
EFFORT (PERSON-WKS)	28	76	81	94	147	108	130	80	75	65	43
C/E (KG)	356	364	390	420	374	351	324	351	377	249	200
% > 2.3 KG			19	20	18	14	10	5	7	8	5
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS	12500		16000	16000	16000	16000	16000	16000	16000	16000	16000
CATCH (KG)	6243	3841	3608	2240	2636	1491	2296	2560	2088	1224	
EFFORT (PERSON-WKS)	24	16	12	12	13	12	16	9	15	7	
C/E (KG)	260	240	301	137	203	124	143	234	139	175	
% > 2.3 KG											

APPENDIX I, ARCTIC CHARR CATCH STATISTICS, 1974-1994.
SUMMARY OF CATCH AND EFFORT DATA FOR THE MAIN FISHING REGION

----- AREA=WEBB BAY -----											
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS											
CATCH (KG)	580	833	4550	2516	3472	3035	3008	8100	4607	15055	10476
EFFORT (PERSON-WKS)	1	5	15	21	16	9	8	29	27	56	43
C/E (KG)	580	167	303	120	217	337	376	279	171	269	244
% > 2.3 KG			21	19	20	39	39	27	11	5	7
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS			9000	9000	9000	9000	9000	9000	9000	9000	9000
CATCH (KG)	5143	5890	8424	6041	5904	4859	2343	3111	928		
EFFORT (PERSON-WKS)	35	34	27	33	17	10	10	16	8		
C/E (KG)	147	173	312	183	347	486	234	194	116		
% > 2.3 KG											
----- AREA=BLACK ISLAND -----											
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS											
CATCH (KG)	4264	2101	2725	3389	2966	10632	20051	14413	11602	11028	7913
EFFORT (PERSON-WKS)	60	62	48	65	81	92	130	94	79	87	62
C/E (KG)	71	34	57	52	37	116	154	153	147	127	128
% > 2.3 KG			8	10	14	7	6	7	8	4	5
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS											
CATCH (KG)	12750	17458	11151	12024	18222	20987	4490	6917	5601	2747	
EFFORT (PERSON-WKS)	68	72	50	61	60	65	37	44	41	24	
C/E (KG)	188	242	223	197	304	323	121	157	137	114	
% > 2.3 KG											
----- AREA=KIGLAPAITS -----											
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS											
CATCH (KG)	5131	1504	6089	5435	12097	17606	16543	21911	8326	20625	11431
EFFORT (PERSON-WKS)	26	32	59	57	103	120	95	99	34	103	55
C/E (KG)	197	47	103	95	117	147	174	221	245	200	208
% > 2.3 KG			25	25	34	14	18	12	16	12	9
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS											
CATCH (KG)	6184	6983	1620	862	2605	1051	1110	653	524	529	
EFFORT (PERSON-WKS)	41	55	14	9	22	10	15	4	4	4	
C/E (KG)	151	127	116	96	113	105	74	163	131	132	
% > 2.3 KG											

APPENDIX 1, ARCTIC CHARR CATCH STATISTICS, 1974-1994.
SUMMARY OF CATCH AND EFFORT DATA FOR THE MAIN FISHING REGION

----- AREA=TASIUYAK -----											
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS											
CATCH (KG)	1467		281		2280	1837	1137		1060	1259	3423
EFFORT (PERSON-WKS)	15		2		9	11	8		6	7	23
C/E (KG)	98		141		253	167	142		177	180	149
% > 2.3 KG			21		71	34	14		11	13	5
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS											
CATCH (KG)	4724	6749	8997	2823	3186	3302	1077	3063	1153	3675	
EFFORT (PERSON-WKS)	36	26	61	22	23	17	5	13	3	11	
C/E (KG)	131	260	147	128	139	194	215	236	384	334	
% > 2.3 KG											
----- AREA=MUGFORD -----											
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS											
CATCH (KG)			1970	1374	1148	170	513			15	
EFFORT (PERSON-WKS)			15	9	7	2	5			1	
C/E (KG)			131	153	164	85	103			15	
% > 2.3 KG			30	36	32	16	15				
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS											
CATCH (KG)											
EFFORT (PERSON-WKS)											
C/E (KG)											
% > 2.3 KG											
----- AREA=OKAK BAY -----											
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS								27300	27300	21000	27000
CATCH (KG)	34250	2354	17812	27592	36125	26171	17434	11049	9031	30732	13864
EFFORT (PERSON-WKS)	105	15	52	107	104	123	65	46	26	147	30
C/E (KG)	326	157	343	258	347	213	268	240	347	209	462
% > 2.3 KG			29	26	18	11	8	10	7	7	2
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS	27000	27000	26000	22000	26000	26000	26000	26000	26000	26000	26000
CATCH (KG)	24746	20141	15695	12608	14973	12497	4112				10866
EFFORT (PERSON-WKS)	119	91	71	51	84	45	13				23
C/E (KG)	208	221	221	247	178	278	316				472
% > 2.3 KG											

APPENDIX 1, ARCTIC CHARR CATCH STATISTICS, 1974-1994.
SUMMARY OF CATCH AND EFFORT DATA FOR THE MAIN FISHING REGION

----- AREA=CUTTHROAT -----											
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS											
CATCH (KG)	12641	2703	7526	15488	41146	17803	32397	37263	25699	19043	4570
EFFORT (PERSON-WKS)	95	47	103	130	267	161	205	172	164	164	65
C/E (KG)	133	58	73	119	154	111	158	217	157	116	70
% > 2.3 KG			17	25	25	12	12	13	15	10	7
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS											
CATCH (KG)	8515	8756	3954	4842	1591	3628	320	180	578		
EFFORT (PERSON-WKS)	106	89	70	89	84	55	18	13	9		
C/E (KG)	80	98	56	54	19	66	18	14	64		
% > 2.3 KG											
----- AREA=NAPARTOK -----											
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS											
CATCH (KG)			28972	28039	8551	2486	752	291	16485		
EFFORT (PERSON-WKS)			124	126	50	33	11	3	60		
C/E (KG)			234	223	171	75	68	97	275		
% > 2.3 KG			14	22	20	16	13	12	8		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS											
CATCH (KG)								242	4414		
EFFORT (PERSON-WKS)								4	16		
C/E (KG)								60	276		
% > 2.3 KG											
----- AREA=HEBRON FIORD -----											
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS											
CATCH (KG)				5957			2915	39901	29072		20000
EFFORT (PERSON-WKS)				37				106	37822		19531
C/E (KG)				161				376	98		112
% > 2.3 KG				16			19	34	386		174
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS											
CATCH (KG)				543		643	20731	21252	5608		
EFFORT (PERSON-WKS)				6		1	49	92	34		
C/E (KG)				91		643	423	231	165		
% > 2.3 KG											

APPENDIX I, ARCTIC CHARR CATCH STATISTICS, 1974-1994.
SUMMARY OF CATCH AND EFFORT DATA FOR THE NAIN FISHING REGION

----- AREA=DONES -----											
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS											
CATCH (KG)								5187	2643		976
EFFORT (PERSON-WKS)								19	14		10
C/E (KG)								273	189		98
% > 2.3 KG								36	17		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS											
CATCH (KG)											
EFFORT (PERSON-WKS)											
C/E (KG)											
% > 2.3 KG											
----- AREA=SAGLEK FIORD -----											
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS											
CATCH (KG)								24722	23791		5389
EFFORT (PERSON-WKS)								77	118		40
C/E (KG)								321	202		135
% > 2.3 KG								18	7		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS											
CATCH (KG)										3247	
EFFORT (PERSON-WKS)										4	
C/E (KG)										812	
% > 2.3 KG											
----- AREA=RAMAH -----											
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS											
CATCH (KG)									7758		3110
EFFORT (PERSON-WKS)									26		25
C/E (KG)									298		124
% > 2.3 KG									20		
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS											
CATCH (KG)									172	580	
EFFORT (PERSON-WKS)									2	2	
C/E (KG)									86	290	
% > 2.3 KG											

APPENDIX 1, ARCTIC CHARR CATCH STATISTICS, 1974-1994.
SUMMARY OF CATCH AND EFFORT DATA FOR THE NAIN FISHING REGION

----- AREA=NACHVAK -----											
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QUOTAS											
CATCH (KG)											
EFFORT (PERSON-WKS)											
C/E (KG)											
% > 2.3 KG											
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS											
CATCH (KG)	6142	1808									
EFFORT (PERSON-WKS)	18	4									
C/E (KG)	341	452									
% > 2.3 KG											
----- AREA=NAIN FISHERY -----											
	1974	1975	1976	1977*	1978	1979	1980	1981	1982	1983	1984
QUOTAS											
CATCH (KG)	120414	44118	134898	186165	213915	175263	167991	231221	203012	149732	123045
EFFORT (PERSON-WKS)	531	309	616	863	966	918	880	914	856	804	729
C/E (KG)	227	143	219	216	221	191	191	253	237	186	169
% > 2.3 KG			24	25	25	17	12	16	13	8	6
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
QUOTAS											
CATCH (KG)	107120	98186	97379	74010	84837	86292	54455	58553	33562	27230	
EFFORT (PERSON-WKS)	637	554	533	471	436	394	320	315	226	122	
C/E (KG)	168	180	183	157	195	219	170	186	149	223	
% > 2.3 KG											

Includes 186 Kg unaccounted by area