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Status report for northern Labrador Arctic charr, 1998

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Abstract

Catch and effort statistics for the northern Labrador Arctic charr fishery in 1998 are summarized and information on catch-at-age and weight-at-age updated. Landings of 37.5 tonnes were similar to 1997 but were derived entirely from within the Nain Fishing Region as there was no reported commercial harvest of charr from the Makkovik Region in 1998. Landings from the Nain Region were 10% higher than the previous year and were the highest since 1992. Increased effort in the Nain stock unit and the highest catch rates since 1990 at both Nain and Voisey stock units contributed to the higher commercial production in 1998. Effort in recent years is still low, relative to the 1980's, and interpretation of current commercial catch rates as an index of stock abundance, could be problematic. Landings of anadromous Arctic charr from the Nain Fishing Region over the past 25 years (1974 - 1998) totalled approximately 2589 tonnes, or over 5.7 million pounds. Of this amount, 77% (1993 tonnes) has been harvested from the three primary stock complexes (Voisey, Nain, Okak) and illustrates the overall capacity of this area of the north coast to produce fish. There was no experimental in-river terminal harvest for Arctic charr in 1998 and the commercial Atlantic salmon fishery was closed. We note that the amount of charr harvested for food is unknown.

Résumé

Une analyse des données de prises et d'effort de la pêche à l'omble chevalier pour 1998 est présentée pour le nord du Labrador ainsi qu'une mise à jour des données de capture à l'âge et poids à l'âge. Les débarquements, totalisant 37,5 tonnes, ont été comparables à ceux de 1997. Ils provenaient en totalité de la région de Nain, étant donné qu'aucune récolte commerciale d'omble chevalier n'a été déclarée pour la région de Makkovik en 1998. Dans la région de Nain, les débarquements ont été de 10 % supérieurs à ceux de l'année précédente et les premiers en importance depuis 1992. La hausse de la production commerciale en 1998 est le résultat d'une augmentation de l'effort de pêche du stock de Nain conjuguée au taux de capture le plus élevé depuis 1990 des deux stocks de Nain et de Voisey. L'effort de pêche ces dernières années demeure faible par rapport aux années 1980. C'est pourquoi l'interprétation du taux actuel de capture commerciale comme un indice de l'abondance des stocks pourrait s'avérer douteuse. Pour les 25 dernières années (1974-1998), les débarquements d'omble chevalier anadrome dans la région de Nain s'élèvent à environ 2 589 tonnes ou 5,7 M lb. De cette quantité, 77 % de la récolte (1 993 tonnes) provient de trois stocks principaux (Voisey, Nain et Okak) et constitue un bon indice de la productivité biologique de cette portion nord de la côte. En 1998, aucune récolte expérimentale n'a été effectuée en rivière lors de la remonte finale de l'omble chevalier, et la pêche commerciale du saumon de l'Atlantique a été fermée. Le volume des prises de l'omble chevalier à des fins alimentaires n'est pas connu.

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 of Arctic charr were caught per year in northern Labrador. Landings declined during the mid-1980's as fewer individuals participated in the fishery. The lowest landings in the past 30 years occurred in 1996 (14.7 t) followed by 1995 (29.6 t) and 1994 (31.1 t). Over the past several years, landings increased to 34.2 t in 1997 and to 37.5 t in 1998 but are still well below the long term average (1974 -1998 = 121 t).

Much of the decline in landings in the Nain Fishing Region during the previous decade can be directly 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, 1993, 1995). In recent years, there has been more emphasis by the Labrador Inuit Association (LIA) to develop 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 to obtain direct evidence of actual spawning escapements. In addition, the issuance of a communal licence at Nain has allowed new participants in the Arctic charr fishery.

This paper provides an updated summary of the catch information for the 1998 fishery in a format similar to that presented in previous years (Shears and Dempson 1996, 1997, 1998). We also update catch- and weight-at-age data for each of the Voisey, Nain, and Okak stock units based upon information collected during the 1998 fishery. We note that there were no in-river terminal fisheries during 1998.

Methods

Information on commercial landings of Arctic charr from the Nain Fishing Region in 1998 was obtained through purchase slips prepared by Statistics and Informatics Branch of the Department of Fisheries and Oceans (DFO) and processed by the Salmonids Section. Information contained on the purchase slips included: name of the fisherperson, licence number, area where the fish were caught, date, weight of fish 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 x 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.

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. As in previous years, a two-stage stratified sampling program was carried out for which specific details are provided in Dempson (1995). Samples were identified from individual subareas which form component parts of stock units (Dempson and Kristofferson 1987). Recent genetic analyses have supported the earlier designation of individual stock complexes in the north Labrador region but have also shown that there are often microgeographic genetic differences among local populations of charr in north Labrador (Bernatchez et al. 1998).

Results and Discussion

Total northern Labrador Arctic charr landings - overview

Figure 2 illustrates the commercial landings of Arctic charr for all of northern Labrador from 1944 to 1998. Also included are the landings from the Nain and Makkovik Fishing Regions since 1974. During the past 25 years, the Nain Region has contributed 86% of the total northern Labrador catch of Arctic charr, averaging 103.5 t per year. There was no commercial charr fishery at Makkovik during 1998. Thus, the total landings of 37.5 t, were derived entirely from the Nain Fishing Region. This catch was 10% greater than 1997, and 38.5% higher than the previous five year mean (27.1 t, 1993-97), but 25% below the previous ten year mean (49.7 t, 1988-97) (Table 1). Landings of anadromous Arctic charr from the Nain Fishing Region over the past 25 years (1974 - 1998) totalled approximately 2589 tonnes, or over 5.7 million pounds. Of this amount 77% (1993 tonnes) has been harvested from the three primary stock complexes (Voisey, Nain, Okak), and illustrates the overall capacity of this limited area of the north coast to produce fish. Besides Arctic charr, the Nain Fishing Region also harvested 429 tonnes, or about 946 thousand pounds of Atlantic salmon (*Salmo salar*) from 1977 to 1997. The commercial Atlantic salmon fishery, however, was closed beginning in 1998.

As noted in past assessments, the number of people charr 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 buy-out

to north coast residents. As stated above, new entrants participating in the fishery were restricted to fishing in those areas where the chance of intercepting Atlantic salmon was very small. Consequently, effort in 1998 (in person-weeks) increased by 25.6% over 1997, and was 187% greater than that which occurred in 1996.

Appendix 1 provides an updated summary of catch and effort statistics for all subareas within the Nain Fishing Region from 1974 to 1998 (experimental in-river harvests are not included in the Appendix - refer to Table 2 for past details). 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 currently considered as component parts of larger assessment units or stock complexes. We note that 4.9 tonnes of charr were caught in the Napartok Bay subarea; this was the first time this area was fished the since 1992.

With the reduction in commercial salmon and charr fishing licences in northern Labrador, there was a corresponding increase in food fishing licences. The number of food licences issued in 1998 was the highest in the time series.

No. of food licences

Community	1980	1982	1987	1993	1994	1995	1996	1997	1998
Postville	12	7	10	22	48	42	46	33	48
Makkovik	19	14	15	13	40	40	49	43	58
Hopedale	7	12	22	16	51	63	67	55	59
Davis Inlet	5	5	1	6	10	8	6	4	2
Nain	10	7	3	21	40	46	50	53	58
TOTAL	53	45	51	78	189	199	218	188	225

As acknowledged in past reports, the amount of charr harvested for food is unknown.

Individual stock unit summaries

Voisey Stock Unit

The Voisey stock unit is made up of Voisey's Bay and the Anton's subareas (Fig. 1). Prior to 1994, annual landings ranged from 4 to 41 t (mean = 19t, 1974-93) and over this interval 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) but landings fell coincident with decreased effort during the 1990's. In 1995 there was no directed commercial fishery on this stock. Overall, 82% of the variation in catch can

be explained simply by effort for the Voisey stock complex (Fig. 4). The Total Allowable Catches (TACs) listed in Table 3 for 1979 to 1984 applied only to the Voisey Bay subarea. A TAC of 14 t was maintained for 1998.

In 1998, landings increased to 7.7 tonnes, the highest catch from this stock unit since 1993 and contributed 21% of the landings from the Nain Fishing Region. Catch rates (CUE) also increased to the highest value since 1990 (Table 3). Timing of the fishery (median date of catch) in 1998 was about 9 days earlier than 1997 and comparable with timing in 1993, 1994, and 1996 (Fig. 5). We note that over the past 25 years (1974 - 1998) almost 400 tonnes of charr, or 874 thousand pounds of fish have been taken from the Voisey stock unit.

Catch- and weight-at-age data are summarized in Tables 4 and 5, respectively. Including the catch in 1998, more than 184 thousand charr have been harvested from the Voisey stock complex since 1977. Seven to nine year old charr, from the 1988 to 1990 year classes, contributed 77% of the catch in 1998 (Table 4). This high dependence on several age classes is consistent with information from past years. Of note this year has been the increase in overall mean weight of charr caught, the heaviest since 1991, and the corresponding increase in individual weights-at-age (Table 5). The decline in mean weight of fish landed (Fig. 7) has been noted in past years. We note that there is no additional quantitative information to suggest changes to the management regime for 1999 owing to the lack of information on abundance of charr returning to Voisey's Bay rivers.

Nain Stock Unit

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 ranged from 5 to 76 t (mean = 39.1 t, 1974-98), and over this interval contributed 38.8% of the commercial catch of charr from the Nain Fishing Region (Table 4). The highest catches occurred during the late 1970's and early 1980's (Fig. 3), with the catches declining during the 1990's coincident with a reduction in effort. The lowest catch of approximately 5 t occurred in 1996. Overall, 87% of the variation in catch can be explained by effort directed in the Nain stock complex (Fig. 4).

The TACs listed in Table 4 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 4 summarized 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. Based partly on Science advice, the management plan for 1994 lowered the TAC from 47 t to 32 t. This TAC remained in effect for 1998.

Landings of Arctic charr from the Nain stock unit in 1998 totalled 14.6 t, a 107% increase over the previous year and the highest catch since 1992 (Table 6). This harvest represented 39% of the landings from the Nain Fishing Region in 1998. The increased catch was, in part, due to an increase in effort over the previous year which, however, is still well below historic values. As noted for the Voisey stock unit, catch rates also increased to the highest recorded in the past 8 years. Timing of the Nain unit fishery was also almost 2 weeks earlier than in 1997 (Fig. 5) which may also have contributed to the increased catch and catch rates. We note that over the past 25 years (1974 - 1998) 978 tonnes, or about 2.2 million pounds of charr have been taken from the Nain stock unit (68.9% from the inshore zone).

A summary of landings partitioned by inshore and offshore fishing zones is presented in Table 7. Historically, 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. During 1998, catch rate increased in the offshore zone while catch rate declined by 14% in the inshore zone.

As we have noted previously (Shears and Dempson 1998) that there was a significant relationship between catch rate and timing of the fishery for the Nain stock unit ($r^2 = 0.37$; $P = 0.003$); the later the timing of the commercial catch, the lower the catch rate. However, if the inshore zone itself was considered, then 73% of the variation in catch-rate was explained by the timing of the fishery ($P = 0.0001$). In contrast with timing of the fishery in the Voisey and Okak stock units, timing of the Nain unit catch had been much later during the past decade (Fig. 5), especially when the inshore and offshore zones are considered separately (Fig. 6). In the absence of fish counting facilities, variability in run timing of charr to local rivers is unknown.

Catch- and weight-at-age data are summarized in Tables 8 and 9, respectively. Seven to nine year old charr, from the 1988 to 1990 year classes, contributed 75% of the catch in 1998 (Table 8). This high dependence on several age classes is consistent with information from past years. Including the catch in 1998, more than 500 thousand charr have been harvested from the Nain stock complex since 1977. Mean weight of charr increased substantially over that reported for 1997 and is comparable with that obtained in 1994-95. Overall, there has been a trend for decline in mean weight of charr over time from this stock complex (Fig. 7), as noted in past assessments. However, recent investigations have shown that fluctuations about some of the trends in mean age and mean weight cannot be explained entirely as a result of exploitation and that variability in environmental factors may be partially responsible (Power et al. 1999).

We note that there is no additional quantitative information to suggest changes to the management regime for 1999 owing to the lack of information on abundance of charr returning to rivers within the Nain stock complex.

Spring food fishery at Nain Bay

The Nain stock unit is where the principle domestic or spring food fishery occurs. This fishery is targeted on charr as they migrate to sea at the mouth of Fraser River (Nain Bay). Efforts in the past, both by DFO and by the Labrador Inuit Association (LIA), have failed to quantify adequately the amount of charr taken annually in this food fishery. As noted in past assessments, this unrecorded harvest has not been factored into the commercial landings or catch-at-age estimates.

Okak Stock Unit

The Okak stock unit consists of an inshore zone made up of Okak Bay and an offshore island zone made up of the Cutthroat subarea (Fig. 1). Annual landings ranged from a low of 180 kg in 1992 to a high of 76 t in 1978 (mean = 24.7 t, 1974-98), and over this interval contributed 23.3% of the commercial catch of charr from the Nain Fishing Region (Table 10). The highest catches occurred during the late 1970's and early 1980's (Fig. 3), with the lowest catches in 1992 and 1993. Overall, 91% of the variation in catch can be explained by effort directed in the Okak stock complex (Fig. 4). The Total Allowable Catches (TACs) listed in Table 10 for 1981 to 1985 applied only to the Okak Bay subarea. A TAC of 31 t was maintained for 1998.

Landings of Arctic charr from the Okak assessment unit have been inconsistent in recent years in part due to effort directed toward other nearby subareas (e.g. Tasiuyak in 1997-98, and Napartok in 1998) that do not form part of the three primary stock units (Voisey, Nain, Okak). No fishery occurred within Okak Bay itself in 1992 and 1993 while only 4 t was harvested in 1991. Landings rebounded during 1994 and 1995, with catches totalling 10.9 t and 10.6 t respectively. Landings in 1997 were the highest recorded since 1990, but decreased again in 1998 totalling approximately 6 tonnes (Table 10) or about 16% of the total charr catch from the Nain Fishing Region. We note that over the past 25 years (1974 - 1998) 618 tonnes, or about 1.4 million pounds of charr have been taken from the Okak stock unit (60.5% from the inshore subarea of Okak Bay).

Similar to catch, catch rates have also been quite variable. Highest catch rates occurred in 1994 - 1996 but were followed by a value in 1997 that was similar to the long term mean while CUE in 1998 was below average (Table 10). Sporadic effort and variable timing of the fishery in the Okak stock unit (Fig. 5) could confound interpretation of catch rate statistics.

Catch- and weight-at-age data are summarized in Tables 11 and 12, respectively. Okak is similarly dominated by 7 to 9-year old charr, originating from the 1988 to 1990 year classes, and contributing 75% of the catch in 1998 (Table 11). Including the catch in 1998, more than 306 thousand charr have been harvested from the Okak stock complex since 1977. Mean weight of charr increased over that reported for 1997 but is still low by comparison with historic information. Overall, there has been a trend for decline in mean weight of charr over time from this stock complex (Fig. 7), as noted in past assessments.

Summary

As stated in past reports, there are no independent estimates of Arctic charr abundance from any of the stock unit areas. With the minimal commercial effort in recent years, both in terms of spatial and temporal coverage, interpretation of catch-rates as an index of abundance is questionable at best. River specific information on Arctic charr abundance and monitoring of stock characteristics are imperative in order to provide sound scientific advice. In the absence of these types of data, only qualitative information related to stock status can be provided along with updates of baseline biological characteristics information derived from sampling the commercial fishery.

Nain Region - Atlantic salmon landings

As specified earlier, the commercial Atlantic salmon fishery was closed in 1998. Reports compiled by local DFO Fisheries Officers reported a by-catch of about 100 salmon in 1998. A summary of past commercial salmon landings up to 1997 is provided in Table 13.

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Table 1: Summary of northern Labrador Arctic charr landings (kg round) by fishing Region, 1974-1998.

Year	Nain Fishing Region				Makkovik Fishing Region			Total Catch
	Catch	No. of Fishermen	Fathoms of Gear Licenced	Catch as % of Total	Catch	No. of Fishermen	Fathoms of Gear Licenced	
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	37	7200	88	4622	90	18000	38184
1994	29345	18	3600	94	1778	18	3600	31123
1995	25080	18	3600	85	4522	18	3600	29602
1996	13281	18	3600	83	2691	19	3800	15972
1997	33985	30	6000	89	4029	10	2000	38014
1998	37458	37	7400	100	0	0	0	37458
Avg. 1993-97	27051				3528			30579
Avg. 1988-97	49689				8896			58585
Avg. 1974-98	103543			86	17828			121372
Total	2588587				445711			3034298

For 1985, Makkovik Region, catch includes 6788 kg from spring fishery in Postville area. Catch for Nain Fishing Region includes in-river harvests in 1989,1991,1992, 1994, 1995, 1996 and 1997, and the trap 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 Gillnet	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
1995	Saglek Fiord			2584
1996	Saglek Fiord			2983
1997	Saglek Fiord			4123

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

Biological characteristic data collected from commercial sized Acrtic charr obtained from various in-river fisheries in northern Labrador

Year	Rivers	Number	Mean FL (cm)	Mean GW (kg)	Mean Age (y)
1989	Ikadlivik Brook, Voisey Bay	98	51.1	1.45	9.2
1989	Webb Brook, Webb Bay	102	47.6	1.19	9.5
1989	Kingurutik River, Tikkoatokak Bay	300	47.6	1.16	9.0
1989	Kamanatsuk Brook, Tikkoatokak Bay	40	47.6	1.02	9.4
1989	Fraser River, Nain Bay	287	45.4	1.02	10.0
1991	Pangertok Inlet River, Saglek	77	53.1	1.55	9.8
1994	Pangertok Inlet River, Saglek	89	53.6	1.53	9.7
1992	Southwest Arm Brook, Saglek	210	52.5	1.35	9.6
1994	Southwest Arm Brook, Saglek	151	52.4	1.41	9.3
1995	Southwest Arm Brook, Saglek	187	52.2	1.49	9.4
1996	Southwest Arm Brook, Saglek*	193	51.9	1.38	10.4
1997	Southwest Arm Brook, Saglek	113	51.3	1.29	10.1
1994	North Arm Brook, Saglek	99	50.0	1.16	10.4

* only 77 fish with ages

Table 3: Catch (kg-round) and effort (person-weeks) statistics for the Voisey assessment unit from 1974 to 1998. 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
1995	14000		0	0	0	0	0
1996	14000		977	6	163	0	7
1997	14000		4860	30	162	85	14
1998	14000		7722	31	249	44	21
Avg. 1993-97			3527	20	145	23	11
Avg. 1988-97			8284	35	205	46	15
Avg. 1974-98			15865	60	240	48	15
Total			396633				

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

Table 4. Estimated catch- and percent-at-age from the commercial Arctic charr fishery in the Voisey stock unit, 1977-1998.

CATCH - AT - AGE

Age	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
6	318	619	475	154	68	316	1045	291	1	44	8	140	68	17	9	364	494	188		31	458	288
7	2085	4374	4914	803	915	755	2947	2891	1917	351	1312	1638	911	1110	909	1198	2088	602		208	1233	1338
8	4030	5372	7928	3386	2571	1566	3410	3254	3066	3230	2813	2319	1445	2865	1047	1034	1344	647		190	962	1427
9	2086	2330	3382	4140	4803	2346	3449	2238	3242	3888	4420	1465	1520	2945	1625	1511	1025	487		53	618	972
10	1237	1236	1163	1424	2359	1226	1611	1392	433	1400	2029	1440	1135	1827	1257	1099	574	374		111	316	569
11	600	1141	634	500	941	657	1084	753	324	686	966	771	702	1083	691	480	237	99		11	113	189
12	389	380	212	238	406	65	827	414	233	244	280	289	245	588	362	241	98	22		52	33	46
13	212	380	159	159	41	13	147	355	64	149	38	28	107	440	155	30	10	5		0	3	9
14	108	334	55	28	19	27	45	83	55	123	57	43	183	136	89	5	6	5		0	12	0
6+	11065	16166	18922	10832	12123	6971	14565	11671	9335	10615	11923	8133	6316	11011	6144	5973	5896	2429	No Fishery	656	3748	4838

PERCENT - AT - AGE

Age	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
6	2.9	3.8	2.5	1.4	0.6	4.5	7.2	2.5	0.0	0.4	0.1	1.7	1.1	0.2	0.1	6.1	8.4	7.7		4.7	12.2	6.0
7	18.8	27.1	26.0	7.4	7.5	10.8	20.2	24.8	20.5	3.3	11.0	20.1	14.4	10.1	14.8	20.1	35.4	24.8		31.7	32.9	27.7
8	36.4	33.2	41.9	31.3	21.2	22.5	23.4	27.9	32.8	30.4	23.6	28.5	22.9	26.0	17.0	17.3	22.8	26.6		29.0	25.7	29.5
9	18.9	14.4	17.9	38.2	39.6	33.7	23.7	19.2	34.7	36.6	37.1	18.0	24.1	26.7	26.4	25.3	17.4	20.0		8.1	16.5	20.1
10	11.2	7.6	6.1	13.1	19.5	17.6	11.1	11.9	4.6	13.2	17.0	17.7	18.0	16.6	20.5	18.4	9.7	15.4		16.9	8.4	11.8
11	5.4	7.1	3.4	4.6	7.8	9.4	7.4	6.5	3.5	6.5	8.1	9.5	11.1	9.8	11.2	8.0	4.0	4.1		1.7	3.0	3.9
12	3.5	2.4	1.1	2.2	3.3	0.9	5.7	3.5	2.5	2.3	2.3	3.6	3.9	5.3	5.9	4.0	1.7	0.9		7.9	0.9	1.0
13	1.9	2.4	0.8	1.5	0.3	0.2	1.0	3.0	0.7	1.4	0.3	0.3	1.7	4.0	2.5	0.5	0.2	0.2		0.0	0.1	0.2
14	1.0	2.1	0.3	0.3	0.2	0.4	0.3	0.7	0.6	1.2	0.5	0.5	2.9	1.2	1.4	0.1	0.1	0.2		0.0	0.3	0.0

Table 5. Average weight-at-age (kg-round) from the Voisey stock unit commercial catch of Arctic charr, 1977-1998.

AVERAGE WEIGHT - AT - AGE

Age	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
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	-	0.82	0.81	1.03
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	-	1.37	1.14	1.35
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	-	1.42	1.44	1.66
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	-	1.80	1.59	1.81
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	-	1.58	1.66	1.97
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	-	1.95	1.63	1.78
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	-	1.84	1.71	1.8
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	-	-	2.64	0.85
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	-	-	2.19	-

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	1995	1996	1997	1998
	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	-	8.38	7.91	8.21

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	1995	1996	1997	1998
	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	-	1.49	1.30	1.60

Table 6: Catch (kg) and effort (person-weeks) statistics for the Nain assessment unit from 1974 to 1998. 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
1995	32000		6835	41	167	88	27
1996	32000		4851	53	92	52	37
1997	32000		7024	42	167	53	21
1998	32000		14602	77	190	57	39
Avg. 1993-97			8189	64	134	60	31
Avg. 1988-97			21143	120	162	52	38
Avg. 1974-98			39132	195	190	38	39
Total			978310				

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 7: Summary of catch and effort statistics for the Nain stock unit, 1974-98. 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.

	Inshore			Offshore				Total				
Year	Catch	Effort	CUE	Catch	Effort	CUE	% Catch Offshore	Catch	Effort*	CUE	TAC	Quota Area Catch
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	8825	69	128	32000	
1995	844	11	77	5991	33	182	88	6835	41	167	32000	
1996	2306	11	72	2545	21	121	52	4851	53	92	32000	
1997	3317	20	166	3707	23	161	53	7024	42	167	32000	
1998	6244	44	142	8358	34	246	57	14602	77	190	32000	

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

Table 8. Estimated catch- and percent-at-age from the commercial Arctic charr fishery in the Nain stock unit, 1977-98.

CATCH - AT - AGE

Age	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
6	2003	371	430	75	145	83	470	182	103	210	483	204	903	459	203	269	83	92	197	30	348	490
7	9250	6703	4306	960	2118	977	2791	2612	2463	4129	5462	6288	4750	4726	1365	3195	1982	999	1040	474	1267	3274
8	12453	13122	11568	10519	6877	4782	5842	4619	6506	7713	6293	7166	9707	6115	2085	3809	2874	2087	1294	944	795	2552
9	7630	7984	9593	16342	15435	7255	6996	5671	4722	5862	7548	4688	8464	8844	2631	3166	2525	1628	1539	1072	1700	1847
10	5052	4406	4208	8345	9787	7987	4177	4374	4111	2857	4498	3607	3785	4681	2175	2574	1596	859	426	454	747	931
11	2454	2367	2168	4077	3746	4936	4357	2173	2494	1284	2013	1631	2853	1908	874	905	469	282	201	241	343	767
12	988	1688	1573	1340	991	2976	2762	1495	1605	625	1375	650	1234	927	444	422	296	94	25	52	138	195
13	358	312	418	813	304	561	600	738	901	240	898	324	665	378	183	241	171	39	0	49	64	106
14	180	272	312	522	151	451	557	281	534	199	306	136	277	137	92	48	49	20	5	0	26	42
15	1	118	34	43	42	59	70	96	322	205	357	52	28	186	48	32	38	24	0	0	0	0
16	1	97	14	1	13	46	27	57	93	50	180	20	6	1	36	1	0	3	0	0	0	0
17	1	1	1	66	10	23	95	89	21	42	37	40	1	1	2	1	2	0	0	0	0	0
6+	40371	37441	34625	43103	39619	30136	28744	22387	23875	23416	29450	24806	32673	28363	10138	14663	10085	6127	4727	3316	5428	10204

PERCENT - AT - AGE

Age	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
6	5.0	1.0	1.2	0.2	0.4	0.3	1.6	0.8	0.4	0.9	1.6	0.8	2.8	1.6	2.0	1.8	0.8	1.5	4.2	0.9	6.4	4.8
7	22.9	17.9	12.4	2.2	5.3	3.2	9.7	11.7	10.3	17.6	18.5	25.3	14.5	16.7	13.5	21.8	19.7	16.3	22.0	14.3	23.3	32.1
8	30.8	35.0	33.4	24.4	17.4	15.9	20.3	20.6	27.3	32.9	21.4	28.9	29.7	21.6	20.6	26.0	28.5	34.1	27.4	28.5	14.6	25.0
9	18.9	21.3	27.7	37.9	39.0	24.1	24.3	25.3	19.8	25.0	25.6	18.9	25.9	31.2	26.0	21.6	25.0	26.6	32.6	32.3	31.3	18.1
10	12.5	11.8	12.2	19.4	24.7	26.5	14.5	19.5	17.2	12.2	15.3	14.5	11.6	16.5	21.5	17.6	15.8	14.0	9.0	13.7	13.8	9.1
11	6.1	6.3	6.3	9.5	9.5	16.4	15.2	9.7	10.4	5.5	6.8	6.6	8.7	6.7	8.6	6.2	4.7	4.6	4.3	7.3	6.3	7.5
12	2.4	4.5	4.5	3.1	2.5	9.9	9.6	6.7	6.7	2.7	4.7	2.6	3.8	3.3	4.4	2.9	2.9	1.5	0.5	1.6	2.5	1.9
13	0.9	0.8	1.2	1.9	0.8	1.9	2.1	3.3	3.8	1.0	3.0	1.3	2.0	1.3	1.8	1.6	1.7	0.6	0.0	1.5	1.2	1.0
14	0.4	0.7	0.9	1.2	0.4	1.5	1.9	1.3	2.2	0.8	1.0	0.5	0.8	0.5	0.9	0.3	0.5	0.3	0.1	0.0	0.5	0.4
15	0.0	0.3	0.1	0.1	0.1	0.2	0.2	0.4	1.3	0.9	1.2	0.2	0.1	0.7	0.5	0.2	0.4	0.4	0.0	0.0	0.0	0.0
16	0.0	0.3	0.0	0.0	0.0	0.2	0.1	0.3	0.4	0.2	0.6	0.1	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.2	0.0	0.1	0.3	0.4	0.1	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 9. Average weight-at-age (kg-round) from the Nain stock unit commercial catch of Arctic charr, 1977-98.

AVERAGE WEIGHT - AT - AGE

Age	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
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	1.14	0.88	0.78	1.04
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	1.29	1.27	1.16	1.33
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	1.46	1.44	1.30	1.43
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	1.50	1.53	1.40	1.53
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	1.62	1.53	1.49	1.59
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	1.68	1.57	1.48	1.67
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	1.97	1.75	1.63	1.80
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	-	1.46	1.47	1.76
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	2.69	-	1.49	1.60
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	1995	1996	1997	1998
	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	8.36	8.79	8.61	8.33

Inshore and Offshore 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	1995	1996	1997	1998
	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	1.45	1.46	1.29	1.43

Inshore 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	1995	1996	1997	1998
				1.74	1.66	1.82	1.84	1.84	1.82	1.59	1.58	1.57	1.55	1.58	1.58	1.26	1.29	1.38	1.3	1.29	1.61	1.45

Offshore 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	1995	1996	1997	1998
						1.85	1.60	1.67	1.59	1.53	1.48	1.54	1.54	1.63	1.56	1.34	1.34	1.53	1.43	1.52	1.24	1.42

Table 10: Catch (kg) and effort (person-weeks) statistics for the Okak assessment unit from 1974 to 1998. 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
1995	31000		10635	26	409	2	42
1996	31000		3425	8	428	2	26
1997	31000		13515	69	196	7	40
1998	31000		5997	43	139	0	16
Avg. 1993-97			7804	27	314	22	29
Avg. 1988-97			9377	58	212	28	22
Avg. 1974-98			24736	138	192	35	23
Total			618406				

Table 11. Estimated catch- and percent at-age from the commercial Arctic charr fishery in the Okak stock unit, 1977-1998.

CATCH - AT - AGE

Age	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
6	84	205	1	130	39	93	475	220	17	41	42	150	190	80	22	0	9	113	260	37	494	426
7	139	2465	1989	638	526	713	1762	1202	2675	2056	1008	1007	1760	1474	577	3	99	1059	998	327	1276	1144
8	417	8163	7462	5631	2135	2760	4471	2047	4948	6333	1636	1822	1829	2667	778	18	120	1972	2123	560	1289	1164
9	1084	5494	4997	9175	7166	4167	5787	1885	5385	5197	3686	2977	2058	2108	693	31	122	1817	2556	661	1337	1042
10	2667	5594	3299	6487	7615	3848	5601	1621	2740	3291	3247	2241	1718	1267	332	26	62	985	1245	437	1068	344
11	3388	3747	1954	2863	4673	3622	5169	1937	2936	1261	1371	1492	1714	1234	164	11	6	655	459	184	509	217
12	5417	3953	878	1382	1330	1542	4075	1290	987	875	395	772	865	556	122	18	10	174	151	64	60	50
13	2278	2773	761	407	1044	444	1643	1034	740	562	299	187	296	261	68	7	0	43	55	13	94	27
14	1694	514	527	350	459	342	658	514	768	148	166	125	139	94	23	0	0	0	2	0	0	5
15	1472	1027	410	262	359	183	307	192	103	170	85	13	52	92	0	0	0	7	0	0	0	0
16	832	308	351	90	44	57	107	111	75	8	34	32	56	0	23	0	0	0	0	0	0	0
17	277	567	399	178	223	114	68	123	123	3	2	1	16	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	0
6+	19749	34810	23028	27593	25613	17885	30123	12176	21497	19945	11971	10819	10700	9856	2802	114	428	6825	7849	2283	6127	4419

PERCENT - AT - AGE

Age	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
6	0.4	0.6	0.0	0.5	0.2	0.5	1.6	1.8	0.1	0.2	0.4	1.4	1.8	0.8	0.8	0.0	2.1	1.7	3.3	1.6	8.1	9.6
7	0.7	7.1	8.6	2.3	2.1	4.0	5.8	9.9	12.4	10.3	8.4	9.3	16.4	15.0	20.6	2.6	23.1	15.5	12.7	14.3	20.8	25.9
8	2.1	23.5	32.4	20.4	8.3	15.4	14.8	16.8	23.0	31.8	13.7	16.8	17.1	27.1	27.8	15.8	28.0	28.9	27.0	24.5	21.0	26.3
9	5.5	15.8	21.7	33.3	28.0	23.3	19.2	15.5	25.1	26.1	30.8	27.5	19.2	21.4	24.7	27.2	28.5	26.6	32.6	29.0	21.8	23.6
10	13.5	16.1	14.3	23.5	29.7	21.5	18.6	13.3	12.7	16.5	27.1	20.7	16.1	12.9	11.8	22.8	14.5	14.4	15.9	19.1	17.4	7.8
11	17.2	10.8	8.5	10.4	18.2	20.3	17.2	15.9	13.7	6.3	11.5	13.8	16.0	12.5	5.9	9.6	1.4	9.6	5.8	8.1	8.3	4.9
12	27.4	11.4	3.8	5.0	5.2	8.6	13.5	10.6	4.6	4.4	3.3	7.1	8.1	5.6	4.4	15.8	2.3	2.5	1.9	2.8	1.0	1.1
13	11.5	8.0	3.3	1.5	4.1	2.5	5.5	8.5	3.4	2.8	2.5	1.7	2.8	2.6	2.4	6.1	0.0	0.6	0.7	0.6	1.5	0.6
14	8.6	1.5	2.3	1.3	1.8	1.9	2.2	4.2	3.6	0.7	1.4	1.2	1.3	1.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.1
15	7.5	3.0	1.8	0.9	1.4	1.0	1.0	1.6	0.5	0.9	0.7	0.1	0.5	0.9	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
16	4.2	0.9	1.5	0.3	0.2	0.3	0.4	0.9	0.3	0.0	0.3	0.3	0.5	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	1.4	1.6	1.7	0.6	0.9	0.6	0.2	1.0	0.6	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 12. Average weight-at-age (kg-round) from the Okak stock unit commercial catch of Arctic charr, 1977-1998.

AVERAGE WEIGHT - AT - AGE

Age	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
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	-	0.88	1.02	1.03	0.88	0.73	0.77
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	1.10	1.24	0.98	1.25
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	1.31	1.37	1.18	1.40
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	1.73	1.36	1.59	1.47	1.53
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	1.90	1.60	1.72	1.53	1.69
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	1.77	1.59	1.69	1.59	1.66
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	1.95	1.68	1.61	2.12	1.67
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	-	1.21	1.67	2.09	1.55	2.26
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	-	-	-	3.93	-	-	2.77
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	-	-	-	3.21	-	-	-	-
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	1995	1996	1997	1998
	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	8.8	8.74	8.88	8.56	8.17

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	1995	1996	1997	1998
	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	1.36	1.50	1.21	1.36

Table 13. Summary of Atlantic salmon landings at Nain, Labrador 1977 - 1998. Catch, effort and CUE as in Arctic charr landings tables.

Year		Catch	Effort	CUE
1977		41581	560	74
1978		48945	562	87
1979		35722	650	55
1980		60332	619	97
1981		48124	598	80
1982		32974	491	67
1983		20105	542	37
1984		15596	339	46
1985		14653	308	48
1986		20090	350	57
1987		14414	275	52
1988		20090	282	71
1989		29960	359	83
1990		12892	246	52
1991		2688	89	30
1992		2671	85	31
1993		1848	76	24
1994		1899	64	30
1995		2989	65	46
1996		254	24	11
1997		1159	32	36
1998		0	0	
Avg. 1993-97		1630	52	29
Avg. 1988-97		7645	132	41
Avg. 1974-98		19499	301	53
Total		428986		

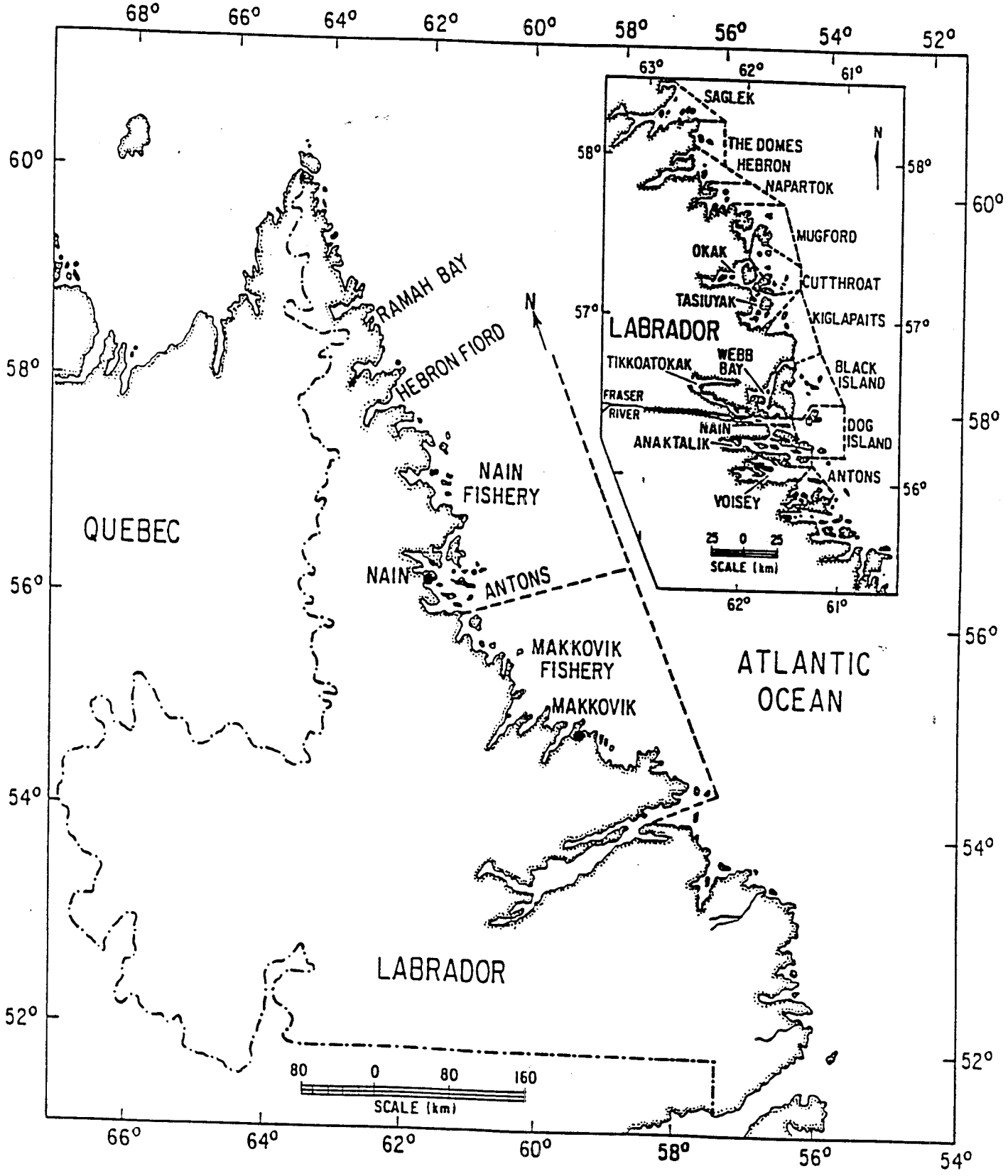

Fig 1: Location of the Nain and Makkovik Fishing Regions in northern Labrador. Insert illustrates the location of subareas within the Nain Fishing Region.

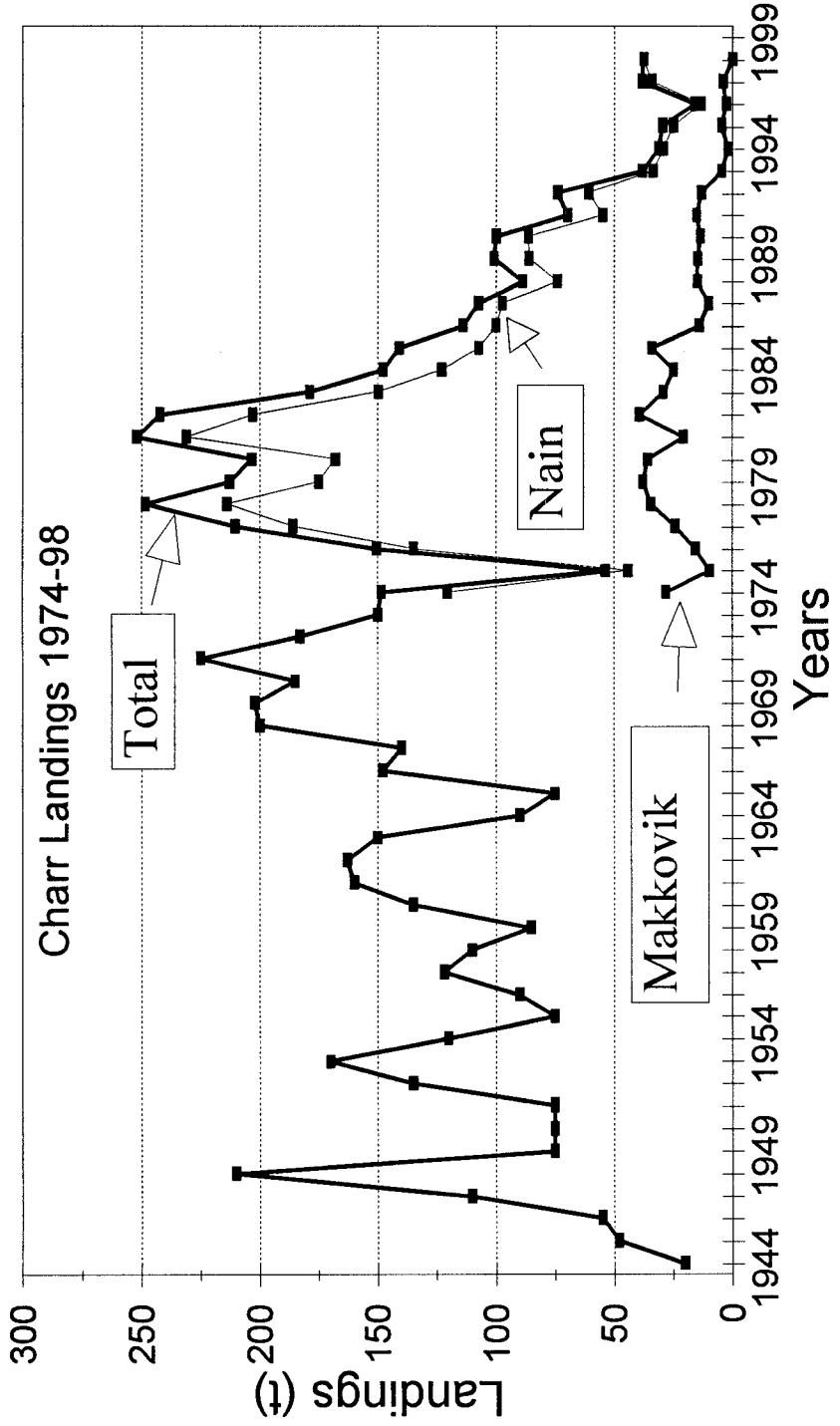

Fig 2. Summary of northern Labrador Arctic charr Landings (tonnes), 1944-97 with separate landings for Nain and Makkovik from 1974 to 1998.

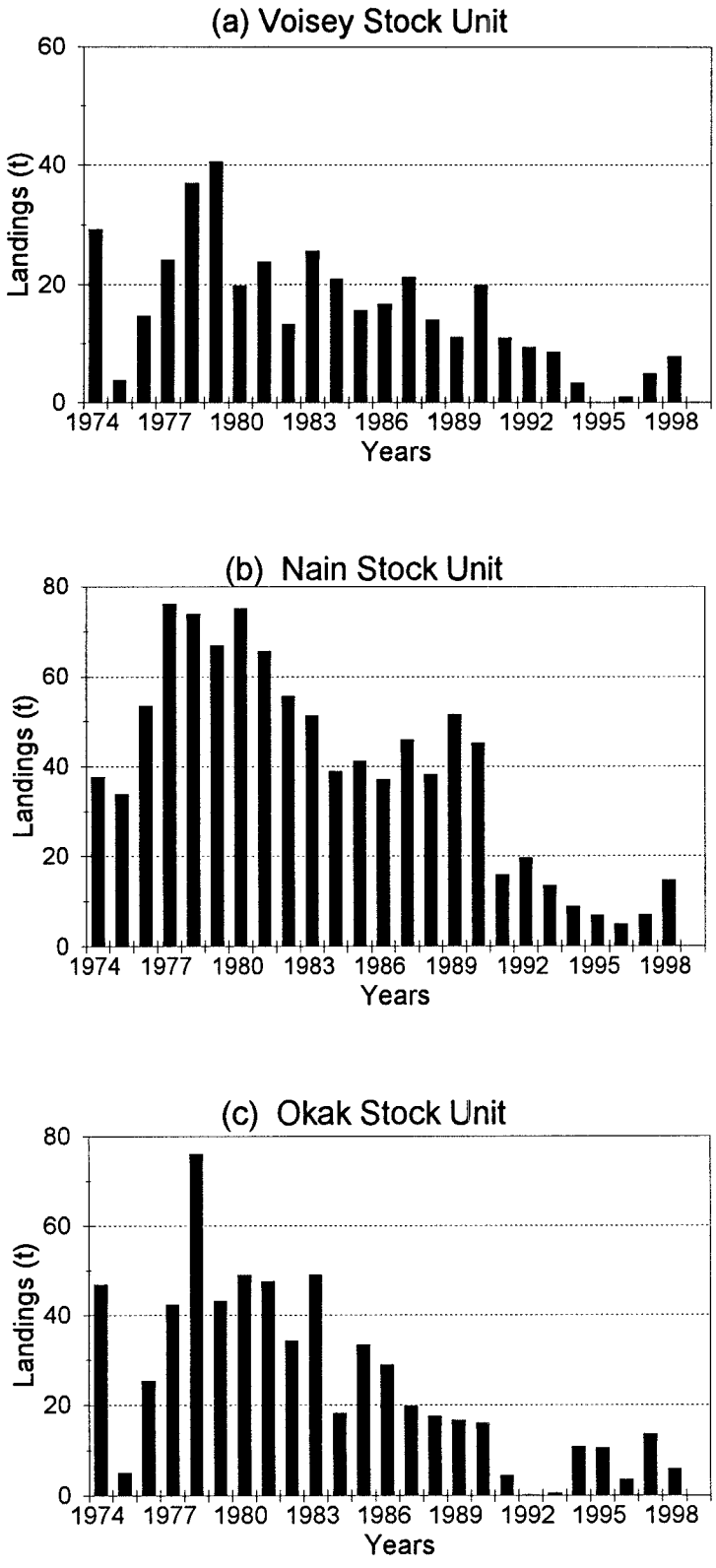

Fig 3. Commercial Landings of anadromous Arctic charr from the (a) Voisey, (b) Nain, and (c) Okak stock units, 1974-98.

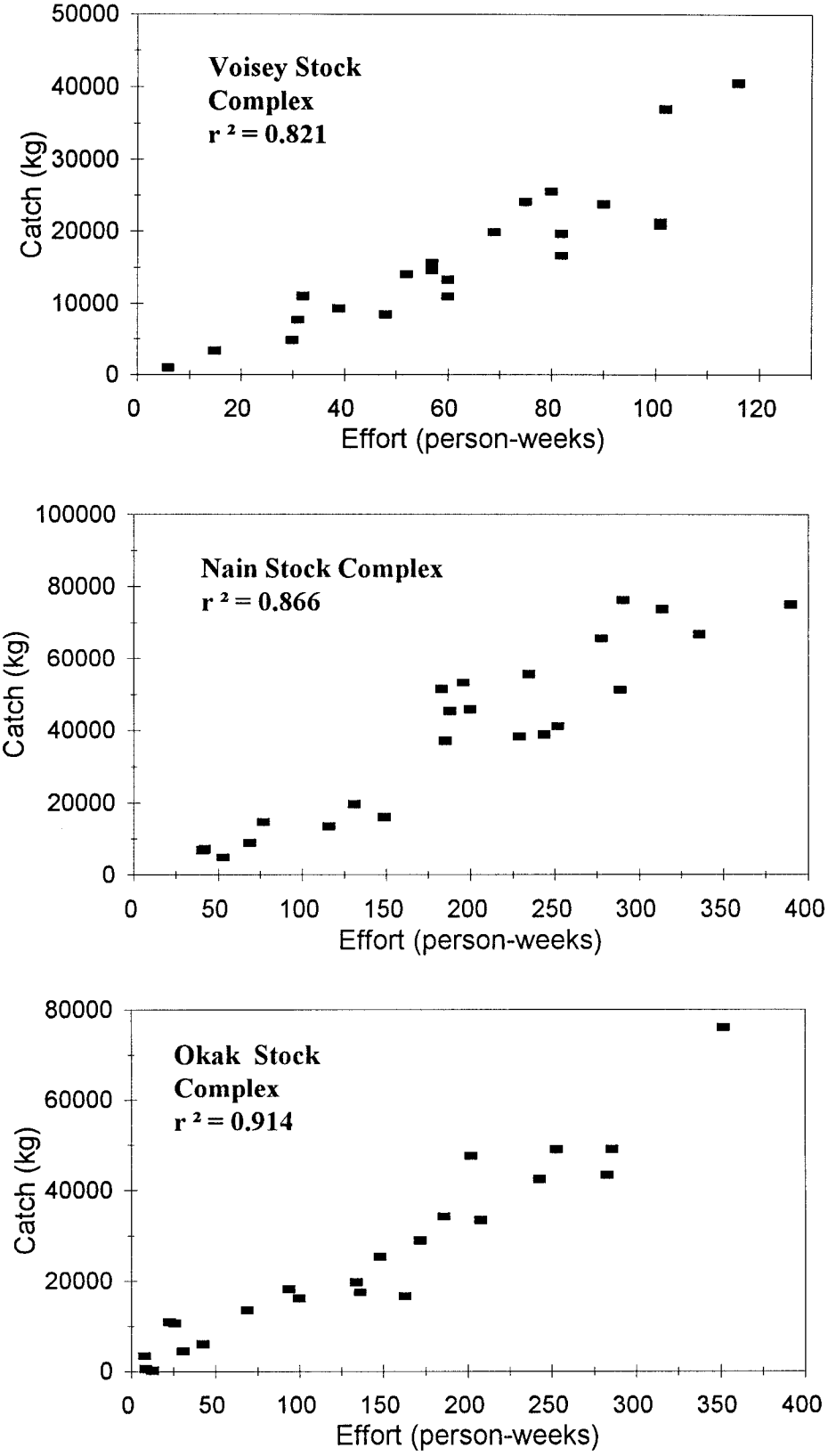

Fig. 4. Scatter plots of Arctic charr catch versus effort for various stock complex fishing areas in north Labrador.

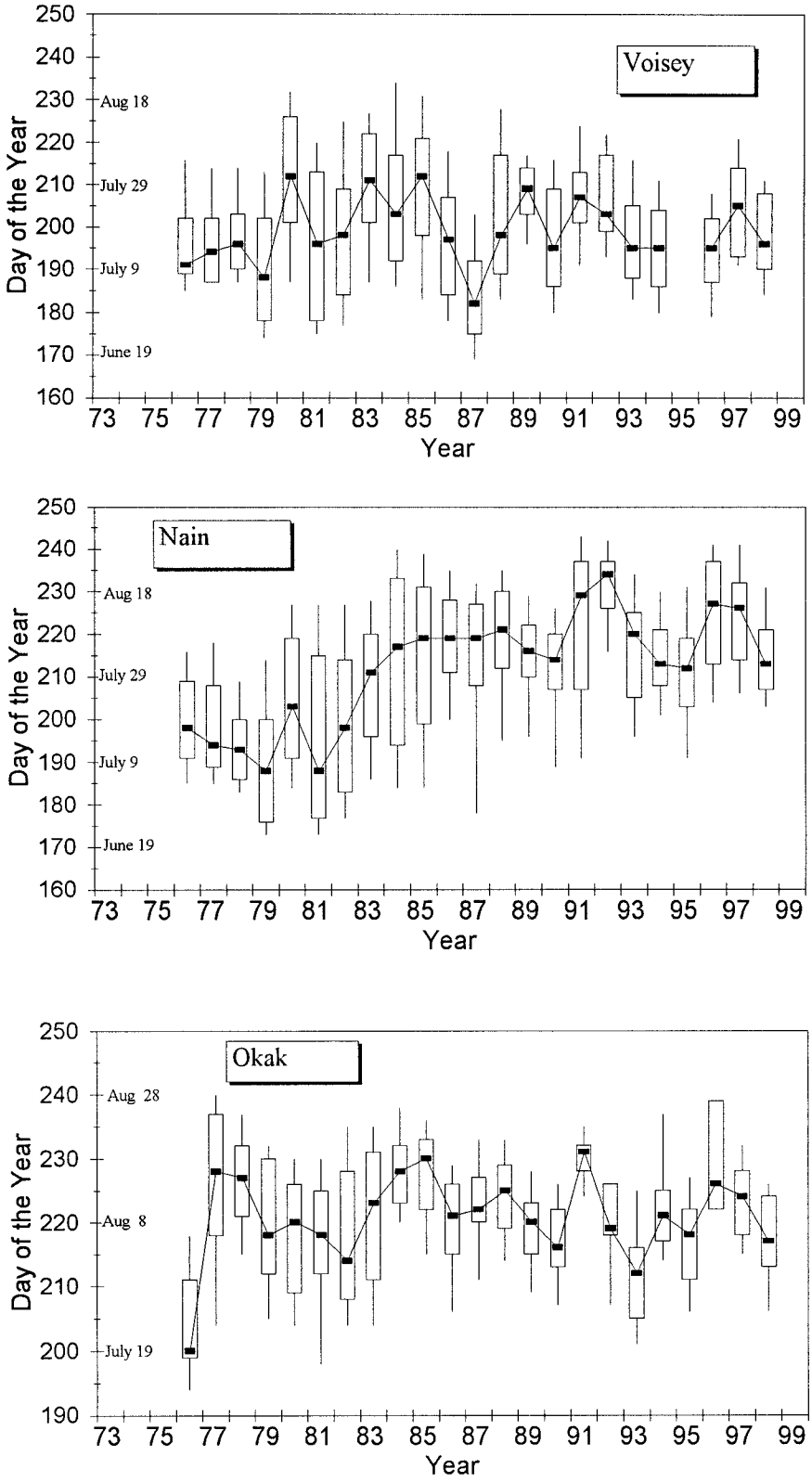

Figure 5. Commercial catch timing of the Voisey, Nain, and Okak stock complex Arctic charr fisheries, 1976 - 1998. Vertical lines represent the 10th and 90th percentiles of the day of the year of catch timing, the rectangle is the 25th and 75th percentiles, while the marker within the rectangle is the median catch timing.

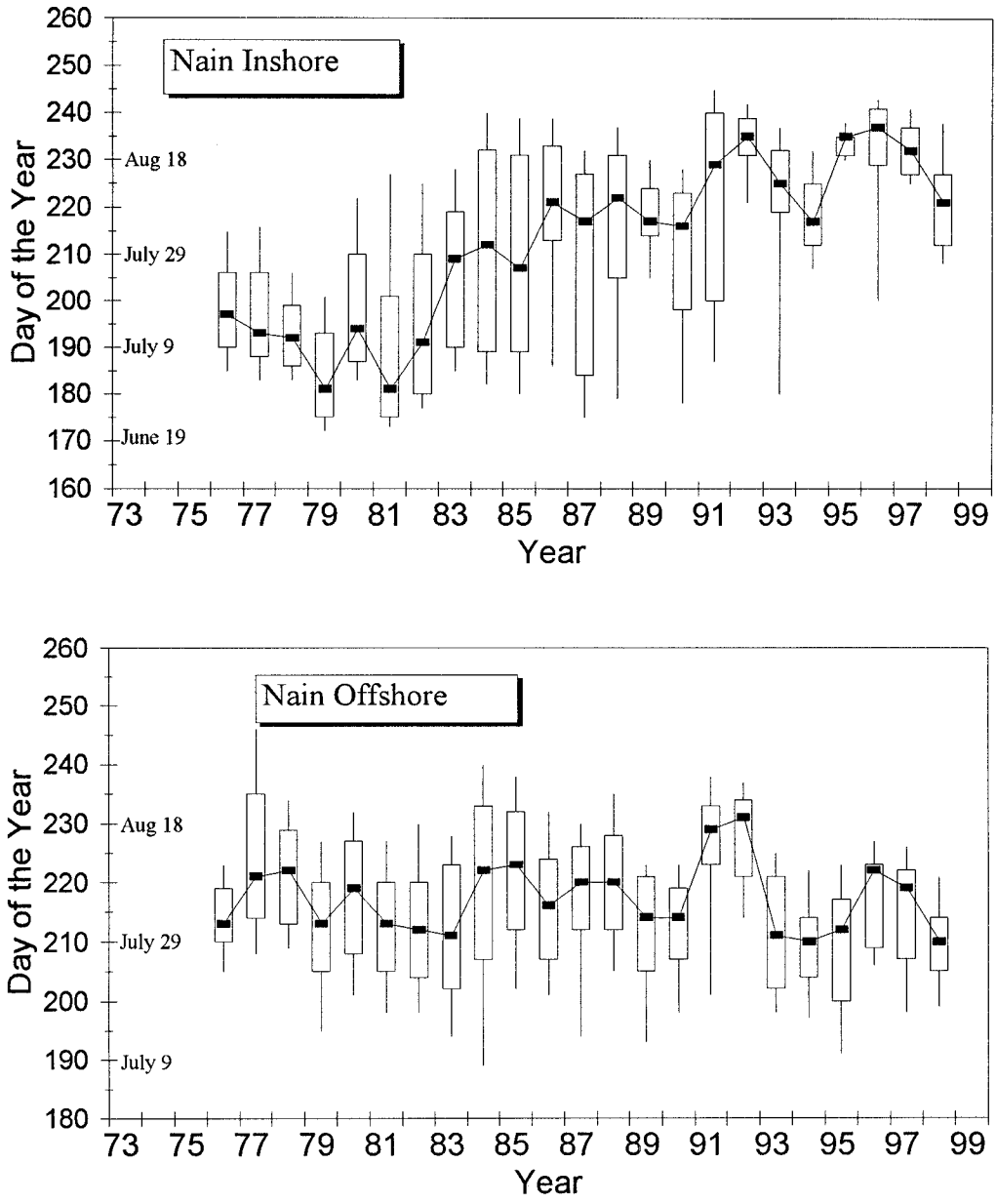

Figure 6. Commercial catch timing for the Nain stock complex Arctic charr fishery inshore and offshore fishing zones, 1976-1998. Vertical lines represent the 10th and 90th percentiles of the day of the year of catch timing, the rectangle is the 25th and 75th percentiles, while the marker within the rectangle is the median catch timing.

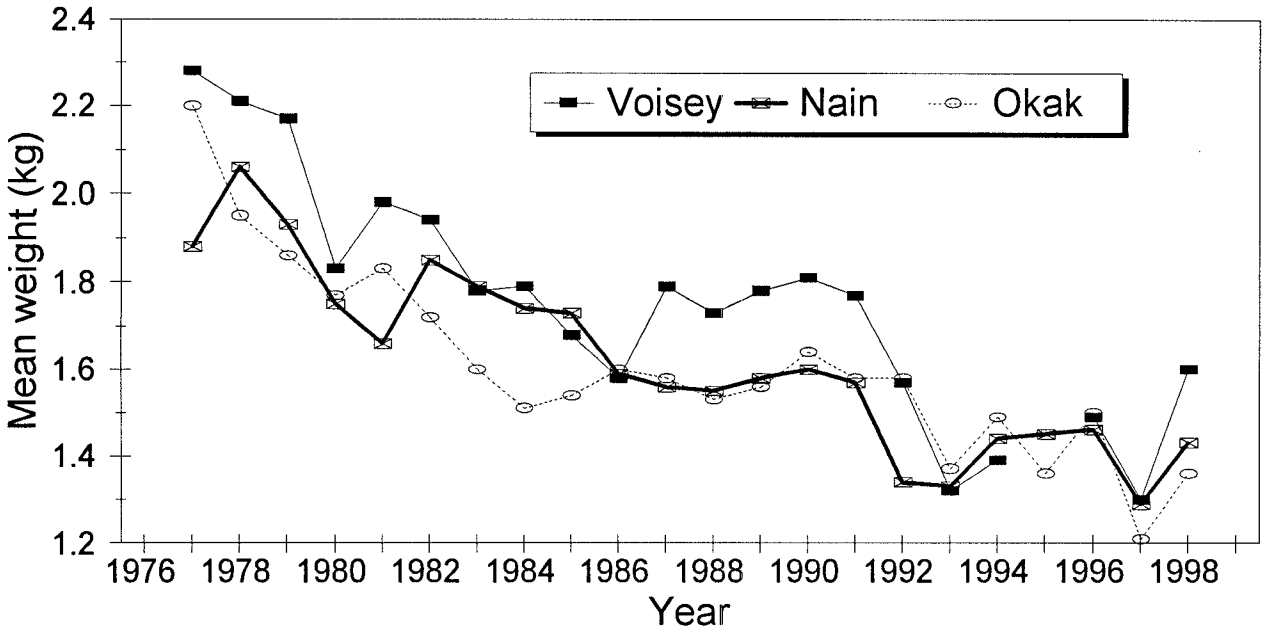

Fig. 7. Mean weight (kg-round) of anadromous Arctic charr from the Voisey, Nain and Okak stock complex fishing areas, 1977 - 1998.

Appendix 1, Arctic Charr Catch Statistics, 1974-1998
Summary of Catch and Effort Data For the Nain Fishing Region

Area=Antons

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Quotas													
Catch (Kg)	9135	3489	3172	2111	4011	19371	8460	7870	6191	23062	13099	14212	13589
Effort (Person-wks)	34	20	6	20	17	63	32	38	24	63	82	51	67
C/E (Kg)	269	174	529	106	236	307	264	207	258	366	160	279	203
% > 2.3 Kg			21	24	28	22	14	13	12	9	7		

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Quotas												
Catch (Kg)	8611	8460	11019	12659	2813	413	1904	180			4121	3359
Effort (Person-wks)	55	29	32	45	20	6	11	2			20	15
C/E (Kg)	157	292	344	281	141	69	173	90			206	224
% > 2.3 Kg												

Area=Voisey's Bay

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Quotas						22500	22500	16100	16100	16000	16000	23400	
Catch (Kg)	20045	238	12232	22488	33597	21880	11557	16325	7688	2953	8113	1435	3065
Effort (Person-wks)	64	2	45	56	85	59	52	53	38	17	24	6	22
C/E (Kg)	313	119	272	402	395	371	222	308	202	174	338	239	139
% > 2.3 Kg			42	35	34	32	17	16	17	17	16		

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Quotas												
Catch (Kg)	12630	5577		7236	8158	8851	6558	3155		977	739	4363
Effort (Person-wks)	54	26		24	43	36	38	13		6	10	16
C/E (Kg)	234	215		301	190	246	173	243		163	74	273
% > 2.3 Kg												

Area=Anaktalik

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Quotas						21500	21500	8660	8660	11000	6100	8400	
Catch (Kg)	7821	2548	14670	21604	13075	14913	8045	9157	10836	2359	3980	7477	180
Effort (Person-wks)	28	10	45	63	55	76	53	32	27	24	34	39	7
C/E (Kg)	279	255	326	343	238	196	152	286	401	98	117	192	26
% > 2.3 Kg			36	38	27	20	12	10	11	11	12		

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Quotas	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	
Catch (Kg)	2002	1075	1175	454	1484	70	230	19				
Effort (Person-wks)	18	12	13	5	17	3	6	1				
C/E (Kg)	111	90	90	91	87	23	38	19				
% > 2.3 Kg												

Appendix 1, Arctic Charr Catch Statistics, 1974-1998
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	1985	1986
Quotas													
Catch (Kg)	2659	653	212	2039	386	1440	3048	1516	1105	6858	6666	6882	3289
Effort (Person-wks)	38	40	11	49	25	61	86	37	38	62	66	62	32
C/E (Kg)	70	16	19	42	15	24	35	41	29	111	101	111	103
% > 2.3 Kg			11	9	8	15	11	14	7	8	10		

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Quotas												
Catch (Kg)	16881	11735	2794	7219	1240	2134	2218	1485	1199	1687	1411	4219
Effort (Person-wks)	86	88	27	44	14	16	18	14	11	13	12	19
C/E (Kg)	196	133	103	164	89	133	123	106	109	130	118	222
% > 2.3 Kg												

Area=Nain Bay

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Quotas										5000			
Catch (Kg)	12461		3119	8464				5450	85	532	1886	2667	6437
Effort (Person-wks)	37		10	28				29	1	8	15	32	39
C/E (Kg)	337		312	302				188	85	67	126	83	165
% > 2.3 Kg			16	15				4		2	6		

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Quotas												
Catch (Kg)	3806	5179	20734	10265	4039	4762	2346	3349	388	1613	1740	5706
Effort (Person-wks)	15	33	61	61	59	45	33	23	7	25	11	39
C/E (Kg)	254	157	340	168	68	106	71	146	55	65	158	146
% > 2.3 Kg												

Area=Tikkoatokak Bay

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Quotas						39500	39500	28500	35000	35000	26000	12500	
Catch (Kg)	9960	27695	31568	39483	55061	37919	42131	28066	28283	16211	8618	6243	3841
Effort (Person-wks)	28	76	81	94	147	108	130	80	75	65	43	24	16
C/E (Kg)	356	364	390	420	374	351	324	351	377	249	200	260	240
% > 2.3 Kg			19	20	18	14	10	5	7	8	5		

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Quotas	16000	16000	16000	16000	16000	16000	16000	16000	16000	16000	16000	16000
Catch (Kg)	3608	2240	2636	1491	2296	2560	2088	1224	457	693	1577	537
Effort (Person-wks)	12	12	13	12	16	9	15	7	4	7	9	9
C/E (Kg)	301	187	203	124	143	284	139	175	114	99	175	60
% > 2.3 Kg												

Appendix 1, Arctic Charr Catch Statistics, 1974-1998
Summary of Catch and Effort Data For the Nain Fishing Region

Area=Webb Bay

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Quotas													
Catch (Kg)	580	833	4550	2516	3472	3035	3008	8100	4607	15055	10476	5143	5890
Effort (Person-wks)	1	5	15	21	16	9	8	29	27	56	43	35	34
C/E (Kg)	580	167	303	120	217	337	376	279	171	269	244	147	173
% > 2.3 Kg			21	19	20	39	39	27	11	5	7		

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Quotas	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000
Catch (Kg)	8424	6041	5904	4859	2343	3111	928					
Effort (Person-wks)	27	33	17	10	10	16	8					
C/E (Kg)	312	183	347	486	234	194	116					
% > 2.3 Kg												

Area=Black Island

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Quotas													
Catch (Kg)	4264	2101	2725	3389	2966	10632	20051	14413	11602	11028	7913	12750	17458
Effort (Person-wks)	60	62	48	65	81	92	130	94	79	87	62	68	72
C/E (Kg)	71	34	57	52	37	116	154	153	147	127	128	188	242
% > 2.3 Kg			8	10	14	7	6	7	8	4	5		

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Quotas												
Catch (Kg)	11151	12024	18222	20987	4490	6917	5601	2747	4792	858	2296	4139
Effort (Person-wks)	50	61	60	65	37	44	41	24	22	8	11	16
C/E (Kg)	223	197	304	323	121	157	137	114	218	107	209	259
% > 2.3 Kg												

Area=Kiglapaits

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Quotas													
Catch (Kg)	5131	1504	6089	5435	12097	17606	16543	21911	8326	20625	11431	6184	6983
Effort (Person-wks)	26	32	59	57	103	120	95	99	34	103	55	41	55
C/E (Kg)	197	47	103	95	117	147	174	221	245	200	208	151	127
% > 2.3 Kg			25	25	34	14	18	12	16	12	9		

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Quotas												
Catch (Kg)	1620	862	2605	1051	1110	653	524	529	354			
Effort (Person-wks)	14	9	22	10	15	4	4	4	4			
C/E (Kg)	116	96	118	105	74	163	131	132	89			
% > 2.3 Kg												

Appendix 1, Arctic Charr Catch Statistics, 1974-1998
Summary of Catch and Effort Data For the Nain Fishing Region

Area=Tasiuyak

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Quotas													
Catch (Kg)	1467		281		2280	1837	1137		1060	1259	3423	4724	6749
Effort (Person-wks)	15		2		9	11	8		6	7	23	36	26
C/E (Kg)	98		141		253	167	142		177	180	149	131	260
% > 2.3 Kg			21		71	34	14		11	13	5		

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Quotas												
Catch (Kg)	8997	2823	3186	3302	1077	3063	1153	3675	4671	1044	4455	4195
Effort (Person-wks)	61	22	23	17	5	13	3	11	9	2	16	31
C/E (Kg)	147	128	139	194	215	236	384	334	519	522	278	135
% > 2.3 Kg												

Area=Mugford

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
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						

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
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	1985	1986
Quotas								27300	27300	21000	27000	27000	27000
Catch (Kg)	34250	2354	17812	27592	36125	26171	17434	11049	9031	30732	13864	24746	20141
Effort (Person-wks)	105	15	52	107	104	123	65	46	26	147	30	119	91
C/E (Kg)	326	157	343	258	347	213	268	240	347	209	462	208	221
% > 2.3 Kg			29	26	18	11	8	10	7	7	2		

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Quotas	26000	22000	26000	26000	26000	26000	26000	26000	26000	26000	26000	26000
Catch (Kg)	15695	12608	14973	12497	4112			10866	10377	3348	12630	5997
Effort (Person-wks)	71	51	84	45	13			23	18	5	56	43
C/E (Kg)	221	247	178	278	316			472	576	670	226	139
% > 2.3 Kg												

Appendix 1, Arctic Charr Catch Statistics, 1974-1998
Summary of Catch and Effort Data For the Nain Fishing Region

Area=Cutthroat

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Quotas													
Catch (Kg)	12641	2703	7526	15488	41146	17803	32397	37263	25699	19043	4570	8515	8756
Effort (Person-wks)	95	47	103	130	267	161	205	172	164	164	65	106	89
C/E (Kg)	133	58	73	119	154	111	158	217	157	116	70	80	98
% > 2.3 Kg			17	25	25	12	12	13	15	10	7		

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
Quotas													
Catch (Kg)	3954	4842	1591	3628	320	180	578		259	77	885		
Effort (Person-wks)	70	89	84	55	18	13	9		8	3	15		
C/E (Kg)	56	54	19	66	18	14	64		32	26	59		
% > 2.3 Kg													

Area=Napartok

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
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				

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
Quotas													
Catch (Kg)					242	4414						4941	
Effort (Person-wks)					4	16						13	
C/E (Kg)					60	276						380	
% > 2.3 Kg													

Area=Hebron Fiord

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Quotas									29072		20000		
Catch (Kg)				5957			2915	39901	37822		19531		
Effort (Person-wks)				37				106	98		112		
C/E (Kg)				161				376	386		174		
% > 2.3 Kg				16			19	34	23				

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
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 1, Arctic Charr Catch Statistics, 1974-1998
Summary of Catch and Effort Data For the Nain Fishing Region

Area=Domes

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Quotas													
Catch (Kg)								5187	2643		976		
Effort (Person-wks)								19	14		10		
C/E (Kg)								273	189		98		
% > 2.3 Kg								36	17				

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
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	1985	1986
Quotas													
Catch (Kg)								24722	23791		5389		
Effort (Person-wks)								77	118		40		
C/E (Kg)								321	202		135		
% > 2.3 Kg								18	7				

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
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	1985	1986
Quotas													
Catch (Kg)									7758		3110		
Effort (Person-wks)									26		25		
C/E (Kg)									298		124		
% > 2.3 Kg													

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Quotas												
Catch (Kg)						172	580					
Effort (Person-wks)						2	2					
C/E (Kg)						86	290					
% > 2.3 Kg												

Appendix 1, Arctic Charr Catch Statistics, 1974-1998
Summary of Catch and Effort Data For the Nain Fishing Region

Area=Nachvak

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Quotas													
Catch (Kg)												6142	1808
Effort (Person-wks)												18	4
C/E (Kg)												341	452
% > 2.3 Kg													

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Quotas												
Catch (Kg)												
Effort (Person-wks)												
C/E (Kg)												
% > 2.3 Kg												

Area=Nain Fishery

	1974	1975	1976	1977*	1978	1979	1980	1981	1982	1983	1984	1985	1986
Quotas													
Catch (Kg)	120414	44118	134898	186165	213915	175263	167991	231221	203012	149732	123045	107120	98186
Effort (Person-wks)	531	309	616	863	966	918	880	914	856	804	729	637	554
C/E (Kg)	227	143	219	216	221	191	191	253	237	186	169	168	180
% > 2.3 Kg			24	25	25	17	12	16	13	8	6		

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Quotas												
Catch (Kg)	97379	74010	84837	86292	54455	58553	33562	27230	25080	13281	29854	37458
Effort (Person-wks)	533	471	436	394	320	315	226	122	84	70	160	201
C/E (Kg)	183	157	195	219	170	186	149	223	299	190	187	186
% > 2.3 Kg												

* Includes 186 kg unaccounted for by area.