Catch Statistics by Subarea and Assessment Unit for the Northern Labrador Arctic Charr Fishery in 1986

by

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Abstract

Catch and effort statistics for the northern Labrador Arctic charr fishery in 1986 are summarized. Total northern Labrador landings of 114 t were 19% lower than 1985 landings and 43% below the previous 10-year mean of 199 t. In spite of this decrease, combined landings from the three major assessment units in the Nain Fishing Region took approximately 80% (range 69-86%) of the TAC allocated. The continued decrease in fishing effort is a major factor associated with reduced landings again in 1986. Fishing effort in the Nain Fishing Region was 35-40% lower than it was during the peak years of 1981 and 1982. Charr landings in the Makkovik region were also the lowest recorded since 1975.

Résumé

On résumé les données statistiques (prises et effort de pêche) sur la pêche à l'omble chevalier dans le nord du Labrador en 1986. Les débarquements totaux provenant de cette région s'élevaient à 114 t, ce qui constitue une diminution de 19 % par rapport à 1985 et de 43 % par rapport à la moyenne de 10 ans qui précède (c.-à-d. 199 t). En dépit de cette baisse, les débarquements combinés pour les trois principales unités d'évaluation de la zone de pêche de Nain constituaient environ 80 % (étendue : 69-86 %) du TPA permis. En 1986, la diminution de l'effort de pêche est encore une fois un facteur important qui explique la diminution des débarquements. L'effort de pêche dans la zone de pêche de Nain a été réduit de 35-40 % par rapport aux années de pointe (1981 et 1982). Les débarquements dans la région de Makkovik étaient également à leur plus bas niveau depuis 1975.

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 regions and from subareas within the Nain Fishing Region (Fig. 1) exist since 1974. From 1977 to 1982 more than 200 t y^{-1} of Arctic charr were caught in northern Labrador but during the past four years (1983-86) annual landings have averaged only 145 t. The highest landings on record were 252 t in 1981, while the lowest during the past 30 years were 54 t in 1975. This paper summarizes catch statistics for the 1986 fishery and updates previous reports (Dempson 1982; LeDrew and Dempson 1982; Dempson et al. 1985, 1986) which have examined landings in the commercial fishery.

Methods

Information on the commercial landings of Arctic charr in Labrador was obtained from Economics Branch of the Department of Fisheries and Oceans. Purchase slips, prepared by Economics, were issued to buyers and were filled out at the time of catch receipt. Information requested included the name of the fisherman, license number, area where fish were caught, date, number of nets used, weight of fish landed and total number of fish caught. Landed 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 were derived following the method initiated by Coady and Best (1976) and are expressed in terms of kilograms per man-weeks fished.

Estimates of ice concentration along the northern Labrador coast were obtained from ice charts produced by Atmospheric Environment Service, Ice Forecasting Central, Ottawa. The area of ice was determined by week within the area defined between 55°N and 60°N latitude inside of a line running northwest from 55°00'N, 59°00'W to 60°00'N, 63°00'W (Fig. 1).

Results and Discussion

Total northern Labrador landings

Figure 2 illustrates the commercial landings of Arctic charr from 1944 to 1986. Also illustrated are the landings from the Nain and Makkovik Fishing Regions from 1974 to 1986. The Nain Region produces about 85% of the total northern Labrador charr catch. Landings in 1986 totaled 114 t and were 19% lower than the previous year and 43% below the previous 10-year mean (199 t, 1976-85). Individually, landings in the Nain Region of 100 t were 7% lower than in the previous year while effort decreased by 13%, resulting in an increase in catch per unit effort over last year. The highest landings in the Nain Region occurred in 1981 and were 231 t. Since then catch has declined by 57% while effort has decreased by 39%. Charr landings in the Makkovik Region in 1986 were 14 t and were 59% lower than in 1985. This was the lowest value recorded since 1975. The number of licensed fishermen in the Makkovik Region also dropped by 17% (Table 1).

Catch and effort data - Nain Fishing Region assessment unit summary

Appendix 1 provides a summary of catch and effort statistics for all subareas within the Nain Fishing Region from 1974 to 1986.

Information on distribution and movement patterns of Arctic charr, as derived from tag recapture information since 1975, resulted in the formation of three major assessment units (Dempson et al. 1986; Dempson and Kristofferson 1987). As indicated last year (Dempson et al. 1986), there has been a trend for increasing catches of charr in the offshore zones for the Voisey and Nain assessment units, and decreasing catches of charr in the offshore Okak zone. This trend continued in 1986 (Table 2). Catches of Arctic charr in the Voisey unit represented 17% of the total for the Nain Fishing Region, while the Nain and Okak assessment units contributed 37% and 29% respectively. This was consistent with the average pattern observed during the period 1977-85.

Table 2 summarizes catch and effort data for the Voisey, Nain, and Okak assessment units, from 1974 to 1986. With respect to the Voisey assessment unit, highest catches occurred during the late 1970s as did the highest catch per unit of effort (CUE). Since 1979 both catch and CUE have varied with the lowest CUE in 1984 and 1986. Landings in 1986 were 16.7 t, an increase of 6% from 1985, and were approximately 83% of the TAC allocated for this assessment unit. Catch per unit effort, however, decreased by 26%.

Landings from the Nain assessment unit totaled 37 t, which were about 86% of the TAC for this unit. Effort decreased by 27%, while CUE was 23% higher than in 1985. The Black Island subarea in the offshore zone recorded its highest CUE, with the Dog Island subarea still maintaining high abundance levels relative to earlier years. This was the first time that more than 50% of the catch from this assessment unit originated in the offshore zone.

Landings from the Okak assessment unit totaled 29 t and were 69% of the allocated TAC for this unit. Effort decreased by 17% but catch per unit effort was slightly higher than the previous year. In general for the three assessment units combined, approximately 79% of the TAC was obtained with combined effort 15% lower than in 1985.

Factors influencing commercial landings in 1986

Since 1981, landings of Arctic charr in the Nain Fishing Region have decreased by about 57%. The high catches and catch rates in 1981 and 1982 were influenced to a large extent by the fishery which occurred in several of the northern fiord subareas. During 1981 and 1982 the fishery in the northern subareas accounted for 30% and 44% of the total landings within the Nain Fishing Region. Since then effort has also decreased in the order of 35 to 40%. Abundance of fish, as indicated by catch per unit of effort, has increased over the past several years but is still lower than historical values. If the years in which the northern fishery are omitted, then the CUE in 1986 for the entire fishery is only 8% lower than the overall average for all remaining years.

Catch rates are also influenced by the distribution of fishing effort. Despite a trend for increased abundance of charr in the offshore zones of several assessment units, these areas have usually had lower CUE rates than the corresponding inner bay areas. This may be due to more confined fishing areas in the inner bays resulting in higher concentrations of Arctic charr per unit area in contrast to lower concentrations of charr in the more open offshore fishing zones. With more charr caught in these offshore zones, catch per unit of effort would not necessarily be expected to be as high as in earlier years.

From 1983 to 1985 the northern Labrador area was affected by large concentrations of ice along the coast. The area of ice coverage was negatively correlated with both Arctic charr and Atlantic salmon landings within the Nain Fishing Region (Dempson et al. 1986). During 1986, the area of ice coverage along the northern Labrador coast was the lowest measured since 1981 (Table 3). Arctic charr landings, however, were also relatively low and the relationship with ice coverage is no longer statistically significant. Landings of Atlantic salmon in the Nain area increased by 37% over 1985; salmon landings are still significantly correlated with the area of ice coverage along the coast ($r = -0.81$, $P = 0.016$).

References

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Table 1. Summary of northern Labrador Arctic charr landings (kg round) by fishing region, 1974-86.

	Nain Fishing Region				Makkovik Fishing Region			
Year	Catch	No. of fishermen	Fathoms of gear licensed	Catch as % of total	Catch	No. of fishermen	Fathoms of gear licensed	Total catch
1974	120,414	66		81	28,133			148,547
1975	44,118	85		82	9,542			53,660
1976	134,898	101		90	15,645			150,543
1977	186,165	128		88	24,205			210,370
1978	213,915	131	21,340	86	34,387	149	29,300	248,302
1979	175,263	142	21,320	82	37,693	110	21,225	212,956
1980	167,991	128	23,960	83	35,561	154	30,635	203,552
1981	231,221	122	21,700	92	20,733	154	30,990	251,954
1982	203,012	118	23,600	84	39,163	141	28,200	242,175
1983	149,732	119	24,400	84	29,100	148	29,600	178,832
1984	123,045	115	23,000	83	24,792	147	29,400	147,837
1985	107,120	95	19,000	76	33,945*	132	26,400	141,065
1986	99,963	79	15,800	88	13,888	109	21,800	113,851

*Includes 6,788 from spring fishery in Postville area.

Table 2. Catch and effort statistics for the Voisey, Nain and Okak assessment units from 1974 to 1986. Quota area catch (QAC) refers to the landings from those subareas specifically under quota regulation only prior to the derivation of assessment units in 1986.

Assessment unit	Year												
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Voisey													
Quota[1]						22,500	22,500	16,100	16,100	16,100	16,100	23,400	20,000
QAC						21,880	11,557	16,325	2,688	2,953	8,113		
Catch	29,180	3,727	14,652	24,108	36,991	40,590	19,694	23,810	13,309	25,593	20,873	15,648	16,655
Effort			57	75	102	116	82	90	60	80	101	57	82
C/E			257	321	363	350	240	265	222	320	207	275	203
% Offshore	31	94	21	9	11	47	42	33	45	89	62	91	82
Nain													
Quota[2]						61,000	61,000	37,160	43,660	51,000	43,200	30,500	43,000
QAC						52,832	50,176	37,223	39,119	19,102	29,063	36,019	
Catch	37,745	33,830	53,313	76,255	73,763	66,844	75,055	65,632	55,617	51,202	38,900	41,158	37,095
Effort			196	291	314	336	390	278	235	289	244	252	185
C/E			272	262	235	199	192	236	237	177	159	163	201
% Offshore	18	8	5	7	4	18	30	24	22	34	37	48	56
Okak													
Quota[3]								27,300	27,300	21,000	27,000	27,000	42,000
QAC								11,049	9,031	30,732	13,864	24,746	
Catch	46,891	5,057	25,338	42,392	76,024	43,261	49,035	47,541	34,171	48,978	18,146	33,261	28,896
Effort			148	243	352	283	253	202	186	286	94	208	172
C/E			171	174	216	153	194	235	184	171	193	160	168
% Offshore	27	53	30	37	54	41	66	78	75	39	25	26	30

[1]Quota applied only to Voisey Bay subarea for 1979 to 1984.
[2]Quota applied only to Anaktalik Bay and Tikkoatokak Bay for 1979 to 1983 (1983 also includes 5 t for Nain Bay) but includes an offshore component for 1984 to 1985.
[3]Quota applied only to Okak Bay subarea for 1981 to 1985.

Table 3. Summary of the area of ice coverage (square kilometers) along the Labrador coast between 55° and 60° latitude, 1979-86.

Week	Year							
	1979	1980	1981	1982	1983	1984	1985	1986
June 11-17	28,056	43,304	43,304	43,304	43,304	23,380	43,304	22,045
June 18-24	35,646	7,590	25,345	43,304	43,304	43,304	43,304	23,606
June 25-1	6,370	6,912	13,012	41,745	43,304	34,290	32,632	28,093
July 2-8	15,993	0	0	13,893	6,912	32,054	30,785	8,584
July 9-15	20,737	0	0	2,711	19,449	31,716	26,475	5,853
July 16-22	2,575	0	0	542	22,364	28,869	24,218	195
July 23-29	1,220	0	0	407	22,228	26,497	14,161	0
July 30-5	0	0	0	609	11,317	1,694	2,258	0
Total	110,597	57,806	81,661	146,515	212,182	221,804	217,137	88,376

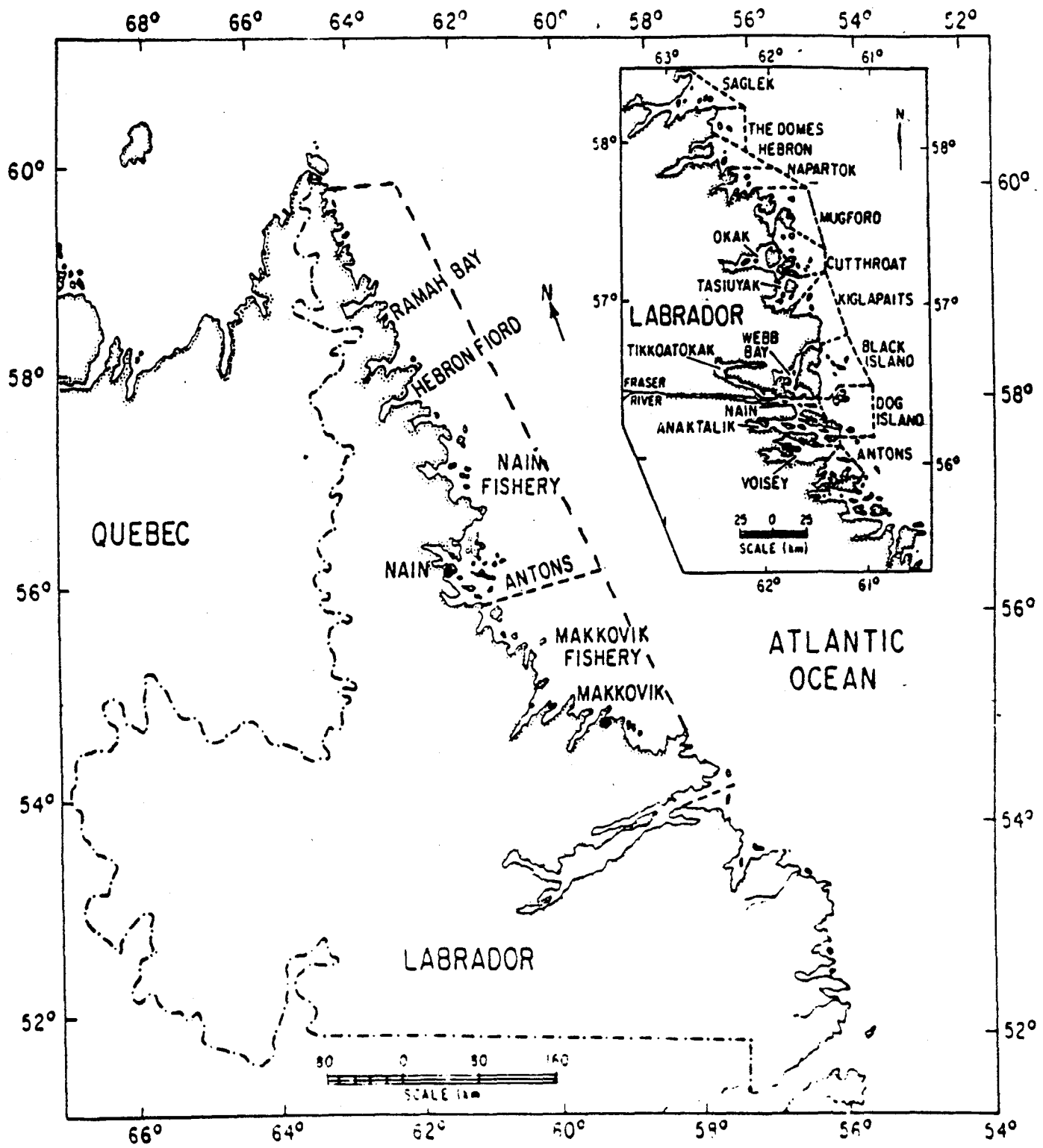

Fig. 1. Location of the Nain and Makkovik Arctic charr fishing regions in northern Labrador, and boundaries from which area of ice was determined. Insert illustrates the location of subareas within the Nain Fishing Region.

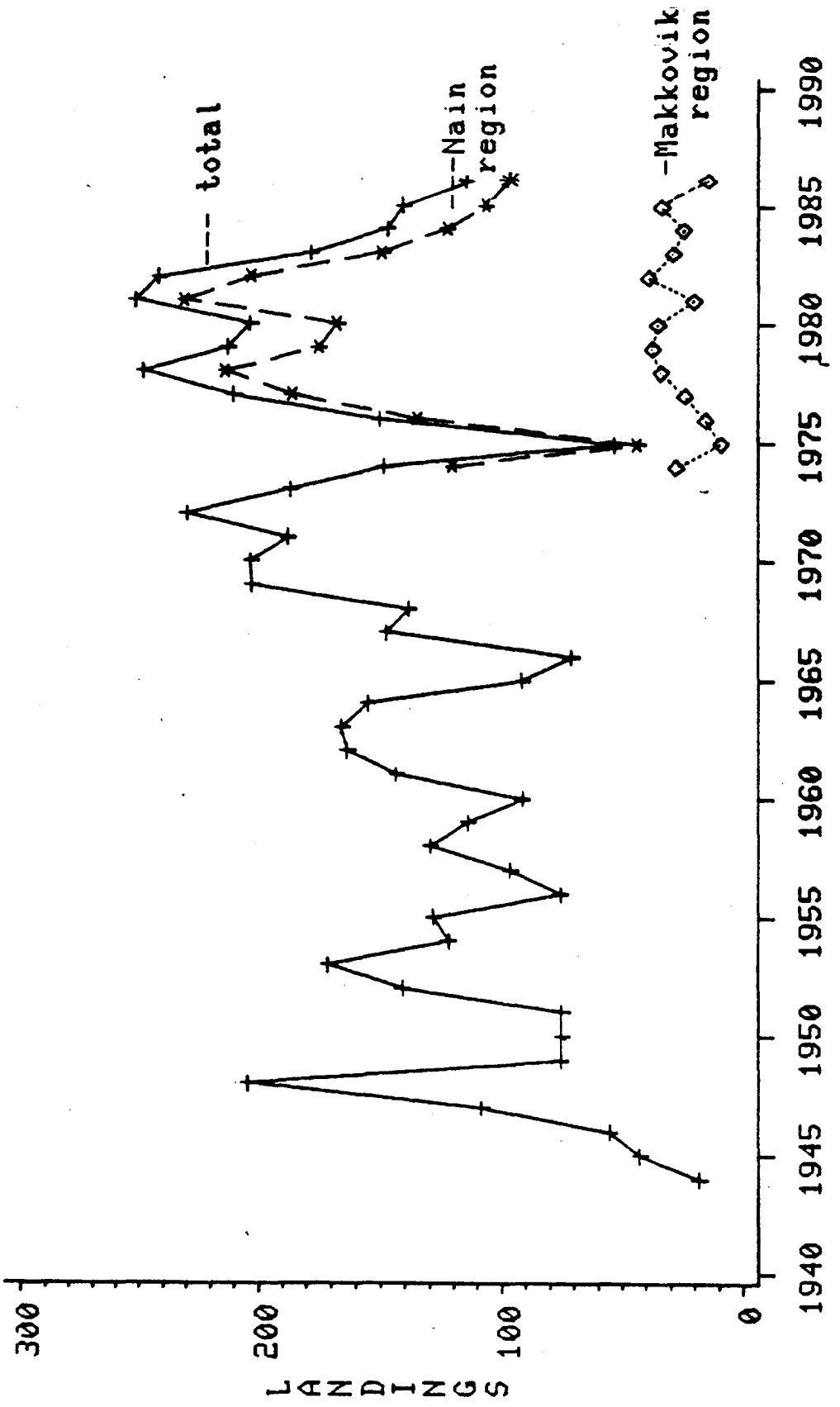

FIG. 2 SUMMARY OF NORTHERN LABRADOR ARCTIC CHARR LANDINGS (METRIC TONNES), 1944–1986

APPENDIX 1, ARCTIC CHARR CATCH STATISTICS, 1974-1986.
SUMMARY OF CATCH, EFFORT AND SIZE COMPOSITION

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 (MAN-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			21.0	24.0	28.0	22.0	14.0	13.0	12.0	9.0	7.4		

VOISEY 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 (MAN-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			42.0	35.0	34.0	32.0	17.0	16.0	17.0	16.7	16.4		

ANAKTALIK BAY	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 (MAN-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			36.0	38.0	27.0	20.0	12.0	10.0	11.0	10.9	11.5		

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 (MAN-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			11.0	9.0	8.0	15.0	11.0	14.0	7.0	7.9	9.8		

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 (MAN-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			16.0	15.0				4.0		2.3	5.7		

APPENDIX 1, ARCTIC CHARR CATCH STATISTICS, 1974-1986.
SUMMARY OF CATCH, EFFORT AND SIZE COMPOSITION

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 (MAN-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			19.0	20.0	18.0	14.0	10.0	5.0	7.0	8.2	5.1		

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 (MAN-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			21.0	19.0	20.0	39.0	39.0	27.0	11.0	5.4	7.2		

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 (MAN-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			8.0	10.0	14.0	7.0	6.0	7.0	8.0	4.2	4.8		

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 (MAN-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			25.0	25.0	34.0	14.0	18.0	12.0	16.0	11.5	8.7		

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 (MAN-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			21.0		71.0	34.0	14.0		11.0	12.9	4.5		

APPENDIX 1, ARCTIC CHARR CATCH STATISTICS, 1974-1986.
SUMMARY OF CATCH, EFFORT AND SIZE COMPOSITION

MUGFORD	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
QUOTAS													
CATCH (KG)			1970	1374	1148	170	513			15			
EFFORT (MAN-WKS)			15	9	7	2	5			1			
C/E (KG)			131	153	164	85	103			15			
% > 2.3 KG			30.0	36.0	32.0	16.0	15.0						

OKAK BAY	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
QUOTAS								27300	27300	21000	27000	27000	
CATCH (KG)	34250	2354	17812	27592	36125	26171	17434	11049	9031	30732	13864	24746	20141
EFFORT (MAN-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			29.0	26.0	18.0	11.0	8.0	10.0	7.0	6.5	2.2		

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 (MAN-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			17.0	25.0	25.0	12.0	12.0	13.0	15.0	10.1	6.9		

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 (MAN-WKS)			124	126	50	33	11	3	60				
C/E (KG)			234	223	171	75	68	97	275				
% > 2.3 KG			14.0	22.0	20.0	16.0	13.0	12.0	8.0				

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 (MAN-WKS)				37				106	98		112		
C/E (KG)				161				376	386		174		
% > 2.3 KG				16.0			19.0	34.0	23.0				

APPENDIX 1, ARCTIC CHARR CATCH STATISTICS, 1974-1986.
SUMMARY OF CATCH, EFFORT AND SIZE COMPOSITION

DOMES

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
QUOTAS													
CATCH (KG)								5187	2643		976		
EFFORT (MAN-WKS)								19	14		10		
C/E (KG)								273	189		98		
% > 2.3 KG								36.0	17.0				

SAGLEK FIORD

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
QUOTAS													
CATCH (KG)								24722	23791		5389		
EFFORT (MAN-WKS)								77	118		40		
C/E (KG)								321	202		135		
% > 2.3 KG								18.0	7.0				

RAMAH

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
QUOTAS													
CATCH (KG)									7758		3110		
EFFORT (MAN-WKS)									26		25		
C/E (KG)									298		124		
% > 2.3 KG									20.0				

NACHVAK

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
QUOTAS													
CATCH (KG)												6142	1808
EFFORT (MAN-WKS)												18	4
C/E (KG)												341	452
% > 2.3 KG													
TRAP NET CATCH													1777

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	99963
EFFORT (MAN-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	177
% > 2.3 KG			24.0	25.0	25.0	17.0	12.0	16.0	13.0	8.3	5.6		

* INCLUDES 186 KG UNACCOUNTED FOR BY AREA
** TOTAL ALSO INCLUDES TRAP NET CATCH FROM NACHVAK FIORD