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## STATUS OF ARCTIC CHARR STOCKS IN LABRADOR

### Introduction

Data on commercial landings of anadromous Arctic charr from northern Labrador are available since 1944 (Fig. 1). From 1977 to 1982, more than 200 t of Arctic charr were caught annually in the northern Labrador coastal area. Landings in 1992 totalled 74 t, an increase of 6% over 1991 but still well below the previous 1982-91 mean of 129 t. Landings from the Nain fishing region totalled 61 t, 11% more than 1991. Unstandardized effort for the Nain fishing region was basically the same for the past two years, but well below values recorded in the early and mid-1980s. The Nain fishing region is composed of three primary assessment units (Nain, Voisey and Okak) but it also includes other subareas which are not, at present, component parts of larger assessment units or stock complexes. The primary assessment units have contributed an average of 79% of the commercial production of Arctic charr from the Nain fishing region over the period 1974 to 1992. In 1992, the Nain assessment unit contributed 32% of the commercial catch of charr from the Nain fishing region with landings totalling 20 t of the 47 t total allowable catch (TAC). The Voisey assessment unit, with landings of 9 t out of a TAC of 14 t, contributed 15% of the Nain region charr catch. The Okak unit was essentially not fished in 1992 (.2t catch). Arctic charr landings from the Hebron Fiord subarea totalled 21 t, the same as in 1991, and contributed 36% of the Nain region catch. Persistent late season ice conditions along the northern Labrador coast prevailed in 1992 and prevented or delayed fishers from accessing some of the traditional fishing areas for part of the fishing season.

Conservation levels have not been determined for Labrador Arctic charr stocks. As an interim goal for the new in-river fisheries in Saglek Fiord, a harvest rate of 25% of the run of commercial-sized fish was agreed upon by the Labrador Inuit Association and the department for the 1992 fishery. This experimental fishery harvested 2.2 t of charr in 1992.

A summary for recent landings, effort and catches for the total Nain fishery is given below:

Year	1988	1989	1990	1991	1992	Min <sup>1</sup>	Max <sup>1</sup>	Mean <sup>1</sup>
<b>Region</b>								
Landings <sup>2</sup>	74	86	86	55	61	44	231	127
Effort <sup>2</sup>	471	436	394	321		309	966	
CPUE <sup>2</sup>	159	195	219	170		143	253	196
<b>Voisey Unit</b>								
Landings	14	11	20	11	9	4	41	20
CPUE	270	344	288	183	238	183	363	268
<b>Nain Unit</b>								
Landings	38	51	45	16	20	16	76	49
CPUE	167	281	241	107	149	107	281	206
<b>Okak Unit</b>								
Landings	17	17	16	4	0.2	0.2	76	30
CPUE	128	102	161	143		102	235	169

<sup>1</sup> Min, Max, Mean for the period 1974-92  
<sup>2</sup> Landings in tonnes, effort in person-weeks fished, CPUE in kg per person-weeks fished

## Nain assessment unit

### Background

The Nain assessment unit consists of an inshore zone made up of Anaktalik Bay, Nain Bay, Tikkoatokak Bay, and Webb Bay subareas, and an offshore island zone consisting of the Dog Island and Black Island subareas (Fig. 2). Prior to 1986, quotas had been applied to Anaktalik Bay and Tikkoatokak Bay. Beginning in 1986, these areas were assessed as a single unit.

Annual landings have ranged from 16 to 76 t with a mean of 49 t between 1974-92. In recent years, 48% of the Nain region catch of charr has originated from the Nain stock unit. In 1991 and 1992, however, this stock unit contributed only 29% and 32%, respectively, of the total region catch. Results of an analytical assessment conducted last year suggested that the TAC should have been reduced by about 20%. However, because of anomalous environmental conditions that affected timing of the commercial fishery, and possibly contributed to lower catch rates in 1991, the TAC in 1992 was maintained at 47 t.

Landings in 1992 totalled 20 t, the second lowest recorded but an increase of 23% from the previous year. Landings have been moderately stable from the mid-1980s until 1990, and generally close to the recommended TAC. Estimates of fishing effort in 1991 and 1992 were also the two lowest values recorded. Severe ice conditions again contributed to the disruption of normal fishing activities along the northern Labrador coast in 1992. Mean timing of the commercial charr fishery for the total Nain stock unit was 27 days later than the average during the 14-year period 1977-90, while median date of landings from the inshore zone was 31 days later. Catches and catch rates may have been lower as a result of fish having already returned to local rivers. However, no data are available on run timing of charr in recent years to rivers of this assessment unit.

Recent landings, TACs and recruitment at age 6 follows:

Year	1988	1989	1990	1991	1992	Min <sup>1</sup>	Max <sup>1</sup>	Mean <sup>1</sup>
TAC (t)	47	47	47	47	47			
Landings (t)	38	51	45	16	20	16	76	50
Stock biomass (t)	226	228	229	207	190	190	540	289
Recruitment <sup>2</sup> Age 6 ('000)	44	51	44	51	51	41	122	58
Mean F (10+)	.50	.78	.84	.37	.30	.30	.84	.55

<sup>1</sup> Min, Max, Mean for 1977-92.  
<sup>2</sup> Geometric mean 1983-90 used for 1991 and 1992.

### Catch-and weights-at-age data

Catch-at-age data are available since 1977. The 1984 year-class, represented by age 8 fish in 1992, was the most abundant, representing 26% of the catch in numbers of fish. Mean age of the catch in 1992 was 8.7 years and it has ranged from a low of 8.5 years in 1979 to a high of 9.8 recorded in 1982. Weights at age in this unit have remained relatively stable in recent years but were lower than those in the late 1970s and early 1980s. In 1992, the mean weight at age for fish aged 6 to 14 years was, on average, about 14% lighter than the average for 1988-91. The decreased weights-at-age may be directly related to the later timing of the fishery as larger charr are known to return to freshwater first.

### Commercial catch rates

A multiplicative model was used to derive standardized catch rates separately for the inshore and offshore fishing zones and a combined rate for the total assessment unit. Catch rates for the inshore zone were the lowest on record in 1992, while those in the offshore zone were about the same as the previous year.

### Assessment results

Sequential population analysis calibrated by the ADAPT method estimated fishing mortality in 1992 to be 0.30 on 10+ fish. Using a geometric mean of the numbers at age 6 and 7 in 1983-90 as the estimate of the numbers of these ages in 1992 gave a total estimated stock size of about 160,000 fish. The assessment suggests that the estimated population size in 1992 is comparable with the average population size for the period 1982-90.

### Prognosis

Results of the projection suggest that to achieve the  $F_{0.1}$  reference level the TAC for 1993 should be reduced from the current 47 t by about 30% to 32 t. Maintaining the current TAC at 47 t could increase fishing mortality to over 0.6.

Catches and catch rates may have been negatively affected by the timing of the commercial fishery in 1992 with corresponding effects on the assessment. While the impact of the late timing of the fishery cannot be quantified as to the effect on catch and catch rates, a cautious approach is warranted.

### Voisey assessment unit

The Voisey assessment unit consists of the Voisey Bay and Antons subareas (Fig. 2). Quotas were first assigned to Voisey Bay beginning in 1979, and TACs for the entire stock unit were introduced in 1985. Annual landings have ranged from 4 to 41 t with a mean of 20 t between 1974-92, and from 1977 to 1992 have contributed 16% of the commercial catch of charr from the Nain fishing region. The recommended TAC in 1992 was 14 t, a reduction of about 18% from the 1987-91 value.

Landings in 1992 totalled 9 t, a decrease of 15% from the 1991 level. While standardized catch rates in 1991 were the lowest on record, the catch rate increased substantially in 1992 and was the same as the previous 15-year (1977-91) mean.

An analytical assessment was not conducted on the Voisey assessment unit for 1992.

### Okak assessment unit

The Okak assessment unit consists of the Inshore Okak Bay subarea and the offshore Cutthroat subarea (Fig. 2). A TAC for the entire stock unit was introduced in 1986. Annual landings have range from 0.2 to 76 t with a mean of 30 t between 1974-92. The TAC in 1992 was 31 t, as it has been since 1988; the catch was 0.2 t as the area was essentially unfished in 1992.

An analytical assessment was not conducted on the Okak assessment unit for 1992.

**Saglek Fiord in-river fishery**

Over the past several years, DFO Science Branch, the Newfoundland Inshore Fisheries Development Agreement, and the Newfoundland Provincial Department of Fisheries have been directly involved with the Labrador Inuit Association in evaluating experimental in-river or terminal fisheries for anadromous Arctic charr. An expanded venture occurred in Southwest Arm Brook, Saglek Fiord, in 1992.

A trap was installed in Southwest Arm Brook and fished from August 2-20, 1992 with a total of 31,687 charr was captured during the 18 days of fishing. Figure 3 illustrates the size distribution of the fish caught, highlighting those classified as commercial-sized fish and the component removed for harvest. Of the total number of charr caught, 16% (4944) were classed as commercial-sized fish. Approximately 28% (N = 1364, 2.2 t) were retained for commercial harvest at the fish plant in Nain.

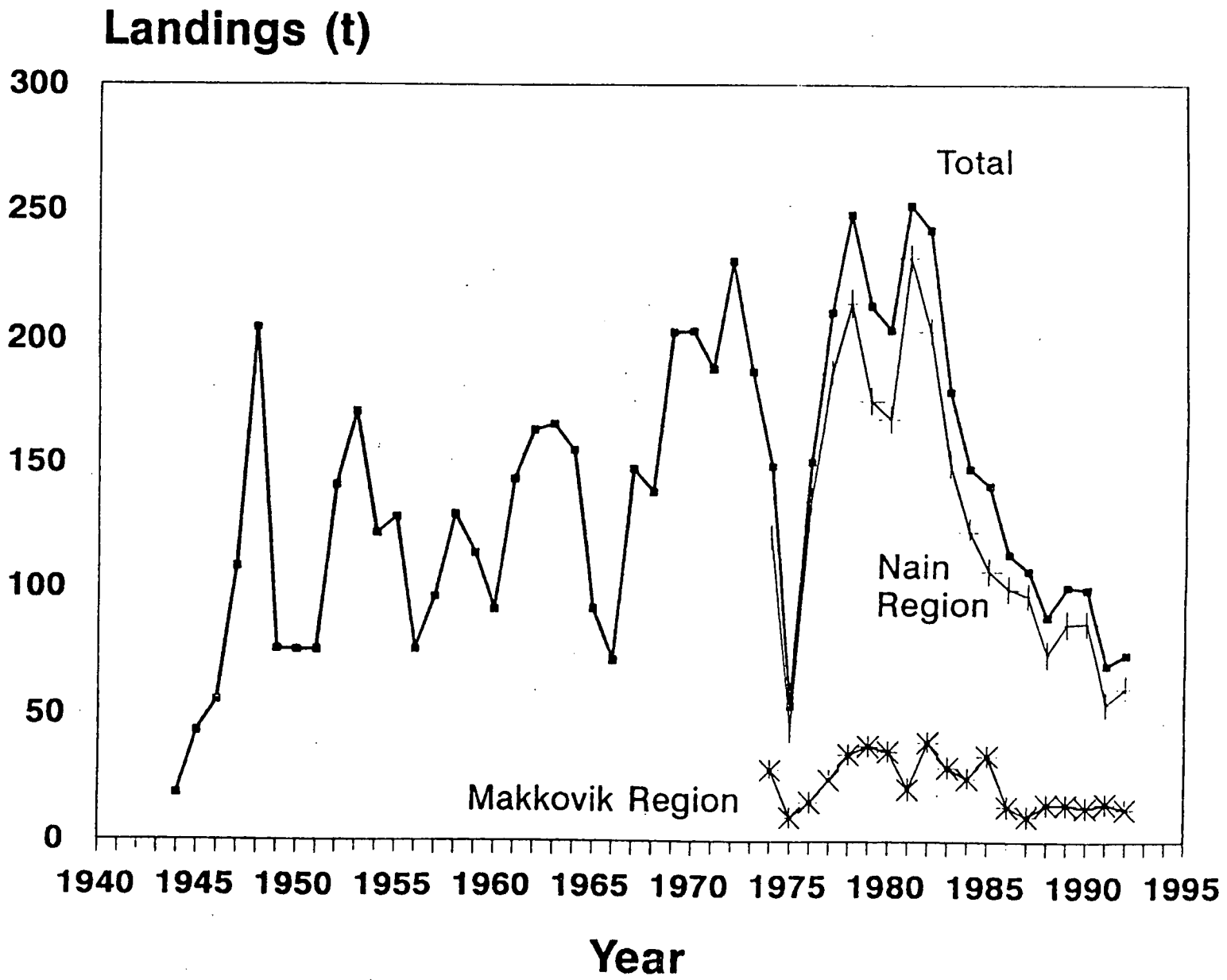


Figure 1 Summary of northern Labrador Arctic charr landings (tonnes), 1944-92

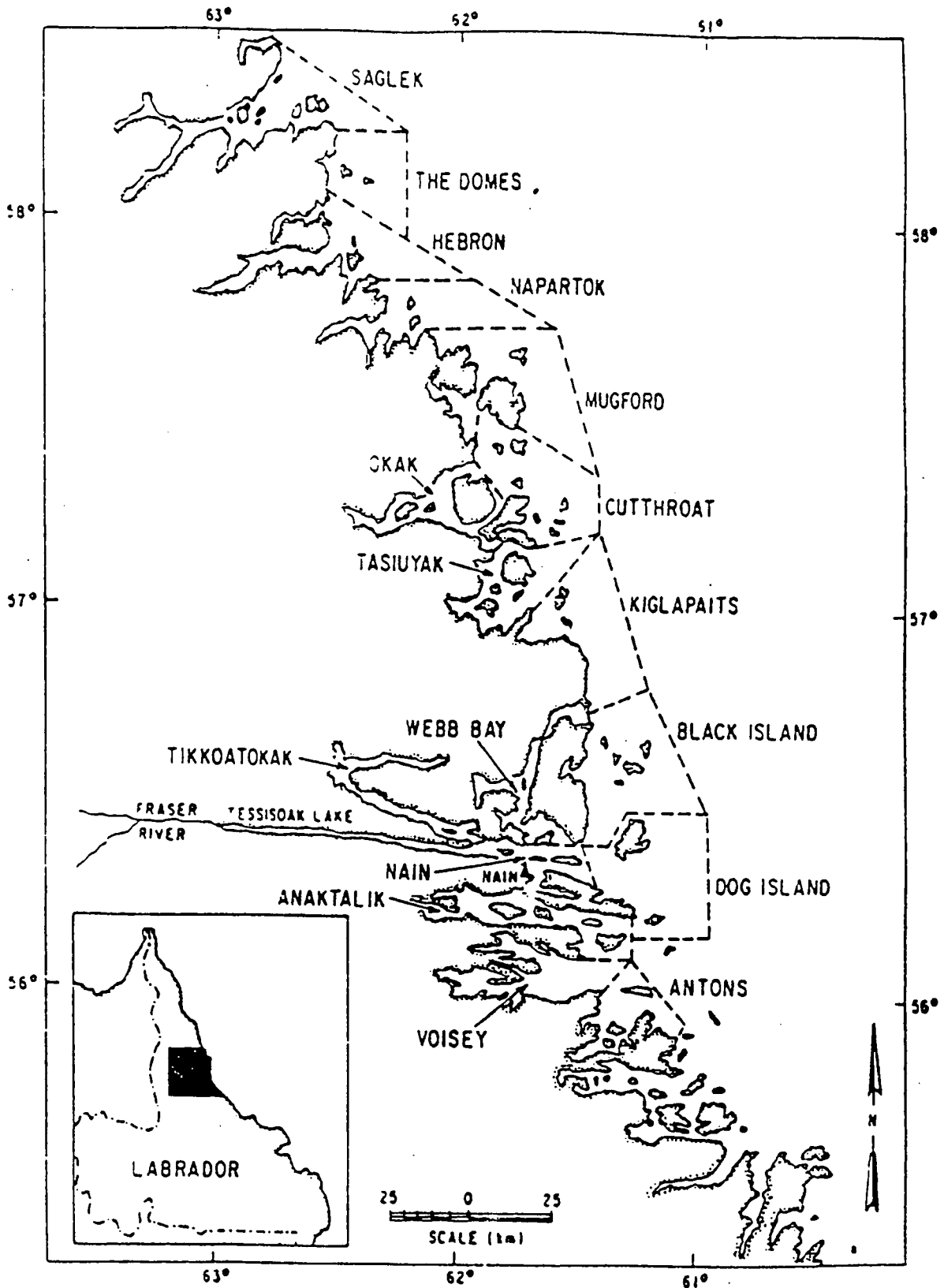


Figure 2 Geographical separation of the Nain Fishing Region subareas.

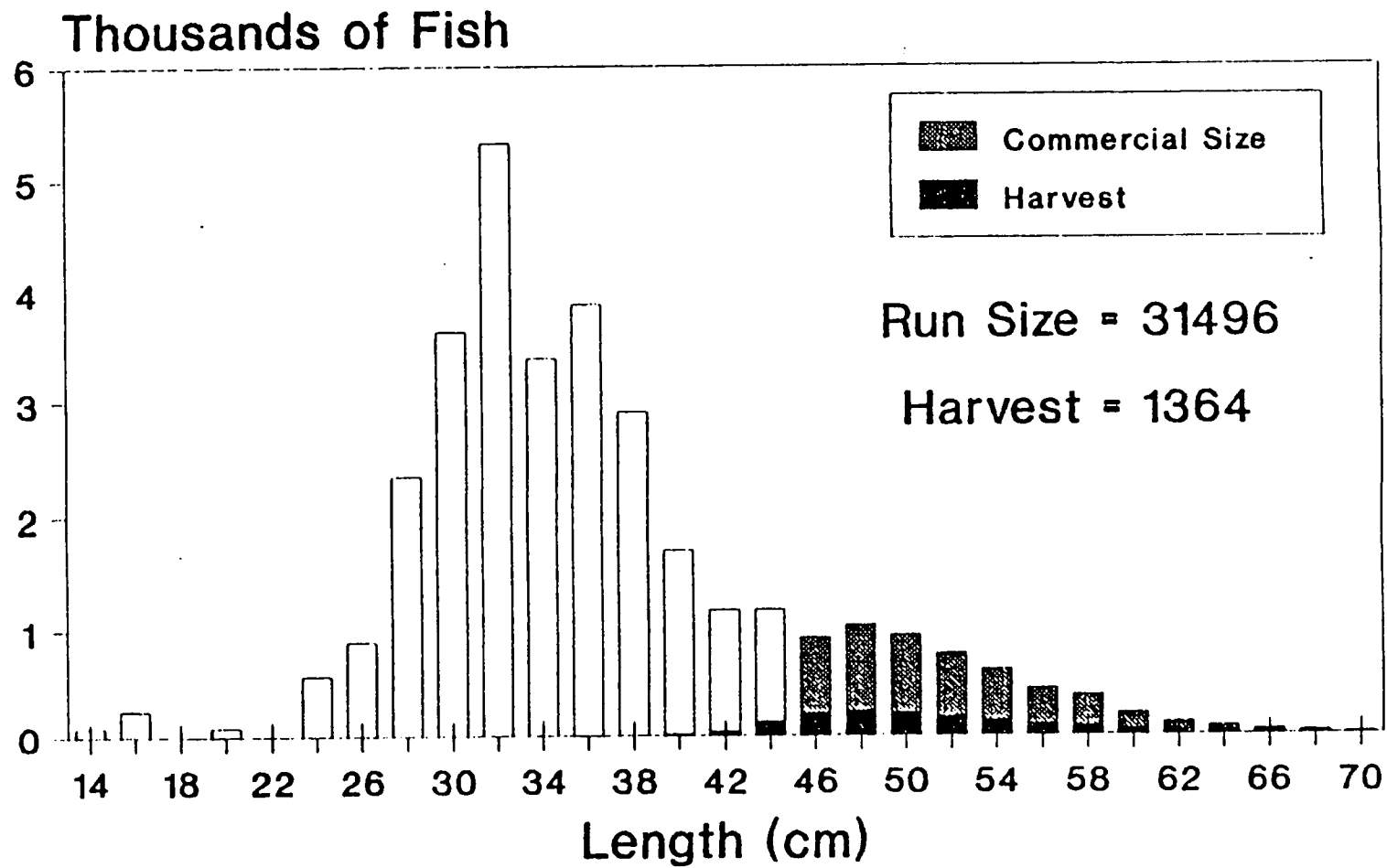


Figure 3. Length-frequency distribution of Arctic charr caught in the Southwest Arm brook, Saglek Flord, in-river fishery, 1992.