A Study of the

Koksoak River Fishery

1994

Research proposal submitted to:

Kuujjuamiut Incorporated

Prepared by:

Gregory Kaminski
and
Alix Gordon

Makivik Corporation
Renewable Resources Development Department
Kuujjuaq Research Center

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INTRODUCTION

The Inuit fisheries of the Koksoak River system have been documented by Makivik Corporation's Renewable Resources Development Department since 1977. These studies have provided a substantial data base describing the harvest levels and biology of fish catches, and have helped to define fisheries management plans for the Koksoak River. The main goals and objectives of the Kuujjuaq Fish Study are:

i) to record the harvest, fishing effort, and biology of fish species captured in the subsistence and commercial fisheries to help determine the impact, if any, of the Caniapiscau River diversion on the stocks of the Koksoak River;

ii) to collect fish muscle tissue and liver samples from subsistence and experimental catches for determining the presence and concentration of mercury.

Biological data from subsistence and commercial harvests on the Koksoak River have been collected over the past 30 years. Power (1961; 1969) documented commercial salmon catches throughout the 1960s; the Kuujjuaq Research Centre (K.R.C.) has been recording both commercial and subsistence harvests since 1977, 5 years before the Caniapiscau Diversion (Gillis and Kemp 1983). A summary of the pre- and post-diversion harvests, fishing effort and biological characteristics of the Koksoak fishery has been documented by Boivin et al. (1990). Further documentation of the subsistence harvests and biological data is essential to determine if there are any changes over time in the domestic fishery. This need for collection of annual data on the fish stocks of the Koksoak River is discussed in the Kuujjuaq Agreement (1988).

Due to poor harvests of sea-salmon during the last four seasons (particularly in 1989 and 1990), examination of the salmon fishery should be continued during the summer of 1994. Of foremost concern is the apparent decrease in recent years in the numbers of 2+ sea-salmon, which constitute both the majority of the commercial catch, as well as the main component of the reproductive stock.

Due to the fact that a request was made by the commercial fishermen and Kuujjuamiut asking MLCP (presently MEF) to buy-out the commercial permits and close the sport fishery in order to protect the stocks, monitoring of the Koksoak River becomes specially important. According to MEF's analysis of the situation, the decrease in the abundance of salmon in the Koksoak River is due primarily to over-exploitation during 1979-81. Currently MEF will not contemplate the buy-out of any permits, but recommends further, close monitoring of fisheries results (stressing that the obtained data is of best quality possible). We hope that our future meetings with MEF representatives can break that impasse. The collection of further data on the salmon stock of the Koksoak will be essential for determining whether the poor salmon harvest was a temporary phenomenon, or whether severe changes have occurred in the salmon stock of this river, and what kind of protective measures should be undertaken. Depending on the outcome of further Kuujjuamiut-MEF-Makivik negotiations and willingness of all participants to contribute to further studies focusing on salmon stocks evaluation, we might submit an additional funding request to Kuujjuamiut Inc.

During the summers of 1988, 1989, 1991 and 1993 the K.R.C. collected fish samples from the Koksoak River for mercury analysis. No analysis was done during 1992 season. The project, funded by Hydro-Quebec in 1988 and by Kuujjuamiut Inc. in 1989, 1991 and 1993 involved the sampling of muscle tissue from fish species which are important to the subsistence diet of the Kuujjuamiut. Low mercury levels have been recorded in Atlantic salmon (*Salmo salar*), brook trout (*Salvelinus fontinalis*), whitefish (*Coregonus clupeaformis* and *Prosopium cylindraceum*) and sculpins (*Myoxocephalus* spp.). These results are encouraging, since these species are consumed in large numbers by the Kuujjuamiut. No restrictions on consumption of these species are necessary. After the 1989 sampling, it was decided that collection of mercury data should be carried out on a biennial basis; therefore, fish species will be sampled for mercury during the 1995 field season. Few samples of lake trout (*S. namaycush*), pike (*Esox lucius*), sukers (*Catostomus catostomus* and *Catostomus commersoni*) and burbot (*Lota lota*) have been collected during previous seasons from the Koksoak River. These species showed elevated mercury levels which were above not only above the recommended consumption limit (0.2 parts per million (ppm) of mercury - Health and Welfare Canada), but also above 0.5 ppm limit permitting commercial sale. We

recommend yearly, further collections of data on these fish species. It will allow to obtain a larger sample size and will be valuable for determining whether restrictions should be recommended on the amounts consumed.

These findings indicate the importance of the continuing monitoring the mercury levels in predator fish (eg. lake trout, pike and burbot). Collection of mercury samples from whitefish and other species important to the subsistence economy of the Kuujjuamiut would also be valuable, in order to determine if mercury levels will continue to remain low, or whether they will fluctuate in the future.

METHODOLOGY

The following is an outline of research on the harvest levels and biology of fish species of the Koksoak River, which the K.R.C. proposes to undertake during the summer of 1994.

Harvest studies

An accurate record of the fish harvests of the Koksoak River is essential for determining the distribution of the catch between the commercial and subsistence users. Harvest booklets and questionnaires have been used for many years in northern Quebec for obtaining the total catch by species, fishing effort and fishing locations utilized by Inuit (JBNQHRC 1982; Dumas et al. 1984).

In early June 1994, booklets similar to those used in previous years will be distributed to approximately 120 known active fishermen. These individuals will be asked to maintain a daily harvest record for all fish species, and their corresponding fishing effort for the duration of the season. Due to poor responses to the harvest study in past few years, every effort will be made to advertise the importance of the study to the Kuujjuamiut, and to encourage people to complete their harvest booklets. The purpose of the harvest study will be explained to all members of the community through broadcasts over the local F.M., the local television network, and during the distribution of booklets to each household. A copy of a poster will be distributed with the harvest booklets to each household in 1994. The poster will include a calendar, a drawing by Inuit artist Sammy Kudluk, and a brief text explaining the importance of the Koksoak Fish Study. It is hoped that this poster will serve as a reminder to Kuujjuamiut to participate in the collection of harvest data. All people who return their harvest booklets will receive a "Koksoak Fish Study" baseball cap. The possibility of lottery among the people who return filled booklets is also being contemplated.

At the end of the fishing season, the harvest booklets will be collected from each fisherman. A questionnaire, similar to that used in previous years, will be distributed to all potential fishermen who were not included in the harvest booklet survey. Over a two-week period, response to this questionnaire will be solicited with phone calls and door-to-door canvassing.

Respondents to the questionnaire will be asked to indicate whether they fished on the Koksoak River in 1994 and if so, to estimate their total fish catch within broad catch categories for each species. Data treatment will follow procedures used in previous years. The report will discuss total harvest numbers, temporal distribution of harvest, catch per unit of effort and the distribution of the salmon harvest between the subsistence and commercial fisheries.

Biological monitoring

i) Morphometric data

At least five Inuit field researchers will be based in different summer fishing camps to collect biological data from subsistence and commercial fish catches. Since 1982, this data collection system has been found extremely effective in terms of quantity and quality of data, as well as the level of cooperation of the Inuit fishermen involved. These researchers will be trained in the techniques of field sampling at the K.R.C. prior to the start of the season. Sampling will begin in mid-June and conclude by mid-October, thereby recording the major upstream migration of sea salmon. Biological data to be recorded includes:

i) catch per unit of effort
ii) fork length (± 0.5 cm)
iii) whole weight (± 50 g)
iv) sex and maturity
v) age (from scales for salmon and whitefishes, or otoliths for brook trout and arctic char)
vi) stomach contents (feeding vs. non-feeding)
vii) parasites (unusually high levels)

The field researchers will be under the regular supervision of Gregory Kaminski (biologist) and Alix H. Gordon (technician). One student will work at the K.R.C. to process the raw data, to enter the data into the computer and to mount fish scales.

ii) Collection of samples for mercury analysis

One biologist and technician will spend a few days on the river in an effort to collect number of samples from less numerous fish species (pike, burbot, suckers, lake trout). Experimental gang-mesh nets will be employed to catch a wide range of fish sizes from different habitats.

Biological data such as fork length, weight, age, etc. will be collected, and muscle tissue samples removed from the left side of each fish, between the dorsal fin and lateral line. Liver will also be collected from a subsample of the catches. Samples will be preserved until 1995, when the analysis for all fish species is scheduled. The following table lists the numbers of samples to be obtained for mercury analysis in 1994:

Table 1. Number and species of fish from the Koksoak River to be sampled for mercury analysis during the summer of 1994.

Species	Koksoak River
Lake trout	15
Suckers	15
Pike	15
Burbot	15
Total	75

Data Analysis and Final Report

The analyses and presentation of these data will be structured in order to produce a biological record compatible with the established data base from previous years. The 1993 report will discuss the total fish harvest, the distribution of the salmon harvest between subsistence and commercial use, and the biological characteristics of fish species sampled.

Schedule for submission of reports

Preliminary report	January 15, 1994
Final report	June 15, 1994

BUDGET

A. PREPARATION and BOOKLET DISTRIBUTION/COLLECTION

1.	Salaries:		
	G.Kaminski	3 days @$244/day	732
	Alix Gordon	3 days @$213/day	639
	Student-researchers	20 man-days @$60/day	1,200
2.	Printing costs: Multicopie, Inc., Montreal, Quebec.		750
	Graphics for booklets, calendar update (Nunavik Graphics)		200
	Truck rental	75 hrs. @$10/hr	750
3.	KFS Caps and Crests	200 @ $5.25	1,050
		Subtotal	**$5,321**

B. FIELD STUDIES

1.	Salaries:		
	Alix Gordon	35 days @$213/day	7,455
	Greg Kaminski	15 days @$244/day	3,660
	Student-researchers	160 man-days @$60/day	9,600
2.	Accommodation:	160 man-days @$30/day	4,800
3.	Consumables:		
	Food	40 man-days @$30/day	1,200
	Fuel	500 litres @$ .90/l	450
	Oil	15 l @ $5.30/l	80
	Parts		250
4.	Rentals:		
	Tent	2 x 10 weeks @$50/week	1,000
	Canoe	20 days @$60/day	1,200
	Sampling equipment	5 kits @ $50/kit	250
	Whirlpacks	2 packs @ $150/pack	300
		Subtotal	**$30,245**

C. DATA ANALYSIS AND REPORT PREPARATION

1.	Salaries		
	A. Gordon	15 days @$213/day	$3,195
	G. Kaminski	15 days @$244/day	3,660
	P. May	10 days @ $213/day	2,130
2.	Computer Services		500
3.	Word processing and production		500
		Subtotal	**$9,985**

GRAND TOTAL $45,551

Literature Cited

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