

# **Arctic Red River Index Netting Study 2003**

**Prepared for  
Ehdiitat Gwich'in Renewable Resource Council**

**by**

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## Introduction

The Arctic Red River has long provided an important subsistence fishery for residents of Tsiigehtchic and the surrounding area. Fish resources in this river have provided food for families and dogs as well as a source of income for individual households. The coregonid (whitefish) species identified in the Arctic Red River also play the principal role in food chains of aquatic ecosystems. Furthermore, the river itself has been identified as an important spawning, rearing and overwintering area for many of the coregonid species in the Mackenzie Delta that are of significant importance to the Gwich'in people.

Because of the importance of this river, both culturally and economically, there is community concern that accelerated oil and gas development in the Mackenzie Delta may negatively impact the Arctic Red River resources. In response to this, the Arctic Red River Index Netting Study was initiated by the Department of Fisheries and Oceans (DFO) in 2002. In 2003, DFO turned down participation in the study, where it was then passed down to the GRRB.

Since the early 1990 s, there have been many fisheries monitoring programs conducted within the Gwich'in Settlement Area. Fisheries monitoring programs are intended to monitor priority fish species on an annual basis, to provide data for the assessment of fisheries and to provide information for reporting the state and sustainability of key fish stocks of ecological, economical and traditional importance. The Arctic Red River Index Netting Study was initiated as a long term monitoring program to collect information on vital rates and biological characteristics of the Arctic Red River fish stocks. Index netting refers to a fishing method in which several sizes of mesh comprise a single gill net. Varying sizes of mesh allow for the best representation of length classes (fish lengths) within a population, and reduce the bias that may result only using one mesh size. This data can then be monitored for potential changes over many years. If, in the future, there is concern that there have been drastic changes to fish populations in the Arctic Red River, we can then collect current data and compare it to the results obtained from the monitoring program.

The goal of this study is to collect information on the vital rates of valued fish stocks within the Arctic Red River by gathering additional information on fish species using the area near and in the Arctic Red River. This will be accomplished by **1/** determining presence of fish species, **2/** gathering baseline biological characteristics of these fish species, and, **3/** documenting the timing of migrations. This study was designed to mirror the Peel River Fish Study, 1998-2003.

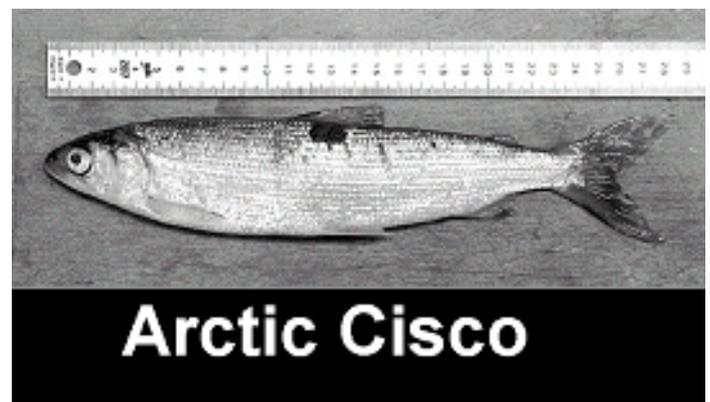
The first year of the study was exploratory in nature and these results will be used to make the appropriate changes to the materials and methods used in subsequent years, to assure that the study runs efficiently.

## Materials and Methods

Tsiigehtchic community member Russell Andre was hired to perform all fish sampling for the duration of the study. He underwent a training session in which he was shown how to efficiently collect and record biological information from captured fish species. Sampling was conducted between September 8 and October 27, 2003. Timing of this study was determined through community consultation, in order to choose a sampling time suitable for catching large numbers of fish.

A floating monofilament experimental gill net (Fig. 1) was used for fish collection. The net consisted of seven panels, each 6.1 m (20 feet) long, and 1.83 m (6 feet) deep. The varying mesh sizes of the seven panels were; 50.80 mm (2-inch), 63.50 mm (2.5-inch), 76.20 mm (3-inch), 88.90 mm (3.5-inch), 101.60 mm (4-inch), 114.30 mm (4.5-inch), and 127.00 mm (5-inch). The net was set perpendicular to shore using local, traditional fishing methods. The experimental gill net with varying mesh sizes was chosen for this study because it would provide a much more accurate representation of fish population characteristics.

Before commencement of this study, it was decided that the experimental gill net should be located a minimum of 11 km upstream from the confluence with the Mackenzie River. This distance would minimize, if not eliminate, the potential of catching Mackenzie River fish stocks, instead of the fish stocks of the Arctic Red River. An effort was made to choose a sampling location that would give a representative sample of all fish species. Three location deemed suitable for the study were identified and shown to us by Tsiigehtchic community members (34.3 km, 20.9 km, and 35.4 km upstream). Originally, the net was set 35.4 km upstream. Debris within the river quickly damaged the net, and within a week, it



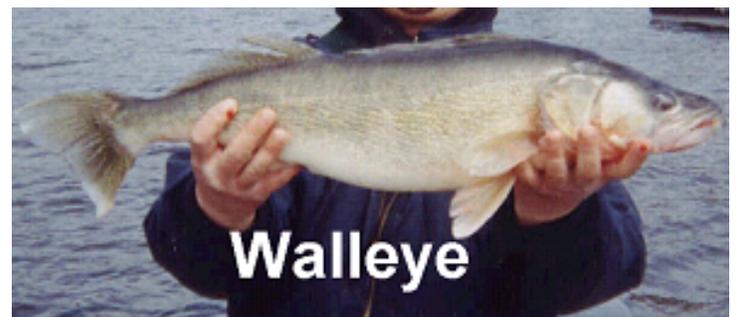
had to be replaced. The net was replaced and moved to a location 20.9 km upstream from the confluence with the Mackenzie River.

Sampling and data collection occurred every Monday, Wednesday, and Friday over the duration of the study. The monitor recorded all catch information each time the net was checked including: length of time the net has been fishing for, and the number of each species of fish caught in each mesh size.

Upon lifting the net, fish were separated according to mesh size. Each fish was identified to the species level and fork length (length from the tip of the nose to the fork in the tail;  $\pm 1.0$  mm) and weight ( $\pm 50$  g) were recorded. Sex and maturity were also determined, and ovaries from all mature females were preserved for future analysis. From every fish, fins were clipped, or otoliths (ear bones) were removed so that age could be determined upon completion of the study.

## Results and Discussion

This year, many forces hindered data collection of the Arctic Red River Index Netting Study. Large woody debris drifting down river, and boats travelling up river took their toll on the nets, forcing delays in fishing. Many days had to be missed while new equipment was being ordered. In addition, on many days unfriendly weather put a halt to fish sampling and data collection for reasons of safety. Due to these uncontrollable circumstances, the study gathered much less data than anticipated. Because of the lack of samples in 2003, a sufficient amount of data was not collected to allow for the most meaningful interpretation, or analysis.



In 2003, a total of 35 fish were captured during the index netting study. The fish species that were captured include: broad whitefish, inconnu, northern pike, chum salmon, walleye and white sucker. Figure 2 shows the number of fish of each species that were captured in 2003, and figure 3 breaks down the species composition from 2003.

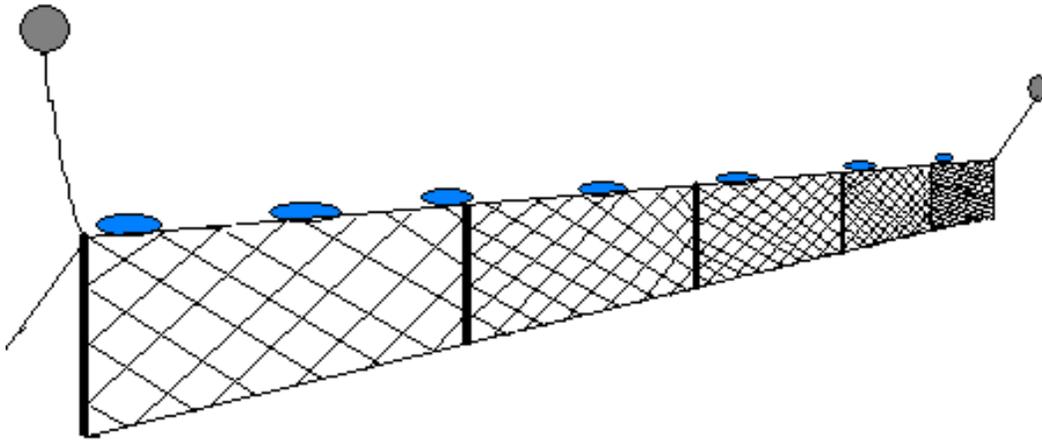


Fig. 1. Diagram of an index gill net showing the varying mesh sizes

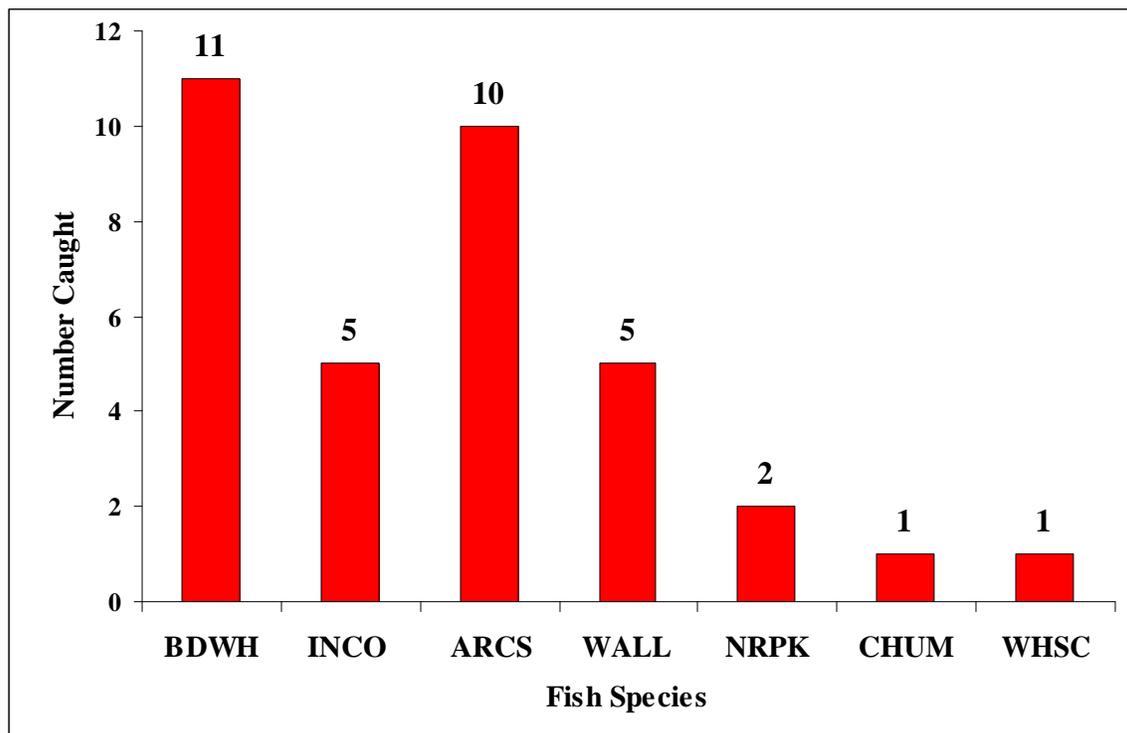


Fig. 2. Total abundance of fish species caught during the Arctic Red River Index Netting Study, 2003. (BDWH = broad whitefish, INCO = inconnu, ARCS = arctic cisco, WALL = walleye (pickerel), NRPK = northern pike, CHUM = chum (dog) salmon and WHSC = white sucker)

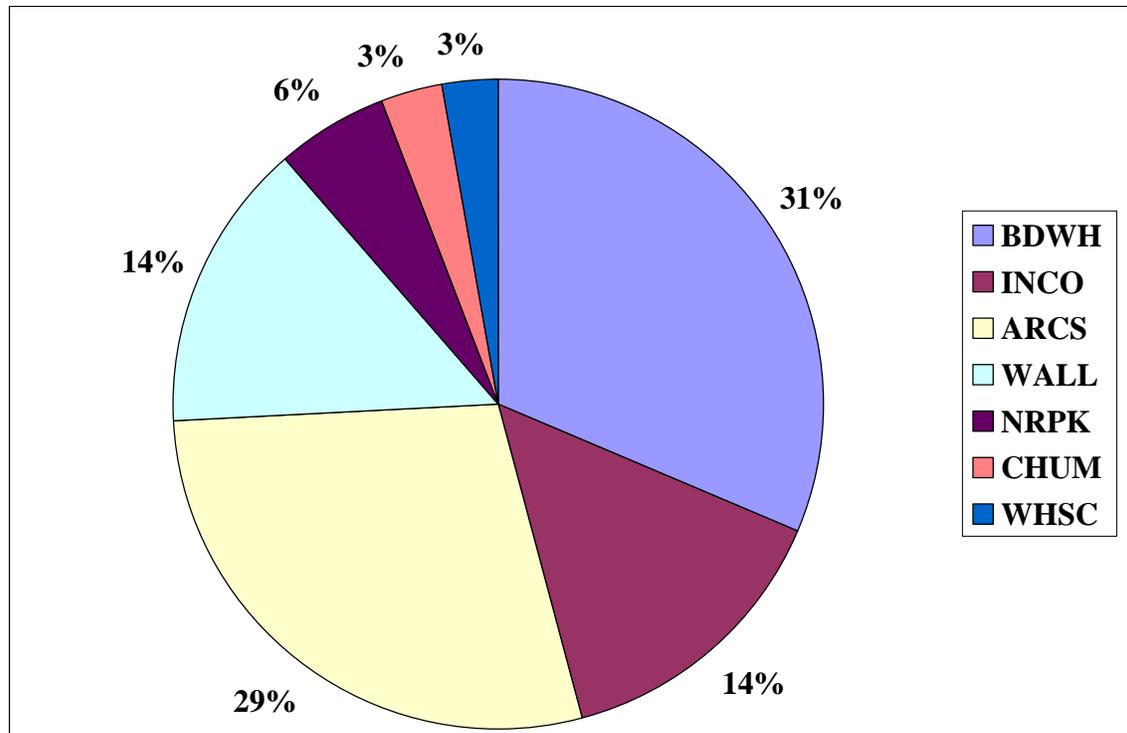


Fig. 3. Composition of fish species captured during the Arctic Red River Index Netting Study, 2003. (BDWH = broad whitefish, INCO = inconnu, ARCS = arctic cisco, WALL = walleye (pickerel), NRPK = northern pike, CHUM = chum (dog) salmon and WHSC = white sucker).

## What's Next?

This preliminary study allowed us to identify all potential problems that may occur during an index netting study. We will learn from the results in 2003, and change the materials and methods in 2004 to ensure that the study runs efficiently. There will not be many changes in 2004, only potentially starting the study much earlier, (beginning of July) so that enough data can be collected to allow for meaningful interpretation and data analysis. Again, Tsiigehtchic monitors will be hired for the duration of the study.

## Acknowledgements

The Arctic Red River Index Netting Study was funded by the Gwich'in Renewable Resource Board. Many thanks to Russell Andre, who as the fish monitor, worked extremely hard for the duration of the study. Thanks also to Sonny Blake and George Niditchie who provided assistance and input when needed.