

## Final Project Reports

1. **NWRT Project Number:** #3-17-06
2. **Project Title:** Community-based fisheries monitoring in Qikiqtarjuaq Fishing Areas.
3. **Project Leader:**

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4. **Summary:**

Qikiqtarjuaq is an island community, located on the north shore of Baffin Island along the Davis Strait at the northern end of Auyuittuq National Park. Arctic char is an important subsistence and commercial fish and is an important factor in maintaining traditional lifestyles for the community. As compared to other Arctic char fisheries in Nunavut, only a few studies have been done in Qikiqtarjuaq community fisheries areas. The objective of this project is to monitor Arctic char stocks in Qikiqtarjuaq commercial fishing areas through community-based fisheries monitoring program. The community was consulted, and TEK survey was conducted. Information from that TEK survey is being used as a baseline for scientific research on Arctic char. A multi-year information collection program is developed to gather the commercial fisheries monitoring data utilising the skills and local knowledge of the fishermen in the community, as well as the administrative and management support of local Hunters and Trappers Organizations (HTO). DFO researchers have trained the community in fish sampling and fisheries data collection including fish size, weight, age structures, sex, maturity, catch and effort data collection. This study will provide indicators of Arctic char commercial stocks health and relative abundance. This is a step towards evaluating total allowable harvests for char stocks, development of a comprehensive sustainable fisheries management plan. The information collected will provide the basis for developing effective management of Qikiqtarjuaq char fisheries in coming years. Present year, 2017-2018 is second year of this study.

5. **Project Objectives:**

The objectives of this proposed research are to

- Collection of biological data from Arctic Char commercial fisheries for stock assessment
- The identification of indicator stocks in Qikiqtarjuaq fishing areas
- Utilising the skills and local knowledge of the fishermen in the communities
- Completion of an integrated Inuit Qaujimagatuqangit-scientific stock assessment
- The training of community fishery monitors and community co-researchers
- Gather information to provide scientific advice for management of char

- Promoting fisheries development while ensuring conservation and sustainability of Arctic Char resources

## 6. Materials and Methods:

Qikiqtarjuaq is an island community, located on the north shore of Baffin Island along the Davis Strait at the northern end of Auyuittuq National Park. Arctic char is an important subsistence and commercial fish for the community of Qikiqtarjuaq. The community of Qikiqtarjuaq traditionally harvests char from the lake and river systems around Qikiqtarjuaq including Natluksiak Lake, Nudluit Lake, Tunusuk Lake, Avaliglut Lake, Kagniliajuk Lake within and outside the boundaries of Auyuittuq National Park.

Monitoring of commercial Arctic char was continued during the financial year 2017-2018. During 2017-2018, three sites were sampled in winters including Nudluit Lake in Nedluit Fiord and Circle Lake and Paddle River in Paddle Fiord. 584 fish were samples from three locations to study their relative abundance and biological including size and age structure and sex ratio. Fishermen also provided information about their effort and catch to calculate Catch Per Unit Effort (CPUE). Fish ageing is under process in the lab and data will be analysed when ageing will be completed. Ageing was completed for 2016-2017. DFO researchers have record data in a database and analyse it to interrupt intruspt initial . Stock assessment models, including life history invariants and maximum surplus production models, will be used to determine the stock abundance and total harvest levels after analysing five years data. Results will be compared with previous surveys and TEK.

## 7. Results:

Size based indicators are used to describe the response of fish populations to exploitation. Mean length of fish in standardized samples from a population is used as an index of population structure. Mean fork length of Arctic char from Data from 2016-2017 and 2017-2018 is analysed for length frequency and data from 2016-2017 is analysed for age frequency distribution. Initial results are indicating proper recruitment and a good number of large size fish (Figure 1 to 3). There is more frequency of large size fish in Nudluit Lake in recent years compared to 1996 (Read 2000) which is a healthy sign (Figure 1).

Mortality is a key component to understand the population dynamics of fish species. Total mortality can be estimated from in sequence decline observed in age classes of fish. It can be used to measure Annual survival rate. Annual mortality and survival rates are in all water bodies in 2016-2017 are at a moderate level (Table 1).

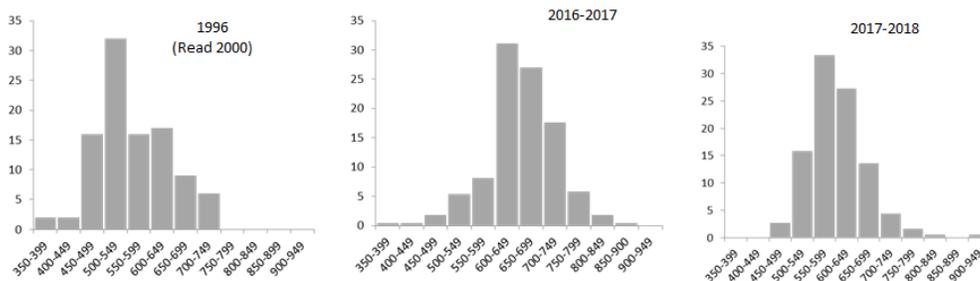


Figure 1: Nudluit Lake Length Frequency. A comparison of year 2016-2017 and 2017-2018 with 1996 (Read 2000).

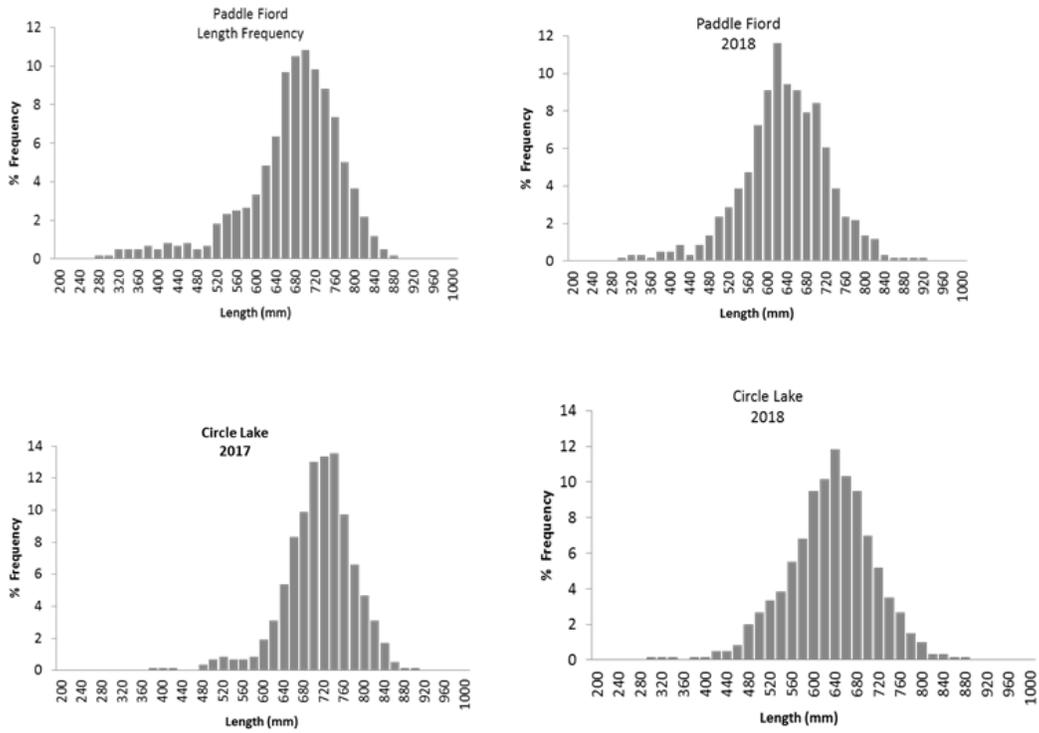


Figure 2: Length-frequency distributions of Arctic Char from the Paddle Fiord, and Circle Lake in Qikiqtarjuaq commercial fisheries areas (2016-2017 and 2017-2018)

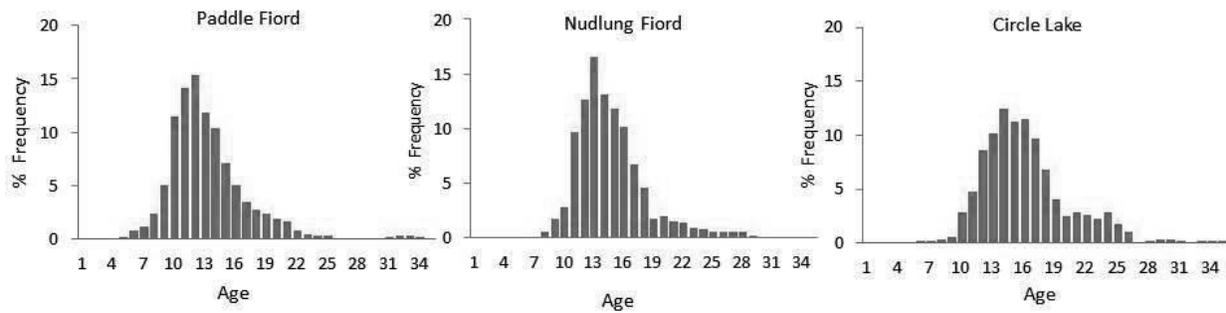


Figure 3: Age-frequency distributions of Arctic Char from the Paddle Fiord, Nudlung Fiord and Circle Lake in Qikiqtarjuaq commercial fisheries areas (2016-2017).

Table 2: Calculations of mean, minimum and maximum fork length for Arctic Char from Paddle Fiord, Circle Lake and Nudlung Fiord in Qikiqtarjuaq commercial fisheries areas (2016-2017).

		Mean	SD	Min	Max	Number
Paddle Fiord	2017	2770	976	208	6365	200
	2018	2912	885	454	6804	200
Nudluit Fiord	2017	3001	875	454	6123	222
	2018	2470	790	907	7031	183
Circle Lake	2017	3348	844	548	5899	192
	2018	2966	923	680	6804	200

Table 2: Calculations of the instantaneous mortality (z), natural mortality (N), Fishing mortality (F), annual total mortality (A) and rate of survival (S) for Arctic Char from Paddle Fiord, Circle Lake and Nudlung Fiord in Qikiqtarjuaq commercial fisheries areas (2016-2017).

	Total Mortality (Z)	Natural Mortality (N)	Fishing Mortality (F)	Annual Mortality (A)	Annual Survival rate (S)
Paddle Fiord	0.204	0.141	0.063	18.5%	81.5%
Circle lake	0.185	0.134	0.050	16.7%	83.3%
Nudluit Fiord	0.238	0.155	0.084	21.2 %	78.8%

#### **8. Discussion/Management Implications:**

After five years, stock assessment models, including life history invariants and maximum surplus production models, will be used to determine the stock abundance and total harvest levels. Results will be compared with previous surveys and TEK. This study will provide indicators of Arctic char commercial stocks health and relative abundance. This is a step towards evaluating total allowable harvests for char stocks and development of a comprehensive sustainable fisheries management plan. The information collected will provide the basis for developing effective management of Qikiqtarjuaq char fisheries in coming years. It will help in developing sustainability criteria and make recommendations that will be used for community partners eg. seafood suppliers. A consultation meeting with the HTO and fishers is planned in December 2018 to discuss two years results and finalise 2018-2019 sampling program.

#### **9. Report by Inuit participants:**

Project participants and HTO has been requested to provide information on the project and inuit involvement by providing a questioner. It was discussed during a HTO board meeting and Report is still awaiting.

#### **10. Reporting to communities/resource users:**

A result reporting workshop in Qikiqtarjuaq was planned in February 2018. However it was cancelled because of the outbreak of Tuberculosis in Qikiqtarjuaq, and as a result, no accommodation was available.

A telephonic conference meeting was held with HTO boards and community member on 21 February 2018 and results were reported and discussed with the community. A consultation meeting with the HTO and fishers is planned in December 2018 to discuss results and finalise 2018-2019 sampling program.

## **11. References**

Read, C.J. 2000. Information from Arctic charr fisheries in the Baffin Region, Nunavut, 1995 to 1999. Can. Data Rep. Fish. Aquat. Sci. 1067: x + 176 p