

Final Project Reports

1. **NWRT Project Number:** 3-18-08
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. The present year, 2017-2018 is the second year of this study.

5. **Project Objectives:**

The objectives of this proposed research include:

- 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 2018-2019. During 2018-2019, three sites were sampled in winter including Nudluit Lake in Nedluit Fiord and Circle Lake and Paddle River in Paddle Fiord. 504 fish were sampled from three locations to study their relative abundance and biology 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 once ageing has been completed. Ageing was completed for the year 2017-2018. DFO researchers have recorded the data in a database and analysed it to interpret initial results. 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 of 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. Fork length of Arctic char in data from 2016-2019 is analysed for length frequency and data from 2016-2018 is analysed for age frequency distribution. Initial results are indicating a good number of large size fish in the populations (Figure 1 to 3). There is more frequency of large fish in Nudluit Lake in recent years compared to 1996 (Read 2000) which is a healthy sign (Figure 1). However 2019, data is showing a decrease in the number of young recruits to the fisheries.

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

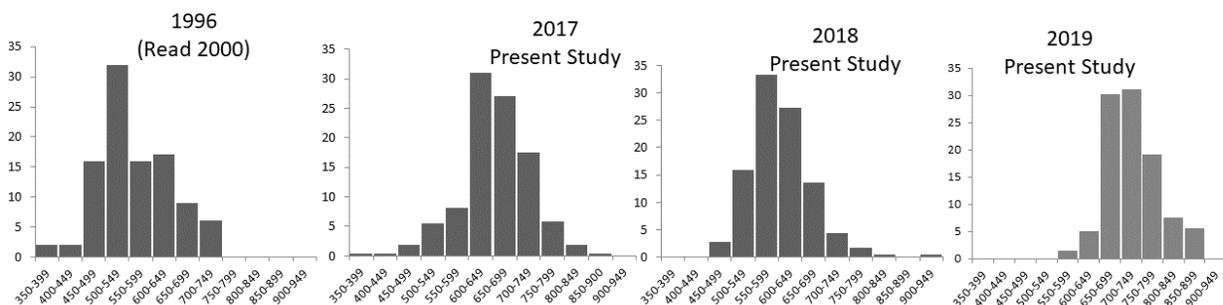


Figure 1: Nudluit Lake Length Frequency. A comparison of year 2017 to 2019 with 1996 (Read 2000).

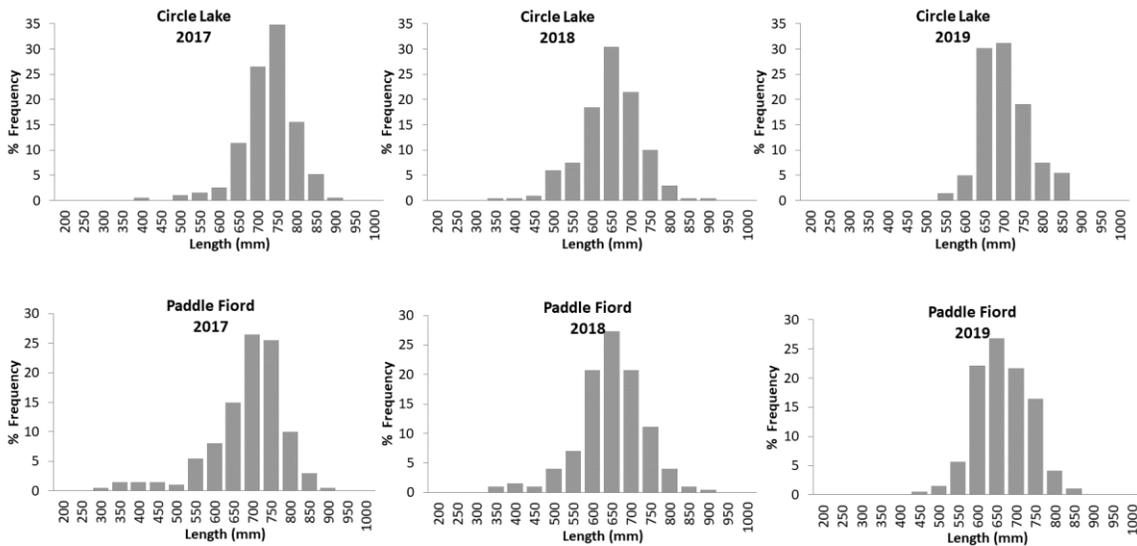


Figure 2: Length-frequency distributions of Arctic Char from the Paddle Fiord, and Circle Lake in Qikiqtarjuaq commercial fisheries areas 2016-2017 and 2017-2018 and 2018-2019

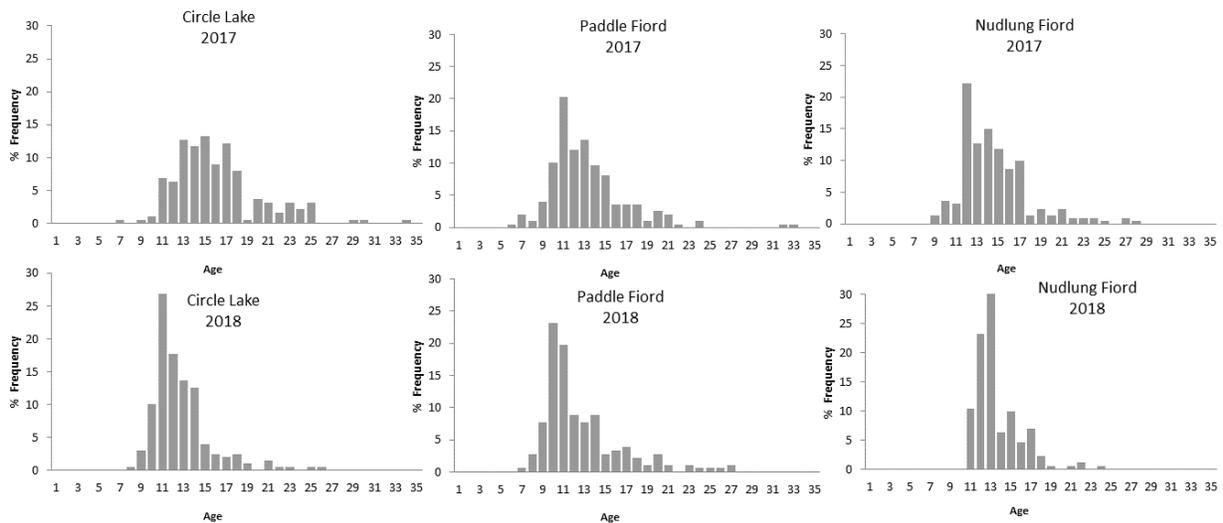


Figure 3: Age-frequency distributions of Arctic Char from the Paddle Fiord, Nudlung Fiord and Circle Lake in Qikiqtarjuaq commercial fisheries areas (2016-2017).

Table 2: Calculations of 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, 2017-2018).

	Fishing Area	Total Mortality (Z)	Natural Mortality (N)	Fishing Mortality (F)	Annual Mortality (A)	Annual Survival rate (S)
2016-2017	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%
2017-2018	Paddle Fiord	0.197	0.143	0.054	17.9%	82.1%
	Circle lake	0.279	0.16	0.119	24.4%	75.6%
	Nudluit Fiord	0.269	0.154	0.115	23.6%	76.4%

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 the 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 in making recommendations that will be used for community partners (e.g., seafood suppliers). A consultation meeting with the HTO and fishers was planned in December 2018 to discuss two years of results and finalise the 2018-2019 sampling program.

9. Report by Inuit participants:

Project participants and HTO have been requested to provide information on the project and Inuit involvement through the provision of a questionnaire.

10. Reporting to communities/resource users:

A results reporting workshop and consultation meetings were held in Qikiqtarjuaq on 12 December 2018 with HTO board members to report and discuss results and plans. A separate meeting was held with the participating fishermen on 11 December 2018 to update them on results, data quality and winter trips planning.

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