

**NWRT Interim Progress Report  
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**1. NWRT Project Number:** 3-13-23

**2. Project Title: Cambridge Bay Arctic Char Research:** Fishery Independent Surveys, Weir Enumeration and Tagging

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**4. Summary**

The purpose of this research is to collect fishery independent biological information/samples from Arctic char harvested in the Cambridge Bay area and operate a weir at the Halovik River for the purpose of enumerating the upstream run while tagging up to 2000 Arctic char. Despite the long commercial history in the Cambridge Bay region, virtually all the current data available on this fishery has come from a fishery-dependent, commercial plant sampling program. As such, the majority of biological information on which stock assessments are conducted, and on which present management decisions based, has typically only considered biological/catch information of commercially harvested fish which typically over represents larger and older individuals. Therefore, data that accurately represent all sizes and ages are lacking from most of these fisheries or this information is outdated. In recent years, however, consistent fishery-independent surveys have been important for collecting biological data from Arctic char to compliment that collected as part of the plant sampling program. Combined, these data will be important for providing estimates of abundance/biomass and potentially resolve sustainable harvest levels. Furthermore, although fishery-independent data are recently becoming available again, accurate enumerations of abundance of Arctic Char in commercial waterbodies are nearly 30 years outdated. Abundance estimates or weir enumerations are a vital component for resolving sustainable harvest levels and validating current stock assessment models for Arctic char in the region. Through this proposed research, we intend to address some of these knowledge gaps, all of which are identified in the 5-year plan for this fishery.

## **5. Objectives**

The objectives of this research are:

- To collect fishery independent biological information/samples from Arctic char harvested in the Cambridge Bay area, specifically from the Halovik (30 Mile) and Jayko rivers
- If permitted, to collect ovaries for fecundity analysis that will help us understand recruitment,
- To collect catch and effort information that will be valuable for understanding how harvest levels are impacting current population status as these data may potentially be used as an index of abundance for these fisheries.
- Collect tissue samples that will potentially be used for future assessments of population structure in Cambridge Bay Arctic char.
- Operate a weir at the Halovik River to enumerate the upstream run of Arctic char in this system.
- Tag up to 2000 Arctic char for future mark-recapture estimates and to update information on movements for this species in the region.

## **6. Materials and Methods**

Primarily, work to date has focused on the biological sampling of Arctic char during upstream migrations, typically when this species is commercially harvested. The study was designed and carried out in cooperation with the Ekaluktutiak HTO and two local field technicians chosen by the Ekaluktutiak HTO assisted with the field component of the work. The field work portion of this project was conducted with little variance from the summary provided in the NIF application with the exception of the Jayko river sampling (explained below).

Briefly, the collection of biological data from Cambridge Bay Arctic char was conducted as part of fishery-independent surveys at the Halovik (30 Mile) River. Due to a blizzard on August 23-24, the inclement weather that followed in the subsequent days and the time spent re-building the field camp resulted in several lost days of sampling, thus forcing us to fall behind our anticipated schedule. As such, we were unable to travel to the Jayko River on time allowing us to be consistent with previous sampling dates. Thus the call was made to remain at the Halovik River to see this work through to the end, thereby postponing sampling at the Jayko River until 2014. This, however, has resulted in the Halovik and Jayko rivers both being on the same sampling schedule (i.e., 2014 will be the fourth year of sampling for both systems).

At the Halovik River, fish were captured using multi-mesh gillnets permitting the capture of Arctic char of all sizes and ages. The aim was to biologically sample two-hundred Arctic char from each location. Location and general environmental data such as position (determined by GPS), time of year, time of day, net depth, water temperature, weather and other environmental conditions were recorded for each net set. To estimate catch-per-unit-effort, the net type and soak time were recorded. The fork length, round weight, gonad weight, sex

and maturity stage were recorded for each fish. Additionally, structures for determining the age and stomach contents of each fish were all taken. Ovaries from any mature individuals were collected and preserved as a means to estimate fecundity (egg number per female) and fish tissues were collected for contaminants (mercury and radium) and for future molecular assessments. Ages of sampled fish will be determined by embedding, sectioning and reading the aging structures (pelvic fins and otoliths) when money becomes available to do so. Preserved eggs will be measured and counted to determine egg size and fecundity of Arctic char. These and the data collected in the field (fork length, weight, sex and maturity) will allow for the assessment of the age and length structure, growth rate, sex ratios, physical condition, age-at-maturity, egg-number-per-female (fecundity), reproductive potential and mortality rates for these Arctic char populations.

Additionally, a weir was operated at the Halovik River with the intent of enumerating the upstream migration of Arctic char in this system. Methodology for weir construction and monitoring followed McGowan (1990). Arctic char were enumerated on a daily basis (including during the commercial harvest). Additionally, 1000 Arctic char were also tagged with T-bar anchor tags and rewards will be offered for the return of any tags from fish captured in subsequent years to provided data that can be incorporated into a mark-recapture estimate of population size.

## **7. Project Schedule:**

At present this project is on schedule as proposed. Field work has been completed and data entry is ongoing. Sample to be aged are still be organized and contracts to do this work are still being prepared. General analyses have commenced, but thorough assessments of these data cannot be completed until age reading is finished and until all years of data have been collected after which time a full assessment can be completed. Reports for the Ekaluktutiak HTO are currently being prepared and community presentations are being planned during upcoming Integrated Fisheries Management Plan (IFMP) meetings.

## **8. Preliminary results/discussion:**

The Halovik River was the only location in the Cambridge Bay region in 2014 where fishery independent sampling commenced. We were unable to sample at the Jayko River for the reasons described above. Data entry for the Halovik River is still ongoing.

The Halovik River (30 Mile) was sampled from August 22-26, 2013. In total, 175 Arctic char were captured, 93 of which were males and 62 of which were females. Arctic char at this location ranged in fork length from 274 mm to 905 mm for males and 414 mm to 814 mm for females. Round weight ranged from 187 g to 7450 g for males and from 850 g to 6150 g for females. The majority of Arctic char captured in 2013 were in resting condition. Additionally, six least cisco (*Coregonus sardinella*) were also captured.

Assessments and analyses of the fishery independent data collected from the Halovik River will continue. These data will be added to the time series collected for this system and a full assessment of stock health will be performed subsequent to five years of data collection. Samples for parasite and genetic assessments are also being organized and contracts for age determination are in progress. All of the above described data will be used to assess trends in stock health (i.e., compared to previous years of fishery-independent sampling) as well as for comparison to those data collected as part of the plant sampling program. Subsequent to five years of data collection, a Regional Advisory Process (RAP) can take place to make recommendations with respect to the sustainability of current commercial quotas for these waterbodies.

Additionally, a weir was constructed on August 8<sup>th</sup>, 2013 and operated until September 8<sup>th</sup>, 2013. During this time approximately 3000 Arctic were enumerated some (data entry is still ongoing), some of which were harvested in the commercial fishery. For the majority of enumerated fish fork length was recorded. Additionally, for a few of the fish, we were also able to record weight and collect otoliths for aging. Additionally, 1000 Arctic char were Floy-tagged and recaptures next year will be used to provide a population estimate using mark-recapture methods. Additionally, recaptures will be important for updating information

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

Numerous telephone and email communications took place with the HTO manager (Brenda Sitatak) to discuss the project and as a means to incorporate local knowledge into sampling locations. Meetings in Cambridge Bay occurred in January and March of 2013 where the project details were presented and approved. Additionally, meetings were conducted in July 2013 prior to the commencement of field work where project planning was discussed again. Meetings are also planned for March 2014 to update residents (i.e., through community presentations) regarding project progress and to obtain approval for this year's fishery-independent sampling. Community reports are currently being prepared and community posters highlighting this work have been distributed throughout Cambridge Bay. Updated posters highlighting results will be distributed in 2014.