

**NUNAVUT WILDLIFE RESEARCH TRUST FUND
INTERIM PROJECT REPORT
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PROJECT TITLE: An analysis of the Sylvia Grinnell Arctic Char (*Salvelinus alpinus*) population: the development of a population estimate, genetic composition, and migration

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SUMMARY

The sustainability of the Sylvia Grinnell Arctic Char population has been a recurring concern to the people of Iqaluit since the 1950's. During a five-year period (2002-2006) snagging was banned throughout Sylvia Grinnell River and the falls area and netting was banned throughout the River, falls area and Sylvia Grinnell Lake. However, during the 2007 and 2008 upstream migrations, after the restrictions expired, large quantities of snagged Char were documented. The effect of this harvesting method on the population is largely unknown and thus, the viability of the stock has once again been questioned.

In July and August of 2009 and 2010, 895 Arctic Char were tagged in the Sylvia Grinnell River. Biological information (fork lengths and round weights) was also collected on over 1000 Arctic Char in this same time period. Other information that was collected from a sub-sample of these Char included: sex, otoliths, stomachs, and fin clips. In July 2010, 72 Arctic Char were also tagged in the Bay

of Two Rivers, which is approximately 18 kilometres (km) southwest from the mouth of the Sylvia Grinnell River.

In 2011/12 we will attempt to use small-mesh gill nets in the Sylvia Grinnell River to complete the recapture portion of this mark-recapture population estimate for Sylvia Grinnell Arctic Char. We will also attempt to tag Char at Burton River, which is approximately 15 km southeast from the mouth of the Sylvia Grinnell River to provide additional information on Char movements. Fin clips and biological data will be collected from Char in the Sylvia Grinnell River and Burton River in 2011. Recapture locations of tagged fish will be used to assess migration routes and Char movement. Recapture counts during 2011 will be used to calculate a population estimate of Sylvia Grinnell Arctic Char. A creel survey will also be conducted along the Sylvia Grinnell River in 2011 to document harvesting effort, amounts, and methods. Genetic samples will be sent for analyses to an outside agency.

PROJECT OBJECTIVES

The objectives of this study are:

- 1) Produce a population estimate for Arctic Char in the Sylvia Grinnell River.
- 2) Assess impact of snagging on Arctic Char in the Sylvia Grinnell River.
- 3) Monitor migration patterns of Arctic Char in the Sylvia Grinnell River.
- 4) Differentiate Arctic Char stocks and overwintering sites in inner Frobisher Bay using genetics.
- 5) Document age-growth and age-structure characteristics of Arctic Char in the Sylvia Grinnell River. This data will be used to make comparisons with historical data for Arctic Char in the Sylvia Grinnell River.

MATERIALS AND METHODS

In 2009, fish were captured using rod and reel and small-mesh gillnets. In 2010, fish were captured with small-mesh gillnets, with the exception of one fish, which was captured via rod and reel. Three mesh sizes were used in 2009 (13, 51, and 57-mm - stretched mesh) and in 2010 (51, 64, and 102-mm - stretched mesh). All gillnets were 50-m long and 2-m deep.

In 2009, angling took place at two locations on the Sylvia Grinnell River (Table 1 and Figure 1). Angling was used to supplement gill-net catches during slow catch periods at site 1. Fish were also tagged opportunistically from recreational anglers that planned to live release captured Char at site 2. In 2010, angling took place at Bay of Two Rivers only (Table 1 and Figure 1).

In 2009, gillnetting took place at two locations in the Sylvia Grinnell River. Site 1 and 3 required the use of a zodiac. Net sets at site 1 varied with the tide cycle

and thus, nets at site 1 were set 1.5-3 hours prior to a high tide and pulled 1.5-3 hours after a high tide. Nets at site 3 were set about 1 hour prior to a high tide and pulled 3-4 hours after a high tide. Site 3 was further upriver and the Char required a high tide to access this portion of the river. In 2010, gillnetting took place at site 1 on the Sylvia Grinnell River and at Bay of Two Rivers (Table 1 and Figure 1). Nets at all sites were constantly checked for Char and checks seldom exceeded 12 minutes.

After capture, fish were placed in holding tanks (plastic fish tubs) until they were tagged. Fork lengths (+/- 1 mm) and round weights (+/- 10 g) were recorded for all captured Char. All healthy Char approximately 300-mm or longer were tagged with blue or white individually numbered external floy tags (Hallprint, Australia) Tags were inserted using a Dennison tagging gun just below the dorsal fin on the left side and anchored in the basal pterygiophores.

A subsample of Char, including incidental mortalities, were sampled for sex, otoliths, stomachs, and fin clips. Aging of 2009 otoliths was recently completed. Otoliths from 2010 and fin clips still need to be aged and genetically analyzed, respectively. All Char that were subsampled were cleaned and donated to the Amarok Hunters and Trappers Associations (HTA) for distribution to local elders.

PRELIMINARY RESULTS

2009

A total of 400 Arctic Char were tagged between August 8 and August 23, 2009 in the Sylvia Grinnell River. A total of 363 Char were tagged at site 1, 1 Char at site 2, and 36 Char at site 3 (Table 1). In addition to the tagged Char, a subsample of 78 Char were sacrificed for aging, sexing, and other biological information. Round weights (g) and fork lengths (mm) were recorded for 499 Char (Figure 2 and 3).

The mean fork length of Char captured was 355-mm (n = 499). The mean round weight of Char captured was 499-g (n = 499). The proportion of females to males to unknown was 41:30:6 (n = 77), respectively.

2010

A total of 495 Arctic Char were tagged between July 21 and August 27, 2010 in the Sylvia Grinnell River at site 1 (Table 1 and Figure 1). A total of 72 Arctic Char were tagged from July 13-15, 2010 in Bay of Two Rivers (Table 1 and Figure 1). In addition to the tagged Char, subsamples of 56 and 10 Char were sacrificed for aging, sexing, and other biological information from the Sylvia Grinnell River and Bay of Two Rivers, respectively. Round weights (g) and fork lengths (mm) were recorded for all tagged and lethally sampled Arctic Char. Note: length and weight data will be summarized for final 2010/11 report.

Furthermore, 30 juvenile Arctic Char were collected from the Sylvia Grinnell River near site 3 (Table 1; Figure 1) for the genetics part of this study.

Thus far, there have been 29 tag returns. The breakdown of capture methods for these tagged Char is: 9 by angling, 9 by gillnetting, 7 by snagging, and 4 unknown (Figure 4).

MANAGEMENT IMPLICATIONS

The Sylvia Grinnell River is an important subsistence and recreational Arctic Char fishery for Iqaluit residents. We will complete the recapture portion of this study in 2011 to aid in the calculation of a population estimate of the Sylvia Grinnell River Arctic Char stock. This will be the first population estimate for this stock. The population estimate will provide some background information that will be important when assessing the effects of harvesting methods (i.e., snagging) and rates at the Sylvia Grinnell River.

Furthermore, by collecting biological information on this stock we will be able to compare the stock status at the current time with findings from other studies that have taken place during the last 60 years. In addition, we will be able to determine if the Sylvia Grinnell stock is a distinct stock or a mixed stock by examining its genetic composition. We also plan to tag Char at Burton River in 2011, which is approximately 15 km southeast from the mouth of the Sylvia Grinnell River. Recaptures of these fish will provide supplementary information on movement of Char among different rivers. The quantification of inter-stock mixing and movement can be used as a model for other Char stocks.

REPORTS TO COMMUNITIES/RESOURCE USERS

A summary of the 2010 research project will be presented to the Amarak Hunters and Trappers Association (HTA) prior to the end of March 2011. Moreover, we stayed in close contact with the HTA and community members during the 2009 and 2010 portions of this research project. We even had a site visit by the HTA Chair one day while we were tagging Arctic Char this past summer.

ACHIEVEMENTS AND MILESTONES - 2010

We tagged 495 Char at the Sylvia Grinnell River.

We tagged 72 Arctic Char at Bay of Two Rivers.

We have received 29 tag returns.

We continued to build on our strong working relationship with the Amarok HTA.

We received positive feedback from the community, media, and HTA.

TABLES AND FIGURES

Table 1. Tagging locations for Arctic Char.

Site	Common Name	Latitude	Longitude	Method(s)
1	Sylvia Grinnell River - metal dump	63°44'12.06N	68°33'30.32W	gillnetting & angling
2	Sylvia Grinnell River - falls	63°44'34.80N	68°34'03.09W	angling
3	Sylvia Grinnell River - end of runway	63°46'04.17N	68°34'55.18W	gillnetting
4	Bay of Two Rivers	63°35'47.00N	68°47'47.98W	gillnetting & angling

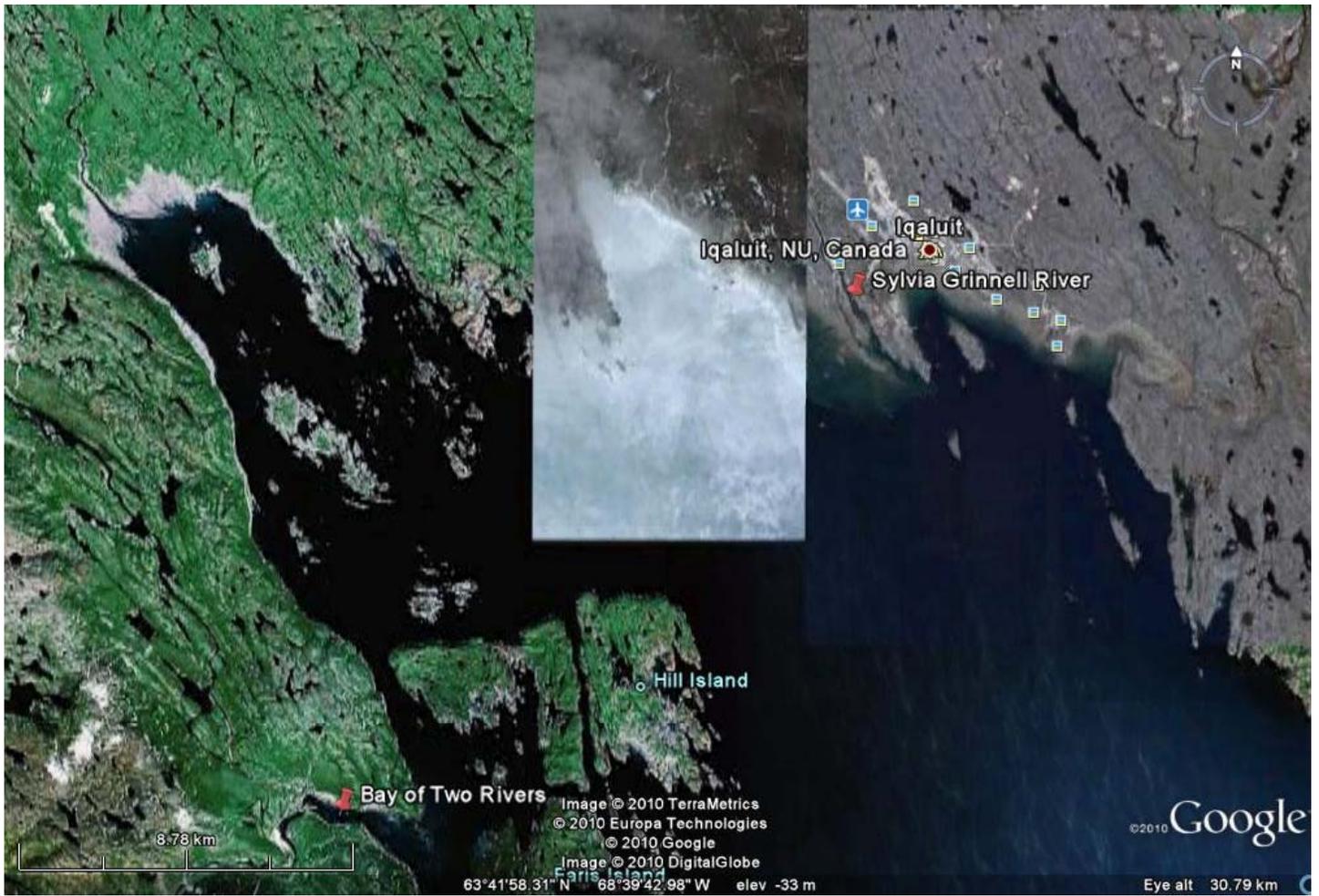


Figure 1. Map of Sylvia Grinnell River and Bay of Two Rivers near Iqaluit, NU.

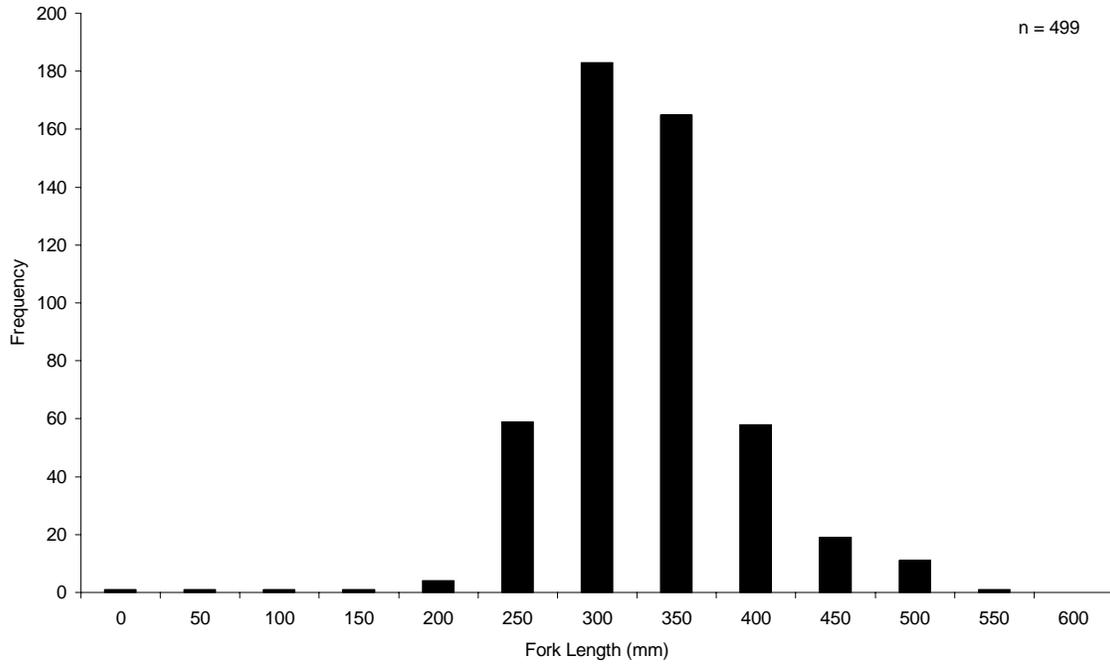


Figure 2. Length frequency of Arctic Char caught at the Sylvia Grinnell River, August 2009.

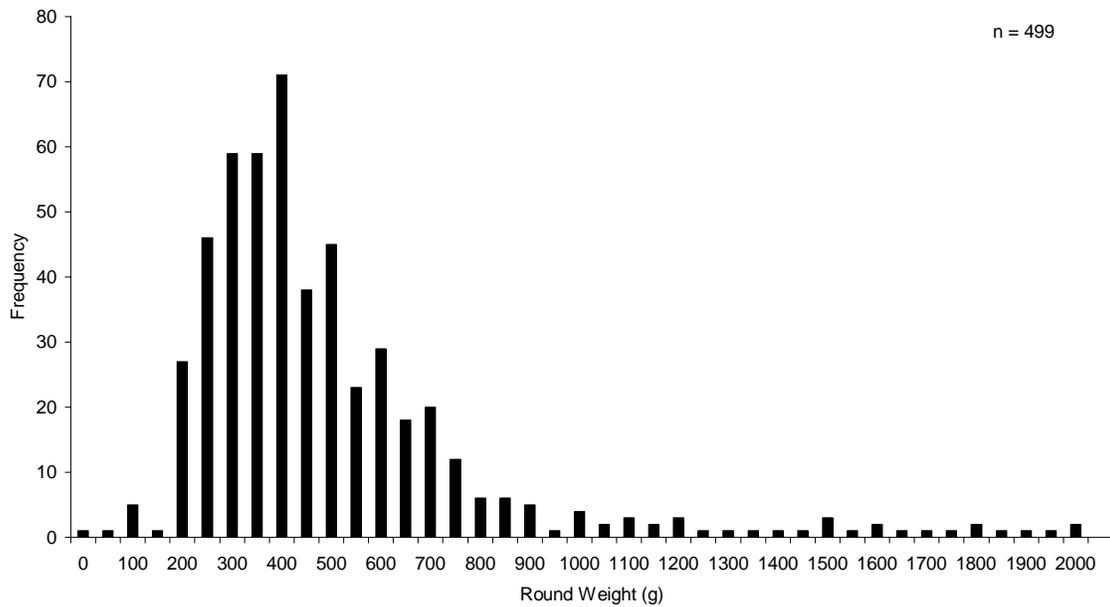


Figure 3. Weight frequency of Arctic Char caught at the Sylvia Grinnell River, August 2009.

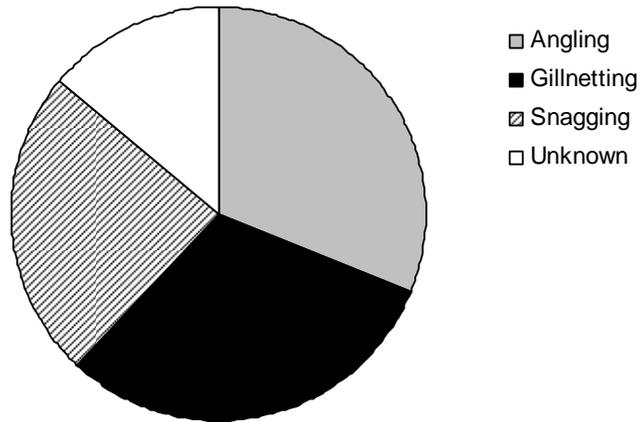


Figure 4. Breakdown of capture methods for tagged Arctic Char that have been returned as of December 2010 (n = 29).