



Spawning migratory Arctic char in Paradise Valley, late September 2009



Migrating Arctic char in Paradise Valley, early September 2008.



Resident Arctic char from the Egaluit River, early September 2008.

## What is the Fish Baseline Study?

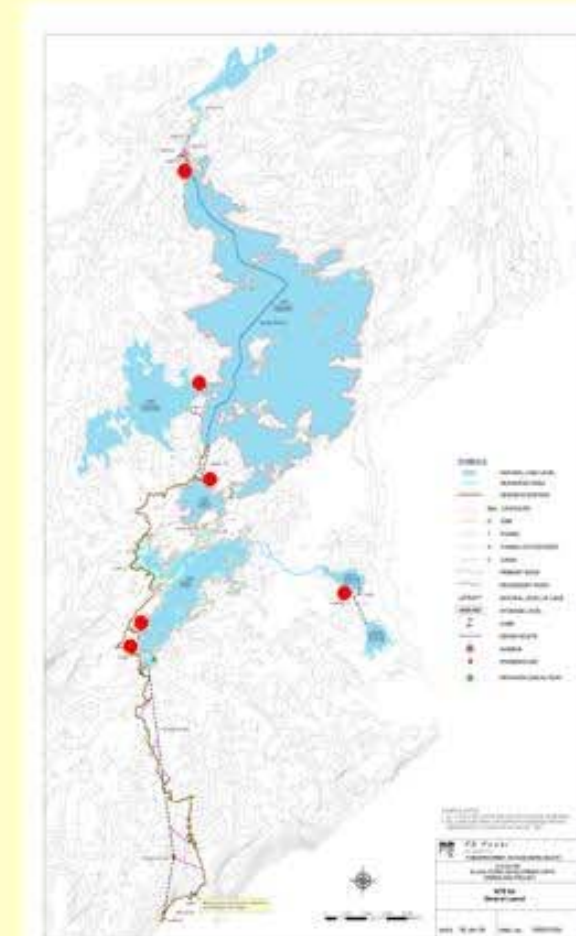
- It is a study to understand how the proposed Project could affect fish and other aquatic life near the proposed hydro and smelter sites
- It is one of several studies being conducted as part of the EIA

## Study Area

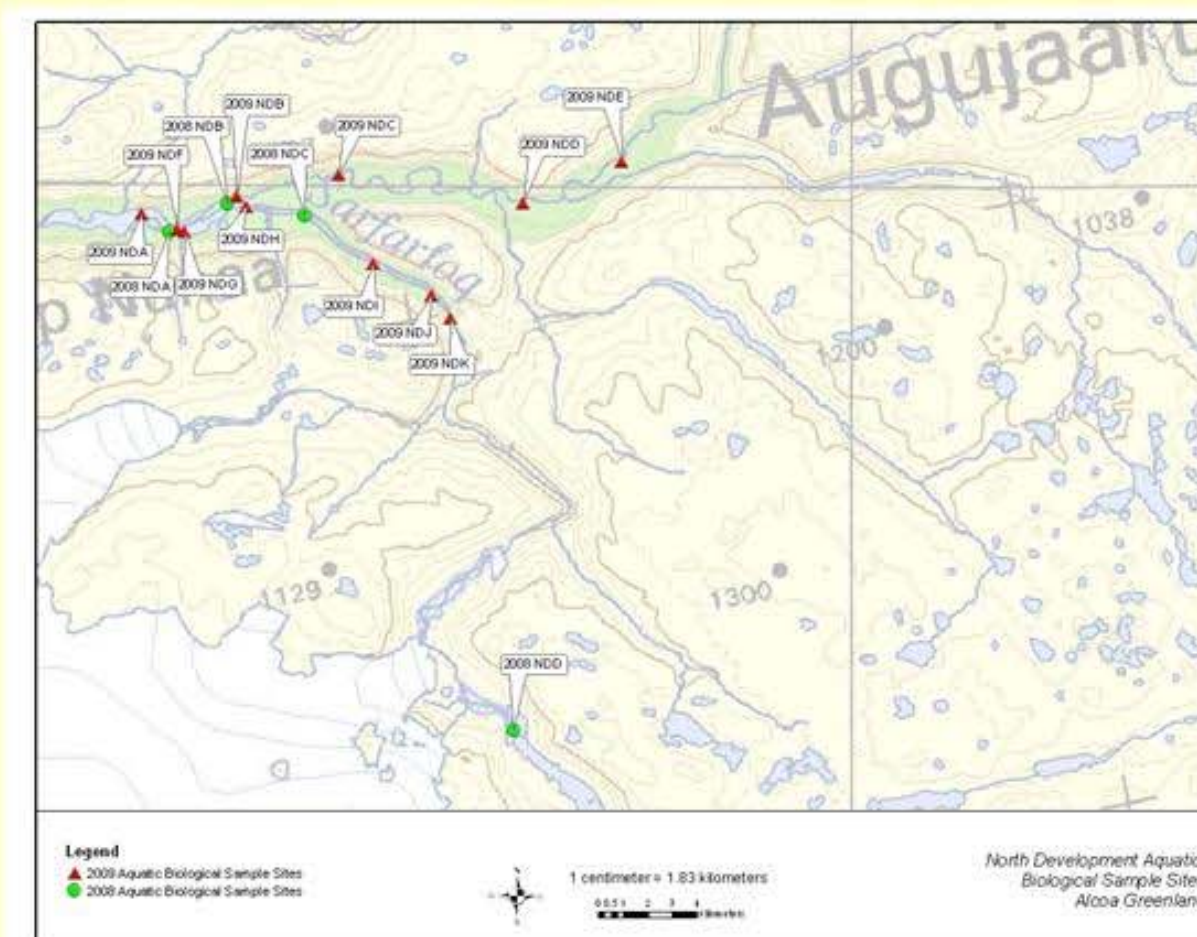
- Northern Development (7e) - 14 river sample locations and one lake sampling location
- Southern Development (6g) – five river sampling locations and six lake sample locations

## What Was Studied?

- Sampled invertebrates, fish, and water quality in lakes and rivers
- 2 years of study on the northern and southern rivers
  - 1<sup>st</sup> year of study to describe the fish present in the rivers
  - 2<sup>nd</sup> year of study to identify important habitats and understand fish distribution in the water systems
- 1 year of study on the lakes to describe the ecology of the lakes



Southern Development (6g) lake sampling locations



Northern Development (7e) river sampling locations in Paradise Valley

## Baseline Study Results

### • Regarding marine fish in the region:

- Several species are important to fisheries in the region: Greenland cod, Atlantic cod, lumpsucker, wolffish, Arctic char, redfish, Greenland halibut, plaice, capelin, and snow crab.
- Fishing is a culturally and economically important activity.
- Fishing occurs in deep fjords year round, and in shallow areas in summer.
- Arctic char, wolffish, lumpfish, crabs and seals are caught near the smelter site.
- Fish, particularly Atlantic cod, have historically gone through cyclical changes, but catches of most species are increasing now.
- Capelin numbers are decreasing and local fishermen suspect that this may be due to the increase in whale populations (increased predation on capelin).

### • Regarding fish in the vicinity of the proposed hydro developments:

- Char in the Igassup kua are smaller on average than char in Paradise Valley.
- Char in Paradise Valley are migratory; char in the Igassup kua are resident.
- Char likely migrate into the Paradise Valley river from August - September.
- No fish were caught in any of the lakes that could be affected by the Project.

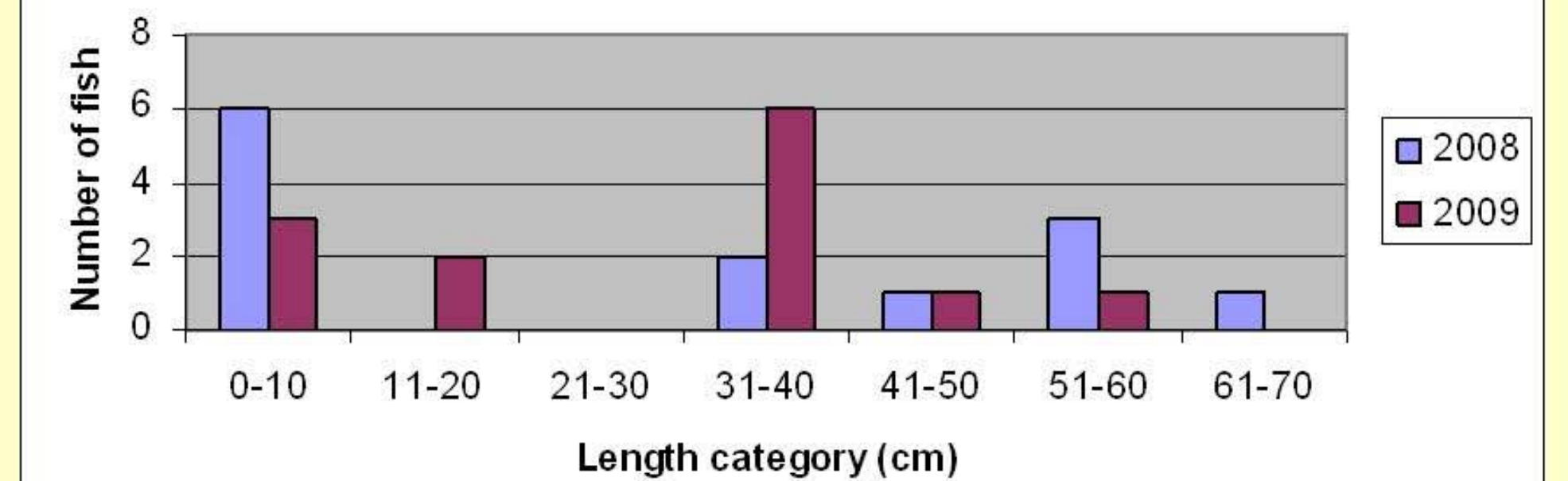
### • Regarding the aquatic food web in the vicinity of the proposed hydro developments:

- Aquatic insects are more diverse in the river downstream of the southern hydro development than in Paradise Valley.
- Zooplankton were found in lakes from both developments.
- Several species of insects were collected from glacial lakes.

### • Regarding aquatic habitat:

- Aquatic habitats that could be affected include lakes, rivers and fjords.
- The upper Arnargangup River is the most important char spawning river in Paradise Valley, but non-spawning fish return from the ocean to spend the winter in the Sarfartoq River and the Arnargangup River.
- The lower section of the Arnargangup is the most important area for very young char in Paradise Valley, but young char also occur in the Sarfartoq.
- The Arnargangup is critically important for char reproduction in Paradise Valley, but the Sarfartoq is mainly a wintering area.
- Silt naturally limits the numbers of animals that can live in glacial rivers.

## Length frequency of Arctic char in the Lower Sarfartoq, August 2008 and September 2009



Very small fish (0-10 cm) and very large fish (over 50 cm) were more common in the Lower Sarfartoq River in August 2008 than in September 2009. Medium sized fish (11-50 cm) were more common in the Lower Sarfartoq in September 2009. It is not clear whether these results are typical, but they are consistent with large spawning fish returning to the river first, followed by smaller non-spawning fish or first-time migrants.

## Next Steps

The environmental impact assessment will assess the following topics in relation to fish and aquatic biodiversity:

### At the hydro developments:

- Effects on physical aquatic habitat in the rivers downstream of the hydro developments.
- Effects on water quality in the reservoirs and rivers
- Effects on fish and insects in the reservoirs and rivers

### At the smelter site:

- Effects on marine habitats near the smelter site
- Effects on fishing and hunting activities near the smelter site
- Impacts on aquatic habitat from the proposed hydro development

### At the hydro discharge sites:

- Effects on water quality (especially on salinity) near the discharge sites
- Effects on marine organisms in the fjords associated with the hydro discharges

### Additional studies and analysis to be completed:

- Further analysis of insect and water quality sampling data