

**Vittrekwa River Char – Habitat Equipment and Analysis**  
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**Introduction**

Dolly Varden (a species of char, *Salvelinus malma*, or Dhik'ii, in Gwich'in) are culturally and economically important for Gwich'in and Inuvialuit from the communities of Fort McPherson and Aklavik. The northern subspecies of Dolly Varden is represented by only five populations in Canada. Four of these populations have been studied (some in great detail), but little information is available on the fifth: that which spawns in the Vittrekwa River. The presence of Dolly Varden in the Vittrekwa was confirmed by the Gwich'in Renewable Resource Board and the Department of Fisheries and Oceans in the late 1990s. Data collected during these studies also confirmed that at least a portion of the fish are anadromous (travel to the ocean to feed). The low number of char caught by downstream fisherman suggests that the population is small. Of the five populations, the Vittrekwa population is farthest from the ocean and fish travel the greatest distance and past the most fishermen to reach spawning and overwintering sites.

No Dolly Varden have been harvested in the Vittrekwa itself for many years. However, because individuals migrate to and from the ocean, they are harvested by downstream fishermen. The region's subsistence char fishery is a mixed stock fishery: char caught on the coast of the Beaufort Sea and in the Mackenzie Delta belong to several distinct populations (including the Vittrekwa). Although the rate of harvest of Vittrekwa Dolly Varden is unknown, overall the species seems to be in decline: in the Rat River – a monitored stock – the population has declined significantly over the last decade. Thus, the Vittrekwa River harbours a small population of anadromous (migratory) char that are likely harvested on their way to and from the ocean. Exploited, small populations are at risk of local extinction and are particularly worthy of close investigation, monitoring, and management.

This project aims to describe and study a population of Dolly Varden char in the Vittrekwa River. Using a variety of methods and techniques, my aim is to collect information on the life history, structure, size, diet, and current status of this population. I also aim to study the habitat requirements and habitat use of this population.

I am doing this project because the community of Fort McPherson (via its Renewable Resource Council) has requested that work on this population be done and has supported this particular project. This work will benefit fisheries managers, the local community, harvesters, and land use planners. The project will provide these

people/organizations with information they need to make decisions that will affect this important resource.

The work involved numerous individuals:

*Lead biologist:* Nathan Millar, M.Sc. in Ecology. Two years working experience with Dolly Varden, 6+ years working on field projects and scientific studies. I led all the field work and planned all of the contract work.

*Field workers:* Brian Dokum, Renewable Resource Technician for the Gwich'in Renewable Resource Board; Lisa Cardinal, Summer Student for the Gwich'in Renewable Resource Board; Jason Francis, Charmaine Wilson, Aaron Storr, Bradley Charlie, and Bobbi-Rose Koe, Youth for the Gwich'in Renewable Resource Board; Steven Tetlich, community worker for the Gwich'in Renewable Resource Board; Erin Hiebert, Fisheries Management Biologist with the Department of Fisheries and Oceans; Sarah Fosbery with the Department of Fisheries and Oceans; Aaron Schweitzer, Fisheries Technician with the Department of Fisheries and Oceans; Tara Schweitzer, Habitat Biologist Department of Fisheries and Oceans.

*Contractor for ageing fish:* Gary Carder, independent contractor

*Contractor for analysis of invertebrates:* Dr. Markus Eymann, On Stream Consulting



**Figure 1.** *Angling on Ne'edilee Creek (Steven Tetlich, Aaron Storr, and Brian Dokum)*

## **Methods**

In 2006 and 2007, we conducted field work on the Vittrekwa River. We established a camp during the field work on a tributary of the Vittrekwa (Ne'edilee Creek, south of Tsih Mountain -Tsih ddhàa' - Figure 2). Ne'edilee Creek contains the only known spawning grounds of Vittrekwa River char. In 2006, the work focused on finding and documenting the spawning grounds for this population. We used radio-telemetry to track fish movements over spawning and early winter. We collected genetic samples for use in a larger project on stock discrimination of Dolly Varden. We also mapped and measured

all of the suitable spawning habitat and mapped out all of the habitat used by juvenile fish in the spawning grounds.

In 2007, we focused on collecting habitat data. We mapped the fish habitat along Ne'edilee Creek. We marked out where we saw mature and immature char and where there were good holes for the char. We established ten long-term habitat monitoring sites. At each site we collected detailed information on river width, depth, flow, and substrate size and type. We investigated aquatic macro-invertebrates to examine the health of the river and to determine the quality and quantity of food for resident char and grayling. We took aerial photographs of the river to be able to monitor future changes in the river that might affect the char. We used a Nikon D2X camera with an attached GPS to take spatially referenced photographs of the spawning grounds and other sections of the river. This work was done in collaboration with DFO.

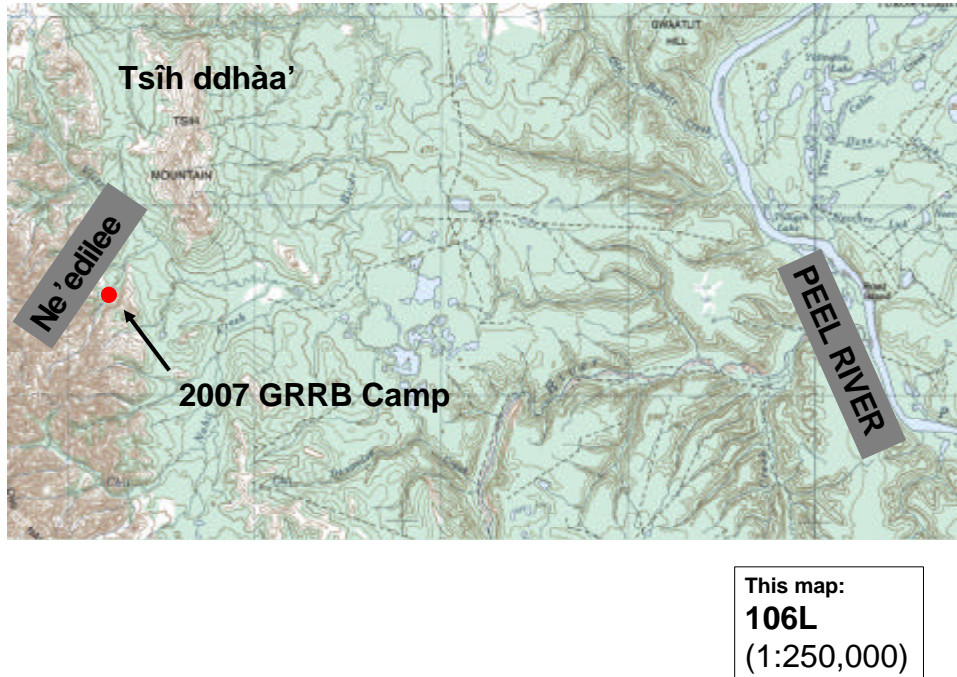
We made several day trips to nearby rivers to investigate the possibility of char spawning in locations other than their known spawning grounds. We visited eight locations in all. At each location we angled for fish and completed a visual examination for juvenile fish.

We returned to the Vittrekwa on September 20, 2007 for the day. We spend the day mapping out the spawning habitat of char and counting mature fish.

In both 2006 and 2007 we collected fish by angling, dip net and in a trap net. We sampled each fish for length and weight. From each fish we caught, we removed a small fin (the adipose fin) from the back of the fish for use in genetics studies. We applied floy tags to all char large enough to receive a tag without injury. We dead sampled a small number of fish (mature and immature) from which we collected otoliths (ear bones) and recorded information about sex and maturity. We will use the otoliths to determine the age of these fish and to determine migration patterns between marine and freshwater environments (based on strontium concentrations). We will also be looking at their stomach contents to determine the feeding habits.

### **Traditional Knowledge**

We relied heavily on the traditional knowledge of certain individuals who had been in the area before. In 2006, we used traditional knowledge to locate the fish hole on Vittrekwa River. William Teya, an elder from Fort McPherson came with us in the helicopter to show us where he had seen fish when he passed through the Vittrekwa by dog sled many years before. Prior to this, there was some documentation of the spawning grounds of this population that was collected during interviews with elders. The work on the Vittrekwa began when the Fort McPherson RRC requested that this work begin. Since then, they have received regular updates and we have hired community members and brought out youth to help with the project.



**Figure 2.** *Location of study area and camp.*

### **Community involvement**

The idea and push for the project came initially (in the mid 1990s) from the Fort McPherson Renewable Resource Council. A small project was begun, but few data were collected. In 2006, The Gwich'in Renewable Resource Board rekindled the idea and proposed to the Fort McPherson RRC to continue the work. The RRC has been regularly consulted about the project.

The GRRB (the main instrument of wildlife management in the Gwich'in Settlement Area) is the lead organization but we involve the Department of Fisheries and Oceans in this work: four staff from the DFO have been involved in the project, and we are collecting data and samples for use in other DFO projects.

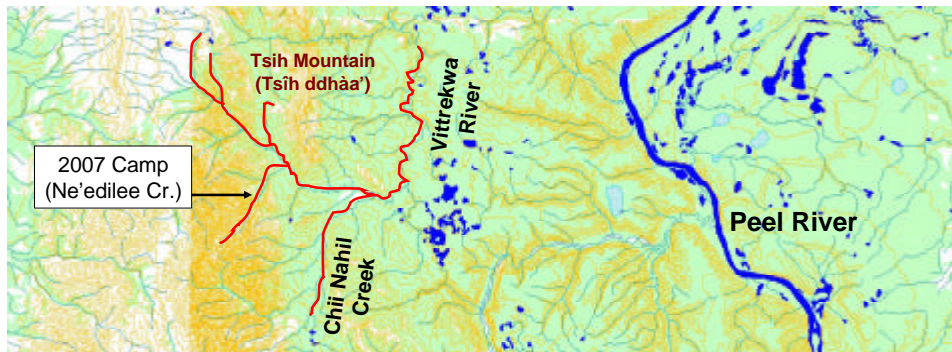
As mentioned before, we always hire community workers for this project. We have been fortunate to have the same worker in both years and this individual is now very well trained in fish sampling and habitat analysis.

### **Results**

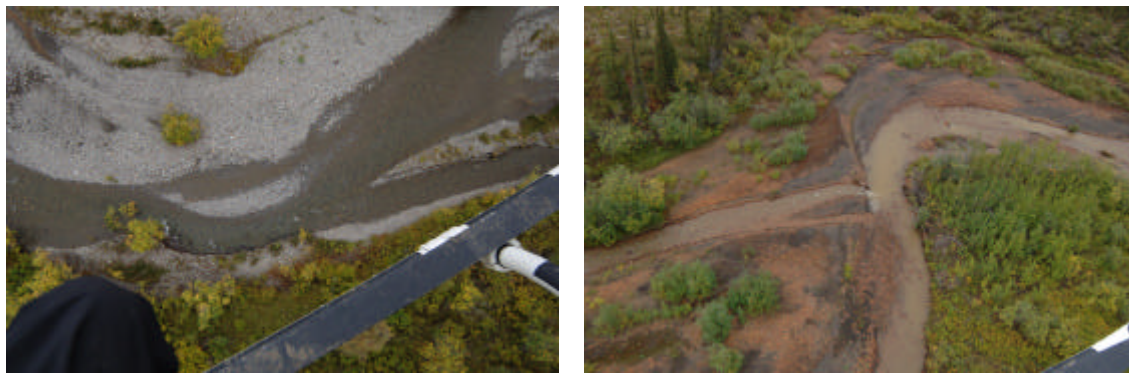
In all we caught over 200 fish, most of which were released unharmed (the others were kept for more in depths study). The analysis of the data that we collected will be forthcoming. We also collected a great deal of habitat data for mature and juvenile char.

#### *Aerial Photography*

We took photographs along Ne'edilee Creek, Chii Nahil Creek, and along the main Vittrekwa River (Figure 3). The photographs (Figure 4) offer a permanent record of the state of the river and will be stored by Fisheries and Oceans.



**Figure 3.** The red line indicates length of river photographed.



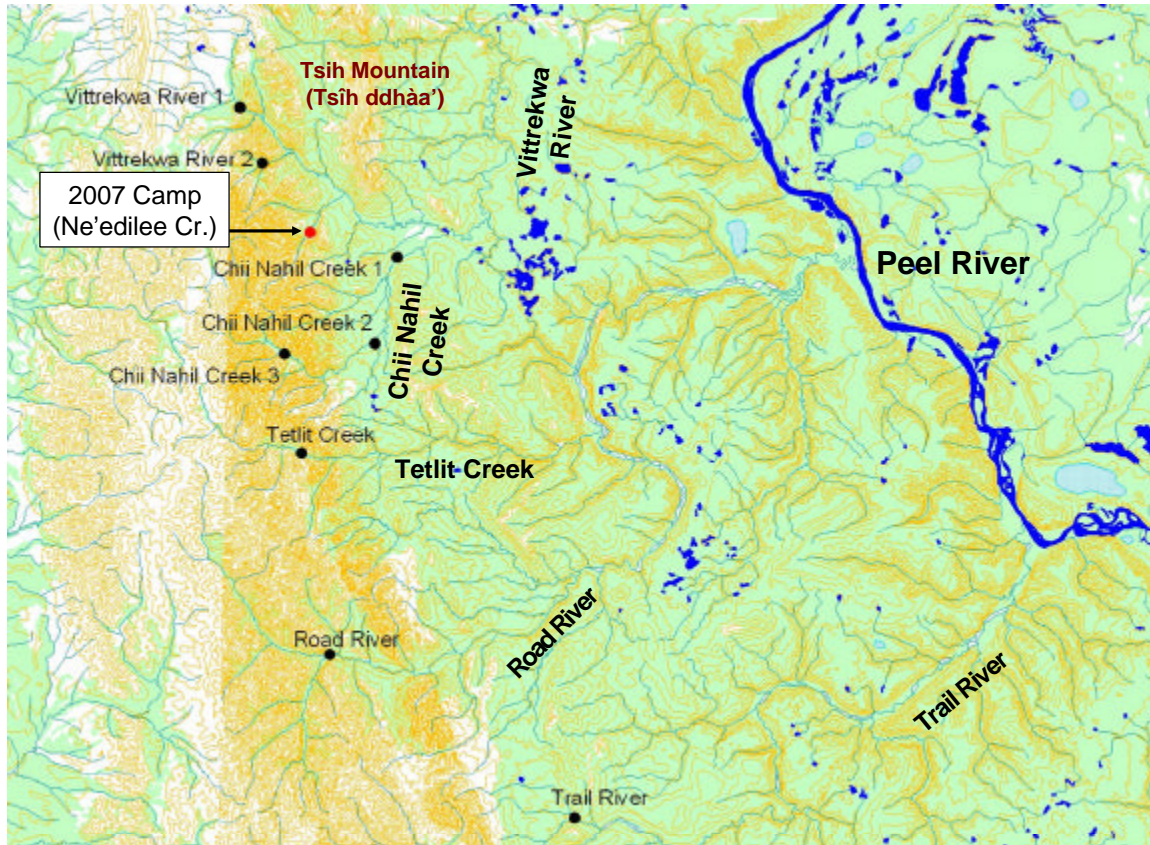
**Figure 4.** Example photographs taking during the aerial photographing.

*Mapping distribution of Dolly Varden in the Vittrekwa and neighbouring rivers*

We made several day trips to nearby rivers to look for other spawning populations of char (Table 1 and Figure 4). We spent time at the upper Vittrekwa River, Chii Nahil Creek, Road River, and Trail River, but never caught or saw any char (or grayling). This further confirms the uniqueness of the Vittrekwa population.

**Table 1.** Location of sites visited to look for signs of char

Sample Date	Location	Latitude	Longitude
August 20, 2007	Chii Nahil Creek (1)	N 66.83955°	W 135.71303°
	Chii Nahil Creek (2)	N 66.78231°	W 135.74855°
	Chii Nahil Creek (3)	N 66.77485°	W 135.90120°
	Tetlit Creek	N 66.70892°	W 135.86963°
August 22, 2007	Vittrekwa River (1)	N 66.93770°	W 135.98140°
	Vittrekwa River (2)	N 66.90076°	W 135.94331°
	Road River	N 66.57579°	W 135.81750°
	Trail River	N 66.46906°	W 135.40672°



**Figure 4.** Location of sites visited to look for signs of char

On September 20, 2007, we returned to the Vittrekwa for the day to document the extent of the spawning grounds. We saw many mature fish in spawning mode (congregated and paired up). However, we also confirmed that the population is small as we saw spawning fish in a very limited section of the creek. The sex ratio of the population appeared to be very male biased. This is in stark contrast to both the Rat and Big Fish rivers which have far more females than males.

Overall, our work was very successful and we collected a great deal of information that will be useful to make decisions about this special resource. The winter will be spent organizing the analysis of the data that we collected.

This project is both a **Monitoring and Research** and **Capacity Building and Training** project and concerns CIMP's **Fish Habitat, Population, and Harvest Value** Component. Throughout this project, training was provided to youth, community members, and GRRB staff. Training was wide ranging and included: performing habitat measurements, live sampling fish, dissecting fish and removing otoliths, etc.

This project provides the most complete documentation of the Vittrekwa River population to date. By sharing the results of our research with communities, we are expanding the knowledge base and awareness about this special resource.

Documenting all of our resources is the first step in being able to determine cumulative impacts.

**Discussion / Conclusions**

Full results and conclusions will be made available to CIMP and to all the communities and interested parties in a final report expected in the Spring of 2008. This report will be made available on the GRRB website ([www.grrb.nt.ca](http://www.grrb.nt.ca)) and copies will be distributed to community organizations (e.g., Fort McPherson Renewable Resource Board).

**Budget**

Table 1: Statement of Revenue and Expenditures

<b>REVENUE</b>		
Polar Continental Shelf Project (in kind - \$ equivalent)		51,625.00
Gwich'in Renewable Resource Board		4,700.00
NWT CIMP		4,200.00
<b>Total Revenue</b>		<b>\$60,525.00</b>
<b>EXPENDITURES</b>		
Project Activity	Total Project Cost	NWT CIMP Funding
Administration	630.00	630.00
Contracting (fish ageing, invertebrate identification)	3,570.00	3,570.00
Field Supplies, Equipment	2,750.00	0.00
Field Transportation	51,625.00	0.00
Field Assistants Wages	1,950.00	0.00
<b>Total Expenditures</b>		<b>\$4,200.00</b>
<b>SURPLUS (DEFICIT) OF NWT CIMP FUNDING</b>		<b>\$0.00</b>
<b>AMOUNT PAYABLE TO INAC</b>		<b>\$0.00</b>

**Appendix:**

As noted above, a final report will be provided to NWT CIMP upon completion in Spring 2008.