**CHAMPAGNE and AISHIHIK First Nations**

# 2004 Little Klukshu Creek Salmon Habitat Restoration Project

## Final Report

# 2004 Little Klukshu Creek Salmon Habitat Restoration Project

**Date started**: June 2, 2004

**Date completed**: October 8, 2004

**Project Location**

**Where the project took place:** Little Klukshu Creek

**Name of Local Water shed**: Tatshenshini – Alsek River Watershed

**Major Drainage:** Klukshu River & Tatshenshini River

**Nearest Community**: Klukshu Village and Haines Junction, Yukon

**Geographic Information to locate the project**: Boundary Ranges (Coast Mountains), adjacent to Kluane National Park.

Latitude: $60^0$ 20’ Longitude: $136^0$ 55’

**UTM Coordinates:**

Grid Zone 8V Easting: 392000m Northing: 6692000m

**Proponent Information**

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**List of Partners**

- **Peter Etherton –** Fisheries & Oceans, Canada, Senior Fisheries Technician.
- **David Petkovich –** DNA Enterprises, Fish Biologist, helped in the Klukshu Sockeye Transplant and guidance throughout the project.
- Pacific Salmon Commission, Northern and Transboundary Rivers Fund

**Project Information**

**Project rationale**

CAFN Community Salmon Management Plan was developed to address interests and concerns that have been raised from the community. One of those interests was to determine if it was possible to re-establish sockeye into the Little Klukshu system. Traditional knowledge indicates that this small system was an important spawning area for sockeye and that people used to set up a seasonal fish camp to catch and prepare fish for food. Since 1995 CAFN has been working on removing beavers out of the system and in 2002 we did an initial transplant of both eggs and adult sockeye. With the proposed work we will learn if the Little Klukshu system can contribute to the production of more Klukshu sockeye and if the trials are successful CAFN people can experience seeing sockeye again where they have not been for as long as many can remember.

**Project Objectives:**

1. Re-establish salmon populations in the Little Klukshu Creek and Lake system by providing access to spawning grounds:

    - Identify, map and remove beaver dams and beavers on the Little Klukshu Creek in accordance with Department of Fisheries and Oceans' "Guidelines for the Management of Beavers in Fish Bearing Streams in the Yukon".

2. Habitat mapping and assessment of Little Klukshu Creek to determine where potential spawning areas are located and the extent of potential spawning habitat available.

3. Monitor the Little Klukshu to determine what salmonid species are using the area and the extent of that use.

    - Monitor adult sockeye after transplant is completed and seine for juveniles in the spring.

4. Determine the beast means to re-establish sockeye populations in the Little Klukshu area

    - Capture and hold sockeye salmon in net pens in Klukshu Lake. Transport and release up to one hundred individuals into the upper Klukshu Creek system.

**Project Preparation:**

There was a historic seasonal use fishing village located by Little Klukshu Lake. Traditionally it was called "Where the red fish spawn". All of the elders that have spoken assumed sockeye would have been targeted, but we are not sure of the time scale when this fishing camp was used last.

In 1995, Fisheries and Oceans did an aerial survey of the area and found that there are abundant ground water discharges, a visible channel and extensive beaver activity. That was confirmed on the ground when CAFN conducted an initial habitat survey of the Little Klukshu Creek. We found that in areas near dams the substrate was poor and that the substrate improved farther away from dams. We did not find any evidence of recent spawning activity, but did determine that Dolly Varden were in the system.

From 1999 to 2001, CAFN conducted extensive beaver dam and beaver removals in an attempt to keep the system open. Basic water chemistry and temperature profiles were collected, habitat and substrate information was mapped.

Additional minnow trapping was done to confirm what fish species were in the system.

In 2002, CAFN conducted the first adult sockeye transplant and egg take. Both the adults and eggs were placed in predetermined locations in the Little Klukshu system (Fig. 2). Since then yearly adult transplants have been done.

A feasibility study/pre-assessment had been done, but in an informal sense. Discussions with Fisheries and Oceans staff indicate that sockeye salmon can be captured and held, and that artificial propagation's has succeed with other transboundary river sockeye stocks (Tahltan and Tatsemenie lake stocks). Methods of capture and holding strategies varied between the lakes as did problems with disease outbreaks and diseases profiles.

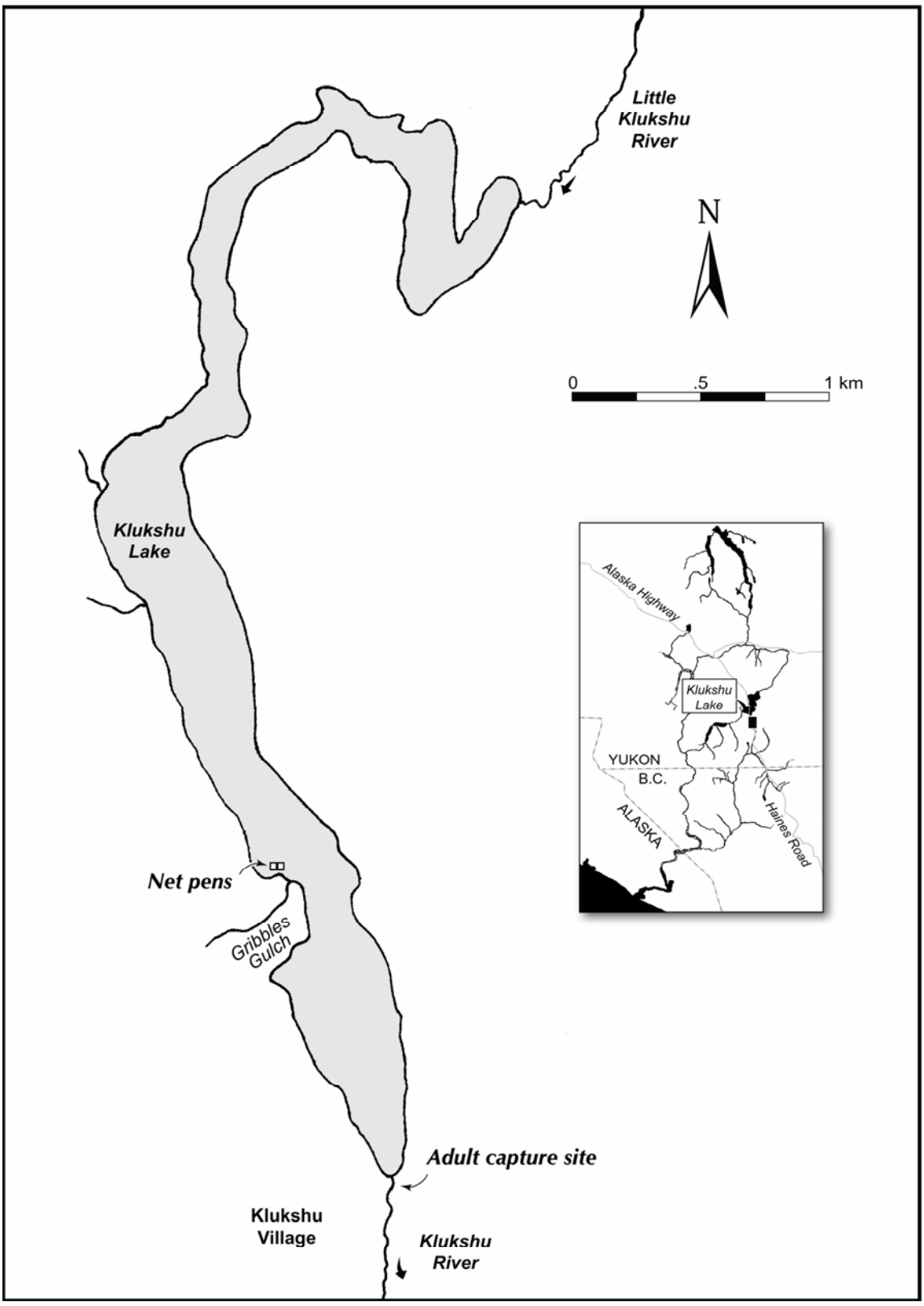


**Figure 1. Capture and net pen locations.**

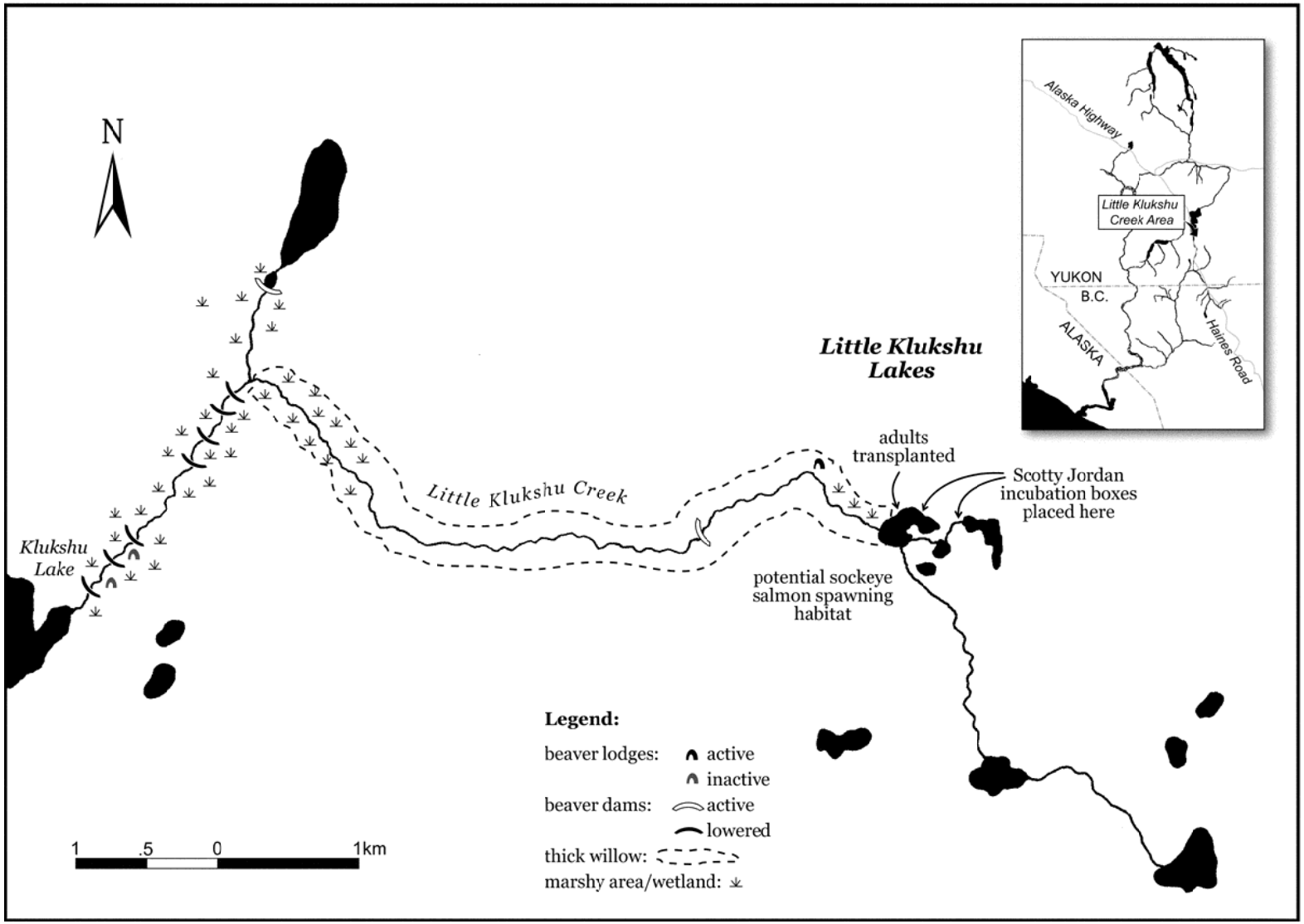


Figure 2. Beaver activity, adult sockeye and egg transplant locations on the Little Klukshu Creek.

**Project Summary**

**Beaver and Beaver Dam Removal**

Little Klukshu Creek is one of the two main tributaries of Klukshu Lake (Fig. 2), a major spawning and rearing habitat. Beaver activity on the creek has resulted in limited access to upstream spawning grounds for migrating salmon. The removal of these obstacles will further help to regenerate the salmon runs into the Little Klukshu Lakes.

In past years the start time has varied from August to October and depending of the amount of beaver activity there has been some year when only sections of the creek can be cleared. The crew during this current field season focused their attention on the entire Little Klukshu Creek system from Klukshu Lake to Little Klukshu Lakes. They started on September 13, 2004 and continue for 7 days. We have noticed that very few dams in new locations are created, but rather new dams are built in the same locations. A total of 3 beaver dams were breached and 1 beaver was trapped.

**Beaver dam downstream of Little Klukshu Lake**

**Monitoring: Out migration Survey**

The monitoring program has two main components to it. One is too conduct an out migration survey of fry leaving the Little Klukshu system and the other is too monitor the transplanted adults and try to verify spawning locations.

The out migration survey was done on June 2nd and 3rd, 2004. This survey was critical to us because the first adult transplant and egg take occurred in 2002 with the eggs hatching in the spring of 2004. If there are surviving fry and they remain

in the system for a year we would capture fry leaving the system in the spring of 2004.

All fry were capture using a simplified version of a fyke trap placed in the creek downstream of Little Klukshu Lake. This location was chosen because we felt we were sampling later than we should have been and we did not want to miss any out migration activity.

The fyke trap dimensions were 46cm x 30cm with a mesh net attached to a pvc pipe approximately 140cm long. This pipe was connected to a 25l capacity capture container. The trap was set in a narrowing of the creek and small mesh wings were set up to help divert any fish coming down stream into the trap.

**Fyke Trap**

We had a total of 3 sets with the set times being 4.5, 5.0, and 10 hours each. A total of 85 individuals (Table 1) were captured with 8 mortalities. All of the mortalities occurred in the overnight set.

| Set # and Time | Species | Total Captured |
|---|---|---|
| **Set 1** | Rainbow Trout | 1 |
| 12:00-16:30 (4.5 hrs) | | |
| | Dolly Varden Char | 2 |
| **Set 2** | Rainbow Trout | 2 |
| 17:00-22:00 (5 hrs) | | |
| | Dolly Varden Char | 2 |
| | Rainbow Trout | 17 |

| | | |
|---|---|---|
| **Set 3** | | |
| 22:30-08:30 (10 hrs) | | |
| | Dolly Varden Char | 45 |
| | Sockeye | 8 |
| | Coho | 7 |
| | Unidentified | 1 |
| **TOTAL** | | **85** |

Table 1. Total Fish Captured by species

Each individual was measured and released (Table 2) and the identification of the sockeye and coho was determined in the field and confirmed Fisheries and Oceans. The objective was to re-establish sockeye in the system and we were able to determine the presence/absence of any sockeye in the system. We were expecting the coho to find their way into the upper reaches of the Little Klukshu system if we kept the channel free of beaver dams. What this means for sockeye re-establishment is unknown.

| Species | Total captured | Average fork length (mm) | Smallest/largest (mm) |
|---|---|---|---|
| Rainbow Trout (RT) | 20 | 104 | 78/165 |
| Dolly Varden Char (DV) | 49 | 98 | 45/240 |
| Sockeye (SK) | 8 | 79 | 75/105 |
| Coho (CO) | 7 | 113 | 95/125 |
| Unidentified | 1 | 75 | 75 |

Table 2. Total captured and average fork lengths.

We have determined that we had some survival, but we do not know if these fry came from the adult transplant or the egg take. We only did an egg take once so we should only have fry out migrants for one year if there was no successful spawning or egg survival from the adult transplants. We will have to continue to monitor for out migrants in the spring to determine if we will have more sockeye fry leaving the system.

The water temperature at the Fyke trap site was 10.5°C. The creek width is 3.0 meters and the average depth is 0.017 meters. The discharge was estimated to be 0.035 $m^3/s$.

**Monitoring: Adult Spawners**

As a follow up to the adult transplant into Little Klukshu Lake a visual survey was conducted to look for evidence of spawning and/or presence of the adults in

the lake. The lake was surveyed on October 8, 2004, 18 days after the adults were released in the lake.
The survey was conducted on foot and by boat. The entire shoreline of the lake was surveyed by foot including about 500 meters downstream of the lake outlet. The lake was surveyed by boat and in deeper sections of the lake an underwater camera connected to a lap-top computer was used to search for evidence of spawning or adults. The camera was limited to a depth of 8 meters whereas the deepest part of the lake is 12 meters. Therefore we did not have completed coverage. No adult sockeye were seen, nor did we see any evidence of spawning during the survey.

This form of monitoring can be limiting, and we would like to apply radio tags to several of the transplanted adults to verify where they are spawning. Little Klukshu Lake is not very large and a scuba survey to look at the bottom substrate for evidence of spawning in the deeper sections of the lake would be beneficial.


**Ground survey for spawning adults with underwater camera.**

**Capture, holding and transplant of adult sockeye.**

All adult sockeye were captured right in Klukshu village using a traditional fish trap and seine net. The trap was left open and fish were held in the trap until they were moved to the net pens located at Gribbles Gulch. To reduce stress on the adult sockeye in the traps, we periodically closed the trap to avoid too many fish being in the trap at any given time. We captured 93 adults on September 16th and the remaining 7 on September 17, 2004. A total of 101 adults (51 males, 50 females) were captured and moved to the net pens. No tags were recovered.

**Traditional fish trap at the outlet of Klukshu Lake used to capture adult sockeye**

The two net pens were installed on September 10, 2004. Each net measures 20′ x 20′ x 20′ and are set up with floats and held in place with weights. The adult sockeye were moved by boat from the trap site to the net pens (Fig 1) and released. Only 10 adults were moved at a time with 5 in each fish tub. Each pen contained 50 and 51 mixed sex adult sockeye. They were checked daily and held until September 20, 2004.

**Net-pens used to hold adult sockeye salmon in Klukshu Lake**

On September 20, 2004, a total of 97 sockeye (49 males and 48 females) were flown by helicopter in a monsoon bucket into the Little Klukshu Lake for release. We lost 4 adults while in the pen. Every year we have a small number of adults that either escape or are predated on. A total of 10 trips with a maximum of 10 adults per trip was completed. Oxygen was provided to the fish during the flight into Little Klukshu.

**Monsoon bucket with adult Sockeye**

**Conclusion and recommendations**

The project was completed without too many unforeseen challenges. Knowledge of spawning activity and locations are still unknown, but we do know that we have sockeye and coho fry in the Little Klukshu system. Our intended objectives for this year were met and the project was completed on schedule. Continued monitoring for spawners and out migrants will enable us to determine how successful the adult transplants are. We are recommending that;

- Transplants continue for one more cycle.
- Radio tags are put on a small percentage of the adult spawners for ease of relocating them after they have been released.
- Continue to survey out migrants each spring
- Continue breaching Beaver dams that are impeding fish movement.