



**TAHLTAN  
FISHERIES**

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## **Tuya sockeye smolt survey - 2014**



**-Final Report -**

**December 3<sup>rd</sup>, 2014**

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For: Northern Fund of the Pacific Salmon Commission

## **ACKNOWLEDGEMENTS**

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This project was funded through the Northern Fund of the Pacific Salmon Commission and implemented by Tahltan Fisheries.

The following groups or individuals should be recognized for their assistance with this project: John Nole (Tahltan Fisheries - Field Technician); Cheri Frocklage (Tahltan Fisheries-Manager); Angus Mackay (PSC-NF); Victor Keong (PSC-NF); and Pacific Western Helicopters (Dease Lake).

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## INTRODUCTION

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In 1992, Transboundary salmon enhancement activities linked to the Pacific Salmon Treaty lead to sockeye salmon first being transplanted into Tuya Lake. Since 1989, associated egg takes have been conducted at Tahltan Lake with the eggs being incubated at Snettisham hatchery in Alaska. Enhanced fry have then been planted into Tuya Lake and/or back into Tahltan Lake. During the hatchery incubation period the fry are thermally marked allowing for subsequent identification through otolith extraction and reading. Tuya Lake is generally considered to have a high rearing capacity (based upon smolt size and previous limnology samples.)

Similar to previous years, the main objective of this project was to capture approximately 200 smolts for subsequent biological sampling. Given the small sample size, detailed interpretation of results would be limited. The project is only a reconnaissance level initiative where samples are obtained over a short period. However, the reduced cost and project duration does allow for the potential collection of useful indicator information, and serves as some means of monitoring.

Tuya Lake is located in the northwest portion of British Columbia at the headwaters of the Tuya River, approximately 72 km northwest of Dease Lake. (See Figure 1.) The lake is approximately 13 km long and 3 km wide at a relatively high elevation of 1,117 m above sea level. Tuya Lake drains into the Tuya River which contains areas of high velocity flows and vertical drops which restrict upstream fish migration, particularly in the lower reaches. The lake is not known to be historically endemic to sockeye salmon. However, there is evidence that since the Tuya enhancement program began, a population of kokanee has been created which is self-sustaining to some degree. This area is quite isolated having no existing roads, with the main land use probably being hunting and guide/outfitting.

## METHODS

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Over the past several years the sampling target for this project has not been achieved. This has largely been attributed to changes in water condition (i.e. higher flows and greater depth that created an inability to set the fyke net appropriately). In light of such, several changes to the approach were implemented in 2014. This included the following aspects: the sampling site was moved up to the actual outlet of the lake. (The previous site was 2km downstream, see Figure 2.); and a small inflatable kayak was utilized to safely cross the river and allow installation of an additional anchor point on the opposite bank. Project timing remained similar to previous years (as discussed by the Enhancement Sub-Committee).

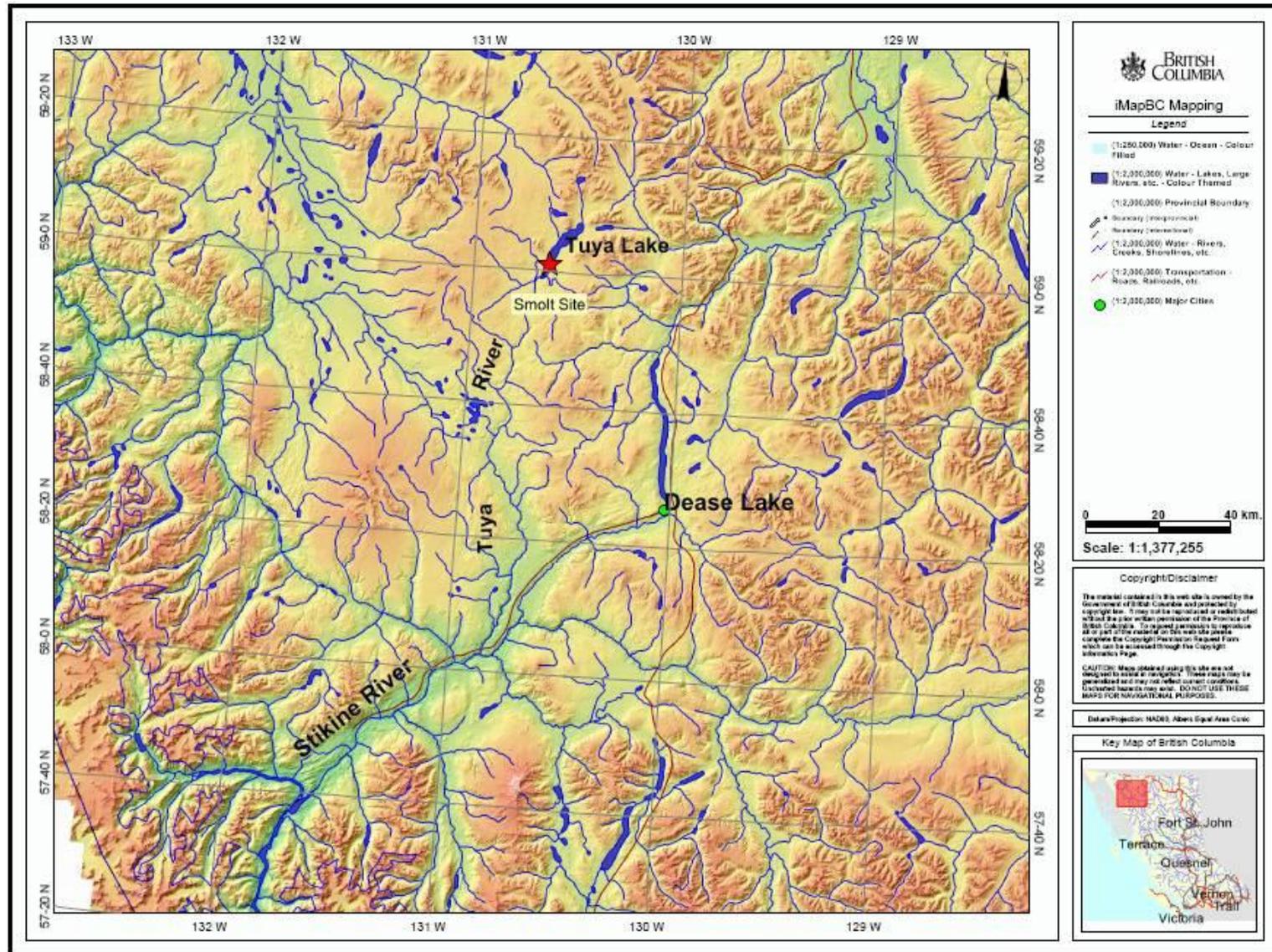


Figure 1: General location of project site

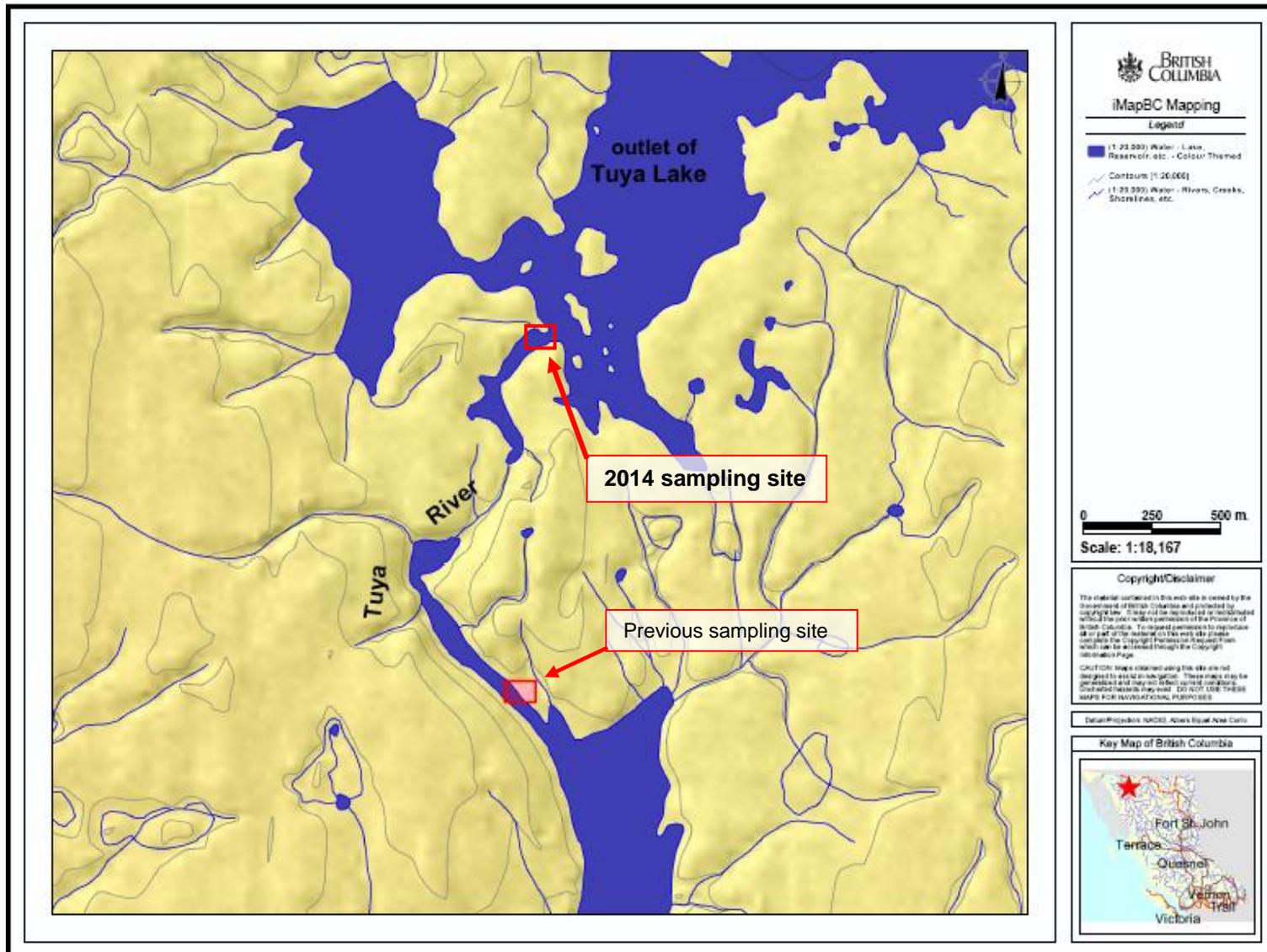


Figure 2: Specific location of smolt sampling site

A Tahltan Fisheries Biologist and Technician flew to the sight by rotor wing on May 26<sup>th</sup>, 2014 and remained there until May 28<sup>th</sup>, 2014. A temporary camp was established at the new sampling site located just below the Tuya Lake outlet (UTM coordinates <sup>09</sup> 405956E / 6544284N).

Fish capture was attempted by using a smolt / fyke net approximately 4 m across at its upstream opening. The associated trap consisted of a plywood box with plumbing joint intake and wire mesh outlet. The net was anchored in-river using re-bar and support lines were then attached from both shores. The net was set and fishing by 22:15 hrs on May 26<sup>th</sup>. It was checked at 1:45 hrs on May 27<sup>th</sup> and then pulled out at 10:30 hrs. The net was re-set by 22:45 hrs on May 27<sup>th</sup> and pulled at 7:00 hrs on May 28<sup>th</sup>.

Sockeye smolts were to be sampled for: fork length (nearest mm); weight (nearest 0.1 g using a digital scale); age (scales); and otoliths. Smolt heads would be preserved in ethanol and sent to the DFO-Whitehorse Lab for otolith extraction and analysis.



**Photo 1: Project site looking towards lake**



**Photo 2: Use of kayak to cross the river**



**Photo 3: Fyke net and trap**



**Photo 4: Ice flows at site**

## **RESULTS**

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Unfortunately, no sockeye smolts were captured and therefore no samples obtained. The first deployment of the fyke net (although somewhat challenging to perform) was considered to be a good set. It was close to the centre of the river, with the wing of the net pulled towards the opposite (right) bank in deeper water. Despite a lot of tension on the ropes, and some substantial ice flows, the net fished throughout the night but did not reveal any catch.

The second night, the fyke was re-deployed with the net and trap closer to the opposite (right) bank and the wing reversed and pulled toward the left bank. This was also considered to be a good set. Unfortunately, by early the next morning the net had broken loose, likely due to ice flows. The wing and net were recovered, however the trap was lost, despite having a separate safety line attached. Since the trap could not be found, whether this set captured fish is unknown.

## DISCUSSION

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Previously this was considered to be an ongoing NF project. However, at this point it is not planned or proposed to be conducted in 2015 or beyond. In this regard the NF Committee did not request a detailed application submission for 2015. Cancellation of the project largely relates to the current Canadian position that no more sockeye fry will be planted into Tuya Lake in 2015, or the foreseeable future. This position is intrinsically linked to long-standing concerns from the Tahltan First Nation which include: a deficiency of adult migratory access to the lake due to natural barriers; straying of blocked Tuya sockeye to other locations; and the current inability to sufficiently harvest terminal Tuya sockeye.

Although there is a lack of quantitative data regarding changes to the river in recent years, by observation alone it is clear that river flows and depths have increased, making effective deployment of a fyke net more difficult. Smolt run timing and/or abundance could have influenced the project to some degree. Although the field work was conducted during the average project timing, such is not based upon known smolt timing or variable weather conditions. Also, from the 2012 brood year there were 0.755 million fry were planted into Tuya Lake. This is below the 10 year average of 1.781 million planted fry.

If for some reason the project was reinitiated in the future, some recommendations or considerations regarding methods may include:

- The new upper sample site could be utilized again, however measures to deal with ice flows should be considered. The previous lower site may be less influenced by ice flows (once they break up somewhat), however it has a higher river velocity to contend with.
- A second wing for the fyke net may provide more coverage. As well, this may facilitate anchoring from both banks and essentially floating the fyke net. This would allow setting the net in deeper water were the use of rebar is not feasible.
- Given the extreme tension on the net and anchor lines, the use of cable (as opposed to rope) may be a more stable means of securing the net.

## **Project performance review:**

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Below is a list of the measures for project success from the original proposal. After each is a brief review of post-project performance.

1. Achievement of sampling targets: The sampling target was not achieved in 2014, in fact no samples were obtained. This is despite several changes to the approach and methods to try and deal with challenging water conditions.
2. Effective reporting of results: The methods and outcomes from the project have been reported in this document. As well, the results were related to the TBR Enhancement Sub-Committee meeting in November of 2014.
3. Not exceeding the original budget: The overall project costs came in within budget. (Please refer to the associated financial report for more details.)