



Taku River Tlingit
Fisheries



King Salmon Lake

Sockeye enhancement project - 2012



- Final Report -

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INTRODUCTION

King Salmon Lake is located approximately 100km SSE from the community of Atlin, BC. (See the map in Figure 1 below.) The lake is situated at the headwaters of King Salmon Creek which flows into the main-stem Taku River. This remote location is only accessible by float plane or helicopter. It supports a lake spawning / rearing sockeye salmon stock, the adults of which have been enumerated by TRT Fisheries since 2004.

An interest in diversifying or expanding the existing Taku enhancement program was reflected in the updated 2009 Transboundary PST arrangements. The impetus for this sockeye enhancement project also came from previous recommendations from the following projects or processes: the Taku sockeye enhancement feasibility study (2008-10), the Transboundary Panel Strategic Salmon Plan (2009), and the Taku Enhancement Production Plan (2009-2012). Due to the nature of this project and the existing Transboundary enhancement arrangements, the project involved partnerships between Canada and US agencies. As such the project was planned in a cooperative manner and with ongoing collaboration.

The main goal of the project was to conduct a relatively small sockeye egg-take ($\leq 250,000$ eggs) in the fall season of 2012, followed by hatchery incubation and subsequent fry outplants back into the lake. The project would take a precautionary approach and be utilized within the short-term to restore sockeye production to higher levels (i.e. to improve natural production in the longer-term). In this regard, it would also take advantage of the currently apparent, underutilized rearing capacity of the lake.

The immediate objectives for this project included:

- The collection and delivery of $\leq 250K$ fertilized sockeye salmon eggs to the Snettisham Hatchery in Alaska.
- The application of methodologies and protocols that have been used at other Transboundary sockeye enhancement sites.

Other longer-term objectives for the project included:

- Effective reporting and communication of project results to Transboundary representatives.
- Increasing egg-to-fry survival and utilizing the rearing capacity of the lake to improve stock productivity.
- The monitoring of results in terms of identified risks and enhanced sockeye productivity.

(Further background and information regarding the project can be found in the submitted document: *King Salmon Lake sockeye enhancement – 2012 - Background, Project and Risk Assessment Outline, May 7, 2012.*)

Figure 1: General location of project



METHODS

On-site field work was conducted from September 9th to 16th, 2012. Transboundary project staff with previous egg-take experience provided guidance and assistance in order to ensure consistency in protocol and methods.

The capture of broodstock was accomplished by using a seine net near shore within the primary spawning areas. Fish were graded and sorted by ripeness and then transferred into a short-term holding pen anchored offshore.

Egg stripping of ripe females involved bleeding out, individual racking, washing with ovadine solution and drying. The fertilization from dispatched males also involved individual disinfection and drying. Milt from a second male was added to ensure fertilization. Subsequently, IHNV free water was added for activation prior to decanting excess water, surface disinfecting the eggs, and the process of water hardening.

The eggs were prepared for transport by draining and pooling the eggs of multiple females into large plastic bags with water added for suspension. The bags were then sealed and placed in transport coolers on a solution of crushed ice and ovadine. Sampling for fish pathology included IHN and BKD samples being collected from the broodstock. The fertilized eggs (and pathology samples) were transported by air to the Port Snettisham Hatchery (in Alaska) on September 15th.



Photo 1: Broodstock seining site



Photo 2: Broodstock transport

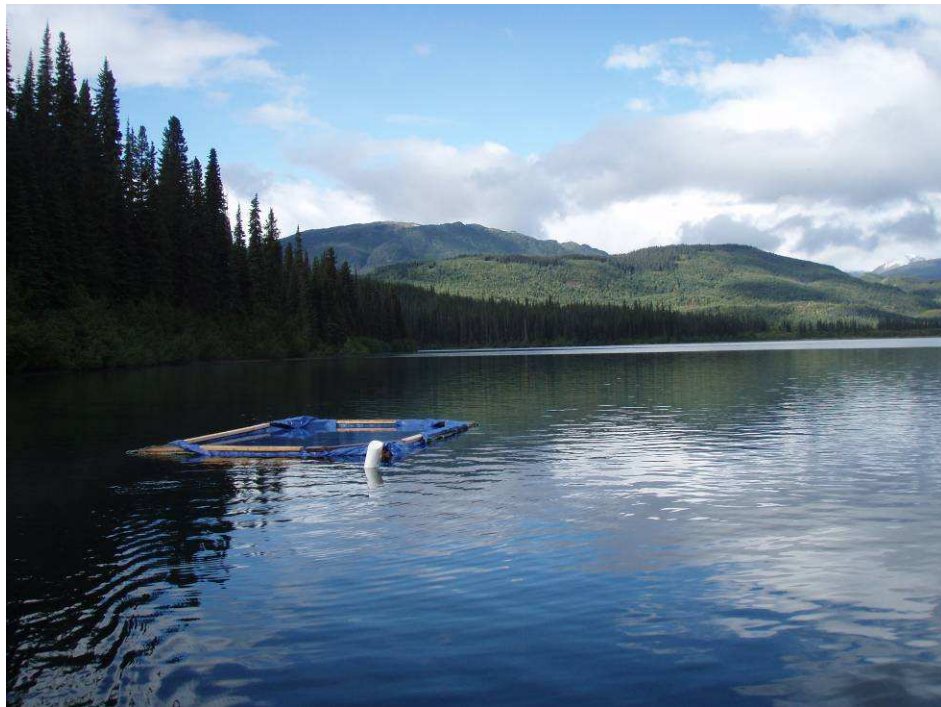


Photo 3: Holding pen



Photo 4: Egg-take site during operation

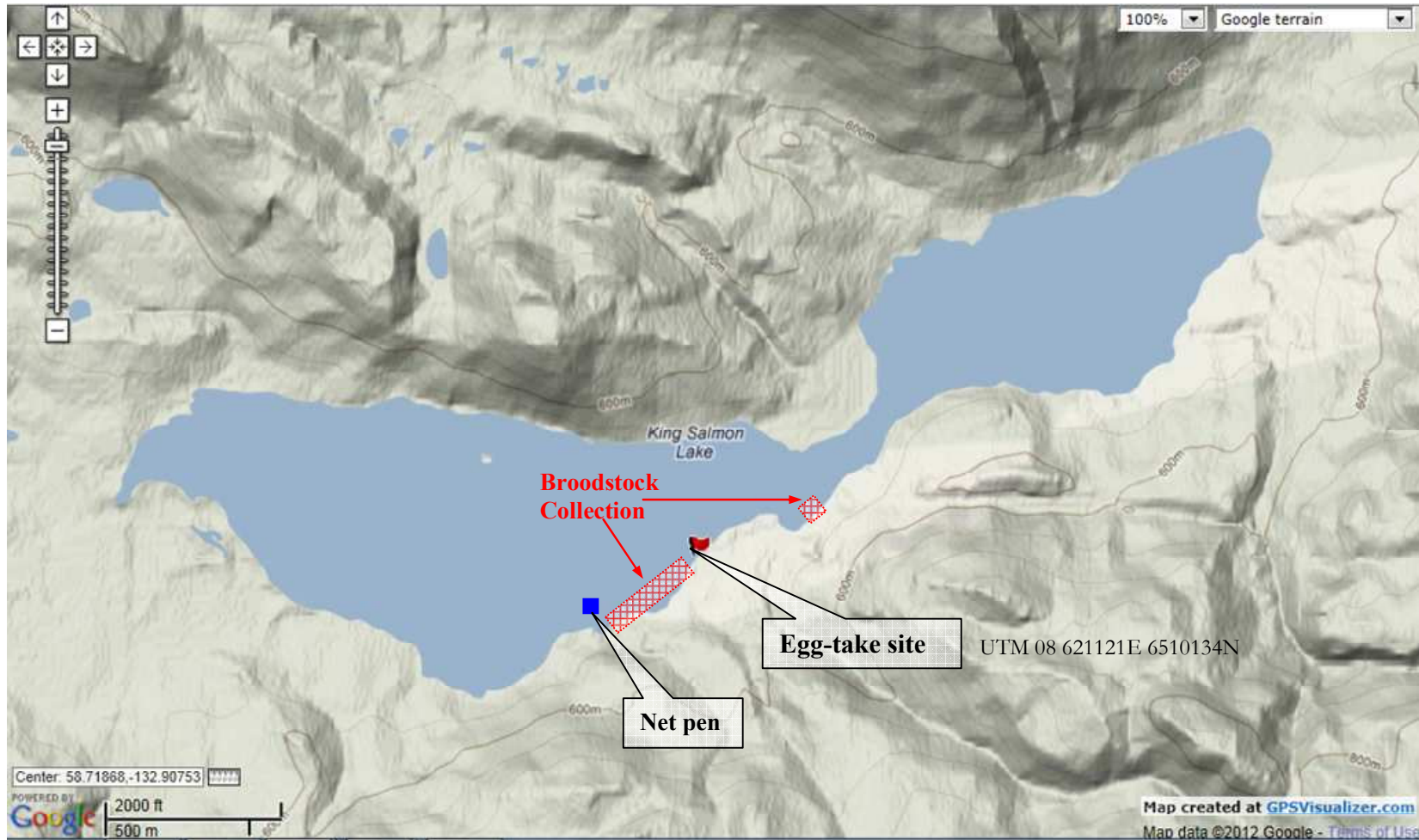
RESULTS

The specific timing of field activities are outlined by date in Table 1 below. Specific locations of the project site are depicted in Figure 2. (GPS UTM coordinates for the egg-take site are: 08 621121E 6510134N.)

Table 1: Specific field activities by date

Date	Main activity or task
Sept. 9	Biologist into site / Camp & gear preparations
Sept. 10	Transport & organization of supplies / Assisting Biologist arrived
Sept. 11	Construction of tables & racks / Establish egg-take site
Sept. 12	Construction and placement of holding pen
Sept. 13	Broodstock collection / Technicians arrived
Sept. 14	Finish broodstock collection / and egg-take site preparations
Sept. 15	Conduct egg-take and associated sampling
Sept. 16	Clean-up and demobilization of crew

Figure 2: Project site specific locations



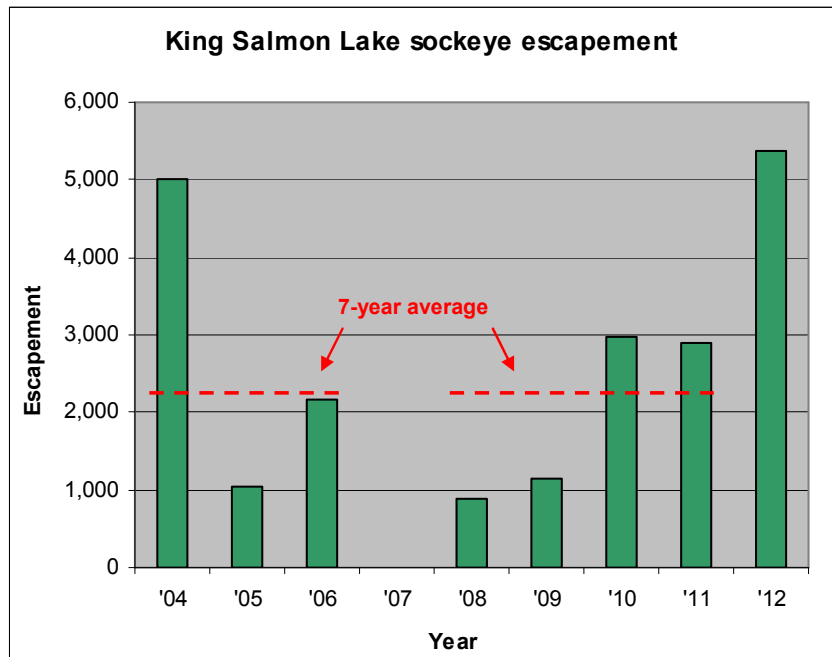
A total of 82 females and 85 males were collected for broodstock. This was accomplished in 10 seine net sets. Very few green fish were observed, and those collected were ripe and considered to be in good condition for an egg-take. Fish were only held in the net-pen for 1-2 nights and no mortalities were realized.

The egg-take was completed in one day (Sept. 15) with the eggs being delivered to the hatchery the same afternoon. Seventy-eight females and the same number males were utilized as broodstock. (This was based upon the anticipated fecundity of approximately 3,200.) Based upon the subsequent egg-pick at the hatchery, the actual fecundity is estimated at 2,976 for a total of 232,128 eggs delivered. The average eyed egg survival was 89.6%.

There were 18 IHN and 51 BKD samples collected for pathology, which was lower than the prescribed number of 75 for each. The pathology sampling targets were not achieved due to a combination of: not having a full sampling kit; and the plane for egg transport showing up earlier than planned. (To note: arrangements were made for the delivery of a full sampling kit, however, the plane flew over the site and did not land, apparently due to fuel considerations.) Results from the IHN and BKD sample analysis are still pending. Fry from the 2012 egg-take are expected to be planted back to King Salmon Lake this spring (i.e. in late May or early June of 2013).

The estimated adult sockeye escapement in 2012 is 5,365. This is the highest recorded and is well above the 7 year average of 2,305. (See Figure 3 below.) This high escapement size was not anticipated due to the low brood years, particularly 2007.

Figure 3: Adult sockeye escapements (2004-2012)



DISCUSSION

Overall, the project went very well and is currently deemed to be successful. Predetermined performance measures for this project included: the egg-take target (of $\leq 250,000$; broodstock availability; mortality levels; and the successful use of field protocols. The delivery of approximately 232,000 eggs to the hatchery was quite close to the original goal. Fortunately, broodstock availability was not a concern given the relatively high escapement and no mortalities were observed during the course of conducting the project. With the assistance of experienced staff, egg-take method protocols were followed with diligence and consistency.

The Enhancement Sub-Committee discussed the 2012 project results during meetings held November 27-28, 2012. General consensus from the group was to submit an ongoing proposal to the Northern Fund for the implementation of a second egg-take in 2013. The rationale for such was based upon: successful completion of the 2012 egg-take; allowing for a longer period over which to evaluate progress; and limited monitoring needs required in 2013.

Subsequent performance of the project will also be gauged by monitoring results in terms of enhanced productivity. Monitoring needs after the project are expected to include sockeye smolt assessments in 2014 and 2015 to determine: average lengths/weights; thermal mark (enhanced) ratios and perhaps some indications of relative abundance and egg-to-smolt survivals.

The biological risks of this project are generally considered to be low. This can be mainly attributed to the relatively small size of the egg-take, the short-term of the project and precautions taken during implementation. That being said, a risk assessment outline was prepared for the 2012 project and was submitted to the Northern Fund, fisheries agency representatives and in concurrence with the permitting applications.