

**MCINTYRE CREEK
SALMON INCUBATION PROJECT
2014-2016 and Project Extension**

**YUKON RIVER SALMON RESTORATION AND ENHANCEMENT
FUND
Project # CRE-65-14**

May 2016 Final Report

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Abstract

The McIntyre Creek Salmon Incubation Project has been managed by Yukon College since August of 2013. Yukon College Renewable Resources Management students, Fisheries and Oceans, Whitehorse, Ta'an Kwa'chan First Nation, Whitehorse Rapids Fish Hatchery, and various contractors worked together to carry out the educational and salmon culture objectives of MCSIP. Yukon College students were involved in assisting a professional coded wire tagger in 2014 when 17,655 Chinook fry were tagged and 17,604 juveniles were released into Fox Creek system on July 13th. In 2015 Yukon College students took over the coded wire tagging process and 23,477 juvenile Chinook were tagged and released into Fox Creek by Ta'an Kwach'an First Nation on July 12.

Introduction

McIntyre Creek Salmon Incubation Project (MCSIP) is a groundwater-sourced salmonid incubation and rearing facility located on an unnamed side channel of McIntyre Creek adjacent to Mountainview Drive within the City of Whitehorse. Since the early 1990s annual cohorts of chinook and sometimes chum salmon have been incubated, reared and tagged at the facility in preparation for release into the wild. These fish have been used primarily to bolster stocks in areas where overharvest has been problematic.

Yukon College took over management of MCSIP in August of 2013. Since that time the facility has undergone major renovations and upgrades primarily utilizing funding from Yukon Territorial Government's Community Development Fund. The long term goal of these efforts is to allow the facility to function at or near capacity – estimated at 200,000 fish per year. In 2013 and 2014 Chinook salmon eggs were received from Whitehorse Rapids Fish Hatchery at the eyed stage (mid- October). The source broodstock for these eggs were captured as they passed through the fish ladder at the Whitehorse Rapids Power Dam. All of the juveniles released in 2014 and 2015 were for the Ta'an Kwach'an First Nations Chinook salmon stock restoration project in Fox Creek. The stream is located 50 kilometers north of Whitehorse and the release took place on the second Sunday in July.

Yukon College utilizes MCSIP primarily as a teaching resource. YC has continued to work with students both in the classroom and at the site over the past 2 academic years. There are opportunities for students to hold paid part-time positions at the facility where they can gain experience in the day-to-day operation of a fish hatchery. Once a student has completed at least one year of working at MCSIP they are eligible for the student manager position. The student employees and particularly the student manager are provided with hands on practical skills including hatchery management, construction, troubleshooting and fish rearing. Many of these skills are valuable to the students' academic development as they proceed through either the Renewable Resources Management Diploma or Bachelor of Science program. The Department of Fisheries and Oceans (DFO) continue to provide additional guidance and act as technical advisors when required.

MCSIP also works with the Stream to Sea Program who bring the juvenile fish that have been reared in classroom aquaria to the facility once they reach the juvenile stage. These fish are later tagged and released with the rest of the cohort into Fox Creek. The students are given a tour of

the facility when they bring their fish. Tours are also provided for the general public and other groups who are interested in our project.

Incubation:

Fox Creek eggs were fertilized at the Whitehorse Rapids Fish Hatchery site with milt from at least two males per female and planted into Heath® trays. Eyed eggs were delivered to MCSIP from Whitehorse Rapids Hatchery in late October of both 2013 and 2014. The eyed eggs were incubated in Heath® Tray incubation stacks with flows beginning at 12 liters per minute and increasing to 15 liters per minute. Student workers monitored the trays daily removing any sediments and dead eggs as well as shell fragments after hatching. Alevins were monitored for yolk sac absorption and the fish were ponded based on this and ATU accumulations. During the incubation period two students would attend the facility daily for cleaning of the trays, settling box and dam. Fresh snow was shoveled from the walkways and stairs as well. Any other maintenance needed was performed. This required approximately one hour per day.

Ponding and Rearing

Yukon College students moved fry from the incubation stacks into Capilano troughs in late March 2014 and again in 2015. Flow rates were adjusted based on densities within the trough so that an adequate supply of oxygen was available for the fish but not so much flow as to exhaust the fish swimming against the current. Once ponded, the student manager and student employees looked after the daily feeding and cleaning until the last of the fry were released in July. Feeding rates were based on a combination of calculations of tank biomass and visual observations of how the fish were responding to the feed. Flows in each of the troughs was initially set at 20 LPM and was gradually increased over the rearing period to about 40 LPM maximum from early April until the time of release in July.

Fish were sampled once per week to assess health status and food requirements. The biosampling procedure involved a random sample of 50 fish from each tank that were anaesthetized with MS222 and then weighed and measured for total length. (See Appendix 1).

Food was distributed using a 24 hour Ziegler belt feeder. Two feeders were installed per trough. The Capilano troughs were cleaned daily using brooms and flow control to gently channel the settled solids to the tank outlet. The fish screen at the downstream end of the channel was cleaned daily to prevent breaching of the screen and back watering of the channel. Skretting® salmon feed in sizes Crumble #0 and #1 were purchased for the 2014 and 2015 rearing season.

School and Community Involvement

In collaboration with Fisheries and Oceans, Whitehorse, MCSIP participated in the Stream to Sea program. Chinook salmon eggs were used in a hands-on activity as part of this project whose objective is to foster stewardship values in youth. The project helps to educate elementary school students on the early life stages and life requirements of Pacific salmon. For the 2014 and 2015 season, salmon were distributed to elementary school classrooms at the eyed egg stage. These fish were then reared through to the fry stage in a classroom aquarium equipped with chillers, allowing students to monitor the development of the fish by charting Accumulated Thermal Units (ATUs). As a celebration of the life of the salmon, and as an end of the school year

activity, students “release” their fry into the tanks at MCSIP. At the same time the students are given a tour of the facility and learn about the life stages of the salmon. The fish from the classroom aquaria are tagged along with the rest of the fish and eventually released into Fox Creek.

Tagging

Tagging of the 2013/14 cohort was completed by Janet Rempel between July 2 and 9, 2014. A total of 17,604 juveniles were tagged, with 51 mortalities and 91.3% tag retention. In 2014/15 Yukon College students took over tagging of the fish. A total of 23,477 fish were tagged between July 6 and 11 with 0 mortalities. Average weight at the outset of tagging was 1.23 grams. All of the tagged fish were released to TKFN for release into Fox Creek.

Release of Fry

The release of fry from 2013/14 broodstock was carried out July 13th of 2014. The 2014/15 cohort were released on July 12, 2015. The fry were turned over to Ta’an Kwa’chan First Nation employees by MCSIP. They were placed in totes with an oxygen supply and immediately transported to Fox Creek for release by TKFN citizens.

Table 1: Summary of MCSIP Data from Incubation and Rearing 2014 and 2015

	2013/14	2014/15
Incubation box flows	12-15 liters per minute	12-15 liters per min.
Capilano trough flows	20 increasing to 40 lpm.	20 increasing to 40 lpm
Juveniles rec’d from Schools	n/k	862
Final # tagged and released	17,655	23,177
Final# clipped but not tagged	0	300
Total mortalities egg stage	700	683
Total mortalities alevin/fry stage	n/k	773
Total mortalities	751	1456

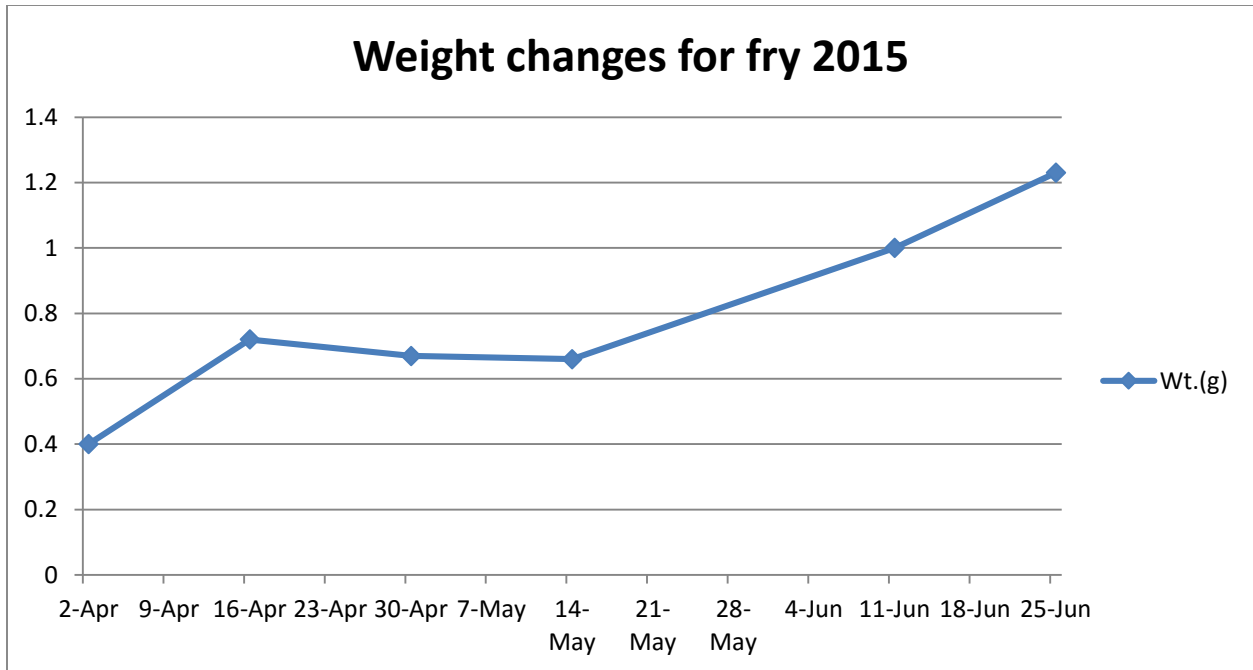


Figure 1: Increase in weight for Chinook fry at MCSIP 2015 (April 16 data skewed high due to excess water)

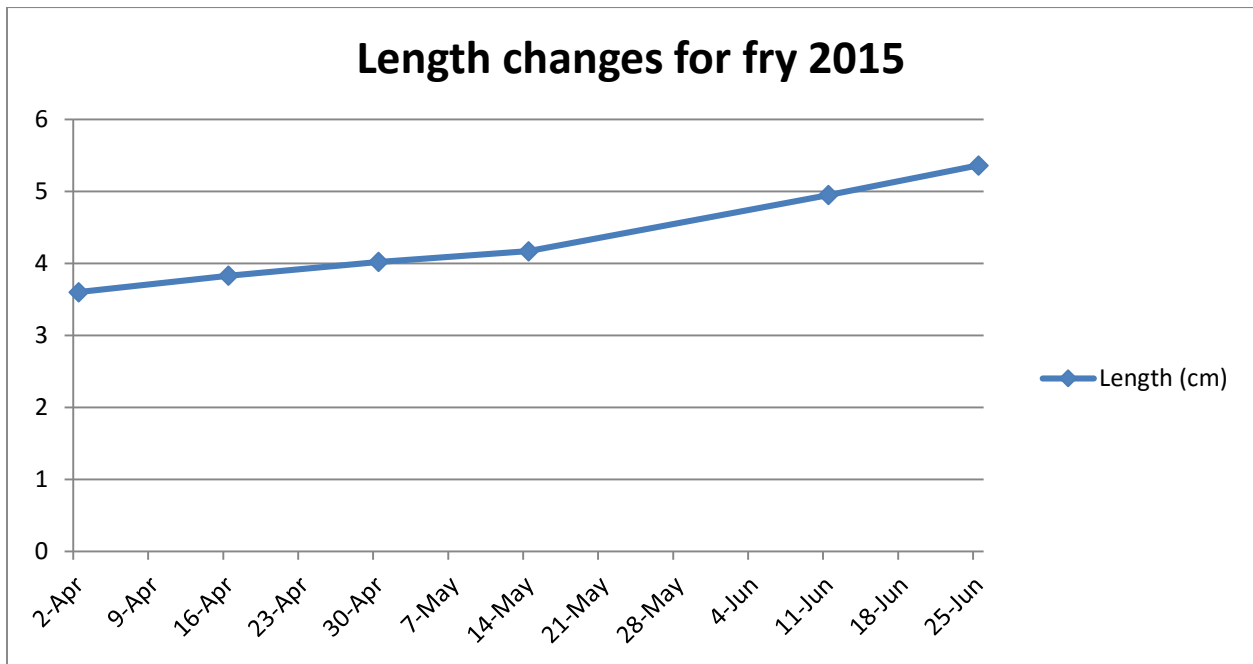


Figure 2: Increase in length for MCSIP fry in 2015

Site Repairs and Upgrades*

Major renovations and upgrades to the MCSIP site were made over the summer of 2014 and again in 2015. In 2014 the dam was replaced and raised with 20cm square timbers. The original plywood settling box was replaced with a box made of isopolycyanurate covered in fiberglass. Also, one of the original plywood incubation boxes was replaced with a

isopolycyanurate/fiberglass unit. All stairs, walkways and the bridge were upgraded with Preserved Wood Foundation lumber and built to Building Code specifications.

In 2015, due to water skirting around the newly improved dam, the banks of the incoming stream and the containment area behind the dam, were completely lined with heavy grade “poly” plastic and reinforced with 250 sandbags. The dam was also raised another 20 cm. This seems to have resolved the problem with water bypassing the dam and has increased available water to the site. In 2015 two more new incubation boxes were added. Two of the Capilano troughs were removed and 8 new round plastic tanks (2@ 250 gallons and 2@ 450 gallons) with conical bottoms were installed over sand bases. The new tanks were plumbed and fitted with wooden lids. We have 2 more round tanks stored on site that will be added in the near future.

The new tanks have increased our capacity to rear juveniles and to hold broodstock until they are ready for spawning. Additionally, we can guarantee that there is genetic isolation of different stocks of juveniles held at MCSIP, which we could not do with the Capilano troughs. Initial trials have shown that the conical bottom tanks are, for the most part, self-cleaning and do not require the daily maintenance that Capilano Troughs do.

With the site repairs and upgrades complete we are able to incubate and rear an estimated 200,000 juvenile salmonids per season.

*Yukon Youth Conservation Corps (Y2C2) crews provided much of the labor for the upgrades at the facility in summer 2014 and 2015.

Broodstock Collection

In 2012, Fox Creek eggs were collected by Whitehorse Rapids Fish Hatchery at Whitehorse Rapids Fishway. Chinook broodstock was received at McIntyre from the Whitehorse Rapids hatchery in October at the eyed egg stage.

No Chinook were collected from Tatchun Creek due to low numbers of returning adults.

Monitoring and Maintenance

The Yukon College student manager and other students undertook regular checks of the site once the egg takes were completed. They visited the site daily to check temperatures and flows, as well as clean intakes, and pick eggs.

Upon ponding of the fry in the spring, daily checks included water flows, feeding and screen cleaning.

