

**MCINTYRE CREEK
SALMON INCUBATION PROJECT
2016-2017**

**YUKON RIVER SALMON RESTORATION AND ENHANCEMENT
FUND
Project # CRE-65-16**

2016 Final Report

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Abstract

The McIntyre Creek Salmon Incubation Project (MCSIP) 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 (TKFN), 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 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. Of that year. In 2016 a professional tagger was brought in and a total of 45,687 juvenile chinook salmon were coded wire tagged and subsequently released into Fox Creek. For the 2017 release a total of 31,899 fish were coded wire tagged in early July by members of Ta'an Kwach'an First Nation. In addition to these, 1,061 fish were deemed too small to tag. These fish were released in two batches into Fox Creek in late July of 2017.

Introduction

McIntyre Creek Salmon Incubation Project 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 occasionally 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 dramatic declines in spawner returns have been problematic.

Yukon College (YC) took over management of MCSIP in August of 2013. Since that time the facility has undergone major renovations and upgrades initially 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 2016 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 migrated upstream through the fish ladder at the Whitehorse Rapids Power Dam. All of the juveniles released in 2017 were for the Ta'an Kwach'an First Nation's Chinook Salmon Stock Restoration Project in Fox Creek. The target stream is located approximately 50 kilometers north of Whitehorse and the release took place in two batches at different locations in late July. The first release involved public participation, while the second occurred at a different site involving only TKFN staff.

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, daily maintenance, feed calculations, construction, troubleshooting and general fish rearing procedures. 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 for “release”. Tours are also provided for the general public and other groups who express interest 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 2016. The eyed eggs were incubated in Heath® Tray incubation stacks with flows initially set at 12 liters per minute eventually increasing to 15 liters per minute over the incubation period. All rates of flow during both incubation and rearing were calculated from the Oceans, Habitat and Enhancement Facts and Figures 4th. Ed. Manual from Fisheries and Oceans, Canada. 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 of this plus ATU accumulations. For reasons of safety two students would attend the facility daily during the incubation period 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 during the daily visits. This required approximately one hour per day.

Ponding and Rearing

Yukon College students moved fry from the incubation stacks into a Capilano trough and two round tanks in late March 2016. The initial plan was to divide the fish into 3 equal groups of approximately 11,000 fish each. Unfortunately, due to frozen pipes the two round tanks did not have waters supply for over a week and all of the fish had to be loaded into the Capilano trough initially. A portion of these fish were later transferred to the round tanks, but at that time it was impossible to get an accurate count of exactly how many fish were in each containment unit. Plans to compare growth rates between round tanks and Capilano troughs had to be deferred until 2018. Once the fish were in the Capilano trough, flow rates were adjusted based on calculated density 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 tagged and 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 and the manufacturer’s suggestions. Flows in the Capilano trough and the round tanks was initially set at 20 LPM and was gradually increased over the rearing period to about 40 LPM maximum as the fish increased in weight from early April until the time of release in July.

Fish were biosampled 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 2016-17 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 2016-17 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.

MCSIP is also used for a variety of teaching opportunities involving Yukon College students. Laboratory sessions that introduce biosampling techniques, the use of anesthetic and ethical treatment of live fish are completed every year.

Tagging

Tagging of the 2016/17 cohort was completed by Ta’an Kwach’an staff between July 6 and July 19. A total of 31,899 juveniles were tagged, with 1,061 fin clipped but not tagged because they were too small. Average weight at the outset of tagging was 1.14 grams. All of the tagged and clipped fish were released to TKFN for release into Fox Creek.

Release of Fry

The release of fry from 2016/17 broodstock was carried out during the last week of July in two segments. One cohort was released on July 23 with the public in attendance and a second release was undertaken by TKFN staff later in the week. . The fry were turned over to Ta’an Kwa’chan First Nation employees by MCSIP. They were placed in totes with an active oxygen supply and transported to Fox Creek for release by TKFN citizens.

Table 1: Summary of MCSIP Data from Incubation and Rearing 2016/17

	2016/17
Incubation box flows	12-15 liters per minute
Capilano trough and tank flows	20 increasing to 40 lpm.
Juveniles rec’d from Schools	1,156
Final # tagged and released	31,899
Final# clipped but not tagged	1,061 (too small)
Total mortalities alevin/fry stage	469

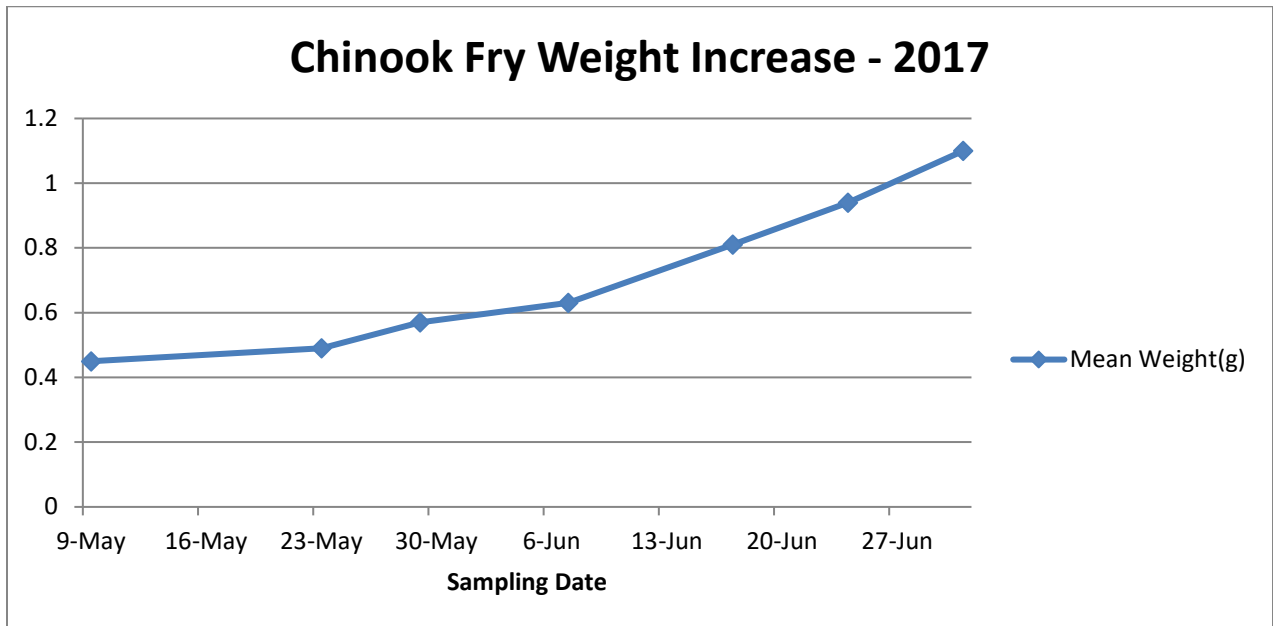


Figure 1: Increase in weight for Chinook fry at MCSIP 2017

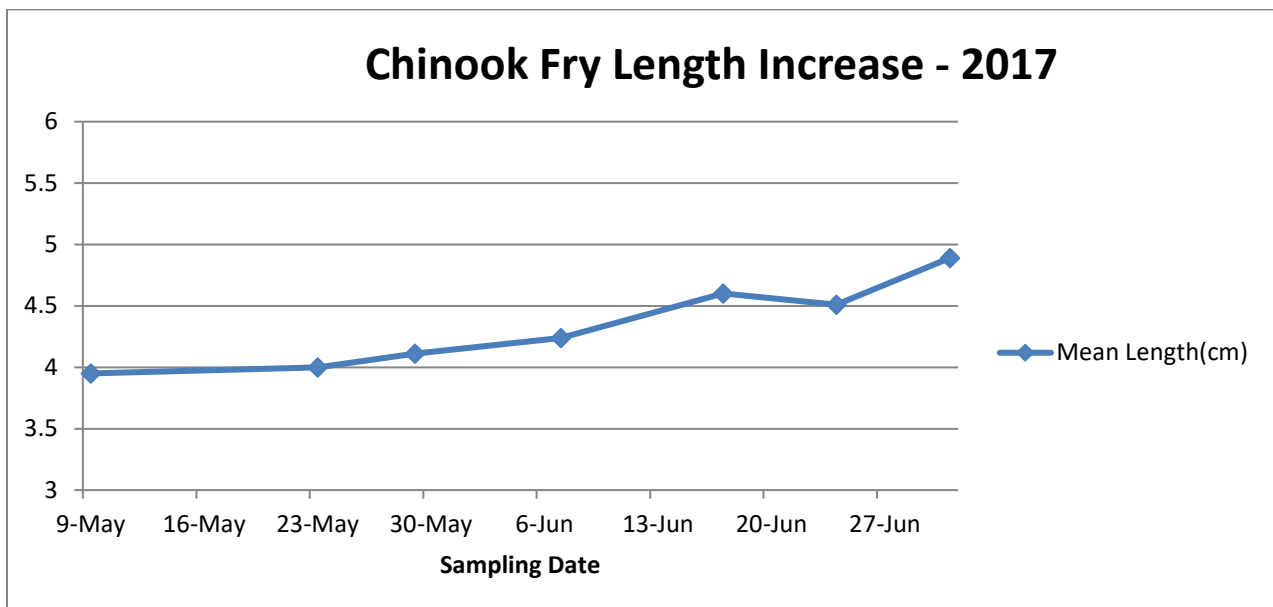


Figure 2: Increase in length for MCSIP fry in 2015

Broodstock Collection

In 2016, Fox Creek eggs were collected by Whitehorse Rapids Fish Hatchery at Whitehorse Rapids Fishway, fertilized and placed in egg incubators at that facility. Eggs were received at McIntyre from the Whitehorse Rapids hatchery in October at the eyed egg stage.

No Chinook were collected from other sources in 2016.

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.