MCINTYRE CREEK
SALMON INCUBATION PROJECT
2008-2009

YUKON RIVER SALMON RESTORATION AND ENHANCEMENT FUND
Project # CRE65-08

March 2009 Project Report

Table of Contents

Abstract

The McIntyre Creek Salmon Incubation Project (MCSIP) tagged and released 41,777 Yukon River Chinook salmon in early summer, 2008 (from 2007 broodstock): 16,748 fry were released into Takhini River and 25,029 fry into Tatchun Creek. Approximately 76,000 chinook eggs were planted in the MCSIP facility heath trays in August 2008, with 6000 eggs from Tatchun Creek, and 70,000 eggs from the Whitehorse Rapids Fishway (WRF) for Ta'an Kwäch'än Council (TKC) and the Fox Creek Salmon Restoration Project. The Whitehorse Rapids Fishway eggs were retrieved from 20 salmon including 13 ladder mortalities and 7 hatchery held fish. An estimated 4000 Tatchun eggs and over 44,000 WRF eggs survived to March 2009. Many batches of eggs from the ladder mortalities showed a poor survival rate. Thermal marking trials were carried out as part of a continued effort to ensure consistent and observable results as an alternative to coded wire tags. Yukon College students observed, worked and volunteered in most of the MCSIP project activities. Approximately 530 Yukon students, teachers and volunteers participated in aquatic habitat studies or incubated salmon eggs from the site in 2008-2009. MCSIP facility was used to carry out a Kwanlin Dun First Nation study on temperature effects on Chinook salmon sex ratios.

Executive Summary

The Northern Research Institute (NRI) ran the McIntyre Creek Salmon Incubation Project (MCSIP) for the 2008/2009 broodstock season with funding from the Yukon River Panel. NRI provided administrative support while working in partnership with Yukon College, Fisheries and Oceans Canada (DFO), Yukon Youth Conservation Corps (Y2C2), Streamkeepers North Society, as well as Whitehorse and various community schools, to carry out the educational and salmon culture objectives of the project.

School and public participation in the project was encouraged throughout the 2008-2009 broodstock season. Six Yukon College students carried out monitoring and maintenance- five first-year Renewable Resource Management students and a second year student. High School students worked and volunteered during the tagging and the Y2C2 participants conducted fry trapping. In early summer 2008, several Whitehorse classes visited the MCSIP facility as part of their fry release field trips, and other Yukon classes released salmon fry that had been incubated from MCSIP eggs back into their natal streams. Field trips to release fish grown from MCSIP eggs involved an estimated 200 students, teachers and volunteers in early summer 2008. In the fall of 2008, the MCSIP once again supported DFO's Stream to Sea program by providing 13 public schools with salmon eggs. This program helps Yukon students gain experience and understanding of salmon life cycles and habitat requirements and develop a stewardship ethic. An additional 330 students, teachers and volunteers participated in MCSIP egg collection and incubation in the 2008-2009 academic year.

All of the chinook fry reared at the MCSIP from the 2007-2008 broodstock were coded wire tagged and released between June 23, 2008 and July 26, 2008. A total of 41,777 chinook fry were tagged and released- 25,029 back into Tatchun Creek and 16,748 back into the Takhini River system.

Approximately 76,000 chinook eggs were collected for incubation at the MCSIP in 2008. An estimated 6000 Tatchun eggs were taken to be incubated in MCSIP heath trays. An estimated 70,000 WRF chinook eggs were taken to be incubated in MCSIP heath trays. All collections were completed between August 25 and September 6, 2008. Eggs and milt were collected on site and transported with ice packs back to the MCSIP. At the MCSIP, each batch of eggs was mixed with the milt of at least two chinook, and then planted into the heath stack incubation trays.

In late August of 2007, Whitehorse Rapids Hatchery staff planted eggs from Whitehorse Rapids fishway chinook into a couple of egg trays at the MCSIP. This was in support of the Kwanlin Dun First Nation's investigation of the effects of temperature during incubation on chinook sex differentiation. The investigation will contribute to the future management of artificial propagation of Yukon River chinook salmon. The Fishway fish were tagged and released into Mitchie Creek by Nick De Graff.

Ponding and rearing of fry will begin late March and and re-enumeration will be done to assess current numbers.

The results of a thermal marking trial on the 2007-2008 broodstock were not assessed in 2008. Initial examination of a couple of preserved fry in early 2008 did not show a clear

thermal mark. More 2007 brood fry have been preserved and will be assessed by the DFO Whitehorse otolith lab in 2009.

In spite of problems with heaters, Tatchun Chinook and WRF had been exposed to four post-hatch warm cycles to create an otolith thermal mark. Fry will be preserved and examined in 2009 to determine the success and pattern of the marking.

Adult salmon returns were monitored during broodstock collection at Tatchun Creek. One spaghetti tag was collected along the banks of Tatchun Creek. No broodstock collection was carried out at Takhini River.

Introduction

The McIntyre Creek Salmon Incubation Project was administered by the Northern Research Institute (NRI) of Yukon College in 2008-2009, with funding from the Yukon River Panel Restoration and Enhancement fund. The NRI has worked with Yukon College Renewable Resources students, partner organizations and contractors to operate the site since the spring of 2002.

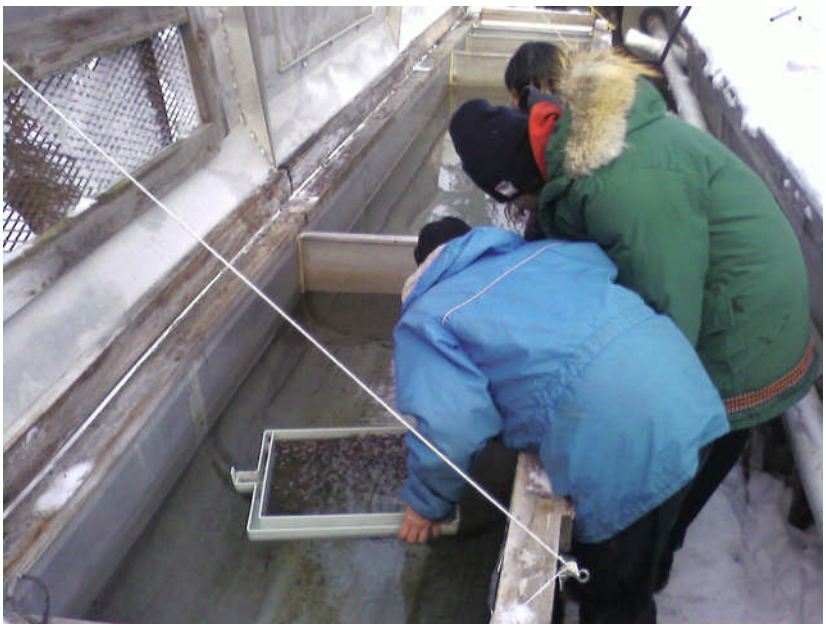
The McIntyre Creek Salmon Incubation Project (MCSIP) again raised and tagged salmon fry from Tatchun Creek and the Takhini River and released them back to their natal streams in spring and summer 2008. The project took and incubated salmon eggs from Tatchun Creek again in 2008 and, for the first time, took eggs from the Whitehorse Rapids fishway for the Ta'an Kwäch'än Council (TKC) Fox Creek Salmon Restoration Project.

The MCSIP incubates, raises and tags chinook salmon, while providing learning opportunities and work experience for Yukon students. Students in the Renewable Resource Management program have been involved in all aspects of the project.

In 2008 the MCSIP facilities were also used to raise Michie Creek salmon for a Kwanlin Dun First Nation study on the effect of incubation temperature on chinook salmon sex ratios.

Ponding and Rearing of 2007 Brood-year Fry

Fry grown from Chinook broodstock taken in 2007 were ponded in late March and early April of 2008. A separate capilano trough was allocated to each group of fry. Approximately 17000 Takhini River Chinook, 26000, Tatchun Creek Chinook, and 5000 Kwanlin Dun First Nation Michie Creek study Chinook were ponded.



Ponding Fry

Flow in each of the troughs was initially set at 60 LPM. This was increased over the rearing period to between 150 and 200 LPM. A maximum total of 530 LPM of water flow was used by the incubation site in mid June prior to the removal of the Michie fry on June 18th. Thereafter the flow was approximately 400 LPM.

Fry were fed Skretting Nutra Plus feed. Food was distributed using 24 hour Ziegler belt feeders. In early April the total amount of food fed daily was less than 200 grams per day. By mid May the feeding had been increased to 800 g/day. In June the daily feeding peaked at 1,000 grams/day. This amount was reduced as fry were released after June 26th and all feeding ended in mid July.

New Feeders at work

Mortality counts during the rearing period of 2008 included: 577 Tatchun fry, 317 Takhini River Chinook fry, and 98 Michie Creek study fry.

Tanks 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 incubation site outflow channel to McIntyre Creek was cleaned daily to prevent breaching of the screen and backwatering of the channel.

(See Appendix A: McIntyre Project Chinook Fry Sampling 2008)

Water Quality Monitoring

Water samples were collected from the groundwater channel at the site intake (to determine background phosphorous levels), and in the groundwater channel immediately downstream of fish screen (to identify possible increase in phosphorous as a result of the fish rearing), and from McIntyre Creek immediately upstream and immediately

downstream of the inflow of the groundwater channel (to identify any phosphorous contribution to McIntyre Creek). Phosphorus levels in samples taken on June 26th (peak rearing) at all sites were below the 0.05 mg/L detectable limit.

(See Appendix B: Water Board Report)

Beaver dam at the downstream screen

School and Community Involvement

Community education is a focus of the McIntyre Salmon Incubation Project. Yukon College students in the Renewable Resources Management program were employed to carry out most of the activities related to the project, and were thus able to practice what they had learned about salmon incubation the year before. Over the 2008-2009 year, over estimated 300 students, teachers and volunteers used the MCSIP.

Stream to Sea program classroom salmon incubation projects in Yukon schools used eggs grown to the eyed stage at the McIntyre facility. Seven classes visited the site to do stream studies as part of their fry release field trip in 2008. Another three classes released fry that they had grown from eggs eyed at McIntyre back to natal streams. These field trips involved over 200 students, teachers and volunteers. A Porter Creek High School student was again hired to assist with the coded wire tagging process. Leaders in the Yukon Youth Conservation Corps (Y2C2) program also provided assistance with tagging, fry trapping and fry releases. Other interested residents visited the site during tagging.

In the 2008- 2009 academic year the MCSIP salmon eggs provided eyed salmon eggs to 13 Yukon classes, involving an estimated 330 students, teachers and volunteers with egg collection and incubation.

NRI and Streamkeepers North Society held an open house at the facility for Oceans Day on June 8, 2008. Twenty people came to the site to enjoy the tour and refreshments and participate in a quiz that offered a chance to win prizes. The public was also invited to a public fry release at Takhini campground on July 2, 2008.

Fox Creek Fry

Tagging

Phyllis Nelson was hired again to wire tag (coded) the MCSIP fry in 2008. Phyllis tagged between June 23th and June 28th. Students from Yukon College, Porter Creek High School and Y2C2 assisted with the tagging and adipose clipping procedure.

A total of 25,029 Tatchun fry and 16,748 Takhini fry were tagged between June 23, 2008 and June 29, 2008. 5,274 Michie fry were tagged by KDFN project personnel on June 17, 2008. Half-sized coded wire tags were used.

An additional 1,016 Chinook fry (700 from Tatchun Creek and 316 from Takhini River) that were too small for the coded wire tag were marked only by an adipose clip.

A study was conducted to determine tag retention. Tagged fish were held for two weeks after tagging (until July 10th and 11th) and then tested for tag retention. Six of the 143 Takhini River fry held had lost their tags, for a tag retention of 95.8%. Two of the 148 Tatchun Creek fry had lost their tags, for a tag retention of 98.6%.

(See Appendix C: McIntyre Coded Wire Tagging Summary 2008)

Releasing

The releases of fry from the 2007 broodstock year were carried out between mid June and early July of 2008. The releases were carried out by DFO personnel, Y2C2 volunteers and the Yukon College student manager.

(See Appendix D: Maps of Release Sites and Rearing Sites 2008)

On June 27, 2008 DFO personnel transported 25,600 Tatchun chinook fry in a fish tote with approximately 300 Litres of water with oxygen supplied through an air stone. They were released at the Tatchun Creek campground in the early afternoon. Water temperature at Tatchun Creek was 15.5°C. Fish were acclimated to the temperature difference (water in the tote was 7°C. upon arrival at the creek) by adding creek water to the transport container until the water was within 3 degrees of the creek temperature.

On July 2nd, 2008, DFO and NRI personnel, assisted by Yukon College students and Y2C2 students assisted with the public release of 16,900 Takhini River Chinook fry.

The fry that were held back for the coded wire tag retention study were released in mid July, 2008.

Michie Creek study fry were released on June 18, 2008 by KDFN project personnel.

Fry Trapping

Two fry traps were set at Tatchun Creek during the fry release. Forty five wild fry were captured with an average size of 55.6 mm in length, with a range from 47 to 67 mm.

(Appendix E: Tatchun Creek Fry Trapping 2008)

Three fry traps were also set at Tahkini during the fry release, with no fry being captured.

Broodstock Collection and Adult Return Monitoring

Due to concerns regarding the very low Chinook salmon run estimates, Tatchun Creek broodstock collection was not to occur until 200 chinook had been observed in the creek. Hatchery staff walked the creek on August 22nd to take the first census of salmon. One hundred and ten salmon were counted with an estimated 40 of them being female. Another walk was conducted on August 24th and sixty-one salmon were counted, including 19 abandoned salmon redds. Surveyors concluded from the counts and considerable bear sign, that it was likely that the total run had been near 200 fish. Broodstock collection was then attempted, but extreme rain and flooding in the creek system on August 24th and August 25th made fish capture very difficult. Six thousand eggs were successfully taken on August 25th.

One spaghetti (A0215) tag was collected during the enumeration walk of Tatchun Creek on August 22nd and submitted to DFO. Viewing conditions did not allow surveyors to determine whether any of the salmon in the creek were adipose clipped.

(See Appendix F: Tatchun Creek Chinook Egg Take 2008)

Tatchun Creek

Volumetric sampling of eggs taken from 18 Whitehorse Rapids Fishway chinook for the Ta'an Kwachan Fox Creek restoration project estimated almost 66,000 eggs. Eggs from another 3 females were not volumetrically sampled. Six of the female Chinook were taken from the Whitehorse Rapids Fishway by Whitehorse Rapids Hatchery staff and held for the project at the Whitehorse Rapids Hatchery. The remaining females were Chinook that were too stressed to continue their migration through the fishway, including a couple that had died in the ladder. Eggs were collected between August 28th and September 9, 2009.

(See Appendix G: Fox Creek Project Egg Take 2008)

A boat survey was conducted on the Takhini River from the Kusawa Lake outlet to the "rock garden" on August 30th. Eighty-two salmon were counted. No spaghetti-tagged salmon were spotted. The water level on the Takhini was too high for good visibility and it was too early in the run for carcass pitch.

(See Appendix H: Takhini River Salmon Count August 30th, 2008.)

Incubation

Two batches of Tatchun Creek Chinook eggs were transported to the MCSIP on ice on August 25th, 2008. Road closures delayed fertilisation by several hours. Each of the two batches of eggs were fertilized with milt from at least two males and planted into egg trays in the heath stack enclosure that day. Water flow within the incubation boxes was set at between 6 and 8 LPM.

Eggs and milt from the Whitehorse Fishway Chinook that were deemed too stressed to continue were taken by Whitehorse Rapids Hatchery staff and given to NRI and DFO personnel to fertilize and plant at the McIntyre site between August 28th and September 5th. DFO and TKC personnel assisted with taking Fox Creek project eggs from Chinook held in the Whitehorse Rapids Hatchery on September 6th. Eggs from the last Chinook held were taken by Whitehorse Rapids Hatchery personnel on September 9th. Fox Creek project chinook eggs were all transported to the MCSIP facility in coolers, on ice, and fertilized with the milt from two males and planted in the heath stacks. Flows were set between 7 and 9 LPM.

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 flow, to clean intakes and downstream screens, and to remove dead eggs once eggs had reached the eyed stage.

Egg Picking

Yukon College student employees removed dead eggs three times from the trays between late October and early December, 2008 at the first signs of hatching. Eggs were shocked with an abrupt change of water and with movement. After shocking, trays were monitored for mortalities and fungus problems. Students removed dead eggs, distinguished by their opaque colour, with egg tweezers and gentle fingers when necessary.

Tatchun eggs were picked between October 24th and November 6th. Survival to the eyed stage was estimated at 68.5 % overall, with 96% survival in the eggs from one female, and 63% in the other.

Based on dead egg removals between October 24th and November 15, over 46,000 Fox Creek project eggs survived to the eyed stage. The average survival of eggs taken from the hatchery-held fish was 93%. The average survival (excluding two batches which were not enumerated) of eggs taken from stressed (and sometimes dead) females in the fishway was 52%. Two batches of eggs had 100% mortality.

(See Appendix I: Fox Creek Project Egg survival 2008)

Otolith Thermal Marking Trials

Each incubation shelter is equipped with a 1000 Watt Livestock Water Immersion Heater and a thermostat control temperature for thermal marking. Thermostats and heaters allowed heating of water within the reservoir at the base of each heath tray. Sump pumps are connected to re-circulate warmed water through the heath stacks and allow all incubation trays containing eggs from one area to be thermally marked at one time.

Thermal Marking of 2007-2008 Broodstock Fry: At the end of February and early March Tatchun fry released in 2008 had been exposed to four 24 hour warm water cycles and Takhini fry were exposed to five 24 hour warm cycles prior to hatching. Although

thermostats were set for 9˚C for the warm cycle, the temperature records for the cycles are not complete, and temperature may have fluctuated due to cold water leakage.

A few fry otoliths were examined by students in the DFO otolith lab in February, 2008 and in the summer by DFO staff. Banding was not clear. More fry were preserved and more may be examined when the otolith lab is operating in 2009.

Thermal marking of 2008 Broodyear Fry: Drains were reconfigured to reduce infiltration of cold water to the reservoir during thermal marking. The thermostat for the warm cycle was set at 9°C. to allow for a 4 degree difference between warm and cold cycles alternating every 24 hours. Tatchun alevins were exposed to four cycles of warm water from February 9th to the 16th. However, during the last two cycles, temperatures were measured at 6°C. during the warm cycle. Two more warm cycles were done in February from the 22nd till the 25th in an attempt to create a clearer mark.

Mortalities from the both batches will be collected and preserved during the 2009 rearing season for examination to determine the success of the otolith marking. All Fox creek eggs had four warm cycles at 24hour intervals from January 30th till February 16th plus an additional two warm cycles from February 22nd till the 25th for clearer markings.

Site Preparation and Upgrades

The student manager and other Yukon College students completed several upgrading and maintenance projects throughout the 2007/2008 season: some in preparation for the incubation season, some in preparation for the ponding and rearing period, and some in preparation for continuing with the trial otolith marking project. These projects included:

- reinforcing staircases and building handrails
- reinforcing trough doors
- repainting all walkways
- draining, cleaning and inspecting incubation boxes
- replacing broken incubation water pipes
- replacing the weather-stripping on the incubation boxes
- replacing weather-stripping in shed
- repairing gill nets for broodstock capture
- repairing all incubation unit doors
- repairing egg trays as needed in preparation for the incubation season,
- reconnecting pipes to Capilano troughs In preparation for rearing
- scrubbing and disinfecting Capilano troughs in preparation for rearing
- removing sandbags from the downstream fish screen and replacing them with rocks

Contract Work

- Electrical work was done to remove and replace defective heater in the incubation boxes
- Electrical box was moved to a better location for easier access during thermal marking
- Alarm system was upgraded from analog to digital which also included a land line being installed for the phone and a new alarm panel

The Northern Research Institute has been in the process of renewing it's water license. An application has been made to the Yukno Water Board for a license with a 25 year term. The process has been through a Yukon Environmental and Socio-economic Assessment Board (YESAB**)** review and is almost complete. The only remaining item to be submitted is a letter of approval from the City of Whitehorse to continue to use the land the site is located on. A request has been sent to the City, which has gone through the City Development Review Committee. The City is currently looking at long-term tenure options for the facility (i.e. lease, easement agreement, etc.) and will be completing an agreement with the Northern Research Institute shortly.

(For a summary of costs related to the project see Appendix J: Financial Summary March, 2009)

Security System

Spectrum Security continues to monitor the alarm system at the McIntyre facility. The project manager or a delegated employee carried a pager with text capability, the number of which was at the top of Spectrum's alarm call-out list. A cell phone on site enabled workers to request assistance. The student manager also carried a cell phone.

Flooding occurred at the site during the summer of 2009 as a result of beaver activity downstream. Lack of flood alarm function during this episode alerted personnel to serious inadequacies in the alarm system resulting from the dropping of analogue signals from cellular telephone service. After several site assessments by alarm and communications contractors, a land telephone line and a new alarm system were finally installed in October 2008. The alarm system requires some repairs to existing float and door switches, and needs to be expanded to include a fourth trough.

Local porcupine gets an aerial view on the hatchery

Upcoming Season

Yukon College students are preparing the site for rearing and are ponding the 2008/2009 Broodstock year fry. Skretting salmon feed (two bags of crumble #0 and two bags of crumble #1) is on site for the 2009 rearing season.

One item still remains on the completion of the Yukon water license for the MCSIP and that is a letter or agreement from the City of Whitehorse to use the land that the facility is located on. The request for long term approval of occupancy has gone through the City's Development Review Committee with no major concerns noted. The request is now being considered for different long-term tenure options for the facility (i.e. lease, easement agreement, etc.).

Coded wire tags were purchased in January of 2009 and will be applied to Chinook fry in early summer 2009. The tagger (Phyliss Nelson) has been contacted and arrangements will be made to tag the fry in mid - June, 2009.

NRI will engage students, volunteers and contractors to prepare the site for the upcoming incubation season. The repairs and maintenance of the MCSIP facility will include checking and adjusting the thermal marking heating system, repairing alarms, changing trough lid supports, changing phone systems, and improving sediment removal in the plumbing system.

NRI will continue to employ Yukon College Renewable Resources Students, including a student manager, to monitor and maintain the MCSIP facility, and to look after the fry during the rearing period. Involvement of new students in the project in the upcoming year is anticipated as the Yukon College Renewable Resources Diploma program has a new intake in the fall of 2009. NRI expects to continue to work in partnership with TKC on the Fox Creek project in the upcoming year.

Appendix A: McIntyre Project Chinook Fry Sampling 2008

Date	Trough	Broodstock ID	# Fry	Average Length (mm)	Average Weight (g)	Average Condition
Mar 15	1	Klondike	10	36.8	0.34	0.68
	2	Tatchun	10	34.4	0.265	.0.65
Mar 23	2	Tatchun	10	33.4	0.34	0.91
	1	Takhini	10	31.5	0.25	0.80
Apr 6	2	Tatchun	10	35	0.37	0.86
	1	Takhini	10	33.9	0.34	0.87
	3	Michie	10	32.7	0.30	0.86
Apr 27	2	Tatchun	10	38.4	0.48	0.85
	1	Takhini	10	37.3	0.44	0.86
	3	Michie	10	35.3	0.36	0.82
May 4	2	Tatchun	10	40.5	0.59	0.90
	1	Takhini	10	36.7	0.57	1.15
	3	Michie	10	35.1	0.48	1.12
May 11	2	Tatchun	10	41	0.61	0.89
	1	Takhini	10	38.7	0.56	0.95
	3	Michie	10	36.1	0.48	1.02
May 18	2	Tatchun	10	42.4	0.67	0.87
	1	Takhini	10	39.3	0.57	0.94
	3	Michie	10	38.8	0.53	0.91
May 25	2	Tatchun	10	44.2	0.77	0.90
	1	Takhini	10	41	0.58	0.81
	3	Michie	10	42.7	0.71	0.91
	4	Tatchun 2	10	41.6	0.6	0.83
June 1	2	Tatchun	10	46.8	0.96	0.92
	1	Takhini	10	46.4	0.86	0.86
	3	Michie	10	43.5	0.73	0.88
	4	Tatchun 2	10	43.2	0.65	0.81
June 15	2	Tatchun	10	44.2	1.27	1.46
	1	Takhini	10	46.8	1.09	1.06
	3	Michie	10	46.3	0.73	0.74
	4	Tatchun 2	10	46.9	0.80	0.78
June 22	2	Tatchun	10	48	1.51	1.41
	1	Takhini	10	47.7	1.27	1.18
	4	Tatchun 2	10	45.5	0.86	0.92
June 25	2	Tatchun	10	54.9	1.51	0.91
	1	Takhini	10	53	1.38	0.93
Released	3	Tatchun tagged	10	53.6	1.57	1.01
	4	Tatchun 2	10	48.3	1.0	0.88

Appendix B: Water Board Report

Bodycote TESTING GROUP

Analytical Report

Bill To: Northern Research Institute
Report To: Northern Research Institute
Box 2799
Whitehorse, YT, Canada
Y1A 5K4
Attn: Clint Sawicki
Sampled By:
Company:

Project:
ID:
Name:
Location:
LSD:
P.O.:
Acct code:

Lot ID: **627660**
Control Number:
Date Received: Jun 27, 2008
Date Reported: Jul 3, 2008
Report Number: 1131150

	Reference Number	627660-1	627660-2	627660-3	
	Sample Date	Jun 26, 2008	Jun 26, 2008	Jun 26, 2008	
	Sample Location				
	Sample Description	Downstream of McIntyre Creek	Upstream of McIntyre Creek	Downstream Channel	
	Matrix	Water	Water	Water	
Analyte	**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters					
Phosphorus Total	mg/L	<0.05	<0.05	<0.05	0.05

Bodycote TESTING GROUP

Analytical Report

Bill To: Northern Research Institute
Report To: Northern Research Institute
Box 2799
Whitehorse, YT, Canada
Y1A 5K4
Attn: Clint Sawicki
Sampled By:
Company:

Project:
ID:
Name:
Location:
LSD:
P.O.:
Acct code:

Lot ID: **627660**
Control Number:
Date Received: Jun 27, 2008
Date Reported: Jul 3, 2008
Report Number: 1131150

Reference Number	627660-4
Sample Date	Jun 26, 2008
Sample Location	
Sample Description	Intake
Matrix	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Phosphorus	Total	mg/L	<0.05			0.05

Approved by:
Randy Neumann, BSc
Vice President, Environmental

Appendix C: McIntyre Coded Wire Tagging Summary2008

Tatchun – Tagging 2008 (Broodstock 2007)

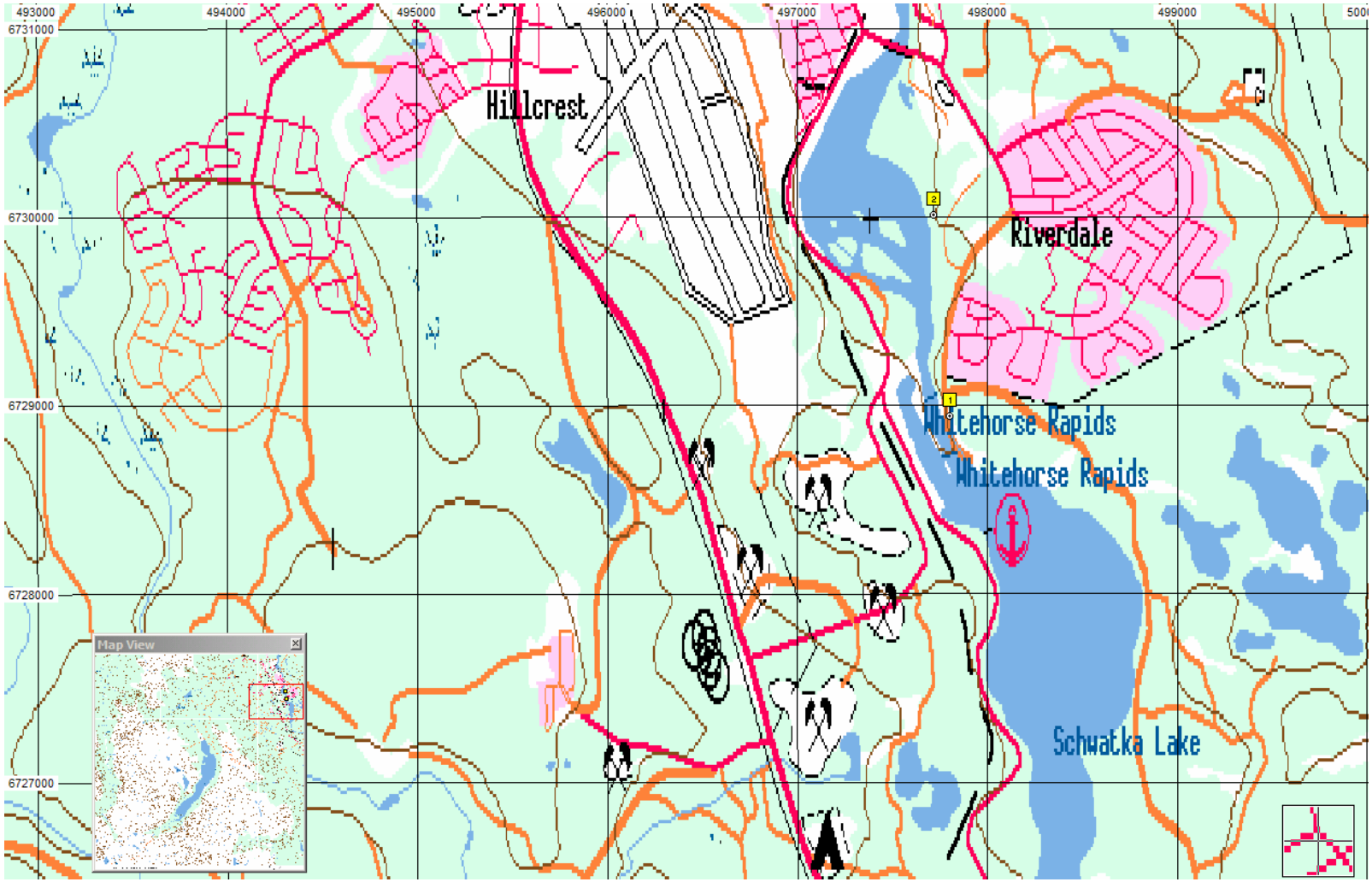
DATE	TAG CODE	STOCK	MORTS	DAILY TOTAL	REJ	ACCUM TOTAL (code)	ACCUM TOTAL (all codes)	SMALL	DAILY RETENTION	# SAMPLED FOR RETENTION	TOTAL RELEASE	marked	TAGGED RELEASE	ADIPOSE CLIP ONLY	UNTAGGED RELEASE
June 23	02-01-02-04-09	Tatchun	0	7151		7151	7151	145	**99**		7296	7151	7079	72	145
June 24			0	3122		10273	10273	0	**99**		3122	3122	3091	31	0
											10418	**10273**	**10170**	**103**	**145**
June 24	02-01-02-04-05	**Tatchun**	0	6264		6264	16537	228	**97**		6492	6264	6076	188	228
June 25			0	4103		10367	20640	0	**97**		4103	4103	3980	123	0
											10595	**10367**	**10056**	**311**	**228**
June 25	02-01-02-04-06	Tatchun	0	2956		2956	23596	328	**99**		3284	2656	2926	30	328
June 26			0	1433		4389	25029	0	**99**		**1433**	**1433**	**1419**	**14**	**0**
											4717	4389	4345	44	328
									Total Tatchun		**25730**	**25029**	**24571**	**458**	**701**

Takhini – Tagging 2008 (Broodstock 2007)

DATE	TAG CODE	STOCK	MORTS	DAILY TOTAL (excl smalls)	REJ	ACCUM TOTAL (code)	ACCUM TOTAL (all codes)	SMALL	DAILY RETENTION	# SAMPLED FOR RETENTION	TOTAL RELEASE	all clipped	TAGGED RELEASE	ADIPOSE CLIP ONLY	UNTAGGED RELEASE
June 27	02-01-02-04-08	Takhini	0	5910		5910	5910	147	97		6057	5910	5733	177	147
June 28			0	1055		6965	6965	50	**97**		**1105**	**1055**	**1023**	**32**	**50**
											7162	**6965**	**6756**	**209**	**197**
June 26	02-01-02-04-07	Takhini	0	6526		6526	6526	119	**97**		**6645**	**6526**	**6330**	**196**	**119**
			0	3257		9783	9783	0	**97**		3257	3257	3159	98	0
											9902	**9783**	**9490**	**293**	**119**
									Total Takhini		**17064**	**16748**	**16246**	**502**	**316**

Appendix D: Maps of Release Sites and Rearing Sites 2008

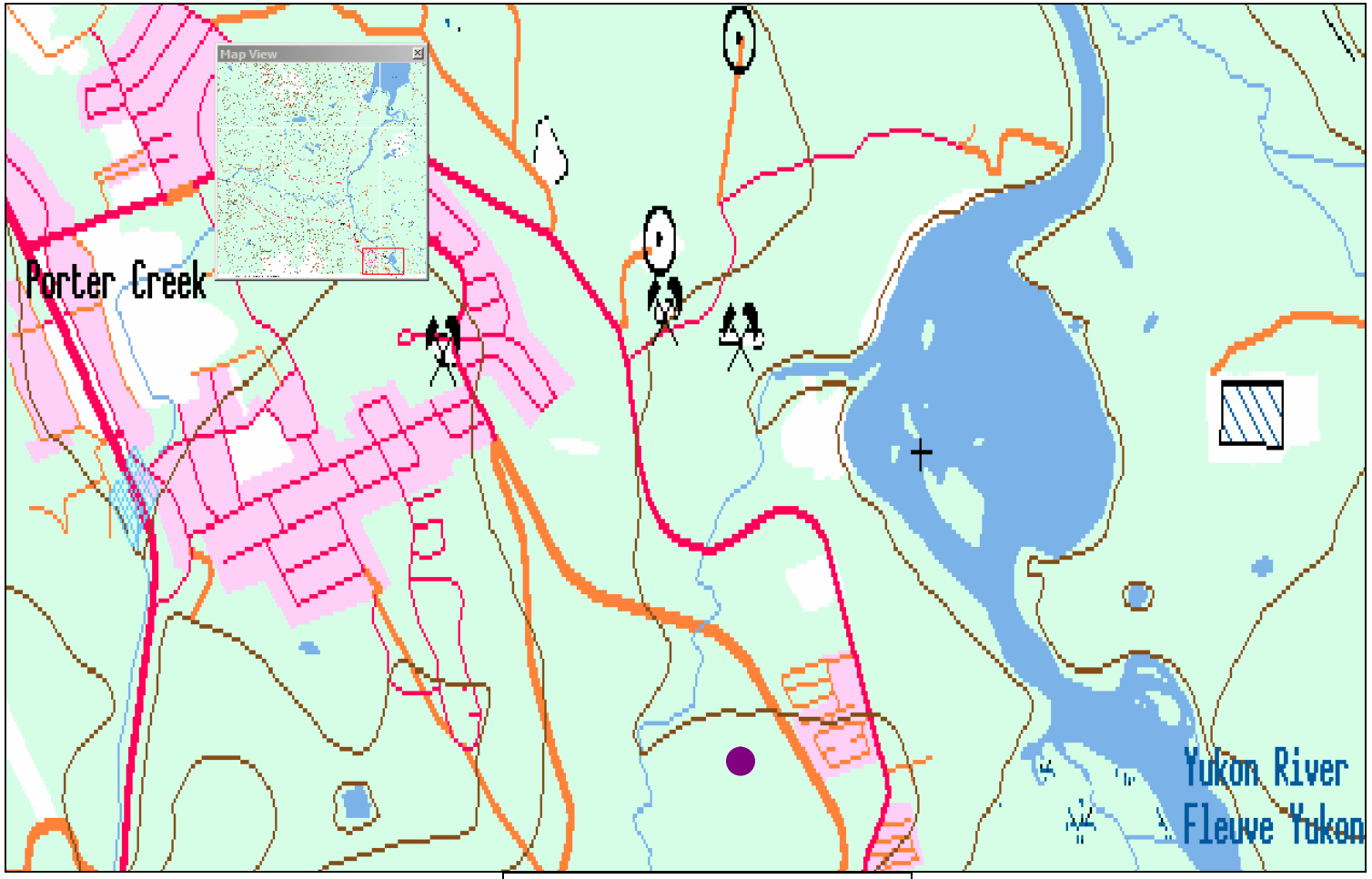
Map 1 - Whitehorse Rapids Hatchery and Fishway Location (NTS 105 D11)



1 Whitehorse Rapids Fishway 2 Whitehorse Rapids Hatchery

Appendix D: Maps of Release Sites and Rearing Sites 2008

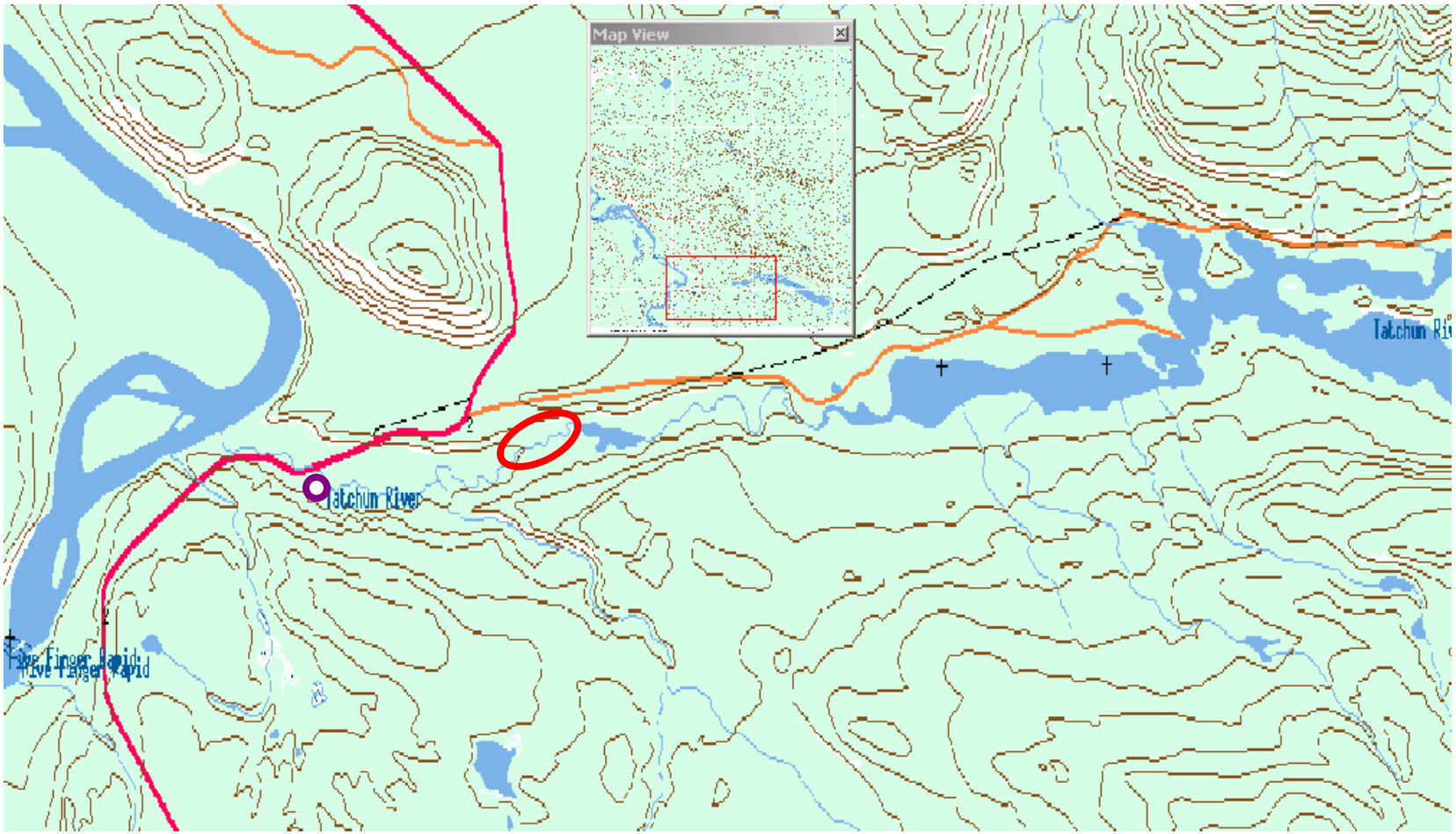
Map 2 - McIntyre Creek Salmon Incubation Facility (NTS Map 105 D14 - SE Corner)



• **Incubation an d Rearing Site**

Appendix D: Maps of Release Sites and Rearing Sites 2008

Map 3 - Tatchun Creek Fry Release and Broodstock Collection Sites (NTS Map 115 I8)

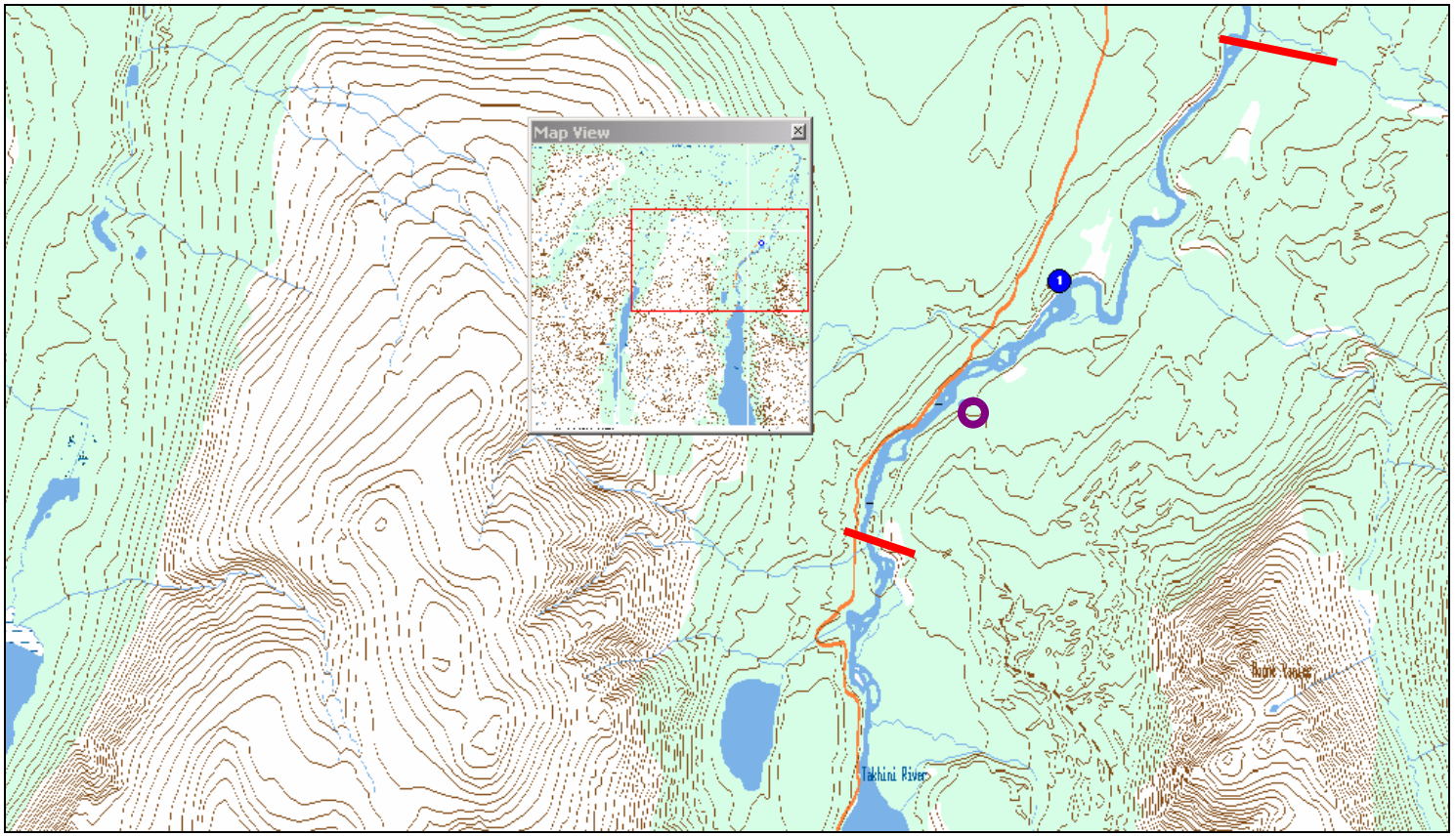


Fry Release Site

Broodstock Collection Area

Appendix D: Maps of Release Sites and Rearing Sites 2008

Map 4 - Takhini River Netting Area (NTS Map 115A9)



1 Broodstock holding site

Boundaries of netting area

Release site

Appendix E: Tatchun Creek Fry Trapping 2008

Tatchun Wild Fry Sample at time of release June 27, 2008

Wild fry trapped in short 1-2 hour set

Water in river at campground (release site) 15.5 to 16 degrees at 1 pm.

	length	weight	K
1	59	2.6	1.27
2	62	2.5	1.05
3	60	2.4	1.11
4	54	1.6	1.02
5	49	1.6	1.36
6	55	1.7	1.02
7	53	1.6	1.07
8	57	2	1.08
9	53	1.5	1.01
10	63	3	1.20
11	48	1.1	0.99
12	59	2.2	1.07
13	53	0	0.00
14	56	1.8	1.02
15	58	1.9	0.97
16	61	2.5	1.10
17	49	1.1	0.93
18	59	2.2	1.07
19	54	1.5	0.95
20	50	1.3	1.04
21	52	1.6	1.14
22	53	1.6	1.07
23	60	2.2	1.02
24	54	1.7	1.08
25	57	1.8	0.97
26	62	2.4	1.01
27	58	2.2	1.13
28	67	3.6	1.20
29	59	2.4	1.17
30	67	3.5	1.16
31	59	2.2	1.07
32	59	2.2	1.07
33	50	1.2	0.96
34	54	1.7	1.08
35	44	0.8	0.94
36	53	1.5	1.01
37	61	2.5	1.10
38	60	2.3	1.06
39	55	1.6	0.96
40	49	1.1	0.93
41	52	1.4	1.00
42	50	1.4	1.12
43	54	1.8	1.14
44	53	1.4	0.94
45	47	1	0.96
AVERAGE:	**55.58**	**1.85**	**1.04**

Appendix F: Tatchun Creek Chinook Egg Take 2008

Tatchun Creek August 9. 2008:

Trix walked Tatchun Creek from 500m upstream of the Tatchun Lake road slide to the campground with Jonathan Parker (volunteer) on Saturday (August 9th). We followed the channel with the most flow (right channel) when the creek diverged.
We partially removed (hand pulling and swede saw) one barrier- a debris pile 500 m downstream of the slide. The rest of the creek appeared passable.
We did not observe any adult chinook in the creek.
I also paddled around the mouth of the creek and looked at the section downstream of the highway on Friday- didn't see any salmon holding.

Tatchun Creek August 22-25, 2008:

August 22:
William Linklater and Evan Manning walked Tatchun Creek from the lake outlet to the campground on August 22, following the right channels.
They counted 110 salmon and identified 40 as definitely female: 13(including 6 females) between the lake outlet and the holding pool upstream of the slide; more than 30 in and around the holding pool; rest downstream and mostly in groups. A spaghetti tag (A1215) was recovered along the bank from the remains of a dead salmon (some skin left). Numerous bear tracks and piles of faeces were observed. Eagles were also present in the area feeding. 4 females were observed guarding there reds and looked spent as they were really skinny. 13 salmon including 6 females were seen upstream of the pool.
No obstructions.

August 24:
Trix Tanner and Doug Knutson walked the creek from the bend upstream of the holding pool upstream of the slide down to the campground, counting redds.
A total of 61 redds were counted- including 19 that appeared to be no longer occupied.
Some groups of fish were observed in pools below stretches with redds, but they appeared to be using the pools for cover (from the fish counters), rather than holding to ripen. Most females appeared spent or partly spent- judging from their shape and the wear on their tales. (Likely missed some redds due to poor visibility.)
One fresh (clear-eyed) spent female carcass with scoliosis was found in a debris pile.
Bear tracks and scat along the river.
Rain all day turned into torrential downpour in the late afternoon at the end of the walk.
Water clear down to the mudslide above the campground, when it became a bit turbid, but fish still visible. Water higher than usual-no beaches.
Water 13 degrees C. at 5 pm
Returned to slide to capture broodstock- difficult due to high water.
Captured 5 spent females and 1 male on run downstream of slide. (One of the females had a puncture wound on the left side of her abdomen with most of an ovary and a piece of liver protruding- but was still swimming strongly.)

Captured 1 firm female from redd at base of slide.

August 25:
Trix and William fished in section from pool to below slide. It rain all day and the creek started to flood in the bushes.
Fishing and wading very difficult due to very high water levels, rain and poor light.
Several salmon were sitting on redds under standing waves.
Water still fairly clear in upper creek. Water at campground VERY turbid- 0 cm visibility- and carrying small woody debris. Water temp 11 degrees C. at 7:30 pm. At campground.
One spent female carcass partly eaten on shore beside pool.
Captured and took eggs from one mainly spent female (1000 eggs remaining) and one female that was approx 80 % loose- took 5000 eggs.
Captured 2 ripe males.
Looks like scouring of redds below mud bank very likely- and quite likely for some of the upstream redds too- especially with rain forecast for next 4 days.
(Yukon River also very turbid. Nordenskiold at Carmacks bridge VERY turbid and high-carrying LARGE woody debris. Klondike Highway closed at Carmacks due to road washout at 10 mile creek (culvert by Plume Agate trail).

NOTE:

Because NRI had agreed to wait until there were 200 fish in the creek before taking eggs, and the run was reportedly late, I thought that August 22nd would be timely for the first egg take. (Peak egg takes in 2007 were August 25th and 27th.) NRI was also carrying out incubation site preparation at McIntyre earlier in the week of the 22nd. However, it appeared that salmon did not hold long in the creek this year and the peak of spawning was in the week prior to the 22nd. Poor timing combined with the difficulty of catching remaining spawners in flood level water resulted in a dismal egg take.
Although 200 salmon were not observed in the creek at one time due to efficient predation on post-spawning salmon, a redd count indicated that this number was likely achieved. If fish were present in a 2 to 1 ratio (males to females), enumerated redds in the section walked would account for 180 fish in the section below the pool. An additional 13 chinook had been counted upstream of the pool after the peak spawning period, and could likely reflect the presence of over 20 fish prior to predation.

Appendix G: Fox Creek Project Egg Take 2008

Date Eggs Taken	Egg Tray at Planting	# Eggs Planted in Heath Trays*	Broodstock Source
28-Aug-08	E1	4625	Ladder
30-Aug-08	E2	2098	Ladder
30-Aug-08	E3	2414	Ladder
30-Aug-08	E4	2987	Ladder
30-Aug-08	E5	5332	Ladder
30-Aug-08	E6	3943	Ladder
31-Aug-08	B1	N/A	Ladder
3-Sep-08	F1	4941	Ladder
3-Sep-08	F2	3705	Ladder
3-Sep-08	F3	2853	Ladder
3-Sep-08	F4	4153	Ladder
5-Sep-08	F5	N/A	Ladder
5-Sep-08	F6	N/A	Ladder
6-Sep-08	H1	3260	Hatchery
6-Sep-08	H2	3105	Hatchery
6-Sep-08	H3	4729	Hatchery
6-Sep-08	H4	3391	Hatchery
6-Sep-08	H5/H6	5688	Hatchery
6-Sep-08	G3	3657	Hatchery
6-Sep-08	F6	2038	Ladder
9-Sep-08	B2	2764	Hatchery
Totals without un-enumerated eggs:		**65683**	

Appendix H: Takhini River Salmon Count: August 30th, 2008

Aug 30, 2008 Takhini River Visit

On August 30th Trix Tanner and Ken Knutson counted chinook salmon from the bow of a Lowe river boat between Kusawa Lake and the "Rock Garden" on the Takhini River. 82 salmon were counted, including 81 that appeared to be just grouping up on redds, and 1 not-quite-ripe female that had been scooped from the river by a bald eagle and was freshly dead. No other carcasses were seen. Water was clear but too deep for complete counts in the deep water sections, particularly in the vicinity of the campground, and in the deep bends immediately upstream of the Rock Garden. No spaghetti tags were observed. Canoeists encountered another 10 spawning chinook approximately 500 m. upstream of Mendenhall Landing later the same day. Water temperature was approximately12.5 degrees C. at the campground in late afternoon.

Appendix I: Tatchun Egg Survival 2008

Date Eggs Taken	Egg Batch ID	Egg Tray at Planting	Date of First Egg Pick	# Eggs Planted in Heath Trays*	Fertilization check	**# Eggs Picked** (est.)	**Calculated** # Eggs Remaining	**% Survival** from Green Eggs
25-Aug-08	G1	G1	30-Oct-08	1000	N/A	42	958	95.8
25-Aug-08	G2	G2	30-Oct-08	5000	N/A	1891	3151	63.0

*Estimates of large numbers of variable accuracy due to difficulty counting and calculating numbers of dead eggs in clumps

Note: Number of surviving fry will be assessed at ponding

Appendix J: Fox Creek Egg Survival 2008

Date Eggs Taken	Tray	# Eggs Planted in Heath Trays*	Broodstock Source	Date of First Egg Pick	**# Eggs Picked** (est.)	**Calc.** # Eggs Remaining	**% Survival**
28-Aug-08	E1	4625	Ladder	24-Oct-08	720	3905	84.4
30-Aug-08	E2	2098	Ladder	24-Oct-08	2098	0	0
30-Aug-08	E3	2414	Ladder	24-Oct-08	571	1843	76.3
30-Aug-08	E4	2987	Ladder	24-Oct-08	2987	0	0
30-Aug-08	E5	5332	Ladder	24-Oct-08	3088	2244	42.1
30-Aug-08	E6	3943	Ladder	25-Oct-08	3032	911	23.1
31-Aug-08	B1	N/A	Ladder	25-Oct-08	226	N/A	N/A
3-Sep-08	F1	4941	Ladder	2-Nov-08	713	4228	85.6
3-Sep-08	F2	3705	Ladder	30-Oct-08	421	3284	88.6
3-Sep-08	F3	2853	Ladder	30-Oct-08	126	2727	95.6
3-Sep-08	F4	4153	Ladder	30-Oct-08	2274	1879	45.2
5-Sep-08	F5	N/A	Ladder	30-Oct-08	386	N/A	N/A
5-Sep-08	F6	N/A	Ladder	30-Oct-08	Removed day 2	0	0
6-Sep-08	H1	3260	Hatchery	30-Oct-08	190	3070	94.2
6-Sep-08	H2	3105	Hatchery	30-Oct-08	421	2684	86.4
6-Sep-08	H3	4729	Hatchery	30-Oct-08	140	4589	97
6-Sep-08	H4	3391	Hatchery	30-Oct-08	324	3067	90.4
6-Sep-08	H5/H6	5688	Hatchery	30-Oct-08	152	5536	97.3
6-Sep-08	G3	3657	Hatchery	3-Nov-08	274	3383	92.5
6-Sep-08	F6	2038	Ladder	30-Oct-08	1375	663	32.5
9-Sep-08	B2	2764	Hatchery	2-Nov-08	381	2383	86.2
Totals without unenumerated eggs:		**65683**				**46396**	
Avg. survival of hatchery brood eggs:		**92.0**					**Avg. Survival of ladder brood eggs: 47.8%**

Estimates of large numbers of variable accuracy due to difficulty counting and calculating numbers of dead eggs in clumps

Note: Does not include eggs removed from batch for study sample at Fox Creek and number of surviving fry will be assessed at ponding.

Appendix K: Financial Summary March, 2009

MCSIP - Salmon Incubation Project - 2008/09
Total Received from Yukon River Panel - Project CRE65-07 - $45,300.00

Financial Summary			
I. PERSONNEL COSTS:			
Tagging, Egg takes			
Site Monitoring/Feeding/Picking	$11641.47		
		$11641.47	
Contract Services			
Tagging	$2402.75		
Total North Communications	$182.96		
Jacobs Industries	$189.84		
		$2775,55	
II. OPERATING COSTS:			
A. TRAVEL			
Mileage – egg takes, fly trapping, carcass surveys, boat fuel, etc		**$1704.40**	
B. MATERIALS, SUPPLIES, MAINENANCE			
Construction/Plumbing/Electrical/Incubation Supplies, Tags, Tagging Equipment	$10942.94		

Phone Hard-line Connection	$5447.37		
Electricity	$3167.20		
Security (phones, monitoring)	$1712.32		
Fish Food - Skretting	$524.38		
Permit Fee	$60.00		
Priniting	$386.05		
		$22240.26	
C. COORDINATION:			
Coordination Fee (15%)	$6795.00		
		$6795.00	
SUB TOTAL		**$45156.68**	
TOTAL			**$45156.68**

OTHER SOURCES OF FUNDING, ASSISTANCE, AND/OR INFORMATION:

Assistance Details	Amount of funding
Northern Research Institute: labour, administration, finance	$10000 in kind
Y2C2: fry trapping labour, adult stream survey -5 or 6 person crews for 5 days=25 person days	$2500 in kind
DFO: technical support and egg take assistance (for school program eggs) egg takes 20 person days	$10000 in kind
Streamkeepers North Society: equipment loans and Streamkeepers workshop	$500 in kind
Yukon College Instructors – 12 days	$5000 in kind
TOTAL	$28000 in kind