

YSSC Restoration History and Issues Briefing

A summary of concerns with current stock restoration projects is provided and possible recommendations. It is followed by a brief history of restoration projects in the Yukon. Information that was easily available was incorporated. This should not be considered a comprehensive summary of stock restoration work in the Yukon.

Concerns Expressed with Salmon Restoration Projects

Stock restoration project applications submitted to the Yukon River Restoration and Enhancement (R&E) fund have been deemed by the Joint Technical Committee (JTC) to be inconsistent with the YRP's Guidance for Restoration Proposals. The applications lack detail to properly evaluate the projects. The JTC believes that instream incubation is unsuitable for large-scale stock restoration due to lack of a means to determine returns. There are also a number of unmeasured risks to existing populations. These concerns have also been expressed by some YSSC Members. In addition, there has been some concern around techniques used in restoration projects to judge success. FN proponents have request clarity from YSSC on what types of restoration projects we would support.

Possible Restoration Recommendations:

1. Before YSSC support's egg transfers or incubation, a restoration plan must be in place and available to YSSC. The plan should outline the activities that will occur and any changes to the plan should special circumstances arise. Examples of special circumstances could include low salmon abundance, environmental conditions, disease, genetic integrity and broodstock availability.
2. During low salmon abundance years, restoring extirpated stocks should not be conducted to minimize risk to the donor population. Instead, efforts should be focused on rebuilding/strengthening the donor or other populations.
3. During periods of sustained average to above average salmon abundance, re-establishing extirpated stocks should be considered, but a plan should be in place if salmon abundance decreases.
4. For existing projects that are re-establishing extirpated stocks, a plan should identify how risks to the donor stock will be mitigated, or at what point egg takes will be delayed or cancelled until donor stocks are more abundant.
5. The type of incubation (hatchery, instream, or stream side incubation) should support the goals of the restoration project. For example, if the goal is to increase harvesting opportunities, then a larger production method, like a hatchery should be considered. However, if the goal is to increase a population with as little human interference as possible, then instream incubation or a short hatchery program should be considered.
6. For populations at risk of extirpation, a very clear restoration in plan must be in place and outline restoration activities for years of dire returns while considering the risks.

Past and Current Salmon Stock Restoration Projects

Older salmon restoration projects tend to have been poorly documented. Many projects will not be described here as we simply do not know the extent to which they progressed. Most recent projects will be described.

An issue has been the lack of DFO support for Salmon Enhancement in the Yukon. In the remainder of the salmon bearing waters of British Columbia the DFO provides “Community Advisors” to assist persons and communities in salmon restoration. DFO in the Yukon used to provide this service but withdrew in 1993.

Current Projects

Fox Creek Salmon Restoration/Stewardship Project

Proponents/Partners: TKC with assistance from EDI, DFO, Y2C2

Years: 2006 to current

Goal: Re-establish a self-sustaining population through stewardship and restoration efforts over 2 life cycles

Chinook used to spawn in Fox Creek but they disappeared around 1958. The cause of the extirpation is unknown, but was associated with a very large forest fire in the area.

Eggs have been provided by the Whitehorse Rapids Hatchery (Yukon Energy). Eggs were then transferred to the McIntyre Creek Hatchery for incubation and tagging. The long-term effects of destruction of the McIntyre Creek Hatchery by fire has not yet been determined.

The project also included: juvenile monitoring and growth rate, hydrology and water quality monitoring, including under-ice conditions, water temperatures, barrier monitoring & breaching of beaver dams, and trail maintenance. The TKC also incorporates their youth and trapper programs into the project.

The stock restoration component of the project now includes a camera assessment (video weir) of the returning adults.

In addition to stock restoration, habitat restoration has included passage restoration and the creek was removed from eroding sand/silt banks to limit erosion and sediment input to the creek

Year	Fry Released	Phase	Comment
2006			Planning
2007	0	I	Planning
2008	0		Broodstock taken
2009	55,000+		First fry release
2010	9,000		
2011	9,000		
2012	87,000		

2013	27,000		First adult return
2014	18,000		
2015	39,000		
2016	50,000	II	Confirmed wild emerging fry
2017	32,000		
2018	7,000		McIntyre Hatchery fire
2019	2,000		
2020	0		Added a video monitored weir

Fishing Branch River Chum Salmon Incubation

Proponents/Partners: VGG, EDI, DFO

Years: 2013 to 2018

Goal: To restore the Fishing Branch chum population

A habitat assessment and found that up to 20% of redds are dewatered during the winter. In 2017/18 a trial project collected eggs from broodstock in the dewatered area. The eggs were to be incubated at the McIntyre Creek Hatchery. Unfortunately, this was the year of the fire that destroyed the Hatchery. All chum eggs were lost. They have switched to instream incubation trials. Eggs are collected from broodstock in the seasonally dewatered area. They are transplanted to downstream locations in the Fishing Branch, planted and then monitored for survival and emergence timing. Additional eggs were also planted directly into the substrate as a restoration effort. The project also includes aerial surveys of redds, temperature monitoring and flow.

There were problems with determining survival of eggs as some were missing, possibly dug up by bears or spawning chum. Invertebrates were found in the bags and likely ate eggs/alevin. Emergence success varied between 0 to 52%.

Year	Eggs Transferred	Comment
2017/18	0	Too late to collect eggs
2018/19		Died in McIntyre Hatchery fire
2019/20	4,991	Instream incubation trials

Deadman & Morley Creek Chinook Restoration

Proponents/Partners: TTC, EDI

Years: 2015 to present

Goal: To re-establish a Chinook population at Deadman Creek

Previous work on Deadman Creek included beaver dam management (2001 to 2006).

Deadman Creek no longer has spawning Chinook. Traditional Knowledge said that there was a spawning population using the creek. Broodstock is collected from Morley River Chinook. Some eggs are replanted into Morley to compensate for the removals and to serve as a control. Eggs are planted into Deadman Creek. Deadman Chinook hatch mid to late January with fry emerging post freshet in mid-June. Morley

eggs hatch at the end of September with fry emerging pre-freshet during mid-April. Wild juveniles typically arrive early July at Deadman Creek.

In addition, there is temperature monitoring, water level and discharge, juvenile monitoring, and aerial surveys of Morley and Nisutlin.

Year	Morley			Deadman			Comment
	Eggs	Hatching Success	Emergence Success	Eggs	Hatching Success	Emergence Success	
2016		87%					
2017					56%		
2018		75%	34%		44%	2%	
2019	5,550	86%		6,581	49%		

Klondike (current)

Proponents/Partners: TH, EDI

Years: 2018? to present

Goal: To increase the Klondike Chinook population back to historic levels

Broodstock is collected from the Klondike River. Eggs are planted into the Klondike, North Klondike and the Farm Channel. Instream incubation methods are used. In addition, water temperature monitoring and water velocity data is collected. Juvenile presence is monitored and aerial survey are also conducted.

A separate project, a sonar also estimates the Chinook run to the Klondike.

Year	Eggs Collected	Klondike		North Klondike		Farm Channel		Comment
		Hatching Success	Emergence Success	Hatching Success	Emergence Success	Hatching Success	Emergence Success	
2018/19	8,136	61%*	-	-	-	61%*	91%	
2019/20	7,857	38%	33%	74%	66%	13%	26%	Klondike is most variable

*Hatching success was an average across both locations

Mica Creek Chinook Restoration

Proponents: SFN, EDI

Years: 2019 to current

Goal:

There was past beaver dam management on Mica in 2001. Note killing of beavers is only allowed in spring under Dooli. A small instream incubation project took place in the late 1980s but there is scant information on it.

Background work for the current project included aerial surveys, temperature measurement with loggers, and winter aerial surveys looking for open water. In 2019 no adult Chinook were seen but low water levels, beaver dams and logjams may have blocked their migration. In 2020 no Chinook were seen but the water was high and dark like chocolate, making visual counts difficult. In the future, they would like to incubate eggs in Mica Creek to strengthen this population (if it still exists). The original plan was to use broodstock from Kalzas River or Mica Creek. This project has not progressed to the incubation stage yet.

Takhini/Ibex

Proponents/Partners: KDFN, EDI, DFO

Years: 2019? to present

Goal:

Currently conducting egg incubation trials at Ibex River (tributary to the Takhini River). This is a previous spawning location for Chinook that is no longer used. Broodstock is collected from Takhini River and incubated instream.

Tay River Chinook Enhancement Project

Proponents: B. Mercer Inc, SFN

Years: 2018 to 2019?

Goal: To establish a new population of Chinook

Habitat studies and Chinook salmon presence investigations were conducted in 2018 to assess the Tay River. The potential production of Chinook from this system was estimated to be ~7,000. A bedrock barrier was assessed to determine if it could be removed. A plan to remove the barrier for Chinook was developed.

Whitehorse Rapids Fish Hatchery (WRFH)

Proponents: Access, YEC, YFGA, DFO

The WRFH raises Chinook as compensation for upstream populations that lose juveniles as they pass through the turbines. The compensation is not the product of a legal agreement. The WRFH has supported restoration efforts at Fox Creek, Wolf Creek and the salmon in the schools program depending on available broodstock. Fry releases to Michie Creek, the M'Clintock River and Wolf Creek have ranged from 150,000 to 300,000. In more recent years fry release targets have been for 150,000. This includes 10,000 released into Wolf Creek as a youth stewardship project.

McIntyre Creek Hatchery

Proponents/Partners: Trix, Whitehorse Corrections, YC, DFO, TKC

Years: 1989 to 2018

This hatchery is located at a ground water discharge site near Mountainview Drive. Both Chinook and chum have been incubated at this location. In June the fry were CWT with half tags. The primary focus was originally Tatchun and Tahkini Chinook and later shifted to supporting Fox Creek Chinook project and the Fishing Branch chum. The hatchery also consistently supported the salmon in the classroom. There were many improvements completed over the years. It burnt down in 2018.

Past Stock Restoration Projects

North Klondike River Stream Side Incubation Boxes (past)

Proponents: Yukon River Commercial Fishers Association, THFN and DFO SEP

Years: 1989 to 1994

These incubators raised on average 28,000 fry/year. Fry were returned to the rivers that the broodstock had been captured in. This project had technical challenges due to very cold ground water used for incubation. The fry were raised in the McIntyre Creek Hatchery, tagged and then taken for release. The project was discontinued in 1996 due to lack of funding and an erosion of interest in the local community.

Mayo River - Wareham Dam

Proponents – Stewart River Save the Salmon Association, Yukon Energy Corporation and DFO SEP

Years:

Incubators were placed at the powerhouse and used water from the penstocks. The SRSOSA were the applicant and much of the work was done by DFO SEP. Challenges included highly turbid water in the spring that killed much of one year's production, and a lack of water during tagging that resulted in many or most of another year's production.

Yukon River Upper Lakes - Wolf Creek

Proponents – DFO SEP

Years:

A single incubation box was installed downstream of the Alaska Highway. The box was fed with surface water from Wolf Creek. The box and all the eggs it contained froze in the first year. Electrical power was then installed to keep the water from being frozen.

Tatshenshini River – Klukshu and tributary streams

Proponents – DFO

Years:

Incubation boxes were placed on the Klukshu River and ground water fed tributary streams. The Klukshu River used surface water. The surface water contained disease and parasites, resulting in high

rates of death of eggs and alevins. The tributary incubation boxes were to deal with this issue, but the program collapsed due to internal DFO issues.

Habitat Restoration Examples

There are also examples of habitat restoration projects. However, the Habitat Restoration has not received the amount of attention that the Stock Restoration has. Some projects are listed below:

- McIntyre Stream crossing near the pumphouse
- Range Rd dump at McIntyre Ck/Yukon River
- Wolf Creek fishway
- beaver dam breaches
- Fox Ck channel restoration
- Germaine Creek Revegetation