Fisheries and Oceans Canada

Champagne and Aishihik First Nations

Alsek River Sockeye and Chinook Salmon

International Stock Rebuilding Initiative

Initial Transboundary Panel Project Scoping Initiative (2019)

Da Ku Cultural Centre - Haines Junction, Yukon

May 28 to 30, 2019

PSC NF-2019-E-5A

Project Report Date February 23, 2020

Context

Alsek River sockeye and chinook salmon are both of significant importance to people and to the broader integrity of the natural environment in Canada and Alaska. In recent years poor returns, in many cases well-below historic levels, have led to reduced opportunity for fishery harvest and concerns over sustaining stocks into the future. The international management of Alsek River sockeye and chinook salmon is coordinated through the Pacific Salmon Treaty (Chapter 1 - Transboundary Rivers) and overseen by the Pacific Salmon Commission's Transboundary Panel. In February 2019 the Transboundary Panel engaged in a directed discussion focused on the current state of Alsek River salmon stocks, declining fishery opportunities and the desire to respond. As a result, the Transboundary Panel Co-Chairs requested funding from the Pacific Salmon Commission's Northern Fund to hold an international meeting to exchange information and share ideas on potential initiatives that could support re-building of Canadian-origin Alsek River sockeye and chinook salmon stocks.

Purpose / Objective

The purpose of the meeting was to bring together interested parties to share information and create a common understanding of Canadian-origin Alsek River sockeye and chinook salmon stocks, identify information gaps and explore opportunities that will inform future plans and initiatives intended to support stock re-building. The engagement involves a multi-party effort to explore, review and evaluate possible bottle-necks to Canadian-origin sockeye and chinook salmon production and survival in the Alsek River watershed. The focus of discussions will involve confirming past trends and current state of salmon stocks, considering issues potentially affecting salmon stock production, and an exploration of habitat improvement options and/or enhancement measures that could provide the greatest likelihood of potentially supporting rebuilding salmon stocks within the near-term.

Participants

Champagne and Aishihik First Nations Government and Citizens
Fisheries and Oceans Canada
Alaska Department of Fish and Game
Pacific Salmon Commission - Transboundary Panel (Members/Advisors)
Yukon Salmon Sub-Committee

Fisheries and Oceans Canada

Champagne and Aishihik First Nations

Meeting Agenda

Tuesday May 28

09:00 to 09:30 Arrival, Coffee, Seating
09:30 to 09:45 Opening Prayer / Participant Introductions
09:45 to 10:00 Opening Remarks, Context and Purpose of the Meeting. (S. Gotch)
10:00 to 12:00 Sharing Perspectives: Historical and current fisheries, observations and discussion of changes and trends in Alsek River (Tatshenshini) salmon. (Participants)

12:00 to 1:15 Lunch

01:15 to 02:15 Alsek River Salmon Distribution and Assessment Programs (P. Vecsei)
02:15 to 03:15 Chinook Salmon, Regional Assessment and Status (E. Jones)
03:15 to 03:30 Coffee Break
03:30 to 05:00

- Review and Discuss Information on Stocks, Habitat and Distribution (Participants)
- Development of Problem Statement and Objective (C. West / Participants)

Evening Tour – Alsek River Watershed (18:00 departure)

Wednesday May 29

08:30 to 08:45 Review of Day 1 (S. Gotch)
08:45 to 09:45 Salmonid Enhancement Program - Salmon Stock Rebuilding (S. Collins)
09:45 to 10:15 Sockeye Salmon Enhancement at Tahltan Lake B.C. (C. Frocklage)
10:15 to 10:30 Break
10:30 to 11:15 Sockeye Salmon Enhancement at Gulkana River Alaska (F. Pryor)
11:15 to 12:00 Approach to Salmon Stock Rebuilding (M. Foy / L. Miller)

12:00 to 1:15 Lunch

01:15 to 01:30 Review Problem Statement and Objective (S. Gotch)
01:30 to 05:00 Alsek Salmon Stock Rebuilding Planning Discussion (C. West / C. Salomi)

- Defining targets and/or outcomes
- Current state of knowledge and gaps
- Potential Strategies
- Planning
- Monitoring or Results

Evening Site Visit to Dalton Post and Klukshu (18:00 departure)

Thursday May 30

08:30 to 12:00 Alsek Salmon Stock Rebuilding Planning Discussion (C. West / C. Salomi)

12:00 to 1:15 Lunch

01:15 to 04:30 Meeting outcomes, actions and next steps and closing remarks.

List of Figures

Figure 1 Alsek Drainage Location of Aboriginal, Commercial and Sport Fisheries 5

Figure 2 Klukshu Sockeye Potential and Confirmed Spawning Locations, 2016 6

List of Tables

Table 1. Potential Information, Habitat and Enhancement Projects for Alsek Sockeye and Chinook Rebuilding - Brainstorming List 17

Attachments

Attachment 1 Alsek River Salmon: Assessment and Management Overview 20

Attachment 2 Pacific Salmon Stock Rebuilding Methods 61

Attachment 3 Lakelse Lake Sockeye Recovery Plan 2005 83

Attachment 4 Enhancement Planning Aid 2014 102

Attachment 5 Sockeye Salmon Enhancement Workshop – 2017 104

Attachment 6 Gulkana Hatchery – Clark 105

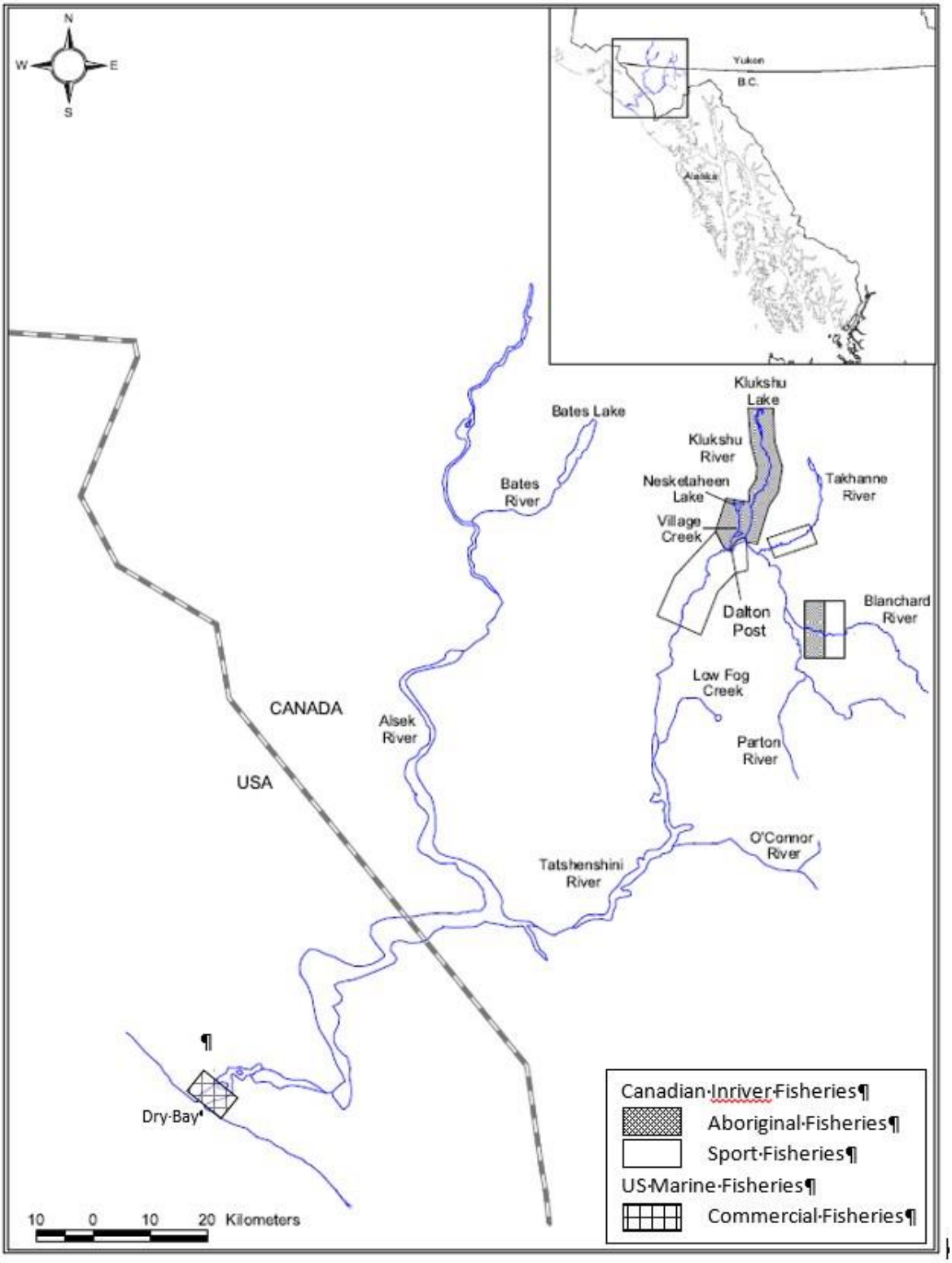

Figure 1: Alsek Drainage Location of US Commercial and Canadian Aboriginal and Sport Fisheries

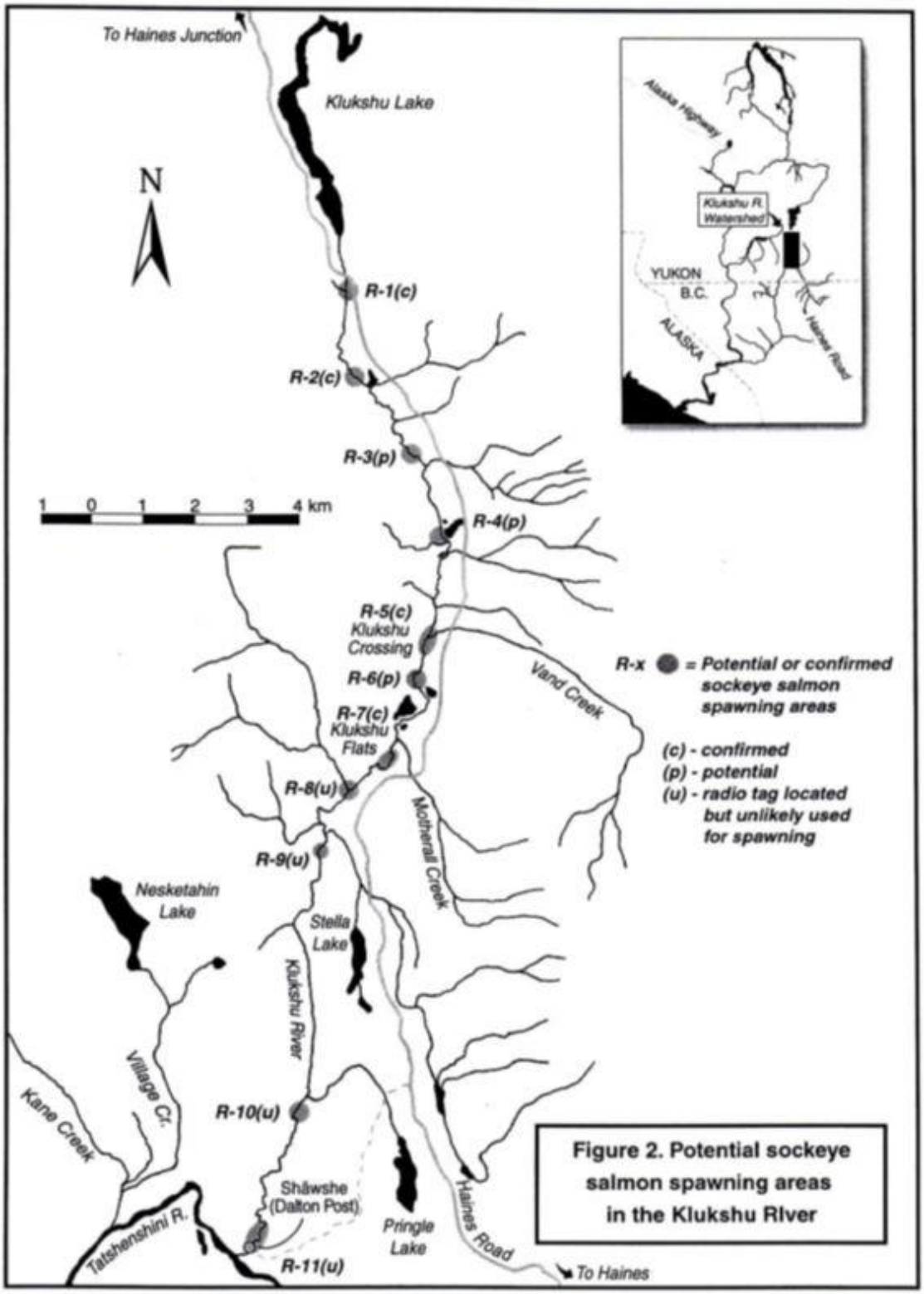

Figure 2: Klukshu Sockeye Potential and Confirmed Spawning Locations, 2016

Sharing Perspectives

Champagne and Aishihik First Nations, a Canadian First Nation holding Final and Self-Government Agreements, historically relied heavily on salmon fishing for subsistence and cultural purposes. With the sustained decline of chinook salmon and more recently poor returns of sockeye salmon, opportunities for harvest have become increasingly limited. An example is of this is evident from recent abundance of sockeye salmon returning to Village Creek, a system that provided for a local fishery however has now declined significantly, particularly since 2013.

Gathering over the regional floor map in the Da Ku Cultural Centre, Lawrence Joe provided an overview of current and historic fisheries of the traditional territory of the Champagne and Aishihik First Nations (CAFN). General discussion followed with participants providing information on status and trends of fisheries, salmon stocks and habitat throughout the watershed including the marine fishery in Dry Bay.

- Beaver dams have become more common and cause passage problems for salmon.
- People actively trapped beavers in the past, which kept their numbers down, but (one of) the last trappers was Fran and Carol's father.
- Access to many parts of the watershed is difficult – 'young man's country'.
- Water levels and floods in the lower river are becoming abnormal, fluctuating a lot.
- The Kaskawalsh glacier is receding and diverting more water into the Alsek. Salmon access past Turnback Canyon may be possible in the future.
- Placer mining has affected some fishing locations.
- Summer, 3rd week of July, used to be spent drying fish at Neskatahin / Dalton Post.
- Takhanne River used to have large, older chinook but in 2018 it was observed to have a large proportion of jacks. The habitat did not appear to be drastically changed.
- Bear population does not appear to have changed much.
- Gravel alluvial fan at outlet of Klukshu Lake could cause a migration barrier at low water.
- Lingcod and lake trout are known to prey on salmon juveniles in Klukshu Lake.
- Harbour seals appear to be increasing around Dry Bay (200+) and another 200 upstream. They might have a significant effect in years of low salmon abundance.
- Klukshu Lake may have potential for fertilization. Neskatahin was not identified as a candidate (in a 1978 study) with its productive littoral zone full of macrophytes.
- Only 2 or 3 gillnetters fish Dry Bay, harvest only 20-30 sockeye and a few chinook.
- Blanchard River seems to be running more clear. Blanchard Lake may be clearing, potential for increased productivity in the long term.

The general location of the US commercial fishery in Dry Bay and the in-river Canadian Aboriginal and sport fisheries on Alsek salmon stocks is shown in figure 1. For information of readers, potential and confirmed Klukshu spawning locations identified in a 2016 study by Pestel, Etherton and Petkovich for the Champagne and Aishihik First Nations (PSC N16-153) is provided in Figure 2.

Alsek River Salmon Distribution and Current Assessment Programs – Dr. Paul Vecsei

Dr. Vecsei provided a presentation (attachment 1) on the life history, management and assessment of Alsek chinook and sockeye. Discussion on the presentation included the following notes:

- Large chinook are becoming less common in upriver fisheries
- Run size information for the total Alsek system is only available for a short time series, unlike the Klukshu, but the commercial harvest is an indicator of run size.
- People are concerned about predation by seals, and climate change, increasing water temperatures and decreasing flows.
- The US commercial fishery has operated since around 1910, but catches have had reduced trends since the early 1980's. The US subsistence fishery is minor, less than 100 chinook per year with very small numbers of sockeye taken.
- Last year, the commercial sockeye fishery in Dry Bay only fished 5 days of a potential 70 days. These restrictions are likely to continue.
- When the Dry Bay fishery is open it has only been for one day per week, theoretically the maximum possible harvest rate could only be (1/7) 14% and realistically it is less.
- Traditional CAFN fisheries are also concerned about long term sustainability.
- Canadian chinook and sockeye harvests have also decreased, to persistent low levels.
- US harvest strategy has reduced harvest rates to around 10% to pass more fish upriver.
- Some spawning grounds are no longer being used.
- Smaller streams are sometimes indicators of what is happening in the larger watershed.
- Takhanne snorkel surveys (recent) being used to provide long term abundance indices - replacing the uncertainty of aerial surveys.
- Traditional knowledge provides one of the few understandings of long term change in fish stocks and the watershed.
- Prior to current Klukshu escapement goals, the goals were 'professional opinion based'.
- CAFN Community Salmon Management Plan is trying to protect early run sockeye that have declined.
- Klukshu River and lake spawning sockeye were historically thought to have separate run timing, before and after Aug 15 at the Klukshu weir. But recent genetic studies have shown the two stocks overlap in timing with the earlier river sockeye being the minor component of the overall run.
- Village Creek sockeye are a priority for CAFN, historically feeding a large number of people. Village Creek is easy to monitor, there used to be large numbers of fish but returns have been very low for several years. Note, however, the Elders used to talk about "hungry" times between years of abundance.
- Freshwater habitat has changed largely through natural processes with some human influences in certain locations. Beaver population/dams, placer mining and alienation of habitat (Haines Road position and culvert development) are causing a net loss. Million

Dollar Falls may have potential for passage development, unclear if historical work affected salmon passage.

- Recreational, US commercial and CAFN fisheries have all been reduced in recent years.
- Juvenile salmon face a variety of predators, including seals, otters, burbot and lake trout.
- Beaver populations need monitoring and control.

Chinook Salmon, Regional Assessment and Status – Ed Jones

Ed Jones provided an update on regional chinook assessment. Discussion of the presentation included the following notes.

- Chinook harvests have decreased coastwide.
- The recreational fishery in Alaskan SE waters has been closed for the last 4 years.
- In the last decade, Alaska has seen the worst chinook production on record.
- Chinook returns have been so low in recent years that harvests could have been zero and the escapement goals would still not have been met.
- Chinook stocks are managed under the Pacific Salmon Treaty (PST) on a 'Maximum Sustained Yield' principle, harvests are reduced when returns decrease.
- Chapter 1 of the Pacific Salmon Treaty coverts fishery management of Transboundary Rivers and Chapter 3 covers chinook.
- Recommendations by PST Panels are made to the PST Commissioners who make recommendations to the Parties (Canada and USA). Four Transboundary Panel members are attending this workshop plus several TBR Technical Committee and Enhancement Sub-Committee members.
- Early marine survival, not freshwater survival, appears to be the major problem. In the last decade, smolt to adult survival of Taku chinook has decreased from 3-4 percent to less than 1 percent.
- Variability (amplitude) of returns is increasing.
- Adults are returning at younger ages which is causing a decrease in average size.
- Escapement goals may need to be increased to compensate for lower fecundity.
- Seal predation might be a factor (on smolts or adults?). Dry Bay may have between 400 and 2,000 seals.
- Harvest of chinook is incidental in the Dry Bay sockeye gillnet fishery, only 88 fish were harvested last year.

Evening Tour - Alsek River Watershed

Following the Day 1 discussions, fourteen workshop participants took part in an aerial tour of the Alsek watershed to view key salmon spawning and rearing areas.

Review of Day 1

Workshop participants had a general discussion of issues affecting their salmon fisheries.

- Many important local fisheries are now restricted or completely closed: Klukshu sockeye at Dalton Post, Klukshu Crossing and Flats.
- Permits for visitor gaffing have not been issued for 10-12 years.
- CAFN asked its members no to take too many fish. Ideally, 3,000 early run sockeye would be taken for drying. Grandma used to put up 400 fish, but now people might only take 40 fish per family each year.
- Early run Klukshu sockeye / Village Creek were good for eating and drying, late run sockeye for freezing. Late run coho are poor quality, harvest is usually less than 20, used to be called 'dog fish' because they were used for dog food.
- Salmon fishing has cultural aspects – sharing, time with other generations and transfer of traditional oral knowledge. Early chinook were a priority for Elders, good for fish head soup. Klukshu chinook are smaller, Blanchard chinook are larger and only some people were able to gaff them. Now, the first salmon come from Alaska.
- In the Dry Bay fishery, grandchildren would be 4th generation harvesters but there may not be enough salmon, even subsistence fishing is low. Ideally, the fishery would start on early fish because the oil content is high and the fish have more flavour. We eat our first fish and share them with our neighbours, not sell them. Ideally, there would be enough fish for everyone upriver and downriver.
- Commercial fishing would start the first Sunday in June, 2 days of productive fishing would supply everyone, but we know enough salmon need to make it to the spawning grounds. 2 days fishing per week would be great but 1 day per week is like throwing the dice. Only fishing a small part of the river. Current, debris, ice and trees make it hard to fish. Tides limit fishing opportunities, and rough weather can limit access from Yakutat. Community access to Dry Bay is limited and expensive for locals in town.
- Many people left the Dry Bay fishery in the '90's due to economics and the cost of fishing. There is only one air taxi operator now and last year they didn't fly fish.
- Coho fishing isn't decent inside the spit until Sept 25, and Alsek coho are 50% blush versus bright ocean troll caught coho that get a premium price.
- Dalton Post coho are coloured, and the flesh is soft and mushy, so they aren't fished much anymore. Increased coho may be causing more predation on sockeye.
- Media reports there are no fish, people go elsewhere and fewer people recreational fish.
- Could angling regulations change to allow coho fishing after sockeye have spawned?
- Recreational fishing chinook and fly fishing for early sockeye used to be good before motor homes started showing up at Dalton Post and people were standing shoulder to shoulder bait casting.
- Early run Klukshu sockeye are desirable for CAFN, 10 to 15 years ago a couple of people could catch 100 fish per day, but runs are so low now that people take only a few fish and allow the rest through the weir to spawn.

- Timing of earlier Klukshu riverine and later Klukshu lake spawning sockeye overlaps. Separating the two stocks for hatchery broodstock would be an issue. Could sample DNA at the weir to identify the timing of the two stocks to see if delivery and management of the stocks could be improved.
- The US commercial fishery has been delayed to stat week 25 (typically used to start sw23) to let early fish up the river.

Salmonid Enhancement Program - Salmon Stock Rebuilding (S. Collins)

Sean Collins provided an overview of enhancement methods used by the DFO Salmonid Enhancement Program (attachment 2). Methods vary widely and affect different stages of the salmon life cycle which are themselves highly variable. For a salmon rebuilding program to be effective, thorough planning with clear goals and assessment are essential.

- Developing reasonable and attainable restoration plans with purpose and measures of success is critical for successful protection of salmon resources
- A goal for the Alsek might be to rebuild stocks to their potential natural levels.
- Survival of wild produced fish is generally higher than that of enhanced fish in the wild, but significant increases in survival during enhanced stages, e.g. 2-5 fold increased survival of juveniles in hatcheries can have an over-all increase in stock production.
- Look at history to find where salmon used to be. Villages used to be located for salmon access, but there are many places where salmon used to spawn that are now cut off by beaver dams, e.g. Raven Creek village is now underwater due to beaver dams.
- Beavers were there historically, but they were hunted and didn't have such a big effect. There are also predators that eat salmon that are no longer being hunted by people, and the expanding beaver population is affecting salmon.
- We need on-the-ground information. We may not be aware of opportunities because people can't easily access some areas.
- Small scale incubation boxes were tested on the Klukshu for 3-5 years in the late 80's early 90's and also in the 70's. Results of the latter period were poor with high mortality particularly due to poor quality water supply and lack of nearby groundwater sources.
- Long term monitoring and assessment is important. Stick to a long term plan and don't react too quickly because results can vary from year to year.
- Follow a planning approach:
    - Review the historical and current salmon stock information
    - Determine what problems may affect the stock of concern
    - Develop options, solutions, plans and establish targets
    - Determine strategies and assess results whether intervening or not
    - Key to success, developing an informed strategy and sticking to it

Approach to Salmon Stock Rebuilding (M. Foy / L. Miller)

Matt Foy – Chinook

- Each salmon population is unique and specific information on each stock is usually needed to address a concern.
- Begin by identifying the concern, such as a decline in stock strength, and then identify drivers causing the concern. Drivers may be large scale environmental conditions such as the North Pacific "Blob" that are difficult to fix. Or, drivers may be local and can be improved, such as access problems caused by low water or beavers, or juvenile rearing conditions.
- Environmental conditions are often cyclic but long term, in which case a hatchery or other fish culture technology could maintain or boost a stock until more favourable environmental conditions return.
- Hatchery produced fish can be more challenged but hatcheries can increase a stock and also improve fishery management by producing smolts for coded-wire-tagging or by supporting other assessment programs.

Lana Miller – Sockeye

- The Lakelse Lake Sockeye Recovery Plan is a good reference document (attachment 3). Lakelse Lake has good quality rearing habitat that is underutilized but small tributary streams can be cut off by beaver dams and there is a lack of flushing flows to clear the dams. Removal of dams during the adult season and a long term beaver management program have been effective in providing access to spawning grounds. A similar beaver management and dam removal program has been put in place on the Bear River near Stewart, BC.
- Two years of small scale outplants of Lakelse sockeye fry from Snootli hatchery was followed by increased adult returns.
- Kitwanga Lake has had low smolt/female production in recent years and a telemetry study last year found 58% of Radio Frequency tagged females were killed by bears at beaver dams.

Matt Foy & Lana Miller

– General Experience

- Experience shows that better information and feasibility usually result in the best programs.

– Spawning Gravel and Spawning Channels

- Kitwanga spawning gravel was rehabilitated by hydraulic cleaning to remove sediment and by addition of new gravel. Assessment showed similar high egg-to-fry survivals in treated and non-treated sites.
- At Lakelse, gravel spawning platforms were created in agricultural ditches by adding screened gravel. Spawning sockeye used the platforms but egg survival was poor and the gravel collected a lot of fines.

- Artificial spawning channels in southern BC use screened gravel (<1/4" removed) to produce very high egg-to-fry survivals. High water quality and gravel maintenance are priorities to prevent silt and organics from penetrating the redds and smothering the eggs.
- In nature, coarse sand and 1/4" gravel cause organics to remain at the surface where it is removed by floods or by salmon redd building. If there is more than 25 percent sand then some fry can't emerge.
- Natural spawning gravel can be cleaned by hand, but salmon redd building cleans the gravel and the shape of the redd forces water through the gravel.
- Semi-natural spawning channels use clean natural gravel that includes sand and 1/4". Natural gravel has lower egg-to-fry survival than screened gravel but is more resistant to siltation and maintains egg-to-fry survival over time.
- Aquifer discharge can provide good opportunity for construction of spawning channels.
- Spawning channels can also prevent egg loss from main channel flood events.
- Due diligence is required for permitting and approvals.

– How to develop a Recovery Plan

- The Lakelse Lake Sockeye Recovery Plan took one year to develop with input from First Nations, local communities and DFO. Stock status information was provided by a DFO Assessment Biologist.
- The PST Northern Fund provided funding support for the process and to hire a local consultant to write the plan.
- The consultant would leave the meetings with a list of action items to keep the process moving forward.

Note: An Enhancement Planning Aid is provided by Lana Miller (attachment 4).

Note: A presentation on the Kitwanga Sockeye Rebuilding project, presented by Mark Cleveland, Gitanyow Fisheries Authority at the 2017 Sockeye Enhancement Workshop is available on YouTube (List of presentations and website – attachment 5).

Sockeye Salmon Enhancement at Gulkana River Alaska (F. Pryor)

Flip Pryor presented a report on the Gulkana sockeye incubation box project (attachment 6). This presentation by Jeff Clark, PWSAC is also available in the 2017 Sockeye Enhancement Workshop report on YouTube (attachment 5).

- The Gulkana project is a very successful large scale sockeye incubation project operated by the Prince William Sound Aquaculture Corporation, and is located on the Gulkana River / Copper River system.
- Annual egg-take goals exceed 36 million eggs – in relative terms, this is four to five times larger than a typical large DFO hatchery in BC.

- A key to the success of this project is an upwelling spring that provides hiqh quality water with sufficient head to supply the incubation boxes without pumping, and operates in minus-46'C temperatures.
- Fry otoliths are marked with strontium to assess the enhanced production.
- The project operates on a cost recovery basis.
- Aerial release techniques using crop-duster aircraft have been developed for fry transport and release.

Evening Site Visit to Dalton Post and Klukshu

Following the Day 2 discussions, many of the workshop participants took part in a driving tour along the Klukshu system to Dalton Post, including stops to view spawning grounds below Klukshu Lake, past habitat restoration and enhancement projects, and the Klukshu weir.

Alsek Salmon Stock Rebuilding Planning Discussion

A general discussion and brainstorming provided the following comments and table of potential information, habitat and enhancement projects for rebuilding Alsek sockeye and chinook stocks.

Tatshenshini River Salmon

Problem Statement:

- Not enough fish. There are fishing closures in marine and freshwater fisheries.

Objectives:

- Access to early fish for all Parties.
- Continuation of CAFN fisheries that also provide community benefits including social activities, engagement with youth and sharing of fish.
- Dry Bay consistent fishing a couple days a week, sustainability and a future for grandchildren
- Improved information for better fish management decisions.
- Recreational fishing, possibly increased opportunities for coho.

Sockeye Targets:

Klukshu Sockeye (PST obligation) (7,500 - 11,000) escapement + (3000) harvest

Klukshu Lake Sockeye – Short-term conservation target of (7500+) escapement. Long-term target with fishing opportunity (escapement plus 3000 fishing opportunity?). Need more information on habitat production capacity, other stocks and predators to refine the escapement target. Recreational fishing is also an objective.

Klukshu River Sockeye: Short-term conservation (1500+). Long-term escapement plus fishing opportunity (escapement plus 3000 for CAFN needs; additional surpluses to support US commercial harvest). Recreational fishing is also an objective.

Village Creek Sockeye – Short-term conservation target of (1000+). Long-term escapement plus fishing opportunity (2000+? <= this may be high, need more information on productivity of habitat, and other stocks and predators in Neskatahin Lake).

Chinook Targets:

Klukshu Chinook Short term spawning escapement (800-1200). Longer term target to support sustainable fisheries of (2000+).

Coho Targets: Currently there are no targets and no dedicated assessment programs. A better understanding of coho interactions with other stocks is needed.

Information Gaps/ Study Opportunities

Need patience and an intimate understanding of stocks and habitat. Understanding of past fish abundance and distribution, habitat changes and likely future conditions

Potential Planning /Actions/Monitoring

Fry production from a hatchery or incubation boxes

Beaver dam removal and beaver management

Freshwater habitat work

Promote wider planning to support healthy marine conditions

Smolt information and coded wire tagging

Predator information

Fisheries and Oceans Canada

Champagne and Aishihik First Nations

Table 1. Potential Information, Habitat and Enhancement Projects for Alsek Sockeye and Chinook Rebuilding - Brainstorming List

Priority	Problem, Concern, Need or Opportunity	Desired Outcome	Activity	Delivery Options and Funding	Status
Information <u>Opportunities / Issues / Options</u>					
1	Adult salmon stock genetics distribution/spawning		Update radio telemetry information		
1	Sockeye smolt production /monitoring		Smolt fence options		
	Juvenile coho coded wire tagging/clipping		Juvenile capture and tagging, adult assessment		
	Information on coho abundance, distribution and potential predators		Leave adult weir in longer smolt sampling and enumeration		
	Predator information and significance for sockeye and chinook		Seals, coho, bear, lake trout, suckers, other?		
	Coho – impact of increased spawning population on sockeye and chinook				
	Coho - explore recreational and commercial harvest options		Increased/new fishing opportunities		
	Beetle impacts on hydrology and needle deposition				

Priority	Problem, Concern, Need or Opportunity	Desired Outcome	Activity	Delivery Options and Funding	Status
Habitat Opportunities / Issues / Options					
1	Migration Barriers		Seasonal monitoring and management of obstructions, dams and beavers	Combine with other programs: radio tagging, DFO and Community	
	Look for good groundwater discharge locations for habitat development or construction of incubation boxes				
	Juvenile rearing locations and life history		Juvenile surveys		
	Lake and stream habitat carrying capacity or productivity		Limnology information on Klukshu and Neskatahin Lakes		
	Stream habitat carrying capacity or productivity		Life history of juvenile riverine sockeye		
	Water temperature and flow monitoring of lakes/rivers		Temperature loggers including current and historical information		
	Migration passage improvement investigation		Million dollar falls? Howard Lakes	Drone use ?	

Priority	Problem, Concern, Need or Opportunity	Desired Outcome	Activity	Delivery Options and Funding	Status
<u>Enhancement Opportunities / Issues / Options</u>					
1	Community engagement and support	Community is engaged and supporting salmon management action	Inform and engage the community on Tatshenshini salmon status, management and options		
1			Compile and share key info	DFO/CAFN/Standing Committee on Salmon, other First Nations	
	Baseline reconnaissance and feasibility information for enhancement		Disease sampling/profiles, adult timing, collection sites and logistics, etc.		
	Upper river conservation/ rebuilding strategies		Neskatahin recovery strategy and options		
	Lower river new opportunities		Survey for future sockeye opportunities		