Pacific Salmon Commission

Northern Boundary & Transboundary Rivers Restoration and Enhancement Fund

2019 Final Report

Prepared for: PSC Northern Funds Committee

Prepared by: Secretariat of the Haida Nation

Date: December 27, 2019

Project: Yakoun River, Haida Gwaii, Annual Chinook & Coho Assessments

Haida Fisheries Program
250-559-4468

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Executive Summary

The Pacific Salmon Commission (PSC) Northern Funds committee supported the Haida Fisheries Program's (HFP) assessment of chinook and coho migrations into the Yakounr River, on Haida Gwaii, over the 2019 season, with an allocation of $35,000 to support operational costs from late June to late October. The season started off reasonably well with the assessment of sockeye beginning in May (supported through AFS contribution funds), transitioning into chinook in late June (supported through PSC Northern Funds). Near the peak of the chinook migration a weather event damaged the ARIS sonar causing the assessment of migrating salmon into the Yakoun River to be discontinued for the season. As 2019 was the first year of the ARIS operation there were many firsts that required learning and modifications. This was particularly the case in regards to the analysis of the data collected by the ARIS. Although the preseason proposal was to hire a data technician for the 2019 season, the HFP Salmon Biologist did most of the data analysis, learning the ARIS programming and formulating the data analysis process. At the time of this report writing (end of December, 2019) data analysis was completed to July 4th, at which point a total of 399 chinook were determined to have migrated past the ARIS sonar site. The final 46 days of data (July 5th to Aug. 19th) will be analyzed in conjunction with the training of a data technician prior to the beginning of the 2020 season, at which time the results from the 2019 season will be completed.

Subject to the outcome of the 2019 season, PSC funding received by the Secretariat of the Haida Nation (SHN) will be returned (in whole or in part) subject to communications and directions from the PSC Northern Funds committee (anticipated early in 2020 prior to selection and determination of Northern Funds projects for 2020).

Introduction

The Yakoun River on Graham Island Haida Gwaii supports populations of all five Pacific salmonid species as well as Steelhead and Cutthroat Trout, and Dolly Varden. Intensive logging activities and consequent habitat degradation coupled with increased fishing harvest pressures resulted in severe declines of Pacific salmon stocks, particularly chinook. By the mid-1980s the number of adult chinook returning yearly to the Yakoun River to spawn was estimated to be as low as 300. In partnership with Fisheries and Oceans Canada (DFO) the Old Massett Village Council established the Yakoun River Hatchery on Lake Marie to rebuild the declining chinook stock.

A counting fence located in the lower Yakoun River was operated in the even years in the 1980s and early 1990s to enumerate salmon (primarily pink and chinook) during their spawning migration to obtain escapement estimates. During high flow events debris would frequently accumulate on the fence panels and river levels would overtop the fence allowing fish to pass over the structure resulting in incomplete counts and unreliable abundance estimates. The use of the fence was discontinued due to its poor effectiveness and since then chinook escapement has been reported by DFO based on qualitative observations of abundance in a few easily accessible reaches of the river. Given the failure of the fence and the qualitative nature of the methods presently used chinook escapement estimates remain unreliable, with much uncertainty regarding harvest rates and the Marie Lake Hatchery contribution to total stock production.

Yakoun chinook were an indicator stock for the Pacific Salmon Treaty and an indicator aggregate used by the Chinook Technical Committee. However, the stock is no longer used in that capacity due to the lack of reliable escapement information. Use of an imaging sonar to generate reliable biologically-based escapement estimates and develop an abundance-based management system including Yakoun chinook is feasible and an evaluation of Yakoun chinook escapement objectives is therefore possible. Reliable escapement enumeration of Yakoun chinook salmon will also allow for the estimation of harvest rates and evaluation of the Marie Lake Hatchery enhancement program which will inform the Haida Nation's decision making around the stock and will allow the Haida Fisheries Program (HFP) to evaluate progress towards achieving the Haida Nation’s escapement goals.

Over 30 years efforts to rebuild the chinook stock through hatchery-rearing, and protective management measures designed to minimize commercial and recreational harvests, appeared to be effective. A rough yearly index of escapement based on anecdotal and opportunistic visual observations suggests that the stock has been recovering. Hatchery production and restraints on harvest has yielded increased numbers of chinook spawners in the Yakoun River. However, DFO North Coast Stock Assessment could not acknowledge salmon escapements to the Yakoun River as biologically defendable enough to base management decisions on. As a result, there has been little opportunity to improve stock size and/or change current regulations affecting harvest and management until a more reliable method to determine salmon escapement is established.

Escapement estimates for coho specific to the Yakoun River are not available so general abundance patterns are unknown for historical and current coho stocks in the Yakoun.

Improved accuracy and consistency of escapement estimates would allow for improved management of the Yakoun River salmon stocks. To that end the Secretariat of the Haida Nation, through the Haida Fisheries Program, has taken on the initiative to establish an imaging sonar for assessing salmon escapements in the Yakoun River.

PSC Northern Funding Proposal Submissions for 2019

On August 31, 2018, the HFP submitted a Stage I proposal to the PSC Northern Funds program.

On October 1, 2018, the Northern Fund Committee approved the Stage I proposal for the Yakoun River chinook and coho assessments with a budget of $35,000. The HFP was invited to provide a "detailed proposal and budget" to the second round (Stage II) of the review process.

On October 22, 2018, the HFP submitted a Stage II proposal to the PSC Northern Funds program.

On February 28, 2019, the Northern Fund Committee approved the Stage II proposal for the Yakoun River chinook and coho assessments with a budget of $35,000.

In the spring of 2019 the ARIS was installed in the Yakoun River to assess sockeye (May/June) and, subject to receipt of the PSC Northern Funding, continued to be operational for the assessments of chinook (July/Aug./Sept.) and coho (Sept./Oct.).

ARIS Site Location on the Yakoun River

Figure 1: The ARIS sonar monitoring site was located 9.4 km upstream from the mouth of the Yakoun River accessible from the East Yakoun Main Road. The ARIS is located between the lower Yakoun River bridge and the old Yakoun counting fence site. This location places the ARIS about 1 km upstream from the highest point of tidal influence. There are no known spawning beds for sockeye, chinook or coho below this site. Pink salmon may utilize gravel beds for spawning below the ARIS assessment site in even years of high abundance.

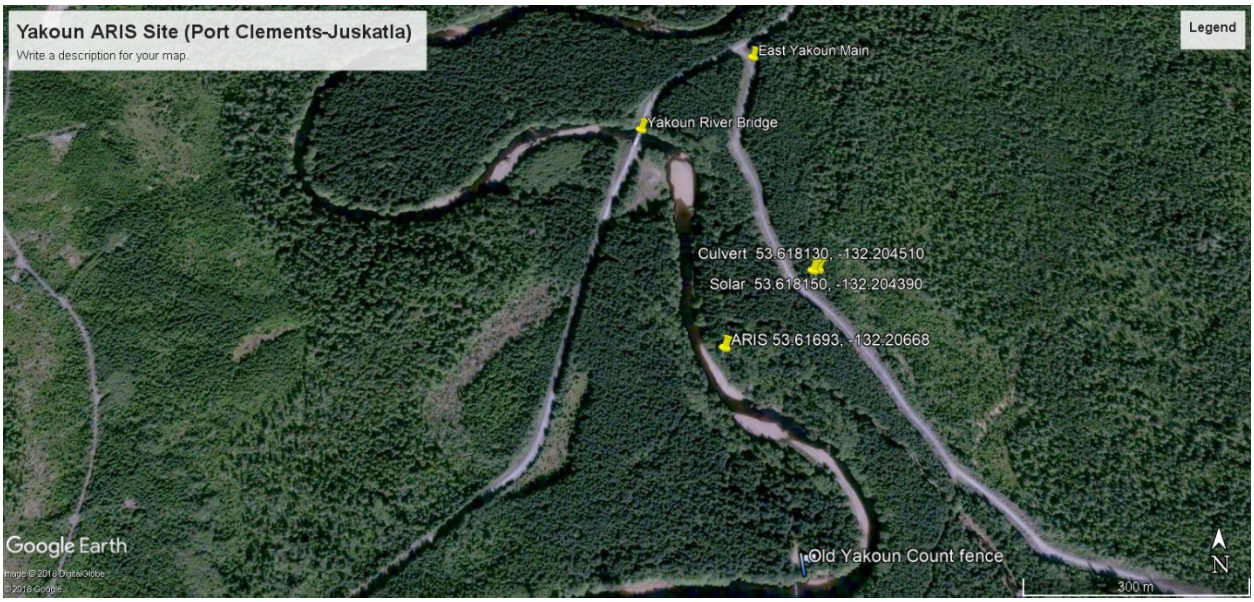

Figure 1. Google Earth image showing study site location on the Yakoun River.

Figure 2: The ARIS site is characterized by a narrow wetted width (27 m) and gently sloping channel from the east to a cut bank on the west side of the channel with a maximum depth of approximately 2 m. The substrate is comprised of gravel and small cobble with some woody debris along the west bank.

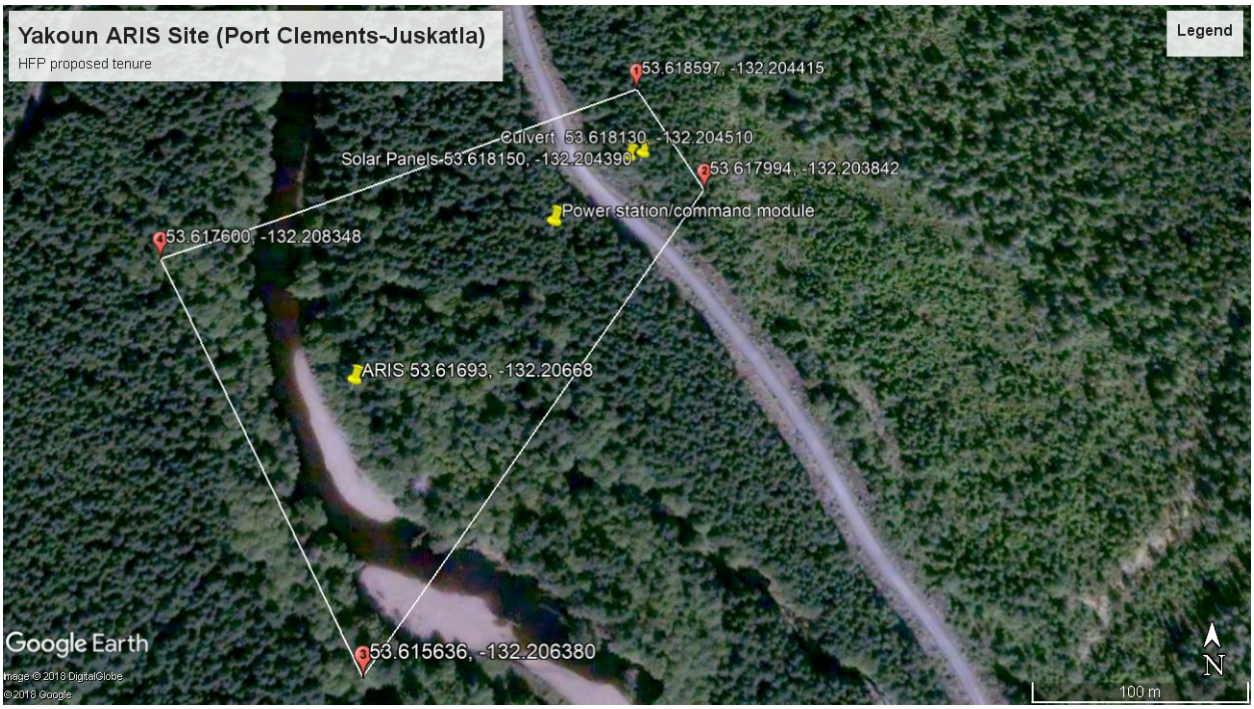

Figure 2. Google Earth image showing study site access point (near pin identified as power station commend module), ARIS control station and gravel bar.

Chronological Account of Events

2018:

Funding for capital infrastructure and initial set-up had been received in 2018, provided through Indigenous Coastal Funding Program. An **adaptive resolution imaging sonar (ARIS)** was installed into the Yakoun River and tested in the fall of 2018.

2019:

April 29 to May 10 – Equipment purchases completed (i.e. computers, hard drives, solar panels and related equipment, batteries, custom made aluminum control box, etc.). Conducted on site preparations.

May 13 to 17 – Contracted local Haida Gwaii solar/electrical specialists (Spark Energy Solutions). Installed solar panels on site in tree canopy and set up electrical infrastructure to run ARIS system.

May 15 – ARIS operational (24/7) for the assessment of sockeye. At this point the ARIS site was being visited daily to ensure system operations, evaluate site security/integrity, and to exchange hard drives.

May 20 – Beginning of hard drive data analysis (in office activity).

June 18 – DFO SEP/CEDP onsite review with Pat Fairweather, Haida Gwaii SEP Advisor, and Sandra Devcic (P. Eng.), Resource Restoration Engineer (note July 23rd, 2019 summary – Appendix I).

June 30 – Collection of ARIS hard drive data related to the assessment of sockeye now complete. Analysis of data continues.

July 1 – ARIS remains operational for the assessment of chinook. Daily visits and data analysis continues for the assessment of chinook, supported through PSC Northern funding.

Most of the data analysis was being done by Mark Spoljaric (HFP Salmon Biologist). The analysis of the data, and getting familiar with the programming, was the one aspect of the ARIS that only got better with time spent. It's like learning a new language – the more you speak it the better you get. In the case of the ARIS programming, the more Mark works with the programming the better his proficiencies. Mark has managed to find features in the programming that significantly improves the time it takes to analyze the data. Initially to took him a day to analyze 3 days of data, it is now taking a day to analyze 5 days of data (these are approximate estimates as data analysis is affected by the frequency and intensity of fish moving through the stream system).

August 19 – Heavy rain event passes over Haida Gwaii.

August 20 – Yakoun River in flood condition. The ARIS sonar and mounting frame remained in place, however the power cord which stretched from the sonar to the control box was damaged by large debris.

At this point the decision was made to discontinue the ARIS assessments for the balance of the 2019 season. Although there was a partial assessment of chinook into the Yakoun River, the count will be incomplete. There will be no counts at all in relation to coho.

Methods and Data Collection

During the 2019 salmon season the ARIS sonar was operational in the Yakoun River from May 17 to August 19. The initial target species was sockeye which would normally begin migrating upstream in the Yakoun River from mid to late May to about mid-July. In addition to the assessment of sockeye, from mid-June onward the objectives of the ARIS project was to focus on the assessment of upstream migrating chinook (mid-June to mid-Sept.) and coho (mid Aug. to late Oct.).

Mark Spoljaric, HFP Salmon Biologist, took the lead in all aspects of the ARIS operation and data analysis. Assisted by HFP field staff, in May he overseen the installation of the ARIS sonar and set-up of the control station which housed the batteries, monitors and hard drives. In addition, he worked with contractors in the establishment of the solar panels in the tree canopy immediately above the ARIS site and set up of electrical power at the control station. By May 17th the ARIS site was fully powered and operational.

When the ARIS was operational it collected data continuously in separate 10 minute long files at a rate of 5 frames per second, and data were ported directly to 3 TB portable external hard drives. Hard drives were swapped out once each day with the new data files being backed up to additional hard drives. Initially Mark Spoljaric travelled from Skidegate to the ARIS site each day (approximately 50 minute drive one way) to check the site and swap out the hard drives. As with any project of this significance being initiated for the first time, Mark took the time to fine tune procedures and ensure efficiencies. By early June he became comfortable enough to pass on a portion of the ARIS site visits to Haida Guardians who were routinely patrolling the Yakoun River watershed.

As noted earlier in this report, based on the preseason management plan, the intent was for the ARIS to remain operational in stream until mid to late October in to order capture the full scope of the chinook and coho migration. However, as noted above, on August 19th a sudden and intense weather event caused a rapid rise in river flows. Subsequent flooding on August 20th caused damage to the ARIS when a large piece of debris caught the control cable and pulled it out of the sonar that remain anchored to the substrate. Once the water receded the ARIS was retrieved and arrangements were made to send it back to

the manufacturer (northeastern United States) for servicing and repairs. As a result, after August 20th, the ARIS was no longer operational for the balance of the season.

Data analysis became the most challenging aspect of the ARIS assessment process. Analyzing the ARIS hard drive data was time consuming. Initially 24 hours of data took an average of approximately 8 hours to analyze. Analysis of the data remained primarily with Mark Spoljaric throughout the 2019 assessment period. Over the summer of 2019 he became much more familiar with the ARIS programing and learnt time saving methods in the analysis of the data. Also, in order to maximize efficiency and time management, he developed a process where he analyzed every third 10 minute segment. Results were then tripled for an expanded daily count (note Appendix II).

One aspect of the preseason plan was to hire and train a data technician who would take on the majority of the ARIS data analysis. This did not happen during the 2019 assessment period. Although some ARIS data was assessed by a short term summer student, most of the analysis remained with Mark. On the positive side, this enabled Mark to develop methods and proficiencies specific to the Yakoun ARIS project. On the negative side, however, given Mark's responsibilities and other duties, the time between data collection and analysis grew as the season progressed to the point when the ARIS was damaged on August 20th Mark was still working on data collected in late-June. As of the writing of this report (late December) data has been analyzed to July 4th (note Appendix II).

It is the intent of the HFP to have all the data analyzed to August 19th, the day before the ARIS was rendered un-operational. Once completed the chinook escapement estimate will only be a partial/incomplete count and the assessment of the coho migration and escapement will have been missed altogether. Given the circumstances, the decision was made to no longer pursue an ARIS data technician in 2019. The intent is now to attempt to hire an individual by April 1, 2020. That person will be trained by Mark to first complete the analysis of the remaining data from 2019, which will then prepare that individual to be proficient in the data analysis before the sockeye migration into the Yakoun River begins again in mid-May, 2020. As a result, a completed version of the data collected by the ARIS in the Yakoun River in 2019 will not be available until late April or early May, 2020.

Species Identification

One of the most significant concerns in the use of the ARIS is the determination and verification of species identification. This concern is currently under discussion through the DFO/CHN Joint Salmon Technical Committee (JSTC). Also, the DFO SEP/CEDP (Community Economic Development Program) has assisted in both staff time and funding to address this concern. The following is a "discussion" document provided to the JSTC and SEP representatives as efforts are made to address this concern in 2020.

> The ARIS provides an image, or picture, of fish passing by the sonar. Although "exact" species identification cannot be provided, the programing does allow for verification of size. In that regard, it is reasonable to conclude species based on size and timing "most of the time". Note the following scenarios:
>
> Sockeye – Identification by size is reliable given there are no other fish migrating upstream of a similar size at that time (mid May to late June). There could be a small number of steelhead kelts moving out (or downstream) of the system that are of the same size but the distinguishing feature would be the direction (sockeye upstream, steelhead down). There could be a 3 to 4 week overlap between the end of the sockeye migration and the beginning of the chinook migration, but there is a distinct size difference (i.e. sockeye 55-65 cm.; chinook 70-80 cm.).

Chinook – Very distinguishable based on size for adult chinook. Because jack chinook are smaller (less than half the size) than adults they may be mistaken for sockeye (early in run) or coho (later in run).

Coho – Generally identifiable based on size and timing. Although there may be a 3 to 4 week overlap between the beginning of the coho migration and the end of the chinook migration, there are distinct size differences between coho and adult chinook.

Pinks – Will be a concern in even years. Pinks normally begin entering the stream by around August 10th and will migrate upstream until mid September. There can also be a significant downstream movement after spawning is complete. Although size can be a distinguishing factor between pinks, coho and chinook, there can be some similarities, especially between pinks and small coho.

Having said that much, options for "conclusive" species verification are currently being discussed and considered through the CHN/DFO Joint Salmon Technical Committee (JSTC) and with DFO SEP/CEDP representatives.

Options for Species Identification (based on least harm to most invasive)

1. **Visual verifications: This method is currently in use.** Immediately above the pool in which the ARIS sonar is situated is a constricted "riffle" which causes the water to flow faster but shallower (note photos 7, 8 and 9, pages 6 and 7 in Appendix I). It is possible for an observer to monitor the sonar image in real time on site. As fish swim upstream past the ARIS sonar the observer can walk the short distance from the control box upstream to the riffle, above the sonar, and actually observe the fish that had just been seen seconds before on the computer screen passing by the sonar.
2. **Video go-pro:** It is possible a camera can be mounted on the ARIS frame to attempt to take a picture of the fish as they swim past by the sonar. This methodology would be limited to visibility and distance.
3. **Fish weir or fence:** A physical barrier that controls fish movement upstream. This option could or would be expensive to set up and operate. However, if infrastructure were set up it could be operated on random days in conjunction with the ARIS.
4. **Beach seine:** This option would be moderately to highly invasive and would require lots of man power.
5. **Gillnet(s):** This option would be very invasive as mortality of fish would likely be high.

Budget and Costs

Over the course of the season during which the ARIS was operational the following is an estimated account of the "operational" costs. (Note: all totals have been rounded off to the nearest $100.)

Pre-assessment set-up period, April 29 to May 17:

- 15 work days of which 9 required on site duties (i.e. site clean-up and preparations, hauling in equipment, etc.)
- Salmon Biologist: average 4 hrs./day over 15 days at a rate of $47.25/hr. = $2,800.
- Field Technicians: average of 2 individuals, 4 hrs./day over 10 days at a rate of $27.00/hr. = $2,200.

Equipment costs:

- Trucks and fuel: one trip with 2 trucks per day over 7 days and one truck per day over 2 days. Estimate $75.00/day/truck in fuel and maintenance = $1,200.

➢ **Total pre-assessment costs (not including materials/equipment) to set up site was $6,200.** (Covered through the AFS contribution agreement.)

Operational period, May 17 to August 20:

On site visits.

- Salmon Biologist: average 3 visits per week, over 13 weeks, taking an average of 3 hours per visit at a rate of $47.25/hr. = $5,500.
- Field Technicians: 2 individuals, 4 visits per week, over 13 weeks, taking an average of 2.5 hours per visit at a rate of $27.00/hr. = $7,000.

Data analysis.

- To date ARIS data has been analyzed over 48 days. It took an average of 8 hours to analyze 24 hours of data. As a result, it took 16 days at 8 hours per day to analyze the data collected from May 17 to July 4.
- Mark Spoljaric did the majority of the data analysis. Estimate 14 days at 8 hours per day at a rate of $47.25/hr. = $5,300.
- A summer student assisted in the data analysis but took more time than Mark plus needed training. Estimate 4 days at 8 hours per day at $20.00/hr. = $600.
- Note: There are an additional 46 days of data that still require analysis (July 5 to August 19). At the current average rate of assessment it will take approximately 16 days at 8 hours per day to complete. If this data was shared between the Salmon Biologist, Mark Spoljaric, and a Data Technician (to be hired by the HFP by no later than April 1, 2020) the cost to have it analyzed will be an estimated $6,000.

Equipment costs:

- Trucks and fuel: one trip per day over 105 days. Estimate $75.00/day in fuel and maintenance = $7,900.

➢ **Total operational cost to collect and analyze all data from May 17 to August 19 is $32,300.**

Assessment of sockeye vs. chinook:

- Pre-season the dividing date between sockeye and chinook was projected to be July 1st.
- Migration of sockeye began, with a trickle (< than 15/day), on May 20th, picked up (15+/day) on May 29th, and continued into July (decline note detected as of July 4th which is the date to which data analysis has so far been completed).
- Migration of chinook began with a trickle (< than 10/day), on June 20th, and picked up (15+/day) on June 28th.
- For the purpose of this report the dividing line between sockeye and chinook will remain as July 1st. Therefore, out of 94 days of operation 46% went into sockeye and 54% into chinook.

➢ **Total operational cost to collect and analyze sockeye data was $14,900 (supported through AFS contribution funds).** (Does not include site preparation and set-up.)

➢ **Total operational cost to collect and analyze chinook data was $17,500 (supported through PSC northern funds).** (Does not include site preparation and set-up.)

List of Appendices

Appendix I - SEP/CEDP Site Visit – Yakoun River ARIS Project – June 18, 2019

Appendix II - Yakoun River Salmon Escapement Estimates using the Adaptive Resolution Imaging Sonar (ARIS), 2019

Haida Fisheries Program

Fisheries and Oceans | Pêches et Océans

MEMORANDUM **NOTE DE SERVICE**

To / À: File

cc: Pat Fairweather and Peter Katinic

From / De: Sandra Devcic, P.Eng.
Resource Restoration Engineer
North Coast Area, SEP

Security Classification - Classification de sécurité **UNCLASSIFIED**
Our file - Notre référence **YAKOUN RIVER**
Your File - Votre référence
Date **July 23, 2019**

Subject / Object: **SITE VISIT – YAKOUN RIVER ARIS PROJECT – JUNE 18, 2019**

On June 18, 2019, I had an opportunity to go see the ARIS project on the Yakoun River. I went to site with Patrick Fairweather, Community Advisor for Haida Gwaii. The CEDP for the Secretairiat of the Haida Nation has invested in the project, so we were interested to see how things were coming together. Pat had let Mark Spoljaric know that we might go there, as we were planning to stop by the hatchery.

Google Earth images showing the location of the project are as follows:

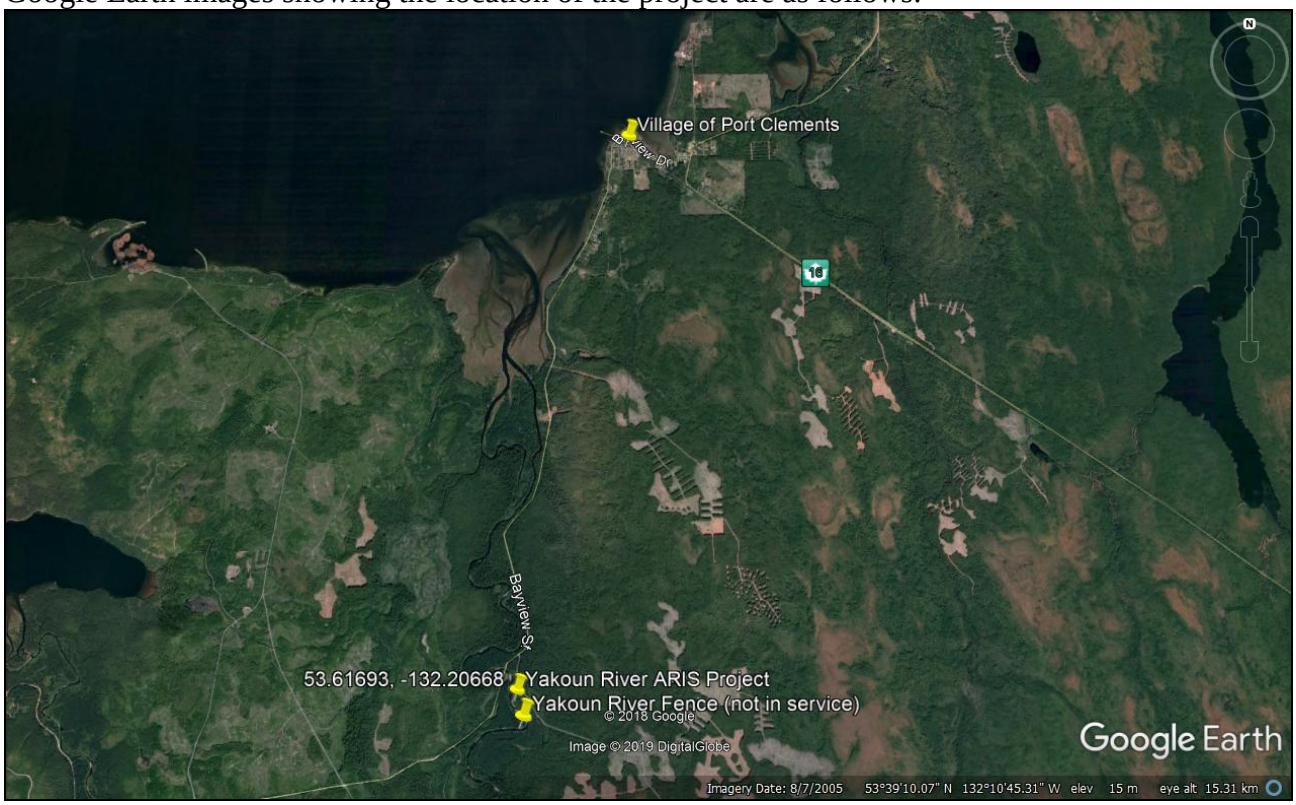

Figure 1 – Site Location - Image 1

Canada

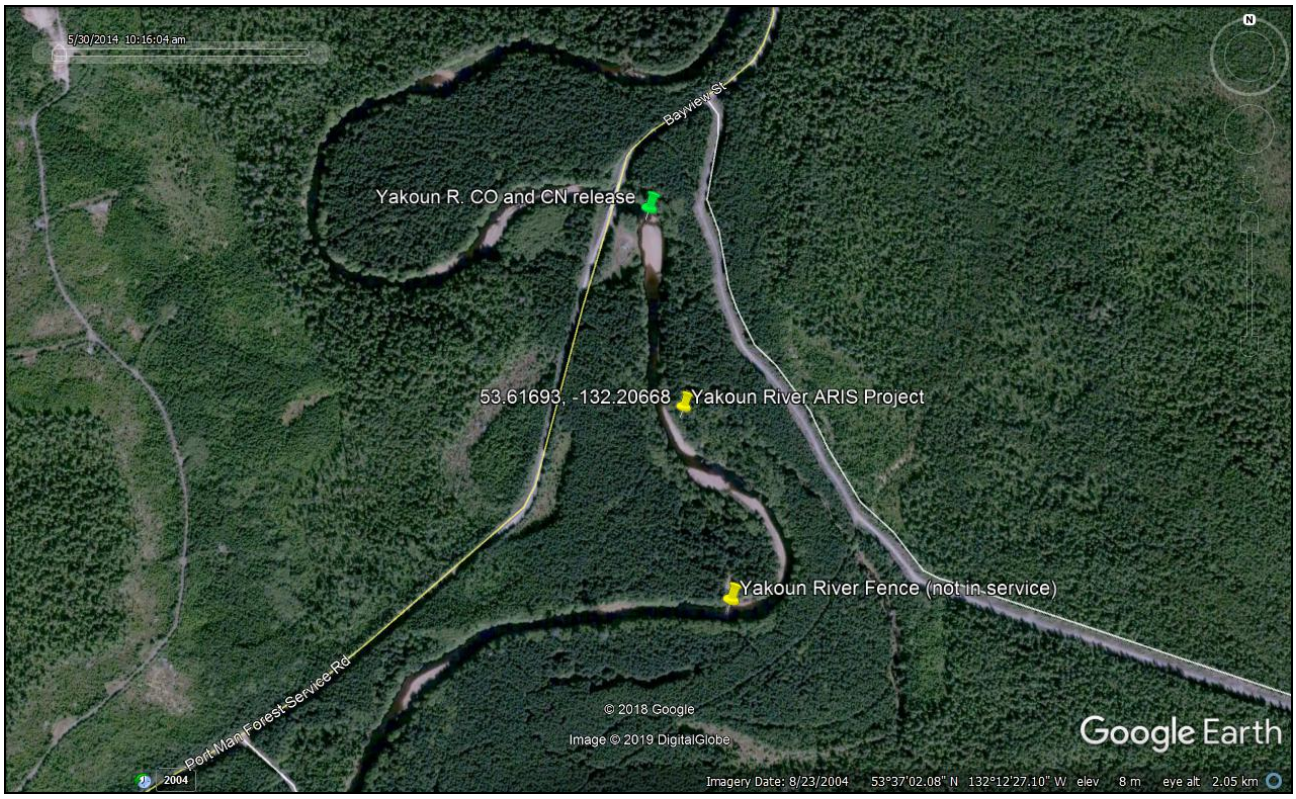

Figure 2 – Site Location – Image 2

The site is easily accessed off of the logging roads outside of Port Clements, but is not well marked (for security reasons). We hiked through the forest (Photo 1), to get to the project and noted that the area was contoured with relic channels.


Photo 1 – Forested, short walk from the logging road to the project site.

When you arrive at the site, you find the lock box, containing the recording equipment (Photo 2), and the power supply has been installed at top of the trees (Photo 3).

Photo 2 – Project location.

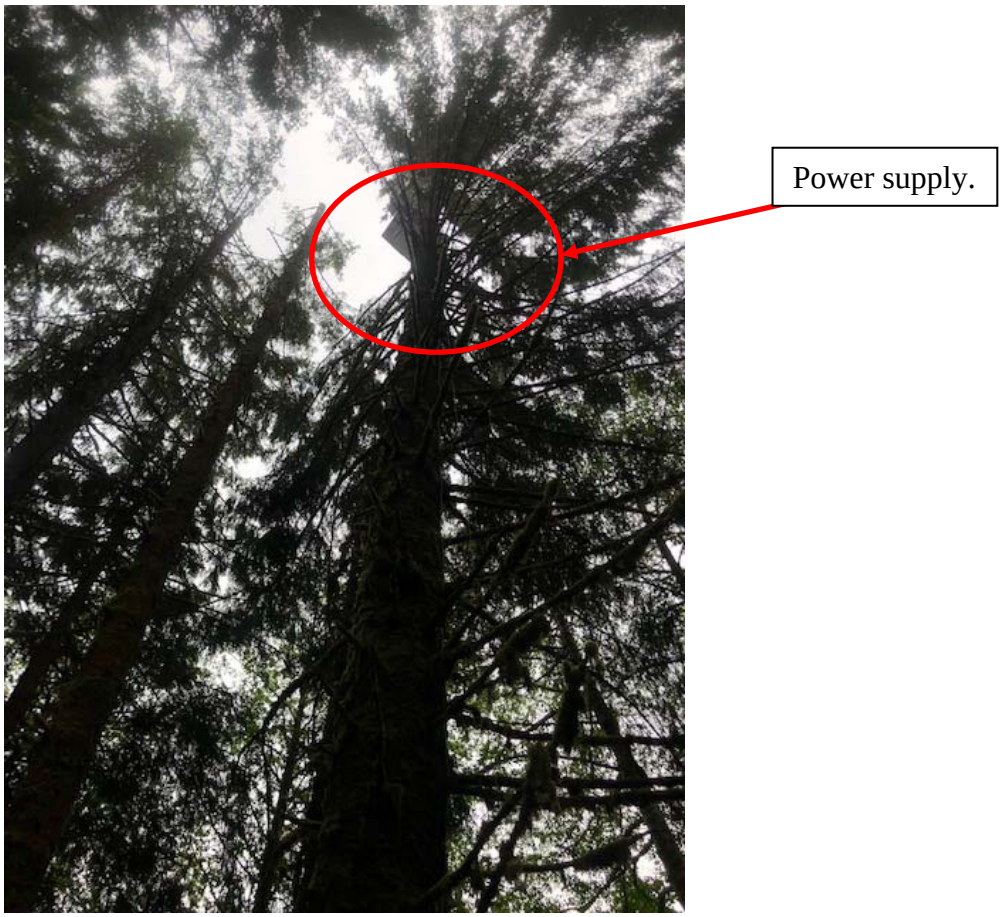

Photo 3 – Treetop power supply

Photo 4 – Project, as seen from river right.

Photo 5 – Sonar and mounting frame

Photo 6 – Overview, looking downstream

Photo 7 – Upstream of the project site, river right

Photo 8 – Upstream of the project site, river left

Photo 9 – Looking upstream at the project area

Observations:

I am not familiar with ARIS projects and the requirements for stream conditions to calibrate or compare the data collected. I have also not looked up the hydrology for the watershed, but have a general feeling for the site based on previous visits to the location where the Yakoun Fence was operated from. I understand that the project is functioning well and that the data collected will be valuable for assessment of the salmon populations in the river. With this in mind, the following notes

are intended to record ideas that may help keep the project from being susceptible to damage or loss of data caused by high water or unexpected spikes in the water levels.

1. The cables that run from the recording equipment to the sonar are strung out along the bank and things are operating successfully. Putting the lines inside a conduit may help to protect them from nicks or damage, or keep them from getting caught in small woody debris or becoming tripping hazards for humans or wildlife. The conduit could be buried in the stream bank if preferred.
2. I understand that the difference between the water level and the sonar unit height is optimized regularly to capture the images. Some thought to providing access to the sonar at various water levels may be helpful for staff in the future.
3. The guide screen downstream of the sonar will fill with leaf litter if the project runs into the fall. It appears to be held in place by rebar, which may not withstand higher flows. If the project stays in this location, you may want to try other styles of guides to find one that requires minimal maintenance.
4. The sonar head is mounted on a metal frame, held down by sandbags. I think I understood that this provides flexibility to adjust the camera when the water level changes. If flows increase, will the sandbags provide enough ballast to prevent the camera from being repositioned by the river? Is there a long term plan to create a weir or permanent mount for the equipment? Or, perhaps consider some kind of deflector to protect the camera from floating debris? Maybe a vertical half-pipe or something that would not impede the lens?
5. One idea that came to mind while looking at the project (just an idea) was that the sonar system could be mounted on a track to help make the adjustments easier for the user. There would be an investment needed, but if the track had features like an access deck, adjustable sonar mount, break away power shut off protection in the event of large woody debris or other, it could help with long term data collection. People more familiar with these projects may see other options for site development.

Thanks again for the opportunity to see the project. I can certainly see the effort that has gone into the site so far. Great work!

Yakoun River Salmon Escapement Estimates using the Adaptive Resolution Imaging Sonar (ARIS), 2019

	Sockeye				Chinook			
Date	upstream	downstream	net upstream	expanded daily count	upstream	downstream	net upstream	expanded daily count
17-May	0	0	0	0				
18-May	0	0	0	0				
20-May	1	0	1	3				
21-May	4	2	2	6				
22-May	6	3	3	9				
23-May	2	0	2	6				
24-May	5	1	4	12				
25-May	7	3	4	12				
26-May	4	3	1	3				
27-May	5	3	2	6				
28-May	4	1	3	9				
29-May	6	1	5	15				
30-May	2	1	1	3				
31-May	5	2	3	9				
01-Jun	6	1	5	15				
02-Jun	6	0	6	18				
03-Jun	18	0	18	54				
04-Jun	26	3	23	69				
05-Jun	30	5	25	75				
06-Jun	38	5	33	99				
07-Jun	19	2	17	51				
08-Jun	11	3	8	24				
09-Jun	21	2	19	57				
10-Jun	25	2	23	69				
11-Jun	32	2	30	90				
12-Jun	29	4	25	75				
13-Jun	37	5	32	96				
14-Jun	39	8	31	93				
15-Jun	20	7	13	39	0	0	0	0
16-Jun	35	6	29	87	0	0	0	0
17-Jun	38	7	31	93	0	0	0	0
18-Jun	22	4	18	54	0	0	0	0
19-Jun	24	3	21	63	0	0	0	0
20-Jun	32	2	30	90	1	0	1	3
21-Jun	41	6	35	105	1	4	-3	-9
22-Jun	29	12	17	51	1	1	0	0
23-Jun	78	40	38	114	0	0	0	0
24-Jun	59	17	42	126	0	0	0	0
25-Jun	55	2	53	159	2	0	2	6
26-Jun	46	2	44	132	2	2	0	0
27-Jun	28	5	23	69	1	0	1	3
28-Jun	75	7	68	204	9	0	9	27
29-Jun	40	13	27	81	21	0	21	63
30-Jun	32	13	19	57	16	4	12	36
01-Jul	82	24	58	174	32	3	29	87
02-Jul	42	4	38	114	18	7	11	33
03-Jul	28	6	22	66	37	4	33	99
04-Jul	37	2	35	105	19	2	17	51
Total	1231	244	987	2961	160	27	133	399