

FEASIBILITY OF ESTIMATING
AGGREGATE COHO SALMON
ESCAPEMENT TO THE LOWER
FRASER MANAGEMENT UNIT –
LFFA 2019/20

Aidan Fisher

LFFA 3092 Sumas Mountain Rd., Abbotsford BC, V3G 2J2

Contents

Summary	1
Work Items Completed in 2019/20	2
Describe the methodology for a test fishery and seek permitting support	2
Research PIT tag detection configurations for the Lower Chilliwack River and prepare for future field feasibility and mark recapture programs.....	4

Summary

The LFFA successfully completed the 2019/20 Lower Fraser Coho project in collaboration with DFO and LGL staff, the Lower Fraser Coho Escapement (LFCE) Project Team. The 2019/20 LFCE project focused on establishing the technical details of the proposed field work. This included developing methods for the test fishery, Chilliwack Coho PIT escapement assessment and engagement with First Nations, DFO resource management and stakeholders on the project.

The three main components of the 2019/20 LFCE project were separated between the three organizations (DFO, LFFA and LGL) based on experience and capacity.

DFO staff were responsible for the Publication and Review of Study/Sample Design component. LFFA biologist participated on Project team conference calls to provide advice on the development of the study and sample design. LFFA biologist reviewed draft and provided input during Project team meetings.

LFFA and LGL staff were responsible for development of the test fishery methods and engagement on the proposed test fishery. LGL prepared a literature review and data analysis of the proposed tangle-tooth test fishery methods. Using the technical work, LGL and LFFA staff developed and presented communication and outreach documents to First Nations, DFO and stakeholders at a variety of meetings.

LFFA and DFO staff were responsible for development of a PIT tag mark recapture program on the Chilliwack River. LFFA and DFO staff met with Salmonid Enhancement Program (SEP) staff at the Chilliwack River Hatchery, and PIT technology experts to develop methods for application and assessment of PIT tagged Chilliwack hatchery coho. LFFA and DFO staff applied 10,000 PIT tags to Chilliwack coho smolts for assessment in 2021. LFFA staff applied for additional funding for the Chilliwack coho PIT tag project with BC Salmon Restoration and Innovation Fund (BCSRIF).

LFFA 2019/20 feasibility of estimating aggregate coho salmon escapement to the Lower Fraser management unit

Describe the methodology for a test fishery and seek permitting support

The LFCE Project team worked with W. Challenger (LGL) to inform the methods development for the tangle-tooth test fishery sampling design. This included a literature review of tangle tooth net fishery studies and modelling work using data from those studies. W. Challenger developed a set of recommendations for sampling design based on a robust review of the available literature relevant to salmon tangle tooth net technical reports. W. Challenger also investigated the published data to inform methods for reduction of bycatch of non-target species. The results of the technical work from LGL was summarized and presented to the LFCE Project team. The results were reviewed by the LFCE project team and are proposed to be implemented in the test fishery in the 2020/21 field season. The results of the technical work also provided further technical information on the test fishery sample design for the engagement processes with First Nations, DFO resource management and stakeholders.

Using the technical analysis from LGL, the LFFA and DFO staff developed a test fishery summary document outlining the details of the proposed test fishery. The test fishery methods are also informed by direct engagement with an author of previous tangle-net fishery scientific assessment work. Including net specifications, fishing specifications, and bio-sampling protocols. The test fishery summary document is attached in Appendix 1.

The LFFA coordinated two meetings with DFO resource management to engage on applying for a scientific licence and a sales licence for catch from the proposed tangle-tooth net test fishery. The first meeting was a webinar with DFO resource management staff, October 18, 2019 (Table 1). This meeting was to present the work to date from the LFCE team to DFO resource management (Fraser and Interior), and understand the licencing requirements for establishing a new test fishery. DFO resource management staff advised that further engagement with DFO resource management staff needs to occur, and that more additional staff need to be involved in the licencing discussion. DFO resource management also informed the LFCE project team that additional documents relevant to the proposed tangle-tooth net test fishery. LFFA staff coordinated a meeting with M. Fetterly (DFO), co-author of previous tangle-tooth net test fisheries. M. Fetterly provided input on successes and challenges their team had establishing this pilot fishery. Considering the goals of the project M. Fetterly suggested the proposed methods were well described and likely to produce results.

The second meeting with DFO resource management was with staff at DFO Regional Headquarters, January 7, 2020 (Table 1). This meeting was to present the project to Salmon Team resource management staff, to develop their understanding of the project and discuss scientific licencing and sales of some catch. DFO staff advised that once the sampling plan for the test fishery has been finalized that licencing the field work will be fairly simple through the typical scientific licencing process. For development of a new test fishery and sales of fish from the proposed test fishery will not occur for the 2020 field season. The proposal to establish a new test fishery and sell catch is uncommon, and there is no process in place to evaluate new test fisheries. The current suite of test fisheries throughout the Pacific region has largely remained unchanged, so no current process exists to evaluate new proposals for sale of test fishery catch. The current process for licencing test fisheries is for resource management staff to prepare a brief to the Regional Director General (RDG) for identification of test fisheries

allowance for catch sales annually. Including the LFCE test fishery in that brief was not possible within the time frame. Additionally, considering the abbreviated nature of the pilot 2020 field season for the LFCE test fishery the recommendation was to establish some more quantitative information on the amount of fish being proposed for sale and operations of the test fishery. DFO resource management staff committed to continue to engage on application for a sales licence for caught fish in future seasons during the 2020/21. The presentation for DFO Resource Management is attached in Appendix 2.

LFFA biologist presented the LFCE project to Lower Fraser First Nations, October 29, 2019. Lower Fraser First Nations in attendance provided comments are perspective on the current state of Lower Fraser Coho science. The First Nations representatives in attendance were supportive of the work proposed by the LFCE project team. Lower Fraser First Nations have been critical of the lack of escapement programs for Lower Fraser Coho, and are excited to see work happening to fill the gap. The LFFA project forum presentation is attached in Appendix 2.

LFFA biologist and LGL biologist presented the LFCE project to the Integrated Harvest Planning Committee (IHPC), February 11, 2020. The IHPC is multi-stakeholder group of commercial fishery representatives, recreational fishery representatives, and conservation/NGO representatives that provide input to DFO annually on salmon fisheries management (Table 1). The IHPC was identified as a group that would be interested in the development of the LFCE project. The IHPC was interested in the project, and generally supportive of work. Recommendations and interest provided by the IHPC on how the sampling protocol can reduce impact on non-target species. IHPC attendees recommended considerations for the test fishery field program which will be investigated during the pilot field season in 2020/21. The presentation provided to the IHPC is attached in Appendix 2.

LFFA biologist and LGL biologist presented the LFCE project to the Joint Technical Working Group (JTWG) for the Forum on Conservation and Harvest Planning, hosted by the Fraser Salmon Management Council, March 9, 2020. The JTWG is an established Tier 2 process that started to support the Fraser River Aboriginal Fisheries Secretariat forums on Conservation and Harvest Planning that was hosted by the Fraser Salmon Management Council for 2020. The JTWG is a venue for First Nations and DFO technical staff to review technical topics related to the forum presentations to First Nations representatives. Attendees of the JTWG included technical staff from marine approach, Lower Fraser, Interior/Upper Fraser and Thompson areas (Table 1). These topics are all related to annual Fraser salmon fisheries management topics. The JTWG was interested and supportive of the work. There were additional questions regarding the potential impact to Interior Fraser Steelhead and Interior Fraser Coho, which were followed up with directly. The presentation provided to the JTWG is attached in Appendix 2.

Following up engagement with the JTWG, we had planned for a presentation to the Forum on Conservation and Harvest Planning hosted by the FSMC for 2020, formerly the FRAFS Forum. This session was intended to inform and consult with marine and Fraser First Nations on the LFCE project. Due to COVID-19 constraints the format of the forum was altered, and the LFCE project presentation was cut from the agenda. We intend to provide marine and approach First Nations an LFCE project presentation in 2020/21 to make up for the missing engagement.

Research PIT tag detection configurations for the Lower Chilliwack River and prepare for future field feasibility and mark recapture programs.

LFFA and DFO staff met with Salmonid Enhancement Program (SEP) staff at Chilliwack Hatchery (Table 2). This meeting was to provide the Chilliwack hatchery staff and SEP managers an understanding of the LFCE project, and request their assistance to provide hatchery coho for the project. Chilliwack hatchery staff were interested in assisting the project where possible and are able to provide hatchery reared coho for the project in-kind. SEP staff were also favourable for allowing PIT tagging of yearling smolts annually, contingent on LFCE team staff organizing and tagging. In order to produce coho for the LFCE project some changes will be required for Chilliwack coho. Currently Chilliwack hatchery reared coho are adipose fin clipped but not otolith marked. We require the use of otolith marks for identifying Chilliwack hatchery coho at the test fishery site to differentiate from other hatchery produced coho. Hatchery staff indicated this could occur at minimal additional cost for future year classes. Yearling chilliwack coho smolts for 2020 release can be PIT tagged, but will not be otolith marked. For future year classes, 2021 release, the Chilliwack hatchery can otolith mark coho for use in the LFCE project.

A field visit with Biomark and InStream consultants was coordinated by DFO and LFFA staff to discuss and identify options for installing PIT arrays in the Vedder Canal (Figure 1). Biomark and InStream consultants surveyed potential sites for PIT array installation, including surveying with specialized equipment for potential sources of PIT tag interference. Interference from nearby power lines were identified as the source of interference, and installation of the PIT array would need to consider that. Two potential sites were identified in the Vedder Canal for installation of a PIT array upstream near the Highway 1 bridge and further downstream near the Sumas/Vedder confluence. Biomark and InStream both provided options for installing PIT array equipment at the identified sites.

The LFCE team decided to move forward with HDX PIT technology from InStream, considering the cost of PIT array equipment. The proposed PIT array site in the Vedder Canal (lower Chilliwack river) is nearly 100m wide, and there are limited options to protect PIT array equipment after installation. HDX antennas are cheaper, and replacement and repair costs will be lower in the long term using HDX PIT tag arrays. FDX equipment is substantially more expensive, and read range is equivalent compared to HDX. The restriction with using HDX technology is in application of smaller PIT tags. HDX tags are not available as small as FDX tags, and are therefore not usable for subyearling hatchery fish application. This is not an issue for the LFCE project as all PIT tags are applied to yearling smolts, and HDX PIT tags can be applied.

DFO and LFFA staff coordinated application of 10,000 HDX PIT tags to adipose fin clipped Chilliwack coho yearling smolts. LFFA provided two staff members and secured two field staff with Sts'ailes to assist with PIT tagging. PIT tagging was completed over 3 field days, March 4, 9,10, 2020 (Figure 2). Results from PIT tagging are described (Table 3).

The LFFA pursued additional funds for the LFCE project through the British Columbia Salmon Restoration and Innovation Fund. This proposal was to fund the Chilliwack Hatchery coho PIT tagging project in the Chilliwack River including PIT array purchase, installation and annual operation for four years. The LFFA was successful in securing funds from BCSRIF for 2020/21 to 2023/24. This project will supplement the LFCE project funded by the SEF, and reduce cost for the SEF-LFCE project starting 2020/21.

Tables

Table 1. Engagement Meeting Participants List

Name	Affiliation	Meeting Title and Date
Matthew Parslow	DFO	DFO Resource Management Meeting 1, 18-Oct-2019
Brittany Jenewein	DFO	
Dean Allan	DFO	
Marla Maxwell	DFO	DFO Resource Management Meeting 2, 7-Jan-2020
Ashley Dobko	DFO	
Madeline Young	DFO	
Dean Allan	DFO	LFFA Forum, 29-Oct-2019
Mike Baird	Tsawwassen	
Les Antone	Kwantlen	
Ken Malloway	Tzeachten // Kwak'Kwa-Apilt	
Kim Charlie	Sts'ailes	
Dominic Hope	Yale	
Rob Rezansoff	Area A	IHPC Meeting, 11-Feb-2020
Chris Ashton	Area B	
Darrel McEachern	Area E	
Lawrence Poulson	Area F	
David MacKay	Area F	
Dane Chauvel	Area H	
Peter Sakich	CSAB	
Misty MacDuffee	MCC	
Greg Taylor	MCC	
Laurie Milligan	SFAB	
Martin Paish	SFAB	
Marilyn Scanlan	SFAB	
George Bates	SFAB	
Mike Wells	Area G	
Larry Nielsen	Province of BC	
Jeff Grout	DFO	
Ge Li	DFO	
Mikaela Bacon	DFO	
Madeline Young	DFO	
Dean Allan	DFO	
Ryan Galbraith	DFO	
Jason Mahoney	DFO	
Heather Owens	DFO	
Peter Hall	DFO	
Jennifer Nener	DFO	
July Mackenzie	DFO	
Kendra Moore	DFO	
Christine Butka	DFO	
Brad Beath	DFO	
Matt Mortimer	DFO	

Terry Palfrey	DFO	JTWG Meeting, 9-Mar-2020
Erika Watkins	DFO	
Greg Hornby	DFO	
Mike Staley	FSMC	
Marla Maxwell	DFO	
Marc Labelle	ONA	
Shamus Curtis	UFFCA	
Carmel Anderson	DFO	
Michelle Walsh	SFC	
Kendra Holt	DFO	
Yi Xu	DFO	
Paul Mozin	STC	
Nicole Fredrickson	IMAWG	
Brittany Jenewein	DFO	
Madeleine McGreer	FSMC	
Karen Rickards	DFO	
Dominic Hope	Yale	
Jamie Scroggie	DFO	
Chad Ormond	Qullhanumutsun	
Ann-Marie Huang	DFO	
Bernette Laliberte	Cowichan Tribes	
Michelle Lloyd	DFO	

Table 2. Chilliwack PIT Tag Meeting Participants

Name	Affiliation	Meeting Title and Date
Jenny Sandher	DFO SEP	Chilliwack PIT Array Hatchery Meeting, 26-Sep-2019
Jeremy Mothus	DFO SEP	
Alex Klingemann	DFO SEP	
Jeremy Smith	DFO SEP	
Dani Ramos-Espinoza	InStream Fisheries Research	Chilliwack PIT Array Site Tour, 22-Oct-2019
Steve Anglea	Biomark, Inc.	

Table 3. Results of PIT tagging Chilliwack Coho smolts, March 2020.

Date	Trough	Total Handled	Day of Mort.	Sickly Sacrifice	24 Hour Mort.	48 Hour Mort.	Total Mort.	Handling Mort. (%)	Total Mort. (%)
3/4/2020	14	2487	4	4	0	0	8	0.16	0.32
3/10/2020	15	2499	5	2	13	3	23	0.84	0.92
3/10/2020	13	644	2	0	0	0	2	0.31	0.31
3/11/2020	13	1853	4	2	0	Unk	6	0.22	0.32
3/11/2020	16	2498	6	1	3	Unk	10	0.36	0.40
2020 Totals	All	9981	21	9	16	3	49	0.40	0.49

Figures



Figure 1. Lower Chilliwack (Vedder Canal) PIT array potential sites. Shore power site also identified.





Figure 2. LFFA, Sts'ailes and DFO staff PIT tagging Chilliwack Coho smolts.