

Fraser Salmon & Watersheds Program



2009/10 FINAL REPORT

FSWP File Number*	07350-35/FSWP 09 LR HWRS 12
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* Please use the FSWP File Number provided in previous FSWP project correspondence.

1. Project Information

1.1. Project Title

Groundwater Habitat Interactions for Interior Fraser Coho

1.2. Proponent's Legal Name

Nicola Tribal Association (NTA)

1.3. Project Location

NTA: Coldwater and Nicola Rivers; Secwepemc Fisheries Commission (SFC): Louis Creek and Deadman River

1.4. Contact for this report

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1.5 Funding Amount

Original Approved Grant Amount:	Total FSWP Expenditures:	Final Invoice Amount:	Final Non-FSWP leveraging, including cash and in-kind:
\$43,252.00	\$28,459.11	\$0.00	\$18,961.00

2. Project Summary

Please provide a single paragraph describing your project, its objectives, and the results. As this summary may be used in program communications, clearly state the issue(s) that were addressed and avoid overly technical descriptions. Maximum 300 words.

There is a lack of knowledge related to what constitutes critical habitats for Interior Fraser (IFR) coho (*Bailey et. al., 2004*), and little study into the relationship between groundwater and habitat use by juvenile IFR coho. The majority of conducted studies have focused on linking adult redd selection to groundwater, and have been done on coastal US streams. This was the third year of a study to confirm juvenile IFR coho usage of groundwater upwelling areas as thermal refuge from lethal mainstem summer water temperatures. Sites were monitored for fish presence/absence and behavior, and water temperatures recorded through the duration of the study. Rather than focusing on one stream, two First Nations groups, in collaboration with Fisheries and Oceans Canada (DFO), are continuing to sample four tributaries of the Fraser River (Thompson River Basin), allowing for better representation and more solid/robust results. Objectives for 2009/2010 were:

1. Locate new groundwater upwelling areas in the Nicola watershed (NTA),
2. Determine the presence/absence of seasonal and diel spatial distribution patterns of juvenile IFR coho, and its relationship to groundwater upwelling sites in tributaries of the Interior Fraser

Basin,

3. To provide a third year of information that will be the basis for developing strategies to protect and enhance groundwater influenced coho habitat, and improve groundwater management and IFR coho conservation, and
4. To establish a coordinated, science-based approach between First Nations and government agencies.

Results for 2009/2010 are:

- The NTA located two new mainstem groundwater upwelling sites (NR32.6 and CW9.42),
- Water temperature data were recorded for groundwater and control sites (July to October),
- Fish usage by species and behaviors recorded before, during and after peak stream temperatures,
- The study showed that groundwater upwelling in mainstem rivers/streams provide critical habitat during summertime peak stream temperatures.

OPTIONAL Please give a short statement (up to 100 words) of the most compelling activity or outcome from your project.

During daylight hours, as long as mainstem stream temperatures did not reach lethal levels juvenile coho seemed to prefer the mainstem habitat (riparian vegetation, cut banks, pools) to the groundwater upwelling habitat (often times no riparian cover, and shallow water) of some of the study sites. Only when stream temperatures reached lethal highs did the juvenile coho move into the groundwater, during daylight. Enhancement of these sites is crucial.

3.Final Project Results and Effectiveness

3.1 Copy EXPECTED OUTCOMES from your detailed proposal and insert into this section. Add additional rows as needed. Then please list the FINAL OUTCOMES (the tangible end products resulting from this work) associated with expected outcome.

If FINAL OUTCOMES differ from the original EXPECTED OUTCOMES please describe why, and the implications for the project.

EXPECTED OUTCOMES	FINAL OUTCOMES
1. Document and substantiate the importance of groundwater upwelling habitats for juvenile IFR coho in order to inform future groundwater management strategies.	A third year of data (water temperature and fish presence) has been collected.
2. Apply the techniques/knowledge gained from this project to other areas in the Fraser Basin facing elevated water temperatures in juvenile coho rearing streams.	Findings from this year, and the previous two years, will be presented at workshop/forums/meetings, and anyone interested can contact us for study design details.
3. Identify specific sites in each project area that can be used in future local management decisions/actions such as future protection and/or enhancement initiatives.	For the coming year of study (2010/2011) one site from each territory has been chosen for further study with the focus of better understanding the inflow rate into the upwelling area.

<p>4. Additional time series of temperature data throughout the summer months for the Nicola, Coldwater, and Deadman Rivers, and Louis Creek systems.</p>	<p>Collected daily temperatures, recorded hourly, from July to October, for the identified systems.</p>
<p>3.2 Please evaluate the EFFECTIVENESS of your project in achieving Project Objectives. Please identify the indicators you have used to measure the effectiveness of your project. Please include any notable successes or challenges.</p>	
<p>Now in its third year, the crews are very familiar with the required procedures, ands timeline for this project. The First Nation organizations involved have developed a great working relationship.</p> <p>The NTA was successful in locating two new groundwater upwelling study sites for 2009. One in the Nicola River (NR32.6gw) and one in the Coldwater River (CW9.42gw).</p> <p>Initial review of the data shows the presence of season and diel spatial distribution patterns of juvenile IFR coho and the usage of groundwater upwelling sites. Due to lack of cover more juvenile IFR coho were observed in the groundwater upwelling sites during night than daytime. More juvenile IFR coho were observed using the groundwater upwelling sites during peak mainstem temperatures than the mainstem control sites (both night and day).</p> <p>A third year of data (daily water temperatures, fish presence by species and behaviors, habitat data for all snorkel sites) has solidified the importance of groundwater upwelling sites as critical refugia habitat for IFR juvenile coho during lethal peak mainstem temperatures. This data will aid in pushing for strategies to be developed to better protect/enhance groundwater in BC, which will, in the process, aid in the conservation of IFR coho.</p>	
<p>3.3 Please attach all DOCUMENTATION of Final Outcomes, and LIST attachments here. These may include technical reports, maps, photos, evidence of communications, lists of meeting participants, etc.</p>	
<p>Data analysis not complete at time of final report submission. Does not interfere with completion of this report, and will be forwarded once complete.</p> <ul style="list-style-type: none"> <i>Groundwater Habitat Interactions for Interior Fraser Coho Year 3 (2009) Project Final Report.</i> 	
<p>3.4 Please describe how the benefits of this project will be sustained and/or be built upon into the future. What are the planned next steps, or recommendations for further work, if applicable?</p>	
<p>For the coming year of study (2010/2011) our objectives and study design have been reworked to allow for taking the next step: to quantify and define the characteristics of groundwater infiltration into confirmed upwelling areas. Results from past study years have confirmed the importance of these thermal refugia sites, during peak water temperatures in the mainstem channels, for juvenile IFR coho. We will now focus on groundwater protection. Making recommendations to improve the management of groundwater in BC, and protecting this critical juvenile IFR coho rearing habitat.</p>	

3.5 What are the top three lessons learned from this project that could be useful to communicate to others doing similar work in the Basin?

1. Continual data quality control throughout the project is essential to validity of results.
2. With multiple organizations taking part in the study it is imperative that we coordinated our schedules: deployment of equipment, conducting field work, etc, and that communication was maintained through the duration of the study.
3. Experienced crew (juvenile fish ID, equipment use) are an asset to obtaining useable data.

4. Project Expenditures

In Part A, please list all line-items from your original proposal, and add any additional line-items for costs that were not originally budgeted. Please include more specific descriptions of services or items where possible, (e.g. the name of the company or individual contracted), and actual rates, unit costs, and total expenditures. In Part B, report the original amount budgeted per line item from the detailed proposal, and the actual FSWP and non-FSWP amounts spent. Please NOTE that FSWP does not expect actual expenditures to necessarily align with the original budget.