Fraser Salmon & Watersheds Program

2011/12 FINAL REPORT

FSWP File Number*	FSWP 11 34 XX HWRS

* Please use the FSWP File Number provided in previous FSWP project correspondence.

1. Project Information

1.1. Project Title

"The Scoop On Poop," - Assessing nutrient loads, sources and habitat risks for endangered sockeye salmon in Cultus Lake, BC

1.2. Proponent's Legal Name

Fraser Basin Council Society

1.3. Project Location

Cultus Lake

1.4. Contact for this report

Name: Marion Robinson	Phone: 604-826-3074	Email: mrobinson@fraserbasin.bc.ca

1.5 Funding Amount

Original Approved Grant Amount:	Total FSWP Expenditures:	Final Invoice Amount:	Final Non-FSWP leveraging, including cash and in-kind:
$44,225	44,225.	11,080.	262,100.00

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.

Ongoing limnological and paleolimnological research has demonstrated Cultus Lake is undergoing cultural eutrophication, the enrichment of nitrogen and phosphorus from watershed sources. Resultant changes in water quality and biological productivity are impacting critical habitat for species at risk (Cultus sockeye salmon; Cultus pygmy sculpin). This project, supported in part by FSWP in Year 1, aims to critically assess the magnitude and sources of watershed nutrient loading to Cultus Lake via surface flows and groundwater. Only with this information can appropriate mitigation be applied for the protection of this sensitive salmon-bearing watershed.

As this research is scheduled to occur over a two-year window, only preliminary results are available at this time. With the assistance of FSWP, we have begun to characterize intra-annual spatial and temporal patterns in surface hydrology and nutrient loadings that will underpin our nutrient flux model. To date, our research has identified unexpected nutrient hot-spots within the watershed, including tributaries originating from

parkland catchments. We have developed a watershed groundwater flow model, which paired with well-water nutrient sampling will allow us to assess sub-surface nutrient loading (both natural and polluted). Since the inception of the project, we have also expanded the focus to assess avian guano nutrient loading from the numerous gulls and Cackling Canada Geese as well as rainfall atmospheric deposition and will be assessing lake nutrient retention by measuring the N and P content of dated lake sediment cores.

Community Engagement:
Science makes the case and community makes it possible to engage decision-makers, First Nations and citizens for the benefit of Caring For Cultus Lake. Community is active at the CLASS table with monthly actions and outreach that expands from 20 people to 60 people to 120 and more. Stewardship interest is increasing and science translated into everyday language is being understood. Given the contact and information, everyone wants to help Cultus Lake. Work also includes peace-making circle-work to build relations with local governments, First Nations and also to help resolve conflict with those impacting Lake well-being. "Without intentional community building around the issue, we would not get very far," said a Cultus resident, " I get this now…."

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

Science is providing critical nutrient research that makes the case - for the public and decision-makers to come together to care for Cultus Lake. Facilitators design the humanistic approach for positive changes. Community and decision-makers are engaged through the work of FBC and CLASS. It does take an entire community of stewards and scientists to help Cultus Lake.

3. Final Project Results and Effectiveness

3.1 Please copy THE EXPECTED DELIVERABLES from your detailed proposal and insert into this table. Add additional rows as needed. Then describe the FINAL DELIVERABLES (the tangible end products resulting from this work) associated with each expected Deliverable.

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

EXPECTED DELIVERABLES	FINAL DELIVERABLES
1. Comprehensive water quality sampling	Bi-weekly monitoring of nutrient and other water chemistry parameters for 13 tributary sites and 1 outlet site (Sweltzer Creek) has been conducted since May 2011. Monthly stream ratings and continuous stage height data for major tributaries and Sweltzer Creek have also been collected for the calculation of nutrient fluxes. Lake physical, chemical and multi-trophic biological assessments have been conducted monthly over the same period.
2. Partial development of a model nutrient budget identifying sources, sinks and fluxes of nutrients within the Cultus Lake watershed (Year 1)	Preliminary rating-stage height curves have been developed to infer time series of hydrological discharge to and from Cultus Lake. Using the nutrient concentration data collected every two weeks, nutrient fluxes will be quantified from various sources. Spatial modeling of the Cultus Lake watershed, and the

	collection of salient land-use data (i.e. agricultural land use, residential development) is ongoing.
3. Training of community and First Nation volunteers	Training consisted mostly of the values-based process. Relationships are the catalyst towards volunteer engagement. New and existing relationships were expanded first to build the understanding of what the lake itself needs. Through FBC, the volunteers, including decision-makers grew capacity to resolve conflict in a good way. Soowahlie FN hosted circle work with leadership and hosted the longhouse community event. Media was also brought in. As this interest and "ownership" grows, so will the interest to undertake lake sampling. Volunteers helping with the science (2 people) will be expanded in the coming year for the 2nd year of the Scoop On Poop.
4. Community Engagement	The community is represented at monthly stakeholder meetings where lake care tasks are assigned. Excellent turn out and participation at the Pike Minnow Derby and at the Longhouse dinner. Citizens monitor sediments and maintain open dialogue with resource sector. Other successes include: Lake Levels, distribution of Lake care booklet, established a sewerage options com'ty, science fair, and sessions with decision/policy makers – and more.

3.2 Please evaluate the EFFECTIVENESS of your project in achieving Project Objectives, using the specific measures of success identified in your proposal. Please include any notable successes or challenges.

Objectives from proposal were: 1. Quantify spatial and temporal dynamics in annual nutrient loading to Cultus Lake. 2. Training of personnel (and community) 3. Community Engagement. 4. Support nutrient abatement in Cultus Lake watershed.

1. The research science has met targets for the FSWP funded portion. This is year one of two year's work. The FSWP contribution enabled other partners and there-by was very effective.
2. Scientific training included the work of a master's student was very effective.
3. Community Engagement – see attached list of activities – fans outward from 15 people to 60 people to 120 people and after that we loose the ability to measure. The work revolves around the public buy-in to what the lake needs. The work involves relationship building in many cultures-of-operating as well as translating the science to lay language. Measurable outcomes include regular attendance, contribution and engagement from 20 agencies (incl FNs) and the additional value at 183,000K. The science makes the case and the community runs with it. FBC and CLASS work to bring supportive public opinion along by the time the FVRD decision has to be made to export the nutrients with municipal infrastructure. Community engagement was very effective. The only missing piece is the role of BCMOE Lakes Water Quality and their responsibility re septic systems. We keep inviting them and cc'ing them on communications. Both the scientists and the community will move the agenda forward.

3.4 If applicable, please describe project outcomes that relate to one or more of the following strategic approaches (Section 2.1 of RFP; section 8 of detailed proposal template), and include specific examples.	
Engagement of First Nations. Please specify who, and in what capacity.	Soowahlie First Nation, Chief Otis Jasper and Band Council, Band members, also Sto:lo Tribal Council specifically in hosting local gov't dialogues, sharing emerging science and lake care understandings, planning for future actions, and youth involved in their own community fundraisers, art projects and longhouse community dinner (March 13). Cultus issues were invited by the Lower Fraser FNs Fisheries Allicance, the L.F.FNs Sport Fish Advisory, STC workshops and SN mapping. The events reach out to local and more distant reserves. Somehow we are all connected in our interest of Cultus Lake.
Active partnerships with one or more organizations.	Fraser Basin Council, Fisheries and Oceans Canada (regulator, scientists and com'ty advisor), Retired DFO senior staff, volunteer scientists, Prov. Parks, FVRD Electoral Area E rep, FVRD Planning and Engineering staff, City of Chilliwack staff, Lindell Beach Ratepayers, Columbia Valley residents, Cultus Community Association, Soowahlie First Nation, Chihlkwayuhk Tribal Society, Sto:lo Tribal Council, Sto:lo Elders and cultural people, Youth, Teachers, School Dist. Work Experience Program, artists, businesses, industry, other non-governmental organizations and you, the Cultus Lake Parks Board. The Fraser Basin Council, Fisheries and Oceans Canada, The Canadian Wildlife Federation, Vancity and the Fraser Salmon Watershed Program provide support. Volunteers include a network of 120 people helping with outreach.
Engagement and participation of diverse and under-represented groups.	First Nations, youth, FNs youth, women and the resource extraction industry.
Relationship building, as a foundation for sustainable, enduring activities.	Relationship building is the core strategy of the Cultus Lake Aquatic Stewardship Strategy (CLASS) since Oct. 2007. FBC brings together the people and the science towards Caring For Cultus Lake.
Capacity building, including mentorship models, leadership training and skills development.	Through the funding provided by the FSWP, those involved in the project through DFO (i.e. students and casual employees) have been trained in watershed aquatic monitoring. Community cohesion and public outreach capacity is built into the CLASS strategy with some large steps taken in the peace-making process each with local governance, First Nations and with the resource extraction industry.
Recognition and support of champions and their initiatives.	Champions include the scientific team, FBC and CLASS stalwarts. Recognition took place in the Longhouse dinner March 13 and the acquisition of a salmon statue to be installed in the Cultus Lake Park with appropriate groups and individuals being honoured. Media is included.
Opportunities to influence policy and decision making,	Anticipating the science, Sewerage options Com'ty is working to

	facilitate decision-makers. Funds were leveraged to enable this. Upon project completion, the scientific data being collected during this 2-year project will be synthesized, published, and presented to relevant managers and policy makers (i.e. Fraser Valley Regional District, Cultus Lake Parks Board) to further the dialogue on the risk nutrients pose to the health of Cultus Lake.

3.5 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?

As noted, this project is ongoing, and will have a full second year of data collection, followed by synthesis, publication and dissemination to managers. This project design lends itself to future replication, cyclical basis of a complete year's monitoring every 5 to 10 years to document trends in nutrient loading to Cultus Lake. Sampling frequency could be adjusted as funding permits. Such an effort would enable the analysis of trends in nutrient loading to Cultus Lake under future nutrient abatement or "business as usual" scenarios.

The nutrient science is a necessary and new direction, partly in thanks to the FSWP. With this commitment other partners were brought in. The CLASS partners will continue with the support of CWF, Vancity and HSP (pending) with more public outreach and decision-maker awareness. Thank you FSWP!

3.6. 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. Using an approach that involves rigorous scientific study and community engagement we can identify and assess stressors for salmon habitat at the watershed scale in a non-adversarial context that informs and empowers stakeholders, policymakers and managers. Only upon completion of this project will it be possible to determine the efficacy of this approach in effecting change at the political level to mitigate stressors.

2.Quantifying nutrient and contaminant loadings to lakes is a complex problem for watershed management and requires a deliberate, methodical and comprehensive approach to evaluate and isolate potential sources. Caution is required before making prior assumptions about the relative importance of various sources to minimize field work.

3.Since water is the primary vector for the transport, mixing and dilution of nutrients or other contaminants, an accurate water budget is first required to quantify and model the watershed flux to stream and lake systems.

And Marion's comments are: 1. If you want something done you have to move people's hearts; 2. Translate the science so people can understand, 3. No global-complex-issue gets traction until it becomes personal….

3.7 REQUIRED: Attach all DOCUMENTATION of Final Deliverables, and LIST attachments in Section 8. These may include technical reports, maps, photos, evidence of communications, lists of meeting participants, etc.

4. Outreach and Communications

Please describe how you have communicated project activities and results within local and basin-wide communities, across organizations and/or to decision makers.

Please list and attach copies of (or links to) any communications materials from these efforts that you have not previously submitted.

Outreach at Cultus is both formal and informal. We grew the network of two people talking to two people with communication links in the hundreds. We have a volunteer run web-site, monthly stakeholder meetings, annual longhouse dinners with scientific presentations, numerous media articles and (new) international visitors to see how we do this. We report out through community newsletters and to each of our respective agencies in the network. We see conflict as opportunity and also provide conflict transformation to benefit the lake and its streams. CLASS is already bringing local government together to open understandings about the importance of exporting nutrients.
Latest media article: http://www.bclocalnews.com/news/142808915.html
Lake Stewards Gather At Longhouse

5.1 If you have had any significant differences in spending in comparison to your original budget, please provide an explanation. Significant differences could include costs that exceed 20% of a line item or budget category (labour, materials, administration), and new items or services that were not originally budgeted, exceeding 10% of total FSWP contribution.

5.2 Please describe all non-FSWP project contributions, cash and in-kind. ATTACH letters of confirmation for non-FSWP contribution sources (cash and/or in-kind).

Non-FSWP Contribution Sources	Letter of Confirmation Attached (Y/N)	Cash ($)	In-Kind ($)	Total ($)
DFO Cultus Lab	N		108,700.	108,700
Can. Wildlife Fed.	N	30,000		30,000
CLASS participants	N		20,000	20,000
Soowahlie UBCM C2C	N		5,000	5,000
Vancity	N	20,000		20,000

6. Additional Comments

OPTIONAL: **Provide any additional comments or recommendations for future efforts and suggestions for helping partners to meet the goals of the Fraser Salmon and Watersheds Program.**

As the FSWP is concluding, we can only say a heartfelt thank you for investing in us at Cultus Lake. The FSWP contribution was the start of so much more and clearly enabled other partners to engage. Cultus needs both the science and the community. FSWP gets that!
Thank you very much!