2009/10 FINAL REPORT

FSWP File Number*	07350-35/FSWP 09 D HWRS 23

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

1. Project Information

1.1. Project Title

FSWP Coquihalla (Ladner Creek) Side-Channel - Phase II

1.2. Proponent's Legal Name

British Columbia Conservation Foundation

1.3. Project Location

Ladner Creek (Hope, BC)

1.4. Contact for this report

Name: Kerry Baird	Phone: 604-576-1433	Email: Kbaird@bccf.com

1.5 Funding Amount

Original Approved Grant Amount:	Total FSWP Expenditures:	Final Invoice Amount:	Final Non-FSWP leveraging, including cash and in-kind:
20,000.00	20,000.00	4000.00 (final invoice only)	18,477.46

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.

Historic and ongoing anthropogenic activities have negatively impacted the aquatic ecosystem of the Coquihalla River and its tributaries; this is mainly due to the infrastructure related to the KVR railway, Coquihalla Highway, and a gas utility pipeline, as well as years of poor timber harvesting practices. River bank armouring to protect this infrastructure has confined the river and prevented river meandering, reducing natural hydraulic conditions from creating diverse fish habitat. The Coquihalla River was once a high producer of summer-run steelhead, and in fact was once a premier recreational steelhead angling stream. It is unique in the sense that it is one of only two Fraser Valley river systems home to a native population of summer-run steelhead trout. This stock has declined drastically over past decades due to poor freshwater habitat and reduced ocean conditions. Improving habitat capacity will yield greater smolt abundance throughout the watershed. The head of the side-channel project is located approximately 1.5 km from the confluence of Ladner Creek and the Coquihalla River. Phase I of the Ladner Creek side-channel project was conducted in 2008 and included the construction of a

natural cut intake, and rudimentary excavation of the 740 m length side-channel, with only minor habitat complexing. In Phase II (2009-2010) the objective was to increase habitat complexity, optimize flow conditions, and protect the channel from mainstem flood flows. The wetted channel was complexed with woody debris (50) and boulders (100), and new deep pond habitat (5) was created. To improve flows throughout the channel, substrate at the intake was removed, bank failure was remediated, and a log drop structure downstream of the intake was modified to improve flow. By engaging volunteers, boulder riffles, and log weirs were re-configured to provide free access to juveniles throughout the entire channel. A 75m length cobble/boulder protective berm was constructed between the mainstem and side channel.

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

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. The complexing of the 740 m channel with LWD, boulder habitat, and selective gravel sites.	A Bell-407 helicopter was employed to move wood from a clear landing site to the side-channel. A conventional excavator was then used to position approximately 30 pieces of wood in ideal locations to create fish habitat. Using the excavator, up to 100 boulders were also strategically placed for fish habitat. While on site, it was determined that a sufficient supply of naturally recruiting gravels are available to the channel for spawning purposes, and there was no need to augment with foreign substrate. Volunteers where engaged in the project to help make micro-adjustments to the habitat and improve the habitat characteristics. Improvements for fish passage throughout the channel were made at sites that had high velocity or vertical drops.
2. The construction of a berm to protect the lower portion of the channel from seasonal high flow events.	A 75m length cobble/boulder protective berm was created between the mainstem and side channel. The objective was to limit silt-laden high mainstem flows from entering the lower portion of the channel where it would likely deposit, and in-fill the newly created habitat. Additionally, an over-flow relief channel was created at the base of the upper side-channel to allow for high-flow silt-laden

	waters that entered the channel at the top end, to exit the channel prior to reaching the lower, low gradient channel were silt would likely deposit.
3. The completion of approximately 3,000 square meters of stable off-channel habitat for summer steelhead and bull trout.	Site measurements indicate that 3400m^2 of new habitat has been created between Phase I (2008) and II (2009) stages. In addition, 5 deep water pools were created for added habitat and cold water capture from groundwater influence.
4. The design and placement of a project sign showing the work completed the plight of steelhead in the Georgia Basin, the aim of habitat restoration, and all the project support groups.	In progress.
5. The completion of clear and concise project report.	"Fraser Salmon and Watersheds Program – 2009/10 Final Report"

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.

An estimate of the newly wetted habitat is 3400m^2. The following provincially developed bio-standards will be used to estimate potential fish production from the project. Additionally, recent in-house studies have provided some estimates that will be applied for an added comparison purpose. These values were acquired from a side-channel study conducted in 2008 and 2010 on a restored side-channel in the Silverhope Creek. The Silverhope Creek fish population is similar to that found in Ladner Creek; where only trout and char exist, with no salmon presence due to anadromous barriers limiting access to the side-channel habitat. An additional assumption, which has not been applied to the population estimates below, is that juvenile over-winter rearing will increase by 60% due to good quality nutrients in the water, originating from the mineral rich geology found throughout the watershed (pers. comm. P. Slaney).

Steelhead fish production bio-standards applied to an estimated 3400m^2 of newly created wetted off-channel habitat

- Steelhead fry per m^2; 0.29 (Watershed Restoration Management Report: No. 4)
- Steelhead parr per m^2; 0.097 (Watershed Restoration Management Report: No. 4)
- Steelhead fry and parr (age class combined) per m^2; 1.45 (side-channel population estimate study; BCCF data on file)

Fish Production Estimates based on the above noted bio-standards applied to an area of 3400m^2

- Steelhead fry per m^2 = 986 (Watershed Restoration Management Report: No. 4)
- Steelhead parr per m^2 = 330 (Watershed Restoration Management Report: No. 4)
- Steelhead fry and parr (age class combined) per m^2 = 4930 (side-channel population estimate study; BCCF data on file)

3.3 REQUIRED: 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.

- Map
- Photo Documentation
- Volunteer event – 1) Request for Volunteers
  2) Event summary and acknowledgement letter

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?

For these benefits to be sustained, ongoing review and potential maintenance should be conducted. Maintaining sufficient flow to this channel is key to improving fish abundance, and re-building the Coquihalla/Ladner fish stocks. In the long-term, most water intakes require periodic maintenance to insure that flow of water to the project is un-interrupted. Interruptions can occur from vandalism, or physical blockages associated with bed-load or floating debris. This attention will need to be provided by stewardship commitments, since it is uncommon to receive maintenance funds from funders. Dedication and ingenuity from MoE / BCCF field staff and community stewards will be the long-term insurance for this project, as it has been for most other restoration projects.

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?

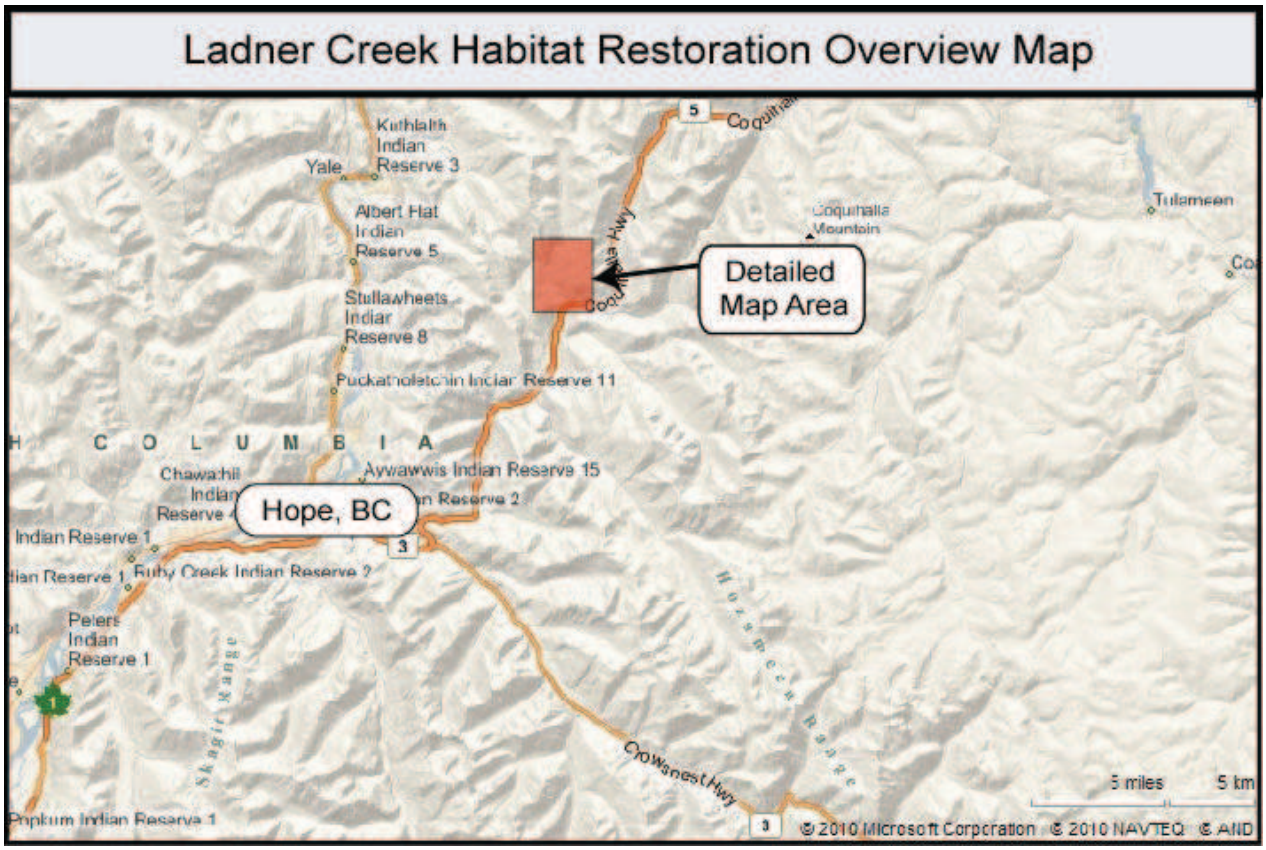
1. Natural river processes are extremely dynamic, and do not always function as humans anticipate them to. Therefore, stewards also need to be dynamic in their approach at rehabilitating ecosystems, and consider back-up plans.

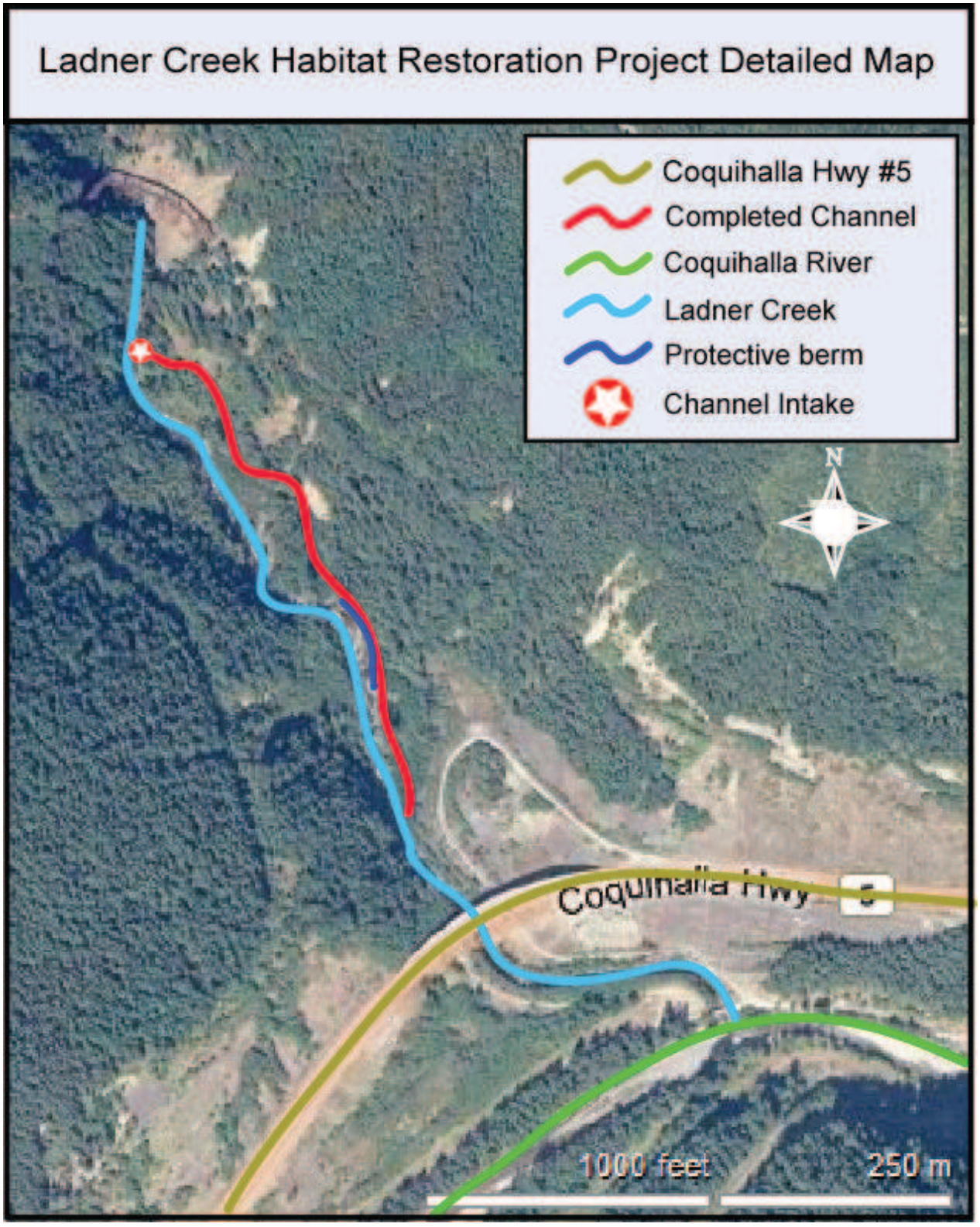
2. Often a second phase to rehabilitation projects is needed to assess, and potentially make modifications to adapt to the changes that have occurred due to the new constructed habitat from the first phase.

3. Volunteer involvement is extremely beneficial, not only in saving project dollars but also in providing a watchful eye on the project investments. Simple maintenance efforts can be conducted by these individuals as they re-visit the work that they assisted with, or messages can be passed along to project managers for larger scale maintenance issues to be dealt with.

8. Appendices

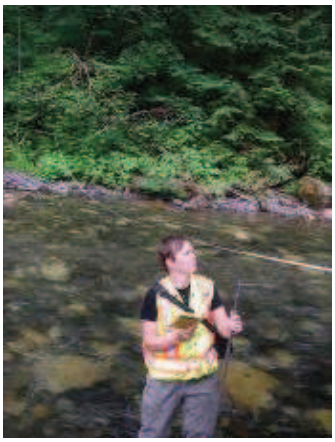
REQUIRED: attach all DOCUMENTATION of Final Outcomes, listed above in section 3.3. These may include technical reports, maps, photos, evidence of communications, lists of meeting participants, etc.



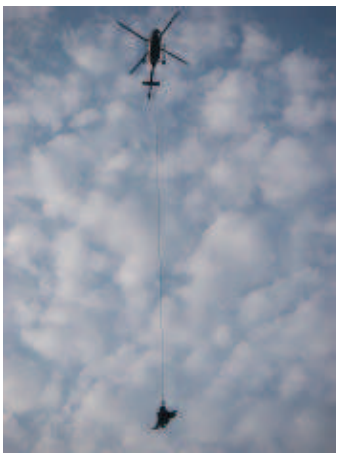

Ladner Creek Habitat Restoration Project Detailed Map
Coquihalla Hwy #5
Completed Channel
Coquihalla River
Ladner Creek
Protective berm
Channel Intake
N
1000 feet
250 m

SOURCING WOODY MATERIALS FOR PLACEMENT IN THE SIDE CHANNEL

LARGE BIN TRUCK OFF-LOADING LOGS AND STUMPS TO BE SET FOR AIRLIFT INTO THE CHANNEL COMPLEX



BCCF FISH TECHNICIAN COLLECTING LADNER CREEK FLOW DATA EARLY SUMMER 2009



BELL-407 HELICOPTER MOVING WOOD MATERIAL INTO THE SIDE CHANNEL

EXCAVATOR MAKING ADJUSTMENTS TO INTAKE STRUCTURE TO PROVIDE GREATER FLOWS

BUILDING RIFFLE HABITATS AND ARMOURING BANKS IN THE UPPER PORTION OF THE CHANNEL

BUILDING ONE OF THE TRIANGULATED LWD STRUCTURES

PHOTO SHOWS THE CONSTRUCTED LWD, BOULDER, AND RIFFLE HABITATS

EXAMPLE OF THE BOULDER CLUSTERS PLACED WITHIN THE SIDE CHANNEL

EXCAVATING A LARGE POND IN THE UPPER PORTION OF THE SIDE CHANNEL

OVERFLOW OUTLET WAS DESIGNED TO ALLOW SILT-LADEN WATER (DURING HIGH FLOWS) TO EXIT THE CHANNEL AND LIMIT SEDIMENT DEPOSITED INTO TO THE LOWER CHANNEL

PICTURE LOOKING UPSTREAM AT THE OVER FLOW PLUG AND FLOOD PROTECTION BERM.

LOOKING UPSTREAM THROUGH ONE OF THE BOULDER CLUSTER SECTIONS

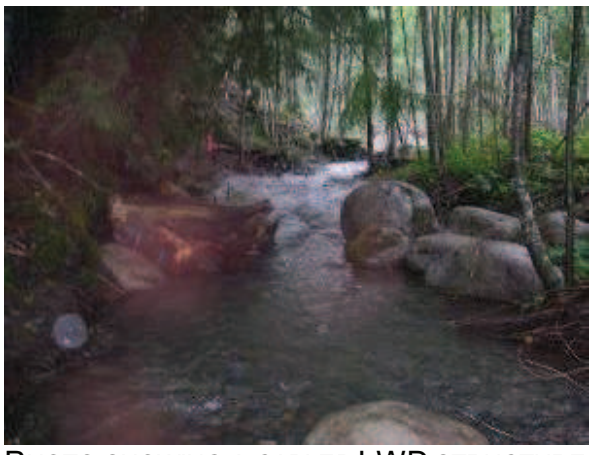


PHOTO SHOWING A CABLED LWD STRUCTURE AND ASSOCIATED BOULDER CLUSTERS

PHOTO 1 - OPTIMAL CHANNEL FUNCTION FOLLOWING MODIFICATIONS IN THE SUMMER OF 2009

PHOTO 2 - OPTIMAL CHANNEL FUNCTION FOLLOWING MODIFICATIONS IN THE SUMMER OF 2009

PHOTO 3 - OPTIMAL CHANNEL FUNCTION FOLLOWING MODIFICATIONS IN THE SUMMER OF 2009

PHOTO 4 - OPTIMAL CHANNEL FUNCTION FOLLOWING MODIFICATIONS IN THE SUMMER OF 2009

PHOTO 5 - OPTIMAL CHANNEL FUNCTION FOLLOWING MODIFICATIONS IN THE SUMMER OF 2009

GREAT VOLUNTEER TURN-OUT. TAKING IN A PRE-DAY ORIENTATION.

KEY BOULDERS AT THE INTAKE WERE CABLED TOGETHER TO REMAIN STRUCTURALY SOUND DURING HIGH FLOWS

ADDING WOODY DEBRIS, AND BOULDERS, AND CREATING RIFFLE HABITAT. RIFFLES DEEPEN THE WATER UPSTREAM, INCREASING HABITAT.

LOG DROP STRUCTRE POSITIONED TO AID IN POOL DEVELOPMENT BELOW THE STRUCTURE

LOG DROP STRUCTURE REFINED BY NOTCHING THE LOG TO DIRECT A FLOW AND IMPROVE FISH PASSAGE

Re: Habitat complexing a newly constructed side-channel in Ladner Creek (Coquihalla Watershed – November 28th **or** November 29th)

Hello everyone,

In the summer of 2008 and 2009, the British Columbia Conservation Foundation (BCCF) fisheries technicians working on the Greater Georgia Basin Steelhead Recovery Plan (GGBSRP) constructed a side-channel alongside Ladner Creek, a tributary to the Coquihalla River. Various angling organizations have supported this project in principal to assist in acquiring the needed funds to carry-out the project. We are grateful for this. Two summers have passed, and channel excavation, water supply intake construction and woody debris addition have taken place. Key project partners have included: Habitat Conservation Trust Foundation (HCTF); and Fraser Salmon and Watersheds Program (FSWP)

Although a significant amount of work has already gone into the channel development, it has mostly been with large machinery, (ie. excavator, or helicopter). The side-channel water supply is functioning well right now, but we would like to improve the micro-habitat characteristics to provide optimal fish habitat. It's one thing to have water, but to have water plus woody debris cover, boulder riffles, pools, overhanging vegetation, and invertebrate diversity...now that's a great channel!

The Coquihalla River steelhead population is considered to be in a recovery mode, primarily due to past habitat damage through highway and pipeline infrastructure development, poor forest harvesting practices, and resulting water quality issues. The closure of the recreational fishery this past summer served as a current reminder of the status of this stock!

We are seeking some keen individuals to assist the Steelhead Recovery Program in making this fish habitat more desirable. We are recruiting volunteers to spend a day at the channel adding rock and woody debris as habitat complexing, and to improve fish passage throughout the channel. Once we provide some general guidelines for the habitat complexing, we plan to remove the reins and let you complex the channel the way you imagine it should be, using the rock and wood from the margins of the channel. We will supply a few tools for leveraging some of the larger pieces, but the majority of the work will be done with sweat and determination. We expect to move, on average, rocks slightly larger than bowling balls (ten pin!). Many hands make for light work. But the day doesn't have to be all work, as we will have a couple of gold pans on-site for those interested in seeking that elusive gold nugget!!

The exact date is yet to be determined, but will be on the weekend, to accommodate most everyone. Since the Coquihalla will soon see that cold, white stuff, we plan to do this work soon, on either **Saturday (November 28), or Sunday (November 29)** depending on the volunteer availability.
We will rendezvous at the Whatcom *Tim Horton's* (~ 5 minutes east of Abbotsford), and then take only as few vehicles as necessary. If you need or would like car pooling options, let me know and we can try to coordinate with others coming from your area. For individuals wanting to join us who reside west of Abbotsford, we can meet some people at the Walnut Grove, Colossus movie theatre, and drive out to the valley from there. A lunch and refreshments will be provided for the day, as well as coffee and donuts when we gather in Whatcom. Please notify me of any food allergies. I anticipate a meeting time of 8:30am in Whatcom, and returning to this point at around 4:30pm.

If this is something that would interest you, RSVP with your preferred date by **Monday November 23, 2009**. If the response is divided for a preferred date, I will likely factor the weather forecast into the

decision making process. If the weather-man says that we will have a rainy Saturday and sunny Sunday, we will choose the Saturday to do the work...considering the weather-man's exceptional batting average!! (ha-ha...just kidding!).

If you have any question, feel free to contact me either at cory_h@bccf.com, or on my work mobile phone 604-834-3479. Please leave a message if I am away from my phone, and I will return the call.

Please forward this to whomever you think would be interested in helping out, or post on any appropriate websites/forums to distribute the request.

Sincerely,

Cory Hryhorczuk
BC Conservation Foundation

O 604-576-1432 Ext.316
C 604-834-3479

http://www.bccf.com/steelhead/
http://www.livingrivers.ca/

What to Bring

- Appropriate clothing for the weather
- Extra set of clothes if the weather is bad...or you fall in the water!
- We will provide all the work equipment
- Waders and non-slip wading boots
- If you don't have waders and boots, rain boots will suffice
- Water and snacks
- We will provide a lunch and refreshments

December 03, 2009

Thanks to all participants of the Ladner Creek (Coquihalla River) habitat complexing volunteer day

How awesome was that! Not taking away from volunteers who have taken part in past restoration projects with the *Steelhead Recovery Program*, but the turn-out on Saturday was fantastic (30 people involved); and the largest volunteer turn-out since we started the program in 2002. It was great meeting so many passionate anglers and conservationists. We're extremely grateful for the hands that you provided to get the work done, especially considering the ~10mm of rain that poured on us and the patches of snow that was on the ground.

What was completed by the volunteers: boulder/riffle habitat complexing; migration improvements for fry and parr throughout the channel; increasing flows in the channel by removing sediment built up at the water supply intake; small woody debris addition; stream bank stabilization at over-flow sites; and a channel elevation survey.

I also want to thank our funders for considering the importance of habitat improvements in the Coquihalla watershed. Financial support for the project was provided by the Fraser Salmon and Watersheds Program (FSWP - http://www.fswp.ca/), BC Living River Trust Foundation, and the Habitat Conservation Trust Foundation (HCTF - http://www.hctf.ca/). For those of you who are not aware, hunters, anglers, trappers and guide-outfitters contribute to HCTF projects through licence surcharges. From the comments I received over the weekend, many of you believe that this side-channel project is a true value for steelhead recovery, and that your surcharge contributions are being well spent on some great fish recovery efforts. The Ministry of Environment, steelhead biologist was also instrumental in acquiring funding for the project, and also providing technical support throughout the project.

For some great photos, please visit the ***Fly BC*** website at
http://forum.flybc.ca/index.php?showtopic=20171&st=60
(photos start on page 4) where volunteers have posted a large number of photos. I have attached a few from our collection, and I also snagged a few from the website to display below. Now that you have a connection with this channel, don't forget about it; frequent it, check its function, add more wood and rock, protect it, and enjoy watching the fish using it. I hope everyone had a great time, and we look forward to providing another fisheries recovery volunteer day sometime in the future. With the additions to our e-mail distribution list, I would anticipate an even greater turn-out next time.

BC Conservation Foundation - Contact
604-576-1433
Cory Hryhorczuk – Cory_h@bccf.com
Dave Harper – Dharper@bccf.com

http://www.bccf.com/steelhead/
http://www.livingrivers.ca/

Project orientation

Creating a small riffle to backwater and improve access at the riffle immediately upstream

A lot of Camo colours...looks like a bunch of ants working!

Notching out a log drop structure to direct the flow (Fly BC; Photo posted by Tex)

Finished product at the drop structure (Fly BC; Photo posted by Tex)

A great looking group of supporters following hours of moving rock and wood!!