



South Thompson Streambank Restoration



INTRODUCTION

On the South Thompson River immediately below the outlet of Little Shuswap Lake a one Kilometer stretch of the river bank was being actively eroded as a result of wave action from boat activity undermining the river bank.

The uplands are also subjected to irrigation, in season, and, because of this, it is suspected that an excess of groundwater makes its way to the South Thompson. The Village of Chase also operates a ground injection process to dispose of their sewage and it is suspected that this has the potential to increase the amount of fluids making their way to the river.

As a result, massive amounts of fine silty material are being washed over an area that contains the highest density of spawning Chinook salmon on the South Thompson River. This area of the river immediately downstream of Little Shuswap Lake is a preferred spawning location for Chinook salmon, and during the third week of October 2005 an estimated 35,000 chinook salmon were counted within this stretch of the river.

A combination of boat activity causing wave erosion, natural soil stratification consisting of layers of silt and adjoining layers of clay, and high stream banks composed of fine silty material has caused large sections of the bank to become unstable and fall into the river. The deposited silty material has been identified as an impediment to Chinook juvenile survival rates in terms of egg to fry survival.

The landowner has been actively managing his land to prevent bank slippage. His efforts have included a rigorous tree planting program and an irrigation management plan to address over use of water within the area. However, these efforts, though commendable, have not stopped the bank from deteriorating. Major stream bank restoration is required to appropriately fix this problem.

The present landowner is committed to the ecological repair of this problem; he has attended many monthly Fraser Basin Council meetings and met with representatives of the DFO Resource Restoration Unit (RRU) (Sean Bennett and Patricia Carlson).

Mr. Park is very determined to find an effective ecological solution to this problem, and to show his commitment he has agreed to provide matching funds to complete the hydrological aspect of this project. This will involve implementation of the geotechnologist's recommendations. After meeting with Mr. Park and hearing of his economic contribution, the DFO RRU have committed to working in cooperation with FBC in overseeing the project during the design and construction phases



Bank View showing boat wakes

Blue Clay toe in river



Ground water exiting bank



Extensive planting at the toe of the slope using quick growing and deep rooted species, such as one or more of several native varieties of willow or cottonwood. The suggested planting method is to use stakes that are a minimum of 1.5 to 2 m in length and 10 to 15 cm in diameter and drive them into the slope at 1 m intervals.



Cables holding logs were anchored to the bank



Hand planting of Willows and Aspen on Toe.

The Project:

The South Thompson is a large river. It can rise 5 meters during freshets and the direction of current can be altered with this increased volume of water. The challenge in this project was to develop solutions for the low water period when the current was directed toward the bank and boat traffic was at it's highest.

Much of our experience with restoration has been on smaller tributaries and we were unsure if the lessons learned on those tributaries could be incorporated into the final installation of the restoration project.

As a result it was decided early in the project to use caution in our approach and carefully plan the works. We began by using the DFO restoration unit to develop an engineered program to accomplish the goal of bank and riverbed protection. It was suggested that a series of Groynes be installed that would have the effect of dampening the river's energy as well as diverting the low flow current away from the toe of the bank.

This process was tested by encouraging site visits from experienced restoration experts who were asked both for their opinion as well as suggestions on the physical approach to accomplishing the job. These advisors included Lee Heskett, the BCCA advisor to ranchers, Mike Wallis from the Salmon River Round Table and the two machine operators whose final work would complete the project. Fraser Basin Council and DFO, who were responsible for the supervision of the job, organized and led the discussions at these meetings.

As the planning progressed, the Thompson Nicola Regional District began an expansion of their Chase Creek Landfill. As a result rock was made available free for the hauling and the project took full advantage of the opportunity. As a result 38 truckloads of rock were delivered to the site and stored until they could be incorporated into the solution.

The Pine Beetle has also devastated the South Thompson area and this has resulted in a surplus of dead and dying ponderosa pine surrounding the site. Arrangements were made with a local ranch to remove the trees from their land and deliver them to the site. It was expected that they would be incorporated into the groynes.

Since the bank was high it was suggested that a roadway be incorporated to allow the machinery to operate at maximum efficiency while limiting the potential to deposit additional silt into the river. It was further decided that the project take place in January to ensure the ground would be frozen and flow from groundwater would be impeded. Work commenced January 10 and was completed February 28th.

Nine Groynes were constructed consisting of large pine root wads being placed in the riverbank and covered with the rock. All logs were anchored to the heavier rock and tree stems were incorporated into the bank itself. These were covered with finer material and planted with willow and poplar stems.

Dampening logs were placed between the groynes to slow the wave action from passing boats. These were anchored to the large rocks as well. The groynes were placed in areas that groundwater appeared to be concentrated and it was expected that this would serve to channel the excess water through the rock and lessen the collapse of the fine silty material.

Mr. Park trimmed his existing trees and planted them along the bank. These trees were fast growing poplars from the BCFS Vernon Experimental nursery and have proven to be excellent in developing root systems to hold material together. This planting was also interspersed by planting of local willows and indigenous species of roses and other shrubs. This planting proved to be a temptation for the local beavers and an electric fence was installed to stop their advances. Seed selection for ground cover was done through Ducks Unlimited and their orchard mix was purchased from Purity Feeds. The seed was planted in April after frost was finished.



Lee Heskett and Jodi Romyn discussing the plan



Machine operators with DFO's Sean Bennett



First Day



Just start Digging



Placing Logs



First Steps



Meeting of the minds



Groynes



Plantings



Wave dampeners



Early Success

Financial:

Much of the funding in a project of this size is devoted to machinery. Skilled operators can and do implement the restoration theories but this is not without cost.

This project was a partnership between several funding sources and three interested parties DFO, FBC, and Mr. Parks, the landowner. Funding sources included the Pacific Salmon Commission, Southern Fund, the BC Agricultural Council through the Environmental Farm Plan, The Pacific Salmon Foundation, the B.C. Living Rivers Initiative and Fisheries and Oceans Canada.

Fraser Basin Council and DFO contributed supervisory time, hands on labour and negotiated with various suppliers for supplies. Mr. Parks contributed his own funding as well as much in-kind work supplying trees and cuttings to be planted.

The following pages are the proposed budget for the Southern Fund grant and the final page is the actual amount spent by the council on the project. As you will note your investment of \$60,000.00 was key to the finishing of the task.

Project Budget Form

H-3
Page 1 of 2

Name of Project: South Thompson Chinook Spawning Area Improvement Project

ELIGIBLE COSTS	BUDGET	OTHER FUNDING	CONTRIBUTION FUNDING
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Labour
Wages & Salaries

Position	# of crew	# of work days	hrs. per day	rate per hour	Total (PSC + In-kind + cash)	In-Kind & Cash	PSC Amount
Labourer anchoring	1	10	8	12	960	960	
Labourer stake collecting	1	10	8	12	960	960	
Labourer planting	1	10	8	12	960	960	
Labourer/swamper	1	10	8	12	960	960	
Person Days (# of crew x work days)				sub total	3,840	3,840	

Labour - Employer Costs (percent of wages subtotal amount)

rate	15%	sub total	576	576	
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Subcontractors & Consultants

# of crew	# of work days	hrs per day	rate per hour	Total	In-Kind & Cash	PSC Amount
DFO Engineer	1	10	7.5	500	5,000	
DFO Technician	1	10	7.5	500	5,000	
DFO Biologist	1	40	7.5	500	20,000	
FBC	1	50	7.5	300	15,000	
Insurance if applicable	rate	0%				
				sub total	45,000	

Volunteer Labour

# of crew	# of work days	hrs per day	rate per hour	Total	In-Kind & Cash	PSC Amount
Skilled						
Un-skilled						
Insurance if applicable	rate	0%				
				sub total		

Total Labour Costs	49,416	49,416	-
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Site / Project Costs

Detail (use additional page for details if needed)

	Unit cost	Number of Units	Total	In-Kind & Cash	PSC Amount
Travel (do not include to & from work)					
Small Tools & Equipment					
Site Supplies & Materials					
Rock (prefer angular, min size 150 cm.	500	100	30,000	30,000	
Trees (conifer, 50 cm butt w/ rootwad 8-	250	80	20,000	10,000	10,000
Chain (5/16" black non rated)	6	250	1,500	1,500	
Log staples (4")	2	250	500	500	
Epoxy/grout	30	5	150	150	
Sediment control (Allowance)			2,500	2,500	
Misc tools (Allowance)			500	500	
Equipment Rental					

Excavator 1	150	200	30,000	10,000	20,000
Excavator 2	180	200	36,000	28,000	10,000
Truck 1	100	100	10,000		10,000
Truck 2	100	100	10,000		10,000
Work & Safety Gear					
Allowance			500	500	
Repairs & Maintenance					
Permits					
Technical Monitoring					
Other site costs					
Total Site / Project Costs			141,650	81,650	60,000

Training (e.g Swiftwater, bear aware, electrofishing, etc).				Total (PSC + In-kind + cash)	In-Kind & Cash	PSC Amount
Name of course	# of crew	# of days				
Total Training Costs						

Overhead / Indirect Costs (not to exceed 20% of PSC Amount)

Office space; including utilities, etc.		200	200	
Insurance				
Office supplies		150	150	
Telephone & long Distance		200	200	
Photocopies & printing				
Other overhead costs	Contingency	400	400	
Misc.		500	500	
Total Overhead Costs		1,450	1,450	

Capital Costs / Assets Detail (use additional page for details if needed)

Assets are things of value that have an initial cost of \$250 CAN or more and which can be readily misappropriated for personal use or gain or which are not, or will not be, fully consumed during the term of the project.

Total Capital Costs				
Project Total Costs	192,516	131,066	60,000	

Budget Summary

(PSC + In-kind + cash)

Total Labour Costs	49,416
Total Site / Project Costs	141,650
Total Training Costs	-
Total Overhead Costs	1,450
Total Capital Costs	-
Project Total	192,516

Fraser Basin Council
 Account QuickReport
 All Transactions

"Aug 7, '07"

Type Num	Source	Name	Memo	Amount
6600000		,Ä Regional Initatives		
6665700		,Ä Thompson - Bank Restoration		
6665940		,Ä Thompson - GST Bank Restoration		
Bill	100606FB	KEEGERS		307.54
Bill	40002183	SEAN BENNETT	WIRE ROPE	3.27
Bill	JAN1907FB	KEEGERS		862.62
Bill	01/28/07	KEEGERS		913.28
Bill	020507KP	KEEGERS		671.48
Bill	40002634	SHAW'S ENTERPRISES	CHAIN	6.12
Bill	KP 70214	KEN PARK	“, NT'L CONCRETEE”	9.56
Bill		KEN PARK	“SHAW ENT., TRUE VALUE”	38.79
Bill		PHILLIPS HALLINAN***	PHOTO PRINTER	4.80
Bill		KEN PARK	trees	36.79
Total 6665940 ,Ä Thompson - GST Bank Restoration				“2,854.25”
6665700 ,Ä Thompson - Bank Restoration - Other				
Bill	100606FB	KEEGERS		10,251.25
Bill	40002183	SEAN BENNETT	WIRE ROPE	116.63
Bill	JAN1907FB	KEEGERS		28,767.44
Bill	479903	JAKE MCLUCKIE	SITE WORK	390.00
Bill		TIM DELEEuw	ANCHORING & CABLING	1,000.00
Bill	01/28/07	KEEGERS		30,453.70
Bill	020507KP	KEEGERS		22,823.50
Bill	40002634	SHAW'S ENTERPRISES	CHAIN	218.28
Bill	KP 70214	KEN PARK	“, NT'L CONCRETEE”	405.15
Bill		KEN PARK	“SHAW ENT., TRUE VALUE”	1,278.58
Bill		PHILLIPS HALLINAN	PHOTO PRINTER	171.18
Bill		KEN PARK	trees	1,226.42
Total 6665700 ,Ä Thompson - Bank Restoration - Other				“97,102.13
Total 6665700 ,Ä Thompson - Bank Restoration				“99,956.38

In the preceeding statement you will see that we used the PSC contribution for Machine time. They are highlighted under the heading Keeger and consists of three invoices (30,453.70, 28,767.44 and 22,823.50) these total \$82,053.64 of which we dedicated the entire \$60,000 of PSC funding.

Conclusion:

The project was started in the summer of 2006 with the gathering of aggregate from the TNRD. Once funding was received from the PSC, machinery was brought to the site, and work commenced shortly thereafter.

Much of the work was completed by February and smaller tasks such as planting were forced to await warmer weather. This was completed by April and we awaited the freshette to determine if we needed additional effort. This proved to not be needed and the project is substantially completed.



The beginning



The End.

The Fraser Basin Council would like to express our appreciation to the following funders . Without their timely contributions the project would not have been possible. Thank you for your assistance..



Pacific Salmon Commission (Southern Fund)

Southern Interior Region



Fisheries and Oceans
Canada

Pêches et Océans
Canada



Agriculture and
Agri-Food Canada

Agriculture et
Agroalimentaire Canada

Environmental Farm Planning



Fraser Basin Initiative

Sean Bennett (DF0), Ken Park, Landowner, Mike Wallis, Salmon River Round Table, Lee Heskett, BCCA, Jodi Romyn, FBC,