

Campbell River (Elk Falls) Canyon Spawning Gravel Placement, 2002



Funding provided by

BC Hydro Bridge Coastal Fish and Wildlife
Restoration Program
6911 Southpoint Drive - E16
Burnaby BC, V3N 4X8
Project Number 02.CA.54

and

Ministry of Water, Land and Air Protection
Fisheries Section
2080A Labieux Rd
Nanaimo BC, V9T 6J9

by

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EXECUTIVE SUMMARY

Both summer and winter steelhead stocks in the Campbell River are in the extreme conservation concern zone. “Declines in steelhead abundance have been caused by sharply reduced ocean survivals combined with impaired freshwater habitat capability. Wild stocks in most systems will not recover unless their freshwater productivity can be significantly increased to compensate for reductions in marine survival” (Lill 2002).

This project addresses a limiting factor for fish production in the upper reach of the Campbell River (Elk Falls) canyon by placing high quality spawning gravel in key locations with a heavy lift helicopter. A total of 94 m³ of spawning substrate was placed at two locations in late July, 2002. Increasing egg to fry survival for the remnant population of summer and winter steelhead is an important step in the future recovery of these stocks in the Campbell River watershed.

Funding for this project came from BC Hydro through the Bridge Coastal Restoration Program and the Ministry of Water, Land and Air Protection through the Habitat Conservation trust Fund.

1.0 INTRODUCTION

Hydro-electric development began in the Campbell River watershed in 1945 and continued through 1958. The Campbell supports the largest hydroelectric generating facility on Vancouver Island with a combined generation capacity of 247.5 MW (http://www.bchydro.com/wup/campbell_river/statistics.html).

Most flow from John Hart Lake is routed through penstocks to a powerhouse on the Campbell River, bypassing the 2.0 km long Elk Falls canyon reach (Figure 1). With completion of the John Hart hydro-electric facilities the canyon received only “leakage flows” from under the dam spill gate, or periodic spills when high local inflows or system maintenance occurred. Spills of more than 400 m³/s have been recorded through the canyon reach. The unreliability of flows in the canyon had a profound impact on its value as anadromous fish habitat in the Campbell River watershed.

Beginning in June of 1996, provincial fisheries staff began a regular monitoring program of the Elk Falls canyon to better determine its potential value to steelhead and other species, in relation to development of the Interim Flow Management Strategy¹. By the fall of 1998, an agreement between BC Hydro, Fisheries and Oceans Canada and the Ministry of Environment Lands and Parks (now Water, Land and Air Protection) provided a base flow of 3.5 m³/s through the canyon as a controlled spill from the John Hart reservoir. This was done to re-establish productive habitat while negotiations in the Campbell River Water Use Plan were underway to re-examine the entire issue of fisheries flows in relation to power production requirements.

Three primary impacts of hydroelectric development in the canyon reach were identified by the Bridge Coastal Restoration Program Strategic Plan: (http://www.bchydro.com/bcrp/strategic_plan/ch02_final.pdf)

1. ...significantly reduced gravel and LWD recruitment to mainstem...
2. Penstock diversion (partly) dewatered ~2 km of spawning & rearing habitats below Elk Falls (flow is currently managed by interim agreement).
3. Mainstem carries augmented flood peaks from diversions that affect morphology of downstream channel and estuary.

These conditions led to a reduction in the quantity and quality of spawning and rearing habitat, severely limiting fish production in the canyon reach.

The first restoration project to address spawning habitat constraints in the Elk Falls canyon occurred in 1999 when LGL Limited (Sydney, BC) was contracted to place 75 m³ of spawning gravel in the tailout of the Elk Falls plunge pool. Gravel size specifications (primarily aimed at replenishing chinook salmon spawning substrates) were likely too large to be used by all fish species present in the canyon.

¹ Campbell River Hydro/Fisheries Advisory Committee. 1997. Campbell River Interim Flow Management Strategy. Final Report. Prepared for BC Hydro, Burnaby, BC. 45pp.

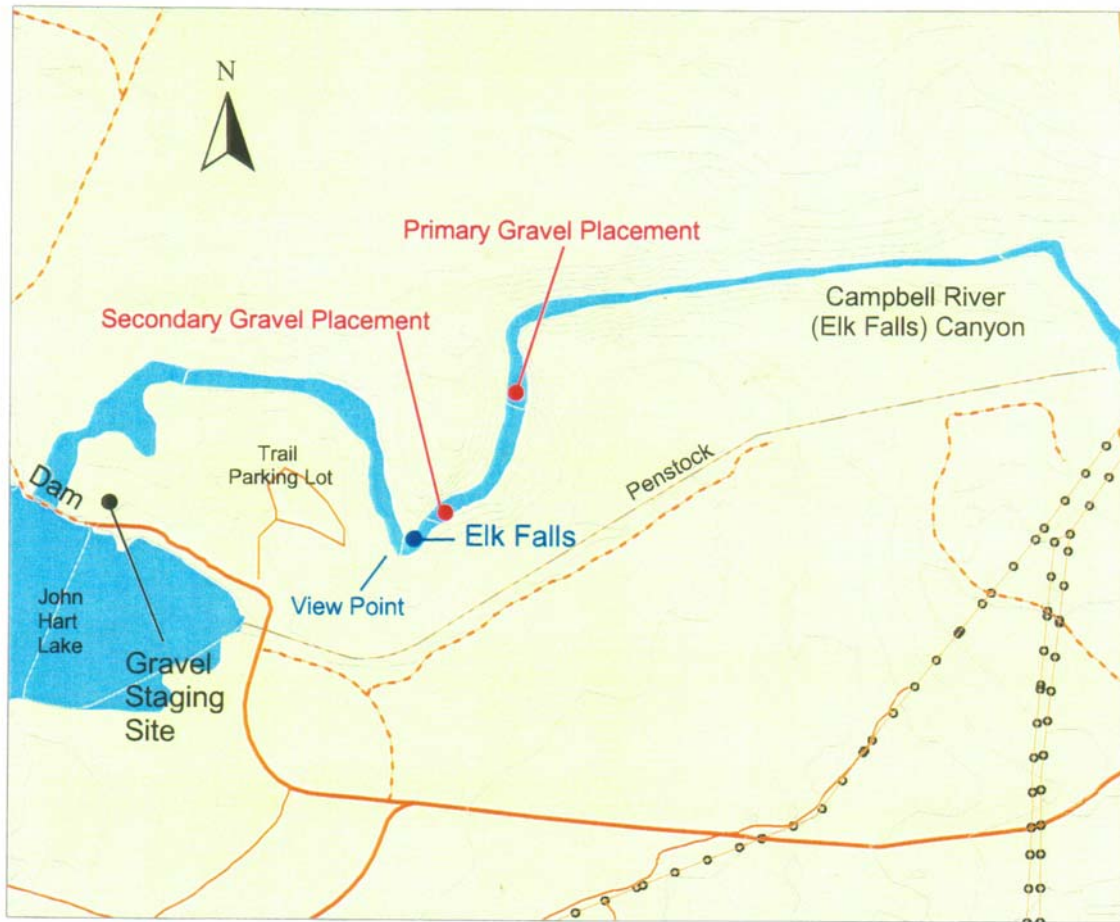
In the fall of 2001, BC Conservation Foundation proposed installing an additional 75 m³ of spawning gravel in the canyon with funding from BC Hydro's Bridge Coastal Restoration Program and MWLAP's Habitat Conservation trust Fund. The objective was to install smaller-sized substrate in locations where it could be immediately used by steelhead, coho, chinook and other species.

2.0 STUDY AREA

The Campbell River flows east from Strathcona Park, entering Johnstone Strait at the town of Campbell River. The Campbell is Vancouver Island's second largest watershed draining 1744 km² with an average annual reservoir flow of 87 m³/s at John Hart Dam and 103 m³/s in the town of Campbell River.

(http://www.bchydro.com/wup/campbell_river/statistics.html).

A penstock leading from John Hart Lake to the John Hart generating station on the mainstem Campbell River circumvents the 2.0 km river channel in the Campbell River canyon (Figure 1).



1:13,000 100 0 100 Meters

- River/Stream - Definite
- Lake - Definite
- Reservoir - Definite
- Pipeline
- Road (Paved Divided)
- Road (Unimproved)
- Bridge
- Line (Transmission) - Electrical -
- Contours
- Road (Gravel Undivided) - 2 Lanes

Campbell River Watershed on Vancouver Island



Campbell River (Elk Falls) Canyon in the Campbell River Watershed



Figure 1. Campbell River Canyon spawning gravel placement (2002).

3.0 METHODS

A notification under Section 9 of the Water Act for “works in and about a stream”, was submitted to MWLAP on June 24 and approved on July 8, 2002. A detailed safety plan was submitted to BCH on July 18, 2002 (Appendix B).

A public announcement of the restricted public access to Elk Falls Provincial Park day use area and trail closures was placed in the Campbell River Mirror newspaper on July 23, 2002 (Appendix C).

The author participated in a preliminary snorkel survey on July 23, 2002 with C. Wightman², A. McLean³, and D. Lowe⁴ (Appendix D). The survey reviewed potential gravel placement options for spawning suitability and project feasibility. Two primary gravel placement locations were identified in the upper canyon reach.

An estimated 75 m³ of gravel (six inch minus) remained near the John Hart Dam from the spawning gravel placement project in 1999. An additional 22 m³ of screened and washed medium sized drain rock (30 – 70 mm) was mixed with the larger gravel on July 24, 2002. Reducing the average size of the gravel would better facilitate spawning by all species present in the canyon reach. Ozero Sand and Gravel⁵ was contracted as the gravel supplier due to their ability to deliver pre-screened, sized and washed gravel at the least cost. The purchase and delivery of the additional gravel did not appear in the original budget, but was deemed critically important for the project’s success by the scientific authority, C. Wightman.

At 7:00 am on July 25, all trails in the flight corridor were cordoned-off and posted with temporary closure signs. At 8:00 am, the ‘tailboard’ (safety) meeting was completed with all personnel on-site.

Vancouver Island Helicopters Ltd. (VIH) was contracted to install the gravel using a Sikorsky S-61 heavy lift helicopter. At 9:00 am, an over-flight of the upper Elk Falls canyon was completed. The author, W. Greene (VIH crew supervisor), and the S-61 pilots confirmed gravel placement procedures, reviewed flight corridors and investigated potential flight hazards. Two gravel distribution buckets, owned by VIH, were specially modified⁶ to increase their capacity to 3,000 kg (6,500 lbs.). The helicopter used a remote release 400-foot long-line to place buckets of gravel in precise locations in the canyon. The project manager, stationed at the Elk Falls lookout or canyon rim lookouts, directed gravel placements using a portable VHF radio. While one bucket was ferried into position, a second was filled with gravel in the staging area with a Hitachi 200LC excavator⁷. Vehicle traffic on the Loveland Bay Road was controlled by ground crew to ensure public safety while the helicopter was overhead.

² Senior Fisheries Biologist, Ministry of Water Land and Air Protection, Nanaimo

³ Regional Biologist, Vancouver Island Region, BC Hydro, Campbell River

⁴ Fish/Hydro biologist, Ministry of Water Land and Air Protection, Nanaimo

⁵ Ozero Sand and Gravel, Parkville

⁶ Southside Welding Campbell River

⁷ Al and Sons Excavating, Campbell River

4.0 RESULTS

A total of 58 loads of gravel were delivered to two sites (Appendix E, photos 5-8) using 5.7 hours of helicopter time (5.9 minutes/load). Nineteen loads, or 33% of the total were placed in the tailout of the Elk Falls plunge pool and 39 loads, or 67%, were placed 400 m downstream. With an average payload weight of 2,950 kg (6,500 lbs.), a total of 171,100 kg of gravel was transported into the canyon reach. At an estimated 1,825 kg/m³, a total of 94 m³ was placed in both locations (31 m³ at the upper site and 63 m³ at the lower site).

Approximately 25% more gravel was placed instream than the 75 m³ originally prescribed in the project proposal.

Media coverage of this project (Appendix D) included the Campbell River Mirror (press on July 31, 2002) and the North Islander (press on July 27, 2002). Television coverage was provided through VI Land News (Victoria) on July 25, 2002.

5.0 MONITORING

Two snorkel surveys were completed in the Elk Falls canyon reach following installation of the spawning gravel (Appendix F). An October 9, 2002 survey examined use of the spawning substrate by sockeye and chinook while a November 5, 2002 survey examined use by coho and chum.

Members of the Campbell River WUP Fisheries Technical Committee⁸ performed the October 9 survey with results reported by R. Ptolemy⁹. The primary purpose of the survey was to identify the distribution and abundance of adult and juvenile salmonids and discuss specific habitat conditions at observed flows. At the time of survey, the Elk Falls canyon contained steelhead, resident rainbow trout, coho, chinook, chum and sockeye salmon. The October 9 survey reported:

1. Overall use of the installed spawning substrate by spawning sockeye and chinook was considered as 'high'; and
2. Hydraulic conditions were good for insect production and juvenile rearing but sub-optimal for spawning salmonids (flow measured at 4.3 m³/s).

The author, C. Wightman, E. Wichman¹⁰ and M. Angelo¹¹ conducted the November 5 survey. The primary purpose was to determine the distribution, spawning suitability and fish use of the introduced gravel. A secondary objective was to identify the distribution of adult salmonids in the canyon reach relative to a series of experimental pulse flows that were being evaluated in relation to the WUP. The November 5 survey reported:

1. the introduced gravel was being used by spawning coho and post-spawn chinook were observed guarding redds;
2. a very high abundance of rainbow parr and cutthroat adults were associated with the gravel pads, likely feeding on salmon eggs displaced from redds;
3. the majority of the gravel could be immediately used by spawning salmonids; and
4. the distribution of chum salmon was skewed downstream in the canyon due to a velocity barrier. The introduced spawning substrate was generally inaccessible to this species. If future placements are to benefit chum salmon, gravel distribution must also target the lower Elk Falls canyon.

⁸ C. Wightman and R. Ptolemy (MWLAP), A. McLean and A. Leake (BCH), M. Sheng and D. Ewart (DFO).

⁹ River Biologist/Fisheries Flow Specialist, MWLAP, Victoria

¹⁰ BC Hydro Environmental Technician, Vancouver

¹¹ Program Head, Fish, Wildlife and Recreation Technology, BCIT, Burnaby.

6.0 RECOMMENDATIONS

- 1) The Bridge Coastal Restoration Program and BC Parks have identified a comprehensive gravel placement plan as a prerequisite for future work in the Campbell River watershed. Completion of this plan is an immediate priority. In the interim, new gravel placements should be by helicopter only to minimize the “footprint” of this work on park land and facilities.
- 2) A flow release schedule based on criteria developed by the WUP should be implemented to facilitate upstream migration, spawning and rearing for all species in the Campbell River (Elk Falls) Canyon.

7.0 ACKNOWLEDGEMENTS

Thanks are extended to Craig Wightman, who developed the project, acted as the scientific authority and edited the final report with Laura Cassin. Wayne Greene and the staff of Vancouver Island Helicopters in Campbell River who helped the project run smoothly and remain within budget. BC Parks staff helped to develop a safe, low impact strategy for securing park trails and facilities and allowed this project to occur within Elk Falls Provincial Park. Thanks also to the field crew of James Craig, Brad Smith, Harlan Wright, Scott Silvestri and Cory Hryhorczuk for their hard work as the ground crew on this project. Thanks finally to the Bridge Coastal Restoration Program and the Ministry of Water Land and Air Protection (Habitat conservation Trust Fund) for funding this valuable project.

8.0 REFERENCES

Wightman, J.C., B.R. Ward, R.A. Ptolemy and F.N. Axford. October 1998. *Draft: A recovery plan for east coast Vancouver Island steelhead trout (*Oncorhynchus mykiss*)*. Ministry of Environment, Lands and Parks, Nanaimo, BC. pp 131 plus appendices.

Lill, A.F. 2002. Greater Georgia Basin steelhead recovery action plan. *prepared for:* Pacific Salmon Foundation, Vancouver, BC. 107 pp.

http://www.bchydro.com/wup/campbell_river/statistics.html

Appendix A

Financial Report

British Columbia Conservation Foundation
Project Budget Update 2002/2003

Today's Date : 19-Mar-03
Regional Coordinator: Pat Stephenson nanaimo@bccf.com

CLIENT NAME : Craig Wightman		PROJECT NAME		Elk Falls Canyon	
CLIENT AGENCY : MWLAP		BCCF PROJECT #		Spawning Gravel	
ADDRESS : 2080-A Labieux Road		CLIENT CONTRACT #		Enhancement	
CITY, PROVINCE : Nanaimo, B.C.		TOTAL CONTRACT	\$	10,262.00	
POSTAL CODE : V9T 6J9		FEES	\$	908.14	
TEL. NUMBER : 250-751-3100		CARRY-OVER OR SUBSIDY			
FAX NUMBER : 250-751-3103		WORKING BUDGET	\$	9,353.86	
GL ACCT.	EXPENDITURE	Working Budget	Spent to Date	Committed Cost	Balance Of Funds
4050	Equipment Rental		0.00		0.00
4051	Other charges		0.00		0.00
4055	Project Coordinator Wages		0.00		0.00
4056..5030	Contract wages	3395.28	3392.93		2.35
5110	Sub Contracts	1145.00	1145.00		0.00
5115	Premises rent		0.00		0.00
5210	Equipment > 100		0.00		0.00
5220	Equipment < 100		0.00		0.00
5230	Equipment Repairs		0.00		0.00
5235	Rentals	29.03	29.03		0.00
5240	Communications		0.00		0.00
5245	Computer Costs		0.00		0.00
5300	Materials/Supplies/Courier	3805.00	3805.00		0.00
5400	Project Publications	41.41	41.41		0.00
5500	Vehicle Operating Costs		0.00		0.00
5520	Transportation	283.50	283.50		0.00
5530	Vehicle Rental		0.00		0.00
5540	Mileage (only)	12.04	12.04		0.00
5545	Travel Costs/Fuel		0.00		0.00
5550	Accommodation		0.00		0.00
5555	Allowances	30.00	30.00		0.00
5560	Per Diem/ Food	197.75	197.75		0.00
5600	Miscellaneous :	126.77	126.77		0.00
5700	Training/Safety	96.02	96.02		0.00
5800	GST	192.06	192.06		0.00
TOTAL		\$9,353.86	\$9,351.51	\$0.00	\$2.35

% working budget spent 99.97%

Comments:

Billings to date - internal check		
3050	fees	-908.14
3100..3359	expenses	-9351.51



INVOICE

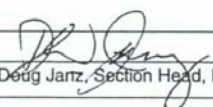
INVOICE DATE YYYY/MM/DD 2003-03-18	CUSTOMER PURCHASE ORDER NO. PS0200664	CUSTOMER ACCOUNT NO. Project #02.CA.54	INVOICE NO. WLAP 0323	VENDOR GST REGISTRATION NO. R 107864738
--	--	---	--------------------------	--

IN ACCOUNT WITH: Use a No. 9 or 10 window envelope

BC HYDRO, BCRP
6911 Southpoint Drive - E16
Burnaby BC V3N 4X8
ATTN: Janice Doane, Program Manager

SHIPPED TO:
Elk Falls Canyon Spawning Gravel
Enhancement Project #02.CA.54

TERMS OF PAYMENT NET CASH:	SHIPPING TERMS DAYS
-------------------------------	------------------------

QUANTITY	DESCRIPTION OF GOODS / SERVICES	GST STATUS	UNIT PRICE	AMOUNT
1	Payment to BC Conservation Foundation for expenses to Dec 31/02 as per invoice N-3071	Exempt	\$5,368.12	\$5,368.12
1	FINAL payment to BC Conservation Foundation for expenses to Mar 18/03 as per invoice N-3089	Exempt	\$1,202.97	\$1,202.97
	Progress report and detailed back-up to BCCF invoice attached.			\$0.00
				\$0.00
	Spending Authority  Doug Jarz, Section Head, F & WSA			\$0.00
				\$0.00
				\$0.00
				\$0.00
	Processing Section Information Service Code 9926			\$0.00
	Supplier: 999987 GL: 048/296A4/31015/8916/2915605			\$0.00

SENT MAR 18/03

MAIL CHEQUE OR MONEY ORDER TO THE MINISTRY YOU ARE DEALING WITH - Enter ministry name and address

Ministry of Water, Land and Air Protection
2080A Labieux Road,
Nanaimo, British Columbia
V9T 6J9
Attn: Processing Section

NOTICE

- Make cheque or money order payable to: Minister of Finance.
- Interest will be charged on overdue accounts in accordance with the applicable regulations.
- Do not mail cash.
- A service fee of \$20.00 minimum will be charged for dishonoured cheques
- Please quote invoice number.

SUB TOTAL	\$6,571.09
POSTAGE / SHIPPING CHARGES	
GOODS & SERVICES TAX	\$0.00
PROVINCIAL SALES TAX	\$0.00
TOTAL	
TOTAL	\$6,571.09



INVOICE

INVOICE DATE YYYY/MM/DD 2002-10-21	CUSTOMER PURCHASE ORDER NO. PS0200664	CUSTOMER ACCOUNT NO. Project #02.CA.54	INVOICE NO. WLAP 0308	VENDOR GST REGISTRATION NO. R 107864738
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IN ACCOUNT WITH: Use a No. 9 or 10 window envelope

BC HYDRO, BCRP
6911 Southpoint Drive - E16
Burnaby BC V3N 4X8
ATTN: Janice Doane, Program Manager

Mailed Oct 25/02

SHIPPED TO:
Elk Falls Canyon Spawning Gravel
Enhancement Project #02.CA.54
Project Manager: Craig Wightman

TERMS OF PAYMENT: NET CASH: DAYS SHIPPING TERMS

QUANTITY	DESCRIPTION OF GOODS / SERVICES	GST STATUS	UNIT PRICE	AMOUNT
1	Payment to BC Conservation Foundation for expenses to September 30/02, as per attached invoice.	Exempt	\$3,688.56	\$3,688.56
1	Payment to VIH Logging Ltd. for flight time associated with project.	Exempt	\$14,737.99	\$14,737.99
	Progress report and detailed back-up to BCCF invoice attached.			\$0.00
	<i>x.c. Led Oct 22/02</i>			\$0.00
	<i>Lea - Deposit to:</i>			\$0.00
	<i>Serv. Code 9926</i>			\$0.00
	<i>Supplier Code 999987</i>			\$0.00
	<i>Client 048</i>			\$0.00
	<i>Resp 296N4</i>			\$0.00
	<i>SL 31015</i>			\$0.00
	<i>Stob 8916</i>			\$0.00
	<i>Project 2915605</i>			\$0.00
	PROJECT MGR: <i>J. Wightman</i>			\$0.00
	<i>Sr. Fisheries Biologist</i>			\$0.00
				\$0.00

MAIL CHEQUE OR MONEY ORDER TO THE MINISTRY YOU ARE DEALING WITH - Enter ministry name and address

Ministry of Water, Land and Air Protection
2080A Labieux Road,
Nanaimo, British Columbia
V9T 6J9
Attn: Processing Section

NOTICE

- Make cheque or money order payable to: **Minister of Finance.**
- Interest will be charged on overdue accounts in accordance with the applicable regulations.
- Do not mail cash.
- A service fee of \$20.00 minimum will be charged for dishonoured cheques
- Please quote invoice number.

SUB TOTAL \$18,426.55

POSTAGE / SHIPPING CHARGES

GOODS & SERVICES TAX \$0.00

PROVINCIAL SALES TAX \$0.00

TOTAL \$18,426.55

Appendix B

Safety Plan

ELK FALLS CANYON GRAVEL ENHANCEMENT PROJECT SAFETY PLAN

The objective of this safety plan is to outline the proposed activities, considerations for ensuring their safe implementation and to outline protocols for check-in and emergent situations.

FIELD TRIP PLAN

Project Overview

Approximately 75 m³ of washed gravel will be installed in the upper Elk Falls canyon. Approximately 50% will be placed in the tailout of the falls pool, with the remainder positioned at appropriate locations (primarily pool tailouts) within 500 m of the falls. Washed river gravel of the preferred diameters (range 1"-6", primarily 2"-3.5") will be stockpiled adjacent to John Hart Dam in mid July 2002 (~66 m³ was left unused at the staging site from the 1999 gravel placement project, the remainder will be delivered by Ozero Sand & Gravel Ltd.).

On-site inspections and snorkel surveys in the canyon prior to gravel placement will determine the most suitable sites for addition of spawning gravel. Placements will be concentrated in the upper canyon to allow spills (by BC Hydro during high water events) to distribute the spawning substrate downstream. Proposed gravel sites will depend on pool location, channel morphology, canyon configuration for helicopter access, and helicopter route safety (i.e., flight path away from traveled roads, hazards, etc.).

A heavy lift helicopter, slinging a custom gravel bucket, will install the gravel in the predetermined locations. Two custom gravel buckets (owned by Vancouver Island Helicopters) will be delivered to the staging site. Buckets will be loaded by an excavator and alternately flown into position by helicopter. A ground crew (BCCF staff) will oversee gravel loading and hook-up the helicopter's long line to each bucket. The project supervisor will oversee placements within the canyon and will communicate by radio with the pilot and the ground crew. Based on 7 minute round trips and 2,500 kg of gravel per load, about 55 trips will be required to achieve the target of 75 m³.

The objectives of the project are to: 1) immediately increase available spawning habitat in the upper canyon, and 2) increase the potential for downstream displacement, thereby improving spawning habitat availability in the longer term throughout the canyon reach. The contract will be completed and work supervised by the BC Conservation Foundation. The scientific authority for this project will be Craig Wightman, Senior Fisheries Biologist for the Region 1 Ministry of Water, Land and Air Protection (MWLAP).

PRE-FIELD HAZARD ASSESSMENT

Falling rock hazard

- All efforts will be made to limit on the ground activity under the loaded or empty bucket at all times
- All staff will be cognizant of their position relative to the bucket while working in the area identified by the helicopter pilot as the danger zone.
- All trails into the work sites will be closed prior to the commencement of work to eliminate the possibility of personnel to enter the danger zone.
- All staff located on site will wear flagging vests and hard hats at all times.
- Radio communication will be maintained between on the ground personnel, helicopter and the crew supervisor at all times.

Overhead Hazard

- All staff will be cognizant of their position relative to the bucket while working in the area identified by the helicopter pilot as the danger zone.
- All staff located on site will wear flagging vests and hard hats at all times.
- Radio communication will be maintained between on the ground personnel, the helicopter and the crew supervisor at all times.
- The bucket will be allowed to touch the ground first to avoid the possibility of electricity shock caused by a build up of static electricity.

Working around Excavator

- All staff will be cognizant of their position relative to heavy machinery.
- All staff located within the work site will wear flagging vests, steel toed boots and hard hats at all times.
- Clear paths of communication will be maintained between the machine operator, field crew and helicopter at all times.

CHECK-IN PROCEDURE

The following procedure shall be followed to during the planning and execution of the work.

1. The Field Crew Leader Mike McCulloch shall contact both the (Vancouver Island I MOS Tom Veary) and the Natural Resource Specialist (Allister McLean) five days prior to the day in which the instream work is undertaken to advise that the work is being planned. The MOS shall submit an outage request to Resource Management (PSOSE).
2. One day prior to the day of work the Field Crew Leader shall contact the MOS to confirm that the specific flow condition (outage) has been approved.

3. On the day of the work the Field Crew Leader shall contact the MOS or his designate immediately prior to the commencement of the work and to advise of the expected completion time for the work. At the end of each working day the Field Crew Leader will contact the MOS or his designate to confirm that they are clear of the river and intakes .
4. Following confirmation that work has been completed, the MOS shall contact Resource Management (PSOSE) to advise that the outage may be completed and that normal flow releases from John Hart Dam can be re-established.

In the event that the MOS needs to contact the Field Crew they can be reached before and after their shift at the cellular phones or home phone numbers listed below. During the shift they may be reached by the cellular phones, depending on location and reception. In the event that communication can not be made via telephone, then local Power Facilities personnel shall be dispatched to contact the field personnel.

FIELD PROCEDURE

A tailboard will be conducted by the field crew leader, Allister McLean, BCCF field crew the Helicopter pilot and excavator operator prior to the commencement of the field day starting on July 25th, 2002. The field crew leader will ensure that all safety and communication equipment is on-site, working and in good order. The field crew leader will assess the weather and river conditions and relay relevant information to each team member. Specifically, the field crew member will advise the crew members of known and implied hazards.

The crew will be equipped with a first aid kit, an analog cell phone, and safety equipment. Emergencies are to be reported promptly to the contact personnel listed below.

CONTACT NUMBERS

B.C. Hydro Natural Resource Specialist

Allister McLean 250-850-5906 (work)

Alternate: Deirdre Riley 250-528-7950 (work)

Vancouver Island MOS

Tom Veary (250) 850-5909 (work) 250- 287-6687 (cell) 250-830-9143 (pager)

Resource Management – Shift Office (PSOSE)
604-891-5098

Vancouver Island Control 250-701-4625

BCCF Field Crew

James Craig 250.954.0228

Scott Silvestri 250.224.3300

BCCF Field Crew Leader

Mike McCulloch
Fisheries Technician
#3-1200 Princess Royal Ave
Nanaimo, B.C

tel. (250) 716.8776
fax. (250) 716.2167
cell. (250) 714.2299
Home (250) 156.4121
email: mmccullo@bccf.com

Craig Wightman, Fisheries Biologist
Water Land Air Protection
tel. (250) 751.3230

Emergency Numbers in Campbell River

Campbell River Ambulance: 911
RCMP Campbell River: 911
Campbell River Hospital: (250) 287.4556

Vancouver Island Helicopters Campbell River 250-923-3133
Long Beach Helicopters 250-286-8863

Appendix C

Media Coverage

BC Conservation 2x4 - Composite

**TEMPORARY TRAIL
CLOSURE**

The BC Parks Millenium trail extending from the BC Hydro generation station west to the Elk falls day use area and the trails leading into the area surrounding Moose and Deer Falls,

**will be temporarily closed
Thursday July 25th
from 6:30 AM to 4:30 PM**

An extreme rock fall hazard related to construction activities will exist during this window and the public is asked to refrain from using the designated trails. Signs identifying the trail closures will be posted at trailheads.

*This closure does not affect the
Canyon View trail or trails adjacent to the
Elk Falls campsite.*

Gravel drop replenishes riverbed

John Thompson
Mirror Staff

With whirling rotors and crashing water, around 85 cubic metres of gravel was dropped by helicopter into the canyon just beyond Elk Falls on Thursday in an effort to replenish the barren riverbed for salmon.

The Elk Falls trails were closed during the operation, funded by BC Hydro and the Ministry of Water, Land and Air Protection.

"The idea is to introduce gravel to allow spawning," said James Craig of the BC Conservation Foundation (BCCF). "There really is very little gravel there."

"We have salmon that make it all the way up to the falls," added Mike McCulloch, also from the BCCF. "But they have nowhere to spawn."

Rivers are constantly shifting gravel downstream and replenishing spawning beds naturally, but since the construction of the John Hart Dam in 1947, this flow of gravel has stopped in the Campbell.

The gravel will be dispersed along a two-kilometre stretch of the canyon, but most was dropped within 600 metres of the falls.

In July 1999 gravel was dropped during a similar exercise, but didn't spread as far as expected. To locate the best drop locations, members of the project snorkelled their way down the river in drysuits after they were dropped off at the base of the falls by helicopter on Tuesday. During their swim, they saw hundreds of resident trout, as well as four summer steelhead, which they were particularly excited to see, said McCulloch, who was part of the snorkelling team.

The restoration project is part of the Vancouver Island Steelhead Recovery plan, he explained.

"When we see them, we're always excited," he said.

Last Wednesday was spent sorting gravel with an excavator. Smaller grades of rock were added to the mix to appeal to all species of fish, McCulloch said.

The larger rock was specific to chinook, which was used exclusively during the 1999 drop, he said. This year's mix is more conducive to all species in the river, which are all five species of salmon as well as trout, he said. Because the gravel is smaller than their last dump, it's also expected to spread further down the river.

Gravel was dropped on Thursday around three sites that were selected, using a heavy-duty S61 helicopter and two custom-built buckets. One bucket is capable of carrying 2,500 pounds of gravel, which was lowered into the water with a 400-foot cable, emptied and then returned to the dam, where the next filled bucket was waiting. The turn-around was quick, with each load dropped roughly every six minutes. The bucket needs to be lowered into the water because the strain of dropping gravel from the air is too great, McCulloch said.

"They can't release above the water surface because the rotors can't handle the punishment," he said.

The Campbell River restoration is one of five projects underway in the province, with other areas including Sawward, Port Alberni and Tofino. The cost of the project is \$35,000. While it's too early to say what the project's exact impact will be, McCulloch said it will be an important factor in the re-creation of the species.

"It's quite difficult and costly, but it's one of the few things we can do, to benefit all species," he said.



John Thompson/The Mirror

■ Drop zone: A heavy-duty S61 helicopter uses a 400-foot cable to drop loads of gravel into the Campbell's riverbed.

Great gravel!

Biologists hope gravel placement will increase fish numbers

By DAN MacLENNAN
North-Islander Reporter

The canyon below Elk Falls is teeming with fish, including coho, cutthroat trout and even a few adult summer-run steelhead, says Craig Wightman, steelhead biologist with the Ministry of Water, Land and Air Protection.

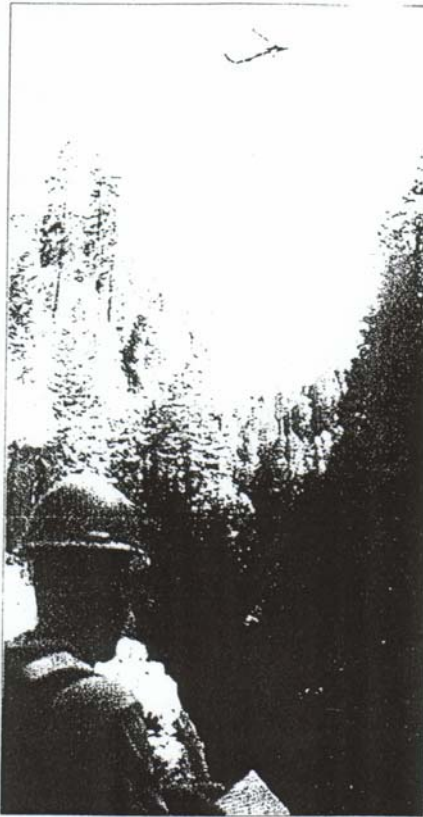
It's hoped the placement of additional spawning gravel in the canyon Thursday will increase habitat and fish numbers over time.

Wightman and three others, including B.C. Hydro biologist Allister McLean, swam the river Tuesday to scout out locations for Thursday's helicopter gravel placement operation.

"There's very high numbers of coho fry in there, right from the top to the bottom over the two kilometres," Wightman said. "There's steelhead fry and there's very, very large numbers of yearling steelhead, last year's fish that are now a year old."

Wightman said he was very surprised to see four adult steelhead so far up the river this early in the season.

See gravel, page 2A



Mike McCulloch, of the B.C. Conservation Foundation (BCCF), supervised from the viewing platform while a Sikorsky S-61 from Vancouver Island Helicopters placed spawning gravel into the canyon below Elk Falls Thursday.

Photo: Dan MacLennan

"They've probably been in the river for a month or two, but for them to swim all the way up, over a series of very steep rapids, that was interesting," he said. "Three of them are right close to the main plunge pool at the falls."

"We found steelhead redds (spawning beds) in the gravel that was placed in 1999. There were three or four redds right in the tailout of that pool, and there were steelhead fry out and kind of defending their little feeding territories."

Up to 90 cubic metres of gravel were to be placed in the canyon Thursday, some near the falls and the majority in a promising pool about half a kilometre below the falls. The work, a Vancouver Island Steelhead Recovery Plan initiative, was being

done through the B.C. Conservation Foundation (BCCF) which contracts to the Ministry of Water, Land and Air Protection.

"That will provide immediate spawning area for all the salmon and/or steelhead this coming fall winter," Wightman said.

"It's a good news story," said McLean.

"It's great to see the addition of gravel into the canyon."

"I would anticipate seeing a significant increase in fish in the upper canyon."

The total project cost is \$25,000 with \$25,000 coming from B.C. Hydro's Bridge Coastal Restoration program and \$10,000 from the Ministry of Water, Land and Air Protection.

Appendix D

Preliminary Snorkel Survey

FILE NOTE

Date: July 24, 2002
File: 34560-20/SNORK
xf: 34560-27/CAMP

SNORKEL SURVEY REPORT

Campbell River

DATE: July 23, 2002
WEATHER: 30% Overcast
WATER TEMP.(°C): ~16 @ 1200h
DISCHARGE (m³/s): 3.5 (by interim agreement)
VISIBILITY (m): 5
PERSONNEL: C. Wightman (WLAP), M. McCulloch (BCCF), A. McLean (Hydro), D. Lowe (WLAP)
AREA: from Elk Falls to the BCH generating station (Elk Falls Canyon)
Approximate distance 2.0 km.

1. Fish Observed:

Adults

Adult assessment

A total of 4 summer steelhead were observed for a density of 2.0 fish/km.

Steelhead were primarily distributed in the upper third of the survey with two observed in the Elk Falls Plunge Pool.

8 rainbow trout (25-35 cm). Note: this represents only a sub-sample of the resident rainbow/steelhead parr in this reach.

5 cutthroat trout (25-35 cm). Note: this represents only a sub-sample of the cutthroat in this reach.

Juveniles

Steelhead parr abundance was high throughout the survey section.

Coho abundance was high in most pool habitats throughout the survey section.

Notes

- The primary purpose of this survey was to assess potential spawning substrate placement locations in the Elk Falls Canyon. Two primary gravel placement locations were identified in the upper 500m of the Elk Falls canyon and one future opportunity was identified in the lower canyon.
- Several rough measurements of the primary gravel placement, approximately 400 m downstream of Elk Falls were taken in the field using a fiberglass surveyor's tape. The average channel width was 36.5 m and the average wetted width was

28.7 m. The estimated average gradient in this reach is 4.0% and the mean depth was approximately 0.6m. The second gravel placement location was in the tailout of the Elk Falls plunge pool. The new substrate is to be placed further back in this tailout, in habitat that is hydraulically suitable for spawning salmonids given the current regulated flow in this reach.

- Numbers of juvenile rainbow and adult steelhead do not reflect total abundance's as adult and juvenile enumeration was not the primary focus of the survey.

Mike McCulloch
Fisheries Technician
BC Conservation Foundation

/dm

sns(creek)

cc: All Fisheries staff
Steelhead Crew
Conservation Officer Service, Campbell River
D. Ewart, Quinsam River Hatchery, Campbell River
A. McLean, BC Hydro, Campbell River

Appendix E

Photo Documentation

Appendix F

Field Assessment/Monitoring

Summary of Snorkel Observations by the Wet Campbell River FTC members on the ELK FALLS CANYON REACH_ Oct. 09, 2002

Date: October 9, 2002 (Wednesday)

Start 1050 Hr

Finish 1350 Hr

Helicopter Access

Generally bright day with some clouds and showers

Stream Transparency = 7 m+

Flow = 4.3 cms or 5%mad

Crew of Six (Wightman, Leake, Sheng, Ewart, McLean, Ptolemy)

Purpose:

1. Examine fish distribution of both spawners and rearing fish
2. Examine the toe-width water coverage
3. Examine hydraulics at riffle/cascade and pool/run tailouts relevant to HSI curves
4. Count number of units of major meso-habitats
5. Count fish numbers per Unit
6. Examine extent of introduced "round" gravel and its use by fish

Meso-Habitat	Units	Parr	Res Adults	Sthd	Coho	Chinook	Chum	Sockeye	Comments
Riffle	1	32							
Cascade/Rapid	13	389	19	2					
Run	5	365	39		9				
Pool	12	830	59	6	51	22	5	26	All parr sighted at head of Pools/Runs
ALL	31	1616	117	8	51	31	5	26	
Prob N		2693							
N/km		1347							
Smolts/km		539							
Adults/km		70							
Total Adults		84							

Conclusions:

1. Non-random fish distribution. Random transects are to be avoided since clear habitat preferences are demonstrated.
2. Stream transects must customize to particular issue.
3. Toe-width coverage is near 100% except for key spawning sites including elevated bars.
4. Hydraulics are good for rearing/insect production but are sub-optimal for spawning salmonids.
5. Total of 31 Units revealed.
6. Very limited distribution and high use of "round" gravel at mainly two locations.
7. Coho fry were "parr-sized" and occupied similar habitat to steelhead parr. Abundance was quite high for a boulder-cascade reach with mad = 86 cms.

FILE NOTE

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xf: 34560-27/CAMP

SNORKEL SURVEY REPORT

Campbell River

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