# HABITAT CONSERVATION TRUST FOUNDATION
# PROJECT FINAL REPORT

1. **PROJECT NAME:** Richards Creek Flow Augmentation

2. **HCTF PROJECT FILE #:** 1-449, 2978156

3. **FISCAL YEAR:** 2008/09

4. **LOCATION**
   a) Distance from a known place: 9 km north of Duncan.
   b) Longitude (degree/minute/seconds): 123°39'35"
   c) Latitude: (degree/minute/seconds): 48°51'11"

5. **PROJECT EXECUTIVE SUMMARY**

Water conservation and initiatives to maximize efficiency of water supplies are strongly supported by the Ministry of Environment (MoE; http://www.env.gov.bc.ca/wsd/plan _protect_sustain/water_conservation/), particularly actions that will improve stream flow-related rearing conditions for trout and salmon. On east coast Vancouver Island (ECVI), Richards Creek, the largest tributary to Somenos Lake (lower Cowichan River, in Duncan), flows from Crofton Lake reservoir, previously a District of North Cowichan (DNC) water supply for the town of Crofton. Original dam design in 1956 only accounted for a nominal release to Richards Creek, which up until 2008 suffered from extremely low summer flows. The Crofton Lake reservoir was recently replaced with a new water supply, making significant storage potentially available to augment flows for fish in Richards Creek.

MoE's delivery partner BC Conservation Foundation (BCCF) delivered this HCTF project, assisting with final consultation and logistical planning and supporting June 2008 dam infrastructure modifications (primary objective) in partnership with DNC, Cowichan Tribes and Fisheries and Oceans Canada (DFO). As a result, approximately 2/3 of Crofton Lake storage was made available to annually augment low summer flows in Richards Creek. The remaining third of the reservoir's storage will be kept as back-up water supply.

This project was generated in part by ECVI Water Storage Feasibility work (HCTF project #1-430) undertaken by BCCF in Nanaimo. BCCF's Living Rivers Georgia Basin/Vancouver Island program is focused on Water for Fish projects and water management planning initiatives in the region. On Crofton Lake/Richards Creek, BCCF worked with DNC and DFO to identify potential habitat benefits from increasing storage releases to Richards Creek. With project implementation, habitat quantity and quality in 1.4 km of anadromous stream length in upper Richards Creek improved significantly (i.e., 765 $m^2$ of new rearing habitat), as did 3 km of resident cutthroat-bearing habitat above the anadromous barrier. Conditions for fish in lower Richards Creek, with lower gradient and some channelization, also improved based on water quality monitoring in 2008 and 2009.

Stakeholder consultation during spring 2008 included subcontracting a local consultant familiar with the Duncan area agricultural community to contact each landowner on Richards Creek, explain the project and secure support.

Project benefits are significant and will re-occur annually with storage releases each summer. DNC hold the existing license, own most of the land around Crofton Lake and are responsible for annual maintenance of the dam and infrastructure as a condition of license.

## 7. Activities/Technique(s)

To accomplish the project's primary objective, BCCF staff completed remaining feasibility and consultation, and worked with DNC and DFO to implement physical upgrades to dam infrastructure in late spring 2008 to enable flow augmentation to start in July 2008.

Remaining feasibility completed as part of this project included a final set of habitat measurements in May 2008 made while background flows in the target reach were near the project's target release rate of 400 lgpm (30.3 L/sec; actual flow during measurements=388 lgpm). This result was included in a summary report (under separate cover) sent to stakeholders that described the potential habitat benefits and justified the infrastructure modifications.

Consultation was broadened to include area streamkeepers, Somenos Steering Committee, Cowichan Tribes, and landowners along Richards and Somenos creeks. A sub-contractor familiar with the area's agricultural community completed consultation, contacting 19 streamside landowners in the watershed to gain their support for the project.

The DNC engineering staff prepared the document "Examination of Use of Water from Crofton Lake to Supplement Flows in Richards Creek." Following discussions, the project team agreed on Scenario #4 which used 319,000 $m^3$ of storage to achieve target flows of 400 lgpm between July 1 and October 31, leaving 260,000 $m^3$ as a reserve.

The project was implemented in late June 2008 with BCCF covering materials and excavator costs and DNC supplying engineering oversight, manpower and small equipment. Once lower river beaver dams were addressed, releases from Crofton Lake commenced July 7 and, with DFO monitoring, were ramped up to target by July 10. Richards Creek stream flows were augmented throughout summer 2008. Water quality parameters were monitored and overseen by DFO staff.

Late in the summer season, DNC suspected the inlet structure in Crofton Lake may have been partially plugged, as target flows were becoming difficult to achieve. A diver was contracted to clean the intake and/or rule it out as a source of the problem. The intake was found to be reasonably clean, and piping infrastrucure and vacuum issues were subsequently examined. DNC concluded that with proper start up procedures in future years, airlock-related flow restrictions should be avoided.

Releases during the summer of 2009 met project targets and stakelholders were satisfied with this most recent season of operation (M. Wright, Biologist, DFO, Nanaimo, pers. comm.).

## 8. Measures of Results

As agreed, flow releases in 2008 and 2009 were monitored by DFO staff. Reporting by DNC indicated that target flows were met during the identified augmentation periods. While benefits

in the Richard Creek target reach included 765 $m^2$ of additional rearing habitat and improvements in existing rearing habitat quality, the degree to which additional flows improved conditions in Richard's lower, low gradient, agriculturally impacted reaches continue to be more difficult to quantify. In 2008 and 2009, DFO focused most of its monitoring effort there and while improvements were evident, they were not consistently significant. Preliminary 2009 water quality data suggests that dissolved oxygen levels in lower Richards Creek became unsuitable for fish at a location ~400 m further downstream compared to past years, indicating that a significant length of additional stream channel in the lowest reach was able to support salmonids in 2009 (M. Wright, Biologist, DFO Nanaimo, pers. comm.). This was most likely a result of additional flow releases from Crofton reservoir.

Beaver activity in the lower sub-basin required periodic maintenance by local property owners, DNC and it's contractor responsible for flood monitoring. Damming complicated monitoring of flows and likely affected temperatures and $O_2$ levels at some sites.

The first two years of monitoring suggest project objectives have been met. Data confirms Richards Creek flows were close to targets throughout summer 2008 and 2009. This year's successful implementation built on two previous years of feasibility during which the problem was clearly identified and a coordinated approach to achieving stated goals was developed.

## 9. Benefits/Risks

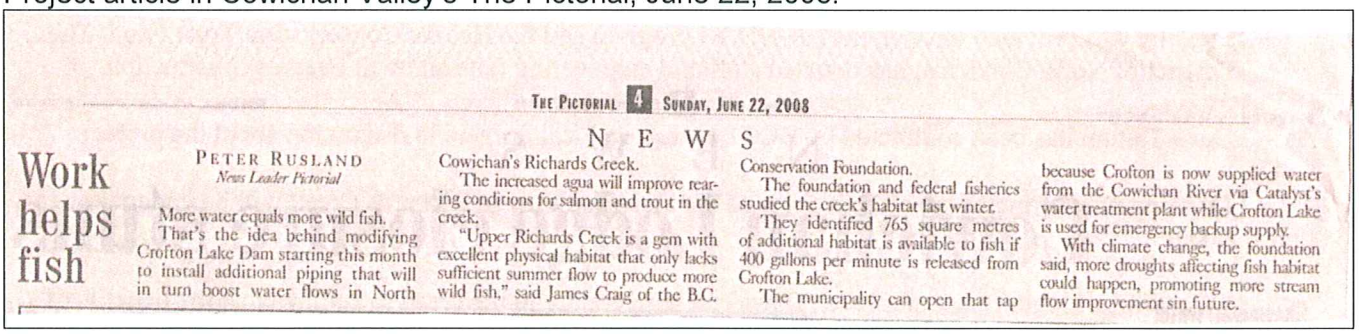
Flows achieved in the two summers since implementation were approximately 700-800% greater than the historic base flow. This will generate significant improvements in habitat quality and quantity, as demonstrated in pre-project feasibility studies. Cutthroat and coho juveniles will experience significantly reduced intra- and inter-species competition for available habitat. Macro-invertebrate habitat also improved, likely leading to increased fish food availability.

## 10. Extension/Public Information/Participation/Partners

Craig, J.D.C. 2008. Crofton Lake/Richards Creek habitat study – final report May 2008. Prepared for BCCF, DFO and DNC. 12 p.

Reitsma, C. 2008. Examination of use of water from Crofton Lake to supplement flows in Richard Creek. Prepared for District of North Cowichan. 17p.

Project article in Cowichan Valley's The Pictorial, June 22, 2008.



THE PICTORIAL 4 SUNDAY, JUNE 22, 2008

NEWS

# Work helps fish

PETER RUSLAND
*News Leader Pictorial*

More water equals more wild fish.

That's the idea behind modifying Crofton Lake Dam starting this month to install additional piping that will in turn boost water flows in North Cowichan's Richards Creek.

The increased agua will improve rearing conditions for salmon and trout in the creek.

"Upper Richards Creek is a gem with excellent physical habitat that only lacks sufficient summer flow to produce more wild fish," said James Craig of the B.C. Conservation Foundation.

The foundation and federal fisheries studied the creek's habitat last winter.

They identified 765 square metres of additional habitat is available to fish if 400 gallons per minute is released from Crofton Lake.

The municipality can open that tap because Crofton is now supplied water from the Cowichan River via Catalyst's water treatment plant while Crofton Lake is used for emergency backup supply.

With climate change, the foundation said, more droughts affecting fish habitat could happen, promoting more stream flow improvement sin future.

Project article in Cowichan Valley Citizen, June 20, 2008.

# The Crofton Lake Dam is undergoing modifications to improve water flows to an important fish-bearing stream in the Cowichan Valley.

By Cowichan Valley CitizenJune 20, 2008

The Crofton Lake Dam is undergoing modifications to improve water flows to an important fish-bearing stream in the Cowichan Valley.

The District of North Cowichan in a project supported by Living Rivers - Georgia Basin/Vancouver Island and Fisheries and Oceans Canada is planning construction in mid-late June to install additional piping at the dam to supplement water flows to Richards Creek.

"Upper Richards Creek is a gem, with excellent physical habitat that only lacks sufficient summer flow to produce more wild fish" said James Craig, BC Conservation Foundation.

No longer the primary domestic water supply for the Town of Crofton, Crofton Lake has storage that can be used to benefit fish. A portion of the water supply will be used each summer to improve rearing conditions for Richards Creek salmon and trout.

With climate change that is expected to bring more frequent and extended droughts, this type of stream flow improvement project may become more common. A habitat assessment conducted by DFO and BCCF in the winter of 2007/08 identified at least 765 m2 of additional habitat available to fish if 400 gallons per minute were released from Crofton Lake.

The District of North Cowichan is able to increase the flow because they now supply Crofton with Cowichan River water via Catalyst's water treatment plant and use Crofton Lake only as an emergency backup supply.

"We were supportive of this venture and looked at it as an opportunity to increase fisheries productivity by providing a substantial increase in rearing habitat on Richards Creek," said John Mackay, Director of Engineering and Operations, District of North Cowichan.

Funding was provided through the LR-GB/VI program and the Habitat Conservation Trust Fund. The District of North Cowichan has donated staff and engineering time and will oversee construction.

Dave Tattum has been contracted by BCCF to engage local farmers in discussion about the project.

Ongoing monitoring of the effectiveness of the increased flow in Richards Creek will be undertaken by DFO.

"We will be monitoring water level, flows and temperature in the creek to confirm that the benefits of this project are realized," said Margaret Wright, DFO.

During consultations with landowners along the creek, BCCF's sub-contractor received positive feedback from the community. The landowners appreciated being contacted and consulted with respect to the project.

## 11. PHOTOGRAPHIC RECORD

Photo 1. Looking upstream at transect #5 (riffle) in **base** flow condition (90 lgpm).

Photo 2. Looking upstream at transect #5 (riffle) in **target** flow condition (400 lgpm).

Photo 3. Looking downstream at relatively wide riffle/spawning habitat in upper Richards Creek during **target** flow conditions (400 lgpm). Note majority of stream channel is wetted.

Photos 4 and 5. New, larger diameter pipe laid below Crofton Lake dam, to enable an increased release rate to Richards Creek. Upgrades occurred in June 2008, overseen by District of North Cowichan engineering staff.

## 12. FINANCIAL DETAILS

# *PROJECT FINANCIAL REPORT*

**Proponent / Project Leader:** Craig Wightman/Randy Dolighan **HCTF Project #:** 1-449 (e.g. 6-125)

**Conditional Grant #:** (if applicable - e.g. CATXX-X-XXX)

**HCTF Approved Budget Amount:** $5,625.00

**Project Name:** Richards Creek Flow Augmentation

Reporting Period: 04/01/08 (mm/dd/yy) to 03/31/09 (mm/dd/yy)

Reporting Purpose:

- ☐ Annual Report
- ☒ Final Report

## PART 1. FINANCIAL REPORTING (HCTF MONIES ONLY)

### A. Labour Costs

**i. Human Resources – Wages & Salaries**

| Position | # of Crew | # of Work Days | Rate/day | HCTF Amount |
|---|---|---|---|---|
| BCCF Tech | 1 | 1.7 | 350 | 599.40 |
| | | | | |
| Person Days (# of crew x work days) | | | **Subtotal i** | $599.40 |

**ii. Subcontractors & Consultants (provide details in text)**

| Contractor | # of Crew | # of Work Days | Rate/day | HCTF Amount |
|---|---|---|---|---|
| Tattam Environmental | | | | 180.72 |
| | | | | |
| | | | **Subtotal ii** | $780.12 |
| | | | **A. Total Labour Costs** | $780.12 |

### B. Site / Project Costs

| | Details | HCTF Amount |
|---|---|---|
| Travel | Per diems | 44.11 |
| Small Tools & Equipment | | |
| Site Supplies & Materials | Valves, piping, gaskets (31% of total DNC costs paid by this project) | 1,988.85 |
| Equipment Rental | Excavator (100% of total DNC costs paid by this project) | 1,987.49 |
| Vehicle Rental (incl. Helicopters) | | |
| Work & Safety Supplies | | |
| Repairs & Maintenance | | |
| Permits | | |
| Technical Monitoring | | |
| Other Site / Project Costs | GST ($107.12), misc ($92.31) | 199.43 |
| | | |
| | **B. Total Site / Project Costs** | $4,219.88 |

## C. Overhead

| Details | | HCTF Amount |
|---|---|---|
| Office space, utilities, etc. | | |
| Insurance | | |
| Office supplies | | |
| Telephone & long distance | | |
| Photocopies & printing | | |
| Administration fees (Details required) | BCCF 12.5% | 625.00 |
| Other overhead costs | | |
| | | |
| | **C. Total Overhead Costs** | $625.00 |

## PART 2. SUMMARY OF EXPENDITURES FROM ALL FUNDING SOURCES (Please list all partnership funding for the project and identify the partner)

| | HCTF Funding Amount (Use data from Part 1) | Other Funding | | | | Total – (HCTF and Other) |
|---|---|---|---|---|---|---|
| | | Source | In-kind | Cash | Sub-total Other Funding | |
| A. Labour Costs | 780.12 | DNC, DFO & LR-GB/VI | 12,165.53 | 7,012.44 | 19,177.97 | 24,177.97 |
| B. Project / Site Costs | 4,219.88 | | | | | |
| C. Overhead Costs | 625.00 | | | 876.56 | 876.56 | 1,501.56 |
| **Total Costs** | $5,625.00 | | 12,165.53 | 7,889.00 | 20,054.53 | 25,679.53 |

## PART 3. EQUIPMENT PURCHASE SUMMARY

| Equipment (list items >$1000 purchased and quantity) | Serial Number | Dollar Value | Location Stored | Contact |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

Certified that the project has been satisfactorily completed and all purchases and equipment over $1000 per item have been returned in satisfactory condition.

J.C. Wightman — Project Proponent Signature

Nov 4/09 — Date

J.C. Wightman — Print Name

HCTF USE ONLY – Financial Report Accepted by:

Controller, Habitat Conservation Trust Foundation

Date