



*Port Coquitlam & District  
Hunting & Fishing Club  
Pt. Coquitlam, B.C.*

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***BRIDGE COASTAL RESTORATION PROGRAM  
2002-2003***

***COQUITLAM RIVER  
Overland Off-Channel Habitat Development***

Coquitlam River Off-Channel Rehabilitation 2002-2003

BCH 02.CO.09

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Port Coquitlam and District Hunting and Fishing Club  
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## Summary:

**Location:** Off-channel is located within the Pinecone-Burke Provincial Park on the Coquitlam River floodplain, 100m upstream of the Pritchett Creek outfall.

**BC Watershed Code:** 100-024500...

**Map References** NRC NTS Map 92G/02  
BCGS TRIM Map 92G.037

**UTM Co-ordinates** Zone 10: 516900mE, 5463900mN (NAD27)

**F&O Drawings:** 11-166-1

<b>Cost Summary:</b>	<i>Funding</i>	<i>Amount</i>
	<b>Total Funds</b>	<b>\$85296.61</b>
	BC Hydro 2002-2003	\$71546.61
	Fisheries & Oceans Canada	\$13750
		(in kind)

<b>Habitat Constructed:</b>	<i>Feature</i>	<i>Area</i>
	total ponds and refuges	3500m <sup>2</sup>
	total channel	1000m <sup>2</sup>
	<b>Total Habitat</b>	<b>4500m<sup>2</sup></b>

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# 1 Introduction:

## 1.1 Background

This project increases the area of coho rearing habitat as well as the food production capabilities of the system. The habitat works continue a program restoring off-channel habitats along the mainstem, anadromous reaches of the Coquitlam River.

Over the past ten years, Fisheries and Oceans Canada has worked with various partners to restore off-channel habitats along the Cheakamus River. Since 1993, BC Hydro has co-funded some of the work. More habitats are available for rehabilitation and this program should be viewed as a long-term investment in population health for coho and chum salmon of the Coquitlam River.

The preferred technique addressing limiting factors for coho salmon success is off-channel habitat creation rather than lateral logjam or river side-channel rehabilitation. For the Coquitlam River, the productivity of coho salmon is limited primarily by the amount of critical off-channel habitat available.

The total watershed area of the Coquitlam River is approximately 262 km<sup>2</sup>. The Coquitlam River originates in the Coast Mountains and flows through Coquitlam Lake and onto the Fraser River floodplain west of Douglas Island. A dam at the mouth of Coquitlam Lake, 11.2 km upstream of the Fraser River, is a barrier to all anadromous fish.

## 1.2 Need Statement

The Coquitlam River has been affected by storing a significant portion of its flow for potable use. The dam has decreased total and base flows as well as changed the hydrograph for the Coquitlam River.

The off-channel habitat exists within a riparian wetland area. McLennan et. al (2000) noted that the present extent of floodplain ecosystems in the Coquitlam is greatly reduced compared to its original extent. The remaining riparian ecosystems provide important aquatic functions that are critical to the maintenance of fish habitats in the Coquitlam River, as well as important terrestrial functions that support diverse and productive wildlife habitats in an urban-suburban area.

Overwintering habitat for coho and steelhead is likely limiting productivity in the Coquitlam River since natural channel braiding and complexity has been reduced by flow diversions and dyking in the lower reaches. Wetland habitat has also been limited due to flow diversions, lack of flood events and riparian encroachment into the floodplain.

## 1.3 Purpose

The Port Coquitlam and District Hunting and Fishing Club, Fisheries and Oceans, and BC Hydro built the Overland Off-channel Habitat to:

- Provide winter habitat for coho and steelhead salmon, and cutthroat trout
- Improve salmon returns and increase delivery of marine-derived nutrients to the Coquitlam watershed
- Increase wetland habitat
- Increase off-channel habitat

## 1.4 Objectives

We achieved the project goals by building two ponds and a groundwater channel. The ponds have both shallow and deep refuge areas, as well as large quantities of woody debris and groundwater inflow.

The grounds around the site have been graded to support trees and vegetation dependent on both dry and wet ground. Woody debris set as barriers periodically along the groundwater channel should limit bear predation

The constructed ponds will provide refuge areas for coho, steelhead and cutthroat. Chinook may also utilise these ponds prior to spring migration. The surrounding grounds have been seeded and are currently supporting a small deer population. We shelved the original planting plan when we were unable to secure a planting crew while the river was safe to cross.

## 2 Site Location:

The Overland Off-channel Habitat is located approximately 100 metres north of the confluence of Pritchett Creek on the east side of the Coquitlam River. The side channel is contained within the floodplain of the Coquitlam River and is bordered by the Pinecone-Burke Mountain Provincial Park to the east. The side channel is about 0.5 km in length and receives flows both from a groundwater aquifer on the Coquitlam River floodplain and from an unnamed creek, which flows out of the adjacent uplands within the Pinecone-Burke Mountain Park. The proposed work under this application would be to create two off-channel ponds adjacent to the side channel to increase rearing habitat for coho salmon and cut-throat and steelhead trout. These ponds would provide critical overwintering habitat for these stream-rearing species of salmonid.

The BC Watershed atlas lists the Coquitlam River as 100-024500. The reach of river this project feeds is shown on Natural Resources Canada National Topographic System map 92G/2 and provincial Base Mapping And Geomatic Services (Ministry of Sustainable Resource Management) TRIM map 92G.037. The position of the site is approximately 5464100 m north, 516805 m east, using Universal Transverse Mercator coordinates for Zone 10U with the 1983 North American Datum.

## 3 Methods:

### 3.1 Equipment

To complete the work, the contractor—Headwater Management Limited of North Vancouver--provided

- Hitachi 220 LC Tracked Excavator and Hitachi 200 Tracked Excavator, and
- TCM 1/8 cubic yard miniature Rubber-Tire Front End Loader, as required
- portable spare fuel tanks, as required

### 3.2 Construction

We built the Overland habitat in three passes. First, we cleared the work area—a portion of the floodplain that was previously a side channel and now had very young trees. Second, we excavated the shallow habitat. Third, we excavated the deep habitat and placed wood and rock habitat features. During all the excavation, we managed the spoil to maintain sufficient work space and create our flood protection. While excavating, we maintained separating berms and weirs to limit sediment impact on the existing habitat. Since the habitat is derived mainly from groundwater, we had to ensure that each section of habitat was complete before we proceeded to the next one. We spread the saved vegetation and soil as a finishing step.

During the late winter, we began arranging for a modest reforestation effort using imported red cedar, Douglas fir, and Nootka rose plants as well as transplanting some native ferns. But the safe access across the river was no longer available before the end of the project schedule and closure of the funding budgets.

The work site limits permitted by BC Parks precluded strict adherence to the original site plan. BC Parks prohibited demolition of trees with diameter at breast height greater than 500mm. But the resulting habitat spans 4500m<sup>2</sup>.

## 4 Results:

Since this is a habitat restoration construction project, the results are the physical works as well as the quantities of productive habitat and expected production yield.

## 4.1 Project Description

Works constructed between July 31, 2002, and September 30, 2002, included:

- building and dismantling a river access ramp for each side of the river using imported angular rock, gravel-filled bulk bags (developed riverside) and native rock (undeveloped riverside)
- clearing the construction areas of vegetation, duff and topsoil and stockpiling it for use as surficial cover on the spoil piles and disturbed ground as well as large woody debris in ponds and channel
- excavated the southern pond, placed large woody debris into it, and connected its outfall to an existing stream (formerly spring fed)
- excavated the northern pond, placed large woody debris
- built a connecting channel to the existing seasonal creek
- excavated the groundwater channel
- built berms to limit possible impact of high flows diverting into the habitat from the main river and the tributary which the site feeds
- graded the spoil to blend into the landscape
- spread stockpiled soil, vegetation, and duff
- seeded the soil cover

## 4.2 Habitat Quantities and Estimated Production:

<i>Feature</i>	<i>Habitat</i>		<i>Production Estimate (primarily coho smolts)</i>	
	<i>Type</i>	<i>Area</i>	<i>Factor</i>	<i>Total</i>
• refuge areas (depth > 1m)	permanently wet	1480m <sup>2</sup>		
• shallower pond areas (0.5m < depth < 1m)	permanently wet	2020m <sup>2</sup>		
• groundwater spawning channel (depth <= 0.5m)	permanently wet	1000m <sup>2</sup>		
• total pond area (permanently wetted habitats)		3500m <sup>2</sup>		
• total channel area	permanently wetted	1000m <sup>2</sup>		
• Total	all	4500m <sup>2</sup>	0.5 coho smolts/m <sup>2</sup>	2250 smolts

## 5 Recommendations:

The project is built and functionally complete. We cancelled the reforestation plan due to coordination problems with the labour crew and access limitations due to atypical spring weather this year. Resource Restoration would like to recommend further opportunities for the Port Coquitlam and District Hunting and Fishing Club (project proponent):

- explore possible co-operation with BC Parks to exploit the site's value as an educational opportunity
- monitor fish use of pond and marsh as well as relative use and productivity of each
- monitor regeneration of plants and plan evergreen, alder and cottonwood population management
- monitor water flows and requirements
- explore opportunities to implement reforestation plan

## **6 Acknowledgements:**

Bridge Coastal Fish and Wildlife Restoration Program, BC Hydro, for funding the project.

BC Parks for permitting fish habitat construction on their lands and supporting its continued maintenance and use in research and development.

Henry Overland and his family for permitting access to the river through their property.

## **7 References:**

McLennan, D.S., V. Veenstra, Oikos Ecological Services for BC Hydro. "Riparian ecosystem mapping lower Coquitlam River". Coquitlam/Buntzen Water Use Plan Study. Coquitlam, 2000.

Omni-Tech Environmental Services. "GPS and GIS mapping for Unnamed Creek and Overland Habitat". Project # 23-01. Vancouver: 2003.

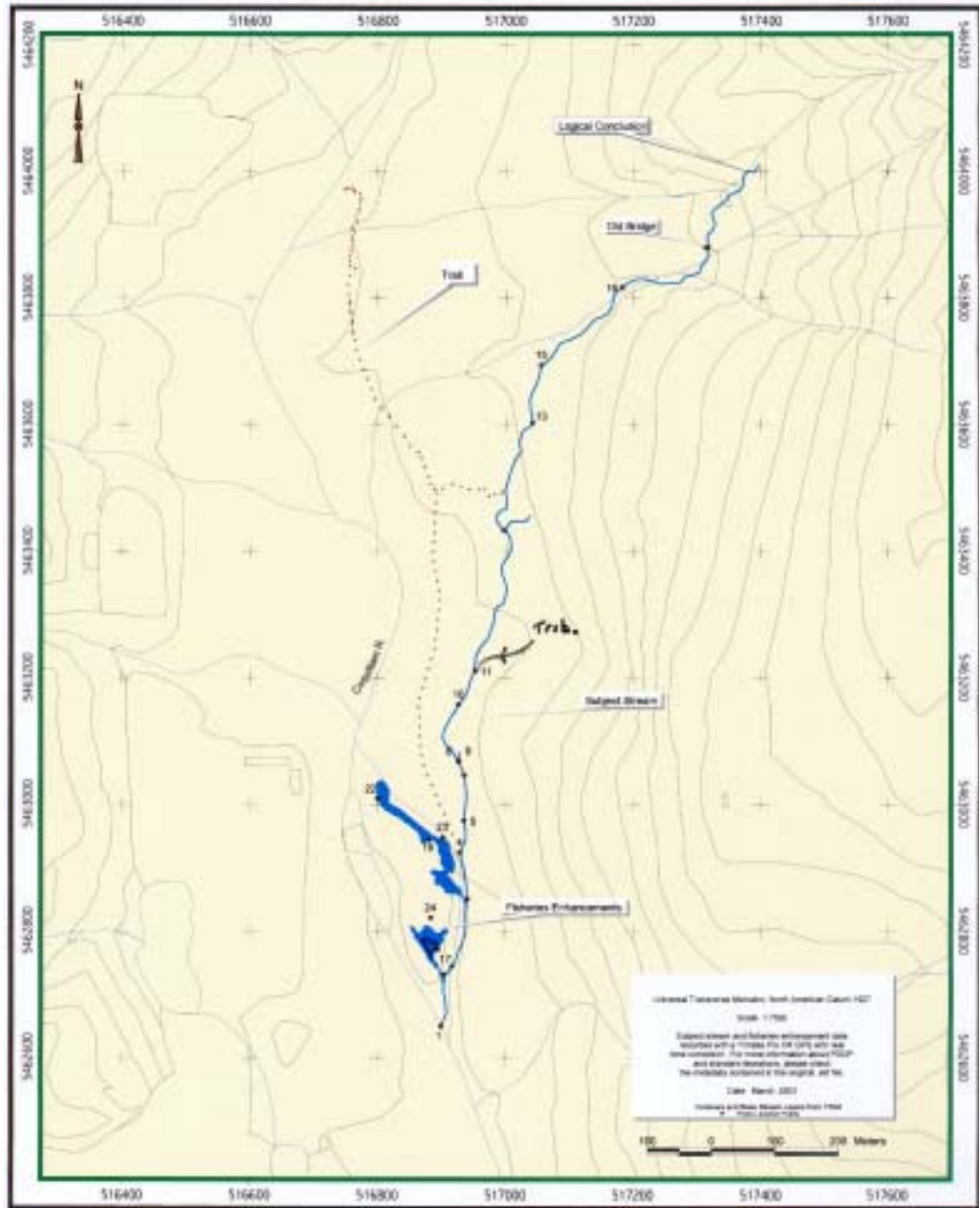
Port Coquitlam and District Hunting and Fishing Club. "Overlander Off-channel Habitat". Proposal Document. Delta: 2001.

Resource Restoration Unit, Fisheries and Oceans Canada. "Coquitlam River: Overland Off-channel Habitat Development". Fisheries and Oceans Construction Reports. Delta: 2002.

# 8 Figures:

*Figure 1.  
GPS mapping  
of the site and  
adjacent  
habitat.*

*(Map provided  
courtesy of  
F&O  
Community  
Economic  
Development  
Program.)*



1

**Figure 2.**  
North end of  
site looking  
south to north  
pond after  
clearing brush  
and soil



2

**Figure 3 & 4.**  
South Pond  
during  
construction  
showing  
separation  
berm after  
settling over  
night (3) and  
during  
construction  
(4)



3



4

**Figure 5.**  
South pond  
during  
deepening  
work



5

**Figure 6.**  
South pond  
several  
months after  
construction  
(looking  
south-  
southwest)



6

**Figure 7.**  
Looking east-  
northeast to  
the north half  
of the north  
pond.  
Machines are  
spoiling the  
shallow pass  
gravel onto a  
separator  
berm to  
protect the  
habitat from  
the Unnamed  
Creek to  
which it  
drains.



7

**Figure 8.**  
Excavators dig the deep portions of the north end of the north pond, as seen from south edge of the north pond.



8

**Figure 9.**  
Upstream end of the groundwater channel before the final grading of the channel.



9

**Figure10.**  
Excavators dig the groundwater channel. Foreground machine is digging final grade and background machine digs the second pass to finish the width of the full channel and grading.



10

**Figure 11.**  
 This shows the channel in Figure 9 with the first 15 metres and an alcove complete. The machines are busy with grading and placing large woody debris at the far upstream channel end.



11

**Figure 12.**  
 During the first excavation pass work at the channel elbow slowed to move large diameter river boulders



12

**Figure 13 to 16.** One of the boulders (8-10 foot size) required the two machines cooperating to move it so the channel elbow could pass.



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14

**Figure 16.** Ultimately, the machines could only manage to place that large on the channel bank.



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16

**Figure 17.**  
The groundwater channel nearly completed with wood and rock. The groundwater is half a foot deep (September, 2002).



17

**Figure 18.**  
While digging the connection to the Unnamed Stream, we discovered an old rail and steel wire rope. They crossed the outlet roughly parallel to the Unnamed Stream.



18

**Figures 19 to 21.** The rail segment we removed was 12 feet long and we broke it to remove it. The rail was three feet below ground, probably buried during the flooding of the mid 1950s.



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*Figures 22 to 24. The 1-inch diameter wire rope was near the rail but did not have a consistent depth.*



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*Figures 25 to 27. We found fish carcasses and activity in the fall and spring.*



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*Figures 26 and 27. Fish carcasses found in the north pond show access is OK.*



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27

**Figure 28.**  
*Panorama pivoting on the north end of the north pond. The south half of the north pond is visible at left and the groundwater channel is visible at right.*



28

**Figure 29.**  
*Panorama pivoting on the east bank of the south end of the north pond. The outlet to Unnamed Stream is visible at left and the south half of the north pond is visible at right.*



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## 9 Appendix A: Financial Statement

<i>Item</i>	<i>Description</i>	<i>Income</i>	<i>Expense</i>	<i>Totals</i>
1	<b><i>Funding</i></b>			
	BCHydro Bridge Coastal Restoration 2002-2003	71546.61		
	BCHydro BCRP 2002-2003 (unused allocation)	11113.39		
	Subtotal Funding			<b>71546.61</b>
2	<b><i>In-kind Support</i></b>			
2.1	Fisheries & Oceans Canada (Professional Support)	5000		
2.2	Fisheries & Oceans (Technical Site Supervision)	8750		
	Subtotal In-kind Support			<b>13750</b>
3	<b><i>Expenditures</i></b>			
3.1	Equipment (includes angular rock and trucking)		70981.28	
3.2	Materials (seeds, bulk bags)		565.33	
3.4	Technical Site Supervision (in kind)		8750	
3.5	Professional Support (in kind)		5000	
	Subtotal Expenditures			<b>85296.61</b>

## **10 Appendix B: Assessment Report**

A memorandum summarising Sam Gidora's population Assessment of the Overland Off-Channel Habitat.

Gidora, S. "Coquitlam R – Overlander's Ponds Population Assessment." March 17, 2003.