



Oxbow Side Channel Restoration Project Report

Project # 09.COQ.01



**Prepared by
North Fraser Salmon Assistance Society**



**Prepared with
Financial Support of BC Hydro
Bridge Coastal Fish and Wildlife Restoration Program**

November 2009

**Oxbow Side Channel Restoration Project Report to
BC Hydro Bridge Coastal Fish and Wildlife Restoration Program**

Acknowledgements

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Salmon Enhancement Program - Resource Restoration Unit

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Salmon Enhancement Program - Resource Restoration Unit

City of Coquitlam

Ministry of Transportation Environmental Management Section

Kwikwetlem Nation, Resource Management Unit, and

North Fraser Salmon Assistance Society

Photo Credits

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Cover Photo

Chum Spawning in New Habitat, October 17, 2009

**Oxbow Side Channel Restoration Project Report to
BC Hydro Bridge Coastal Fish and Wildlife Restoration Program**

Executive Summary

In response to the decline of returns and loss of critical habitat for coho salmon (*Oncorhynchus kisutch*) and other salmonids, a partnership was developed to undertake a project to contribute to the restoration of these historic habitats in the Coquitlam River watershed. This project links to and addresses limiting factors identified in BC Hydro's Bridge Coastal Fish and Wildlife Restoration Program Strategic Plan.

North Fraser Salmon Assistance Society (NFSAS) provided project management and Fisheries and Oceans Canada (DFO) provided design and implementation expertise. Financial support from the Bridge Coastal Fish and Wildlife Restoration Program (BCRP) was augmented with significant contributions from DFO's Salmon Enhancement Program-Resource Restoration Unit. Additional in-kind contributions received from the City of Coquitlam - the landowner, Ministry of Transportation Environmental Management Section and Kwikwetlem Nation, ensured project success.

The Oxbow Side Channel Restoration Project has resulted in 2,600m² of rearing and 540m² of spawning compensatory salmonid habitat undergoing major maintenance and refurbishment. In addition, 640m² new rearing and 460m² of new spawning habitat that directly and immediately benefited the target species was created. Approximately 300m² of riparian habitat was also restored.

The project also included installing two beaver boxes to reduce the opportunity for beaver activity to restrict juvenile salmonid use of this habitat, especially during the prime over-wintering periods.

New interpretative signage will increase public knowledge of salmon, their habitat and the role that BCRP, other funders and community groups have in their conservation and enhancement.

The creation of new side channel habitat and improved access to existing habitat has recovered some of the side channel rearing habitat that was lost due to the development of the Coquitlam River dam.

Long-term monitoring will inform an adaptive management plan and will provide relevant data for future restoration and rehabilitation works.

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1.0 Introduction

The BC Hydro Bridge Coastal Fish and Wildlife Restoration Program (BCRP) has provided a \$50,050.00 contribution to the Oxbow Side Channel Restoration Project located in the Coquitlam River watershed, a tributary of the Fraser River in southern British Columbia. This project links to and addresses limiting factors for fish and wildlife identified in BC Hydro's Bridge Coastal Fish and Wildlife Restoration Program Strategic Plan, Chapter 8, Coquitlam Buntzen Watersheds.

The Oxbow Side Channel Restoration Project addresses the following limiting factors:

1. Factors Limiting Fish Diversity and Production:

Limiting Factor #2 – Loss of Habitat

Former rearing and over-wintering areas are permanently lost or seasonally reduced due to inundation by the Coquitlam dam, flow diversions, dykes and urban encroachment along banks of the lower river which have alienated off-channel, riparian and wetland areas. Much of the Coquitlam River watershed wetland and off-channel habitats have been lost. The opportunity to provide additional wetland, over-wintering and riparian habitat for juvenile salmonids in the Coquitlam system is critical.

Limiting Factor #4 - Reduced Biological Productivity

These side channel habitats will improve salmon returns to the Coquitlam River that in turn will increase the amount of marine-derived nutrients entering the system. This will partially compensate for loss of marine nutrients when the Coquitlam dam denied salmon access to the upper watershed.

2. Factors Limiting Wildlife Diversity and Productivity

Limiting Factor # 1 – Habitat Changes

An altered flow regime has detrimentally changed critical riverine and riparian habitats. Wetland habitat in particular has been significantly reduced due to inundation, flow diversions and dyke construction.

Many species of fish and aquatic wildlife will utilize the new side channel habitat created by this project, particularly species such as juvenile coho salmon (*Oncorhynchus kisutch*) and chum salmon (*O. keta*). Coho, in particular, have a critical need for side channel habitat for over-wintering and during early spring to successfully prepare for their migration to marine waters in late spring.

Adult and juvenile cutthroat (*O. clarki clarki*) and steelhead juveniles (*O. mykiss*) will utilize this type of habitat as they forage for small fish and invertebrate prey.

Turtles and frogs would use the still water and ponds for feeding and reproduction. Beaver, otter and mink can forage and cohabitate with the target species. Additional beaver boxes will reduce blocked fish access resulting from the beaver activity at the culvert sites.

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2. Goals and Objectives

The Oxbow Side Channel Restoration Project's goals and objectives are directly linked to the BCRP's Strategic Plan, which will address the following program objectives:

Fish Restoration Objective #1

Conserve and Improve Fish Habitats in the Lower Coquitlam River

Restore rearing and over-wintering salmonid habitat and provide refuge habitat for fish during flood events and dam spills.

This project will have hydraulic characteristics designed to withstand the historic range of discharges in the Coquitlam River.

Provide greater species diversification.

Planting of fruit bearing shrubs and coniferous trees that have fish benefits will enhance the value of this site as riparian habitat.

Wildlife Restoration Objective #3

Create or Enhance Wetlands and Riparian Habitats for Aquatic Species

Provide benefits to species that rely on side channel and wetland habitats.

Riparian dependant species expected to benefit from this work include herons, raptors and small mammals in general, north-west salamanders, red legged frogs, painted turtle, kingfishers, mink, and otter.

This project also provides the value added benefit of enhanced public awareness and appreciation of the value of fish and wildlife habitats desired by the BCRP Board by:

- Creating passive education opportunities with interpretative signage
- Providing active environmental education opportunities for city parks staff and regional stewardship groups
- Enhancing opportunities for local engagement of stewardship and service clubs in projects
- Strengthening local project partnerships, collaboration and in-kind support.

The goals of this project were to:

- Create 1500m² side-channel rearing habitat for coho and chum salmon and cutthroat and steelhead trout
- Create 100m spawning channel for coho and chum salmon
- Install 2 beaver boxes and culverts
- Create 200m² of riparian habitat rich with preferred native berry-producing plants and other wildlife friendly vegetation
- Install information signs to provide educational opportunities and enhanced awareness of the salmonid resource, the importance of healthy habitat and to acknowledge the partners involved in the restoration project

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- Provide an educational experience for the public who visit the Lower Coquitlam River Park, and
- Strengthen existing partnerships between BCRP, DFO, MoT, Kwikwetlem Nation, Ministry of Environment (MoE), City of Coquitlam, watershed stewardship groups and regional industry for the long-term conservation, protection and restoration of fish and fish habitat in the Coquitlam River Watershed.



**Figure 1
Beaver Baffle Installed on New Culvert**

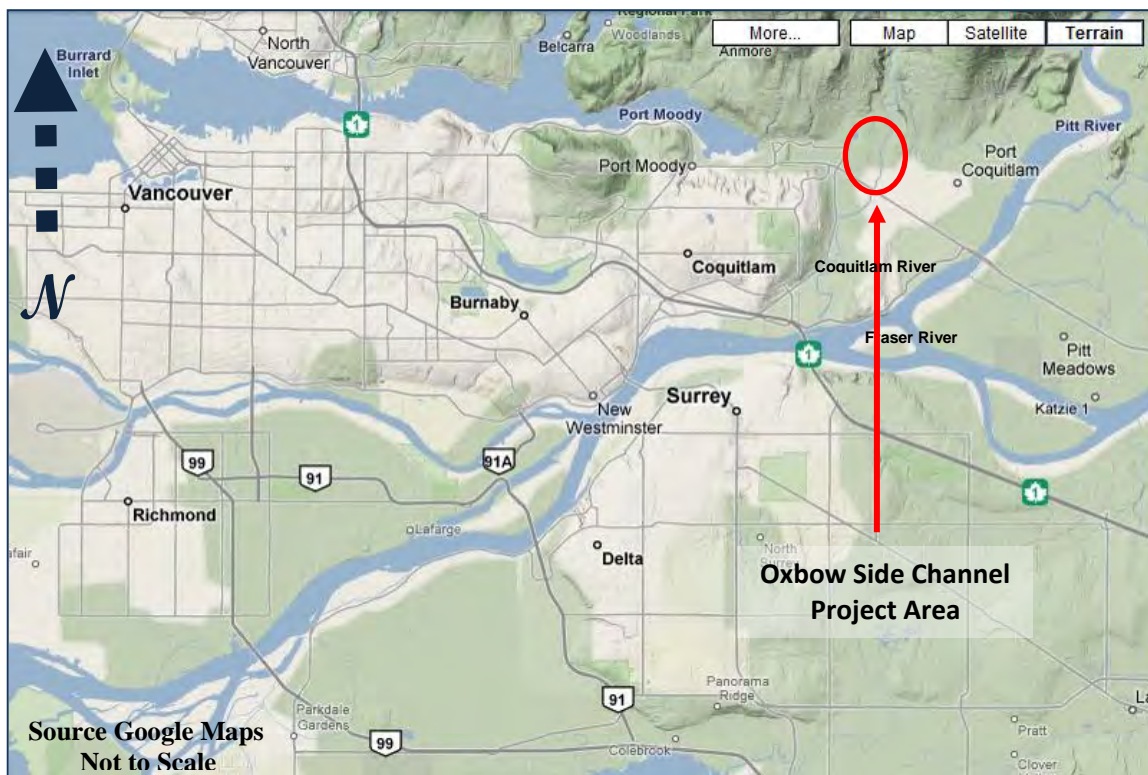
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3.0 Study Area

The study area is located on historic Coquitlam River floodplain in the City of Coquitlam’s Lower Coquitlam River Park, approximately 6,000m upstream of the river’s confluence with the Fraser River. This area is impacted by the Coquitlam River dam footprint as described in BCRP’s Strategic Plan.

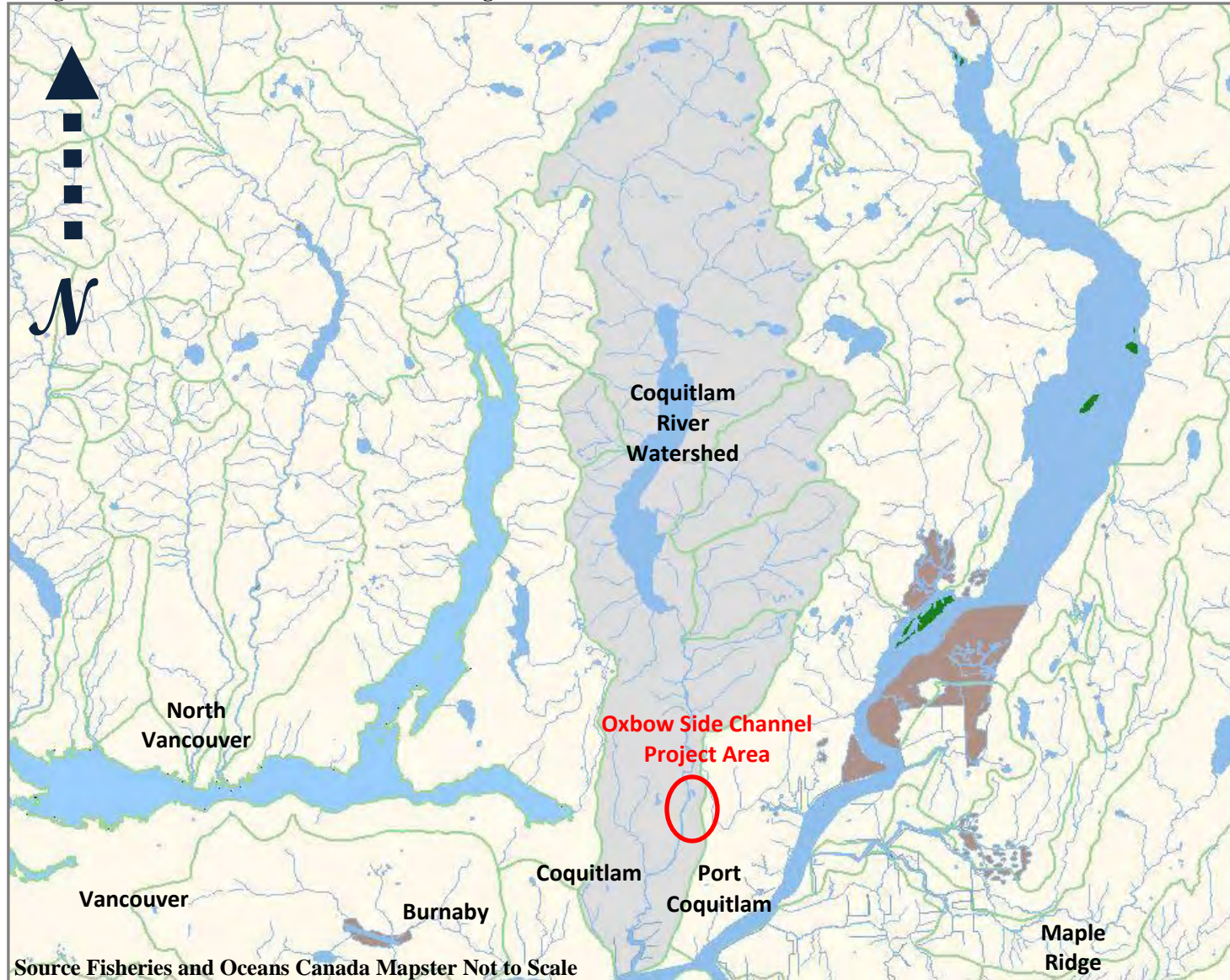
**Table 1
Study Area Description**

Location	Coquitlam River Watershed, Coquitlam BC ~6,000 metres Upstream of Fraser River Confluence		
Watershed Code	100-024500-00000-00000-000-000-000-000-000-000		
Map References	Geodata BC TRIM Map 92G.026 Natural Resources Canada NTS 92G/2		
UTM Co-ordinates	Zone 10	5459724mN, 516564mE	NAD 27
Construction Drawings	DFO Projects Doc. Coquitlam River 11-99-4		
Land Ownership	City of Coquitlam, Parks		
Land Use	Historical: Equestrian paddock, floodplain Current: Passive recreation trails, wildlife habitat		
First Nations Traditional Territory	Kwkwetlem Nation Primary Territory		



**Figure 2
Study Area: Oxbow Side Channel Project Site, Coquitlam BC**

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**Figure 3
Study Area: Coquitlam River Watershed**

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**Figure 4
Project Site: Oxbow Side Channel Restoration Project**

The project site is located in the Lower Coquitlam River Park on the left bank of the Coquitlam River. The municipal address is 1146 Shaughnessy Street.

This project has been developed to expand and enhance the Oxbow Side Channel constructed in 1995 by DFO, Salmonid Enhancement Program, Habitat Restoration Unit in partnership with BC Hydro. Maintenance and effectiveness monitoring results informed an adaptive management process which resulted in this project.

The success of the original project indicated that salmonid and other aquatic species side channel habitat was the highest and best use of the project site and its rehabilitation to restore lost side-channel habitat will increase both watershed biodiversity and productivity. The existing works are a consistent producer of coho and chum salmon and cutthroat and steelhead trout, which resulted in this conclusion.

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4.0 Methods

This project was developed and implemented through partnerships with BCRP, DFO, MoT, Kwikwetlem Nation and NFSAS:

- Kwikwetlem Nation provided gravel and archeological monitors for the project
- DFO, Salmon Enhancement Program, Resource Restoration Unit, designed and supervised the construction elements of the project

This included topographic surveying and drafting services, in-field construction supervision and as-built drawings. DFO also provided the necessary approvals from the federal government and worked with the Province of BC on the necessary notifications related to the project.

These services were in-kind contributions that insured the project fit within watershed and landscape level plans and overarching policies.

- North Fraser Salmon Assistance Society managed the project.

This included the environment management plan, vegetation management, volunteer coordination, site restoration and site safety.

- City of Coquitlam Parks provided the land and access and facilitated ongoing and long-term consultation on best use of land
- MoT provided gravel, loading and trucking
- DFO, NFSAS and local watershed groups will undertake long-term project maintenance and effectiveness monitoring

This project involved the excavation of approximately 2100m³ of unconsolidated floodplain materials to create 640m² of side channel habitat.

Excavation of an additional 500m³ was also undertaken to create 160m² of spawning habitat.

A large tracked Hitachi, Model # EX 200 was used to excavate these two features and for other major works on this project.

The 2600m³ spoils from this project were utilized on an enhancement project on the Brunette River. This was a cost saving/in-kind benefit to both projects.

Kwikwetlem Nation and MoT donated 200m³ of spawning gravel, its loading and trucking, which was recovered from a dyke removal project on Kwikwetlem Reserve IR#1 for installation in the newly constructed spawning channel and to refurbish the spawning gravel at 11 locations in the existing Oxbow project. This resulted in 540m² of improved spawning habitat. Two berms, totally 65m, were constructed as flow control and future naturalized gravel recruitment sites.

Four 6m X 1m Canada 200 corrugated fish friendly culverts were installed. Two beaver boxes were installed on the culverts at the pond outlets to ensure juvenile access to the new and existing habitat works.

A 100m X .15m PCV pipe was installed to flood and maintain four-season flow to 2,600m² of side channel habitat created as compensation for the David Avenue Bridge.

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Split rail cedar fencing, 100m, was installed to limit intrusions into sensitive habitat and to reduce disturbance of spawning salmon, other wildlife and newly planted riparian areas.

Restoration of the adjacent riparian area with native fruit bearing shrubs and shade trees was undertaken after the autumn rains began to improve percent survival and reduce theft. About 500 native plants were planted. Trees and shrubs (Appendix D) were cluster-planted to provide Year 1 shade, cover for juvenile salmonids and fruits for songbirds and other wildlife. The planting plan was designed to increase both flora and fauna biodiversity.

The aquatic and terrestrial works were complexed with 250m³ of large woody debris (LWD) to ensure habitats were suitable for the widest range of desirable plant and animal species targeted by this project.

Two interpretative signs were designed and installed to educate the public about salmon, their habitat needs and their ecosystem value. The signs were also designed to inform the audience of the role of BCRP, DFO, City of Coquitlam, Kwikwetlem Nation and other contributors to the project. Two project signs were also installed during the work period to inform passersby of the purpose, project partners and contact information (Appendix E).

The physical works commenced on August 18, 2009 and were completed around November 30, 2009.

Safety and Environment Management Plan

The project environmental management plan was based on current federal and provincial guidelines, regulations and best management practices. Care was taken to ensure no impacts to adjacent lands or downstream habitats.

Sole sourcing machine operators and project personnel with a minimum of 10 years of experience working directly with DFO greatly reduced the risks associated with this project. Their familiarity and compliance with all Federal and Provincial regulations and guidelines for working in and around water was reaffirmed at a pre-project site meeting.

All rates were in accordance with the BC Road Builders & Heavy Construction Association-BC Ministry of Transportation Blue Book Equipment Rental Rate Guide.

The safety plan was agreed to by the landowner and funders (Appendix B).

5.0 Results

Factors limiting fish diversity and production

Limiting Factor #2 – Loss of Habitat

Former rearing and over wintering areas are permanently lost or seasonally reduced due to inundations by the Coquitlam River dam, flow diversion, dykes and urban encroachment along banks of the lower river which has alienated side-channel, riparian and wetland areas.

This project recreates some of the wetland, side channel and riparian habitats that have been lost which will provide important over-wintering and riparian habitat for the targeted species.

In total 700m² of spawning and 3,240m² rearing habitat are available and fully accessible for salmonids and other target species (Figure 5, Project As Built Drawing). The installation of two beaver boxes will ensure juvenile access and egress to this habitat that is protected from the dynamic flow regimes of the river.

Limiting Factor #4 - Reduced Biological Productivity

These side channel habits will improve salmon returns to the watershed that in turn will increase the amount of marine derived nutrients entering the system, thus partially compensating for the loss of these nutrients when the Coquitlam River dam denied salmon access to the upper watershed.

This increased nutrient loading will support diversification and increased species richness of the watershed's flora and fauna. It will also support increased abundance of the target species.

The 700m² of new and refurbished spawning habitat will increase amount of higher quality spawning habitat with a corresponding potential higher rate of egg to fry survival. This coupled with increased robustness of outmigrating juveniles will eventually lead to increased adult returns, which in turn will continue the trend toward higher productivity and biodiversity.

Factors Limiting Wildlife Diversity and Productivity

Limiting Factor #1 – Habitat Changes

Inundation, flow diversions and dyke construction has altered flow regimes and detrimentally changed critical wetland, riverine and riparian habitats. This project recreated like habitat in an appropriate reach of the river, well situated in the watershed where these historic floodplain features were once abundant and where wildlife historical utilized them. Well placed, well engineered habitat will be utilized as the abundance and diversity increases over time.

The 300m² of riparian habitat created will work in harmony with the aquatic improvements.

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Fish Restoration Objectives

#1 Conserve And Improve Fish Habitats in the Lower Coquitlam River

This project links to the above objective through the development of side channel habitat to restore rearing and overwintering habitat and readily available refuge habitat during flood events and dam spills. This project has hydraulic characteristics designed to withstand the range of discharges in the Coquitlam River.

The side channel habitat constructed and refurbishing of existing similar habitat has created a network of habitats that should support maximum fish densities through increased productivity and significantly improved egress and access.

Wildlife Restoration Objectives

#3 Create or Enhance Wetlands and Riparian Habitats for Aquatic Species

This project realizes this objective through improvements to and creation of floodplain features such as side channel and wetland habitat which support species dependant on these habitat types such as: great blue herons, kingfishers, raptors, small mammals and amphibians.

Results Summary

In total the 4,240m² habitat (Table 2, Expected Results) resulting from this project in the Coquitlam Watershed and the in-kind benefits accrued to this project from the accommodation of the spoils on the Brunette River will ultimately be confirmed by long-term project monitoring. However, it is fully expected to be as successful as the existing works, which work in tandem with other BCRP funded projects in the watershed and are now the major producers and protectors of salmonids in the Coquitlam system.

**Table 2
Expected Results**

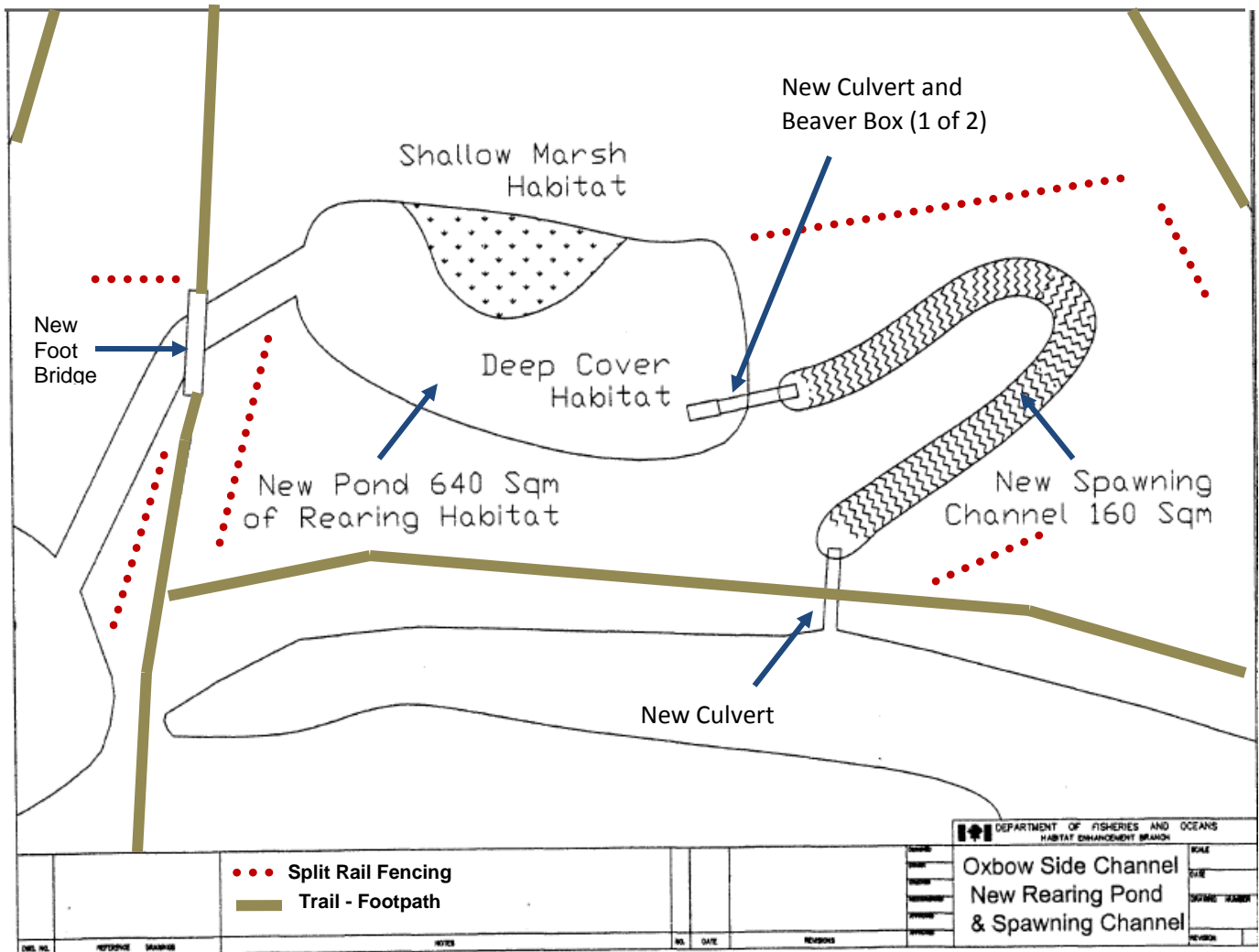
Expected Results	Quantity Expected	Quantity Realized
Side Channel Rearing Habitat	1500m ²	3240m ²
Spawning Habitat	100m ²	700m ²
Beaver Boxes	2	2
Riparian Habitat	200m ²	300m ²
Fencing		100m
Informational Signs	1	2
As Built Report	March 2010	November 2009

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Added Value Desired By the BCRP Board

Increased awareness and appreciation of fish and wildlife and their habitat needs can lead to human behaviour and value changes.

This is possibly the most significant outcome beyond the targeted species conservation and ecosystem benefits desired in this project. The desire by the board to support knowledge transfer, synthesis and exchange between and among stewards, community, all levels of government, business and industry and the public is the most sustainable benefit for all, humans and wildlife are equal beneficiaries.



**Figure 5
Detail of New Rearing Pond and Spawning Channel**

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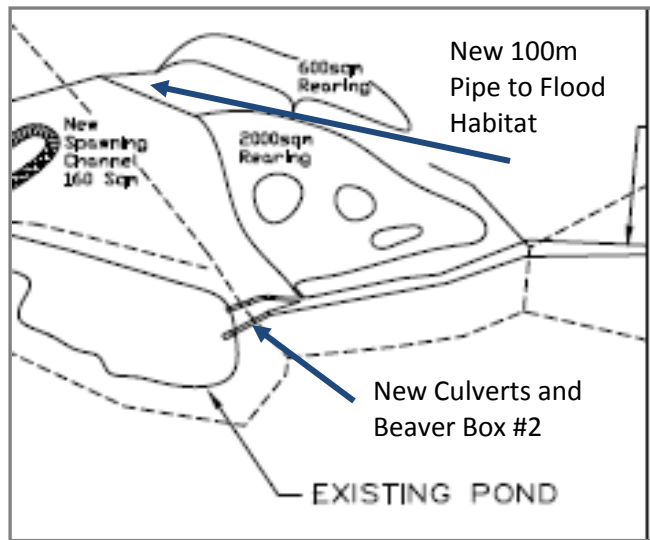


Figure 6
Detail Refurbished Flooded Area

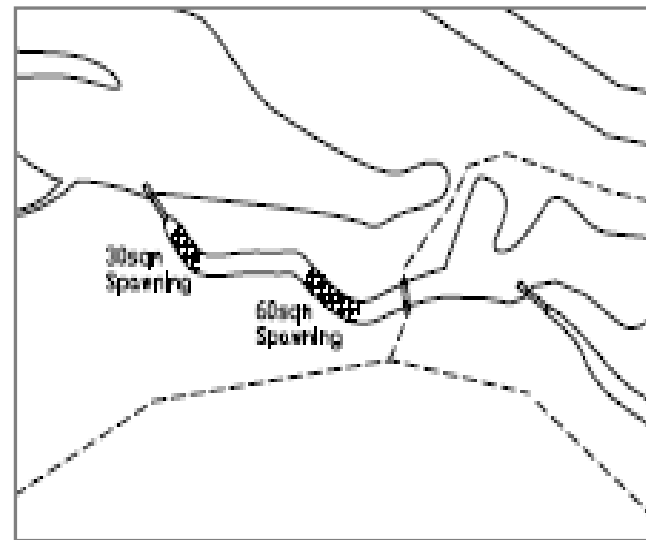


Figure 7
Detail Refurbished Spawning Areas

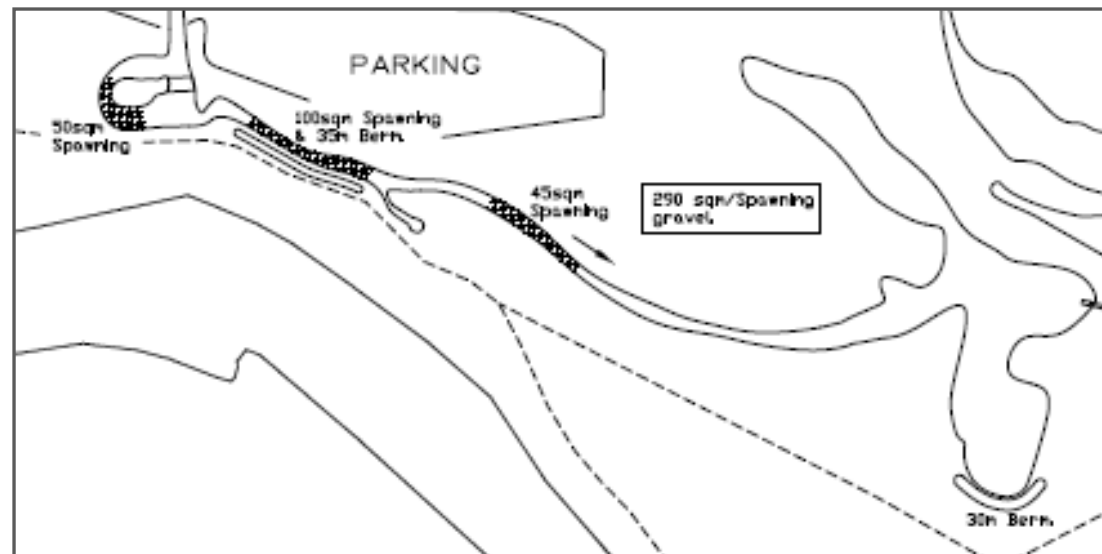


Figure 8
Detail Refurbished Spawning Areas and New Berms

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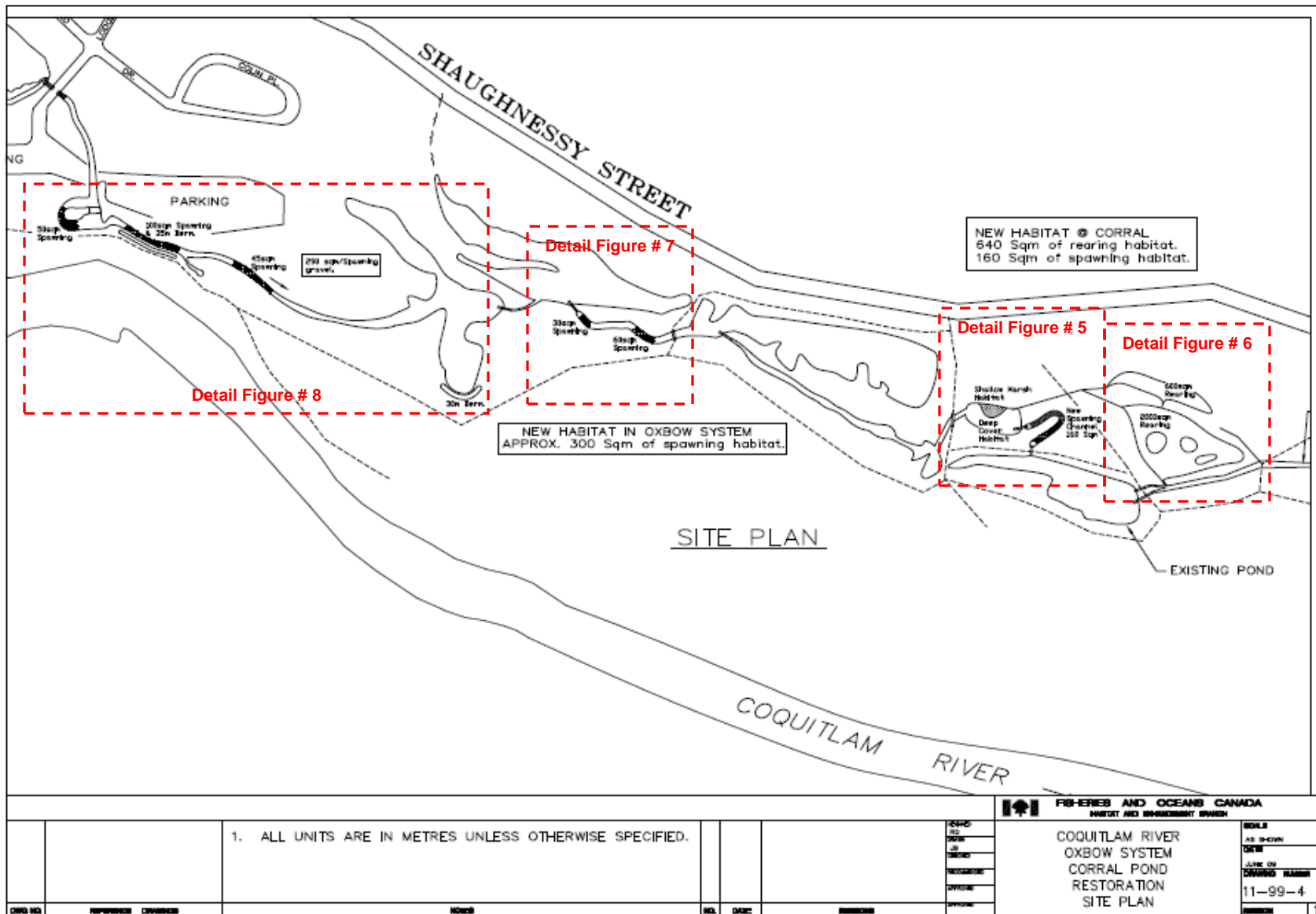


Figure 9
 Project As-Built Drawing

6.0 Discussion and Recommendations

Lack of winter juvenile rearing habitat and cool water summer habitat is thought to limit the productive capacity of most coastal BC coho stocks. The side channel habitat created in this project provides critical habitat to address both of these limiting factors.

Coho, in particular, critically depend on this type of habitat during the winter and early spring to successfully prepare for their migration to marine waters in late spring. New understandings of the level of fitness needed for the successful migration of early marine environments is reaffirming the need for readily available side channel habitat, indeed it is critical.

However, freshwater habitats have been and will continue to be under extreme pressure from urban, agricultural and industrial development. Projected global warming trends and expected rises in the sea level are expected to inundate and degrade habitat making these upriver habitats even more critical for the salmonids of the Coquitlam watershed and other species dependant on these specific habitats.

Within the lower Fraser limited available land for restoration projects and high land costs are an increasing challenge and are limiting the ability of both government and the interested public to recover lost salmon habitat and to rehabilitate it to a productive state.

The City of Coquitlam's dedication of land for this purpose is significant and provides leadership to other municipalities. The interested public is fortunate to have a willing partner such as this. The parkland converted for this project has provided side channel habitat at extremely low cost and maximized benefits to humans and the ecosystem alike.

It is important that these and other works are linked and build upon each other to create a networked mosaic of habitat that restores and preserves watershed function to help address the growing challenges to long-term sustainability of salmonids in the Fraser River.

Understating that former rearing and overwintering habitat has been lost or seasonally reduced due to inundations by the Coquitlam dam flow diversions, dykes and urban encroachment within the riparian areas has alienated side channel, riparian and wetland areas. It is critically important that we restore where we can and create where it is no longer possible to restore this habitat.

The absolute critical importance of naturalized habitats such as this in the long-term sustainability of salmon, and in particular coho salmon, cannot be stressed enough. It is imperative that we provide every opportunity for salmon to "save themselves" as they have in the past five climate changes; however, they cannot do this without us providing access to historic and alternate habitats.

These restoration works being undertaken in the Coquitlam River watershed will play a key role in this and the future sustainability of Fraser River coho and chum stocks.

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It is recommend that:

- 1 Additional projects to recover lost critical habitat be undertaken in the near term as the economy remains slow and significant cost savings can still be realized
- 2 Long term monitoring results be captured and reported widely at relevant symposiums and conferences to support communities of practice knowledge transfer, and
- 3 All efforts be made to increase public understanding of the role salmon has as both a biosensor and keystone species. Community led salmon projects, undertaken with multiple partners, both government and non-government, are where democracy and sustainability meet.

The North Fraser Salmon Assistance Society, in partnership with the funders and regional support: BCRP, DFO, Kwikwetlem Nation, MoT and the City of Coquitlam has successfully completed this project that has contributed to the long-term, ongoing restoration of lost side channel habitat in the Coquitlam River watershed.

Scott Allen's site visit created an important opportunity for the proponent to fully demonstrate to the funder the complexities and the precautions that come together to make a successful project and it was much appreciated.

The Oxbow Side Channel Restoration Project has resulted in over 4,240m² of restored habitat and the improvement of the function of existing constructed works. Many species of fish and aquatic wildlife will make use of this habitat and will benefit from having increased abundance of ecosystem keystone species such as coho and chum salmon. Long-term monitoring and maintenance is necessary for the protection of these investments made on behalf of the public.

This project is downstream of the river reach monitored by the BC Hydro Water Use Planning Committee and therefore will not conflict with this program. Long-term maintenance and effectiveness monitoring results will be reported to appropriate units within DFO and the City of Coquitlam to support an adaptive management program and inform future project development.

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7.0 References

BC Hydro's Bridge Coastal Fish and Wildlife Restoration Program Strategic Plan, Chapter 8
Coquitlam Buntzen Watershed

http://www.bchydro.com/bcrp/about/strategic_plan.html

Coquitlam Off Channel Habitat Restoration Projects 2005, 2006
BC Hydro's Bridge Coastal Fish and Wildlife Restoration Program

http://www.bchydro.com/bcrp/projects/docs/bridge_river/06.COQ.02.pdf

Pacific Region Operating Statements, Fisheries and Oceans Canada

http://www-heb.pac.dfo-mpo.gc.ca/decisionsupport/os/operational_statements_e.htm

Standards and Best Management Practices for Instream Works, Ministry of Environment

<http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf>

Appendix A

**Financial Statement
and
Performance Measures**

**Oxbow Side Channel Restoration Project Report to
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Financial Statement

	Budget		Actual	
	BCRP	Other	BCRP	Other
Income				
(Total Income by Source)				
BCRP	50,050.00		50,050.00	
Fisheries and Oceans		16,600.00		16,600.00
North Fraser Salmon Assistance		2,000.00		8,000.00
Ministry of Transportation				12,000.00
Local Volunteers				2,000.00
Kwikwetlem Nation		5,000.00		5,000.00
Grand Total Income	50,050.00	23,600.00	50,050.00	43,600.00
Expenses				
Project Personnel				
Wages or Professional Fees	6,000.00	12,500.00	6,500.00	12,000.00
Consulting Fees				
Kwikwetlem FN	1,000.00		1,000.00	
Volunteers				8,000.00
Total Personnel	7,000.00	12,500.00	7,500.00	20,000.00
Materials and Equipment				
Equipment Rental	18,500.00	4,100.00	22,551.50	4,100.00
Materials Purchased	20,000.00	7,000.00	15,448.50	19,500.00
Travel Expenses				
Permits				
Total Materials and Equip	38,500.00	11,100.00	38,000.00	23,600.00
Administration				
Office supplies	4,470.00		4,520.00	
Photo copies and Printing	60.00		10.00	
Postage	20.00		20.00	
Total Administration	4,550.00		4,550.00	
Total Expenses	50,050.00	23,600.00	50,050.00	43,600.00
Grant Total Expenses				93,650.00
BCRP + Other				93,650.00
Balance				0

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Performance Measures													
Project Type	Primary Habitat Benefit targeted By Project	Primary Target Species	Estuarine	Instream Habitat Mainstem	In Stream Habitat Tributary	Riparian	Reservoir	Reservoir Shoreline Complexes	Riverine	Lowland Deciduous	Lowland Coniferous	Upland	Wetland
Impact Mitigation													
Fish Passage Technologies	Area of Habitat Made Available												
Drawdown Zone Re-vegetation	Area Turned into Productive Habitat												
Wildlife Migration	Area of Habitat Made Available to Target Species	salmonids			3,940m ²								
Prevention of Nest Drowning	Area of Wetland Habitat Created Outside Flood Level												
Habitat Conservation													
Habitat Conservation - General	Functional Habitat Conserved/replaced Through Acquisition and Management												
	Functional Habitat Conserved by other Methods												
Designate Rare Species/Special Habitat	Rare/Special Species Protected												
Maintain or Restore Habitat Forming Processes													
Artificial Gravel Recruitment	Area of Stream Habitat Improved				700m ²								
Artificial Wood Debris Recruitment	Area of Stream Habitat Improved				640m ²								
Small Scale Complexing	Area of Increased Functional Habitat												
Prescribed Burns	Functional Area of Habitat Improved												
Habitat Development													
New Habitat Created	Functional Habitat Created	Salmonids, Small mammal, passerine birds, raptors, amphibian			800m ²	300m ²							

Appendix B

Project Safety and Environment Management Plan

**Oxbow Side Channel Restoration Project Report to
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**Fisheries and Oceans
Canada**

**Pêches et Océans
Canada**

Pacific Region, Lower Fraser Area
Habitat and Enhancement Branch
Resource Restoration
Unit 3 1fi) Annacis Parkway
Delta BC V3MGM

Region de la Pacifique, Cours inferieur du Fraser
L'habitat et de la mise en valeur
Retablissement des ressources
100 Annacis Parkway
Delta (C.-8,) V3M 6A2

October 23, 2008

Your file

Votre reference

Our file

Notre reference

Tony Matahlija
North Fraser Salmon Assistance Society
Suite 502, 1199 Eastwood St. Coquitlam B C
V3B 7W7

Dear Tony:

Subject: Oxbow Sidechannel Restoration Project

As required by the Bridge Coastal Restoration Program and in support of your project I have composed a Safety Plan Description. The description itemizes our existing safety measures using the format suggested in Appendix A to Schedule D of the standard contribution agreement.

Work Description

The work funded by the Bridge Coastal Restoration Program is predominantly excavating. The project involves heavy hydraulic excavators digging and grading earthworks; placing rock armour, large rounded rock, large woody debris, and other heavy infrastructure. A member of Fisheries and Oceans professional engineering staff will oversee the project and perform periodic inspections. Secondary activities will involve removing invasive plant species, monitoring wildlife, and planting riparian vegetation. The project manager from the NFSAS and DFO technical staff will ensure all works are conducted in a safe manner consistent with WCB regulations and standards.

Purpose and Location of Field Trips

The work requires continuous field activity from beginning to end of each phase of construction- A properly permitted and suitably experienced excavation contractor will execute all construction under the guidance and monitoring of Fisheries and Oceans Canada's professional engineering staff. All trips will be to sites within the bounds of the Work site property.

Pre-Field Hazard Assessment

Heavy Excavator Operations

Hydraulic Excavators will be operated by experienced personnel only and will dig and lift from level positions with suitably load-rated rigging.

Site Location on Active Floodplain

Work crews will be required to obey all municipal and provincial flood warnings. During peak freshet the work sites will close and will also shut down during heavy rain.

Oxbow Side Channel Restoration Project Report to BC Hydro Bridge Coastal Fish and Wildlife Restoration Program

Channel Excavation and Grading

All personnel on the site will be required to comply with provincial safety regulations for personal protective equipment. The site supervisor will accompany visitors in proper personal protective equipment when approaching operating machinery.

Large Woody Debris Placement and Anchoring

The equipment operators will position the large wood pieces with heavy hydraulic excavators using the attached hydraulic thumbs or wire-rope chokers where applicable. Portions of the debris may be buried by the machinery. Crew personnel will attach anchor cables to dead man rocks or logs when heavy equipment is idle or otherwise clear of the anchor site.

Large Rock Armour Placement

Personnel will be required to stay clear of rock dumping.

Control Structure and Culvert Installation

The crew will dig trenches, set pipe and backfill, under professional engineering guidance, following WCB regulations and practice.

Crew Check-in Procedures

Crew will be monitored and checked on 3 times a day. Independent check-in is not required.

Safety Policy

Minimum Crew

Usually 2 people will be active at the work site during construction, including a representative from Fisheries and Oceans Canada or North Fraser Salmon Assistance Society. If a person is to be alone a call in procedure will be implemented.

Emergency Communications

The contractor or crew leader will be accessible on their CDMA cell phones.

First Aid

The maximum number of crew active on the work site will be 8. Under Part 33 of the Occupational Safety and Health Regulation, such a work site requires a Level I First Aid Attendant with Transportation Endorsement to their certification. All trucks have First Aid Kits.

Wildlife Hazard Precautions

Transient bears are present throughout April to November. Each crew will carry bear-spray.

Motor Vehicle Use

While on the construction site, motor vehicles will be limited to travelling 40 km/h

Swift-water Emergency Procedures

The crew will not work during high-flow river conditions. All personnel will be educated, restricted and equipped as required by Occupational Safety Regulations.

Public Access

Signage will be displayed to warn the Public of ongoing construction

**Oxbow Side Channel Restoration Project Report to
BC Hydro Bridge Coastal Fish and Wildlife Restoration Program**

Emergency Plan

Overdue Crew

In the event the crew does not answer calls, or does not clear the site at the end of a day, the F&O representative will inspect the site for problems.

On-site Injury or Illness

If an injury or illness occurs, the crew will call the contractor and inform the North Fraser Salmon Assistance Society Project Manger and F&O engineering staff as described by Occupational Safety Regulations.

Emergency Contacts

Coquitlam Emergency Services 911

If you find this suggested Safety Plan adequate for your needs then please sign and forward on to BC Hydro. If you need any further safety information, please call me at 604-666-3602.

Sincerely,

Harold Beardmore
Senior Engineer
Resource Restoration
Fisheries and Oceans Canada

Tony Matahlija
North Fraser Salmon Assistance Society

**Oxbow Side Channel Restoration Project Report to
BC Hydro Bridge Coastal Fish and Wildlife Restoration Program**

Appendix C

Project Photos

**Oxbow Side Channel Restoration Project Report to
BC Hydro Bridge Coastal Fish and Wildlife Restoration Program**



Hitachi EX 200 Excavating New Habitat



New Spawning Channel During Construction



Beaver Box Installation



LWD Installation



Rearing Pond, Split Rail Cedar Fence
During Construction



New Pond Flooding

**Oxbow Side Channel Restoration Project Report to
BC Hydro Bridge Coastal Fish and Wildlife Restoration Program**



Spoils Accommodated by Brunette River Project



New Foot Bridge, Fencing and Project Sign #2



Soil Erosion Protection, Straw and Grasses



New Spawning Channel



New Culvert, Access to Spawning Channel



New Fencing, 100m

**Oxbow Side Channel Restoration Project Report to
BC Hydro Bridge Coastal Fish and Wildlife Restoration Program**



Project Information Signage In Situ



One of Two Beaver Boxes on Culvert Outfall



New Riparian Planting Protected by New Fencing



Original Equestrian Corral Fence Post



Two Pair Chum Spawning Oct 17, 2009 New Channel



Chum Female Spawning in New Habitat

**Oxbow Side Channel Restoration Project Report to
BC Hydro Bridge Coastal Fish and Wildlife Restoration Program**



Installing Pipe to Flood Compensation Habitat



Installed Pipe to Flood Compensation Habitat



Flooded Habitat, Existing Culvert



Flooded Habitat



Refurbished Gravel Site



Refurbished Gravel Site

Oxbow Side Channel Restoration Project Report to
BC Hydro Bridge Coastal Fish and Wildlife Restoration Program



Refurbished Gravel Site



Refurbished Gravel Site



Refurbished Gravel Site



Refurbished Gravel Site



Berm 1

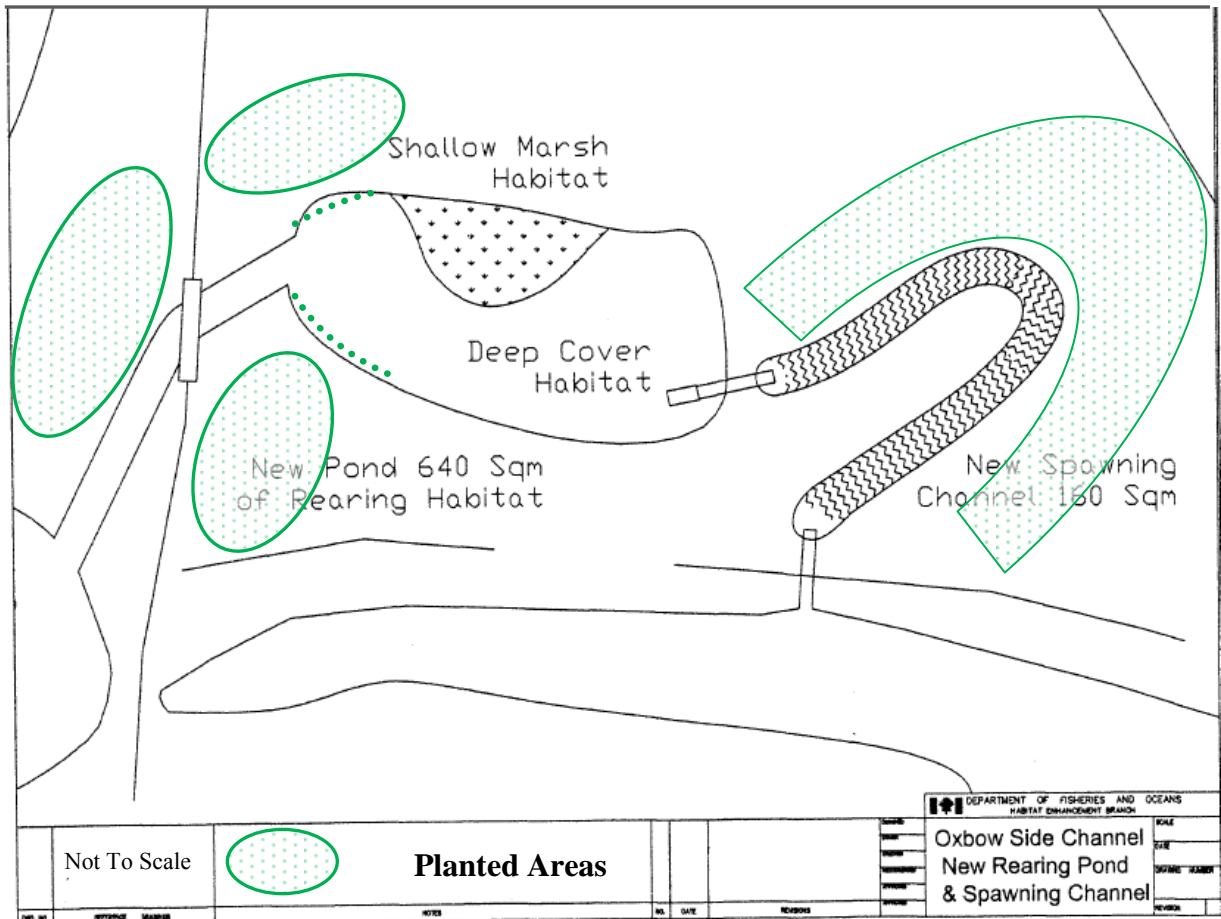


Berm 2

Appendix D

Planting Plan and Plant List

**Oxbow Side Channel Restoration Project Report to
BC Hydro Bridge Coastal Fish and Wildlife Restoration Program**



Plant List

Thuja plicata	35, #5	western redcedar
Alnus rubra	56, #2	red alder
Rubus spectabilis	129, #2	salmonberry
Oemleria cerasiformis	86, #2	indian plum
Spirea douglasii	65, #2	hardhack
Symphoricarpus albus	43, #2	snowberry
Lonicera involucrata	22, #2	twinberry
Salix scouleriana/hookeriana	50, 3ft	willow ssp

Appendix E

Media and Communications

**Oxbow Side Channel Restoration Project Report to
BC Hydro Bridge Coastal Fish and Wildlife Restoration Program**

Media and Communications

Publicity and communication are ongoing, as there is a high degree of community interest in salmon and their habitat in the Coquitlam area. Site tours, public presentations and site signage publicized this project to very diverse audiences.

During the term of this project, the Project Manager, Tony Matahlija, gave four presentations to regional audiences.



**Lower Fraser Coho Conservation and Enhancement Initiative Workshop
September 2009**

In September a presentation was given at the Lower Fraser Coho Conservation and Enhancement Initiative workshop on Musqueam Territory. BRCP's significant contribution and long-term program support and leadership were highlighted. Approximately 95 people were present representing all 5 levels of government, major projects, seven lower Fraser FN and 25 stewardship groups.

**Oxbow Side Channel Restoration Project Report to
BC Hydro Bridge Coastal Fish and Wildlife Restoration Program**



Photo Credit:
Euncie Hodge, Photo Artist

**Coquitlam Watershed Planning Initiative International Tour
of Oxbow and other Watershed Projects**

In October a project tour was given to the dignitaries and participants of the Coquitlam Watershed Planning Initiative. Present on this tour were dignitaries and representatives of Government/Stewardship initiatives from Washington State and Vancouver Island, City Council members from Coquitlam and Port Coquitlam, Kwikwetlem Nation, industry and watershed stewardship groups. About 30 people attended.



Photo Credit:
City of Coquitlam Staff

Phase III, Of The Coquitlam Watershed Planning Initiative Town Hall

In March and again in October BCRP was highlighted at both recent phases, Phase II and Phase III, of the Coquitlam Watershed Planning Initiative town hall meetings.

Appendix F

Contacts

**Oxbow Side Channel Restoration Project Report to
BC Hydro Bridge Coastal Fish and Wildlife Restoration Program**

Proponent **North Fraser Salmon Assistance Society**
Suite 502 - 1199 Eastwood Street
Coquitlam, BC
V3B 7W7

Project Manager **Tony Matahlija**
antonm@smartt.com
604 710-0581 cell

Project Partners **BC Hydro Bridge Coastal Restoration Program**
Scott Allen, Program Manager
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604 528-3308

Fisheries and Oceans Canada
OHEB Salmon Enhancement Program, Resource Restoration Unit

Matt Foy, Senior Biologist
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Jonathan Bulcock, Project Technologist
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604 666- 8266

Maurice Coulter-Boisvert, Stewardship and Community Involvement
Community Advisor
Maurice.Coulter-Boisvert@dfo-mpo.gc.ca
604 666-2870

Ministry of Transportation
Sean Wong, Environmental Management Section
250 213-8659
Sean.Wong@gov.bc.ca

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Coquitlam, BC
V3C 3V4
604 540-0680

Glen Joe, Resource Restoration
zemtumus@yahoo.com

**Oxbow Side Channel Restoration Project Report to
BC Hydro Bridge Coastal Fish and Wildlife Restoration Program**

George Chaffee, Resource Restoration
jam_jam60@hotmail.com

Nancy Joe, Archaeological Monitor
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City of Coquitlam
Urban Forestry Operations Manager
Lanny W. M. Englund
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604-591-4691

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