

PART I - IDENTIFICATION

A. Proponent/Contractor Name Squamish River Watershed Society

B. Proponent/Contractor Address PO Box 1791
Squamish, BC
V0N 3G0

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(Phone/Fax)
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PART II - PROJECT DESCRIPTION

A. Project Number and Name 03.CH.03 Squamish River Estuary Tidal Channels and Marsh Restoration

B. Project Location
(Specific Stream/Watershed/etc. as applicable latitude and longitude, UTM and watershed code)
Squamish River Estuary, 926/11;
Watershed Code: 900-097600
NTS 5505000 N, 487200 E UTM NAD83,
Zone 10

C. Project Life May, 2003 March 31, 2004
(Start Date) *End Date)*

D. Project Funding \$73,050

E. Final Report Prepared by Edith B. Tobe,
March 31st, 2004





**To: Janice Doane, Program Manger
BC Hydro Bridge Coastal Fish and Wildlife Restoration Program
6911 Southpoint Drive (E16)
Burnaby, British Columbia
V3N 4X8**

**Re: Project #03.Ch.03
Project Name: Squamish River Estuary Tidal Channels and Marsh
Restoration**

For the period from April 1, 2003 to March 31, 2004

Executive Summary

1) Introduction

The project undertook several components including:

- restoring tidal channels in key areas of the Squamish Estuary that have been identified as being areas which were once prime salmon habitat, and
- reestablishing estuarine habitat in the dredge spoil area.

In this manner, the high marsh areas of the Squamish River Estuary that were previously inaccessible to salmonid smolts and other fish species have become available once again.

In 1971 BC Rail dredged out a significant portion of the estuary and constructed a training dyke along the Squamish River in order to contain it along the western bank. The intention, at the time, was that BC Rail planned to construct a deep sea port for the storage of coal. The majority of the remaining dredgeate material (that did not go into the dike production) was placed within the estuary filling an area approximately 250 m². In 1972, the Department of Fisheries and Oceans put a stop to BC Rails efforts. However, the legacy of the dike construction and the stockpiling of the dredgeate material remained until the mid-1980's. At that time, Fisheries and Oceans Canada made an effort to place 2 culverts, which would connect the inner estuary to the Squamish River, which effectively had been restricted through the training dyke construction. In recent years, Fisheries and Oceans has installed several more culverts, up to 7 at present, and made an effort to reestablish channels and salmon spawning habitat within the inner estuary. As well, Fisheries and Oceans made efforts to remove the vast majority of the dredge spoils and reestablish the estuary to a productive state.



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With the assistance of funding from the Habitat Restoration and Stewardship Program, the former Fisheries Renewal BC, and other internal DFO funding, and with the assistance and direction of the Squamish River Watershed Society, these projects were implemented over the years in a phased process. In the year 2000 the majority of the work was completed but there were several outstanding areas that needed attending to – including the ultimate removal of 90% of the original stock piled dredged material, the reconnection of the main channel that was constructed in the western estuary in the late 1990's and the final connection of some channels in the inner estuary by the WestBarr Log Sort.

Without these efforts the fisheries potential of this location would be all but lost, the area would be inhospitable to visit and would not be a welcome location for the locals to utilize as a nature viewing area, and the estuary would in no way provide the productive habitat that it had once provided.

This years work included the final removal of all the remaining dredge material, the final grading of the estuary and the reconnection of two side channels at the dredge spoil site. A new channel was constructed in the South Loop Trail area reconnecting isolated tidal channels and allowing fish access and passage.

2) Study Area

The site is on the east bank of the Squamish River approximately 8.0 km. downstream of the Squamish-Cheakamus confluence, in the area known as the central estuary. Map reference Squamish. NTS 92G/11. 5504250mN: 487600mE.

The proposed project involved restoring access to high marsh areas of the Cheakamus-Squamish River estuary that are no longer accessible to salmonid smolts and other fishes. Connecting tidal channels were excavated to develop new estuary habitat and to provide access to now isolated estuary channels. This work provided benefits to salmonid smolts and other fishes, which rely on this critical and limiting habitat.

3) Methods

Detailed resources utilized to complete works were undertaken by John Hunter Company Limited of Squamish.

A Caterpillar 320B L Tracked Hydraulic Excavator was used to do the majority of the work with a Caterpillar 966C Rubber-Tire Front End Loader as required. In order to access the construction site with minimal environmental damage, 35 hemlock fir logs were used as a machine working platform (as a travelling corduroy road). Labourers made use of a railway push car to deploy the logs on site (as the construction site was located adjacent to the BC Rail spur line servicing the Squamish Terminals). Safety spotters were on site during the night low-tide work. Gravel dump trucks were used as required to end haul the material from the site.

Squamish Nation and the Squamish River Watershed Society/Squamish StreamKeepers provided labour support for planting and other miscellaneous activities outside of the scope of the excavations.

4) Results

The scope of work that occurred between April 1, 2003 – March 31st, 2004 included:

- excavating 570 m of intertidal channel, 2.4 m deep, 0.75 m bed width
- excavating 85 m of shallow intertidal channel, 1.0 m deep, 0.6 m bed width
- excavating 300 m² of intertidal marsh lowlands, 0.60 m deep
- creating 300 m of trail berm
- salvaging, stockpiling and re-spreading existing surface vegetation over 25% of the channel spoil (1100 m²)
- grading spoil from 190 m of channel to minimize the impacts on overall ground height and visual aesthetics
- restoring 60m of channel built in 1996 from flood damage due to October 2003 flooding

The dredge spoil site has been completely cleaned up and brought down to grade so that the area can be revegetated through volunteer efforts. The channels have not only successfully been constructed but as soon as the South Loop Trail tidal channel was opened up to Howe Sound hundreds upon hundreds of herring swarmed into the area (which may suggest that eelgrass beds should be planted in the channels to provide plants for the herring to spawn on).

5) Discussion

The construction and work went according to schedule (with only minor delays due to the unprecedented flood event that occurred in October 2003). The tidal channel was constructed during low tide (mostly in the late evening) and afforded a good opportunity to work without disrupting the public use of the adjacent trail system.

The alignment of the tidal channel construction in the South Loop Trail area was undertaken in collaboration with the members of the Squamish Estuary Management Committee to determine a route that would appease the various member interests.

A further benefit to all of the tidal channel construction and the final grading of the dredge spoils has been an opportunity to involve the public in planting up these areas with indigenous plant species through volunteer efforts. The bulk of these efforts will take place to coincide with Earth Day (likely the weekend before Earth Day) and will involve numerous groups including the Squamish StreamKeepers,



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the Squamish Estuary Conservation Society, and students from Capilano College.

Overall, an estimated increase in habitat has included:

- 570 m, 3900 m² of tidal channel;
- 85 m, 110 m² in shallow tidal feeder channels
- planting of 750 native species
- 110 m² of remaining estuarine habitat in the dredge spoil area returned to proper grade.

Estimated production from the tidal channel construction is over 36,000 / annum Coho fry. An unestimated population of herring has been noted and Chinook salmon will also be utilizing these important water ways.

6) Recommendations

An important component of this restoration work has been the support from the community such as with the Squamish Estuary Management Committee, Squamish Nation and the agencies. This support needs to be maintained and the input from the various interest groups needs to be addressed each year when discussing restoration opportunities in the estuary.

The Squamish Estuary is becoming a more attractive area for pedestrian traffic and the current restoration efforts try as best as possible to encourage educational trails and water route systems. One of the benefits of the current restoration project is to assist in bridge access and Fisheries and Oceans Canada, the Squamish Trails Society, and numerous others have contributed to this end. It is important not just to acknowledge these additional resources but to work together to ensure as healthy, productive and "public friendly" area at the end of the day.

7) Acknowledgements

We would like to thank BC Hydro Bridge Coastal Fish and Wildlife Restoration Program for all of their help and assistance in funding and supporting the tidal channel and marsh restoration project.

We would also like to take this time to thank:

- Tom Bell, BC Parks (chair of the SEMC),
- Randall Lewis, Squamish Nation,
- All the members who contributed their input through the SEMS
- Squamish StreamKeepers, Squamish Estuary Conservation Society, and Capilano College for their assistance in offering volunteers to help plant,
- District of Squamish for their support in this project,
- BC Rail / Squamish Terminals for allowing access to the site,
- Matt Foy, Harold Beardmore, and especially Jesse Neri, Fisheries and Oceans Canada, for all of their hard work, and finally

- John Hunter Company Limited for their superb work, once again, in making this not just a functioning habitat project but a work of art!

8) List of Figures

1. Tidal Channel construction in South Loop Trail – February 2004



2. Dredge Spoil site BEFORE (June 2003)



AFTER (March 2004)



3. Temporary signage that was placed in August 2003 at the Dredge Spoil site (to provide information for the National Windsurfing event later that month)



4. Signage (to be placed at three locations: South Loop Trail; Dredge Spoil site; West Barr Log Sort site) – with replaceable project details at end (not attached to sign but a laminated sheet that accompanies the project sites)

Intertidal Channels and Wetlands



BC Hydro Bridge Coastal Fish and Wildlife Restoration Program (BCRP) provides \$1.5 million annually to projects that restore fish and wildlife populations and habitat impacted by the construction of hydroelectric generating stations in 15 watersheds located along the coast, the Fraser Valley, Bridge River, Shuswap River and on Vancouver Island. The program is managed by a Board composed of three public, three First Nation, one federal, one provincial and one BC Hydro

representatives.

A dam and diversion tunnel on the upper Cheakamus River diverts water from Daisy Lake through a hydroelectric generating plant which discharges into the Squamish River. Salmon and wildlife in these two watersheds have been detrimentally affected by this operation.

Over the past century development in the estuary isolated many areas of important

marsh habitat as people cut off or filled in tidal channels. By cutting the connections between these food-rich upland marshes and the estuary waterways, people reduced the overall productivity of the Squamish River estuary. Many species of fish including juvenile salmon depend on a healthy estuary to successfully complete their life cycle. Waterfowl, migrating and resident birds, and other wildlife, all use this rich feeding area. Fish and wildlife from the Cheakamus and Squamish Rivers directly benefit from restoring damaged habitat here in the estuary.

Since 1996, a strong partnership between government, First Nations, corporations, community organizations, and individuals, has worked on recovering damaged habitat here in the Squamish River estuary. Continued financial support from programs such as the BC Hydro Bridge Coastal Fish and Wildlife Restoration Program is important if these efforts are to continue.



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Appendices

Financials

Please find attached the financial report in the appendix detailing all expenditures to date.

Date	Description	sub-total	50% GST	Total
01/09/03	Proj Manager	\$1,575.00	\$55.13	\$1,630.13
	Bridge Decking	\$68.00	\$0.00	\$68.00
	Advertising	\$84.49	\$2.96	\$87.45
	signage	\$215.00	\$7.00	\$222.00
	supplies	\$85.40	\$2.78	\$88.18
	Administration	\$37.93	\$1.24	\$39.17
		<u>\$2,065.82</u>	<u>\$69.10</u>	<u>\$2,134.92</u>

Date	Description	sub-total	GST	Total
03/12/03	Proj Manager	\$962.50	\$67.38	\$1,029.88
	Southwood Holdings	\$621.00	\$21.00	\$642.00
	John Hunter Co.	\$780.00	\$54.60	\$834.60
	Administration	\$310.97	\$0.00	\$310.97
	Sub Total	<u>\$2,674.47</u>	<u>\$142.98</u>	<u>\$2,817.45</u>

Date	Description	sub-total	GST	Total
31/03/04	John Hunter Co.	\$50,830.00	\$3,558.10	\$54,388.10
	supplies for signage	\$193.72	\$12.61	\$206.33
	signage	\$619.20	\$40.32	\$659.52
	Mapping (GPS)	\$3,416.60	\$338.91	\$3,755.51
	Proj Manager	\$4,725.00	\$330.75	\$5,055.75
	Rancheree	\$550.00	\$0.00	\$550.00
	Administration	\$3,230.76	\$0.00	\$3,230.76
	Sub Total	<u>\$63,565.28</u>	<u>\$4,280.69</u>	<u>\$67,845.97</u>

TOTAL		<u>\$66,239.75</u>	<u>\$4,423.67</u>	<u>\$72,798.34</u>
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