

**FINAL REPORT 1998**

**URBAN SALMON HABITAT PROGRAM**

**Assessment of  
BEACH CREEK**

**Qualicum Beach BC**

**by**

**Faye Smith  
and the  
Qualicum Beach Streamkeepers**

**Qualicum Beach, BC  
March 31, 1999**

## TABLE OF CONTENTS

1. Introduction.....	3
2. Objectives.....	3
3. Survey Area.....	4
4. Methods .....	4
5. Results .....	4
6. Fisheries Assessment.....	6
7. Water Quality Tests.....	7
8. Discussion.....	7
9. Project Budget 1998 .....	8
10. Appendices	
Map 1. Beach Creek Watershed, 1:10,000 scale.....	9
Map 2. Beach Creek Planning and Restoration Map, 1:2,000 scale.....	10
Table 1. Beach Creek, Garden Road and Schoolhouse tributaries; 1998 Habitat, Fish Population and Riparian Data Summaries and Ratings.	11
Table 2. Reach 2-1 Habitat and Riparian Assessment Data. ....	12
Table 3. Reach 3-1 Habitat and Riparian Assessment Data.....	13
Table 4. Reach 1 Data Summaries and Ratings. ....	14
Table 5. Reach 2 (Section 1 &2) Data Summaries and Ratings.....	15
Table 6. Reach 2 (Section 3 & 4) Data Summaries and Ratings.....	16
Table 7. Reach 3 Data Summaries and Ratings.....	17
C. Photographs.....	18

## INTRODUCTION

This report is an addition to the 1996 USHP inventory. In 1996, three mainstem reaches were identified in the *Beach Creek 1996 USHP Inventory (April 6, 1997)*. Restoration work was identified in 1996 and undertaken in 1997. In 1998, the Qualicum Beach Streamkeepers inventoried the two tributaries to Beach Creek. School House Creek is identified as Reach 2-1 as it enters Reach 2 in the top of the Brown Property forest. Garden Road Creek is Reach 3-1 and it enters reach three on the farm upstream of Mant Road. No other major tributaries exist on Beach Creek. We have appended the 1996 data summaries and results for reaches 1 to 3 into this report to provide a better perspective of the entire habitat condition of Beach Creek.

## OBJECTIVES

The objectives of this survey were to;

- 1.) to conduct an Urban Salmon Habitat Restoration Program survey of Beach Creek and identify its' restoration needs.
- 2.) Involve local people and increase awareness of Beach creek as a natural feature of Qualicum beach.

## SURVEY AREA

Beach Creek originates from a peat bog, situated within Glengarry Golf Course, just to the south of the boundary of the Town of Qualicum Beach. The Creek has been ditched from where it leaves the golf course along Nenzel Road to the corner of Rupert Road and Qualicum Road, approximately 1km. It then travels through the Davidson property and another private property where the riparian zone has been preserved in its natural state. Below, the Creek is channelized for about 500m as it goes through some small farms. There is a large pond situated on the KenDor property (nursery business) which is used for irrigation. According to the owner, he also has a well which he uses when the water level of the pond gets too low. It may be supplying the creek with ground water because there is always water downstream even when the creek runs dry upstream, as it does at the end of hot summers.

Downstream of the farms, the creek goes under Mant Road, the railway line and Memorial Drive. It goes through mostly natural forest again even though it is in residential lots, some 5 acres in area, a few the usual city lot size, and one, the Brown property, is 50 acres. A small spring originates in the Brown property and once was the site of a volunteer SEP Coho egg incubator and fish holding area.

Beach Creek then passes under West Crescent and meanders through the Qualicum Beach Memorial Golf Course where it enjoys a mostly natural riparian zone until it comes to the large pond at the north end of the golf course. This pond is used for irrigation from May until September when the stop logs must be removed to allow for fish passage.

Below the Golf Course, Beach Creek passes through four private properties, then it goes into a culvert at Elizabeth Avenue then under the Old Dutch Inn and Highway 19a. This culvert is scheduled for replacement. The Qualicum Beach Streamkeepers will be involved with the plans for this culvert.

Beach Creek has 12 culverts along its length, most of them under private driveways. One such culvert, off Hemsworth Road, was unblocked by the Streamkeepers and the banks stabilized with sandbags, boulders and plants in 1997.

## METHODS:

As stated earlier, the three mainstem reaches were inventoried in 1996 and the tributaries done in 1998. In 1996, the USHP Assessment and Mapping Procedures for Vancouver Island (Draft, T. Michalski & G. Reid, 1996) was used for data collection in addition to Fish Habitat Assessment Procedures (WRP Tech. Circ. #8, N. T. Johnson & P.A. Slaney, 1996). Both manuals were used for assessment after the survey data was collected as well. In 1998, a later version of the USHP Assessment and Mapping Procedures was used (T. Michalski & G. Reid & G. Stewart, 1997).

In 1996, Surveys began Sept. 23 at the top end of Beach Creek in Glengarry Golf Course, and ended Oct. 16, 1996. Survey crews were parties of two to four persons. Prior permission of property owners was obtained before entering. There were approximately a dozen people involved, all outings were supervised by at least one survey experienced Streamkeeper. Weather was good and flows were low but not quite at their lowest due to some precipitation.

All stream data was entered into the MOELP USHP spreadsheet (Excel) provided by T. Michalski and modified by G. Stewart for ease of data entry. There were 8 different field expeditions and survey start/finish points. These sections were then inserted into three reaches categorized for Beach Creek based on our observations in the field. In 1998, Garden Road Tributary was inventoried in September after fish were discovered in the drainage. The school Creek (aka Violetta Creek) was inventoried in August to augment the knowledge of the Brown property drainage.

## RESULTS:

Stream Maps used in this survey of Beach Creek include a 1:10,000 scale topographic map that identifies the watershed area, reach breaks and overall watershed development (Map 1). A 1:2,000 scale tracing map of inventory and restoration plans is also presented (Map 2).

The 1998 inventory data of reaches 2-1 and 3-1 is presented as summaries (Table. 1) and raw data (Table 2 & 3.) Reach 1 to 3 assessments were done in 1996 and reported in *Beach Creek 1997 USHP Inventory Report*. The data summary sheets (Tables 4, 5 & 6) were reproduced for reaches 1-3 in this report, the raw data is available in the 1997 report.

**Reach 1:** Beach Creek enters the ocean out of a culvert that passes under the Island highway and the Old Dutch Inn Hotel. The length is approximately 100 meters with a varying culvert diameter giving an estimated average of 1.2 meters. Reach One begins at the top end of the culvert at Elizabeth Avenue. A 547 m long reach that goes upstream through residential back yards, a stop log weir, a golf course pond and then a second growth alder wood to its' end at West Crescent. This reach has the most urban development and lacks canopy in the back yards. The Golf Course pond was relatively shallow due to an in-filling of sand from similarly composed streambanks. The outlet weir when in place is an obstacle to fish passage. The splash apron is angled with concrete such that there is no jump pool at low flows.

The habitat conditions of concern in this reach are the lack of boulder and gravels and high percentage of fines in the substrate. There is also no off channel habitat. There were only three sites where gravel or cobble occurred in this section; aeration, insect production and spawning are definitely limited. Large Woody Debris is deficient as well.

The riparian crown cover is good on average but the golf course pond and several backyards have no trees or shrubs. The riparian zone is composed of younger second growth trees, mostly alder with some conifers in the understory. Bank slopes are low which is good as the bank material is mostly sand and erosion is easily created.

**Reach 2:** This reach was broken into four sections due to changes in sampling method. Section 2-1; beginning at the West Crescent culvert, entered the Brown Estate upstream 200 meters at 100 % habitat sampling. This section has excellent rearing except for lacking wood debris due no doubt to stream cleaning to keep the downstream culvert from plugging. Section 2-2 was done in the UHSP manner where habitat cross sections were done every 250 meters. This section was 563 meters long and included the middle section of the Brown Property Estate. Habitat was similar to the previous site. Schoolhouse tributary entered at 463 meters from the north. Section 2-3 of Reach 2 was 889 meters long and departed the Brown Property crossed under Memorial Drive and ended at the Hemsworth Road driveway culverts. This reach was sampled at 100 % habitat frequency and included some residential backyards. This reach also lacked instream log debris and had a fairly high number of eroding banks on the upper portions. Section 4 of Reach 2 was sampled at 100 % frequency for its 213 m length to Mant Road. This section has a recently installed culvert that is a fish barrier at low flow. It also has a steep sand bank ravine with considerable erosion. At the top end the channel is diverted and completely exposed through a field before entering the culverts.

The general habitat conditions are good in the Brown Property which has the best rearing habitat in the entire creek. Upper areas of the reach (Hemsworth Rd.) offer better gravel for spawning but have poor cover, bank erosion and low summer volume.

The riparian summary correctly identifies the extensive bank erosion apparent in all areas of this reach except the Brown Property. This reach does have fair to good riparian depth in all but the upper most areas which provide the necessary shade for summer rearing. Bank erosion appears to be caused by high winter runoff and lack of rooted understory vegetation.

**Reach 3:** This reach was surveyed downstream from its' headwater ponds in GlenGarry Golf Course downstream 1256 meters to a private farm. This farm lies between Reach 3 and Reach 2 and the property owner did not give permission to access, its length is estimated at 750 meters. Drying is probably the most significant habitat concern in this reach. It offers good headwater spawning substrates but fry that don't migrate downstream are lost. The ditching of the headwaters has left only a few shallow pools and little instream cover.

The habitat conditions of this reach are very poor for year round rearing with the exception of the peat bogs at the headwater. This reach has no flow in summer and only a handful of deeper pools upstream of Garden Road tributary have summer water. The creek offers fair to good spawning gravel for resident trout and any coho that make through the cumulative culvert barriers.

The riparian zone is completely denuded in several areas of road ditch and farm ditch. Where present it is usually thin and second growth with the exception of the Davidson property above the farms.

**Reach 2-1, School Creek Tributary:** School Creek (a more official name is likely Violetta Creek) emerges from a culvert just south of Kwalicum Secondary School. The creek was incorporated into the design of the school and runs under a bridge leading to the gymnasium. The creek then flows toward Beach Creek, first going through a culvert under Village Way. This culvert is suspended and would certainly prevent any migration of fish in this area. There is a high gradient area just after the culvert outlet (approximately 200m) but then the creek flows at a lower gradient through natural forest where it joins up with Beach Creek at just about the southern edge of the Brown property. This tributary is marked by a lot of woody debris from numerous blow downs in the area as well as a lot of garbage (too much to be all taken out on that day).

Qualicum Beach Streamkeepers Doug Pahl, Ken Small, Faye Smith and Betty Drew Brook were joined by Lew and Gloria Carswell for the inventory on August 27, 1998.

The habitat is poor generally, it has many culverts and is overwhelmed by storm drain flow from the town. The habitat assessment ratings indicate concern in every aspect (see table). Low flow and lack of volume are two of the most significant. The lower reaches of this tributary offer the best potential.

The riparian conditions are fair for overhead cover (62%) and depth (15 + m) except where culverted. Bank erosion sites were common in association with debris jams. The debris jams were bunched together in tight knots likely from the force of the runoff water.

**Reach 3-1; Garden Road Tributary:** The Garden Road tributary to Beach Creek emerges from a culvert at Berwick Road where it is ditched going in an easterly direction for approximately 700m to Hemsworth Road when it enters a wooded area of about 100m (a Town owned gazetted road allowance) and flows into Beach Creek. It was decided to inventory this reach last summer after fish were discovered in the outlet pool at Berwick Road. The fish we saw were cutthroat trout, but Sandy Lochbaum, DFO Fishery Officer claimed to have also seen coho fry. The inventory was carried out by Betty Drew Brook, Doug Taylor and Faye Smith on September 11, 1998.

The Garden Road ditch runs through a portion of ALR land that lies within the Town of Qualicum Beach boundary. Most of the riparian zone on the south side is privately owned natural forest, with the exception of about 100m which has been cleared to the edge of the ditch. The north side is, of course, Garden Road.

The Qualicum Beach Streamkeepers took the opportunity offered by DFO to create some pools in this stretch. The resident trout fry were electroshocked before excavation began and placed downstream in the wooded area east of Hemsworth. Although we didn't take the time to count them, there were probably about 200 fry moved. These pools provide deeper, calmer water for the fish but need to have instream and overhead cover. The Streamkeepers plan to work on that in the summer of 1999.

The habitat conditions of this reach are poor, all but the lower 76 meters have been ditched recently. The tributary originates from storm drains that pick up some ground water but considerable surface drainage as well. The recent ditching has left the channel with little residual depth. There was no LWD, boulders or undercuts in the creek. The only cover offered was some seasonal aquatic vegetation. Fish were observed in the shallow pools but many were lost to predators over the summer/fall period.

The riparian canopy was closed over the creek in lower 76 meters. The remaining 700 meters were barren on the road side and pruned back on the opposite side. It is in need of more restoration. It is worth noting that agreements have been sought with the Town of Qualicum and Highways Dept. to protect the existing riparian zone and develop additional canopy.

## FISHERIES ASSESSMENT

No directed juvenile studies were done in the system in 1998 but several activities allowed some assessment information. In September at Garden Road tributary we removed approximately two hundred trout fry before construction. This represents the population of the reach prior to construction. Adult spawner assessment was done by Streamkeepers through the fall, visibility was poor but approximately 6 adult coho were seen at the Brown Property. No Chum were seen above the lower culvert. Recently (March) spawning resident cutthroat and their redds were observed in the Garden and Nenzel Road reaches of Beach Creek. No fish were observed in the Schoolhouse tributary but access is unblocked for the first 100 meters and it is possible for spawners or winter feeders to move up this tributary.

## WATER QUALITY TESTS

Water quality; chemicals and coliform, was tested in 3 sites on Beach Creek on September 23, 1997 by MB Labs of Victoria. These sites were tested again for coliform only on December 1, 1997 when the Environment Canada mobile lab was in the area. The results are in the *1997 USHP Assessment of Beach Creek*. No water quality tests were done in 1998.

## DISCUSSION

Habitat data summaries from the results identify the most significant problems in Beach Creek. In general, there is a lack of instream log debris, gravel/cobble substrates, ditching and poor bank stability. Additionally, low summer flow and storm water flooding are hindering its' habitat. There are 12 culverts to the headwaters, many are points of difficulty for fish, the lowest two (Old Dutch, Golf Course) are the most significant. Many of the problems identified on the mainstem reaches in 1996 have been addressed in 1997 and 1998. Many restoration projects have already been done and are presented in the 1997 and 1998 *Final Report USHP Restoration Projects on Beach Creek*.

In Reach 1 the biggest problems are access, lack of spawning gravel, riparian and instream habitat. In 1997 and 1998, trees and shrubs were planted (Map 2). Boulder clusters, spawning gravel and LWD were added in 1998. We continued with more of the same in 1998. The biggest challenge is the lower culvert barrier. This culvert under the Old Dutch Inn is a point of difficulty for coho and trout as well as complete barrier to Chum. It also deletes a large part of habitat from fish. There is a plan developed by the Qualicum Beach Streamkeepers in concert with the Town of Qualicum and government agencies to see it improved in 1999. Funding applications are being reviewed currently. This culvert improvement plan will have a very significant effect on fish access into Beach Creek.

Reach 2 incorporates the Brown property where in 1997 LWD and Boulders were placed. This reach is the best rearing habitat in a mature second growth forest which is an excellent urban riparian area. The property is now up for sale and rezoning. The Qualicum Beach Streamkeepers have been involved in raising the community awareness of the high riparian values of this property with the hopes of protecting it from being lost.

Reach 3 has the most potential because it also has the most problems. The low summer flow in this reach means that scour logs and pool depth are important for over summer survival. As is overhead canopy, water quality and quantity. In 1997 and 1998 there have been improvements to canopy, instream volume and cover to this reach. The problems with water flow are being addressed with a water management plan being developed in concert with the Qualicum Beach Streamkeepers, Glengarry Golf Course, Town of Qualicum, and government agencies. It is hoped that a storage plan can be developed for a surface or ground water reservoir. The benefit will be higher summer flow and lower winter flow.

The newly inventoried reaches of Garden Road Creek (3-1) and Schoolhouse Creek (2-1) have had some attention in 1998. Through DFO funding we were able to initiate some instream and riparian work at Garden Road. Approximately 15 pools were excavated each 3 to 5 meters long with a mean depth of 0.3 m. Several leaning alders were bent over to help train the shade trees over the creek. Future work of instream complexing and planting of the pools is planned in 1999. Schoolhouse Creek has not yet seen much work, other than garbage clean up. We will be looking at awareness as a big part of this tributaries' restoration as it goes through a school yard and drains the town site.

## Qualicum Beach Streamkeepers PROJECT BUDGET - 1998

### Beginning Balance

From 1997 Budget	\$ 2,000.00	
USHP 1998	\$ 9,345.00	
<b>Total</b>		<b>\$11,345.00</b>

### Contracted/Professional Services

DR Clough	\$1,006.16	
Carex Environmental	\$ 636.65	
Jake's Contracting	\$ 603.48	
Copcan Contracting	\$2,570.14	
		<b>\$4,816.43</b>

### Administration

Office	\$ 886.44	
Telephone & Installation	\$ 311.14	
Phone bills	\$ 252.65	
Corp. Registry	\$ 175.50	
Community Events	\$ 239.16	
Insurance	\$ 809.21	
		<b>\$2,674.10</b>

### Materials/Supplies

Plants	\$ 1,217.98	
Camera	\$ 256.40	
Photos & Film	\$ 320.57	
Equipment	\$ 1,664.75	
		<b>\$3,459.70</b>

### Workshops

New Directions DFO	\$ 224.50	
Stormwater Management	\$ 35.00	
Watershed Plan	\$ 150.00	
		<b>\$ 409.50</b>

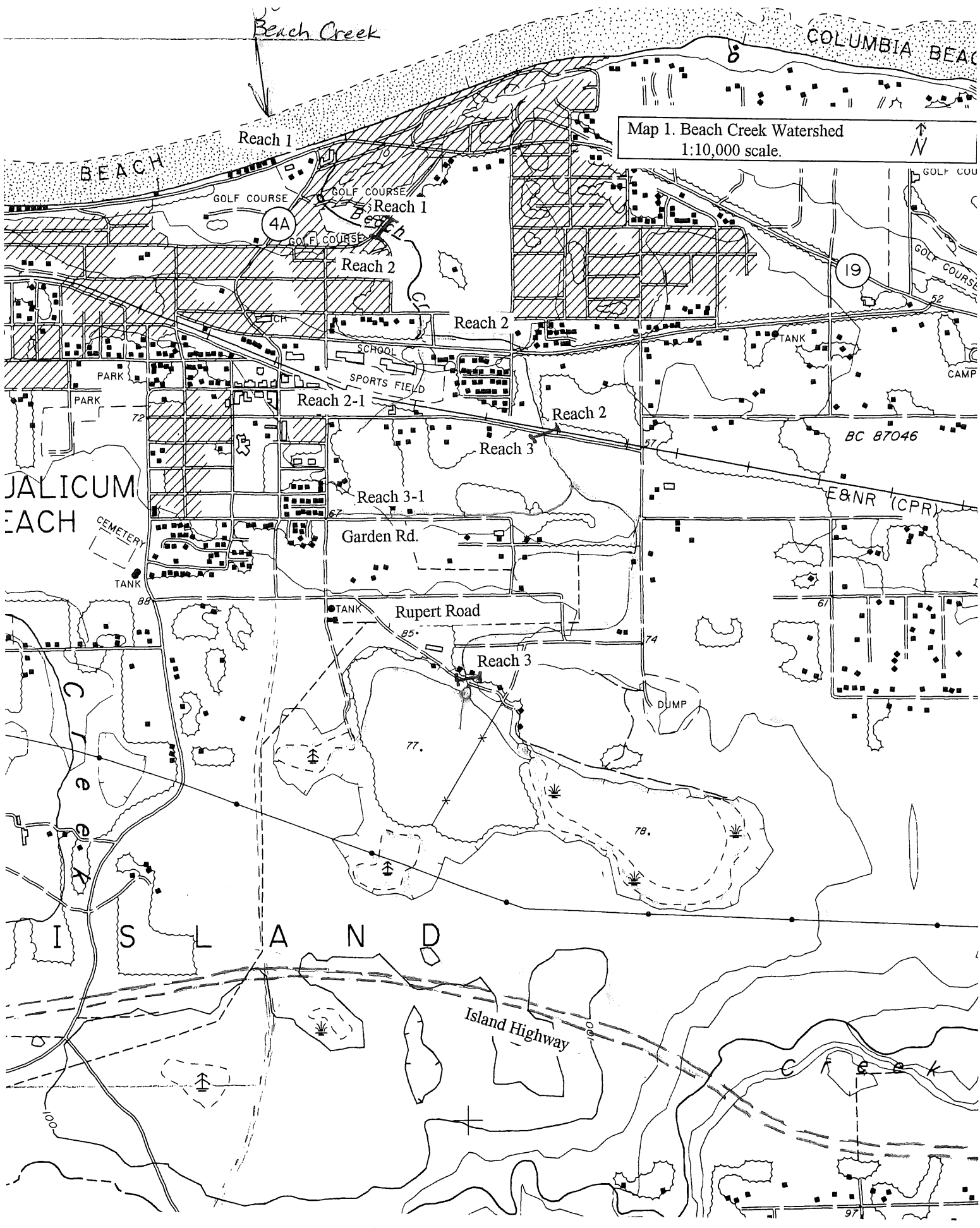
### Total Expenses

\$11,342.48

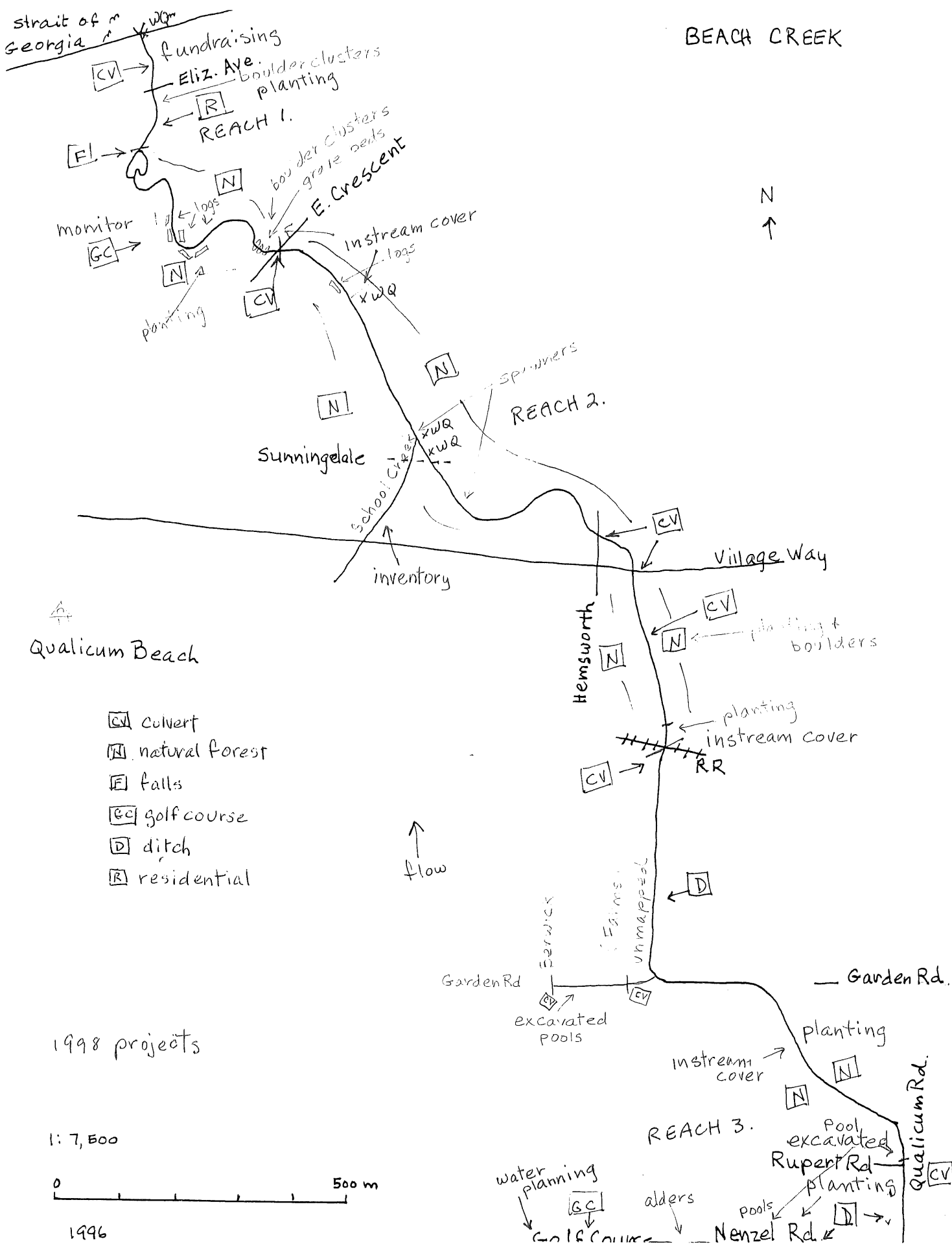
### Balance

\$ 2.52





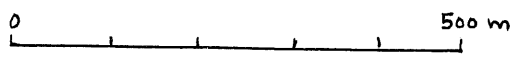
BEACH CREEK



- CV convert
- N natural forest
- F falls
- GC golf course
- D ditch
- R residential

1998 projects

1: 7, 500



1996

Table 1. Beach Creek, Garden Road and Schoolhouse tributaries; 1998 Habitat, Fish Population and Riparian Data Summaries and Ratings.

Stream Name Beach Creek Watershed Code

Habitat Parameter	Garden Rd.	Ratings	School Ck	Rating s		Rating s		Rating s		Rating s		Rating s	Total
Percent Pool Area	21.22	5	39.85	5									10
Large Woody Debris/Bankfull Channel Width	0.00	5	1.50	3									8
Percent Cover in Pools	15	3	16	3									6
Average Percent Boulder Cover	5	5											5
Percent Crown Cover	37.50	5	62.50	3									8
Substrate (Percent Fines)	70.83	5	47.50	5									10
Erosion Sites	0	1	21	5									6
Obstructions	1	1	5	5	0	0	0	0	0	0	0	0	6
Altered Stream Sites	0	1	0	1									2
% Wetted Area (Wetted Area/Total Area)	79.58	3	37.12	5									8
Dissolved Oxygen			12.00	1									1
pH			7.00	1									1
<b>Totals</b>		<b>34</b>		<b>37</b>		<b>0</b>		<b>0</b>		<b>0</b>		<b>0</b>	<b>71</b>

Off-Channel Habitat	0	5	0	5									10
---------------------	---	---	---	---	--	--	--	--	--	--	--	--	----

Fish Data						
Reach	Garden Rd.	School Ck				Total
Fry Capacity	2250	446				2697
Actual Pop.	0.00	0.00				0

Fry Densities							
Species	Coho		Coho		Coho		Total
Site One							0
Site Two							0

Riparian Ratings						
Reach	Garden Rd.	School Ck				Total
Land Use	42					42
Livestock Access	0	0				0
Slope	7	2				9
Stability	68					68
<b>Totals</b>	<b>117</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>119</b>

Table 4. Beach Creek, Reach 1 Habitat, Fish Population and Riparian Data Summaries and Ratings.

USHP DATA FORMAT		Reach 1, B5
Data summary	Value	Diagnostic
Reach Area (m <sup>2</sup> ):	2116.35	
Percent Pool:	73.91	Good
LWD per Channel Width:	0.03	Poor
Total Erosion Sites:	0	
Total Altered Sites:	0	
Total Obstructions:	1	Weir stops fish.
Number Pools:	34	
Number Riffles:	11	
Number Glides:	1	
Reach length (m):	547.00	
Average Grade (%):	0.5 %	
Average Bankfull Width (m):	4.13	
Average Wetted Width (m):	2.98	
Average Depth (m):	0.32	
Wetted Area (m <sup>2</sup> ):	2116.35	
Average Temperature (C):	10.0	High in Summer
Discharge (m <sup>3</sup> /sec):	1 CFS	
Average Substrate Type:	fines	Poor, only 3 gravel sites
Average Instream Cover (%):	5.12	Fair
Number of Off Chan. Habitats:	0	Poor
Percent Fines:	95	
Average % Boulder Cover	0.00	Poor
Average Crown Cover (%):	81	
Dissolved Oxygen (mg/l):	na	
pH:	7.00	
Total Dissolved Solids:	na	

Reach 1: Beach 5 from West crescent d/s to Elizabeth Culvert, 100 % Sample.

Riparian	Unit 1	Unit 2	Unit 3	Unit 4	Reach Average
Land Use:	5				5
Livestock:	0				0
Slope:	1				1
Stability:	3				3
Total:	9.00				9.00

STREAM:	Beach Creek	DATE:	Oct 3/4/96
LOCATION	Reach 1, West Crescent d/s to Elizabeth Culvert.		
COMMENT	Originally Beach 5, R1., Sample 100%.		
SURVEY DIRECTION:	downstream		
TEMPERATURE (C):	10.0	D.O.:	pH:
CREW:	Doug, Faye, Dave		
WATERSHED CODE:	92-3640		
DISCHARGE (m <sup>3</sup> /sec)	1 CFS		
SITE:	Golf Course and backyards to Elizabeth Culvert.		
TDS:			

Table 5. Beach Creek, Reach 2 Habitat, Fish Population and Riparian Data Summaries and Ratings.

Reach 2-1,2-2, B5,6,6a.

Reach 2-1: Beach 5, West Crescent u/s Browns Property to 200 m, 100% sample.

USHP DATA FORMAT		
		Reach 2-1,B5
Data summary	Value	Diagnostic
Reach Area (m <sup>2</sup> ):	505.50	
Percent Pool:	94.44	(Poor)
LWD per Channel Width:	0.07	Poor
Total Erosion Sites:	0	
Total Altered Sites:	0	
Total Obstructions:	0	
Number Pools:	17	
Number Riffles:	0	
Number Glides:	1	
Reach length (m):	200.00	
Average Grade (%):	1.50	
Average Bankfull Width (m):	4.46	
Average Wetted Width (m):	2.49	
Average Depth (m):	0.37	
Wetted Area (m <sup>2</sup> ):	505.50	
Average Temperature (C):	8.0	
Discharge (m <sup>3</sup> /sec):	est 1 cfs	
Average Substrate Type:	finer	Poor
Average Instream Cover (%):	12.53	Good
Number of Off Chan. Habitats:	0	Poor
Percent Fines:	100	
Average % Boulder Cover	0.00	Poor
Average Crown Cover (%):	75.00	Fair to Good
Dissolved Oxygen (mg/l):	na	
pH:	7.00	
Total Dissolved Solids:	na	

Riparian					Reach
	Unit 1	Unit 2	Unit 3	Unit 4	Average
Land Use:	na				na
Livestock:	0				0
Slope:	1				1
Stability:	5				5
Total:	6.00	0.00	0.00	0.00	6.00

STREAM:	Beach Creek	DATE:	Oct 4/96
LOCATION:	Brown Property, Beach 5		
COMMENTS:	start at West Crescent culvert, sample: 100%		
SURVEY DIRECTION:	u/s		
TEMPERATURE (C):	8		
DISTANCE (m):	0-200 m		
CREW:	Doug, Faye, Dave		
WATERSHED CODE:	92-3640		92-3640
DISCHARGE (m <sup>3</sup> /sec)	est 1 cfs		est 1 cfs
SITE:			

USHP DATA FORMAT		
		Beach 6,6a
Data summary	Value	Diagnostic
Reach Area (m <sup>2</sup> ):	1375.72	
Percent Pool:	52.46	(Poor)
LWD per Channel Width:	0.12	Poor
Total Erosion Sites:	0	
Total Altered Sites:	0	
Total Obstructions:	1	minor debris
Number Pools:	64	
Number Riffles:	52	
Number Glides:	6	
Reach length (m):	563.00	
Average Grade (%):	1.50	
Average Bankfull Width (m):	2.03	
Average Wetted Width (m):	2.44	
Average Depth (m):	0.38	
Wetted Area (m <sup>2</sup> ):	1375.72	
Average Temperature (C):	8.0	
Discharge (m <sup>3</sup> /sec):	0.00	
Average Substrate Type:	grav/finer	Fair
Average Instream Cover (%):	10.40	Good
Number of Off Chan. Habitats:	0	Poor
Percent Fines:	40	
Average % Boulder Cover	0.00	Poor
Average Crown Cover (%):	76.00	Fair to Good
Dissolved Oxygen (mg/l):	na	
pH:	7.00	
Total Dissolved Solids:	na	

Reach 2-2: Beach 6,6a u/s Browns Property 563 m. Sample Rate: 250 m.

Riparian					Reach
	Unit 1	Unit 2	Unit 3	Unit 4	Average
Land Use:	na				na
Livestock:	0				0
Slope:	1				1
Stability:	5				5
Total:	6.00	0.00	0.00	0.00	6.00

STREAM:	Beach Creek	Beach 6	DATE:	Oct.10/96
LOCATION:	Mainstem, Browns lower property, 200 m from W. crescent			
COMMENTS:	u/s from beach 5, sample rate: every 250 m			
SURVEY DIRECTION:	Survey direct U/S			
TEMPERATURE (C):	Temp:			8 D.O.
DISTANCE (m):	0-563 m			
CREW:	Faye/Doug/Gord/Betty			
WATERSHED CODE:	92-3640			
DISCHARGE (m <sup>3</sup> /sec)				
SITE:	Brown prop			
pH:	TDS:			

Table 6. Beach Creek, Reach 2 (Section 3 & 4) Habitat, Fish Population and Riparian Data Summaries and Ratings.

Reach 2-3, 2-4; B4,4a,4b.

USHP DATA FORMAT		
		Reach 2-3, B4,4a,4b
Data summary	Value	Diagnostic
Reach Area (m <sup>2</sup> ):	1502.86	
Percent Pool:	54.81	good
LWD per Channel Width:	0.34	poor
Total Erosion Sites:	0	
Total Altered Sites:	0	
Total Obstructions:	0	
Number Pools:	74	
Number Riffles:	58	
Number Glides:	1	
Reach length (m):	889.00	
Average Grade (%):	1.50	
Average Bankfull Width (m):	3.99	
Average Wetted Width (m):	1.75	
Average Depth (m):	0.18	
Wetted Area (m <sup>2</sup> ):	1502.86	
Average Temperature (C):	7.0	
Discharge (m <sup>3</sup> /sec):	350/lpm est.	Poor
Average Substrate Type:	50/50 f/g	fair to good
Average Instream Cover (%):	10.04	Good
Number of Off Chan. Habitats:	0	Poor
Percent Fines:	40	
Average % Boulder Cover	0.00	Poor
Average Crown Cover (%):	71.88	
Dissolved Oxygen (mg/l):	na	
pH:	7.00	
Total Dissolved Solids:	na	-

Reach 2-3, Beach 4.4a4b, Upper Browns u/s to Hemsworth, 100% Sample.

Riparian	Unit 1	Unit 2	Unit 3	Unit 4	Reach Average
Land Use:	na				na
Livestock:	0				0
Slope:	1				1
Stability:	4				4
Total:	5.00	0.00	0.00	0.00	5.00

STREAM:	Beach Creek	DATE:	Oct. 16/96
LOCATION:	reach 2 (upper Brown property)		
COMMENTS:	starts at GS 563m, ends at footpath below Hemsworth		
SURVEY DIRECTION:	U/S		
TEMPERATURE (C):	7.0	D.O.	pH:
DISTANCE (m):	0-64 m		
CREW:	Dave/Faye/Betty		
WATERSHED CODE:			
DISCHARGE (m <sup>3</sup> /sec)	350/pm est.		
SITE:	u/s from School Ck		
TDS:			

USHP DATA FORMAT		
		Reach 2-4
Data summary	Value	Diagnostic
Reach Area (m <sup>2</sup> ):	355.90	
Percent Pool:	46.67	Poor
LWD per Channel Width:	0.07	Fair
Total Erosion Sites:	11	poor
Total Altered Sites:	3	fair
Total Obstructions:	2	fair
Number Pools:	14	
Number Riffles:	16	
Number Glides:	0	
Reach length (m):	213	
Average Grade (%):	3	
Average Bankfull Width (m):	3.22	
Average Wetted Width (m):	1.73	
Average Depth (m):	0.16	
Wetted Area (m <sup>2</sup> ):	1.73	
Average Temperature (C):	10	
Discharge (m <sup>3</sup> /sec):	na	
Average Substrate Type:	finer	Fair
Average Instream Cover (%):	15.19	Fair
Number of Off Chan. Habitats:	0	Poor
Percent Fines:	60	
Average % Boulder Cover	<5	Poor
Average Crown Cover (%):	80.36	
Dissolved Oxygen (mg/l):	na	
pH:	7	
Total Dissolved Solids:	na	

Reach 2-4, Hemsworth culverts u/s to Mant Rd, 100 % sample.

Riparian	Unit 1	Unit 2	Unit 3	Unit 4	Reach Average
Land Use:	3				3
Livestock:	0				0
Slope:	3				3
Stability:	5				5
Total:	11	0	0	0	11

STREAM:	Beach Creek	DATE:	Oct. 17, 1996
LOCATION:	Reach 2, two part survey, check dist & Oct. 20, 1996		
COMMENTS:	culvert length 19m		
SURVEY DIRECTION:	U/S		
TEMPERATURE (C):		D.O.	pH:
DISTANCE (m):	0-65	0-148	213 total
CREW:	Betty, Faye, Dave, Scott, Robbie, Taylor.		
WATERSHED CODE:			
DISCHARGE (m <sup>3</sup> /sec)	Very low flow, est 250 - 400 lpm.		
SITE:	Hemsworth culverts to RR		
TDS:			

Table 7. Beach Creek, Reach 3 Habitat, Fish Population and Riparian Data Summaries and Ratings.

USHP DATA FORMAT Reach 3		
Data summary	Value	Diagnostic
Reach Area (m <sup>2</sup> ):	1714.50	
Percent Pool:	100.00	Poor
LWD per Channel Width:	0.04	Poor
Total Erosion Sites:	4	
Total Altered Sites:	9	Ditched
Total Obstructions:	0	
Number Pools:	34	100 % Pool
Number Riffles:	20	
Number Glides:	3	
Reach length (m):	1256.00	
Average Grade (%):	1.50	
Average Bankfull Width (m):	2.43	
Average Wetted Width (m):	1.27	
Average Depth (m):	0.10	Poor
Wetted Area (m <sup>2</sup> ):	1714.50	
Average Temperature (C):	13.0	Good
Discharge (m <sup>3</sup> /sec):	0.00	Poor
Average Substrate Type:	Fines/grav	Fair
Average Instream Cover (%):	19.31	fair, mostly grass
Number of Off Chan. Habitats:	0	Poor
Percent Fines:	40	Poor
Average % Boulder Cover	0.00	Poor
Average Crown Cover (%):	87.76	Fair to Good, except top end
Dissolved Oxygen (mg/l):	na	good
pH:	7.00	
Total Dissolved Solids:	na	

Reach 3: Upper Beach Creek Glengarry d/s thru Davidsons, 100% Sample.

Riparian	Glengarry Davidsons				Reach
	Unit 1	Unit 2	Unit 3	Unit 4	Average
Land Use:	5	3	na	na	8
Livestock:	0	0	na	na	0
Slope:	3	1	na	na	4
Stability:	5	5	na	na	10
Total:	13.00	9.00	0.00	0.00	22

STREAM:	Beach Creek	DATE:	23-Sep
LOCATION:	Glengarry Rd		Beach1, Reach 3
COMMENTS:	Starts at culvert into ditch		
SURVEY DIRECTION:	Downstream		
TEMPERATURE (C):	13.0	D.O.	7 pH:
CREW:	DC,MB,BD		
WATERSHED CODE:	NA		
DISCHARGE (m <sup>3</sup> /sec)	0		
SITE:	Top of Beach at Glengarry GC, D/S.		
na	TDS:	na	

STREAM:	Beach Creek	DATE:	Oct. 8/96 & Oct 15/96
LOCATION:	Davidsons		Beach2
COMMENTS:	continues from Beach2 EXL		
SURVEY DIRECTION:	d/s		
TEMPERATURE (C):	10.0	D.O.	na pH:
CREW:	Faye & Betty		
WATERSHED CODE:			
DISCHARGE (m <sup>3</sup> /sec)			
SITE:	Doug Davidson's prop		
7 TDS:	na		

**Beach Creek 1998 USHP Inventory  
Garden Road Tributary; Reach 3-1.**



Confluence 0+000 m, 98/9/11

**Beach Creek 1998 USHP Inventory  
Garden Road Tributary; Reach 3-1.**



67.5 m d/s Hemsworth Rd. 98/9/11

**Beach Creek 1998 USHP Inventory  
Garden Road Tributary; Reach 3-1.**



82.7 m u/s Hemsworth Rd. 98/9/11

**Beach Creek 1998 USHP Inventory  
Garden Road Tributary; Reach 3-1.**



809.3 d/s Berwick Rd. 98/9/11



**Beach Creek 1998 USHP Inventory  
School Creek Tributary; Reach 2-1.**



Confluence 0+000 m 98/8/27

**Beach Creek 1998 USHP Inventory  
School Creek Tributary; Reach 2-1.**



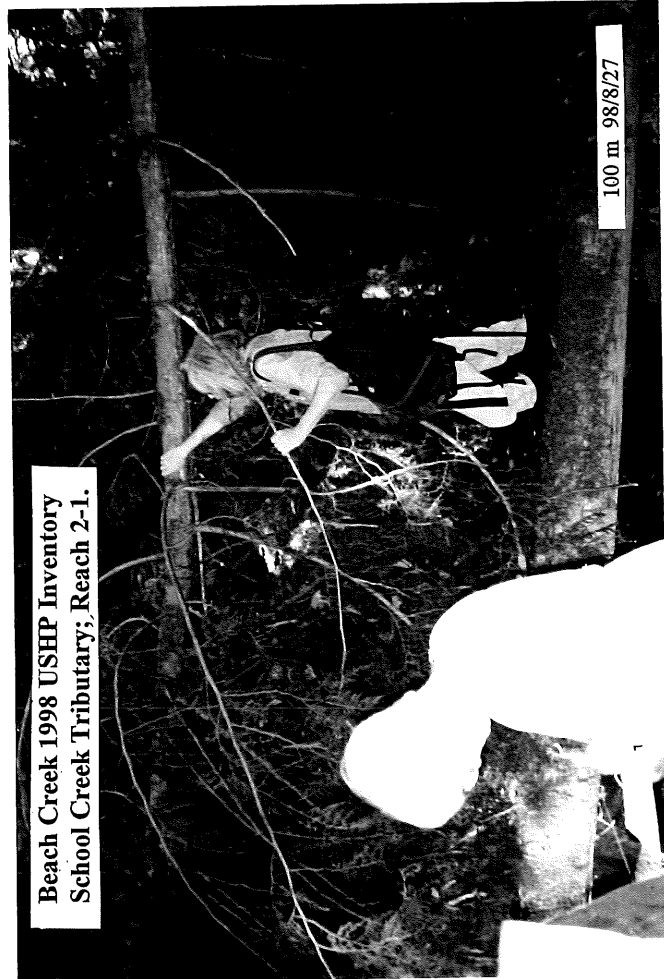
10 m, Water quality site 98/8/27

**Beach Creek 1998 USHP Inventory  
School Creek Tributary; Reach 2-1.**



75 m d/s 98/8/27.

**Beach Creek 1998 USHP Inventory  
School Creek Tributary; Reach 2-1.**



100 m 98/8/27

**Beach Creek 1998 USHP Inventory  
School Creek Tributary; Reach 2-1.**



**155 m Trib on RB, 98/8/27.**

**Beach Creek 1998 USHP Inventory  
School Creek Tributary; Reach 2-1.**



**203 m cv under Village Way 98/8/27.**

GARDEN ROAD - Beach trib.



0.00m  
confluence

98/9/11



67.5 m  
d/s Hemsworth Rd.

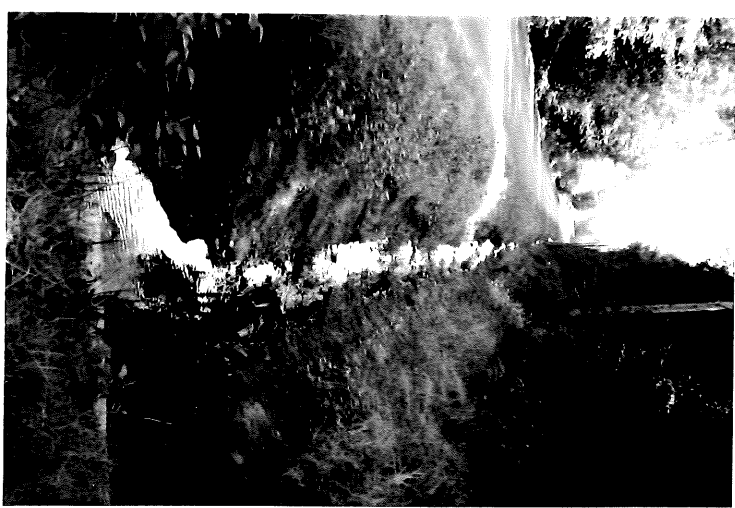
98/9/11

GARDEN ROAD (2)



82.7 m  
u/s Hemsworth

98/9/11



809.3  
d/s Berwick

98/9/11

SCHOOL CREEK - Beach Trib



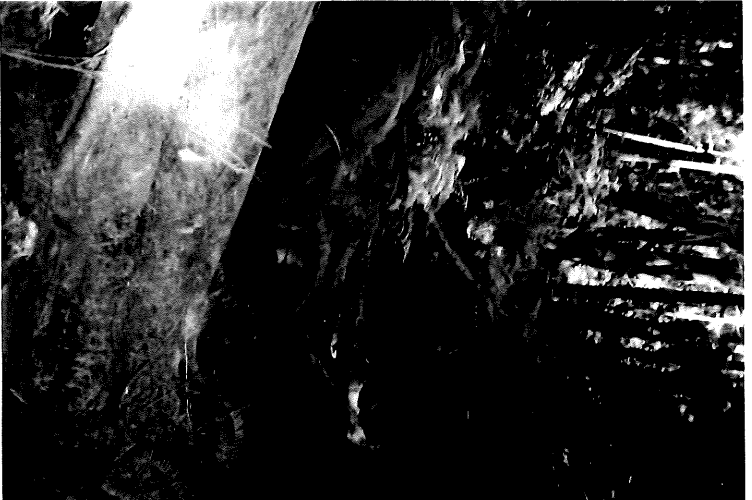
0.00m  
confluence

98/8/27



10m  
water quality

98/8/27



75m  
d/s

98/8/27

SCHOOL CREEK (2)



100m

98/8/27

SCHOOL CREEK (3)

PLANTING - Beach Creek



155 m  
trib on R13

98/8/27



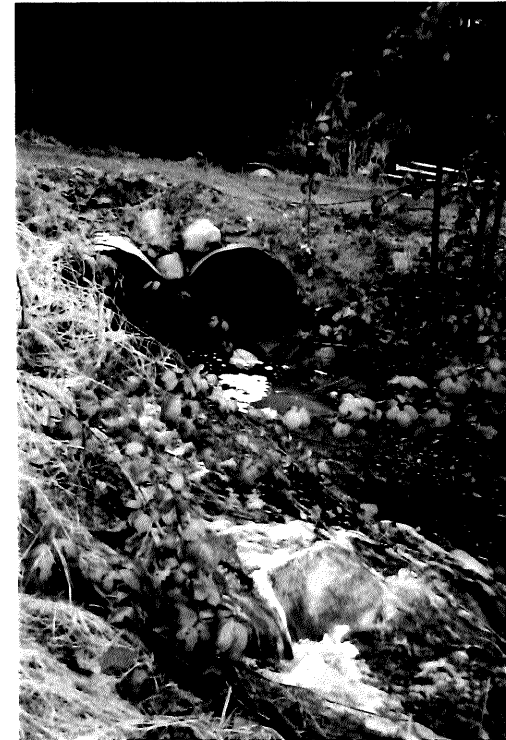
203 m  
cv under Village Way

98/8/27



Qualicum Rd

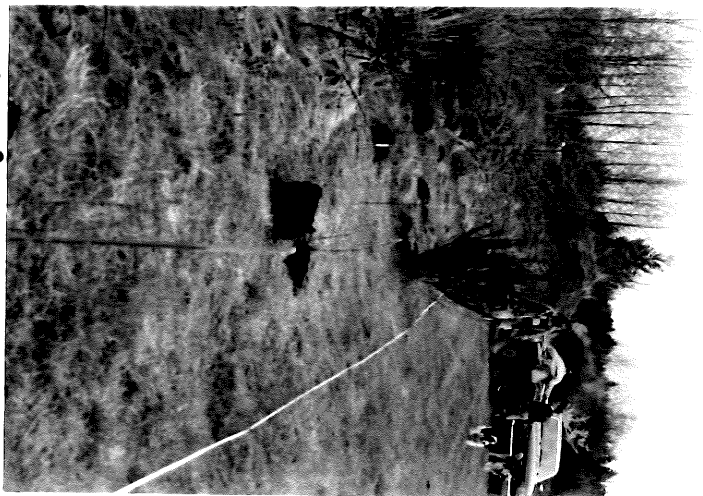
98/4/11



KenDor

98/1/29

PLANTING - Beach (2)



Ken Dor farm 98/4/11



Ken Dor pond 98/4/11

PLANTING - Beach (3)



Von Eugen  
u/s Elizabeth Ave. 98/4/18



Von Eugen 98/4/18

Pool - Beach Creek

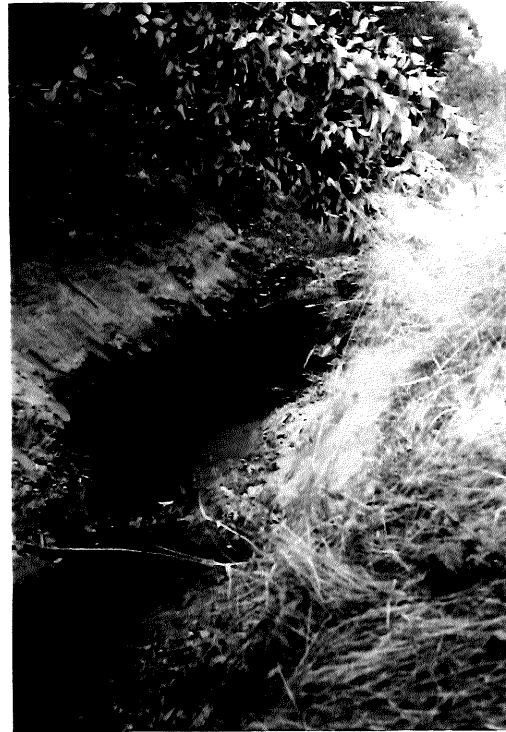


Doug Davidson's

98/8/22

OVERHEAD COVER  
Beach Creek

alders bent over  
Nenzel Rd.



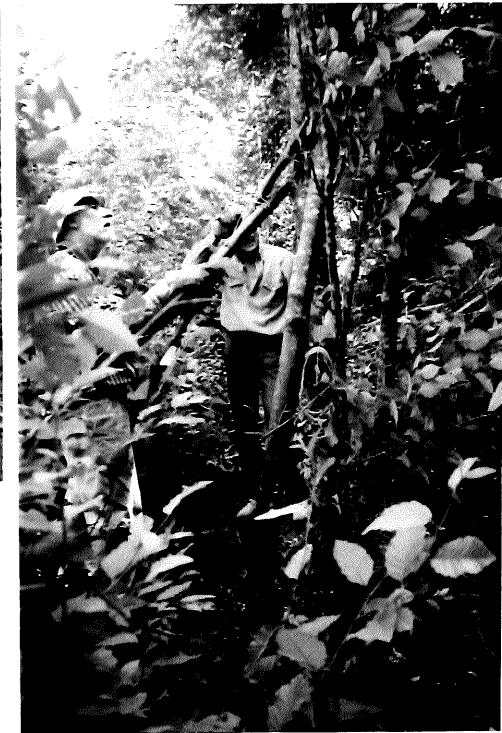
98/8/22

BANK STABILIZATION - Beach



uprooted  
trees on bank  
Nenzel Rd.

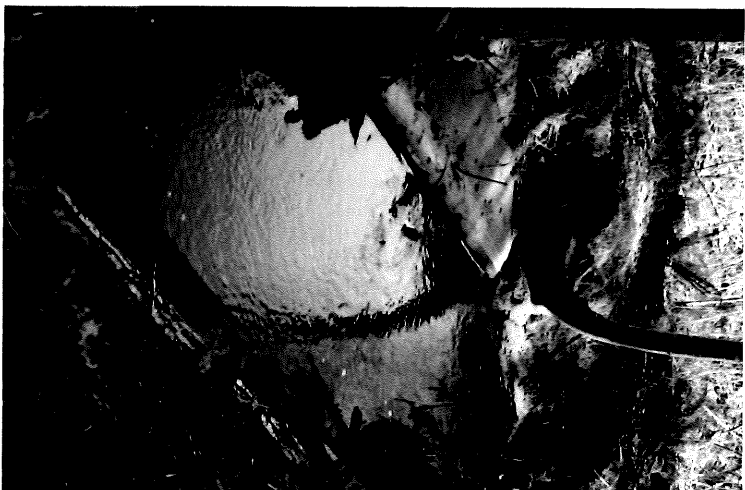
98/7/25



pushing alders  
back in place

98/7/25

MONITORING - Beach Creek



ogs 98/3/6



logs 98/3/6



logs Brown Property 98/10/19

MONITORING - Beach (2)



cut trees Golf Course 98/8/17



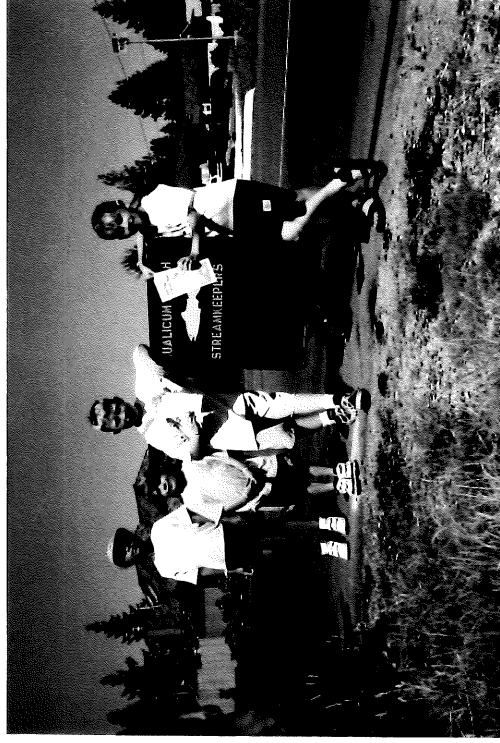
MONITORING - Beach (3)



D.D. pool  
after first rain

98/10/4

AWARENESS - Beach Creek



Storm drain marking

98/8/4



Brown prop.  
1 site spawning coho

98/11/17





