

## SECTION 5

### WHALLEY CREEK

#### 5.1 Introduction

The 1988 Stream Summary Catalogue does not recognise Whalley Creek, but the City of Nanaimo Bylaws do identify this as a fish-bearing stream. Cutthroat trout are found downstream from the sewage treatment plant. Whalley Creek is in precarious condition; current and proposed development could easily eliminate the resident fish, which have already been affected by pipeline installations in the 1970's. No fish were found in the upper reach of the creek above the sewage treatment plant. Active protection and enhancement are required.

#### 5.2 Description

Whalley Creek is a first-order stream, originating in a marsh west of Entwhistle Drive, and north of Hammond Bay Road (see map, page 25. The creek flows east, along Hammond Bay Road to Hammond Bay (Figure 5.1), a distance of 2.1 km, with an average gradient of less than 1%. Flow is year-round. The wetted width is 1-2 metres. There is very little pool area, but the gravel below Shores Drive is adequate for spawning. For sequential habitat data, as surveyed on 29th June, 1994, see Table 5.2.

The creek can be divided into two reaches.

**Reach 1:** Tidewater to the sewage treatment plant (698 metres). The creek goes through several private properties, but is close to the natural state (Figure 5.3). Wetted width is 0.7-2.0 metres, depth is 2.7-24.7 cm. Below Morningside Road, flow is controlled by a flood-control culvert (Figure 5.2) which allows floodwater to bypass the lowest 242 metres of the creek. Whilst this structure undoubtedly controls flooding, any fry caught in the culvert will be washed out to sea. There is extensive use of trails along the stream banks including several footbridges, which have affected the riparian vegetation.

**Reach 2:** Waste treatment plant (698 m) to source (2,126 m). From the sewage treatment plant to the source, a distance of 1428 metres, the creek is devoid of fish. The water is stagnant, the average gradient is less than 0.5%, in a straight, artificial channel running along the sewage pipeline.

#### 5.3 Water Quality Results

Samples were taken from the pool below Shores Road. The original laboratory report is in Table 5.3. A summary of abnormal findings vs. M.O.E.L.P. criteria is in Table 5.1.

Table 5.1

Water Quality Summary for Whalley Creek

Abnormal Result	Level Found	Maximum Acceptable Level
Aluminium	0.15 mg/L	0.1 ug/L
Iron	0.95 mg/L	0.3 ug/L
NO <sub>2</sub> /NO <sub>3</sub>	0.28 mg/L	0.06 mg/L as nitrite

**5.4 Fish Populations**

Reach 1 holds cutthroat trout; 51 fish were found in 22 m<sup>2</sup> of creek just below Morningside Drive. Sizes ranged from 51-140 mm, suggesting two age classes. See Table 5.4 for a summary of electrofishing data.

Electrofishing produced no fish at Williamson Road, or downstream for 400 metres. The substrate is 50 cm-deep anaerobic mud. This reach may be important to downstream fish as a food source, but it does not support fish in the Summer.

**5.5 Enhancement**

Reach 1 is a series of riffle-run complexes. The creation of pools in this area would complement the existing habitat. Water quality is an ongoing concern, and should be monitored. The existing (0.5-1.0 cm) gravel substrate is small, and could be augmented with 2.0-2.5 cm size material to improve the spawning potential.

The ornamental pond (Figure 5.4) at the waste treatment plant on McGuffie Road should be removed. This would allow fish passage to the upper reaches.

Reach 2 is reduced to a ditch (Figures 5.6-5.8), adjacent to the sewage pipeline. There are fish barriers which should be removed at 7-, 8- and 9- 4604 Hammond Bay Road (Figure 5.5).

Degradation of this reach, and of the entire creek will continue if stormwater management is not given a high priority by municipal government. Restoration of this reach would be a major, long-term project, beyond the scope of this 3-year program. A year-round study of flows and current fish utilisation is needed.



Figure 5.1. Whalley Creek enters Hammond Bay at a pebble beach.



Figure 5.2. A flood control culvert empties directly into Hammond Bay, short-circuiting the lowest 220 metres of creek; fry caught in the culvert will be washed out to sea.

Figure 5.3.  
The lowest 220 metres of  
Whalley Creek provide  
habitat (right) for  
cutthroat trout. Crown  
cover and instream  
cover are excellent.



Figure 5.4.  
The ornamental pond  
at the sewage treatment  
plant (below) is a  
barrier to fish  
migration.

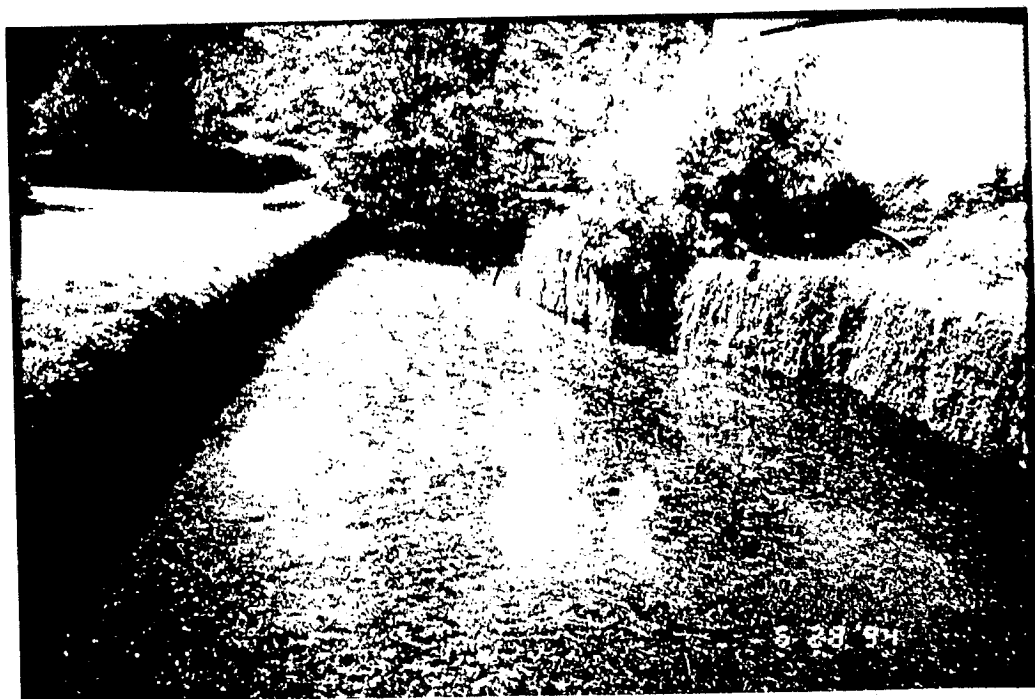




Figure 5.5. Upstream from the sewage treatment plant, Whalley Creek has been reduced to a garden pond at the expense of fish habitat.



Figure 5.6. At Gregalach Road, the creek passes through an area of extensive riparian development.

Figure 5.7.  
Downstream from Williamson  
Road, Whalley Creek follows  
a sewer line (right).



Figure 5.8.  
Residential development  
continues at Williamson  
Road (below). Infilling  
of land will affect  
drainage future patterns.



Table 5.2. Sequential progression upstream of microhabitats in Whalley Creek. 29 June 1994.

Unit #	Habitat Type	Length (m)	Location (m)	Wetted Width (m)	Wetted Area (Sq. m)	Average Depth (cm)	Maximum Depth (cm)	Gravel dia. 90% (cm)	Crown Cover (%)	Instream Cover (%)	Gradient (%)
1	RF	11.3	0	1.1	12.8	7.6	15	1	90	5	4
2	R3	2.3	11.3	1.6	3.6	24.7	44	1	90	70	1
3	RF	2.6	13.6	0.7	1.7	2.7	5	0.5	90	5	10
4	R3	12.5	16.2	1.2	15.0	9.2	29	0.5	80	20	1
5	RF	28.3	28.7	1.6	45.3	12.1	29	0.5	80	5	5
6	F3	5	57	1.5	7.7	10.4	19	Fines	90	10	0.5
7	RF	45.5	62	1.1	51.6	6.2	16	1	80	10	5
8	F3	2.7	107.5	1.6	4.4	16.6	28	5	95	10	0.5
9	RF	111.1	110.2	1.3	144.4	12.0	28	1	60	25	4
10	R3	2.3	221.3	2.0	4.5	9.8	23	2.5	90	15	0.5
11	CULVERT	18.2	223.6		(Morningside dr.)						
12	RF	29.1	241.8	0.9	25.2	6.2	10	1.5	70	5	4
13	F3	2.2	270.9	1.5	3.3	20.7	40	2.5	70	15	0.5
14	RF/X	102.9	273.1	1.6	164.6	12.7	40	2.5	70	15	0.5
15	F3/X	4.9	376	1.5	7.5	9.1	12	5	100	5	0.5
16	RF/R3/X	61.2	380.9	1.8	110.2	7.3	15	2.5	80	10	3
17	P3/X	2.4	442.1	2.3	5.6	19.1	40	1	90	5	0.5
18	CULVERT	21.4	444.5		(Shores rd.)						
19	RF/R3	138.2	465.9	1.2	161.2	5.3	16	1	90	10	1
20	F3	10	604.1	1.9	18.7	17.1	39	5	80	5	0.5
21	RF/R3	13.6	614.1	1.3	17.2	8.7	15	0.5	95	5	2
22	F3	70.5	627.7	1.5	103.4	19.6	53	Fines	85	5	0.5
23	CULVERT	25.7	698.2		(sewage treatment plant)						
24	MARSH	42.1	723.9	7.1	297.5	47.6	81	Fines	20	5	0.5
25	CULVERT	6.4	766		(sewage treatment plant)						
26	MARSH	30.2	772.4	5.3	161.1	21.0	30	Fines	30	30	0.5
27	CULVERT	14.2	802.6		(McGruffie rd.)						
28	RF	15.2	816.8	1.0	14.7	5.2	10	2.5	10	70	3
29	CULVERT	9.6	832		(lane)						
30	RF/R3	424.6	841.6	1.4	608.6	8.6	14	Fines	60	20	2
31	CULVERT	40.9	1266.2		(Gregalach rd.)						
32	MARSH	23.8	1307.1	0.0	0.0	0.0	20				
33	RF/R3	494.7	1330.9	2.0	972.9	10.7		Fines	90	15	2
34	CULVERT	25.9	1825.6		(Williamson rd.)						
35	RF/R3	247.8	1851.5	1.3	330.4	8.3	22	Fines	90	20	1
36	MARSH	25.3	2099.3	0.0	0.0	0.0					
TOTAL LENGTH			2124.6								

WATER QUALITY REPORT

WHALLEY CREEK

*high Al*  
*high - both exceed aquat*  
*life support*  
*of 0.1 mg/L*  
*0.3 mg/L*

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ANALYTICAL REPORT  
 Form 03027310



Sampling site : WHALLEY CREEK  
 Submitted by :

Zenon ID : 94020234

Sparcode	Parameter	Unit	MDC	Media	Workroute
00041220	pH	7.3	pH units	0.1	02/01 Automated pH Meter
00111160	Specific Conductance	270	uS/cm	1	02/01 Cond. Meter Siebold
007H1033	Res. Filterable 1.0u	194	mg/L	4	02/01 Grav 1.0 um Filter
0107CALC	Hardness Total	105	mg/L	--/--	Calculated Result
01021210	Alkalinity Total 4.5	74.8	mg/L	0.5	02/01 Automated Electrometer
0113136A	Nitrogen Kjel. Tot(N)	0.35	mg/L	0.04	02/01 HgSO4 Dig. Auto. Colour.
0114CALC	Nitrogen Total	0.63	mg/L	--/--	Calculated Result
11091350	Nitro NO3+NO2 D	0.28	mg/L	0.02	02/01 Auto. Cadmium Reduction
P--D1390	Phosphorus Tot. Diss	0.007	mg/L	0.003	02/01 Dig. Auto. Ascorbic Acid
Ag-T0042	Silver	< 0.03	mg/L	0.03	05/02 GI HNO3 Dig; ICAP 61E
Al-T0042	Aluminum	0.15 <i>high</i>	mg/L	0.06	05/02 GI HNO3 Dig; ICAP 61E
As-T0042	Arsenic	< 0.04	mg/L	0.04	05/02 GI HNO3 Dig; ICAP 61E
B--T0042	Boron	0.06	mg/L	0.04	05/02 GI HNO3 Dig; ICAP 61E
Ba-T0042	Barium	0.003	mg/L	0.001	05/02 GI HNO3 Dig; ICAP 61E
Be-T0042	Beryllium	< 0.001	mg/L	0.001	05/02 GI HNO3 Dig; ICAP 61E
Bi-T0042	Bismuth	< 0.02	mg/L	0.02	05/02 GI HNO3 Dig; ICAP 61E
Ca-T0042	Calcium	30.6	mg/L	0.05	05/02 GI HNO3 Dig; ICAP 61E
Cd-T0042	Cadmium	< 0.002	mg/L	0.002	05/02 GI HNO3 Dig; ICAP 61E
Co-T0042	Cobalt	< 0.004	mg/L	0.004	05/02 GI HNO3 Dig; ICAP 61E
Cr-T0042	Chromium	0.003	mg/L	0.002	05/02 GI HNO3 Dig; ICAP 61E
Cu-T0042	Copper	0.003	mg/L	0.002	05/02 GI HNO3 Dig; ICAP 61E
Fe-T0042	Iron	0.95 <i>high</i>	mg/L	0.05	05/02 GI HNO3 Dig; ICAP 61E
K_T0042	Potassium	1.0	mg/L	0.4	05/02 GI HNO3 Dig; ICAP 61E
Mg-T0042	Magnesium	7.04	mg/L	0.02	05/02 GI HNO3 Dig; ICAP 61E
Mn-T0042	Manganese	0.107	mg/L	0.002	05/02 GI HNO3 Dig; ICAP 61E
Mo-T0042	Molybdenum	< 0.004	mg/L	0.004	05/02 GI HNO3 Dig; ICAP 61E
Na_T0042	Sodium	13.3	mg/L	0.4	05/02 GI HNO3 Dig; ICAP 61E
Ni-T0042	Nickel	< 0.01	mg/L	0.01	05/02 GI HNO3 Dig; ICAP 61E
P_T0042	Phosphorus	0.05	mg/L	0.04	05/02 GI HNO3 Dig; ICAP 61E
Pb-T0042	Lead	< 0.03	mg/L	0.03	05/02 GI HNO3 Dig; ICAP 61E
S_T0042	Sulphur	4.0	mg/L	0.1	05/02 GI HNO3 Dig; ICAP 61E
Sb-T0042	Antimony	< 0.02	mg/L	0.02	05/02 GI HNO3 Dig; ICAP 61E
Se-T0042	Selenium	< 0.03	mg/L	0.03	05/02 GI HNO3 Dig; ICAP 61E
Si-T0042	Silicon	9.1	mg/L	0.8	05/02 GI HNO3 Dig; ICAP 61E
Sn-T0042	Tin	< 0.02	mg/L	0.02	05/02 GI HNO3 Dig; ICAP 61E
Sr-T0042	Strontium	0.086	mg/L	0.001	05/02 GI HNO3 Dig; ICAP 61E
Te-T0042	Tellurium	< 0.02	mg/L	0.02	05/02 GI HNO3 Dig; ICAP 61E
Ti-T0042	Titanium	0.019	mg/L	0.003	05/02 GI HNO3 Dig; ICAP 61E
Tl-T0042	Thallium	< 0.03	mg/L	0.03	05/02 GI HNO3 Dig; ICAP 61E

Sample State : Fresh Water  
 Sampled on : 94/08/29 00:00  
 Upper Depth : 0.1  
 Lower Depth : 0.1



## WATER QUALITY REPORT

WHALLEY CREEK

25-Sep-94  
Page 3 of 4ANALYTICAL REPORT  
Form 03027310

Sampling site : WHALLEY CREEK  
Submitted by :

Zenon ID : 94020234

Sparcode	Parameter		Unit	MDC	Media	Workroute
V--T0042	Vanadium	0.004	mg/L	0.003	05/02	GI HNO3 Dig; ICAP 61E
Zn-T0042	Zinc	< 0.01	mg/L	0.01	05/02	GI HNO3 Dig; ICAP 61E
Zr-T0042	Zirconium	< 0.003	mg/L	0.003	05/02	GI HNO3 Dig; ICAP 61E

Sample State : Fresh Water  
Sampled on : 94/08/29 00:00  
Upper Depth : 0.1  
Lower Depth : 0.1

Table 5.4 Microfish population estimate for Whalley Creek.

Stream:	Whalley Creek site 1		
Species:	Cutthroat		
Removal Pattern:	27	18	8
Total Catch		=	53
Population Estimate		=	62
Chi Square		=	0.558
Pop Est Standard Err		=	7.088
Lower Conf Interval		=	53.000
Upper Conf Interval		=	76.177
Capture Probability		=	0.465
Capt Prob Standard Err		=	0.099
Lower Conf Interval		=	0.266
Upper Conf Interval		=	0.664
The population estimate lower confidence interval was set equal to the total catch. Actual calculated lower CI was 47.82334			

Table 5.5. Electrofishing data collected from site #1, (423 m), Whalley Creek, 26 July, 1994

Sample No.	Species Code	E.F. Pass No.	Length (mm)	Weight (g)
1	CT	1	51	2
2	CT	1	105	15
3	CT	1	64	2
4	CT	1	70	3
5	CT	1	59	2
6	CT	1	70	3
7	CT	1	58	2
8	CT	1	140	29
9	CT	1	70	4
10	CT	1	65	3
11	CT	1	68	3
12	CT	1	57	2
13	CT	1	60	2
14	CT	1	64	2
15	CT	1	57	2
16	CT	1	65	2
17	CT	1	58	2
18	CT	1	56	2
19	CT	1	63	2
20	CT	1	65	3
21	CT	1	63	2
22	CT	1	52	2
23	CT	1	82	5
24	CT	1	64	2
25	CT	1	118	16
26	CT	1	54	1
27	CT	1	128	20
28	CT	2	54	2
29	CT	2	54	1
30	CT	2	59	2
31	CT	2	54	1
32	CT	2	124	17
33	CT	2	53	1
34	CT	2	64	3
35	CT	2	57	1
36	CT	2	65	2
37	CT	2	59	2
38	CT	2	56	2
39	CT	2	124	20
40	CT	2	69	3
41	CT	2	60	2
42	CT	2	61	2
43	CT	2	63	3
44	CT	2	80	6
45	CT	2	62	3
46	CT	3	69	3
47	CT	3	56	2
48	CT	3	66	3
49	CT	3	52	1
50	CT	3	68	3
51	CT	3	72	4
52	CT	3	60	2
53	CT	3	55	2