

# **Brunette Watershed Fish Sampling Study**

**2003 – 2004**



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**City of Burnaby  
Burnaby Lake Systems Project**

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## **Summary**

The 2003-2004 Brunette Watershed Fish Sampling Study (BWFSS), was a student project undertaken by students of the Fish, Wildlife, and Recreation (FWR) program at the British Columbia Institute of Technology (BCIT) from January 2004 to March 2004. It was prepared for the City of Burnaby and the Burnaby Lake Systems Project (BLSP).

The project was designed to determine if there is a presence of fish species within selected streams in the Brunette River Basin. Three systems were selected to study: (1) Guichon Creek; (2) Chub Creek; (3) Darnley Creek. Catch methods consisted of deploying juvenile salmonid traps in selected reaches of each system. Traps were checked and maintained daily. Fish enumeration results are organized in the report by species, length, system, and reach, using tables and graphs. In addition, problems and concerns related to the study are also included throughout the report.

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## 1.0 Introduction

### 1.1 Background

The Brunette Fish Sampling study is an initiative of the Fish, Wildlife, and Recreation Program at British Columbia Institute of Technology and is supported by the City of Burnaby and the Burnaby Lake Systems Project.

The Brunette Watershed is highly urbanized and subject to high water events, pollution, poor water quality and loss of valuable habitat. Over 80% of the area is developed leaving 20% as green space (City of Burnaby, 2003). The three systems included in the study are all within the Brunette watershed and no doubt experience some of these adverse effects. Examining how these problems effect fish populations by sampling each system and checking for fish presence was the main focus of the study.



Fig 1. Coho caught in a minnow trap

## 2.0 Objectives

The primary objective was to capture juvenile salmon, trout and other resident fish species, and provide information on what fish reside in these urban streams to the City of Burnaby.

Information collected included:

- Abundance.
- Presence of any salmonid species within the creeks.
- Lengths of all salmonids caught.
- Effects of urbanization.
- Habitat and barriers within the study creeks.



Fig 2. Coho caught and being measured

### 3.0 Study Area

#### 3.1 Brunette Watershed

The Brunette Watershed is located mostly within the City of Burnaby but also extends into Coquitlam, New Westminister, Vancouver, and a small portion of Port Moody. The Brunette Watershed contains a network of creeks as well as two lake systems. Beginning from Vancouver Still Creek flows east and drains into Burnaby Lake. Many smaller creeks drain into Still creek, such as Chub, Guichon and Darnley creeks. Deer Lake is also part of the watershed; and is connected to Burnaby Lake by Deer Lake Brook.

Burnaby Lake begins to narrow to the east. Draining from the lake towards the Fraser River through the Cariboo Dam is the Brunette River. The Brunette River also has other creeks entering before it conflues the Fraser River.



Fig 3. A satellite image of the Brunette watershed

The three creeks that were examined in the Brunette Watershed were Guichon Creek, Chub Creek, and Darnley Creek.

### 3.1.1 Chub Creek

Chub Creek is a small stream in the Brunette Watershed. The headwaters of the creek originate in North West Burnaby and East Vancouver, south of Parker Street. Chub Creek is culverted numerous times before entering Still Creek. Numerous storm drains spill directly into the creek and as a result, fluctuation in water levels can be quite irregular. Pollution and erosion caused by impervious connection is a concern to the salmonid population within the system. Cutthroat trout, coho salmon, and three spined sticklebacks are all known to inhabit the system. There has been habitat enhancement done throughout the creek. Volunteer organizations through the City of Burnaby and construction companies have stocked coho in the creek and have restored native vegetation along its banks. Access to Chub Creek is relatively easy due to an adjacent industrial development. We broke Chub Creek into different reaches. The first reach began from a culvert running under Lougheed Highway. The second reach was a riffle section near Home Depot and Dick's Lumber. The third reach was a side channel on Dawson Street off of Madison Street that connected to the main channel before Dick's Lumber. The fourth reach ran under Dicks lumber through culverts and connected to Still Creek.

Four traps were deployed in this system. Each trap was placed on the bottom at a depth of at least 50 cm's in slow moving water.

### 3.1.2 Darnley Creek

Darnley Creek begins on the south side of the Highway#1 near Kensington Street. This creek is culverted until it appears next to the SCPA near Darnley Street in Burnaby. The creek then flows east towards the 8 Rinks Sports Complex. The creek then veered north and had one culverted section before it drained into Still Creek. Darnley creek consisted of two major reaches. Our Team placed a fish trap below the culvert on the Still Creek side and one above the culvert. Darnley Creek was very shallow and did not provide many good trapping locations.

### 3.1.3 Guichon Creek

Guichon Creek had historically supported populations of coho (*Oncorhynchus kisutch*), steelhead trout (*O. mykiss*) and cutthroat trout (*O. clarki clarki*). The headwaters of Guichon Creek originate on the upper slopes above Gilpin Crescent and drain into the main stem of Still Creek on the north side of Trans-Canada highway just below Still Creek Way. Large scale urbanization has seen much of the system culverted, with a large portion of the creek flowing beneath the British Columbia Institute of Technology campus. These culverts can act as fish barriers and hinder fish from migrating into the upper portions of the creek. There have been attempts to reintroduce cutthroat trout into the upper portion of the system in June 2000. The objective of this study is to see where fish are distributed throughout the creek. For the purpose of this study Guichon Creek was divided into four reaches:

Reach 1- North side of Trans-Canada highway via Still Creek Way

Reach 2- South portion of the Guichon Creek on the BCIT campus

Reach 3- On the corner of Willingdon and Moscrop

Reach 4- On the corner of Wildwood and Gilpin

Minnow traps were placed in each reach at depth no less than 50cm and left for a twenty-four hour period at which time they were checked and fish were processed. A total of four trapping days were done on the creek.

## 4.0 Methods

Minnow traps were assembled and baited prior to deployment within the field. To eliminate possible bias in the study trap locations were spread out within each creek. Trapping locations were selected based on the following criteria:

- Adequate depth to submerge trap completely
- Areas with vegetation or LWD (anchor points for traps)
- Sheltered areas to deter vandalism or theft

### 4.1 Equipment

12 Gee-Traps	White Twine
Flagging Tape	Knife
Measuring Board	Waders
Dry Cat Food	Meter Stick
Dissolved Oxygen Meter	Alcohol Thermometer
Field Notebook	Digital Ph/Temperature/Conductivity Meter
Salmonid Identification Book	Digital Camera

#### 4.1.1 Office Software

Microsoft Word 2002  
Microsoft Excel 1998

#### 4.1.2 Trap Placement and Collection

Locations were selected by finding in stream debris to act as anchor points. Traps were secured using rope or string and baited with cat food. Pools were at a depth of at least 50 cm to limit the chance of fish mortality. Traps were checked within a twenty four hour period. All fish were removed and analyzed.

#### 4.1.3 Fish Analysis

Fish were analyzed according to species, length (cm), and were examined for any pre-existing clips or marks. Upon arriving on site, fish were removed from traps and placed into a temporary holding tank. Each individual was then removed from the tank and placed on a measuring board and data were entered into log books. Any salmonids that did not have an existing fin clip were given an adipose clip and released. Fish were processed as quickly as possible to minimize undue stress and reduce the chance of mortality.

## **5.0 Results**

### **5.1 Fish Capture Results**

#### **5.1.1 Chub Creek**

Trapping of Chub Creek produced some varied results. In reach #1 a large amount of three spine stickleback 3cm to 6cm in length were captured. In reach # 2 three spine stickleback were also caught but there was also the presence of a juvenile coho. Reach # 3 was by far the most productive reach for salmonid species. In total 4 coho, and 2 cutthroat were captured in reach 3. The coho ranged from 9.2 -10.5 cm in nose to fork length. The cutthroats were slightly at 13.2-13.4 cm in nose to fork length. Again there was a presence of three spine stickleback but not as high as in reach # 1 and 2. All the salmonids caught were marked by removing or clipping their adipose fin. All the six salmonids captured still had an adipose fin. This indicated that all salmonids captured were caught only once. The presence of six salmonids and no recaptures could indicate a viable salmonid population within this reach. The population of coho and cutthroat could be a larger than first anticipated.

#### **5.1.2 Darnley Creek**

All fish captured were caught in reach one. The total amount of fish caught on Darnley Creek was five different fish. Three of the fish captured were three spined stickleback, the other two fish captured were juvenile coho.

#### **5.1.3 Guichon Creek**

All fish captured were caught in reach one. There was a number of three spined stickleback ranging in lengths of 4.5cm-5.5cm. A 10cm cutthroat trout was also captured, which was the only salmonid caught in the entire system.

## **6.0 Discussion**

### **6.1 Chub Creek**

The upper sections of Chub Creek are almost all culverted over. Mainly storm drains drain directly into the main stem of Chub Creek. The high industrialization of the area poses many environmental questions:

- What is happening underground?
- How much runoff is entering the creek?
- Are the fish affected?
- Would there be presence of other fish?

The presence salmonids were detected, but how healthy were they really? Further study of this creek should be done. Information is needed on the amount of adults that will be returning.

### **6.2 Darnley Creek**

Darnley Creek is located between two waste dump sites. Visible leaching in the area has led to water quality concerns. Each time the study team was on site discoloration of the water was noted along with the smell of petroleum. This leads to the question of fish health. Can it sustain viable fish populations over time? There were no signs of stream rehabilitation and little information was available for the system.

### **6.3 Guichon Creek**

Increased urbanization has led to the installations of culverts throughout Guichon Creek. Some of the major factors hindering fish residence in the upper portions of Guichon Creek are:

- Impervious area, causing stream flashiness
- Pollution from urban runoff and industrial activity
- Obstructions in the form of culverts which could potentially effect fish migration
- Lack of over stream vegetation

Fish found in reach one was probably due to its close proximity to main stem of Still Creek. Further trapping and adjusting trap locations may be needed along with an in depth stream survey.

## **7.0 Recommendations**

### **7.1 Chub Creek**

Chub Creek is located within a highly industrialized area of Burnaby. Presently there are some ongoing rehabilitation projects on Chub Creek, including:

Bank stabilization or armouring  
Planting of native vegetation  
Creation of wildlife trees.

This creek is located within a high traffic area; often runoff from the roads was traveling directly into the creek. On many occasions our team could smell a stench of fuel within the creek.

Creek recommendations:

- Storm drain filters could be implemented
- More in stream rehabilitation
- More bank stabilization
- Possible construction of a silt traps
- And removal of culverts.

Another recommendation is the stocking of Chub Creek with coho and cutthroat every second year. The stocking of this creek could potentially help boost the chances of these fish returning back and spawn.

Possible additional studies:

- Soil and water studies
- Fish migration
- Runoff and pH.

Further studies would produce more information generating possible improvement projects and rehabilitation.

### **7.2 Darnley Creek**

Further study of Darnley Creek is recommended. Looking at water quality and invertebrates should give a clearer indication of the creeks health.

### **7.3 Guichon Creek**

Guichon Creek has seen the effects of high urbanization and has sustained massive damage as a result. Much of the system has been culverted over, with a large portion running beneath the BCIT campus. Efforts have been made to enhance the creeks productivity in the past. In 2000, Guichon Creek saw the reintroduction of cutthroat trout. This study did not answer the question of the success of this initiative. As a result, the study team has provided further recommendations for establishing fish populations:

- Planting of native vegetation
- Construction of cut banks
- Boulder placement for fish refuge
- Pool and side channel habitat

In addition, one of the most important factors in fish habitat is water quality. It is recommended that further studies be done on water quality in this system before any enhancement procedures take place.

## **References**

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