

# Musqueam Creek State of the Watershed Report Executive Summary



## Introduction

Musqueam Creek is Vancouver's last wild salmon stream supporting runs of wild Coho, Chum and Cutthroat Trout. Being wild the Musqueam Coho stock it is an important contributor to the health and biodiversity of Pacific Salmon, and in-particular lower Fraser River coho stocks.

Canada's Policy for the Conservation of Wild Salmon (June 2005) states...

*The health of Pacific Salmon depends not only on their abundance but also on their biological diversity. That diversity includes the irreplaceable lineages of salmon evolved through time, the geographic distribution of these populations, the genetic differences, and the habitats that support these differences. Diversity of Pacific salmon represents their legacy to-date and their potential for adaptation to future changes in climate, fishing, and habitat. Protecting diversity is the most prudent policy for the future continuance of wild salmon as well as the ecological processes that depend on them and the cultural, social, and economic benefits drawn from them.*

This 'State of the Watershed' report is designed to compile and review all available information on the hydrology and biology of the Musqueam/ Cutthroat Creek watershed and their salmonid populations, in an attempt to provide a clearer picture of the factors limiting production in this system. As well as, provide recommendations for further study and highlight potential protection and restoration opportunities.

## Discoveries

Results of the hydrological analysis revealed that the Musqueam Creek watershed is in relatively "good" health when compared to regional expectations and the area geology.

### *Surficial Geology*

Through this study we supported traditional ecological knowledge that Cutthroat Creek was diverted from its original location and channel (originally an independent creek and tributary to the the North Arm of the Fraser River) into a tributary of Musqueam Creek.

Protection afforded by the Pacific Spirit Regional Park (PSRP) has helped maintain the limited base-flows for these creeks although alterations below the PSRP combined with changes in area geology may result in the dewatering of channel sections in Cutthroat Creek through the SGCC.

Field reconnaissance and GIS analysis indicated that the upper portion of the watershed within PSRP, fall within a very different Hydrological Soil Group than the lower reaches of the watershed below SW Marine Drive. These changes drastically effect runoff potential and infiltration rates as water flows down stream to fish habitat areas.

### *Hydrological Assessment*

Musqueam and Cutthroat Creek until very recently have been essentially un-gauged watersheds and so for this report we compared them with nearby watersheds for hydrological analysis using local Water Survey of Canada stream gauges and Environment Canada weather stations.

Although these systems have minor differences the data shows that on average, most of the high flows, greater than two times the mean annual discharge, occurs in the fall and winter months with low flows, less than one quarter on the mean annual discharge, occurring in the summer months. This is the expected regime for the Musqueam and Cutthroat Creek system.

### *Water Quality*

Temperature data shows acceptable temperature profiles for successful rearing of salmonids.

### *Fish Production*

Estimates of the potential total capacity cited 5,675 coho fry for Musqueam Creek and 10,850 for Cutthroat Creek, assuming a large area of accessible habitat, particularly within Cutthroat Creek.

The length of Cutthroat Creek known to support salmonids is approximately 600-m and only extends to the fourth fairway on SGCC. Areas above the fourth fairway may become available under increased water conditions but were observed to dry and become isolated during low summer flows.

### **Further Study and Analysis**

The initial hydrological analysis of the Musqueam Creek watershed resulted in a number of possibilities for improving creek stream flow. Through this analysis we discovered that the flow of the original Cutthroat Creek channel and its small tributaries, upon entering the “Triangle” lands above SGCC and below SW Marine Drive, pools into what was once Cutthroat Creek channel, forming a wetland, and does not emerge into the drainage channel along the top of the golf course. These observations suggest that there may be an opportunity to...

- ④ Direct some of the flow from a western unnamed creek towards the old Cutthroat Creek tributaries in order to augment stream flow through the wetland and into the current Cutthroat Creek channel.
- ④ Reconstruct the old Cutthroat Creek channel through the wetland in order to lessen the residence time of the water flowing through the wetland on its way to Cutthroat Creek, thus lessening the amount of evapotranspiration and infiltration.
- ④ Stop subsurface flow from the wetland to the old stream channel by improving the channel through the wetland.
- ④ Stop seepage from the drainage ditch at the intersection of the old creek channel.
- ④ Construct storage in the wetland to be released into Cutthroat Creek to augment the flows in the late summer.
- ④ Construct pools within Cutthroat Creek to provide fish habitat during low summer flows.

## **Conclusions/ Recommendations**

Although there exists an wide and varied archive of prior studies on this system there is little coherence between these studies making it difficult to measure the “State of the Watershed’ until further stream gauge and biological data is collected and analysed. To enable further analysis it is suggested that...

- A gauging stations be installed on the unnamed creek, west of the Cutthroat Creek tributaries, to investigate its seasonal flows.
- The wetland be further investigated and assessed for the possibility of water storage through the creation of an enlarged wetland and stream channel that has better connection to Cutthroat Creek.
- Future studies implement a unified stream assessment procedure in order to investigate the entire stream corridor for major impairments and scout potential locations for storm water retrofit, stream repair, riparian management and discharge prevention practices.
- An analysis of suitable parr rearing habitat, predominately complex pool habitats accessible during the summer months, be conducted through detailed summer sampling in both streams.
- An identification of areas with complex pool habitats should be created. Excavating deeper pools may be an option for rehabilitation and increased survival over critical low flow periods. These should be explored throughout Cutthroat Creek where salmonids currently access this habitat.
- A detailed juvenile rearing population and habitat assessment on both creeks be conducted to provide a better idea of current creek capacity and capability. This assessment should be specific and detailed enough to provide population level details an include age class structure, standing stock estimates and habitat versus density comparisons. A detailed smolt monitoring program should be implemented in 2009 starting in early April and extending through early June.
- A water quality monitoring program be implemented that targets specific water level events such as base-flow and small, medium and high discharge periods.

## **Comment**

The review was compiled in a relatively short period of time. Some existing biological and chemical information has not yet been presented. This data collected by non--profit groups, students, community members and UBC included excellent records of stream flow, water quality and invertebrate populations within the Musqueam Creek watershed. These groups/ individuals and their data will be cited and credited in phase two of this report.