

## **Grilse Creek Restoration Project**

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### **Objectives**

The restoration objectives were:

- to increase summer rearing and overwintering refuge for coho, rainbow trout (steelhead), cutthroat trout and Dolly Varden char, and
- to increase pool frequency and habitat complexity.

### **FRBC Region / MELP Region**

Pacific / Vancouver Island

### **Author**

Marc Gaboury

### **Proponent**

Weyerhaeuser and Renewal Investment Corporation

### **Watershed / Stream**

Salmon River Watershed / Grilse Creek, Tributary G02, Tributary G03

### **Location**

The Grilse Creek watershed is about 40 km northwest of Campbell River on the east side of Vancouver Island. The project area can be accessed via branch roads off Menzies Bay and Salmon River Mains.

### **Introduction**

Tributaries G02 and G03 are small S3 streams with drainage areas of 4.7 and 4.6 km<sup>2</sup> and estimated 50 yr floods of 2.8 m<sup>3</sup>/s/km<sup>2</sup>. Grilse Creek has a drainage area of 79 km<sup>2</sup> and the mainstem is classified S1. Coho, rainbow trout (steelhead), cutthroat trout and Dolly Varden char are common in these streams.

The channels in the project area can be characterized as: riffle-pool with gradients generally in the range of 1% to 2%, moderately aggraded and over-widened in sections.

Virtually 100% of the restoration reaches had been logged to the banks in the past 30 years. The extensive loss of large conifers within the riparian areas had eliminated the recruitment of high quality LWD to the streams.

### **Assessments and Prescriptions**

Level 1 Fish Habitat Assessments (FHAP) of Tributaries G02 and G03 within the Grilse Creek watershed were conducted by Wong and Komori (1999), and Level 2 Restoration prescriptions were prepared by Wong et al. (2000) and Gaboury (2001a). From the assessment, restoration work in the project areas was considered to have a high priority and high probability of success, with a low to moderate risk of being negatively impacted from potential hillslope and channel instability, excessive sediment loads, or channel avulsions.

Activities prescribed for the project area included: excavating coarse sediments from pools prior to installing LWD structures, using LWD structures to promote pool scour and provide cover, excavating and complexing a backwater alcove, constructing riffle structures to backwater pools and increase hydraulic diversity.

### **Rehabilitation Work**

Instream restoration and excavation of the backwater alcoves were completed between August 2 and 11, 2001.

The majority of the restoration work involved LWD complexing of existing pool sites. A total of 22 LWD complexing sites were constructed, with 14 sites in Tributary G02, six in Tributary G03, and two in the Grilse Creek mainstem (Gaboury 2001b). All LWD were anchored using boulder ballast, and designed with safety factors for buoyancy and sliding of >1.5.

An old borrow pit adjacent to Grilse Creek was converted to a backwater alcove by excavating it about 2.7 m deeper and connecting the alcove to

the mainstem. The alcove was constructed with a width of between 14 and 18 m, and a length of 75 m. A residual water depth of 1 m in the alcove will be maintained by a natural riffle in the mainstem. Most of the excavated material was loaded on a truck and dumped along the deactivated spur road on the South side of the alcove. Also, some spoil was placed around the perimeter of the alcove to provide flood protection. Maximum height of the spoil averaged 1.5 m above the existing ground surface. The alcove pool was then complexed with about 56 pieces of large and small woody debris. At the completion of the alcove construction project, the spoil area was seeded to grass.

#### **Cost Summary**

Labour	\$27,928
Machinery and materials	\$45,622
Total	\$73,550

#### **Production Estimates**

We estimate that the backwater alcove should have the capacity to support approximately 1200 juvenile coho and trout, assuming 1 fish per m<sup>2</sup>. The expected fish densities for LWD complexed pool sites are 0.9 coho fry/m<sup>2</sup> and 0.3 trout fry/m<sup>2</sup>. Recent (November 2001) monitoring has found coho densities of 0.8, 0.9 and 0.3 coho fry/m<sup>2</sup>, and 0.13, 0.09 and 0.1 trout fry/m<sup>2</sup> in G02, G03 and the mainstem, respectively (Chapman et al. 2001).

#### **Proposed Work**

More restoration work is planned on the Grilse Creek mainstem in 2002.

#### **For Further Information, Contact:**

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**Figure 1. Constructed LWD cover structure in Tributary G02.**



**Figure 2. Looking downstream at completed backwater alcove adjacent to Grilse Creek.**

#### **References**

- Chapman, A., B. Bodnar, B. Smith, and L. Stewardson. 2001. An Evaluation of Fish Habitat Restoration Projects in the Salmon River Watershed. Paper presented at the Coastal Forest Site Rehabilitation Workshop, 2001, Nanaimo, BC.
- Gaboury, M. 2001a. Fish Habitat Restoration Designs for Grilse Creek Watershed. Prepared by LGL Limited for Renewal Investment Corporation, Campbell River, BC.
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Wong, R. and V. Komori. 1999. Level I Fish Habitat Assessment and Restoration Opportunities for Grilse Creek and Upper Salmon River. Prepared for Renewal Investment Corp., Campbell River, BC.

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Watershed Code  
920-725300-73100 – Grilse Creek