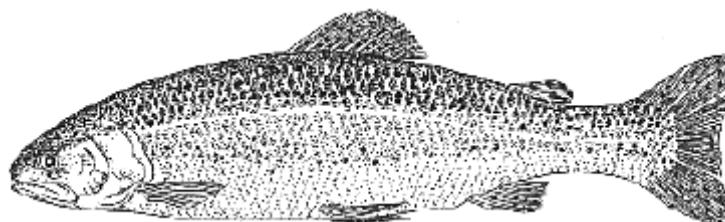


**LAKE CREEK FISHERIES  
INVESTIGATIONS, 2004**



*Prepared for:*

Energy Northwest

*Prepared by:*

EES Consulting

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## **LAKE CREEK FISHERIES INVESTIGATIONS, 2004**

### ***SECTION 1: INTRODUCTION***

As part of the relicensing of the Packwood Lake Hydroelectric Project (FERC No. 2244), Energy Northwest is conducting an Instream Flow Study on Lake Creek using the USFWS Instream Flow Incremental Methodology. Energy Northwest began fisheries investigations to determine species composition, distribution and relative abundance in Lake Creek during 2004. In response to study requests by the natural resource agencies and tribes under the Integrated Licensing Process (ILP), continuing, more detailed investigations will be conducted in Lake Creek, Packwood Lake and its tributaries, the tailrace slough and Hall and Snyder creeks.

Efforts in 2004 focused on the anadromous salmonid reach of lower Lake Creek (the site of a permanent anadromous barrier has not yet been determined and agreed upon) and the resident salmonids reach above the barriers and below and in the vicinity of the drop structure at the outlet of Packwood Lake.

### ***SECTION 2: METHODS***

EES Consulting requested and was awarded a Scientific Collectors Permit (SCP) for the Project in October 2004. Energy Northwest was permitted to electrofish upstream of the anadromous salmonid reach and use an experimental, variable-mesh gillnet to capture fish just upstream of the Project intake (see Photo 1). EES Consulting used a Smith-Root LR 24 Backpack Electrofisher. The net was 150 ft (45.7 m) long and 8 ft (2.4 m) deep with various sized meshes ranging from ¼ in (6.4 mm) to 3 in (76.2 mm) stretched mesh.



Photo 1. Location of experimental gillnet, Packwood Lake intake structure.

EES Consulting also snorkeled in the anadromous zone to begin collecting baseline information and to initiate development of site-specific Habitat Suitability Index (HSI), or preference curves for Lake Creek. When snorkeling, two biologists snorkeled in an upstream direction, side-by-side, and observed fish in an undisturbed state; a marker was then put at the location of the fish observation, and depth (ft), mean column velocity (ft/s) and substrate were noted. If the fish were disturbed by the diver, its presence was recorded but in situ measurements of depth, velocity and substrate were not recorded.

### **SECTION 3: RESULTS**

#### **3.1 Gillnet at the Project Intake**

A total of 9 rainbow trout were observed in the gillnet that was set around the Project intake upstream of the drop structure. All of these fish were captured during the October 13 – 16 sampling trip (Table 3-1). Rainbow trout ranged in size from 8 in (203 mm) to 12 in (254 mm). No fish were captured or observed during the October 27<sup>th</sup> sampling. This may have been due to the change in water temperatures. The water temperature on October 13 was 13.3°C (56°F) while it decreased to 6.7°C (44°F) on October 27. Generally, a decrease in temperature below the 7°C – 8°C threshold results in change in behavior from vigorous diurnal foraging to less vigorous nocturnal foraging (H. Beecher, WDFW, pers. comm. January 6, 2005).

<b>DATE</b>	<b>Species</b>	<b>Length (mm)</b>	<b>Water temp (°C)</b>
Oct. 13	Rainbow trout	203	13.3
	Rainbow trout	203	13.3
Oct. 14	Rainbow trout	229	13.3
Oct. 15	Rainbow trout	254	13.3
	Rainbow trout	229	13.3
Oct. 16	Rainbow trout	254	13.3
	Rainbow trout	279	13.3
	Rainbow trout	305	13.3
	Rainbow trout	305	13.3
Oct. 27	None	-	3.7

#### **3.2 Electrofishing Surveys**

Because the collection permit was not secured until October, only one electrofishing survey was performed in the fall of 2004. As a result, the findings are extremely limited. A total of 8 rainbow trout, ranging from 25 mm – 152 mm, were captured in Study Site 4, immediately downstream of the Project drop structure (see Table 3-2 and Photo 2).

Date	Reach	Species	Length (mm)
18-Nov-04	SS4	Rainbow	25
18-Nov-04	SS4	Rainbow	76
18-Nov-04	SS4	Rainbow	76
18-Nov-04	SS4	Rainbow	152
18-Nov-04	SS4	Rainbow	152
18-Nov-04	SS4	Rainbow	127
18-Nov-04	SS4	Rainbow	102
18-Nov-04	SS4	Rainbow	102



Photo 2. Location of Electrofishing surveys, Lake Creek Study Site 4 [Note: survey was not conducted at this calibration flow for the instream flow study, but rather the current instream flow of 3 cfs from the drop structure].

### 3.3 Snorkeling surveys

EES Consulting conducted snorkeling surveys in the anadromous reach of Lake Creek from its confluence with the upper Cowlitz River to above the second bridge, and at Study Site 4 immediately below the drop structure. Much of this data was collected for development of rainbow trout and coho salmon HSI curve development.

Table 3-3 summarizes the results of these surveys. A total of 130 coho salmon juveniles, 4 rainbow trout adults and 38 juvenile rainbow were observed in Lake Creek. Those rainbow trout observed in Study Site 1, below the anadromous barriers, could be either resident or anadromous forms of *O. mykiss*.

Date	Reach	Species	Life Stage	Total	Comments
7/10/2004	SS1	Coho	Juv	14	Preference curve development
		Unid	Fry	9	
		Unid	Juv	2	
		Total		25	
8/11/2004	SS4	Rainbow	Juv	9	Preference curve development
			Adult	4	
			Total	13	
10/16/2004	SS1	Coho	Juv	56	
		Rainbow <sup>1/</sup>	Juv	14	
		Total		70	
10/25/2004	SS1	Coho	Juv	60	Preference curve development
		Rainbow <sup>1/</sup>	Juv	15	
		Total		75	
Total	All	Coho	Juv	130	
		Rainbow <sup>1/</sup>	Juv	38	
		Rainbow	Adult	4	
		Unid	Fry	9	
		Unid	Juv	2	
		Total		183	

<sup>1/</sup>Note: Rainbow trout (*Oncorhynchus mykiss*) in Study Site 1 not distinguishable between anadromous and resident form in this area.

#### **SECTION 4: ONGOING STUDIES**

Studies to determine species composition, distribution and relative abundance were initiated in 2004 and are very preliminary. The Scientific Collectors Permit was secured late in the sampling season, and only those areas above the confirmed anadromous barrier (RM 1.95) could be sampled with methods other than snorkeling.

As part of the re-licensing process for the Packwood Lake Hydroelectric Project, Energy Northwest is currently negotiating the scope of several studies to more fully describe the aquatic resources in Lake, Hall, and Snyder creeks and Packwood Lake with its associated tributaries. These include the following study plans, which were submitted to the Federal Energy Regulatory Commission on April 26, 2005 and will be revised and resubmitted in August 2005:

- Anadromous Salmonid Spawning Surveys Study Plan
- Entrainment Study Plan
- Fish Distribution and Species Composition Study Plan
- Fish Population Characterization Below the Drop Structure Study Plan
- Lake Creek Instream Flow Study Plan

- Tailrace Use by Anadromous Salmonid Study Plan.

Studies will be conducted in accordance with methods and schedules contained in the approved study plans. Reports will be generated as described in these plans.