Lake Creek Instream Flow Study
Status Update
Fish/Aquatics Meeting
August 14, 2007
Study Requested by:

- Washington Department of Ecology
- US Forest Service
- US Fish and Wildlife Service
Purpose of Study

• Assess the relationship between flow and aquatic habitat in Lower Lake Creek
Status of Investigation

• EN conducted physical habitat surveys of Lake Creek in 2004
• 3 calibration flow measurements taken during summer 2004 (3 – 34 cfs)
• Spill event for higher flows in 2005 to extend model range
Lake Creek Study Sites and Reaches
and Fish Distribution

RM
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5

Elevation (ft)
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5

Rainbow
Steelhead
Chinook
Coho
Cutthroat

Reach 1
Reach 2
Reach 3
Reach 4
Reach 5
SS1
SS2
SS3
SS4
Barrier
Drop Structure
Amphibians

• Species and Life Stages Modeled
  – Giant Salamander (*Dicamptodon spp.*)
    • Eggs
    • Larvae
  – Coastal Tailed Frogs (*Ascaphus truei*)
    • Eggs
    • Larvae
  – Cascade Torrent Salamander (*Rhyacotrin cascadae*)
    • Eggs
    • Larvae
Status of Investigation, cont’d

• Data reduction and model calibration occurred in Winter 2006 and Spring 2007.
  – Model calibration
  – Transect and study site weighting
  – HSI curves
  – Monthly inflow estimates between sites

• WUA produced for target species and life stages
Weighted Usable Area

• Index of Habitat Quantity
  – Square feet/ 1000 linear feet of stream

• Does not Indicate the Quality of the Habitat
  – Small amount of very good habitat
  -or-
  – Large amount of marginal habitat

• It doesn’t indicate where on the transect the habitat is located
Figure 3.3-1 Lake Creek Study Site 1 (T1-4) Fish Rearing Habitat (WUA) vs. Flow

Streamflow in Cubic Feet Per Second

WUA (Sq. Ft. of Habitat Per 1000 Ft. of Stream)

- Chinook Rearing
- Coho Rearing
- Steelhead Rearing
- Cutthroat Rearing
- Rainbow Rearing
- Winter Rearing
Figure 3.3-2 Lake Creek Study Site 1 (T1-4) Fish Spawning Habitat (WUA) vs. Flow

Streamflow in Cubic Feet Per Second (cfs)

WUA (Sq. Ft. of Habitat per 1000 Ft. of Stream)

- Chinook Spawning
- Coho Spawning
- Steelhead Spawning
- Cutthroat Spawning
- Rainbow Spawning
Figure 3.4-4 Lake Creek IFIM SS4 Amphibian Habitat (WUA) vs. Flow

Streamflow in Cubic Feet Per Second (cfs)

WUA (Sq. Ft. of Habitat per 1000 Ft. of stream)

- Yellow line: Larvae
- Light blue line: Eggs
- Purple line: Eggs and Larvae
Input Hydrology

• Inflow exists in Lake Creek from the Drop Structure downstream to confluence with the Cowlitz River

• Each study site or group of transects will receive differing amounts of inflow

• Inflow varies
  – Site to site
  – Month to month
Figure 5.2-1 Lake Creek IFIM January: Fish Rearing Habitat (WUA) vs. Flow

Streamflow in Cubic Feet Per Second (cfs)

WUA (Sq. Ft. of Habitat per 1000 Ft. of Stream)

Chinook Rearing
Coho Rearing
Steelhead Rearing
Cutthroat Rearing
Rainbow Rearing
Winter Rearing
Figure 5.2-2 Lake Creek IFIM January: Fish Spawning Habitat (WUA) vs. Flow

- **Streamflow in Cubic Feet Per Second (cfs):** 0 to 250
- **WUA (Sq. Ft. of Habitat per 1000 Ft. of Stream):** 0 to 80

**Legend:**
- **Coho Spawning**
- **Cutthroat Spawning**
Figure 5.3-1 Lake Creek IFIM January Amphibian Habitat (WUA) vs. Flow

- Giant Salamander Larvae
- Tailed Frog Larvae
- Torrent Salamander Larvae
Anticipated Completion of Field Study

- Field work has been completed for this study.
Anticipated Draft Study Report Due Date:

- Habitat Assessment report finalized in 2005
- The draft report with modeling results was distributed in June 2007
Modifications to Ongoing Studies or New Studies Proposed by Applicant

- No modifications to ongoing studies or new studies are being proposed.
- Energy Northwest is currently running various scenarios that examine historic flow conditions in Lake Creek.
- Energy Northwest is also modeling the effects of habitat enhancement on the anadromous reaches of Lake Creek.