

Packwood Lake Hydroelectric Project  
Study Reports  
August 14, 2007  
Meeting Summary<sup>1</sup>

Presentations

The following presentations were made during the meeting, and have been posted to the Energy Northwest website at: <http://www.energy-northwest.com/generation/packwood/relicensing/aquaticmeetingminutes.php>

Recreation Resources Needs Analysis  
Gravel Transport  
Large Wood  
Fish Passage Barriers  
Fish Distribution and Species Composition  
Fish Population Characterization Near the Drop Structure  
Lake Creek Instream Flow and Habitat Assessment  
Tailrace Slough Instream Flow  
Tailrace Slough use by Anadromous Salmonids  
Water Quality Modeling  
Packwood Lake Entrainment

In addition to the above presentations Dan Ross provided a status on the barrier replacement in the project tailrace.

Attendees

Charlene Andrade, WDFW  
Brock Applegate, WDFW  
Ruth Tracy, US Forest Service  
Brian Peck, US Fish and Wildlife Service  
Ken Wieman, US Forest Service  
Cory Warnock, EES Consulting  
John Blum, EES Consulting  
Debby Howe, EES Consulting  
Kent Doughty, EES Consulting  
Kathy Dube, Watershed Geodynamics  
Dan Ross, Energy Northwest  
Bill Kiel, Energy Northwest  
Bernice Kasko, Energy Northwest  
Ken Hogan, FERC (by phone)  
Shana Murray, FERC (by phone)  
Diane Bedell, US Forest Service (by phone)

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<sup>1</sup> These meeting summary notes are not verbatim. They do not reflect formal decisions by Energy Northwest, any agency, tribe, non-governmental organization, or interested stakeholder.

## SUMMARY OF DISCUSSIONS

### Recreation Resources Needs Analysis

Debby Howe provided a presentation of data collected in 2005/2006. Historically, and prior to development of the Packwood Lake Hydroelectric Project, Packwood Lake has been a popular recreation destination. The greatest visitor use occurred from 1921 to 1991, when the Forest Service oversaw a permitted resort at Packwood Lake. Although visitor use at Packwood Lake significantly decreased since the resort's removal by the Forest Service in 1992, Packwood Lake is still a popular destination for day use and camping, especially during peak-season weekends.

Over the years, numerous dispersed sites have been created along the Packwood Lake non-Wilderness and Wilderness shorelines because of visitors' desires to recreate near the Lake and because steep slopes along most of the Packwood Lake shoreline limit placement of sites elsewhere.

Remains of the old resort, including two pit toilets within the non-Wilderness area along Packwood Lake continue to be used, although they are not maintained and are out of compliance with Forest Service standards. Another portable toilet installed more recently by the Forest Service near the old historic ranger station is situated in a swampy area and has not been serviced in the last couple of years.

Management decisions by the Forest Service to address ecological concerns and associated managerial standards may change the visitor experience and/or significantly reduce the ability to recreate at Packwood Lake. The Forest Service will need to allow exceptions to its management standards for the Packwood Lake area or visitor use will need to be limited, and limits enforced, to prevent further visitor created dispersed camp sites. Compliance with existing management standards will result in few camp sites near Packwood Lake which will reduce recreation opportunities and use in the area. Consequently, significant reductions in recreation use at Packwood Lake may help alleviate the current sanitation concerns at Packwood Lake. Since the Forest Service mandates the type of use on the Pipeline Road/Trail #74, the Forest Service will also need to decide whether to continue to allow or disallow motorized use of this route. These management decisions will need to be made by the Forest Service to balance the level of impacts to the environment as well as to recreation visitors.

A Barrier Free Analysis was also conducted as a part of this study. Due to the dispersed nature of the Packwood Lake area and ecological concerns, barrier free access to this area is not likely a feasible or practical option. The final Recreation Needs Analysis Report has been distributed to stakeholders for comment and is scheduled to be issued in September, 2007.

### Gravel Transport

Kathy Dubé provided an update on the 2007 field results. A repeat of the painted rock study at 5 transects was conducted in Reaches 1-2 at flows of approximately 16, 35, and 284 cfs. Lake Creek is dominantly a boulder-cobble stream with little gravel. The majority of gravel is located in Reaches 2-4 and is associated with large woody debris or large boulders. During November 2006, a large natural peak flow event occurred. To take advantage of this event, the gravel was re-inventoried between RM 0 and RM 2.05 in 2007. The total gravel in the wetted channel was slightly higher than in the 2005 inventory and there was over twice the amount of gravel in the bankfull channel. The large increase in gravel in the bankfull channel was likely due in some part to removal of

vegetation that had been obscuring gravel on the stream banks as well as deposition of new gravel on the banks. The final gravel report has been distributed to stakeholders for comment and is scheduled to be issued in September 2007.

### Large Wood

Kathy Dubé provided an update on the 2007 field results. The large wood inventory was repeated between the mouth of Lake Creek and the falls near River Mile (RM) 2. The re-inventory took place in April 2007 and included counts of wood in the wetted and bankfull channel, including size class, source, and decay class.

Pieces of floating wood that reached the log boom in Packwood Lake were measured and tagged starting on September 8, 2005. During 2005 and 2006, wood was checked during visits to the intake structure, usually weekly or bi-weekly between late Spring and Fall and less often during the winter when access is more restricted. Wood was only checked twice between late November 2006 and July 2007. A total of 18 pieces of wood were tagged at the log boom over the two year study period. One piece of wood was tagged in September 2005, two pieces in early February 2006, eight pieces in late May 2006, two pieces in May 2007 and five pieces in July 2007. A final report will be issued in August 2007.

There was some additional discussion on Energy Northwest's proposal to provide habitat enhancement in the lower portion of Lake Creek and the size of wood needed to provide gravel recruitment. Energy Northwest has committed to consult with the stakeholders and a consultant experienced in stream restoration to develop an enhancement plan for lower Lake Creek.

### Fish Passage Barrier

John Blum provided a presentation on the results of the analysis of the Snyder Creek culvert. A level B analysis was performed for the Snyder Creek crossing at the tailrace. The culvert was found to be partially passable to adult salmonids. Coho salmon fry, as well as juvenile cutthroat trout, were found in the reach above the culvert. The culvert is in need of annual inspection and maintenance and is scheduled for cleanout on August 22, 2007. EES Consulting received input from WDFW Engineering and the report will be modified accordingly. If existing culvert poses passage issues, Energy Northwest will consider alternatives, including replacing crossing or rerouting Snyder Creek. The final Fish Passage Barrier report will be issued in September 2007.

### Fish Distribution and Species Composition

Cory Warnock provided a presentation on the results of the study. Snorkeling and electrofishing surveys were completed on Lake Creek, Hall and Snyder creeks and all tributaries to Packwood Lake including Beaver Bill Creek, a tributary to Upper Lake Creek. Coho juveniles, westslope cutthroat and sculpin were observed in Snyder Creek. Rainbow trout, westslope cutthroat trout and sculpin were observed in Hall Creek and rainbow trout were the only species observed in the tributaries to Packwood Lake. In lower Lake Creek, Coho juveniles, rainbow trout and sculpin were observed below RM 1.03, rainbow trout and sculpin were observed between RM 1.03 and 1.95 and rainbow trout were the only species observed above RM 1.95. Energy Northwest performed supplemental hydroacoustic analysis of Packwood Lake to enumerate the population of rainbow trout in the lake and distinguish the size classes present. Preliminary data suggests that the population of rainbow trout is approximately 21,000. Another survey will be conducted in early August after all spawning rainbow have

returned to the lake. The draft Fish Distribution and Species Composition report was issued to stakeholders in August 2007 for comment.

#### Fish Population and Characterization Near the Drop Structure

Cory Warnock provided a presentation on the results of the study. A barrier to fish migration, an 11.80 ft waterfall, was identified approximately 1464 feet below the drop structure. The falls exceeds the leaping capabilities of rainbow trout and other resident species potentially present in Lake Creek. The entire 1464 ft reach was surveyed for species information on October 17th and 18, 2006 and again on May 30, 2007.

Rainbow trout were the only species observed in the reach immediately below the drop structure. Spawning habitat is lacking in the reach and likely a primary reason for the small population. An age analysis was conducted on fish captured below and above the drop structure. All of the fish captured during electroshocking efforts below the drop structure were either 1 or 2 year old fish. Fish captured immediately above the drop structure during entrainment work were primarily 3 and 4 year old fish. In March 2007 43 rainbow trout were captured, the size and age of the rainbow trout captured were much larger than the fish observed during shocking efforts in the rest of the isolated reach and consistent with the age and size of fish captured above the drop structure. The discrepancy in size and age are likely a result of fish carried over from Packwood Lake during overtopping events. The larger fish were all observed orienting themselves into the fish flow immediately below the drop structure. No observations were made of any injuries to rainbow related to overtopping the drop structure. There is no evidence from netting and spawning data to indicate that any timed upstream migration of resident rainbow trout occurs in the section of lower Lake Creek below the drop structure. Upon completion of rearing, fish likely migrate downstream over the barrier (1464 ft), to find more suitable feeding and spawning habitat. The Fish Distribution and Species Composition Report further documents rainbow trout populations further down lower Lake Creek. The draft Fish Population Characterization near the Drop Structure report was issued to stakeholders in August for comment.

#### Lake Creek Instream Flow

John Blum provided a presentation on the results of the hydraulic modeling that was completed for Lake Creek. In May 2006 a planned spill event was conducted in order to collect water surface elevation data at each of the transects. The hydraulic modeling was completed in the spring of 2007 and was used to generate Weighted Usable Area for the target species and life stages. Energy Northwest is currently running various scenarios that examine historic flow conditions in Lake Creek and is also modeling the effects of habitat enhancement on the anadromous reaches of Lake Creek. The draft report was issued in June 2007 to stakeholders for comment, and a meeting was held at that time to discuss the results of the modeling. The final report is scheduled to be issued in September 2007.

#### Tailrace Slough Instream Flow

John Blum provided a presentation on the tailrace instream flow study. The results of the tailrace spawning surveys, habitat use and presence surveys and the Tailrace Slough Instream Flow study were examined. Records of Project operations and its effects on salmonid habitat within the tailrace were also reviewed and analyzed to determine potential impacts on spawning salmonids in this area. The tailrace slough is a complex, dynamic environment that may remain stable or change many times during the course of a year. The analysis presented in this report represents a type of analysis that could be performed to analyze the effects of the Project, and reflects conditions as present during the summer 2006. Since then, the tailrace slough channel has changed

twice and it is certain that it will change many more times in the future. As a result, the numerical values cited in this report are no longer valid for the tailrace slough. In some years, the Cowlitz River does not provide much or any water to the tailrace slough during spawning periods, especially in late August – October for Spring Chinook salmon. Project flows typically mirror conditions in the upper Cowlitz River; in these instances, unless the Project flows are sufficient to provide an attractant flow, Project operations will not likely attract fish for spawning. It is important to acknowledge that the Project tailrace discharge is ordinarily a very small percentage of the overall Cowlitz River flows. Accordingly, the Cowlitz River exerts a much greater influence on the entire area's available spawning habitat than Project tailrace outflows.

Energy Northwest is proposing to change the annual maintenance outage from October to August and to modify the summer lake levels. Benefits include: 1) not attracting fish into the tailrace slough to spawn unless there is adequate water provided from the Cowlitz River, 2) uninterrupted water flow will be provided to the tailrace slough after the project resumes operation during the late August -October period, and 3) Lake level flexibility and the proposed fish flow release provide additional water to Lake Creek during Spring Chinook spawning in August and September.

A draft report was issued for comment in June 2007. A final report will be issued in September 2007.

#### Tailrace Slough Use by Anadromous Salmonids

Cory Warnock provided a presentation on the results of the study. Spawning surveys were conducted twice monthly from July 26, 2004 to July 26, 2007. Five reaches were snorkeled in July 2006 and then again in January, April and June 2007 as part of the seasonal anadromous salmonid analysis. Juvenile coho were observed during the July 2006, April 2007 and June 2007 surveys. Four Chinook juveniles were observed in July 2006 and one in April 2007. The tailrace slough is a dynamic complex that can go through multiple hydrologic and habitat alterations as a result of high flows in the Cowlitz River. Through all the Cowlitz River alterations, the left side channel maintained a high level of spawning and rearing habitat. A majority of coho juveniles and all coho spawners were observed in the left side channel. The lack of steelhead and Chinook adults is likely the result of: 1) lower numbers of adult Chinook and steelhead spawners released above the dams 2) fewer fish associated with an abundance of suitable spawning and rearing habitat in the upper Cowlitz River lowers the likelihood of observations in the tailrace slough and 3) Chinook spawn timing (mid-August – September) occurs during periods of low flow in the tailrace slough, likely precluding spawners from utilizing the majority of the available habitat. The draft report was issued in August 2007 to stakeholders for comment, and a final report will be issued in September 2007.

#### Water Quality Modeling

Kent Doughty provided a presentation of the results of water temperature modeling for Lake Creek and the tailrace. The presentation provided a summary of Lake Creek summer water temperature downstream of Packwood Lake, a comparison of pre-project temperatures to current temperatures, an evaluation of Project temperature loading to the Cowlitz River, and an evaluation relative to water quality standards for temperature. Modeling results indicate that temperature in Lake Creek just downstream of Packwood Lake is a function of warm lake surface outflow temperatures where temperature near the mouth of Lake Creek is a function of cool groundwater inflow. The effect of the Project is cooler summer temperatures in Lake Creek. The flow weighted average 7-

DADMax (Lake Creek+ tailrace) is slightly warmer than 7-DADMax for natural conditions in Lake Creek. Combined temperatures for Lake Creek and the tailrace result in no downstream temperature effect for the Cowlitz River. Water quality modeling for Packwood Lake is in progress. A draft Lake Creek temperature report was issued to stakeholders in August 2007. A final report will be issued in September 2007. A draft Packwood Lake temperature report will be issued to stakeholders in September 2007.

#### Packwood Lake Entrainment

John Blum provided a presentation on the results of the 2007 field work. Measurements of screen velocity, lake levels, and monitoring of the screens will continue through August 2007. Plant operators have been checking the traveling screens weekly and the debris screens monthly and will complete the monitoring in August 2007. Debris screen cleaning resulted in the misalignment of screens between January 23 – April 5. Fish were entrained within the intake behind the trash rack and in front of traveling screens. Fish entrainment from June – August closely mirrored spawning timing in upper tributaries.

Energy Northwest is investigating the need to replace existing debris screens with better fitting screens or install additional trash screens that are suspended from the floating booms nearest the intake building.

A draft report for the 2006 field season was completed in November 2006. An additional draft report with results of the 2007 field season will be issued in September 2007.

#### Engineering Studies Related to Barrier Replacement

Energy Northwest filed a request with FERC in April 2007 to amend the existing license to construct a permanent barrier to fish passage in the tailrace. The draft biological assessment included a monitoring plan to ensure the effectiveness of the barrier. NMFS will be issuing a biological opinion and providing all other required approvals are obtained, Energy Northwest expects to construct the permanent barrier in October 2007.

#### General

WDFW asked FERC if the agencies don't comment on the studies how does that affect comments on the PLP. FERC expects comments on the studies and their adequacy.