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Subject: **PACKWOOD LAKE HYDROELECTRIC PROJECT  
FERC DOCKET NO. P-2244-037  
FISH SALVAGE REPORT 2019**

References: 1) NMFS Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Consultation, issued March 22, 2018  
2) FERC's Order issuing a New License to the Packwood Hydroelectric Project filed October 11, 2018  
3) FERC's Order Amending License to Incorporate Revised Incidental Take Statement filed February 14, 2019

Energy Northwest (EN) and McMillen Jacobs Associates surveyed the Packwood Lake Hydroelectric Project (Project) tailrace, the "tailrace slough" downstream of the fish barrier at the terminus of the Project tailrace, and the stilling basin on August 13, 14, 15 and 16, 2019. Per the revised Incidental Take Statement (ITS), multiple salvage efforts and redd surveys occurred in the slough in advance of the Project shutting down.

A similar communication to this report has been submitted to FERC and the requisite agencies for the past several years. Given the modification to the ITS and the fact that this was the first year with the new measures incorporated, this report has been expanded to describe all of those efforts and a section has been added to describe some logistical observations and slight modifications to the methods that may make the process more efficient and effective in subsequent years.

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**Tailrace and Slough**

*Project Tailrace:*

On August 15, 2019, a block net was placed at the downstream end of the stilling basin to isolate fish in the tailrace. EN and McMillen Jacobs staff then walked the Project tailrace using a Smith-Root LR-24 backpack electrofisher and dip nets to capture any fish present. One juvenile Coho Salmon (*Oncorhynchus kisutch*) was captured near a small alcove or inconsistency in the concrete lined structure approximately mid-way down the tailrace (Table 1). Additionally, approximately 15 deceased Coho were observed immediately upstream of the barrier. The fish appeared to have been recently deceased and based on their condition, the mortality appeared to be the result of injuries sustained while coming in contact with the barrier. The block net at the upper end of the tailrace remained in place after the survey to prevent additional downstream movement of fish prior to and during the stilling basin survey, which took place the following day.

*Tailrace Slough:*

Surveying of the tailrace slough occurred on August 13, 14 and 15, 2019. At the time of the surveys, flows in the Cowlitz River, as measured at the USGS Gage at Packwood (14226500) ranged from 594 cfs to 449 cfs (Figure 1; USGS provisional data).

Given the modified methodology in the ITS, the Project was still operating during the tailrace slough fish rescue effort. A range of 1-2 MW of power (10-18 cfs) was being generated. This resulted in higher water conditions and stronger flows than are typically seen during tailrace slough fish rescues. The entire slough, including both channels were connected and actively flowing. Certain isolated sections of the slough upstream of the split and in the south channel were actually too deep to electrofish effectively. Further discussion related to this topic has been added below in the "Potential Modifications" section.

Two days of electrofishing occurred in advance of the Project outage (August 13 and 15) and 3 days of redd surveys took place (August 13, 14 and 15). No redds were documented nor was any spawning activity and/or adult anadromous salmonids observed during any of the surveys. After the initial electrofishing effort on August 13 and per the ITS, block nets were placed at the terminus of both the north and south channel to preclude any further upstream movement of fish back into the tailrace slough. These nets were left in place until after the Project had been shut down and all potential attraction flow had subsided.

Salmonids were captured in all 3 primary zones (upstream of split, north and south channels). The majority of salmonid captures occurred in the south channel and were associated with the deeper pools near marginal root wads and other types of overhead cover. A total of 72 salmonids were relocated (Table 2). Coho Salmon were the most abundant salmonid species in the tailrace slough, constituting 80.5% of the total salmonids captured. Mountain Whitefish

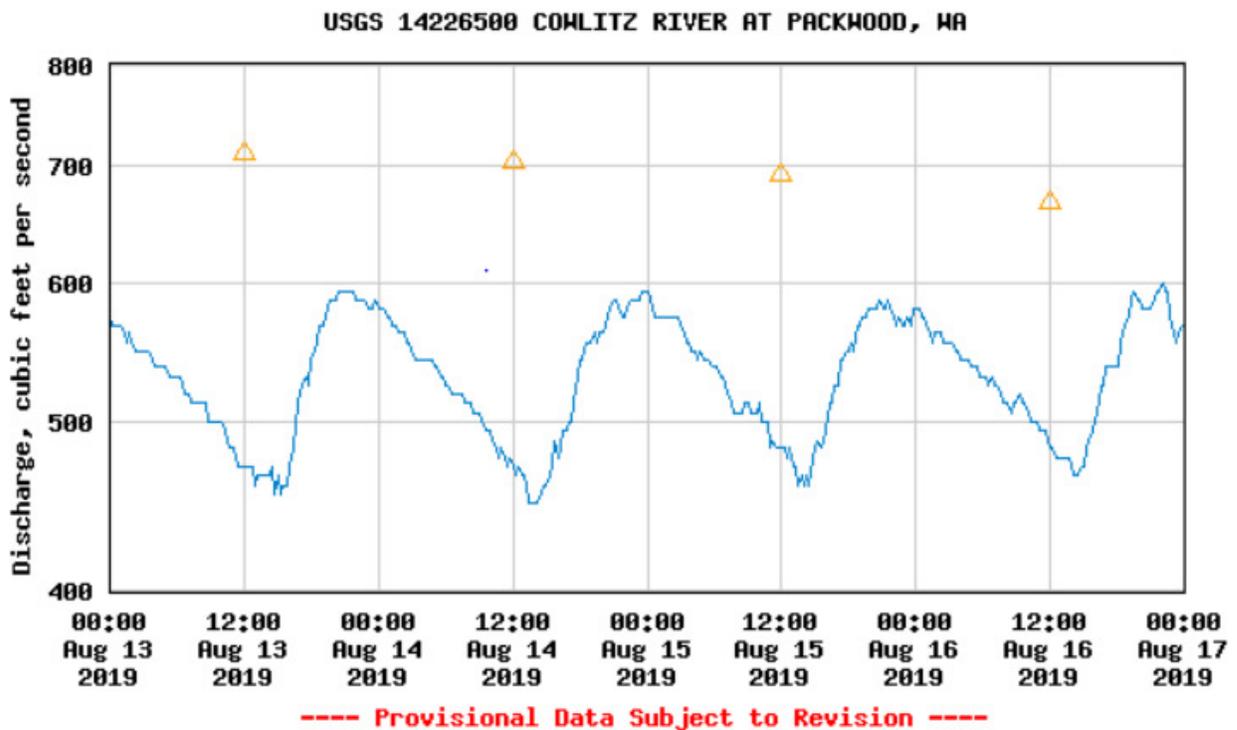
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(*Prosopium williamsoni*) were the next most abundant (11.1%), followed by Rainbow trout/Steelhead (*O. mykiss*) at 6.9% and Chinook Salmon (*Oncorhynchus tshawytscha*) at 1.3% (n=1). Other species captured included dace (>800), sculpin (>80).

All salvaged fish were placed in a pre-fabricated and aerated container and transported and released at the confluence of the tailrace slough with the mainstem Cowlitz River. Attachment A contains the raw data sheets from the salvage effort in the tailrace and tailrace slough.

**Table 1. Summary of fish captured in the Project tailrace – August 15, 2019**

Species	Number	Percent
Coho (juveniles)	1	100%
<b>TOTAL</b>	<b>1</b>	



**Figure 1. USGS gage 14226500 Cowlitz River at Packwood – August 13 - 16, 2019**

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**Table 2. Summary of fish captured in the Project tailrace slough – August 13 and 15, 2019**

<b>Tailrace Slough Day 1 (August 13, 2019)</b>		
<b>Species</b>	<b>Number</b>	<b>Percent</b>
Coho	40	87%
Mountain Whitefish	4	9%
Rainbow Trout/Steelhead	1	2%
Chinook	1	2%
<b>TOTAL</b>	<b>46</b>	
Sculpin <i>spp.</i>	>50	
Dace	>500	
<b>Tailrace Slough Day 2 (August 15, 2019)</b>		
Coho	18	69%
Mountain Whitefish	4	15.5%
Rainbow Trout/Steelhead	4	15.5%
<b>TOTAL</b>	<b>26</b>	
Sculpin <i>spp.</i>	>30	
Dace	>300	
<b>Overall Salmonid Total</b>	<b>72</b>	

**Stilling Basin Seining**

Representatives from EN, Washington Department of Fish and Wildlife (WDFW), and McMillen Jacobs Associates conducted two seining passes in the stilling basin on August 16, 2019 resulting in a total catch of 55 fish. A total of 45 fish were captured during the first pass with 10 coming on the second pass. Given the quality of the passes as displayed via catch regression from Pass 1 to Pass 2, all parties agreed that a third pass was unnecessary and a high percentage of all fish present in the basin had been captured. Of the total catch, 53 were salmonids with Coho making up the highest species percentage at 90.5% followed by Rainbow Trout/Steelhead at 3.8%. Other salmonids captured included Mountain Whitefish (n=2) and Coastal Cutthroat Trout (*Oncorhynchus clarkia clarkia*) (n=1). Non-salmonid captures consisted wholly of sculpin species (n=2). An itemized documentation of species captures (per pass) is displayed in Table 3. The raw data sheet is included as Attachment B. All captured fish from the seining effort were relocated to the mainstem Cowlitz River near its confluence with Skate Creek via a pre-fabricated and aerated container.

More than 50 salmonids were captured and removed from the stilling basin. As a result and per requirement, Energy Northwest will conduct a seining effort in 2020 in the stilling basin during the initial phases of Project shut-down.

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**Table 3. Summary of fish captured in the Project stilling basin - August 16, 2019**

<b>Species</b>	<b>Pass 1</b>	<b>Pass 2</b>	<b>Total</b>
Coho	41	7	48
Rainbow/Steelhead	2	0	2
Coastal Cutthroat	0	1	1
Mountain Whitefish	0	2	2
Sculpin	2	0	2
<b>TOTAL</b>	<b>45</b>	<b>10</b>	<b>55</b>

**Potential Modifications**

As mentioned in the Tailrace Slough section above, the modified ITS that was collaboratively developed between NMFS and EN states that the tailrace slough area will be electrofished and surveyed for spawning activity during the 3 days prior to the Project outage occurring (August 13-15) annually. The intent of this methodology was to ensure that all salmonids that may be present in the tailrace slough have suitable conditions (quality habitat, high dissolved oxygen, consistent food source, etc.) up to the point when they are removed from the area and in advance of the Project shutting down and beginning to minimize those variables.

Upon conducting the first year of rescue efforts under this methodology, EN believes some modifications to the existing rescue regime in subsequent years may result in a more efficient and effective salvage process. Given the amount of residual flow and access to refugia that is present in the two days immediately following Project shutdown, EN would like to discuss the potential of conducting the rescue efforts in the tailrace slough on August 15, 16 and 17 in future years as opposed to August 13, 14 and 15, as currently specified. The limited amount of flow and shallower overall conditions would facilitate a more efficient and effective rescue effort and create more confidence that a majority of the fish present in the tailrace slough are actually being captured and relocated. As has been seen in past years, the three or four days immediately after Project shutdown result in conditions with ample refugia and levels of dissolved oxygen to sustain the health of the fish present in the area. To be clear, this would not be any reduction in overall effort; simply a modification of the dates that the rescue in the tailrace slough would occur.

EN looks forward to discussing this potential modification with NMFS at the annual Resource Coordination meeting. EN recognizes that a formal agreement with the agency must be reached and documented with FERC prior to any changes being implemented.

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If you have any questions or require additional information regarding this matter, please contact me at 509.378.9755 or [kwilliams@energy-northwest.com](mailto:kwilliams@energy-northwest.com).

Respectfully,



Ken Williams  
Supervisor, Hydro & Wind Projects

Attachment: Raw Data Sheets

Distribution (hard copy):

Cowlitz Indian Tribe – Aalvik, Iyall, Reynolds

Yakama Nation – Lally, Meninick, Oliver

FERC-PRO – Douglas Johnson (2)

Distribution (email):

Resource Agencies Committee

Cory Warnock, McMillen Jacobs Associates

Chuck Sauvageau, McMillen Jacobs Associates

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**Attachment A**

**Raw Data Sheets from Fish Salvage Effort in the Project Tailrace and Tailrace Slough**

No. 312

Day 1 Packwood Slough Shocking  
8/13/2019

Upper Reach near Drum Screen

Coho	###	(All in buckets w/ of tailrace but influenced by it)
Coho	##	(12 coho)
Chin	1	(1 Chinook)

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Left Channel

Coho	###	(21 coho)
MWF	11	(2 MWF) Block Net Line 11:37am

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Right Channel

Coho	###	(7) Block net in (4)
MWF	11	(2) 12:37pm
Packow	1	(1)

Alt. on line

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**Attachment A (cont'd)**

**Raw Data Sheets from Fish Salvage Effort in the Project Tailrace and Tailrace Slough**

Day 2 Tailrace Slough Shocking 8/19/2019

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Upper Reach near Drum Screen

1 coho, 4 coho, 3 RBT

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Right Channel

1 coho  
4 MWF

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Left Channel

coho	HT	HT	HT	HT	(12)
RB/SH	1				(1)

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Tailrace (concrete lined)

1 coho

**Attachment B**  
**Raw Data Sheets from Fish Salvage Effort in the Stilling Basin Seining**

