Lewis River Hydroelectric Projects Settlement Agreement
Aquatic Coordination Committee (ACC)
Meeting Agenda

Date & Time: **Thursday, December 14, 2017**
9:00 a.m. – 11:15 a.m.

Place: **Merwin Hydro Control Center**
105 Merwin Village Court
Ariel, WA 98603

Contacts: **Frank Shrier: (503) 320-7423**

Time	Discussion Item
9:00 a.m.	Welcome ➢ Review Agenda and ACC 11/9/17 Meeting Notes ➢ Comment & Accept Agenda and 11/9/17 Meeting Notes
9:10 a.m.	Public Comment Opportunity
9:20 a.m.	2013 Bull Trout Habitat Restoration Project ID Assessment, Q&A
10:00 a.m.	ACC/TCC Structure and Ground Rules; Review and Approve
10:30 a.m.	Study/Work Product Updates o H&S Plan Update o Woodland Release Ponds Construction - Status o Merwin Upstream Passage – Status o Swift Floating Surface Collector – Status o Lewis River In-Lieu Update
11:00 a.m.	➢ Next Meeting's Agenda ➢ Public Comment Opportunity Note: all meeting notes and the meeting schedule can be located at: http://www.pacificorp.com/es/hydro/hl/lr.html#
11:15 a.m.	**Adjourn**

Join by Phone
+1 (503) 813-5252 [Portland, Ore.]
+1 (855) 499-5252 [Toll Free]

Conference ID: 3947894

FINAL Meeting Notes
Lewis River License Implementation
Aquatic Coordination Committee (ACC) Meeting
December 14, 2017
Merwin Hydro Control Center

ACC Participants Present (18)
Kim McCune, PacifiCorp
Chris Karchesky, PacifiCorp
Erik Lesko, PacifiCorp
Frank Shrier, PacifiCorp
Todd Olson, PacifiCorp
Tom Wadsworth, WDFW
Aaron Roberts, WDFW
Peggy Miller, WDFW
Amanda Froberg, Cowlitz PUD
Eli Asher, Cowlitz Indian Tribe
Bryce Michaelis, USDA Forest Service
Ruth Tracy, USDA Forest Service
Michelle Day, NMFS
Steve Manlow, LCFRB
Jim Malinowski, Fish First
Carol Serdar, WDOE
Jim Bryne, Trout Unlimited
Tim Romanski, USFWS (via conference)

Calendar:

January 11, 2018	ACC Meeting	Location: HCC

Assignments from December 14, 2017	**Status**
McCune: Finalize ACC/TCC Ground Rules document, post to Lewis River website and distribute to ACC.	**Complete – 12/15/17**

Assignments from November 9, 2017	**Status**
McCune/Lesko: Schedule a tour of the Woodland Release Ponds for the ACC, when possible.	**Schedule for April or May 2018**

Opening, Review of Agenda and Meeting Notes
Frank Shrier (PacifiCorp) called the meeting to order at 9:05 a.m. and reviewed the agenda. No additional agenda topics were requested.

Shrier also reviewed the November 9, 2017 meeting notes. Jim Malinowski (Fish First) requested the following clarification change on page 9, relating to In Lieu Fund – Status:
Malinowski further stated that Fish First opposes reintroduction into Merwin & Yale. Fish First wants significant funds spent on a basin-wide nutrient enhancement program.

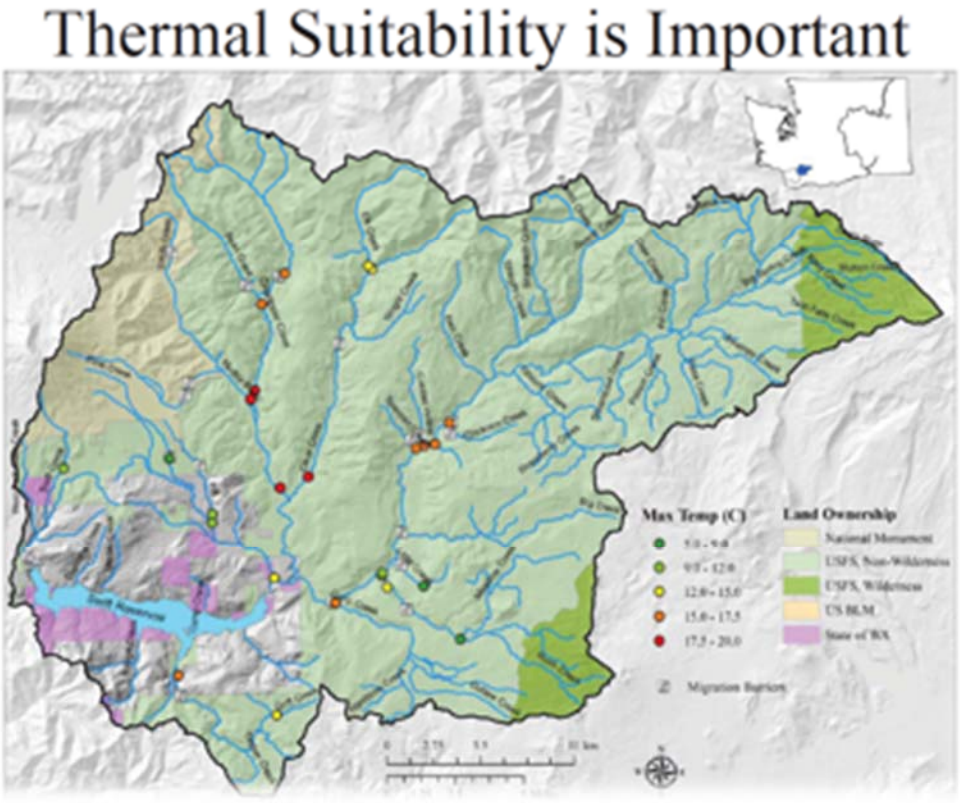
The meeting notes were approved with the above-referenced change at 9:15 a.m.

Public Comment
None

2013 Bull Trout Habitat Restoration Project ID Assessment, Q&A
Jamie Lamperth (WDFW) and Bryce Michaelis (USFS) provided a PowerPoint presentation (see link below) that provided additional project objective detail for ACC review.
http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Hydro/Hydro_Licensing/Lewis_River/li/acc/Bull_Trout_LewisRiver_ACC_Distributed.pdf

The presentation outlined the development of a list of project conceptual scoping designs that could be implemented to increase the quantity and quality of bull trout spawning and rearing habitat. Lamperth discussed approach, streams that should be assessed outside of known spawning tributaries, i.e., habitat accessibility, restoration potential and thermal suitability. Lamperth noted that thermal suitability is extremely important as a habitat variable. Approximately 25 temperature loggers were used to characterize thermal suitability throughout the basin study area.

Red = known spawning areas
Yellow = look at and see what can be done in these areas.



Within this project, certain stream reaches were surveyed for specific environmental parameters. Survey methods included two (2) aquatic resource experts collecting data and quantifying habitat; current instream habitat and areas that can be manipulated through habitat restoration. Eighteen (18) habitat variables were all included in the model, plus 1 additional variable - complex channel variable.

Through data analysis and modeling, the top variables identified were channel complexity and depth.

Top Variables: Channel Complexity and Depth

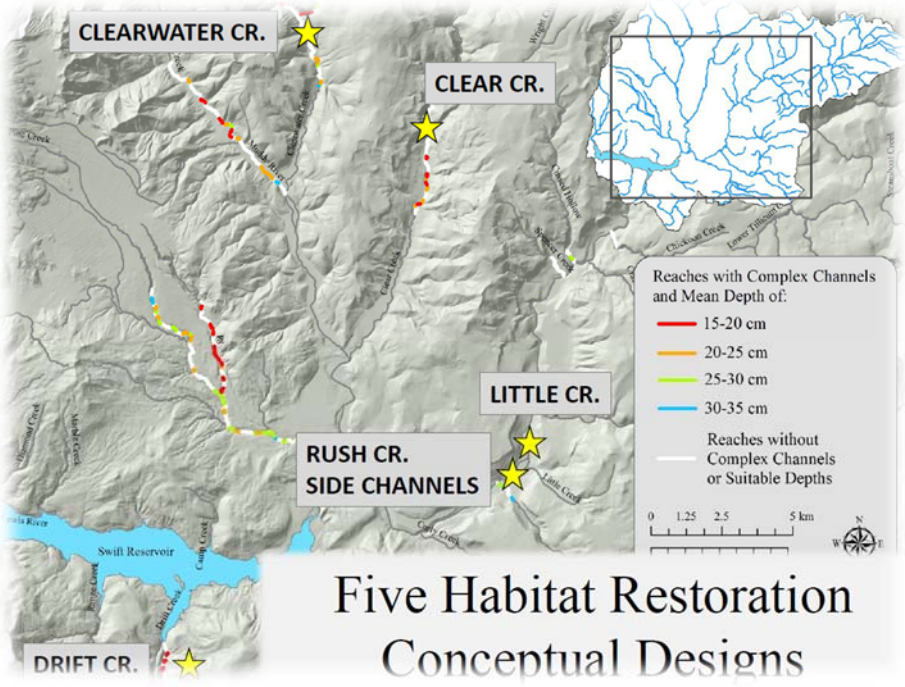
Variable	Parameter Estimate	Standard Error	Scaling factor	**Scaled odds ratio**	95% CI for scaled odds ratio	*P*-value
Intercept	1.871	1.086				0.085
Complex Channel	1.378	0.453	1.00	**3.96**	1.63 - 9.64	0.002
Depth (m)	-16.830	4.739	0.05	**0.43**	0.27 - 0.69	< 0.001

The pooled data indicates that it is 4x greater that bull trout will spawn in complex channels. Suitable and unsuitable habitat in the study area was also identified. In conclusion, key drivers are:

- Stream temperature
- Proximity to source populations
- Increase habitat complexity and suitable depths in coldest accessible reaches

Five (5) Habitat Restoration conceptual designs were identified for the following reaches:

- Little Creek – install PIT array
- Rush Creek Side Channels – needs to stabilize
- Drift Creek – increase complexity and recruit spawning substrate with LWD; retain LWD
- Clear Creek – decrease depth, increase complexity
- Clearwater Creek – increase suitable depths and complexity



<Break 10:30am>
<Reconvene 10:45am>

ACC/TCC Structure and Ground Rules; review and approve
Amanda Froberg (Cowlitz PUD) requested the ACC attendees consider a specific edit proposed by WDFW on the draft Terrestrial and Aquatic Coordination Committee Structure and Ground Rules. The Utilities wish to remove the following WDFW requested edit on page 2. The TCC approved removing the WDFW additional language which states:

"Comments received after the agreed upon date will be considered if a Representative requests an extension before the agreed upon date, and the extension can be reasonably accommodated by the Licensees".

The Utilities expressed that this added language lessens the focused intent that all members be timely in providing their input.

Peggy Miller (WDFW) noted that the intent of this addition is in the event a TCC or ACC representative had an unforeseeable emergency that would require the need to request more review time.

After ACC discussion relating to the timely submittal of comments during a review period and the merits of the WDFW proposed language, the ACC approved the following modified text:
ACC approved modified text reads as follows: "If a Representative requests an extension before the agreed upon due date, Licensees will consider accommodating an extension".

The ACC also agreed to use the term Representative(s) in the Ground Rules document rather than Member(s), where appropriate.

McCune will modify the document as requested, post a final to the Lewis River website and distribute to the ACC and TCC representatives.

Study/Work Product Updates

H&S Plan Update
Erik Lesko (PacifiCorp) informed the ACC that the subgroup continues to work on two key issues. First, how best to effectively monitor and evaluate hatchery volitional release. PacifiCorp consultants conducted a literature search but found only limited information on factors reducing residualism among released hatchery fish. The subgroup is currently focused on expanding the sampling rate of smolts to detect morphological diversity or differences between different release groups. The subgroup is also proposing to use the screw traps to gain a better understanding of when hatchery fish migrate past the trap and when peak migration periods occurs post release

The second issue involves modifying and evaluating different spring Chinook release groups. The goal of this evaluation is to improve rearing conditions and smolt quality to enhance survival (SAR). Tom Wadsworth (WDFW) provided the following data today, Preliminary Survival of Lewis River Spring Chinook by 2013, for ACC review and discussion.

PRELIMINARY Survival of Lewis River Spring Chinook BY 2013

Release Month	Transfer month to Lewis Hatchery		Size (fish/lb)	Number tagged	% Mortality + tag loss	Est. tag release	Tag Recoveries	SAR	Overall Survival
February	Dec		12.4	102,409	8%	94,328	234	0.25%	0.23%
February	June		7.7	102,151	51%	50,386	55	0.11%	0.05%
October	June		11.4	102,688	1%	101,814	128	0.13%	0.12%

Note: Recovery data includes expanded tag recoveries from RMIS through 2016 and observed tag recoveries from WDFW database and mainstem Columbia sport sampling - most tags collected by WDFW in 2017 are included here but other organizations data are not included

Proposed Release Strategy for BY 2017

Release Month	Transfer month to Lewis Hatchery	Speelyai rearing environment	Size (fish/lb)	Total number at ponding	Losses pre-marking*	Number tagged	% Mortality + tag loss**	Expected tag release	Expected total release
February	Dec	Asphalt pond	12	200,000	6,000	75,000	9.0%	68,250	176,000
February	Dec	Raceway	8	170,000	5,100	75,000	9.0%	68,250	149,600
February	June	Raceway	8	200,000	6,000	75,000	24.0%	57,000	146,000
October	June	Raceway	12	862,000	25,860	75,000	10.0%	67,500	749,940
Total				1,432,000	42,960	300,000		261,000	1,221,540

*3% pre-marking mortality rate applied to all groups

**Mortality rates averaged for brood years 2011-2015 wherever release size and timing were similar, derived from subtracting the RMIS release numbers from the original tag number for each group, mortality rate for Feb 8/lb release group moved to Lewis in Dec was assumed to be the same as the 12/lb release group from BY2013

The information provided is in draft form and requires more time for the H&S subgroup to finalize. Once finalized the subgroup will seek ACC review and approval of the study design. Day requested that the proposed hatchery release strategy for BY 2017 be run by Rich Turner (NMFS) for his review and comment. **Pending Turner's input the ACC understands the concept and agrees with the Subgroup moving forward.**

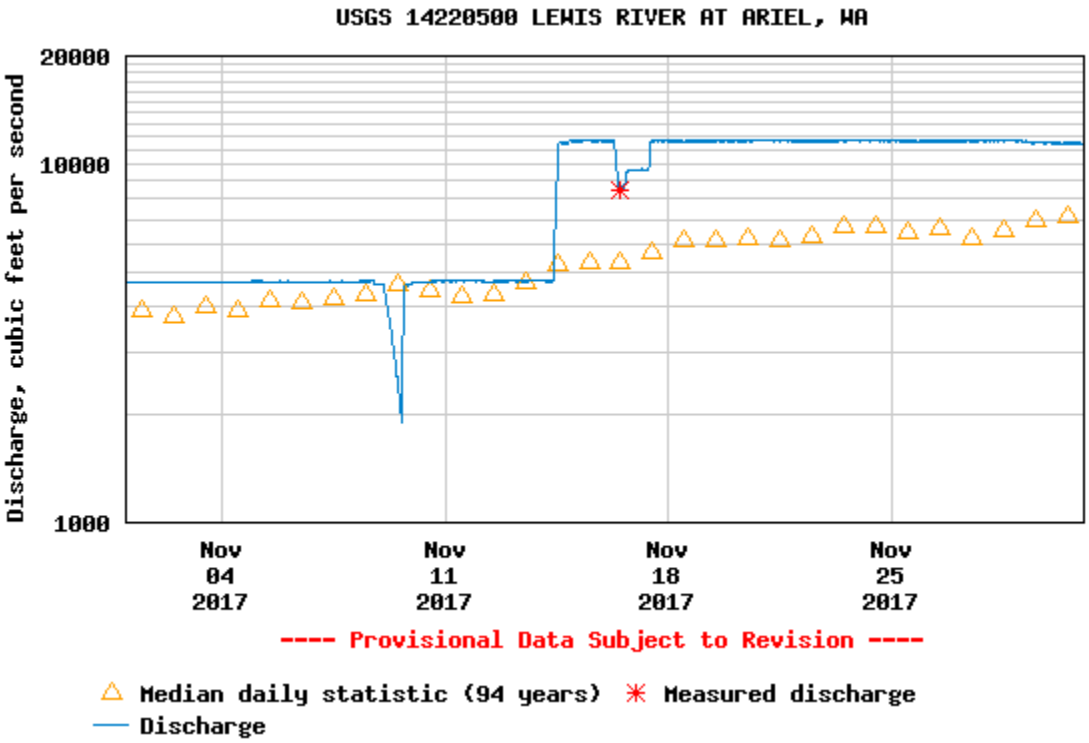
Woodland Release Ponds/Construction Update
Construction of the facility is complete and in testing mode. Pump and operations testing is going well. SCADA testing in process and pit tags installed.

Merwin Adult Fish Trap Efficiency (ATE) Study – Karchesky (PacifiCorp) noted that the ATE study report is nearly completed. PacifiCorp will distribute via email to the ACC as soon as possible and this will be a topic on the January 2018 ACC agenda.

Merwin Fish Collection Facility and General Operations (Attachment A)
During the month of November, a total of 2,031 fish were captured at the Merwin Adult Fish Collection Facility. The vast majority of these fish were adult coho (1,864 – 91%).

The Merwin Dam adult fish trap ran continuously through the month of November except on November 26 when the fish crowder and lift assembly were temporarily shut down due to high water. However, the trap's attraction water supply and ladder flow pumps remained in operation. Fish were not processed November 21, 2017 on account of the SR503 road closure. All fish collected on the November 21, 2017 were processed the following day. River flow varied downstream of Merwin Dam ranging between 4,660 and 11,600 cfs throughout the month (the low flow occurring November 9, 2017 was for the scheduled fish carcass surveys).

Discharge, cubic feet per second



Upstream Transport (Attachment A)

One Blank Wire Tag (BWT) winter steelhead was transported upstream of Swift Dam in November 2017. This was the second BWT steelhead collected this fall and will be consider a part of the 2018 run year. Typically, late run winter steelhead in the North Fork Lewis River begin arriving at the trap in January and continue through early-May. A total of 599 BWT winter steelhead were transported as part of the 2017 run year earlier this spring.

PacifiCorp began transporting adult spring Chinook to the upper basin on May 18, 2017, with the last fish being transported in early-August. A total of 1,110 adults were transported and release at head of Swift Reservoir during the 2017 run year. A number of these fish were observed spawning throughout the upper basin and as far upstream as Lower Falls. These were the first spring Chinook adults to be released in the upper basin since 2013, when about 600 adults were released upstream of Swift Reservoir.

PacifiCorp began transporting early coho salmon to the upper basin on August 25, 2017. By the end of the November, a total of 6,018 early- and late-coho had been transported and released at the head of Swift Reservoir.

2017 Coho Salmon (thru November 2017)

Stock	Origin	Male	Female	Jacks	Total
Early (S-type)	Natural	910	1,141	18	2,069
Early (S-type)	Hatchery	765	752	16	1,533
Late (N-type)	Natural	68	83	23	174
Late (N-type)	Hatchery	1,118	1,122	2	2,242
TOTAL		**2,861**	**3,098**	**59**	**6,018**

Swift Floating Surface Collector (Attachment A)
The Swift Reservoir FSC was returned to full 24-hour service on October 20, 2017. During the month of November, nearly 12,000 fish were collected; more than tripling the previous monthly record for November, which occurred in 2015 with just 3,500 fish for the month. The largest percentage of the fish were coho parr and smolt (76%), although nearly a quarter of these fish were spring Chinook. Recent changes to the facilities Sorting Area Flow (SAF) Pumps that helped reduce pump noise and improve underwater ambient sound in the vicinity of the facility seem to be benefiting fish passage. The FSC ran continuously throughout the month of November.

In Lieu Fund – Status
On December 8, 2017 PacifiCorp emailed a memorandum, *Correction to July 2017 Decision Support Document: Cougar Creek Reach Length/Revised Lewis River EDT Results*, from Mike Bonoff, Meridian Environmental (**Attachment B**). This memo is in response to a question by Mark Celedonia (NMFS) regarding available habitat in Cougar Creek. Based on Celedonia's review, Cougar Creek habitat was corrected from approximately 3 miles to 1.6 miles and the EDT model was re-run based on that correction.

Michelle Day (NMFS) informed the ACC attendees that NMFS' is moving forward with the Tribes to begin government to government discussions. NMFS' tribal liaison will set up the meetings.

Acclimation Program
PacifiCorp currently has a request for proposal in process for consultant support to evaluate the acclimation program. Once a consultant has been selected, they will present their evaluation process to the ACC for review and approval.

Other
In Lieu Fish Passage - Malinowski expressed that he is hoping the Services will agree with Fish First to dedicate funds to a basin-wide productivity program instead of constructing fish passage into Merwin and Yale. Fish First would like to see the ACC look at better ways to use the financial resources for the Lewis River basin, benefiting fish of the area affected by the hydro projects.

At the end of the meeting, special thanks, appreciation and recognition was given to Frank Shrier for his 30+ years of work for PacifiCorp and his contribution to the Lewis River. This was his last meeting as he is retiring from PacifiCorp at the end of December. Erik Lesko will take Shrier's position as PacifiCorp's primary representative to the ACC and Chris Karchesky will be PacifiCorp's alternate.

Agenda items for January 11, 2018
- December 14, 2017 Meeting Notes
- Merwin Adult Fish Trap Efficiency (ATE) Study
- 2017 Year-end Financial Reporting
- Lewis River In Lieu Update
- Study/Work Product Update

Adjourn 12:10pm

Next Scheduled Meeting:

January 11, 2018
Merwin Hydro Control Center
Ariel, WA
9:00 a.m. - 12:00 p.m.

Meeting Handouts & Attachments:

- Meeting Notes from 11/9/17
- Agenda from 12/14/17
- **Attachment A** - Lewis River Fish Passage Report (November 2017)
- **Attachment B** - Correction to July 2017 Decision Support Document: Cougar Creek Reach Length/Revised Lewis River EDT Results, from Mike Bonoff, Meridian Environmental, December 7, 2017

Lewis River Fish Passage Report

November 2017

Merwin Fish Collection Facility and General Operations

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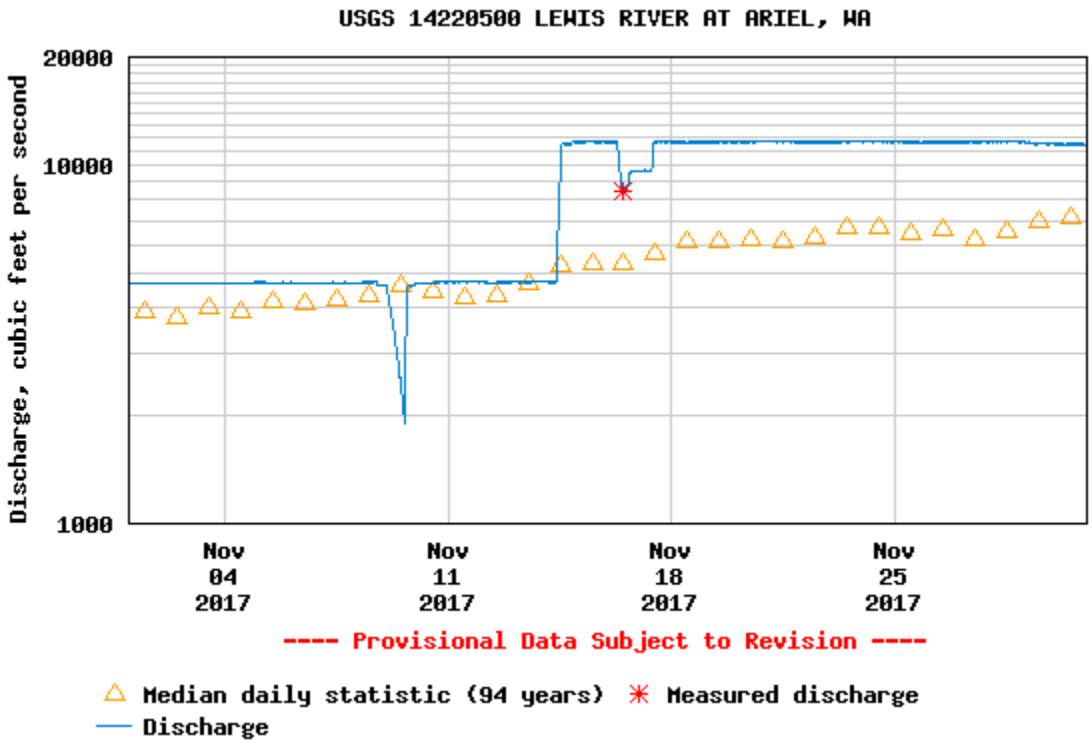

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Fish Facility Report
Merwin Adult Trap
November 2017

Reporting Date	Spring Chinook [1]									Early Coho											
	AD-Clip			Wild			Recap			AD-Clip			CWT			Wild			Recap		
	M	F	JK	M	F	JK	M	F	JK	M	F	JK	M	F	JK	M	F	JK	M	F	JK
01-Nov										2											
02-Nov																					
03-Nov																					
04-Nov																					
05-Nov																				1	
06-Nov																1					
07-Nov										1											
08-Nov										2											
09-Nov										4							2				
10-Nov																					
11-Nov										2											
12-Nov																					
13-Nov																					
14-Nov										3											
15-Nov											2			1		1	1				
16-Nov										13	1		1	1			1				
17-Nov											1										
18-Nov																					
19-Nov																					
20-Nov											2										
21-Nov																					
22-Nov										2	3										
23-Nov																					
24-Nov																					
25-Nov											1										
26-Nov																					
27-Nov																					
28-Nov																					
29-Nov																					
30-Nov																					
Monthly	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**29**	**10**	**0**	**1**	**2**	**0**	**2**	**4**	**0**	**0**	**1**	**0**
Annual	**997**	**1316**	**545**	**21**	**13**	**4**	**0**	**0**	**0**	**619**	**775**	**108**	**68**	**136**	**28**	**833**	**1126**	**16**	**12**	**16**	**0**

Reporting Date	Late Coho												S. Steelhead					
	AD-Clip			CWT			Wild			Recap			Fresh		Recap		Wild	
	M	F	JK	M	F	JK	M	F	JK	M	F	JK	M	F	M	F	M	F
01-Nov	20	15	3	4	2			1										
02-Nov	22	19	3	6	6		1	3					1					
03-Nov	8	10	1	1	4		3	2						1				
04-Nov	6	7	1	3	3		1	1						2				
05-Nov	9	7		2	1	1		1										
06-Nov	4	4	1	2	1								2					
07-Nov	5	7	3	6			1		1									
08-Nov	15	17	5	5	1	1		3										
09-Nov	15	20	1	7	6			2						1				
10-Nov	18	17	6	7	8		1						3	1				
11-Nov	8	14	2		5		1	3					1					
12-Nov	6	11	1	2			2											
13-Nov	6	8						1										
14-Nov	5	4		2	1													
15-Nov	110	93	7	29	24	1	1	3										
16-Nov	96	115	11	24	24	1		2	2									
17-Nov	58	74	6	18	21	1		2	1									
18-Nov	38	26		1	3		1											
19-Nov	34	20		4	7													
20-Nov	21	11	2	1	3				1									
21-Nov																		
22-Nov	33	38	2	8	6			3	3				1			1		
23-Nov	14	16	2	4	4		1	1										
24-Nov	11	19	1	2	4													
25-Nov	2	2		2	2													
26-Nov																		
27-Nov	20	33		5	6		2	2										
28-Nov	18	31		4	5		1	1	1									
29-Nov	14	19	2	4	2		1											
30-Nov	34	59		6	17		2											
Monthly	**650**	**716**	**60**	**159**	**166**	**5**	**19**	**31**	**9**	**0**	**0**	**0**	**8**	**5**	**0**	**1**	**0**	**0**
Annual	**938**	**974**	**172**	**220**	**214**	**18**	**84**	**103**	**25**	**1**	**1**	**0**	**1098**	**1395**	**399**	**681**	**1**	**17**

Reporting Date	W. Steelhead								Fall Chinook								
	AD-Clip		BWT		RT Recap		Wild		AD-Clip			Wild			Recap		
	M	F	M	F	M	F	M	F	M	F	JK	M	F	JK	M	F	JK
01-Nov		1								1		2					
02-Nov												3	1				
03-Nov		1															
04-Nov																	
05-Nov																	
06-Nov		1															
07-Nov	1	1												1			
08-Nov		1											2				
09-Nov		1											1				
10-Nov																	
11-Nov																	
12-Nov	1	1															
13-Nov	1	3										1		1			
14-Nov	2	2									1						
15-Nov	4	1												1			
16-Nov	2	1		1													
17-Nov	4	2											1				
18-Nov	1											1					
19-Nov	1	1															
20-Nov	4											1				1	
21-Nov																	
22-Nov	6	3										1					
23-Nov	2																
24-Nov	2	4															
25-Nov		1															
26-Nov																	
27-Nov	9	2											1				
28-Nov	5	4											1				
29-Nov	11	3															
30-Nov	18	8															
Monthly	**74**	**42**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**9**	**7**	**3**	**0**	**1**	**0**
Annual	**360**	**324**	**340**	**285**	**67**	**49**	**47**	**43**	**106**	**155**	**8**	**84**	**101**	**62**	**1**	**1**	**0**

Reporting Date	Sockeye		Chum		Pink		Cutthroat	Rainbow (< 20 inches)	Bull Trout	Daily Total
	M	F	M	F	M	F				
01-Nov							4			**55**
02-Nov										**65**
03-Nov							2			**33**
04-Nov							1			**25**
05-Nov										**22**
06-Nov							1			**17**
07-Nov										**27**
08-Nov							1			**53**
09-Nov										**60**
10-Nov										**61**
11-Nov										**36**
12-Nov										**24**
13-Nov										**21**
14-Nov			1							**21**
15-Nov										**279**
16-Nov										**296**
17-Nov							1			**190**
18-Nov							1			**72**
19-Nov										**67**
20-Nov							1			**48**
21-Nov										
22-Nov							1			**111**
23-Nov										**44**
24-Nov										**43**
25-Nov										**10**
26-Nov										
27-Nov										**80**
28-Nov										**71**
29-Nov										**56**
30-Nov										**144**
Monthly	**0**	**0**	**1**	**0**	**0**	**0**	**13**	**0**	**0**	**2031**
Annual	**14**	**10**	**1**	**2**	**4**	**1**	**13**	**18**	**0**	**15161**

[1] Only hatchery verses wild distinctions are currently being made. All hatchery fish are labeled as "AD-Clip".

[2] Total counts do not include recaptured salmon.

Berkshire Hathaway Energy

Fish Facility Report

Swift Floating Surface Collector

November 2017

	Coho			Chinook			Steelhead				Cutthroat			Bull	Planted	
Day	fry	parr	smolt	fry	parr	smolt	fry	parr	smolt	kelt	fry	< 13 in	> 13 in	Trout	Rainbow	Total
01		57	35			4						2				**98**
02		87	59			4			2			1				**153**
03		59	68			12							1			**140**
04		55	33			3						2				**93**
05		59	41			4						6				**110**
06		54	25		2	2						1				**84**
07		122	10			14			5							**151**
08	2	79	95			22	1					1				**200**
09	52	41	73			28			2			2			1	**199**
10	3	129	34		1	9			2			3				**181**
11	4	75	56			15						2			1	**153**
12	2	67	92			31			2			3				**197**
13		68	63			18			2			4				**155**
14		109	78			15			2			4				**208**
15		19	28			22			4			8				**81**
16	4	2	27			20			2			2				**57**
17		61	22			5										**88**
18		52	21		2	14		1	1			1				**92**
19		53	31			28			2			11			1	**126**
20		83	26			35		1	5			2				**152**
21		111	14			10			2			6				**143**
22		103	85			12						2				**202**
23		65	31		1	12			1			2				**112**
24		217	61		1	9			3			5				**296**
25	40	2270	1015		182	764		14	9			18			65	**4377**
26		506	372		16	184			10			19			2	**1109**
27		111	21		1	4		1	2			8			2	**150**
28		206	165			158						28				**557**
29	63	265	267			241			6			8				**850**
30	29	288	156			225			10		1	8				**717**
Monthly	199	5473	3104	0	206	1924	1	17	74	0	1	159	1	0	72	**11231**
Total	3445	7425	14296	0	258	4011	18	70	1644	9	14	552	40	8	2879	**34669**

BERKSHIRE HATHAWAY ENERGY

McCune, Kimberly

From:	McCune, Kimberly
Sent:	Friday, December 08, 2017 9:05 AM
To:	Amanda Froberg; Amelia Johnson; Asher, Eli; Bob Rose; Brice Crayne; Bryce Glaser; Bryce Michaelis; Daniel Rawding; David Howe; Doyle, Jeremiah; Ed Meyer; Ferraiolo, Mark; Hudson, Michael; James Byrne (byrnejim7@gmail.com); James H Malinowski; 'Kale Bentley'; Karchesky, Chris; Kelley Jorgensen; Lesko, Erik; Mariah Stoll-Smith Reese; 'Melody Tereski'; 'Michelle Day'; Morgan, David; Nathan Reynolds; Olson, Todd; 'Patrick Lee'; Peggy Miller; Pienovi, Levi; Rhidian Morgan; Roberts, Aaron; 'Ruth Tracy'; Samuel Kolb; Serdar Carol; Shrier, Frank; Steve Manlow; Taylor Aalvik; Tim Romanski; Tom Wadsworth; Weatherly, Briana; Whitesel, Timothy
Cc:	'mbonoff@meridianenv.com'
Subject:	Correction to July 2017 Decision Support Document; Cougar Creek Reach Length
Attachments:	Memo_Cougar Creek Reach Length Correction and EDT Modeling.pdf

Attn: ACC Participants

The attached memorandum from Mike Bonoff, Meridian Environmental is for discussion at next week's ACC meeting. This memo is in response to a question by Mark Celedonia regarding available habitat in Cougar Creek. Based on Mark's review, Cougar Creek habitat was reduced from approximately 3 miles to 1.6 miles and the EDT model was re-run based on that correction.

Thank you.

Kimberly McCune
Sr. Business Administrator
PacifiCorp – Hydro Resources
825 NE Multnomah St., Suite 1500
Portland, OR 97232
Ph: (503) 813-6078

To: Todd Olson, PacifiCorp

From: Mike Bonoff, Meridian Environmental

Date: December 7, 2017

Subject: Correction to July 2017 Decision Support Document: Cougar Creek Reach Length / Revised Lewis River EDT Results

Review of EDT modeling results conducted by Mark Celedonia (USFWS) suggested that the approximately 3 miles of available habitat reported for Cougar Creek in the June 2016 New Information Report, and subsequently presented in the Decision Support Document of July 2017, was incorrect. In the EDT model, Cougar Creek was broken into two reaches; upstream and downstream of the Panamaker Creek confluence. The reach downstream of Panamaker Creek, originally modeled as 8,973 feet (Cougar Creek 2), is incorrect. This reach is actually 1,877 feet in length. Combined with the upstream reach (Cougar 3), total habitat in Cougar Creek downstream of the natural passage barrier is now reduced from approximately 3 miles to 1.6 miles (Table 1).

Table 1. Original and corrected reach lengths for Cougar Creek.

EDT Reach	Description	Initial (ft)	Corrected (ft)
Cougar Creek 2	Panamaker to Yale Lake	8,973	1,877
Cougar Creek 3	Upstream of Panamaker	6,640	6,640
Total		**15,613**	**8,517**

The Lewis River EDT model has been re-run with the revised Cougar Creek reach lengths for all 5 passage + restoration alternatives developed, as described in the July 2017 Decision Support Document. Results differed slightly from those previously reported but did not change the best performing alternative in regard to adult abundance, spatial structure, productivity and diversity for spring Chinook, coho and winter steelhead. Both revised and original tables are shown below.

Revised Table 3.1-4; replaces the table previously shown on page 14 of the July, 2017 Decision Support Document:

Table 3.1 4. February 2, 2017 EDT model run results, Scenario 2 – *revised per 1.6 miles Cougar Creek available habitat*.

	Spring Chinook				Coho				Winter Steelhead				
Alternative	Abundance	Spatial	Productivity	Diversity	Abundance	Spatial	Productivity	Diversity	Abundance	Spatial	Productivity	Diversity	Total Abundance All Species
1A1	3,701	100%	5.76	86%	11,645	95%	7.59	80%	2,399	94%	12.81	82%	17,745
1A2	3,686	93%	6.40	86%	11,121	80%	8.18	86%	2,210	78%	14.51	85%	17,017
1B	3,483	100%	5.43	85%	10,782	95%	6.60	81%	2,160	94%	12.03	80%	16,425
2	2,761	100%	4.83	75%	8,310	100%	5.21	70%	1,910	100%	8.64	73%	12,981
3	3,911	93%	6.38	89%	12,153	80%	8.76	88%	2,280	78%	15.51	87%	18,344
Percent difference between alternatives and Alternative 2 (Full Passage No Habitat)													
	Spring Chinook				Coho				Winter Steelhead				
Alternative	Abundance	Spatial	Productivity	Diversity	Abundance	Spatial	Productivity	Diversity	Abundance	Spatial	Productivity	Diversity	Total Abundance All Species
1A1	34%	0%	19%	15%	40%	5%	46%	15%	26%	6%	48%	12%	37%
1A2	33%	-7%	33%	15%	34%	-20%	57%	23%	16%	-22%	68%	16%	31%
1B	26%	0%	12%	13%	30%	-5%	27%	17%	13%	-6%	39%	9%	27%
2	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
3	42%	-7%	32%	19%	46%	-20%	68%	27%	19%	-22%	79%	19%	41%

Table 3.1-4. as shown on page 14 in the July 28, 2017 Fish Passage Decision Support Document.

	Spring Chinook				Coho				Winter Steelhead				
Alternative	Abundance	Spatial	Productivity	Diversity	Abundance	Spatial	Productivity	Diversity	Abundance	Spatial	Productivity	Diversity	Total Abundance All Species
1A1	3,752	100%	5.76	86%	11,878	95%	7.6	80%	2,437	94%	12.81	82%	18,067
1A2	3,686	91%	6.40	86%	11,121	79%	8.2	86%	2,210	77%	14.51	85%	17,017
1B	3,532	100%	5.43	85%	11,011	95%	6.6	81%	2,196	94%	12.03	80%	16,739
2	2,800	100%	4.83	75%	8,445	100%	5.2	69%	1,943	100%	8.64	73%	13,188
3	3,911	91%	6.38	89%	12,153	79%	8.8	88%	2,280	77%	15.51	87%	18,344

Percent Difference Between Alternatives and Alternative 2 (Full Passage No Habitat)

	Spring Chinook				Coho				Winter Steelhead				
Alternative	Abundance	Spatial	Productivity	Diversity	Abundance	Spatial	Productivity	Diversity	Abundance	Spatial	Productivity	Diversity	Total Abundance All Species
1A1	34%	0%	19%	15%	41%	-5%	46%	15%	25%	-6%	48%	12%	37%
1A2	32%	-9%	33%	15%	32%	-21%	57%	23%	14%	-23%	68%	16%	29%
1B	26%	0%	13%	13%	30%	-5%	27%	17%	13%	-6%	39%	9%	27%
2	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
3	40%	-9%	32%	19%	44%	-21%	68%	27%	17%	-23%	79%	19%	39%