



Grant County  
**PUBLIC UTILITY DISTRICT**  
*Excellence in Service and Leadership*

**Fall Chinook Work Group**

**Tuesday, 3 December 2013**

**Grant PUD Headquarters Building**

**Ephrata, WA**

**Technical members**

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Paul Wagner, NMFS	Joe Skalicky/Don Anglin, USFWS
Jeff Fryer, CRITFC	Paul Ward/Bob Rose, YN
Holly Harwood, BPA	Brett Swift, American Rivers
Keith Truscott, CPUD	Tom Kahler, DPUD
Bill Tweit, WDFW	Paul Hoffarth, WDFW
Pat McGuire, WDOE	John Clark, ADFG
Russell Langshaw, GCPUD	Todd Pearsons, GCPUD
Steve Hemstrom, CPUD	

**Attendees: (\*Denotes Technical member)**

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Russell Langshaw, GCPUD*	Paul Wagner, NMFS* (Phone)
Paul Hoffarth, WDFW* (Phone)	Jeff Fryer, CRITFC*
Steve Hays, CPUD (Phone)	Tracy Hillman, Facilitator

**Action Items:**

- 1. Blue Leaf will provide the FCWG with the draft predation report by Monday, 16 December 2013.**
- 2. Tracy Hillman will contact Blue Leaf to let them know that the FCWG would like an appendix to the predation report describing the changes in assumptions and data used in the first and final drafts.**
- 3. Russell Langshaw will make sure the FCWG is included on the Hatchery Committee distribution list.**
- 4. Russell Langshaw will provide the FCWG with a draft study plan for assessing density dependence in the Hanford Reach by 4 February 2014.**

5. **The 2013 draft Stranding and Entrapment Report is due to the FCWG no later than Friday, 13 December 2013.**
6. **Russell Langshaw will conduct retrospective analysis on historical stranding and entrapment work. The next update will be in February 2014.**

## Meeting Minutes

- I. **Welcome and Introductions** – Tracy Hillman welcomed attendees to the meeting. Attendees introduced themselves.
- II. **Agenda Review** – The agenda was reviewed and approved.
- III. **Approval of Meeting Minutes**
  - The November Meeting Minutes were reviewed and approved.
- IV. **Review of Action Items** - Action items identified during the November meeting were discussed.
  - Blue Leaf will provide the FCWG with a draft report on their evaluation of juvenile fall Chinook survival estimates from the Hanford Reach to McNary Dam by Friday, 8 November. **Complete. The FCWG received the document and provided comments to Blue Leaf.**
  - Paul Hoffarth will provide the FCWG with a table and memo on egg retention in the Hanford Reach by Friday, 29 November. **Complete.**
  - Russell Langshaw will provide the FCWG with a draft study plan for assessing density dependence in the Hanford Reach by the next FCWG meeting on Tuesday, 3 December. **Ongoing. The next update will be February 2014.**
  - The 2013 Stranding and Entrapment Report is due to the FCWG on Friday, 29 November. **Ongoing. The report is due to the FCWG by no later than Friday, 13 December.**
  - Russell Langshaw will conduct retrospective analysis on historical stranding and entrapment work and identify issues for discussion during the next FCWG meeting. **Ongoing. The next update will be February 2014.**
- V. **Phase I Study Updates**
  - A. **Productivity Assessment** – The final productivity report is complete and has been posted to Box.net.
  - B. **Egg to Fry Survival** – The final egg-to-fry study report is complete and has been posted to Box.net.
  - C. **Dam Passage Fallback** – The final dam passage fallback report is complete and has been posted to Box.net.

- D. **Hydrodynamic Model** – The final hydrodynamics model report (methods and a catalogue of what is available) is complete and has been posted to Box.net.
- E. **Production Simulation Model** – Russell Langshaw indicated that there are no new updates on the production simulation model. Cedar Morton will revisit funding opportunities in spring 2014. Cedar is also looking at PATH as a modeling tool.

## VI. Phase II Study Plan

**Predation Report** – Russell Langshaw reported that Blue Leaf is making significant progress on the body of the predation report. The survival section of the report was provided to the FCWG and John Clark, Jeff Fryer, and Russell Langshaw provided comments. Blue Leaf is addressing the comments.

Blue Leaf is completing the bioenergetics section. They conducted the back calculations that were recommended by the FCWG (i.e., they estimated how many predators are needed to consume the numbers of juvenile fall Chinook that are lost in the study area).

Paul Wagner asked if Blue Leaf could provide a brief appendix to the report that describes what changes they made to the report and analyses since the first draft. Specifically, what changes or assumptions were made that resulted in the large differences in predators and consumption rates between the first draft and the final draft. Tracy Hillman will contact Blue Leaf to let them know that the FCWG would like an appendix to the predation report describing the changes in assumptions and data used in the first and final drafts.

The entire predation report will be sent to the FCWG by 16 December 2013 for their review. The FCWG will have 30 days to review the draft report. The final will be completed by 15 February 2014.

**Density Dependence** – Russell Langshaw said that he is still working on a study plan to address the density dependence that was identified in the productivity assessment. He is looking at relationships among growth, survival, and productivity. He is also trying to compile information on condition factors. Russell said that he will draw upon the work conducted by Connor et al. (2013).<sup>1</sup> He expects to provide the FCWG with a draft study plan in February 2014.

**Redd Superimposition** – Paul Hoffarth provided a memo to the FCWG that identified the number of eggs retained by fall Chinook in the Hanford Reach (see Attachment 1). Paul reported that for the

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<sup>1</sup> Connor, W. P., K. F. Tiffan, J. M. Plumb, and C. M. Moffitt. 2013. Evidence for density-dependent changes in growth, downstream movement, and size of Chinook salmon subyearlings in a large-river landscape. *Transactions of the American Fisheries Society* 142:1453-1468.

period 2004 to 2012, spawning success has been high (>95% of the sampled females voided all their eggs). The number of eggs retained by females did not change with spawning escapement. In addition, there was little difference between egg retention of wild and hatchery-origin Chinook. On average, spawning success was slightly higher for wild fish (98.4%) than for hatchery fish (96.9%); however, sample sizes for hatchery fish were small.

The FCWG agreed that this work satisfies the egg-retention objective. The Group recommended that this work continue in the future. Results will be provided in the annual Priest Rapids Hatchery Monitoring and Evaluation reports. The FCWG asked to be included on the Hatchery Committee's distribution list. Russell Langshaw will make sure the FCWG is included on the Hatchery Committee distribution list. A final report (memo) on egg retention is due in March 2014 (this memo will include 2013 sampling).

## **VII. HRWG Activities**

**Stranding and Entrapment Analysis and Reporting** – Russell Langshaw said that he is still waiting on information from WDFW and the U.S. Fish and Wildlife Service for the stranding and entrapment report. Russell noted that roughly 161,000 juvenile fall Chinook were stranded in 2013. He also noted that the area dewatered in 2013 was about half that dewatered in previous years. Russell said that he would try to send the draft report to the FCWG by Friday, 6 December. He noted that the report would be submitted by no later than Friday, 13 December. The final report is due to FERC on 15 January 2014.

**2013 Protection Program Implementation** – Russell Langshaw shared with the FCWG a memo from Chris Carlson, Grant PUD, describing results of spawning surveys on Vernita Bar (see Attachment 2). Based on the surveys, the 2013-2014 critical flow elevation is set at the 65 kcfs elevation. The monitoring team agreed that the spawning season ended on 24 November. No additional surveys are scheduled for this year. Russell noted that operations did a good job operating at the 65 kcfs.

**Hanford Reach Tour** – The FCWG briefly discussed their tour of the Hanford Reach.

## **VIII. Next Meeting:** Tuesday morning, 7 January 2014 at Grant PUD in Ephrata, WA.

# Attachment 1

## Review of Spawning Success for Female Fall Chinook in the Hanford Reach

2000-2012

*Prepared by: Paul Hoffarth, WDFW*

Washington Department of Fish and Wildlife  
Pasco, Washington

### 1.1 HANFORD REACH FALL CHINOOK STREAM SURVEYS

The Columbia River Coded Wire Tag Program (CRCWTP) conducts stream surveys of post spawn Up River Bright Fall Chinook in the Hanford Reach. This area is an integral component of the coded wire tag (CWT) recovery effort in the Columbia River. The Hanford Reach is sampled from Richland, Washington, river kilometer 538 upstream to Priest Rapids Dam, river kilometer 639, a distance of approximately 100 kilometers. Technicians sample the Hanford Reach natural spawning areas from a jet boat or by walking the Columbia River shorelines. Prior to 2010, the survey crew typically consisted of two boats with a two-person crew operating seven days a week. Each boat surveys approximately 16 km of river per day. Carcasses are retrieved from water depths up to four meters and in shore areas de-watered by the daily operations of Priest Rapids Dam. The Hanford Reach fall Chinook stream survey is conducted annually from November 1 through the first week of December. The goal of the stream survey crew is to collect and sample 10% of the naturally spawning fall Chinook in the Hanford Reach (escapement).

All fish are visually inspected for fin clips and scanned for the presence of coded wire tags. The snout is collected from all coded wire tagged Chinook along with the biological data. Sampling of the population for run reconstruction is obtained through random, systematic design (i.e., every  $k^{\text{th}}$  fish). Data is recorded on length, gender, age (scales), and spawning success (egg retention) for all "in-sample" fish ( $k^{\text{th}}$  fish). Annual fall Chinook escapement in the Hanford Reach is variable ranging from 18,000 to 102,000 adults. The random sampling goal is set at 510 to ensure that the sample size is statistically valid (Thompson 1987). In 2010, WDFW began a robust monitoring and evaluation plan (M&E) to assess the influence of Priest Rapids Hatchery fall Chinook releases and adult returns on the natural population of the Hanford Reach. The sampling protocol developed in association with this M&E Plan required an increase in sampling to produce the accuracy of estimates under this program. Under the M&E Plan, a third boat and an additional technician to each boat has been added to the Hanford Reach stream surveys.

During the past thirteen years Hanford Reach coded wire tag recovery crews have sampled between 9.9% and 23.4% of the estimated escapement (Table 1). Survey crews relied on fin clips (adipose) to determine the presence of coded wire tags prior to 2011. After 2010, all fish were scanned for CWTs. Over this same time period an average of 20% of the carcasses collected during the stream surveys were sampled for run reconstruction (gender, age, and length). All "in-sample" females are sampled for egg retention (spawn success).

Table 1. Summary of annual fall chinook escapement, biological sampling, and coded wire tags recoveries from the Hanford Reach fall Chinook stream surveys, 2000 - 2012.

Year	Escapement	Carcass Sampled		Biological Samples		Coded Wire Tags	
		#	% of Escapement	#	% of Sampled	#	% of Sampled
2012	57,715	6,810	11.2%	1,657	24.3%	100	1.5%
2011	75,256	8,391	11.1%	2,210	26.3%	93	1.1%
2010	87,016	9,791	11.3%	2,385	24.4%	42	0.4%
2009	36,720	5,318	14.5%	849	16.0%	25	0.5%
2008	29,058	5,455	23.4%	1,061	19.5%	20	0.4%
2007	22,272	3,115	14.0%	748	24.0%	19	0.6%
2006	51,701	5,972	11.6%	565	9.5%	51	0.8%
2005	71,967	8,491	11.8%	2,096	24.7%	70	0.8%
2004	87,696	11,030	12.6%	1,807	16.4%	115	1.1%
2003	100,840	13,573	13.5%	2,227	16.4%	190	1.5%
2002	84,509	8,402	9.9%	1,414	16.8%	167	2.0%
2001	60,576	6,072	10.1%	1,465	24.1%	113	1.9%
2000	47,960	10,556	22.0%	2,557	24.2%	380	3.6%
Mean	<b>62,560</b>	<b>7,921</b>	<b>13.6%</b>	<b>1,619</b>	<b>20.5%</b>	<b>107</b>	<b>1.2%</b>

### Spawn Success

All “in-sample” females recovered during stream surveys in the Hanford Reach are dissected to determine egg retention. This provides an indication of spawn success. Eggs are not counted or weighed during this process. Egg retention is based on a rough estimate of the proportion of eggs remaining in the female, 0%, 25%, 50%, 75%, or 100%. If no eggs or minimal numbers of eggs are retained, the Chinook is recorded as 0% spawned. If all eggs are retained, the chinook is recorded as “unsuccessful”. From 2004 to 2012, spawn success averaged 98.4% with 97.3% of the female Chinook categorized as completely spawned. Spawn success for fall Chinook in the Hanford Reach has been very high and very consistent between years ranging from 97.4% to 99.2% with a large proportion of the fish sampled having little to no egg retention.

Table 2. Annual summary of egg retention and spawning success for fall Chinook in the Hanford Reach, 2004-2012.

Year	Females Sampled	Egg Retention					Spawn Success	
		0%	25%	50%	75%	100%	Return	No Egg Retention
2012	771	747	14	5	1	4	98.6%	96.9%
2011	1,264	1,203	1	52	5	3	97.4%	95.2%
2010	1,173	1,147	6	13	1	6	98.7%	97.8%
2009 <sup>1</sup>	499	484		5		10	97.5%	97.0%
2008	584							
2007	454	443		8		3	98.5%	97.6%
2006	352	343		8		1	98.6%	97.4%
2005	1,323	1,310		6		7	99.2%	99.0%
2004	1,176	1,151		21		4	98.8%	97.9%
<b>Mean</b>	<b>844</b>						<b>98.4%</b>	<b>97.3%</b>

<sup>1</sup> Prior to 2010, egg retention was only categorized as fully spawn, partial spawn, or did not spawn in the database.

## 1.2 COMPARISON OF SPAWNING SUCCESS FOR NATURAL ORIGIN AND HATCHERY ORIGIN FALL CHINOOK

Based on sampling of post spawn fall Chinook carcasses in the Hanford Reach, spawning success for natural origin fall Chinook was slightly higher than hatchery origin fall Chinook. Mean spawning success was 98.4% for natural origin fall Chinook compared to 96.9% for hatchery origin fall Chinook that spawned in the Hanford Reach. Spawning success was very high for both groups and the minor difference in rates could potentially be attributed to the small sample size for hatchery origin spawners. Hatchery origin fall Chinook could only be identified by adipose clips and coded wire tags for all return years except 2012. As the majority of Priest Rapids Hatchery returns are not adipose clipped a portion of the fish identified as natural origin in the Hanford may be hatchery origin. In 2012, otoliths were collected from all “in-sample” fish to determine origin. All Priest Rapids Hatchery releases were otolith marked for broodyears 2007 through 2010. These broodyears would be represented by age 2 (jacks) through age 5 adult hatchery returns in 2012. This increased the sample size from 70 hatchery origin fall Chinook to 90 fish.

Table 3. Comparison of spawn success of fall Chinook spawning in the Hanford Reach for natural origin and hatchery origin returns, 2009-2012.

Year	Origin	Females Sampled	Egg Retention					Spawn Success	
			0%	25%	50%	75%	100%	Return	No Egg Retention
2012 <sup>1</sup>	Natural	681	658	14	5	1	3	98.6%	96.6%
	Hatchery	90	89	0	0	0	1	98.9%	98.9%
2011	Natural	1,176	1,121	1	48	4	2	97.5%	95.3%
	Hatchery	88	82		4	1	1	95.7%	93.2%
2010	Natural	1,125	1,101	6	12	1	5	98.8%	97.9%
	Hatchery	48	46		1		1	96.9%	95.8%
2009	Natural	494	482		12		0	98.8%	97.6%
	Hatchery	13	12		1		0	96.2%	92.3%

Year	Origin	Females Sampled	Egg Retention					Spawn Success	
			0%	25%	50%	75%	100%	Return	No Egg Retention
Mean	Natural	869						98.4%	96.8%
	Hatchery	60						96.9%	95.1%

<sup>1</sup> Otoliths were used to determine origin in addition to adipose clips and CWTs



# Attachment 2

## Vernita Bar Redd Surveys

### Memorandum from Chris Carlson

**MEMORANDUM**

November 24, 2013

**TO:** Interested Parties

**FROM:** Chris Carlson, Senior Biologist

**SUBJECT:** Vernita Bar Redd Survey, November 24, 2013

**Discussion:** On Sunday, November 24, 2013 the third Vernita Bar ground redd count was conducted to determine the 2013-2014 Hanford Reach Critical Flow Elevation. The Monitoring Team consisted of Paul Hoffarth (WDFW) and Chris Carlson (GCPUD). Observing the redd count were Scott Bettin (BPA), Julie Doumbia (BPA) and Tim Dykstra (ACOE). Flows from Priest Rapids Dam at Vernita Bar were about 51 kcfs. Results of this survey are provided in the table below.

Transect	----- Redd Count by Flow Level (kcfs) -----						Total Number Of Redds
	<u>*(36 – 50)</u>	<u>(50 – 55)</u>	<u>(55 – 60)</u>	<u>(60 – 65)</u>	<u>(65 – 70)</u>	<u>(Above 70)</u>	
Above A	--	27	10	15	1	0	53
A – AB	--	43	19	24	2	2	90
AB – B	--	50	48	43	3	1	145
Below B	--	25	18	27	5	2	77
C	--	5	2	0	0	0	7
Totals	--	150	97	109	11	5	372

\* Redds were not counted in the 36-50 kcfs zone because Initiation of Spawning had been previously established for this zone and there was no need to dewater these redds.

Based on the above survey count and the Hanford Reach Fall Chinook Protection Program Agreement, the 2013-2014 Critical Flow Elevation is set at the 65 kcfs elevation (the Agreement states in section C6b, “If there are 15 to 30 Redds above the 65 kcfs elevation, the Critical Elevation will be the 65 kcfs elevation”). The Monitoring Team agreed that the fish spawning season had ended and that November 24, 2013 be identified as the End of Spawning date. Therefore, the December 1 supplemental ground redd count will not be required.

Previously determined 2013 Initiation of Spawning dates are: October 23 for both flow elevation zones 36 – 50 kcfs and above 50 kcfs.

During last year’s November 18 final redd count, 38 redds were counted within the 50-55 kcfs zone, 48 between 55-60 kcfs, 20 redds between 60-65 kcfs, 3 redd between 65-70 kcfs and 2 above the 70 kcfs elevation. Based on these redd counts, the Critical Elevation was set at 65 kcfs.

Fall Chinook Work Group  
Final Meeting Minutes  
3 December 2013

No additional ground redd counts are planned for this year.

A separate memorandum will be provided to Grant County PUD Dispatch outlining redd and juvenile fish protection flow requirements.

Please contact me if you have any questions.

(VBReddCountM.doc)

c: Don Anglin  
Scott Bettin  
James Adams  
Sarah Morford  
Kelly Harlan  
Joe Taylor  
Geoffrey McMichael  
Shane Scott  
Dawn Woodward  
Tom Kahler

John Nugent  
Shane Bickford  
Alex Ybarra  
Russ George  
Jeff Fryer  
Paul Hoffarth  
Robert Mueller  
Rudd Turner  
Power Dispatch  
PRD Operators

Bill Berry  
Jeff Grizzel  
Gary Donabauer  
NR Records  
Scott Boyd  
Lisa Wright  
Greg Patton  
Bill Tweit  
FWWQ Team  
WAN Operators