



Grant County
PUBLIC UTILITY DISTRICT
Excellence in Service and Leadership

Fall Chinook Work Group

Tuesday, 6 October 2015

Grant PUD (USBOR Building)

Ephrata, WA

Technical members

Paul Wagner, NMFS
Jeff Fryer, CRITFC
Holly Harwood, BPA
Keith Truscott, CPUD
Bill Tweit, WDFW
Patrick McGuire, WDOE
Peter Graf, GCPUD
Steve Hemstrom, CPUD

Joe Skalicky/Don Anglin, USFWS
Paul Ward/Bob Rose, YN
Brett Swift, American Rivers
Tom Kahler, DPUD
Paul Hoffarth, WDFW
John Clark, ADFG
Todd Pearsons, GCPUD

Attendees: (*Denotes Technical member)

Peter Graf, GCPUD*
Paul Hoffarth, WDFW* (Phone)
John Clark, ADFG* (Phone)
Todd Pearsons*, GCPUD
Patrick McGuire*, WDOE
Tracy Hillman, Facilitator

Jeff Fryer, CRITFC* (Phone)
Paul Wagner, NMFS* (Phone)
Ryan Harnish, Battelle (Phone)
Geoff McMichael, Mainstem Fish Res (Phone)
Tom Kahler*, DPUD

Action Items:

1. **Peter Graf will provide updates on the HRFPPA Periods and Flow Constraints.**
2. **Paul Hoffarth will provide the 2014 egg retention report to the FCWG/HRWG by 30 October 2015.**
3. **Comments on the draft Annual Priest Rapids Hatchery Monitoring and Evaluation report for 2014-2015 are due to Todd Pearsons on Thursday, 15 October 2015.**

4. **Comments on the draft 2015 annual Hanford Reach Fall Chinook Protection Program Agreement report are due to Peter Graf on Friday, 6 November 2015.**

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 March Meeting Minutes were reviewed and approved with edits.
- IV. **Review of Action Items** - Action items identified during the March meeting were discussed.

- Peter Graf will provide updates on the HRF CPPA Periods and Flow Constraints. **Ongoing.**
- Paul Hoffarth will provide the 2014 egg retention report to the FCWG/HRWG by October 2015. **Ongoing. The report will be submitted to the FCWG/HRWG by 30 October 2015.**

V. **Update on Wanapum Dam Issues**

Peter Graf gave a final update on the completion of fixes at Wanapum Dam. Peter said that Grant PUD began filling the reservoir on 16 March at a rate of about 2.5 feet per day. By 21 March the reservoir reached a level of 571.1 feet. The project has operated normally since April.

Peter described all the construction/repairs that occurred on the dam. He said that all ladders are fully operational and providing fish passage.

VI. **HRWG Activities**

2015-2016 Protection Program Implementation – Peter Graf said that operations to support the Hanford Reach Fall Chinook Protection Program will begin on 15 October. Reverse Load Factoring will begin at midnight on the 15th and continue through the end of the spawning period. The spawning period is expected to end on 22 November, but may be extended if spawning activity is observed during the redd survey on the 22nd. During Reverse Load Factoring, Priest Rapids outflows must remain between 55 and 70 kcfs during daylight hours.

Peter noted that reduced daytime flows (38 kcfs) downstream from Priest Rapids Dam on Sundays during the spawning period will be required to support redd counts on Vernita Bar. The first redd count will be conducted on Sunday, 18 October. Peter said he will provide updates to the FCWG/HRWG throughout the protection period. Finally,

Peter indicated that all temperature and flow data are displayed in the Fixed Site Monitoring – Monthly Summary files on the Grant PUD Water Quality Website (<http://grantpud.org/environment/water-quality/monitoring-data>). The temperature unit tracking spreadsheet is found under “Monthly Summaries (xls).”

Draft 2015 HRFPPA Annual Report – Peter Graf said that the Monitoring Team (WDFW, GPUD, and BPA) completed the draft 2015 annual Hanford Reach Fall Chinook Protection Program Agreement report. Peter stated that John Clark provided harvest information and Paul Hoffarth provided escapement data. The Monitoring Team reviewed the draft report in September. The draft report will be sent to the FCWG/HRWG on Wednesday, 7 October. The FCWG/HRWG will have 30 days to review the draft report. Comments are due to Peter on Friday, 6 November 2015.

Peter walked through the draft report showing key results. He noted that water temperatures for brood year 2014 were warmer than the long-term average during most of the protection period, especially during the spring rearing period (see Figure 1). Spawn timing was similar to previous years, but the warmer water temperatures from February through May resulted in the emergence and rearing periods beginning earlier than the long-term averages.

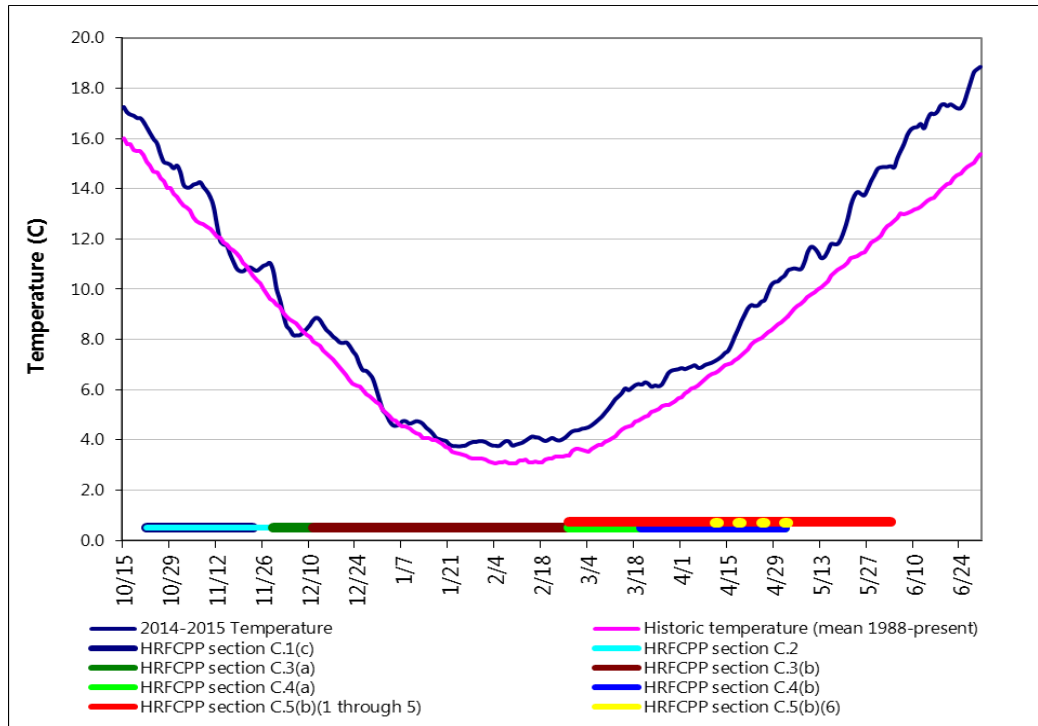


Figure 1. Mean daily river temperatures on the Hanford Reach and estimated timing of fall Chinook salmon protections based on accumulated temperature units (ATU), 2014-2015.

Peter also indicated that there were two brief Protection Program violations. One brief violation of critical elevation occurred on 1 December for a two-hour period (see Figure 2). At that time, flows dropped below 65 kcfs. Peter noted that this brief violation likely did not result in dessication of fall Chinook salmon redds in the Reach because of the short duration that flows were below 65 kcfs.

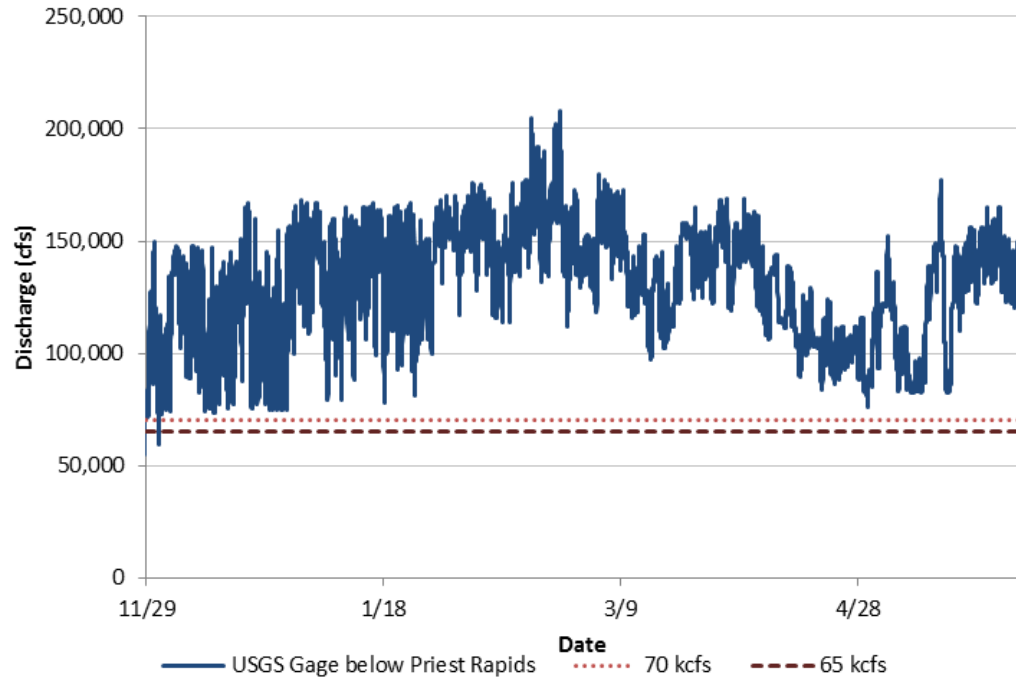


Figure 2. Discharge during the 2014-2015 Post-Hatch and Emergence and Rearing periods measured at USGS Gage 12472800 downstream from Priest Rapids Dam. Critical Elevation (70 kcfs, dotted line) and the minimum discharge requirement for the Post-Hatch Period (65 kcfs, dashed line) are shown in the figure.

Peter also noted that there was one daily delta violation during the emergence and rearing period (see Figure 3). On 15 May 2015, the daily delta from Priest Rapids Dam was 45.6 kcfs, which exceeded the daily delta constraint of 40 kcfs by 5.6 kcfs.

Priest Rapids Dam Operations 2015

Number of exceedances: 1

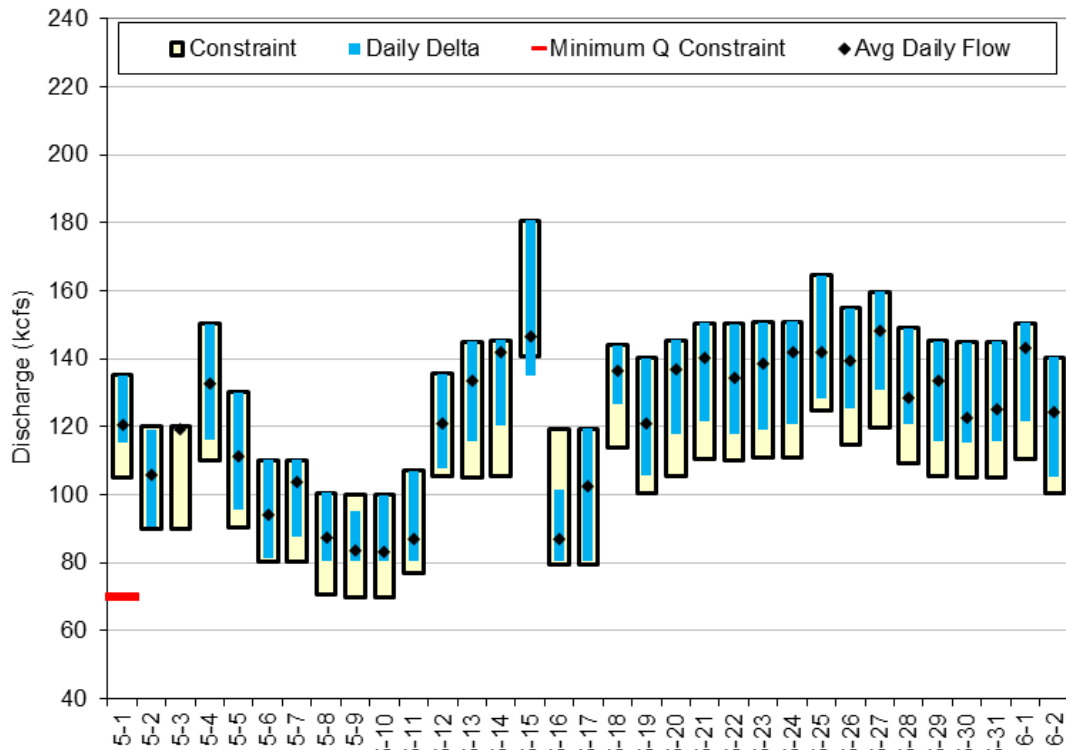


Figure 3. Mean, minimum, maximum hourly discharge and daily fluctuation from Priest Rapids Dam, May 1 – June 2, 2015.

Peter concluded by stating that operations to protect the 2014 brood year of fall Chinook salmon in the Hanford Reach were highly successful. Despite the two minor exceedances, all remaining discharge constraints were met during the spawning, pre-hatch, and emergence periods. This continues the trend of high performance that began with the 2006 brood year and is significantly greater than the historical mean under the HRFPPA.

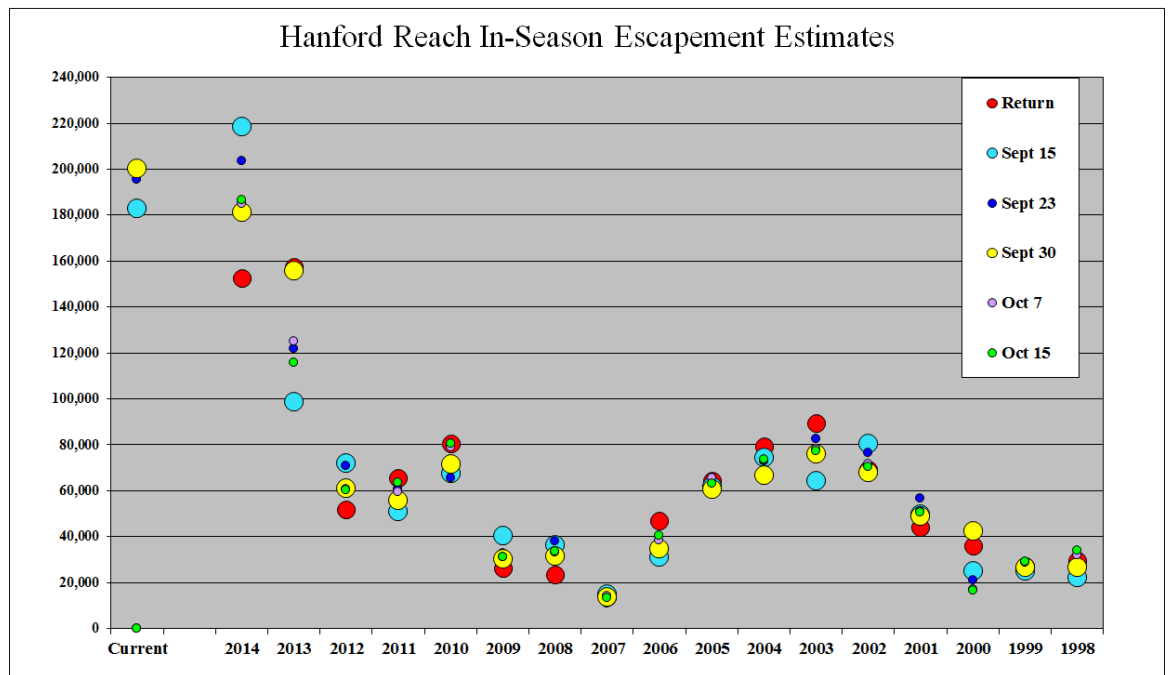
Priest Rapids Hatchery Updates – Todd Pearsons said that hatchery trapping operations began in September. There were only a few trapping issues to address. Todd noted that this year they are predicting the highest return of Chinook to the hatchery on record. Trapping is occurring seven days a week. They are working to meet a Proportionate Natural Influence (PNI) value of 0.67. They will use real-time otolith reading during spawning to help increase the proportion of natural-origin fish in the broodstock. They will also cross single natural-origin males with four females. Natural-origin males will come primarily from OLAFT collections or from angling on the Hanford Reach. Paul Hoffarth indicated that angling for natural-origin broodstock collection

will occur on 30 October through 1 November. Those wanting to help collect natural-origin broodstock need to contact Paul Hoffarth.

Fall Chinook Hatchery Operations – Todd Pearsons indicated that the draft Annual Priest Rapids Hatchery Monitoring and Evaluation report for 2014-2015 was sent to the FCWG/HRWG on 15 September for their review. Comments are due to Todd on 15 October 2015. Todd indicated that the report is very similar to previous years with an extra row of annual data within each table. Thus, all figures and tables have been updated. Todd also reported that last year the program achieved the highest system-wide Proportionate Natural Influence (PNI) value since otolith-based estimates have been generated. The system-wide PNI value last year was 0.63. The previous year system-wide PNI value was 0.47. Todd explained that they calculated the system-wide PNI value as a weighted PNI based on the number of hatchery fish from each hatchery program (Priest Rapids and Ringold) on spawning grounds. Todd also mentioned that he used Craig Busack’s PNI model to calculate a system-wide PNI. The model estimated a system-wide PNI value of 0.78. This result is not included in the draft report at this time. Todd said that the PNI value for Priest Rapids was 0.90 if only the Priest Rapids Hatchery was considered.

VII. HRWG Activities

Fall Chinook Run Forecast – Paul Hoffarth reported that Hanford Reach forecasts over the years have been close to reality (see Figure below).



Paul indicated that they are expecting about 250,000 fall Chinook to the Reach this year. These are split equally between hatchery and natural-origin fish. Paul said that they are expecting about 200,000 spawners on the Reach.

Paul shared with the Working Group the following tables, which show the forecasts, by age, for 2014 and 2015, and the actual estimates for 2014.

Natural Origin		Age 2	Age 3	Age 4	Age 5	Age 6	Total	Adults (Age 3-6)
	2014 Forecast	11,208	14,693	141,097	35,619	7	202,624	191,416
	2014 Actual	34,617	15,629	143,365	8,914	87	202,611	167,995
	2015 Forecast	12,124	20,757	42,365	52,197	100	127,543	115,419

Hanford Reach		Age 2	Age 3	Age 4	Age 5	Age 6	Total	Adults (Age 3-6)
	2014 Forecast	16,120	37,165	206,723	38,024	8	298,040	281,921
	2014 Actual	50,270	41,785	207,986	11,899	87	312,027	261,757
	2015 Forecast	21,452	102,118	64,632	60,946	114	249,262	227,809

Hanford Reach Origins	Origin	Age 2	Age 3	Age 4	Age 5	Age 6	Total
	2015 Return	21,452	102,118	64,632	60,946	114	249,262
	Natural Origin	12,124	20,757	42,365	52,197	100	127,543
	Hatchery Origin	9,328	81,361	22,267	8,749	14	121,718
	%Hatchery	43.5%	79.7%	34.5%	14.4%	12.1%	48.8%

Origin	Age 2	Age 3	Age 4	Age 5	Age 6	Total
Priest Rapids Hatchery	7,272	63,916	19,434	7,936	14	98,572
Ringold Springs Hatchery	2,056	17,445	2,833	813	0	23,146
Hanford Reach Natural	12,124	20,757	42,365	52,197	100	127,543
Combined	21,452	102,118	64,632	60,946	114	249,262

41.0% 25.9% 24.5%

In addition, Paul described the proportion of 2014 returns that ended in different hatcheries, on the spawning grounds, or in the sport fishery (see tables below).

2014 Return Proportions to Hanford Reach			
Hatchery	Stream	Sport Fishery	Ringold Springs
84.7%	10.5%	4.7%	0.1%
83,507	10,305	4,618	143

Long Term Mean			
Hatchery	Stream	Sport Fishery	Ringold Springs
67.5%	26.2%	6.1%	0.2%
66,533	25,849	5,984	207

Hatchery	Stream	Sport Fishery	Priest Rapids
77.1%	7.8%	7.7%	7.4%
17,841	1,807	1,783	1,715

Hatchery	Stream	Sport Fishery	Priest Rapids
47.6%	37.7%	10.3%	4.4%
11,012	8,728	2,387	1,020

Stream	Sport Fishery	Priest Rapids	Ringold Springs
84.8%	13.0%	2.2%	0.0%
108,125	16,619	2,799	0

Stream	Sport Fishery	Priest Rapids	Ringold Springs
87.1%	11.9%	1.0%	0.0%
111,077	15,150	1,316	0

Next, Paul showed the history of escapements to the Reach and the percentage of the escapements made up of hatchery and natural-origin Chinook (see table below).

Hanford Reach Escapement

Year	Escapement (All Origin)	NORs	% Hatchery Origin				pHOS
			Combined	PRH	RSRF	OOB	
2014	183,759	93%	7%	5.1%	1%	1%	0.065
2013	174,841	70%	30%	22.3%	6%	1%	0.297
2012	57,715	89%	11%	6%	4%	1%	0.106
2011	75,256	85%	15%	7%	8%	1%	0.154
2010	86,982	92%	8%	4%	3%	0%	0.076
2009	36,719	83%	17%	16%	1%	1%	0.174
2008	29,058	91%	9%	9%	0%	0%	0.087
2007	22,371	94%	6%	6%	0%	0%	0.065
2006	51,612	88%	12%	11%	1%	0%	0.124
2005	71,967	85%	15%	14%	1%	0%	0.155
2004	87,695	90%	10%	8%	2%	0%	0.099
2003	100,508	88%	12%	7%	4%	1%	0.117

2002	84,510	88%	12%	10%	2%	1%	0.125
2001	59,847	93%	7%	4%	2%	1%	0.066
2000	48,021	79%	21%	19%	0%	2%	0.210
1999	29,813	67%	33%	31%	0%	2%	0.334
1998	35,393	96%	4%	3%	0%	1%	0.043
1997	43,493	90%	10%	9%	0%	1%	0.100
Mean	71,087	86.7%	13.3%	10.6%	2.0%	0.8%	0.133

(Hatchery contributions estimated based on adult to adult returns calculated at the hatcheries)

Paul also described the contribution of natural-origin Chinook to the different hatchery programs, spawning escapement, and sport fisheries (see table below).

NOR Contributions to Hanford Reach

Year	Stream	Sport	Priest Rapids	Ringold Springs
2014	85%	13%	2%	0%
2013	90%	9%	1%	0%
2012	82%	16%	3%	0%
2011	87%	13%	0%	0%
2010	88%	11%	1%	0%
2009	79%	20%	1%	0%
2008	81%	19%	0%	0%
2007	76%	19%	5%	0%
2006	93%	7%	0%	0%
2005	91%	8%	0%	0%
2004	91%	9%	0%	0%
2003	94%	6%	0%	0%
2002	93%	7%	0%	0%
2001	90%	9%	0%	0%
Mean	87.1%	11.9%	1.0%	0.0%

Lastly, Paul described the returns of the Priest Rapids Hatchery Chinook over time and where these fish ended (e.g., what percent ended at Priest Rapids Hatchery, on spawning grounds, in the sport fishery, or at Ringold Hatchery) (see tables below).

Priest Rapids Hatchery Adult Returns to the Hanford Reach

Year	Return	Location			
		Priest Rapids	HR Natural Spawn	Sport Fishery	Ringold Springs
2014	89,291	84.7%	10.5%	4.7%	0.1%
2013	88,675	45.6%	44.0%	10.1%	0.4%
2012	37,029	74.6%	9.7%	15.3%	0.3%
2011	28,476	72.8%	18.0%	8.5%	0.7%
2010	24,753	77.2%	14.9%	7.2%	0.7%
2009	19,836	64.2%	29.2%	6.4%	0.2%
2008	22,489	86.4%	11.0%	2.6%	0.0%
2007	8,491	70.0%	16.3%	13.7%	0.0%
2006	15,356	53.3%	38.4%	8.4%	0.0%
2005	22,608	46.4%	44.1%	8.8%	0.6%
2004	23,139	68.1%	29.8%	2.1%	0.1%
2003	16,641	56.7%	39.7%	3.5%	0.0%
2002	22,599	54.6%	35.7%	9.7%	0.0%
2001	17,370	83.7%	13.8%	2.3%	0.3%
Mean	31,197	67.5%	26.2%	6.1%	0.2%

Natural Origin CWTs Recovered at Priest Rapids Hatchery

Return Year	Age					Total
	2	3	4	5	6	
2014	5	3	13	0	0	21
2013	3	5	1	0	0	9
2012	3	0	1	0	0	4
2011	0	0	1	0	0	1
2010	0	1	0	0	0	1
2009	1	0	1	0	0	2
2008	0	0	0	0	0	0
2007	0	2	2	0	0	4
2006	0	0	0	0	0	0
2005	0	1	0	0	0	1
2004	0	0	1	0	0	1
2003	0	0	1	0	0	1
2002	0	2	1	0	0	3
2001	2	1	0	0	0	3
2000	0	0	0	0	0	0
1999	1	1	3	0	0	5
1998	0	1	0	0	0	1
Mean	1	1	1	0	0	3

2014 Egg Retention Report – Paul Hoffarth indicated that he will provide the 2014 egg retention report to the FCWG/HRWG by the end of the month (30 October 2015).

VIII. Hanford Reach Studies

Jeff Fryer reported that this was a good year for tagging juvenile fall Chinook on the Hanford Reach. He said they completed tagging on 8 June after 12 days of tagging. They tagged 264,162 juvenile Chinook with CWTs (this exceeded last year's number of 213,259 CWTs). They lost about 1,200 tagged fish because of water issues in one tank. In addition, Jeff said they PIT tagged about 5,000 juvenile fall Chinook this year. Draft results from the PIT-tagged fish are shown in the following table.

Tag Location	N	Detect-ions at dams and TWX	Total Detections divided by number of fish tagged	Release-McNary Survival		McNary-John Day Survival		John Day-Bonneville Survival	
				Mean	Std Err	Mean	Std Err	Mean	Std Err
2015 Hanford	4,965	179	3.6%	0.777	0.537	0.239	0.230	NA	NA
2014 Hanford	9,940	1,705	17.2%	0.342	0.019	0.810	0.099	1.188	0.659
2015 PRDH	42,621	5,425	12.7%	0.770	0.048	0.489	0.057	1.240	1.224
2014 Priest Rapids	2,988	863	28.9%	0.769	0.073	0.856	0.205	0.546	0.375

Jeff said that next year they will PIT tag about 10,000 juvenile Chinook on the Reach.

Geoff McMichael and Ryan Harnish talked about the study they conducted on fall Chinook density dependence. Geoff indicated that this study was funded with Northern Funds. In a nutshell, they found emergence of fish was later as spawning density increased on the Reach. They also evaluated spawning escapement and size of subyearling Chinook, and smolt index and fish size. They reported that there appears to be a density effect on the size (fork length) of pre-smolts measured at McNary Dam. Geoff said that density dependence is occurring on the Reach, but it does not appear to be related to spawning or incubation habitat. Rather, density dependence appears to be related to rearing habitat or food for juveniles. Geoff stated that the final report will be available soon.

IX. Hanford Reach Site Visit

Tracy Hillman asked the FCWG/HRWG if they are interested in a Hanford Reach site visit this fall. Members indicated that there is no need for a visit this year. Paul Hoffarth indicated that members are welcome to join WDFW and GPUD during spawning ground surveys and to help collect natural-origin broodstock for the Priest Rapids Hatchery Program.

- X. Next Meeting:** The FCWG will next meet on Tuesday morning, 1 March 2016 at Grant PUD in Ephrata, WA.