



Grant County
PUBLIC UTILITY DISTRICT
Excellence in Service and Leadership

Fall Chinook Work Group

Tuesday, 10 April 2018

Grant PUD (Bureau of Reclamation Building)

Ephrata, WA

Technical members

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

Attendees: (*Denotes Technical member)

Peter Graf, GCPUD*	Jeff Fryer, CRITFC* (Phone)
Paul Hoffarth, WDFW* (Phone)	Paul Wagner, NMFS* (Phone)
John Clark, ADFG* (Phone)	Tom Kahler*, DPUD
Todd Pearsons*, GCPUD	Dani Evenson, ADFG (Phone)
Rod O'Connor, GCPUD	Tracy Hillman, Chair

Action Items:

1. **Peter Graf will provide updates on the HRFPPA Periods and Flow Constraints.**

Meeting Minutes

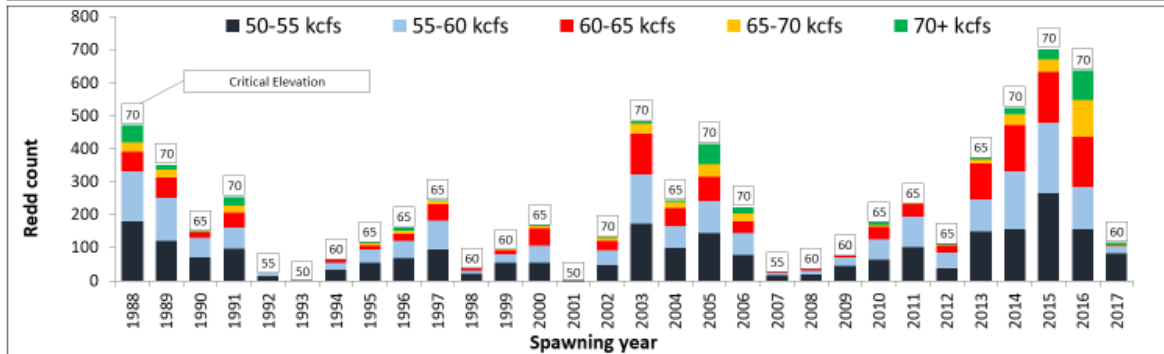
- I. **Welcome and Introductions** – Tracy Hillman welcomed attendees to the meeting. Attendees introduced themselves.
- II. **Agenda Review** – The agenda was reviewed and approved.
- III. **Review of Action Items** - Action items identified during the November 2017 meeting were discussed.
 - Peter Graf will provide updates on the HRF CPPA Periods and Flow Constraints. **Ongoing.**
 - Ryan Harnish will provide the Hayes et al. (2013) report to the FCWG. **Complete.**
- IV. **HRWG Activities**

Results from the 2017 Vernita Bar Surveys – Peter Graf provided an overview of activities since reverse load factoring began on 15 October 2017. Peter said they (Grant PUD and WDFW) conducted six redd surveys on Vernita Bar in 2017. They observed no redds during the first spawning survey. They observed 49 redds below the 50 kcfs elevation on the second survey (29 October), establishing the Initiation of Spawning date for the below 50 kcfs elevation at 25 October. On 12 November, 40 redds were counted above 50 kcfs, establishing the Initiation of Spawning date above 50 kcfs at 8 November 2017.

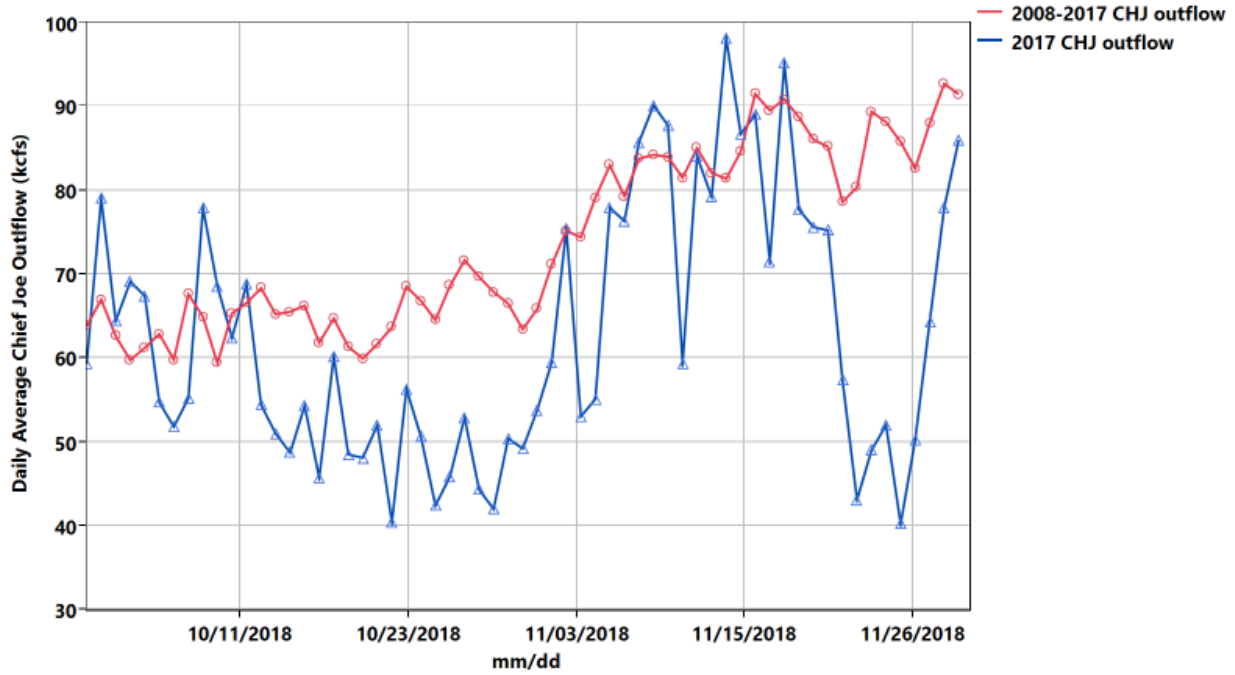
Peter said they conducted their final redd survey on 26 November 2017. In total, they counted 116 redds (see Table and Figure below). This was considerably lower than the numbers counted in the previous four years when the spawning escapements were much larger. Based on redd surveys, the critical elevation was set at 60 kcfs.

2017 Vernita Bar Surveys Results

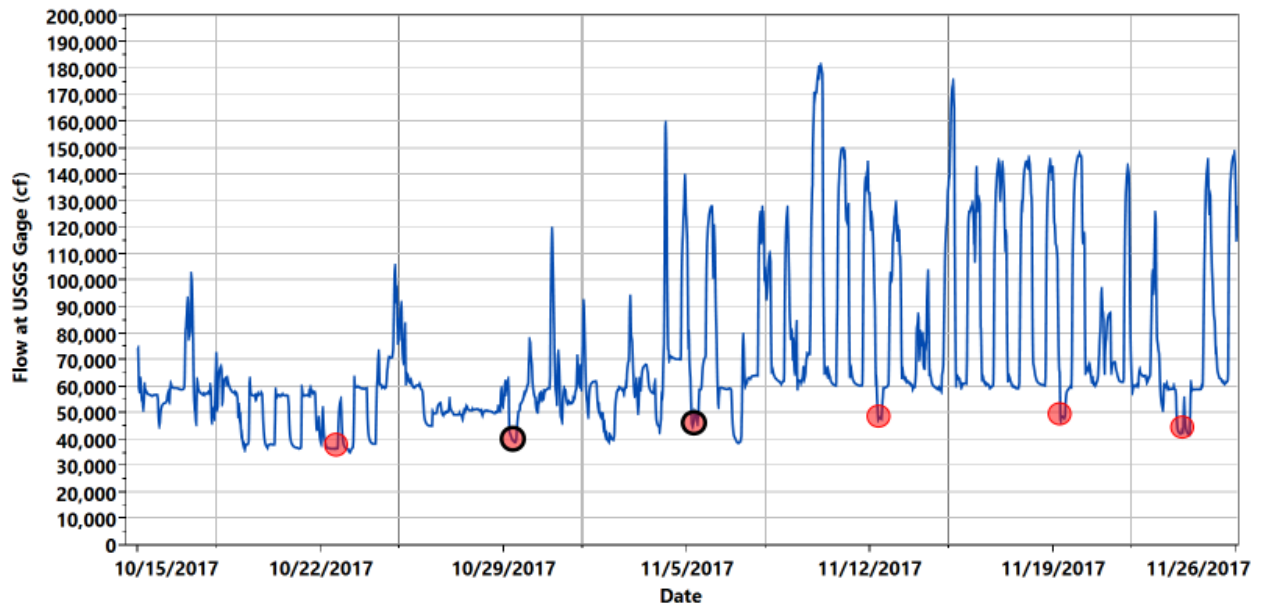
Transect	Final 2017 Redd Count by Flow Level (kcfs)						Total Number of Redds
	36 – 50	50 – 55	55 – 60	60 – 65	65 – 70	Above 70	
Above A	--	10	1	0	0	0	11
A – AB	--	17	2	0	0	0	19
AB – B	--	23	4	3	0	2	32
Below B	--	18	10	1	2	4	35
C	--	16	3	0	0	0	19
Totals	--	84	20	4	2	6	116

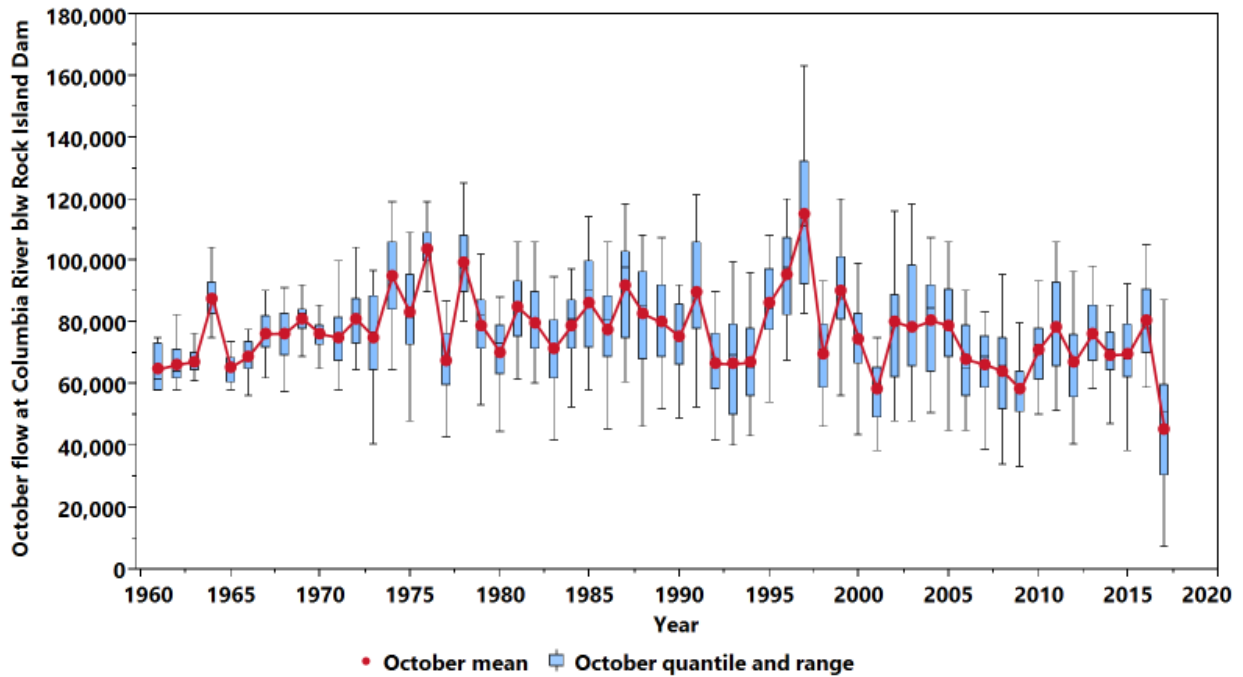


2017-2018 Protection Program Update – Peter Graf indicated that river operators had a difficult time maintaining the target, daytime-spawning flows (55-70 kcfs) in October because of low outflow from Chief Joseph (see Figure below). In the beginning of reverse load factoring, operators had to reduce flows at night to hit daily flow targets, which is opposite of the normal reverse load factoring pattern (see Figure below). October experienced the lowest flows on record since the early 1960’s (see Figure below). Thus, the request in October to reduce the daytime target flows. Flows increased in November making it easier to meet the reverse load factoring daytime flows.

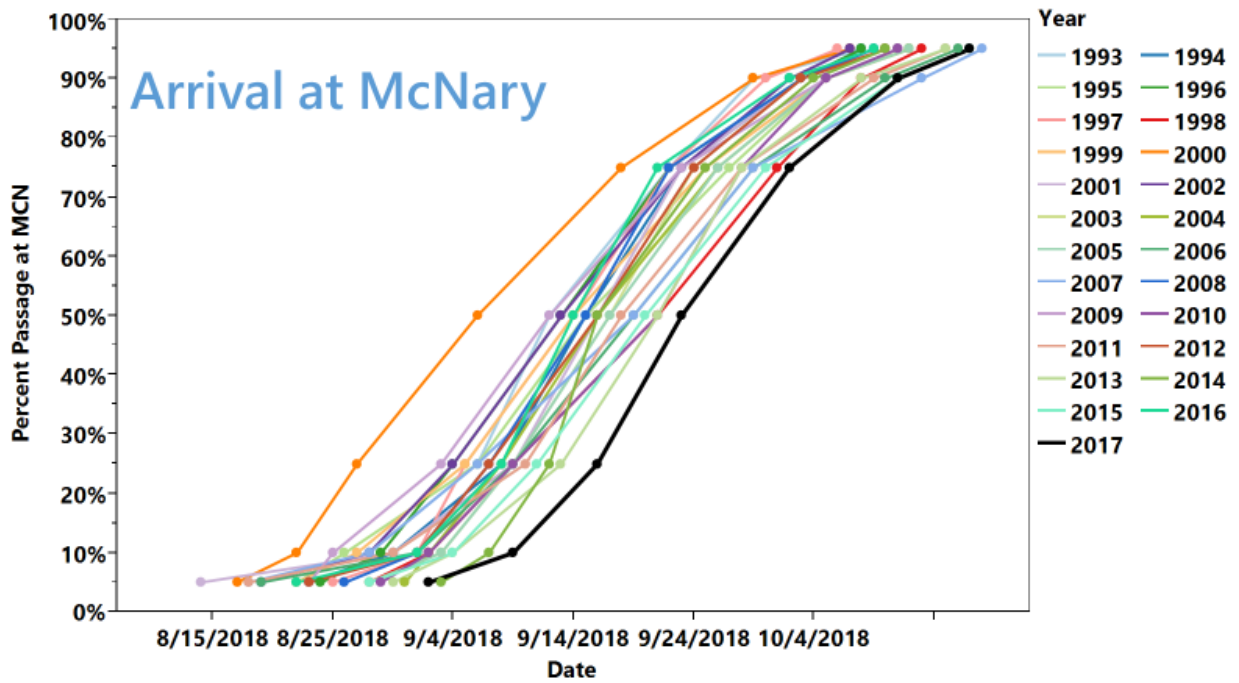
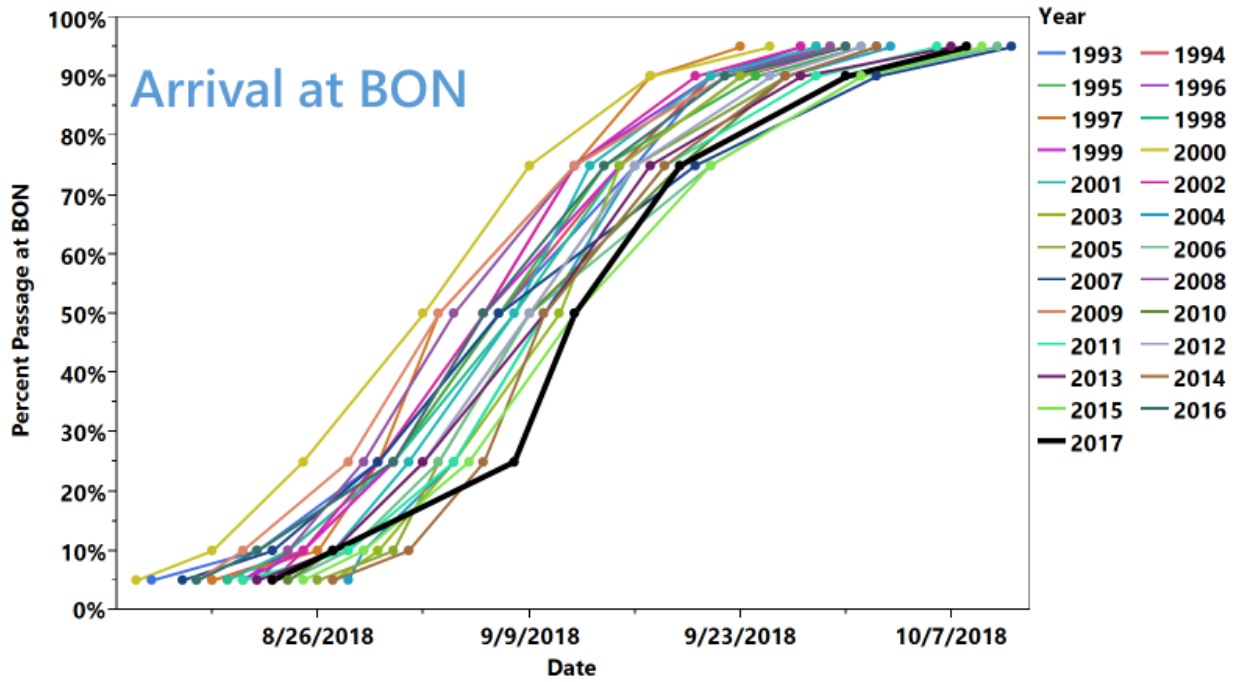


Spawning Period



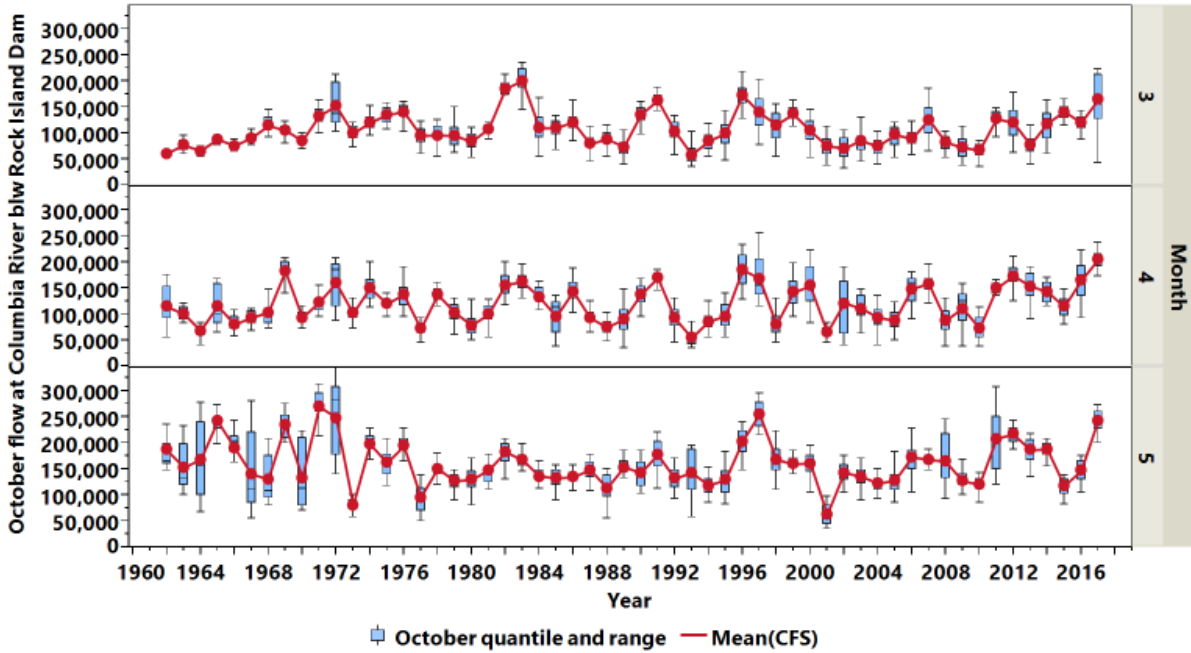


Peter stated that adult fall Chinook arrived late to the Hanford Reach in 2017. He showed the arrival of fall Chinook at both Bonneville and McNary dams (see Figures below). Arrival at these projects was later than normal. There is no apparent reason for the late arrival. Some speculate that low flows, warm temperatures, or predation may be the reason for the late arrival of fall Chinook.

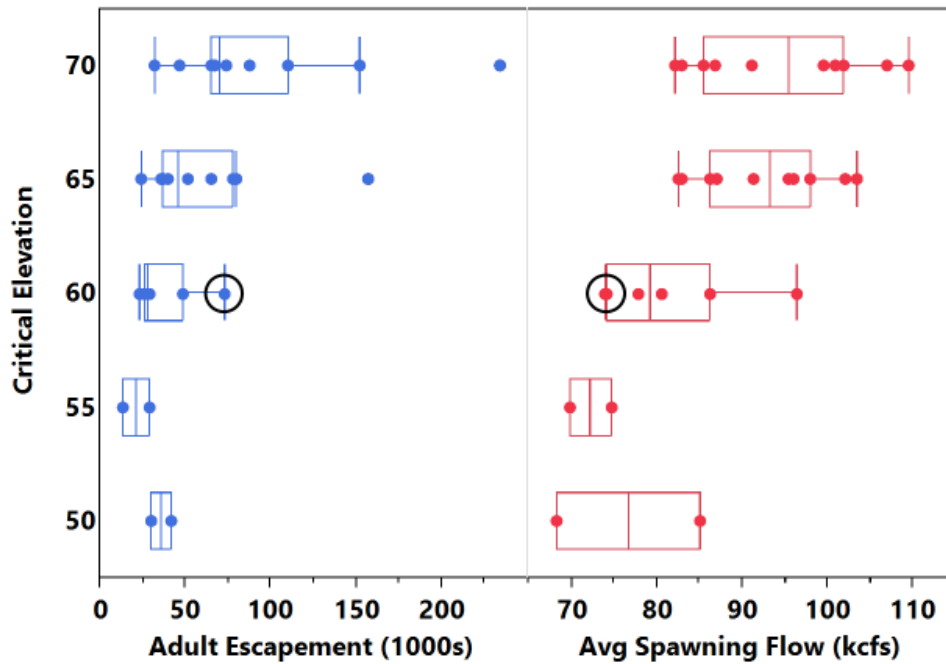
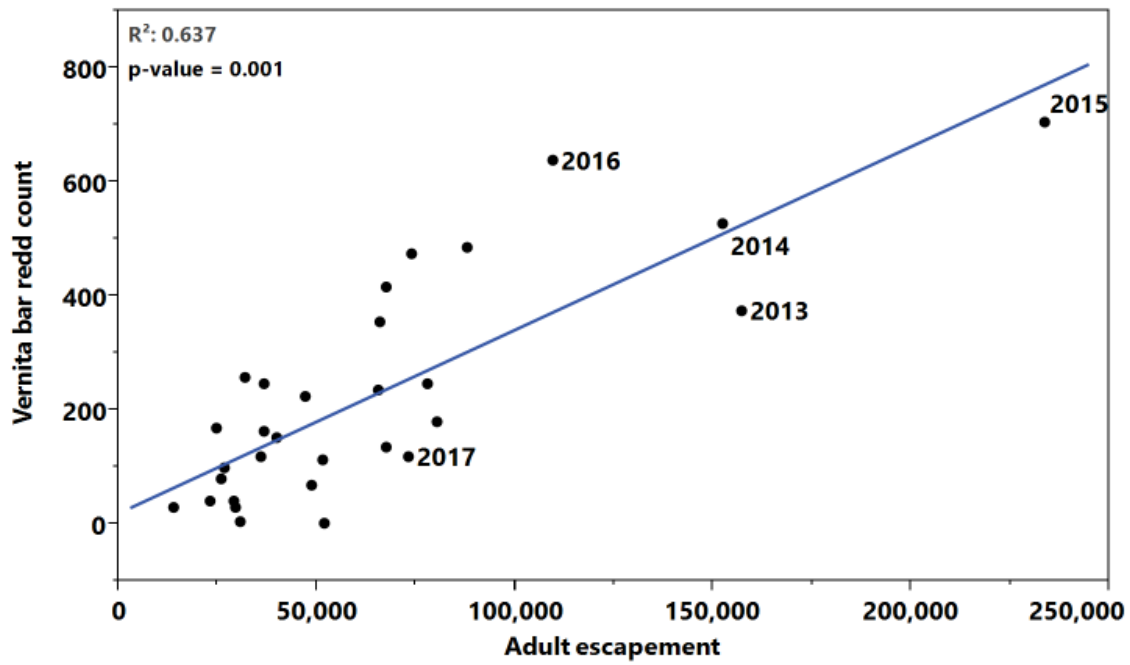


Peter noted that flows during March through May 2017 were some of the highest on record (see Figure below). It is interesting that record

high flows occurred during spring and record low flows occurred during fall in 2017.

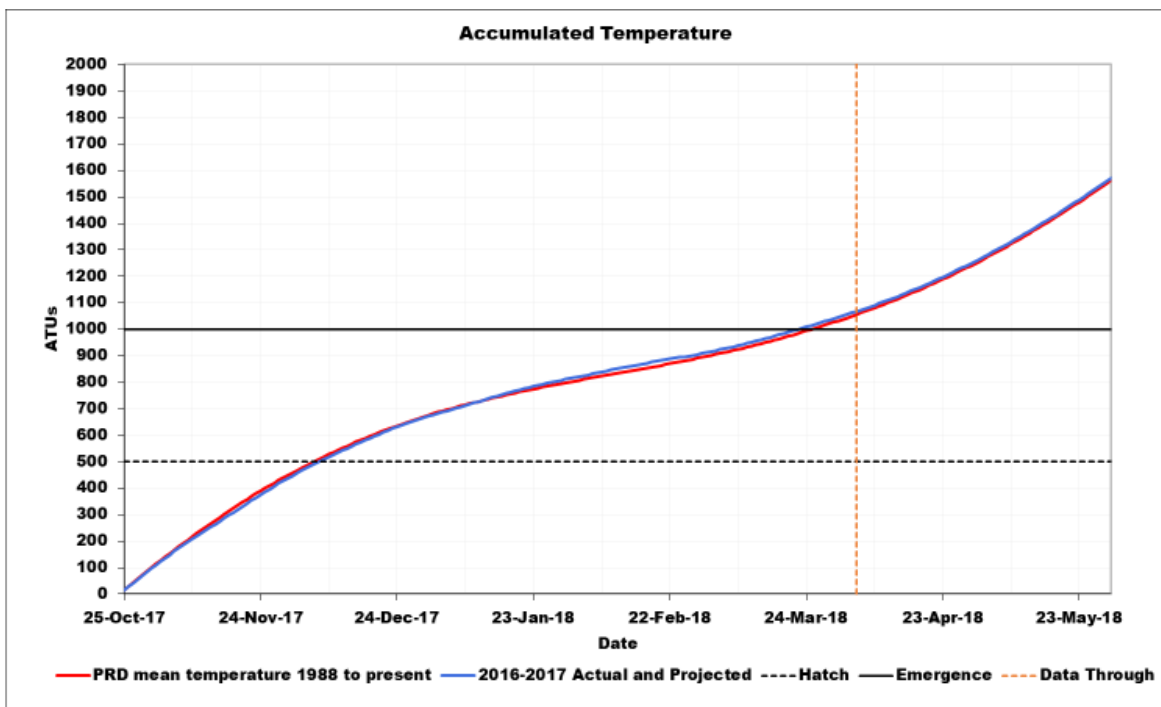
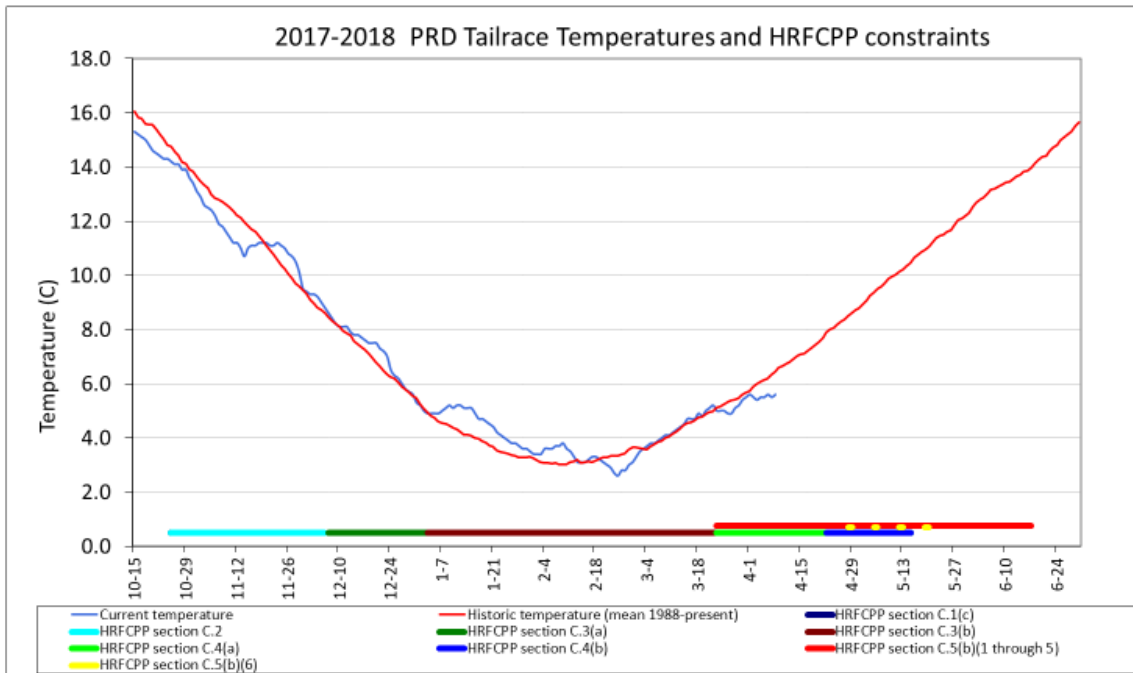


Peter described the relationship between adult escapement and Vernita Bar redd counts (see Figure below) and the relationship between critical elevation and escapement (see Figure below).

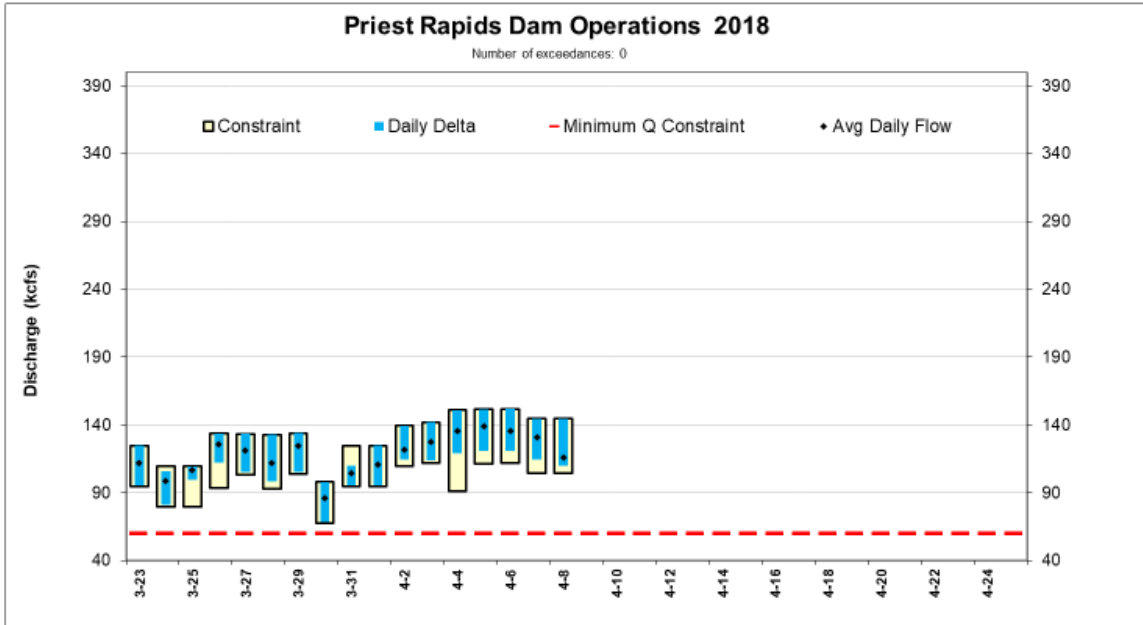


Peter then described the change in temperatures over time and compared them to mean temperatures (1988-present). He also showed accumulated temperature units (ATMs) over time (see Figures

below). He said fall Chinook require 500 ATUs to hatch and 1,000 ATUs for emergence.



Peter indicated that they have successfully met all flow fluctuation constraints since Hatch (60 kcfs minimum and daily delta constraints) (see Figure below). He also identified program average dates for each protection period (see Table below).



Protection Period	Program Average	2017-2018
Spawning Period	10/23	10/25/2017
Hatch	12/3	12/7/2017
Emergence & Rearing Period	3/17	3/23/2018
End of Protections	6/13	6/17/2018

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).”

Priest Rapids Dam Monitoring Update – Peter Graf described the recent efforts to evaluate leakage at Priest Rapids Dam. He said contractors are drilling into the spillway monoliths to determine the amount and location of leakage at Priest Rapids Dam. Peter showed photos taken during the construction of the dam (see Figure below). He said leakage occurs in the joint between the upper and lower blocks. The upper block was constructed about one year after the lower block was finished. Thus, the river flowed over the lower block for about one year before the upper block was constructed. This may be the reason for higher than normal leakage at the dam.

Priest Rapids Spillway Construction

- Normal operating range = 481.5 – 488.0
- Current operating range = 481.5 – 484.5



Low Block – High Block Monoliths



Low Block & PH Monoliths



Peter said the number of drill crews increased to two and they will be drilling into all 22 monoliths. They estimate it will take about two months to complete the work. He said the Priest Rapids Reservoir will be held to operating elevations between 484.5 to 481.5 feet, which is within the lower end of the normal operating range. The maximum reservoir elevation is 488.0 feet. Grant PUD will be able to maintain flows necessary for fall Chinook in the Hanford Reach. Peter reassured everyone that there is no threat to life or property and Priest Rapids Dam will continue to generate electricity and operate as usual.

2017 Fall Chinook Escapement Projections – Paul Hoffarth gave an update on the projected fall Chinook return to the Hanford Reach. He said they are expecting about 60,000 fall Chinook (excluding Jacks) to the Reach. Of those, about 41,000 are wild (natural-origin) fish (see Table below).

2018 URB Forecasted Returns to the Hanford Reach							Estimated return to escapement, sport fishery, and hatcheries							
							Adult return estimates do not include strays, adjusted totals in "combined" (line 30)							
Hanford Reach Natural Origin Fall Chinook							Adult Return Estimate				Adult Return Estimate			
Age 2	Age 3	Age 4	Age 5	Age 6	Total	Adult	Stream	Sport Fishery	Priest Rapids	Ringold Springs	Stream	Sport Fishery	Priest Rapids	Ringold Springs
9,878	6,553	24,046	10,360	519	51,357	41,479	35,790	4,993	696	0	35,134	5,411	933	0
							86.3%	12.0%	1.7%	0.0%	84.7%	13.0%	2.2%	0.0%
							* Mean (2010-2017)				* 2017			
Priest Rapids Hatchery Origin Fall Chinook							Adult Return Estimate				Adult Return Estimate			
Age 2	Age 3	Age 4	Age 5	Age 6	Total	Adult	Priest Rapids	Stream	Sport Fishery	Ringold Springs	Priest Rapids	Stream	Sport Fishery	Ringold Springs
2,203	7,113	6,077	1,987	45	17,424	15,221	10,669	3,208	1,291	53	10,487	3,677	1,050	7
							70.1%	21.1%	8.5%	0.3%	68.9%	24.2%	6.9%	0.0%
							* Mean (2010-2017)				* 2017			
% Female	0%	19%	59%	67%	76%		~ 4,454 females				4,378 females			
Females	0	1,381	3,599	1,341	34	6,354								
Ringold Springs Hatchery Origin Fall Chinook							Adult Return Estimate				Adult Return Estimate			
Age 2	Age 3	Age 4	Age 5	Age 6	Total	Adult	Ringold Springs	Stream	Sport Fishery	Priest Rapids	Ringold Springs	Stream	Sport Fishery	Priest Rapids
1,077	1,212	2,332	497	49	5,167	4,091	2,407	964	506	214	1,289	1,542	717	543
							58.8%	23.6%	12.4%	5.2%	31.5%	37.7%	17.5%	13.3%
							* Mean (2010-2017)				* 2017			
% Female	0%	19%	53%	60%	67%		~ 1,060 females				1,261 @70%			
Females	0	234	1,238	296	33	1,801								
Hanford Reach Fall Chinook (natural and hatchery combined)							Adult Return Estimate				Adult Return Estimate			
Age 2	Age 3	Age 4	Age 5	Age 6	Total	Adult	Stream	Sport Fishery	Priest Rapids	Ringold Springs	Stream	Sport Fishery	Priest Rapids	Ringold Springs
13,157	14,878	32,455	12,844	614	73,948	60,791	39,961	6,790	11,579	2,460	40,353	7,178	11,963	1,296
							* Mean (2010-2017)				* 2017			
Jack estimates based on recent average														
All other estimates based on broodyear regressions														
Estimates calculated using adult to adult CWT expansions, not adjusted by otolith data (yet)														

Paul believes they will have enough fish returning to satisfy broodstock needs at Priest Rapids and Ringold hatcheries and to support a recreational fishery in the reach. He said there has been a reduction in the non-native fisheries and commercial fisheries, including a reduction in ocean fisheries. Paul also indicated that there is a reduction in the number of age-5 fish. John Clark said they are seeing a similar reduction in older fish in Alaska.

Paul noted that WDFW's in-season escapement monitoring begins on 15 September. The minimum escapement goal for the Reach is 31,110 wild fall Chinook. The level of harvest is based on escapement. If more than 42,000 fish escape to the Reach (maximum escapement goal), all fish over the 42,000 escapement can be harvested. If the escapement

is less than 42,000 fish, only 10% of the escapement can be harvested.

2018 CRITF Tagging Study – Jeff Fryer described his proposed tagging activities on the Reach in 2018. He said tagging efforts will be similar to past years with the goal of tagging 200,000 juvenile fall Chinook with CWT. He added that he also has 10,000 PIT tags. Jeff indicated that he plans to start tagging on 31 May and conclude by 11 June. They plan to PIT tag on 5-8 June. He said fish need to be larger than 60 mm for PIT tagging and greater than 48 mm for CWT. Anyone wanting to participate in the tagging efforts should contact Jeff.

V. Priest Rapids Hatchery Updates

Todd Pearsons said the final 2016-2017 hatchery M&E report is available on the Grant PUD website. He said they are working on the 2017-2018 report.

Todd indicated that the release schedule for fall Chinook from the Priest Rapids Fish Hatchery this spring will be the same as last year. That is, fish within the five ponds will be released at different times. Fish in one pond will be released on 23 May, fish in a second pond will be released on 25 May, fish in the third pond will be released on 8 June, and fish in the remaining two ponds will be released after 11 June. This will result in fish being released before and after CRITFC tagging, but not during tagging. Todd indicated that fish in each pond will be differentially marked with CWT and PIT tags. This will allow them to estimate survival rates (SARs) for fish within each release group. Todd noted that fish will be released at night to reduce predation. He said there is some evidence that fish released earlier have a higher survival rate (Snow 2016)¹.

VI. Studies on the Reach

Tracy Hillman asked if there will be any studies conducted in the Project Area this year.

John Clark reported the PSC Northern Fund is sponsoring a study to evaluate metrics of growth in otolith samples of natural-origin recruits to test the hypothesis that early freshwater growth of Hanford Reach Fall Chinook salmon is related to adult spawner and/or subsequent juvenile abundance (density dependent effects). The project will determine whether the prior-year adult escapement and/or pre-smolt abundance of juvenile fall Chinook salmon in the Hanford Reach is related to early freshwater growth in these fish. Recently completed work indicates that the size at emigration of fall Chinook smolts at McNary Dam is negatively correlated with pre-smolt abundance. With

¹ Snow, C. 2016. Survival of age-0 hatchery summer-run Chinook salmon is enhanced by early release. North American Journal of Aquaculture 78:45-51.

recent adult escapements for this stock reaching record highs in the past several years, it is possible that early freshwater rearing habitat or food may be reducing the growth of this stock following high spawner escapements. A unique opportunity exists to use preexisting otolith microchemistry analysis (run years 2011 and 2012) and new samples to determine whether juvenile freshwater rearing habitat carrying capacity may be limiting the growth of juvenile fall Chinook salmon in the Hanford Reach.

John also indicated that the CTC Letter of Agreement (LOA) is funding predator abundance work between Priest Rapids and McNary dams. Geoff McMichael and the Yakama Nation will use mark-recapture techniques to estimate the abundance of walleye, smallmouth bass, and northern pikeminnow. The results from the proposed project will provide important missing information regarding the abundance of predator fishes that are thought to be responsible for the productivity bottleneck on juvenile Chinook salmon in the mid-Columbia Basin. Paul Hoffarth noted that the managers may be able to regulate flows such that they reduce recruitment of walleye and smallmouth bass.

Lastly, Tracy Hillman stated that NOAA Fisheries will be developing a model to assess the effects of contaminants on juvenile and adult Pacific lamprey in the Hanford Reach.

- VII. Next Meeting:** The FCWG will next meet on Monday, 29 October 2018 at Grant PUD in Ephrata, WA. The meeting will follow the spawning survey on Sunday, 28 October. Members are encouraged to participate in the spawning survey.