



# FISH PASSAGE CENTER

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## MEMORANDUM

To: Fish Passage Advisory Committee (FPAC)  
From: FPC Staff  
Date: January 12, 2018  
Subject: Action Notes from January 9, 2018, FPAC meeting

On January 9, 2018, FPAC met via conference call for its weekly meeting. The following people participated in the meeting:

Paul Wagner (FPAC Co-Chair NOAA)	Gabe Scheer (FPC)
Tom Lorz (FPAC Co-Chair CRITFC)	Jay Hesse (Nez Perce Tribe)
Bobby Hsu (FPC)	Jennifer Graham (Warm Springs Tribe)
Brandon Chockley (FPC)	Kyle Dittmer (CRITFC)
Charlie Morrill (WDFW)	Michele DeHart (FPC)
Dave Swank (USFWS)	Sheri Sears (Colville Tribe)
Erick Van Dyke (ODFW)	
Erin Cooper (FPC)	

## **AGENDA ITEMS**

### ***Approval of Notes***

- FPAC notes from December 19 were approved without changes.

### ***Water Supply***

- The usual Water Supply Summary was not distrusted prior to the meeting. Paul Wagner (NOAA) noted that most of the water supply forecasts are trending towards normal.

### ***Weather***

- Kyle Dittmer (CRITFC) provided a summary of weather conditions and water year status. See attached.
- Approaching system expected to bring significant precipitation to lower elevations and snow in higher elevations (~4,000 feet) on Thursday, January 11<sup>th</sup>.
- NOAA's models predicting 80-90% probability of La Niña.

### ***Dworshak Operations***

- Paul Wagner (NOAA) stated that the current COE preference for outflows at Dworshak is 1.7 Kcfs. COE has concerns over refill. Although there are some potential modifications to operations, there are not a lot of options.
  - The current COE forecast is for 2.9 MAF of inflows, but the COE does not feel that this forecast is accurate (overinflated influence of SOI, snowpack is close to average, overall concerns about the model). COE is using current RFC forecast of 2.5 MAF and feels that even it might be too high.
- The COE is currently operating to and end of January elevation of 1530.5'. The current elevation of Dworshak Reservoir is 1521.77'.
  - Paul Wagner pointed out that the STP shows a discharge of 8.5 Kcfs through February, but the COE had previously responded that they expect inflows to be much lower than predicted by current forecast.
  - Tom Lorz (CRITFC) pointed out that they will refill to flood control elevations because they are limiting turbine output to 1.7 Kcfs.
- Dave Swank (USFWS) asked when turbine maintenance (on small unit) would be completed. Paul Wagner replied that the current turbine maintenance is routine and will likely be done on time. There will be an update on this at TMT tomorrow.
- Charlie Morrill (WDFW) asked how many times we have not met refill for spring flows. Tom Lorz replied that we have always met refill, with the exceptions of when there was too much drafting in January.
- Paul Wagner asked if FPAC members want to request a change from the current operation of 1.7 Kcfs outflow from Dworshak. He stated that an SOR would not necessarily be required as the COE stated a preference to not manage through SORs.
  - Michele DeHart (FPC) asked what the alternative to SORs if managers would like a change in operations.
  - Paul Wagner stated that operation alternatives can be discussed at TMT. The COE will want an SOR if the requested operations are outside of the BiOp, such as operating below flood control.
  - Tom Lorz pointed out that the STP for February is 1510. Even if the COE believes inflows will be less than predicted, the difference can be made up in a few days once turbine units are back online.
  - Michele DeHart suggested that having a record of managers' operational requests and reasoning would be beneficial. Paul Wagner replied that if requests differ from the BiOp, the COE will ask managers to document the rational. Michele DeHart pointed out that the COE has not done this for

managers, despite deviations from COE forecasts. Paul Wagner replied that information will be provided at tomorrow's TMT.

- Jay Hesse (Nez Perce Tribe) pointed out that at the beginning of December, FPAC provided an end of December target elevation for the COE to operate to (1,520'), including an analysis of refill probabilities. The approach could be taken again.
  - Charlie Morrill (WDFW) suggested this approach be taken and revised with newer forecasts as available.
- FPAC need verification that DWOR is down to single small unit, as planned. Will ask for verification at tomorrow's TMT meeting.
- Brandon Chockley (FPC) pointed out that limiting outflows by 0.7 Kcfs now may create a TDG problem later if COE plans to manage to 110% standard, as turbine outflows will be limited to 2.5 Kcfs for rest of January.
- FPAC managers agree to discuss Dworshak operations at tomorrow's TMT and then decide if an SOR is necessary.

### ***Adult Passage at Little Goose Dam***

- Michele DeHart (FPC) provided a summary of past FPC analysis regarding delay at LGS and summarized the status of current FPC reviews/analyses of adult passage at Little Goose Dam.
  - In the summer of 2017, Russ Kiefer (IDFG) distributed a spreadsheet used by Idaho to indicate when there is an observed delay. At December 19, 2017 FPAC meeting, Charlie Morrill (WDFW) asked the FPC to review this spreadsheet, outline the underlying assumptions, and make recommendations on whether it is an appropriate tool for diagnosing delay at LGS.
  - FPC provided a review of NOAA's assessment of spill and delay at Little Goose (see FPC memo [August 16, 2017](#)).
  - FPC filed a FOIA request for hourly turbine operations at Little Goose Dam. This information was given to FPC and an analysis is currently underway to explore the relationship between operations and adult passage.
  - FPC is currently working on an analysis to determine the impact of adult delay on upstream success and arrival at hatcheries.
  - FPC has received a data request from ODFW to synthesize all available information on LGS adult passage into a single summary. This is currently underway and will hopefully be available by the end of January.

### ***Coordination***

- The next FPAC meeting will be a face-to-face on January 16<sup>th</sup> at 10AM.
- There is an SRWG meeting immediately following FPAC today to discuss juvenile tagging and adult tagging at Ice Harbor.
- There will be an SRWG on January 18<sup>th</sup> at CRITFC at 1:00 PM to discuss proposed studies.
- TMT will be tomorrow, January 10

- The next FPOM will be Thursday, January 11.

DRAFT

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**FPAC Agenda for Tuesday January 9, 2018**  
**Meeting time: 9:00 AM**

1. Approval of notes from December 19 meeting
2. Water supply and reservoir status
3. Weather update and climate forecast
4. Dworshak operations
5. Initial discussion of Idaho passage method
6. Other
7. Coordination for other schedule meetings

# YEAR-TO-DATE ADULT RETURN COMPARISON REPORT

[ [FPC Home](#) ] [ [Adult Salmon Home](#) ]

Dam	End Date	Spring Chinook						Summer Chinook						Fall Chinook					
		2017		2016		10-yr Avg		2017		2016		10-yr Avg		2017		2016		10-yr Avg	
		Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack
BON	01/06	1	0	0	0			0	0	0	0			0	0	0	0		
TDA	01/05	1	0					0	0					0	0				
JDA																			
MCN	01/06	0	0					0	0					0	0				
IHR																			
LMN																			
LGS																			
LGR																			
PRD																			
WAN																			
RIS																			
RRH																			
WEL																			
WFA	01/07	0	0	0	0			0	0	0	0			0	0	0	0		

Dam	End Date	Coho						Sockeye			Steelhead						Lamprey			Shad		
		2017		2016		10-yr Avg		2017	2016	10 Year	2017	2016	10 Year	2017	2016	10 Year	2017	2016	10 Year			
		Adult	Jack	Adult	Jack	Adult	Jack	Adult	Adult	Adult	Adult	Adult	Unclipped	Unclipped	Unclipped							
BON	01/06	0	-1	0	0			0	0		25	22		11	11		-1	0		0	0	
TDA	01/05	0	0					0			7			0			0			0		
JDA																						
MCN	01/06	0	0					0			28			12			0			0		
IHR																						
LMN																						
LGS																						
LGR																						
PRD																						
WAN																						
RIS																						
RRH																						
WEL																						
WFA	01/07	0	2	0	0			0	0		58	22		0	0		0	0		0	0	

**NOTES:**

- Since the year 2006, Priest Rapids Dam jack counts have included mini jacks.
- BON=Bonneville, TDA=The Dalles, JDA=John Day, MCN=McNary, LMN=Lower Monumental, LGS=Little Goose, LGR=Lower Granite, PRD=Priest Rapids, RIS=Rock Island, RRH=Rocky Reach, WEL=Wells, WFA Willamette Falls Dam
- This report is based on historic dam counting dates. In January and February, Willamette Falls Dam is the only project that appears on the report because historically it collected data during this time period.
- End Date is the last day of data we have for that site - the 2014 and 10 year average are also run to this end date.
- PRD is not posting wild steelhead numbers.
- These numbers were collected from USACE, Grant PUD, Douglas PUD, Chelan PUD, ODFW and DART.
- Shad data are not available at WEL, WFA, RIS, and RRH.
- Wild steelhead numbers are included in the total. Wild Steelhead are defined as unclipped fish.
- Historic counts (pre-1996) were obtained from CRITFC and compiled by the FPC.
- Historic counts 1997 to present were obtained from the Corps of Engineers.

Page design last updated on: March 9, 2017

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# 2018 ADULT SALMON COUNTS

Daily Totals for Last 7 days and Year to Date Totals (based on reporting dates since 2000)

[ [FPC Home](#) ] [ [Adult Salmon Home](#) ]

[Corp of Engineers Adult Fish Count Queries by Project and Fish Ladder](#)

**NOTE:**

- These data are updated as soon as the Corp of Engineers provides the data to us.

**MORE HOT LINKS:**

GO TO: [Adult Count RSS Feed](#) or [Annual Totals](#) or 10 Yr. Avg. vs 2017 and 2016 [Graph Table](#) or [Water Flow & Spill](#) or [Current Water Temperature \(January through December\)](#)  
[Current vs. Historical Water Temperature \(April through Aug\) Offline until April](#)

**FISHING REPORTS:** [Oregon](#) or [Washington](#) or [Idaho](#)

**WILLAMETTE FALLS 2)**

DATE	CHINOOK ADULT	CHINOOK JACK	SPRING CHINOOK ADULT	SPRING CHINOOK JACK	SUMMER CHINOOK ADULT	SUMMER CHINOOK JACK	FALL CHINOOK ADULT	FALL CHINOOK JACK	COHO ADULT	COHO JACK	STEELHEAD	WILD 5) STEELHEAD	SHAD	SOCKEYE	LAMPREY	CHUM	PINK	SOURCE
01/02/18	0	0	0	0	n/a	n/a	0	0	0	2	9	n/a	n/a	n/a	n/a	n/a	n/a	WFA
01/03/18	0	0	0	0	n/a	n/a	0	0	0	0	9	n/a	n/a	n/a	n/a	n/a	n/a	WFA
01/04/18	0	0	0	0	n/a	n/a	0	0	0	0	8	n/a	n/a	n/a	n/a	n/a	n/a	WFA
01/05/18	0	0	0	0	n/a	n/a	0	0	0	0	10	n/a	n/a	n/a	n/a	n/a	n/a	WFA
01/06/18	0	0	0	0	n/a	n/a	0	0	0	0	5	n/a	n/a	n/a	n/a	n/a	n/a	WFA
01/07/18	0	0	0	0	n/a	n/a	0	0	0	0	7	n/a	n/a	n/a	n/a	n/a	n/a	WFA
01/08/18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>YTD</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>n/a</b>	<b>n/a</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>58</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>	

**BONNEVILLE DAM**

DATE	CHINOOK ADULT	CHINOOK JACK	SPRING CHINOOK ADULT	SPRING CHINOOK JACK	SUMMER CHINOOK ADULT	SUMMER CHINOOK JACK	FALL CHINOOK ADULT	FALL CHINOOK JACK	COHO ADULT	COHO JACK	STEELHEAD	WILD 5) STEELHEAD	SHAD 6)	SOCKEYE	LAMPREY	CHUM	PINK	SOURCE
01/02/18	1	0	1	0	0	0	0	0	0	0	4	1	0	0	0	0	0	USACE
01/03/18	0	0	0	0	0	0	0	0	-1	0	3	1	0	0	0	0	0	USACE
01/04/18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01/05/18	0	0	0	0	0	0	0	0	0	0	10	3	0	0	0	0	0	USACE
01/06/18	0	0	0	0	0	0	0	0	0	0	3	2	0	0	-1	0	0	USACE
01/07/18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01/08/18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>YTD</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-1</b>	<b>25</b>	<b>11</b>	<b>0</b>	<b>0</b>	<b>-1</b>	<b>0</b>	<b>0</b>	

**THE DALLES DAM 2) \*\*)**

DATE	CHINOOK ADULT	CHINOOK JACK	SPRING CHINOOK ADULT	SPRING CHINOOK JACK	SUMMER CHINOOK ADULT	SUMMER CHINOOK JACK	FALL CHINOOK ADULT	FALL CHINOOK JACK	COHO ADULT	COHO JACK	STEELHEAD	WILD 5) STEELHEAD	SHAD	SOCKEYE	LAMPREY	CHUM	PINK	SOURCE
01/02/18	1	0	1	0	0	0	0	0	0	0	3	0	n/a	0	0	0	0	USACE
01/03/18	0	0	0	0	0	0	0	0	0	0	2	0	n/a	0	0	0	0	USACE
01/04/18	-1	0	-1	0	0	0	0	0	0	0	1	0	n/a	0	0	0	0	USACE
01/05/18	0	0	0	0	0	0	0	0	0	0	0	0	n/a	0	0	0	0	USACE
01/06/18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01/07/18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01/08/18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>YTD</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>n/a</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	

**MCNARY DAM \*\*)**

DATE	CHINOOK ADULT	CHINOOK JACK	SPRING CHINOOK ADULT	SPRING CHINOOK JACK	SUMMER CHINOOK ADULT	SUMMER CHINOOK JACK	FALL CHINOOK ADULT	FALL CHINOOK JACK	COHO ADULT	COHO JACK	STEELHEAD	WILD 5) STEELHEAD	SHAD	SOCKEYE	LAMPREY	CHUM	PINK	SOURCE
01/02/18	0	0	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	USACE
01/03/18	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	USACE
01/04/18	0	0	0	0	0	0	0	0	0	0	6	2	0	0	0	0	0	USACE
01/05/18	0	0	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	USACE
01/06/18	0	0	0	0	0	0	0	0	0	0	10	4	0	0	0	0	0	USACE
01/07/18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01/08/18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>YTD</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>28</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	

**NOTES:**

- At Willamette Falls Dam, it takes the staff most of the day to accurately review one day of fish passage on tape when the counts are high. The WFA staff make every attempt to keep the counts as up-to-date as possible. Note: at WFA Monday's are extremely busy, as the staff attempt to catch-up with the weekend counts.
- The Corp of Engineers has stopped shad counting at The Dalles, starting in 2011 on the advice of the Fish Passage Operations and Management (FPOM) committee, made up of NOAA, CRITFC, ODFW, WDFW, IDFW, BPA, and COE biologists.
- 1) Since the year 2006, Priest Rapids Dam and Wanapum Dam jack counts have included mini jacks.
- 2) Shad are not counted at Willamette Falls, The Dalles, John Day, Lower Monumental, Little Goose, Rock Island, Rocky Reach and Wells Dams
- 3) Steelhead counts appear higher at Lower Granite Dam because most years a group which migrated into the river system between October and December overwinters below LGR and continues its migration in early March.

- 4) As the Army Corp of Engineers no longer collects adult counts from the PUDs, we now get data directly from Chelan, Douglas and Grant Co. PUDs and DART.
- The steelhead counts include unclipped (wild) steelhead. It is not appropriate to add the steelhead counts and wild steelhead counts together.
- 5) Wild steelhead are counted separately from hatchery steelhead at Corps dams on the Columbia and Snake Rivers. Wild steelhead are identified as fish with an intact adipose fin. However, a small number of hatchery fish may not have had their adipose fin removed. There are no wild steelhead counts at Priest Rapids or Willamette Falls. Willamette Falls counts for: Chinook, Steelhead, and Coho only.
- 6) Shad are typically not counted at any of the Corps dams after August 31 each year and shad are not counted at all Corps dams. An n/a in the shad columns at Bonneville Dam and Lower Granite Dam after August 31st means that the shad are not being counted.
- 7) In 2014, Grant County PUD trapped and transported hundreds of Lamprey above Rock Island Dam. Therefore, the ladder counts of Lamprey at Rock Island under estimate the true numbers of lamprey past the project.
- In 2012, the U.S. Army Corps of Engineers and NOAA Fisheries are currently developing automated counting systems for Lamprey Passage Structures (LPS) installed at Bonneville Dam. In the interest of publishing accurate counts, LPS counts will not be publicly posted in-season until the automated systems are fully operational.
- The adult counts in this report are based on reporting dates for dams recently established (2000). They are presented in the table below. A report with adult salmon counts based on historical dates (prior to 2000) can be found [here](#).
- The reporting dates table shows that several dams stop counting fish around November 15th each year. After a dam stops counting fish for the season, only the total number of fish are shown on this report.
- These data are updated periodically throughout the day. The FPC data retrieving robot searches the web for updated data every 30 minutes in the AM, and every hour in the PM.
- The last column " Source " shows where the data was imported from: NWACE is imported from the COE's Daily Fish Reports; USACE is from [US Army Corps of Engineers](#) fish count pages; CHPUD is from [Chelan PUD](#); GCPUD is from [Grant PUD](#) and DGPUD is from [Douglas PUD](#) and DART is from the [University of Washington's Data Access in Real Time](#). WFA is imported from [ODFW's Willamette Falls](#) website.
- Some of the sites are several days behind in reporting, but is reported by the COE as zero, so where zeros appear across all rows, the data should be considered as "not yet reported".
- Video counts can cause a delay in posting the data to the web, because the staff at the projects have to review the tapes.

2017-18 Adult Salmon Dam Count Monitoring Dates

Dam	Video Monitoring Dates		Direct Monitoring Dates
	Day	Night	
Bonneville Dam	March 1 - March 31, 2017 December 1, 2017 - February 28, 2018	May 15 - September 30, 2016	April 1 to November 30, 2017
The Dalles Dam	March 1 - March 31 December 1, 2017 - February 28, 2018	June 15 - September 30, 2017	April 1 to October 31, 2017
John Day Dam		June 15 - September 30, 2017	April 1 to October 31, 2017
McNary Dam	March 1 - March 31 November 1, 2017 - February 28, 2018	June 15 - September 30, 2017	April 1 to October 31, 2017
Ice Harbor Dam			April 1 to October 31, 2017
Lower Monumental Dam			April 1 - October 31, 2017
Little Goose Dam			April 1 to October 31, 2017
Lower Granite Dam	March 1 - March 31, 2017 November 1 - December 30, 2017	June 1 - September 30, 2017	April 1 - October 31, 2017
Priest Rapids Dam	April 15 - November 15, 2017 (24 hr)		
Wanapum Dam	April 15 - November 15, 2017 (24 hr)		
Rock Island Dam	April 14 - November 15, 2017 (24 hr)		
Rocky Reach Dam	April 14 - November 15, 2017 (24 hr)		
Wells Dam	May 1 - November 15, 2017 (24 hr)		
Willamette Falls	Count year round (24 hr)		

2016-2017 Columbia and Snake River Fishway Outages

Dam	Dates Fishways are Closed
Bonneville Dam	Bradford Island Fishway: Not Dewatering. Cascades Island Fishway: Not Dewatering. Washington Shore Fishway: December 1, 2016 - February 28, 2017.
The Dalles Dam	East Fish Fishway: December 1, 2016 - February 28, 2017. North Fish Fishway: January 3, 2017 - January 17, 2017.
John Day Dam	North Fish Fishway: December 1, 2016 - January 10, 2017. South Fish Fishway: January 17, 2017 - February 28, 2017.
McNary Dam	Washington Shore Fishway: December 1, 2016 - January 27, 2017. Oregon Shore Fishway: January 28, 2017 - February 24, 2017.
Ice Harbor Dam	North Shore Fishway: January 3, 2017 - January 27, 2017. South Shore Fishway: January 30, 2017 - February 27, 2017.
Lower Monumental Dam	North Shore Fishway: January 3, 2017 - January 30, 2017. South Shore Fishway: February 6, 2017 - February 28, 2017.
Little Goose Dam	January 2, 2017 - February 17, 2017.
Lower Granite Dam	January 2, 2017 - February 13, 2017.
Priest Rapids Dam	Left Bank Fishway: TBD Right Bank Fishway: TBD
Wanapum Dam	Right Bank Fishway: TBD Left Bank Fishway: TBD
Rock Island Dam	Right Bank Fishway: January 3, 2017 to January 24, 2017. Left Bank Fishway: December 19, 2017 to February 2, 2017. Middle Fishway: December 5, 2016 to December 30, 2016.



Rocky Reach Dam ●  
Wells Dam ●

December 12, 2016 to February 28, 2017.  
West Ladder: TBD  
East Ladder: TBD

- Data source: Corp of Engineers, Dewatering Plans and Schedules. Available online at: <http://www.nwd-wc.usace.army.mil/tmt/documents/FPOM/2010/Plans%20lists%20charts/>

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Water Year 2018 Clim Norm 1981-2010	Precipitation		Monthly Temp. (degF) (pro-rated)
	Monthly	Seasonal	
	Dec. 1 - 31	(Oct. 1 - now)	
Portland	56%	100%	-0.6

UPPER-COLUMBIA:

Kamloops	116%	103%	-2.9
Revelstoke	96%	64%	-2.5
Cranbrook	144%	151%	-5.2
Creston	136%	89%	-1.8
average:	123%	102%	-3.1
Normal:	1.90	6.18	24.9

MIDDLE-COLUMBIA:

Pendleton	83%	105%	-2.3
Redmond	10%	40%	-2.4
Yakima	24%	73%	3.4
Wenatchee AP	62%	104%	-0.4
Omak	33%	69%	0
Spokane	125%	124%	-0.7
average:	56%	86%	-0.4
Normal:	1.68	3.92	29.3

LOWER SNAKE:

Lewiston	271%	179%	-2.6
Pullman	214%	170%	-1.5
Stanley	106%	170%	2
Challis	24%	59%	5.4
average:	154%	145%	0.8
Normal:	1.14	3.77	24.0

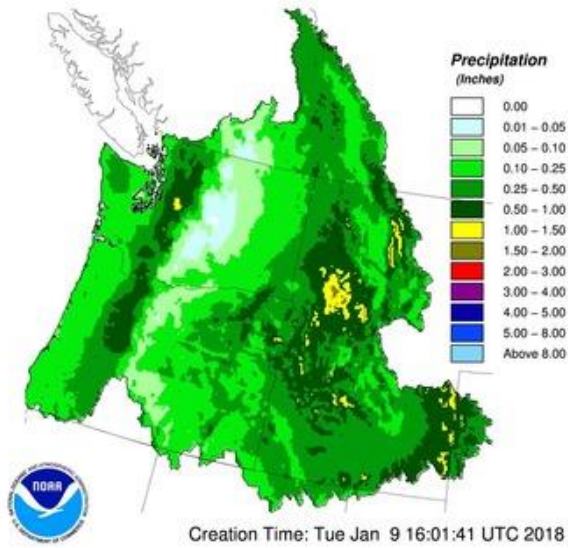
UPPER and MIDDLE SNAKE:

McCall	75%	111%	1.2
Ontario	32%	79%	0.6
Boise	66%	93%	-2.1
Twin Falls	29%	79%	-0.9
Burley	33%	57%	2.5
Pocatello	80%	87%	1
Idaho Falls	37%	75%	-0.1
average:	50%	83%	0.3
Normal:	1.40	3.59	25.6

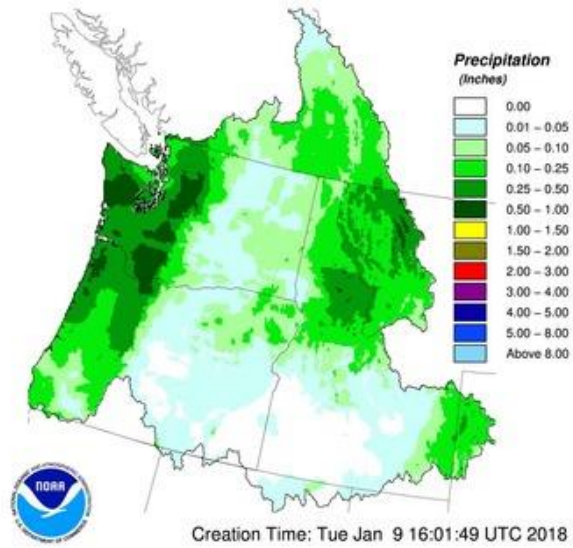
Forecasted Daily Rain (in inches), BON dam area:

9-Jan	0.5
10-Jan	0.57
11-Jan	<b>1.78</b>
12-Jan	0
13-Jan	0
14-Jan	0
15-Jan	0

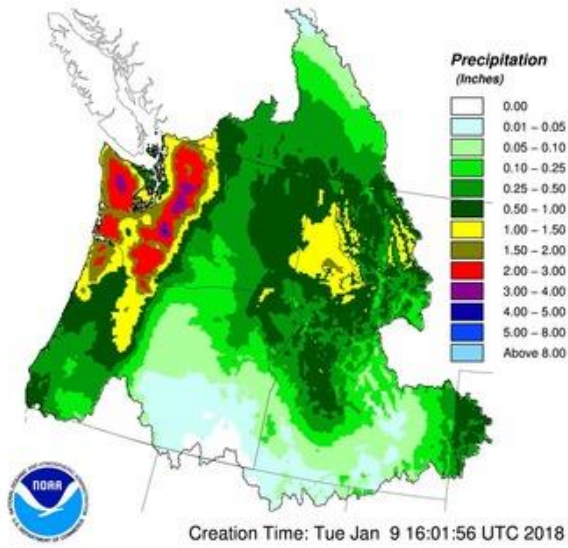
DAY 1 QPF, 24hr Period Ending 12Z, 01/10/2018



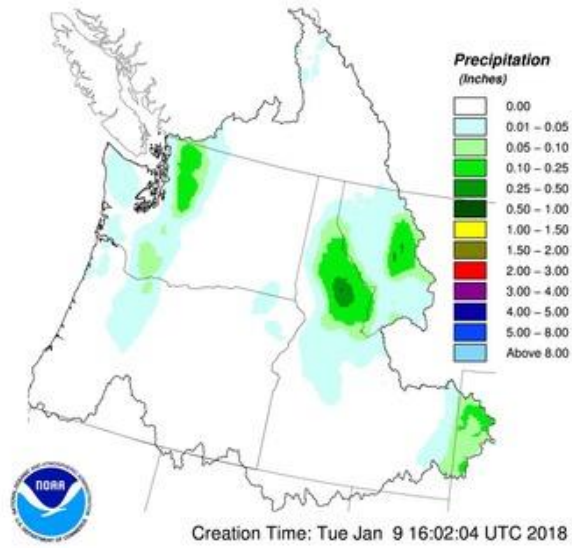
DAY 2 QPF, 24hr Period Ending 12Z, 01/11/2018



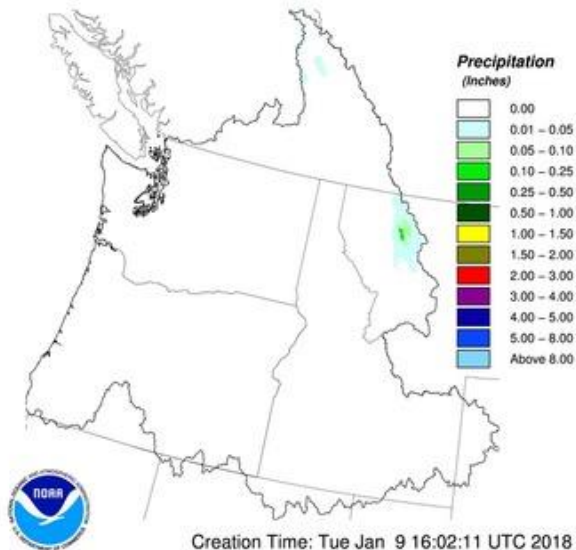
DAY 3 QPF, 24hr Period Ending 12Z, 01/12/2018



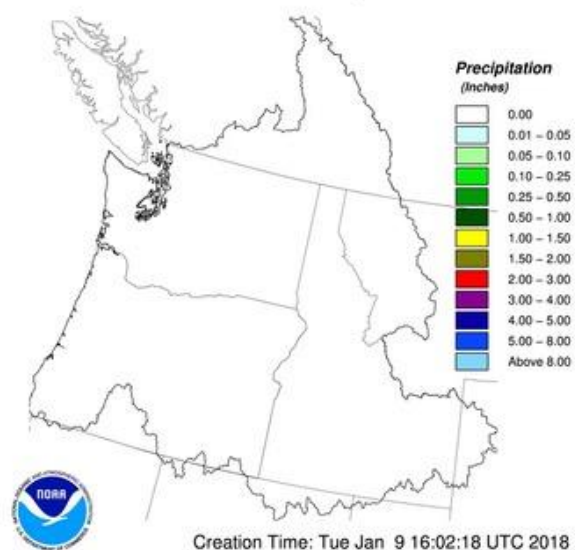
DAY 4 QPF, 24hr Period Ending 12Z, 01/13/2018



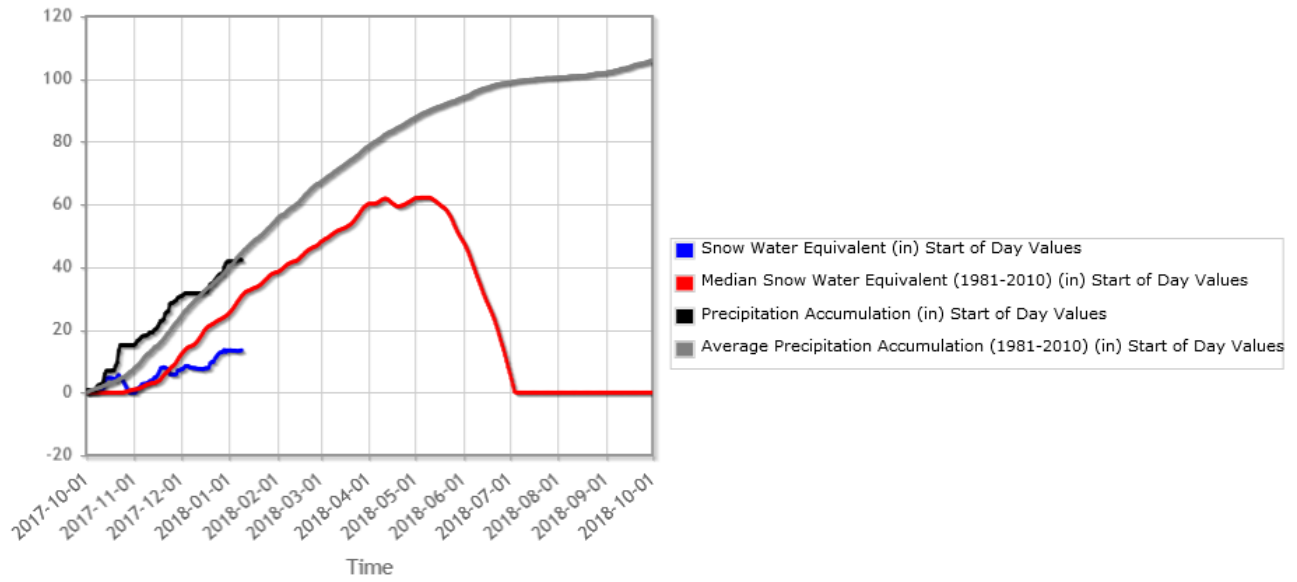
DAY 5 QPF, 24hr Period Ending 12Z, 01/14/2018



DAY 6 QPF, 24hr Period Ending 12Z, 01/15/2018

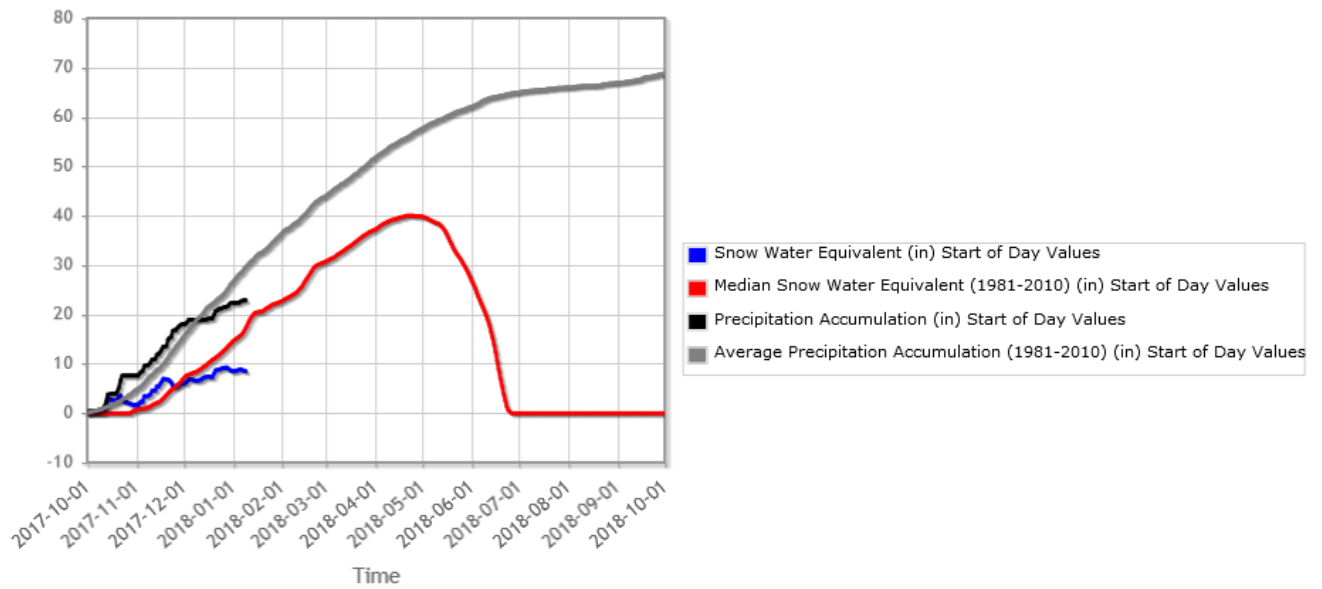


**Mt Hood Test Site (651) Oregon SNOTEL Site - 5370 ft** Reporting Frequency: Daily; Date Range: 2017-10-01 to 2018-09-30



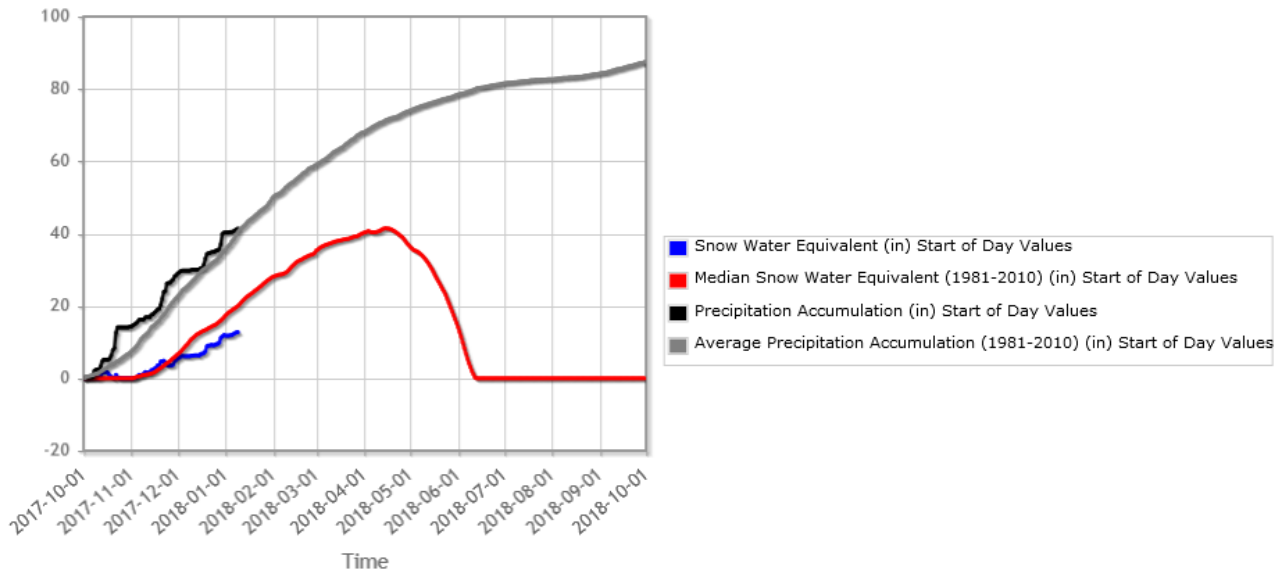
Mt. Hood Test Site, Oregon (north Oregon Cascades). Elevation 5370 feet.

**Irish Taylor (545) Oregon SNOTEL Site - 5540 ft** Reporting Frequency: Daily; Date Range: 2017-10-01 to 2018-09-30



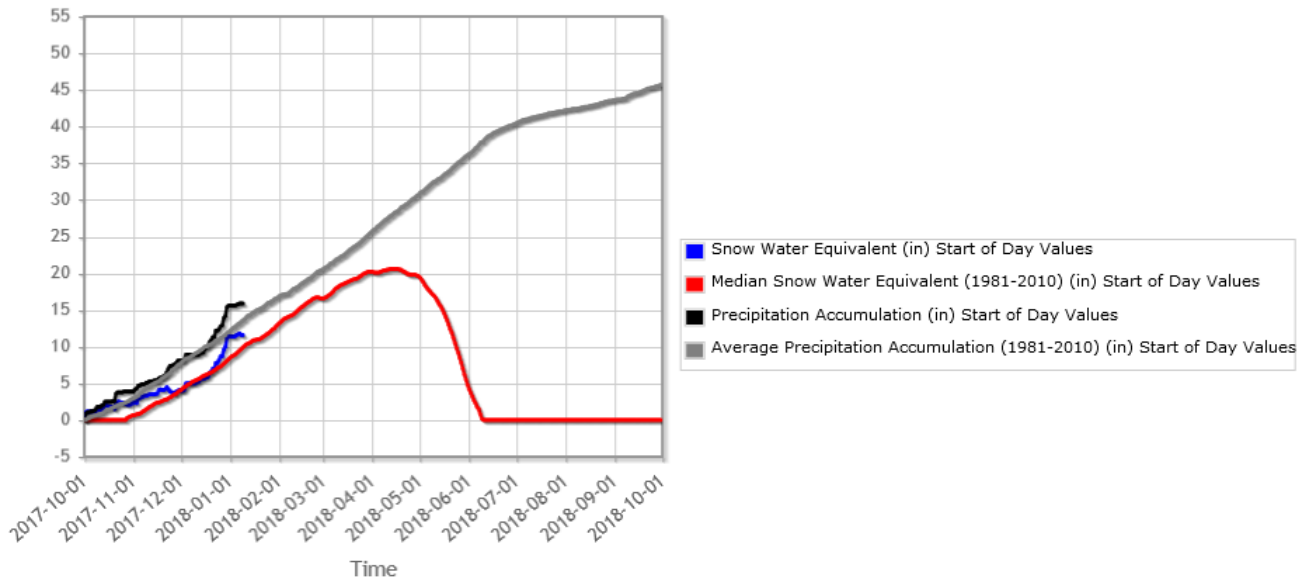
Irish Taylor, Oregon (central Oregon Cascades). Elevation 5540 feet.

**Stampede Pass (788) Washington SNOTEL Site - 3850 ft** Reporting Frequency: Daily; Date Range: 2017-10-01 to 2018-09-30



Stampede Pass, Washington (central Washington Cascades). Elevation 3850 feet.

**Mountain Meadows (650) Idaho SNOTEL Site - 6320 ft** Reporting Frequency: Daily; Date Range: 2017-10-01 to 2018-09-30



Mountain Meadows, Idaho (Panhandle, Salmon River drainage). Elevation 6360 feet.