

The Official WSF is computed on the 3rd work day of the month, January through July, using the 5-day QPF 50% exceedance value. FRM is computed at standard intervals and posted online at: <http://www.nwd.usace.army.mil/Missions/Water/Columbia/FloodControl>

**The APRIL Water Supply Forecast sets BiOp actions as highlighted in the table below.**

Forecast Point	Forecast period	Forecast	BiOp Actions to be Determined
Hungry Horse	April – August Provided by Reclamation	January, February, March Final	Sets min. flows at Hungry Horse and Columbia Falls
	May – September Provided by Reclamation	January, February, March Final	Sets VARQ FRM targets
		April Final	Sets VARQ FRM targets and VARQ refill flows
		May, June Final	Sets VARQ refill flows
The Dalles	April – September Provided by NWRFC	March Final	Sets CRWMP adjustments at Grand Coulee
	April – August Provided by NWRFC	April Final	Sets spring flow objective at McNary Dam
		May Final	Sets end of September draft limits at Hungry Horse and Libby
		July Final	Sets end of August draft limit at Grand Coulee
Lower Granite	April – July Provided by NWRFC	April Final	Sets spring flow objective at Lower Granite
		June Final	Sets summer flow objective at Lower Granite
Libby	April – August Provided by Corps Seattle District	December Final	Sets end of December variable draft target
		January, February, March Final	Sets VARQ FRM targets
		April Final	Sets VARQ FRM targets and VARQ refill flows
		May Final	Sets Libby min. sturgeon flow volume and min. bull trout flows for after sturgeon pulse through Sept. Sets VARQ FRM targets and VARQ refill flows
		June Final	VARQ refill flows
Dworshak	April – July Provided by Corps Walla Walla District	January to June Final	Manage for reservoir FRM and refill

April 3, 2018

**Hungry Horse Dam – Official Water Supply Forecast  
APRIL 2018**

The volumes for the April 2018 final forecast for Hungry Horse Inflows are:

Apr-Jul: 2,543 kaf (136%)

Jan-Jul: 2,861 kaf (136%)

Apr-Aug: 2,636 kaf (136%)

May-Sep: 2,395 kaf (141%)

The minimum flows downstream of Hungry Horse for the rest of the calendar year are as follows:

Columbia Falls: 3,500 cfs

Hungry Horse: 900 cfs

Thanks,

Joel Fenolio, P.E.  
River and Reservoir Operations  
U.S. Bureau of Reclamation  
PN Regional Office  
Boise, ID 83706



# Northwest River Forecast Center Water Supply Forecasts

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## COLUMBIA - THE DALLES DAM (TDAO3) Forecasts for Water Year 2018

### Official Forecast

10 days QPF: Ensemble: 2018-04-04 Issued: 2018-04-04

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	105119	111032	120	120466	92704
APR-JUL	90420	96155	120	106468	79855
APR-AUG	99956	104755	120	113745	87532
JAN-SEP	128371	134284	118	143718	114216
JAN-JUL	113672	119407	118	129719	101368
OCT-SEP	144587	150499	115	159934	130518

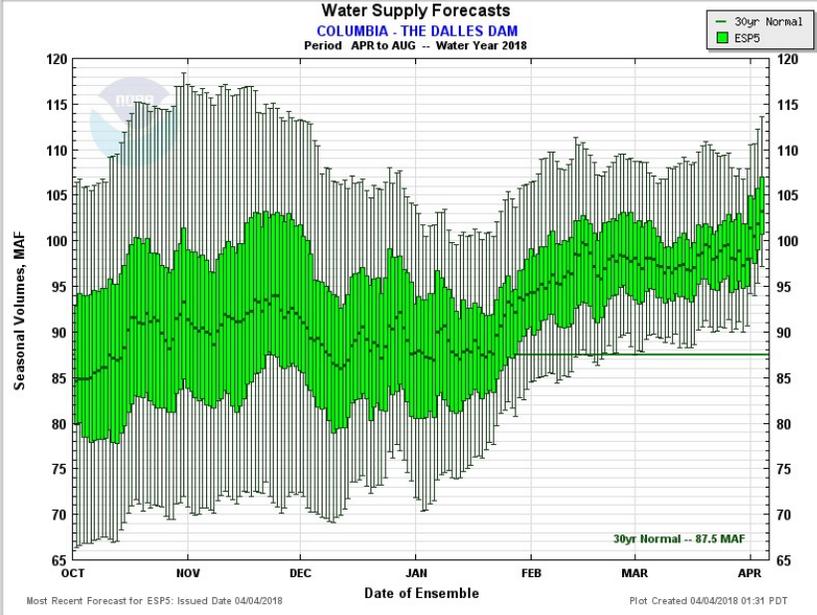
5 days QPF: Ensemble: 2018-04-04 Issued: 2018-04-04

APR-SEP	103256	110300	119	119156	92704
APR-JUL	88855	94310	118	104948	79855
APR-AUG	97152	103258	118	113565	87532
JAN-SEP	126507	133551	117	142408	114216
JAN-JUL	112107	117562	116	128200	101368
OCT-SEP	142723	149767	115	158624	130518

0 days QPF: Ensemble: 2018-04-04 Issued: 2018-04-04

APR-SEP	96869	104504	113	112843	92704
APR-JUL	83344	89146	112	98786	79855
APR-AUG	90684	98469	112	106992	87532
JAN-SEP	120121	127756	112	136095	114216
JAN-JUL	106596	112398	111	122038	101368
OCT-SEP	136337	143971	110	152311	130518

Move the mouse over the desired "Forecast Period" to display a graph.



Most Recent Forecast for ESP5: Issued Date 04/04/2018

Plot Created 04/04/2018 01:31 PDT

Max Scale  Scale To Data  Scale To Last 45 Days

### Overlay

ESP10 **ESP5** ESP0

### Data Files

CSV (ESP5 / APR-AUG)

Forecast Ensemble



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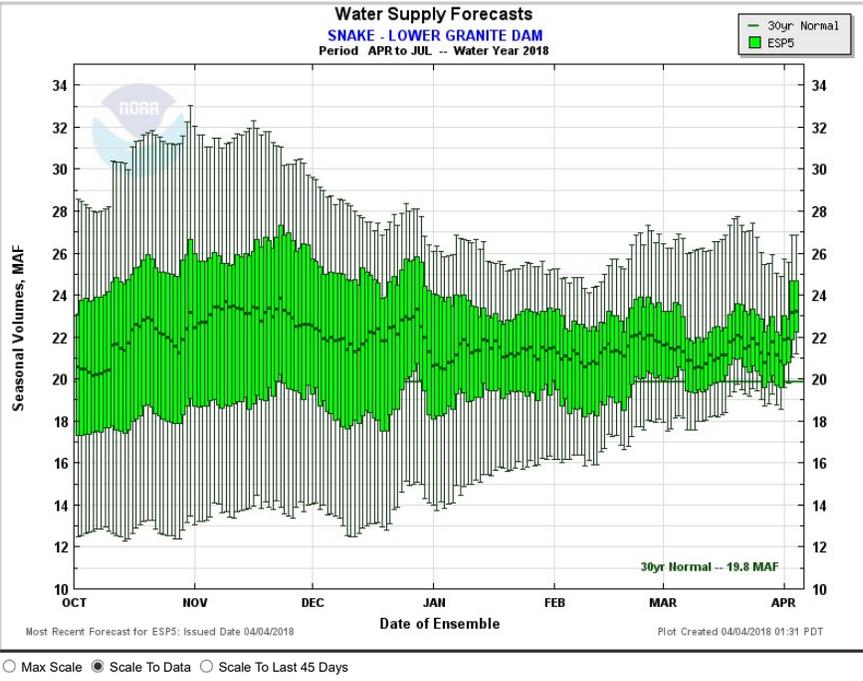


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SNAKE - LOWER GRANITE DAM (LGDW1) Forecasts for Water Year 2018					
Official Forecast					
10 days QPF: Ensemble: 2018-04-04 Issued: 2018-04-04					
Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	24344	26674	120	30482	22279
APR-JUL	21692	23919	121	27696	19848
APR-AUG	23103	25354	120	29150	21091
JAN-SEP	32958	35288	118	39096	29872
JAN-JUL	30306	32533	119	36311	27440
OCT-SEP	38175	40505	117	44313	34667
5 days QPF: Ensemble: 2018-04-04 Issued: 2018-04-04					
APR-SEP	23772	25811	116	29962	22279
APR-JUL	21212	23202	117	26880	19848
APR-AUG	22582	24614	117	28521	21091
JAN-SEP	32386	34425	115	38576	29872
JAN-JUL	29826	31817	116	35494	27440
OCT-SEP	37603	39642	114	43793	34667
0 days QPF: Ensemble: 2018-04-04 Issued: 2018-04-04					
APR-SEP	21569	23989	108	27925	22279
APR-JUL	19089	21367	108	25275	19848
APR-AUG	20341	22744	108	26627	21091
JAN-SEP	30183	32603	109	36539	29872
JAN-JUL	27703	29981	109	33889	27440
OCT-SEP	35400	37820	109	41756	34667

Move the mouse over the desired "Forecast Period" to display a graph.



**Overlay**

ESP10 **ESP5** ESP0

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**Data Files**

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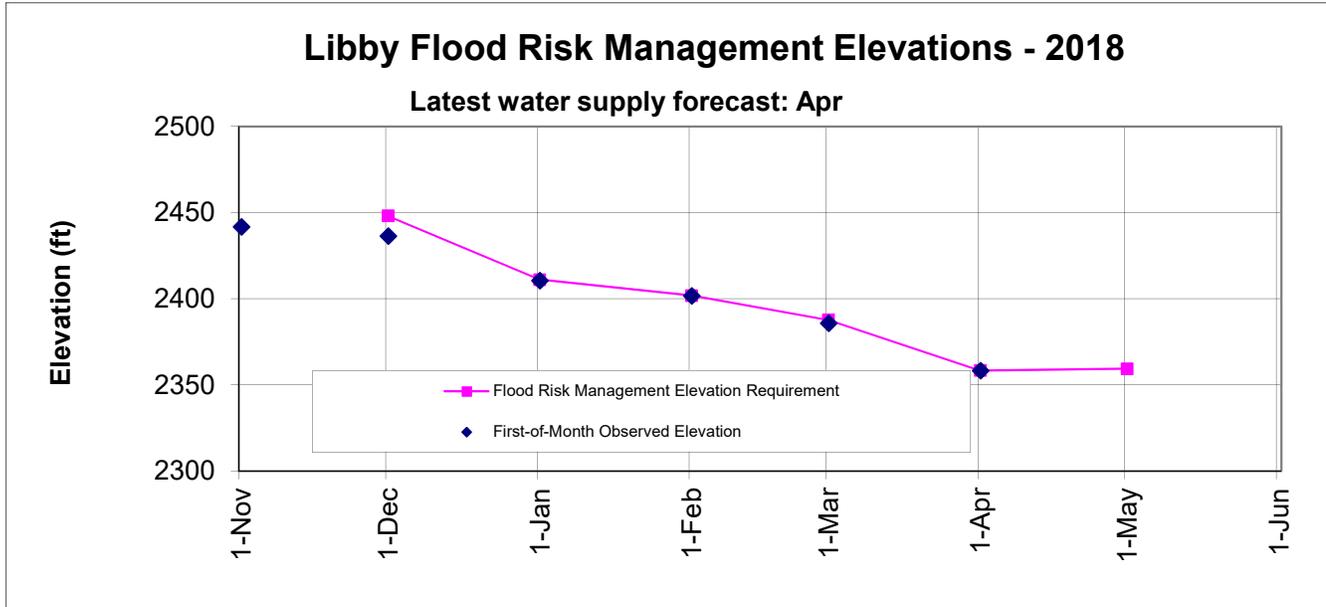
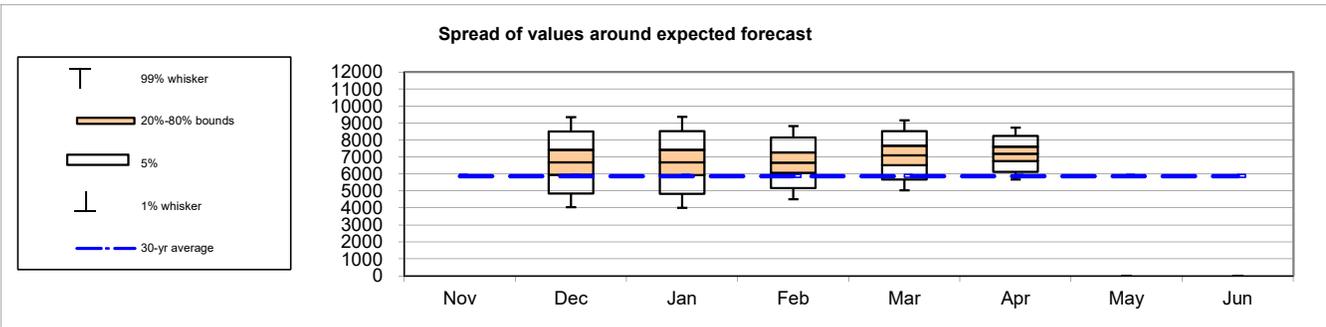
# Libby : April Runoff Forecast & Flood Risk Management Calculation

WY 2018

Runoff Forecast and Flood Risk Management				1981-2010 Average	Percent of Average	1929-2008 Average	Percent of Average
Most Probable Runoff Volume:	Apr-Aug	7189	KAF	5885	122%	6282	114%
	Apr-Jul	6526	KAF	5342	122%	5720	114%
	May-Jul	5889	KAF	4821	122%	5199	113%
30-Apr Flood Risk Management Space			3533	KAF			
30-Apr Flood Risk Management Elevation			2359.3	ft			

Seasonal Flood Risk Management		VARQ Flood Risk Management Implemented						
Forecast Date >>	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Aug Runoff Forecast		6687	6681	6671	7096	7189		
First-of-Month Elev	2441.8	2436.5	2410.6	2401.8	2385.9	2358.4		

Date >>	30-Nov	31-Dec	31-Jan	28/29-Feb	31-Mar	30-Apr
FRM Space	500	2000	2322	2762	3558	3533
FRM Elevation	2448.0	2411.0	2401.8	2387.7	2358.3	2359.3



- Notes:
- The given forecast is the official Corps of Engineers forecast for Libby. If you have any questions please contact Logan Osgood-Zimmerman (206) 764-6928, Jon Moen (206) 764-3561, or the general Water Management line (206) 764-3584.
  - If a prior month's forecast as published in this document is different than what was originally published in the issue month, then the earlier forecast has been adjusted to reflect updated values for precipitation or streamflow.
  - The Akamina Pass snow station was destroyed in a fire in Sept. 2017. Akamina Pass SWE was estimated based on a regression equation and observed values at nearby sites Grave Creek, Poorman Creek, Three Isle Lake, and Mount Odium.

# Libby : April Runoff Forecast & Flood Risk Management Calculation

Apr-Aug Runoff Forecast Calculation:						
Variable	Month(s)	Units	Observed Value	Percent of Average	Regression Coefficient	Marginal Runoff (KAF)
			A		B	=A*B
SOI	ΣJun:Jul					
Eureka RS, MT	ΣOct:Mar Prcp	inches	8.16	140%	68.5	559.1
West Glacier, MT	ΣOct:Mar Prcp	inches	22.83	138%	29.5	672.8
Cranbrook A, BC	ΣOct:Mar Prcp	millimeters	219.00	137%	3.0	654.8
Fernie, BC	ΣOct:Mar Prcp	millimeters	770.80	115%	0.7	547.3
Hawkins Lake, MT	1-Apr SWE	inches	28.70	114%	22.4	643.7
Stahl Creek, MT	1-Apr SWE	inches	43.20	124%	19.7	851.0
East Creek, BC	1-Apr SWE	millimeters	905.00	105%	0.7	660.7
Moyie Mountain, BC	1-Apr SWE	millimeters	518.00	121%	1.2	626.8
Sunshine Village, AB	1-Apr SWE	millimeters	608.60	108%	1.4	870.3
Akamina Pass, AB	1-Apr SWE	millimeters	598.30	129%	0.7	430.8
South Racehorse Creek, AB	1-Apr SWE	millimeters	445.20	104%	1.4	601.0
Intercept			1		70.5	70.5
	1-Apr Forecast (KAF)				Σ	7188.8

## Data used in Libby Water Supply Forecast

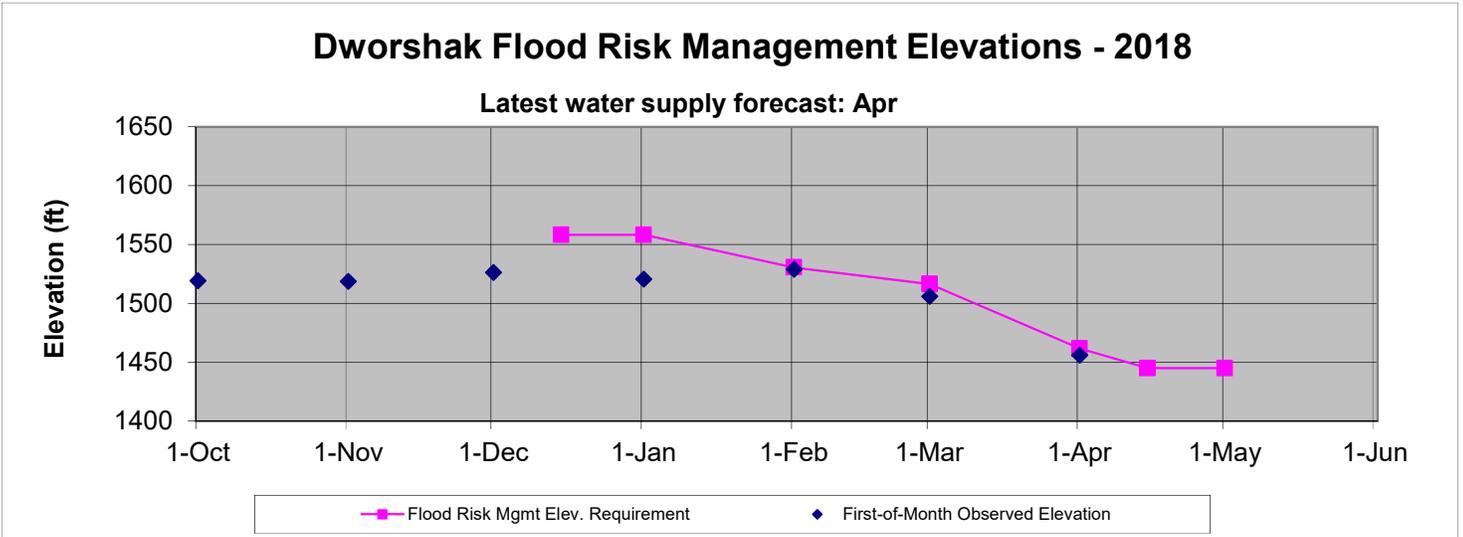
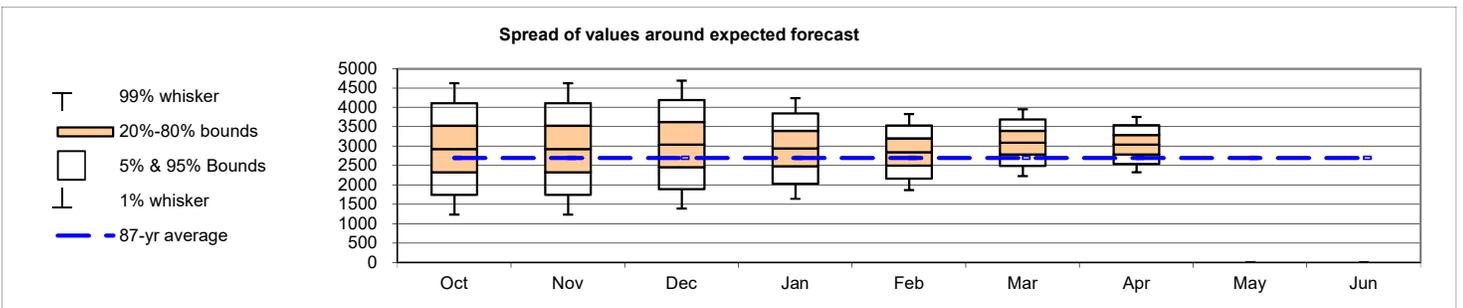
WY 2018

Climate Data				Jun-17	Jul-17				
SOI				-0.40	0.80				
Precipitation Data	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Units
Eureka RS, MT	0.87	1.76	2.33	0.84	1.35	1.01			inch
West Glacier, MT	3.10	4.57	4.23	4.18	5.02	1.73			inch
Cranbrook A, BC	25.00	63.60	47.00	29.80	27.20	26.40			mm
Fernie, BC	132.00	193.00	77.00	180.00	84.80	104.00			mm
Snow Water Equiv	1-Jan			1-Feb	1-Mar	1-Apr	1-May	1-Jun	Units
Hawkins Lake, MT				18	23	29			inch
Stahl Creek, MT	15			26	35	43			inch
East Creek, BC				659	803	905			mm
Moyie Mountain, BC	194			318	429	518			mm
Sunshine Village, AB	284			407	511	609			mm
Akamina Pass, AB				362	479	598			mm
South Racehorse Creek, AB				240	356	445			mm
Streamflow	Jan			Feb	Mar	Apr	May	Jun	Units
Libby Inflow Volume	205.1			166.2	214.4				KAF
Reservoir Elevation	1-Nov	1-Dec	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun	Units
Libby FOM Elev	2441.8	2436.5	2410.6	2401.8	2385.9	2358.4			feet

William D. Proctor, P.E.  
 Approving Official  
 Ch., Hydrologic Engineering and Power Branch  
 Northwestern Division

Logan Osgood-Zimmerman, P.E.  
 Water Management Section  
 Seattle District

Runoff Forecast and Flood Risk Management (FRM)				1981-2010 Average	Percent of 30yr Average	1929-2008 Average	Percent of Average		
Most Probable Runoff Volume	Apr-Jul	3040	KAF	2438	125%	2696	113%		
	May-Jul	2223	KAF	1784	125%	1972	113%		
30-Apr Flood Risk Management Space		2016	KAF						
30-Apr Flood Risk Management Elevation		1445.0	ft						
Seasonal Flood Risk Management (assumes no shift of flood risk management space to Grand Coulee)									
Forecast Date>>	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Jul Runoff Forecast	2929	2929	3043	2941	2849	3093	3040		
First-of-Month Elev	1519.1	1518.7	1526.2	1520.7	1529.1	1506.0	1456.0		
Date >>	15-Dec	31-Dec	31-Jan	28-Feb	31-Mar	15-Apr	30-Apr	31-May	
FRM Space	--	700	700	1090	1276	1863	2016	2016	
FRM Elevation	--	1558.2	1558.2	1530.5	1516.5	1461.6	1445.0	1445.0	



## Dworshak : April Runoff Forecast & Flood Risk Management Calculation

Apr-Jul Runoff Forecast Calculation					
Variable	Month	Observed Value	% of Average	Regression Coefficient	Marginal Runoff (KAF)
		A		B	=A*B
SOI	Sep	0.60		171.32	102.8
HQSI Cumulative Precip	Oct-Date	30.55	112%	22.32	681.9
Elk Butte SWE	1-Apr	42.0	122%	11.61	487.6
Hoodoo Basin SWE	1-Apr	43.6	111%	10.27	447.8
Sherwin SWE	1-Apr	7.8	114%	19.49	152.0
Lost Lake SWE	1-Apr	59.9	115%	7.91	473.8
Crater meadows SWE	1-Apr	53.1	124%	13.37	709.9
Intercept		1		-15.43	-15.4
1-Apr Forecast (KAF)				$\Sigma$	3040.4

Data Station	Sept	Nov	Dec	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun
<b>Climate (Stdzd SOI)</b>									
September SOI	0.60								
<b>Precipitation (in)</b>									
Headquarters, ID	3.65	6.20	6.10	4.50	7.00	3.10	--		
Cumulative HQSI Data	3.65	9.85	15.95	20.45	27.45	30.55	--		
<b>Snow Water Equiv (First of Month values) (in)</b>									
Elk Butte, ID				16.1	31.9	36.5	42.0		
Cool Creek, ID				18.9	32.0				
Hoodoo Basin, MT				18.7	29.5	39.8	43.6	--	--
Sherwin, ID				5.1	7.0	10.7	7.8		
Shanghi Summit, ID								--	--
Lost Lake, ID				22.3	38.0	52.6	59.9	--	--
Hemlock, ID								--	--
Crater Meadows Mar						46.9	53.1		
<b>Streamflow (End of Month) (kaf)</b>				Jan	Feb	Mar	Apr	May	Jun
Dworshak Inflow				316	520	358	--	--	--

- Notes:
1. The given forecast is the official Corps of Engineers forecast for Dworshak. If you have any questions please contact Steve Hall (509-527-7550), Amanda Morelos (509-527-7632), Alfredo Rodriguez (509-527-7532), or Jon Roberts (509-527-7518).
  2. Due to updated values for precipitation, snow or streamflow, subsequent forecasts may be different from the forecast published herein.
  3. 15-Dec and 31-Dec Flood Management Space is fixed at 700 KAF.

Approval:

John J. Heitstuman P.E.  
Chief Hydrology Section  
Walla Walla District USACE

William D. Proctor, P.E.  
Ch., Hydrologic Engineering and Power Branch  
Columbia Basin Water Management Division



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## COLUMBIA - GRAND COULEE DAM (GCDW1) Forecasts for Water Year 2018

### Official Forecast

10 days QPF: Ensemble: 2018-04-04 Issued: 2018-04-04

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	68647	72804	121	78826	60110
APR-JUL	58168	62120	122	68852	51015
APR-AUG	64922	68720	121	75190	56763
JAN-SEP	77820	81977	119	87999	68694
JAN-JUL	67341	71293	120	78024	59599
OCT-SEP	85238	89395	116	95417	76824

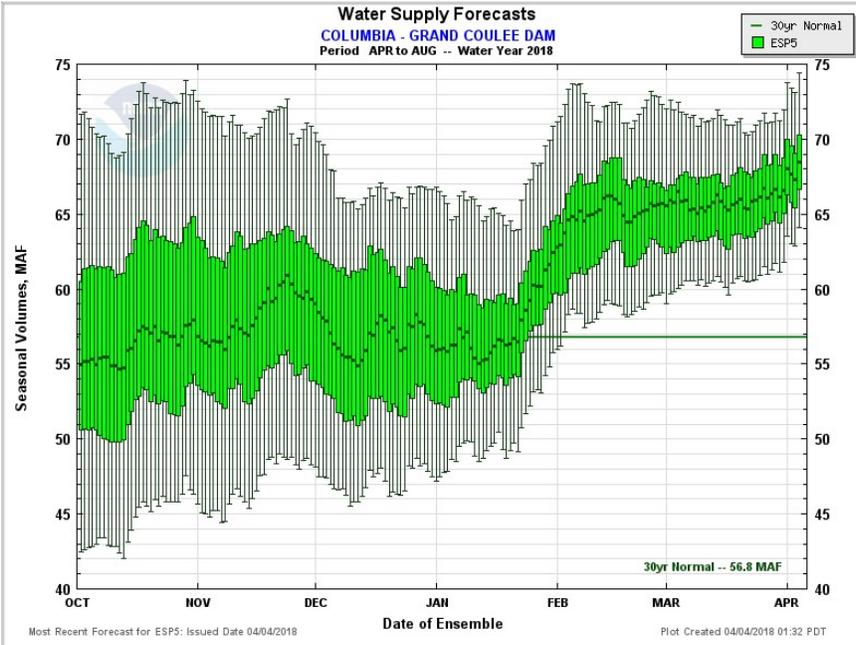
5 days QPF: Ensemble: 2018-04-04 Issued: 2018-04-04

APR-SEP	68227	72524	121	78105	60110
APR-JUL	57535	61763	121	68030	51015
APR-AUG	64140	68482	121	74420	56763
JAN-SEP	77400	81697	119	87278	68694
JAN-JUL	66708	70936	119	77203	59599
OCT-SEP	84818	89115	116	94696	76824

0 days QPF: Ensemble: 2018-04-04 Issued: 2018-04-04

APR-SEP	65280	70661	118	74960	60110
APR-JUL	54996	59653	117	65644	51015
APR-AUG	61155	66243	117	71253	56763
JAN-SEP	74453	79834	116	84133	68694
JAN-JUL	64169	68826	115	74816	59599
OCT-SEP	81871	87252	114	91551	76824

Move the mouse over the desired "Forecast Period" to display a graph.



Max Scale Scale To Data Scale To Last 45 Days

**Overlay**

ESP10 **ESP5** ESP0

**Data Files**

CSV (ESP5 / APR-AUG)

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## PEND OREILLE - ALBENI FALLS DAM (ALFW1) Forecasts for Water Year 2018

### Official Forecast

10 days QPF: Ensemble: 2018-04-04 Issued: 2018-04-04

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	16691	18702	146	21057	12815
APR-JUL	15283	17190	146	19415	11777
APR-AUG	16040	18024	146	20431	12354
JAN-SEP	19438	21449	141	23804	15226
JAN-JUL	18030	19937	141	22162	14189
OCT-SEP	21621	23632	137	25987	17218

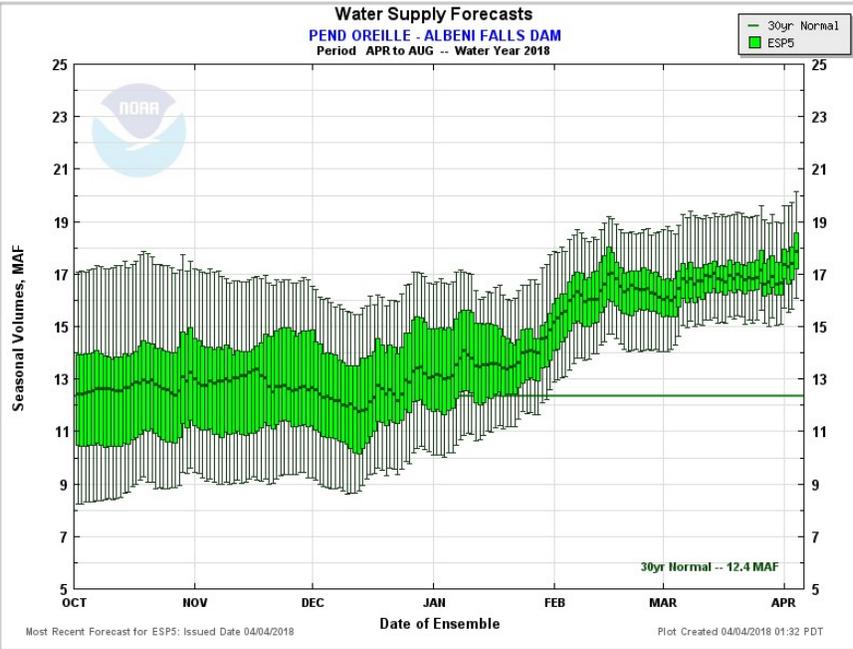
5 days QPF: Ensemble: 2018-04-04 Issued: 2018-04-04

APR-SEP	16657	18534	145	20775	12815
APR-JUL	15258	17031	145	19320	11777
APR-AUG	16070	17874	145	20159	12354
JAN-SEP	19404	21281	140	23522	15226
JAN-JUL	18005	19777	139	22066	14189
OCT-SEP	21587	23464	136	25705	17218

0 days QPF: Ensemble: 2018-04-04 Issued: 2018-04-04

APR-SEP	15754	17417	136	19857	12815
APR-JUL	14440	15982	136	18176	11777
APR-AUG	15222	16799	136	19156	12354
JAN-SEP	18501	20163	132	22604	15226
JAN-JUL	17187	18729	132	20922	14189
OCT-SEP	20684	22346	130	24787	17218

Move the mouse over the desired "Forecast Period" to display a graph.



Most Recent Forecast for ESP5: Issued Date 04/04/2018

Plot Created 04/04/2018 01:32 PDT

Max Scale
  Scale To Data
  Scale To Last 45 Days

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  ESP0

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