

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 FEBRUARY 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

Source: 2019 Water Management Plan
<http://pweb.crohms.org/tmt/documents/wmp/2019/>

February 5, 2019

**Hungry Horse Dam – Official Water Supply Forecast
FEBRUARY 2019**

Here are the volumes for the February 2019 final forecast for Hungry Horse inflow:

Feb-Jul: 1,796 kaf (88%)

Apr-Aug: 1,700 kaf (88%)

May-Sep: 1500 kaf (89%)

The minimum flows downstream of Hungry Horse are as follows:

Columbia Falls: 3,450 cfs

Hungry Horse: 825 cfs

Thanks,

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Joel Fenolio, P.E.

Water Management - Operations Team Supervisor

U.S. Bureau of Reclamation

PN Regional Office



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COLUMBIA - THE DALLES DAM (TDAO3) Forecasts for Water Year 2019

Official Forecast

10 days QPF: Ensemble: 2019-02-05 Issued: 2019-02-05

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	70997	80809	87	92223	92704
APR-JUL	59552	68288	86	78782	79855
APR-AUG	66168	75273	86	85834	87532
JAN-SEP	85745	97050	85	109946	114216
JAN-JUL	74452	84276	83	97047	101368
OCT-SEP	99286	110591	85	123487	130518

5 days QPF: Ensemble: 2019-02-05 Issued: 2019-02-05

APR-SEP	72442	80906	87	94611	92704
APR-JUL	60563	68736	86	80535	79855
APR-AUG	67498	75301	86	88074	87532
JAN-SEP	87285	97647	85	115623	114216
JAN-JUL	75637	85011	84	101160	101368
OCT-SEP	100826	111188	85	129164	130518

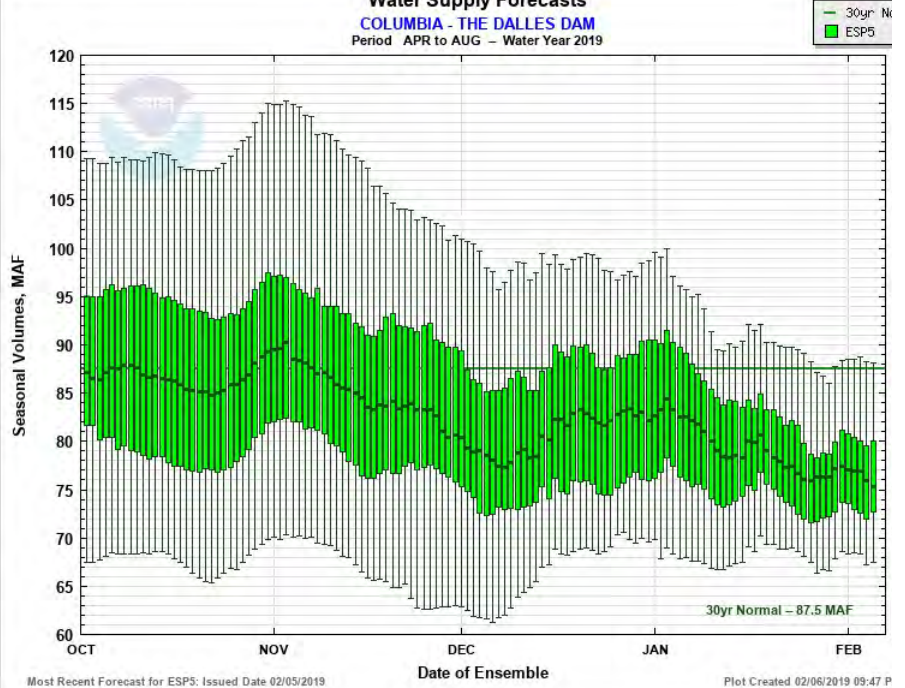
0 days QPF: Ensemble: 2019-02-05 Issued: 2019-02-05

APR-SEP	73803	83073	90	95043	92704
APR-JUL	62358	69955	88	81443	79855
APR-AUG	69070	77848	89	89208	87532
JAN-SEP	90019	99749	87	116016	114216
JAN-JUL	78516	86792	86	101565	101368
OCT-SEP	103560	113290	87	129557	130518

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

Water Supply Forecasts

COLUMBIA - THE DALLES DAM
Period APR to AUG - Water Year 2019



☐ Max Scale ☒ Scale To Data ☐ Scale To Last 45 Days

Overlay

ESP10 ESP5 ESP0

Data Files

CSV (ESP5 / APR-AUG)

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SNAKE - LOWER GRANITE DAM (LGDW1) Forecasts for Water Year 2019

Official Forecast

10 days QPF: Ensemble: 2019-02-05 Issued: 2019-02-05

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	15056	19182	86	22524	22279
APR-JUL	13000	16856	85	19943	19848
APR-AUG	14012	18045	86	21186	21091
JAN-SEP	20690	24724	83	28421	29872
JAN-JUL	18629	22423	82	25988	27440
OCT-SEP	24680	28714	83	32411	34667

5 days QPF: Ensemble: 2019-02-05 Issued: 2019-02-05

APR-SEP	15190	19390	87	23144	22279
APR-JUL	13126	16980	86	20177	19848
APR-AUG	14125	18247	87	21770	21091
JAN-SEP	20428	25029	84	29675	29872
JAN-JUL	18485	22562	82	27162	27440
OCT-SEP	24418	29019	84	33665	34667

0 days QPF: Ensemble: 2019-02-05 Issued: 2019-02-05

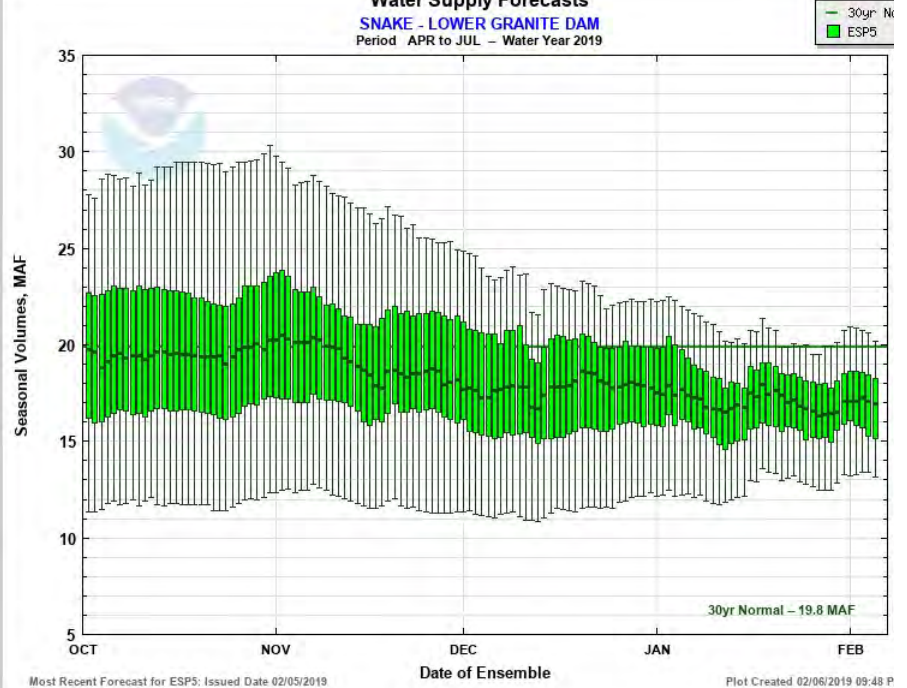
APR-SEP	15214	19505	88	23264	22279
APR-JUL	13259	17159	86	20772	19848
APR-AUG	14214	18398	87	22094	21091
JAN-SEP	20764	25028	84	29804	29872
JAN-JUL	18606	22660	83	27297	27440
OCT-SEP	24755	29018	84	33794	34667

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

Water Supply Forecasts

SNAKE - LOWER GRANITE DAM

Period APR to JUL - Water Year 2019



☐ Max Scale ☒ Scale To Data ☐ Scale To Last 45 Days

Overlay

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Libby : February Runoff Forecast & Flood Risk Management Calculation

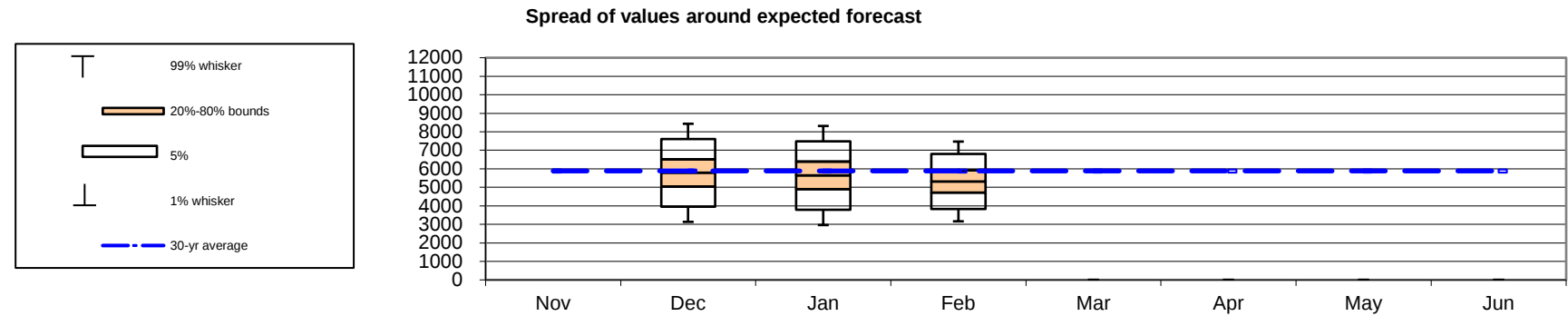
WY 2019

Runoff Forecast and Flood Risk Management

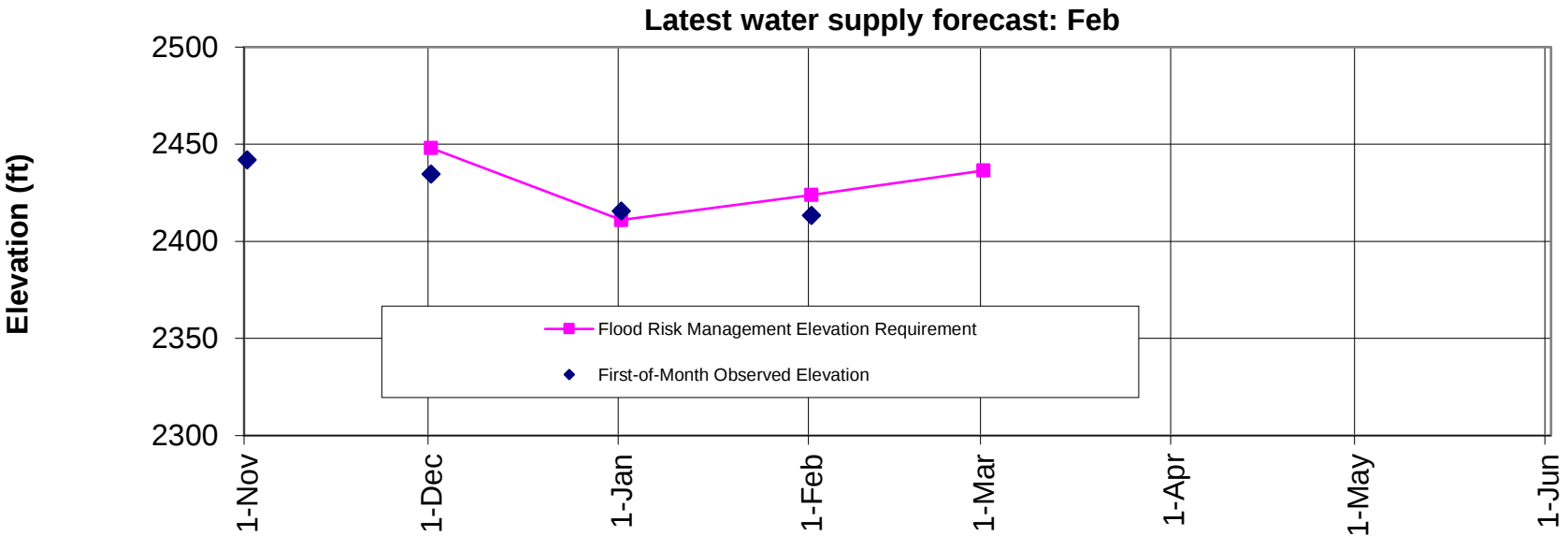
Most Probable Runoff Volume:	Apr-Aug	5318	KAF
	Apr-Jul	4827	KAF
	May-Jul	4356	KAF
28 Feb Flood Risk Management Space		1002	KAF
28 Feb Flood Risk Management Elevation		2436.4	ft

1981-2010 Average	Percent of Average	1929-2008 Average	Percent of Average
5885	90%	6282	85%
5342	90%	5720	85%
4821	90%	5199	85%

Seasonal Flood Risk Management		VARQ Flood Risk Management Implemented							
Forecast Date >>		Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Aug Runoff Forecast			5784	5639	5318				
First-of-Month Elev		2441.9	2434.6	2415.5	2413.3				
Date >>		30-Nov	31-Dec	31-Jan	28-Feb	15-Mar	31-Mar	15-Apr	30-Apr
Flood Risk Management Space		500	2000	1511	1002				
Flood Risk Management Elevation		2448.0	2411.0	2423.9	2436.4				



Libby Flood Risk Management Elevations - 2019



- Notes:
1. 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, Kevin Shaffer (206) 764-3660, Sonja Michelsen (206) 316-3947, or Jon Moen (206) 764-3561.
 2. The January forecast as published in this document is lower than what was originally published in the issue month, the earlier forecast has been adjusted to reflect updated updated precipitation values for Eureka and West Glacier.
 3. 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, Hand Creek, Lost Creek South, Mount Odlum, and Three Isle Lake.

Libby : February 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	Σ Jun:Jul					
Eureka RS, MT	Σ Oct:Jan Prcp	inches	3.53	82%	78.5	277.0
West Glacier, MT	Σ Oct:Jan Prcp	inches	10.27	84%	31.0	317.9
Cranbrook A, BC	Σ Oct:Jan Prcp	millimeters	94.70	82%	2.8	268.9
Fernie, BC	Σ Oct:Jan Prcp	millimeters	426.00	86%	0.7	306.7
Hawkins Lake, MT	1-Feb SWE	inches	12.70	77%	30.6	388.6
Stahl Peak, MT	1-Feb SWE	inches	19.70	84%	23.0	452.9
East Creek, BC	1-Feb SWE	millimeters	709.00	116%	0.8	531.8
Moyie Mountain, BC	1-Feb SWE	millimeters	223.00	78%	1.5	330.0
Sunshine Village, AB	1-Feb SWE	millimeters	373.28	96%	1.5	548.7
Akamina Pass, AB	1-Feb SWE	millimeters	258.50	81%	1.3	328.3
South Racehorse Creek, AB	1-Feb SWE	millimeters	180.12	64%	1.5	275.6
Intercept			1		1291.5	1291.5
1-Feb Forecast (KAF)					Σ	5317.9

Data used in Libby Water Supply Forecast

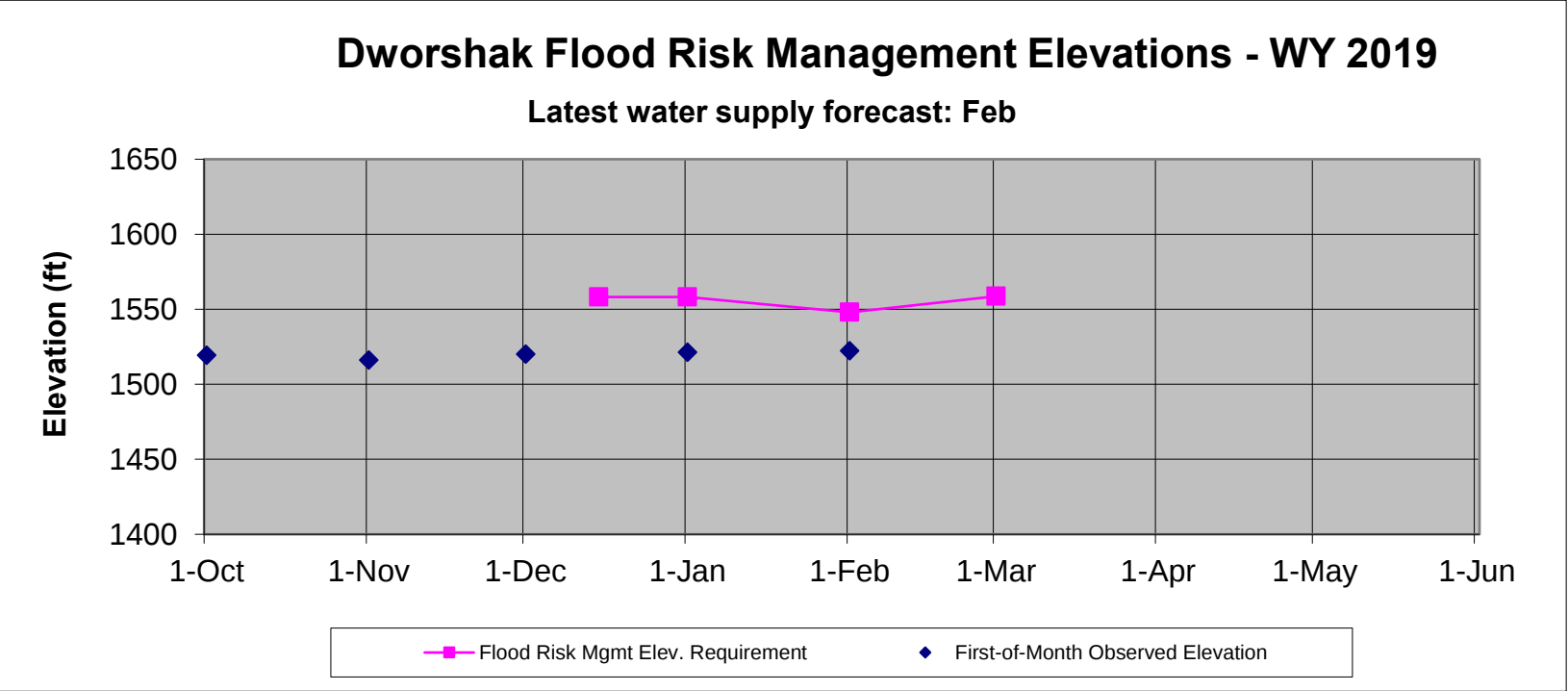
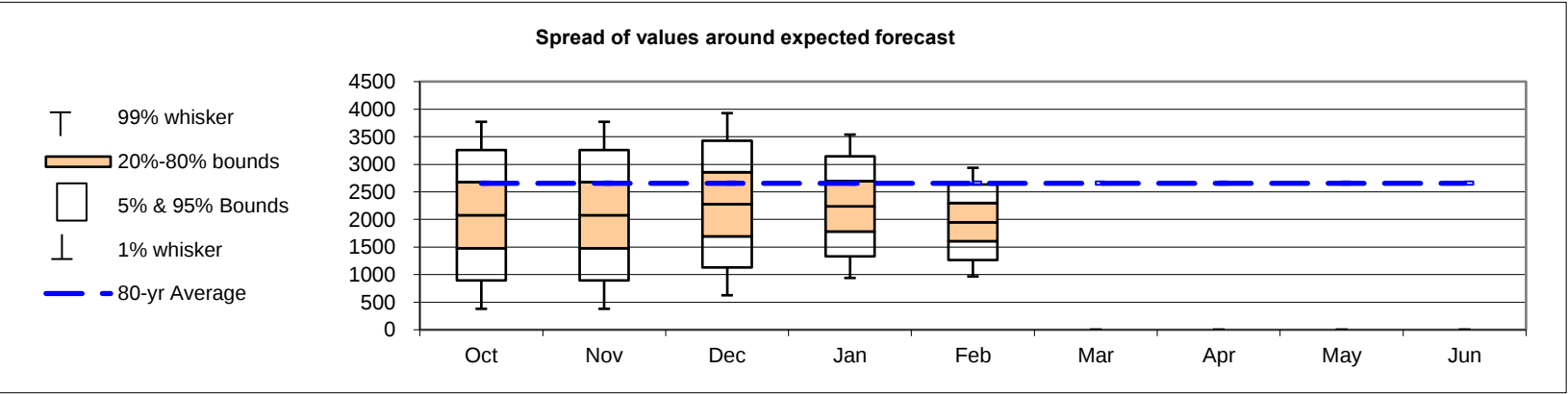
WY 2019

Climate Data				Jun-18	Jul-18				
SOI				-0.10	0.20				
Precipitation Data		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Eureka RS, MT		1.64	0.55	0.40	0.94				
West Glacier, MT		2.55	3.19	2.24	2.29				
Cranbrook A, BC		34.50	14.60	26.60	19.00				
Fernie, BC		87.00	139.00	117.00	83.00				
Snow Water Equiv		1-Jan			1-Feb	1-Mar	1-Apr	1-May	1-Jun
Hawkins Lake, MT					13				
Stahl Creek, MT					20				
East Peak, BC					709				
Moyie Mountain, BC					153				
Sunshine Village, AB					272				
Akamina Pass, AB					259				
South Racehorse Creek, AB					180				
Streamflow		Jan			Feb	Mar	Apr	May	Jun
Libby Inflow Volume		162.5							
Reservoir Elevation		1-Nov	1-Dec	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun
Libby FOM Elev		2441.9	2434.6	2415.5	2413.3				

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

Logan Osgood-Zimmerman, P.E.
Upper Columbia Senior Water Manager
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	1951	KAF			2438	80%	2655	73%
	May-Jul	1428	KAF			1784	80%	1959	73%
28/29-Feb Flood Risk Management Space			694	KAF					
28/29-Feb Flood Risk Management Elevation			1558.6	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	2075	2075	2276	2239	1951				
First-of-Month Elev	1519.3	1516.1	1520.1	1521.4	1522.3				
Date >>		15-Dec	31-Dec	31-Jan	28-Feb	31-Mar	15-Apr	30-Apr	31-May
FRM Space	--	700	700	849	694				
FRM Elevation	--	1558.2	1558.2	1547.9	1558.6				



Dworshak : February 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	-0.90		264.27	-237.8
HQSI Cumulative Precip	Oct-Date	16.90	87%	27.04	457.0
Elk Butte SWE	1-Feb	20.6	89%	12.06	248.4
Cool Creek SWE	1-Feb	26.7	92%	11.35	303.0
Hoodoo Basin SWE	1-Feb	21.1	82%	10.97	231.5
Sherwin SWE	1-Feb	6.1	79%	29.17	177.9
Lost Lake SWE	1-Feb	26.1	75%	7.60	198.4
Intercept		1		572.93	572.9
1-Feb Forecast (KAF)				Σ	1951.3

Data Station	Sept	Nov	Dec	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun
Climate (Stdzd SOI)									
September SOI	-0.90								
Precipitation (in)									
Oct									
Headquarters, ID	3.80	5.60	5.30	2.20	--	--	--		
Cumulative HQSI Data	3.80	9.40	14.70	16.90	--	--	--		
Snow Water Equiv (First of Month values) (in)									
Elk Butte, ID				15.5	20.6	--	--		
Cool Creek, ID				21.5	26.7				
Hoodoo Basin, MT				14.4	21.1	--	--	--	--
Sherwin, ID				3.7	6.1	--	--		
Shanghi Summit, ID								--	--
Lost Lake, ID				18.8	26.1	--	--	--	--
Hemlock, ID								--	--
Crater Meadows Mar						--	--		
Streamflow (End of Month) (kaf)				Jan	Feb	Mar	Apr	May	Jun
Dworshak Inflow				114	--	--	--	--	--

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), 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. There is a snow flight scheduled in mid-Feb. to verify snow density in the basin.

Approval:

John J. Heitstuman P.E., D.WRE
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 2019

Official Forecast

10 days QPF: Ensemble: 2019-02-05 Issued: 2019-02-05

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	47265	53603	89	61414	60110
APR-JUL	38760	44986	88	51141	51015
APR-AUG	44099	50676	89	57627	56763
JAN-SEP	54138	60852	89	69540	68694
JAN-JUL	45777	51374	86	59200	59599
OCT-SEP	61330	68044	89	76733	76824

5 days QPF: Ensemble: 2019-02-05 Issued: 2019-02-05

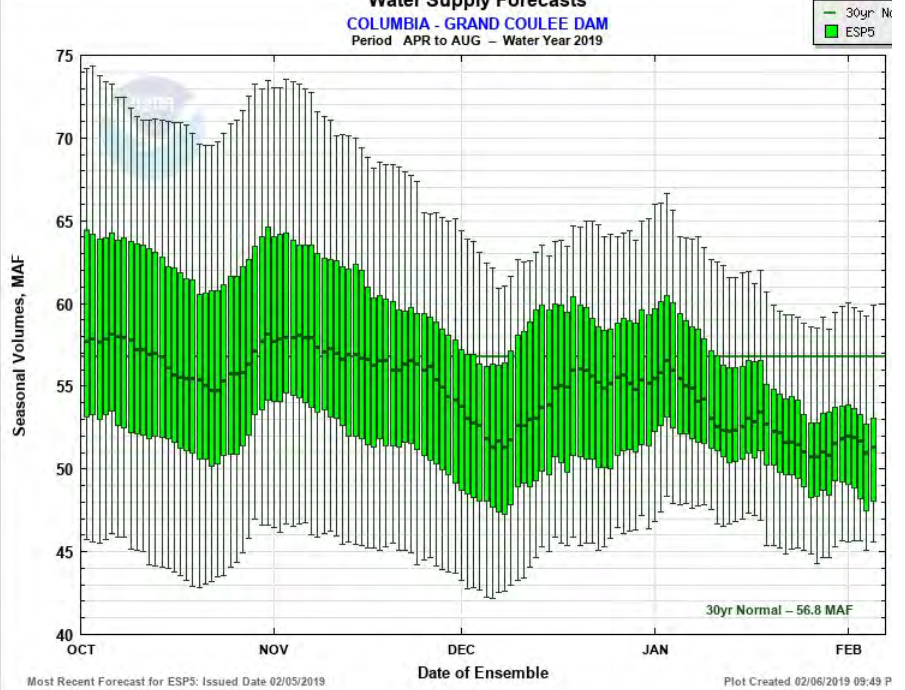
APR-SEP	48703	54475	91	63789	60110
APR-JUL	40234	45766	90	53498	51015
APR-AUG	45590	51352	90	59896	56763
JAN-SEP	55565	61513	90	72445	68694
JAN-JUL	47166	52637	88	61716	59599
OCT-SEP	62757	68706	89	79637	76824

0 days QPF: Ensemble: 2019-02-05 Issued: 2019-02-05

APR-SEP	49344	55672	93	64769	60110
APR-JUL	40941	46095	90	54558	51015
APR-AUG	46006	52206	92	60164	56763
JAN-SEP	56140	62984	92	73251	68694
JAN-JUL	48349	53664	90	62122	59599
OCT-SEP	63332	70176	91	80443	76824

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

Water Supply Forecasts COLUMBIA - GRAND COULEE DAM Period APR to AUG - Water Year 2019



☐ 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 2019

Official Forecast

10 days QPF: Ensemble: 2019-02-05 Issued: 2019-02-05

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	9154	11153	87	13359	12815
APR-JUL	8302	10020	85	12192	11777
APR-AUG	8761	10658	86	12894	12354
JAN-SEP	10848	12869	85	14972	15226
JAN-JUL	10023	11837	83	13865	14189
OCT-SEP	12530	14550	85	16654	17218

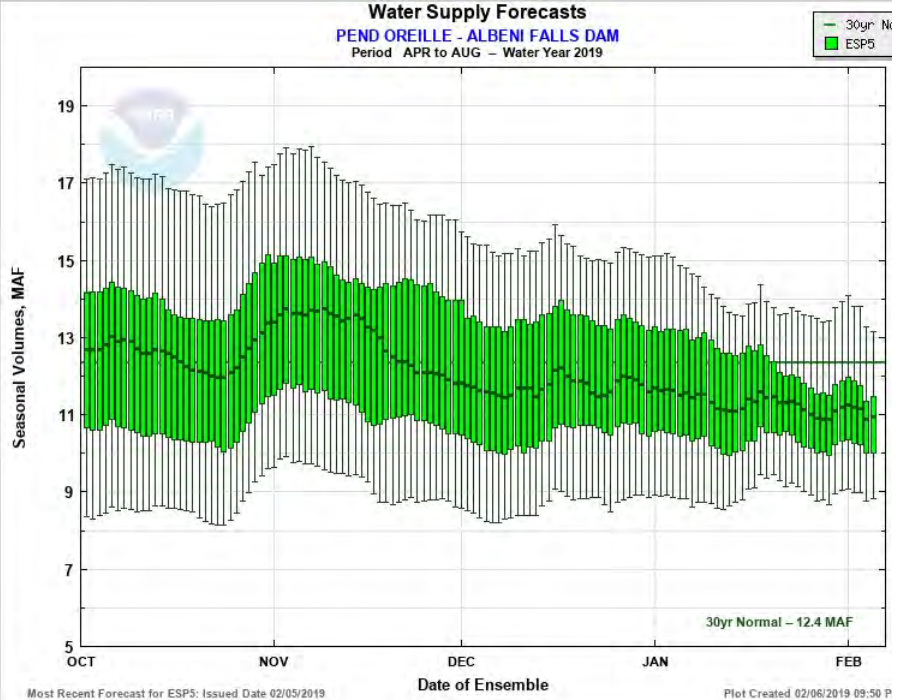
5 days QPF: Ensemble: 2019-02-05 Issued: 2019-02-05

APR-SEP	9234	11385	89	13679	12815
APR-JUL	8352	10420	88	12403	11777
APR-AUG	8821	10937	89	13139	12354
JAN-SEP	11187	13166	86	16417	15226
JAN-JUL	10286	12172	86	15167	14189
OCT-SEP	12868	14847	86	18098	17218

0 days QPF: Ensemble: 2019-02-05 Issued: 2019-02-05

APR-SEP	9499	11604	91	14369	12815
APR-JUL	8470	10506	89	13254	11777
APR-AUG	8932	11084	90	13840	12354
JAN-SEP	11416	13552	89	16689	15226
JAN-JUL	10575	12400	87	15453	14189
OCT-SEP	13097	15234	88	18370	17218

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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