

The Official Water Supply Forecasts for January through July are computed on the 3rd work day of the month. Flood Risk Management (FRM) is computed at standard intervals and posted at: www.nwd.usace.army.mil/Missions/Water/Columbia/FloodControl

The **JUNE** 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/>

June 4, 2019

Hungry Horse Dam – Official Water Supply Forecast June 2019

Good Afternoon,

The volumes for the June 2019 final forecast for Hungry Horse inflows are:

- Jun-Jul: 680 kaf (80%)
- Jan-Jul: 1,820 kaf (87%)
- Apr-Aug: 1,700 kaf (88%)
- May-Sep: 1,420 kaf (84%)

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

- Columbia Falls: 3,480 cfs
- Hungry Horse: 870 cfs

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

Official Forecast

10 days QPF: Ensemble: 2019-06-05 Issued: 2019-06-05

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	85001	87204	94	89977	92704
APR-JUL	74523	75997	95	78594	79855
APR-AUG	80527	82303	94	84940	87532
JAN-SEP	100851	103054	90	105827	114216
JAN-JUL	90373	91847	91	94444	101368
OCT-SEP	114392	116595	89	119369	130518

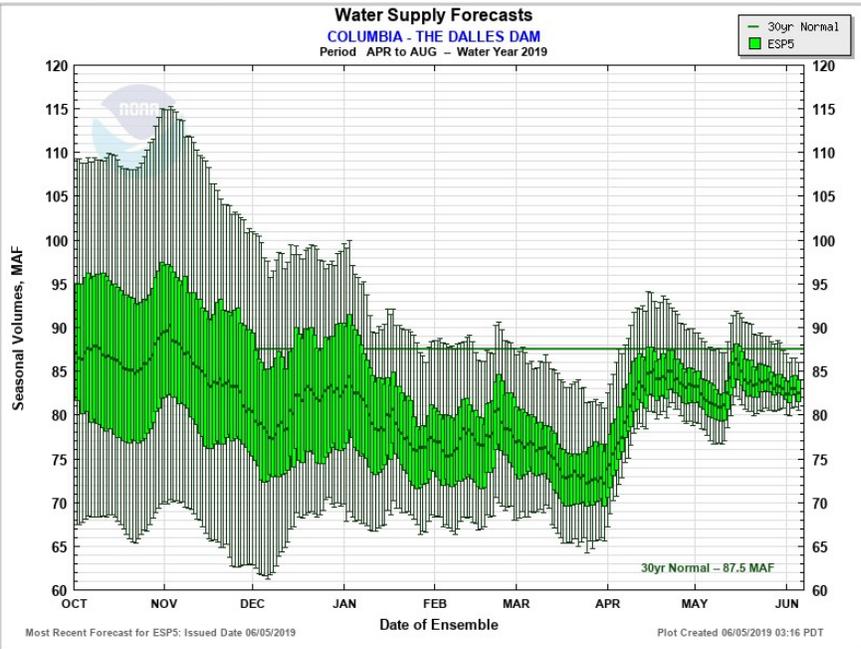
5 days QPF: Ensemble: 2019-06-05 Issued: 2019-06-05

APR-SEP	84998	87443	94	91025	92704
APR-JUL	74706	76275	96	79140	79855
APR-AUG	80599	82586	94	86031	87532
JAN-SEP	100848	103293	90	106875	114216
JAN-JUL	90556	92125	91	94990	101368
OCT-SEP	114389	116834	90	120416	130518

0 days QPF: Ensemble: 2019-06-05 Issued: 2019-06-05

APR-SEP	85172	87746	95	92266	92704
APR-JUL	74632	76728	96	80332	79855
APR-AUG	80731	83050	95	87151	87532
JAN-SEP	101022	103596	91	108116	114216
JAN-JUL	90482	92578	91	96182	101368
OCT-SEP	114563	117137	90	121657	130518

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

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

Official Forecast

10 days QPF: Ensemble: 2019-06-05 Issued: 2019-06-05

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	26166	26618	119	27244	22279
APR-JUL	23559	23810	120	24411	19848
APR-AUG	24892	25165	119	25830	21091
JAN-SEP	31969	32421	109	33047	29872
JAN-JUL	29362	29613	108	30214	27440
OCT-SEP	35959	36412	105	37037	34667

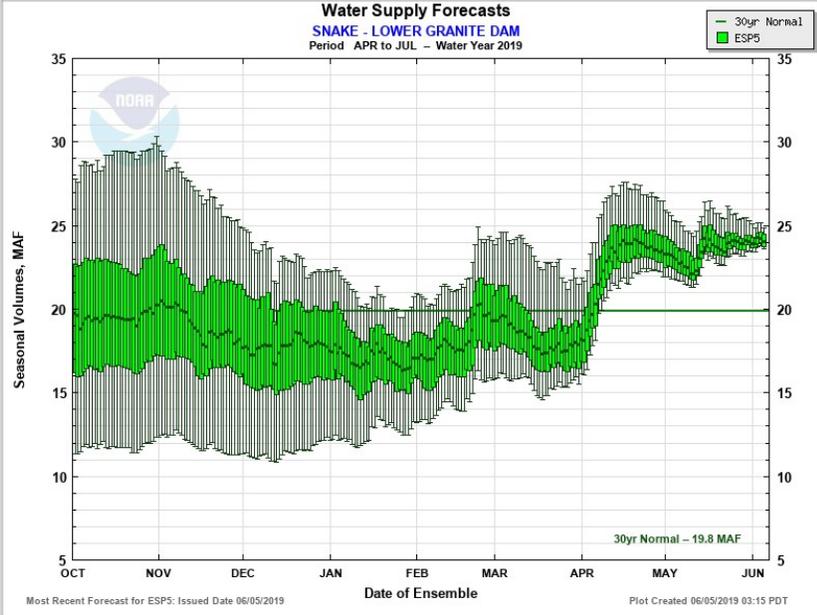
5 days QPF: Ensemble: 2019-06-05 Issued: 2019-06-05

APR-SEP	26225	26755	120	27713	22279
APR-JUL	23611	24034	121	24865	19848
APR-AUG	24923	25386	120	26359	21091
JAN-SEP	32028	32558	109	33516	29872
JAN-JUL	29414	29837	109	30668	27440
OCT-SEP	36018	36548	105	37506	34667

0 days QPF: Ensemble: 2019-06-05 Issued: 2019-06-05

APR-SEP	26179	26941	121	28169	22279
APR-JUL	23574	24192	122	25419	19848
APR-AUG	24899	25566	121	26823	21091
JAN-SEP	31982	32744	110	33972	29872
JAN-JUL	29377	29995	109	31222	27440
OCT-SEP	35972	36734	106	37962	34667

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



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Libby : June Runoff Forecast & Flood Control Calculation

WY 2019

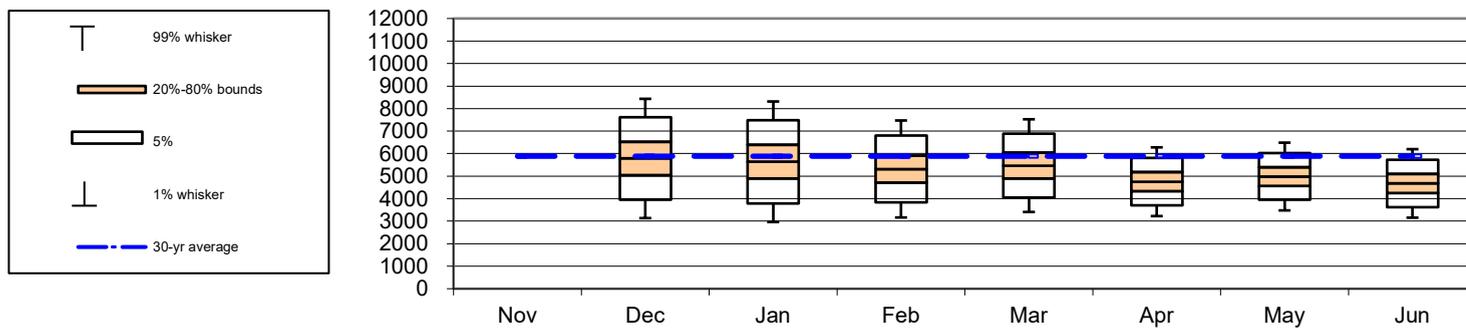
Runoff Forecast and Flood Control			
Most Probable Runoff Volume:	Apr-Aug	4676	KAF
	Apr-Jul	4238	KAF
	May-Jul	3809	KAF

1981-2010 Average	Percent of Average	1929-2008 Average	Percent of Average
5885	79%	6282	74%
5342	79%	5720	74%
4821	79%	5199	73%

Seasonal Flood Control VARQ Flood Control Implemented								
Forecast Date >>	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Aug Runoff Forecast		5784	5639	5318	5467	4752	4983	4676
First-of-Month Elev	2441.9	2434.6	2415.5	2413.3	2410.6	2405.8	2409.2	2417.0

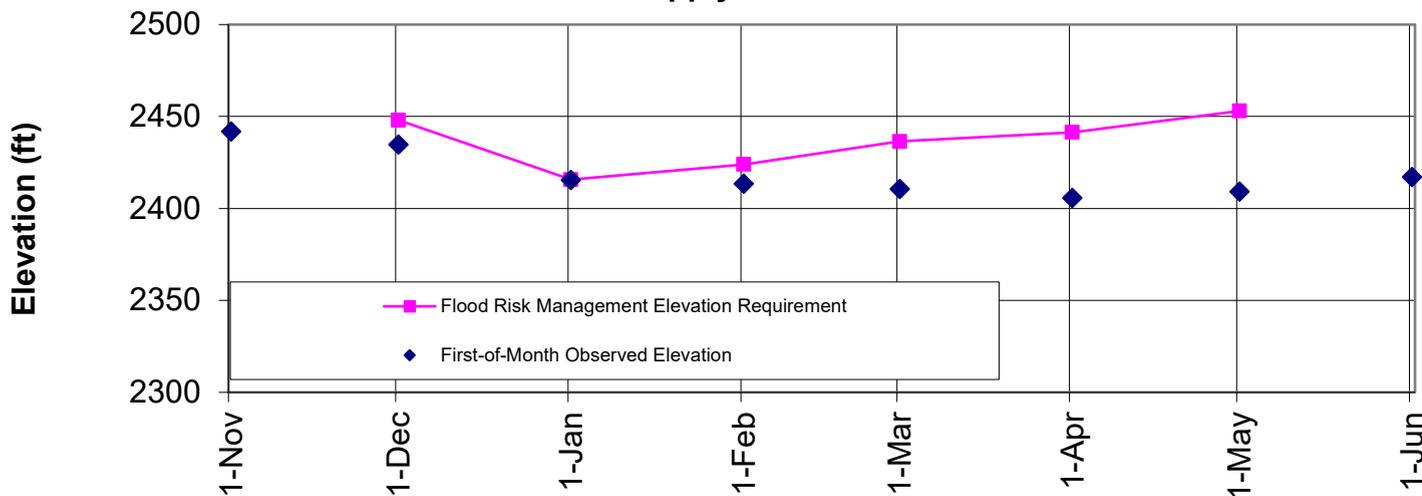
Date >>	30-Nov	31-Dec	31-Jan	28-Feb	31-Mar	30-Apr
Flood Control Space	500	1826	1511	1002	790	276
Flood Control Elevation	2448.0	2415.7	2423.9	2436.4	2441.4	2453.0

Spread of values around expected forecast



Libby Flood Control Elevations - 2019

Latest water supply forecast: Jun



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. 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.
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, Poorman Creek, Morrissey Ridge, and Mount Odium.

Libby : June Runoff Forecast & Flood Control 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:May Prcp	inches	7.74	89%	37.7	291.5
West Glacier, MT	ΣOct:May Prcp	inches	18.55	88%	22.5	416.7
Cranbrook A, BC	ΣOct:May Prcp	millimeters	183.20	79%	2.0	371.9
Fernie, BC	ΣOct:May Prcp	millimeters	624.00	74%	0.5	313.3
Hawkins Lake, MT	1-Jun SWE	inches	0.00	0%	10.1	0.0
Stahl Peak, MT	1-Jun SWE	inches	15.00	52%	10.3	154.6
East Creek, BC	1-Jun SWE	millimeters	589.00	81%	0.4	254.6
Moyie Mountain, BC	1-Jun SWE	millimeters	0.00	0%	0.8	0.0
Sunshine Village, AB	1-Jun SWE	millimeters	386.50	81%	0.6	240.2
Akamina Pass, AB	1-Jun SWE	millimeters	45.18	72%	0.7	30.7
South Racehorse Creek, AB	1-Jun SWE	millimeters	0.00	0%	0.6	0.0
Intercept			1		978.0	978.0

Forecast June-August Inflow (KAF)	Σ	3051.5
Observed April-May Inflow (KAF)		1624.8
1-June Forecast, April-August Inflow (KAF)	Σ	4676.2

Data used in Libby Water Supply Forecast

WY 2019

Climate Data									SOI
				Jun-18	Jul-18				
				-0.10	0.20				
Precipitation Data	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Units
Eureka RS, MT	1.64	0.55	0.40	0.94	1.74	0.80	0.96	0.71	inch
West Glacier, MT	2.55	3.19	2.24	2.29	2.29	1.09	3.55	1.35	inch
Cranbrook A, BC	34.50	14.60	26.60	19.00	33.60	4.00	20.20	30.70	mm
Fernie, BC	87.00	139.00	117.00	83.00	68.00	13.00	90.00	27.00	mm
Snow Water Equiv	1-Jan			1-Feb	1-Mar	1-Apr	1-May	1-Jun	Units
Hawkins Lake, MT				13	17	18	20	0	inch
Stahl Peak, MT			14	20	25	28	31	15	inch
East Creek, BC				709	806	842	961	589	mm
Moyie Mountain, BC			153	223	299	284	233	0	mm
Sunshine Village, AB			272	373	379	433	443	387	mm
Akamina Pass, AB				259	316	348	260	45	mm
South Racehorse Creek, AB				180	252	241	169	0	mm
Streamflow	Jan			Feb	Mar	Apr	May	Jun	Units
Libby Inflow Volume			162.5	120.6	175.8	429.5	1195.3		KAF
Reservoir Elevation	1-Nov	1-Dec	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun	Units
Libby FOM Elev	2441.9	2434.6	2415.5	2413.3	2410.6	2405.8	2409.2	2417.0	feet

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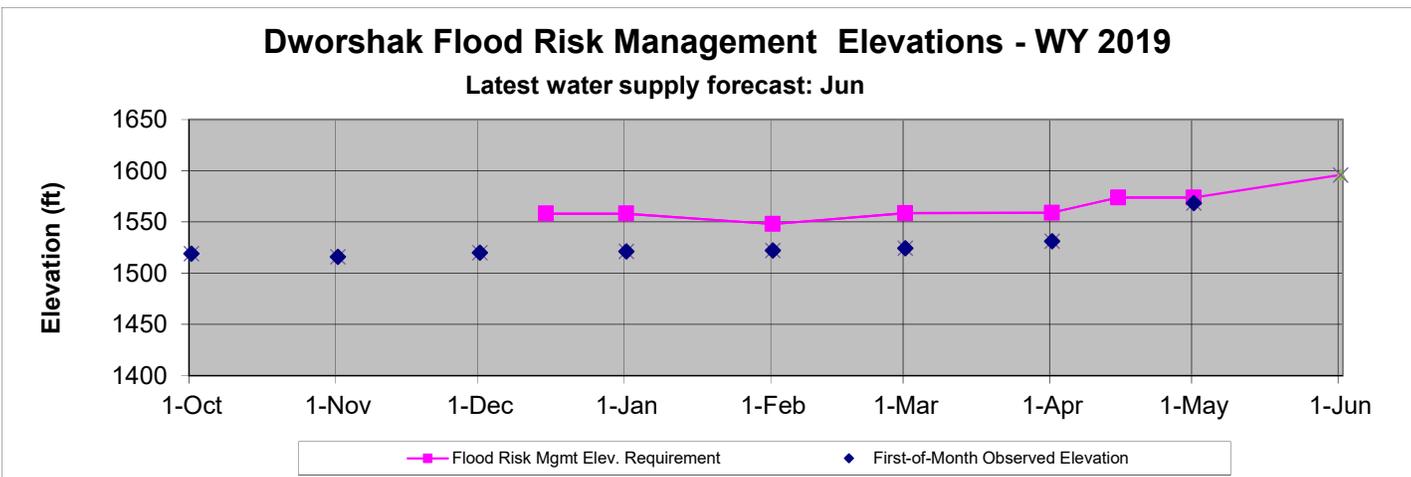
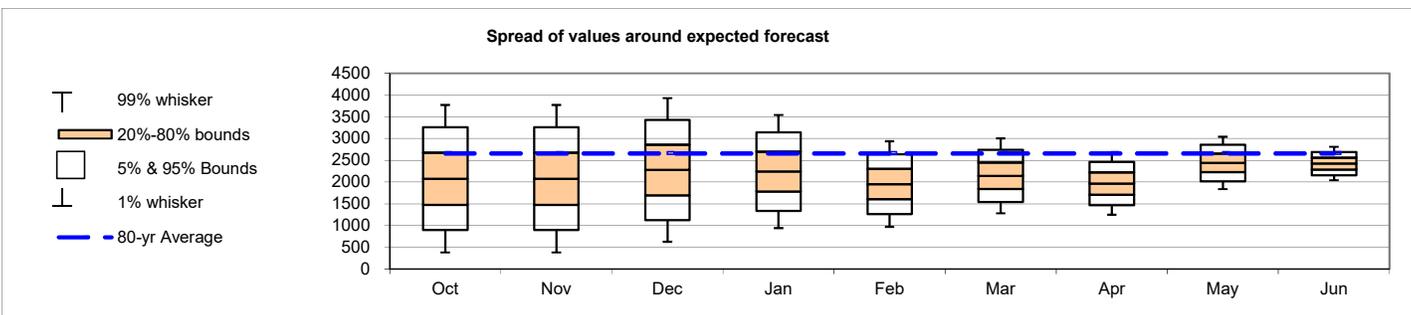
Dworshak : June Runoff Forecast & Flood Risk Management Calculation

WY 2019

Runoff Forecast and Flood Risk Management (FRM)				1981-2010 Average	Percent of 30yr Average	1929-2008 Average	Percent of Average
	Apr-Jul	2425	KAF	2438	99%	2655	91%
	May-Jul	1496	KAF	1784	84%	1959	76%
	Jun-Jul	543	KAF	853	64%	914	59%

Seasonal Flood Risk Management (assumes no shift of flood control space to Grand Coulee)									
Forecast Date>>	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Jul Runoff Forecast	2075	2075	2276	2239	1951	2142	1964	2438	2425
First-of-Month Elev	1519.3	1516.1	1520.1	1521.4	1522.3	1524.3	1531.3	1568.6	1595.9

Date >>	15-Dec	31-Dec	31-Jan	28-Feb	31-Mar	15-Apr	30-Apr	31-May	
FRM Space	--	700	700	849	694	689	460	460	75
FRM Elevation	--	1558.2	1558.2	1547.9	1558.6	1559.0	1573.8	1573.8	1596



Dworshak : June 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
Hoodoo Basin SWE	1-Jun	23.1	89%	8.21	189.7
Shanghi Summit SWE	1-Jun	0.0	0%	10.26	0.0
Lost Lake SWE	1-Jun	19.9	61%	6.14	122.0
Hemlock SWE	1-Jun	12.3	69%	7.57	92.9
Intercept		1		138.78	138.8
1-Jun Forecast (KAF)				Σ	543.4

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)									
Headquarters, ID	3.80	5.60	5.30	2.20	1.40	2.70	3.20		
Cumulative HQSI Data	3.80	9.40	14.70	16.90	18.30	21.00	24.20		
Snow Water Equiv (First of Month values) (in)									
Elk Butte, ID				15.5	20.6	29.9	31.3		
Cool Creek, ID				21.5	26.7				
Hoodoo Basin, MT				14.4	21.1	30.6	33.1	37.9	23.1
Sherwin, ID				3.7	6.1	10.2	5.7		
Shanghi Summit, ID								7.6	0.0
Lost Lake, ID				18.8	26.1	36.2	39.8	44.7	19.9
Hemlock, ID								47.4	12.3
Crater Meadows Mar						37.8	40.1		
Streamflow (End of Month) (kaf)									
				Jan	Feb	Mar	Apr	May	Jun
Dworshak Inflow				114	121	219	929	952	--

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).

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: 2019-06-05 Issued: 2019-06-05

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	49512	51319	85	53600	60110
APR-JUL	42686	43788	86	45832	51015
APR-AUG	46878	48204	85	50505	56763
JAN-SEP	55612	57419	84	59700	68694
JAN-JUL	48786	49888	84	51932	59599
OCT-SEP	62804	64611	84	66892	76824

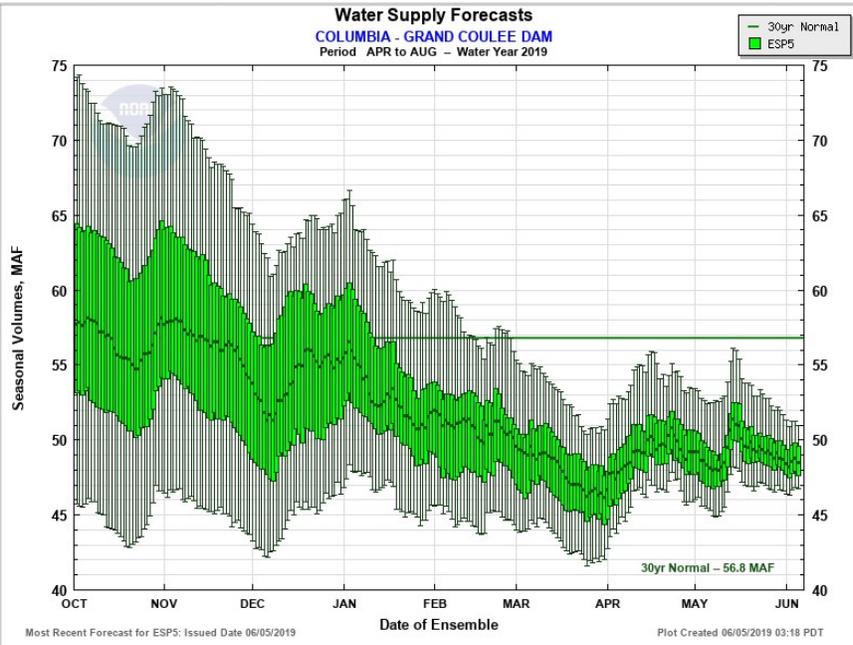
5 days QPF: Ensemble: 2019-06-05 Issued: 2019-06-05

APR-SEP	49386	51461	86	54189	60110
APR-JUL	42511	43948	86	46077	51015
APR-AUG	46760	48466	85	50945	56763
JAN-SEP	55486	57561	84	60289	68694
JAN-JUL	48611	50048	84	52177	59599
OCT-SEP	62678	64753	84	67482	76824

0 days QPF: Ensemble: 2019-06-05 Issued: 2019-06-05

APR-SEP	49468	51605	86	54710	60110
APR-JUL	42432	44102	86	46760	51015
APR-AUG	46448	48571	86	51341	56763
JAN-SEP	55568	57705	84	60810	68694
JAN-JUL	48532	50202	84	52860	59599
OCT-SEP	62760	64898	84	68002	76824

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



Max Scale Scale To Data Scale To Last 45 Days

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ESP10 ESP5 ESP0

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PEND OREILLE - ALBENI FALLS DAM (ALFW1) Forecasts for Water Year 2019

Official Forecast

10 days QPF: Ensemble: 2019-06-05 Issued: 2019-06-05

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	11776	12119	95	12951	12815
APR-JUL	10785	11049	94	11765	11777
APR-AUG	11294	11629	94	12436	12354
JAN-SEP	13355	13697	90	14530	15226
JAN-JUL	12364	12628	89	13344	14189
OCT-SEP	15036	15379	89	16212	17218

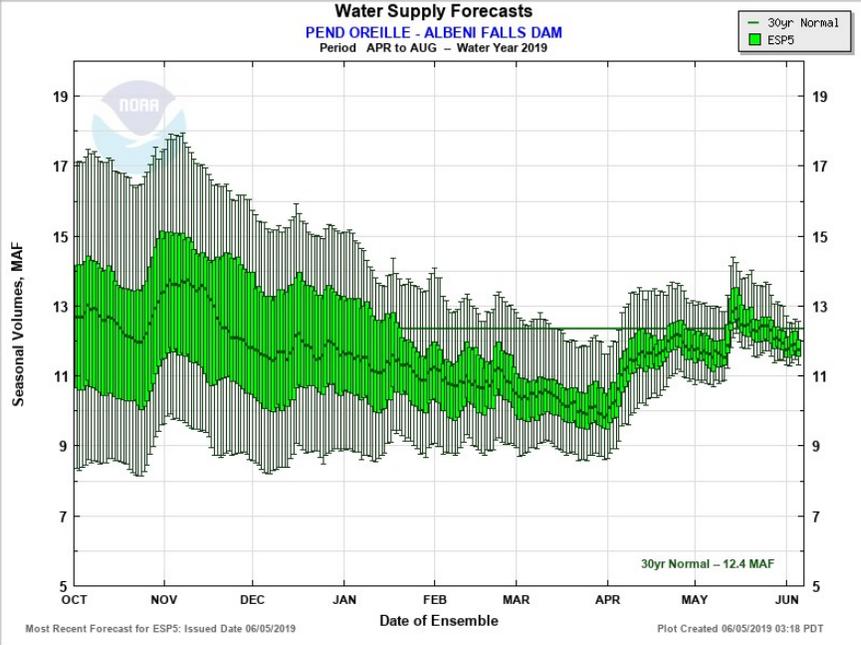
5 days QPF: Ensemble: 2019-06-05 Issued: 2019-06-05

APR-SEP	11836	12274	96	13065	12815
APR-JUL	10811	11199	95	11871	11777
APR-AUG	11326	11763	95	12568	12354
JAN-SEP	13414	13853	91	14644	15226
JAN-JUL	12390	12777	90	13449	14189
OCT-SEP	15096	15535	90	16326	17218

0 days QPF: Ensemble: 2019-06-05 Issued: 2019-06-05

APR-SEP	11797	12359	96	13353	12815
APR-JUL	10815	11268	96	12082	11777
APR-AUG	11337	11814	96	12844	12354
JAN-SEP	13376	13938	92	14932	15226
JAN-JUL	12394	12847	91	13661	14189
OCT-SEP	15058	15620	91	16614	17218

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