The Offical 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 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

June 1, 2018

Hungry Horse Dam – Official Water Supply Forecast
JUNE 2018

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

Jun-Jul: 880 kaf (102%)

Jan-Jul: 2,950 kaf (150%)

Apr-Aug: 2,848 kaf (148%)

May-Sep: 2,538 kaf (150%)

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:*** **2018-06-05** ***Issued:*** 2018-06-05

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	108287	111347	120	114748	92704
APR-JUL	95825	97593	122	100906	79855
APR-AUG	103008	105422	120	108779	87532
JAN-SEP	131538	134599	118	138000	114216
JAN-JUL	119076	120844	119	124158	101368
OCT-SEP	147754	150815	116	154216	130518

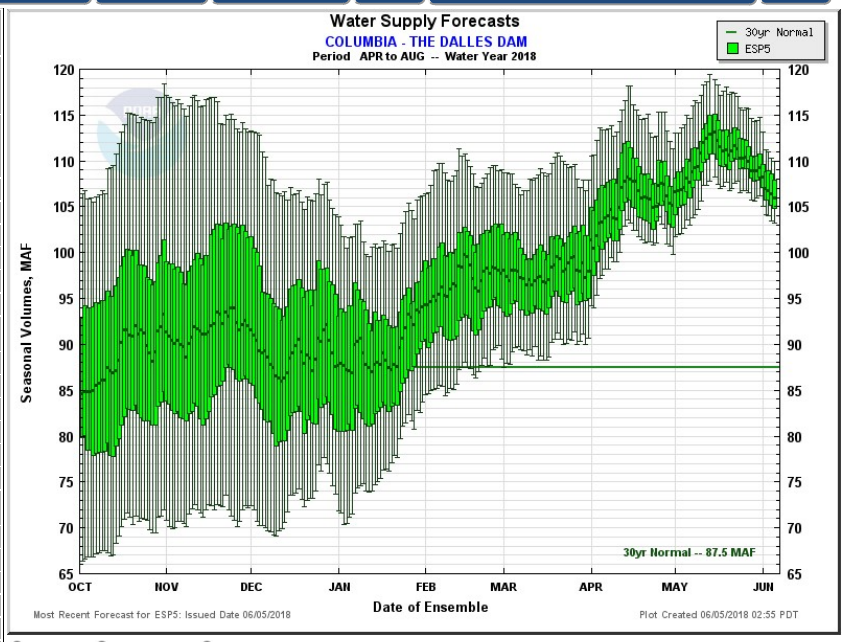
5 days QPF: ***Ensemble:*** **2018-06-05** ***Issued:*** 2018-06-05

APR-SEP	108325	111593	120	116062	92704
APR-JUL	96167	98079	123	101440	79855
APR-AUG	103172	105908	121	109910	87532
JAN-SEP	131576	134844	118	139314	114216
JAN-JUL	119418	121331	120	124692	101368
OCT-SEP	147792	151060	116	155530	130518

0 days QPF: ***Ensemble:*** **2018-06-05** ***Issued:*** 2018-06-05

APR-SEP	108410	112095	121	117331	92704
APR-JUL	96283	98625	124	103129	79855
APR-AUG	103395	106547	122	111641	87532
JAN-SEP	131662	135347	119	140582	114216
JAN-JUL	119534	121877	120	126381	101368
OCT-SEP	147878	151563	116	156798	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: CSV (ESP5 / APR-AUG) | Forecast Ensemble

Northwest River Forecast Center

Water Supply Forecasts

SNAKE - LOWER GRANITE DAM (LGDW1)
Forecasts for Water Year 2018

Official Forecast

10 days QPF: ***Ensemble:*** 2018-06-05 ***Issued:*** 2018-06-05

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	25877	26298	118	26818	22279
APR-JUL	23380	23768	120	24189	19848
APR-AUG	24637	25059	119	25577	21091
JAN-SEP	34491	34913	117	35432	29872
JAN-JUL	31994	32383	118	32803	27440
OCT-SEP	39708	40129	116	40649	34667

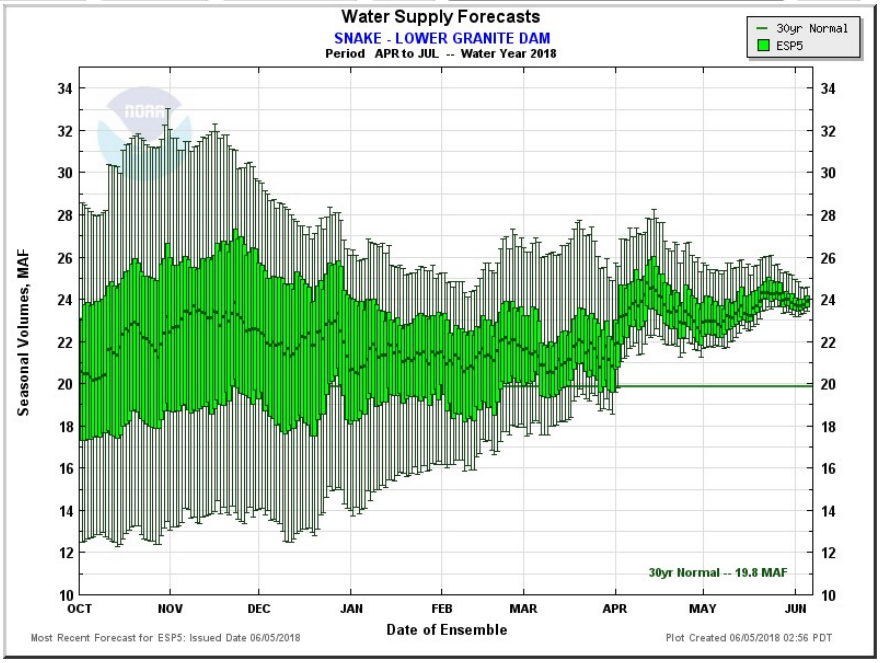
5 days QPF: ***Ensemble:*** 2018-06-05 ***Issued:*** 2018-06-05

APR-SEP	25920	26353	118	27181	22279
APR-JUL	23440	23878	120	24590	19848
APR-AUG	24650	25112	119	25906	21091
JAN-SEP	34534	34967	117	35795	29872
JAN-JUL	32054	32492	118	33204	27440
OCT-SEP	39751	40184	116	41012	34667

0 days QPF: ***Ensemble:*** 2018-06-05 ***Issued:*** 2018-06-05

APR-SEP	25786	26536	119	27857	22279
APR-JUL	23337	24000	121	25148	19848
APR-AUG	24574	25261	120	26527	21091
JAN-SEP	34400	35150	118	36471	29872
JAN-JUL	31951	32614	119	33762	27440
OCT-SEP	39617	40367	116	41688	34667

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-JUL) | Forecast Ensemble

Libby : June Runoff Forecast & Flood Control Calculation — WY 2018

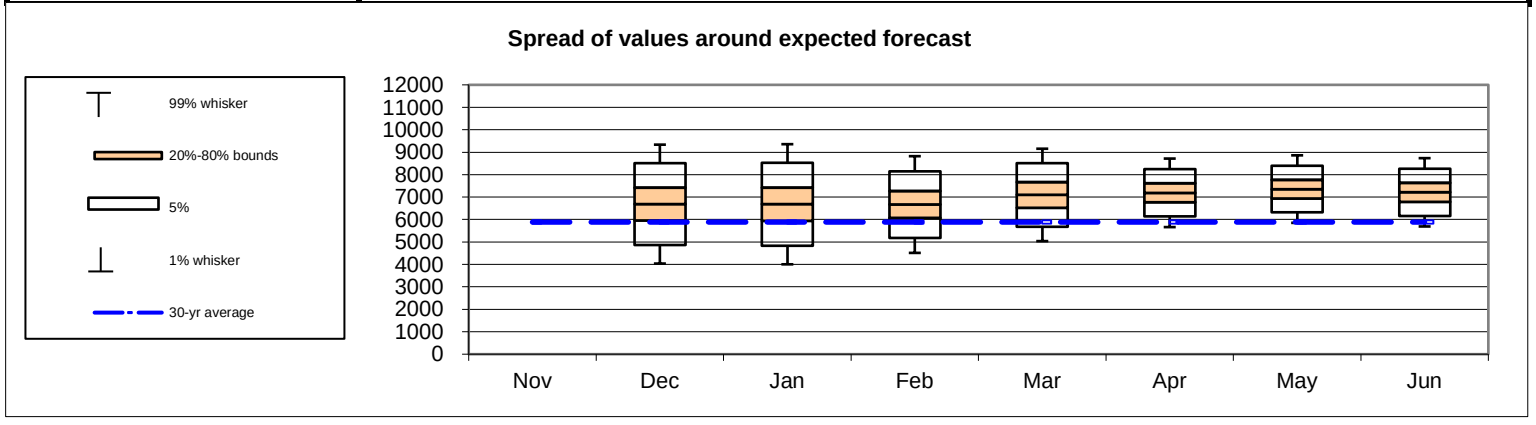
Runoff Forecast and Flood Control

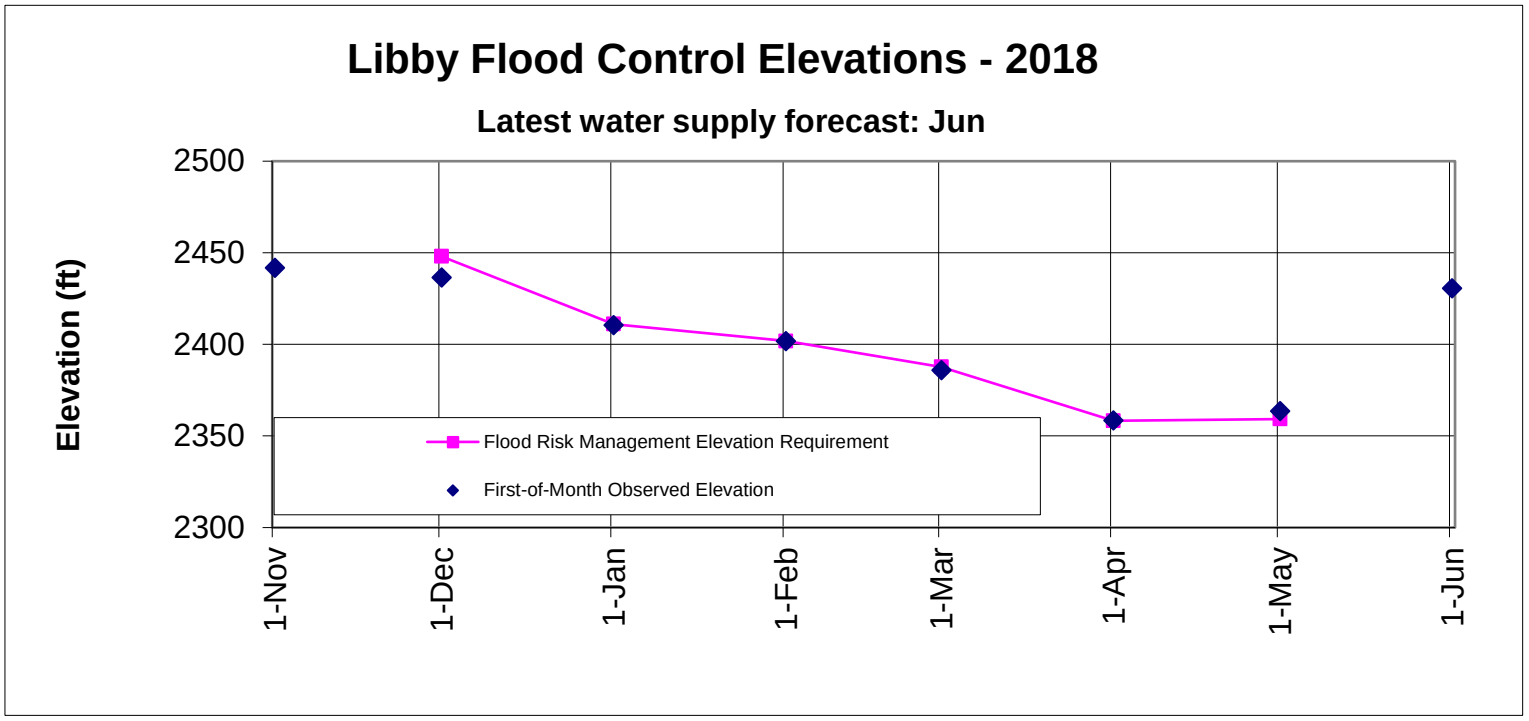
				1981-2010 Average	Percent of Average	1929-2008 Average	Percent of Average
Most Probable Runoff Volume:	**Apr-Aug**	**7213**	**KAF**	5885	123%	6282	115%
	Apr-Jul	**6681**	**KAF**	5342	125%	5720	117%
	May-Jul	**6222**	**KAF**	4821	129%	5199	120%

Seasonal Flood Control VARQ Flood Control Implemented

Forecast Date >>	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Aug Runoff Forecast		6687	6681	6668	7096	7189	7356	7213
First-of-Month Elev	2441.8	2436.5	2410.6	2401.8	2385.9	2358.4	2363.5	2430.5

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





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, Jon Moen (206) 764-3561, or the general Water Management line (206) 764-3584.
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 Odlum.

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	*∑Jun:Jul*					
Eureka RS, MT	*∑Oct:May Prcp*	*inches*	10.95	126%	37.7	412.4
West Glacier, MT	*∑Oct:May Prcp*	*inches*	27.39	129%	22.5	615.3
Cranbrook A, BC	*∑Oct:May Prcp*	*millimeters*	288.30	125%	2.0	585.3
Fernie, BC	*∑Oct:May Prcp*	*millimeters*	893.80	105%	0.5	448.7
Hawkins Lake, MT	*1-Jun SWE*	*inches*	0.00	0%	10.1	0.0
Stahl Peak, MT	*1-Jun SWE*	*inches*	28.10	97%	10.3	289.6
East Creek, BC	*1-Jun SWE*	*millimeters*	438.00	60%	0.4	189.3
Moyie Mountain, BC	*1-Jun SWE*	*millimeters*	0.00	0%	0.8	0.0
Sunshine Village, AB	*1-Jun SWE*	*millimeters*	255.20	54%	0.6	158.6
Akamina Pass, AB	*1-Jun SWE*	*millimeters*	36.80	59%	0.7	25.0
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)	∑	3702.2
Observed April-May Inflow (KAF)		3510.4
1-June Forecast, April-August Inflow (KAF)	∑	7212.7

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	2.23	0.56	inch
West Glacier, MT	3.10	4.57	4.23	4.18	5.02	1.73	2.47	2.09	inch
Cranbrook A, BC	25.00	63.60	47.00	29.80	27.20	26.40	44.10	25.20	mm
Fernie, BC	132.00	193.00	77.00	180.00	84.80	104.00	98.00	25.00	mm
Snow Water Equiv			***1-Jan***	***1-Feb***	***1-Mar***	***1-Apr***	***1-May***	***1-Jun***	***Units***
Hawkins Lake, MT				18	23	29	32	0	inch
Stahl Peak, MT			15	26	35	43	52	28	inch
East Creek, BC				659	803	905	1033	438	mm
Moyie Mountain, BC			194	318	429	518	537	0	mm
Sunshine Village, AB			284	407	511	609	652	255	mm
Akamina Pass, AB				362	479	598	529	37	mm
South Racehorse Creek, AB				240	356	445	380	0	mm
Streamflow			***Jan***	***Feb***	***Mar***	***Apr***	***May***	***Jun***	***Units***
Libby Inflow Volume			205.1	166.2	214.4	459.4	3051.1		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	2363.5	2430.5	feet

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

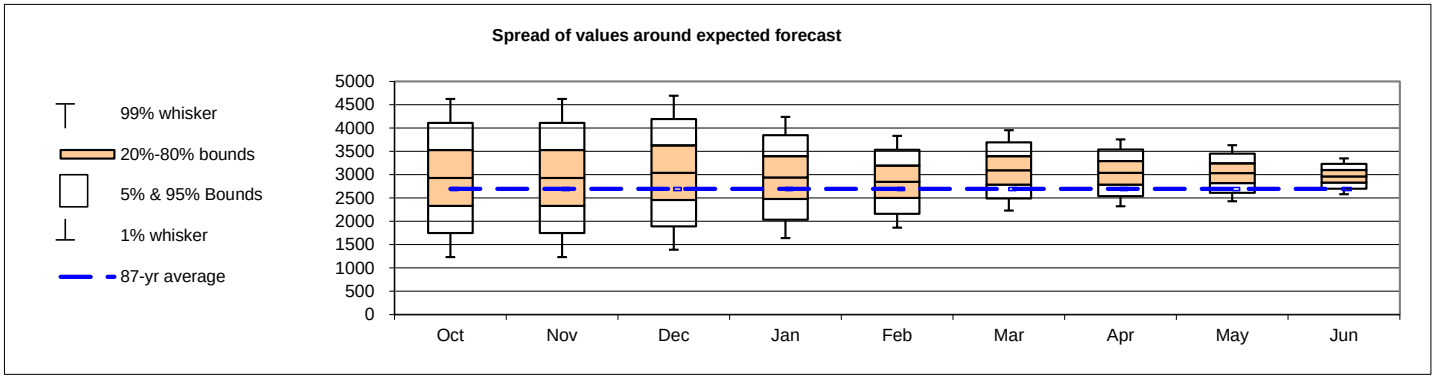
Dworshak : June Runoff Forecast & Flood Risk Management Calculation WY 2018

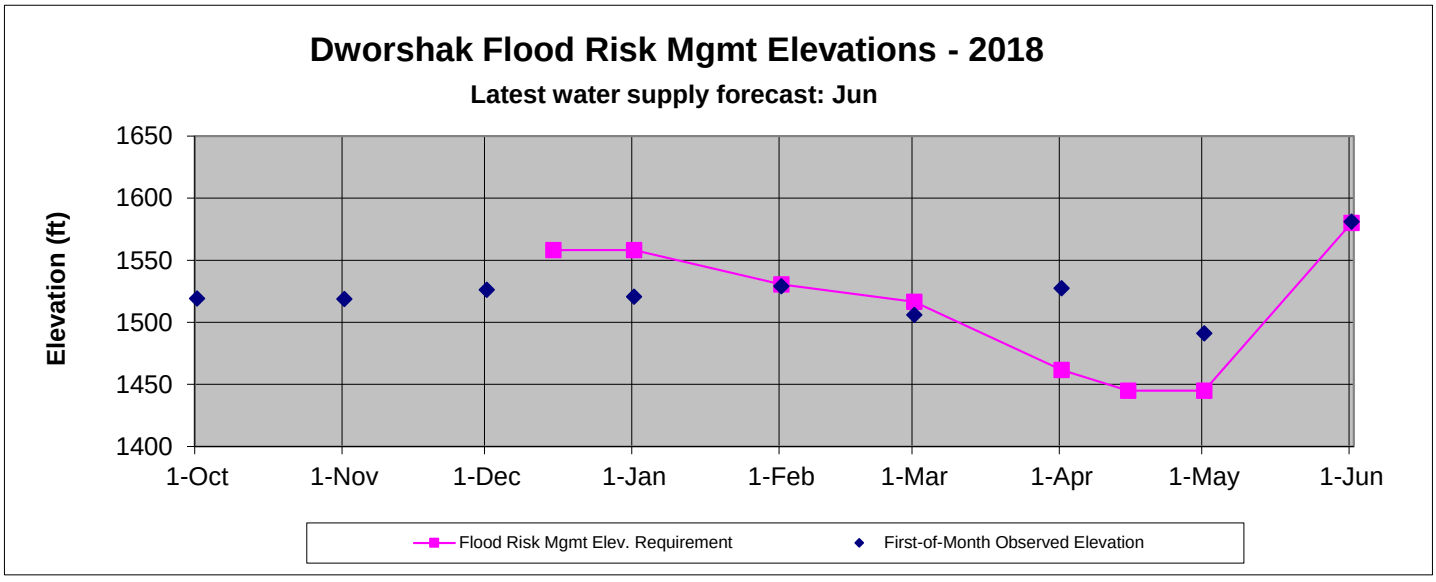
Runoff Forecast and Flood Risk Management (FRM)				1981-2010 Average	Percent of 30yr Average	1929-2008 Average	Percent of Average
	Apr-Jul	2966	KAF	2438	122%	2696	110%
	May-Jul	2151	KAF	1784	121%	1972	109%
	Jun-Jul	674	KAF	853	79%	926	73%

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	2929	2929	3043	2941	2849	3093	3040	3032	2966
First-of-Month Elev	1519.1	1518.7	1526.2	1520.7	1529.1	1506.0	1527.5	1491.1	1581.1

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	358
FRM Elevation	--	1558.2	1558.2	1530.5	1516.5	1461.6	1445.0	1445.0	1580





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*	30.2	116%	8.21	247.9
Shanghi Summit SWE	*1-Jun*	0.0	0%	10.26	0.0
Lost Lake SWE	*1-Jun*	34.1	105%	6.14	209.4
Hemlock SWE	*1-Jun*	10.3	58%	7.57	78.0
Intercept		1		138.78	138.8
	1-Jun Forecast (KAF)			∑	674.1

Data Station	*Sept*	*Nov*	*Dec*	*1-Jan*	*1-Feb*	*1-Mar*	*1-Apr*	*1-May*	*1-Jun*
Climate (Stdzd SOI)									
September SOI	0.60								
Precipitation (in)	Oct								
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**	**--**		
Snow Water Equiv (First of Month values) (in)									
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	49.7	30.2
Sherwin, ID				5.1	7.0	10.7	7.8		
Shanghi Summit, ID								15.2	0.0
Lost Lake, ID				22.3	38.0	52.6	59.9	65.6	34.1
Hemlock, ID								53.9	10.3
Crater Meadows Mar						46.9	53.1		
Streamflow (End of Month) (kaf)				Jan	Feb	Mar	Apr	May	Jun
Dworshak Inflow				316	520	358	815	1477	--

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

Northwest River Forecast Center

Water Supply Forecasts

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

Official Forecast

10 days QPF: ***Ensemble:*** **2018-06-05** ***Issued:*** 2018-06-05

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	69823	72628	121	75485	60110
APR-JUL	61248	62642	123	65252	51015
APR-AUG	66443	68468	121	71309	56763
JAN-SEP	78996	81801	119	84657	68694
JAN-JUL	70421	71815	120	74425	59599
OCT-SEP	86414	89219	116	92076	76824

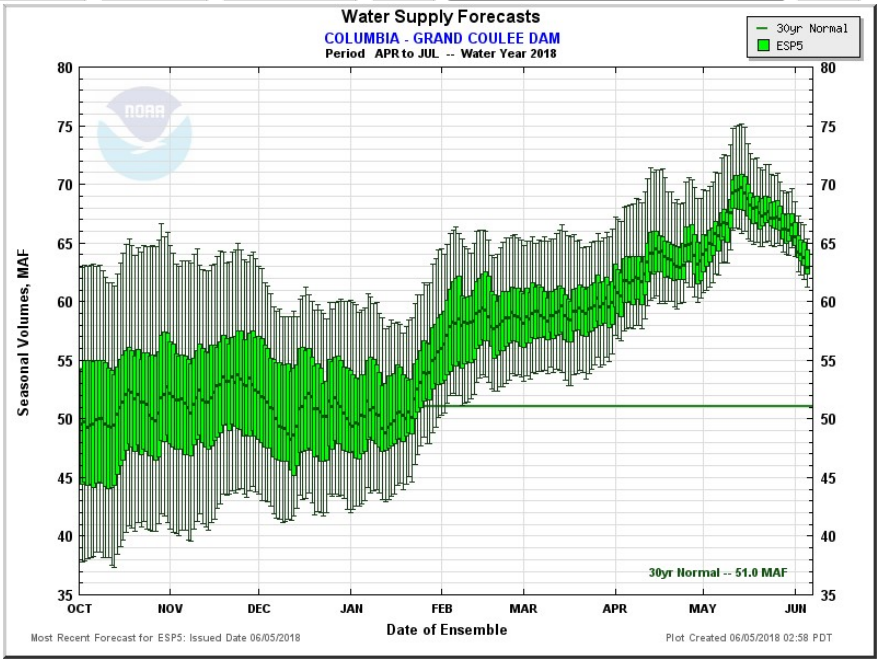
5 days QPF: ***Ensemble:*** **2018-06-05** ***Issued:*** 2018-06-05

APR-SEP	69987	72873	121	76081	60110
APR-JUL	61229	62919	123	65358	51015
APR-AUG	66602	69088	122	72120	56763
JAN-SEP	79160	82045	119	85254	68694
JAN-JUL	70402	72092	121	74531	59599
OCT-SEP	86578	89464	116	92673	76824

0 days QPF: ***Ensemble:*** **2018-06-05** ***Issued:*** 2018-06-05

APR-SEP	70186	73167	122	77103	60110
APR-JUL	61450	63428	124	66390	51015
APR-AUG	66701	69403	122	72805	56763
JAN-SEP	79358	82340	120	86276	68694
JAN-JUL	70623	72601	122	75563	59599
OCT-SEP	86777	89759	117	93694	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)

Forecast Ensemble

Northwest River Forecast Center

Water Supply Forecasts

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

Official Forecast

10 days QPF: ***Ensemble:*** 2018-06-05 ***Issued:*** 2018-06-05

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	17636	18086	141	19046	12815
APR-JUL	16394	16784	143	17581	11777
APR-AUG	17072	17504	142	18421	12354
JAN-SEP	20383	20832	137	21793	15226
JAN-JUL	19141	19530	138	20327	14189
OCT-SEP	22566	23015	134	23976	17218

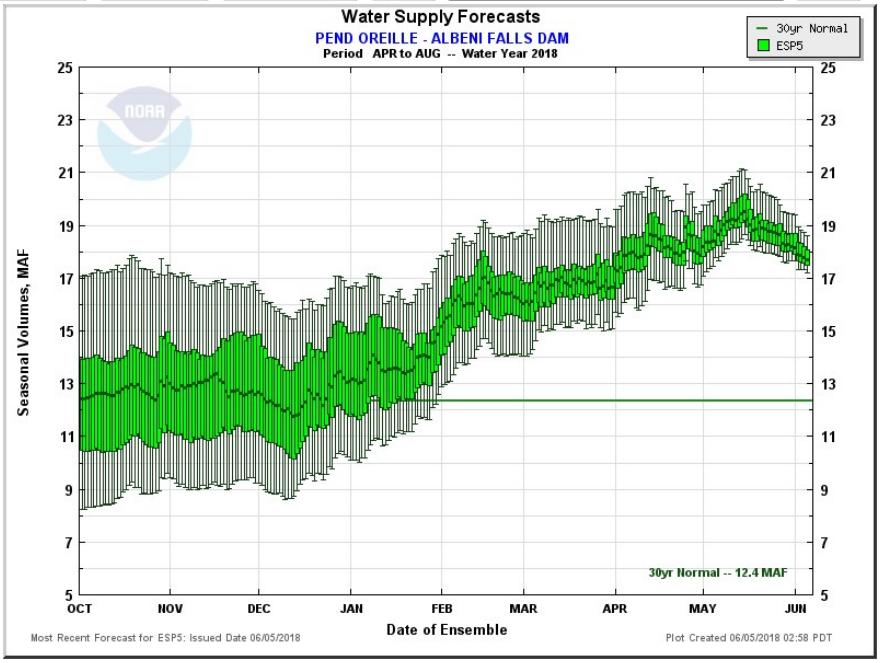
5 days QPF: ***Ensemble:*** 2018-06-05 ***Issued:*** 2018-06-05

APR-SEP	17781	18333	143	19193	12815
APR-JUL	16545	16976	144	17841	11777
APR-AUG	17214	17692	143	18612	12354
JAN-SEP	20528	21079	138	21940	15226
JAN-JUL	19291	19723	139	20588	14189
OCT-SEP	22711	23263	135	24123	17218

0 days QPF: ***Ensemble:*** 2018-06-05 ***Issued:*** 2018-06-05

APR-SEP	17886	18482	144	19775	12815
APR-JUL	16628	17079	145	18238	11777
APR-AUG	17310	17814	144	19084	12354
JAN-SEP	20633	21229	139	22522	15226
JAN-JUL	19375	19826	140	20985	14189
OCT-SEP	22816	23412	136	24705	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) | Forecast Ensemble