

The Official Water Supply Forecasts for January through July are computed on the 3rd workday of the month. Flood Risk Management (FRM) requirements are computed at standard intervals and posted at: <https://www.nwd.usace.army.mil/CRWM/Forecasts/>

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	Sets min. flows at Hungry Horse and Columbia Falls
	May – September Provided by Reclamation	January, February, March	Sets VARQ FRM targets
		April	Sets VARQ FRM targets Sets VARQ refill flows
		May	Sets VARQ refill flows Sets end of September draft target
		June	Sets VARQ refill flows
The Dalles	April – September Provided by NWRFC	March	Sets CRWMP adjustments at Grand Coulee
	April – August Provided by NWRFC	April	Sets spring flow objective at McNary
		July	Sets end of August draft limit at Grand Coulee
Lower Granite	April – July Provided by NWRFC	April	Sets spring flow objective at Lower Granite
		June	Sets summer flow objective at Lower Granite
Libby	April – August Provided by Corps Seattle District	December	Sets end of December variable draft target
		January, February, March	Sets VARQ FRM targets
		April	Sets VARQ FRM targets and VARQ refill flows
		May	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 Sets end of September draft limit.
		June	VARQ refill flows
Dworshak	April – July Provided by Corps Walla Walla District	January to March	Manage for reservoir FRM and VDL
		April to June	Manage for reservoir FRM and refill

Source: 2021 Water Management Plan, page 15:
<http://pweb.crohms.org/tmt/documents/wmp/2021/>

June 1, 2021

Hungry Horse Dam – Official Water Supply Forecast JUNE 2021

The volumes for the JUNE 2021 final forecast for Hungry Horse Inflows are:

- Jun-Jul: 820 kaf (91%)
- Apr-Aug: 1,820 kaf (94%)
- May-Sep: 1,640 kaf (97%)

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

U.S. Bureau of Reclamation
Columbia-Pacific Northwest Interior - Region 9
Water Management | Operations Group



Northwest River Forecast Center Water Supply Forecasts

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Choose Date: 06/03/2021 Archive: Water Year

COLUMBIA - THE DALLES DAM (TDAO3) Forecasts for Water Year 2021

Official Water Supply

ESP with 10 Days QPF Ensemble: 2021-06-02 Issued: 2021-06-02

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	75468	77732	84	80582	92704
APR-JUL	64532	65778	82	68581	79855
APR-AUG	71076	72604	83	75748	87532
JAN-SEP	91700	93964	82	96814	114216
JAN-JUL	80765	82011	81	84814	101368
OCT-SEP	106871	109134	84	111984	130518

Experimental Water Supply

HEFS with 15 days EQPF Ensemble: 2021-06-02 Issued: 2021-06-02

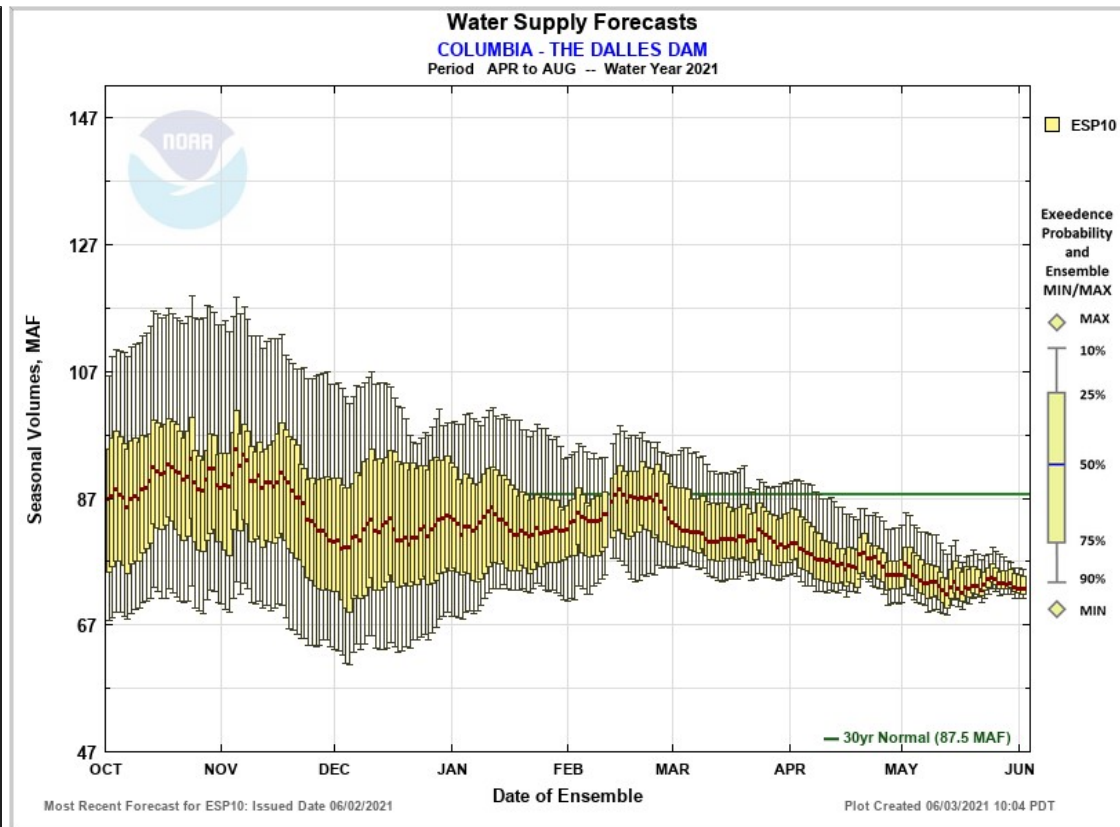
APR-SEP	77199	78882	85	82562	92704
APR-JUL	65808	66942	84	69252	79855
APR-AUG	71991	73667	84	76837	87532
JAN-SEP	93432	95115	83	98794	114216
JAN-JUL	82040	83174	82	85485	101368
OCT-SEP	108602	110285	84	113965	130518

Reference

ESP with 0 Days QPF Ensemble: 2021-06-02 Issued: 2021-06-02

APR-SEP	78426	80194	87	85107	92704
APR-JUL	66370	68163	85	71893	79855
APR-AUG	72910	75212	86	79732	87532
JAN-SEP	94659	96427	84	101339	114216
JAN-JUL	82603	84396	83	88125	101368
OCT-SEP	109829	111597	86	116509	130518

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



☐ Max Scale ☒ Scale To Data ☐ Scale To Last 45 Days ☐ Show Min/Max Ensemble Volume ☐ Show Tooltips Help



Northwest River Forecast Center Water Supply Forecasts

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SNAKE - LOWER GRANITE DAM (LGDW1) Forecasts for Water Year 2021

Official Water Supply

ESP with 10 Days QPF Ensemble: 2021-06-02 Issued: 2021-06-02

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	15322	15529	70	15963	22279
APR-JUL	13224	13371	67	13590	19848
APR-AUG	14281	14472	69	14750	21091
JAN-SEP	20599	20806	70	21240	29872
JAN-JUL	18501	18648	68	18867	27440
OCT-SEP	24696	24903	72	25337	34667

Experimental Water Supply

HEFS with 15 days EQPF Ensemble: 2021-06-02 Issued: 2021-06-02

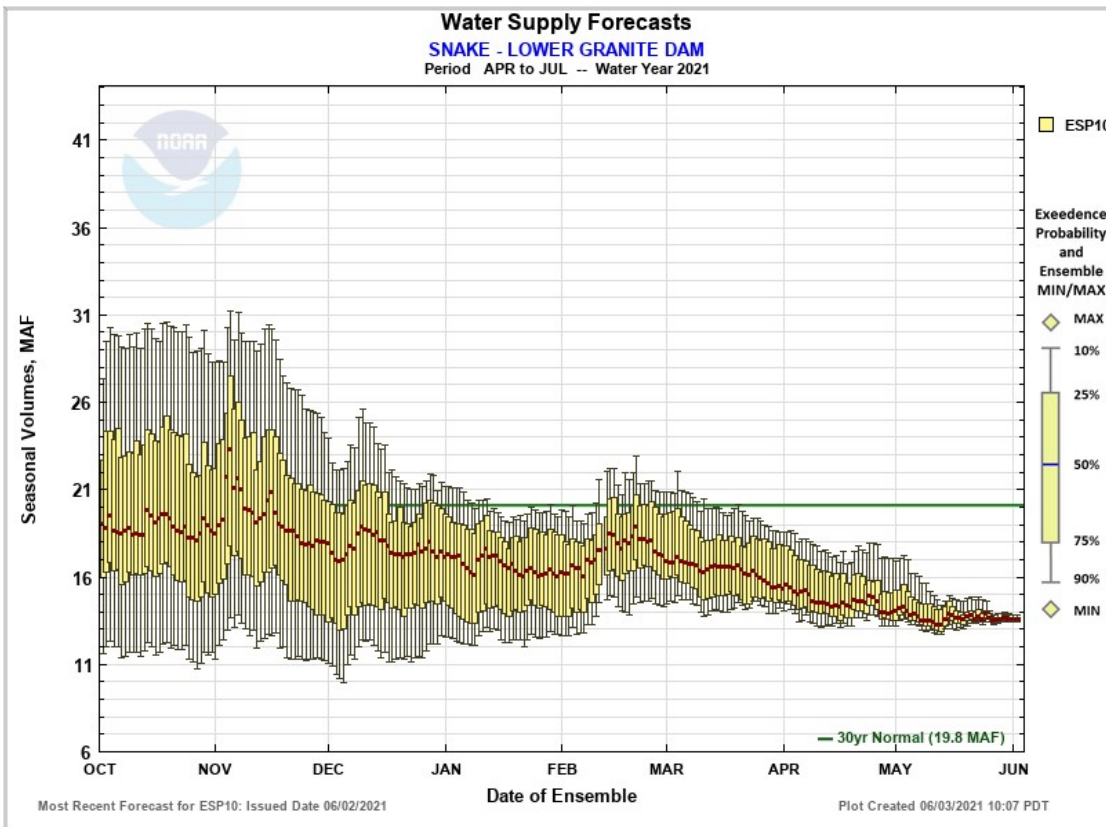
APR-SEP	15295	15503	70	15951	22279
APR-JUL	13235	13371	67	13663	19848
APR-AUG	14282	14441	68	14820	21091
JAN-SEP	20572	20780	70	21228	29872
JAN-JUL	18512	18648	68	18941	27440
OCT-SEP	24669	24877	72	25326	34667

Reference

ESP with 0 Days QPF Ensemble: 2021-06-02 Issued: 2021-06-02

APR-SEP	15330	15797	71	17082	22279
APR-JUL	13303	13637	69	14790	19848
APR-AUG	14306	14708	70	15947	21091
JAN-SEP	20607	21074	71	22359	29872
JAN-JUL	18580	18915	69	20067	27440
OCT-SEP	24704	25172	73	26457	34667

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



☐ Max Scale ☒ Scale To Data ☐ Scale To Last 45 Days ☐ Show Min/Max Ensemble Volume ☐ Show Tooltips Help

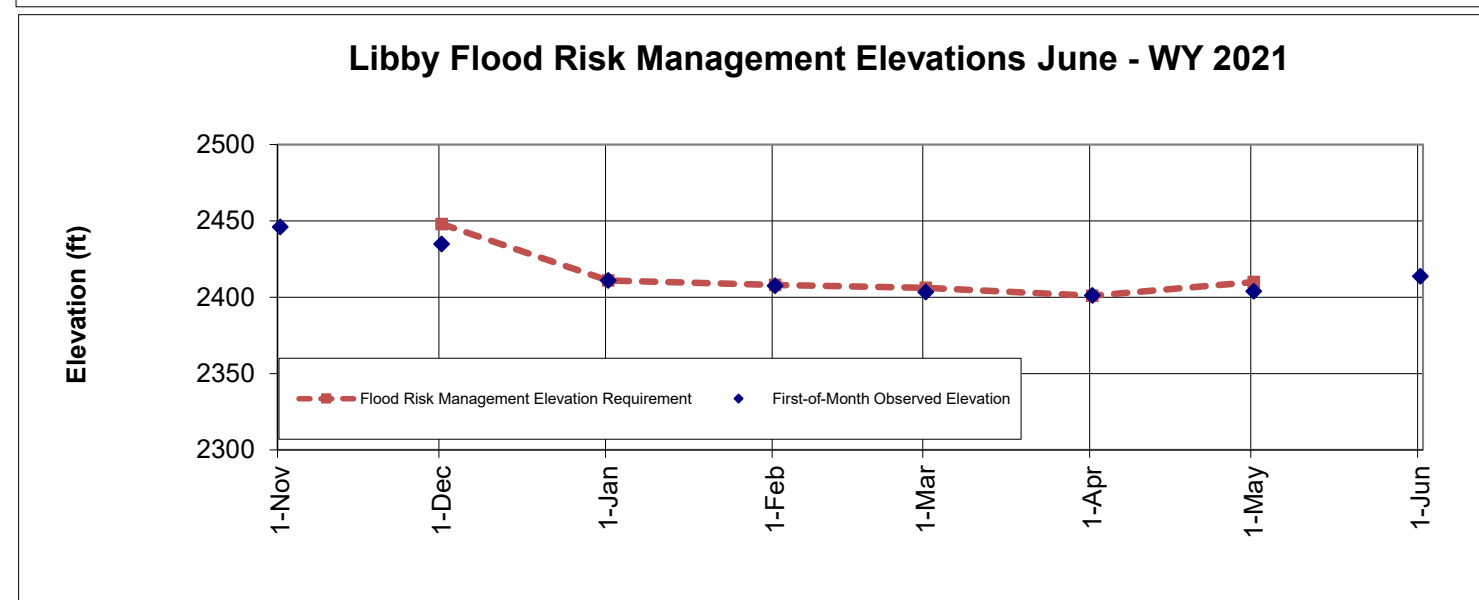
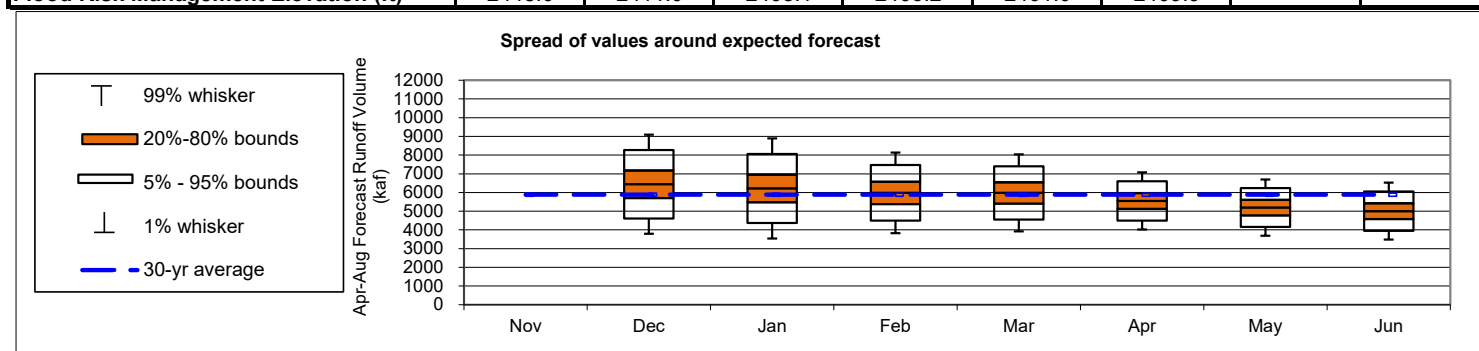
Libby : June Runoff Forecast & Flood Control Calculation

WY 2021

Runoff Forecast	June	1981-2010 Average	1981 - 2010 Percent of Average	1929-2008 Average	1929 - 2008 Percent of Average
Most Probable Runoff Volume: Apr-Aug (kaf)	5006	5885	85%	6282	80%
Most Probable Runoff Volume: Apr-Jul (kaf)	4540	5342	85%	5720	79%
Most Probable Runoff Volume: May-Jul (kaf)	4205	4821	87%	5199	81%

Forecast/Reservoir Data	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Aug Runoff Forecast (kaf)		6442	6215	5979	5980	5549	5191	5006
First-of-Month Elev (ft)	2446.1	2434.8	2410.9	2407.6	2403.4	2401.2	2403.9	2413.8

Seasonal FRM Requirements	30-Nov	31-Dec	31-Jan	28-Feb	31-Mar	30-Apr		
Flood Risk Management Space (kaf)	500	2000	2105	2173	2349	2039		
Flood Risk Management Elevation (ft)	2448.0	2411.0	2408.1	2406.2	2401.0	2409.9		



Notes:

1. The given forecast is the official Corps of Engineers forecast for Libby. If you have any questions please contact David Bogema (615) 736-5631, Justin Lawrence (206) 764-3699, Logan Osgood-Zimmerman (206) 764-6928, or Kristian Mickelson (206) 764-6927.
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. Cranbrook A gage data was intermittent during the month of April. Nearby Cranbrook Airport Auto gage data was used instead.

Libby : June Runoff Forecast & Flood Control Calculation

Apr-Aug Runoff Forecast Calculation:

Variable	Month(s)	Units	Observed Value A	Percent of Average	Regression Coefficient	Marginal Runoff (KAF) =A*B
SOI	ΣJun:Jul					
Eureka RS, MT	ΣOct:May Prcp	inches	6.65	77%	37.7	250.45
West Glacier, MT	ΣOct:May Prcp	inches	20.40	96%	22.5	458.25
Cranbrook A, BC	ΣOct:May Prcp	millimeters	154.70	67%	2.0	314.08
Fernie, BC	ΣOct:May Prcp	millimeters	736.80	87%	0.5	369.89
Hawkins Lake, MT	1-Jun SWE	inches	0.00	0%	10.1	0.00
Stahl Peak, MT	1-Jun SWE	inches	14.60	50%	10.3	150.49
East Creek, BC	1-Jun SWE	millimeters	767.00	105%	0.4	331.54
Moyie Mountain, BC	1-Jun SWE	millimeters	6.00	6%	0.8	5.09
Sunshine Village, AB	1-Jun SWE	millimeters	541.50	114%	0.6	336.47
Akamina Pass, AB	1-Jun SWE	millimeters	75.79	121%	0.7	51.54
South Racehorse Creek, AB	1-Jun SWE	millimeters	3.80	4%	0.6	2.44
Intercept			1		978.0	977.98
Forecast Inflow	June-August	kaf				3248.20
Observed Inflow	April-May	kaf				1757.68
1-June Forecast	April-August	kaf				5005.88

Data used in Libby Water Supply Forecast

WY 2021

Climate Data	Jun-20	Jul-20
SOI	0.40	0.40

Precipitation Data	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Eureka RS, MT (inch)	1.77	0.92	0.98	0.37	0.29	0.17	0.80	1.35
West Glacier, MT (inch)	4.52	4.32	2.34	2.92	2.36	0.72	1.29	1.93
Cranbrook A, BC (mm)	27.60	21.90	26.30	34.20	3.40	0.90	17.10	23.30
Fernie, BC (mm)	118.80	158.00	106.68	109.73	55.63	73.15	52.07	62.74
Snow Water Equiv	1-Nov	1-Dec	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun
Hawkins Lake, MT (inch)				16	19	21	21	0
Stahl Peak, MT (inch)			16	21	24	28	28	15
East Creek, BC (mm)				715	848	991	1029	767
Moyie Mountain, BC (mm)			166	235	323	354	220	6
Sunshine Village, AB (mm)			322	422	522	609	626	542
Akamina Pass, AB (mm)				316	384	428	263	76
South Racehorse Creek, AB (mm)				263	345	398	372	4
Streamflow	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Libby Inflow Volume (kaf)			182.3	128.4	169.4	335.0	1422.7	
Reservoir Elevation	1-Nov	1-Dec	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun
Libby FOM Elev (feet)	2446.1	2434.8	2410.9	2407.6	2403.4	2401.2	2403.9	2413.8

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

Kristian Mickelson
 Water Management Section Chief
 Seattle District

Dworshak : June Runoff Forecast & Flood Risk Management Calculation

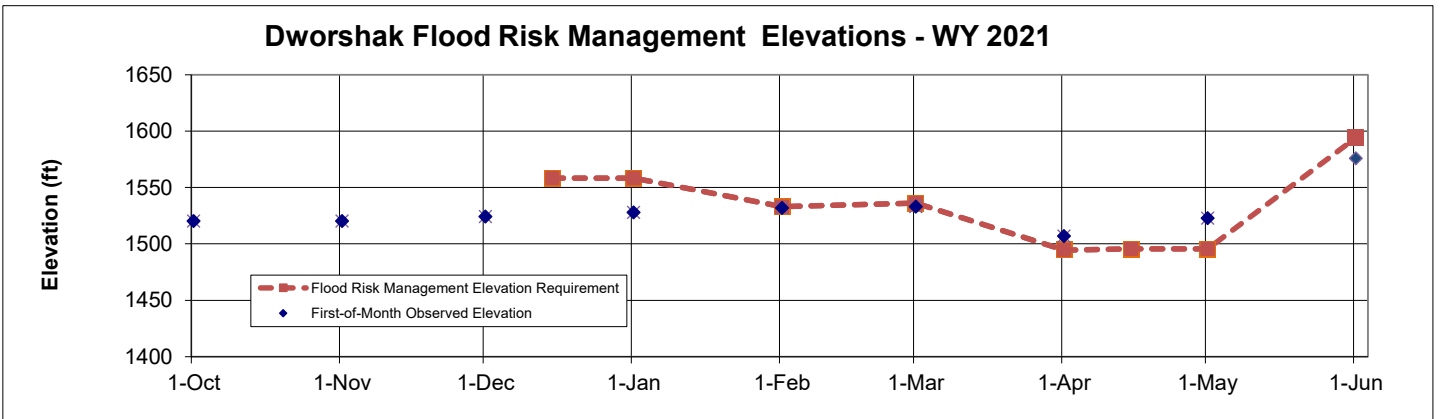
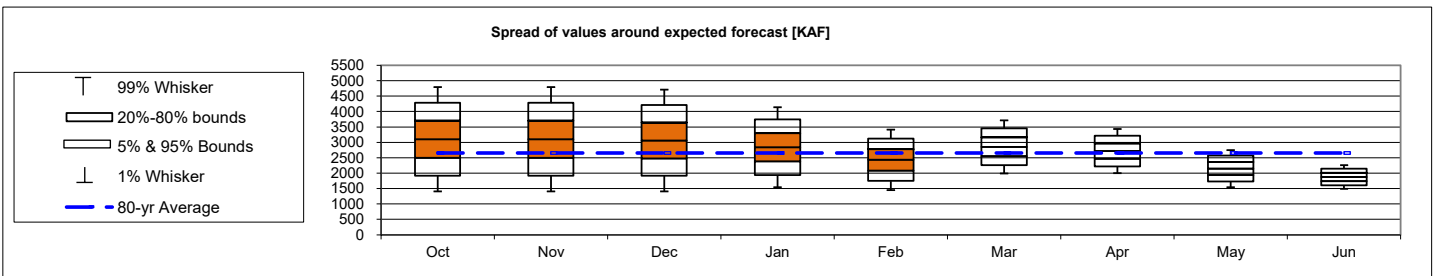
WY 2021

Runoff Forecast	June	1981-2010 Average	1981 - 2010 Percent of Average	1929-2008 Average	1929 - 2008 Percent of Average
Most Probable Runoff Volume: Apr-Jul (KAF)	1875	2438	77%	2655	71%
Most Probable Runoff Volume: May-Jul (KAF)	1358	1784	76%	1959	69%
Most Probable Runoff Volume: Jun-Jul (KAF)	497	853	58%	914	54%

Seasonal Flood Risk Management (assumes no shift of Flood Risk Management space to Grand Coulee, nor refill on the Flood Control Refill Curve)

Seasonal Flood Risk Management (FRM) Forecast	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Jul Runoff Forecast (KAF)	3100	3100	3063	2843	2432	2855	2716	2149	1875
First-of-Month Elevation (ft)	1520.2	1520.2	1524.2	1527.8	1531.7	1533.0	1506.8	1522.8	1575.6

Seasonal FRM Space	15-Dec	31-Dec	31-Jan	28-Feb	31-Mar	15-Apr	30-Apr
Flood Risk Management Space (KAF)	700	700	1057	1013	1534	1525	1525
Flood Risk Management Elevation (ft)	1558.2	1558.2	1533.0	1536.2	1494.6	1495.5	1495.5



Dworshak : June Runoff Forecast & Flood Risk Management Calculation

Apr-Jul Runoff Forecast Calculation:

Variable	Month(s)	Units	Observed Value A	Percent of Average	Regression Coefficient B	Marginal Runoff (KAF) $A \cdot B$
Hoodoo Basin SWE	1-Jun	Inch	22.8	88%	8.21	187.2
Shanghi Summit SWE	1-Jun	Inch	0.0	0%	10.26	0.0
Lost Lake SWE	1-Jun	Inch	25.4	78%	6.14	156.0
Hemlock SWE	1-Jun	Inch	2.0	11%	7.57	15.1
Intercept			1		138.78	138.8
1-Jun Forecast	Apr-Jul	KAF				497.1

Data used in Dworshak Water Supply Forecast:

Climate Data	Sept								
SOI	0.90								
Precipitation Data	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Headquarters, ID (inch)		4.00	4.30	5.10	4.30	5.91	1.94	1.10	
Cumulative HQSI Data (inch)		4.00	8.30	13.40	17.70	23.61	25.55	26.65	
Snow Water Equivalent	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Elk Butte, ID (inch)				13.0	19.2	34.2	37.4		
Cool Creek, ID (inch)				16.4	24.3				
Hoodoo Basin, MT (inch)				14.9	21.1	30.9	34.2	35.5	22.8
Sherwin, ID (inch)				5.6	6.8	11.9	9.0		
Shanghi Summit, ID (inch)								8.8	0.0
Lost Lake, ID (inch)				18.8	27.0	44.0	48.8	48.5	25.4
Hemlock, ID (inch)								36.8	2.0
Crater Meadows Mar (inch)						41.4	49.4		
Streamflow	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Dworshak Inflow Volume (KAF)				160	205	146	255	517	861

Notes:

1. The given forecast is the official Corps of Engineers forecast for Dworshak. If you have any questions please contact Willow Walker (509-527-7073), 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. An approved deviation request allowed Dworshak reservoir to target elevation 1,533.8 ft for 30 April rather than the listed 30 April FRM target elevation of 1,495.5 ft.

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