

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 **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	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 and 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 Dam
		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, VDL, and Flood Control Refill Curve (FCRC)
		April to June	Manage for reservoir FRM and FCRC

Source: 2022 Water Management Plan, page 15:
<http://pweb.crohms.org/tmt/documents/wmp/2022/>

April 4, 2022

Hungry Horse Dam – Official Water Supply Forecast APRIL 2022

Below are the volumes for the April 2022 final forecast for Hungry Horse:

- Apr-Jul: 1,950 kaf (98%)
- Apr-Aug: 2,000 kaf (99%)
- May-Sep: 1,600 kaf (91%)
- May-Jul: 1,500 kaf (90%)

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

- Columbia Falls: 3,500 cfs
- Hungry Horse: 900 cfs

Joel Fenolio, P.E.

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Columbia - Pacific Northwest Region
Boise, ID 83706



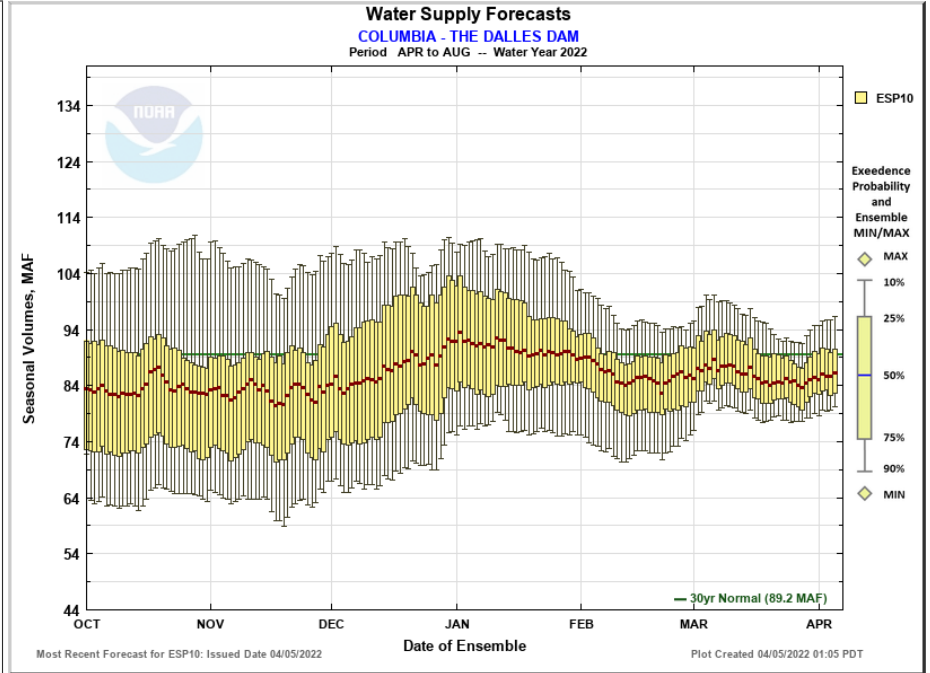
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Choose Date: 04/05/2022 Archive: Water Year

COLUMBIA - THE DALLES DAM (TDAO3) Forecasts for Water Year 2022					
Official Water Supply					
ESP with 10 Days QPF Ensemble: 2022-04-05 Issued: 2022-04-05					
Forecast Period	Forecasts Are in KAF				30 Year Average (1991-2020)
	90 %	50 %	% Average	10 %	
APR-SEP	85206	91206	97	101581	94166
APR-JUL	71315	78424	96	87672	81933
APR-AUG	79973	86007	96	95980	89196
JAN-SEP	103597	109597	95	119972	115946
JAN-JUL	89706	96815	93	106063	103714
OCT-SEP	121662	127663	96	138037	132314
Experimental Water Supply					
HEFS with 15 days EQPF Ensemble: 2022-04-05 Issued: 2022-04-05					
APR-SEP	86559	92950	99	102663	94166
APR-JUL	73694	79989	98	88786	81933
APR-AUG	81060	87345	98	97018	89196
JAN-SEP	104950	111342	96	121054	115946
JAN-JUL	92085	98380	95	107177	103714
OCT-SEP	123015	129407	98	139120	132314
Reference					
ESP with 0 Days QPF Ensemble: 2022-04-05 Issued: 2022-04-05					
APR-SEP	87551	94544	100	102564	94166
APR-JUL	75249	82538	101	88910	81933
APR-AUG	82676	89803	101	96866	89196
JAN-SEP	105942	112935	97	120956	115946
JAN-JUL	93640	100929	97	107301	103714
OCT-SEP	124007	131000	99	139021	132314

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

Overlay

ESP10 | HEFS | ESPO

Data Files

CSV (ESP10 / APR-AUG)

Forecast Ensemble



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Choose Date: 04/05/2022 Archive: Water Year

SNAKE - LOWER GRANITE DAM (LGDW1)
Forecasts for Water Year 2022

Official Water Supply

ESP with 10 Days QPF Ensemble: 2022-04-05 Issued: 2022-04-05

Forecast Period	Forecasts Are in KAF				30 Year Average (1991-2020)
	90 %	50 %	% Average	10 %	
APR-SEP	14636	16582	75	19433	22232
APR-JUL	12588	14416	72	17039	19946
APR-AUG	13615	15546	74	18253	21121
JAN-SEP	20123	22069	74	24919	29736
JAN-JUL	18075	19903	73	22525	27450
OCT-SEP	24028	25974	76	28824	34287

Experimental Water Supply

HEFS with 15 days EQPF Ensemble: 2022-04-05 Issued: 2022-04-05

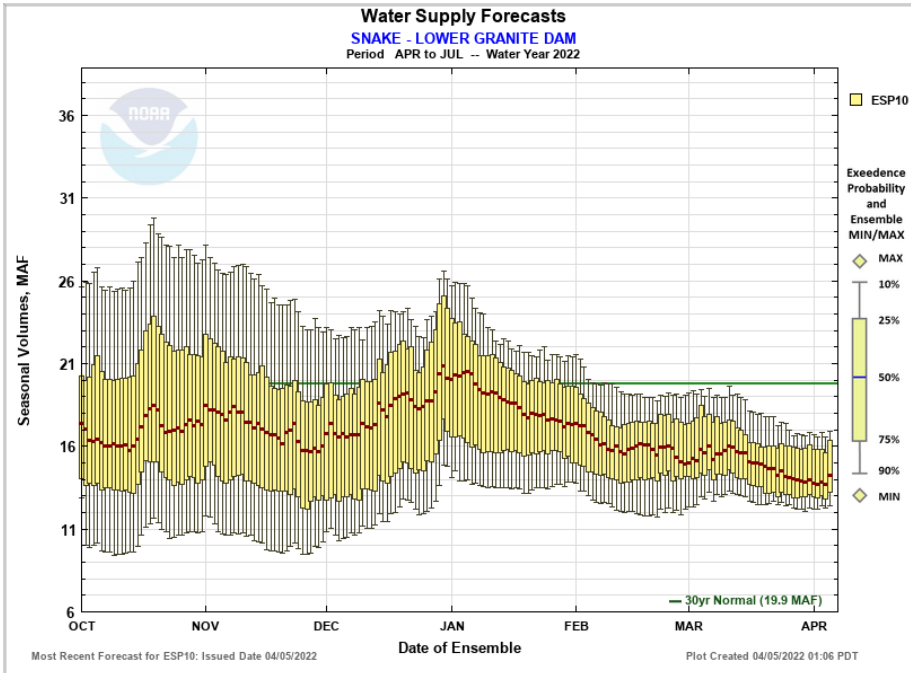
Forecast Period	90 %	50 %	% Average	10 %	30 Year Average (1991-2020)
APR-SEP	15330	17029	77	20223	22232
APR-JUL	13158	14809	74	17782	19946
APR-AUG	14255	15883	75	19053	21121
JAN-SEP	20816	22516	76	25710	29736
JAN-JUL	18645	20296	74	23268	27450
OCT-SEP	24721	26421	77	29615	34287

Reference

ESP with 0 Days QPF Ensemble: 2022-04-05 Issued: 2022-04-05

Forecast Period	90 %	50 %	% Average	10 %	30 Year Average (1991-2020)
APR-SEP	15769	17413	78	20582	22232
APR-JUL	13588	15288	77	18045	19946
APR-AUG	14637	16365	77	19337	21121
JAN-SEP	21256	22899	77	26068	29736
JAN-JUL	19074	20775	76	23531	27450
OCT-SEP	25161	26804	78	29973	34287

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



Most Recent Forecast for ESP10: Issued Date 04/05/2022 Plot Created 04/05/2022 01:06 PDT

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

Overlay

ESP10 HEFS ESPO

Data Files

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Forecast Ensemble



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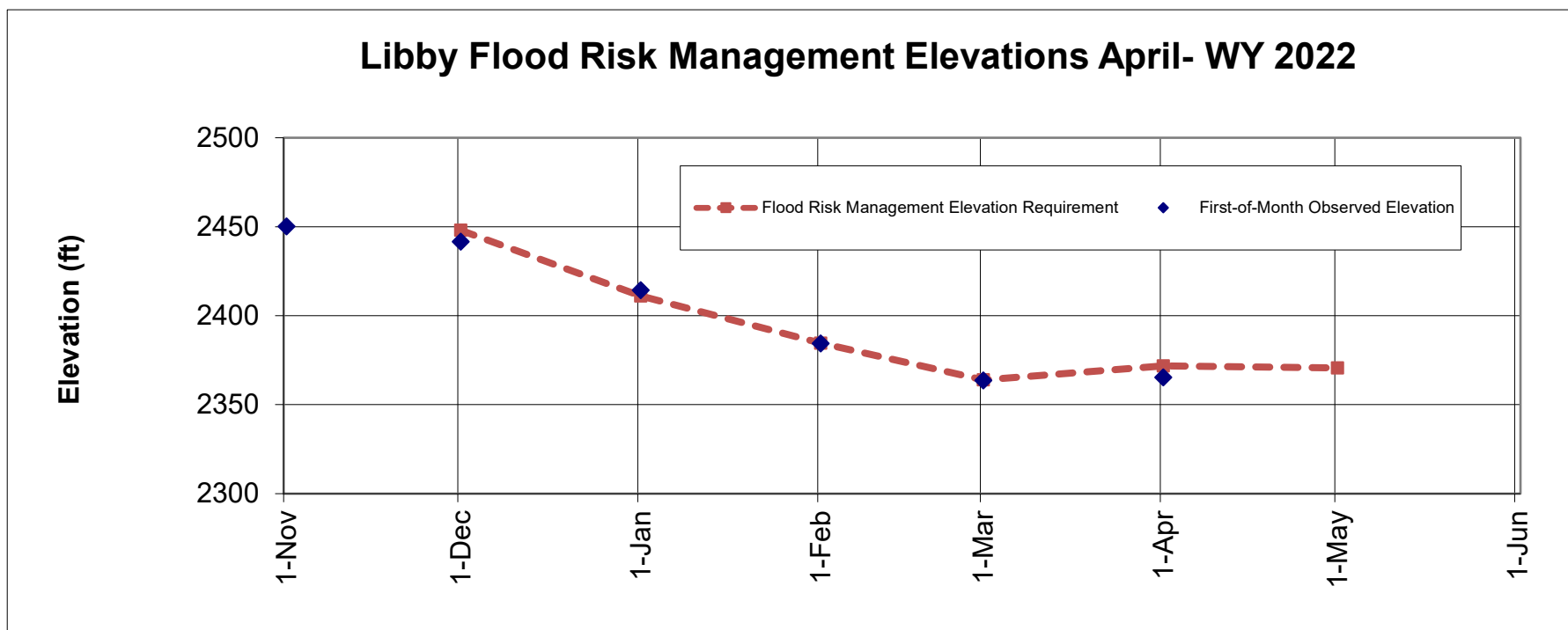
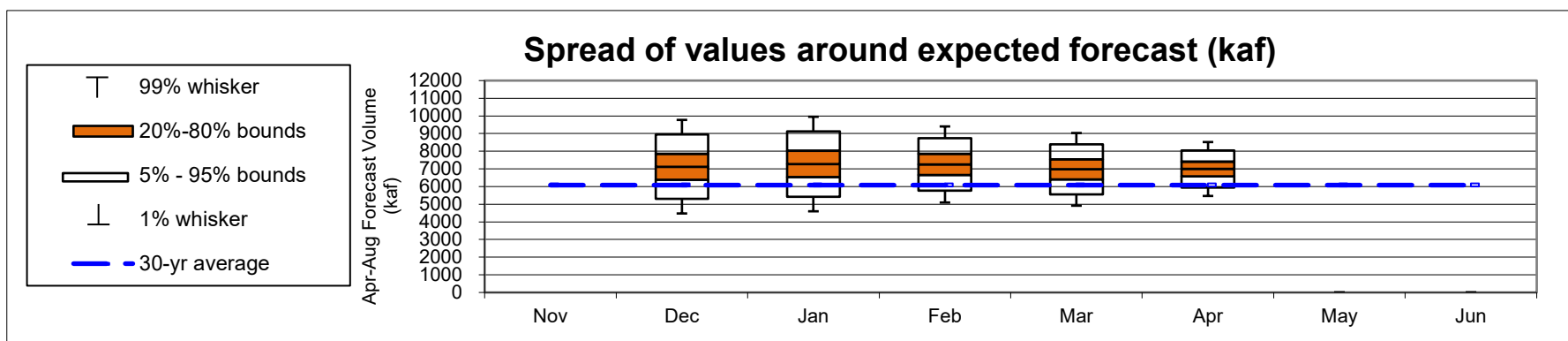
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Runoff Forecast	April	1991-2020 Average	1991 - 2020 Percent of Average	1929-2008 Average	1929 - 2008 Percent of Average
Most Probable Runoff Volume: Apr-Aug (kaf)	6992	6080	115%	6259	112%
Most Probable Runoff Volume: Apr-Jul (kaf)	6406	5570	115%	5708	112%
Most Probable Runoff Volume: May-Jul (kaf)	5766	5014	115%	5183	111%

Flood Risk Management	April
30-April Flood Risk Management Space (kaf)	3238
30-April Flood Risk Management Elevation (ft)	2370.7

Forecast/Reservoir Data	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Aug Runoff Forecast (kaf)		7123	7273	7249	6972	6992		
First-of-Month Elev (ft)	2450.2	2441.6	2414.4	2384.5	2363.5	2365.3		

Seasonal FRM Requirements	30-Nov	31-Dec	31-Jan	28-Feb	31-Mar	30-Apr
Flood Risk Management Space (kaf)	500	2000	2851	3416	3209	3238
Flood Risk Management Elevation (ft)	2448.0	2411.0	2384.6	2363.9	2371.8	2370.7



Notes:

- The given forecast is the official Corps of Engineers forecast for Libby. If you have any questions please contact Leon Basdekas (208) 353-2564, Jason Chang (206) 764-3528, or Kevin Shaffer (206) 764-3660.
- 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.
- Cranbrook A gage data was intermittent in the month of November through March. Nearby Cranbrook Airport Auto gage data was used instead.

Libby : April Runoff Forecast & Flood Risk Management Calculation

Apr-Aug Runoff Forecast Calculation:

Variable	Month(s)	Units	Observed Value A	Percent of Average	Regression Coefficient	Marginal Runoff (kaf) =A*B
SOI	Σ Jun:Jul		1.80			0.0
Eureka RS, MT	Σ Oct:Mar Prcp	inches	5.72	92%	68.5	391.9
West Glacier, MT	Σ Oct:Mar Prcp	inches	22.61	127%	29.5	666.3
Cranbrook A, BC	Σ Oct:Mar Prcp	millimeters	175.00	101%	3.0	523.3
Fernie, BC	Σ Oct:Mar Prcp	millimeters	970.73	143%	0.7	689.2
Hawkins Lake, MT	1-Apr SWE	inches	22.50	88%	22.4	504.7
Stahl Peak, MT	1-Apr SWE	inches	42.00	117%	19.7	827.4
East Creek, BC	1-Apr SWE	millimeters	1177.00	132%	0.7	859.2
Moyie Mountain, BC	1-Apr SWE	millimeters	349.00	79%	1.2	422.3
Sunshine Village, AB	1-Apr SWE	millimeters	707.40	126%	1.4	1011.6
Akamina Pass, AB	1-Apr SWE	millimeters	558.70	119%	0.7	402.3
South Racehorse Creek, AB	1-Apr SWE	millimeters	461.65	111%	1.4	623.2
Intercept			1		70.5	70.5
April Forecast	April - August	kaf				6991.9

Data used in Libby Water Supply Forecast

WY 2022

Climate Data	Jun-21	Jul-21
SOI	0.40	1.40

Precipitation Data	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Eureka RS, MT (inch)	1.52	1.12	0.63	0.66	0.93	0.86		
West Glacier, MT (inch)	3.51	4.63	4.54	3.03	2.98	3.92		
Cranbrook A, BC (mm)	34.20	34.10	45.80	33.20	3.80	23.90		
Fernie, BC (mm)	180.85	337.00	194.82	106.17	52.07	99.82		
Snow Water Equiv	1-Nov	1-Dec	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun
Hawkins Lake, MT (inch)				16.9	19.8	22.5		
Stahl Peak, MT (inch)			19.3	28.1	35.1	42.0		
East Creek, BC (mm)				935.0	1040.0	1177.0		
Moyie Mountain, BC (mm)			127.0	235.0	300.0	349.0		
Sunshine Village, AB (mm)			432.5	596.9	617.5	707.4		
Akamina Pass, AB (mm)				420.3	455.5	558.7		
South Racehorse Creek, AB (mm)				347.2	396.4	461.7		
Streamflow	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Libby Inflow Volume (kaf)			299.2	206.1	291.0			
Reservoir Elevation	1-Nov	1-Dec	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun
Libby FOM Elev (feet)	2450.2	2441.6	2414.4	2384.5	2363.5	2365.3		

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 Northwestern Division

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 Upper Columbia Senior Water Manager
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Dworshak : April Runoff Forecast & Flood Risk Management Calculation

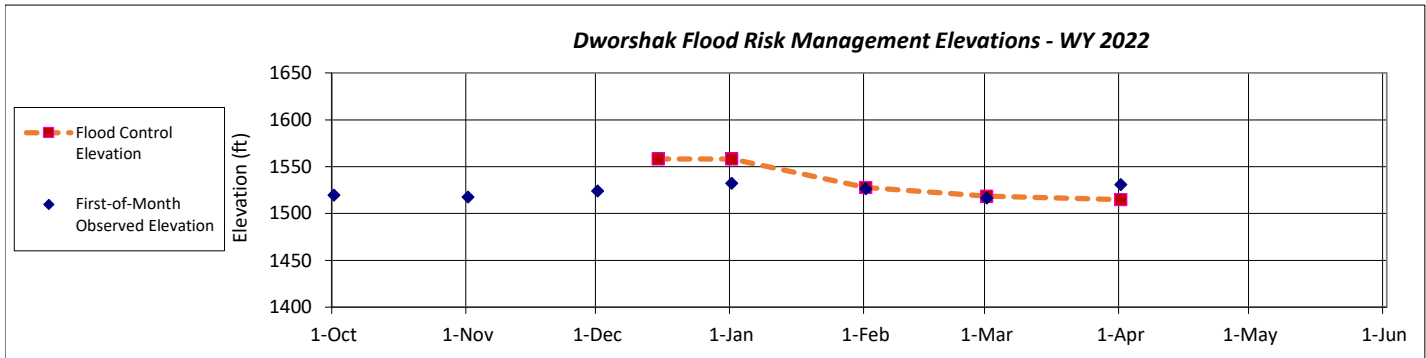
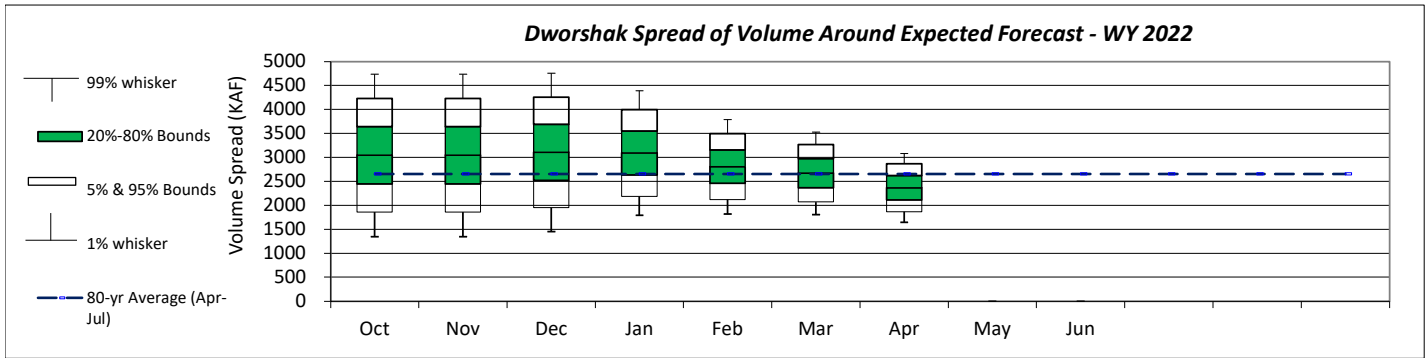
Runoff Forecast	April Value	1991 2020 Average	1991 2020 Percent of Average	1929 2008 Average	1929 2008 Percent of Average
Most Probable Runoff Volume: Apr-Jul (KAF)	2367	2474	96%	2655	89%
Most Probable Runoff Volume: May-Jul (KAF)	1710	1788	96%	1959	87%

Flood Risk Management (FRM)	April Value
30-April Flood Risk Management Space (KAF)	1000
30-Apr Flood Risk Management Elevation (ft)	1537.2

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

Seasonal FRM Forecast	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Jul Runoff Forecast (KAF)	3043	3043	3104	3090	2805	2669	2367		
First-of-Month Elevation (ft)	1519.7	1517.7	1524.3	1532.3	1526.5	1516.7	1530.9		

Seasonal FRM Space	15 Dec	31 Dec	31 Jan	28 Feb	31 Mar	15 Apr	30 Apr	31 May
Flood Risk Management Space (KAF)	700	700	1127	1248	1297	1000	1000	
Flood Risk Management Elevation (ft)	1558	1558	1527.8	1518.6	1514.8	1537.2	1537.2	



Dworshak : April Runoff Forecast & Flood Risk Management Calculation

Apr-Jul Runoff Forecast Calculation

Variable	Month(s)	Units	Observed Value A	Percent of Average (1991 2020)	Regression Coefficient B	Marginal Runoff (KAF) A*B
SOI	Sept		0.80		171.32	137.1
Headquarters Precipitation	Oct-Apr	Inch	28.50	105%	22.32	636.1
Elk Butte SWE	1-Apr	Inch	25.60	72%	11.61	297.2
Hoodoo Basin SWE	1-Apr	Inch	36.60	90%	10.27	375.9
Sherwin SWE	1-Apr	Inch	2.50	38%	19.49	48.7
Lost Lake SWE	1-Apr	Inch	42.30	81%	7.91	334.8
Crater Meadows SWE	1-Apr	Inch	41.30	88%	13.37	552.2
Intercept			1		-15.43	-15.4
1-Apr Forecast	Apr-Jul	KAF				2366.5

Data used in Dworshak Water Supply Forecast

Climate Data		Sept								
SOI		0.80								
Precipitation Data		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Headquarters, ID (inch)		2.30	7.10	7.50	5.70	2.60	3.30	--		
Cumulative HQSI Data (inch)		2.30	9.40	16.90	22.60	25.20	28.50	--		
Snow Water Equivalent, 1st of Month		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Elk Butte, ID (inch)					13.0	21.4	24.8	25.6		
Cool Creek, ID (inch)					20.7	31.2				
Hoodoo Basin, MT (inch)					18.1	26.0	31.8	36.6	--	--
Sherwin, ID (inch)					6.1	9.1	10.9	2.5		
Shanghi Summit, ID (inch)									--	--
Lost Lake, ID (inch)					21.3	32.5	39.4	42.3	--	--
Hemlock, ID (inch)									--	--
Crater Meadows Mar (inch)							37.0	41.3		
Streamflow		Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Dworshak Inflow Volume (KAF)					205	145	109	533	--	--

Notes:

1. Values do not reflect FRM shift to Grand Coulee or deviation in March. They do not reflect the commencement of refill prior to 30 April, which may occur based on daily inflow values from NWRFC and the calculation of the refill guide curve.
2. 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).
3. Due to updated values for precipitation, snow or streamflow, subsequent forecasts may be different from the forecast published herein.
4. 15-Dec and 31-Dec Flood Management Space is fixed at 700 KAF.

Approval:

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 Walla Walla District USACE

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 Ch., Hydrologic Engineering and Power Branch
 Columbia Basin Water Management Division