

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](http://www.nwd.usace.army.mil/Missions/Water/Columbia/FloodControl)

The MARCH 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, <b>March</b>	Sets min. flows at Hungry Horse and Columbia Falls
	May – September Provided by Reclamation	January, February, <b>March</b>	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	<b>March</b>	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, <b>March</b>	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	<b>January to March</b>	Manage for reservoir FRM, VDL, and Flood Control Refill Curve (FCRC)
		April to June	Manage for reservoir FRM and FCRC

March 3, 2022

## **Hungry Horse Dam – Official Water Supply Forecast MARCH 2022**

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

- Mar-Jul: 2,140 kaf (102%)
- Apr-Aug: 1,960 kaf (96%)
- May-Sep: 1,700 kaf (96%)
- May-Jul: 1,600 kaf (96%)

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

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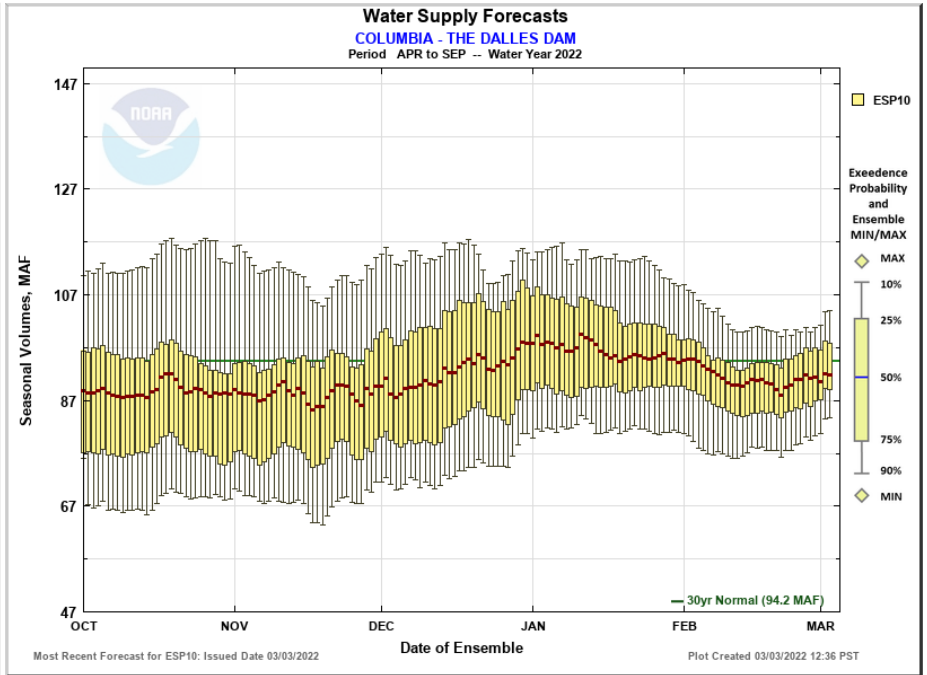
# Northwest River Forecast Center Water Supply Forecasts

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Choose Date: 03/03/2022 Archive: Water Year

COLUMBIA - THE DALLES DAM (TDAO3) Forecasts for Water Year 2022					
Official Water Supply					
ESP with 10 Days QPF Ensemble: 2022-03-03 Issued: 2022-03-03					
Forecast Period	Forecasts Are in KAF				30 Year Average (1991-2020)
	90 %	50 %	% Average	10 %	
APR-SEP	83588	91641	97	103727	94166
APR-JUL	72745	78510	96	89432	81933
<b>APR-AUG</b>	<b>78998</b>	<b>86386</b>	<b>97</b>	<b>97865</b>	<b>89196</b>
JAN-SEP	103485	110182	95	123182	115946
JAN-JUL	92133	97483	94	108887	103714
OCT-SEP	121550	128248	97	141248	132314
Experimental Water Supply					
HEFS with 15 days EQPF Ensemble: 2022-03-03 Issued: 2022-03-03					
APR-SEP	84916	96677	103	106862	94166
APR-JUL	73223	83355	102	93255	81933
APR-AUG	79517	91155	102	100957	89196
JAN-SEP	103851	114835	99	126645	115946
JAN-JUL	92646	102423	99	112486	103714
OCT-SEP	121916	132900	100	144711	132314
Reference					
ESP with 0 Days QPF Ensemble: 2022-03-03 Issued: 2022-03-03					
APR-SEP	83332	95771	102	106808	94166
APR-JUL	70794	82151	100	92976	81933
APR-AUG	77547	90181	101	100796	89196
JAN-SEP	102565	114721	99	127067	115946
JAN-JUL	91660	101955	98	113101	103714
OCT-SEP	120630	132787	100	145132	132314

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



Most Recent Forecast for ESP10: Issued Date 03/03/2022 Plot Created 03/03/2022 12:36 PST

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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# Northwest River Forecast Center

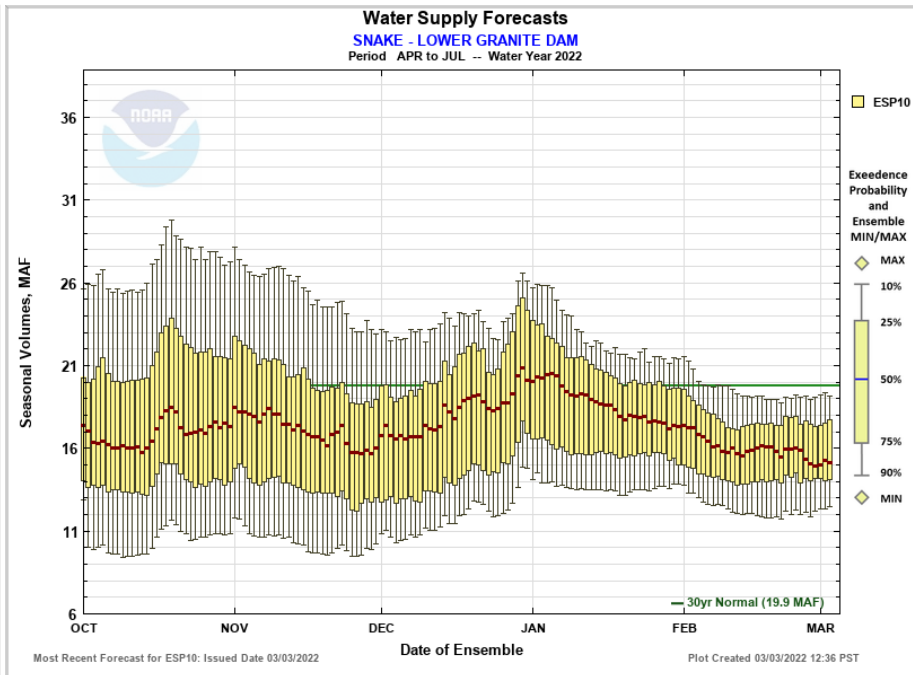
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SNAKE - LOWER GRANITE DAM (LGDW1) Forecasts for Water Year 2022					
Official Water Supply					
ESP with 10 Days QPF Ensemble: 2022-03-03 Issued: 2022-03-03					
Forecast Period	Forecasts Are in KAF				30 Year Average (1991-2020)
	90 %	50 %	% Average	10 %	
APR-SEP	14578	17567	79	21745	22232
<b>APR-JUL</b>	<b>12611</b>	<b>15293</b>	<b>77</b>	<b>19305</b>	<b>19946</b>
APR-AUG	13567	16482	78	20533	21121
JAN-SEP	20359	23165	78	27581	29736
JAN-JUL	18351	20884	76	25210	27450
OCT-SEP	24264	27071	79	31486	34287
Experimental Water Supply					
HEFS with 15 days EQPF Ensemble: 2022-03-03 Issued: 2022-03-03					
APR-SEP	15028	19185	86	22894	22232
APR-JUL	12916	16832	84	20212	19946
APR-AUG	13959	18072	86	21586	21121
JAN-SEP	20864	24330	82	28585	29736
JAN-JUL	18854	22061	80	25914	27450
OCT-SEP	24769	28235	82	32490	34287
Reference					
ESP with 0 Days QPF Ensemble: 2022-03-03 Issued: 2022-03-03					
APR-SEP	14626	18548	83	21964	22232
APR-JUL	12530	16296	82	19534	19946
APR-AUG	13562	17447	83	20793	21121
JAN-SEP	20373	24363	82	28402	29736
JAN-JUL	18467	22111	81	26105	27450
OCT-SEP	24278	28268	82	32307	34287

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-JUL)

Forecast Ensemble



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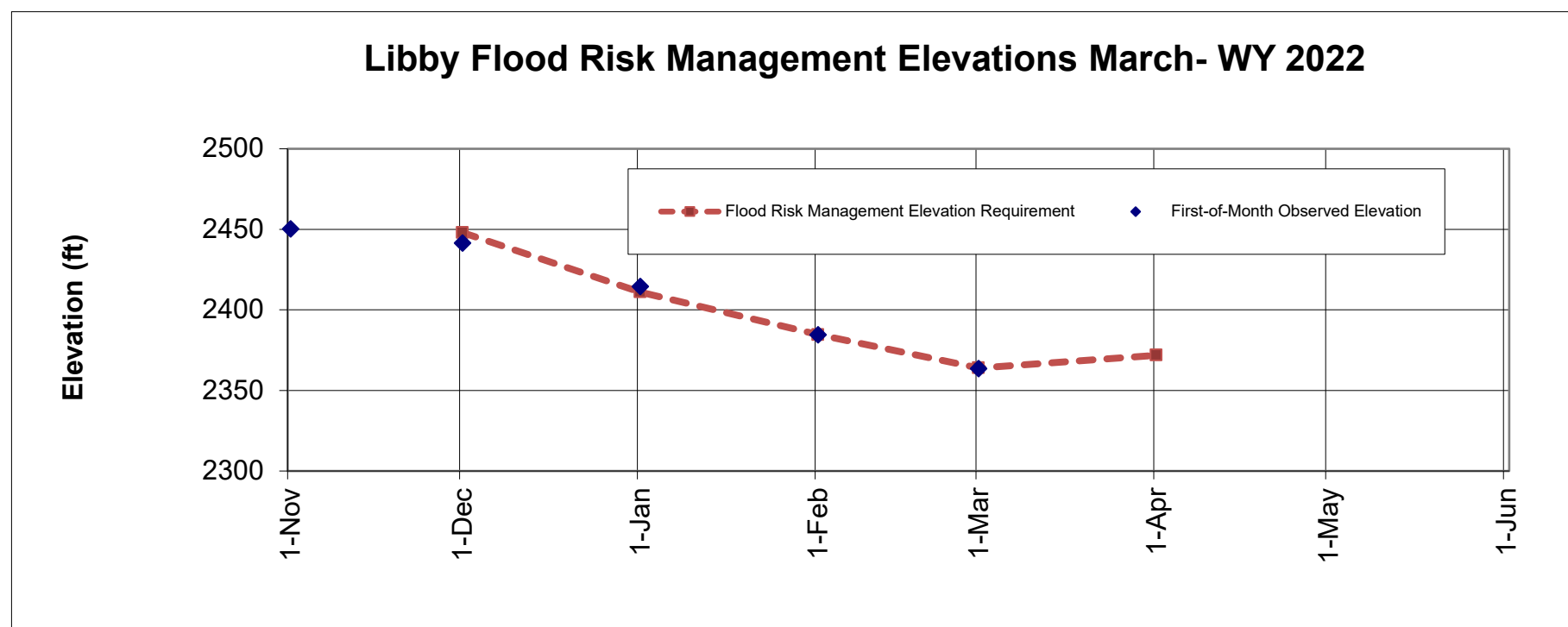
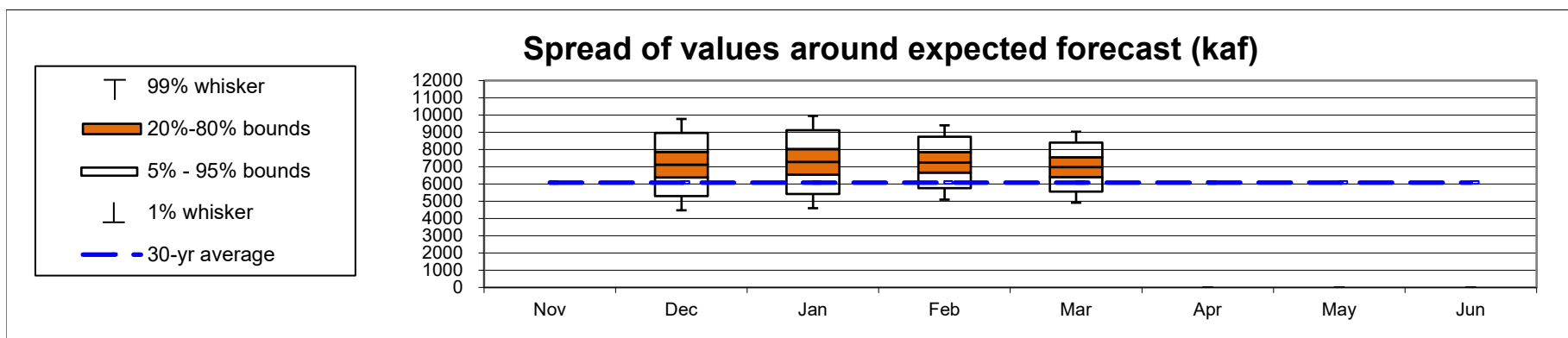
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Runoff Forecast	March	1991-2020 Average	1991 - 2020 Percent of Average	1929-2008 Average	1929 - 2008 Percent of Average
Most Probable Runoff Volume: Apr-Aug (kaf)	6972	6080	115%	6259	111%
Most Probable Runoff Volume: Apr-Jul (kaf)	6388	5570	115%	5708	112%
Most Probable Runoff Volume: May-Jul (kaf)	5750	5014	115%	5183	111%

Flood Risk Management	March
31-March Flood Risk Management Space (kaf)	3209
31-March Flood Risk Management Elevation (ft)	2371.8

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

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	
Flood Risk Management Elevation (ft)	2448.0	2411.0	2384.6	2363.9	2371.8	



Notes:

1. 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.
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 October through February. Nearby Cranbrook Airport Auto gage data was used instead.

# Libby : March 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	ΣJun:Jul					
Eureka RS, MT	ΣOct:Feb Prcp	inches	4.86	91%	65.9	320.1
West Glacier, MT	ΣOct:Feb Prcp	inches	18.69	123%	28.5	532.9
Cranbrook A, BC	ΣOct:Feb Prcp	millimeters	151.10	104%	2.7	412.5
Fernie, BC	ΣOct:Feb Prcp	millimeters	870.91	151%	0.6	548.7
Hawkins Lake, MT	1-Mar SWE	inches	19.80	96%	24.3	481.7
Stahl Peak, MT	1-Mar SWE	inches	35.10	118%	19.1	670.8
East Creek, BC	1-Mar SWE	millimeters	1040.00	141%	0.7	676.0
Moyie Mountain, BC	1-Mar SWE	millimeters	300.00	82%	1.3	381.0
Sunshine Village, AB	1-Mar SWE	millimeters	617.50	139%	1.3	778.1
Akamina Pass, AB	1-Mar SWE	millimeters	455.50	114%	1.0	473.7
South Racehorse Creek, AB	1-Mar SWE	millimeters	396.40	118%	1.4	555.0
Intercept			1		1142.0	1142.0
March Forecast	April - August	kaf				6972.4

## 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			
West Glacier, MT (inch)	3.51	4.63	4.54	3.03	2.98			
Cranbrook A, BC (mm)	34.20	34.10	45.80	33.20	3.80			
Fernie, BC (mm)	180.85	337.00	194.82	106.17	52.07			
Snow Water Equiv	1-Nov	1-Dec	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun
Hawkins Lake, MT (inch)				17	20			
Stahl Peak, MT (inch)			19	28	35			
East Creek, BC (mm)				935	1040			
Moyie Mountain, BC (mm)			127	235	300			
Sunshine Village, AB (mm)			432	597	618			
Akamina Pass, AB (mm)				420	456			
South Racehorse Creek, AB (mm)				347	396			
Streamflow	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Libby Inflow Volume (kaf)			299.2	206.1				
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			

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 Seattle District

### Dworshak : March Runoff Forecast & Flood Risk Management Calculation

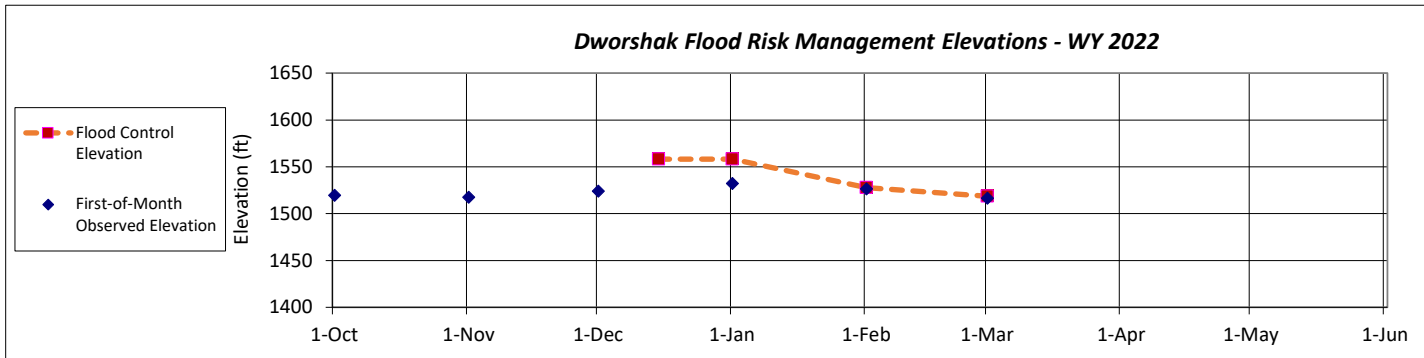
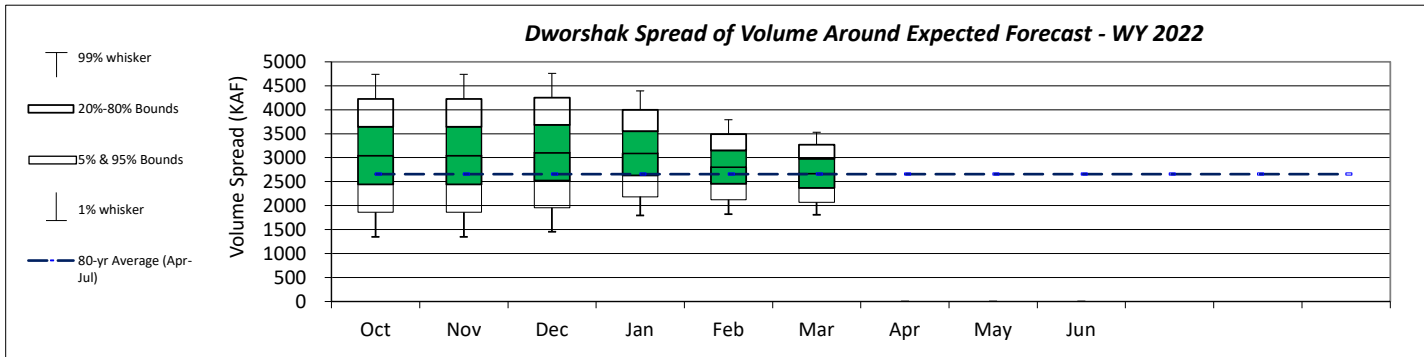
Runoff Forecast	March Value	1991 2020 Average	1991 2020 Percent of Average	1929 2008 Average	1929 2008 Percent of Average
Most Probable Runoff Volume: Apr-Jul (KAF)	2669	2474	108%	2655	101%
Most Probable Runoff Volume: May-Jul (KAF)	1929	1788	108%	1959	98%

Flood Risk Management (FRM)	March Value
31-March Flood Risk Management Space (KAF)	1297
31-March Flood Risk Management Elevation (ft)	1514.8

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

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

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			
Flood Risk Management Elevation (ft)	1558	1558	1527.8	1518.6	1514.8			



**Dworshak : March Runoff Forecast & Flood Risk Management Calculation**

**Apr-Jul Runoff Forecast Calculation**

<i>Variable</i>	<i>Month(s)</i>	<i>Units</i>	<i>Observed Value A</i>	<i>Percent of Average (1991 2020)</i>	<i>Regression Coefficient B</i>	<i>Marginal Runoff (KAF) A*B</i>
SOI	Sept		0.80		220.73	176.6
Headquarters Precipitation	Oct-Mar	Inch	25.20	116%	23.39	589.4
Elk Butte SWE	1-Mar	Inch	24.76	81%	10.16	251.6
Hoodoo Basin SWE	1-Mar	Inch	31.82	95%	10.01	318.5
Sherwin SWE	1-Mar	Inch	10.94	120%	25.42	278.1
Lost Lake SWE	1-Mar	Inch	39.36	91%	6.99	275.1
Crater Meadows SWE	1-Mar	Inch	37.00	95%	13.06	483.2
Intercept			1		296.75	296.8
1-Feb Forecast	Apr-Jul	KAF				2669.3

**Data used in Dworshak Water Supply Forecast**

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

**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. Refer to FRM guidance for final elevations.

Approval:

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 Chief Hydrology Section  
 Walla Walla District USACE

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