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 **MAY** 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/

May 4, 2022

Hungry Horse Dam – Official Water Supply Forecast
MAY 2022

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

- May-Jul: 1,780 kaf (106%)
- Apr-Aug: 2,100 kaf (103%)
- May-Sep: 1,910 kaf (108%)

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.
Water Management - Operations Team Supervisor
U.S. Bureau of Reclamation
Columbia - Pacific Northwest Region
Boise, ID 83706

Northwest River Forecast Center
Water Supply Forecasts

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

COLUMBIA - THE DALLES DAM (TDAO3)
Forecasts for Water Year 2022

Official Water Supply
ESP with 10 Days QPF **Ensemble:** 2022-05-04 **Issued:** 2022-05-04

Forecast Period	Forecasts Are in KAF: 90 %	50 %	% Average	10 %	30 Year Average (1991-2020)
APR-SEP	84439	88889	94	97187	94166
APR-JUL	70372	75003	92	81837	81933
APR-AUG	78563	83250	93	91391	89196
JAN-SEP	102851	107301	93	115600	115946
JAN-JUL	88785	93415	90	100249	103714
OCT-SEP	120916	125366	95	133665	132314

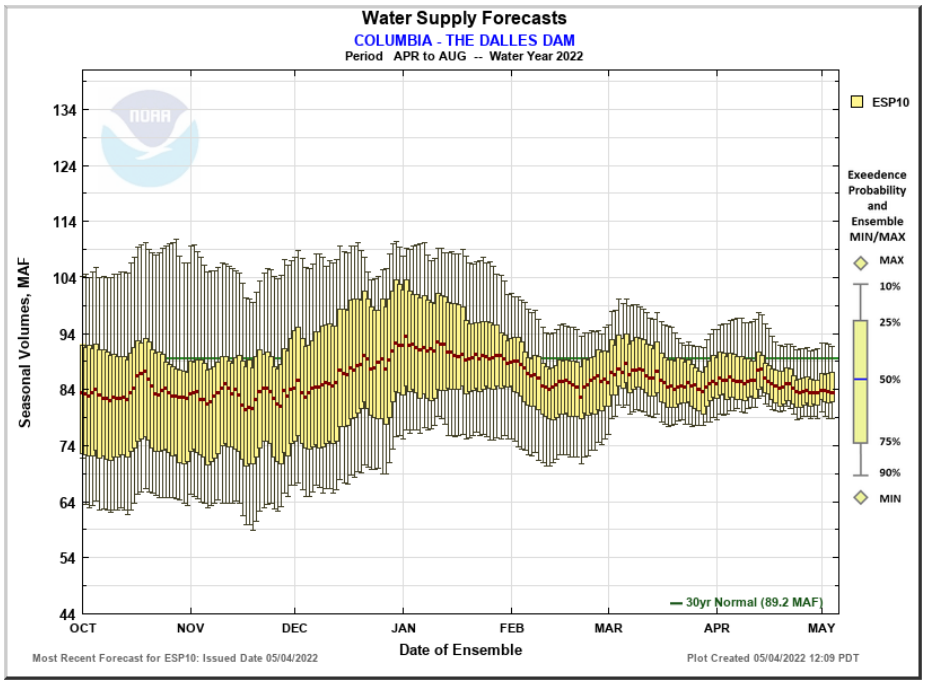
Experimental Water Supply
HEFS with 15 days EQPF **Ensemble:** 2022-05-04 **Issued:** 2022-05-04

APR-SEP	85198	90996	97	99406	94166
APR-JUL	72885	77186	94	85235	81933
APR-AUG	79930	85425	96	93679	89196
JAN-SEP	103610	109408	94	117818	115946
JAN-JUL	91297	95598	92	103647	103714
OCT-SEP	121675	127474	96	135883	132314

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

APR-SEP	84079	88843	94	96933	94166
APR-JUL	71162	75567	92	83067	81933
APR-AUG	78290	83565	94	91232	89196
JAN-SEP	102491	107255	93	115345	115946
JAN-JUL	89575	93979	91	101479	103714
OCT-SEP	120556	125320	95	133410	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 | ESP0

Data Files: CSV (ESP10 / APR-AUG) | Forecast Ensemble

Northwest River Forecast Center
Water Supply Forecasts

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

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

Official Water Supply
ESP with 10 Days QPF **Ensemble:** 2022-05-04 **Issued:** 2022-05-04

Forecast Period	Forecasts Are in KAF				30 Year Average (1991-2020)
	90 %	50 %	% Average	10 %	
APR-SEP	17265	18123	82	21321	22232
APR-JUL	14990	15716	79	18813	19946
APR-AUG	16135	16936	80	20087	21121
JAN-SEP	22751	23610	79	26807	29736
JAN-JUL	20477	21202	77	24299	27450
OCT-SEP	26656	27515	80	30712	34287

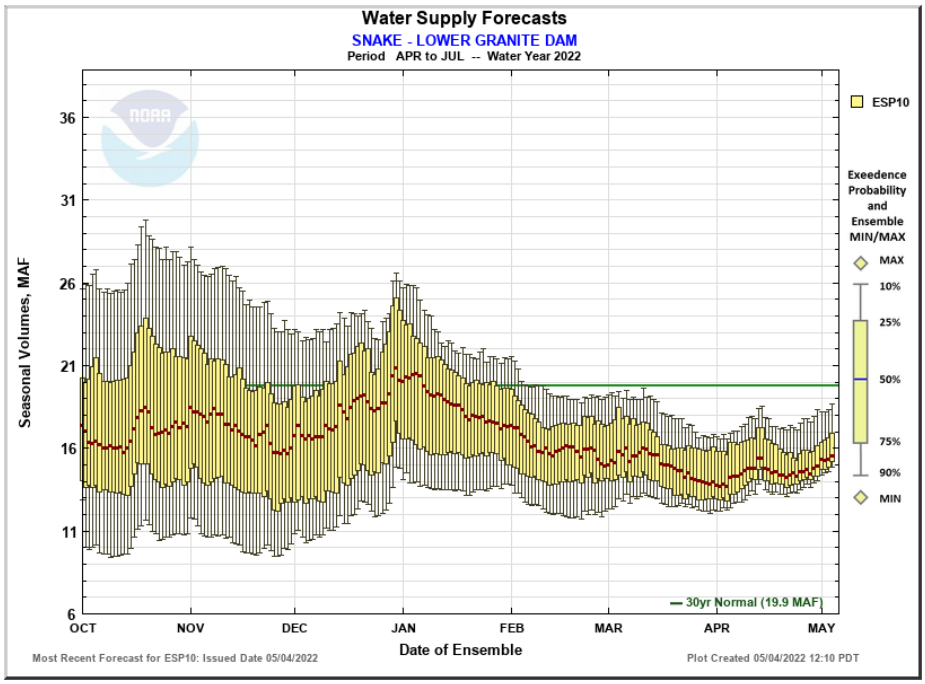
Experimental Water Supply
HEFS with 15 days EQPF **Ensemble:** 2022-05-04 **Issued:** 2022-05-04

APR-SEP	16892	18390	83	21576	22232
APR-JUL	14677	15919	80	18952	19946
APR-AUG	15797	17121	81	20249	21121
JAN-SEP	22379	23876	80	27063	29736
JAN-JUL	20163	21406	78	24439	27450
OCT-SEP	26284	27781	81	30968	34287

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

APR-SEP	16306	17692	80	20888	22232
APR-JUL	14078	15256	76	18431	19946
APR-AUG	15199	16387	78	19710	21121
JAN-SEP	21792	23178	78	26374	29736
JAN-JUL	19565	20743	76	23917	27450
OCT-SEP	25697	27083	79	30279	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 | ESP0

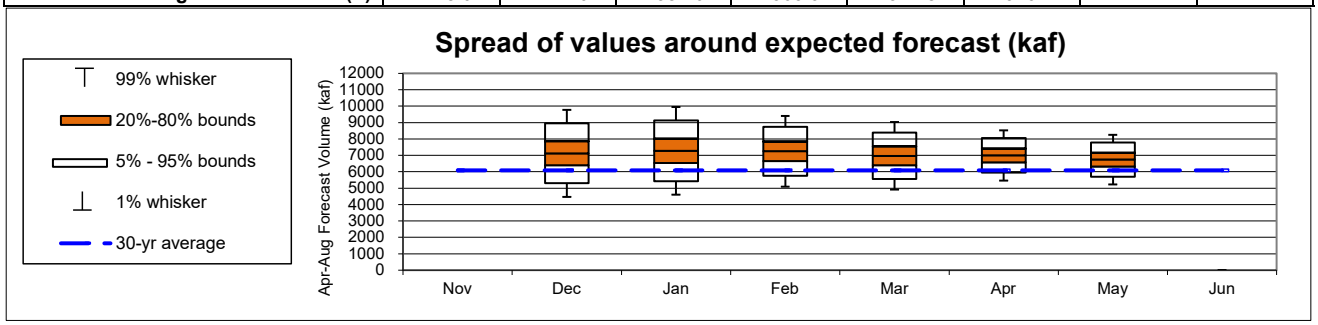
Data Files
CSV (ESP10 / APR-JUL)
Forecast Ensemble

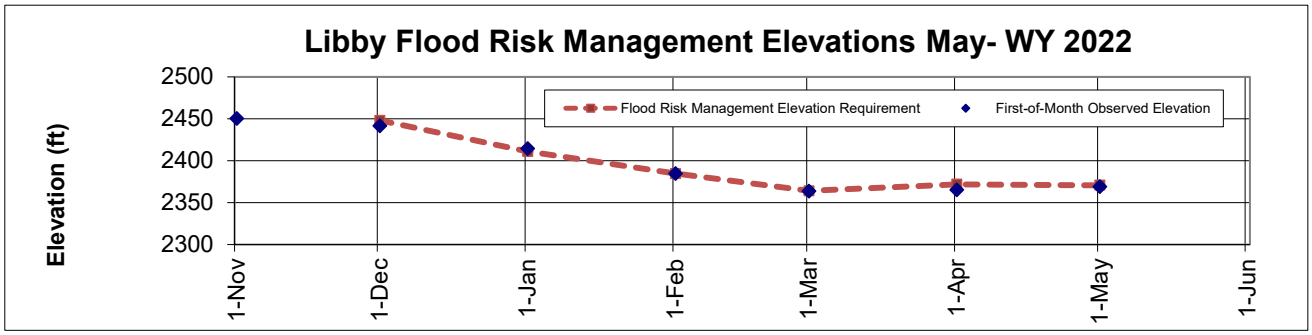
Libby : May Runoff Forecast & Flood Risk Management Calculation WY 2022

Runoff Forecast	May	1991-2020 Average	1991 - 2020 Percent of Average	1929-2020 Average	1929 - 2020 Percent of Average
Most Probable Runoff Volume: Apr-Aug (kaf)	**6740**	6080	111%	6259	108%
Most Probable Runoff Volume: Apr-Jul (kaf)	**6150**	5570	110%	5708	108%
Most Probable Runoff Volume: May-Jul (kaf)	**5804**	5014	116%	5183	112%

Forecast/Reservoir Data	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Aug Runoff Forecast (kaf)		7123	7273	7249	6972	6992	6740	
First-of-Month Elev (ft)	2450.2	2441.6	2414.4	2384.5	2363.5	2365.3	2369.0	

Seasonal FRM Requirements	30-Nov	31-Dec	31-Jan	28-Feb	31-Mar	30-Apr		
Flood Risk Management Space (kaf)	500	2000	2851	3416	3208	3238		
Flood Risk Management Elevation (ft)	2448.0	2411.0	2384.6	2363.9	2371.8	2370.7		





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 in the month of October through April. Nearby Cranbrook Airport Auto gage data was used instead.

Libby : May Runoff Forecast & Flood Risk Management Calculation

Apr-Aug Runoff Forecast Calculation:

Variable	Month(s)	Units	Observed Value A	Percent of Average (1991-2020)	Regression Coefficient B	Marginal Runoff (KAF) =A*B
SOI	∑Jun:Jul		1.8		0.0	0.0
Eureka RS, MT	∑Oct:Apr Prcp	inches	6.1	114%	57.5	351.0
West Glacier, MT	∑Oct:Apr Prcp	inches	24.0	158%	28.0	673.2
Cranbrook A, BC	∑Oct:Apr Prcp	millimeters	187.4	129%	2.8	524.7
Fernie, BC	∑Oct:Apr Prcp	millimeters	1007.8	175%	0.6	614.8
Hawkins Lake, MT	1-May SWE	inches	25.4	124%	17.3	439.4
Stahl Peak, MT	1-May SWE	inches	48.0	162%	16.7	803.5
East Creek, BC	1-May SWE	millimeters	1264.0	172%	0.6	720.5
Moyie Mountain, BC	1-May SWE	millimeters	359.0	98%	0.9	326.7
Sunshine Village, AB	1-May SWE	millimeters	757.7	171%	1.3	954.7
Akamina Pass, AB	1-May SWE	millimeters	448.5	112%	0.6	246.7
South Racehorse Creek, AB	1-May SWE	millimeters	398.3	119%	0.8	330.6
Intercept			1		408.0	408.0
Forecast Inflow	May-August	kaf				6393.8
Observed Inflow	April	kaf	346.3			346.3
May Forecast	April - August	kaf				6740.1

Data used in Libby Water Supply Forecast

Climate Data	Jun-21	Jul-21
SOI	0.4	1.4

Precipitation Data	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Eureka RS, MT (inch)	1.5	1.1	0.6	0.7	0.9	0.9	0.4	
West Glacier, MT (inch)	3.5	4.6	4.5	3.0	3.0	3.9	1.4	
Cranbrook A, BC (mm)	34.2	34.1	45.8	33.2	3.8	23.9	12.4	
Fernie, BC (mm)	180.9	337.0	194.8	106.2	52.1	99.8	37.1	

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	25.4	
Stahl Peak, MT (inch)			19.3	28.1	35.1	42.0	48.0	
East Creek, BC (mm)				935.0	1040.0	1177.0	1264.0	
Moyie Mountain, BC (mm)			127.0	235.0	300.0	349.0	359.0	
Sunshine Village, AB (mm)			432.5	596.9	617.5	707.4	757.7	
Akamina Pass, AB (mm)				420.3	455.2	558.7	448.5	
South Racehorse Creek, AB (mm)				347.2	396.4	461.7	398.3	

Streamflow	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Libby Inflow Volume (kaf)			299.2	206.1	291.0	346.3		

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	2369.0	

Kasi Whorley, P.E.
Columbia Basin Water Management Division
Hydrologic Engineering and Power Branch
Northwestern Division

Leon Basdekas, P.E.
Upper Columbia Senior Water Manager
Seattle District

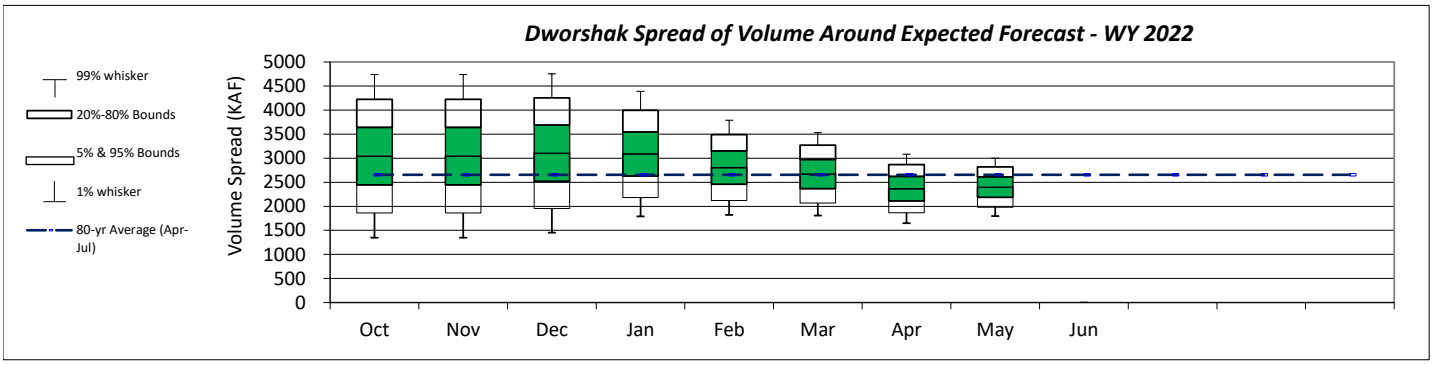
Dworshak : May Runoff Forecast & Flood Risk Management Calculation

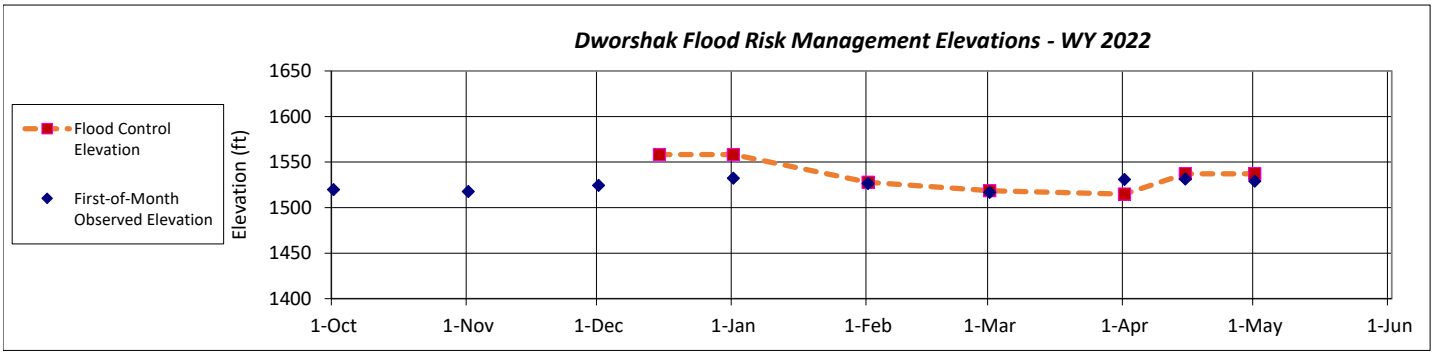
Runoff Forecast	May Value	1991-2020 Average	1991 - 2020 Percent of Average	1929-2008 Average	1929 - 2008 Percent of Average
Most Probable Runoff Volume: Apr-Jul (KAF)	2399	2474	97%	2655	90%
Most Probable Runoff Volume: May-Jul (KAF)	1985	1788	111%	1959	101%

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	2399	
First-of-Month Elevation (ft)	1519.7	1517.7	1524.3	1532.3	1526.5	1516.7	1530.9	1529.0	

Seasonal FRM Space	15-Dec	31-Dec	31-Jan	28-Feb	31-Mar	15-Apr	30-Apr
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	1537.2





Prepared: 5/3/2022

Dworshak : May Runoff Forecast & Flood Risk Management Calculation

May-Jul Runoff Forecast Calculation

Variable	Month(s)	Units	Observed Value A	Percent of Average (1991-2020)	Regression Coefficient B	Marginal Runoff (KAF)
SOI	Sept		0.80		122.04	97.6
Hoodoo Basin SWE	1-May	Inch	42.40	99%	11.71	496.5
Shanghi Summit SWE	1-May	Inch	16.60	113%	14.41	239.2
Lost Lake SWE	1-May	Inch	49.30	92%	9.67	476.7
Hemlock SWE	1-May	Inch	51.00	117%	11.58	590.6
Intercept			1		84.24	84.2
1-May Forecast	May-Jul	KAF				1984.9

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	4.20		
Cumulative HQSI Data (inch)	**2.30**	**9.40**	**16.90**	**22.60**	**25.20**	**28.50**	**32.70**		

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	42.4	--
Sherwin, ID (inch)				6.1	9.1	10.9	2.5		
Shanghi Summit, ID (inch)								16.6	--
Lost Lake, ID (inch)				21.3	32.5	39.4	42.3	49.3	--
Hemlock, ID (inch)								51.0	--
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	414	--

Notes:

1. The given forecast is the official Corps of Engineers forecast for Dworshak. If you have any questions please contact 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.

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

Prepared: 5/3/2022