

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 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, 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/>

March 3, 2021

Hungry Horse Dam – Official Water Supply Forecast MARCH 2021

Below are the volumes for the March 2021 final forecast for Hungry Horse:

- Mar-Jul: 2,070 kaf (105%)
- Apr-Aug: 2,055 kaf (106%)
- May-Sep: 1,805 kaf (107%)
- May-Jul: 1,680 kaf (107%)

The minimum flows downstream of Hungry Horse are as follows:

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

Joel Fenolio, P.E.

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Northwest River Forecast Center Water Supply Forecasts

Home Data/Normals Rankings ENSO / Runoff Adjustments Verification Verify All Years Archive Monthly Water Supply Forecasts

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

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

Official Water Supply

ESP with 10 Days QPF Ensemble: 2021-03-03 Issued: 2021-03-03

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	Average	10 %	
APR-SEP	81382	87639	95	100239	92704
APR-JUL	70667	75090	94	85998	79855
APR-AUG	76660	82215	94	94455	87532
JAN-SEP	98660	104310	91	117653	114216
JAN-JUL	86728	92127	91	103659	101368
OCT-SEP	113830	119480	92	132822	130518

Experimental Water Supply

HEFS with 15 days EQPF Ensemble: 2021-03-03 Issued: 2021-03-03

APR-SEP	81623	91923	99	100700	92704
APR-JUL	69941	78522	98	87175	79855
APR-AUG	75859	86693	99	94459	87532
JAN-SEP	98819	109224	96	120750	114216
JAN-JUL	87597	96467	95	107446	101368
OCT-SEP	113989	124395	95	135920	130518

Reference

ESP with 0 Days QPF Ensemble: 2021-03-03 Issued: 2021-03-03

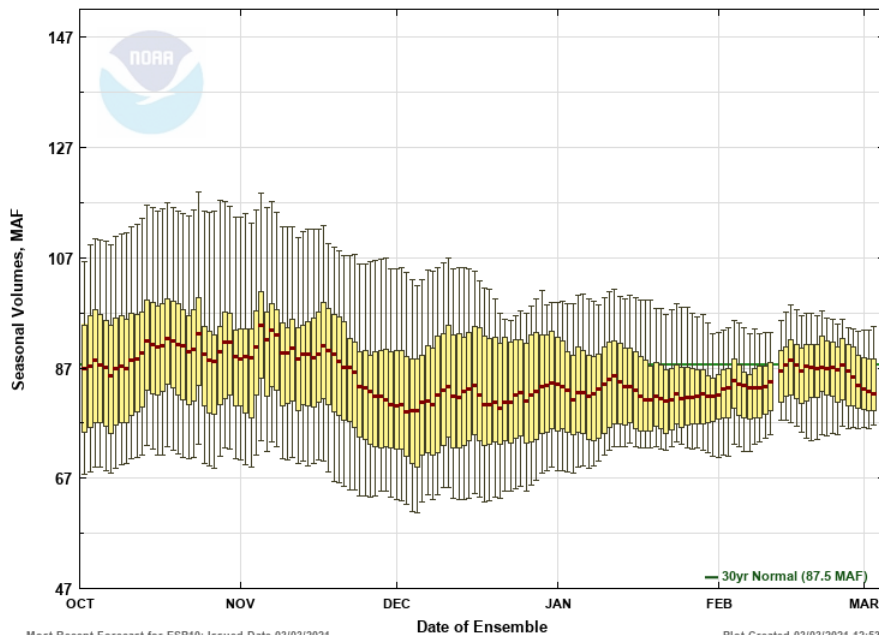
APR-SEP	80893	92529	100	103109	92704
APR-JUL	69236	79452	99	89989	79855
APR-AUG	75102	86996	99	97432	87532
JAN-SEP	99835	110590	97	122355	114216
JAN-JUL	87840	97589	96	108917	101368
OCT-SEP	115005	125759	96	137524	130518

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

Water Supply Forecasts

COLUMBIA - THE DALLES DAM

Period APR to AUG -- Water Year 2021



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



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Northwest River Forecast Center Water Supply Forecasts

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

Snake - Lower Granite Dam (LGDW1) Forecasts for Water Year 2021

Official Water Supply

ESP with 10 Days QPF Ensemble: 2021-03-03 Issued: 2021-03-03

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	16374	18901	85	23197	22279
APR-JUL	14322	16573	84	20578	19848
APR-AUG	15331	17788	84	21864	21091
JAN-SEP	21686	24220	81	28646	29872
JAN-JUL	19629	21887	80	26149	27440
OCT-SEP	25783	28317	82	32743	34667

Experimental Water Supply

HEFS with 15 days EQPF Ensemble: 2021-03-03 Issued: 2021-03-03

APR-SEP	16259	19787	89	23658	22279
APR-JUL	14228	17453	88	20721	19848
APR-AUG	15213	18648	88	22280	21091
JAN-SEP	21953	25440	85	29338	29872
JAN-JUL	19950	23012	84	26393	27440
OCT-SEP	26050	29537	85	33435	34667

Reference

ESP with 0 Days QPF Ensemble: 2021-03-03 Issued: 2021-03-03

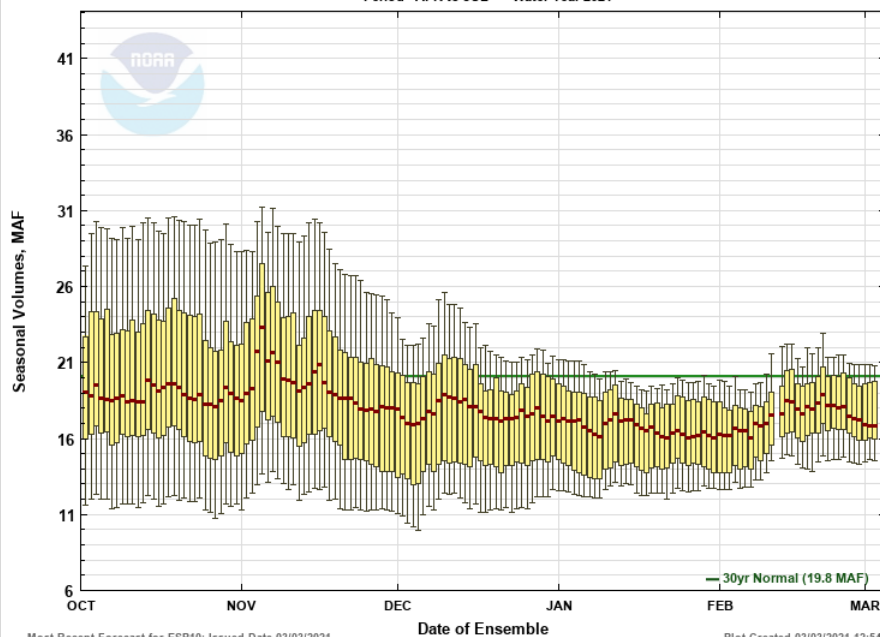
APR-SEP	16186	20622	93	24894	22279
APR-JUL	14164	18097	91	22027	19848
APR-AUG	15144	19409	92	23541	21091
JAN-SEP	21940	26147	88	30870	29872
JAN-JUL	19918	23671	86	27947	27440
OCT-SEP	26037	30244	87	34967	34667

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

Water Supply Forecasts

Snake - Lower Granite Dam

Period APR to JUL -- Water Year 2021



Most Recent Forecast for ESP10: Issued Date 03/03/2021 Plot Created 03/03/2021 12:54

Overlay

ESP10 HEFS ESP0

Data Files

CSV (ESP10 / APR-JUL)

Forecast Ensemble



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Libby : March Runoff Forecast & Flood Risk Management Calculation

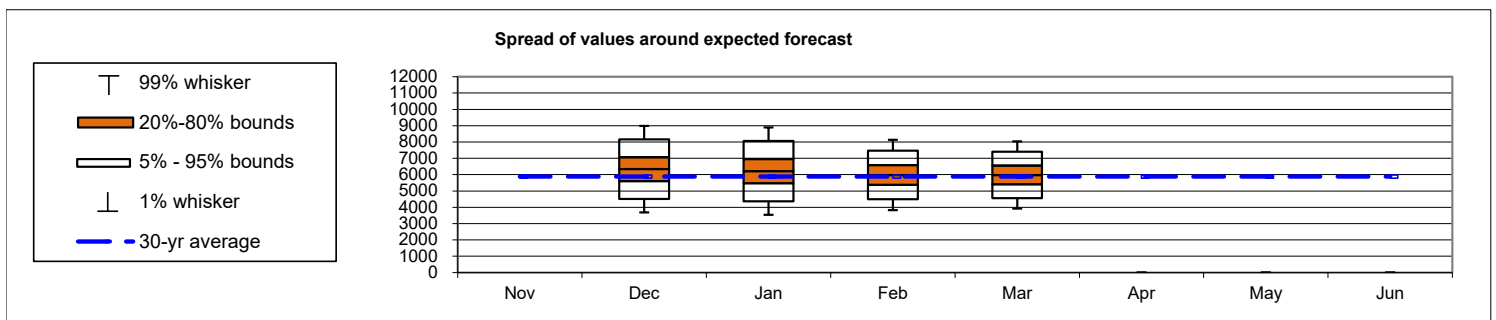
WY 2021

Runoff Forecast	March	1981-2010 Average	1981 - 2010 Percent of Average	1929-2008 Average	1929 - 2008 Percent of Average
Most Probable Runoff Volume: Apr-Aug (kaf)	5980	5885	102%	6282	95%
Most Probable Runoff Volume: Apr-Jul (kaf)	5428	5342	102%	5720	95%
Most Probable Runoff Volume: May-Jul (kaf)	4898	4821	102%	5199	94%

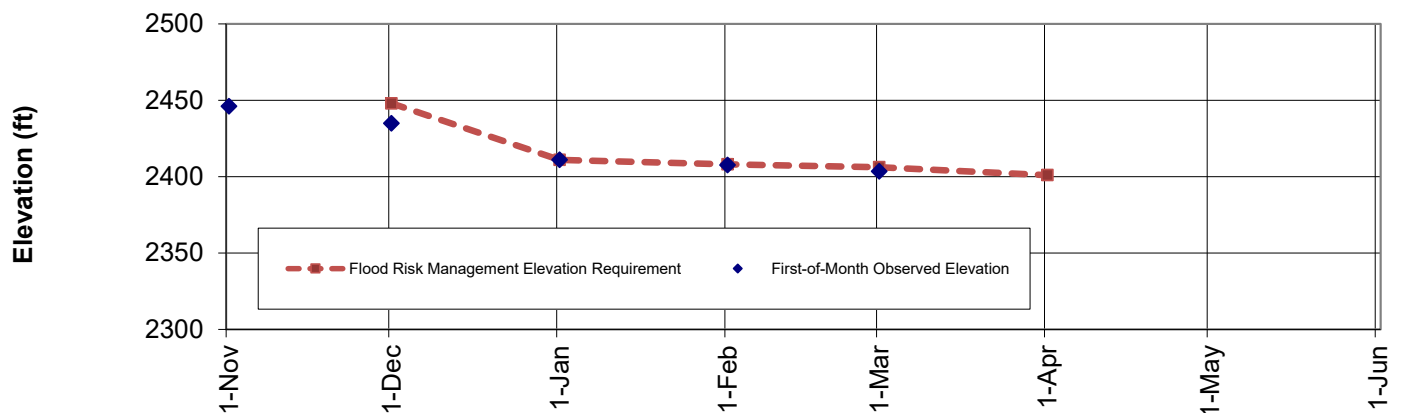
Flood Risk Management	March
31-March Flood Risk Management Space (kaf)	2349
31-March Flood Risk Management Elevation (ft)	2401.0

Reservoir/Forecast Data	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Aug Runoff Forecast (kaf)		6336	6215	5979	5980			
First-of-Month Elev (ft)	2446.1	2434.8	2410.9	2407.6	2403.4			

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	
Flood Risk Management Elevation (ft)	2448.0	2411.0	2408.1	2406.2	2401.0	



Libby Flood Risk Management Elevations March- WY 2021



Notes:

- The given forecast is the official Corps of Engineers forecast for Libby. If you have any questions please contact Jon Moen (206) 764-3561, Justin Lawrence (206) 764-3699, Logan Osgood-Zimmerman (206) 764-6928, 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 during December 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	4.33	87%	65.9	285.2
West Glacier, MT	ΣOct:Feb Prcp	inches	16.46	116%	28.5	469.3
Cranbrook A, BC	ΣOct:Feb Prcp	millimeters	113.40	84%	2.7	309.6
Fernie, BC	ΣOct:Feb Prcp	millimeters	548.84	96%	0.6	345.8
Hawkins Lake, MT	1-Mar SWE	inches	18.90	93%	24.3	459.8
Stahl Peak, MT	1-Mar SWE	inches	24.40	85%	19.1	466.3
East Creek, BC	1-Mar SWE	millimeters	848.00	120%	0.7	551.2
Moyie Mountain, BC	1-Mar SWE	millimeters	323.00	91%	1.3	410.2
Sunshine Village, AB	1-Mar SWE	millimeters	521.64	112%	1.3	657.3
Akamina Pass, AB	1-Mar SWE	millimeters	384.20	98%	1.0	399.6
South Racehorse Creek, AB	1-Mar SWE	millimeters	345.30	100%	1.4	483.4
Intercept			1		1142.0	1142.0
March Forecast	April - August	kaf				5979.6

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			
West Glacier, MT (inch)	4.52	4.32	2.34	2.92	2.36			
Cranbrook A, BC (mm)	27.60	21.90	26.30	34.20	3.40			
Fernie, BC (mm)	118.80	158.00	106.68	109.73	55.63			
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			
Stahl Peak, MT (inch)			16	21	24			
East Creek, BC (mm)				715	848			
Moyie Mountain, BC (mm)			166	235	323			
Sunshine Village, AB (mm)			322	422	522			
Akamina Pass, AB (mm)				316	384			
South Racehorse Creek, AB (mm)				263	345			
Streamflow	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Libby Inflow Volume (kaf)			182.3	128.4				
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			

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

Jonathan Moen
 Upper Columbia Senior Water Manager
 Seattle District

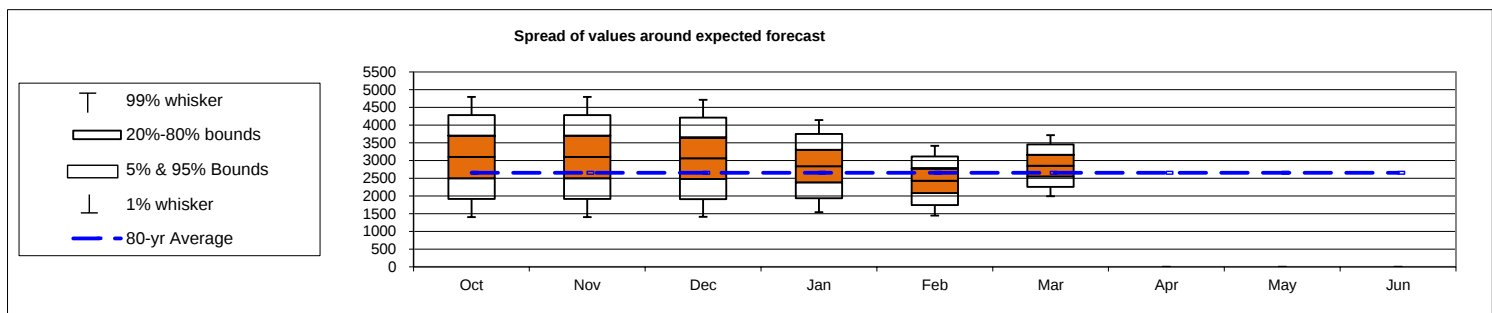
Runoff Forecast	March	1981-2010 Average	1981 2010 Percent of Average	1929-2008 Average	1929 2008 Percent of Average
Most Probable Runoff Volume: Apr-Jul (KAF)	2855	2438	117%	2655	108%
Most Probable Runoff Volume: May-Jul (KAF)	2089	1784	117%	1959	107%

Flood Risk Management (FRM)	March
31-March Flood Risk Management Space (KAF)	1534
31-March Flood Risk Management Elevation (ft)	1494.6

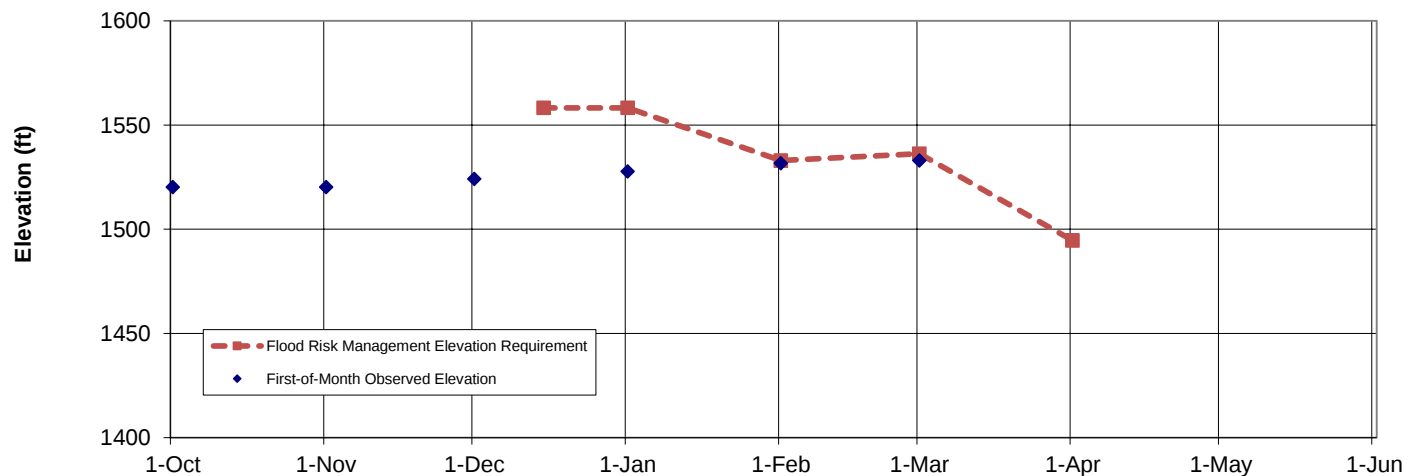
Seasonal Flood Risk Management (assumes no shift of Flood Risk Management space to Grand Coulee)

Seasonal FRM Forecast	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Jul Runoff Forecast (KAF)	3100	3100	3063	2843	2432	2855			
First-of-Month Elevation (ft)	1520.2	1520.2	1524.2	1527.8	1531.7	1533.0			

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	1057	1013	1534			
Flood Risk Management Elevation (ft)	1558.2	1558.2	1533.0	1536.2	1494.6			



Dworshak Flood Risk Management Elevations - WY 2021



Dworshak : March Runoff Forecast and 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*B
SOI	Sept		0.90		220.73	198.7
HQSI Cumulative Precipitation	Oct-Date	Inch	23.61	105%	23.39	552.2
Elk Butte SWE	1-Mar	Inch	34.2	116%	10.16	347.5
Hoodoo Basin SWE	1-Mar	Inch	30.9	95%	10.01	309.3
Sherwin SWE	1-Mar	Inch	11.9	137%	25.42	302.5
Lost Lake SWE	1-Mar	Inch	44.0	102%	6.99	307.6
Crater meadows SWE	1-Mar	Inch	41.4	117%	13.06	540.7
Intercept			1		296.75	296.8
1-Mar Forecast	Apr-Jul	KAF				2855.2

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	--	--	
Cumulative HQSI Data (inch)		4.00	8.30	13.40	17.70	23.61	--	--	
Snow Water Equivalent, 1st of Month	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Elk Butte, ID (inch)				13.0	19.2	34.2	--		
Cool Creek, ID (inch)				16.4	24.3				
Hoodoo Basin, MT (inch)				14.9	21.1	30.9	--	--	--
Sherwin, ID (inch)				5.6	6.8	11.9	--		
Shanghi Summit, ID (inch)								--	--
Lost Lake, ID (inch)				18.8	27.0	44.0	--	--	--
Hemlock, ID (inch)								--	--
Crater Meadows Mar (inch)						41.4	--		
Streamflow	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Dworshak Inflow Volume (KAF)				160	205	146	--	--	--

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.

Approval:

John J. Heitstuman P.E., D.WRE
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Walla Walla District USACE

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