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 JANUARY 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/

January 4, 2022

Hungry Horse Dam – Official Water Supply Forecast
JANUARY 2022

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

- Jan-Jul: 2,375 kaf (113%)
- Apr-Aug: 2,200 kaf (108%)
- May-Sep: 1,920 kaf (108%)

The minimum flows downstream of Hungry Horse 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: 01/05/2022 Archive: Water Year

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

Official Water Supply

ESP with 10 Days QPF **Ensemble:** 2022-01-05 **Issued:** 2022-01-05

Forecast Period	Forecasts Are in KAF				30 Year Average (1991-2020)
	90 %	50 %	% Average	10 %	
APR-SEP	81480	97639	104	115713	94166
APR-JUL	69987	82855	101	101298	81933
APR-AUG	76585	91310	102	109614	89196
JAN-SEP	100067	119508	103	141867	115946
JAN-JUL	87906	106825	103	127210	103714
OCT-SEP	118122	137563	104	159922	132314

Experimental Water Supply

HEFS with 15 days EQPF **Ensemble:** 2022-01-05 **Issued:** 2022-01-05

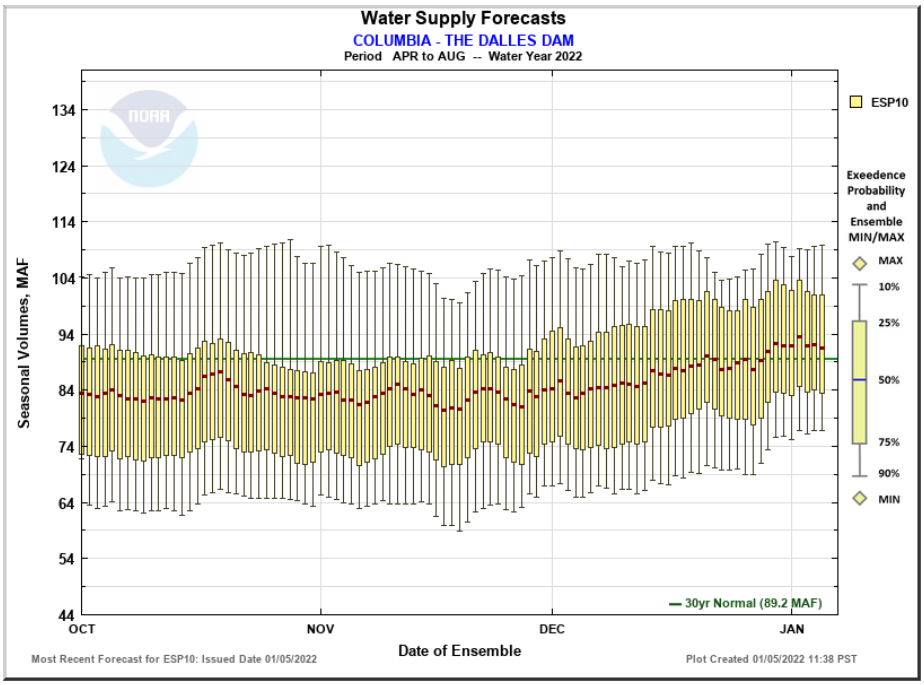
APR-SEP	80292	99486	106	115924	94166
APR-JUL	68119	84488	103	100858	81933
APR-AUG	74695	93631	105	109209	89196
JAN-SEP	98426	119676	103	140628	115946
JAN-JUL	86594	106034	102	126013	103714
OCT-SEP	116481	137731	104	158683	132314

Reference

ESP with 0 Days QPF **Ensemble:** 2022-01-05 **Issued:** 2022-01-05

APR-SEP	78368	98892	105	115109	94166
APR-JUL	66407	84066	103	101915	81933
APR-AUG	72730	93725	105	109787	89196
JAN-SEP	97246	118619	102	141237	115946
JAN-JUL	85499	103325	100	125291	103714
OCT-SEP	115301	136674	103	159292	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: 01/05/2022 Archive: Water Year

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

Official Water Supply

ESP with 10 Days QPF **Ensemble:** 2022-01-05 **Issued:** 2022-01-05

Forecast Period	Forecasts Are in KAF 90 %	50 %	% Average	10 %	30 Year Average (1991-2020)
APR-SEP	16200	23314	105	28980	22232
APR-JUL	14094	20691	104	25830	19946
APR-AUG	15142	22061	104	27503	21121
JAN-SEP	22809	29716	100	38435	29736
JAN-JUL	20716	27038	99	35715	27450
OCT-SEP	26714	33621	98	42340	34287

Experimental Water Supply

HEFS with 15 days EQPF **Ensemble:** 2022-01-05 **Issued:** 2022-01-05

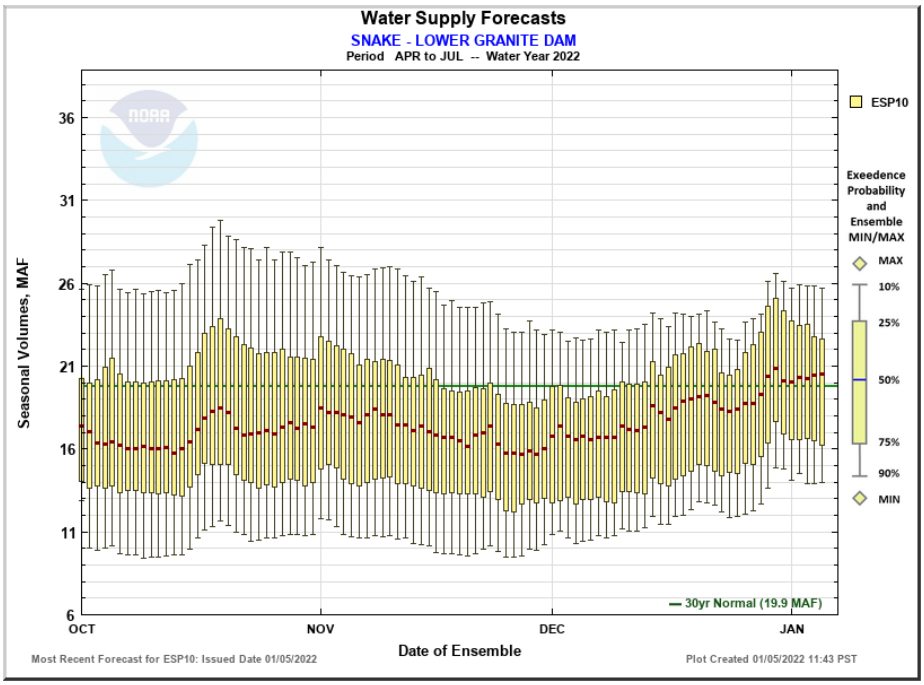
APR-SEP	16210	23173	104	27644	22232
APR-JUL	14138	20619	103	24879	19946
APR-AUG	15175	21931	104	26229	21121
JAN-SEP	22098	30117	101	36859	29736
JAN-JUL	20054	27495	100	33949	27450
OCT-SEP	26003	34022	99	40764	34287

Reference

ESP with 0 Days QPF **Ensemble:** 2022-01-05 **Issued:** 2022-01-05

APR-SEP	15148	22535	101	27634	22232
APR-JUL	13068	19928	100	24973	19946
APR-AUG	14096	21287	101	26384	21121
JAN-SEP	21865	28846	97	36664	29736
JAN-JUL	19757	26273	96	33777	27450
OCT-SEP	25770	32751	96	40569	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 : January Runoff Forecast & Flood Risk Management Calculation

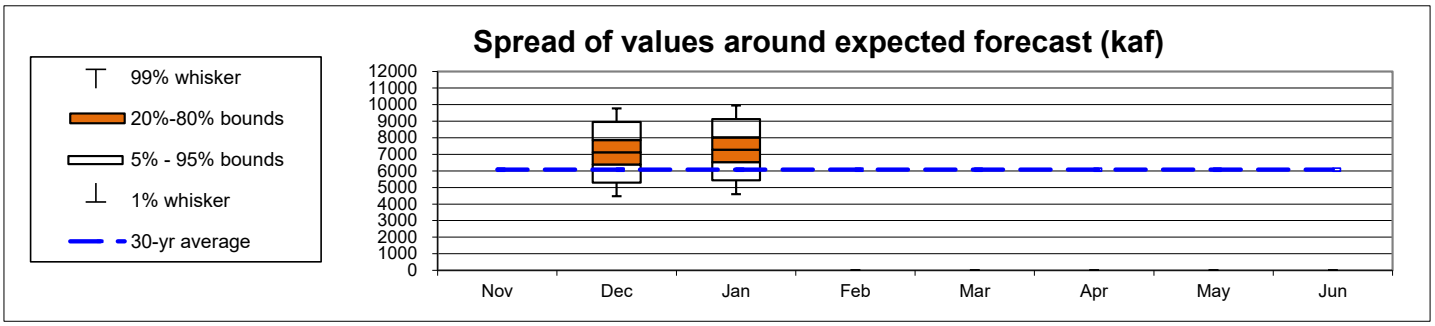
WY 2022

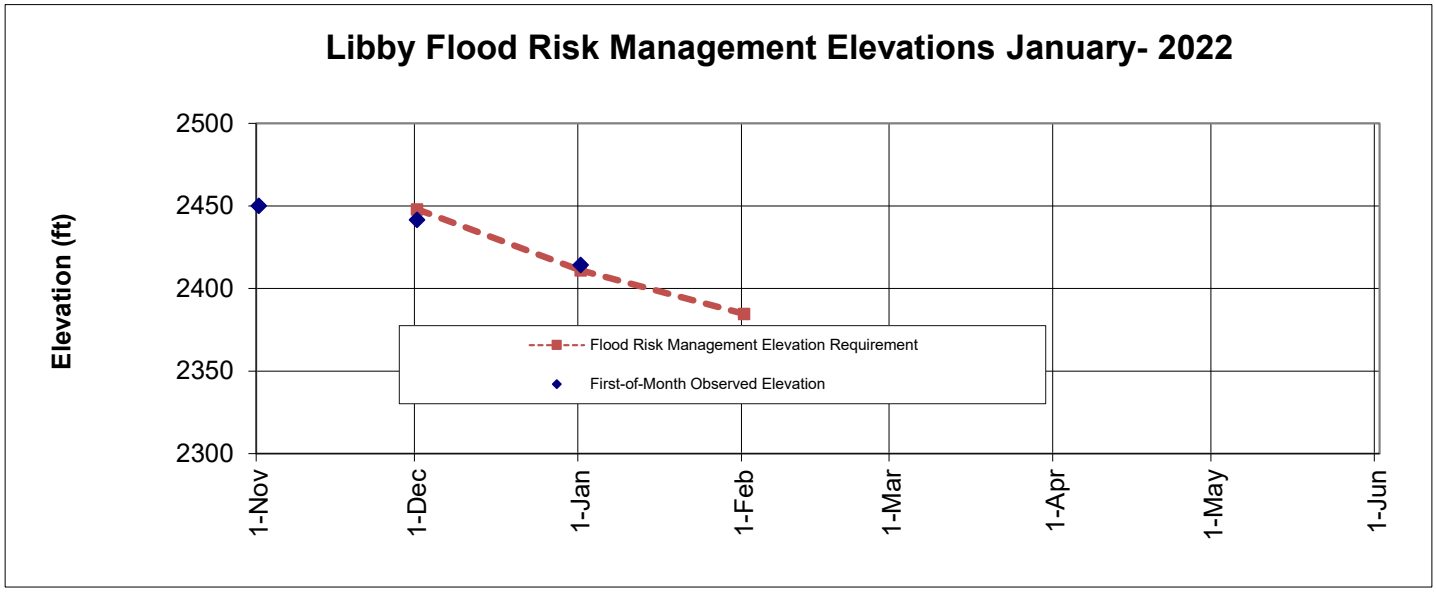
Runoff Forecast	January	1991-2020 Average	1991 - 2020 Percent of Average	1929-2020 Average	1929 - 2020 Percent of Average
Most Probable Runoff Volume: Apr-Aug (kaf)	**7273**	6080	120%	6259	116%
Most Probable Runoff Volume: Apr-Jul (kaf)	**6663**	5570	120%	5708	117%
Most Probable Runoff Volume: May-Jul (kaf)	**5998**	5014	120%	5183	116%

Flood Risk Management	January
31-Jan Flood Risk Management Space (kaf)	**2851**
31-Jan Flood Risk Management Elevation (ft)	**2384.6**

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

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





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 December. Nearby Cranbrook Airport Auto gage data was used instead.

Libby : January 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		1.80		95.28	171.5
Eureka RS, MT	∑Oct:Dec Prcp	inches	3.27	88%	141.74	463.5
West Glacier, MT	∑Oct:Dec Prcp	inches	12.68	134%	58.42	740.8
Cranbrook A, BC	∑Oct:Dec Prcp	millimeters	114.10	117%	4.58	522.6
Fernie, BC	∑Oct:Dec Prcp	millimeters	712.67	188%	1.20	855.2
Hawkins Lake, MT	1-Jan SWE	inches				
Stahl Peak, MT	1-Jan SWE	inches	19.30	114%	34.63	668.4
East Creek, BC	1-Jan SWE	millimeters				
Moyie Mountain, BC	1-Jan SWE	millimeters	127.00	70%	1.59	201.3
Sunshine Village, AB	1-Jan SWE	millimeters	432.45	159%	2.14	925.4
Akamina Pass, AB	1-Jan SWE	millimeters				
South Racehorse Creek, AB	1-Jan SWE	millimeters				
Intercept			1		2724.44	2724.4
January Forecast	April - August	kaf				7273.1

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					
West Glacier, MT (inch)	3.51	4.63	4.54					
Cranbrook A, BC (mm)	34.20	34.10	45.80					
Fernie, BC (mm)	180.85	337.00	194.82					
Snow Water Equiv	**1-Nov**	**1-Dec**	**1-Jan**	**1-Feb**	**1-Mar**	**1-Apr**	**1-May**	**1-Jun**
Hawkins Lake, MT (inch)								
Stahl Peak, MT (inch)			19					
East Creek, BC (mm)								
Moyie Mountain, BC (mm)			127					
Sunshine Village, AB (mm)			432					
Akamina Pass, AB (mm)								
South Racehorse Creek, AB (mm)								
Streamflow	**1-Nov**	**1-Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
Libby Inflow Volume (kaf)								
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					

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

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

Dworshak : January Runoff Forecast and Flood Risk Management Calculation — WY 2022

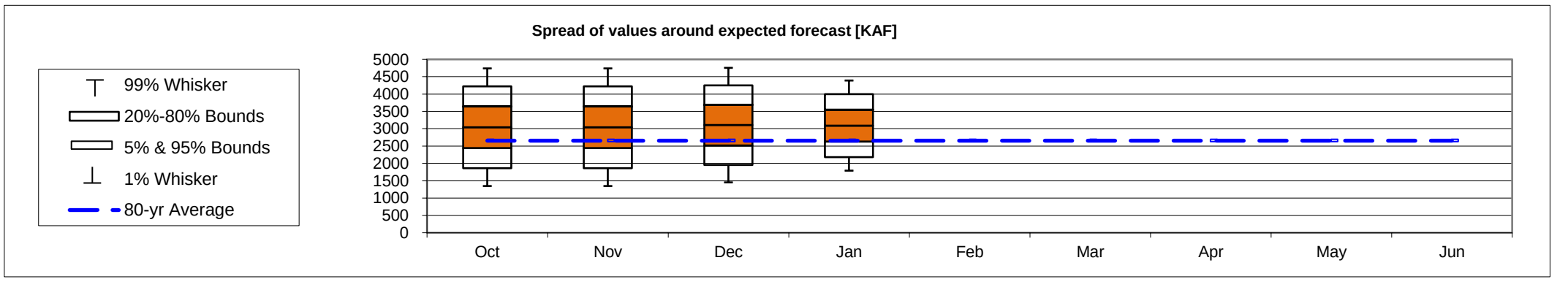
Runoff Forecast	January	1991-2020 Average	1991 2020 Percent of Average	1929-2008 Average	1929 2008 Percent of Average
Most Probable Runoff Volume: Apr-Jul (KAF)	**3090**	2474	125%	2655	116%
Most Probable Runoff Volume: May-Jul (KAF)	**2233**	1788	125%	1959	114%

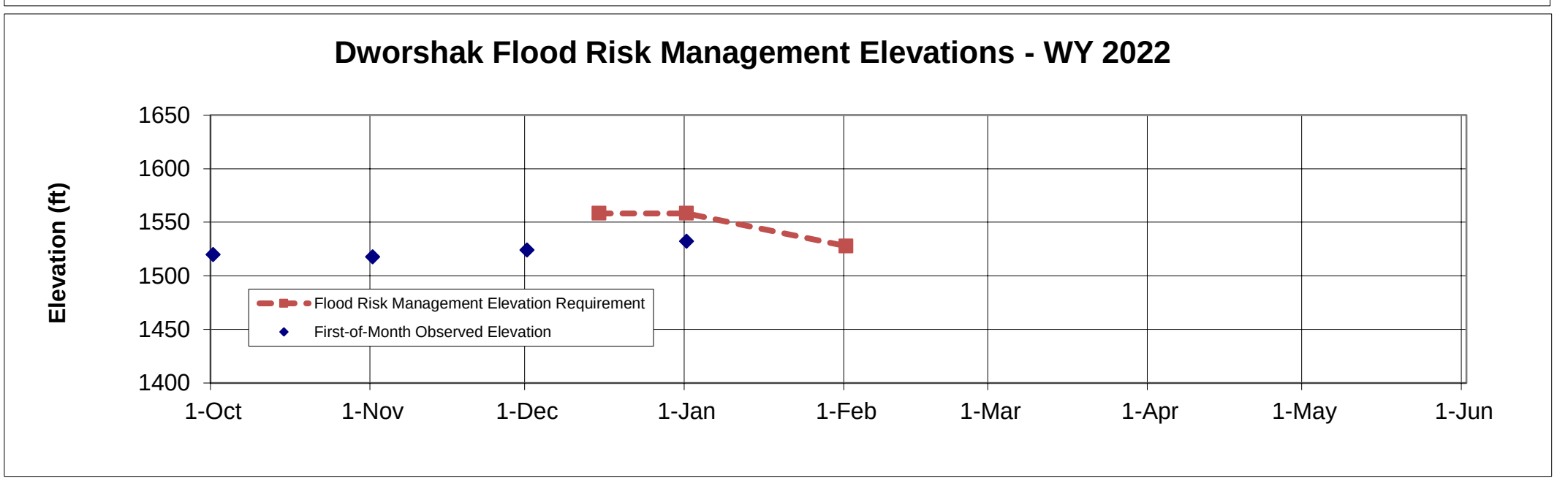
Flood Risk Management (FRM)	January Value
31-January Flood Risk Management Space (KAF)	**1127**
31-January Flood Risk Management Elevation (ft)	**1527.8**

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					
First-of-Month Elevation (ft)	1519.7	1517.7	1524.3	1532.3					

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					
Flood Risk Management Elevation (ft)	1558.2	1558.2	1527.8					





Dworshak : January Runoff Forecast and 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		355.71	284.6
HQSI Cumulative Precipitation	Oct-Date	Inch	16.90	129%	48.12	813.2
Elk Butte SWE	1-Jan	Inch	12.98	88%	6.25	81.1
Cool Creek SWE	1-Jan	Inch	20.7	109%	9.96	206.2
Hoodoo Basin SWE	1-Jan	Inch	18.1	106%	12.22	221.2
Sherwin SWE	1-Jan	Inch	6.1	136%	44.69	273.9
Lost Lake SWE	1-Jan	Inch	21.3	98%	4.24	90.3
Intercept			1		1119.86	1119.9
1-Jan Forecast	Apr-Jul	KAF				3090.4

Data used in Dworshak Water Supply Forecast:

Climate Data	Sept
SOI	0.80

Precipitation Data	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Headquarters, ID (inch)		2.30	7.10	7.50	--	--	--	--	
Cumulative HQSI Data (inch)		**2.30**	**9.40**	**16.90**	**-**	**-**	**-**	**-**	
Snow Water Equivalent, 1st of Month	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**
Elk Butte, ID (inch)				13.0	--	--	--		
Cool Creek, ID (inch)				20.7	--				
Hoodoo Basin, MT (inch)				18.1	--	--	--	--	--
Sherwin, ID (inch)				6.1	--	--	--		
Shanghi Summit, ID (inch)								--	--
Lost Lake, ID (inch)				21.3	--	--	--	--	--
Hemlock, ID (inch)								--	--
Crater Meadows Mar (inch)						--	--		
Streamflow	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**
Dworshak Inflow Volume (KAF)				205	--	--	--	--	--

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
Chief Hydrology Section
Walla Walla District USACE

William D. Proctor, P.E.
Ch., Hydrologic Engineering and Power Branch
Columbia Basin Water Management Division