

The MAY WSF sets BiOp actions as highlighted in the table below.

In 2017, the official WSF will be computed January through July on the 3rd work day of the month using the 5-day QPF 50% exceedance value. FRM will be computed at the same intervals as before and posted online at: <http://www.nwd.usace.army.mil/Missions/Water/Columbia/FloodControl>

Forecast Point	Forecast period	Forecast	BiOp Actions to be Determined
Hungry Horse	April – August Provided by Reclamation	January, February, March Final	Sets min. flows at Hungry Horse and Columbia Falls
	May – September Provided by Reclamation	January, February, March Final	Sets VARQ FRM targets
		April Final	Sets VARQ FRM targets and VARQ refill flows
		May, June Final	Sets VARQ refill flows
The Dalles	April – September Provided by NWRFC	March Final	Sets CRWMP adjustments at Grand Coulee
	April – August Provided by NWRFC	April Final	Sets spring flow objective at McNary Dam
		May Final	Sets end of September draft limits at Hungry Horse and Libby
		July Final	Sets end of August draft limit at Grand Coulee
Lower Granite	April – July Provided by NWRFC	April Final	Sets spring flow objective at Lower Granite
		June Final	Sets summer flow objective at Lower Granite
Libby	April – August Provided by Corps Seattle District	December Final	Sets end of December variable draft target
		January, February, March Final	Sets VARQ FRM targets
		April Final	Sets VARQ FRM targets and VARQ refill flows
		May Final	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
		June Final	VARQ refill flows
Dworshak	April – July Provided by Corps Walla Walla District	January to June Final	Manage for reservoir FRM and refill

May 2, 2017

**Hungry Horse Dam – Official Water Supply Forecast
MAY 2017**

The volumes for the May final forecast for Hungry Horse Inflows are:

Apr-Jul: 1,878 kaf (119%)

Jan-Jul: 2,698 kaf (129%)

Apr-Aug: 2,325 kaf (120%)

May-Sep: 2,015 kaf (119%)

Mary Mellema

River and Reservoir Operations

U.S. Bureau of Reclamation

PN Regional Office

Boise, ID 83706



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COLUMBIA - THE DALLES DAM (TDAO3) Forecasts for Water Year 2017

Official Forecast

10 days QPF: Ensemble: 2017-05-03 Issued: 2017-05-03

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	111923	118210	128	124615	92704
APR-JUL	97900	103329	129	110324	79855
APR-AUG	106295	111651	128	118589	87532
JAN-SEP	146177	152463	133	158869	114216
JAN-JUL	132154	137583	136	144577	101368
OCT-SEP	168250	174536	134	180942	130518

5 days QPF: Ensemble: 2017-05-03 Issued: 2017-05-03

APR-SEP	111984	117131	126	124366	92704
APR-JUL	97121	102690	129	109342	79855
APR-AUG	106273	111123	127	118206	87532
JAN-SEP	146237	151385	133	158620	114216
JAN-JUL	131374	136944	135	143596	101368
OCT-SEP	168310	173458	133	180693	130518

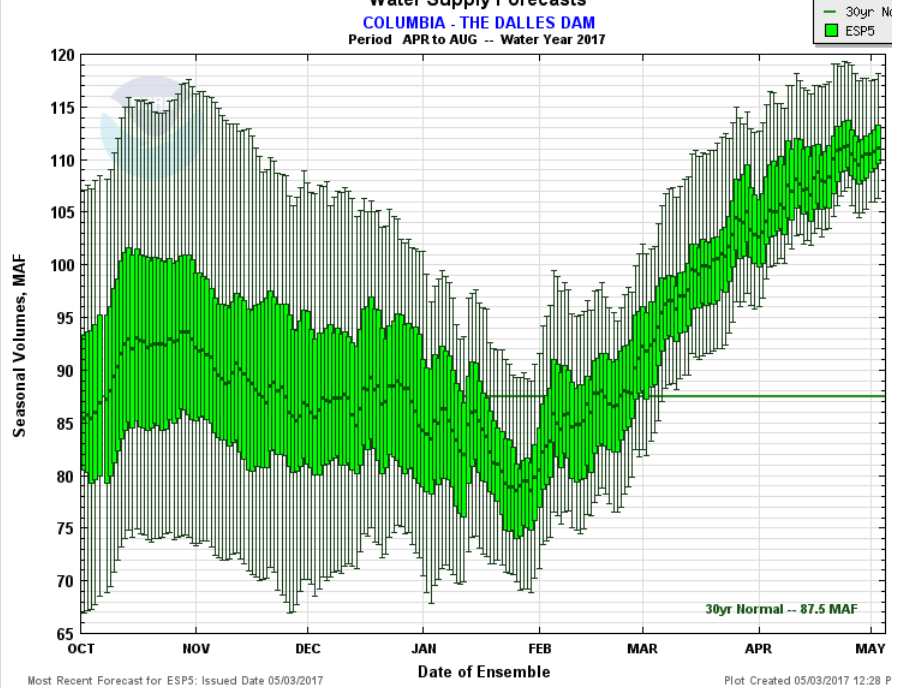
0 days QPF: Ensemble: 2017-05-03 Issued: 2017-05-03

APR-SEP	110225	116260	125	124063	92704
APR-JUL	95795	101113	127	108207	79855
APR-AUG	104662	109789	125	117786	87532
JAN-SEP	144478	150514	132	158317	114216
JAN-JUL	130048	135367	134	142461	101368
OCT-SEP	166551	172587	132	180390	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 2017



☐ Max Scale ☒ Scale To Data ☐ Scale To Last 45 Days

Overlay

[ESP10](#)[ESP5](#)[ESP0](#)

Data Files

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SNAKE - LOWER GRANITE DAM (LGDW1) Forecasts for Water Year 2017

Official Forecast

10 days QPF: Ensemble: 2017-05-03 Issued: 2017-05-03

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	30659	32282	145	34681	22279
APR-JUL	27767	29178	147	31465	19848
APR-AUG	29285	30691	146	33088	21091
JAN-SEP	43865	45488	152	47886	29872
JAN-JUL	40973	42383	154	44670	27440
OCT-SEP	48295	49917	144	52316	34667

5 days QPF: Ensemble: 2017-05-03 Issued: 2017-05-03

APR-SEP	30339	32141	144	35264	22279
APR-JUL	27644	29118	147	31938	19848
APR-AUG	29036	30673	145	33640	21091
JAN-SEP	43544	45347	152	48470	29872
JAN-JUL	40849	42323	154	45143	27440
OCT-SEP	47974	49777	144	52899	34667

0 days QPF: Ensemble: 2017-05-03 Issued: 2017-05-03

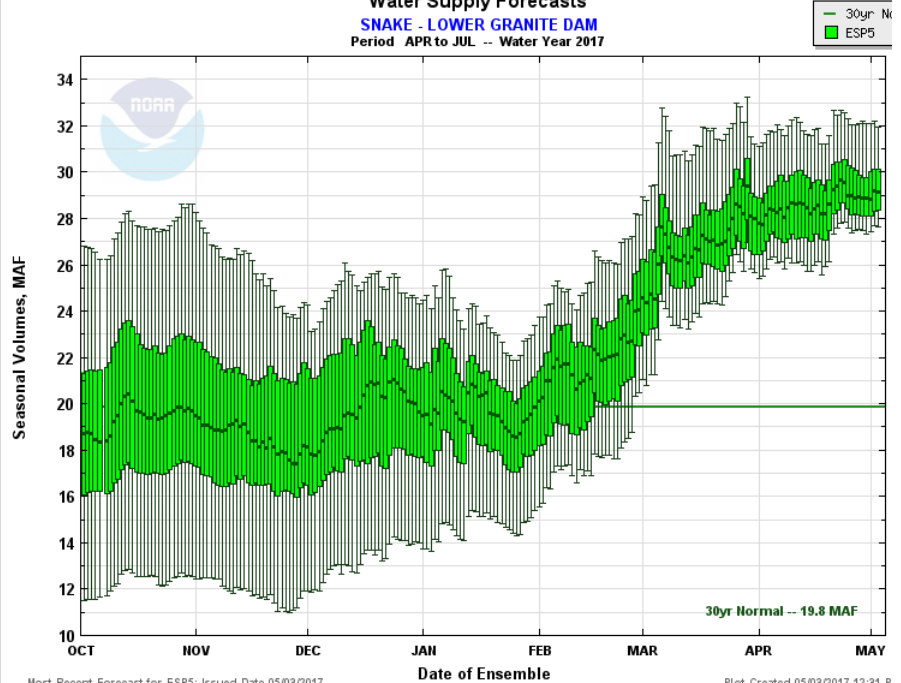
APR-SEP	30390	31760	143	35346	22279
APR-JUL	27453	28777	145	32007	19848
APR-AUG	28977	30264	143	33592	21091
JAN-SEP	43595	44966	151	48551	29872
JAN-JUL	40659	41982	153	45212	27440
OCT-SEP	48025	49395	142	52981	34667

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 2017



Most Recent Forecast for ESP5: Issued Date 05/03/2017

Plot Created 05/03/2017 12:31 P

☐ Max Scale ☒ Scale To Data ☐ Scale To Last 45 Days

Overlay

ESP10 ESP5 ESP0

Data Files

CSV (ESP5 / APR-JUL)

Forecast Ensemble



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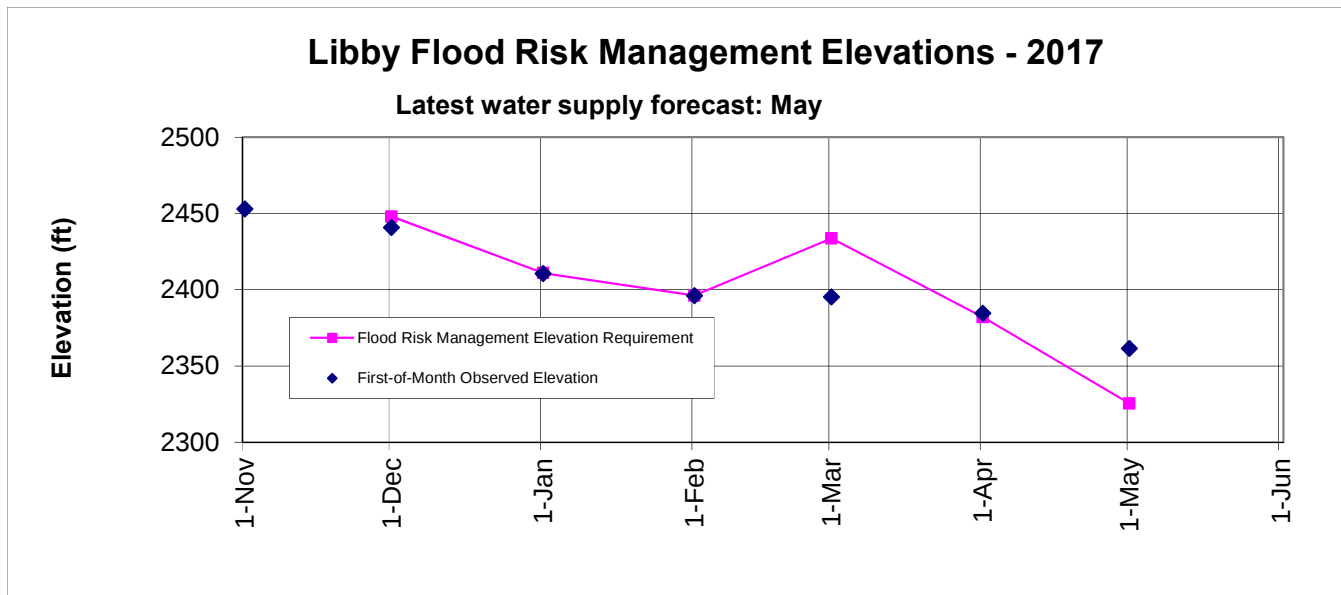
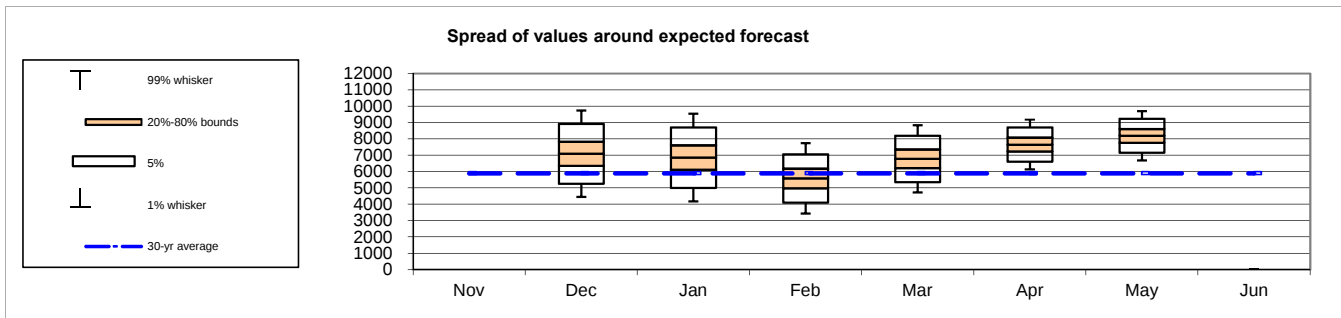
Libby: May Runoff Forecast & Flood Risk Management Calculation

WY 2017

Runoff Forecast and Flood Risk Management				1981-2010 Average	Percent of Average	1929-2008 Average	Percent of Average
Most Probable Runoff Volume:							
	Apr-Aug	8190	KAF	5885	139%	6282	130%
	Apr-Jul	7436	KAF	5342	139%	5720	130%
	May-Jul	6699	KAF	4821	139%	5199	129%

Seasonal Flood Risk Management VARQ Flood Risk Management Implemented								
Forecast Date >>	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Aug Runoff Forecast		7093	6861	5583	6783	7654	8190	
First-of-Month Elev	2452.9	2440.9	2410.5	2396.2	2395.2	2384.7	2361.5	

Date >>	30-Nov	31-Dec	31-Jan	28-Feb	31-Mar	30-Apr	
Flood Risk Management Space	500	2000	2503	1114	2924	4303	
Flood Risk Management Elevation	2448.0	2411.0	2396.2	2433.7	2382.1	2325.4	



Notes:

1. The given forecast is the official Corps of Engineers forecast for Libby. If you have any questions please contact Joel Fenolio (206) 764-6683, Kristy Riley (206) 316-3947, Kevin Shaffer (206) 764-3660, Logan Osgood-Jacobs (206) 764-6928, or Kristian Mickelson (206) 764-6927.
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. October Precip capped at Mean plus 2 standard deviations. A memo to NWD summarizes the methodology used.

Libby: May Runoff Forecast & Flood Risk Management Calculation

Apr-Aug Runoff Forecast Calculation:						
Variable	Month(s)	Units	Observed Value	Percent of Average	Regression Coefficient	Marginal Runoff (KAF)
			A		B	=A*B
SOI	Σ Jun:Jul					
Eureka RS, MT	Σ Oct:Apr Prcp	inches	11.13	164%	57.5	639.3
West Glacier, MT	Σ Oct:Apr Prcp	inches	26.10	141%	28.0	731.8
Cranbrook A, BC	Σ Oct:Apr Prcp	millimeters	310.93	168%	2.8	870.6
Fernie, BC	Σ Oct:Apr Prcp	millimeters	910.92	120%	0.6	555.7
Hawkins Lake, MT	1-May SWE	inches	34.20	130%	17.3	591.7
Stahl Creek, MT	1-May SWE	inches	50.00	133%	16.7	837.0
East Creek, BC	1-May SWE	millimeters	1170.00	127%	0.6	666.9
Moyie Mountain, BC	1-May SWE	millimeters	587.00	162%	0.9	534.2
Sunshine Village, AB	1-May SWE	millimeters	810.00	131%	1.3	1020.6
Akamina Pass, AB	1-May SWE	millimeters	472.00	140%	0.6	259.6
South Racehorse Creek, AB	1-May SWE	millimeters	407.00	111%	0.8	337.8
Intercept			1		408.0	408.0
1-May Forecast (KAF)					Σ	7453.1

Data used in Libby Water Supply Forecast

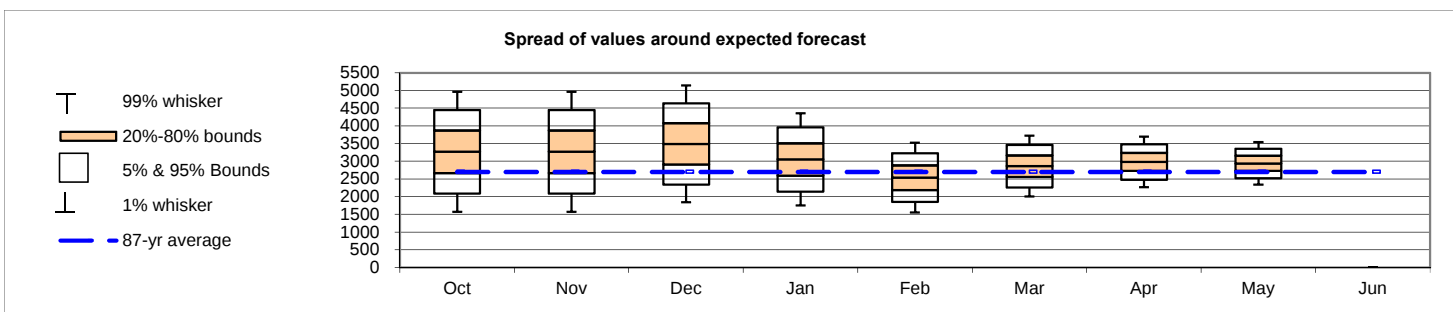
WY 2017

Climate Data					Jun-16	Jul-16				
	SOI				0.60	0.40				
Precipitation Data		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Units
	Eureka RS, MT	2.34	1.07	1.53	0.57	3.12	1.27	1.23		inch
	West Glacier, MT	5.91	2.71	2.27	1.32	3.53	5.53	4.83		inch
	Cranbrook A, BC	54.93	20.20	46.60	16.80	83.80	51.60	37.00		mm
	Fernie, BC	238.07	157.00	76.00	33.00	168.00	124.00	114.85		mm
Snow Water Equiv				1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun	Units
	Hawkins Lake, MT				12	22	30	34		inch
	Stahl Creek, MT			21	22	33	40	50		inch
	East Creek, BC				527	711	1020	1170		mm
	Moyie Mountain, BC			171	221	376	560	587		mm
	Sunshine Village, AB			281	388	514	681	810		mm
	Akamina Pass, AB				188	368	516	472		mm
	South Racehorse Creek, AB				206	340	506	407		mm
Streamflow				Jan	Feb	Mar	Apr	May	Jun	Units
	Libby Inflow Volume			227.9	203.7	452.8	737.0			KAF
Reservoir Elevation		1-Nov	1-Dec	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun	Units
	Libby FOM Elev	2452.9	2440.9	2410.5	2396.2	2395.2	2384.7	2361.5		feet

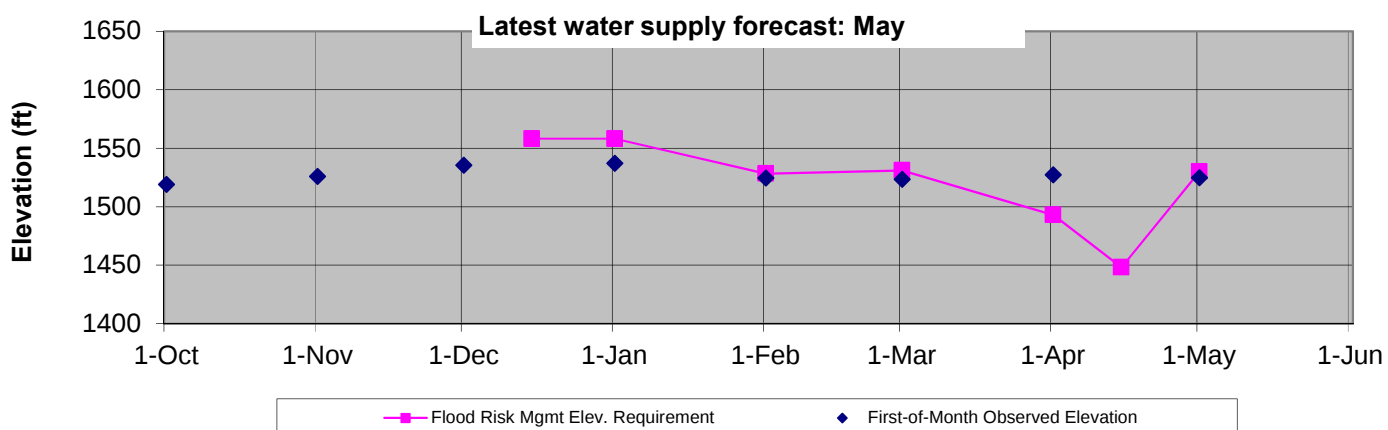
William D. Proctor, P.E.
 Approving Official
 Ch., Hydrologic Engineering and Power Branch
 Northwestern Division

Joel Fenolio, P.E.
 Upper Columbia Senior Water Manager
 Seattle District

Runoff Forecast and Flood Risk Management (FRM)						1981-2010 Average	Percent of 30yr Average	1929-2008 Average	Percent of Average
Most Probable Runoff Volume		Apr-Jul	2941	KAF		2438	121%	2696	109%
		May-Jul	2048	KAF		1784	115%	1972	104%
Seasonal Flood Risk Management (assumes no shift of flood risk management space to Grand Coulee)									
Forecast Date>>	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Jul Runoff Forecast	3271	3271	3493	3055	2541	2867	2984	2941	
First-of-Month Elev	1519.1	1525.9	1535.4	1537.3	1524.5	1523.6	1527.4	1524.9	
Date >>		15-Dec	31-Dec	31-Jan	28-Feb	31-Mar	15-Apr	30-Apr	31-May
FRM Space	--	700	700	1120	1082	1551	1986	1097	
FRM Elevation	--	1558.2	1558.2	1528.3	1531.1	1493.1	1448.3	1530.0	



Dworshak Flood Risk Management Elevations - 2017



Dworshak : May Runoff Forecast & Flood Risk Management Calculation

Apr-Jul Runoff Forecast Calculation					
Variable	Month	Observed Value	% of Average	Regression Coefficient	Marginal Runoff (KAF)
		A		B	=A*B
SOI	Sep	1.20		122.04	146.4
Hoodoo Basin SWE	1-May	46.2	115%	11.71	541.0
Shanghi Summit SWE	1-May	10.5	76%	14.41	151.3
Lost Lake SWE	1-May	56.8	111%	9.67	549.3
Hemlock SWE	1-May	49.7	125%	11.58	575.5
Intercept		1		84.24	84.2
1-May Forecast (KAF)				Σ	2047.8

Data Station	Sept	Nov	Dec	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun
Climate (Stdzd SOI)									
September SOI	1.20								
Precipitation (in)	Oct								
Headquarters, ID	7.90	3.90	3.70	4.70	8.20	10.10	3.54		
Cumulative HQSI Data	7.90	11.80	15.50	20.20	28.40	38.50	42.04		
Snow Water Equiv (First of Month values) (in)									
Elk Butte, ID				14.8	20.3	32.1	35.8		
Cool Creek, ID				15.9	20.8				
Hoodoo Basin, MT				11.9	17.2	31.8	42.4	46.2	--
Sherwin, ID				6.5	8.5	10.2	4.8		
Shanghi Summit, ID								10.5	--
Lost Lake, ID				17.8	24.6	39.0	50.4	56.8	--
Hemlock, ID								49.7	--
Crater Meadows Mar						35.6	44.2		
Streamflow (End of Month) (kaf)				Jan	Feb	Mar	Apr	May	Jun
Dworshak Inflow				127	471	1242	893	--	--

Notes:

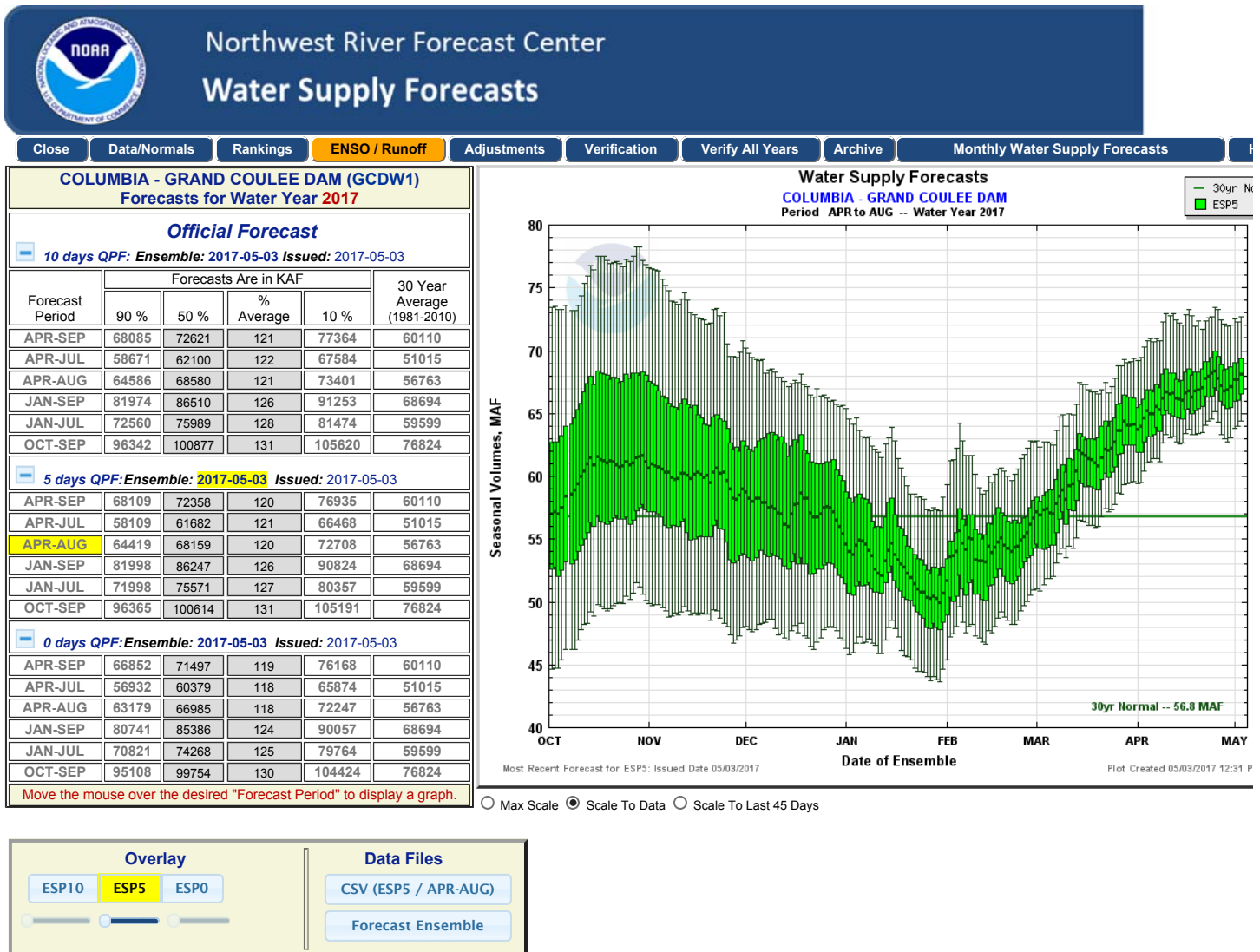
1. The given forecast is the official Corps of Engineers forecast for Dworshak. If you have any questions please contact Steve Hall (509 527 7550), Wayne Jousma (509-527-7606), Amanda Connell (509-527-7632), or Alfredo Rodriguez (509-527-7532).
2. Due to updated values for precipitation, snow or streamflow, subsequent forecasts may be different from the forecast published herein.
3. 15-Dec and 31-Dec Flood Management Space is fixed at 700 KAF.

Approval:

John J. Heitstuman P.E.
Chief Hydrology Section
Walla Walla District USACE

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

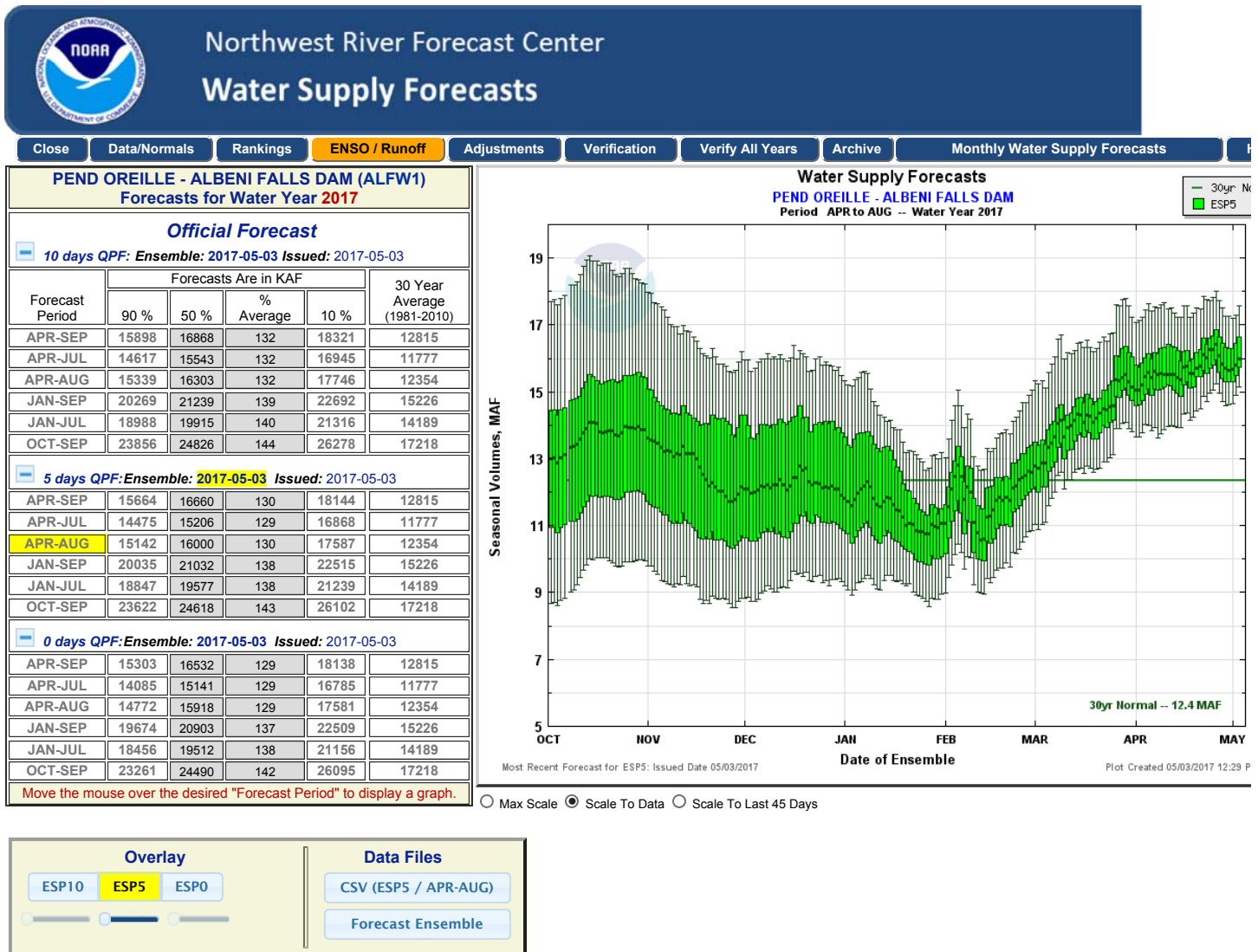
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