

The JUNE 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

June 2, 2017

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

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

Jun-Jul: 1,040 kaf (121%)

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

Apr-Aug: 2,326 kaf (120%)

May-Sep: 2,020 kaf (119%)

Mary Mellema

River and Reservoir Operations

U.S. Bureau of Reclamation

PN Regional Office

Boise, ID 83706



Northwest River Forecast Center Water Supply Forecasts

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

Official Forecast

10 days QPF: Ensemble: 2017-06-05 Issued: 2017-06-05

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	Average	10 %	
APR-SEP	119718	122614	132	126018	92704
APR-JUL	106354	108300	136	111483	79855
APR-AUG	114025	116575	133	119849	87532
JAN-SEP	153971	156867	137	160272	114216
JAN-JUL	140608	142554	141	145736	101368
OCT-SEP	176044	178940	137	182345	130518

5 days QPF: Ensemble: 2017-06-05 Issued: 2017-06-05

APR-SEP	118336	121585	131	126015	92704
APR-JUL	105494	107604	135	110782	79855
APR-AUG	112868	115610	132	119512	87532
JAN-SEP	152590	155838	136	160269	114216
JAN-JUL	139747	141858	140	145036	101368
OCT-SEP	174663	177911	136	182342	130518

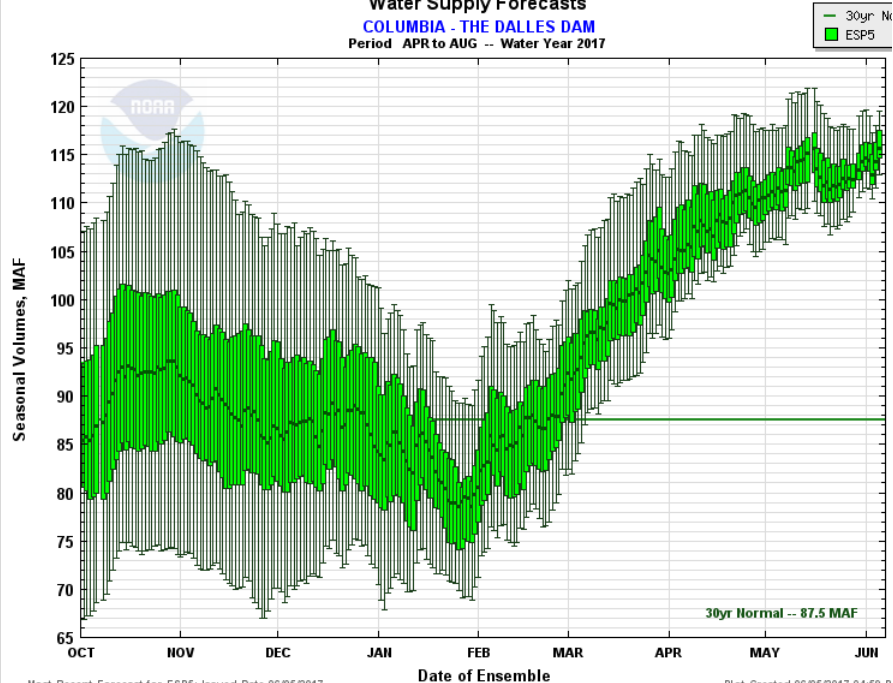
0 days QPF: Ensemble: 2017-06-05 Issued: 2017-06-05

APR-SEP	116799	120155	130	125734	92704
APR-JUL	103588	106067	133	110831	79855
APR-AUG	111136	114411	131	119570	87532
JAN-SEP	151053	154408	135	159988	114216
JAN-JUL	137841	140321	138	145084	101368
OCT-SEP	173126	176481	135	182061	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



Most Recent Forecast for ESP5: Issued Date 06/05/2017

Plot Created 06/05/2017 04:59 P

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

Overlay

ESP10 ESP5 ESP0

Data Files

CSV (ESP5 / APR-AUG)

Forecast Ensemble



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

Official Forecast

10 days QPF: Ensemble: 2017-06-05 Issued: 2017-06-05

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	Average	10 %	
APR-SEP	31613	32214	145	33014	22279
APR-JUL	28704	29187	147	29925	19848
APR-AUG	30154	30700	146	31487	21091
JAN-SEP	44818	45420	152	46220	29872
JAN-JUL	41910	42393	154	43131	27440
OCT-SEP	49248	49850	144	50650	34667

5 days QPF: Ensemble: 2017-06-05 Issued: 2017-06-05

APR-SEP	31678	32338	145	33232	22279
APR-JUL	28739	29293	148	30128	19848
APR-AUG	30172	30779	146	31716	21091
JAN-SEP	44884	45544	152	46438	29872
JAN-JUL	41944	42499	155	43334	27440
OCT-SEP	49314	49973	144	50867	34667

0 days QPF: Ensemble: 2017-06-05 Issued: 2017-06-05

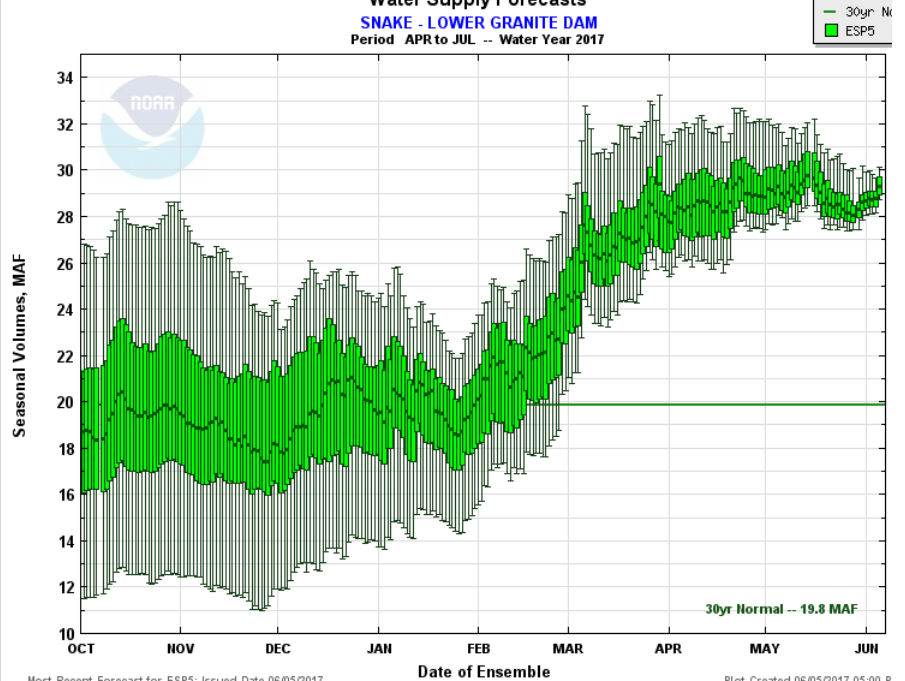
APR-SEP	31063	31909	143	33479	22279
APR-JUL	28144	28939	146	30372	19848
APR-AUG	29606	30422	144	31959	21091
JAN-SEP	44268	45114	151	46685	29872
JAN-JUL	41350	42145	154	43578	27440
OCT-SEP	48698	49544	143	51115	34667

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 06/05/2017

Plot Created 06/05/2017 05:00 P

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

Overlay

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

Data Files

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Libby : June Runoff Forecast & Flood Control Calculation

WY 2017

Runoff Forecast and Flood Control

Most Probable Runoff Volume:

Apr-Aug 7594 KAF
Apr-Jul 6939 KAF
May-Jul 6202 KAF

1981-2010 Average	Percent of Average	1929-2008 Average	Percent of Average
5885	129%	6282	121%
5342	130%	5720	121%
4821	129%	5199	119%

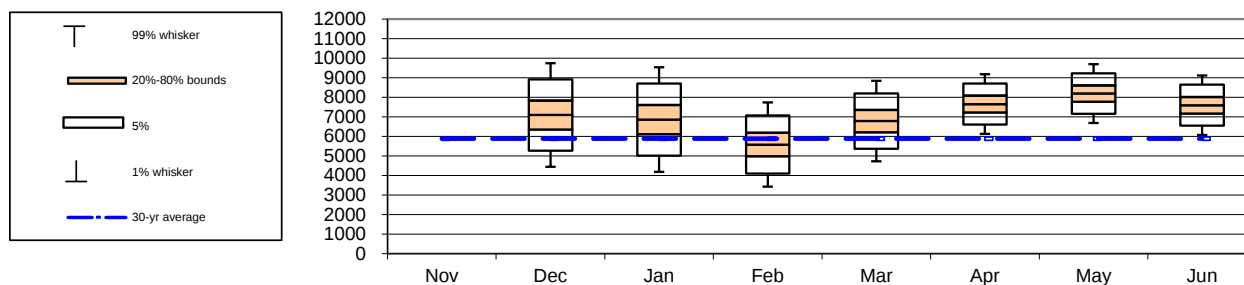
Seasonal Flood Control

VARQ Flood Control Implemented

Forecast Date >>	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Aug Runoff Forecast		7093	6861	5583	6783	7654	8190	7594
First-of-Month Elev	2452.9	2440.9	2410.5	2396.2	2395.2	2384.7	2361.5	2400.3

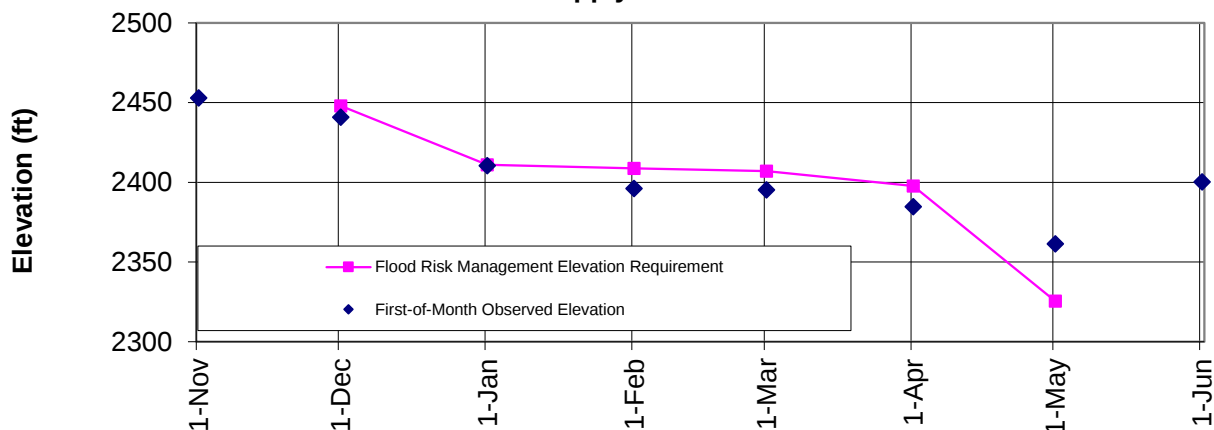
Date >>	30-Nov	31-Dec	31-Jan	28-Feb	31-Mar	30-Apr
Flood Control Space	500	2000	2083	2145	2453	4303
Flood Control Elevation	2448.0	2411.0	2408.7	2407.0	2397.8	2325.4

Spread of values around expected forecast



Libby Flood Control Elevations - 2017

Latest water supply forecast: Jun



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 : June Runoff Forecast & Flood Control 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	ΣJun:Jul					
Eureka RS, MT	ΣOct:May Prcp	inches	11.71	135%	37.7	440.9
West Glacier, MT	ΣOct:May Prcp	inches	27.44	130%	22.5	616.3
Cranbrook A, BC	ΣOct:May Prcp	millimeters	339.93	147%	2.0	690.1
Fernie, BC	ΣOct:May Prcp	millimeters	950.92	112%	0.5	477.4
Hawkins Lake, MT	1-Jun SWE	inches	14.80	117%	10.1	149.4
Stahl Creek, MT	1-Jun SWE	inches	42.60	147%	10.3	439.1
East Creek, BC	1-Jun SWE	millimeters	938.00	128%	0.4	405.5
Moyie Mountain, BC	1-Jun SWE	millimeters	3.00	3%	0.8	2.5
Sunshine Village, AB	1-Jun SWE	millimeters	585.00	123%	0.6	363.5
Akamina Pass, AB	1-Jun SWE	millimeters	0.00	0%	0.7	0.0
South Racehorse Creek, AB	1-Jun SWE	millimeters	1.00	1%	0.6	0.6
Intercept			1		978.0	978.0
1-June Forecast (KAF)					Σ	4563.3

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	0.58	inch
West Glacier, MT	5.91	2.71	2.27	1.32	3.53	5.53	4.83	1.34	inch
Cranbrook A, BC	54.93	20.20	46.60	16.80	83.80	51.60	37.00	29.00	mm
Fernie, BC	238.07	157.00	76.00	33.00	168.00	124.00	114.85	40.00	mm
Snow Water Equiv			1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun	Units
Hawkins Lake, MT				12	22	30	34	15	inch
Stahl Creek, MT			21	22	33	40	50	43	inch
East Creek, BC				527	711	1020	1170	938	mm
Moyie Mountain, BC			171	221	376	560	587	3	mm
Sunshine Village, AB			281	388	514	681	810	585	mm
Akamina Pass, AB				188	368	516	472	0	mm
South Racehorse Creek, AB				206	340	506	407	1	mm
Streamflow			Jan	Feb	Mar	Apr	May	Jun	Units
Libby Inflow Volume			227.9	203.7	452.8	737.0	2293.7		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	2400.3	feet

Barbara Miller
 Approving Official
 Hydrologic Engineering and Power Branch
 Northwestern Division

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

Dworshak : June Runoff Forecast & Flood Control Calculation

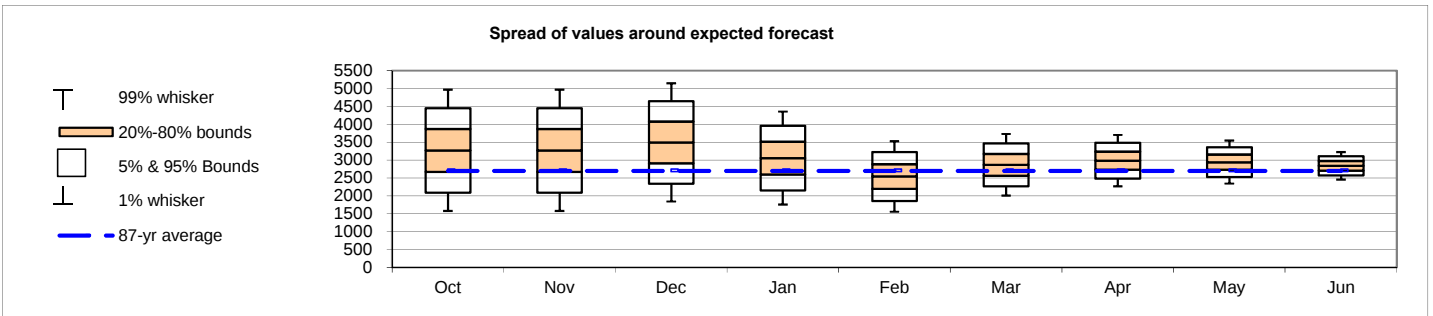
WY 2017

Runoff Forecast and Flood Risk Management (FRM)					1981-2010 Average	Percent of 30yr Average	1929-2008 Average	Percent of Average
	Apr-Jul	2838	KAF		2438	116%	2696	105%
	May-Jul	1945	KAF		1784	109%	1972	99%
	Jun-Jul	820	KAF		853	96%	926	89%

Seasonal Flood Control (assumes no shift of flood control space to Grand Coulee)

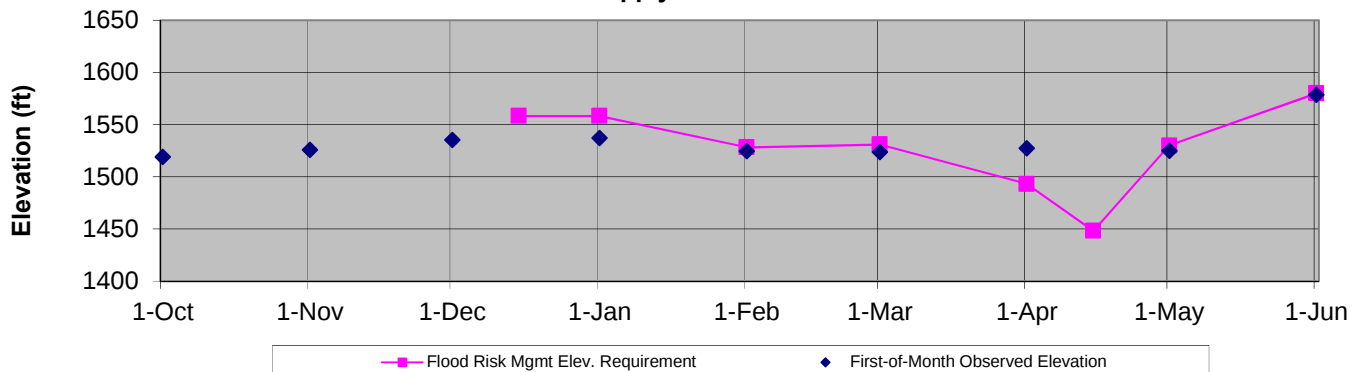
Forecast Date>>	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Jul Runoff Forecast	3271	3271	3493	3055	2541	2867	2984	2941	2838
First-of-Month Elev	1519.1	1525.9	1535.4	1537.3	1524.5	1523.6	1527.5	1524.9	1578.6

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 Mgmt Elevations - 2017

Latest water supply forecast: Jun



Dworshak : June Runoff Forecast & Flood Control Calculation

Apr-Jul Runoff Forecast Calculation

Variable	Month	Observed Value	% of Average	Regression Coefficient	Marginal Runoff (KAF)
		A		B	=A*B
Hoodoo Basin SWE	1-Jun	34.6	133%	8.21	284.1
Shanghi Summit SWE	1-Jun	0.0	0%	10.26	0.0
Lost Lake SWE	1-Jun	38.7	119%	6.14	237.6
Hemlock SWE	1-Jun	21.1	119%	7.57	159.7
Intercept		1		138.78	138.8
1-Jun Forecast (KAF)				Σ	820.2

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)									
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	34.6
Sherwin, ID				6.5	8.5	10.2	4.8		
Shanghi Summit, ID								10.5	0.0
Lost Lake, ID				17.8	24.6	39.0	50.4	56.8	38.7
Hemlock, ID								49.7	21.1
Crater Meadows Mar						35.6	44.2		
Streamflow (End of Month) (kaf)				Jan	Feb	Mar	Apr	May	Jun
Dworshak Inflow				127	471	1242	893	1125	--

Notes:

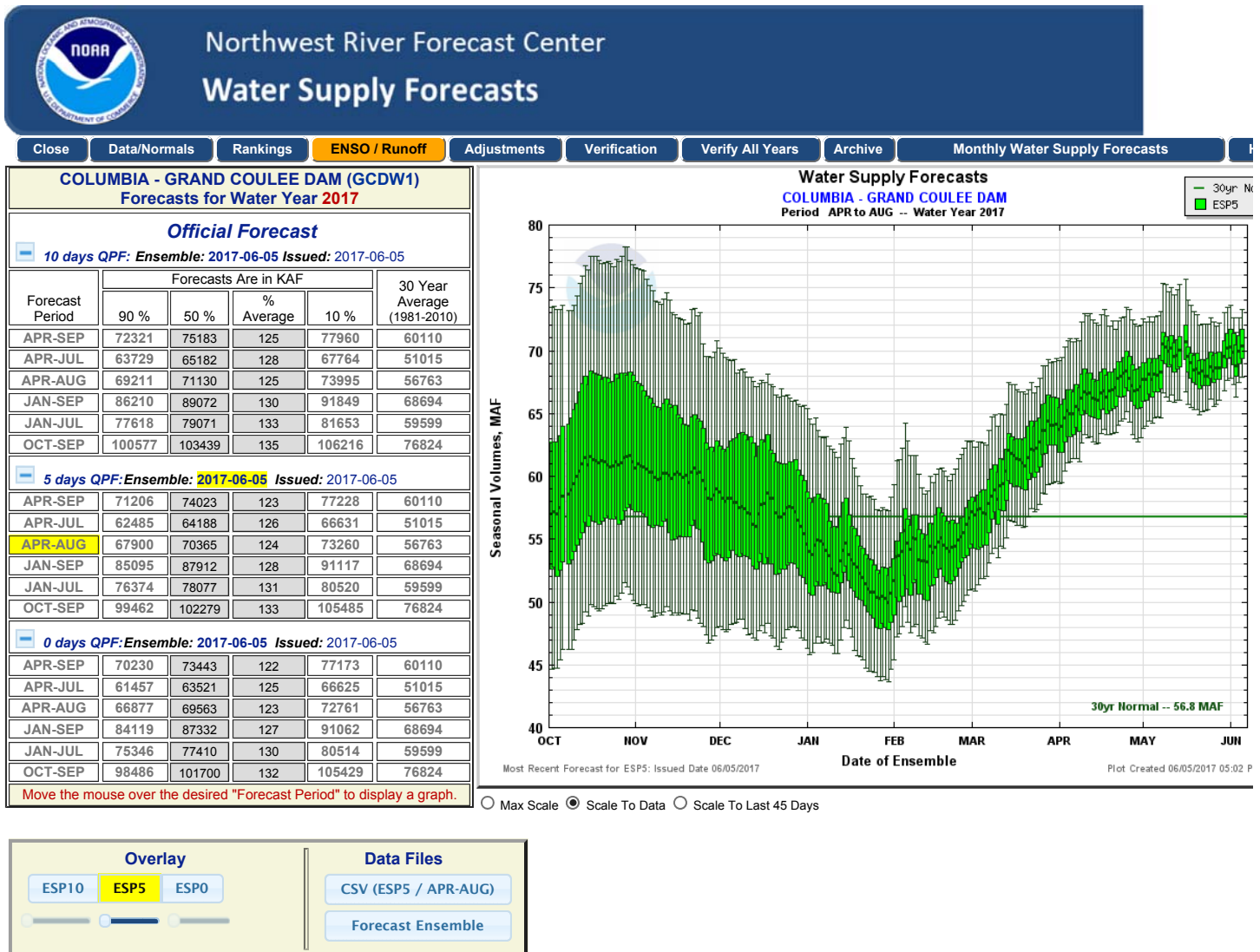
1. The given forecast is the official Corps of Engineers forecast for Dworshak. If you have any questions please contact Steve Hall (509 527 7550), Wayne Jousma (509-527-7606), Amanda Connell (509-527-7632), or Alfredo Rodriguez (509-527-7532).
2. Due to updated values for precipitation, snow or streamflow, 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

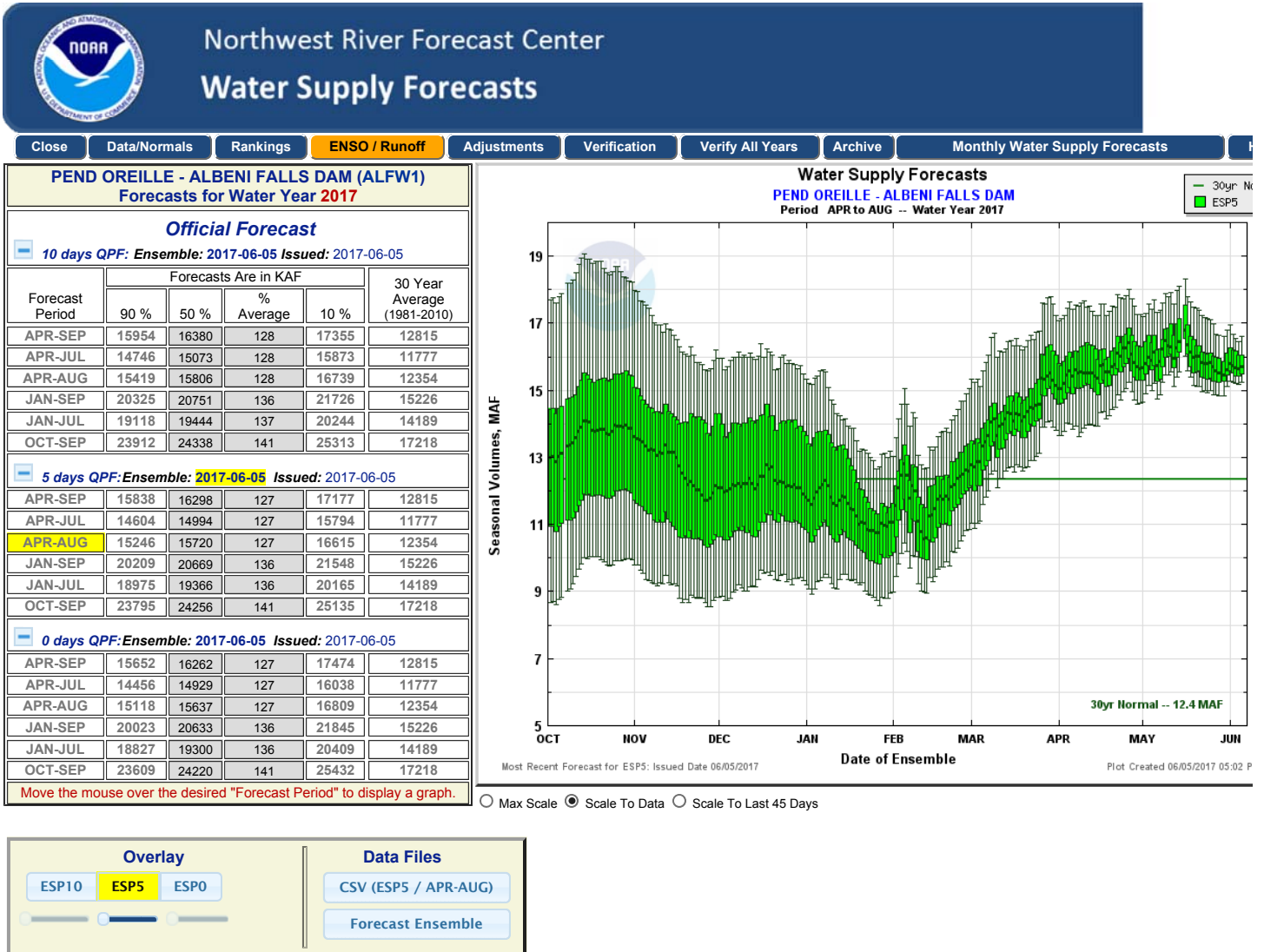
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