

The APRIL Final WSF sets BiOp actions as defined in the table below where highlighted.

Other projects are provided for informational purposes only.

For flood control requirements, see: <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

April 5, 2016

**Hungry Horse Dam – Official Water Supply Forecast
April 2016**

Here are the forecast volumes from the April final forecast for Hungry Horse inflow:

Apr-Jul: 1719.8 kaf (92%)

Jan-Jul: 2000.0 kaf (95%)

Apr-Aug: 1781.3 kaf (92%)

May-Sep: 1557.3 kaf (92%)

The minimum flows downstream of Hungry Horse remain:

Columbia Falls: 3500 cfs

Hungry Horse: 900 cfs

Mary Mellema

River and Reservoir Operations
U.S. Bureau of Reclamation
PN Regional Office
Boise, ID 83706



Northwest River Forecast Center Water Supply Forecasts

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

COLUMBIA - THE DALLES DAM (TDAO3) Forecasts for Water Year 2016

Official Forecast

10 days QPF: Ensemble: 2016-04-07 Issued: 2016-04-07

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	88873	93355	101	103216	92704
APR-JUL	75587	80656	101	89702	79855
APR-AUG	83853	88364	101	97264	87532
JAN-SEP	113906	118387	104	128248	114216
JAN-JUL	100620	105689	104	114735	101368
OCT-SEP	129420	133902	103	143762	130518

5 days QPF: Ensemble: 2016-04-07 Issued: 2016-04-07

APR-SEP	87060	93160	100	101506	92704
APR-JUL	74367	79677	100	89609	79855
APR-AUG	81953	86867	99	96314	87532
JAN-SEP	112092	118192	103	126538	114216
JAN-JUL	99399	104709	103	114641	101368
OCT-SEP	127607	133707	102	142053	130518

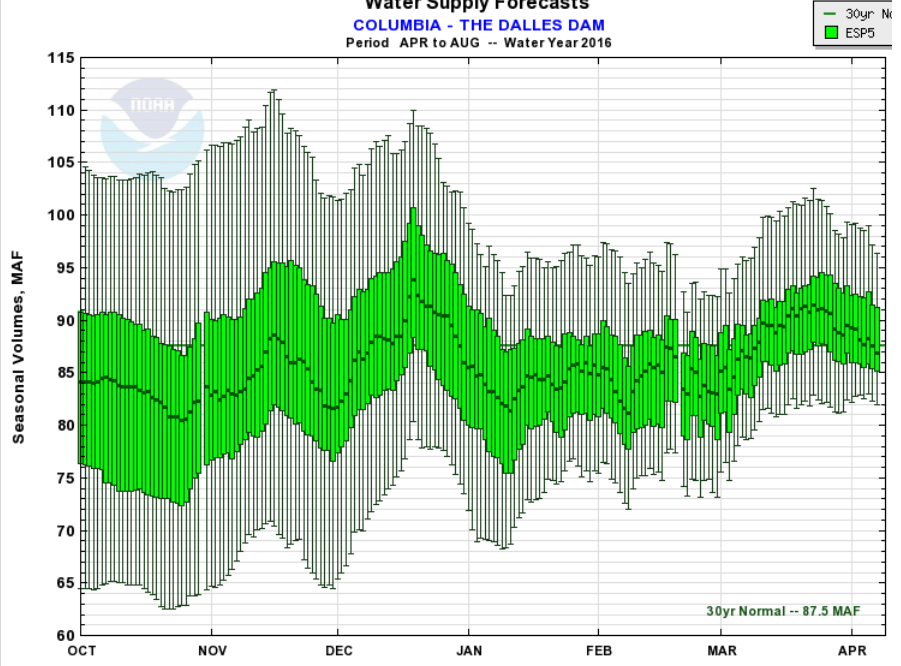
0 days QPF: Ensemble: 2016-04-07 Issued: 2016-04-07

APR-SEP	88128	95215	103	104117	92704
APR-JUL	74968	80348	101	90847	79855
APR-AUG	82786	89234	102	99134	87532
JAN-SEP	113160	120247	105	129149	114216
JAN-JUL	100000	105380	104	115880	101368
OCT-SEP	128675	135762	104	144664	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 2016



Most Recent Forecast for ESP5: Issued Date 04/07/2016

Date of Ensemble

Plot Created 04/07/2016 02:00

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

Overlay

ESP10 ESP5 ESP0

Data Files

CSV (ESP5 / APR-AUG)

Forecast Ensemble



[Commerce Home](#) | [NOAA](#) | [NWS Organization](#) | [NWRFC Site Map](#) | [Search](#)

[Freedom of Information Act](#) | [Privacy Policy](#) | [Information Quality](#) | [USA.gov](#) | [Career Opportunities](#)



Northwest River Forecast Center Water Supply Forecasts

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

SNAKE - LOWER GRANITE DAM (LGDW1) Forecasts for Water Year 2016

Official Forecast

10 days QPF: Ensemble: 2016-04-07 Issued: 2016-04-07

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	20150	22459	101	25465	22279
APR-JUL	17560	19917	100	22792	19848
APR-AUG	18939	21189	100	24203	21091
JAN-SEP	27764	30073	101	33080	29872
JAN-JUL	25175	27531	100	30407	27440
OCT-SEP	31612	33921	98	36928	34667

5 days QPF: Ensemble: 2016-04-07 Issued: 2016-04-07

APR-SEP	19571	21684	97	24720	22279
APR-JUL	16805	18825	95	22147	19848
APR-AUG	18100	20165	96	23489	21091
JAN-SEP	27185	29298	98	32335	29872
JAN-JUL	24419	26440	96	29761	27440
OCT-SEP	31033	33146	96	36182	34667

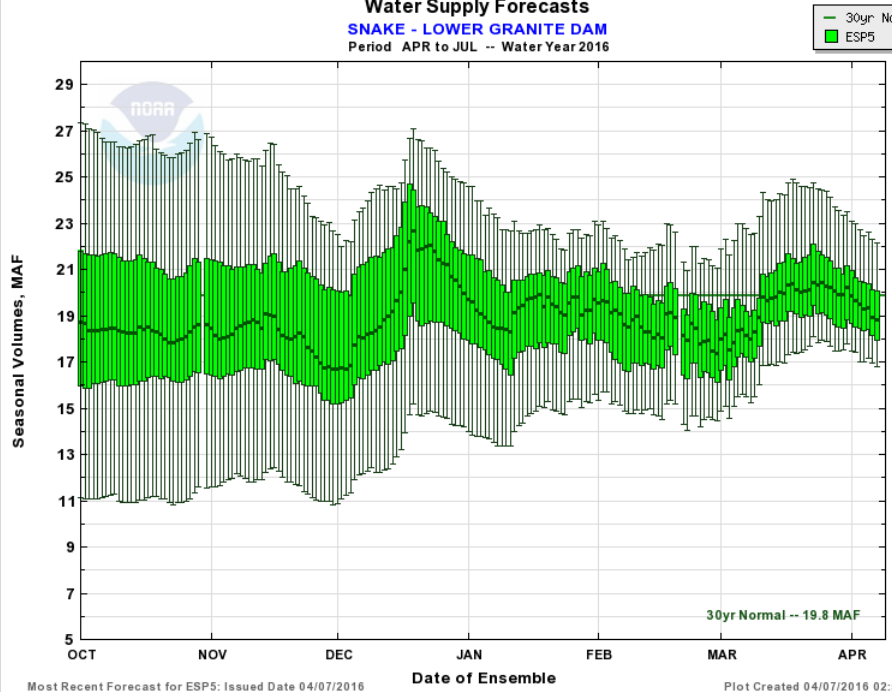
0 days QPF: Ensemble: 2016-04-07 Issued: 2016-04-07

APR-SEP	19618	21830	98	25174	22279
APR-JUL	17092	19306	97	22557	19848
APR-AUG	18345	20615	98	23931	21091
JAN-SEP	27232	29445	99	32789	29872
JAN-JUL	24707	26921	98	30171	27440
OCT-SEP	31080	33293	96	36637	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 2016



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

Overlay

ESP10 ESP5 ESP0

Data Files

CSV (ESP5 / APR-JUL)

Forecast Ensemble



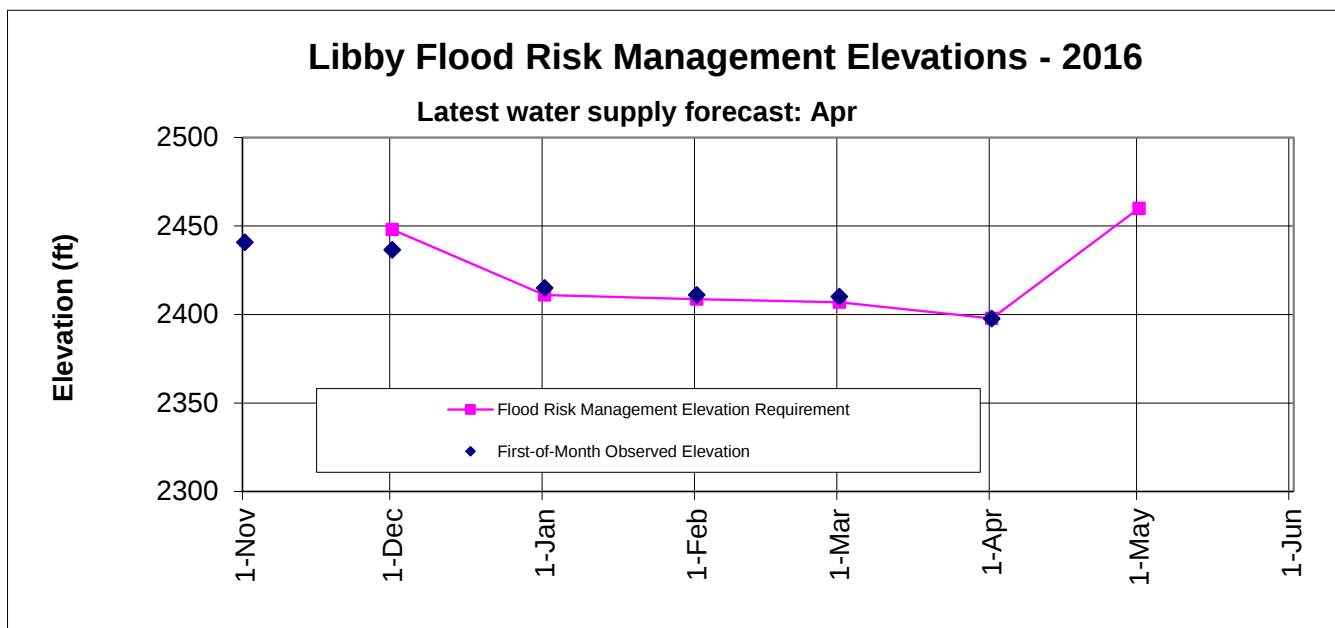
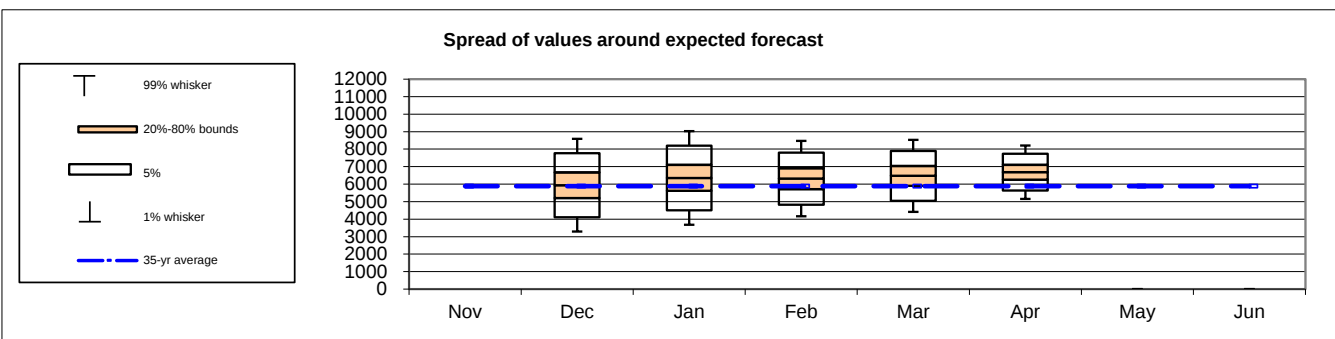
Commerce Home | NOAA | NWS Organization | NWRFC Site Map | Search

Freedom of Information Act | Privacy Policy | Information Quality | USA.gov | Career Opportunities

Libby : April Runoff Forecast & Flood Risk Management Calculation

WY 2016

Runoff Forecast and Flood Risk Management					1981-2010 Average	Percent of Average	1929-2008 Average	Percent of Average
Most Probable Runoff Volume:		Apr-Aug	6681	KAF	5885	114%	6282	106%
		Apr-Jul	6065	KAF	5342	114%	5720	106%
		May-Jul	5473	KAF	4821	114%	5199	105%
30-Apr Flood Risk Management Space				2772	KAF			
30-Apr Flood Risk Management Elevation				2387.4	ft			
Seasonal Flood Risk Management		VARQ Flood Risk Management Implemented						
Forecast Date >>	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Aug Runoff Forecast		5940	6354	6318	6472	6681		
First-of-Month Elev	2440.7	2436.5	2415.0	2411.0	2410.1	2397.6		
Date >>	30-Nov	31-Dec	31-Jan	28/29-Feb	31-Mar	30-Apr		
d Risk Management Space	500	2000	2083	2145	2453	-1716		
isk Management Elevation	2448.0	2411.0	2408.7	2407.0	2397.8	2460.0		



- 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, Adam Price (206) 764-3604, 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.

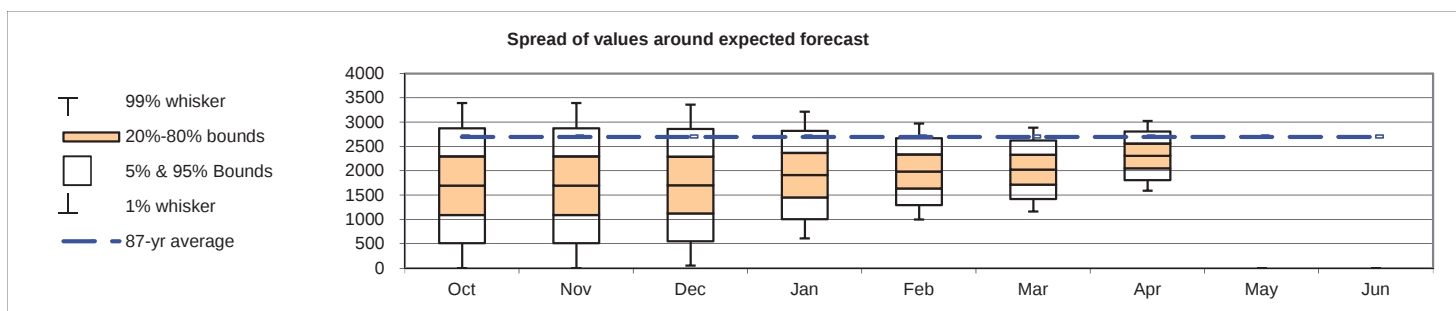
Libby : April Runoff Forecast & Flood Risk Management Calculation

Apr-Aug Runoff Forecast Calculation:						
Variable	Month(s)	Units	Observed Value	Percent of Average	Regression Coefficient	Marginal Runoff (KAF)
			A		B	=A*B
SOI	ΣJun:Jul					
Eureka RS, MT	ΣOct:Mar Prcp	inches	8.22	141%	68.5	563.2
West Glacier, MT	ΣOct:Mar Prcp	inches	18.43	112%	29.5	543.1
Cranbrook A, BC	ΣOct:Mar Prcp	millimeters	200.90	126%	3.0	600.7
Fernie, BC	ΣOct:Mar Prcp	millimeters	775.40	115%	0.7	550.5
Hawkins Lake, MT	1-Apr SWE	inches	29.70	118%	22.4	666.2
Stahl Creek, MT	1-Apr SWE	inches	39.30	112%	19.7	774.2
East Creek, BC	1-Apr SWE	millimeters	1006.00	117%	0.7	734.4
Moyie Mountain, BC	1-Apr SWE	millimeters	406.00	95%	1.2	491.3
Sunshine Village, AB	1-Apr SWE	millimeters	541.00	96%	1.4	773.6
Akamina Pass, AB	1-Apr SWE	millimeters	464.00	100%	0.7	334.1
South Racehorse Creek, AB	1-Apr SWE	millimeters	429.00	100%	1.4	579.2
Intercept			1		70.5	70.5
1-Apr Forecast (KAF)					Σ	6681.0

Data used in Libby Water Supply Forecast

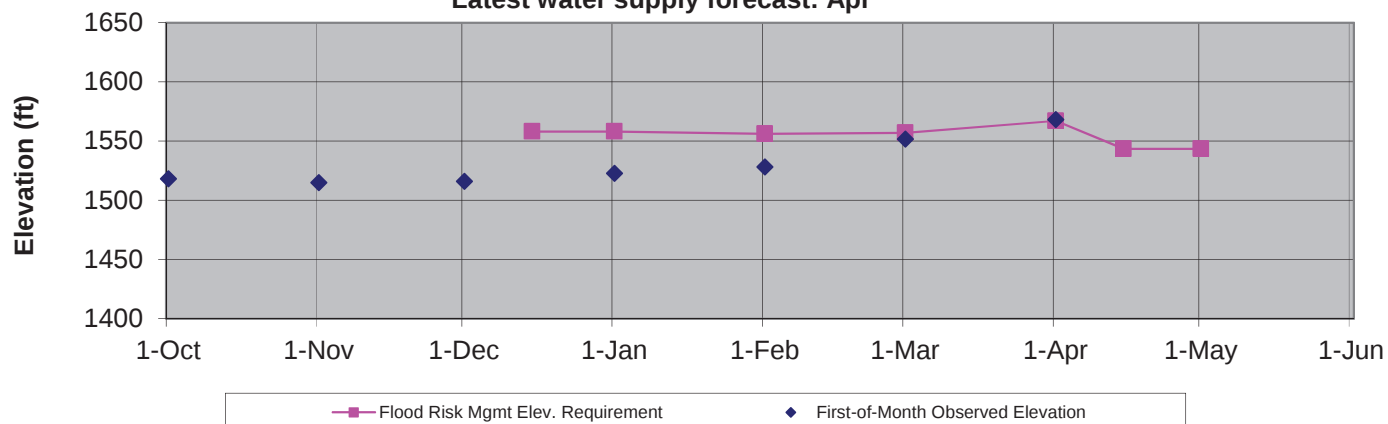
Data used in Libby Water Supply Forecast							WY	2016	
							WY	Jul-05	
Climate Data	Jan-15	Feb-15	Mar-15	Jun-15	Jul-15	Oct-15	Nov-15	Dec-15	Jan-16
SOI				-0.60	-1.10				
Precipitation Data	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Units
Eureka RS, MT	1.37	1.73	2.69	1.33	0.59	0.51			inch
West Glacier, MT	1.93	2.45	4.62	3.07	2.68	3.68			inch
Cranbrook A, BC	16.60	49.30	50.80	38.00	17.20	29.00			mm
Fernie, BC	104.00	198.40	172.00	104.00	85.00	112.00			mm
Snow Water Equiv	1-Jan			1-Feb	1-Mar	1-Apr	1-May	1-Jun	Units
Hawkins Lake, MT				17	23	30			inch
Stahl Creek, MT	15			24	32	39			inch
East Creek, BC				691	846	1006			mm
Moyie Mountain, BC	185			286	353	406			mm
Sunshine Village, AB	252			291	414	541			mm
Akamina Pass, AB				283	320	464			mm
South Racehorse Creek, AB				286	361	429			mm
Streamflow	Jan			Feb	Mar	Apr	May	Jun	Units
Libby Inflow Volume			189.4	199.1	294.0				KAF
Reservoir Elevation	1-Nov	1-Dec	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun	Units
Libby FOM Elev	2440.7	2436.5	2415.0	2411.0	2410.1	2397.6			feet

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	2308	KAF	2418	95%	2696	86%
				May-Jul	1688	KAF	1771	95%	1972	86%
30-Apr Flood Risk Management Space				912	KAF					
30-Apr Flood Risk Management Elevation				1543.5	ft					
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	1676	1676	1708	1913	1986	2025	2308			
First-of-Month Elev	1518.2	1515.0	1516.1	1522.7	1528.2	1551.6	1568.2			
Date >>	15-Dec	31-Dec	31-Jan	29-Feb	31-Mar	15-Apr	30-Apr	31-May		
FRM Space	--	700	700	727	718	567	912	912		
FRM Elevation	--	1558.2	1558.2	1556.4	1557.0	1567.1	1543.5	1543.5		



Dworshak Flood Risk Management Elevations - 2016

Latest water supply forecast: Apr



Dworshak : April 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	-1.60		171.32	-274.1
HQSI Cumulative Precip	Oct-Date	30.40	111%	22.32	678.5
Elk Butte SWE	1-Apr	38.1	110%	11.61	442.3
Hoodoo Basin SWE	1-Apr	36.7	93%	10.27	376.9
Sherwin SWE	1-Apr	0.7	10%	19.49	13.6
Lost Lake SWE	1-Apr	52.3	100%	7.91	413.7
Crater meadows SWE	1-Apr	50.3	117%	13.37	672.5
Intercept		1		-15.43	-15.4
1-Apr Forecast (KAF)				Σ	2308.1

Data Station	Sept	Nov	Dec	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun
Climate (Stdzd SOI)									
September SOI	-1.60								
Precipitation (in)	Oct								
Headquarters, ID	2.80	3.80	6.40	6.30	4.20	6.90	0.00		
Cumulative HQSI Data	2.80	6.60	13.00	19.30	23.50	30.40	30.40		
Snow Water Equiv (First of Month values) (in)									
Elk Butte, ID				14.6	25.8	30.8	38.1		
Cool Creek, ID				17.2	26.5				
Hoodoo Basin, MT				15.1	22.6	29.6	36.7	0.0	0.0
Sherwin, ID				4.6	7.3	5.5	0.7		
Shanghi Summit, ID								0.0	0.0
Lost Lake, ID				19.9	31.7	41.2	52.3	0.0	0.0
Hemlock, ID								0.0	0.0
Crater Meadows Mar						37.9	50.3		
Streamflow (End of Month) (kaf)				Jan	Feb	Mar	Apr	May	Jun
Dworshak Inflow				171	415	631	--	--	--

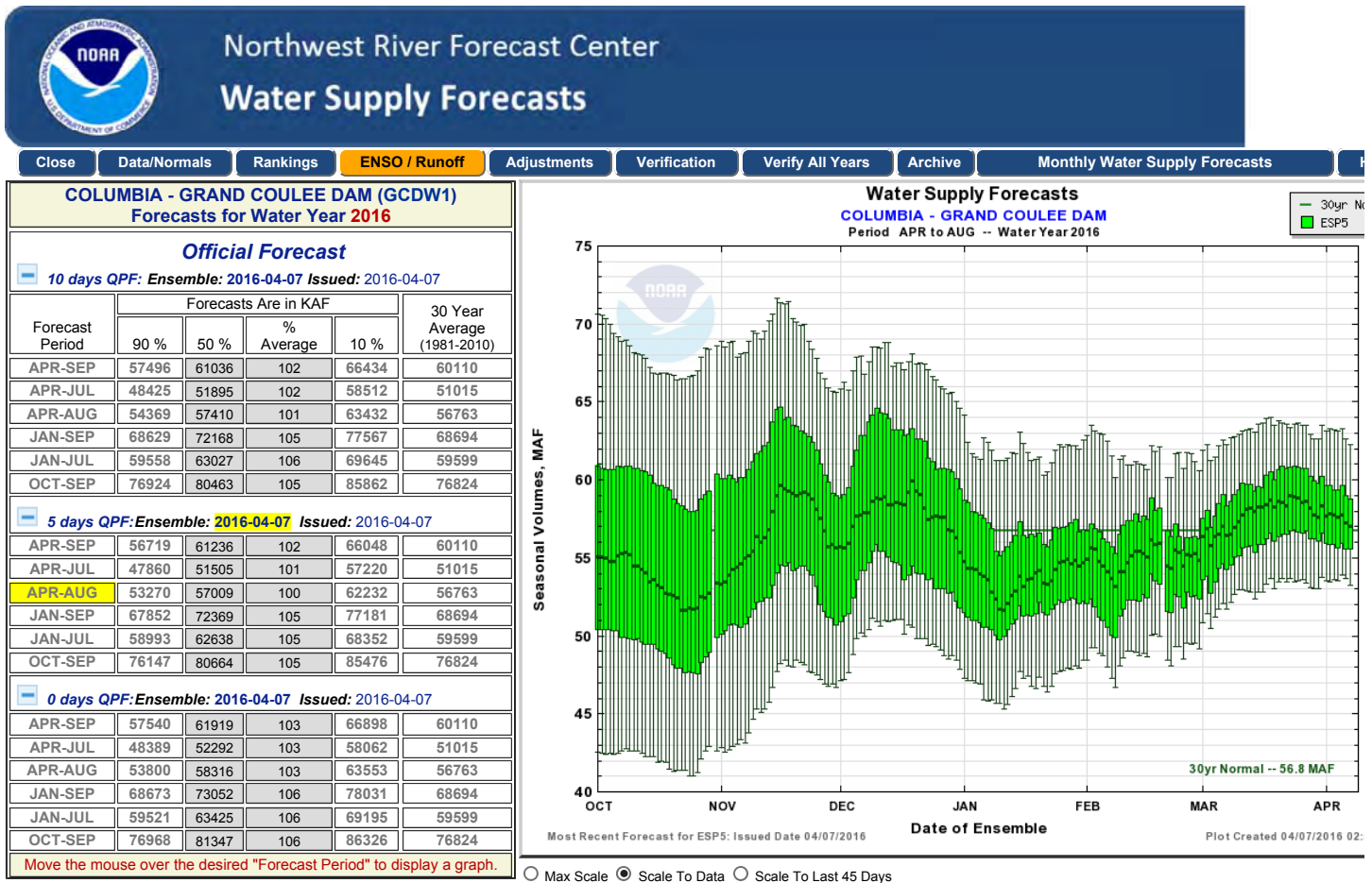
Notes:

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), 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: **SCHWARZ.TRACY.S.**
1239595231
 John J. Heitstuman P.E.
 Chief Hydrology Section
 Walla Walla District USACE

PROCTOR.WILLIAM.D
ALE.1387297118
 William D. Proctor, P.E.
 Ch., Hydrologic Engineering and Power Branch
 Columbia Basin Water Management Division

Grand Coulee Dam forecasts are not used for implementation of BiOp actions.
 This forecast from NWRFC is provided for informational purposes only.



Overlay

ESP10
ESP5
ESP0

Data Files

CSV (ESP5 / APR-AUG)

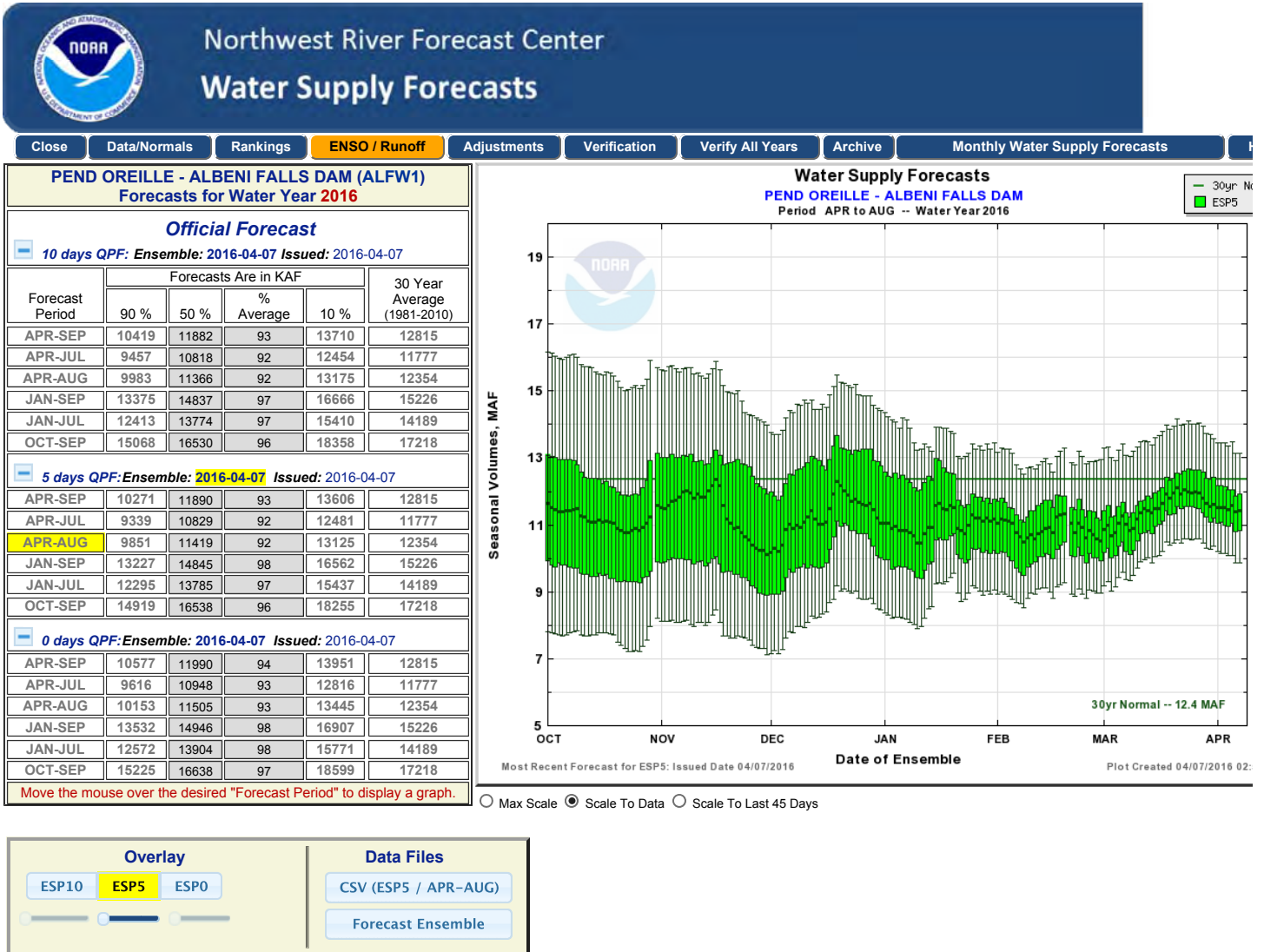
Forecast Ensemble



[Commerce Home](#) |
 [NOAA](#) |
 [NWS Organization](#) |
 [NWRFC Site Map](#) |
 [Search](#)

[Freedom of Information Act](#) |
 [Privacy Policy](#) |
 [Information Quality](#) |
 [USA.gov](#) |
 [Career Opportunities](#)

Albeni Falls Dam forecasts are not used for implementation of BiOp actions.
This forecast from NWRFC is provided for informational purposes only.



[Commerce Home](#) |
 [NOAA](#) |
 [NWS Organization](#) |
 [NWRFC Site Map](#) |
 [Search](#)

[Freedom of Information Act](#) |
 [Privacy Policy](#) |
 [Information Quality](#) |
 [USA.gov](#) |
 [Career Opportunities](#)