

JANUARY final WSF sets BiOp actions as defined in table below. Other projects provided for informational purposes only.

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 – 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 through June Final	Manage for reservoir FRM and refill

January 5, 2015

Hungry Horse Dam

Here are the volumes for the January final forecast for Hungry Horse inflow:

- Jan - Jul: 2,450 kaf (117%)
- Apr - Aug: 2,265 kaf (117%)
- May - Sep: 1,980 kaf (117%)

The minimum flows downstream of Hungry Horse are as follows:

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

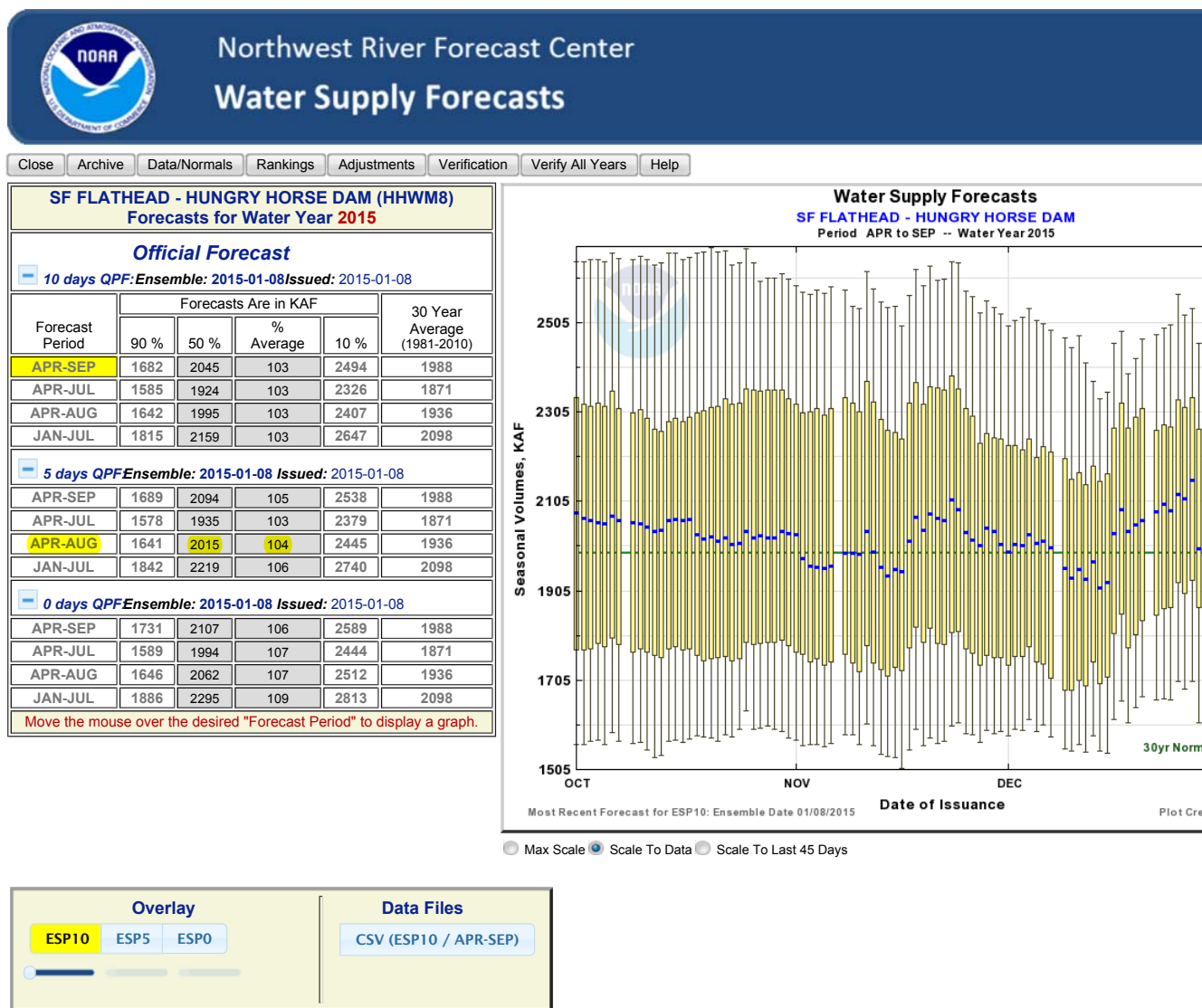
Mary Mellema

River and Reservoir Operations
U.S. Bureau of Reclamation
PN Regional Office
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*Hungry Horse Dam official water supply forecasts computed by the Bureau of Reclamation (on previous page).

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COLUMBIA - THE DALLES DAM (TDAO3) Forecasts for Water Year 2015

Official Forecast

☐ 10 days QPF: Ensemble: 2015-01-08 Issued: 2015-01-08

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	79190	91013	98	100341	92704
APR-JUL	67962	77684	97	87790	79855
APR-AUG	74583	85824	98	94768	87532
JAN-JUL	87352	99676	98	112633	101368

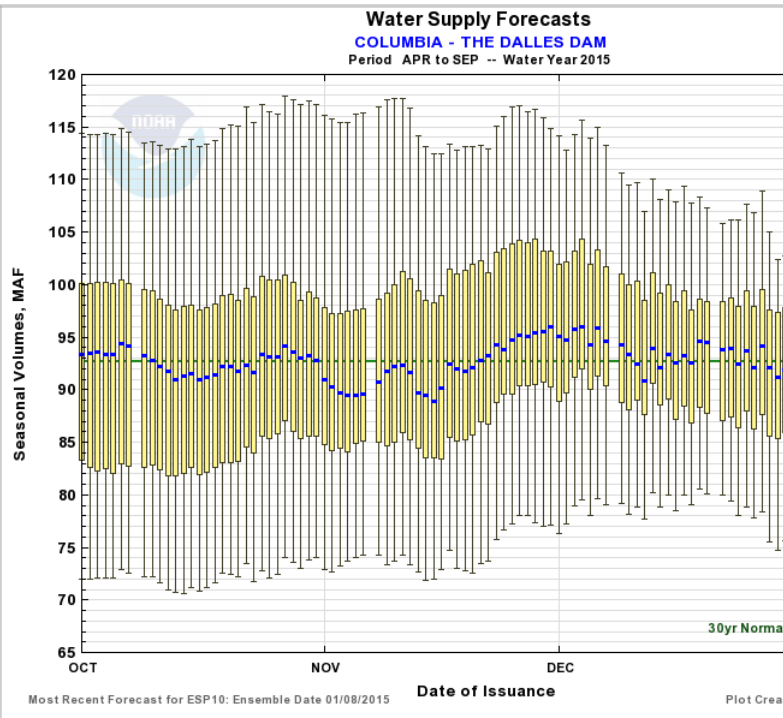
☐ 5 days QPF: Ensemble: 2015-01-08 Issued: 2015-01-08

APR-SEP	78583	92499	100	104371	92704
APR-JUL	66602	79252	99	90246	79855
APR-AUG	73127	87324	100	98532	87532
JAN-JUL	85983	102646	101	116983	101368

☐ 0 days QPF: Ensemble: 2015-01-08 Issued: 2015-01-08

APR-SEP	79515	96716	104	107668	92704
APR-JUL	68390	82516	103	94489	79855
APR-AUG	75208	91464	104	102494	87532
JAN-JUL	89801	104553	103	120948	101368

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



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

Overlay
☒ ESP10 ☐ ESP5 ☐ ESP0

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SNAKE - LOWER GRANITE DAM (LGDW1) Forecasts for Water Year 2015

Official Forecast

10 days QPF: Ensemble: 2015-01-08 Issued: 2015-01-08

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	17309	22861	103	26504	22279
APR-JUL	15197	20299	102	23888	19848
APR-AUG	16301	21580	102	25272	21091
JAN-JUL	21838	27211	99	32960	27440

5 days QPF Ensemble: 2015-01-08 Issued: 2015-01-08

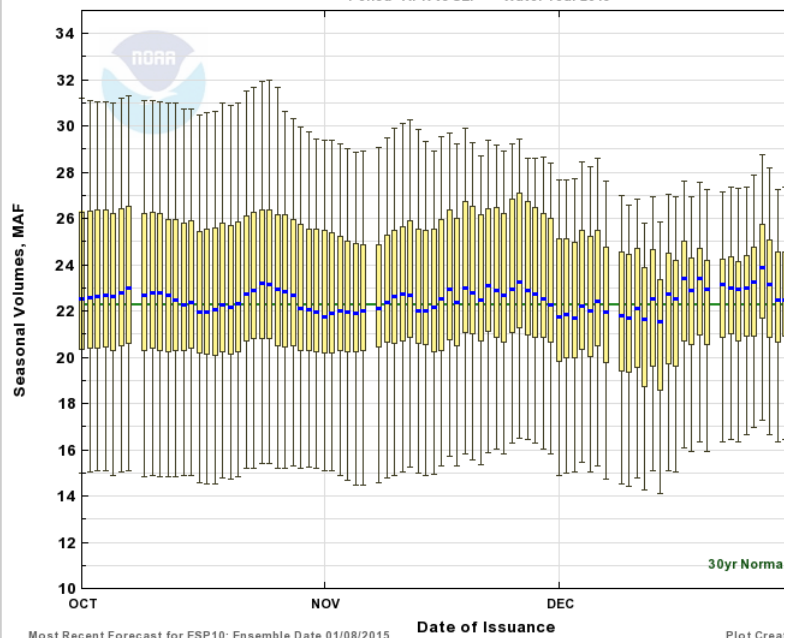
APR-SEP	17273	23353	105	28272	22279
APR-JUL	15188	20760	105	25345	19848
APR-AUG	16280	22139	105	26933	21091
JAN-JUL	21560	27621	101	34075	27440

0 days QPF Ensemble: 2015-01-08 Issued: 2015-01-08

APR-SEP	17708	24296	109	29092	22279
APR-JUL	15720	21822	110	26315	19848
APR-AUG	16732	23116	110	27784	21091
JAN-JUL	22162	28600	104	35237	27440

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

Water Supply Forecasts SNAKE - LOWER GRANITE DAM Period APR to SEP -- Water Year 2015



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

Overlay

ESP10

ESP5

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Libby : January Runoff Forecast & Flood Control Calculation**WY 2015****Runoff Forecast and Flood Control****Most Probable Runoff Volume:****Apr-Aug****6297****KAF****Apr-Jul****5716****KAF****May-Jul****5158****KAF****31-Jan Flood Control Space****2037****KAF****31-Jan Flood Control Elevation****2410.0****ft**1981-2010
AveragePercent of
Average1929-2008
AveragePercent of
Average

5885

107%

6282

100%

5342

107%

5720

100%

4821

107%

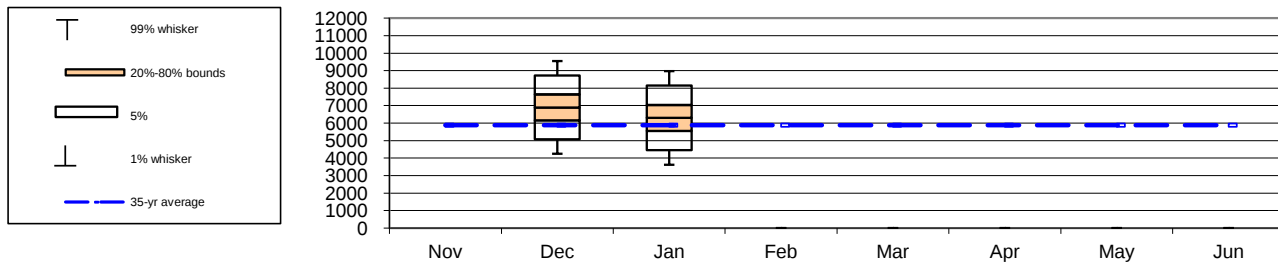
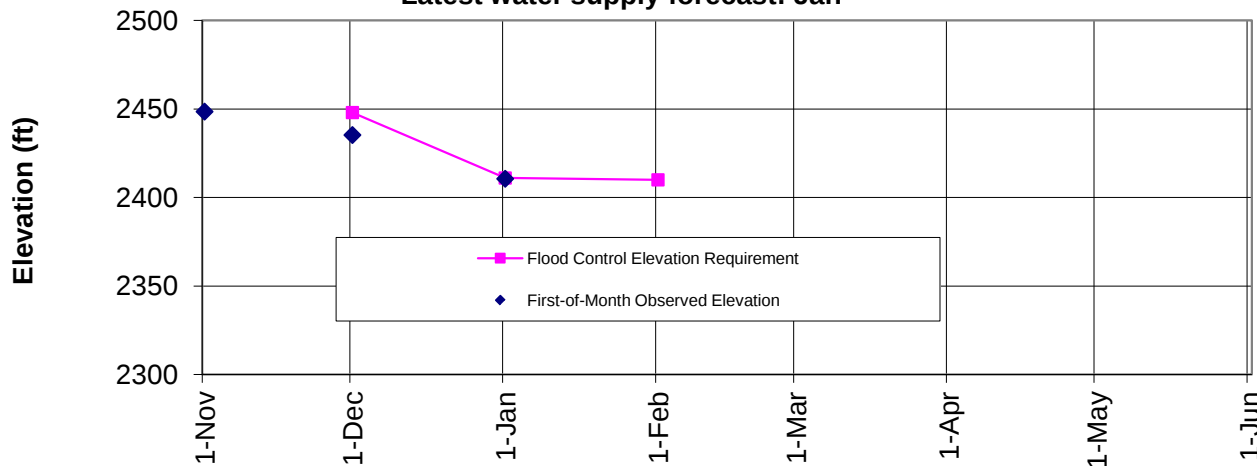
5199

99%

Seasonal Flood Control**VARQ Flood Control Implemented**

Forecast Date >>	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Aug Runoff Forecast		6899	6297					
First-of-Month Elev	2448.5	2435.3	2410.6					

Date >>	30-Nov	31-Dec	31-Jan	28-Feb	15-Mar	31-Mar	15-Apr	30-Apr
Flood Control Space	500	2000	2037					
Flood Control Elevation	2448.0	2411.0	2410.0					

Spread of values around expected forecast**Libby Flood Control Elevations - 2015****Latest water supply forecast: Jan****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, 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 : January 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	Σ Jun:Jul		0.00		95.3	0.0
Eureka RS, MT	Σ Oct,Nov,Dec Prcp	inches	4.19	123%	141.7	593.9
West Glacier, MT	Σ Oct,Nov,Dec Prcp	inches	12.48	139%	58.4	729.1
Cranbrook A, BC	Σ Oct,Nov,Dec Prcp	inches	108.50	119%	4.6	496.9
Fernie, BC	Σ Oct,Nov,Dec Prcp	inches	494.90	136%	1.2	593.9
Hawkins Lake, MT	1-Jan SWE	inches				0.0
Stahl Creek, MT	1-Jan SWE	inches	15.10	93%	34.6	522.9
East Creek, BC	1-Jan SWE	inches				0.0
Moyie Mountain, BC	1-Jan SWE	inches	131.00	73%	1.6	207.6
Sunshine Village, AB	1-Jan SWE	inches	200.00	73%	2.1	428.0
Akamina Pass, AB	1-Jan SWE	inches				0.0
South Racehorse Creek, AB	1-Jan SWE	inches				0.0
Intercept			1		2724.4	2724.4
1-Jan Forecast (KAF)					Σ	6296.8

Data used in Libby Water Supply Forecast

WY
WY
2015
Jul-05

Climate Data	Jan-14	Feb-14	Mar-14	Jun-14	Jul-14	Oct-14	Nov-14	Dec-14	Jan-15
SOI				0.20	-0.20				
Precipitation Data	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Units
Eureka RS, MT	0.55	2.42	1.22						inch
West Glacier, MT	2.64	5.77	4.07						inch
Cranbrook A, BC	29.40	53.60	25.50						mm
Fernie, BC	126.90	273.00	95.00						mm
Snow Water Equiv	1-Jan			1-Feb	1-Mar	1-Apr	1-May	1-Jun	Units
Hawkins Lake, MT									inch
Stahl Creek, MT			15						inch
East Creek, BC									mm
Moyie Mountain, BC			131						mm
Sunshine Village, AB			200						mm
Akamina Pass, AB									mm
South Racehorse Creek, AB									mm
Streamflow	Jan			Feb	Mar	Apr	May	Jun	Units
Libby Inflow Volume									KAF
Reservoir Elevation	1-Nov	1-Dec	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun	Units
Libby FOM Elev	2448.5	2435.3	2410.6						feet

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Northwestern Division

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

*Libby Dam official water supply forecasts computed by the Corps Seattle District (on previous pages).

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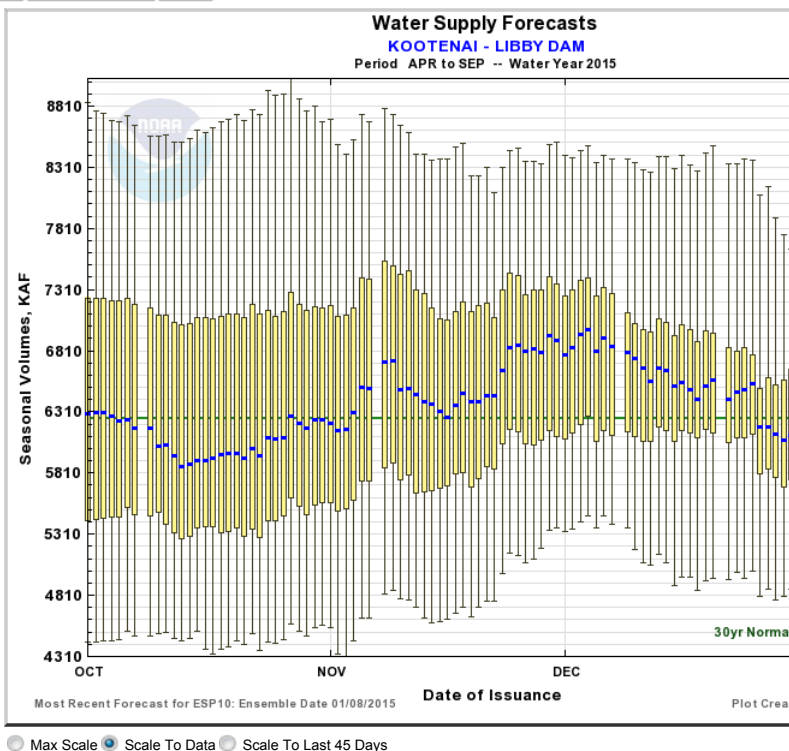
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KOOTENAI - LIBBY DAM (LYDM8) Forecasts for Water Year 2015					
Official Forecast					
10 days QPF: Ensemble: 2015-01-08 Issued: 2015-01-08					
Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	4933	5914	95	7158	6254
APR-JUL	4177	5074	95	6204	5342
APR-AUG	4648	5568	95	6828	5885
JAN-JUL	4799	5776	96	6878	6002
5 days QPF: Ensemble: 2015-01-08 Issued: 2015-01-08					
APR-SEP	4869	6018	96	7346	6254
APR-JUL	4137	5162	97	6390	5342
APR-AUG	4594	5678	96	6980	5885
JAN-JUL	4848	5826	97	7095	6002
0 days QPF: Ensemble: 2015-01-08 Issued: 2015-01-08					
APR-SEP	4963	6281	100	7951	6254
APR-JUL	4268	5327	100	6746	5342
APR-AUG	4681	5929	101	7472	5885
JAN-JUL	4968	6033	101	7516	6002

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ESP5
ESP0

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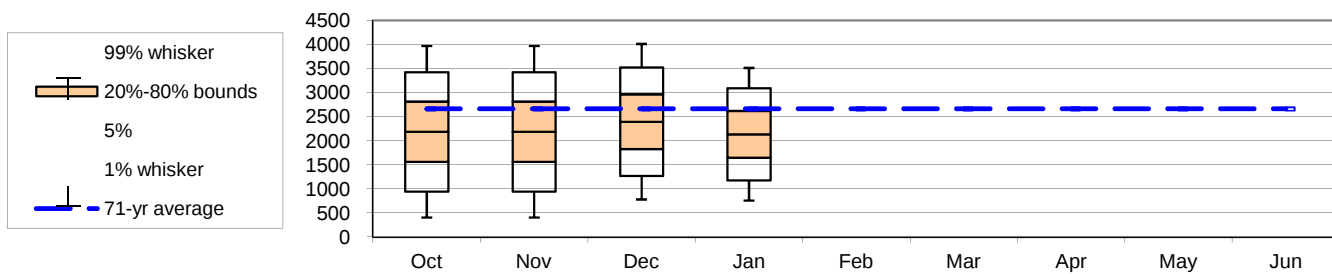
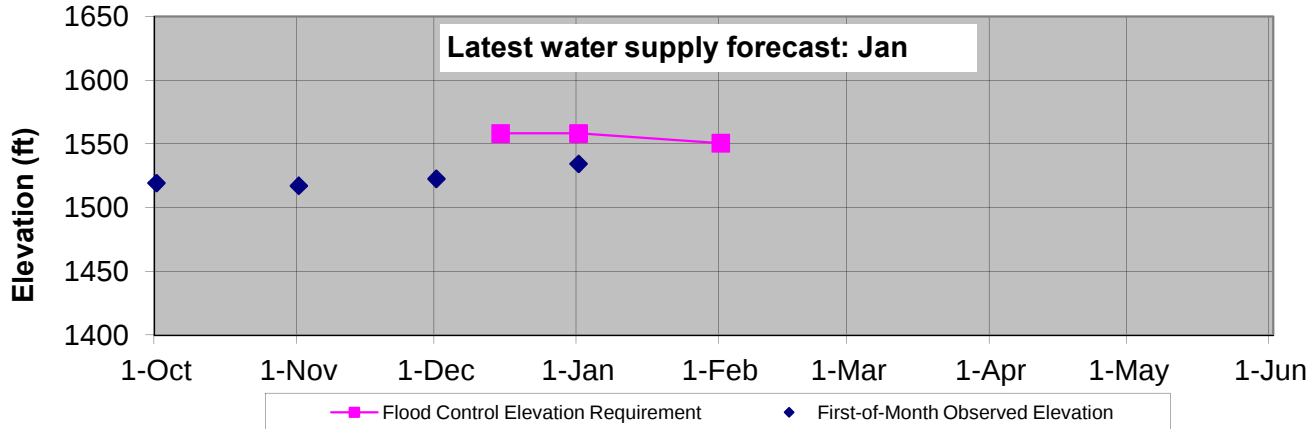
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Dworshak : January Runoff Forecast & Flood Control Calculation**WY 2015**

Runoff Forecast and Flood Control						units	1981-2010 Average	Percent of Average	1929-2010 Average	Percent of Average
Most Probable Runoff Volume		Apr-Jul	2136	KAF		2438	88%	2663	80%	
		May-Jul	1514	KAF		1784	85%	1953	78%	
31-Jan Flood Control Space			811	KAF						
31-Jan Flood Control Elevation			1550.6	ft						
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	2189	2189	2398	2136						
First-of-Month Elev	1519.4	1517.2	1522.7	1534.4						
Date >>		15-Dec	31-Dec	31-Jan	28-Feb	31-Mar	15-Apr	30-Apr		
Flood Control Space	--	700	700	811						
Flood Control Elevation	--	1558.2	1558.2	1550.6						

Spread of values around expected forecast

**Dworshak Flood Control Elevations - 2015****Notes:**

1. The given forecast is the official Corps of Engineers forecast for Dworshak. If you have any questions please contact Jeremy Giovando (509 527 7053), or Steve Hall (509 527 7550).
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 control space is fixed at 700 KAF.

Dworshak : January 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
SOI	Sep	-0.70		355.71	-249.0
HQSI Cumulative Precip	Oct-Date	15.20	119%	48.12	731.4
Elk Butte SWE	1-Jan	10.50	62%	6.25	65.6
Cool Creek SWE	1-Jan	16.7	77%	9.96	166.3
Hoodoo Basin SWE	1-Jan	14.0	73%	12.22	171.1
Sherwin SWE	1-Jan	1.4	27%	44.69	62.6
Lost Lake SWE	1-Jan	16.1	59%	4.24	68.3
Intercept		1		1119.86	1119.9

1-Jan Forecast (KAF)

Σ 2136.2

Data Station	Sept	Nov	Dec	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun	1-Jul
Climate (Stdzd SOI)										
September SOI	-0.70									
Precipitation (in)	Oct									
Headquarters, ID	2.60	7.10	5.50	--	--	--	--			
Cumulative HQSI Data	2.60	9.70	15.20	--	--	--	--			
Snow Water Equiv (First of Month values) (in)										
Elk Butte, ID				10.5	--	--	--			
Cool Creek, ID				16.7	--					
Hoodoo Basin, MT				14.0	--	--	--	--	--	
Sherwin, ID				1.4	--	--	--			
Shanghi Summit, ID								--	--	
Lost Lake, ID				16.1	--	--	--	--	--	
Hemlock, ID								--	--	
Crater Meadows Mar						--	--			
Streamflow (End of Month) (kaf)				Jan	Feb	Mar	Apr	May	Jun	Jul
Dworshak Inflow				--	--	--	--	--	--	--

Approval:

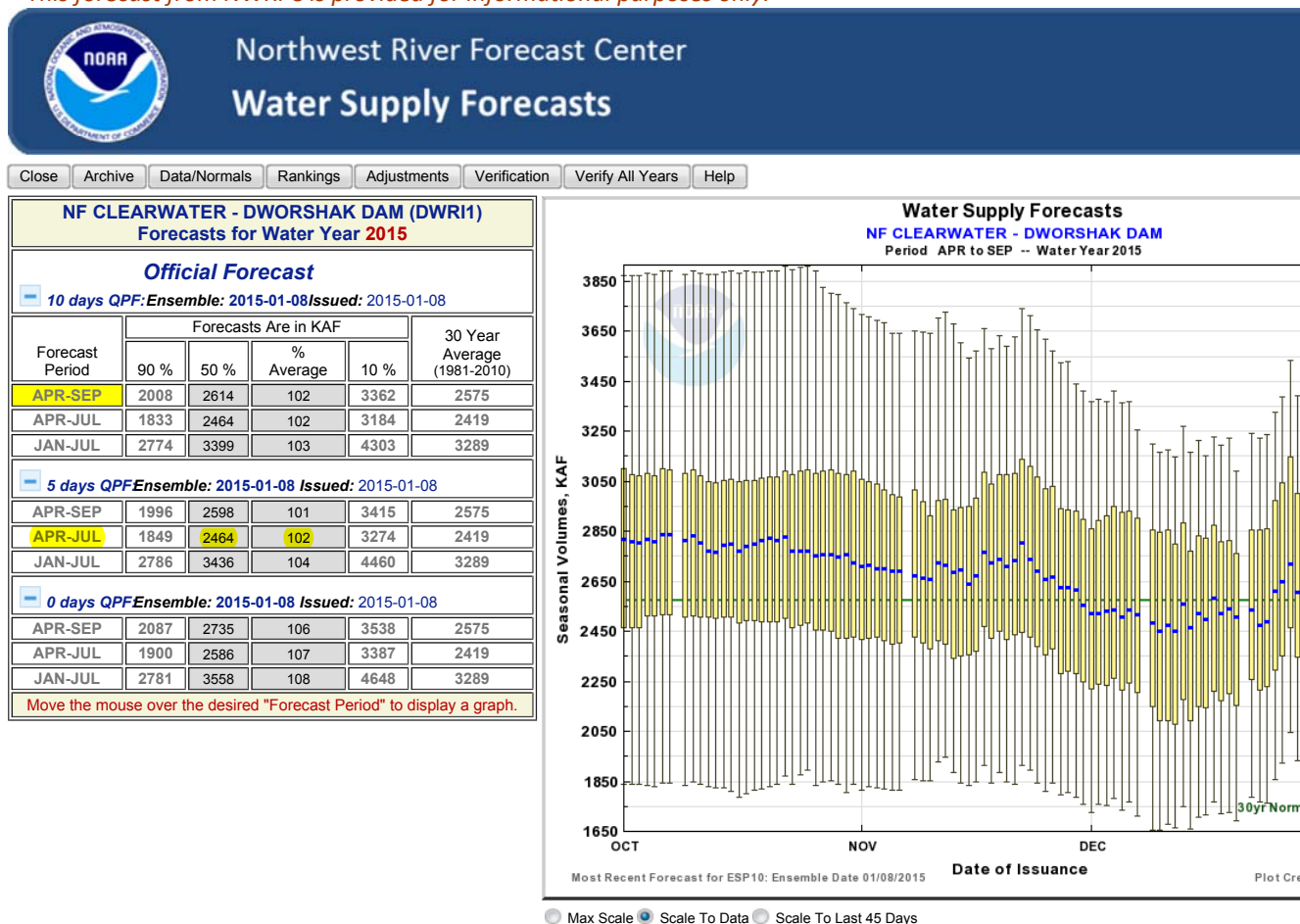
John J. Heitstuman P.E.
Chief Hydrology Section
Walla Walla District USACE

Peter Brooks, P.E., D. WRE
Ch., Hydrologic Engineering and Power Branch
Columbia Basin Water Management Division

* Dworshak Dam official water supply forecasts computed by the Corps Walla Walla District (on previous pages).

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* Grand Coulee Dam water supply forecasts are not used for implementation of BiOp actions.

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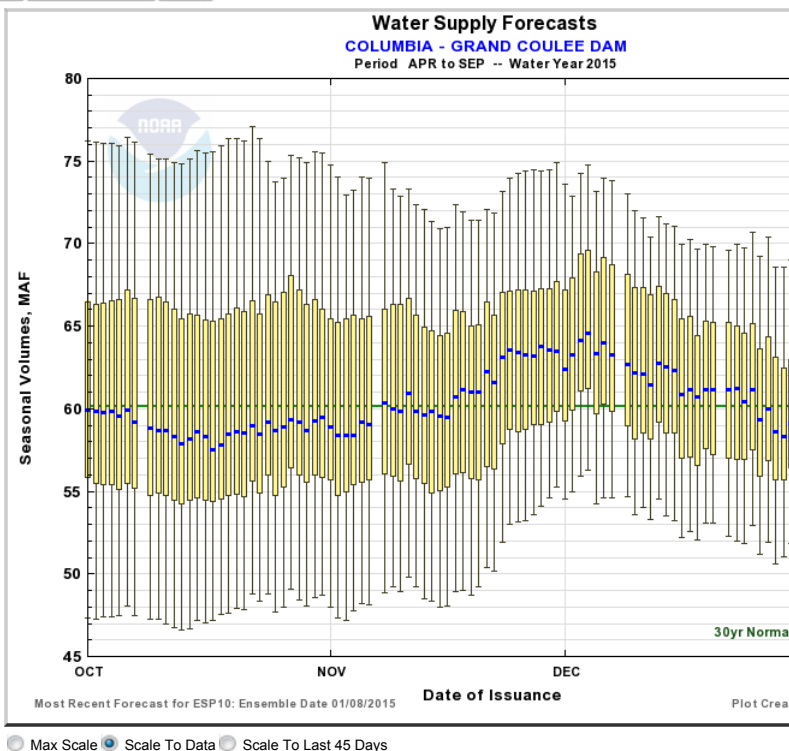
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COLUMBIA - GRAND COULEE DAM (GCDW1)					
Forecasts for Water Year 2015					
Official Forecast					
10 days QPF: Ensemble: 2015-01-08 Issued: 2015-01-08					
Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	53943	58876	98	67530	60110
APR-JUL	44294	49101	96	56671	51015
APR-AUG	49268	55252	97	63444	56763
JAN-JUL	53991	59293	99	66096	59599
5 days QPF Ensemble: 2015-01-08 Issued: 2015-01-08					
APR-SEP	54219	59943	100	69137	60110
APR-JUL	44761	50399	99	58270	51015
APR-AUG	49727	56539	100	64945	56763
JAN-JUL	53986	60140	101	68468	59599
0 days QPF Ensemble: 2015-01-08 Issued: 2015-01-08					
APR-SEP	54432	62165	103	72532	60110
APR-JUL	45868	52618	103	60882	51015
APR-AUG	51304	58669	103	66475	56763
JAN-JUL	54585	62914	106	72890	59599

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Overlay

ESP10

ESP5

ESP0

Data Files

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* Albeni Falls Dam water supply forecasts are not used for implementation of BiOp actions.

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