Northwest River Forecast Center

Water Supply Forecasts

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(TDAO3) THE DALLES
Forecasts for Water Year 2013
Ensemble Date: 2013-03-06 Issue Date: 2013-03-07

Official Forecast with 10 days of QPF

Forecast Period	Forecast Are in KAF 90 %	50 %	% Average	10 %	30 Year Average
APR-SEP	79144	86341	93	95790	92704
APR-JUL	64836	72222	90	82451	79855
APR-AUG	73540	80958	92	90208	87532
JAN-JUL	82215	89675	88	99751	101368

with 3 days of QPF

APR-SEP	78361	86799	94	96712	92704
APR-JUL	64488	72293	91	82574	79855
APR-AUG	73040	80372	92	90927	87532
JAN-JUL	82105	89723	89	100718	101368

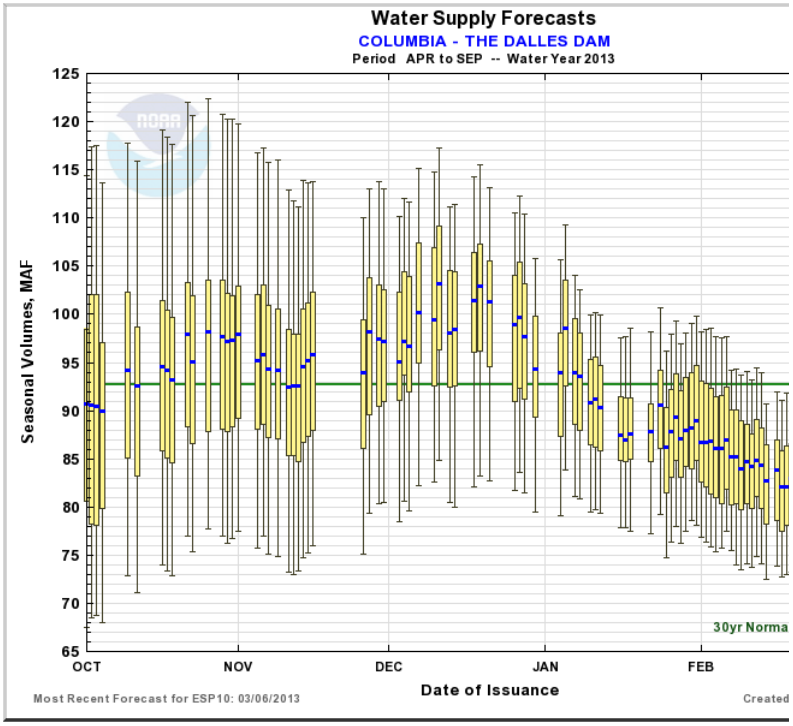
with 0 days of QPF

APR-SEP	77877	86262	93	96489	92704
APR-JUL	64205	71499	90	82456	79855
APR-AUG	72858	80022	91	90784	87532
JAN-JUL	81104	88826	88	100496	101368

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

Overlay: ESP10 | ESP3 | ESP0

Data Files: CSV (ESP10 / APR-SEP)



Max Scale | Scale To Data | Scale To Last 45 Days

Note: Compatible with the latest browsers (Chrome, Firefox, Safari, and Internet Explorer (ie9+)).

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(LGDW1) LOWER GRANITE DAM
Forecasts for Water Year 2013
Ensemble Date: 2013-03-06 Issue Date: 2013-03-07

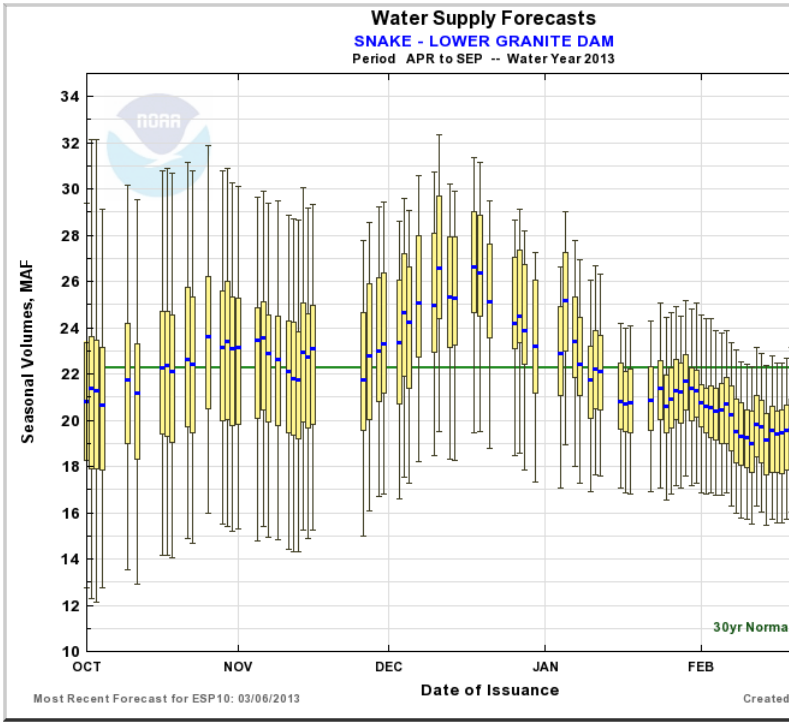
Official Forecast with 10 days of QPF

Forecast Period	Forecast Are in KAF 90 %	50 %	% Average	10 %	30 Year Average
APR-SEP	16414	19092	86	22669	22279
APR-JUL	14121	16612	84	20132	19848
APR-AUG	15326	17965	85	21475	21091
JAN-JUL	19355	21710	79	25486	27440
with 3 days of QPF					
APR-SEP	16839	19838	89	23475	22279
APR-JUL	14550	17236	87	20774	19848
APR-AUG	15728	18571	88	22229	21091
JAN-JUL	19722	22455	82	26294	27440
with 0 days of QPF					
APR-SEP	16901	19987	90	23346	22279
APR-JUL	14569	17477	88	20650	19848
APR-AUG	15785	18795	89	22102	21091
JAN-JUL	19728	22362	81	26016	27440

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

Overlay: ESP10 | ESP3 | ESP0

Data Files: CSV (ESP10 / APR-SEP)



Max Scale | Scale To Data | Scale To Last 45 Days

Note: Compatible with the latest browsers (Chrome, Firefox, Safari, and Internet Explorer (ie9+)).

The official Dworshak Dam water supply forecast is computed by the Corps Walla Walla District on the 5th working day of the month from October-June to manage reservoir refill. See the 2013 Water Management Plan (Table 4) for more info. MAR 07, 2013.

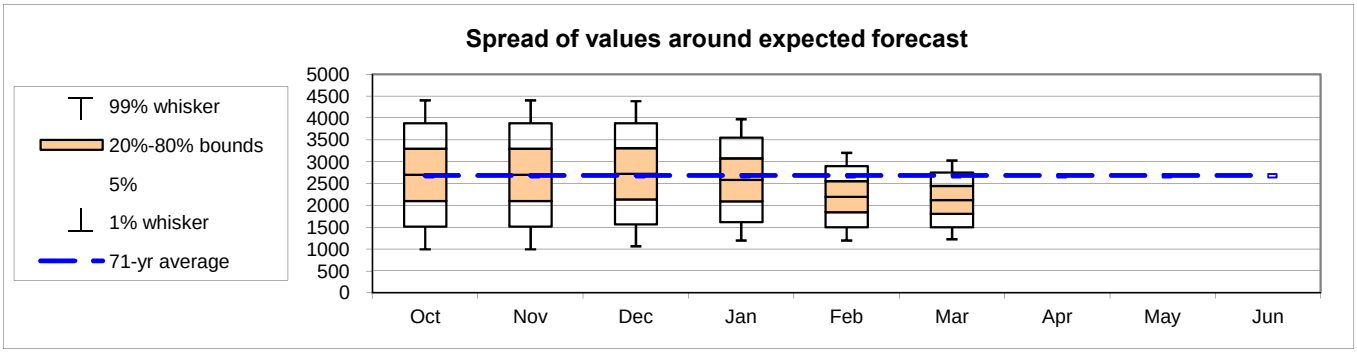
Dworshak : March Runoff Forecast & Flood Control Calculation WY 2013

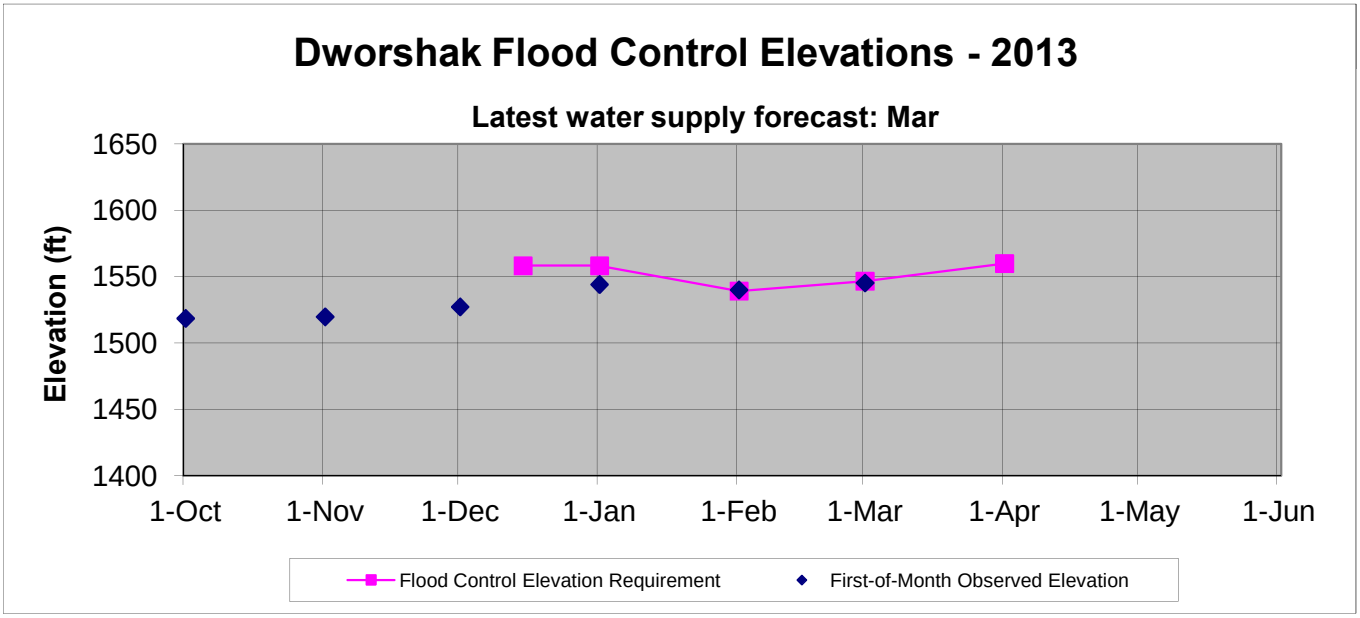
Runoff Forecast and Flood Control				1929-1999 Average	Percent of Average
Most Probable Runoff Volume	Apr-Jul	2128	KAF	2683	79%
	May-Jul	1571	KAF	1980	79%
31-Mar Flood Control Space		675	KAF		
31-Mar Flood Control Elevation		1560.0	ft		

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	2701	2701	2727	2587	2202	2128			
First-of-Month Elev	1518.8	1519.9	1527.3	1544.2	1540.2	1545.3			

Date >>		15-Dec	31-Dec	31-Jan	28-Feb	31-Mar	15-Apr	30-Apr
Flood Control Space	--	700	700	970	867	675		
Flood Control Elevation	--	1558.2	1558.2	1539.2	1546.7	1560.0		





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 : March 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*	0.20		123.33	24.7
Elk Butte SWE	*1-Mar*	25.90	75%	15.95	413.1
Hemlock Butte SWE	*1-Mar*	32.00	79%	15.98	511.4
Hoodoo Basin SWE	*1-Mar*	29.90	78%	15.41	460.8
Pierce SWE	*1-Mar*	6.20	65%	38.57	239.1
DWR January Inflow	*Jan*	158.08	78%	0.860	135.9
DWR February Inflow	*Feb*	162.05	59%	0.220	35.7
Intercept		1		307.66	307.7
	1-Mar Forecast (KAF)			∑	2128.3

Data Station	*Sept*	*Nov*	*Dec*	*1-Jan*	*1-Feb*	*1-Mar*	*1-Apr*	*1-May*	*1-Jun*	*1-Jul*
Climate (Stdzd SOI)										
September SOI	0.20									
Precipitation (monthly depth, inches)										
Headquarters, ID		5.30	6.30							
Snow Water Equiv (first of month SWE depth, inches)										
Elk Butte, ID				12.6	21.0	25.9	--	--	--	
Hemlock Butte, ID				15.1	25.6	32.0	--	--	--	
Hoodoo Basin, MT				17.2	23.8	29.9	--	--	--	
Pierce RS,ID				1.9	5.6	6.2				
Shanghi Summit, ID							--	--		
Lost Lake, ID								--	--	
Streamflow (monthly volume, KAF)				Jan	Feb	Mar	Apr	May	Jun	Jul
Dworshak Inflow				158	162	--	--	--	--	--

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

Northwest River Forecast Center

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(GCDW1) GRAND COULEE DAM
Forecasts for Water Year 2013
Ensemble Date: 2013-03-05 Issue Date: 2013-03-06

Official Forecast with 10 days of QPF

Forecast Period	Forecast Are in KAF				30 Year Average
	90 %	50 %	% Average	10 %	
APR-SEP	51652	57929	96	63894	60110
APR-JUL	42530	46945	92	53549	51015
APR-AUG	48298	53683	95	60266	56763
JAN-JUL	49816	54403	91	61188	59599

with 3 days of QPF

APR-SEP	51671	57800	96	64684	60110
APR-JUL	42308	47408	93	54484	51015
APR-AUG	48437	53967	95	61007	56763
JAN-JUL	49498	54598	92	62435	59599

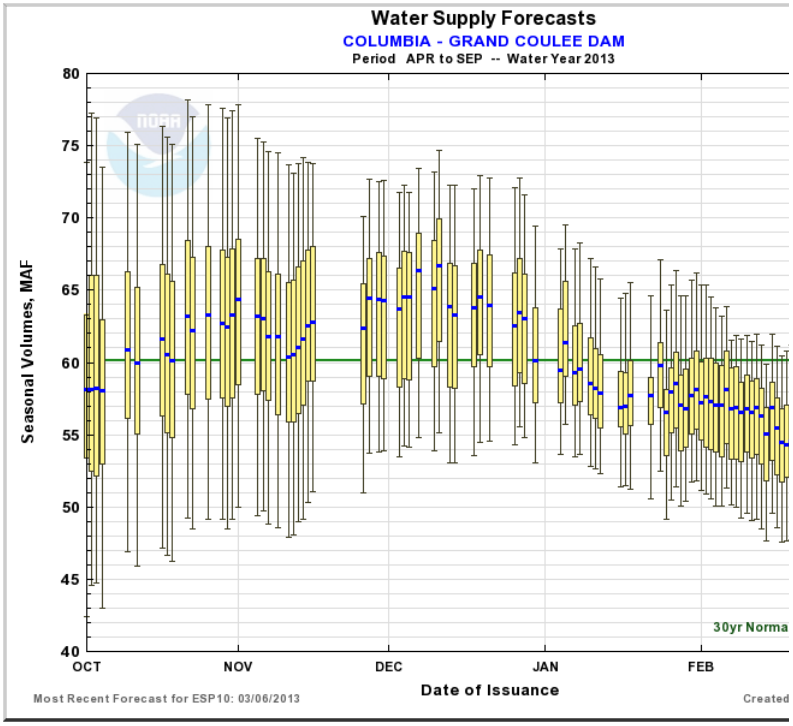
with 0 days of QPF

APR-SEP	51481	57503	96	64627	60110
APR-JUL	42284	46879	92	54407	51015
APR-AUG	48425	53344	94	60771	56763
JAN-JUL	49706	54675	92	62342	59599

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

Overlay: ESP10 | ESP3 | ESP0

Data Files: CSV (ESP10 / APR-SEP)



Max Scale | Scale To Data | Scale To Last 45 Days

Note: Compatible with the latest browsers (Chrome, Firefox, Safari, and Internet Explorer (ie9+)).

The official Libby Dam water supply forecast is computed by the Corps Seattle District. The MARCH final forecast of April-August runoff volume is used to set VARQ flood control targets. See the 2013 Water Management Plan (Table 4) for more info. MAR 07, 2013.

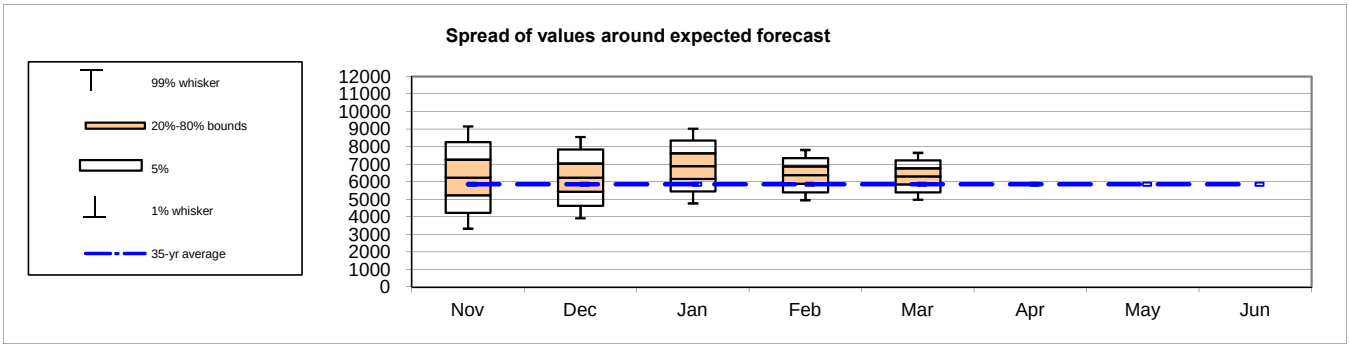
Libby : March Runoff Forecast & Flood Control Calculation WY 2013

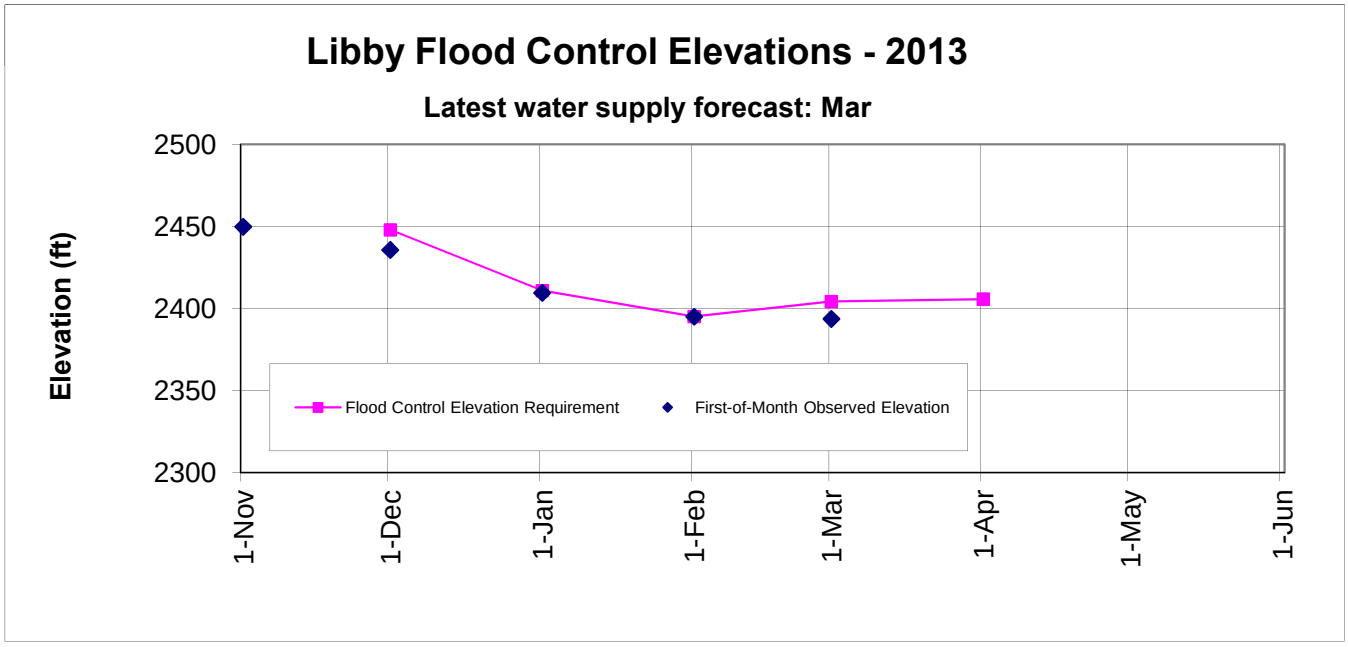
Runoff Forecast and Flood Control				1975-2009 Average	Percent of Average	1929-1999 Average	Percent of Average
Most Probable Runoff Volume:	Apr-Aug	6315	KAF	5865	108%	6337	100%
	Apr-Jul	5710	KAF	5303	108%	5771	99%
	May-Jul	5165	KAF	4797	108%	5247	98%
31-Mar Flood Control Space		2186	KAF				
31-Mar Flood Control Elevation		2405.8	ft				

Seasonal Flood Control — VARQ Flood Control Implemented

Forecast Date >>	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Apr-Aug Runoff Forecast	6245	6238	6898	6384	6315			
First-of-Month Elev	2449.9	2435.7	2409.7	2395.1	2393.8			

Date >>	30-Nov	31-Dec	31-Jan	28-Feb	31-Mar	30-Apr
Flood Control Space	500	2000	2534	2238	2186	
Flood Control Elevation	2448.0	2411.0	2395.2	2404.3	2405.8	





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.
3. Extreme observed precipitation in October was reduced so that the forecast would reflect realistic physical conditions. Observed values for October were replaced with average values + 1/2 standard deviation from the forecast training period (1975-2010).
4. Previous Water Supply Forecasts included flood control elevations for March 15 and April 15. As of the current update to the Libby Water Control Manual , there are no longer any flood control elevations associated with these mid-month dates.

Libby : March 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
QBO	*∑Jan:Mar*		-48.06		-10.2	490.5
Eureka, MT	*∑Oct:Feb Prcp*	*inches*	3.73	75%	68.6	256.0
Libby 1 NE RS, MT	*∑Oct:Feb Prcp*	*inches*	10.03	111%	51.5	516.7
West Glacier, MT	*∑Oct:Feb Prcp*	*inches*	16.12	112%	33.7	543.5
Fernie, BC	*∑Oct:Feb Prcp*	*inches*	22.65	89%	11.5	260.3
Floe Lake, BC	*1-Mar SWE*	*inches*	23.78	102%	6.4	151.8
Sunshine Village, AB	*1-Mar SWE*	*inches*	16.38	89%	17.8	291.7
East Creek, BC	*1-Mar SWE*	*inches*	25.00	87%	4.8	119.0
Stahl Peak, MT	*1-Mar SWE*	*inches*	25.20	87%	15.2	384.0
Gardiner Creek, AB	*1-Mar SWE*	*inches*	21.26	117%	13.2	279.8
Three Isle Lake, AB	*1-Mar SWE*	*inches*	13.35	87%	26.1	348.6
Lost Creek South, AB	*1-Mar SWE*	*inches*	21.54	112%	14.7	316.4
Morrissey Ridge, BC	*1-Mar SWE*	*inches*	20.24	89%	18.6	376.4
Hawkins Lake, MT	*1-Mar SWE*	*inches*	22.20	110%	22.8	506.9
Intercept			1		1473.3	1473.3
	1-Mar Forecast (KAF)				∑	6315.1

Data used in Libby Water Supply Forecast

WY Jul-05

Climate Data	*Jan-12*	*Feb-12*	*Mar-12*	*Jun-12*	*Jul-12*	*Oct-12*	*Nov-12*	*Dec-12*	*Jan-13*
SOI				-0.40	0.00				
QBO	-16.07	-15.25	-16.74						
PNA						-1.13	-1.06	-1.31	0.05
Precipitation Data	***Oct***	***Nov***	***Dec***	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***Units***
Eureka, MT	1.24	0.76	1.21	0.31	0.21				inch
Libby 1 NE RS, MT	1.94	2.52	4.39	0.91	0.27				inch
West Glacier, MT	3.06	4.59	4.51	1.92	2.04				inch
Fernie, BC	136.60	153.20	186.00	54.00	45.50				mm
Snow Water Equiv			***1-Jan***	***1-Feb***	***1-Mar***	***1-Apr***	***1-May***	***1-Jun***	***Units***
Floe Lake, BC			429	532	604				mm
Sunshine Village, AB			319	370	416				mm
East Creek, BC			459	533	635				mm
Stahl Peak, MT			14	20	25				inch
Gardiner Creek, AB			365	479	540				mm
Three Isle Lake, AB			249	294	339				mm
Lost Creek South, AB			355	452	547				mm
Morrissey Ridge, BC			331	428	514				mm
Hawkins Lake, MT			14	19	22				inch
Streamflow			***Jan***	***Feb***	***Mar***	***Apr***	***May***	***Jun***	***Units***
Libby Inflow Volume			213.0	179.9					KAF
Reservoir Elevation	***1-Nov***	***1-Dec***	*1-Jan*	*1-Feb*	*1-Mar*	*1-Apr*	*1-May*	*1-Jun*	***Units***
Libby FOM Elev	2449.9	2435.7	2409.7	2395.1	2393.8				feet

Peter F. Brooks, P.E., D. WRE
Ch., Hydrologic Engineering and Power Branch

Joel M. Fenolio, P.E.
Upper Columbia Senior Water Manager

Northwest River Forecast Center

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(ALFW1) ALBENI FALLS DAM
Forecasts for Water Year 2013
Ensemble Date: 2013-03-06 Issue Date: 2013-03-07

Official Forecast with 10 days of QPF

Forecast Period	Forecast Are in KAF				30 Year Average
	90 %	50 %	% Average	10 %	
APR-SEP	9674	11009	86	12822	12815
APR-JUL	8854	9985	85	11691	11777
APR-AUG	9315	10518	85	12344	12354
JAN-JUL	10903	12050	85	13695	14189

with 3 days of QPF

APR-SEP	9706	10993	86	12959	12815
APR-JUL	8889	9997	85	11869	11777
APR-AUG	9333	10538	85	12501	12354
JAN-JUL	11063	12121	85	13957	14189

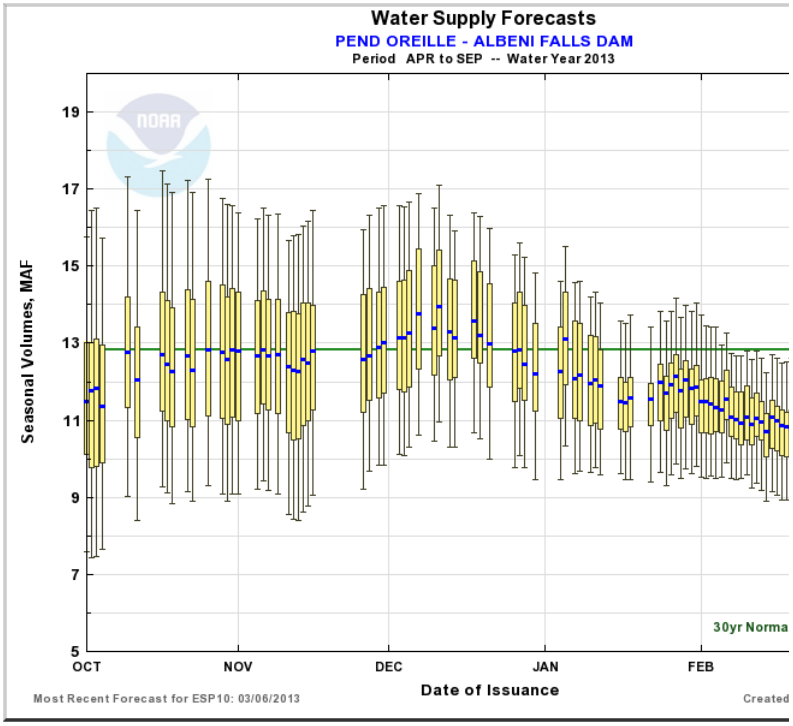
with 0 days of QPF

APR-SEP	9564	11000	86	12791	12815
APR-JUL	8717	9920	84	11728	11777
APR-AUG	9193	10501	85	12331	12354
JAN-JUL	10895	11950	84	13900	14189

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

Overlay: ESP10 | ESP3 | ESP0

Data Files: CSV (ESP10 / APR-SEP)



Max Scale | Scale To Data | Scale To Last 45 Days

Note: Compatible with the latest browsers (Chrome, Firefox, Safari, and Internet Explorer (ie9+)).

MARCH 06, 2013
The official Hungry Horse Dam water supply forecast is computed by the Bureau of Reclamation on the 5th working day of the month from January-June.

The MARCH final forecast of the *April-August* runoff volume is used to set minimum flows at Hungry Horse and Columbia Falls, and the forecast for *May-Sept* runoff volume is used to set VARQ flood control targets. See the 2013 Water Management Plan (Table 4) for more info.

Here are the volumes for the March final forecast for Hungry Horse Inflow.

- Mar – Jul: 2,030 kaf (103%)
- Apr – Aug: 1,994 kaf (103%)
- May – Sep: 1,743 kaf (103%)
- Jan - Jul: 2,154 kaf (103%)

The minimum flows for Columbia Falls and below Hungry Horse are as follows:

- Columbia Falls: 3500 cfs
- Hungry Horse: 900 cfs

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John Roache, Civil Engineer
River and Reservoir Operations
U.S. Bureau of Reclamation
PN Regional Office, Boise, ID