Blackfoot Water Supply Report
April 1st, 2016

Montana Water Supply Report as of April 1st, 2016 (from NRCS):
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/mt/snow/waterproducts/basin/?cid=stelprdb1237267

Overview:

Over the last month almost all river basins in the state of Montana have seen an increase in snowpack percentages, and it couldn't be more welcomed after last year's disappointing snowpack left rivers well below average in most locations. March snow totals west of the Divide increased in all basins except the Upper Clark Fork (-1%) and all river basins are only slightly below normal for snow water equivalent on April 1st. The largest gains in the northwest part of the state were in the Lower Clark Fork which saw an improvement of 11% over the month.

East of the Divide the snowpack continues to do well in the southwest and central part of the state, while north central river basins continue to suffer from below normal snowpack for April 1st. The Jefferson River basin currently has the highest snowpack in the state in terms of percentage of normal at 111%, other southwestern and central basins improved through the month and remain near to slightly above normal on April 1st. Northern basins east of the Divide in the Front Range continued to be overlooked by the approaching storms and basin-wide snowpack remains near record low for this date at SNOTEL measurement locations. This area tends to be favored during the spring, but things will quickly need to change in order for recovery to occur before spring runoff.

Southern basins along the Montana/Wyoming border made substantial recoveries during the end of the month when a "closed low" dropped 2 to 3" of snow water in the mountains of Montana, and up to 5" of snow water in Wyoming basins. These events which typically happen in the spring can drop substantial amounts of precipitation in a short amount of time and can be game changers for water users in the basin. The Upper and Lower Yellowstone sub-basins all improved mostly due to this one storm, and in some areas went from record low snowpack to near average in a few days.

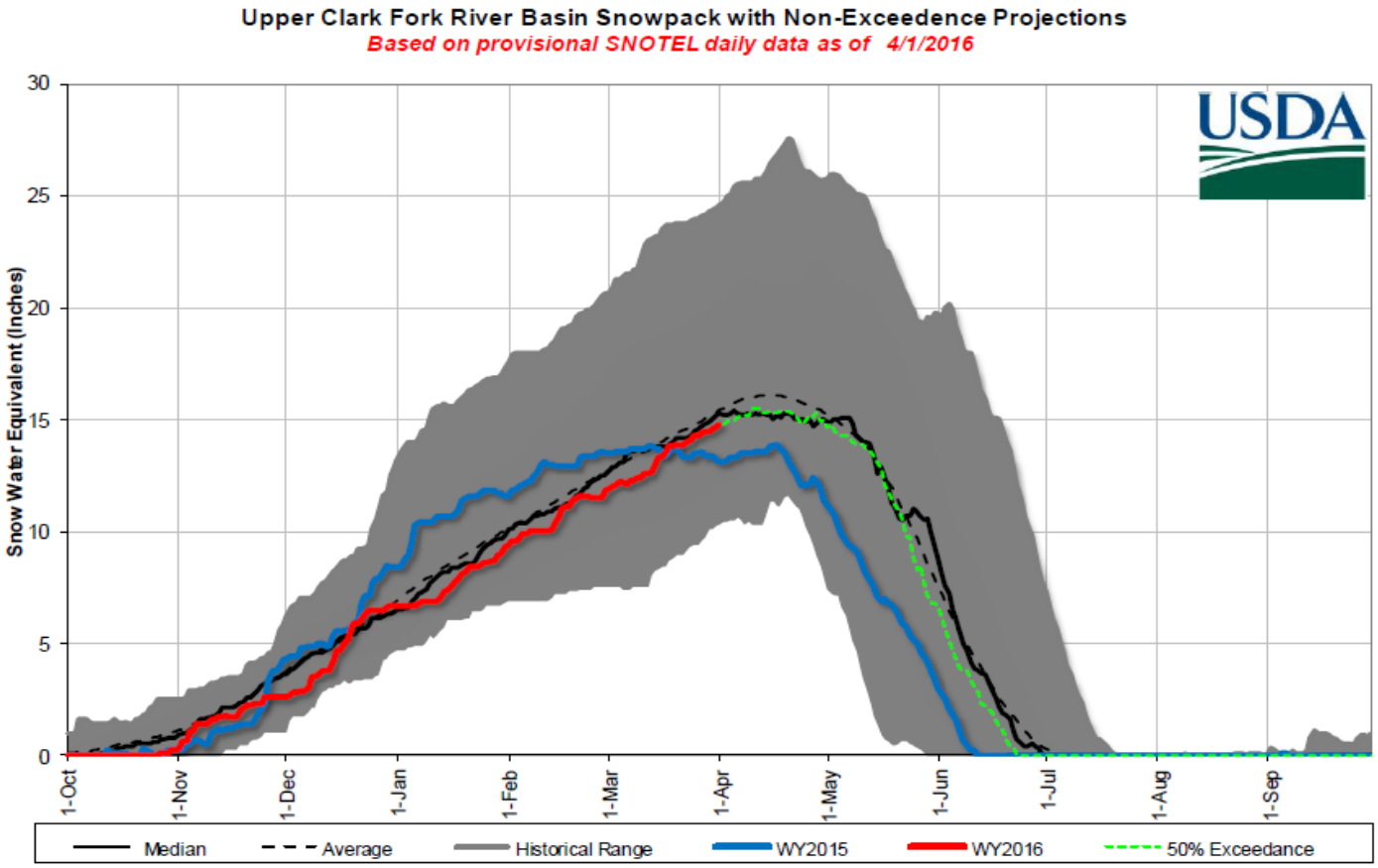
So far the strongest "El Nino" signal we have seen this year is the above average temperatures we have experienced under high pressure ridging between storm systems. The warm temperatures have caused the low elevation snowpack to transition to melt and mid elevations are starting to follow this trend. Snowpack in most river basins typically peaks during the month of April or early May depending on elevation and location, and we hope to add some more snow water to the mountains before runoff occurs. If the warm temperatures persist the snowpack at mid to low elevations may move ahead of schedule this year. More seasonal temperatures and additional snowfall would be welcome to help prolong our mountain snowpack reservoir into summer.

Upper Clark Fork Overview:

Snow trickled in relatively consistently in March in the Upper Clark Fork and the basin is currently at near normal conditions, which is slightly better than last year at this time. Last year on April 1st the basin wide snow water content was at 13.1 inches and appeared to have peaked several weeks earlier until a storm brought some much needed moisture. The basin wide snowpack peaked at 13.9 inches on April 17th last year. This year the basin wide snow water content is currently at 14.8 inches and appears to still be accumulating at higher elevations. Rock Creek and Flint Creek have the highest percentage of normal snowpack in the basin at 107% and 101%, while the Blackfoot is the lowest at 88%.

The mid-March precipitation event that swept across most of western Montana wasn't quite as significant in the Upper Clark Fork River basin as it was downstream in the Lower. Peterson Meadows SNOTEL received about 1 inch of precipitation during this event. March basin wide precipitation at SNOTEL sites reached 3.4 inches, which is 0.4 inches more than average. Overall, mountain SNOTEL sites received 106% of average precipitation for the month of March, while valley weather stations received 84% of average precipitation in the Bitterroot River basin.

Upper Clark Fork Basin (See page 11 for graph explanation**)



Snowpack Analysis:

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
CLARK FORK ab FLINT CREEK	13	98	77
FLINT CREEK	5	100	73
ROCK CREEK	4	107	83
CLARK FORK ab BLACKFOOT	20	99	78
BLACKFOOT	13	88	74
UPPER CLARK FORK RIVER BASIN	31	95	77

Reservoir Storage:

Reservoir storage in the Upper Clark Fork River basin is currently at 100% of average.

Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
East Fork Rock Creek Res	8.8	11.0	9.1	15.6
Georgetown Lake	29.4	28.8	27.8	31.0
Lower Willow Creek Reservoir		5.0	3.0	4.9
Nevada Creek Res	6.5	10.9	7.7	12.6
Basin-wide Total	44.7	50.7	44.6	59.2
# of reservoirs	3	3	3	3

Streamflow Forecasts:

Streamflow forecasts are generally near to above average across the basin for the April-July time period with exception of the Blackfoot drainage which is slightly lower. Consult the individual point forecasts at the end of this section for specific point forecasts. Current basin-wide streamflows for the 50 percent exceedance are 96% of average for the April- July time period.

UPPER CLARK FORK RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Little Blackfoot nr Garrison								
	APR-JUL	43	59	70	100%	81	97	70
	APR-SEP	47	64	77	100%	99	107	77
Clark Fork R ab Milltown								
	APR-JUL	325	460	555	105%	645	780	530
	APR-SEP	400	550	655	107%	755	905	615
Nevada Ck nr Helmville								
	APR-MAY	2.3	5.3	7.4	88%	9.5	12.6	8.4
	APR-JUL	4	9.1	12.6	89%	16.1	21	14.2
Blackfoot R nr Bonner								
	APR-JUL	445	550	620	86%	695	800	720
	APR-SEP	505	620	695	87%	775	885	800
Clark Fork R ab Missoula								
	APR-JUL	820	1040	1190	95%	1340	1560	1250
	APR-SEP	960	1200	1360	96%	1520	1770	1420

1) 90% and 10% exceedance probabilities are actually 95% and 5%

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

3) Median value used in place of average

Snow Water Equivalent:

Columbia River Basin SNOTEL Snow/Precipitation Update Report

Based on Mountain Data from NRCS SNOTEL Sites

Provisional data, subject to revision

Data based on the first reading of the day (typically 00:00) for April 11th, 2016

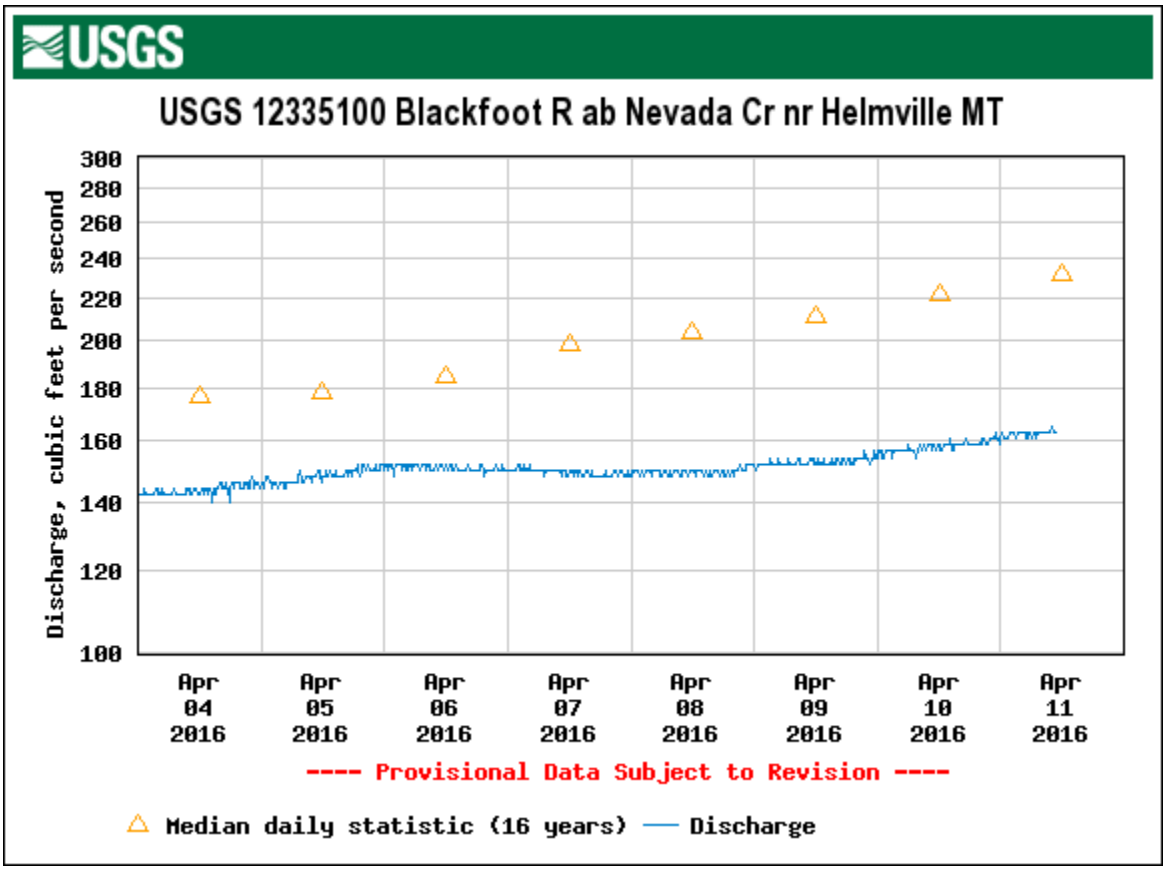
Basin Site Name	Elev (ft)	Snow Water Equivalent			Water Year-to-Date Precipitation		
		Current (in)	Median (in)	Pct of Median	Current (in)	Average (in)	Pct of Average
UPPER CLARK FORK RIVER BASIN							
Barker Lakes	8250	14.1	14.9	95	15.2	16.8	90
Basin Creek	7180	9.8	8.3	118	12.9	10.3	125
Black Pine	7210	6.2	10.0	62	13.1	13.8	95
Combination	5600	0.0	3.6	0	9.8	9.2	107
Copper Bottom	5200	0.0	N/A	*	13.4	15.8	85
Copper Camp	6950	26.1	N/A	*	22.1	31.9	69
Lubrecht Flume	4680	0.0	0.2	0*	10.9	10.4	105
Nevada Ridge	7020	11.3	14.0_C	81	14.1	16.3_C	87
N Fk Elk Creek	6250	8.0	10.5	76	12.0	14.2	85
North Fork Jocko	6330	37.3	42.5	88	48.8	47.6	103
Peterson Meadows	7200	11.0	10.4	106	14.9	12.4	120
Rocker Peak	8000	13.0	13.5	96	12.2	14.4	85
Skalkaho Summit	7250	17.1	22.2	77	20.5	22.8	90
Stuart Mountain	7400	30.0	30.7_C	98	30.2	31.6_C	96
Warm Springs	7800	21.5	20.6	104	21.2	22.9	93
Basin Index (%)		**89**			**93**		

-M = Missing data.
* = Analysis may not provide a valid measure of conditions.
N/A = Not available.
C = Conditional, only 10-19 years of data available.
R = Rough, less than 10 years of data available.

April 11th 2016, USGS Real Time Flow Conditions

USGS Blackfoot River above Nevada Creek Near Helmville

Most recent instantaneous value: 163



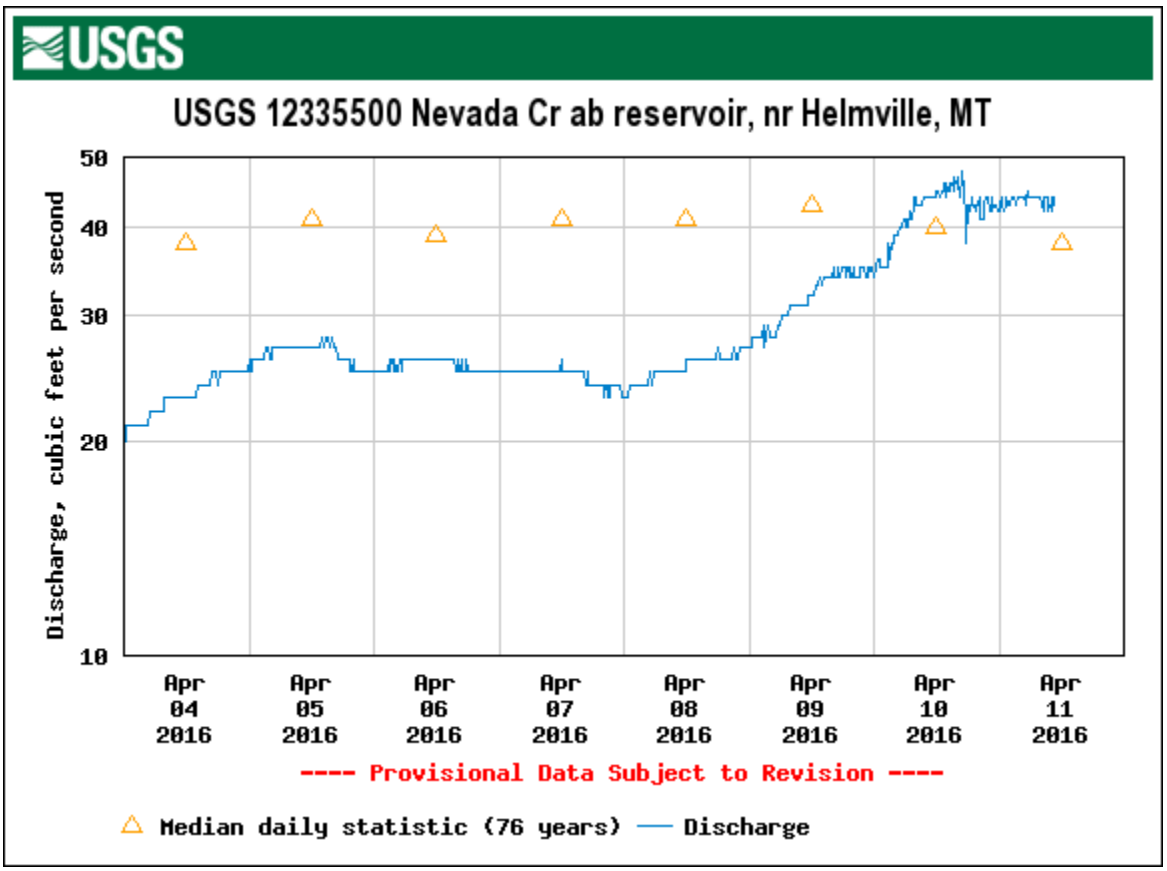
Daily discharge, cubic feet per second -- statistics for Apr 11 based on 16 years of record more

Min (2010)	25th percen-tile	Most Recent Instantaneous Value Apr 11	Median	Mean	75th percen-tile	Max (2015)
117	149	163	232	238	323	444

Nevada Creek

Discharge, cubic feet per second

Most recent instantaneous value: 44



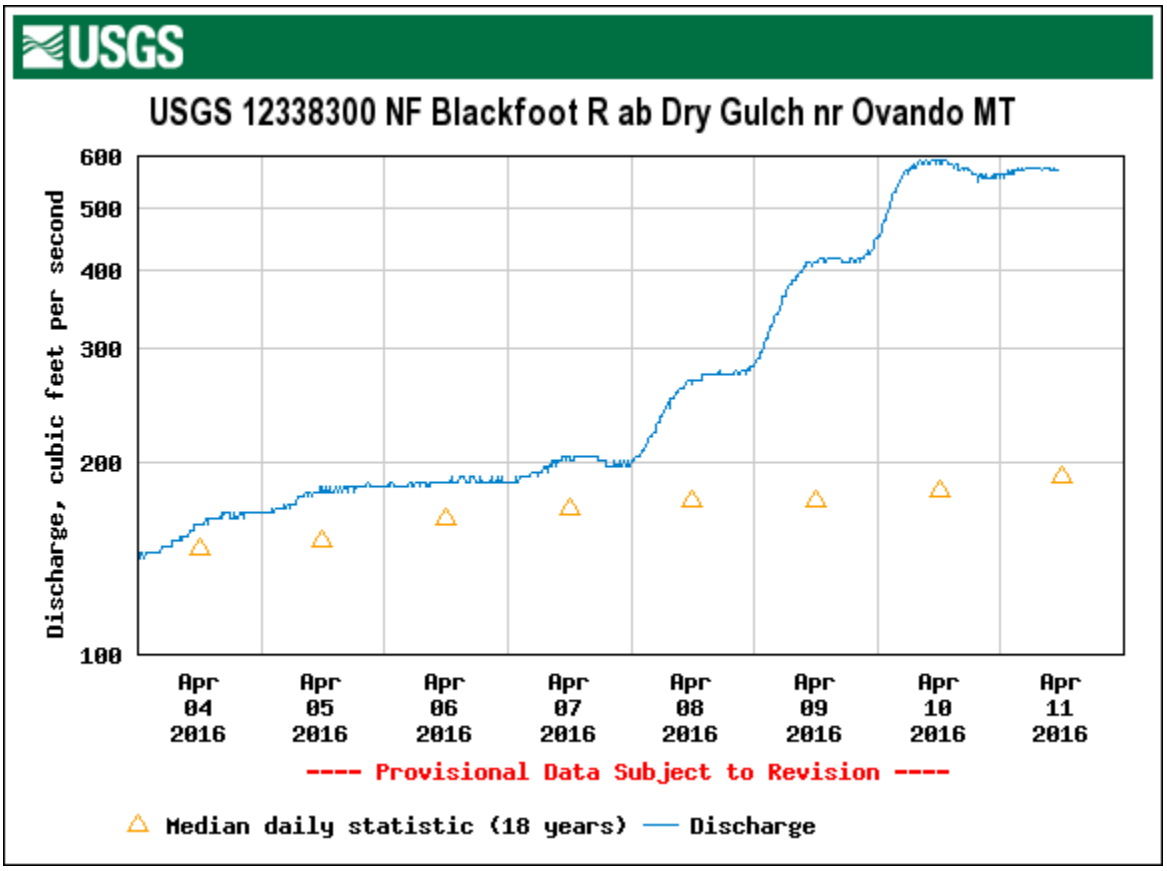
Daily discharge, cubic feet per second -- statistics for Apr 11 based on 76 years of record more

Min (1975)	25th percen-tile	Median	Most Recent Instantaneous Value Apr 11	Mean	75th percen-tile	Max (2009)
12	24	38	44	67	77	395

North Fork Blackfoot

Discharge, cubic feet per second

Most recent instantaneous value: 570



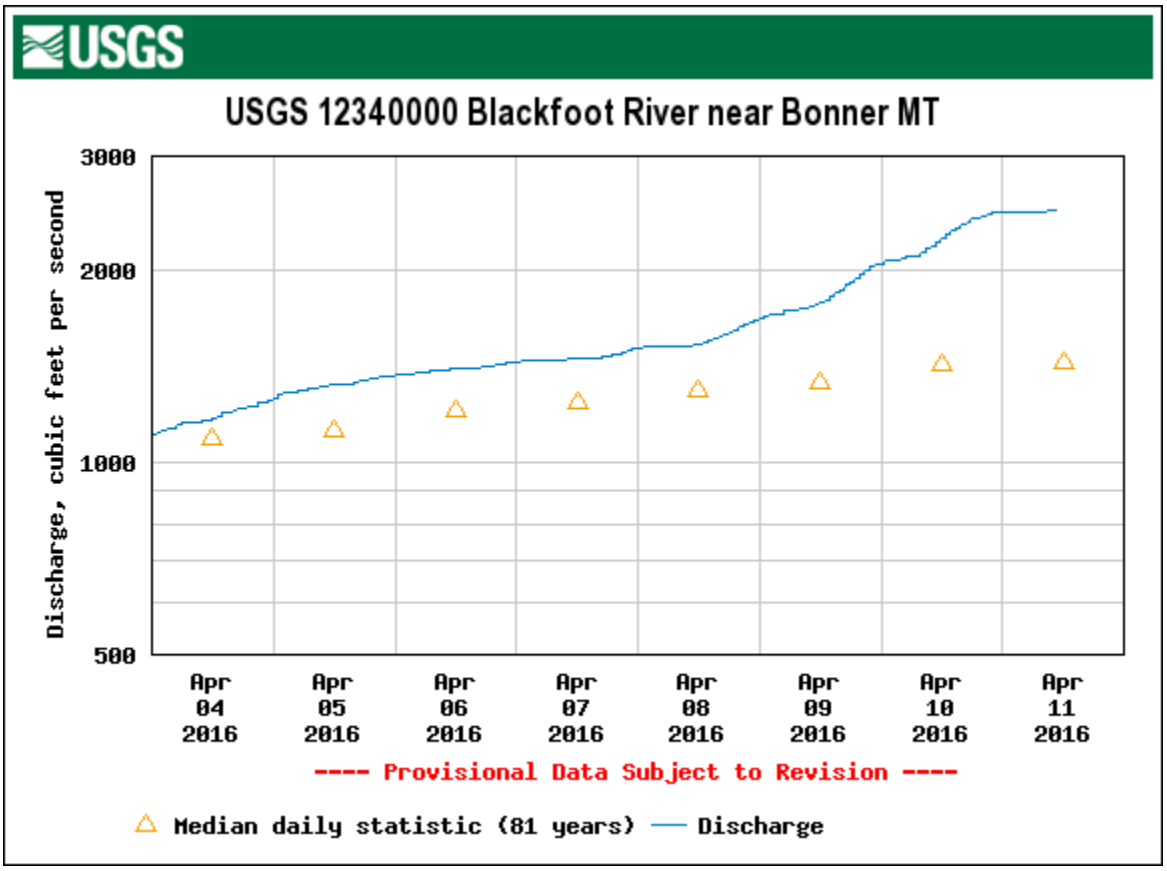
Daily discharge, cubic feet per second -- statistics for Apr 11 based on 18 years of record more

Min (2008)	25th percen-tile	Median	Mean	75th percen-tile	Max (2015)	Most Recent Instantaneous Value Apr 11
82	143	189	214	273	482	570

Blackfoot River at Bonner

Discharge, cubic feet per second

Most recent instantaneous value: 2480



Daily discharge, cubic feet per second -- statistics for Apr 11 based on 81 years of record more

Min (1905)	25th percen-tile	Median	Mean	75th percen-tile	Most Recent Instantaneous Value Apr 11	Max (1996)
415	1030	1430	1750	2280	2480	7360

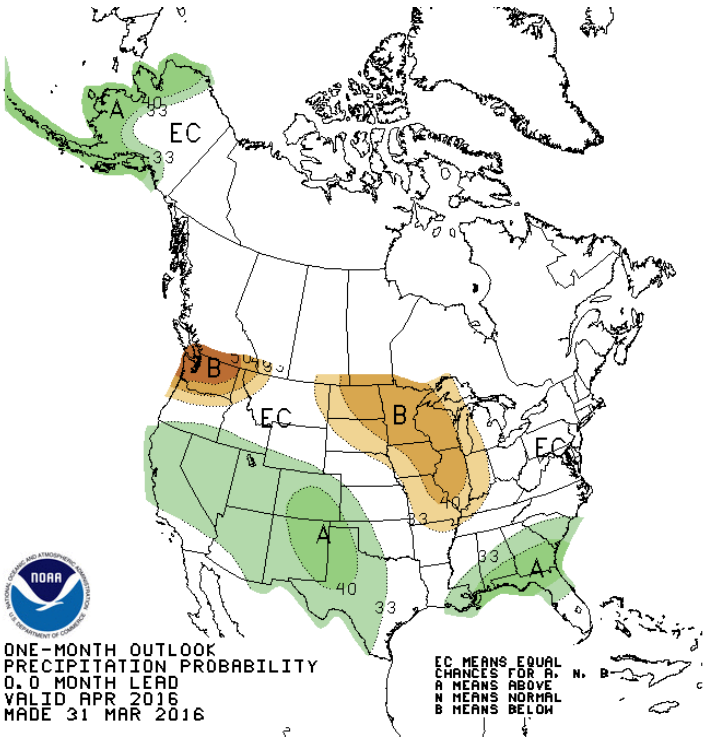
One Month Outlook
April 11th, 2016

From

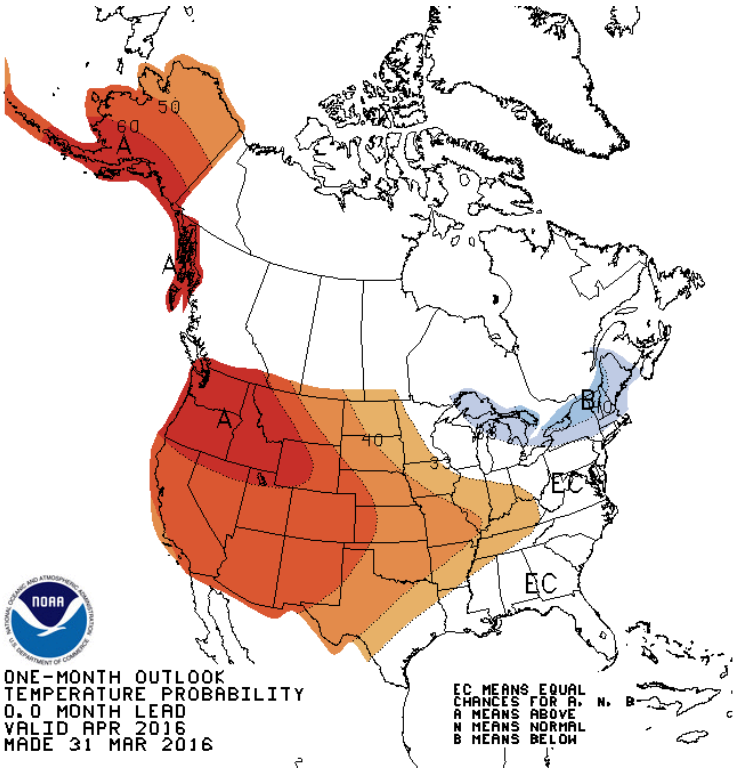
National Weather Service Climate Prediction Center

http://www.cpc.ncep.noaa.gov/

Equal chance for above normal, below normal or normal precipitation in the next month



High chance for above normal temperatures in the next month.



**How to Read Non-Exceedance Projections Graphs

How to Read Non-Exceedance Projections Graphs

The graphs show snow water equivalent (in inches) projections for the October 1 through September 30 water year. The new trend graph format uses non-exceedance projections.

Current water year is represented by the heavy red line terminating on the last day the graphic was updated.

Historical percentile range is shown as a gray background area on the graph. Shades of gray indicate maximum, 90 percentile, 70 percentile, 50 percentile (dotted black line), 30 percentile, 10 percentile, and minimum for the period of record.

Projections for maximum, 90 percent, 70 percent, 50 percent, 30 percent, 10 percent, and minimum exceedances are graphed as different colored lines originating at the end of the current line.

Sample Graph with Explanations