Blackfoot Water Supply Report
May 9th, 2016

Montana Water Supply Report as of May 1st, 2016 (from NRCS):
http://www.nrcs.usda.gov/wps/portal/nrcs/main/mt/snow/waterproducts/basin/

Overview

Solar radiation is the primary driver of snowmelt and during the month of April there were plenty of sunny and very warm days where temperatures at low and mid elevations barely got to freezing overnight. These periods of record warmth under high pressure caused substantial melt at many snow measurement locations during the month, which resulted in decreases in snowpack percentages ranging from 5 to 34 percent across the state.

This weather pattern has played out consistently this winter, warm and dry periods followed by unsettled weather for a few days. Unfortunately, there wasn't an abundance of snowfall in the basins during the month of April. West of the Continental Divide only one storm impacted the basin mid-month which caused marginal increases in snow water equivalent (SWE), however it did cause the snowpack to slow it's melt for a few days. Basins east of the Divide received more snowfall during the event mid-month but to similar effect, little in the way of major SWE increases and decreased melt. Cloudy and cooler weather caused snowmelt to slow during the last week of the month and some basins received some snowfall. One major basin saw major increases in SWE during the month, the Lower Yellowstone received abundant moisture from a few closed lows which impacted the sub-basins. This moisture was needed in the basins which had been very low for snow totals through mid-March.

Peak snow water equivalent for this year occurred around the first of April west of the Divide, and between the 1st and 15th of April East of the Divide. Some high elevation sites have been able to retain their snowpack east of the Divide, but most sites have started to make the transition to melt on May 1st. Peak snow water has come early this year, one to two weeks early west of the Divide, and up to four weeks early at high elevation sites east of the Divide. On a positive note, peak snow water this year exceeded last year in all basins except for the Sun-Teton-Marias. Unfortunately, the warm temperatures caused melt and the movement of water ahead of schedule in almost all of the basins. 14 measurement locations west of the Divide experienced the most April snowmelt on record at SNOTEL and snowcourses, 10 sites had second highest melt on record. Early movement of the snow water contained in the mountains will have implications later in the spring and summer when we typically rely on the slow release of snow water into the river systems.

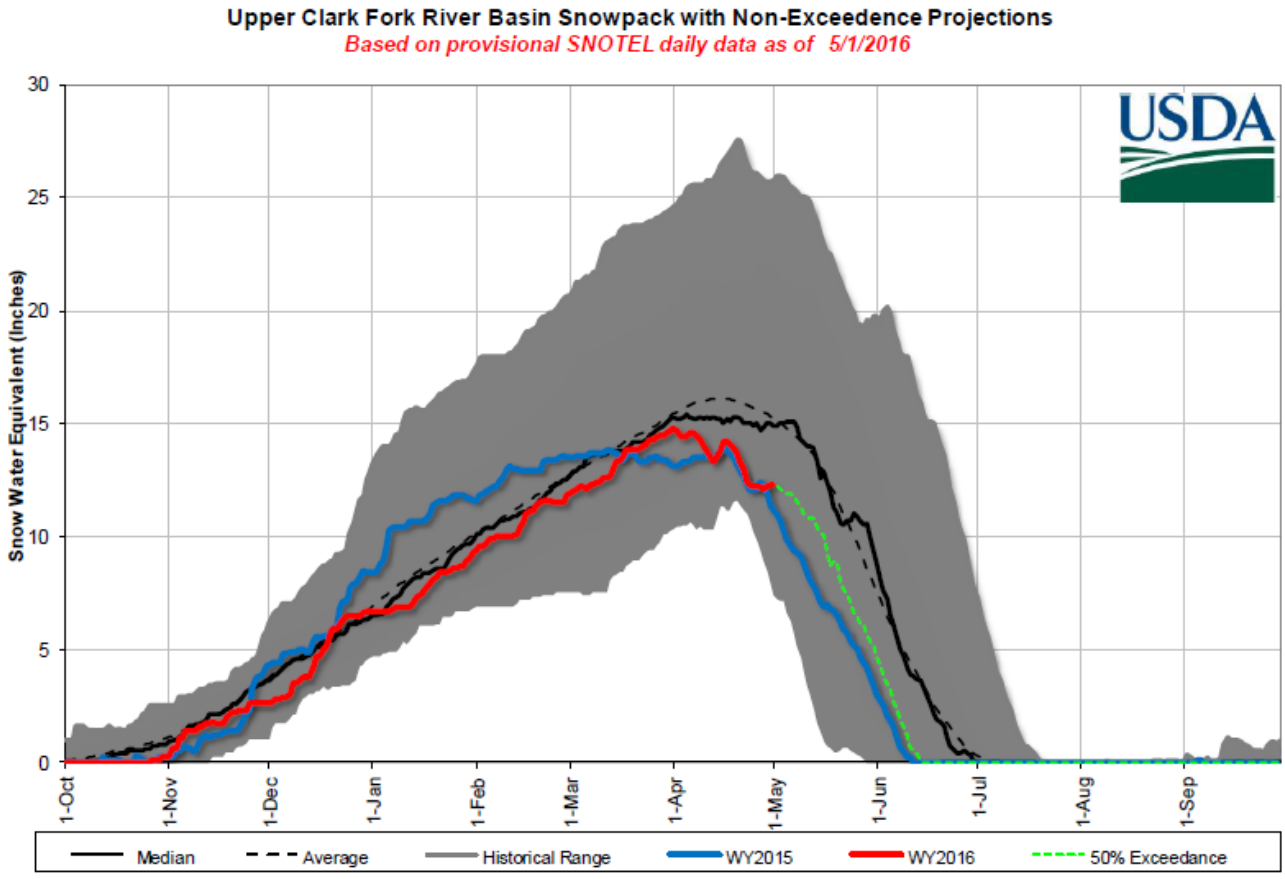
Upper Clark Fork River Basin Overview

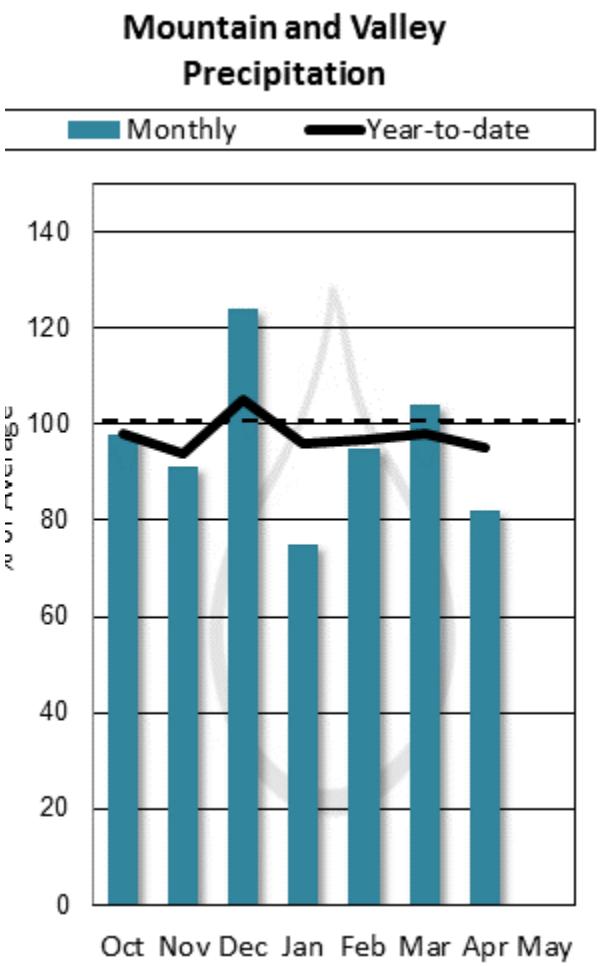
Peak basin-wide snow water equivalent occurred on April 1st in the Upper Clark Fork River basin this year, which was 92% of the average peak and 13 days early. The snowpack was primed and melting at a significant rate by then end of the first week in April. At the end of the second week a storm dropped a significant amount of snow at higher elevations. Warm Springs SNOTEL (7800 ft) received 14 inches of snow (1.2 inches SWE) during this storm bumping it up to 109% of normal. The remainder of the month brought more melt and as of May 1st the Upper Clark Fork River basin was at 79% of normal. Last year at this time the snowpack was at 68% of normal.

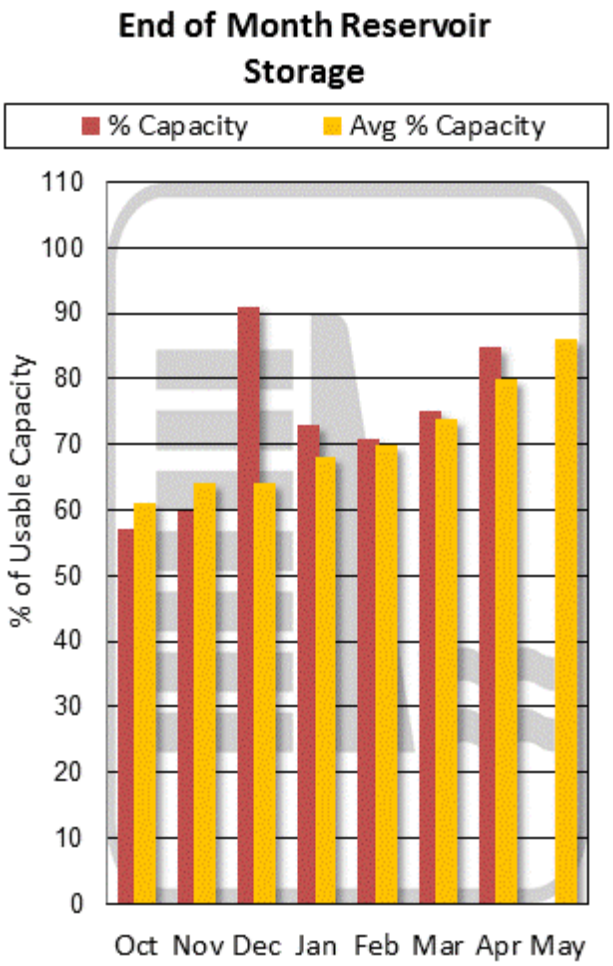
April precipitation at SNOTEL sites in the Upper Clark Fork River basin was slightly below average. The mid-month storm that delivered snow up high, delivered rain at valley elevations. Lubrecht Flume SNOTEL (4680 ft) received 0.4 inches of rain during this event. Mountain SNOTEL sites received 82% of average precipitation for the month of April, while valley weather stations received 99% of average precipitation in the Upper Clark Fork River basin. Currently water-year-to date precipitation in the basin is at 95% of average.

Reservoir storage in Georgetown Lake is currently at 106% of average. Current basin-wide streamflow forecasts for the 50% exceedance are 81% of average for the May-July time period.

Upper Clark Fork Basin







Snowpack Analysis

Watershed Snowpack Analysis May 1st, 2016	# of Sites	% Median	Last Year
CLARK FORK ab FLINT CREEK	11	84%	71%
FLINT CREEK	5	77%	56%
ROCK CREEK	4	78%	62%
CLARK FORK ab BLACKFOOT	18	79%	65%
BLACKFOOT **UPPER CLARK FORK RIVER BASIN**	13 **29**	78% **79%**	**72%** **68%**

Reservoir Storage

Reservoir Storage End of April, 2016	Current (KAF)	Last Year	Average (KAF)	Capacity (KAF)
East Fork Rock Creek Res	9.5	11.9	9.2	15.6
Georgetown Lake	30.8	29.0	28.2	31.0
Lower Willow Creek Reservoir		5.0	4.1	4.9
Nevada Creek Res	9.8	11.2	9.9	12.6
Basin-wide Total	50.1	52.1	47.3	59.2
# of reservoirs	3	3	3	3

Streamflow Forecast

Current basin-wide streamflow forecasts for the 50% exceedance are 81% of average for the May-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	14.6	30	40	71%	50	65	56
	APR-SEP	16.2	33	44	70%	55	72	63
Clark Fork R ab Milltown								
	APR-JUL	141	275	370	83%	465	600	445
	APR-SEP	183	355	435	82%	535	685	530
Nevada Ck nr Helmville								
	MAY	-0.22	2	3.6	69%	5.1	7.3	5.2
	MAY-JUL	-0.23	4	6.9	63%	9.8	14.1	11
Blackfoot R nr Bonner								
	MAY-JUL	305	385	445	75%	500	580	590
	APR-SEP	360	450	510	76%	570	660	675
Clark Fork R ab Missoula								
	MAY-JUL	470	680	825	80%	970	1180	1030
	MAY-SEP	575	800	955	80%	1110	1340	1200

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
3) Median value used in place of average

Snow Water Equivalent: May 9, 2016

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 Msy 9th, 2016

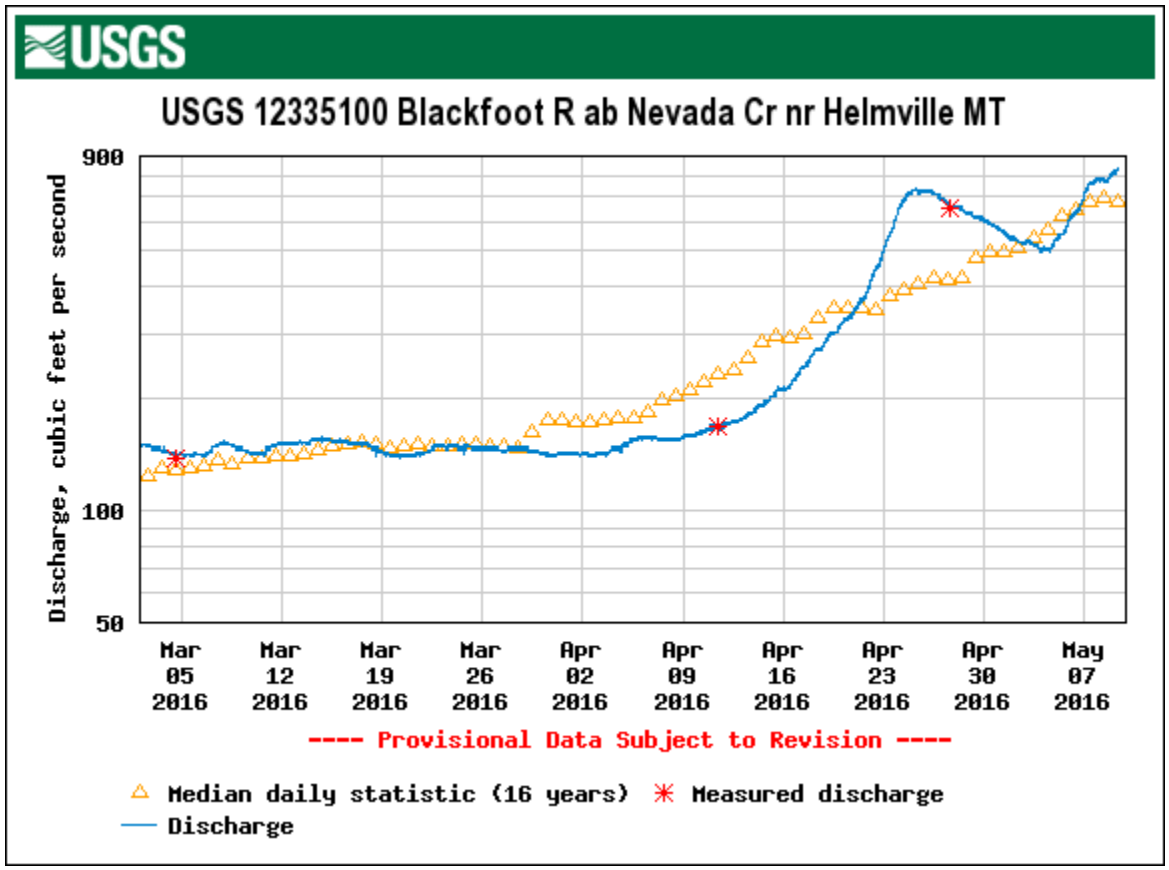
Basin Site Name	Elev (ft)	Snow Water Equivalent			Water Year-to-Date Precipitation		
		Current (in)	Median (in)	Pct of Median	Current (in)	Average (in)	Pct of Average
UPPER CLARK FORK RIVER BASIN							
Barker Lakes	8250	12.5	15.6	80	18.4	20.8	88
Basin Creek	7180	1.9	8.8	22	15.4	13.1	118
Black Pine	7210	0.0	6.8	0	15.3	16.2	94
Combination	5600	0.0	0.0	*	10.4	11.2	93
Copper Bottom	5200	0.0	N/A	*	15.0	17.5	86
Copper Camp	6950	10.4	N/A	*	24.2	35.0	69
Lubrecht Flume	4680	0.0	0.0	*	11.8	11.9	99
Nevada Ridge	7020	3.1	11.1_C	28	16.5	18.7_C	88
N Fk Elk Creek	6250	0.0	4.5	0	14.6	16.5	88
North Fork Jocko	6330	30.7	37.9	81	51.0	52.1	98
Peterson Meadows	7200	6.6	10.2	65	19.1	15.5C	123
Rocker Peak	8000	11.2	15.2	74	14.8	17.4	85
Skalkaho Summit	7250	4.7	21.2	22	22.2	25.7	86
Stuart Mountain	7400	22.1	31.0_C	71	32.9	35.0_C	94
Warm Springs	7800	19.2	21.8	88	25.1	26.7	94
Basin Index (%)		**61**			**92**		

-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.

May 9, 2016: USGS Real Time Flow Conditions

USGS Blackfoot River above Nevada Creek Near Helmville

Discharge, cubic feet per second
Most recent instantaneous value: 834



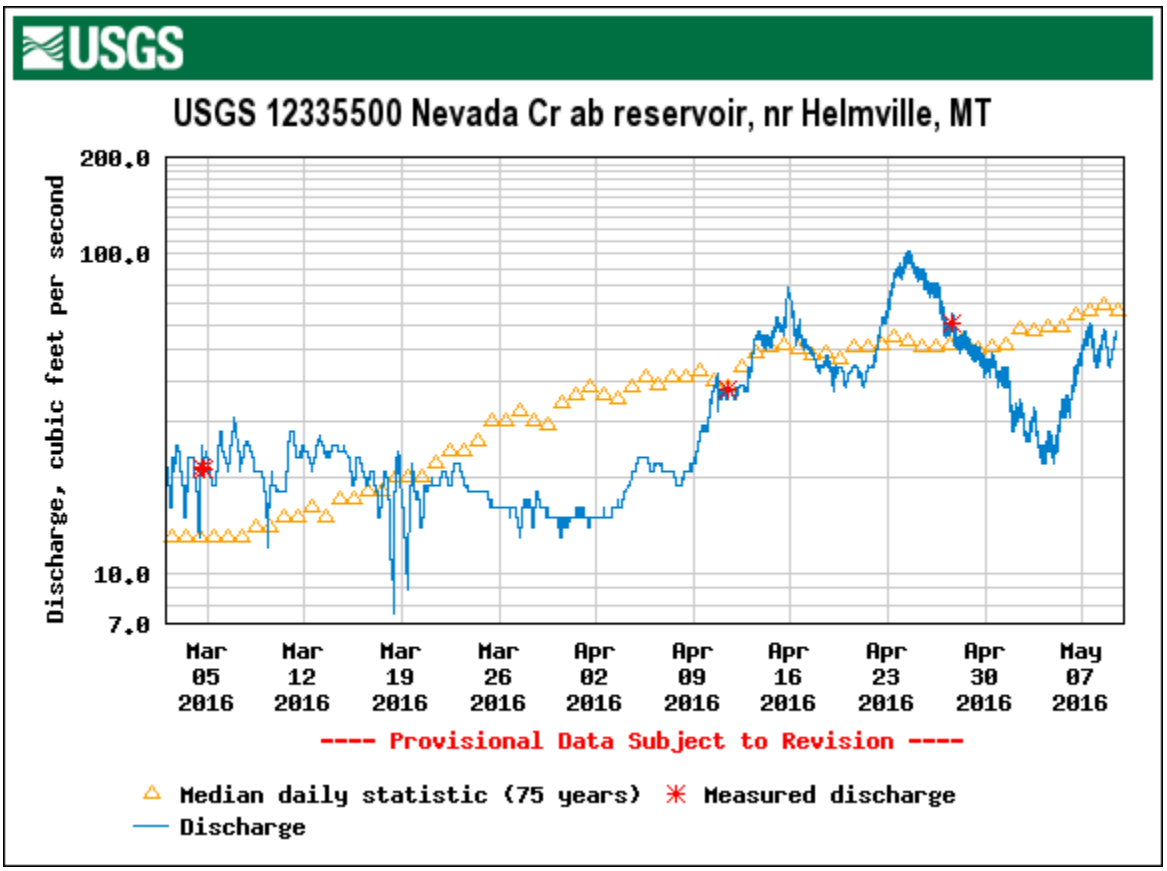
Daily discharge, cubic feet per second -- statistics for Feb 4 based on 14 years of record

Daily discharge, cubic feet per second -- statistics for May 9 based on 16 years of record more						
Min (2002)	25th percen-tile	Median	Mean	Most Recent Instantaneous Value May 9	75th percen-tile	Max (2014)
177	476	674	684	834	955	1210

Nevada Creek

Discharge, cubic feet per second

Most recent instantaneous value: 57

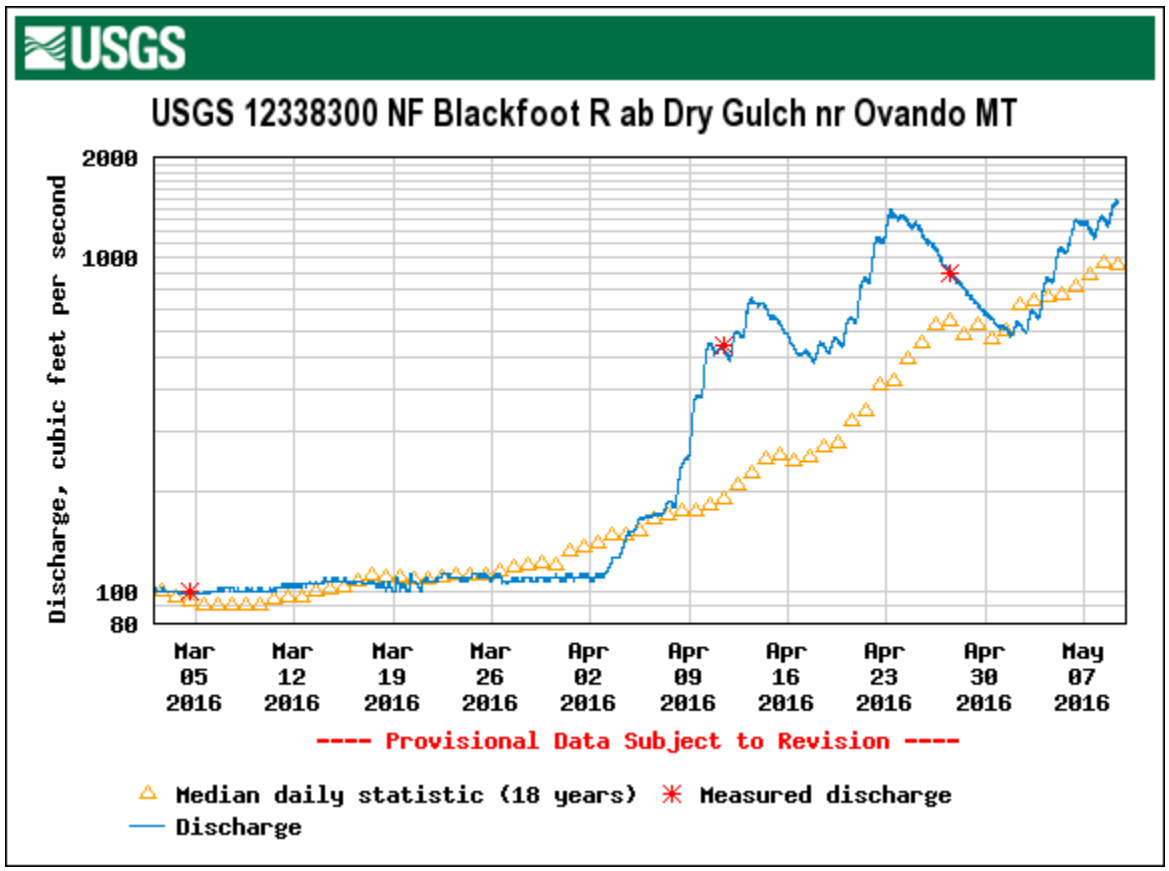


Daily discharge, cubic feet per second -- statistics for May 9 based on 77 years of record more

Min (1977)	25th percen-tile	Most Recent Instantaneous Value May 9	Median	Mean	75th percen-tile	Max (1976)
12	41	57	66	88	101	430

North Fork Blackfoot

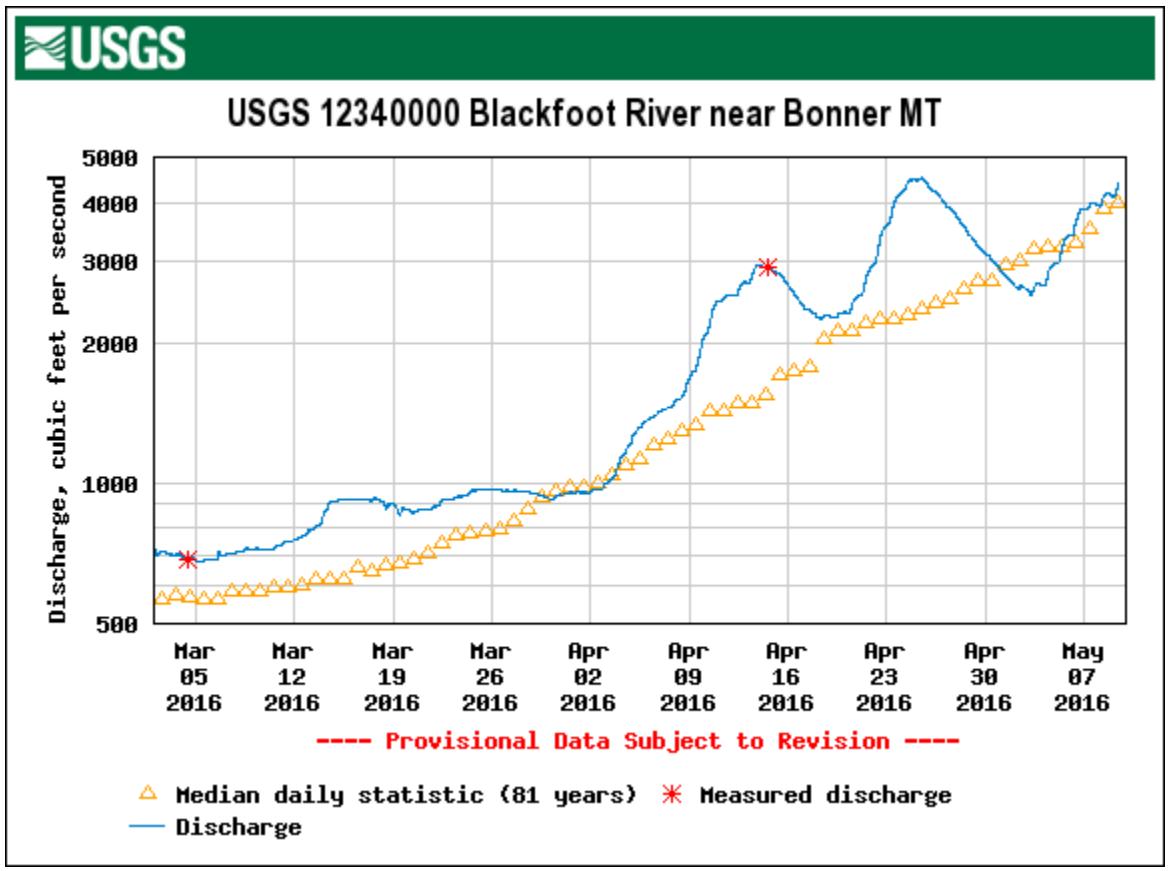
Discharge, cubic feet per second
Most recent instantaneous value: 1450



Daily discharge, cubic feet per second -- statistics for May 9 based on 18 years of record more						
Min (2010)	25th percen-tile	Median	Mean	75th percen-tile	Most Recent Instantaneous Value May 9	Max (2004)
276	675	955	962	1200	1450	1670

Blackfoot River at Bonner

Discharge, cubic feet per second
Most recent instantaneous value: 4,470 05-09-2016 13:45 MDT



Daily discharge, cubic feet per second -- statistics for May 9 based on 82 years of record more

Min (1905)	25th percen-tile	Median	Mean	Most Recent Instantaneous Value May 9	75th percen-tile	Max (1947)
940	2830	3980	4140	4390	4690	12800

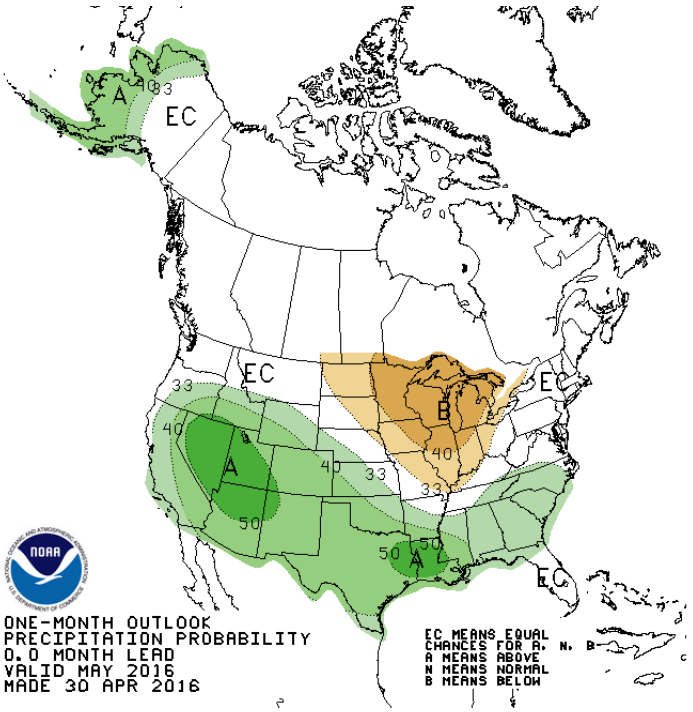
One Month Outlook
May 9th, 2016

From

National Weather Service Climate Prediction Center

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

Equal chance of experiencing above normal, normal, or below normal precipitation in May.



High chance to experience above normal temperatures in May.