

Blackfoot Water Supply Report

March 10, 2016

Montana Water Supply Report as of March 1st, 2016 (from NRCS):

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/mt/snow/waterproducts/basin/>

Overview

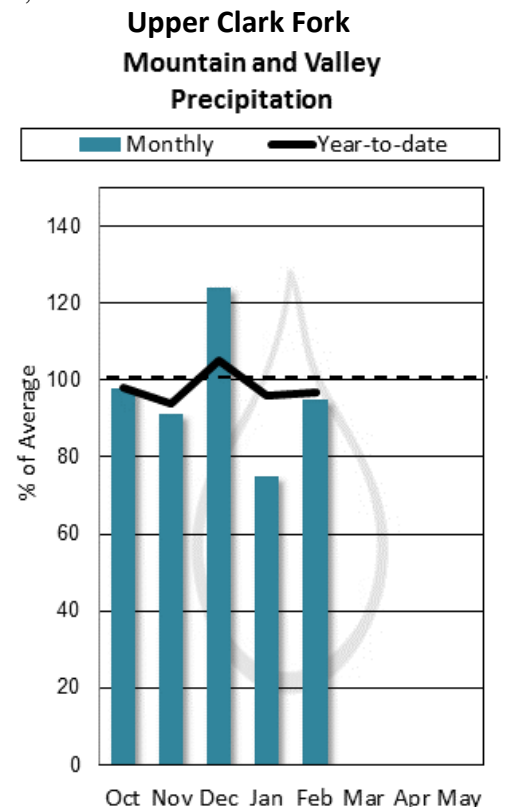
February may be the first month that “El Nino” reared his ugly face in the state of Montana. El Nino played favorites this month bringing warm and moist westerly and southwesterly flow to some basins while almost completely looking over others. In the northwest river basins there was been abundant precipitation in the form of snow and rain and the snowpack is retaining this moisture with melt only occurring at the lowest of elevations. Four of the five major river basins west of the Divide saw increases in basin percentages for snowpack on March 1st. After a dry spring and summer and near record to record low snowpack on April 1st last year the change is more than welcome. River basins west of the Divide are near to slightly below normal for snowpack on March 1st.

With the exception of a few of the east facing basins that have been largely overlooked this water year, basins east of the Divide generally saw declines in basin snowpack percentages over the month. Warm and dry conditions were experienced during the first two weeks of the month before the basins received their Valentines gift of much needed moisture. Some small events trickled in during the rest of the month helping to add to the annual snowpack, but these events weren’t significant enough to maintain snowpack percentiles in most basins. There are a large range of conditions in the Missouri and Yellowstone River basins, and the individual basin reports should be consulted for specific information. A few basins continue to be well below normal for this date and will be watched as we enter the spring when these east facing basins are historically favored in terms of precipitation. The Sun-Teton-Marias (64%), St. Mary-Milk (65%) and Lower Yellowstone (77%) River basins are well below normal for this date and will need some help this spring to recover before the bulk of snowmelt occurs. State-wide snowpack is currently 90% of normal for February 1st.

So what do snowpack percentages mean on March 1st? With the exception of the northwest river basins snowpack conditions last year were generally near to even above what we have now. This speaks to the importance of spring precipitation and snow over the next two to three months. Spring can be a game changer for water users across the state, let’s just hope we’re not playing the same game we were last spring and summer this year.

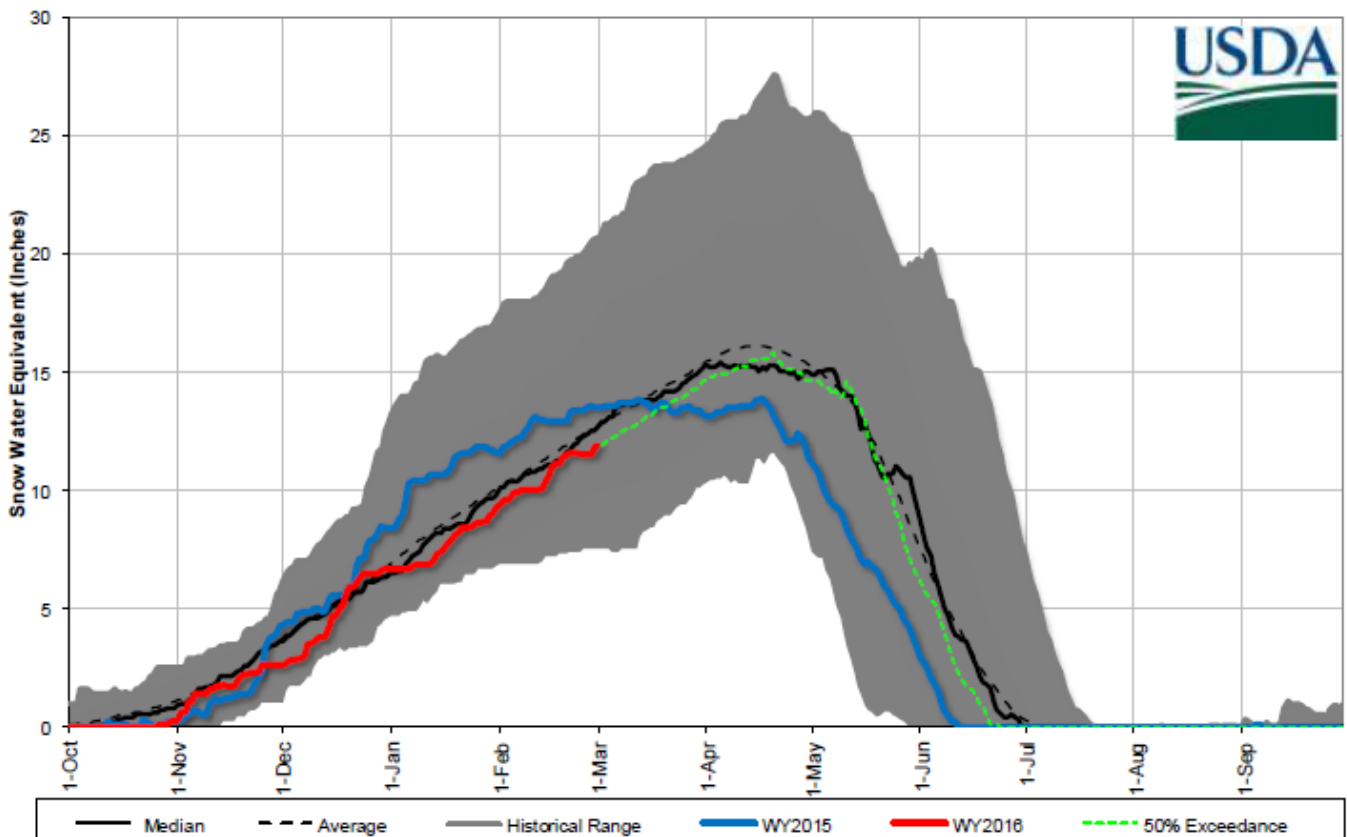
Upper Clark Fork River Basin Overview

February could be called “Steady Eddy” for this basin. A consistent stream of storm pulses passed through the basin during the entire month. Like the rest of Montana, warm temperatures persisted resulting in some snowmelt in the valley areas and at low



elevation sites. Sites in the northern most areas of the basin received well above average moisture whereas sites in the headwaters area received below average moisture for the month. The snowpack is variable throughout the basin depending on aspect and elevation. Sites in the lower end of the basin in the Lubrecht Experimental Forest have well below normal snowfall while sites in the headwaters area near Butte continue to be well above average on March 1. The continued storm pulses that went through the basin during the month helped to increase or maintain existing snowpack. Although some of the storms were more of the rain/snow variety than straight snow. Basin-wide the snowpack is 95% of normal for March 1st. February mountain precipitation fell mainly in the form of snow or rain/snow at most of the sites throughout the basin. Low elevation sites saw more rain due the very warm temperatures. Sites in the headwaters area near Butte saw well below average precipitation. Areas in the central portion of the basin saw near to above average precipitation. Sites in the northwest area received well above average precipitation. Valley stations recorded well below average February precipitation. Basin-wide the month ended up at 95% of average for water year-to-date precipitation.

Upper Clark Fork River Basin Snowpack with Non-Exceedence Projections
Based on provisional SNOTEL daily data as of 3/1/2016



Snowpack Analysis

The snowpack is variable throughout the basin depending on aspect and elevation. Sites in the lower end of the basin in the Lubrecht Experimental Forest have well below normal snowfall while sites in the headwaters area near Butte continue to be well above average on March 1. The continued storm pulses that went through the basin during the month helped to increase or maintain existing snowpack. Although some of the storms were more of the rain/snow variety than straight snow. Basin-wide the snowpack is 95% of normal for March 1st.

Watershed Snowpack March 1, 2016	# of Sites	% Median	Last Year % Median
CLARK FORK ab FLINT CREEK	14	101	108
FLINT CREEK	5	99	115
ROCK CREEK	5	103	109
CLARK FORK ab BLACKFOOT	22	100	108
BLACKFOOT	13	86	103
UPPER CLARK FORK RIVER BASIN	33	95	106

Reservoir Storage

Reservoir storage is above average in the basin at most locations, and close to last year at this time.

Reservoir Storage End of February, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
East Fork Rock Creek Res	8.1	10.6	8.3	15.6
Georgetown Lake	28.7	28.7	27.6	31.0
Lower Willow Creek Reservoir		4.3	2.2	4.9
Nevada Creek Res	5.1	9.6	5.6	12.6
Basin-wide Total	42.0	48.9	41.5	59.2
# of reservoirs	3	3	3	3

Streamflow Forecast

Streamflow forecasts for March 1st should be used knowing 65 to 80% of our annual snowpack has accumulated and conditions can change before runoff occurs. The 50% exceedance forecast assumes normal conditions will occur from this point and through snowmelt. Current basin-wide streamflows for the 50% exceedance are 92% 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	38	57	70	100%	83	102	70
	APR-SEP	42	63	77	100%	91	111	77
Flint Ck nr Southern Cross	APR-JUL	5.7	9.5	12	97%	14.5	18.3	12.4
	APR-SEP	6.4	11.1	14.3	98%	17.5	22	14.6
Flint Ck bl Boulder Ck	APR-JUL	27	42	52	100%	62	77	52
	APR-SEP	36	54	66	100%	78	96	66
Lower Willow Ck Reservoir Inflow ²	APR-MAY	3	5.5	7.1	97%	8.7	11.1	7.3
	APR-JUL	4.2	8	10.6	100%	13.2	17.1	10.6
MF Rock Ck nr Philipsburg	APR-JUL	41	50	57	98%	64	73	58
	APR-SEP	46	57	64	98%	71	82	65
Rock Ck nr Clinton	APR-JUL	157	210	245	98%	280	335	250
	APR-SEP	178	235	275	98%	315	370	280
Clark Fork R ab Milltown	APR-JUL	275	425	525	99%	630	780	530
	APR-SEP	330	495	610	99%	725	890	615
Nevada Ck nr Helmville	APR-MAY	2.2	5.5	7.7	92%	9.9	13.1	8.4
	APR-JUL	3.7	9.3	13	92%	16.8	22	14.2
Blackfoot R nr Bonner	APR-JUL	410	525	605	84%	680	800	720
	APR-SEP	465	590	675	84%	760	885	800
Clark Fork R ab Missoula	APR-JUL	695	960	1140	91%	1320	1590	1250
	APR-SEP	810	1100	1300	92%	1490	1780	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: March 11, 2016

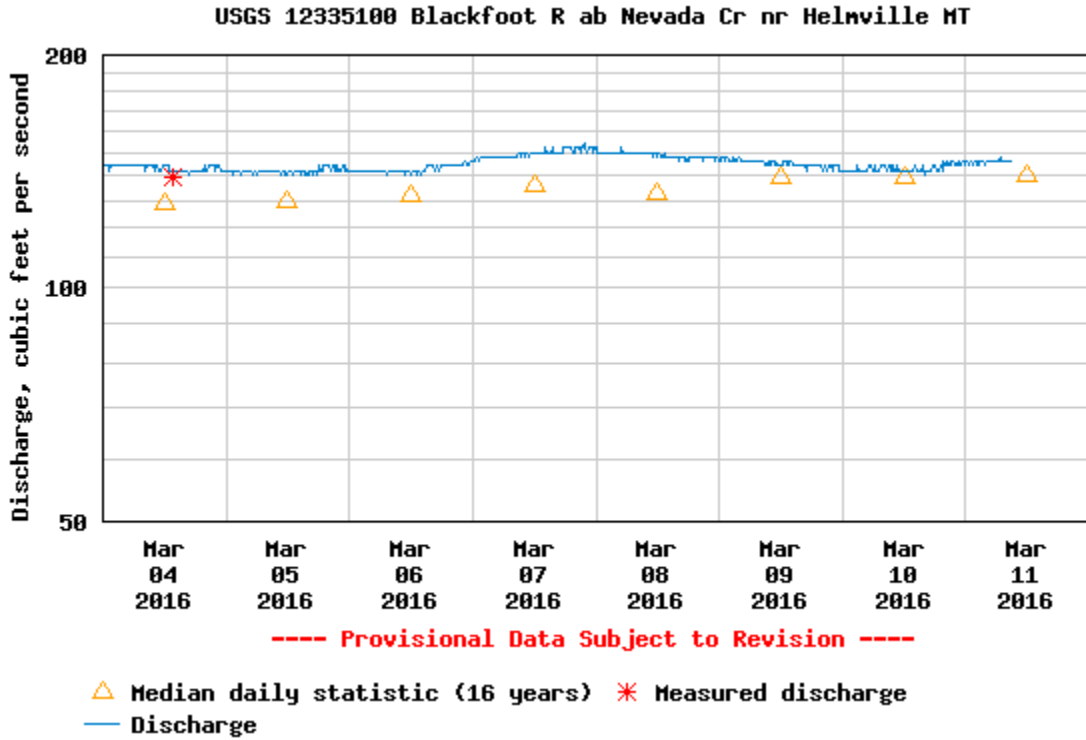
Montana SNOTEL Snow/Precipitation Update Report							
Based on Mountain Data from NRCS SNOTEL Sites							
Provisional data, subject to revision							
Data based on the first reading of the day (typically 00:00) for Friday, March 11, 2016							
Basin Site Name	Elev (ft)	Snow Water Equivalent			Water 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	11.3	111	12.9	12.9	100
Basin Creek	7180	8.3	5.9	141	10.9	7.5	145
Black Pine	7210	7.6	8.7	87	11.0	11.1	99
Combination	5600	1.9	4.3	44	8.5	7.8	109
Copper Bottom	5200	0.0	N/A	*	11.3	13.9	81
Copper Camp	6950	23.7	N/A	*	18.8	27.6	68
Lubrecht Flume	4680	2.1	4.8	44	9.7	8.7	111
Nevada Ridge	7020	10.8	12.2 _c	89	11.6	13.7 _c	85
N Fk Elk Creek	6250	7.9	9.5	83	10.2	11.6	88
North Fork Jocko	6330	32.7	35.6	92	41.5	41.6	100
Peterson Meadows	7200	9.5	7.8	122	12.0	9.4 _c	128
Rocker Peak	8000	10.8	10.6	102	9.5	11.2	85
Skalkaho Summit	7250	17.7	18.6	95	17.7	19.3	92
Stuart Mountain	7400	25.4	26.8 _c	95	26.1	27.0 _c	97
Warm Springs	7800	16.8	16.2	104	16.7	18.6	90
Basin Index (%)		95			94		

March 11, 2016, USGS Real Time Flow Conditions

Blackfoot River above Nevada Creek Near Helmville

Discharge, cubic feet per second

Most recent instantaneous value: 146 03-11-2016 08:45 MST



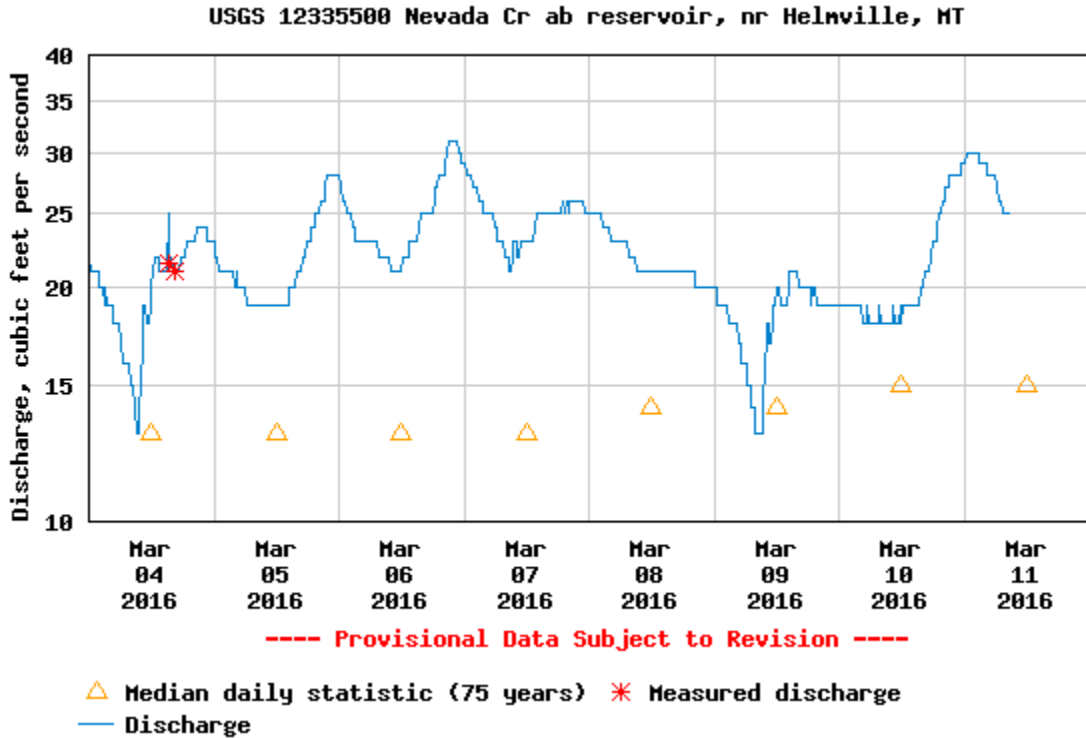
Daily discharge, cubic feet per second -- statistics for Mar 11 based on 16 years of record [more](#)

Min (2001)	25th percentile	Median	Most Recent Instantaneous Value Mar 11	Mean	75th percentile	Max (2014)
108	122	140	146	151	185	230

Nevada Creek

Discharge, cubic feet per second

Most recent instantaneous value: 25 03-11-2016 08:45 MST



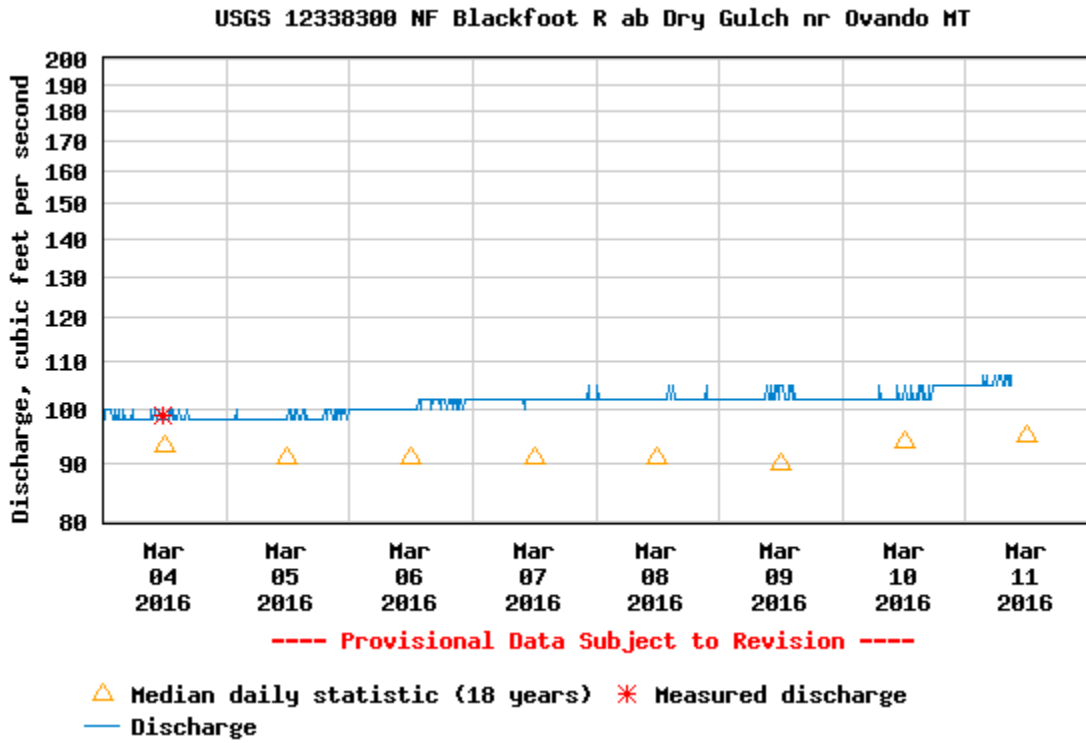
Daily discharge, cubic feet per second -- statistics for Mar 11 based on 75 years of record [more](#)

Min (1974)	25th percentile	Median	Mean	Most Recent Instantaneous Value Mar 11	75th percentile	Max (1982)
4.8	10	15	23	25	25	166

North Fork Blackfoot

Discharge, cubic feet per second

Most recent instantaneous value: 107 03-11-2016 09:00 MST



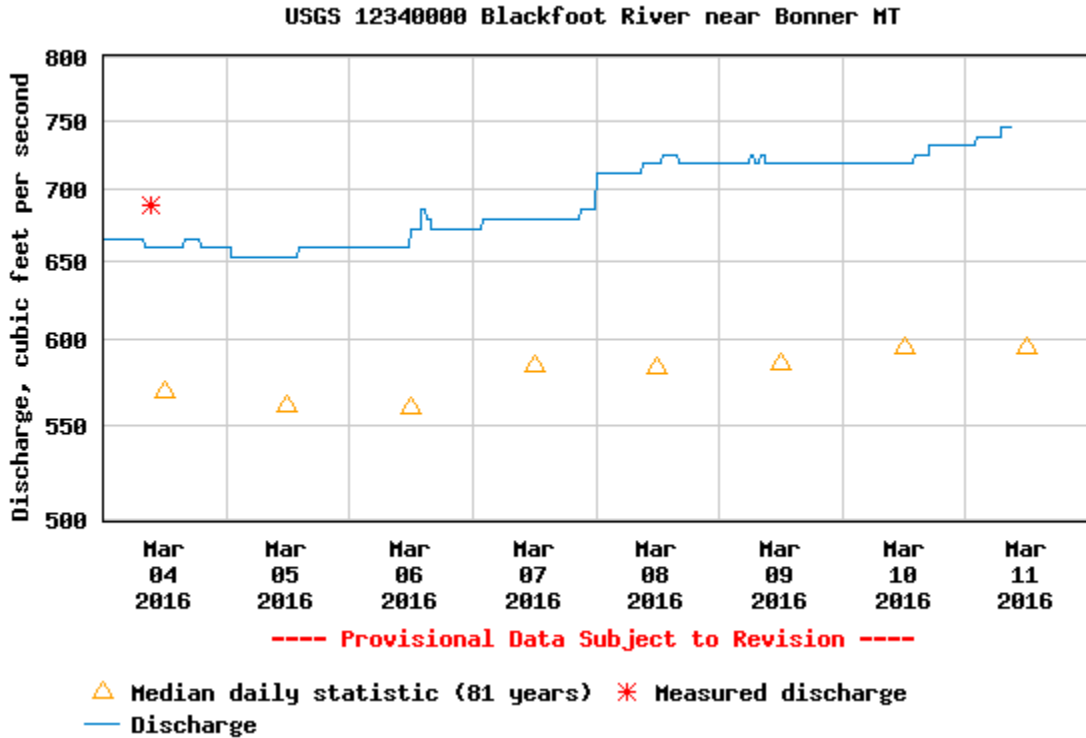
Daily discharge, cubic feet per second -- statistics for Mar 11 based on 18 years of record.

Min (2001)	25th percentile	Median	Mean	Most Recent Instantaneous Value Mar 11	75th percentile	Max (2015)
73	82	95	100	107	112	164

Blackfoot River at Bonner

Discharge, cubic feet per second

Most recent instantaneous value: 745 03-11-2016 08:45 MST



Daily discharge, cubic feet per second -- statistics for Mar 11 based on 81 years of record [more](#)

Min (1988)	25th percentile	Median	Mean	Most Recent Instantaneous Value Mar 11	75th percentile	Max (1986)
389	498	595	701	745	770	2720

Three-Month Outlook March 10, 2016

From
National Weather Service Climate Prediction Center

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

Probability leaning toward about average precipitation for March through May.

High chance to experience above normal temperatures from March through May.

