

Blackfoot Water Supply Report March 9, 2015

Montana Water Supply Outlook Report as of March 1, 2014 (from NRCS):

http://www.nrcs.usda.gov/wps/portal/nrcs/detail/mt/snow/?cid=nrcs144p2_057799

Overview

Ending January and beginning February the residents of Montana were looking to the skies and hoping for a return to winter, unfortunately what most received was a wet face, from rain. February started off with precipitation, just not in the solid form we are used to mid-winter. West of the Continental Divide this was a rather significant event with valleys receiving 2 inches or more of rain during the first 10 days. Mountain locations also experienced rain during this event, but it was limited to the low to mid elevations with the higher elevations receiving snowfall. East of the Divide this storm also fell in the form of rain at lower elevations, but due to the higher elevation of the ranges snow was received at many mountain locations. Across the state at elevations where there was rain on snow the snowpack was able to soak up much of the moisture without discharging snow water (melt).

Ending this cycle was a period of high pressure with dry conditions and well above average temperatures that lingered a little too long in the state. After having received rain on the snowpack at lower elevations there was some snowmelt that occurred during this time, as was evident in the well above normal streamflows in the rivers in Montana. Temperatures during this period were well above average adding to the snowmelt at lower elevations, but at higher elevations with deeper and more insulated snowpacks little melt occurred during this time.

Fortunately the last week of the month brought several small disturbances to the state and temperatures cooled off to more seasonal conditions. Snowfall, mostly east of the Continental Divide helped to add a little more water to the snowpack before the month ended, and cooler temperatures stopped the loss of snow water from the snowpack at lower elevations. Some areas received an impressive amount of the “sneaker” storms with upper elevations in the Northern Gallatin Range receiving up to 18” of new snow. Unfortunately these storms were not wide spread and snow totals varied greatly over short distances.

What impact did the month have overall on our regional snowpack? Basins across the state saw further declines in basin percentages of normal snowpack between February 1st and March 1st. This had a direct impact on the streamflow forecasts on March 1st for the April-July time period. West of the Divide Snowpack percentages dropped up to 16 percent during the month, and up to 10 percent east of the Divide. While it is always alarming to hear the word “decline” when it comes to the snowpack, many basins still remain near normal for March 1st due in large part to the abundance of early season snowfall.

Old Man Winter could easily show his face again as there are typically another 1.5 to 2 months left of potential snow accumulation for the mountains of Montana. Some basins east of the Divide are typically favored during this period regarding snowfall and precipitation, and major changes could occur in all of the basins before snowmelt begins.

Upper Clark Fork River Basin

Compared to most basins west of the Continental Divide the Upper Clark Fork River basin is in pretty good shape snowpack wise. It is currently the only basin above normal for March 1st, though snowpack percentages did drop 16 percent since February 1st. The month started with substantial precipitation in the basin with valleys and lower elevations in the mountains receiving rain, and higher elevations receiving a rain/snow mix depending on the location. After this event, warm and dry conditions prevailed under high pressure with some low elevations experiencing melt. After a small storm brought scattered snowfall in the basin during the 3rd week, cooler conditions returned to end the month.

While most mid to high elevation measurement locations are near to well above normal in the basin, some low elevation sites are well below normal. Combination SNOTEL near Phillipsburg is currently 54 percent of normal, and two snow courses in the Lubrecht Experimental Forest are 29 and 41 percent of normal. These lower elevation sites received rain on snow during the month and felt the effect of the warmer than average weather, dropping their percentages since February 1st. As a whole the basin currently 106 percent of normal for March 1st, and 76 percent of last year at this time.

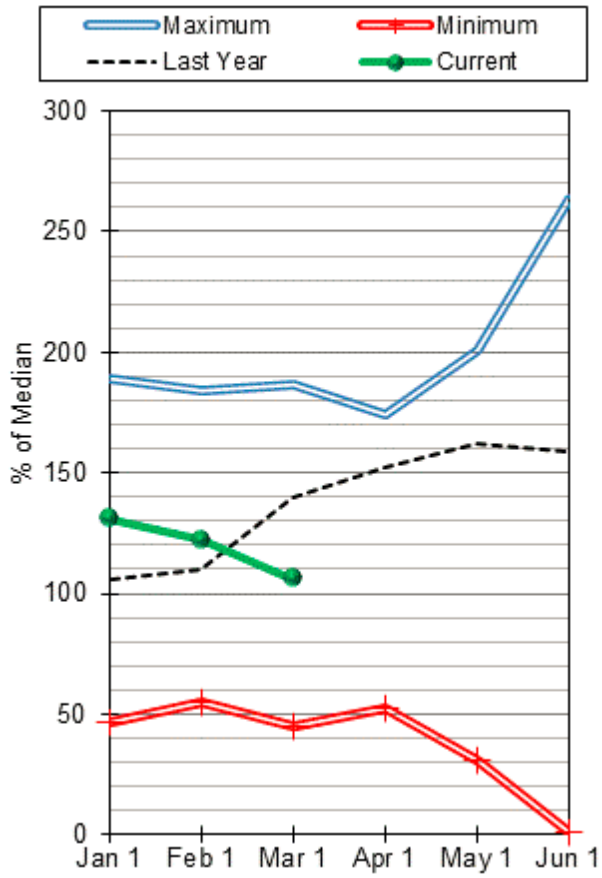
Valley weather stations received 104 percent of monthly average precipitation for February, while mountain SNOTEL sites received 84 percent. Currently on February 1st, the Upper Clark Fork River Basin is 110 percent of water year-to-date average. Last year at this time the water year-to-date precipitation was 107 percent of average.

Basin-wide reservoir storage is currently 118 percent of average and 117 percent of last year at this time.

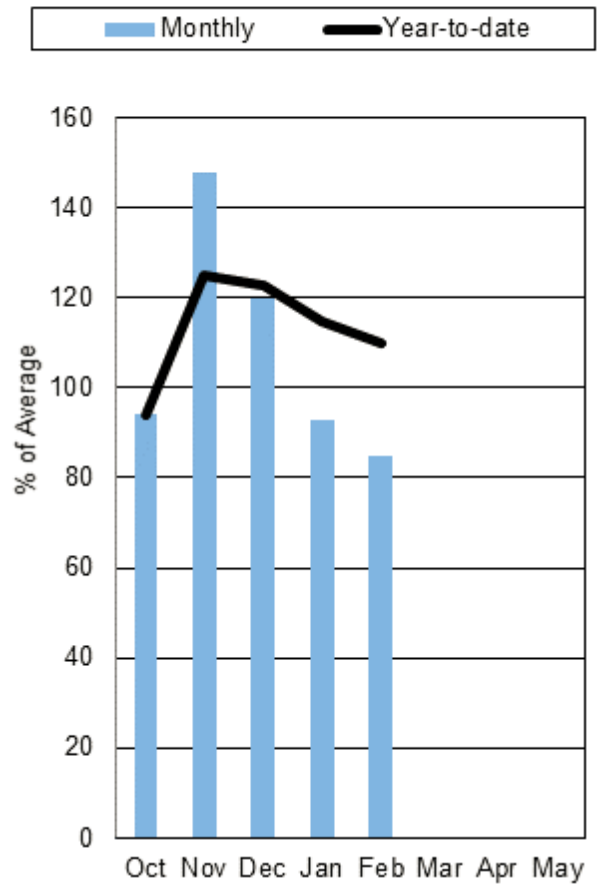
The basin-wide average April-July streamflow forecast for the Upper Clark Fork River is currently at 107 percent of average and 76 percent of last year.

Upper Clark Fork River Basin

Mountain Snowpack



Precipitation



Snowpack Analysis

Watershed Snowpack Analysis March 1st, 2015	# of Sites	% Median	Last Year % Median
CLARK FORK ab FLINT CREEK	12	108%	142%
FLINT CREEK	5	115%	148%
ROCK CREEK	4	110%	138%
CLARK FORK ab BLACKFOOT	19	108%	143%
BLACKFOOT	12	102%	137%
<u>UPPER CLARK FORK RIVER BASIN</u>	<u>29</u>	<u>106%</u>	<u>140%</u>

Reservoir Storage

Basin-wide reservoir storage is currently 118 percent of average and 117 percent of last year.

Reservoir Storage End of February, 2015	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
East Fork Rock Creek Res	10.6	9.3	8.3	15.6
Georgetown Lake	28.7	28.4	27.6	31.0
Lower Willow Creek Reservoir		2.1	2.2	4.9
Nevada Creek Res	9.6	4.1	5.6	12.6
Basin-wide Total	48.9	41.8	41.5	59.2
# of reservoirs	3	3	3	3

Streamflow Forecast

The basin-wide average April-July streamflow forecast for the Upper Clark Fork River is currently at 107 percent of average and 76 percent of last year.

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	45	64	77	110%	89	109	70
	APR-SEP	49	70	84	109%	98	118	77
Clark Fork R ab Milltown	APR-JUL	340	490	595	112%	700	850	530
	APR-SEP	410	575	690	112%	800	970	615
Nevada Ck nr Helmville	APR-MAY	4.4	7.6	9.8	117%	12	15.3	8.4
	APR-JUL	7	12.5	16.3	115%	20	26	14.2
Blackfoot R nr Bonner	APR-JUL	530	645	725	101%	805	920	720
	APR-SEP	595	720	805	101%	890	1020	800
Clark Fork R ab Missoula	APR-JUL	885	1150	1330	106%	1520	1780	1250
	APR-SEP	1020	1310	1510	106%	1700	1990	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 9, 2015

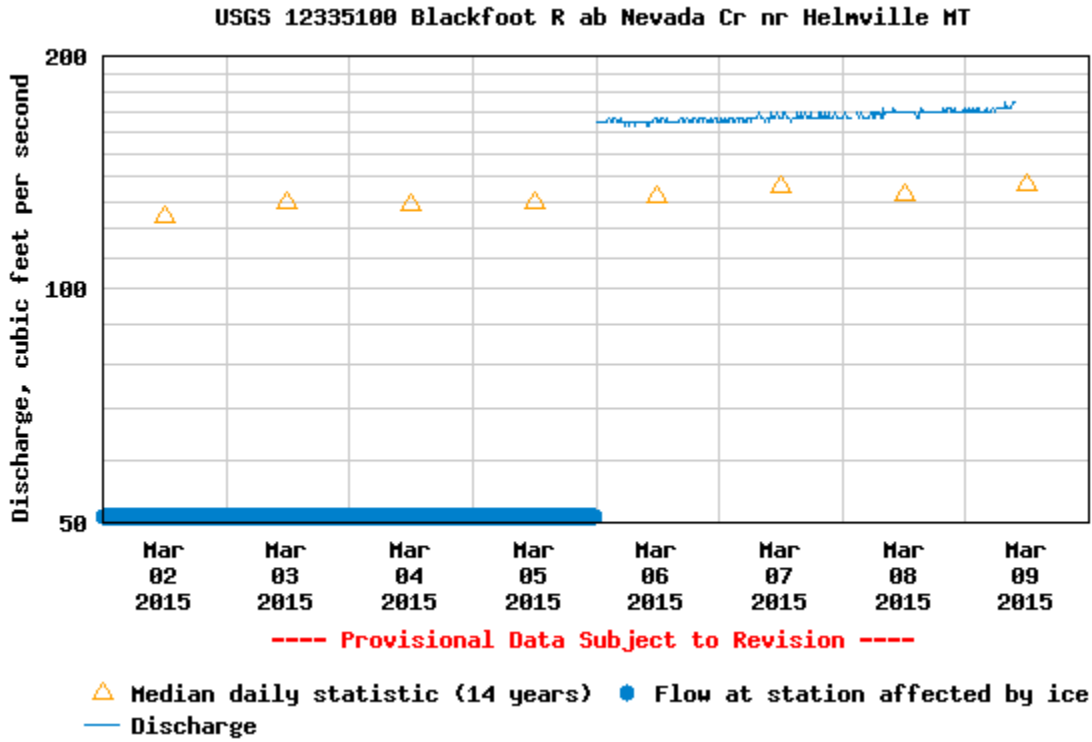
Columbia River Basin SNOTEL Snow/Precipitation Update Report							
Based on Mountain Data from NRCS SNOTEL Sites							
Provisional data, subject to revision							
Data based on the first reading of the day (typically 00:00) for Monday, March 09, 2015							
Basin Site Name	Elev (ft)	Snow Water Equivalent			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	11.0	11.2	98	14.2	12.8	111
Basin Creek	7180	6.8	5.9	115	6.2	7.4	84
Black Pine	7210	10.4	8.7	120	13.4	11.0	122
Combination	5600	2.4	4.3	56	8.5	7.8	109
Copper Bottom	5200	3.0	N/A	*	12.7	13.8	92
Copper Camp	6950	30.6	N/A	*	21.2	27.3	78
Lubrecht Flume	4680	4.9	4.8	102	11.0	8.6	128
Nevada Ridge	7020	12.7	12.1 _c	105	14.4	13.5 _c	107
N Fk Elk Creek	6250	10.0	9.4	106	12.0	11.5	104
North Fork Jocko	6330	32.8	35.2	93	43.6	41.3	106
Peterson Meadows	7200	9.0	7.7	117	11.8	9.3 _c	127
Rocker Peak	8000	12.2	10.5	116	12.3	11.1	111
Skalkaho Summit	7250	17.6	18.4	96	19.3	19.1	101
Stuart Mountain	7400	28.8	26.5 _c	109	30.0	26.7 _c	112
Warm Springs	7800	19.7	15.9	124	21.1	18.4	115
Basin Index (%)		105			105		

March 9, 2015 USGS Real Time Flow Conditions

Blackfoot River Above Nevada Creek Near Helmville

Discharge, cubic feet per second

Most recent instantaneous value: 175 03-09-2015 09:45 MDT



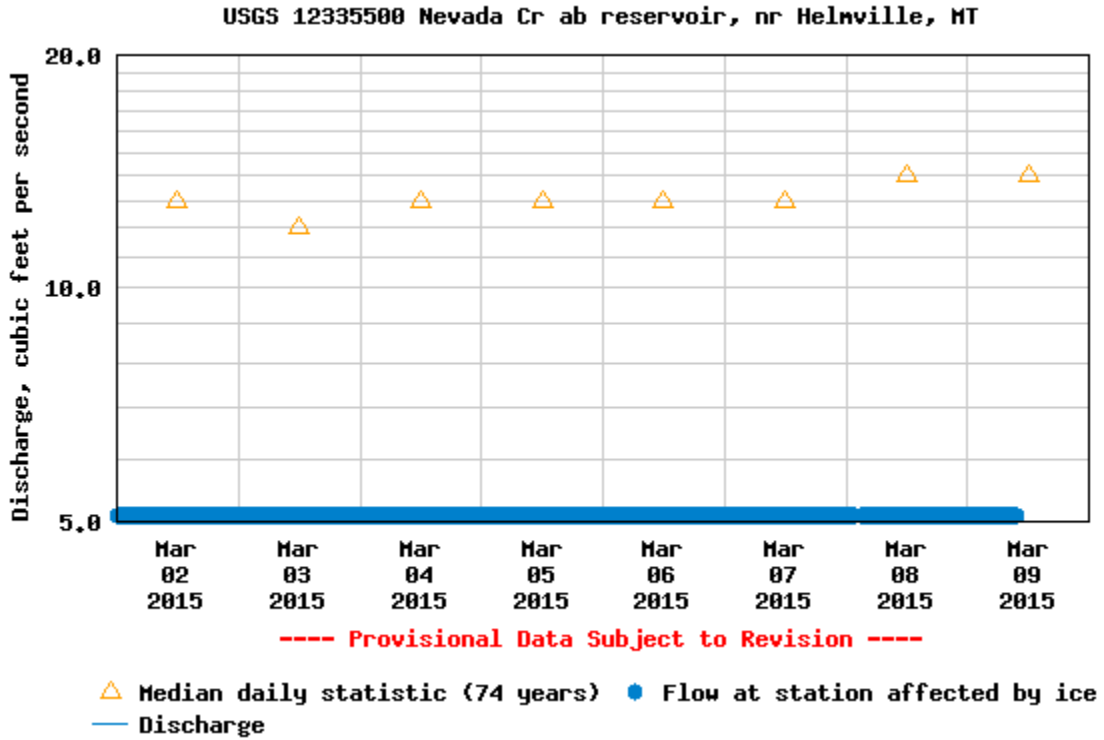
Daily discharge, cubic feet per second -- statistics for Mar 9 based on 14 years of record [more](#)

Min (2001)	25th percentile	Median	Mean	75th percentile	Most Recent Instantaneous Value Mar 9	Max (2007)
105	119	137	138	158	175	179

Nevada Creek

Discharge, cubic feet per second

Most recent instantaneous value: Ice 03-09-2015 09:45 MDT

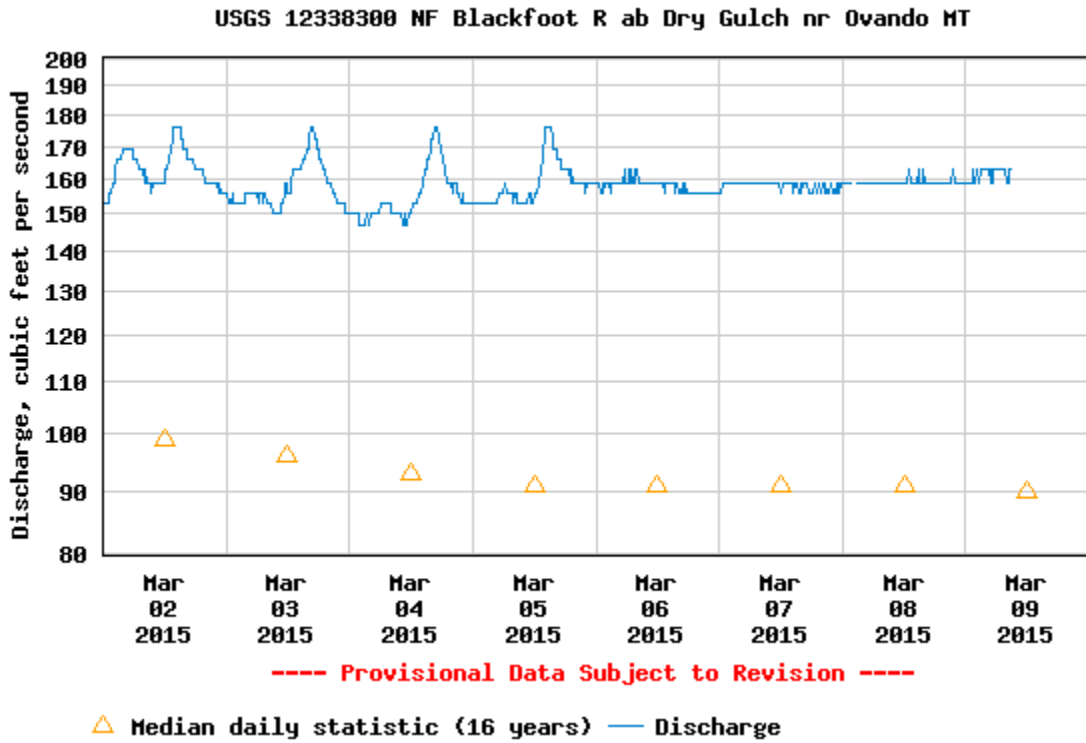


Most Recent Instantaneous Value Mar 9	Min (1974)	25th percentile	Median	Mean	75th percentile	Max (1986)
Ice	4.5	10	14	20	20	94

North Fork Blackfoot

Discharge, cubic feet per second

Most recent instantaneous value: 163 03-09-2015 09:00 MDT



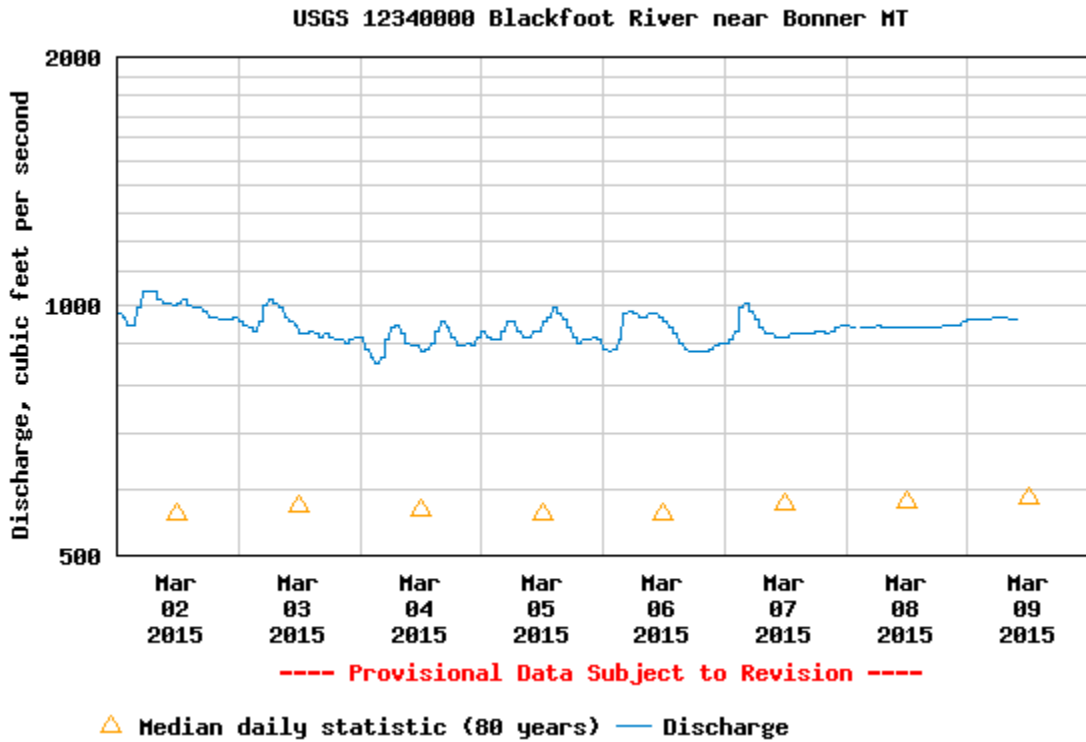
Daily discharge, cubic feet per second -- statistics for Mar 9 based on 16 years of record [more](#)

Min (2001)	25th percentile	Median	Mean	75th percentile	Max (2005)	Most Recent Instantaneous Value Mar 9
73	82	90	96	110	148	163

Blackfoot River at Bonner

Discharge, cubic feet per second

Most recent instantaneous value: 965 03-09-2015 09:45 MDT



Daily discharge, cubic feet per second -- statistics for Mar 9 based on 80 years of record [more](#)

Min (2003)	25th percentile	Median	Mean	75th percentile	Most Recent Instantaneous Value Mar 9	Max (1986)
397	503	585	658	757	965	3060

One-Month Outlook March 9, 2015

From
National Weather Service Climate Prediction Center
<http://www.cpc.ncep.noaa.gov/products/forecasts/>

Equal to higher chance for above normal temps

Equal chance for normal, above or below
normal precipitation

