

Montana Water Supply Outlook Report April 1st, 2016



Photo: Brett Kamrud

The Montana Snow Survey would like to welcome the most recent addition to the amazing group of individuals who collect snowpack information on a monthly basis. Kuna Kamrud went out this month with the rest of the Kamrud family to measure the Pipestone Pass snow course outside Butte, MT. The Kamrud family has a long history of snow surveying in Montana. Norm Kamrud measured snow working for the USFS in Choteau MT, and son Halvor worked a brief stint assisting the Snow Survey Program with summer maintenance. Brett Kamrud (and Kuna...who was careful not to step on the snowcourse) now helps the family performing contract surveys, which gets three generations of the Kamrud family out measuring snow monthly. The snowpack they measured on March 25th was 180% of normal for the date.

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Montana Water Supply Outlook Report as of April 1st, 2016

How forecasts are made

Most of the annual streamflow in the Western United States originates as snowfall that has accumulated high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are combined with snowpack data to prepare runoff forecasts. Streamflow forecasts are coordinated by Natural Resources Conservation Service and National Weather Service hydrologists. This report presents a comprehensive picture of water supply conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data, and narratives describing current conditions.

Snowpack data are obtained by using a combination of manual and automated SNOTEL measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation and temperature are monitored on a daily basis and transmitted via meteor burst telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

Forecast uncertainty originates from two sources: (1) uncertainty of future hydrologic and climatic conditions, and (2) error in the forecasting procedure. To express the uncertainty in the most probable forecast, four additional forecasts are provided. The actual streamflow can be expected to exceed the most probable forecast 50% of the time. Similarly, the actual streamflow volume can be expected to exceed the 90% forecast volume 90% of the time. The same is true for the 70%, 30%, and 10% forecasts. Generally, the 90% and 70% forecasts reflect drier than normal hydrologic and climatic conditions; the 30% and 10% forecasts reflect wetter than normal conditions. As the forecast season progresses, a greater portion of the future hydrologic and climatic uncertainty will become known and the additional forecasts will move closer to the most probable forecast.

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Snowpack – 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 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.

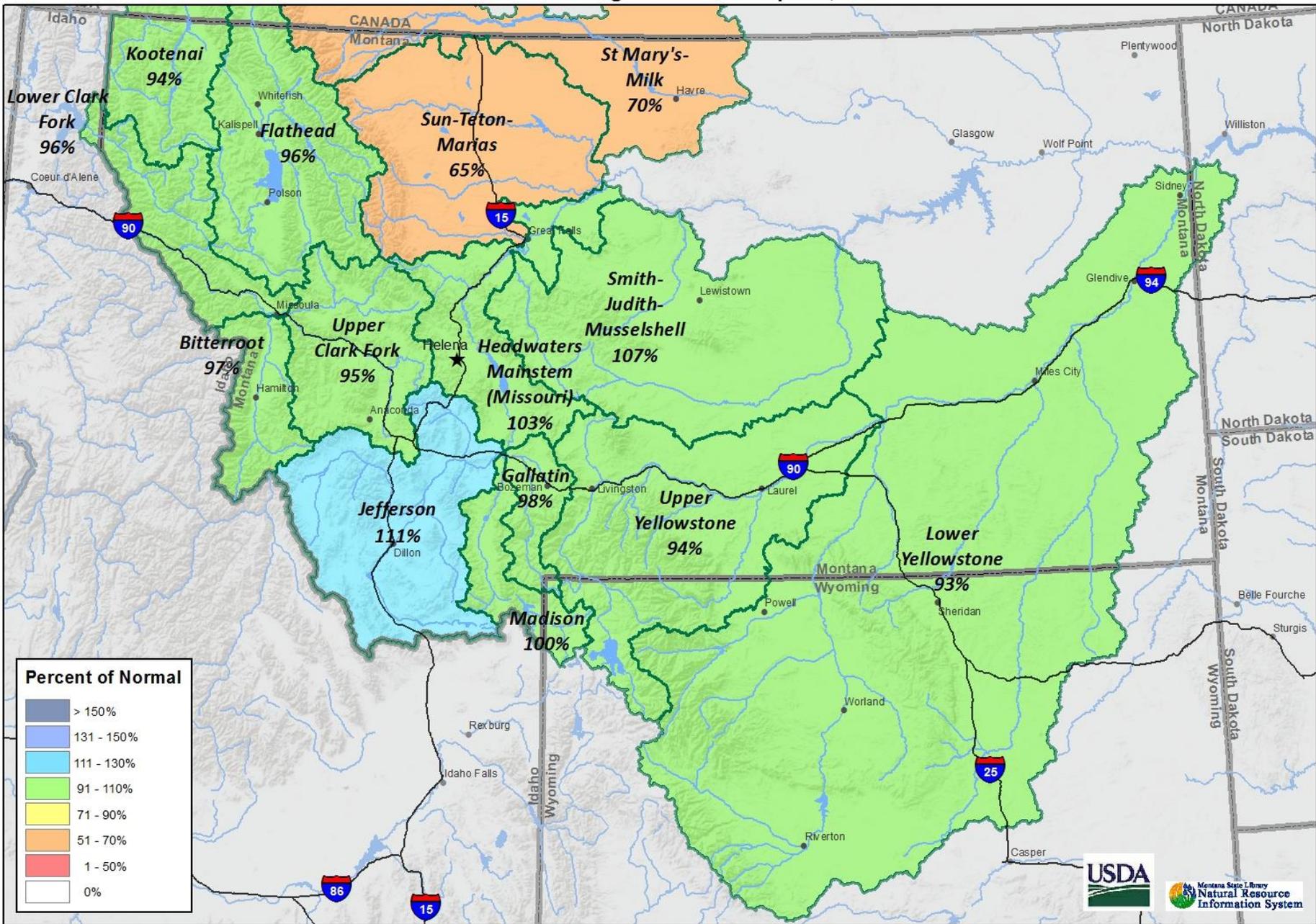
Southern basins along the Montana/Wyoming border made substantial recoveries during the end of the month when a "closed low" dropped 2 to 3" of snow water in the mountains of Montana, and up to 5" of snow water in Wyoming basins. These events which typically happen in the spring can drop substantial 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.

Snow Water Equivalent

4/1/2016	<i>% Normal</i>	<i>Monthly Δ</i>	<i>% Last Year</i>
Columbia River Basin	95	+4	140
Kootenai in Montana	94	+8	192
Flathead in Montana	96	+6	132
Upper Clark Fork	95	-1	123
Bitterroot	97	+2	124
Lower Clark Fork	96	+11	145
Missouri River Basin	98	+5	144
Jefferson	111	+3	144
Madison	100	+11	159
Gallatin	98	+6	126
Headwaters Mainstem	103	+0	134
Smith-Judith-Musselshell	107	+3	134
Sun-Teton-Marias	65	+1	123
St. Mary-Milk	70	+5	156
Yellowstone River Basin	94	+11	116
Upper Yellowstone	94	+6	116
Lower Yellowstone	93	+15	115
West of Divide	95	+4	140
East of Divide	95	+7	130
Montana State-Wide	96	+5	139

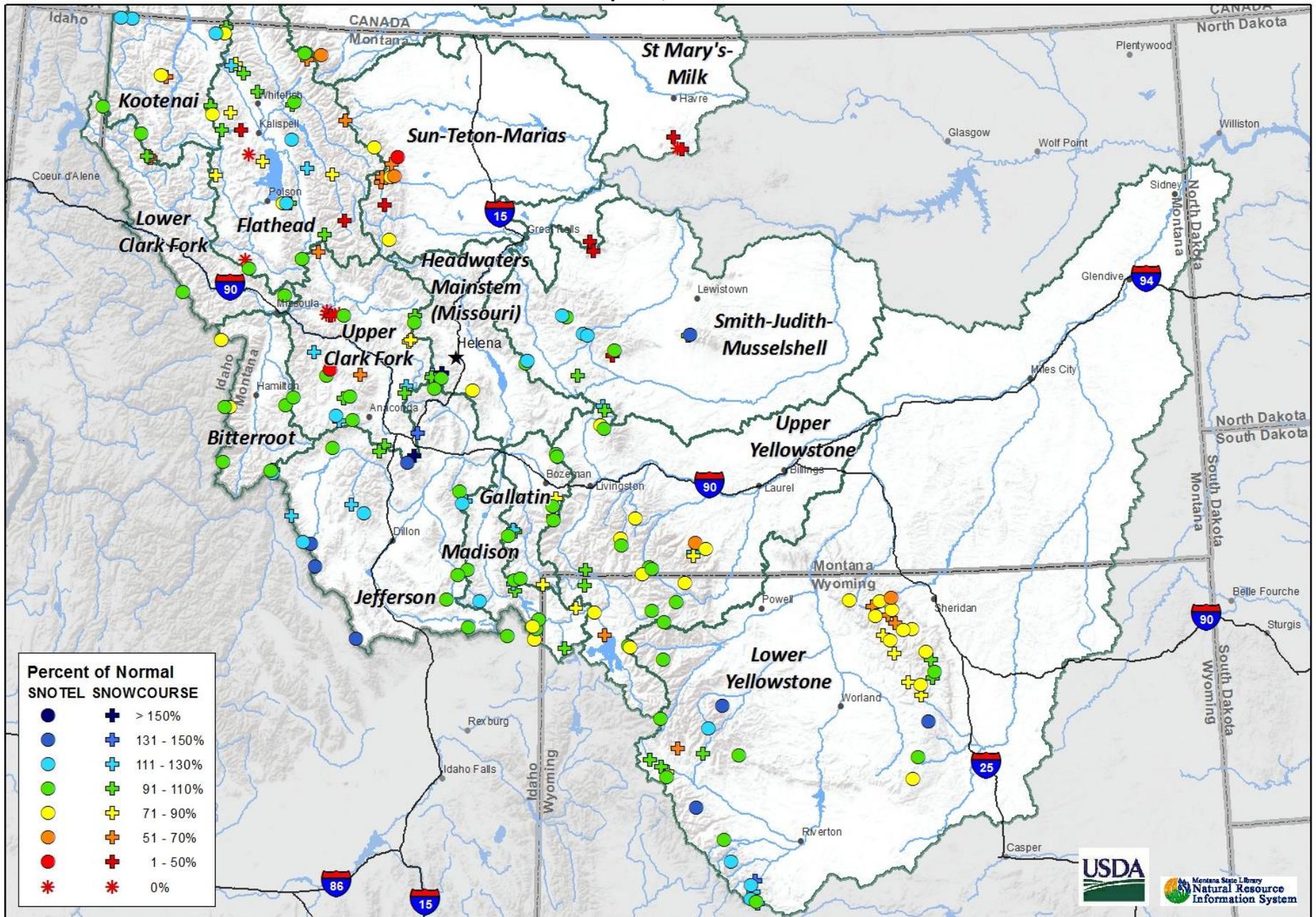
**Montana Data Collection Office
Current Snow Water Equivalent
Basin Percentage of Normal - April 1, 2016**



Note: Data includes SNOTEL and Snow course Measurements on April 1, 2016



Montana Data Collection Office
 Current Snow Water Equivalent
 April 1, 2016



Precipitation - Overview

Spring marks the transition in our weather patterns where we typically begin to see valley level rain at low elevations and snow at higher elevations in the mountains. What fell this month was abundant, and all basins except for the Sun-Teton-Marias River basin received above average precipitation. West of the Divide both mountain and valley precipitation were near to above average for the month of March, while east of the Divide mountain locations were favored over valleys with regards to precipitation.

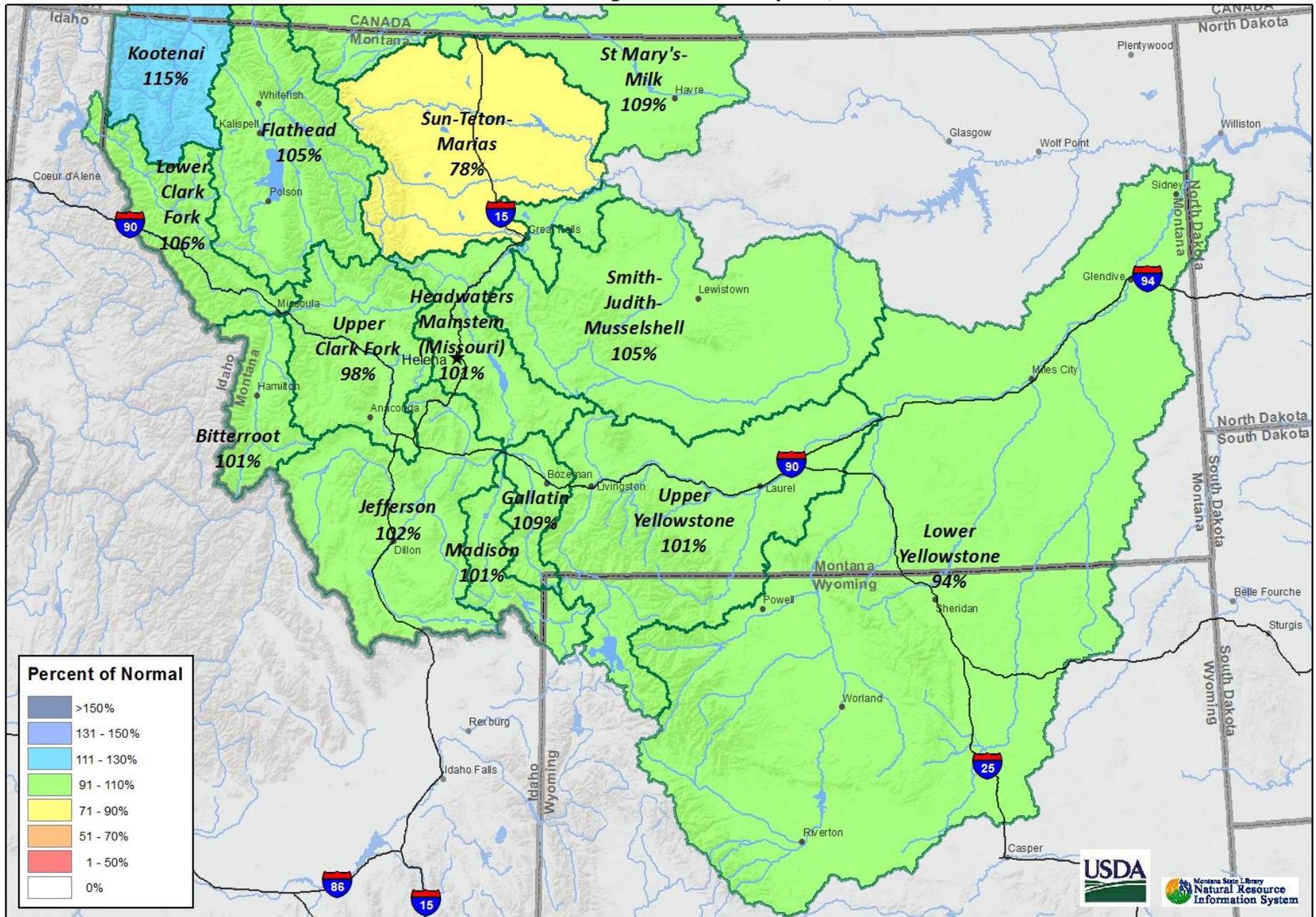
Water year-to-date precipitation (October 1st - current) across the state increased due to the storms that passed through this month and all basins are near to slightly above average, except the Sun-Teton-Marias. Current water year-to-date precipitation in the Sun-Teton-Marias River basin has dropped to 78% of average for April 1st, after experiencing its 3rd straight month of below average precipitation.

Basins east of the Divide are generally favored with regards to spring precipitation, and the last major storm that targeted the southern mountains and Wyoming basins that feed Montana's rivers illustrated that the story can change quickly in these areas. For today's date most of the major rivers in the state are in good shape, but April-June are important state wide. Normal precipitation in most basins would keep us on track as long as we gain high elevation snow, but some northern basins will require a major pattern change for recovery before spring runoff.

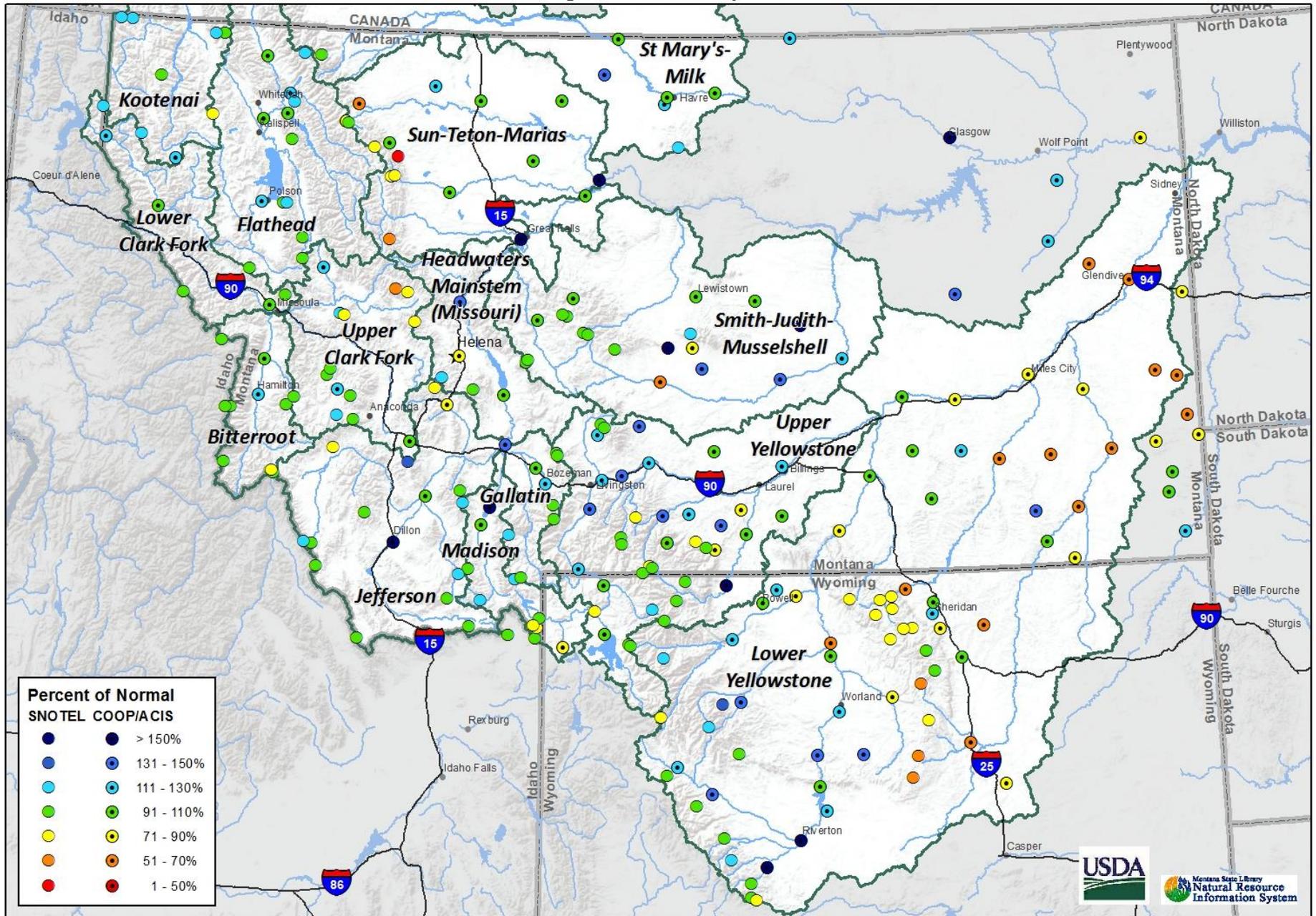
Precipitation

4/1/2016	<i>Monthly % Avg</i>	<i>Water Year % Avg</i>	<i>WY % Last Year</i>
Columbia River Basin	124	105	99
Kootenai in Montana	130	115	111
Flathead in Montana	134	105	94
Upper Clark Fork	104	98	97
Bitterroot	113	101	94
Lower Clark Fork	135	106	101
Missouri River Basin	111	100	110
Jefferson	114	102	121
Madison	140	101	136
Gallatin	138	109	118
Headwaters Mainstem	109	101	100
Smith-Judith-Musselshell	104	105	112
Sun-Teton-Marias	71	78	71
St. Mary-Milk	125	109	94
Yellowstone River Basin	134	97	109
Upper Yellowstone	121	101	110
Lower Yellowstone	142	94	109
West of Divide	124	105	99
East of Divide	121	98	109
Montana State-Wide	117	102	104

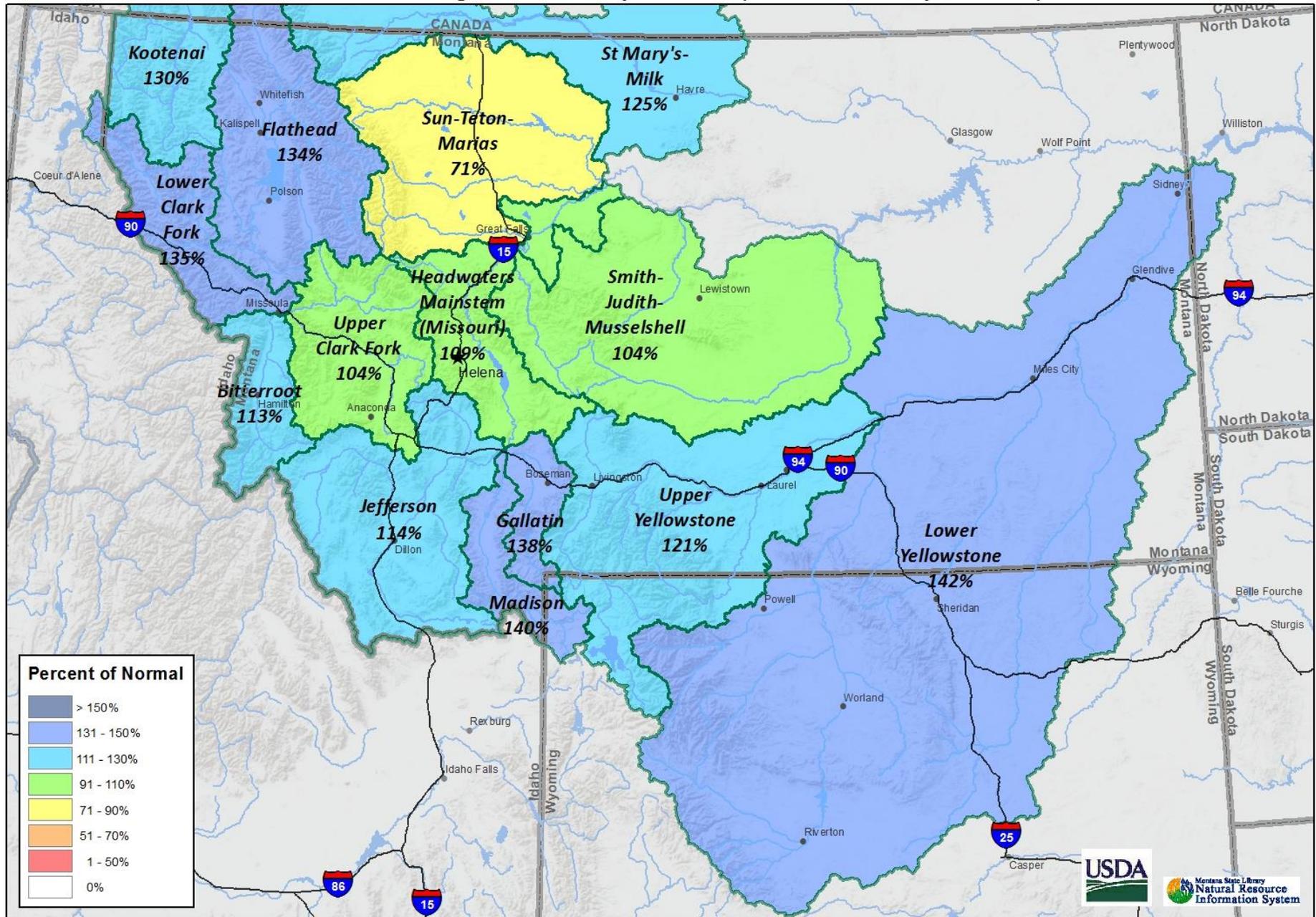
Montana Data Collection Office
 Water Year to Date Precipitation
 Basin Percentage of Normal - April 1, 2016



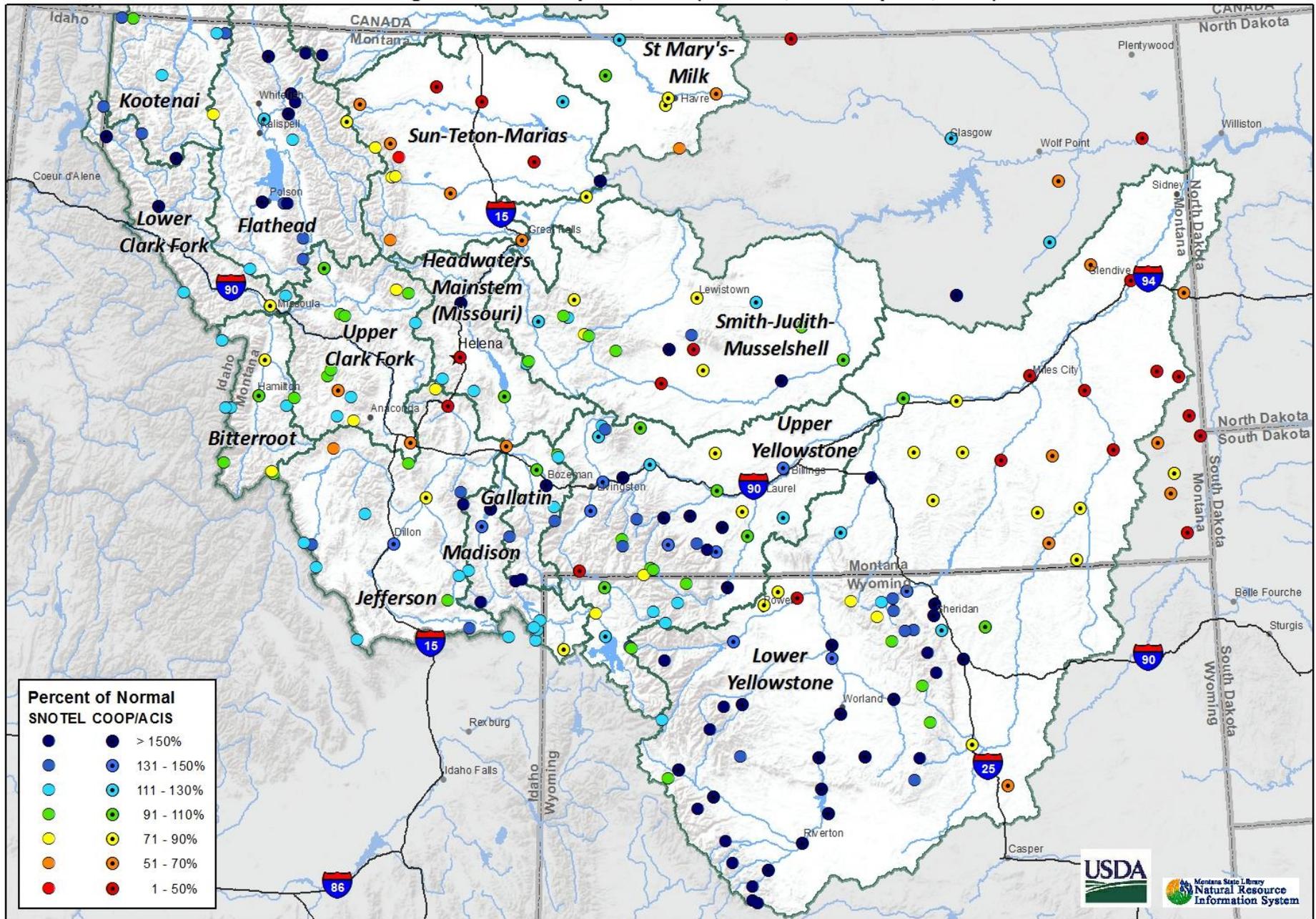
Montana Data Collection Office
 Water Year to Date Precipitation
 Percentage of Normal - April 1, 2016



**Montana Data Collection Office
 Monthly Precipitation
 Basin Percentage of Normal - April 1, 2016 (March 1, 2016 - April 1, 2016)**



**Montana Data Collection Office
 Monthly Precipitation
 Percentage of Normal - April 1, 2016 (March 1, 2016 - April 1, 2016)**



Reservoirs - Overview

The warm temperatures experienced this month have cause some of the low elevation snowpack to move into the water systems of the state, increasing reservoir volumes in many locations. Over the next few months reservoir operators will be tasked with the complicated job of balancing the inflows from snowmelt and rain events with release levels in order to fill the reservoirs for agricultural and recreational use this summer and fall. Most reservoirs in the state are currently above average for April 1st, which is good news for most water users.

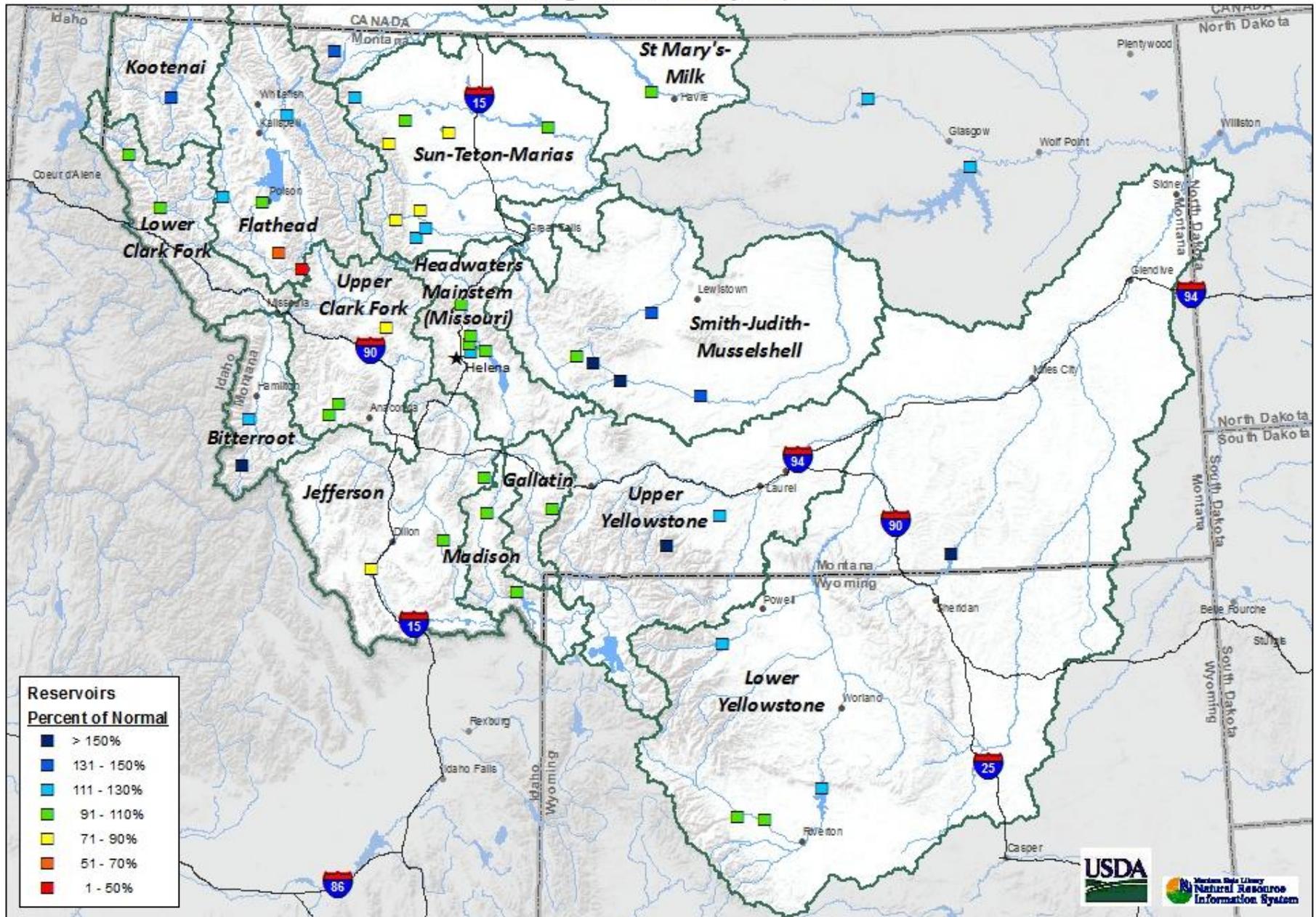
A few basins in southwest Montana have below average storage for this date, Lima (74%) and Clark Canyon (84%) are both low for this date, but snowpack and water year precipitation in the Beaverhead River basin is above average for April 1st. This should help ensure adequate levels for irrigation in these reservoirs as we enter spring and summer, however, entering the runoff season below average means wise water use and near to above average precipitation will be needed to end this water year near normal.

The reservoirs located at the foothills of the Rocky Mountain Front in the Sun-Teton-Marias River basin are also below average for this date. Gibson (75%) and Swift (78%) have both been below normal this water year due to the dry summer of last year, but have increased since last month due to low elevation melt. Spring precipitation events can assist in quickly filling reservoirs, but the long duration melt of the snowpack sustains water over a long period allowing use and refill of water from reservoirs. Snowpack in these basins is well below average for this date and without a substantial snowfall in the coming months it will provide less than average inflow into these reservoirs this water year.

Reservoir Storage

<i>4/1/2016</i>	<i>% Average</i>	<i>% Capacity</i>	<i>% Last Year</i>
Columbia River Basin	123	60	83
Kootnenai in Montana	137	57	82
Flathead in Montana	114	61	81
Upper Clark Fork	100	75	88
Bitterroot	141	51	70
Lower Clark Fork	100	93	96
Missouri River Basin	112	76	96
Jefferson	85	45	84
Madison	107	77	94
Gallatin	99	54	87
Headwaters Mainstem	115	79	97
Smith-Judith-Musselshell	138	80	87
Sun-Teton-Marias	99	52	82
St. Mary-Milk	122	56	74
Yellowstone River Basin	107	60	97
Upper Yellowstone	122	53	109
Lower Yellowstone	106	61	96
West of Divide	123	60	83
East of Divide	112	75	96
Montana State-Wide	115	70	92

Montana Data Collection Office
 Reservoir Levels
 Percentage of Normal - April 1, 2016



Streamflow - Overview

Spring is here and with it has come the transition to the seasonal runoff of snowpack from the mountains in the state. During the first half of the month streamflows were above average to well above average in the northwest river basins, due to low elevation snowmelt and precipitation from the storms that passed through the area. Cooler weather mid-month and some additional snowfall brought the rivers flows closer to average ending the month. Most other river basins across the state have remained near average, or slightly below for the month.

Streamflow forecasts for April 1st range widely across the state due to the variability in snow cover and precipitation, but for most river basins are near to slightly above average for the April-July time period. There are some exceptions where low snowpack for the date and below average water year precipitation has led to forecasts which are well below average. The average basin-wide forecast for the Sun-Teton-Marias River basin is 60% of average for the April-July time period, and forecasts for the Tongue and Powder River basins in Wyoming range from 62% to 77% of average for the period.

Overall, streamflow prospects look much better this year than they did at this time last year. West of the Divide the average streamflow forecast is 101% of average, and east of the Divide the average streamflow forecast is 91% of average. There are still two important months to add snowpack to the water systems of the state, so the story is not written yet. Normal precipitation and temperatures from this point forward will maintain what we have, but some basins need substantial improvement in order to see normal stream volumes this summer.

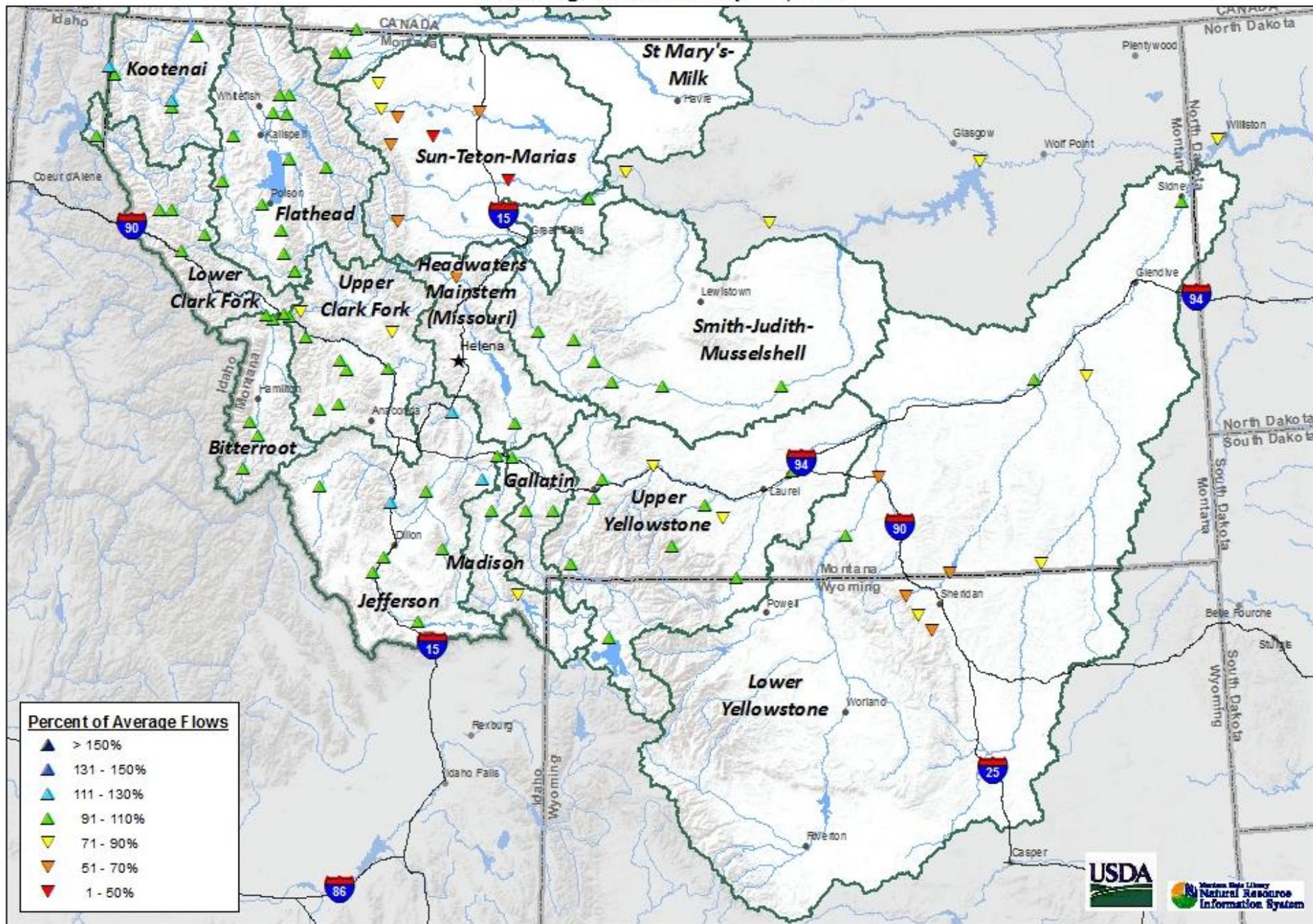
For more information on streamflow forecasts and how to interpret these forecasts [click here](#).

FOR FORECASTS ABOVE AND BELOW THE 50 PERCENT EXCEEDANCE, LOOK TO THE SPECIFIC BASIN REPORTS.

APR-JUL Streamflow Forecasts

<i>4/1/2016</i>	<i>% Average</i>	<i>% Last Year</i>
Columbia River Basin	101	150
Kootenai in Montana	113	162
Flathead in Montana	99	152
Upper Clark Fork	96	136
Bitterroot	98	115
Lower Clark Fork	97	147
Missouri River Basin	90	123
Jefferson	107	204
Madison	93	135
Gallatin	97	135
Headwaters Mainstem	89	117
Smith-Judith-Musselshell	99	100
Sun-Teton-Marias	60	97
St. Mary-Milk	94	131
Yellowstone River Basin	93	93
Upper Yellowstone	95	108
Lower Yellowstone	92	84
West of Divide	101	150
East of Divide	91	108
Montana State-Wide	97	127

Montana Data Collection Office
 Streamflow Forecast
 Percentage of Normal - April 1, 2016



Surface Water Supply Index (SWSI)

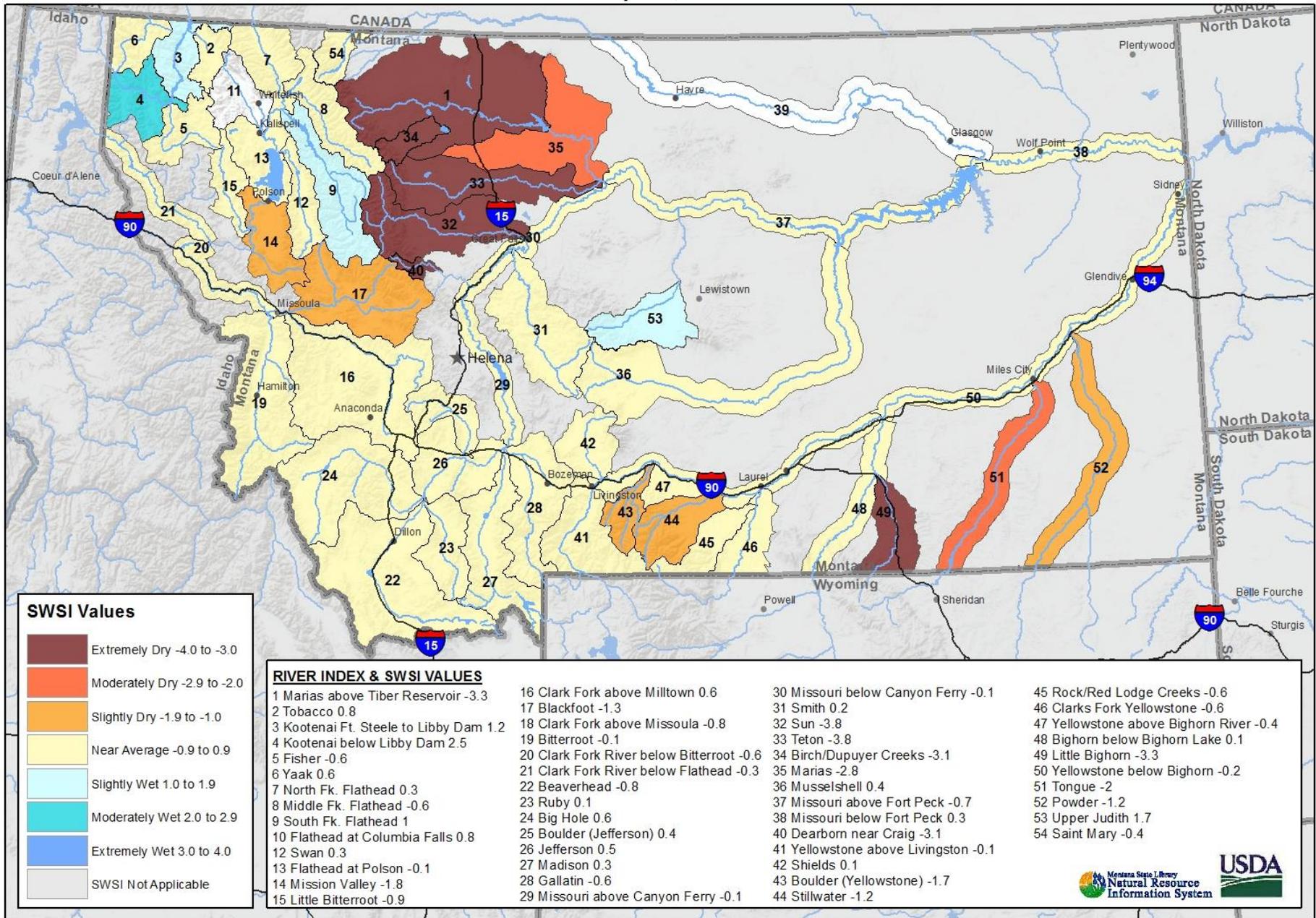
The Surface Water Supply Index (SWSI) is a measure of available surface water availability for the spring and summer months. Water users that rely on mountain precipitation can use the index to evaluate seasonal surface water supplies. The SWSI accounts for mountain snowpack, mountain precipitation, streamflow, reservoir storage, and soil moisture.

Watershed	This month's SWSI	Last Year's SWSI
Marias above Tiber Reservoir	-3.3	-2.9
Tobacco	0.8	-2.9
Kootenai Ft. Steele to Libby Dam	1.2	-0.7
Kootenai below Libby Dam	2.5	2.3
Fisher	-0.6	-3.1
Yaak	0.6	-2.2
North Fk. Flathead	0.3	-1.8
Middle Fk. Flathead	-0.6	-1.1
South Fk. Flathead	1.0	3.2
Flathead at Columbia Falls	0.8	0.7
Swan	0.3	0.7
Flathead at Polson	-0.1	-0.2
Mission Valley	-1.8	1.2
Little Bitterroot	-0.9	-1.6
Clark Fork above Milltown	0.6	-1.6
Blackfoot	-1.3	-2.5
Clark Fork above Missoula	-0.8	-2.2
Bitterroot	-0.1	-2.0
Clark Fork River below Bitterroot	-0.6	-2.1
Clark Fork River below Flathead	-0.3	-0.9
Beaverhead	-0.8	-2.4
Ruby	0.1	-4.0
Big Hole	0.6	-1.1
Boulder (Jefferson)	0.4	-1.8
Jefferson	0.5	-2.4
Madison	0.3	-3.3
Gallatin	-0.6	-2.2
Missouri above Canyon Ferry	-0.1	-2.9
Missouri below Canyon Ferry	-0.1	-2.2
Smith	0.2	-0.4
Sun	-3.8	-2.5
Teton	-3.8	-1.6
Birch/Dupuyer Creeks	-3.1	-1.3
Marias	-2.8	-0.7
Musselshell	0.4	-0.9
Missouri above Fort Peck	-0.7	-0.2
Missouri below Fort Peck	0.3	-0.9
Milk		
Dearborn near Craig	-3.1	-2.7
Yellowstone above Livingston	-0.1	-1.8
Shields	0.1	-2.6
Boulder (Yellowstone)	-1.7	-2.7
Stillwater	-1.2	-1.6
Rock/Red Lodge Creeks	-0.6	-0.5
Clarks Fork Yellowstone	-0.6	-0.2
Yellowstone above Bighorn River	-0.4	-0.4
Bighorn below Bighorn Lake	0.1	-0.7
Little Bighorn	-3.3	-1.6
Yellowstone below Bighorn	-0.2	-0.5
Tongue	-2.0	-1.8
Powder	-1.2	-1.1
Upper Judith	1.7	-0.3
Saint Mary	-0.4	-2.7

SWSI Scale

+3.0 to +4.0	Extremely Wet
+2.0 to +2.9	Moderately Wet
+1.0 to +1.9	Slightly Wet
+0.9 to -0.9	Near Average
-1.0 to -1.9	Slightly Dry
-2.0 to -2.9	Moderately Dry
-3.0 to -4.0	Extremely Dry

**Montana Data Collection Office
Surface Water Supply Index (SWSI)
April 1, 2016**



Note: Data used to generate this map are PROVISIONAL and SUBJECT TO CHANGE



Kootenai River Basin



Last year, April 1st marked the day that the Kootenai River basin wide snowpack reached an all-time low. Currently the basin wide snow water equivalent value is 10.9 inches higher than last year and near normal. On April 1st, 2015 Baree Creek Snow Course (5500 ft) only had 17.1 inches of snow water (42 inches depth) and ranked lowest out of 78 years of record. This year Baree Creek has 33.1 inches of snow water (88 inches depth), which is 95% of normal. As of April 1st the snowpack percentage of normal is higher in the northern portion of the Kootenai. The Yaak River basin is the highest at 123% of normal. Currently at 102% of normal the Tobacco River basin saw 14% increase from last month. The Fisher River basin is the lowest 80% of normal.

Even though snowpack numbers are generally near normal in the Kootenai River basin not all precipitation came in the form of snow. Above normal temperatures, particularly during the second week of the month brought rain or very high density snow to SNOTEL sites within the basin. The second week also brought March's largest storm delivering over 3 inches of precipitation to Poorman Creek SNOTEL (5100 ft). Mountain SNOTEL sites received 128% of average precipitation for the month of March, while valley weather stations received 173% of average precipitation in the Kootenai River basin.

Reservoir storage in Lake Koocanusa is currently above average at 137%.

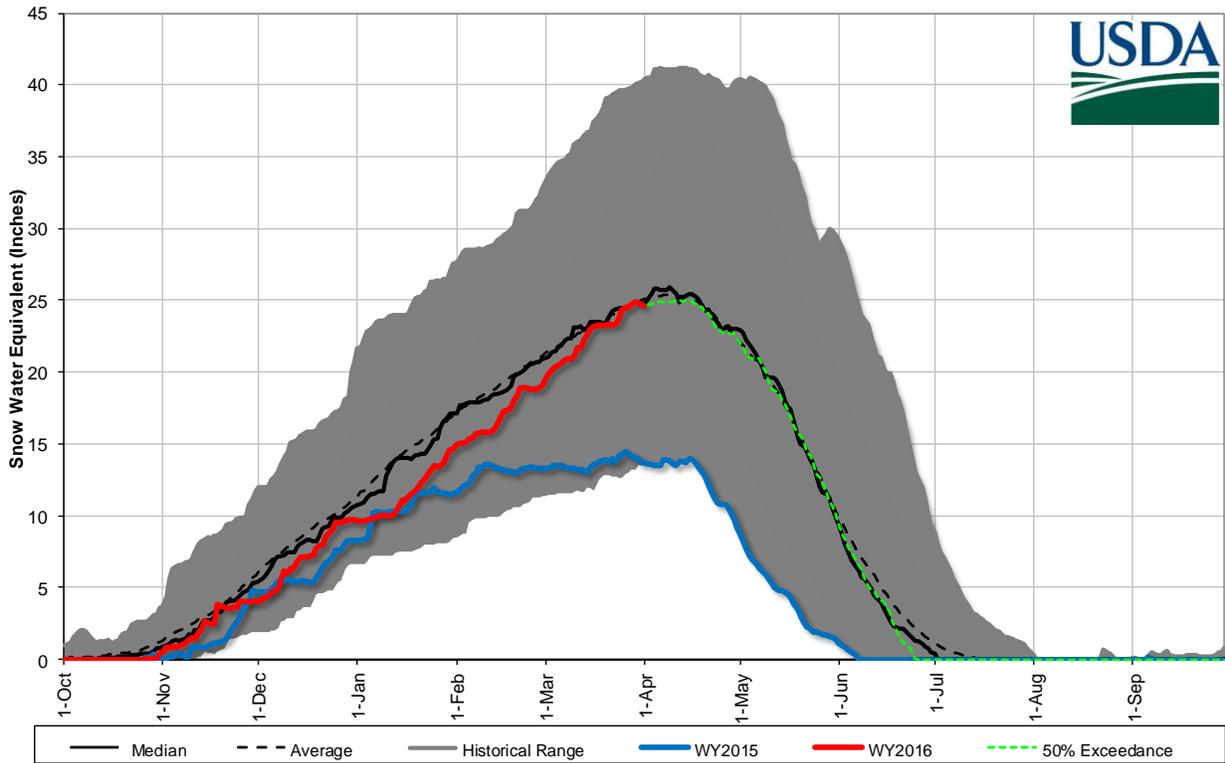
Streamflow forecasts are generally above average across the basin for the April-July time period with the exception of the Fisher, which is slightly below. Consult the individual point forecasts at the end of this section for specific point forecasts. Current basin-wide streamflows for the 50 percent exceedance are 113% of average for the April-July time period.

Kootenai River Basin Data Summary		4/1/2016	
Snowpack	Percent of 1981-2010 Normal (Median)	Last Year Percentage of Normal (Median)	
Basin-Wide	94%	49%	
Precipitation	Monthly Percentage of Average	WYTD Percentage of 1981-2010 Average*	Last Year Percentage of Average
Mountain Precipitation	128%	114%	103%
Valley Precipitation	173%	129%	117%
Basin Precipitation	130%	115%	104%
Reservoir Storage	Percentage of Average	Percentage of Capacity (Total)	Last Year Percentage of Average
Basin-Wide Storage	137%	57%	167%
Streamflow Forecast	50 % Exceedance Forecast Percentage of Average	50 % Exceedance Forecast % of Last Year's Flows	Last Year Percentage of Average
Basin-Wide Apr-July	113%	162%	70%

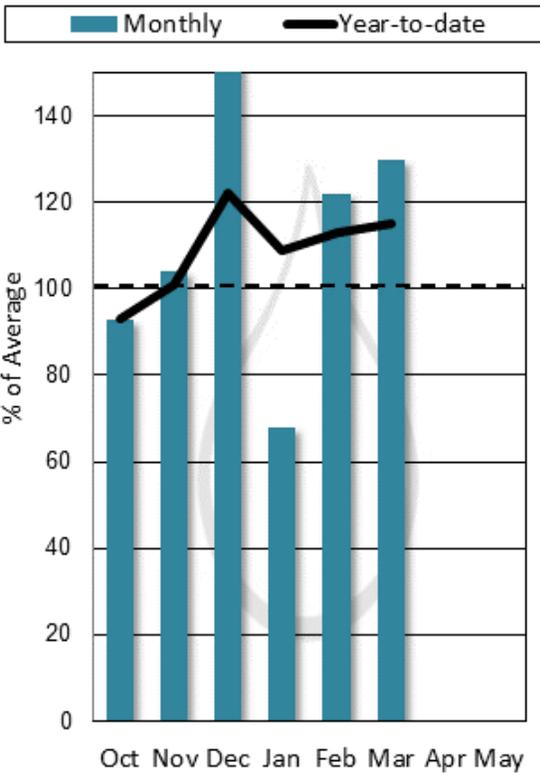
*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

**Basin-wide streamflows are an average of the individual streamflow points within the basin for the 50 percent exceedance forecast. Consult the individual streamflow forecasts in the table below for the range of forecasts at an individual point.

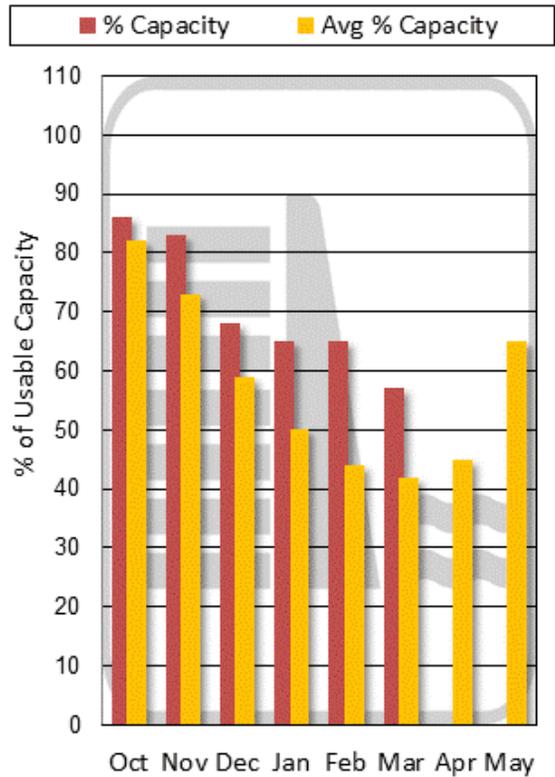
Kootenai River Basin Snowpack with Non-Exceedence Projections
Based on provisional SNOTEL daily data as of 4/1/2016



**Mountain and Valley
Precipitation**

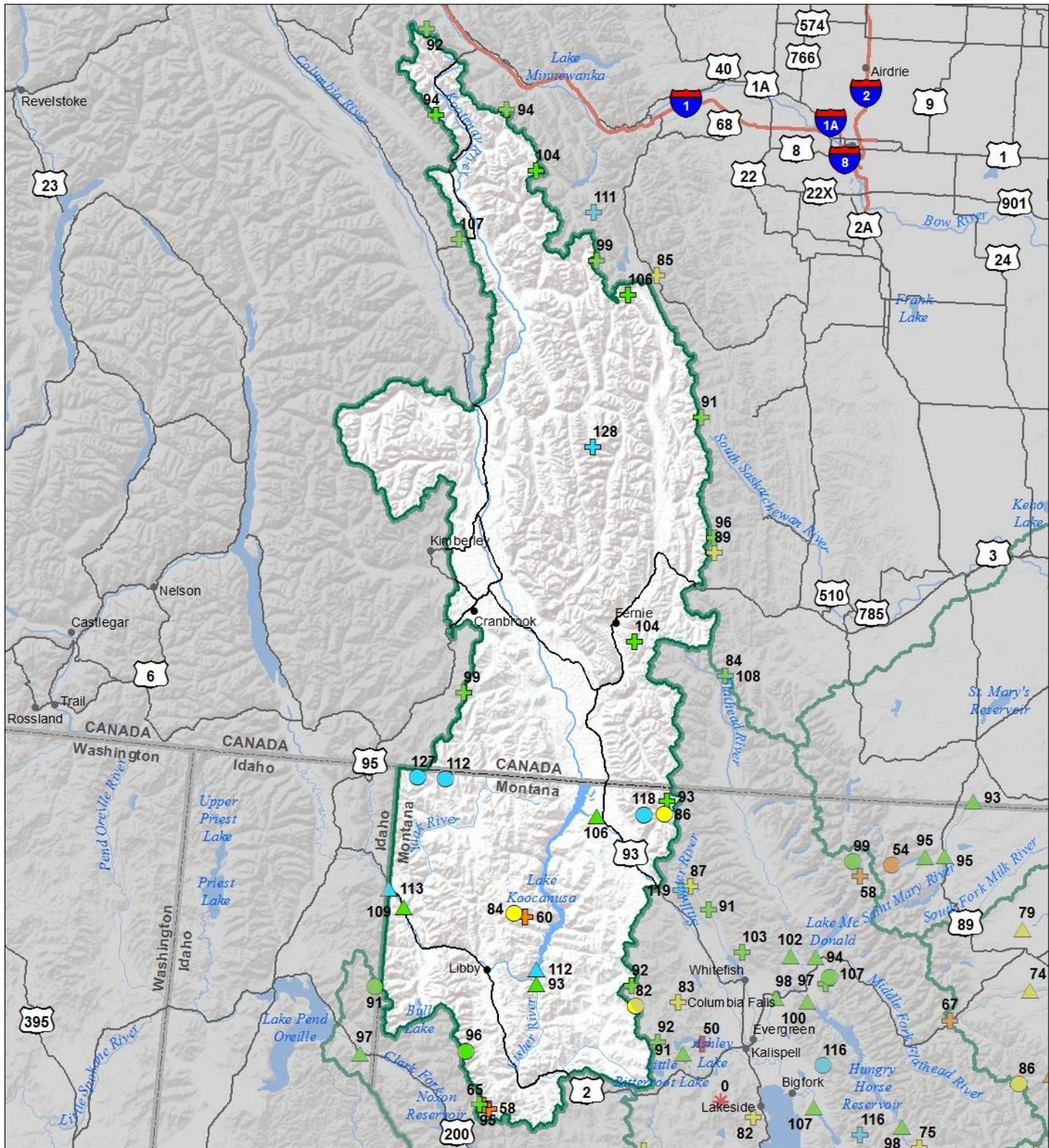


**End of Month Reservoir
Storage**



Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Kootenai River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Normal April 1, 2016



Snow Water Equivalent Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%
- * 0%

Snowcourse

- + > 150%
- + 131 - 150%
- + 111 - 130%
- + 91 - 110%
- + 71 - 90%
- + 51 - 70%
- + 1 - 50%
- * 0%

Streamflow Forecast Percent of Average Flows

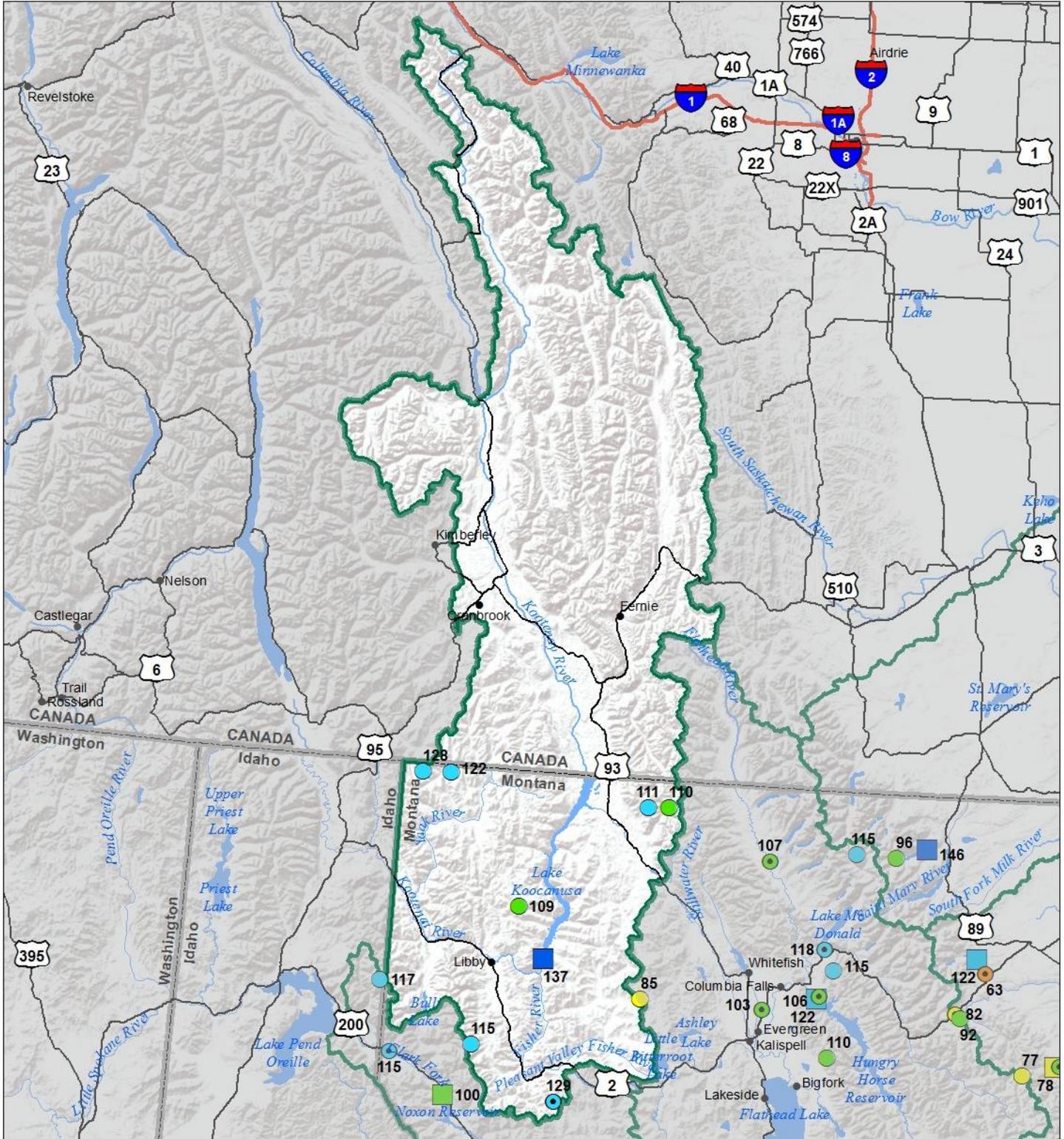
- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



Kootenai River Basin

Water Year to Date Precipitation and Reservoir Levels Percentage of Normal

April 1, 2016



Precipitation Percent of Normal

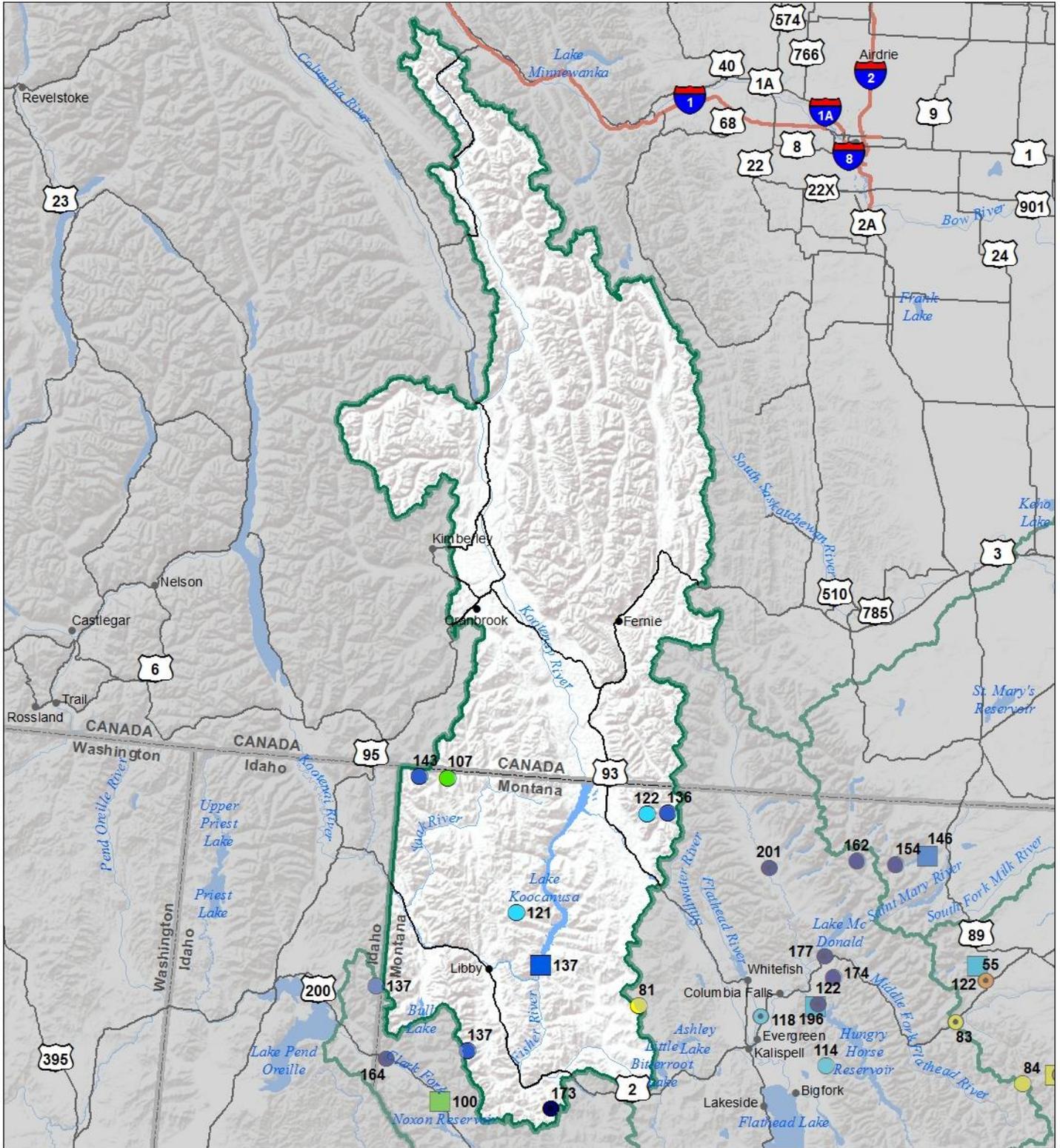
SNOTEL		COOP/ACIS	
● > 150%	● 71 - 90%	● > 150%	● 71 - 90%
● 131 - 150%	● 51 - 70%	● 131 - 150%	● 51 - 70%
● 111 - 130%	● 1 - 50%	● 111 - 130%	● 1 - 50%
● 91 - 110%		● 91 - 110%	

Reservoirs Percent of Normal

■ > 150%
■ 131 - 150%
■ 111 - 130%
■ 91 - 110%
■ 71 - 90%
■ 51 - 70%
■ 1 - 50%



Kootenai River Basin Monthly Precipitation and Reservoir Levels Percentage of Normal April 1, 2016 (March 1, 2016 - April 1, 2016)



Precipitation Percent of Normal

SNOTEL

- > 150%
- 71 - 90%
- 131 - 150%
- 51 - 70%
- 111 - 130%
- 1 - 50%
- 91 - 110%

COOP/ACIS

- > 150%
- 71 - 90%
- 131 - 150%
- 51 - 70%
- 111 - 130%
- 1 - 50%
- 91 - 110%

Reservoirs Percent of Normal

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%



Kootenai River Basin In Montana Streamflow Forecasts - April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast

KOOTENAI RIVER BASIN in MONTANA	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Tobacco R nr Eureka	APR-JUL	104	123	135	107%	148	166	126
	APR-SEP	113	134	149	106%	163	185	140
Libby Reservoir Inflow ¹	APR-JUL	5160	5760	6040	113%	6310	6920	5340
	APR-SEP	6100	6720	7000	112%	7280	7900	6250
Fisher R nr Libby	APR-JUL	144	173	192	94%	210	240	205
	APR-SEP	155	185	205	93%	225	255	220
Yaak R nr Troy	APR-JUL	365	420	460	110%	500	555	420
	APR-SEP	380	440	480	109%	520	580	440
Kootenai R at Leonia ^{1,2}	APR-JUL	6430	7170	7510	114%	7840	8580	6600
	APR-SEP	7460	8210	8550	113%	8890	9640	7590

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

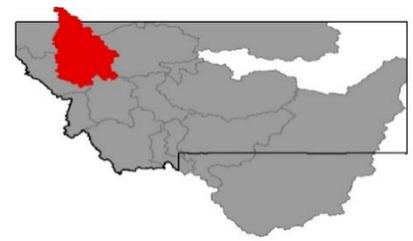
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

3) Median value used in place of average

Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Koocanusa	3288.4	4020.2	2408.0	5748.0
Basin-wide Total	3288.4	4020.2	2408.0	5748.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
KOOTENAY in CANADA	8	96	81
KOOTENAI MAINSTEM	4	90	41
TOBACCO	3	102	70
FISHER	5	80	30
YAAK	2	123	83
KOOTENAI RIVER BASIN in MONTANA	14	94	49
KOOTENAI ab BONNERS FERRY	21	95	62

Flathead River Basin



This winter started slow in the Flathead River basin and basin wide snowpack was actually faring worse than it was last winter, until this March. Relatively consistent snowfall since a dry spell in early January attributed to the basin reaching a couple water year 2016 landmarks last month. March 7th was the first day all year that the basin had more snow than last year and on March 17th the basin reach above normal snowpack conditions for the first time all year. Typically the basin wide snowpack in the Flathead peaks between the first and second week of the April. On April 1st the snowpack at the basin’s highest elevation SNOTEL site, Flattop Mountain (6300 ft), was still accumulating snow. The snowpack at low elevation SNOTEL sites was melting over the last several days of March.

Overall the Flathead River basin received well above average precipitation in March. During the first two weeks of the month the basin saw enough precipitation to drive streamflows to well above average conditions. On March 14th the Middle Fork of the Flathead River near West Glacier reached about 2500 cfs, which was 300% of its mean daily value. Badger Pass and Hand Creek were the only two SNOTEL sites in the Flathead basin to receive below average March precipitation at 84% and 81%. Overall, mountain SNOTEL sites received 133% of average precipitation for the month of March, while valley weather stations received 140% of average precipitation in the Flathead River basin.

Reservoir capacities in the Flathead River basin are currently near to above average, with the exception of Mission Valley Reservoir, which is at 67%. Lower Jocko Lake is not reported. Overall basin wide reservoir capacity is at 114% of average.

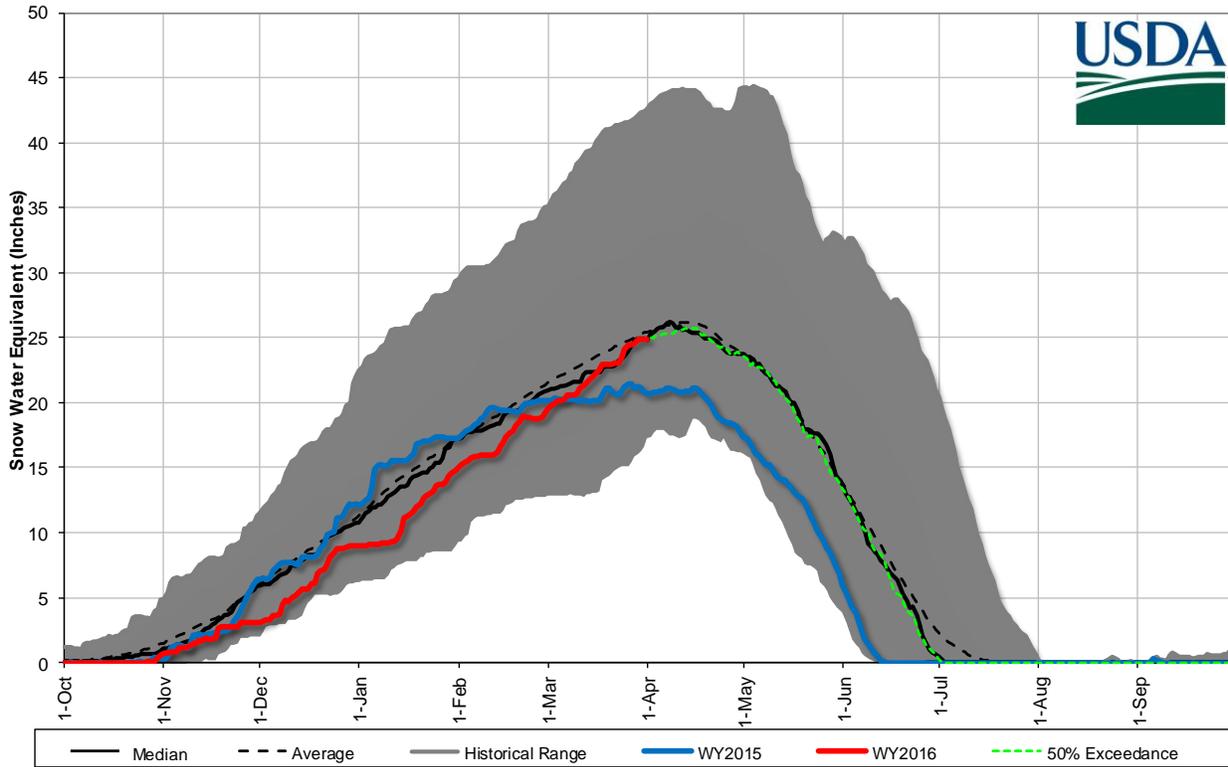
Streamflow forecasts are generally near to above average across the basin for the April-July time period. Consult the individual point forecasts at the end of this section for specific point forecasts. Current basin-wide streamflows for the 50 percent exceedance are 99% of average for the April-July time period.

Flathead River Basin Data Summary		4/1/2016	
	Percent of 1981-2010 Normal (Median)	Last Year Percentage of Normal (Median)	
Snowpack			
Basin-Wide	96%	73%	
	Monthly Percentage of Average	WYTD Percentage of 1981-2010 Average*	Last Year Percentage of Average
Precipitation			
Mountain Precipitation	133%	104%	111%
Valley Precipitation	140%	115%	157%
Basin Precipitation	134%	105%	112%
	Percentage of Average	Percentage of Capacity (Total)	Last Year Percentage of Average
Reservoir Storage			
Basin-Wide Storage	114%	61%	140%
	50 % Exceedance Forecast Percentage of Average	50 % Exceedance Forecast % of Last Year's Flows	Last Year Percentage of Average
Streamflow Forecast			
Basin-Wide Apr-July	99%	152%	65%

*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

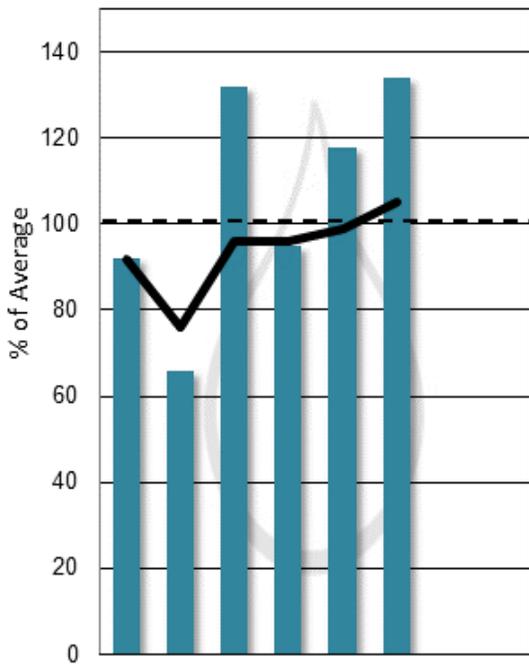
**Basin-wide streamflows are an average of the individual streamflow points within the basin for the 50 percent exceedance forecast. Consult the individual streamflow forecasts in the table below for the range of forecasts at an individual point.

Flathead River Basin Snowpack with Non-Exceedence Projections
Based on provisional SNOTEL daily data as of 4/1/2016



Mountain and Valley Precipitation

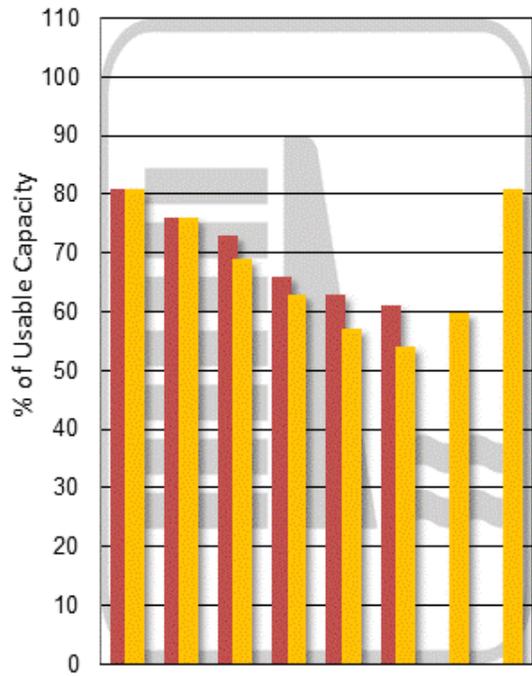
Monthly Year-to-date



Oct Nov Dec Jan Feb Mar Apr May

End of Month Reservoir Storage

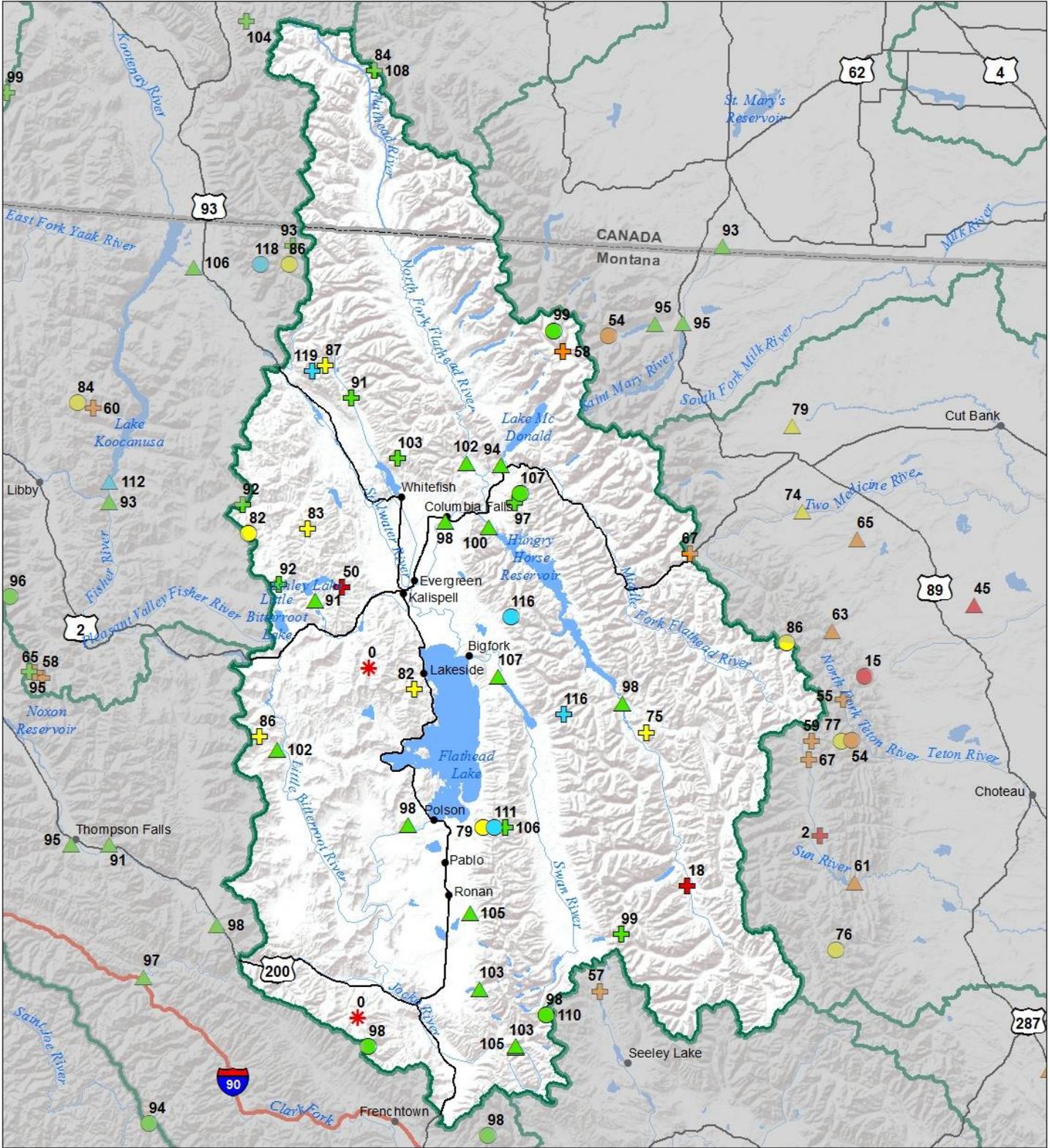
% Capacity Avg % Capacity



Oct Nov Dec Jan Feb Mar Apr May

Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Flathead River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Normal April 1, 2016



Snow Water Equivalent Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%
- *

Snowcourse

- ⊕ > 150%
- ⊕ 131 - 150%
- ⊕ 111 - 130%
- ⊕ 91 - 110%
- ⊕ 71 - 90%
- ⊕ 51 - 70%
- ⊕ 1 - 50%
- ⊕ *

Streamflow Forecast Percent of Average Flows

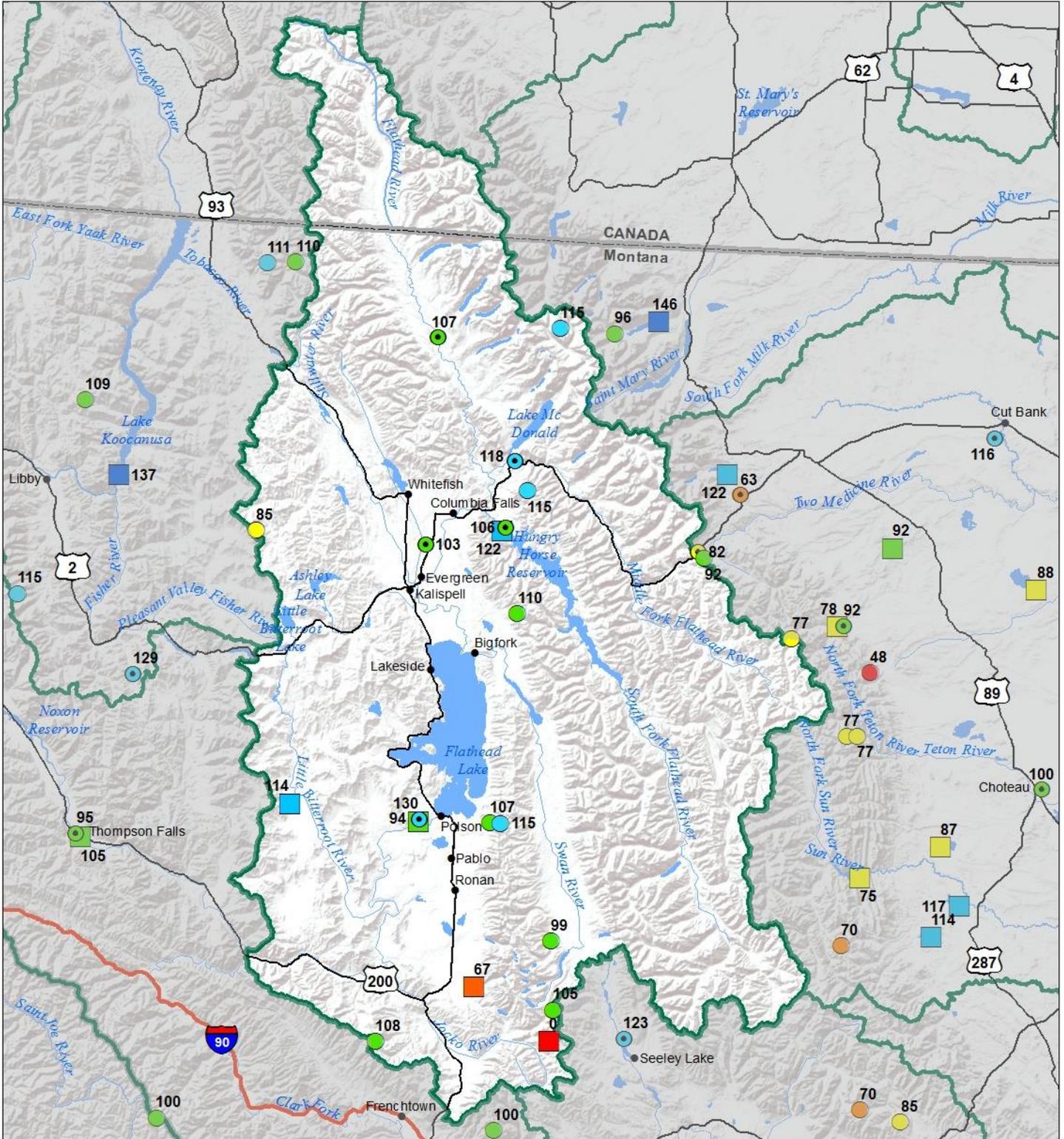
- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



Flathead River Basin

Water Year to Date Precipitation and Reservoir Levels Percentage of Normal

April 1, 2016



Precipitation Percent of Normal

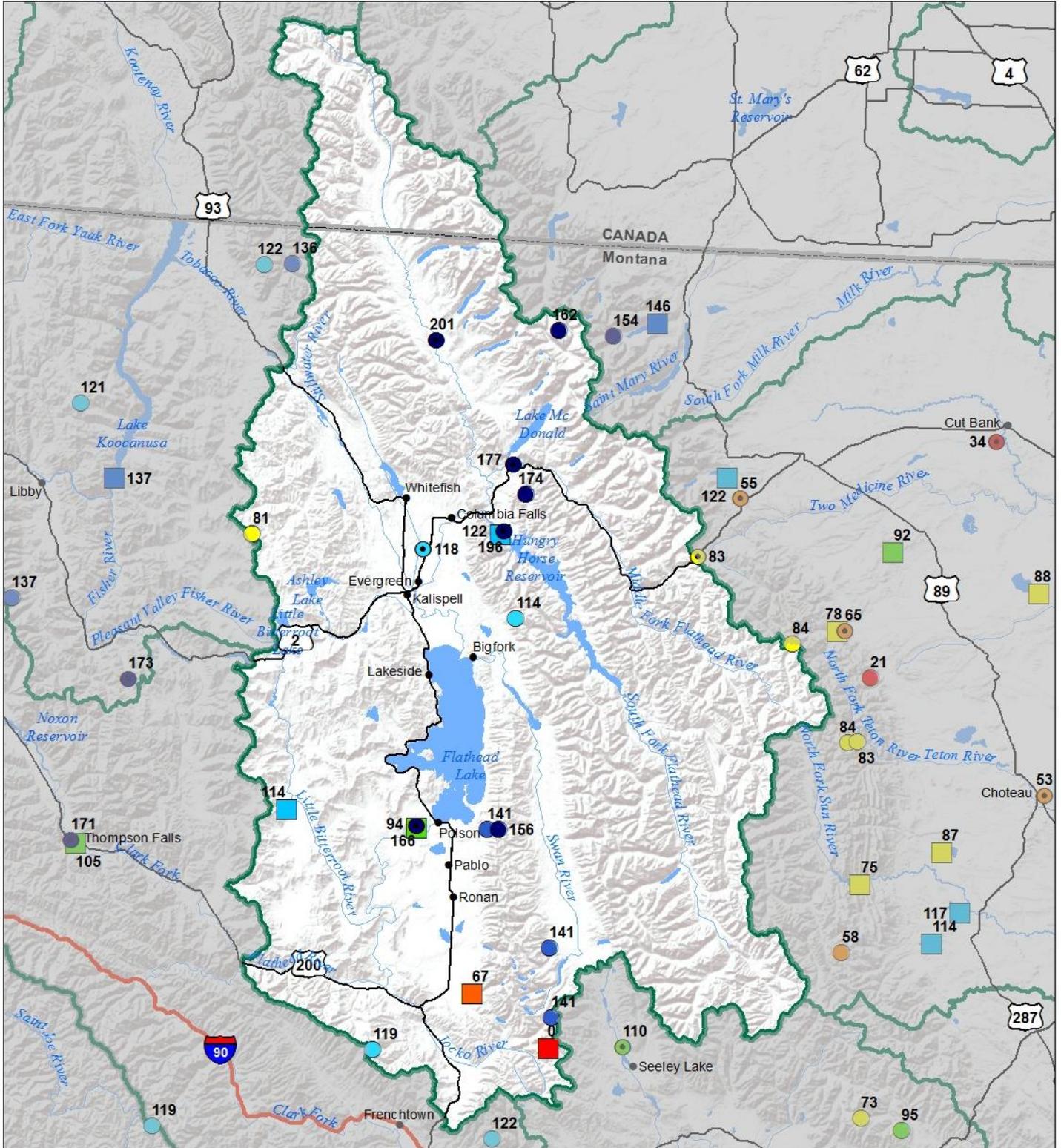
SNOTEL		COOP/ACIS	
● > 150%	● 71 - 90%	● > 150%	● 71 - 90%
● 131 - 150%	● 51 - 70%	● 131 - 150%	● 51 - 70%
● 111 - 130%	● 1 - 50%	● 111 - 130%	● 1 - 50%
● 91 - 110%		● 91 - 110%	

Reservoirs Percent of Normal

■ > 150%
■ 131 - 150%
■ 111 - 130%
■ 91 - 110%
■ 71 - 90%
■ 51 - 70%
■ 1 - 50%



Flathead River Basin Monthly Precipitation and Reservoir Levels Percentage of Normal April 1, 2016 (March 1, 2016 - April 1, 2016)



Precipitation Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

COOP/ACIS

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

Reservoirs Percent of Normal

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%



Flathead River Basin Streamflow Forecasts - April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

FLATHEAD RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
NF Flathead R nr Columbia Falls	APR-JUL	1360	1490	1570	102%	1650	1770	1540
	APR-SEP	1510	1640	1730	102%	1830	1960	1700
MF Flathead R nr West Glacier	APR-JUL	1190	1320	1410	94%	1490	1620	1500
	APR-SEP	1300	1440	1530	94%	1630	1770	1630
Sf Flathead R nr Hungry Horse	APR-JUL	995	1090	1160	98%	1220	1320	1180
	APR-SEP	1050	1160	1230	98%	1300	1410	1260
Hungry Horse Reservoir Inflow ^{1,2}	APR-JUL	1500	1760	1870	101%	1990	2240	1860
	APR-SEP	1580	1860	1980	100%	2110	2380	1980
Flathead R at Columbia Falls ²	APR-JUL	4300	4690	4950	99%	5220	5610	5020
	APR-SEP	4620	5060	5360	98%	5650	6090	5450
Ashley Ck nr Marion ²	APR	0.99	1.83	2.4	92%	3	3.8	2.6
	APR-JUL	3.6	5	5.9	91%	6.8	8.2	6.5
Swan R nr Bigfork	APR-JUL	470	525	560	108%	595	650	520
	APR-SEP	530	595	635	107%	675	740	595
Flathead Lake Inflow ^{1,2}	APR-JUL	4660	5380	5710	98%	6040	6770	5810
	APR-SEP	4950	5780	6150	98%	6530	7360	6270
Mill Ck ab Bassoo ck nr Niarada	APR-JUL	2.9	3.7	4.2	105%	4.7	5.5	4
	APR-SEP	3.2	4	4.5	102%	5	5.8	4.4
South Crow Ck nr Ronan	APR-JUL	8.3	9.7	10.7	106%	11.6	13	10.1
	APR-SEP	9.5	11.1	12.2	105%	13.2	14.8	11.6
Mission Ck nr St. Ignatius	APR-JUL	22	25	26	104%	28	30	25
	APR-SEP	26	29	31	103%	33	36	30
SF Jocko R nr Arlee	APR-JUL	27	32	35	106%	37	42	33
	APR-SEP	31	36	39	105%	42	46	37
NF Jocko R bl Tabor Feeder Canal	APR-JUL	28	30	32	103%	34	37	31
	APR-SEP	30	32	34	103%	36	39	33

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

Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Camas (4)	25.6	41.8	22.5	45.2
Lower Jocko Lake	0.0	0.0	0.0	6.4
Mission Valley (8)	22.5	36.8	33.7	100.0
Hungry Horse Lake	2529.4	2969.8	2081.0	3451.0
Flathead Lake	715.8	1007.5	762.6	1791.0
Basin-wide Total	3293.2	4056.0	2899.8	5393.6
# of reservoirs	5	5	5	5

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
NF FLATHEAD in CANADA	1	84	63
NF FLATHEAD in MONTANA	8	93	66
MIDDLE FORK FLATHEAD	5	92	72
SOUTH FORK FLATHEAD	6	103	84
STILLWATER-WHITEFISH	9	96	68
SWAN	6	108	98
MISSION VALLEY	4	101	88
LITTLE BITTERROOT-ASHLEY	5	75	27
JOCKO	4	98	90
FLATHEAD in MONTANA	33	96	73
FLATHEAD RIVER BASIN	34	96	73

Upper Clark Fork River Basin



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.

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

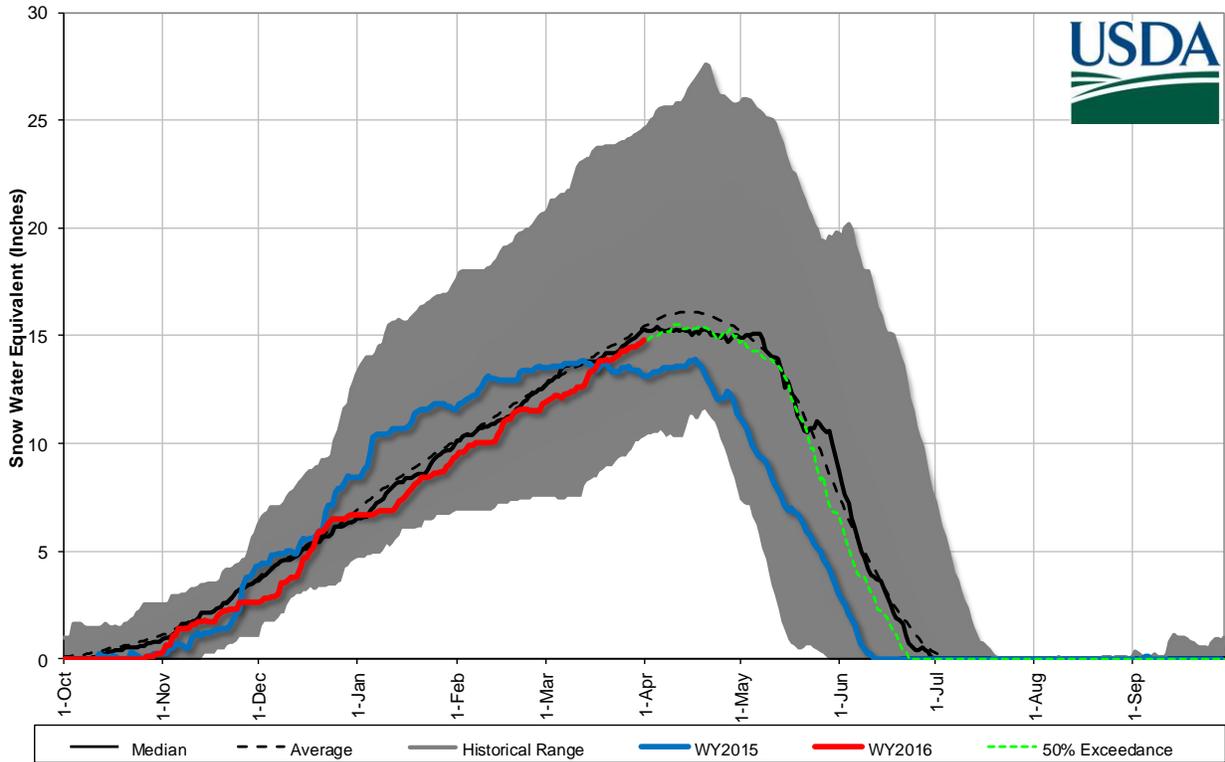
Streamflow forecasts are generally near to above average across the basin for the April-July time period with exception of the Blackfoot drainage which is slightly lower. Consult the individual point forecasts at the end of this section for specific point forecasts. Current basin-wide streamflows for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

Upper Clark Fork River Basin Data Summary		4/1/2016	
	Percent of 1981-2010 Normal (Median)	Last Year Percentage of Normal (Median)	
Snowpack			
Basin-Wide	95%	77%	
	Monthly Percentage of Average	WYTD Percentage of 1981-2010 Average*	Last Year Percentage of Average
Precipitation			
Mountain Precipitation	106%	97%	100%
Valley Precipitation	84%	118%	113%
Basin Precipitation	104%	98%	101%
	Percentage of Average	Percentage of Capacity (Total)	Last Year Percentage of Average
Reservoir Storage			
Basin-Wide Storage	100%	75%	114%
	50 % Exceedance Forecast Percentage of Average	50 % Exceedance Forecast % of Last Year's Flows	Last Year Percentage of Average
Streamflow Forecast			
Basin-Wide Apr-July	96%	136%	70%

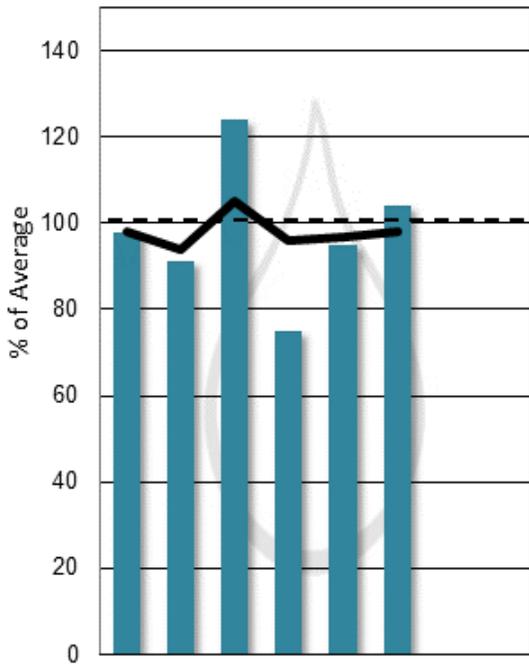
*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

**Basin-wide streamflows are an average of the individual streamflow points within the basin for the 50 percent exceedance forecast. Consult the individual streamflow forecasts in the table below for the range of forecasts at an individual point.

Upper Clark Fork River Basin Snowpack with Non-Exceedence Projections
Based on provisional SNOTEL daily data as of 4/1/2016

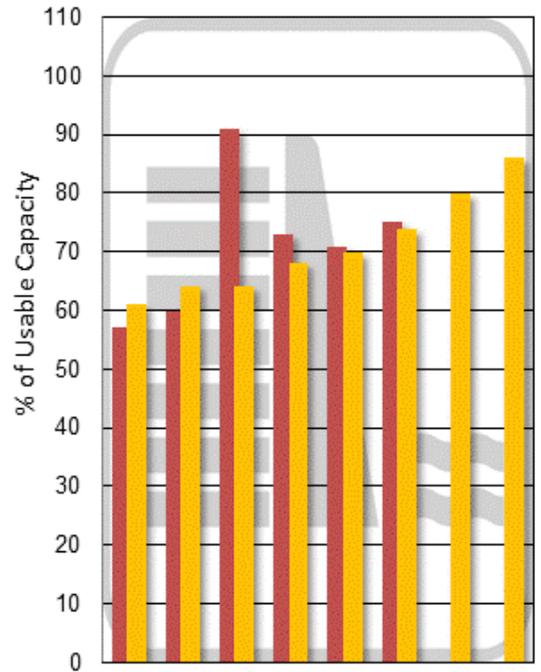


Mountain and Valley Precipitation



Oct Nov Dec Jan Feb Mar Apr May

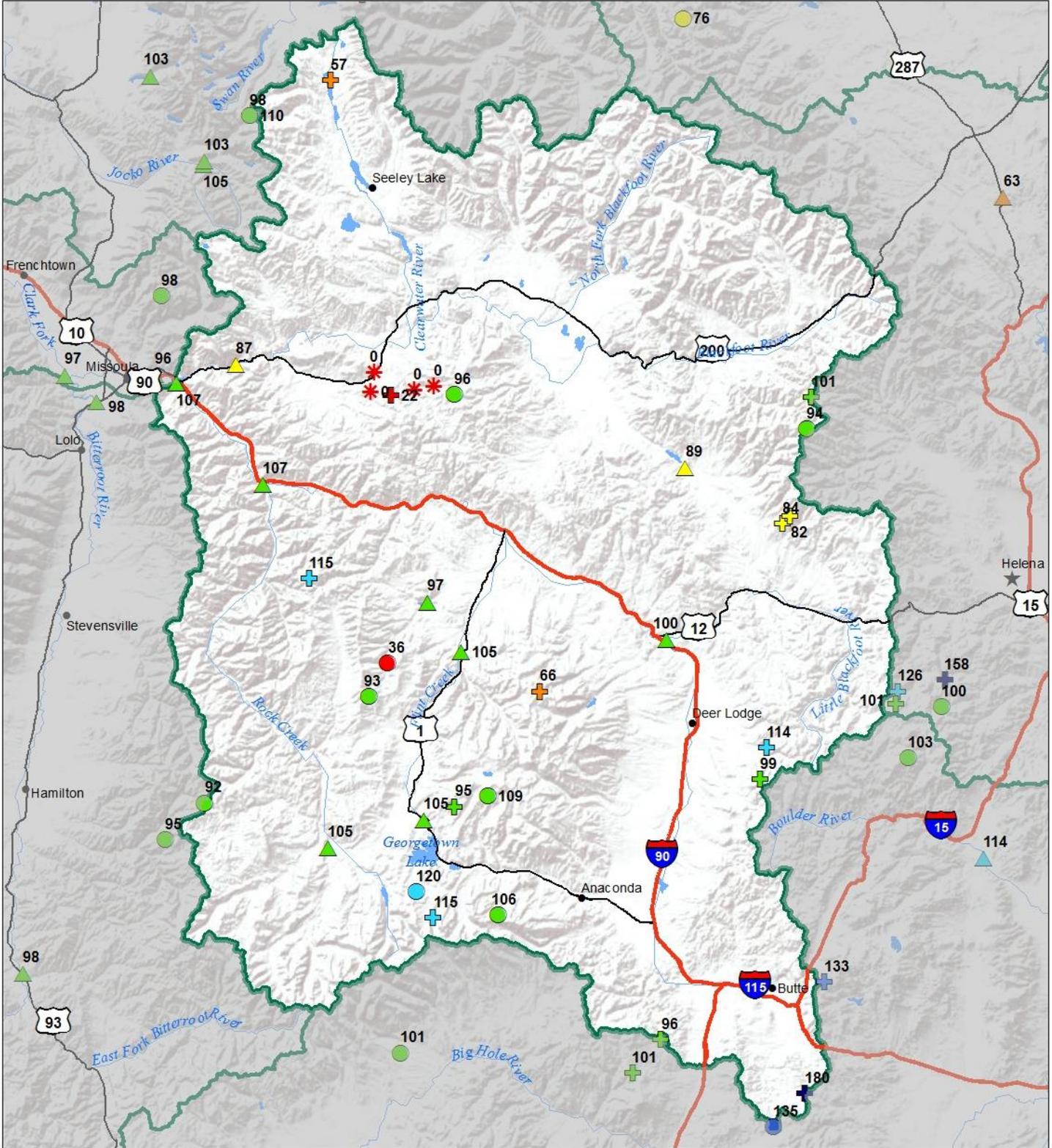
End of Month Reservoir Storage



Oct Nov Dec Jan Feb Mar Apr May

zStorage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Upper Clark Fork River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Normal April 1, 2016



Snow Water Equivalent Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

- 71 - 90%
- 51 - 70%
- 1 - 50%
- *

Snowcourse

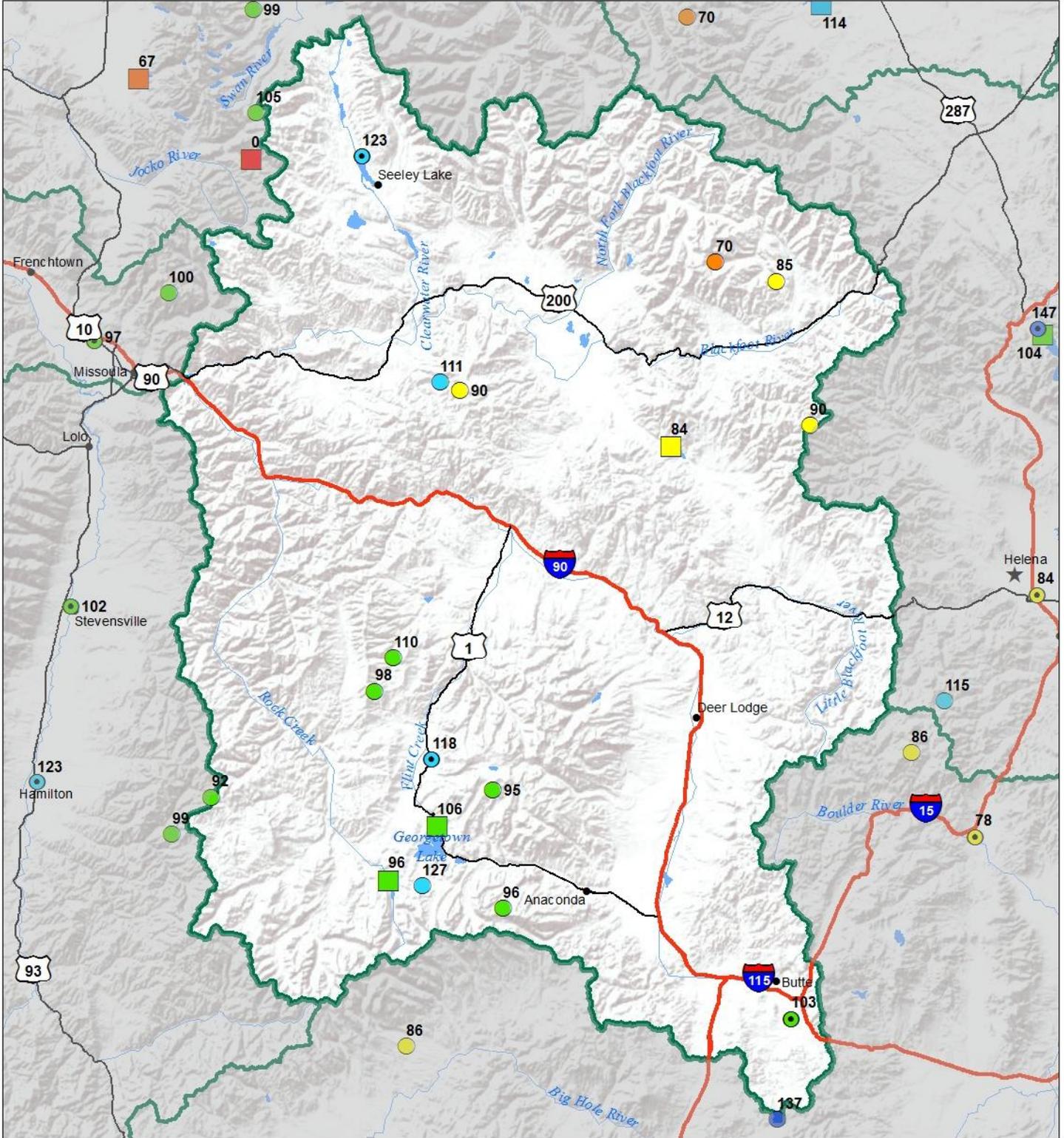
- ⊕ > 150%
- ⊕ 131 - 150%
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- ⊕ 91 - 110%
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- ⊕ 51 - 70%
- ⊕ 1 - 50%
- ⊕ *

Streamflow Forecast Percent of Average Flows

- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



Upper Clark Fork River Basin Water Year to Date Precipitation and Reservoir Levels Percentage of Normal April 1, 2016



Precipitation Percent of Normal

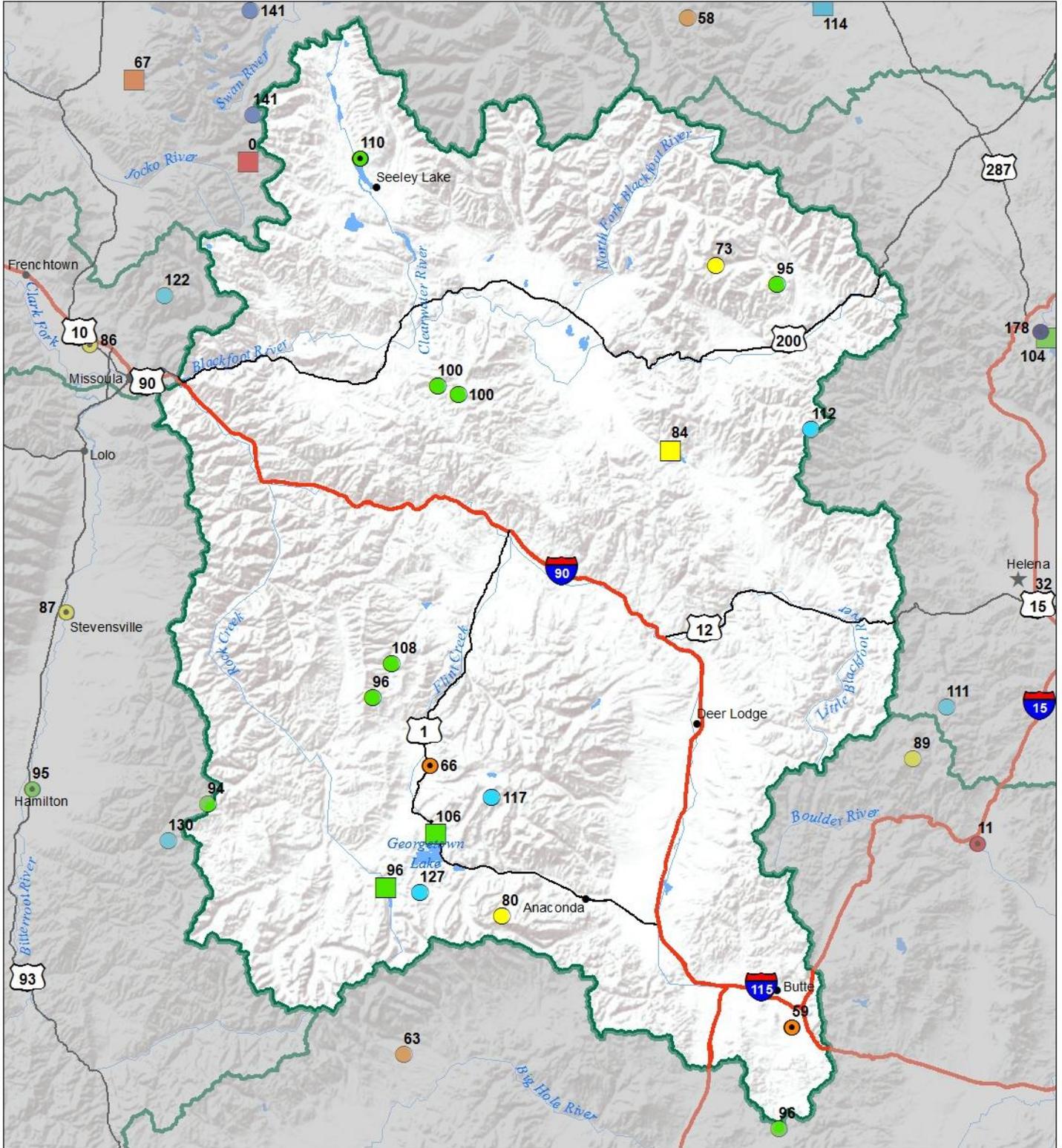
SNOTEL		COOP/ACIS	
● > 150%	● 71 - 90%	● > 150%	● 71 - 90%
● 131 - 150%	● 51 - 70%	● 131 - 150%	● 51 - 70%
● 111 - 130%	● 1 - 50%	● 111 - 130%	● 1 - 50%
● 91 - 110%		● 91 - 110%	

Reservoirs Percent of Normal

■ > 150%
■ 131 - 150%
■ 111 - 130%
■ 91 - 110%
■ 71 - 90%
■ 51 - 70%
■ 1 - 50%



Upper Clark Fork River Basin Monthly Precipitation and Reservoir Levels Percentage of Normal April 1, 2016 (March 1, 2016 - April 1, 2016)



Precipitation Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%

COOP/ACIS

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%

Reservoirs Percent of Normal

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%



Upper Clark Fork River Basin Streamflow Forecasts - April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

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%	89	107	77
Flint Ck nr Southern Cross	APR-JUL	6.8	10.5	13	105%	15.5	19.2	12.4
	APR-SEP	7.6	12.2	15.4	105%	18.5	23	14.6
Flint Ck bl Boulder Ck	APR-JUL	31	45	55	106%	64	78	52
	APR-SEP	41	58	69	105%	81	98	66
Lower Willow Ck Reservoir Inflow ²	APR-MAY	3.3	5.4	6.9	95%	8.3	10.4	7.3
	APR-JUL	4.6	8	10.3	97%	12.6	15.9	10.6
MF Rock Ck nr Philipsburg	APR-JUL	45	54	60	103%	67	76	58
	APR-SEP	50	61	68	105%	75	86	65
Rock Ck nr Clinton	APR-JUL	184	230	260	104%	290	335	250
	APR-SEP	215	265	300	107%	335	385	280
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%

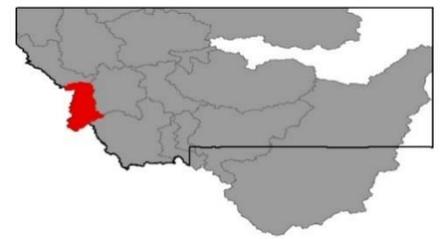
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

3) Median value used in place of average

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

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

Bitterroot River Basin



Last year the Bitterroot River basin reached peak basin wide snow water content on March 13th, nearly a month early. This year the basin is still accumulating snow as it nears seasonal peak, which is typically just after the first week of April. Similar to other Montana basins this March the Bitterroot received large mid-month and end of month storms. Combined these storms delivered over 30 inches of snow depth to the Twin lakes SNOTEL (6400 ft) and about 4.4 inches of snow water. Currently the east side of the Bitterroot River basin is doing slightly better than the west side with 99% and 95% of normal snowpack conditions. Overall, snowpack numbers are up 2% from last month in the Bitterroot River basin at 97% of normal.

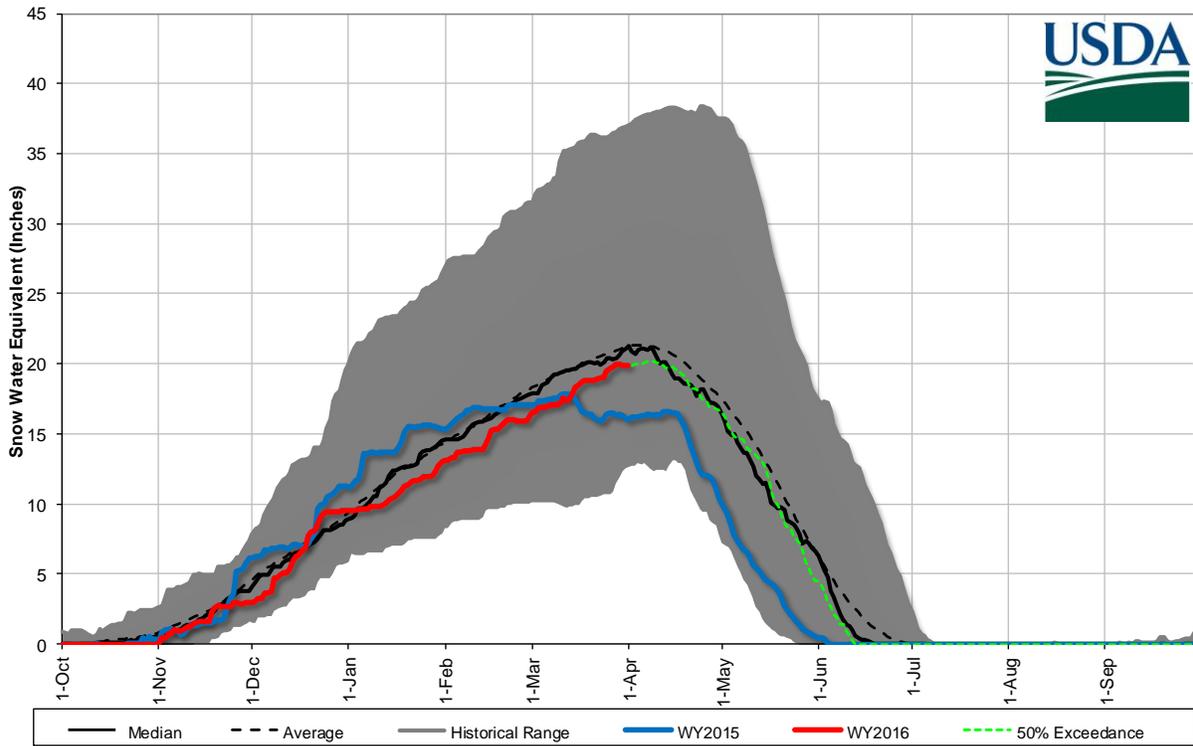
With the arrival of spring in March came relatively warm temperatures. The highest elevation SNOTEL site in the Bitterroot basin, Saddle Mountain SNOTEL (7940 ft), only had 6 days in March in which the daily maximum temperature was below freezing. With above average precipitation in March, SNOTEL sites received some rain during the month. Much of this rain was retained at the high elevation deep snowpack within the basin. Mountain SNOTEL sites received 114% of average precipitation for the month of March, while valley weather stations received 91% of average precipitation in the Bitterroot River basin.

Reservoir storage is currently above average in Painted Rocks Lake at 185% and above average in Lake Como at 116%.

Streamflow forecasts are slightly below average across the basin for the April-July time period. 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 98% of average for the April-July time period.

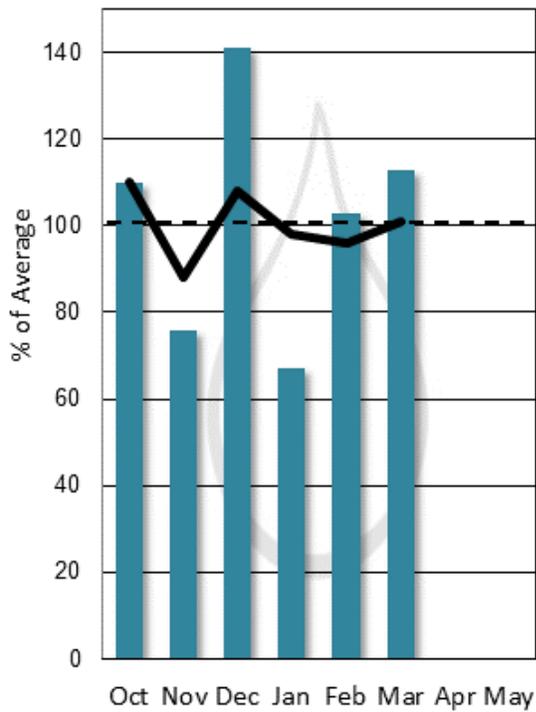
Bitterroot River Basin Data Summary		4/1/2016	
Snowpack	Percent of 1981-2010 Normal (Median)	Last Year Percentage of Normal (Median)	
Basin-Wide	97%	78%	
Precipitation	Monthly Percentage of Average	WYTD Percentage of 1981-2010 Average*	Last Year Percentage of Average
Mountain Precipitation	114%	100%	106%
Valley Precipitation	91%	113%	140%
Basin Precipitation	113%	101%	108%
Reservoir Storage	Percentage of Average	Percentage of Capacity (Total)	Last Year Percentage of Average
Basin-Wide Storage	141%	51%	202%
Streamflow Forecast	50 % Exceedance Forecast Percentage of Average	50 % Exceedance Forecast % of Last Year's Flows	Last Year Percentage of Average
Basin-Wide Apr-July	98%	115%	79%
*Water Year-to-Date (WYTD) Precipitation is October 1st - Current			
**Basin-wide streamflows are an average of the individual streamflow points within the basin for the 50 percent exceedance forecast. Consult the individual streamflow forecasts in the table below for the range of forecasts at an individual point.			

Bitterroot River Basin Snowpack with Non-Exceedence Projections
Based on provisional SNOTEL daily data as of 4/1/2016



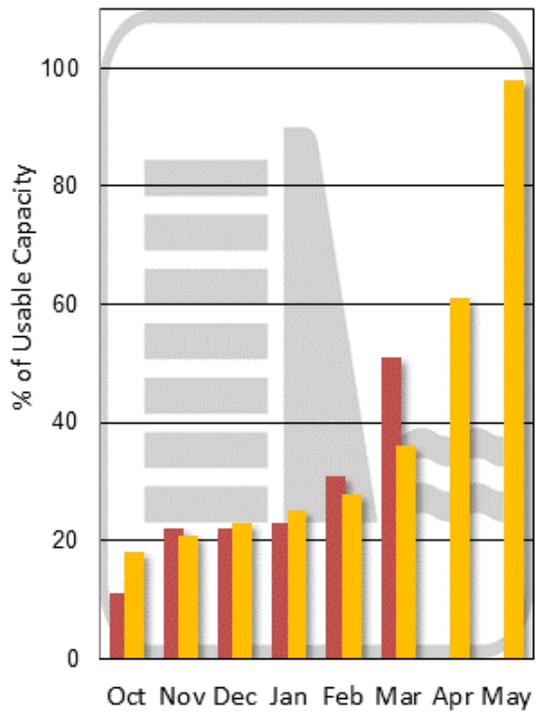
Mountain and Valley Precipitation

Monthly (teal bar) Year-to-date (black line)



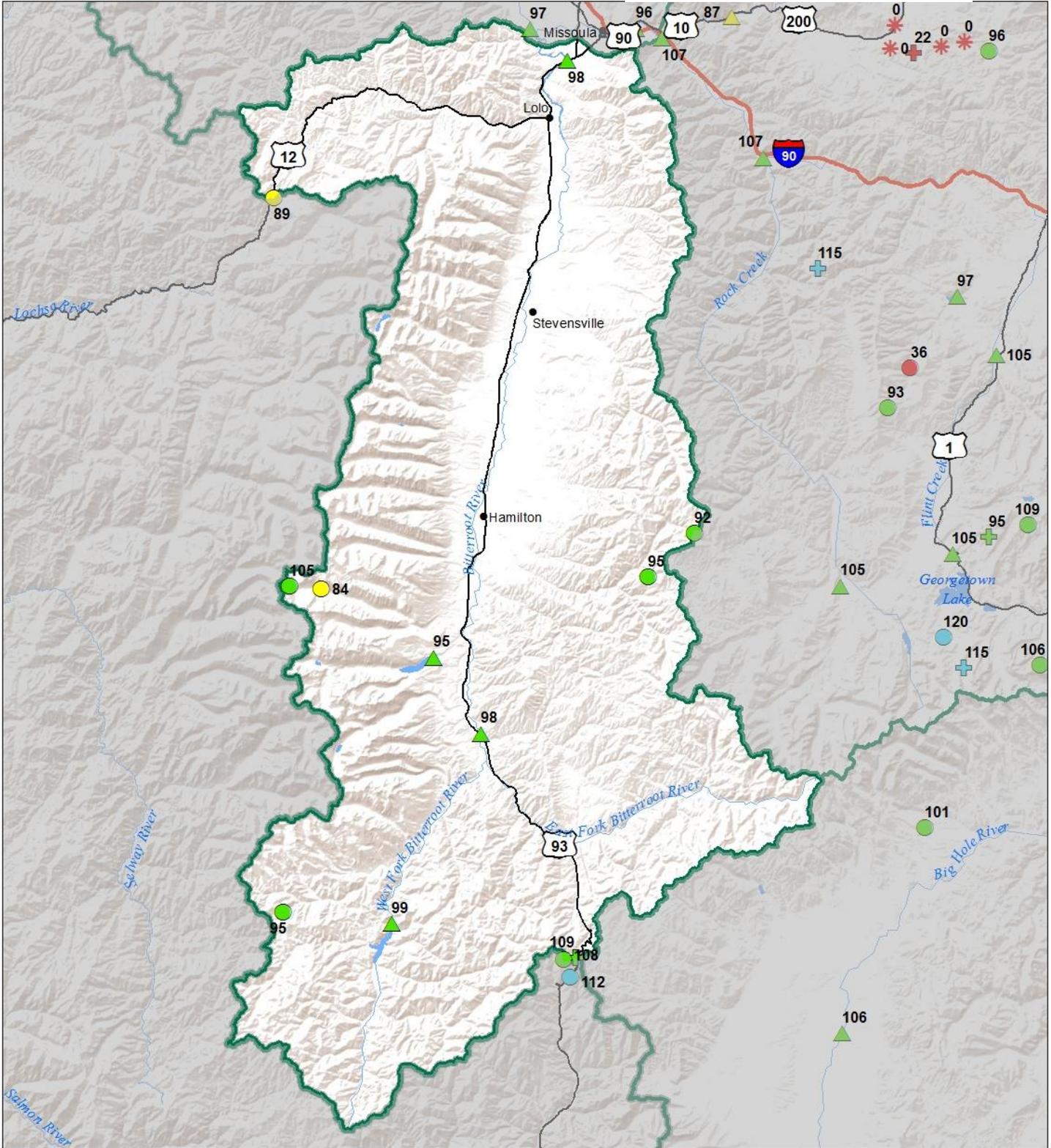
End of Month Reservoir Storage

% Capacity (red bar) Avg % Capacity (yellow bar)



Bitterroot River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Norm April 1, 2016

Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.



Snow Water Equivalent Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%
- 0%

Snowcourse

- ⊕ > 150%
- ⊕ 131 - 150%
- ⊕ 111 - 130%
- ⊕ 91 - 110%
- ⊕ 71 - 90%
- ⊕ 51 - 70%
- ⊕ 1 - 50%
- ⊕ 0%

Streamflow Forecast Percent of Average Flows

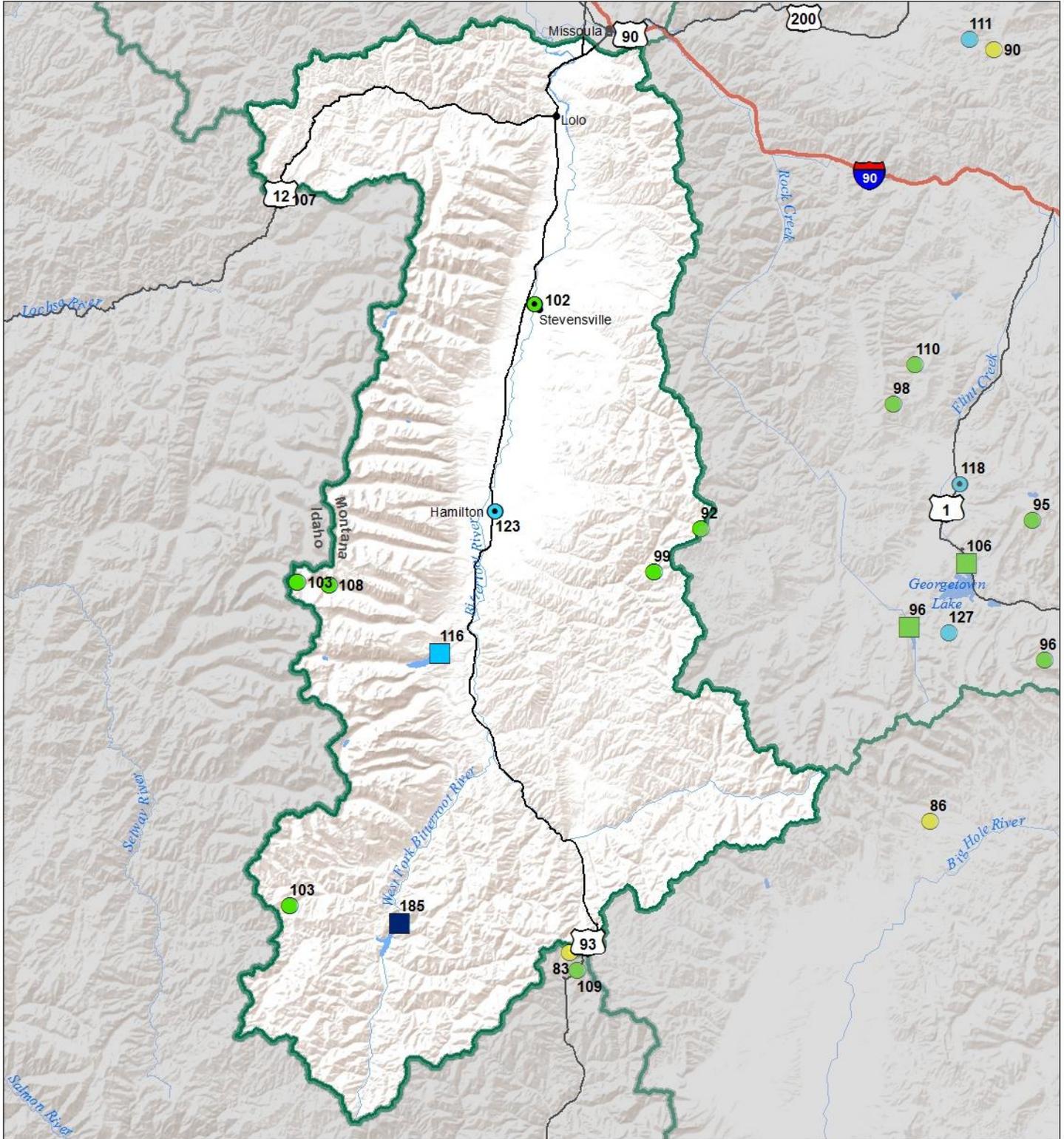
- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



Bitterroot River Basin

Water Year to Date Precipitation and Reservoir Levels Percentage of Normal

April 1, 2016

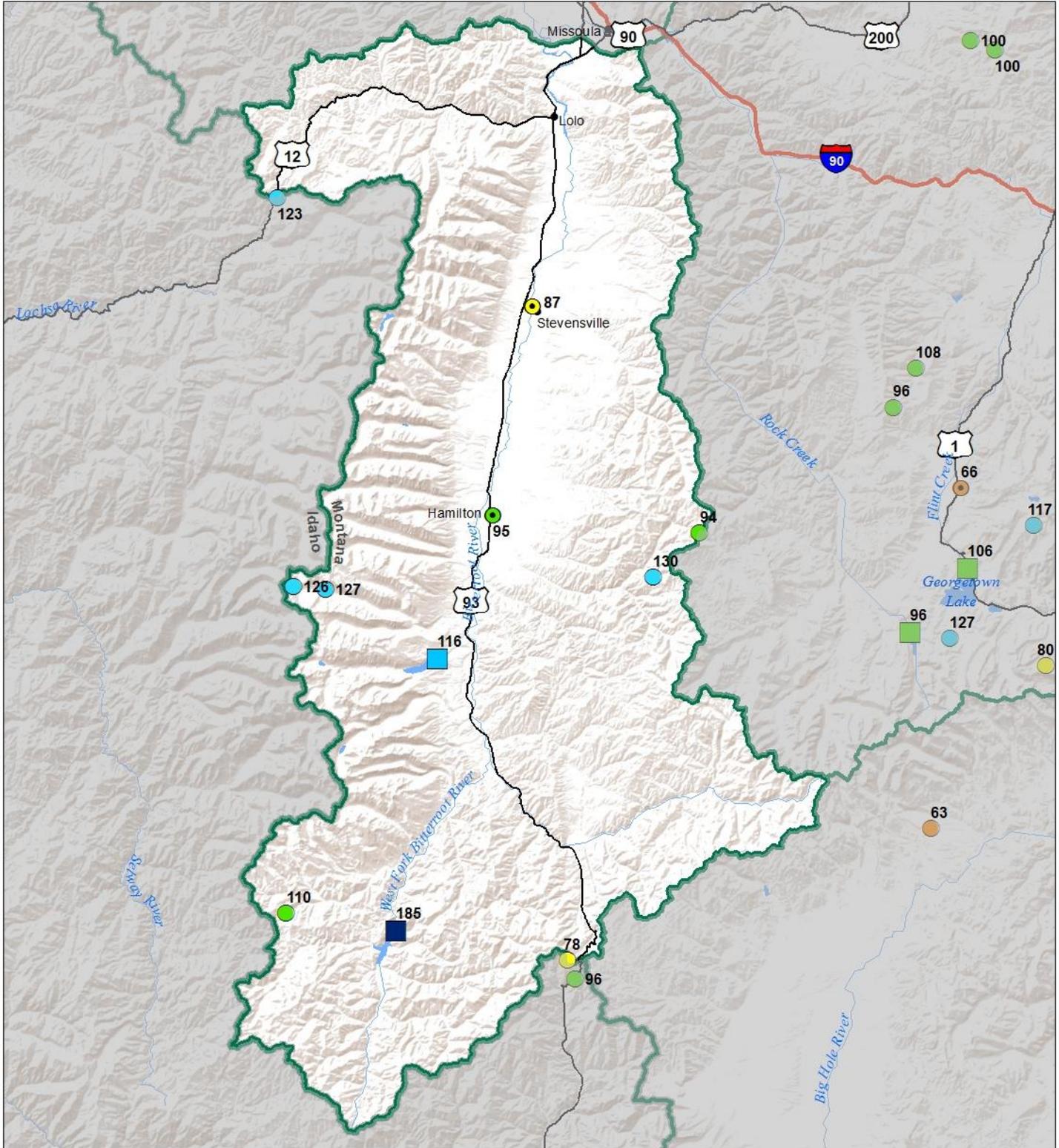


Precipitation Percent of Normal	
SNOTEL	COOP/ACIS
● > 150%	● > 150%
● 131 - 150%	● 131 - 150%
● 111 - 130%	● 111 - 130%
● 91 - 110%	● 91 - 110%
● 71 - 90%	● 71 - 90%
● 51 - 70%	● 51 - 70%
● 1 - 50%	● 1 - 50%

Reservoirs Percent of Normal	
■ > 150%	■ 131 - 150%
■ 111 - 130%	■ 91 - 110%
■ 71 - 90%	■ 51 - 70%
■ 1 - 50%	



Bitterroot River Basin Monthly Precipitation and Reservoir Levels Percentage of Normal April 1, 2016 (March 1, 2016 - April 1, 2016)

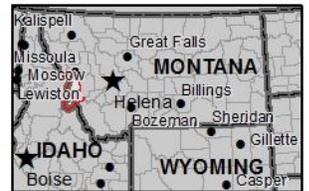


Precipitation Percent of Normal

SNOTEL		COOP/ACIS	
● > 150%	● 71 - 90%	● > 150%	● 71 - 90%
● 131 - 150%	● 51 - 70%	● 131 - 150%	● 51 - 70%
● 111 - 130%	● 1 - 50%	● 111 - 130%	● 1 - 50%
● 91 - 110%		● 91 - 110%	

Reservoirs Percent of Normal

■ > 150%
■ 131 - 150%
■ 111 - 130%
■ 91 - 110%
■ 71 - 90%
■ 51 - 70%
■ 1 - 50%



Bitterroot River Basin Streamflow Forecasts - April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

BITTERROOT RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
WF Bitterroot R Nr Conner ²	APR-JUL	85	110	127	99%	144	169	128
	APR-SEP	92	119	137	99%	155	181	139
Bitterroot R Nr Darby	APR-JUL	285	355	405	99%	455	525	410
	APR-SEP	340	410	460	98%	510	580	470
Como Reservoir Inflow ²	APR-JUL	60	67	72	95%	77	84	76
	APR-SEP	63	70	75	95%	81	88	79
Bitterroot R nr Missoula	APR-JUL	870	1020	1130	98%	1230	1380	1150
	APR-SEP	940	1110	1220	98%	1330	1500	1250

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

Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Painted Rocks Lake	16.1	20.0	8.7	31.7
Lake Como	18.1	29.1	15.6	34.9
Basin-wide Total	34.2	49.1	24.3	66.6
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
WEST FORK BITTERROOT	2	103	90
EAST SIDE BITTERROOT	3	99	84
WEST SIDE BITTERROOT	3	95	74
BITTERROOT RIVER BASIN	7	97	78

Lower Clark Fork River Basin



The mountains of the Lower Clark Fork River basin have had near normal snowfall since a 3 week dry spell starting at the end of December. If it wasn't for those 3 weeks the basin would mostly likely have above normal basin wide snowpack numbers. With that said, the Lower Clark Fork snowpack is currently in much better condition than it was last year at this time. On March 30th of last year basin wide snowpack conditions reached an all-time low. Last year on April 1st Lookout SNOTEL (5140 ft) only had 5.4 inches of snow water (12 inches depth), while this year there is 21.9 inches of snow water (58 inches of depth). The Lower Clark Fork typically reaches its basin wide snow water peak around the first two weeks of April. As of April 1st higher elevation SNOTEL sites in the basin were still accumulating snow, while lower sites were reporting minor melting of the snowpack. Currently the Lower Clark Fork River basin snowpack is up 5% from last month at 95% of normal.

The largest precipitation event the Lower Clark Fork River basin received in March was mid-month. Hoodoo Basin SNOTEL (6050 ft) received 2.4 inches in 5 days during that event. Much of this precipitation was received as snow at high elevation and rain at low elevations. March basin wide SNOTEL precipitation reached 7.5 inches, which is 2.2 inches more than average. Overall, mountain SNOTEL sites received 133% of average precipitation for the month of March, while valley weather stations received 153% of average precipitation in the Bitterroot River basin.

Reservoir storage in Noxon Rapids Reservoir is currently above average at 100%.

Streamflow forecasts are slightly below average across the basin for the April-July time period. 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 97% of average for the April-July time period.

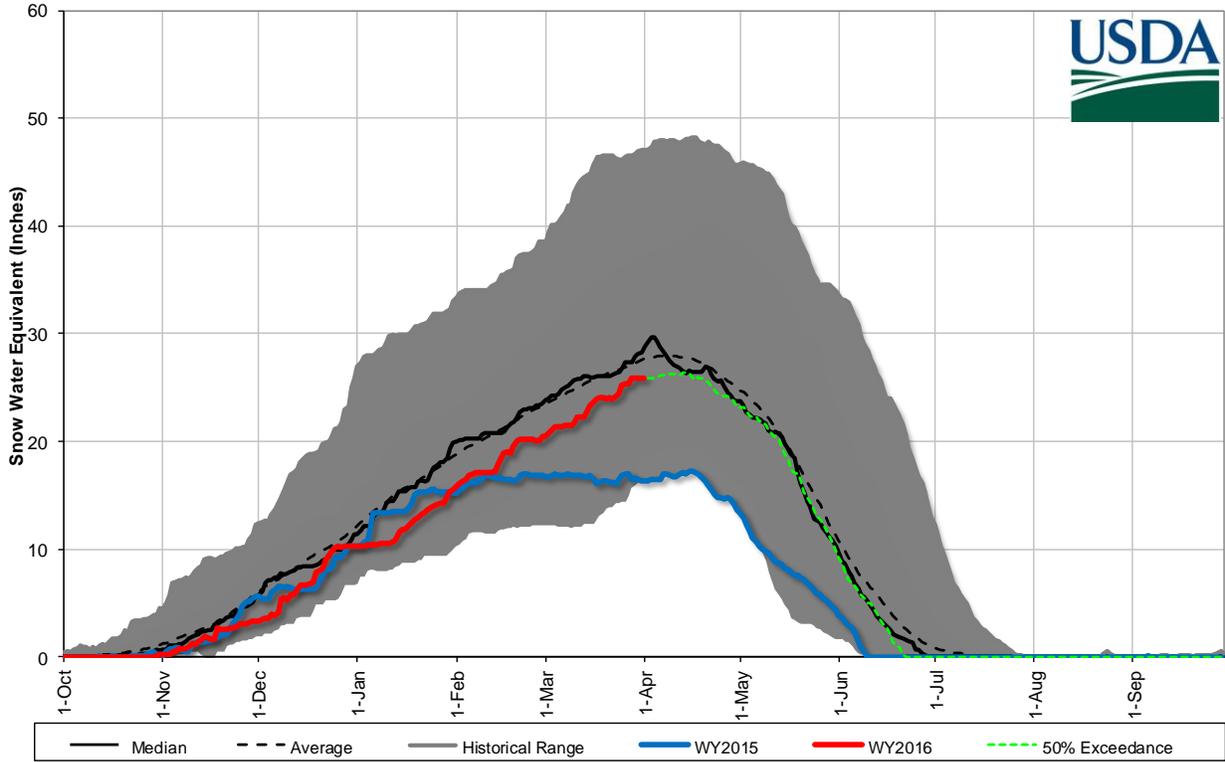
Lower Clark Fork River Basin Data Summary		4/1/2016	
	Percent of 1981-2010 Normal (Median)	Last Year Percentage of Normal (Median)	
Snowpack			
Basin-Wide	92%	49%	
	Monthly Percentage of Average	WYTD Percentage of 1981-2010 Average*	Last Year Percentage of Average
Precipitation			
Mountain Precipitation	133%	106%	104%
Valley Precipitation	153%	106%	115%
Basin Precipitation	135%	106%	105%
	Percentage of Average	Percentage of Capacity (Total)	Last Year Percentage of Average
Reservoir Storage			
Basin-Wide Storage	100%	93%	104%
	50 % Exceedance Forecast Percentage of Average	50 % Exceedance Forecast % of Last Year's Flows	Last Year Percentage of Average
Streamflow Forecast			
Basin-Wide Apr-July	97%	147%	39%

*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

**Basin-wide streamflows are an average of the individual streamflow points within the basin for the 50 percent exceedance forecast. Consult the individual streamflow forecasts in the table below for the range of forecasts at an individual point.

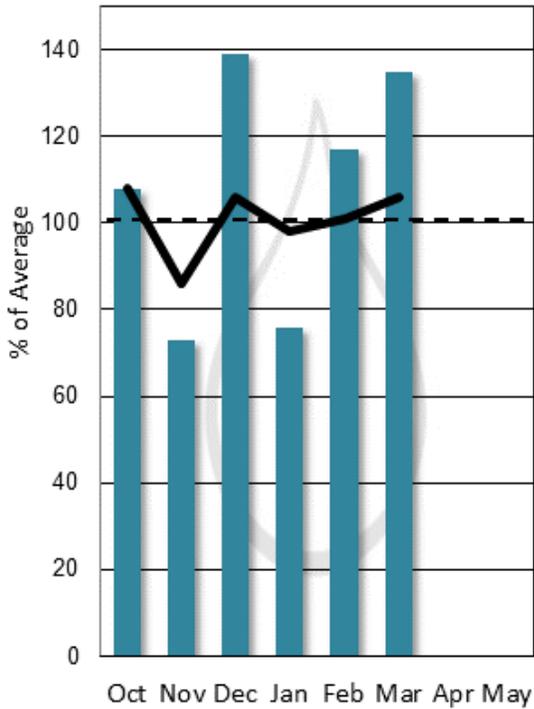
Lower Clark Fork River Basin Snowpack with Non-Exceedence Projections

Based on provisional SNOTEL daily data as of 4/1/2016



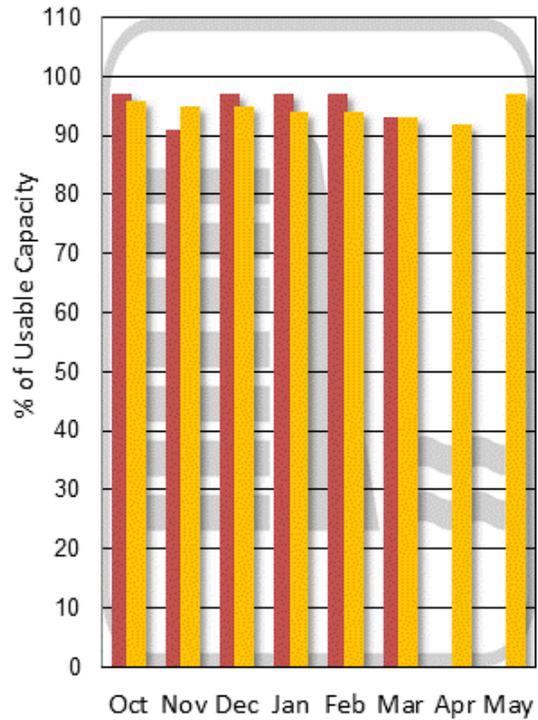
Mountain and Valley Precipitation

Monthly (teal bar) Year-to-date (black line)



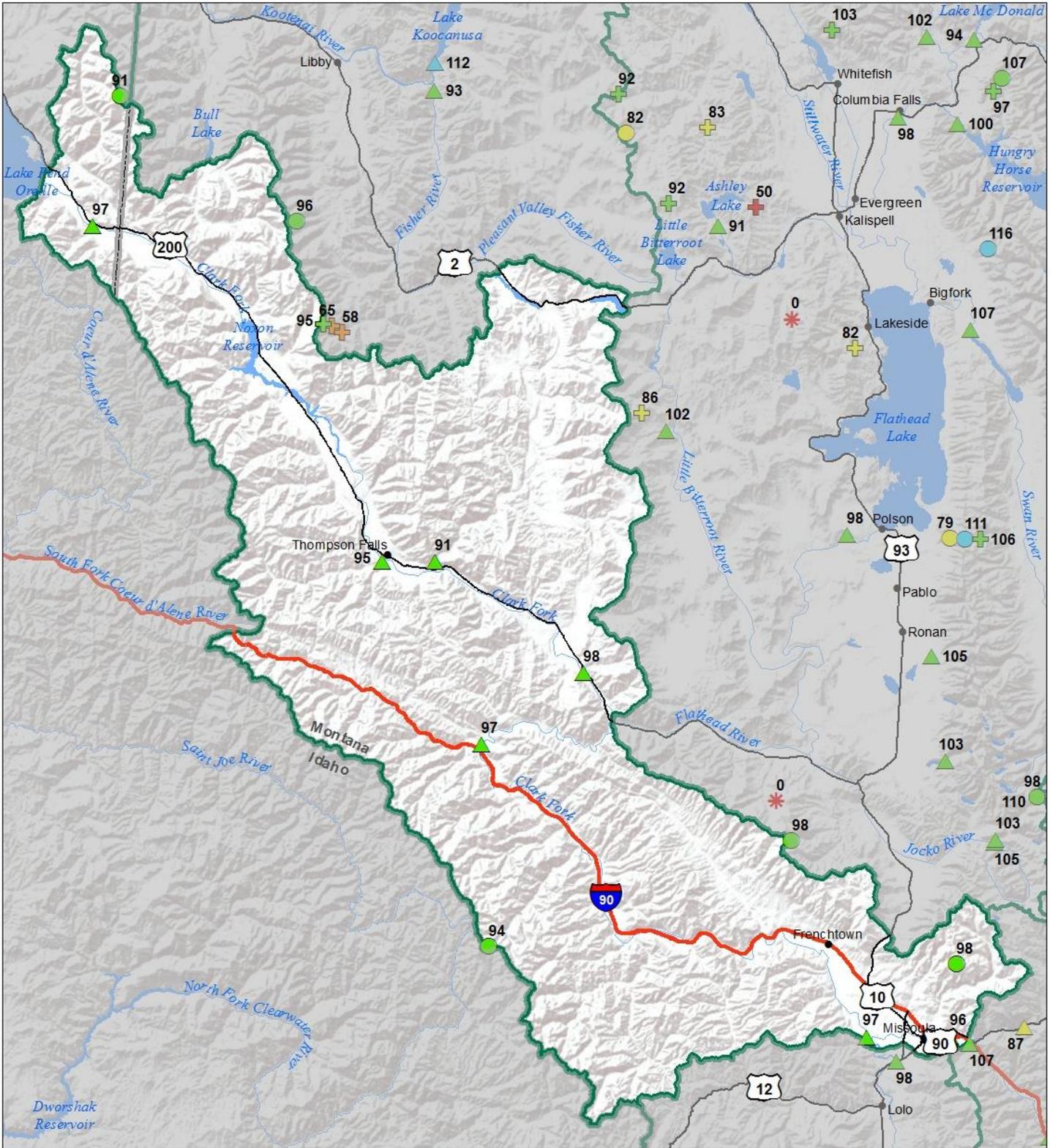
End of Month Reservoir Storage

% Capacity (red bar) Avg % Capacity (yellow bar)



Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Lower Clark Fork River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Normal April 1, 2016



Snow Water Equivalent Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

- 71 - 90%
- 51 - 70%
- 1 - 50%
- * 0%

Snowcourse

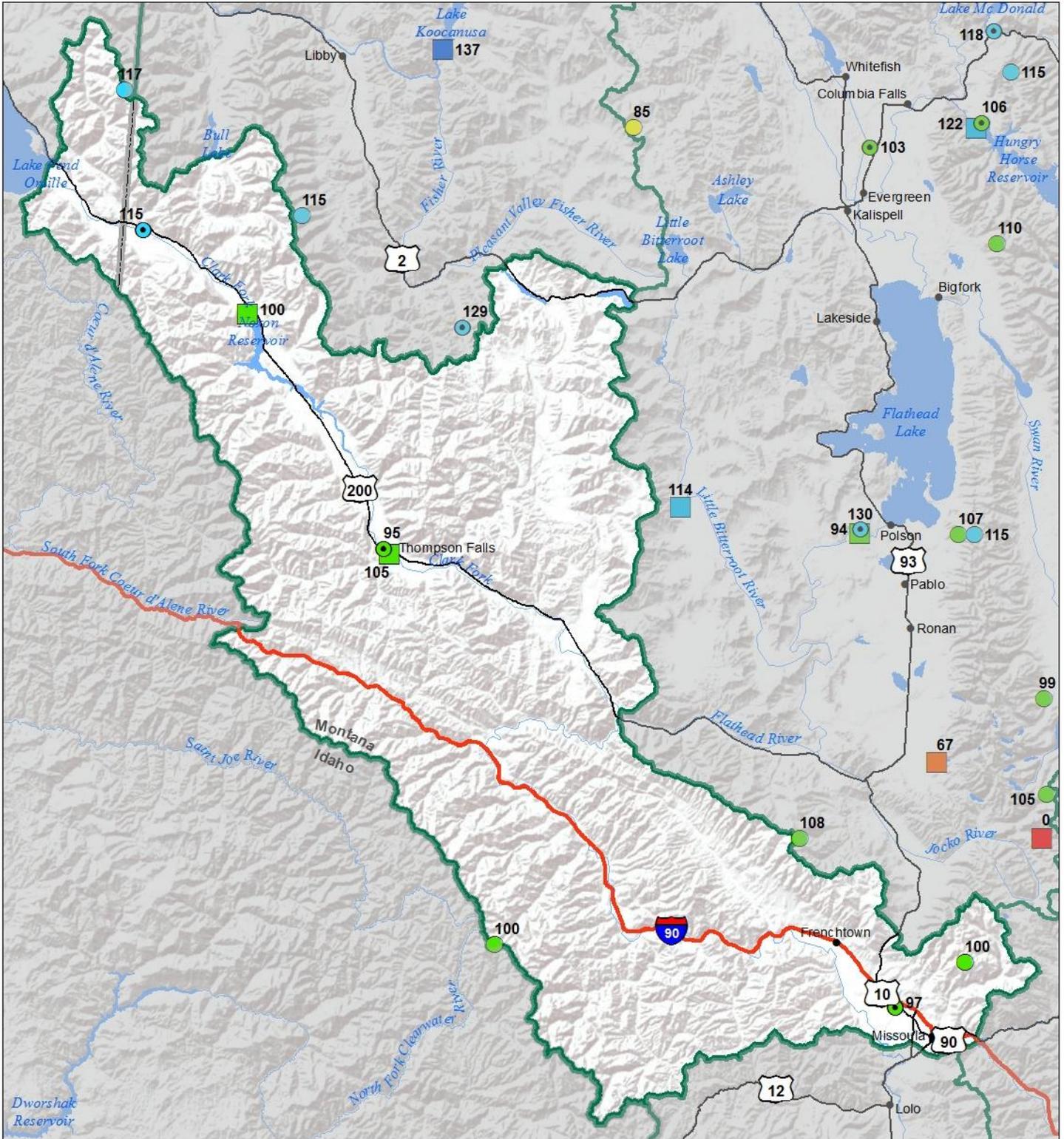
- ⊕ > 150%
- ⊕ 131 - 150%
- ⊕ 111 - 130%
- ⊕ 91 - 110%
- ⊕ 71 - 90%
- ⊕ 51 - 70%
- ⊕ 1 - 50%
- * 0%

Streamflow Forecast Percent of Average Flows

- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



Lower Clark Fork River Basin Water Year to Date Precipitation and Reservoir Levels Percentage of Normal April 1, 2016



Precipitation Percent of Normal

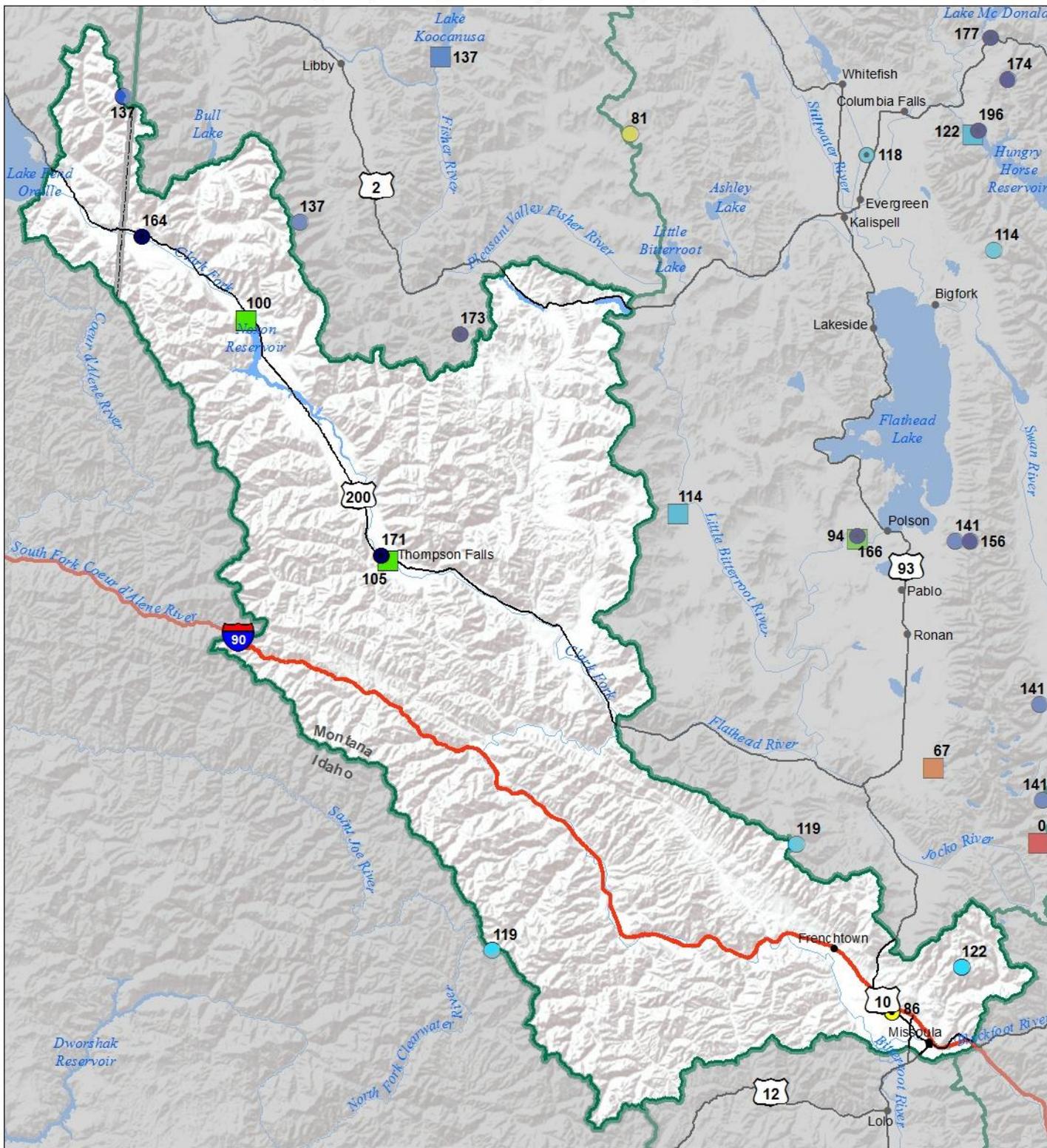
SNOTEL		COOP/ACIS	
● > 150%	● 71 - 90%	● > 150%	● 71 - 90%
● 131 - 150%	● 51 - 70%	● 131 - 150%	● 51 - 70%
● 111 - 130%	● 1 - 50%	● 111 - 130%	● 1 - 50%
● 91 - 110%		● 91 - 110%	

Reservoirs Percent of Normal

■ > 150%
■ 131 - 150%
■ 111 - 130%
■ 91 - 110%
■ 71 - 90%
■ 51 - 70%
■ 1 - 50%



Lower Clark Fork River Basin Monthly Precipitation and Reservoir Levels Percentage of Normal April 1, 2016 (March 1, 2016 - April 1, 2016)



Precipitation Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%

COOP/ACIS

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%

Reservoirs Percent of Normal

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%



Lower Clark Fork River Basin Streamflow Forecasts - April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

LOWER CLARK FORK RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Clark Fork R. bl Missoula	APR-JUL	1730	2080	2320	97%	2560	2920	2400
	APR-SEP	1930	2310	2580	97%	2840	3230	2670
Clark Fork R. at St. Regis ¹	APR-JUL	2150	2780	3070	97%	3360	3990	3160
	APR-SEP	2420	3100	3410	97%	3720	4410	3510
Clark Fork R. nr Plains ^{1,2}	APR-JUL	7070	8430	9040	98%	9660	11000	9200
	APR-SEP	7650	9180	9880	98%	10600	12100	10100
Thompson nr Thompson Falls	APR-JUL	109	142	164	91%	187	220	181
	APR-SEP	127	163	187	91%	210	245	205
Prospect Ck at Thompson Falls	APR-JUL	79	90	98	96%	106	117	102
	APR-SEP	85	97	105	95%	113	125	110
Clark Fork R. at Whitehorse Rapids ^{1,2}	APR-JUL	8160	9570	10200	97%	10900	12300	10500
	APR-SEP	8860	10500	11200	97%	11900	13500	11500

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

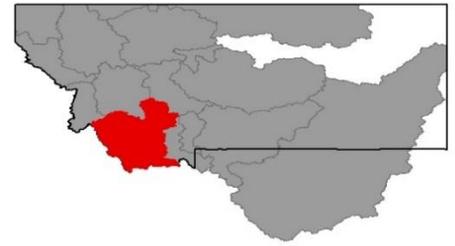
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

3) Median value used in place of average

Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Noxon Rapids Reservoir	310.7	323.2	309.9	335.0
Basin-wide Total	310.7	323.2	309.9	335.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
LOWER CLARK FORK RIVER BASIN	12	92	49

Jefferson River Basin



The Jefferson River Basin had a stellar month with all sub-basins receiving normal to well above normal precipitation. Mild weather impacted the region through the first two weeks of the month until a significant storm cycle reached the basin between the 13th and the 15th and brought over an inch of water. Dry weather then dominated until another round of storms impacted the area during the final week of the month. In total, the basin received an average of 114% of normal precipitation, bringing April 1st average cumulative snow water equivalence (SWE) to 111%. SWE levels were up only slightly from March 1st levels, but showed a marked improvement compared to this time last year when only 77% of normal was measured.

In terms of sub-basins, the Ruby Basin fared the best receiving 135% of normal precipitation, followed by the Beaverhead which received 124%, the Bighole with 101%, and the Boulder with 97%. These strong gains resulted in robust sub-basin SWE increases. The Beaverhead now has 112% of average SWE, up from 107% last month and well ahead of last year at this time. The Ruby has 103%, up from 92% last month and well above last year's April 1st snowpack levels. The Bighole came in at 113% of normal SWE, up from 112% last month and is well. And finally, the Boulder now has 120%, up six percent from last month and well ahead of last year at this time.

Jefferson River Basin reservoirs are up slightly from March 1st. Lima climbed four percent to 74%, Clark Canyon is up to 84% from 81%, and the Ruby River Reservoir measured 104%. Clark Canyon is down sharply compared to this time last year when it was measured at 141%. Ruby River was also down from last year when it measured 118%, and Lima remained relatively unchanged. Combined, April 1st basin reservoirs registered an average of 85% of normal, up 2% from March 1st but down 16% from April 1st of last year.

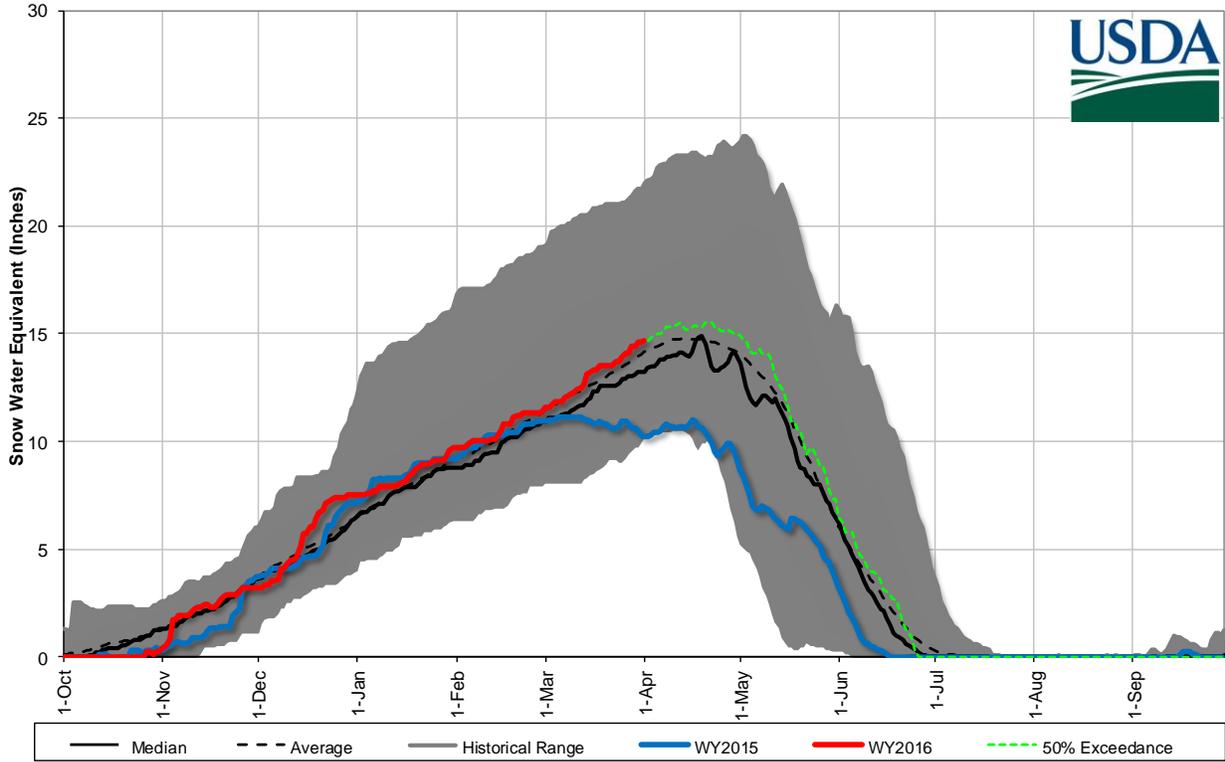
Streamflow forecasts are generally near to above average across the basin for the April-July time period. Consult the individual point forecasts at the end of this section for specific point forecasts. Current basin-wide streamflows for the 50 percent exceedance are 107% of average for the April-July time period.

Jefferson River Basin Data Summary		4/1/2016	
	Percent of 1981-2010 Normal (Median)	Last Year Percentage of Normal (Median)	
Snowpack			
Basin-Wide	111%	77%	
	Monthly Percentage of Average	WYTD Percentage of 1981-2010 Average*	Last Year Percentage of Average
Precipitation			
Mountain Precipitation	115%	102%	84%
Valley Precipitation	82%	122%	78%
Basin Precipitation	114%	102%	84%
	Percentage of Average	Percentage of Capacity (Total)	Last Year Percentage of Average
Reservoir Storage			
Basin-Wide Storage	85%	45%	101%
	50 % Exceedance Forecast Percentage of Average	50 % Exceedance Forecast % of Last Year's Flows	Last Year Percentage of Average
Streamflow Forecast			
Basin-Wide Apr-July	107%	204%	53%

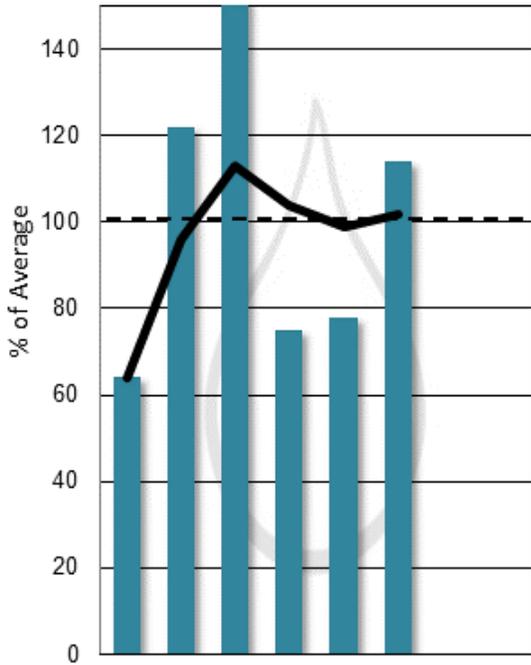
*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

**Basin-wide streamflows are an average of the individual streamflow points within the basin for the 50 percent exceedance forecast. Consult the individual streamflow forecasts in the table below for the range of forecasts at an individual point.

Jefferson River Basin Snowpack with Non-Exceedence Projections
Based on provisional SNOTEL daily data as of 4/1/2016

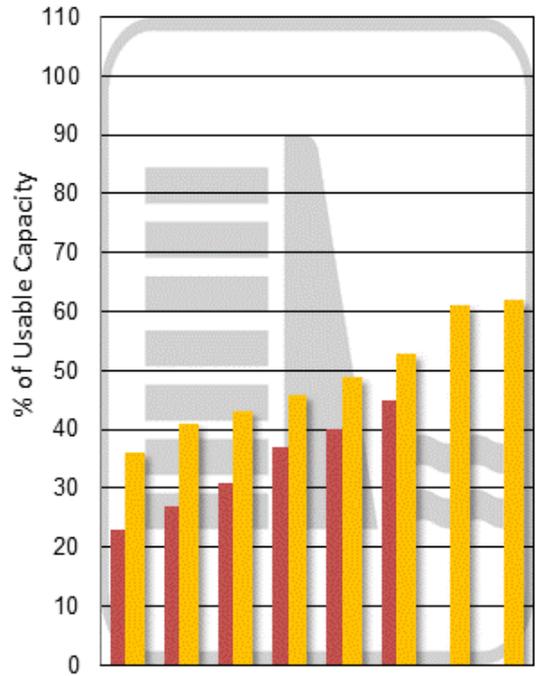


**Mountain and Valley
Precipitation**



Oct Nov Dec Jan Feb Mar Apr May

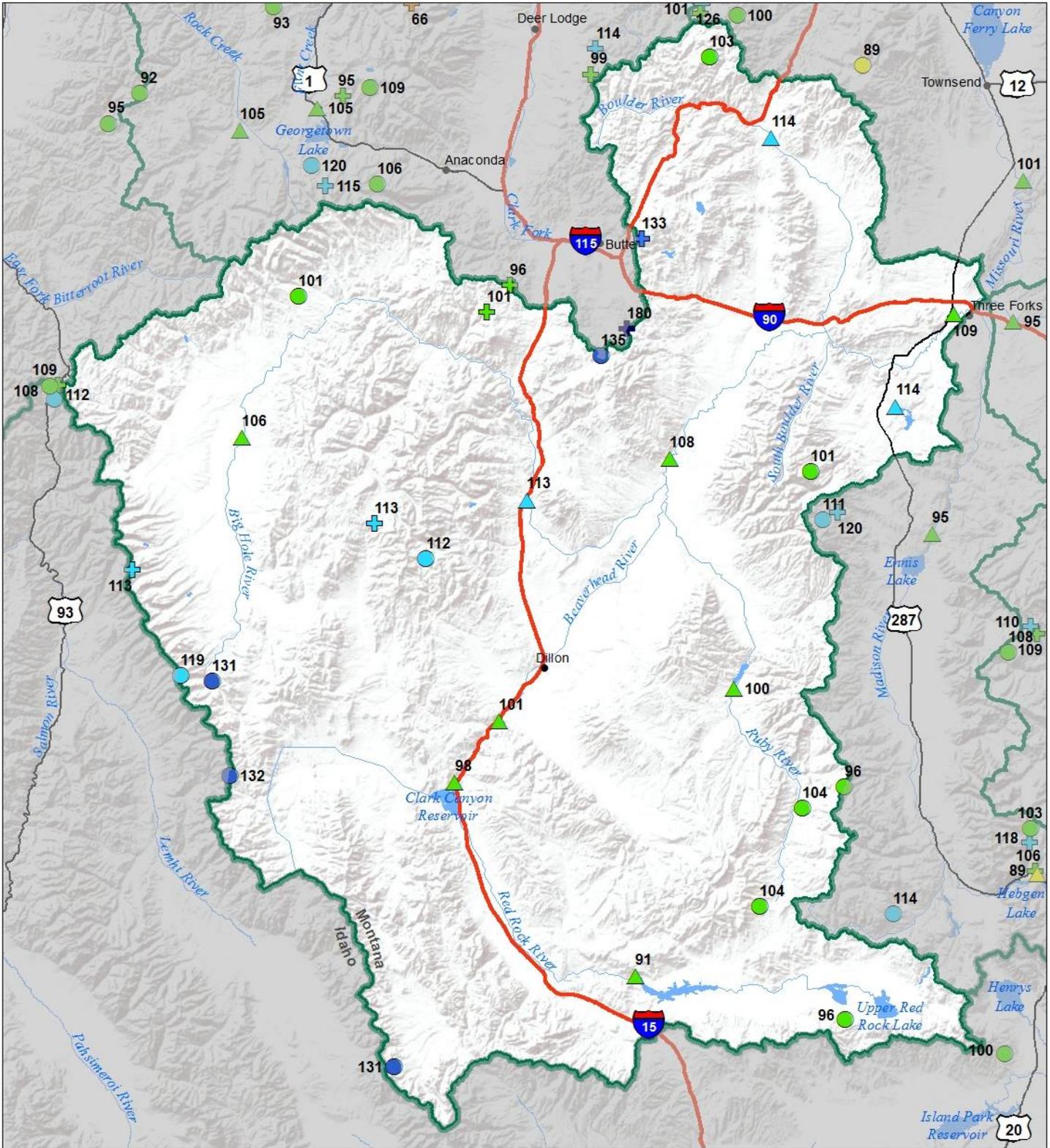
**End of Month Reservoir
Storage**



Oct Nov Dec Jan Feb Mar Apr May

Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Jefferson River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Normal April 1, 2016



Snow Water Equivalent Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%
- *

Snowcourse

- ⊕ > 150%
- ⊕ 131 - 150%
- ⊕ 111 - 130%
- ⊕ 91 - 110%
- ⊕ 71 - 90%
- ⊕ 51 - 70%
- ⊕ 1 - 50%
- ⊕ *

Streamflow Forecast Percent of Average Flows

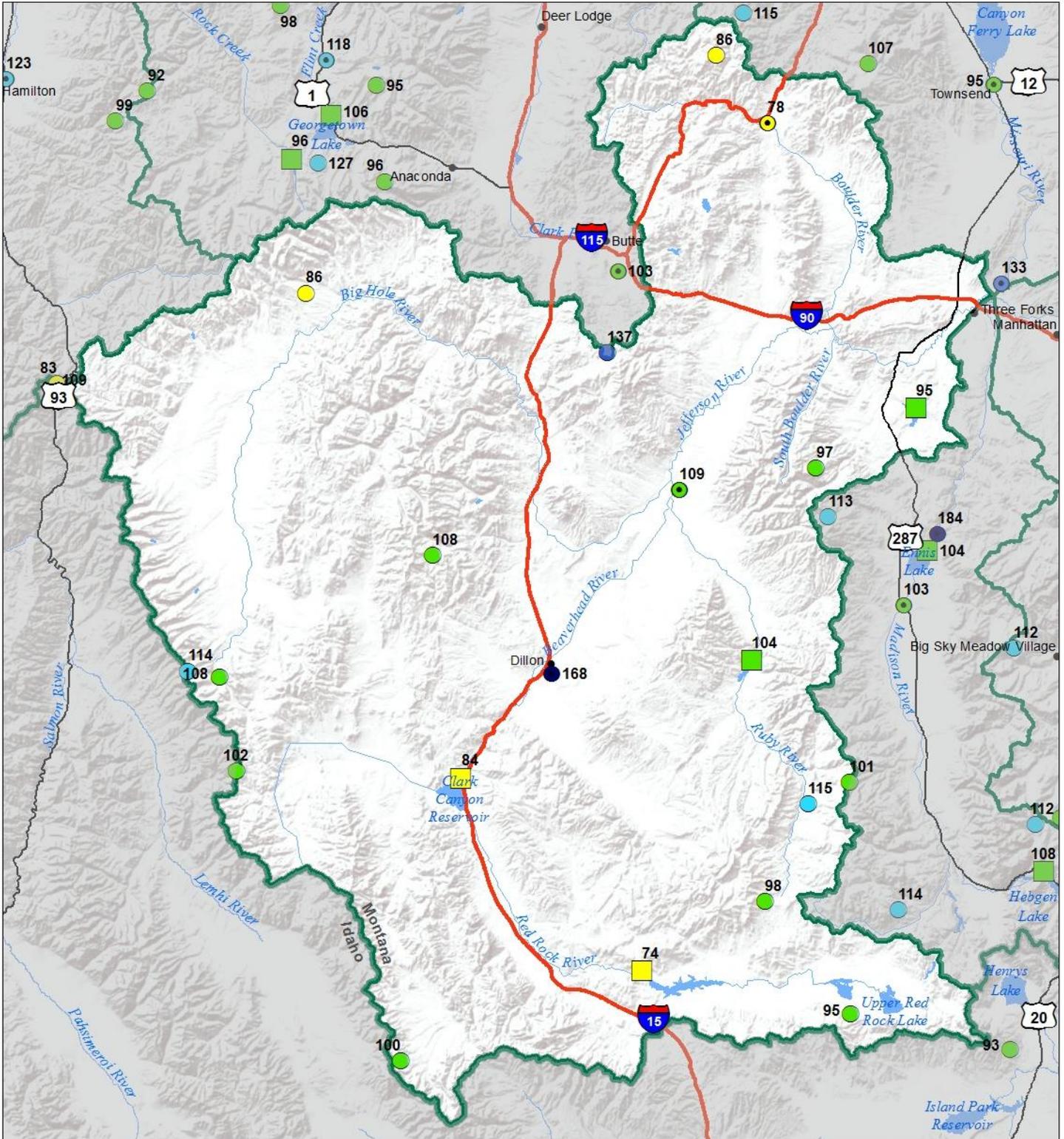
- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



Jefferson River Basin

Water Year to Date Precipitation and Reservoir Levels Percentage of Normal

April 1, 2016



Precipitation Percent of Normal

SNOTEL		COOP/ACIS	
● > 150%	● 71 - 90%	● > 150%	● 71 - 90%
● 131 - 150%	● 51 - 70%	● 131 - 150%	● 51 - 70%
● 111 - 130%	● 1 - 50%	● 111 - 130%	● 1 - 50%
● 91 - 110%		● 91 - 110%	

Reservoirs Percent of Normal

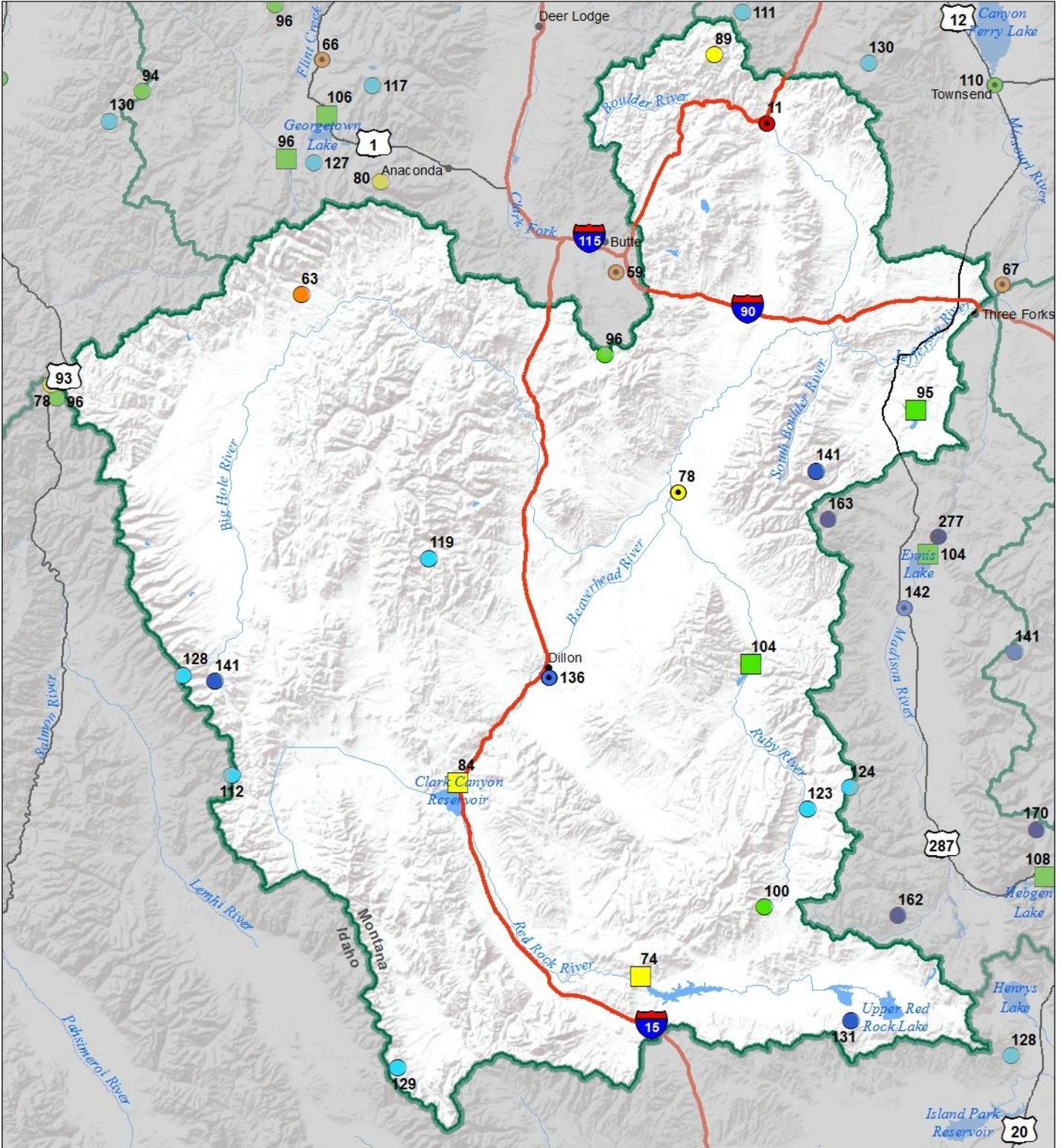
■ > 150%
■ 131 - 150%
■ 111 - 130%
■ 91 - 110%
■ 71 - 90%
■ 51 - 70%
■ 1 - 50%



Jefferson River Basin

Monthly Precipitation and Reservoir Levels Percentage of Normal

April 1, 2016 (March 1, 2016 - April 1, 2016)



Precipitation Percent of Normal

SNOTEL		COOP/ACIS	
● > 150%	● 71 - 90%	● > 150%	● 71 - 90%
● 131 - 150%	● 51 - 70%	● 131 - 150%	● 51 - 70%
● 111 - 130%	● 1 - 50%	● 111 - 130%	● 1 - 50%
● 91 - 110%		● 91 - 110%	

Reservoirs Percent of Normal

■ > 150%
■ 131 - 150%
■ 111 - 130%
■ 91 - 110%
■ 71 - 90%
■ 51 - 70%
■ 1 - 50%



Jefferson River Basin Streamflow Forecasts - April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

JEFFERSON RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Lima Reservoir Inflow ²	APR-JUL	58	68	75	91%	82	92	82
	APR-SEP	61	73	81	91%	89	101	89
Clark Canyon Inflow ²	APR-JUL	29	69	96	95%	123	163	101
	APR-SEP	46	88	117	98%	146	188	120
Beaverhead R at Barretts ²	APR-JUL	24	87	129	100%	171	235	129
	APR-SEP	33	107	157	101%	205	280	156
Ruby R Reservoir Inflow ²	APR-JUL	55	68	77	100%	86	99	77
	APR-SEP	65	80	91	100%	102	117	91
Big Hole R at Wisdom	APR-JUL	43	82	108	106%	134	173	102
	APR-SEP	44	86	115	106%	144	186	108
Big Hole R nr Melrose	APR-JUL	430	520	585	114%	650	740	515
	APR-SEP	465	565	635	113%	705	805	560
Jefferson R nr Twin Bridges ²	APR-JUL	395	590	725	105%	855	1050	690
	APR-SEP	410	635	785	108%	940	1160	730
Boulder R nr Boulder	APR-JUL	54	68	78	113%	88	102	69
	APR-SEP	57	73	84	114%	95	111	74
Willow Ck Reservoir Inflow ²	APR-JUL	11.3	15.9	19	113%	22	27	16.8
	APR-SEP	13.4	18.5	22	114%	25	31	19.3
Jefferson R nr Three Forks ²	APR-JUL	475	675	815	110%	955	1160	740
	APR-SEP	490	720	875	109%	1030	1250	800

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

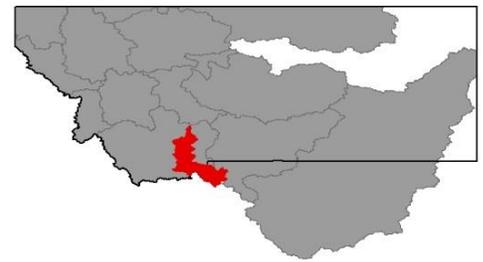
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

3) Median value used in place of average

Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lima Reservoir	25.3	48.1	34.2	84.0
Clark Canyon Res	113.0	116.4	134.5	255.6
Ruby River Reservoir	32.9	37.1	31.5	38.8
Basin-wide Total	171.2	201.7	200.2	378.4
# of reservoirs	3	3	3	3

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
BEAVERHEAD	11	112	72
RUBY	5	103	69
BIGHOLE	14	112	90
BOULDER	6	120	83
JEFFERSON RIVER BASIN	29	111	77

Madison River Basin



The Madison River Basin accumulated nearly five inches of water during March. The majority of this moisture fell over the basin during the second and fourth weeks of the month, with the heaviest accumulations occurring between the 13th and 15th. In total, the basin received 140% of normal precipitation. This raised the basin-wide average snow water equivalence (SWE) to 100% of normal, up from 89% on March 1st and up significantly from April 1st of 2015 when only 64% of normal had accumulated.

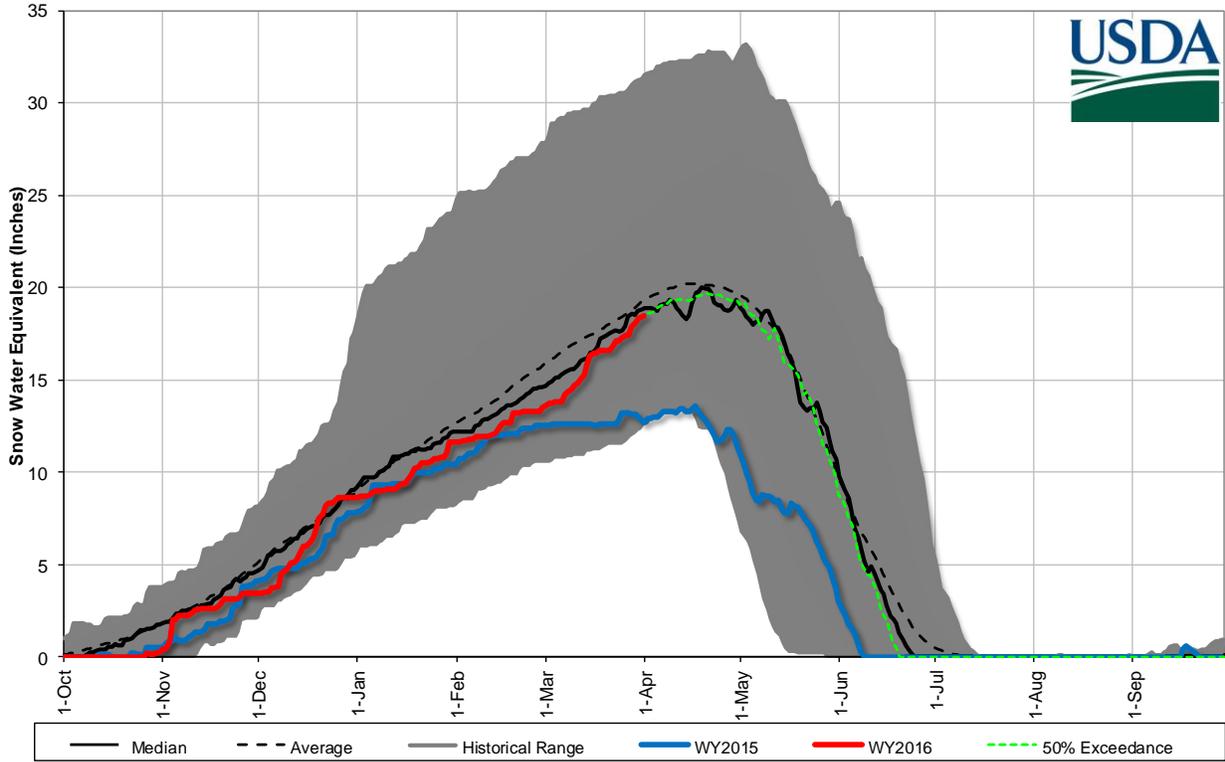
While both mountain and valley locations received well above normal precipitation, the weather patterns certainly favored the region below Hebgen Lake. That area received over 150% of normal, bringing SWE totals up from 92%, measured on March 1st, to 106% on April 1st. Above Hebgen Lake, 120% of normal precipitation fell and cumulative SWE levels rose to 92%, up from 85% on March 1st and only 56% on April 1st of last year.

Reservoirs in the basin remained relatively unchanged from March 1st readings, with the exception of Ennis Lake, which climbed from 97% of average to 104%. Combined reservoir levels, on April 1st, were at 107% of normal, down 2% from March 1st, and down 7% from April 1st of last year.

Streamflow forecasts are generally near to slightly below average across the basin for the April-July time period. 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 93% of average for the April-July time period.

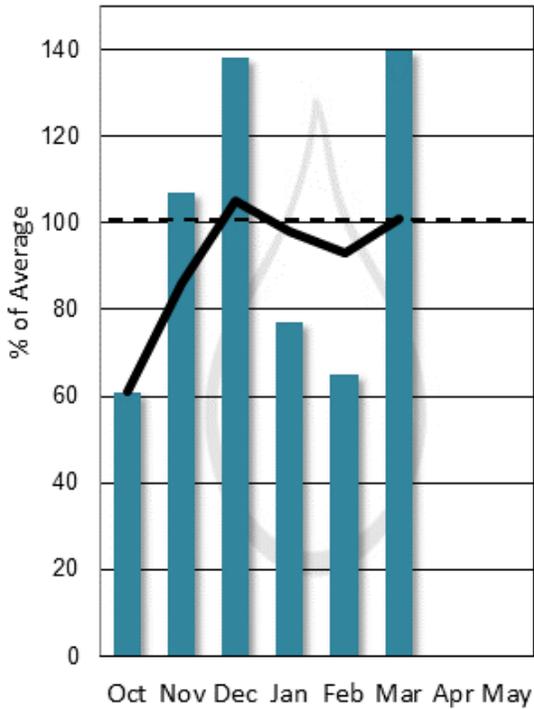
Madison River Basin Data Summary		4/1/2016	
Snowpack	Percent of 1981-2010 Normal (Median)	Last Year Percentage of Normal (Median)	
Basin-Wide	100%	63%	
Precipitation	Monthly Percentage of Average	WYTD Percentage of 1981-2010 Average*	Last Year Percentage of Average
Mountain Precipitation	140%	100%	73%
Valley Precipitation	143%	108%	81%
Basin Precipitation	140%	101%	74%
Reservoir Storage	Percentage of Average	Percentage of Capacity (Total)	Last Year Percentage of Average
Basin-Wide Storage	107%	77%	114%
Streamflow Forecast	50 % Exceedance Forecast Percentage of Average	50 % Exceedance Forecast % of Last Year's Flows	Last Year Percentage of Average
Basin-Wide Apr-July	93%	135%	69%
*Water Year-to-Date (WYTD) Precipitation is October 1st - Current			
**Basin-wide streamflows are an average of the individual streamflow points within the basin for the 50 percent exceedance forecast. Consult the individual streamflow forecasts in the table below for the range of forecasts at an individual point.			

Madison River Basin Snowpack with Non-Exceedence Projections
Based on provisional SNOTEL daily data as of 4/1/2016



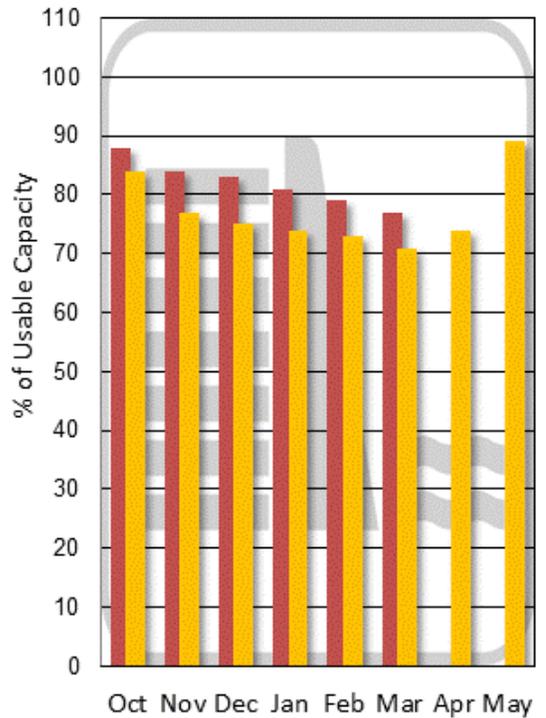
Mountain and Valley Precipitation

Monthly (teal bar) Year-to-date (black line)



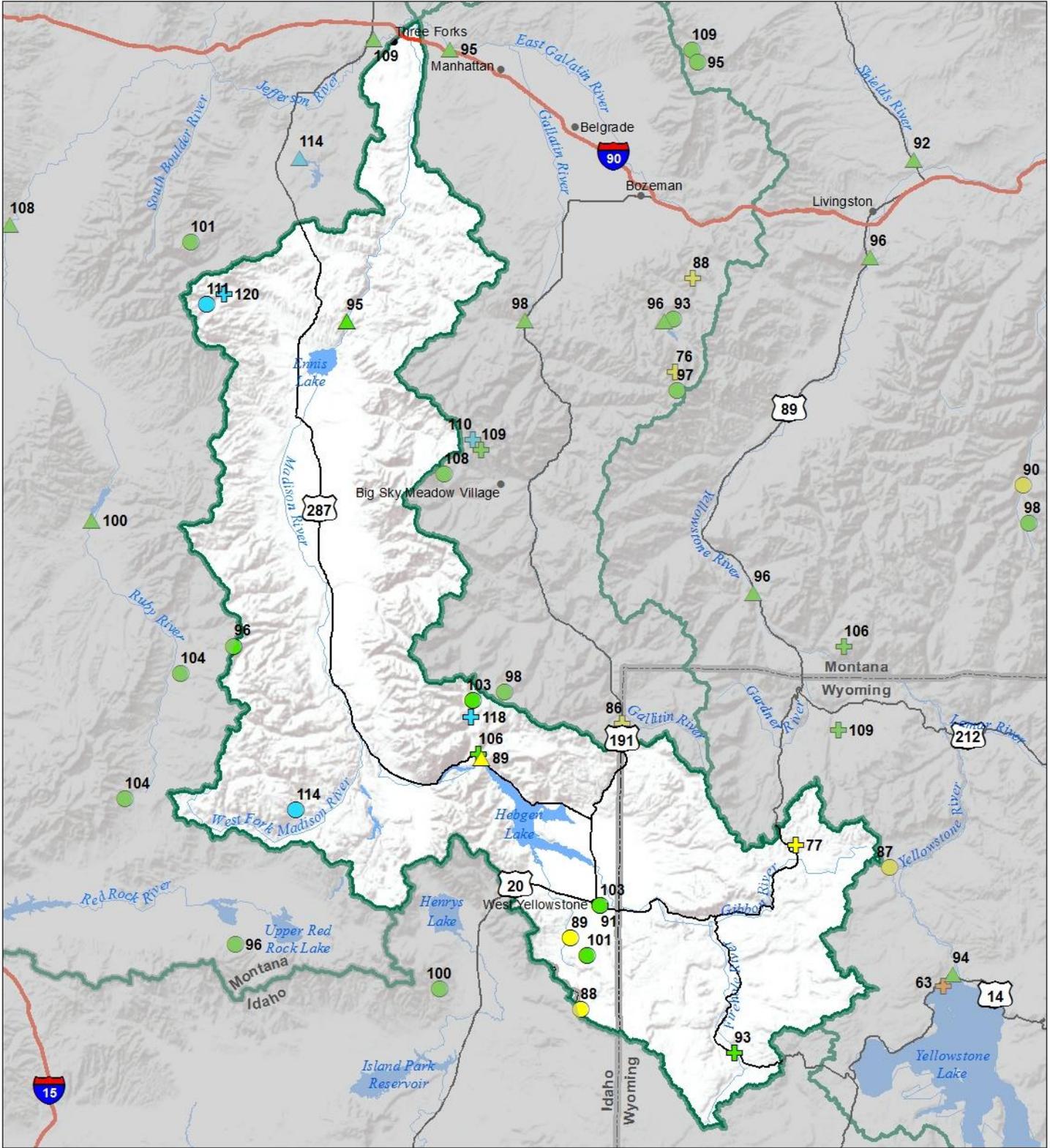
End of Month Reservoir Storage

% Capacity (red bar) Avg % Capacity (yellow bar)



Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Madison River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Normal April 1, 2016



Snow Water Equivalent Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

- 71 - 90%
- 51 - 70%
- 1 - 50%
- *

Snowcourse

- ⊕ > 150%
- ⊕ 131 - 150%
- ⊕ 111 - 130%
- ⊕ 91 - 110%
- ⊕ 71 - 90%
- ⊕ 51 - 70%
- ⊕ 1 - 50%
- ⊕ *

Streamflow Forecast Percent of Average Flows

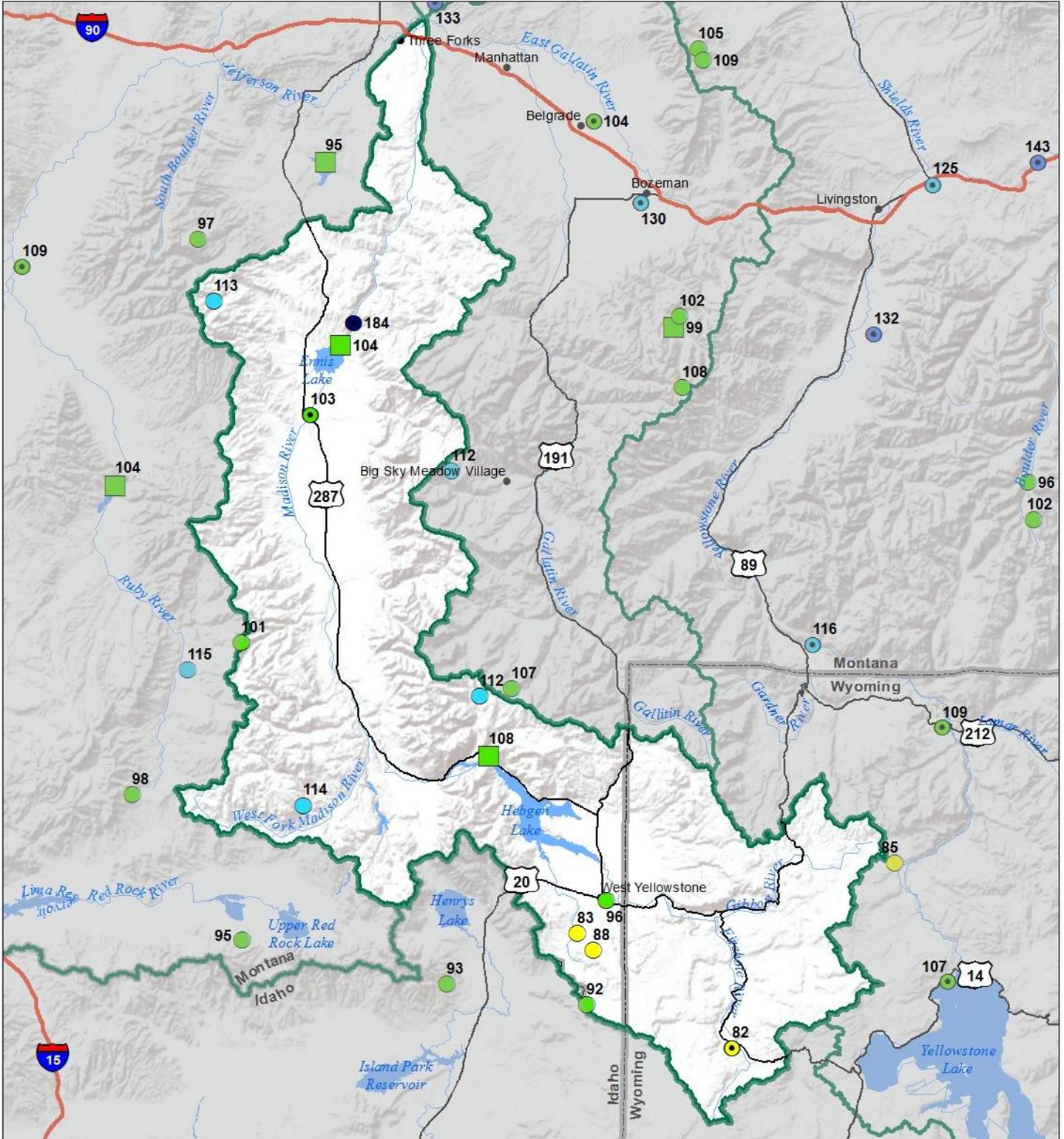
- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



Madison River Basin

Water Year to Date Precipitation and Reservoir Levels Percentage of Normal

April 1, 2016



Precipitation Percent of Normal

SNOTEL		COOP/ACIS	
● > 150%	● 71 - 90%	● > 150%	● 71 - 90%
● 131 - 150%	● 51 - 70%	● 131 - 150%	● 51 - 70%
● 111 - 130%	● 1 - 50%	● 111 - 130%	● 1 - 50%
● 91 - 110%		● 91 - 110%	

Reservoirs Percent of Normal

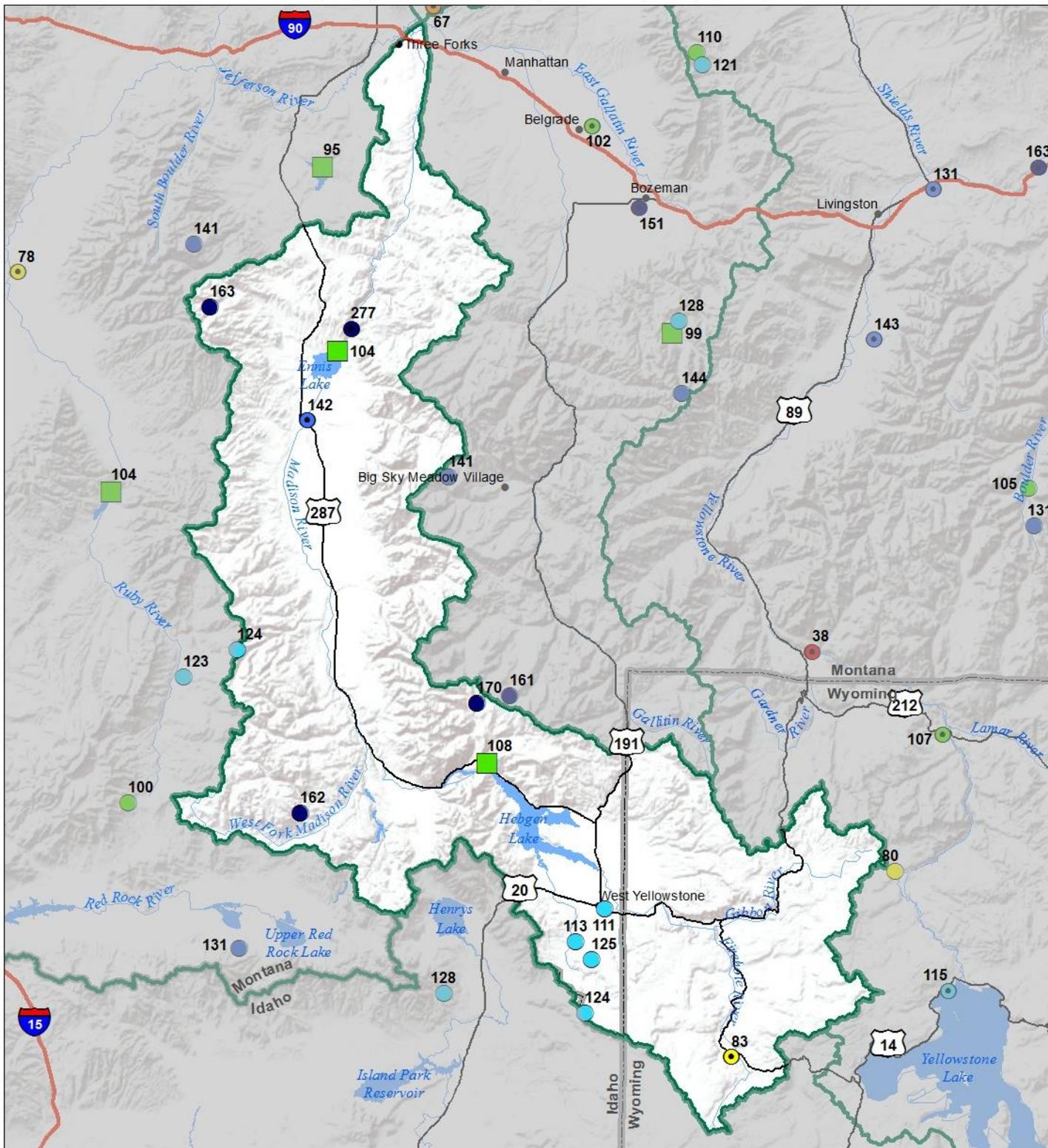
■ > 150%
■ 131 - 150%
■ 111 - 130%
■ 91 - 110%
■ 71 - 90%
■ 51 - 70%
■ 1 - 50%



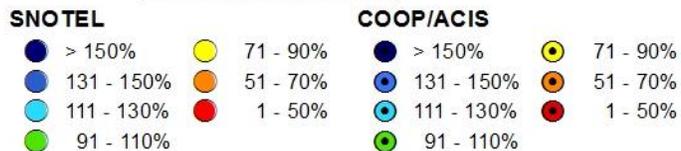
Madison River Basin

Monthly Precipitation and Reservoir Levels Percentage of Normal

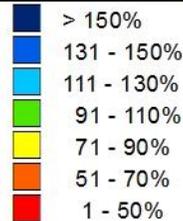
April 1, 2016 (March 1, 2016 - April 1, 2016)



Precipitation Percent of Normal



Reservoirs Percent of Normal



Madison River Basin Streamflow Forecasts - April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

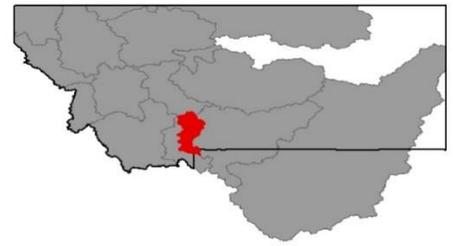
MADISON RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Hebgen Reservoir Inflow ²	APR-JUL	280	310	330	89%	350	380	370
	APR-SEP	360	395	420	89%	445	480	470
Ennis Reservoir Inflow ²	APR-JUL	475	545	595	95%	640	710	625
	APR-SEP	600	680	735	95%	790	870	775

- 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

Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Ennis Lake	30.7	28.5	29.5	41.0
Hebgen Lake	291.5	314.1	270.4	378.8
Basin-wide Total	322.1	342.6	299.9	419.8
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
MADISON abv HEBGEN LAKE	6	92	56
MADISON blw HEBGEN LAKE	10	106	68
MADISON RIVER BASIN	16	100	63

Gallatin River Basin



The Gallatin River Basin received above average precipitation during the month of March. The period was characterized by steady, moderate accumulations and punctuated by larger storms during the second and fourth weeks.

The mountains received 139% of average precipitation yielding snow water equivalence (SWE) accumulations of over five inches. This brought cumulative SWE totals to 97% of average, up six percent from March 1st levels, and up significantly from the 76% recorded at this time last year. All sub-basins, with the exception of Hyalite, are at or above average. Hyalite increased month-over-month, but remained below normal for the water-year at 90%.

With a healthy 131% or normal, valley precipitation during March proved particularly productive. An average of over four and half inches fell across valley locations, beating expectations by over an inch and bolstering water-year totals to 120%. This is a significant increase from April 1st of 2015, when levels measured a meager 72% of normal. Combined, basin-wide water-year cumulative precipitation, increased from 102% of normal on March 1st, to 109% on April 1st; well ahead of the 92% of average last year at this time.

Middle Creek Reservoir levels fell slightly from March 1st, ending the month at and 99% of average. This is slightly down from April 1st of 2015 when Middle Creek Reservoir was at 104%.

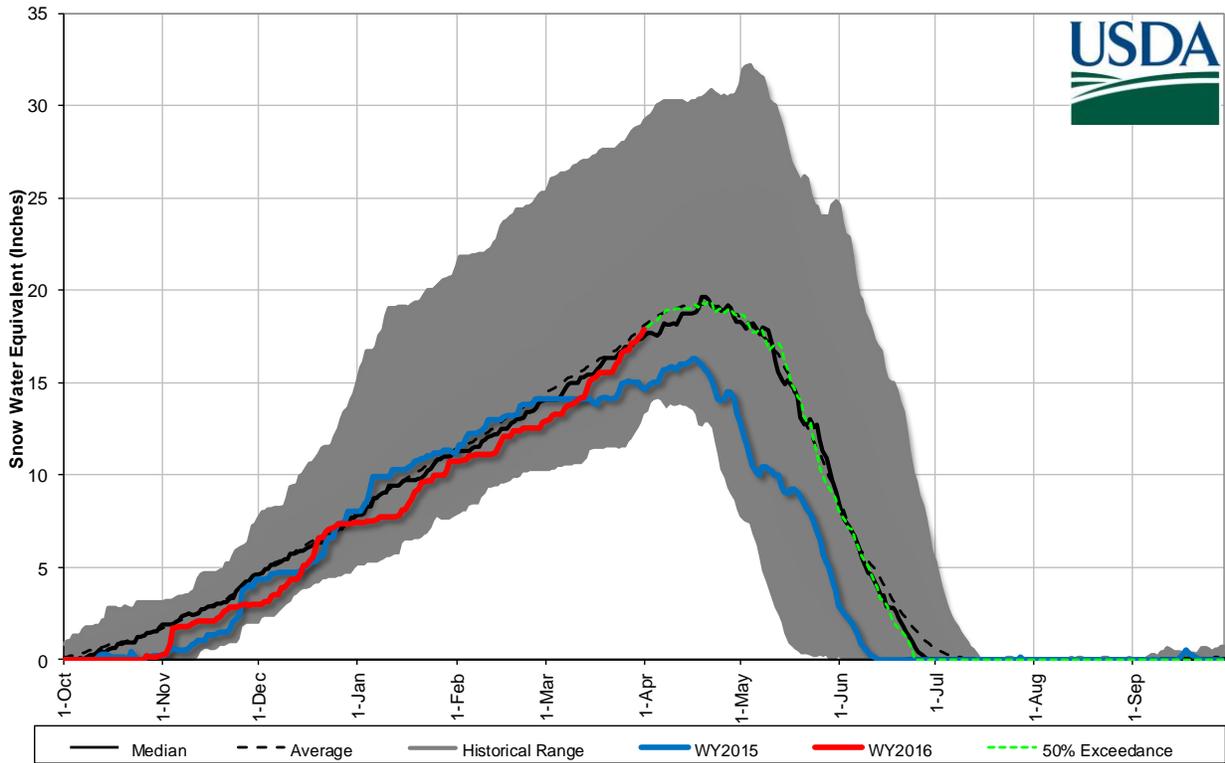
Streamflow forecasts are generally near to slightly below average across the basin for the April-July time period. Consult the individual point forecasts at the end of this section for specific point forecasts. Current basin-wide streamflows for the 50 percent exceedance are 97% of average for the April-July time period.

Gallatin River Basin Data Summary		4/1/2016	
	Percent of 1981-2010 Normal (Median)	Last Year Percentage of Normal (Median)	
Snowpack			
Basin-Wide	98%	78%	
	Monthly Percentage of Average	WYTD Percentage of 1981-2010 Average*	Last Year Percentage of Average
Precipitation			
Mountain Precipitation	139%	108%	93%
Valley Precipitation	131%	120%	72%
Basin Precipitation	138%	109%	92%
	Percentage of Average	Percentage of Capacity (Total)	Last Year Percentage of Average
Reservoir Storage			
Basin-Wide Storage	99%	54%	104%
	50 % Exceedance Forecast Percentage of Average	50 % Exceedance Forecast % of Last Year's Flows	Last Year Percentage of Average
Streamflow Forecast			
Basin-Wide Apr-July	97%	135%	70%

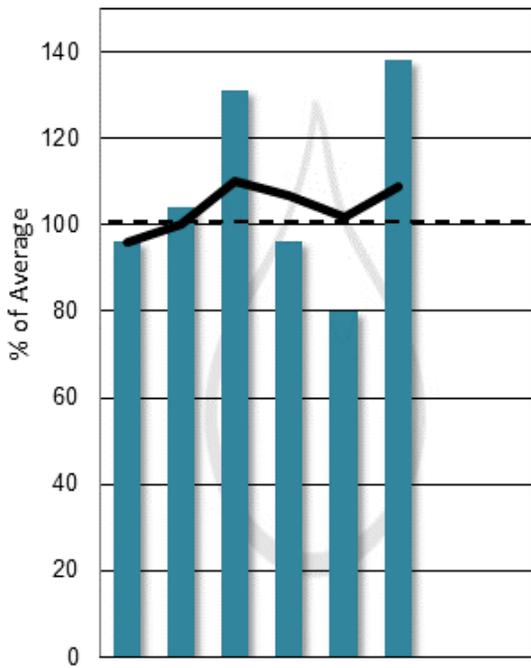
*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

**Basin-wide streamflows are an average of the individual streamflow points within the basin for the 50 percent exceedance forecast. Consult the individual streamflow forecasts in the table below for the range of forecasts at an individual point.

Gallatin River Basin Snowpack with Non-Exceedence Projections
Based on provisional SNOTEL daily data as of 4/1/2016

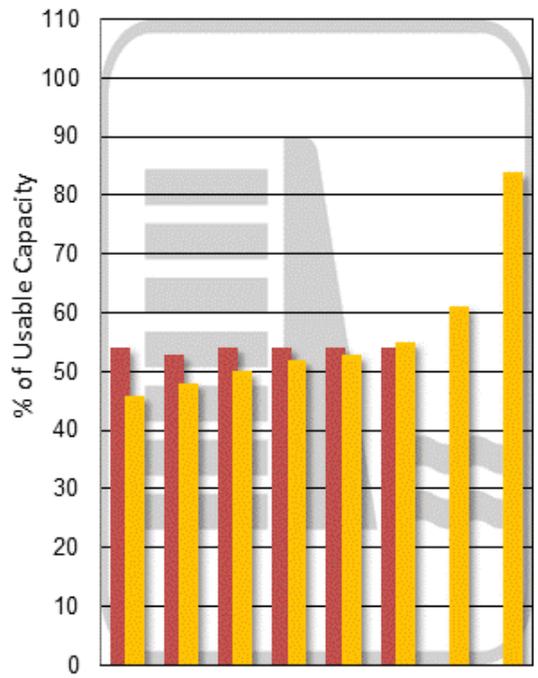


Mountain and Valley Precipitation



Oct Nov Dec Jan Feb Mar Apr May

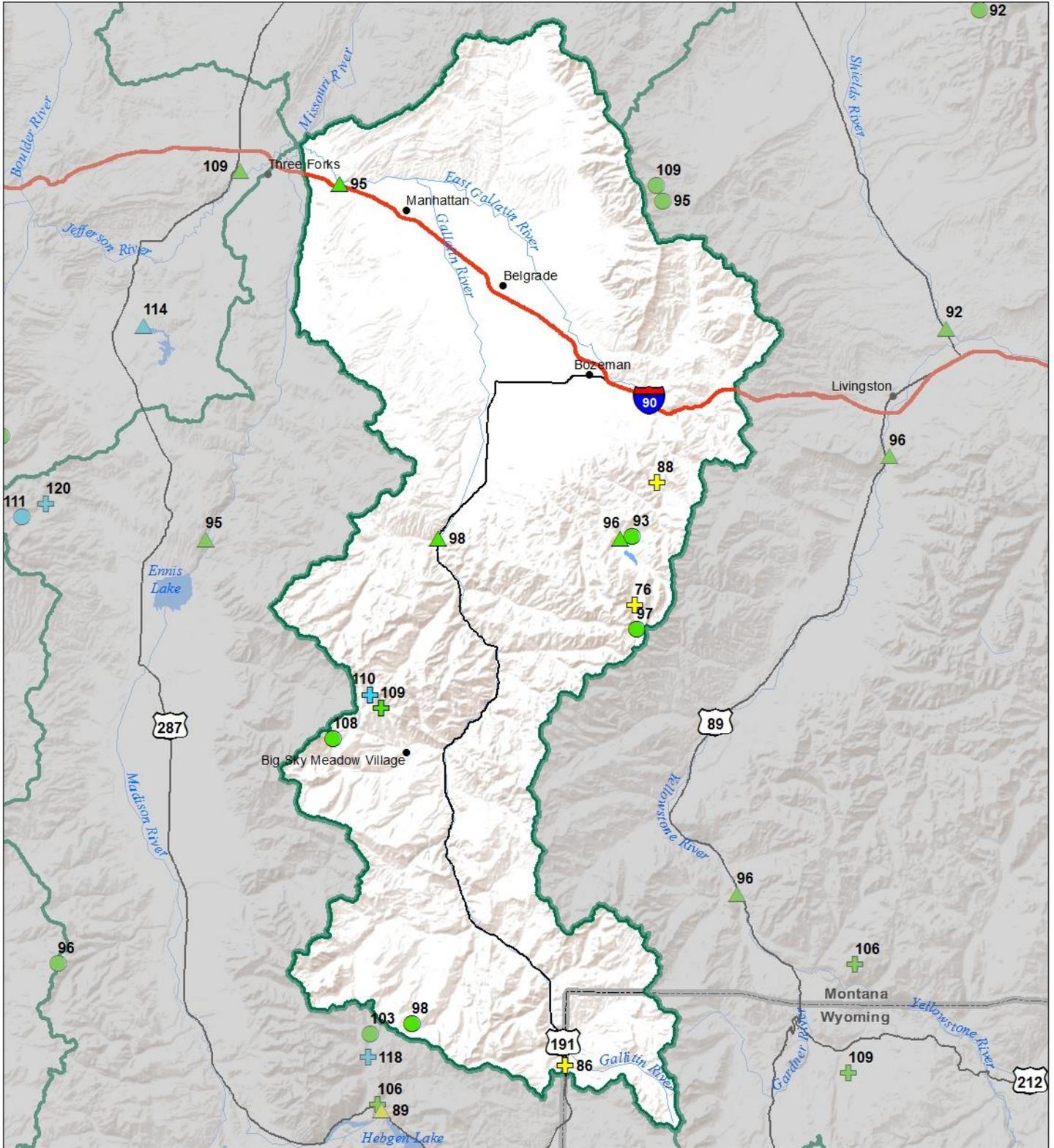
End of Month Reservoir Storage



Oct Nov Dec Jan Feb Mar Apr May

Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Gallatin River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Normal April 1, 2016



Snow Water Equivalent Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%
- * 0%

Snowcourse

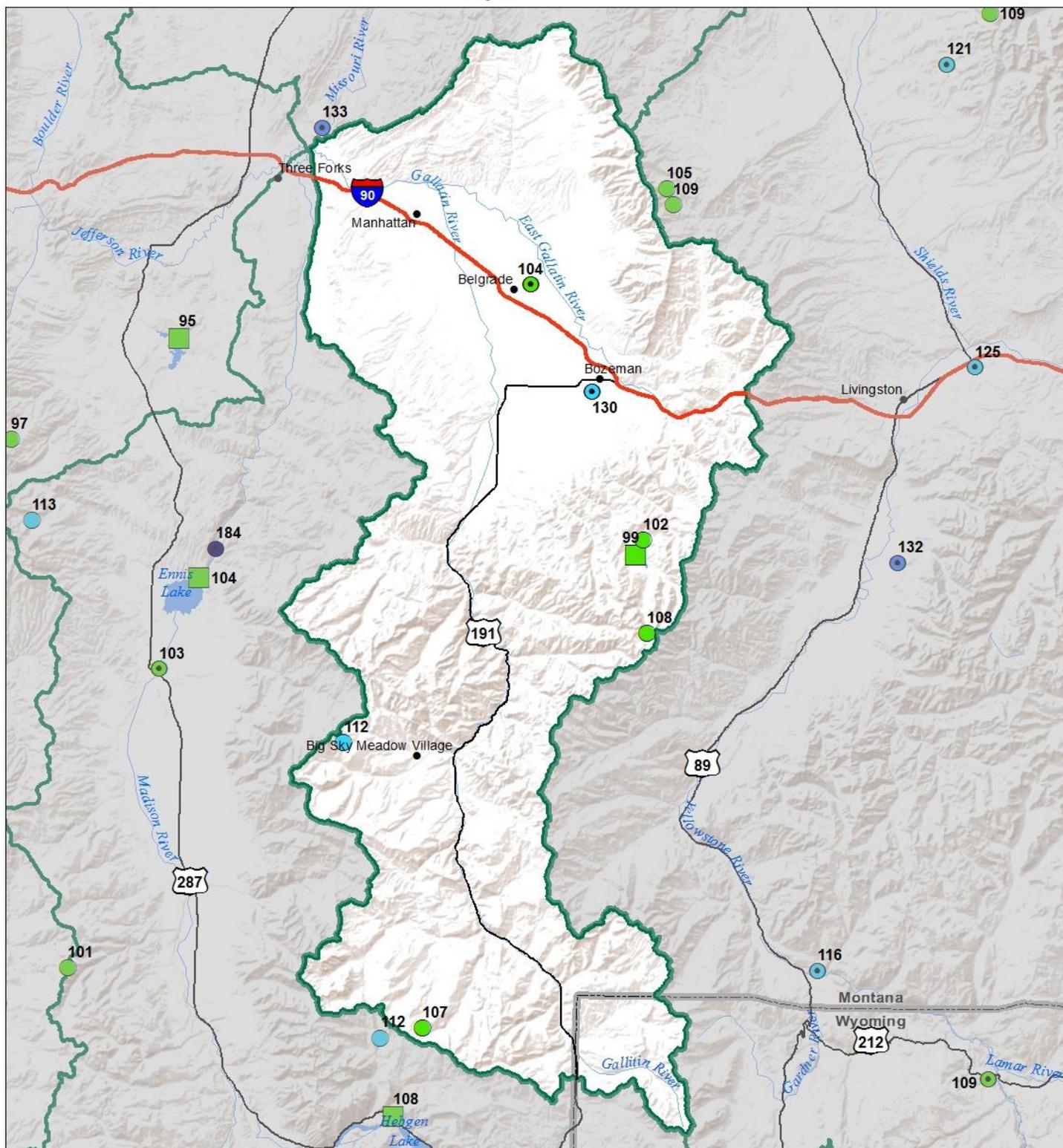
- + > 150%
- + 131 - 150%
- + 111 - 130%
- + 91 - 110%
- + 71 - 90%
- + 51 - 70%
- + 1 - 50%
- * 0%

Streamflow Forecast Percent of Average Flows

- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



Gallatin River Basin Water Year to Date Precipitation and Reservoir Levels Percentage of Normal April 1, 2016

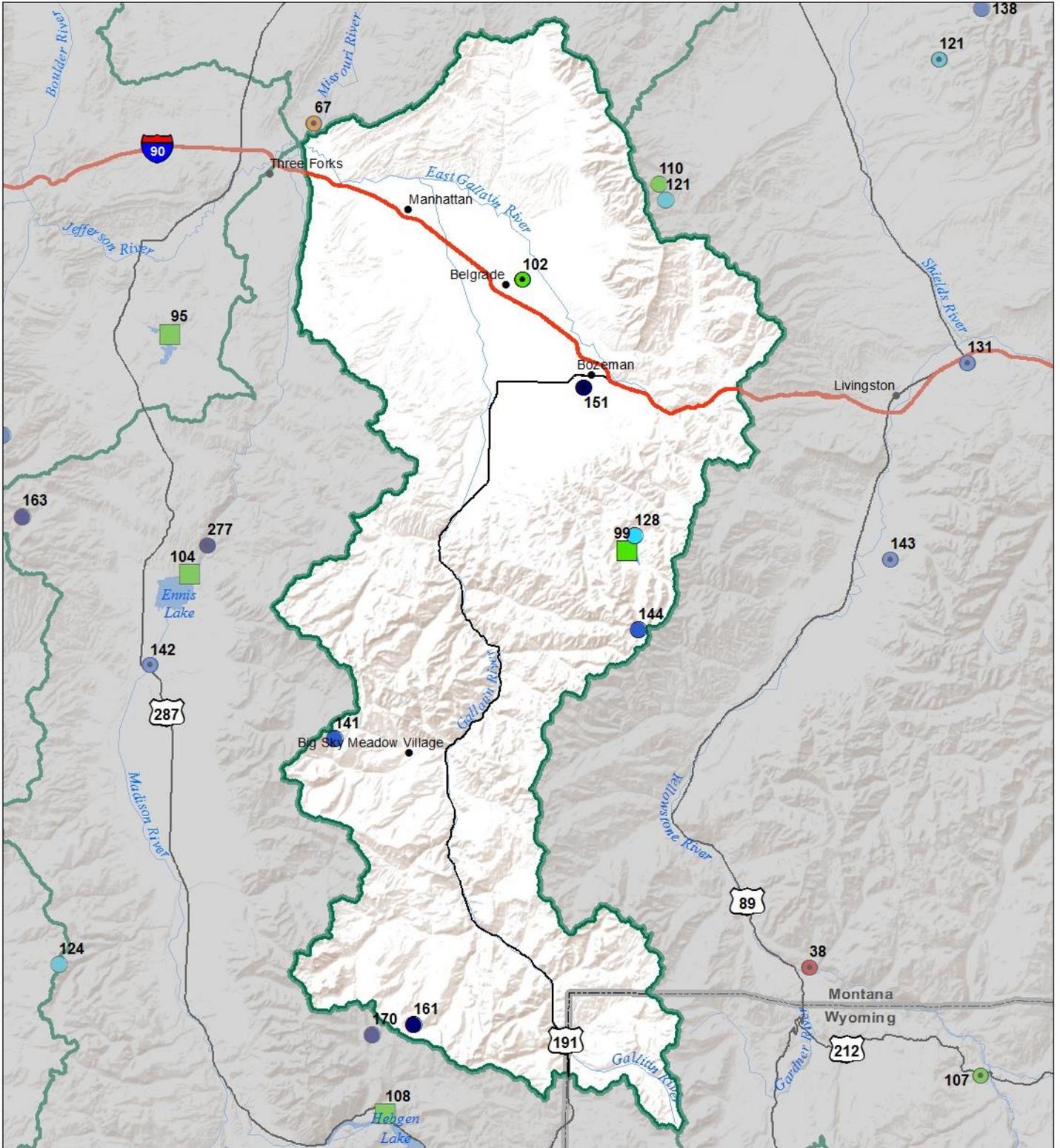


Precipitation Percent of Normal		COOP/ACIS	
SNOTEL			
● > 150%	● 71 - 90%	● > 150%	● 71 - 90%
● 131 - 150%	● 51 - 70%	● 131 - 150%	● 51 - 70%
● 111 - 130%	● 1 - 50%	● 111 - 130%	● 1 - 50%
● 91 - 110%		● 91 - 110%	

Reservoirs Percent of Normal	
■ > 150%	
■ 131 - 150%	
■ 111 - 130%	
■ 91 - 110%	
■ 71 - 90%	
■ 51 - 70%	
■ 1 - 50%	

USDA
Montana State Library
Natural Resource
Information System

Gallatin River Basin Monthly Precipitation and Reservoir Levels Percentage of Normal April 1, 2016 (March 1, 2016 - April 1, 2016)



Precipitation Percent of Normal

SNOTEL		COOP/ACIS	
● > 150%	● 71 - 90%	● > 150%	● 71 - 90%
● 131 - 150%	● 51 - 70%	● 131 - 150%	● 51 - 70%
● 111 - 130%	● 1 - 50%	● 111 - 130%	● 1 - 50%
● 91 - 110%		● 91 - 110%	

Reservoirs Percent of Normal

■ > 150%
■ 131 - 150%
■ 111 - 130%
■ 91 - 110%
■ 71 - 90%
■ 51 - 70%
■ 1 - 50%



Gallatin River Basin Streamflow Forecasts - April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

GALLATIN RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Gallatin R nr Gateway	APR-JUL	305	360	395	99%	430	485	400
	APR-SEP	355	420	460	98%	505	565	470
Hyalite Reservoir Inflow ²	APR-JUL	15.6	17.6	19	95%	20	22	20
	APR-SEP	18.5	21	22	96%	23	25	23
Gallatin R at Logan	APR-JUL	260	355	420	95%	485	580	440
	APR-SEP	300	405	480	95%	555	665	505

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

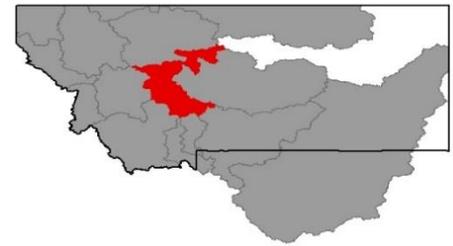
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

3) Median value used in place of average

Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Middle Creek Res	5.6	5.8	5.6	10.2
Basin-wide Total	5.6	5.8	5.6	10.2
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
UPPER GALLATIN	6	100	77
HYALITE	4	90	71
BRIDGER	2	103	95
GALLATIN RIVER BASIN	12	98	78

Headwaters Mainstem (Missouri) River Basin



Missouri Headwater’s Mainstem Basin conditions were average to slightly above average during the month of March. Relatively dry weather dominated the basin during the first half of the month until the first significant storm reached the area between the 13th and 15th. Dry weather pushed back into the area until the final week of the month when moist weather returned, keeping total precipitation at average levels.

Overall, the basin received 109% of average precipitation during the month bringing water-year cumulative totals to 101%, equal to what was measured at this time last year. Mountain snow water equivalence (SWE) ended the month at 103%, equal to the levels on March 1st, but 26% higher than levels recorded on April 1st of 2015.

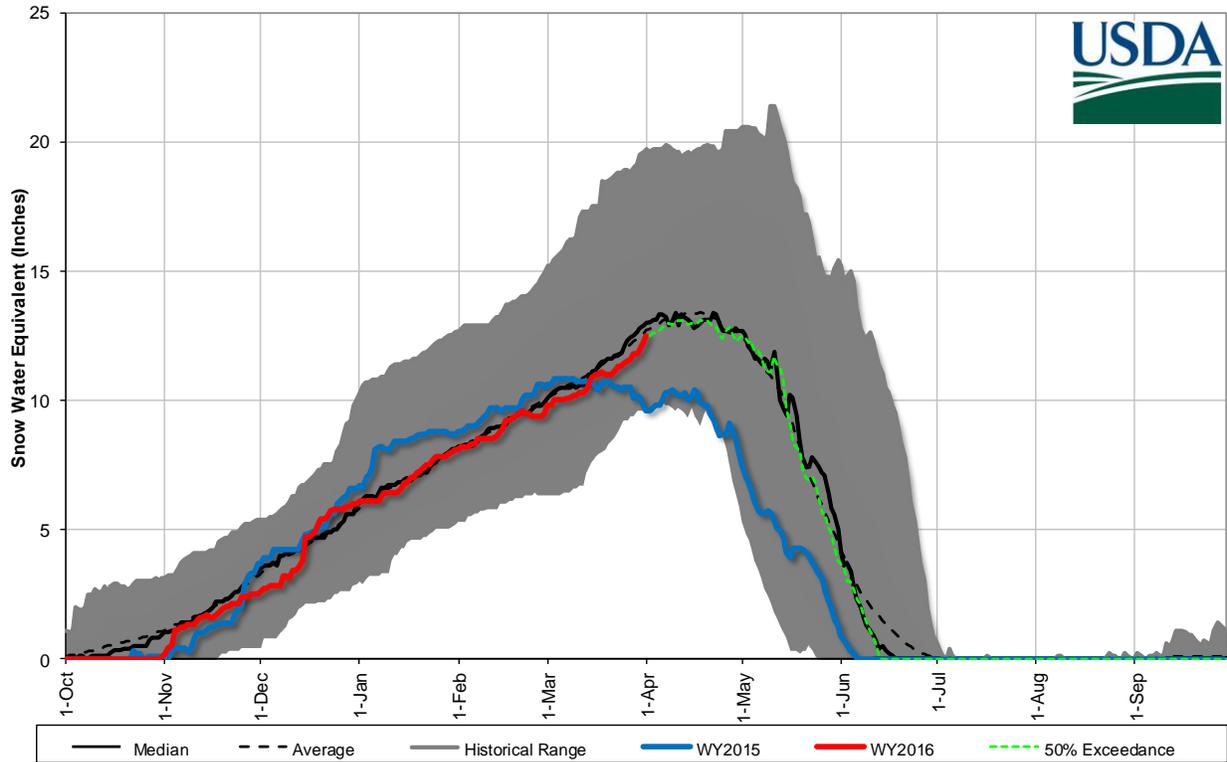
Precipitation favored mountain regions slightly, those areas received 109% of average while valleys received 106%. However, valley locations had greater total water-year accumulations than did the mountains, registering 110% and 100%, respectively

All reservoirs in the basin remained relatively unchanged from the beginning of the month with the exception of Lake Helena, which climbed from 90% of average to 98%. Combined, on April 1st, Missouri Headwater’s Mainstem reservoir levels averaged 113% of normal, down 2% from March 1st and down 3% from April 1st of last year.

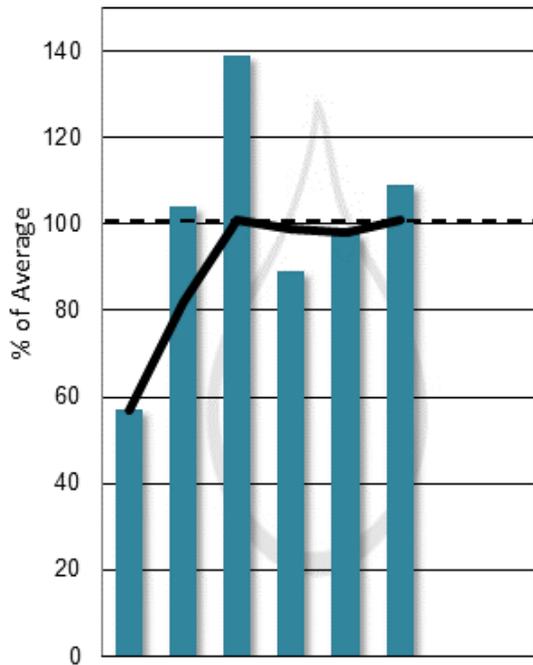
Streamflow forecasts are generally near to slightly below average across the basin for the April-July time period. Consult the individual point forecasts at the end of this section for specific point forecasts. Current basin-wide streamflows for the 50 percent exceedance are 89% of average for the April-July time period.

Missouri Mainstem River Basin Data Summary 4/1/2016			
	Percent of 1981-2010 Normal (Median)	Last Year Percentage of Normal (Median)	
Snowpack			
Basin-Wide	103%	77%	
	Monthly Percentage of Average	WYTD Percentage of 1981-2010 Average*	Last Year Percentage of Average
Precipitation			
Mountain Precipitation	109%	100%	99%
Valley Precipitation	106%	110%	123%
Basin Precipitation	109%	101%	101%
	Percentage of Average	Percentage of Capacity (Total)	Last Year Percentage of Average
Reservoir Storage			
Basin-Wide Storage	113%	79%	116%
	50 % Exceedance Forecast Percentage of Average	50 % Exceedance Forecast % of Last Year's Flows	Last Year Percentage of Average
Streamflow Forecast			
Basin-Wide Apr-July	89%	117%	76%
*Water Year-to-Date (WYTD) Precipitation is October 1st - Current			
**Basin-wide streamflows are an average of the individual streamflow points within the basin for the 50 percent exceedance forecast. Consult the individual streamflow forecasts in the table below for the range of forecasts at an individual point.			

Missouri Headwaters Mainstem River Basin (below Toston, above the Smith) Snowpack with Non-Exceedence
Based on provisional SNOTEL daily data as of 4/1/2016

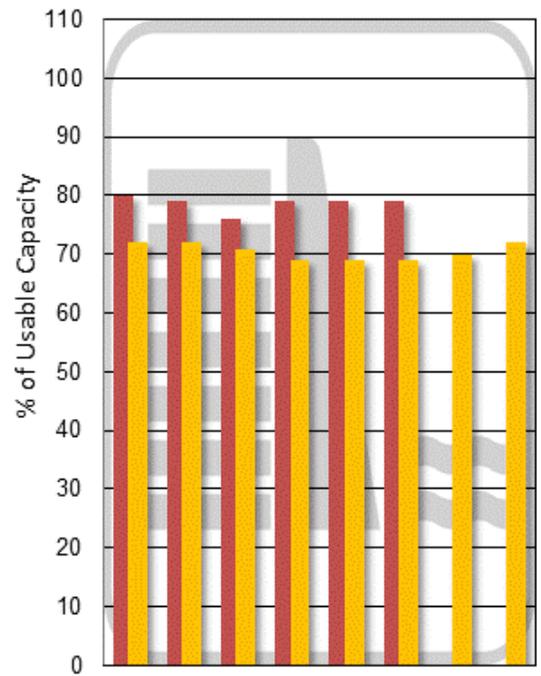


Mountain and Valley Precipitation



Oct Nov Dec Jan Feb Mar Apr May

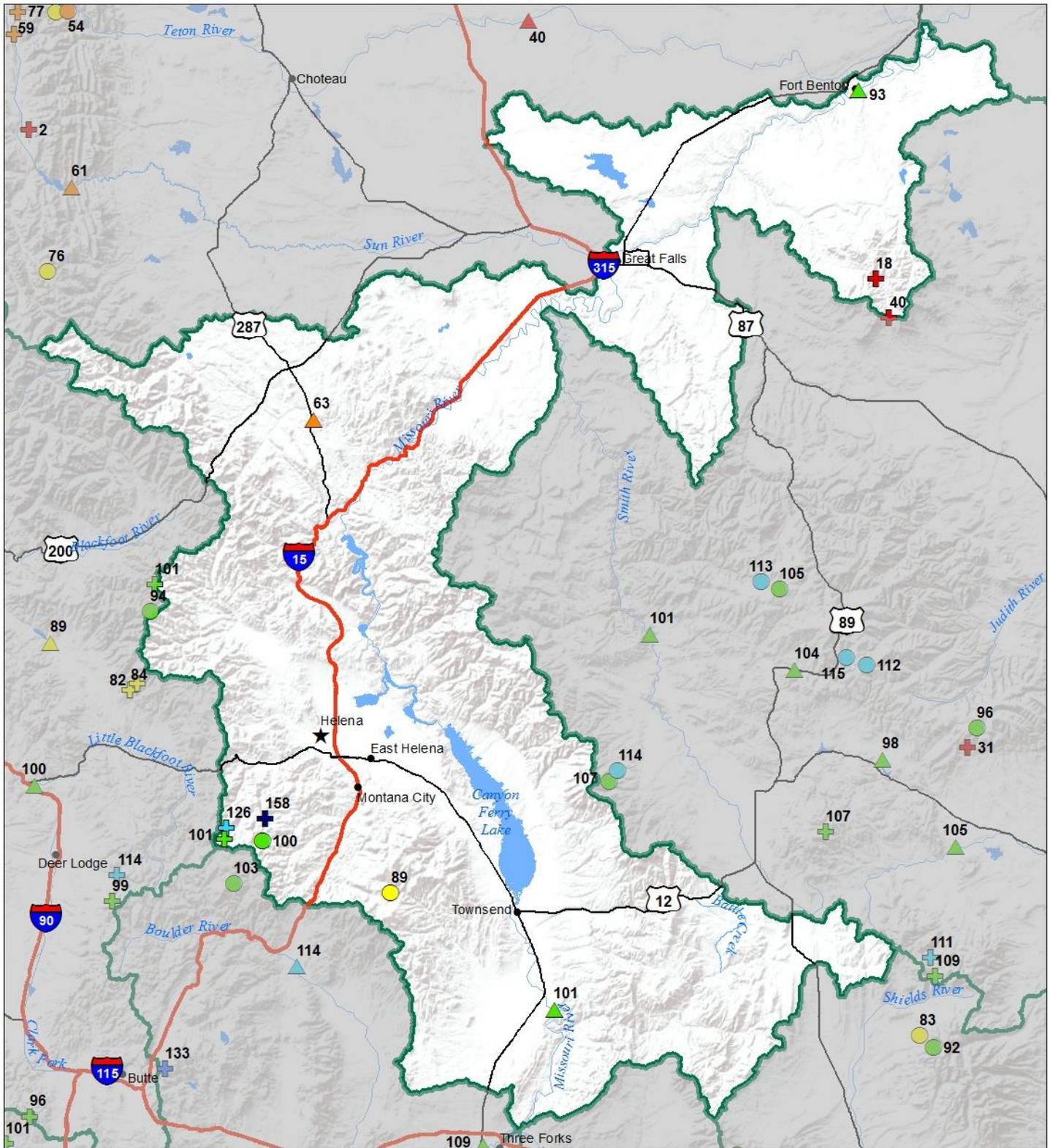
End of Month Reservoir Storage



Oct Nov Dec Jan Feb Mar Apr May

Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Headwaters Mainstem (Missouri) River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Normal April 1, 2016



Snow Water Equivalent Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%
- *

Snowcourse

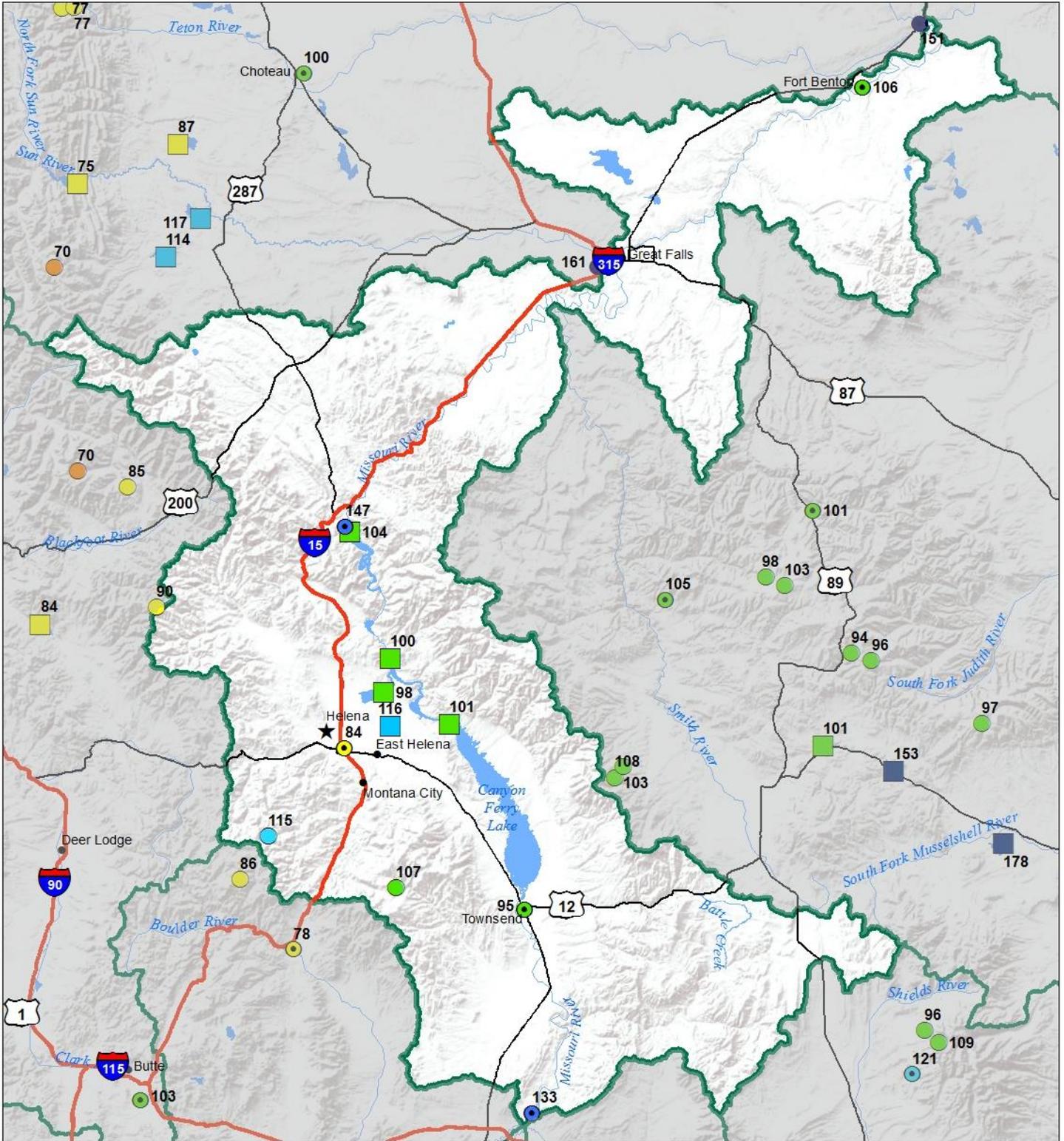
- ⊕ > 150%
- ⊕ 131 - 150%
- ⊕ 111 - 130%
- ⊕ 91 - 110%
- ⊕ 71 - 90%
- ⊕ 51 - 70%
- ⊕ 1 - 50%
- ⊕ *

Streamflow Forecast Percent of Average Flows

- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



Headwaters Mainstem (Missouri) River Basin Water Year to Date Precipitation and Reservoir Levels Percentage of Normal April 1, 2016



Precipitation Percent of Normal

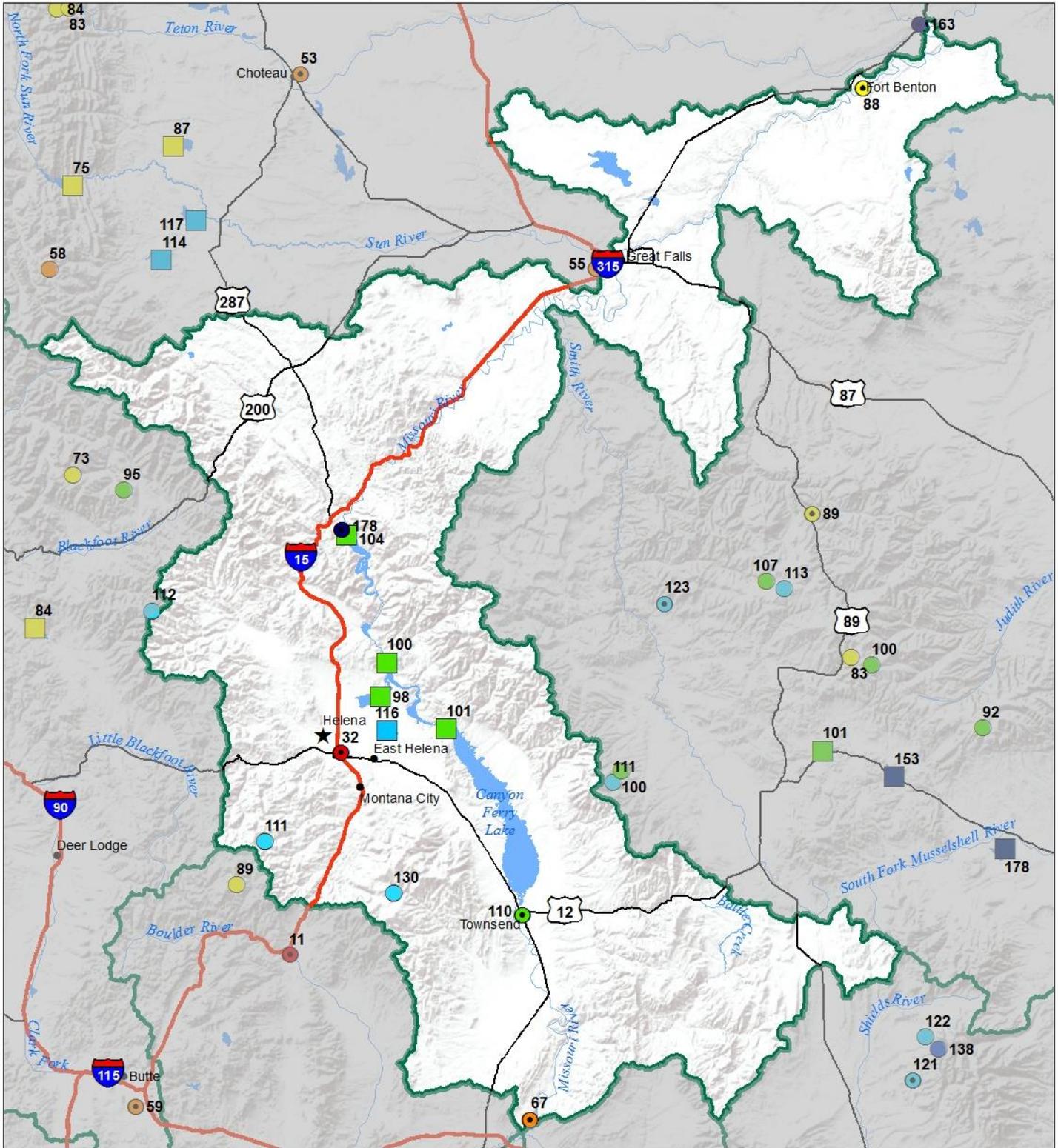
SNOTEL		COOP/ACIS	
● > 150%	● 71 - 90%	● > 150%	● 71 - 90%
● 131 - 150%	● 51 - 70%	● 131 - 150%	● 51 - 70%
● 111 - 130%	● 1 - 50%	● 111 - 130%	● 1 - 50%
● 91 - 110%		● 91 - 110%	

Reservoirs Percent of Normal

■ > 150%
■ 131 - 150%
■ 111 - 130%
■ 91 - 110%
■ 71 - 90%
■ 51 - 70%
■ 1 - 50%



Headwaters Mainstem (Missouri) River Basin Monthly Precipitation and Reservoir Levels Percentage of Normal April 1, 2016 (March 1, 2016 - April 1, 2016)



Precipitation Percent of Normal

SNOTEL

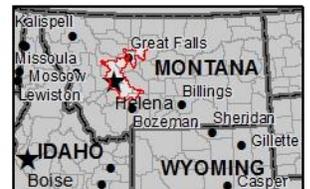
- > 150%
- 71 - 90%
- 131 - 150%
- 51 - 70%
- 111 - 130%
- 1 - 50%
- 91 - 110%

COOP/ACIS

- > 150%
- 71 - 90%
- 131 - 150%
- 51 - 70%
- 111 - 130%
- 1 - 50%
- 91 - 110%

Reservoirs Percent of Normal

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%



Missouri Mainstem Basin Streamflow Forecasts - April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

MISSOURI MAINSTEM BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Missouri R at Toston ²	APR-JUL	1250	1590	1820	102%	2050	2380	1790
	APR-SEP	1400	1810	2090	101%	2370	2780	2070
Dearborn R nr Craig	APR-JUL	7.9	37	56	63%	75	104	89
	APR-SEP	9.4	40	60	63%	80	111	95
Missouri R at Fort Benton ²	APR-JUL	1560	2070	2420	93%	2760	3270	2610
	APR-SEP	1820	2450	2880	93%	3300	3930	3110
Missouri R nr Virgelle ²	APR-JUL	1620	2210	2610	87%	3020	3610	3000
	APR-SEP	1870	2600	3090	88%	3580	4310	3520
Missouri R nr Landusky ²	APR-JUL	1750	2350	2760	87%	3160	3760	3160
	APR-SEP	2030	2770	3280	88%	3780	4520	3720
Missouri R bl Fort Peck Dam ²	APR-JUL	1650	2330	2790	86%	3250	3930	3240
	APR-SEP	1720	2600	3190	86%	3780	4660	3700
Lake Sakakawea Inflow ²	APR-JUL	4640	6290	7410	89%	8530	10200	8310
	APR-SEP	4830	6940	8370	89%	9800	11900	9400

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

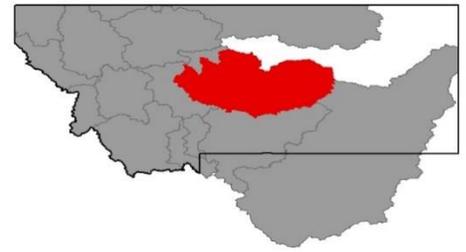
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

3) Median value used in place of average

Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Canyon Ferry Lake	1471.9	1533.1	1457.0	2043.0
Helena Valley Reservoir	5.3	4.9	4.6	9.2
Lake Helena	10.7	10.7	10.9	12.7
Hauser Lake & Lake Helena	73.1	73.1	73.5	74.6
Holter Lake	81.0	81.1	77.9	81.9
Fort Peck Lake	14976.7	15365.6	13029.0	18910.0
Basin-wide Total	16618.8	17068.6	14652.9	21131.4
# of reservoirs	6	6	6	6

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
HEADWATERS MAINSTEM	9	103	77
SMITH-JUDITH-MUSSELSHELL	14	107	80
SUN-TETON-MARIAS	10	65	53
MAINSTEM ab FT PECK RES	34	89	67
MILK RIVER BASIN	3	2	0
MISSOURI MAINSTEM BASIN	37	87	65

Smith-Judith-Musselshell River Basin



The Smith-Judith-Musselshell has benefitted from storms approaching from nearly every direction this water year, leaving the basin well above last year, and above the normal seasonal peak for the year. Snowpack is highest in the Smith (110%) and Judith (111%) basins, and near normal in the Musselshell (98%) on April 1st. The lower elevation Highwood Range is the only part of the basin that is well below normal at 32% on April 1st, significant melt during the month and lack of snowfall in that range has caused the transition to runoff a little ahead of schedule. Hopefully this wet pattern keeps up for water users this spring, which is climatically favored for precipitation in the basin.

Valley precipitation was below normal for the month of March at 88%, while mountain precipitation was slightly above normal at 111%. Crystal Lake SNOTEL in the Big Snowy Range received a well above 145% of average precipitation for the month, helping to boost the water year totals. Water year-to-date precipitation in the basin continues to be well above average at valley locations (111%) and slightly above average at mountain locations (103%). Currently, the basin as a whole is 105% of average for April 1st, and ahead of last year at this time.

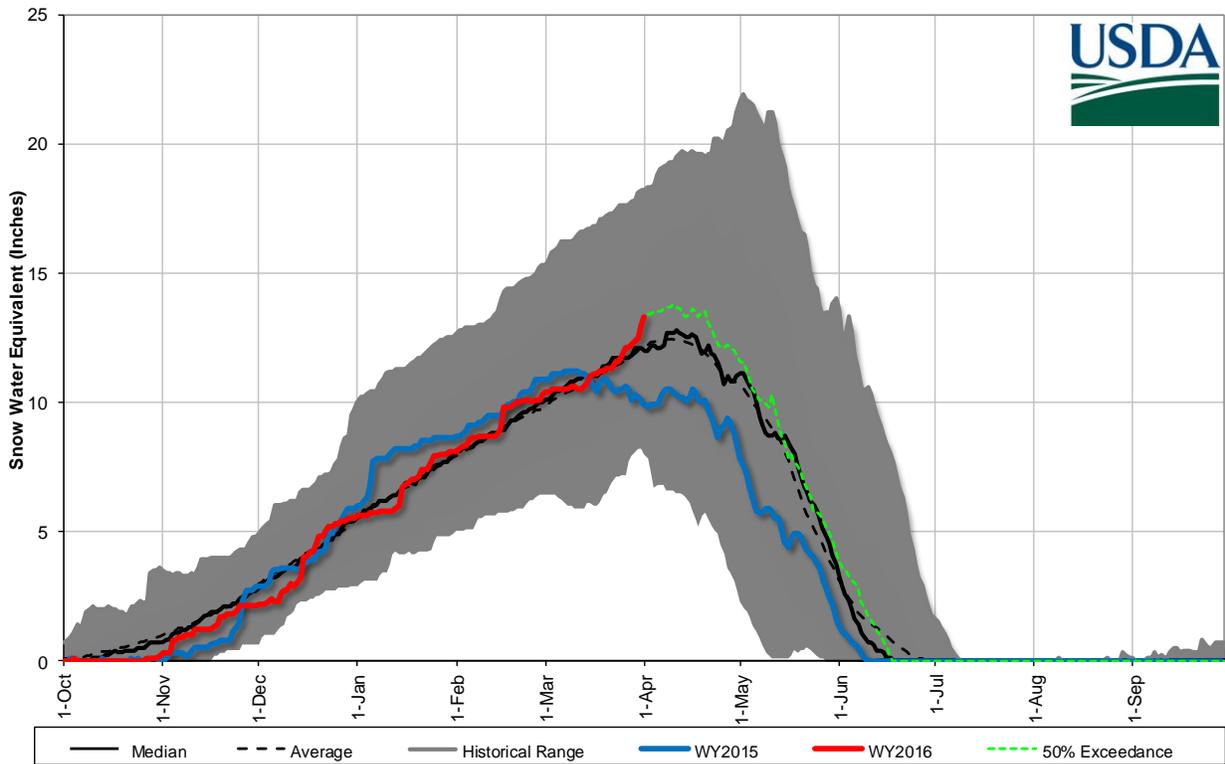
Reservoir storage is well above average for this date in the basin. Basin-wide reservoir storage is currently 138% of average for April 1st.

Streamflow forecasts are generally near to above average across the basin for the April-July time period. 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 99% of average for the April-July time period.

Smith-Judith-Musselshell River Basin Data Summary		4/1/2016	
	Percent of 1981-2010 Normal (Median)	Last Year Percentage of Normal (Median)	
Snowpack			
Basin-Wide	107%	80%	
	Monthly Percentage of Average	WYTD Percentage of 1981-2010 Average*	Last Year Percentage of Average
Precipitation			
Mountain Precipitation	109%	103%	98%
Valley Precipitation	88%	111%	78%
Basin Precipitation	104%	105%	94%
	Percentage of Average	Percentage of Usable Capacity	Last Year Percentage of Average
Reservoir Storage			
Basin-Wide Storage	138%	80%	158%
	50 % Exceedance Forecast Percentage of Average	50 % Exceedance Forecast % of Last Year's Flows	Last Year Percentage of Average
Streamflow Forecast			
Basin-Wide Apr-July	99%	100%	97%
*Water Year-to-Date (WYTD) Precipitation is October 1st - Current			
**Basin-wide streamflows are an average of the individual streamflow points within the basin for the 50 percent exceedance forecast. Consult the individual streamflow forecasts in the table below for the range of forecasts at an individual point.			

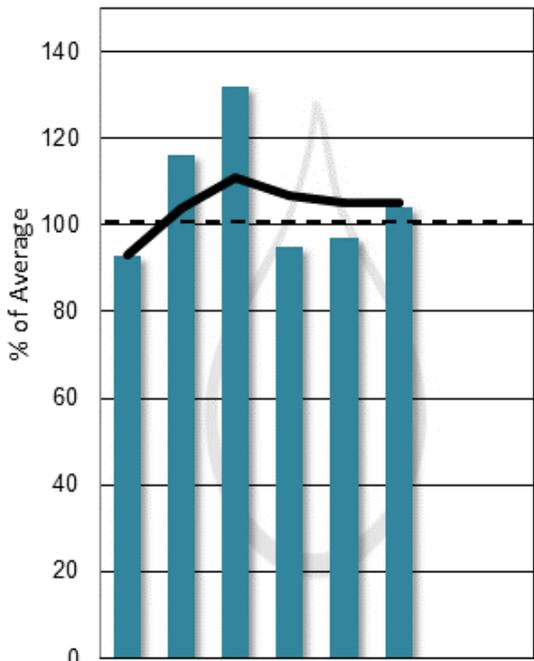
Smith-Judith-Musselshell River Basin Snowpack with Non-Exceedence Projections

Based on provisional SNOTEL daily data as of 4/1/2016



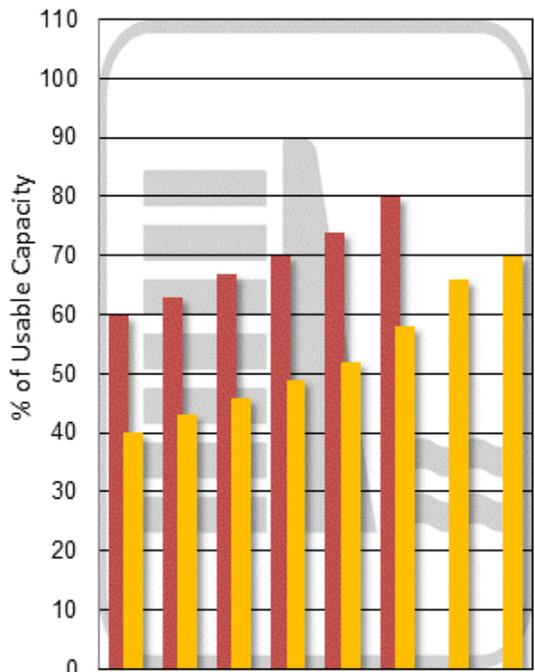
Mountain and Valley Precipitation

Monthly (teal bar), Year-to-date (black line)



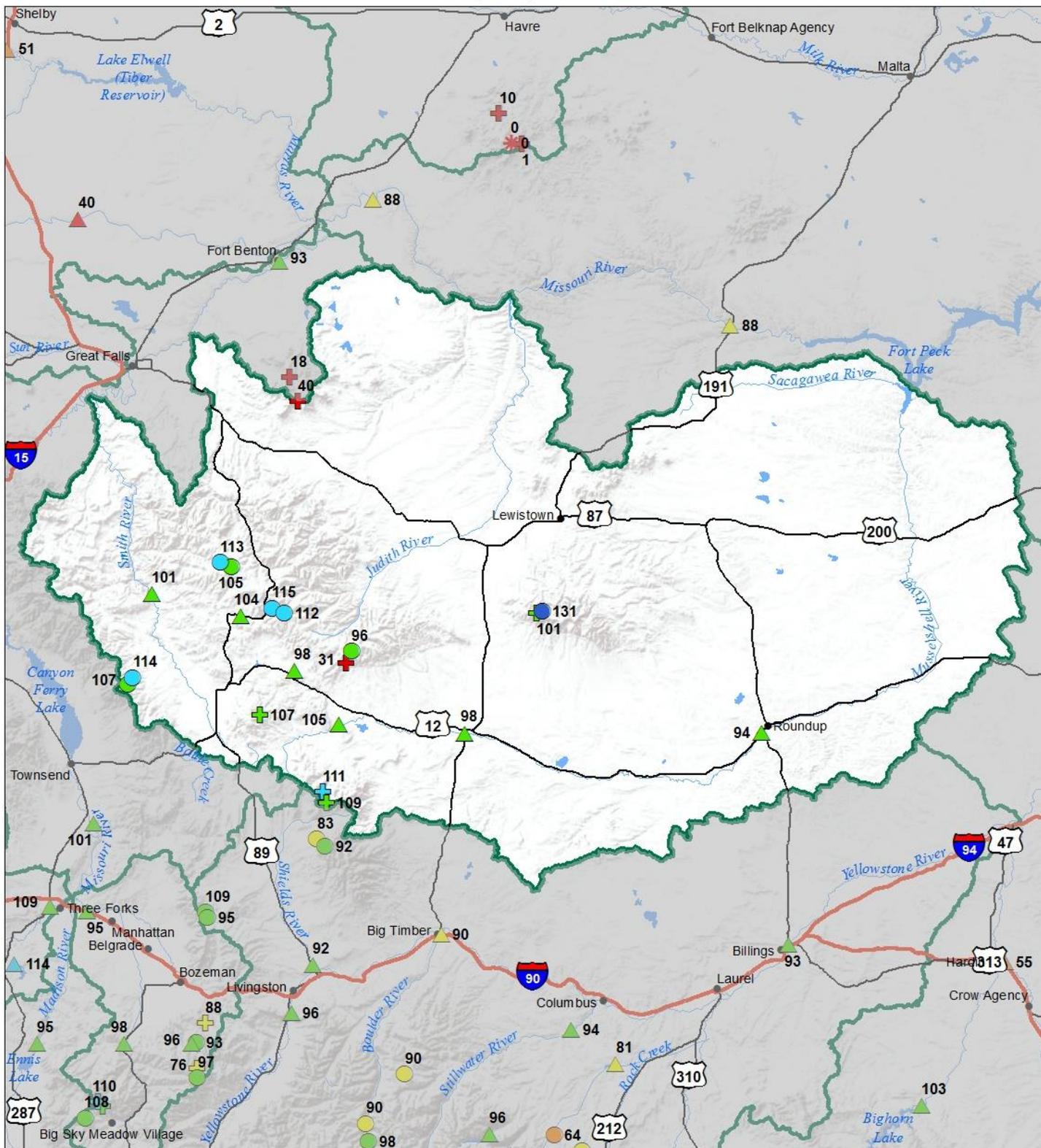
End of Month Reservoir Storage

% Capacity (red bar), Avg % Capacity (yellow bar)



Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Smith-Judith-Musselshell River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Normal April 1, 2016



Snow Water Equivalent Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%
- *

Snowcourse

- ⊕ > 150%
- ⊕ 131 - 150%
- ⊕ 111 - 130%
- ⊕ 91 - 110%
- ⊕ 71 - 90%
- ⊕ 51 - 70%
- ⊕ 1 - 50%
- ⊕ *

Streamflow Forecast Percent of Average Flows

- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%

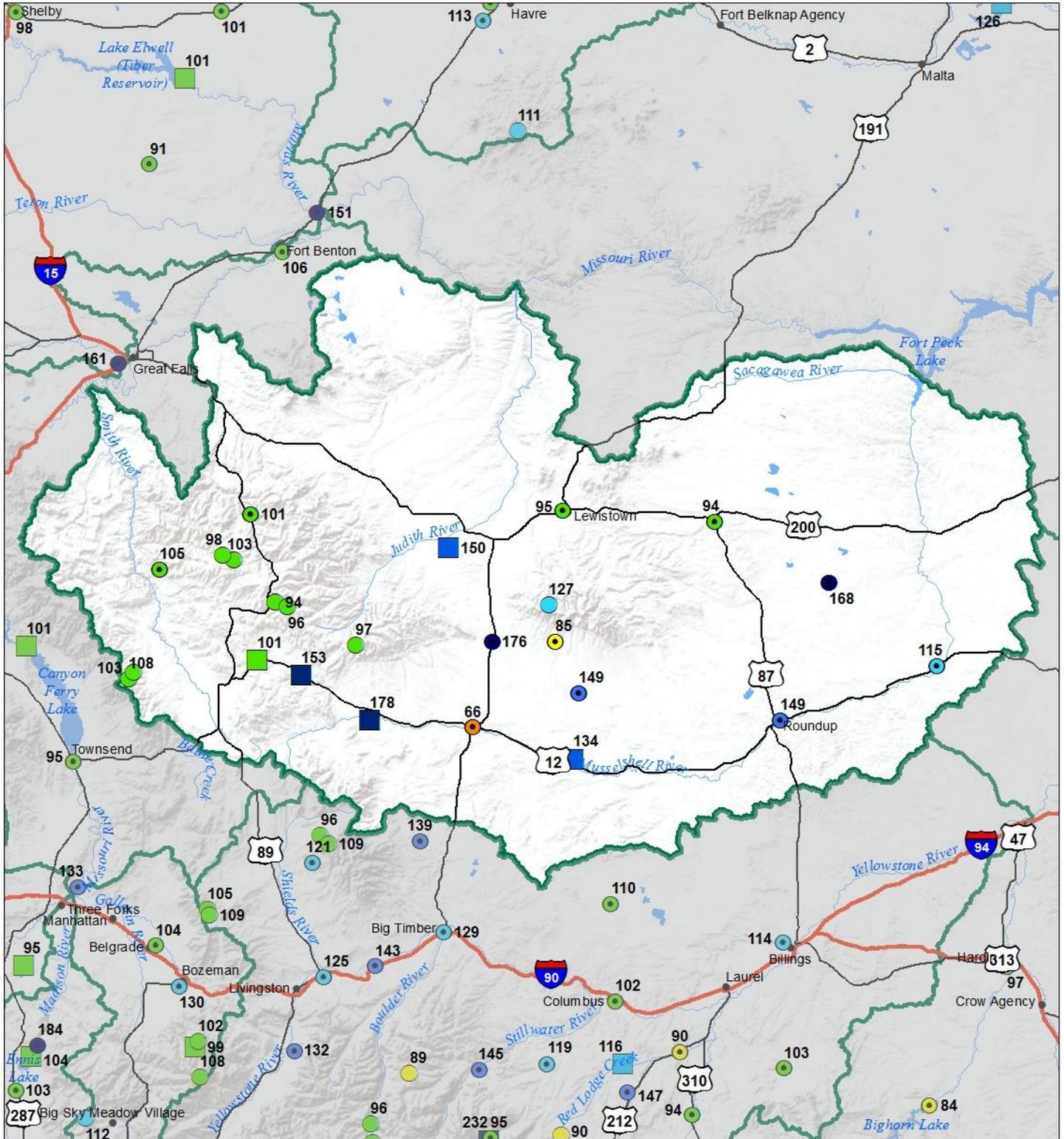


Smith-Judith-Musselshell River Basin

Water Year to Date Precipitation and Reservoir Levels

Percentage of Normal

April 1, 2016



Precipitation Percent of Normal

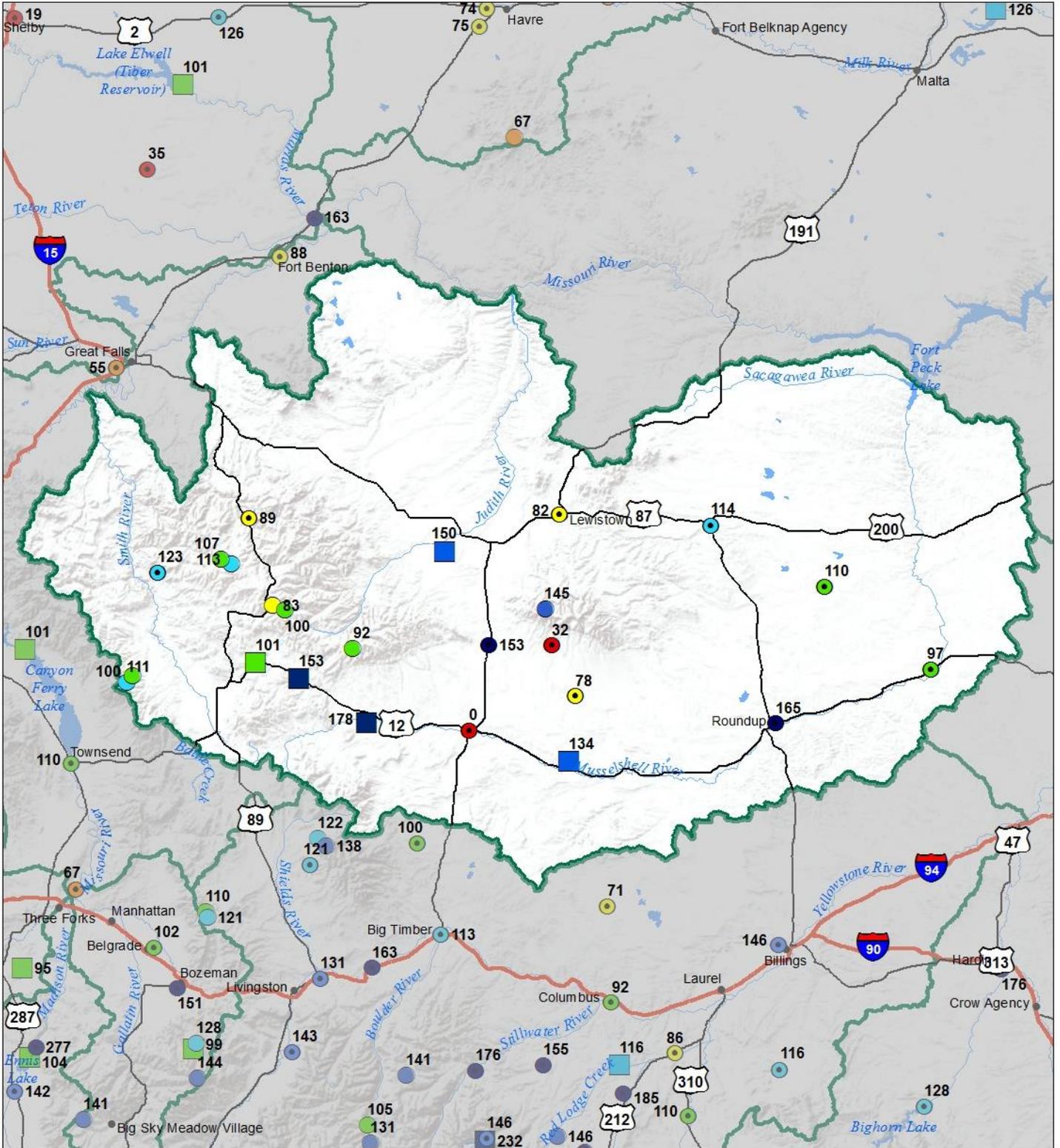
SNOTEL		COOP/ACIS	
● > 150%	● 71 - 90%	● > 150%	● 71 - 90%
● 131 - 150%	● 51 - 70%	● 131 - 150%	● 51 - 70%
● 111 - 130%	● 1 - 50%	● 111 - 130%	● 1 - 50%
● 91 - 110%		● 91 - 110%	

Reservoirs Percent of Normal

■ > 150%
■ 131 - 150%
■ 111 - 130%
■ 91 - 110%
■ 71 - 90%
■ 51 - 70%
■ 1 - 50%



Smith-Judith-Musselshell River Basin Monthly Precipitation and Reservoir Levels Percentage of Normal April 1, 2016 (March 1, 2016 - April 1, 2016)



Precipitation Percent of Normal

SNOTEL		COOP/ACIS	
● > 150%	● 71 - 90%	● > 150%	● 71 - 90%
● 131 - 150%	● 51 - 70%	● 131 - 150%	● 51 - 70%
● 111 - 130%	● 1 - 50%	● 111 - 130%	● 1 - 50%
● 91 - 110%		● 91 - 110%	

Reservoirs Percent of Normal

■ > 150%
■ 131 - 150%
■ 111 - 130%
■ 91 - 110%
■ 71 - 90%
■ 51 - 70%
■ 1 - 50%



Smith-Judith-Musselshell Streamflow Forecasts - April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

SMITH-JUDITH-MUSSEL SHELL	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Sheep Ck nr White Sulphur Springs								
	APR-JUL	10.8	14	16.2	105%	18.4	22	15.5
	APR-SEP	12.6	16.5	19.2	104%	22	26	18.4
Smith R bl Eagle Ck ²								
	APR-JUL	55	86	107	101%	128	159	106
	APR-SEP	54	91	117	101%	143	180	116
NF Musselshell R nr Delpine								
	APR-JUL	1.42	2.5	3.3	97%	4.1	5.2	3.4
	APR-SEP	1.76	3	3.9	98%	4.8	6.1	4
SF Musselshell R ab Martinsdale								
	APR-JUL	8.8	25	36	103%	47	63	35
	APR-SEP	10.4	28	40	105%	52	70	38
Musselshell R at Harlowton ²								
	APR-JUL	5.3	36	56	98%	76	107	57
	APR-SEP	2.7	36	58	98%	80	113	59
Musselshell R nr Roundup ²								
	APR-JUL	-23	19.7	62	93%	104	167	67
	APR-SEP	-26	19.9	62	94%	104	166	66

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

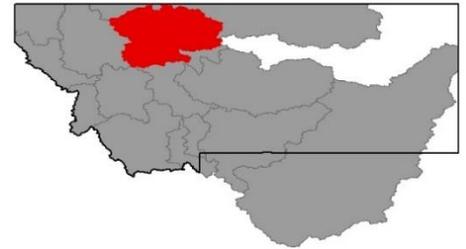
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

3) Median value used in place of average

Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Smith River Res	6.8	10.3	6.7	10.6
Ackley Lake	4.2	4.0	2.8	7.0
Bair Res	5.7	5.6	3.7	7.0
Martinsdale Res	15.6	19.3	8.8	23.1
Deadman's Basin Res	63.4	70.6	47.5	72.2
Basin-wide Total	95.7	109.9	69.5	119.9
# of reservoirs	5	5	5	5

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
SMITH	7	110	87
HIGHWOOD	2	32	0
JUDITH	5	111	87
MUSSEL SHELL	6	98	69
SMITH-JUDITH-MUSSEL SHELL	14	107	80

Sun-Teton-Marias River Basin



Snowpack conditions in the Sun-Teton-Marias River basin are well below normal for April 1st, and optimism for recovery before spring runoff is slowly fading. Snow did fall in the Sun-Teton-Marias River basin during the month of March, but snowfall totals for the month were below normal for the 3rd straight month (21% to 84%). Well above average temperatures during the month caused the low to mid-elevation snowpack to transition to melt which further decreased snowpack percentages for this date. Spring and summer precipitation will play a key role in the river volumes, as snowpack is approaching record low for the date basin-wide. Hopefully spring and summer will deliver the much needed moisture as the mountain “snowpack reservoir” will deliver less long duration water than can normally be anticipated. Currently snowpack in the Sun-Teton-Marias River basin is 65% of normal for April 1st, but ahead of last year at this time.

Mountain (71%) and Valley (71%) precipitation for the month of March was also well below average in the Sun-Teton-Marias. The lack of precipitation so far this water year has resulted in water year-to-date percentages that are well below average. Currently, mountain precipitation is 77% of average for April 1st and Valley precipitation is 82% of average. Overall, basin water year-to-date precipitation is 78% of average for this date, and well below last year at this time.

Reservoir storage has increased over the month due to the early melt of low and mid elevation snowpack. Reservoir storage ranges from below average at Pishkun (75%) and Swift (78%) Reservoirs to near or above average at larger reservoirs in the eastern part of the basin. Overall, basin-wide storage is 99% of average for April 1st.

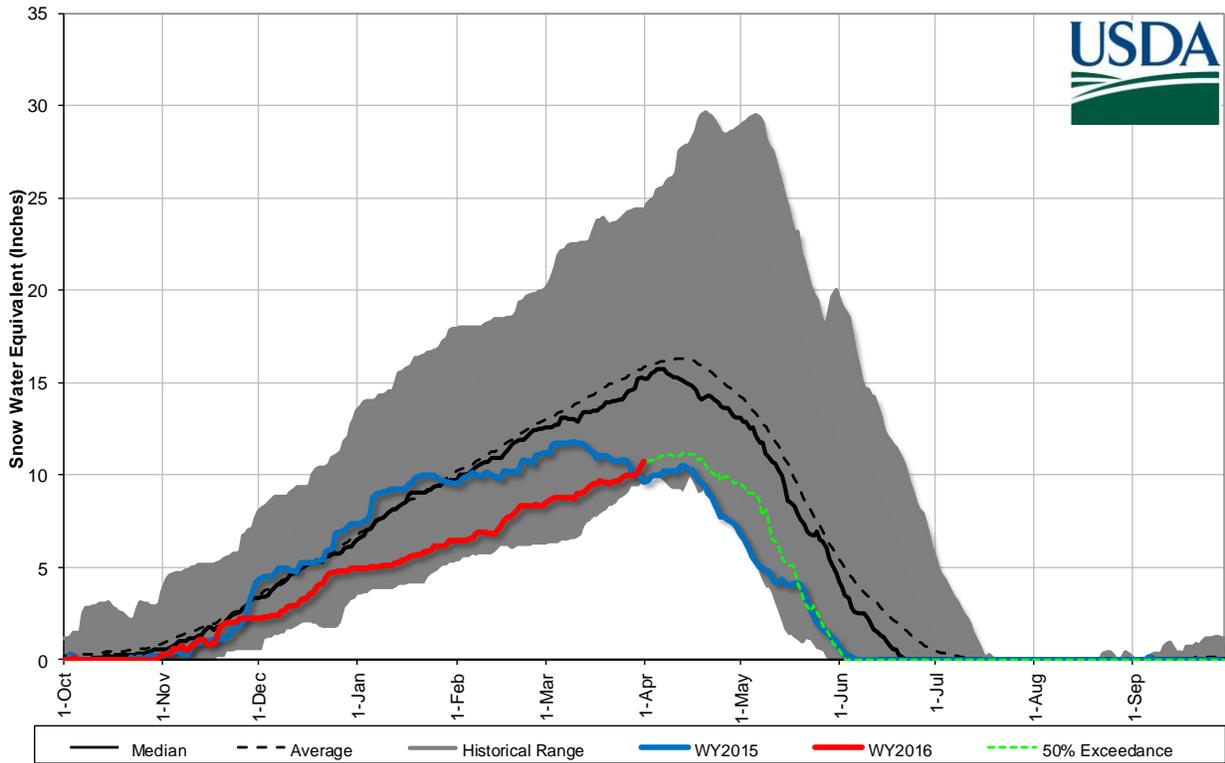
Streamflow forecasts reflect the lack of snowpack and water year precipitation in the basin and are well below average for the April-July time period. Please consult the streamflow forecast table at the end of this section for individual forecasts as there is a broad range across the basin. Current basin-wide streamflows for the 50 percent exceedance are 60% of average for the April-July time period.

Sun-Teton-Marias River Basin Data Summary		4/1/2016	
Snowpack	Percent of 1981-2010 Normal (Median)	Last Year Percentage of Normal (Median)	
Basin-Wide	65%	53%	
Precipitation	Monthly Percentage of Average	WYTD Percentage of 1981-2010 Average*	Last Year Percentage of Average
Mountain Precipitation	71%	77%	106%
Valley Precipitation	71%	82%	118%
Basin Precipitation	71%	78%	110%
Reservoir Storage	Percentage of Average	Percentage of Usable Capacity	Last Year Percentage of Average
Basin-Wide Storage	99%	52%	121%
Streamflow Forecast	50 % Exceedance Forecast Percentage of Average	50 % Exceedance Forecast % of Last Year's Flows	Last Year Percentage of Average
Basin-Wide Apr-July	60%	97%	57%

*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

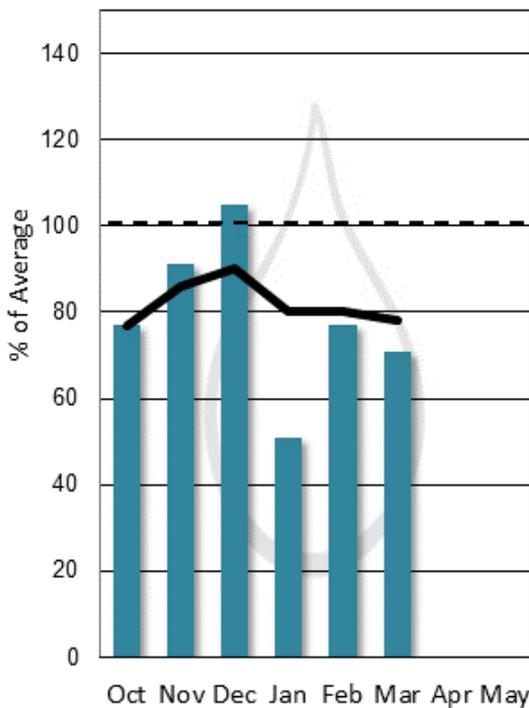
**Basin-wide streamflows are an average of the individual streamflow points within the basin for the 50 percent exceedance forecast. Consult the individual streamflow forecasts in the table below for the range of forecasts at an individual point.

Sun-Teton-Marias River Basin Snowpack with Non-Exceedence Projections
Based on provisional SNOTEL daily data as of 4/1/2016



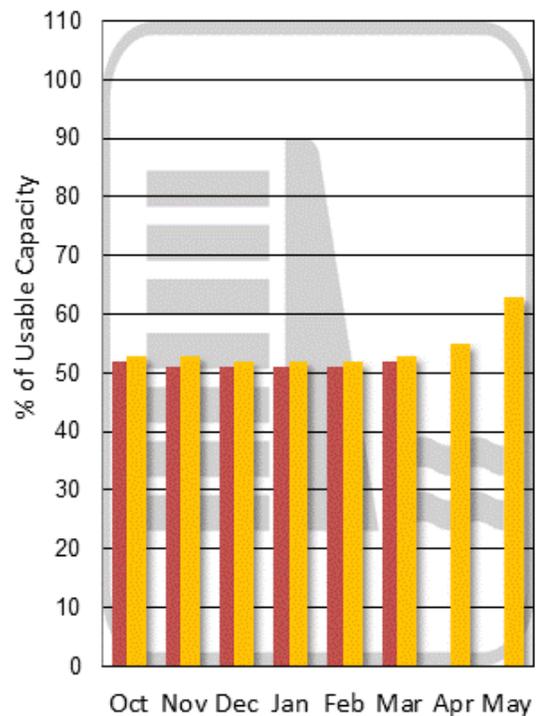
**Mountain and Valley
Precipitation**

Monthly Year-to-date



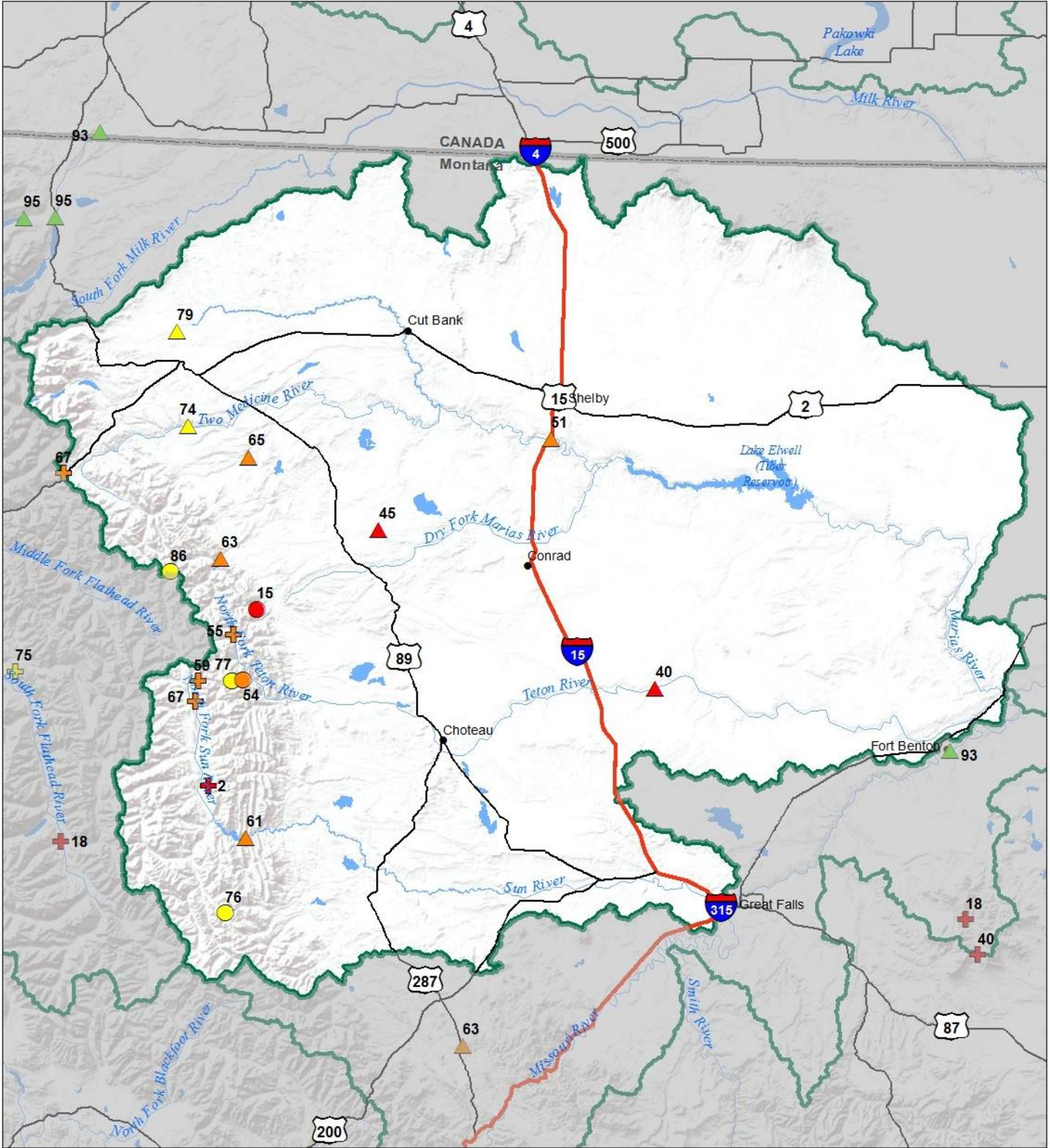
**End of Month Reservoir
Storage**

% Capacity Avg % Capacity



Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Sun-Teton-Marias River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Normal April 1, 2016



Snow Water Equivalent Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

- 71 - 90%
- 51 - 70%
- 1 - 50%
- * 0%

Snowcourse

- ⊕ > 150%
- ⊕ 131 - 150%
- ⊕ 111 - 130%
- ⊕ 91 - 110%
- ⊕ 71 - 90%
- ⊕ 51 - 70%
- ⊕ 1 - 50%
- * 0%

Streamflow Forecast Percent of Average Flows

- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%

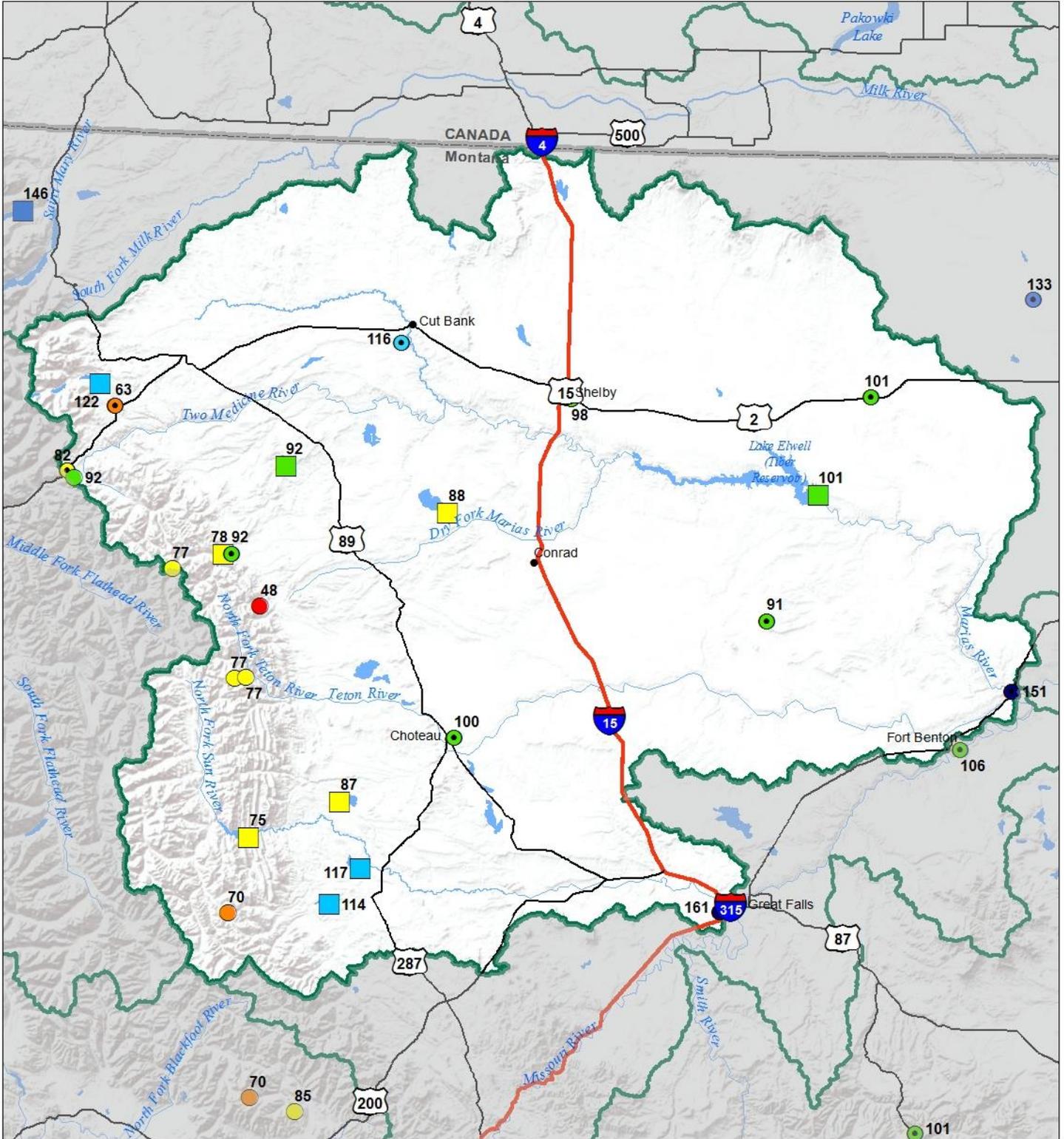


Sun-Teton-Marias River Basin

Water Year to Date Precipitation and Reservoir Levels

Percentage of Normal

April 1, 2016



Precipitation Percent of Normal

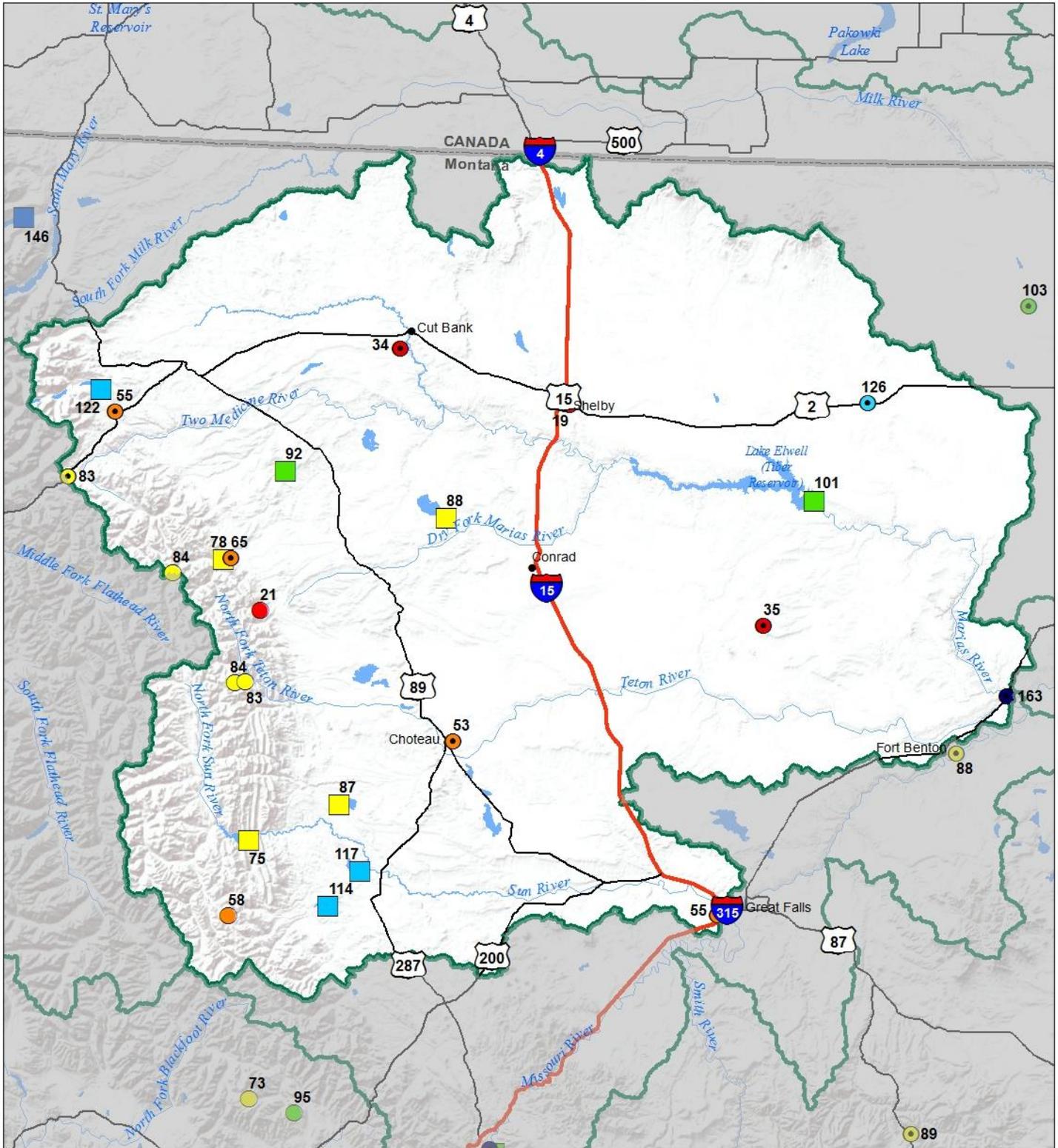
SNOTEL		COOP/ACIS	
● > 150%	● 71 - 90%	● > 150%	● 71 - 90%
● 131 - 150%	● 51 - 70%	● 131 - 150%	● 51 - 70%
● 111 - 130%	● 1 - 50%	● 111 - 130%	● 1 - 50%
● 91 - 110%		● 91 - 110%	

Reservoirs Percent of Normal

■ > 150%
■ 131 - 150%
■ 111 - 130%
■ 91 - 110%
■ 71 - 90%
■ 51 - 70%
■ 1 - 50%



**Sun-Teton-Marias River Basin
 Monthly Precipitation and Reservoir Levels
 Percentage of Normal
 April 1, 2016 (March 1, 2016 - April 1, 2016)**



**Precipitation
 Percent of Normal**

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

- 71 - 90%
- 51 - 70%
- 1 - 50%

COOP/ACIS

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

- 71 - 90%
- 51 - 70%
- 1 - 50%

**Reservoirs
 Percent of Normal**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%



Sun-Teton-Marias Streamflow Forecasts - April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

SUN-TETON-MARIAS	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Gibson Reservoir Inflow	APR-JUL	158	205	240	61%	275	320	395
	APR-SEP	178	230	270	61%	305	360	440
Two Medicine R nr Browning ²	APR-JUL	96	119	135	74%	151	174	183
	APR-SEP	103	127	144	74%	161	185	194
Badger Ck nr Browning	APR-JUL	33	46	55	63%	64	77	88
	APR-SEP	42	57	67	65%	77	92	103
Swift Reservoir Inflow ²	APR-JUL	15.7	27	34	60%	41	52	57
	APR-SEP	21	33	42	63%	51	63	67
Dupuyer Ck nr Valier	APR-JUL	0.09	1.7	4.9	44%	9.7	16.8	11.1
	APR-SEP	0.38	1.9	5.7	45%	11	18.8	12.7
Cut Bank Ck nr Browning	APR-JUL	34	46	54	78%	62	74	69
	APR-SEP	37	50	59	79%	68	81	75
Marias R nr Shelby ²	APR-JUL	12.3	110	176	51%	240	340	345
	APR-SEP	10.4	109	182	51%	255	360	360
Teton R nr Dutton	APR-JUL	1	5.4	15.7	37%	33	59	42
	APR-SEP	1	5.6	19.4	40%	39	67	48

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

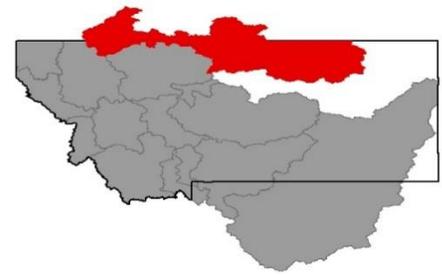
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

3) Median value used in place of average

Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Gibson Res	36.0	58.4	47.9	99.1
Pishkun Res	15.8	19.2	18.2	32.0
Willow Creek Res - Augusta	27.8	30.5	23.8	32.2
Lower Two Medicine Lake	11.0	11.7	9.0	11.9
Four Horns Lake	9.3	9.9	10.1	19.2
Swift Res	13.3	19.3	17.2	30.0
Lake Frances	52.7	81.5	60.1	112.0
Lake Elwell (Tiber)	706.0	834.8	697.7	1347.0
Nilan Reservoir	8.2	10.0	7.2	11.0
Basin-wide Total	880.2	1075.4	891.2	1694.4
# of reservoirs	9	9	9	9

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
SUN	5	64	53
TETON	4	56	45
MARIAS	4	67	54
SUN-TETON-MARIAS	10	65	53

St. Mary-Milk River Basin



Snowpack percentiles vary greatly in the St. Mary-Milk River basin, high elevation sites in Glacier National Park are near normal for the date, while lower elevation sites are well below normal, or melted out on April 1st. Over the month of March the high elevation Flattop Mountain SNOTEL site saw substantial gains in snow water from the storms that rolled through and is near normal at 99% for April 1st, while the low elevation Many Glacier SNOTEL site received most of its moisture in the form of rain and is 54% of normal. Further east in the Bearpaw Mountains of the Milk River basin the snowpack is virtually non-existent at long term measurement locations. The Rocky Boy SNOTEL site in this area experienced melt through the month and was snow-free as of March 23rd, 2016. The early low elevation melt and lack of snowfall this winter at these sites has left the basin as a whole below normal at 70% for April 1st, but ahead of last year at this time.

Although snowpack increases didn't happen in the basin over the month, precipitation was abundant at the Many Glacier (154%) and Flattop Mountain SNOTEL (162%) sites in Glacier National Park for the month of March. Further east in the Bearpaw Range precipitation was below average for the month ranging from 67% to 89%. Overall water year-to-date precipitation has been decent in the valleys of the basin and currently valley precipitation is well above average at 116% for April 1st, mountain precipitation is slightly above average for the water year at 108%. Overall, the St. Mary-Milk River basin is currently 109% of average for the date, and slightly below last year at this time.

Reservoir storage is well above average for this date in the basin. Basin-wide reservoir storage is currently 122% of average for April 1st.

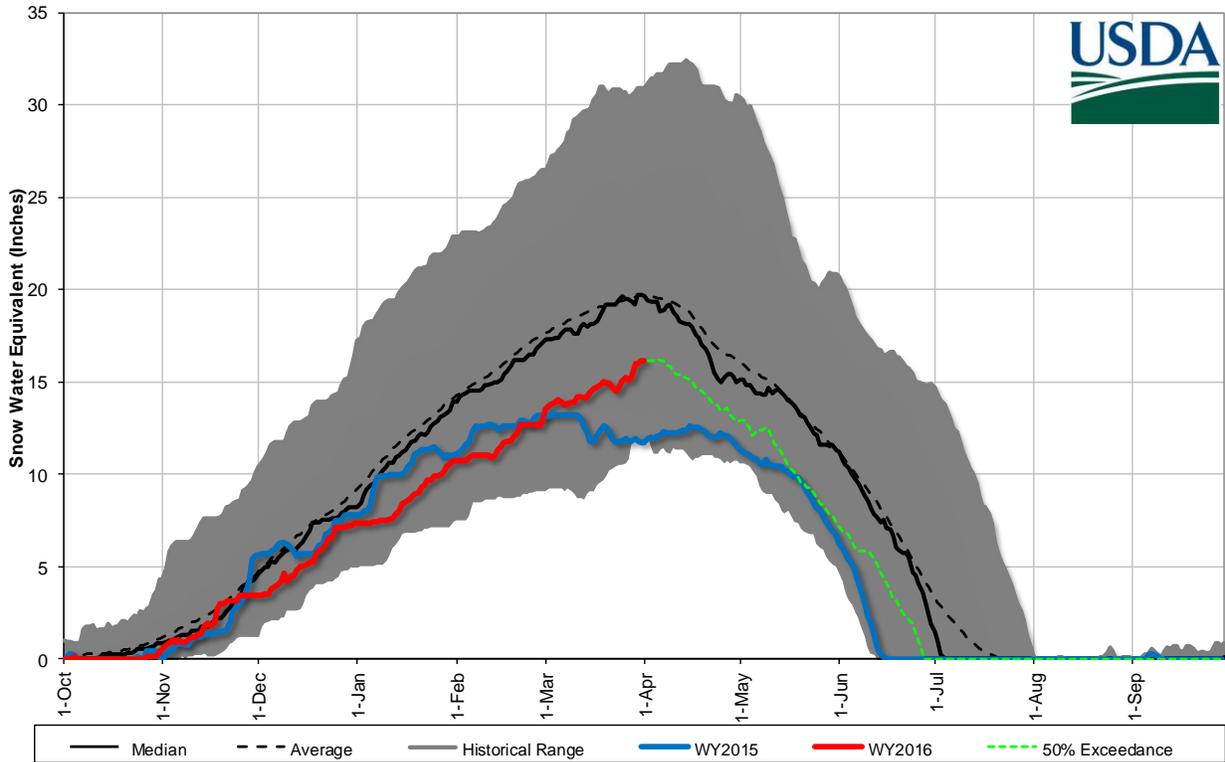
Streamflow forecasts on the St. Mary reflect the above average water year precipitation and near normal snowpack. Streamflow forecasts are 94 to 95% of average for the April-July time period on the St. Mary River, while the forecast on the Milk at Western Crossing is below average at 80% for April-July. Current basin-wide streamflows for the 50 percent exceedance are 94% of average for the April-July time period.

St. Mary-Milk River Basin Data Summary		4/1/2016	
	Percent of 1981-2010 Normal (Median)	Last Year Percentage of Normal (Median)	
Snowpack			
Basin-Wide	70%	45%	
	Monthly Percentage of Average	WYTD Percentage of 1981-2010 Average*	Last Year Percentage of Average
Precipitation			
Mountain Precipitation	136%	108%	120%
Valley Precipitation	81%	116%	98%
Basin Precipitation	125%	109%	116%
	Percentage of Average	Percentage of Capacity (Total)	Last Year Percentage of Average
Reservoir Storage			
Basin-Wide Storage	122%	56%	164%
	50 % Exceedance Forecast Percentage of Average	50 % Exceedance Forecast % of Last Year's Flows	Last Year Percentage of Average
Streamflow Forecast			
Basin-Wide Apr-July	94%	131%	72%

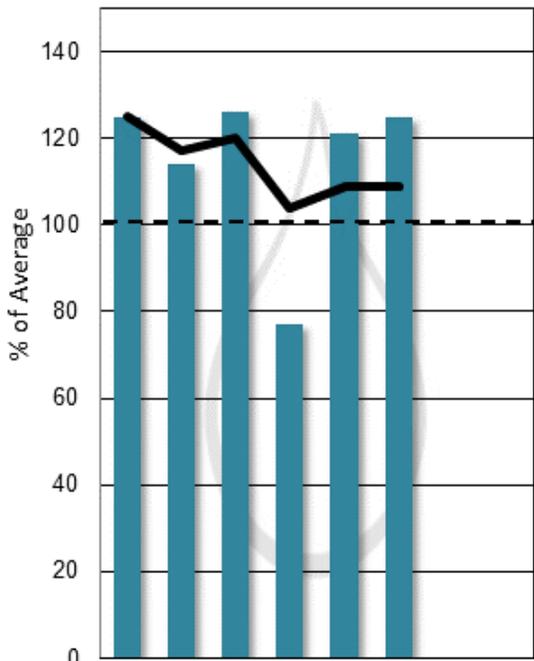
*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

**Basin-wide streamflows are an average of the individual streamflow points within the basin for the 50 percent exceedance forecast. Consult the individual streamflow forecasts in the table below for the range of forecasts at an individual point.

St. Mary-Milk River Basin Snowpack with Non-Exceedance Projections
Based on provisional SNOTEL daily data as of 4/1/2016

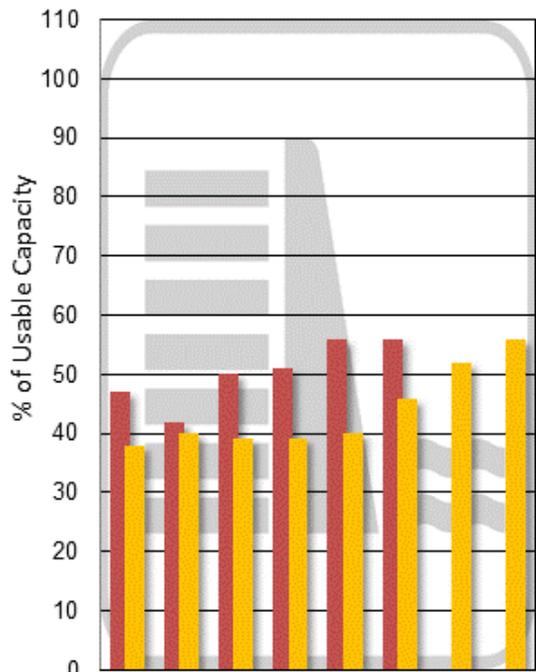


Mountain and Valley Precipitation



Oct Nov Dec Jan Feb Mar Apr May

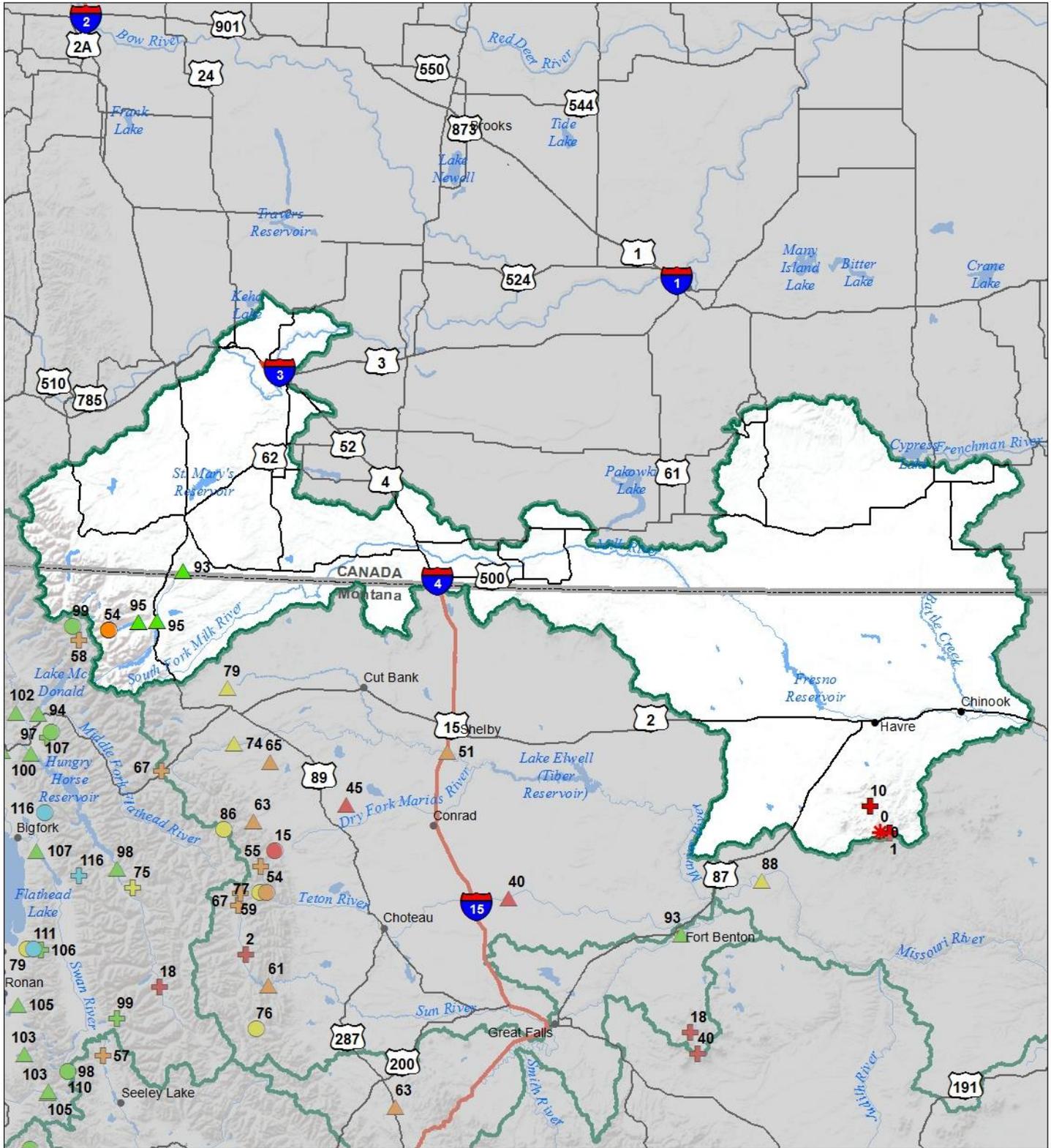
End of Month Reservoir Storage



Oct Nov Dec Jan Feb Mar Apr May

Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

St Mary's-Milk River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Normal April 1, 2016



Snow Water Equivalent Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

- 71 - 90%
- 51 - 70%
- 1 - 50%
- *

Snowcourse

- ⊕ > 150%
- ⊕ 131 - 150%
- ⊕ 111 - 130%
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- ⊕ *

Streamflow Forecast Percent of Average Flows

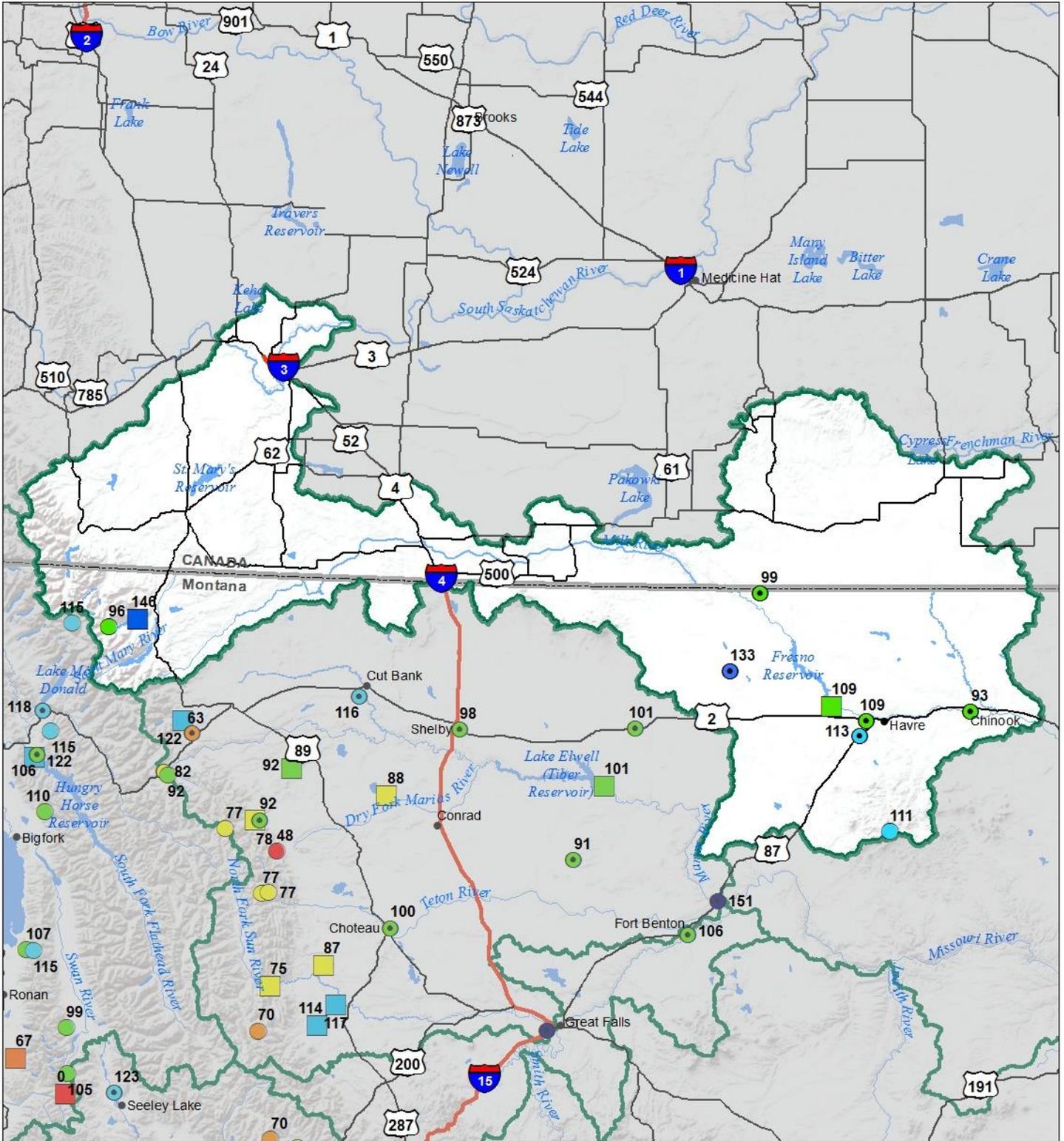
- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



St Mary's-Milk River Basin

Water Year to Date Precipitation and Reservoir Levels Percentage of Normal

April 1, 2016



Precipitation Percent of Normal

SNOTEL		COOP/ACIS	
● > 150%	● 71 - 90%	● > 150%	● 71 - 90%
● 131 - 150%	● 51 - 70%	● 131 - 150%	● 51 - 70%
● 111 - 130%	● 1 - 50%	● 111 - 130%	● 1 - 50%
● 91 - 110%		● 91 - 110%	

Reservoirs Percent of Normal

■ > 150%
■ 131 - 150%
■ 111 - 130%
■ 91 - 110%
■ 71 - 90%
■ 51 - 70%
■ 1 - 50%



St. Mary & Milk Basins Streamflow Forecasts - April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

ST. MARY & MILK BASINS	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Lake Sherburne Inflow								
	APR-JUL	78	86	92	95%	98	106	97
	APR-SEP	90	99	106	95%	113	122	112
St. Mary R nr Babb ²								
	APR-JUL	285	325	350	95%	375	415	370
	APR-SEP	330	375	405	95%	435	480	425
St. Mary R at Intl Boundary ²								
	APR-JUL	315	370	410	94%	450	505	435
	APR-SEP	370	430	470	93%	510	570	505
Milk R at Western Crossing of Intl Bndry, AB								
Milk R at Eastern Crossing of Intl Bndry								

- 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

Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Sherburne	38.4	56.1	26.4	64.3
Fresno Res	63.6	89.0	58.6	127.0
Nelson Res	42.8	49.5	34.0	66.8
Basin-wide Total	144.8	194.6	119.0	258.1
# of reservoirs	3	3	3	3

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
ST. MARY	3	82	53
BEARPAW MOUNTAINS	3	2	0
CYPRESS HILLS, CANADA	0		
MILK RIVER BASIN	3	2	0
ST. MARY & MILK BASINS	6	70	45

Upper Yellowstone River Basin



The month of March brought more favorable storm tracks to the Upper Yellowstone River basin and helped all of the sub-basins to improve through the month. A closed low which dropped significant snowfall south of the basin in Wyoming was nice enough to share some of its moisture with the Montana basins in the Upper Yellowstone and ended the month with big improvements in snowpack totals. The basin overall saw an improvement of 7% this month from 87% on Mar 1st to 94% on April 1st. The sub-basins in east facing ranges saw the largest improvements, the Red Lodge/Rock Creek drainages improved from near record low conditions on March 1st (54%) to still low, but better, conditions on April 1st (72%). Spring tends to favor these east facing basins in the Upper Yellowstone, so water users should keep their fingers crossed that a few more closed lows roll through and continue to improve conditions.

Both mountain and valley locations received above average precipitation during the month, 120% and 127% respectively. A large portion of the precipitation fell during the last week of the month during the final storm event which dropped snow at high elevations and rain the valleys. This helped to further improve the water year-to-date valley precipitation to 117% for April 1st, and increased water year mountain precipitation to 98%. Overall, the basin is currently 101% of average for water year precipitation on April 1st and above last year at this time.

Reservoir storage is well above average for this date in the basin. Basin-wide reservoir storage is currently 122% of average for April 1st.

Because of the improvements in snowpack and water year precipitation over the last month the streamflow forecasts have improved for the April-July time period. Most streamflow forecasts are near to only slightly below average on April 1st, with the exception of Cooney Reservoir inflow which remains below average. Continued spring precipitation will be key for the forecasts to verify, and forecasts assume “average” precipitation through the time period. Current basin-wide streamflows for the 50 percent exceedance are 95 percent of average for the April-July time period.

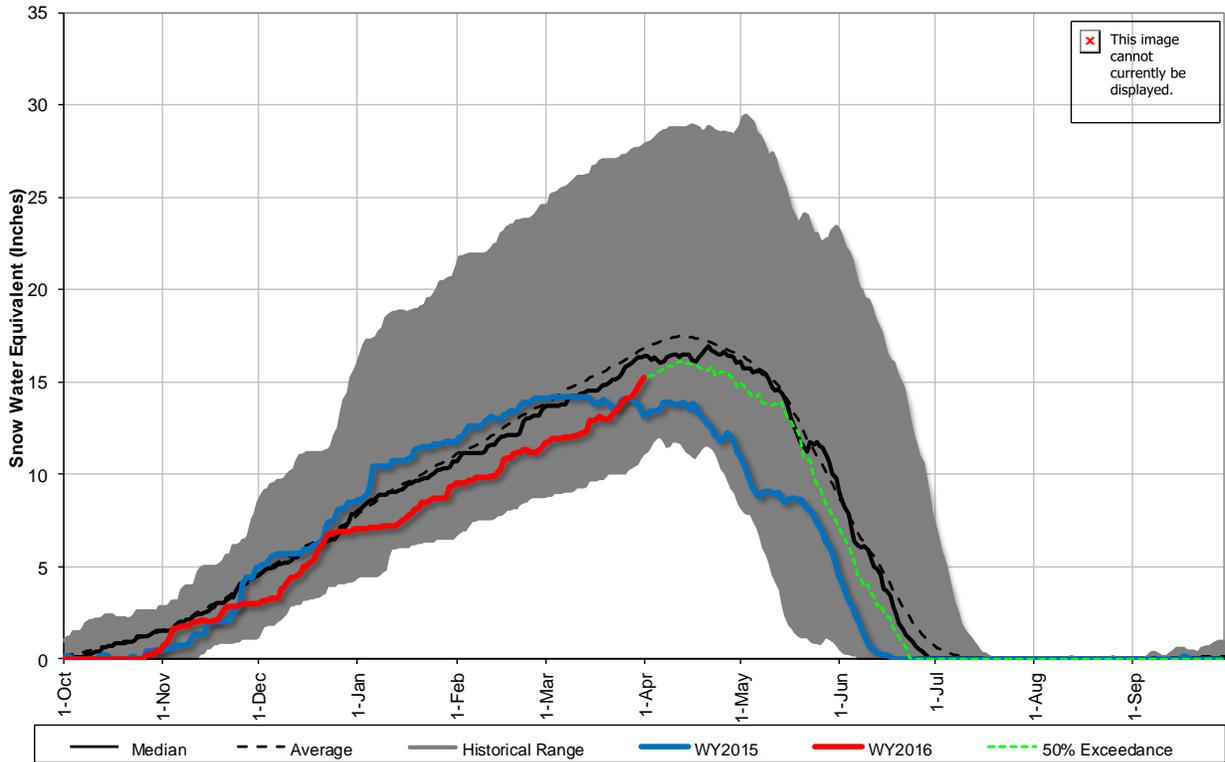
Upper Yellowstone River Basin Data Summary		4/1/2016	
	Percent of 1981-2010 Normal (Median)	Last Year Percentage of Normal (Median)	
Snowpack			
Basin-Wide	94%	81%	
	Monthly Percentage of Average	WYTD Percentage of 1981-2010 Average*	Last Year Percentage of Average
Precipitation			
Mountain Precipitation	120%	98%	93%
Valley Precipitation	127%	117%	88%
Basin Precipitation	121%	101%	92%
	Percentage of Average	Percentage of Capacity (Total)	Last Year Percentage of Average
Reservoir Storage			
Basin-Wide Storage	122%	53%	112%
	50 % Exceedance Forecast Percentage of Average	50 % Exceedance Forecast % of Last Year's Flows	Last Year Percentage of Average
Streamflow Forecast			
Basin-Wide Apr-July	95%	108%	87%

*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

**Basin-wide streamflows are an average of the individual streamflow points within the basin for the 50 percent exceedance forecast. Consult the individual streamflow forecasts in the table below for the range of forecasts at an individual point.

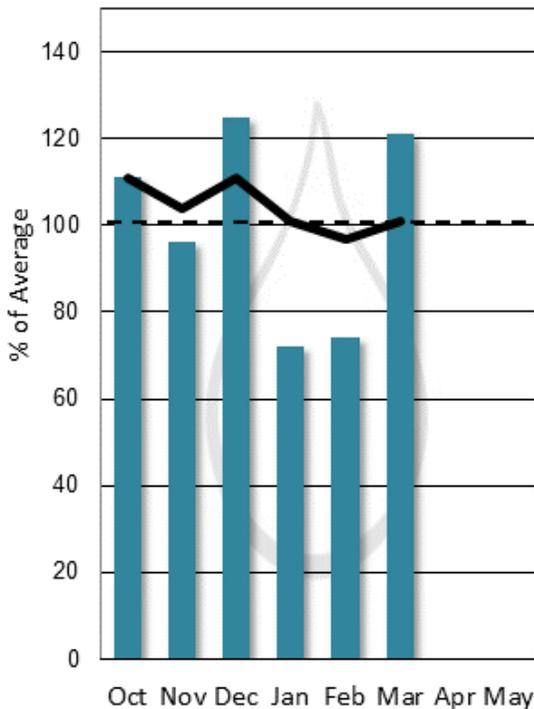
Upper Yellowstone River Basin Snowpack with Non-Exceedence Projections

Based on provisional SNOTEL daily data as of 4/1/2016



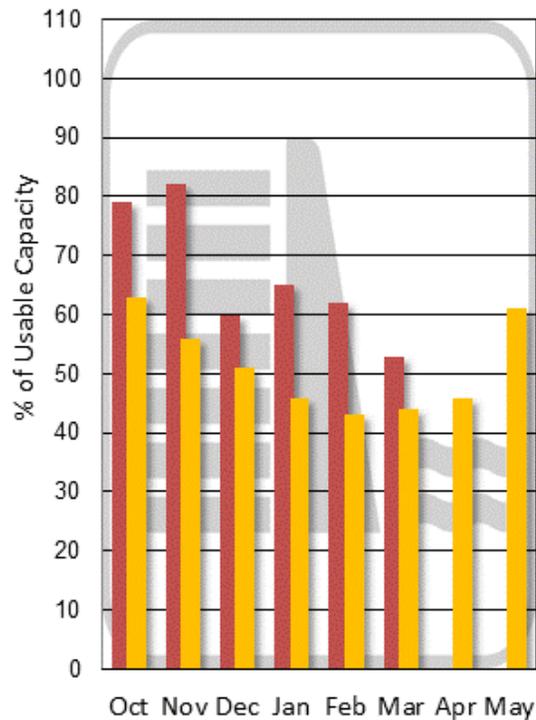
Mountain and Valley Precipitation

Monthly Year-to-date



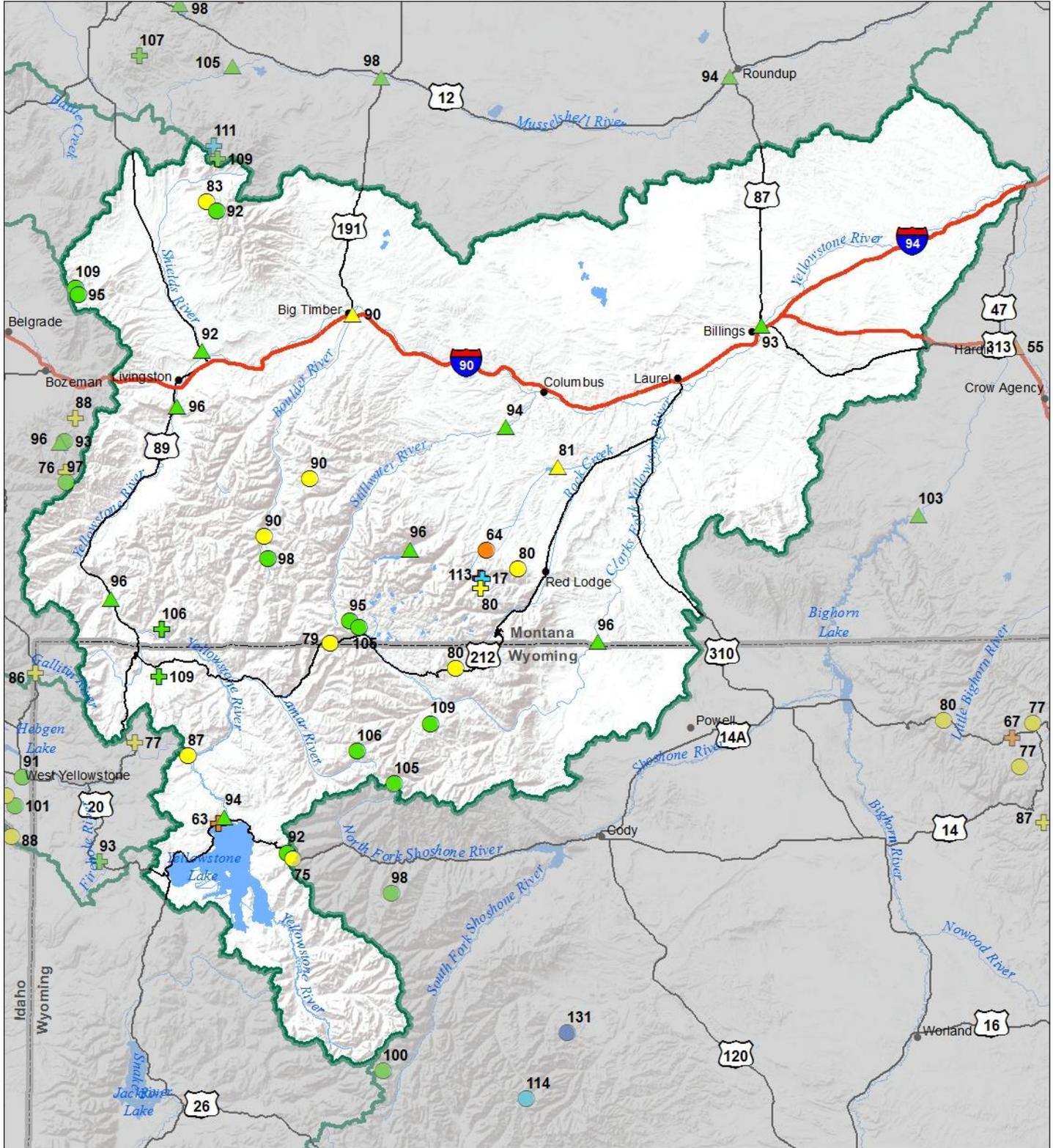
End of Month Reservoir Storage

% Capacity Avg % Capacity



Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Upper Yellowstone River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Normal April 1, 2016



Snow Water Equivalent Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%
- *

Snowcourse

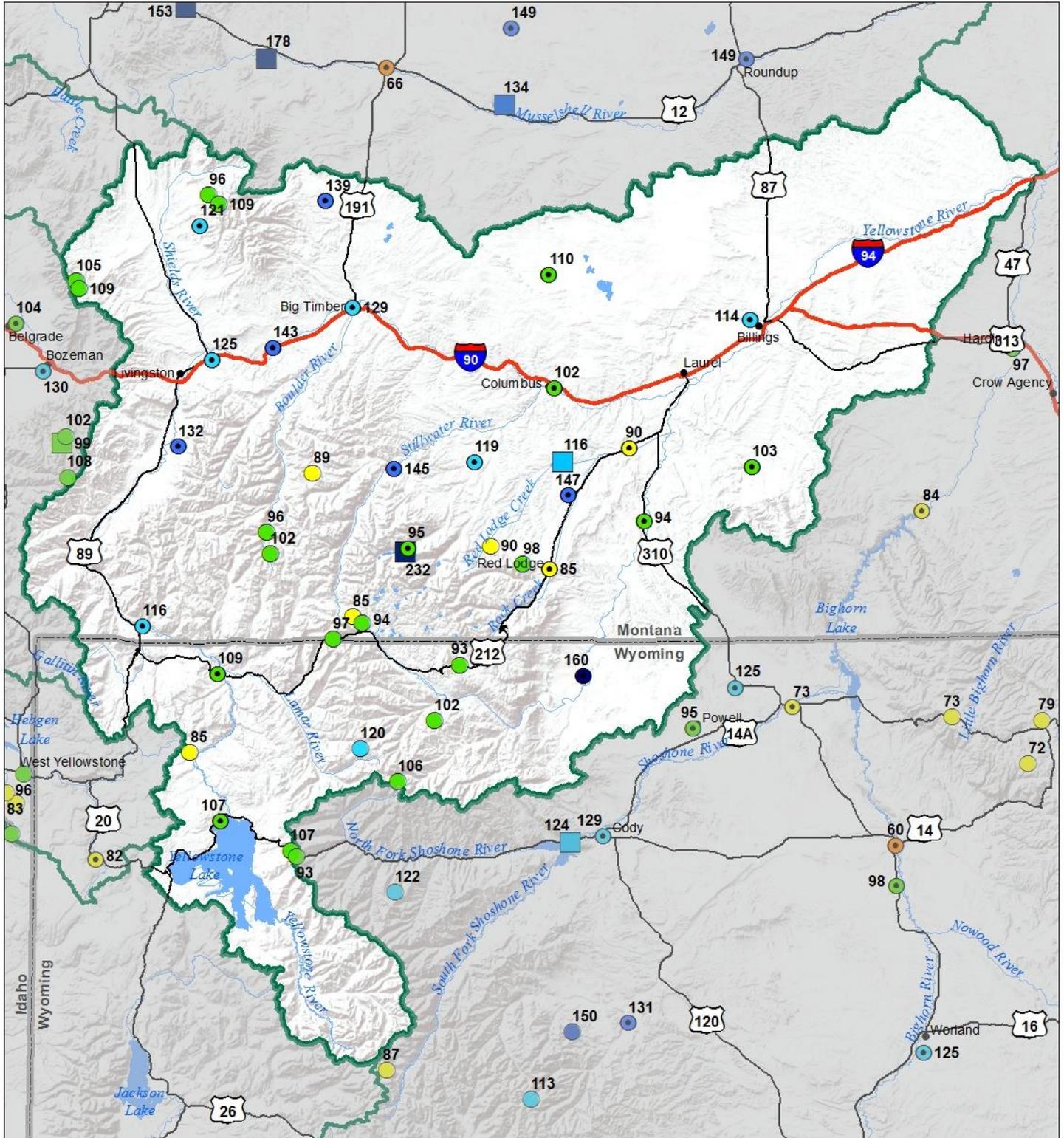
- ⊕ > 150%
- ⊕ 131 - 150%
- ⊕ 111 - 130%
- ⊕ 91 - 110%
- ⊕ 71 - 90%
- ⊕ 51 - 70%
- ⊕ 1 - 50%
- ⊕ *

Streamflow Forecast Percent of Average Flows

- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



Upper Yellowstone River Basin Water Year to Date Precipitation and Reservoir Levels Percentage of Normal April 1, 2016



Precipitation Percent of Normal

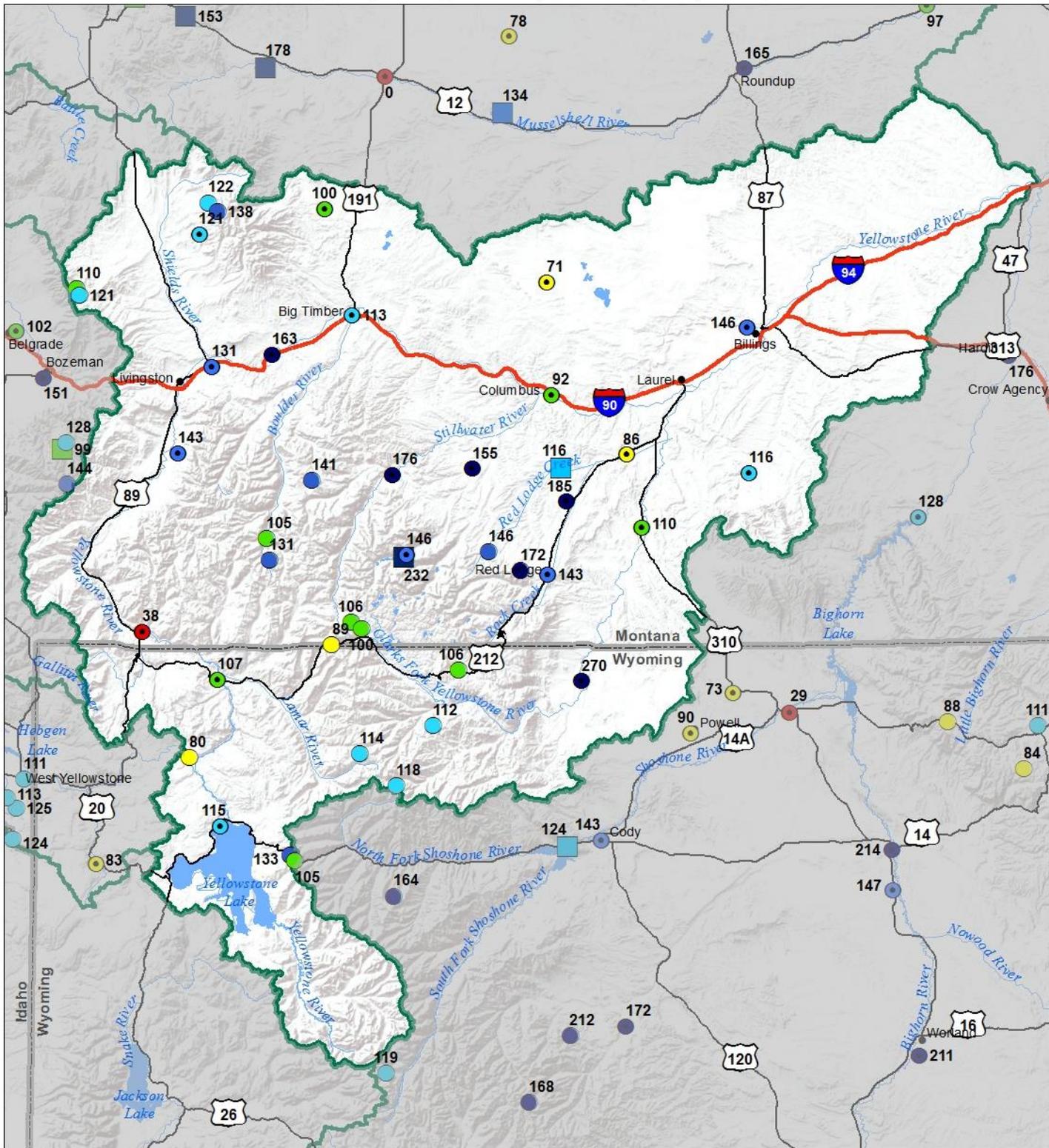
SNOTEL		COOP/ACIS	
● > 150%	● 71 - 90%	● > 150%	● 71 - 90%
● 131 - 150%	● 51 - 70%	● 131 - 150%	● 51 - 70%
● 111 - 130%	● 1 - 50%	● 111 - 130%	● 1 - 50%
● 91 - 110%		● 91 - 110%	

Reservoirs Percent of Normal

■ > 150%
■ 131 - 150%
■ 111 - 130%
■ 91 - 110%
■ 71 - 90%
■ 51 - 70%
■ 1 - 50%



Upper Yellowstone River Basin Monthly Precipitation and Reservoir Levels Percentage of Normal April 1, 2016 (March 1, 2016 - April 1, 2016)



Precipitation Percent of Normal

SNOTEL

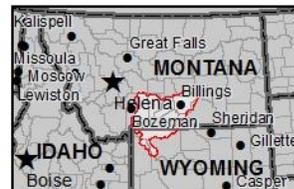
- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

COOP/ACIS

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%

Reservoirs Percent of Normal

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%



Upper Yellowstone River Basin Streamflow Forecasts - April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

UPPER YELLOWSTONE RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Yellowstone R at Yellowstone Lake Outlet	APR-JUL	450	505	545	95%	585	640	575
	APR-SEP	600	675	725	94%	775	850	770
Yellowstone R at Corwin Springs	APR-JUL	1250	1420	1530	96%	1640	1810	1590
	APR-SEP	1450	1660	1800	96%	1940	2150	1880
Yellowstone R at Livingston	APR-JUL	1380	1590	1740	97%	1890	2100	1800
	APR-SEP	1630	1890	2060	96%	2230	2490	2140
Shields R nr Livingston	APR-JUL	55	95	122	95%	149	189	129
	APR-SEP	56	101	132	92%	163	210	143
Boulder R at Big Timber	APR-JUL	188	230	255	91%	280	320	280
	APR-SEP	192	240	270	90%	300	350	300
Mystic Lake Inflow ²	APR-JUL	49	53	56	95%	59	63	59
	APR-SEP	60	67	71	96%	75	82	74
Stillwater R nr Absarokee ²	APR-JUL	325	380	420	94%	460	515	445
	APR-SEP	375	445	490	94%	535	605	520
Clarks Fk Yellowstone R nr Belfry	APR-JUL	405	455	490	96%	525	575	510
	APR-SEP	435	490	530	96%	570	625	550
Cooney Reservoir Inflow	APR-JUL	10.5	22	30	79%	38	49	38
	APR-SEP	17.4	30	39	81%	47	60	48
Yellowstone R at Billings	APR-JUL	2180	2680	3020	93%	3360	3860	3230
	APR-SEP	2450	3060	3470	93%	3880	4490	3730

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

Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Mystic Lake	2.3	1.4	1.0	21.0
Cooney Res	23.5	22.3	20.2	27.4
Basin-wide Total	25.8	23.7	21.2	48.4
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
YELLOWSTONE ab LIVINGSTON	11	94	75
SHIELDS	5	100	80
BOULDER-STILLWATER	3	93	80
RED LODGE-ROCK CREEK	5	72	81
CLARK'S FORK	7	97	93
UPPER YELLOWSTONE RIVER BASIN	29	94	81

Lower Yellowstone River Basin



Arriving on the heels of lackluster snow accumulation throughout this water year, March began with well below normal snowpack percentages and conditions in some sub-basins (the Powder and Tongue) looked a bit dire. Spring storms can make all the difference in the Lower Yellowstone basin however and hopes for spring precipitation were realized this year. March went out with a bang, serving up back to back storm systems in the region during the last 10 days of the month. These storms dropped significant amounts of snow at all elevations, improving snowpack conditions across the basin. The snowpack in the Wind River basin saw the biggest improvement from 82% of normal on March 1st to 106% of normal as of April 1st. On the east side of the basin, the Big Horn Mountains also benefited; adding more than 1 inch of water content to the snowpack with each storm system. The moisture was especially welcome in this area considering the Powder and Tongue River basins had been experiencing record low snowpack totals for the majority of this water year. It appears that both basins reached their seasonal snowpack peaks on April 1st at 72% of normal for the Tongue and 92% for the Powder. Overall the snowpack in the Lower Yellowstone basin was near normal, 93% on April 1, a considerable improvement from last month. With any luck this weather pattern will persist and the basin can continue to benefit from additional moisture in the coming months.

Mountain precipitation in all sub-basins of the Lower Yellowstone was well above normal for the month of March. Totals for the month ranged from 120% of normal in the Tongue River basin to 192% of normal in the Wind River basin. At 6 out of the 8 SNOTEL sites located on the east side of the Wind River Mountain Range new monthly precipitation records were set for March with the sites recording over 200% of normal precipitation for the month. Exceptional monthly totals boosted year-to-date percentages across the basin but it was not quite enough to bring the Tongue and Powder basins up to normal conditions. Year-to-date precipitation as of April 1st was 74% in the Tongue and 78% in the Powder, while the Wind River jumped up to 100% on April 1st from 77% on March 1st. Basin-wide water year-to-date precipitation including the mountains and valleys of the Lower Yellowstone is now near normal at 94% of average.

Reservoir storage in the basin remains in good condition with totals hovering just above normal for this time of year and at 61% of capacity.

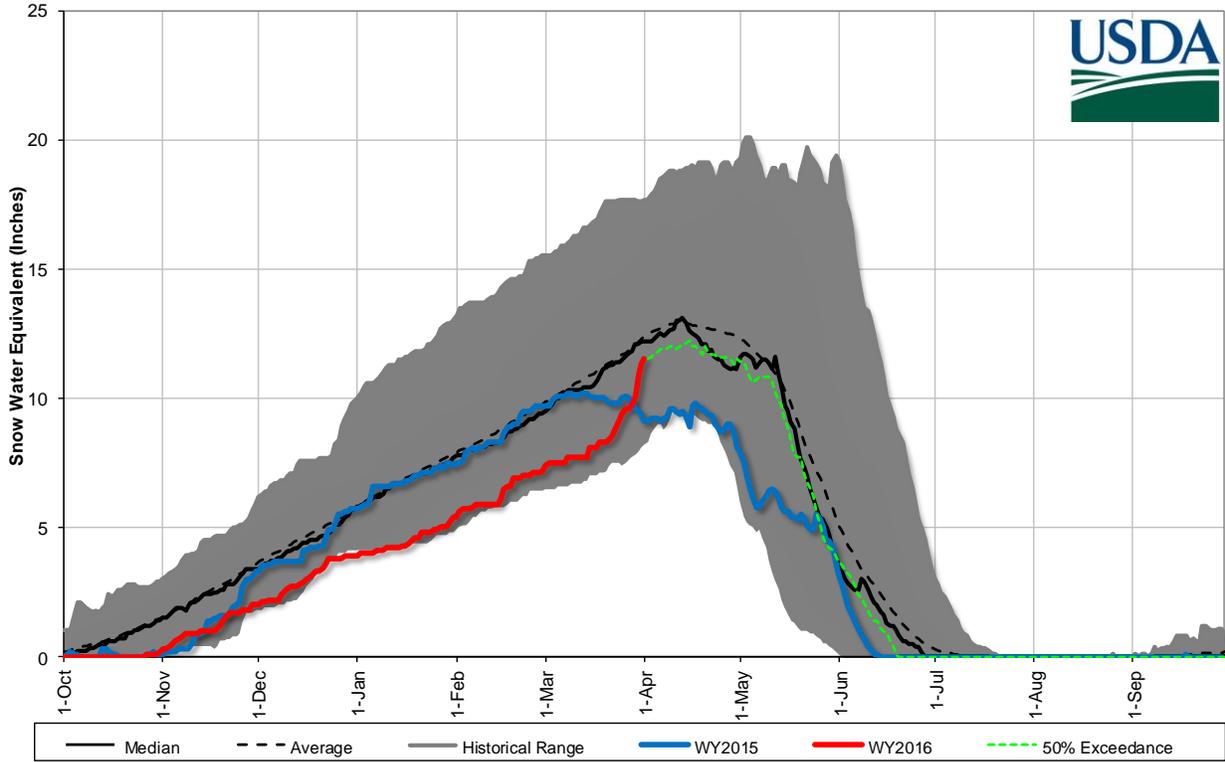
Streamflow forecasts reflect the current snowpack and water year precipitation totals across the basin. The majority call for below average flows during April-July; the exception is the Bighorn near St. Xavier which is forecast to be 103% of average this season. Please consult the streamflow forecast table at the end of this section for individual forecasts as there is a broad range across the basin. Current basin-wide streamflows for the 50 percent exceedance are 76% of average for the April-July time period.

Lower Yellowstone River Basin Data Summary		4/1/2016	
	Percent of 1981-2010 Normal (Median)	Last Year Percentage of Normal (Median)	
Snowpack			
Basin-Wide	93%	81%	
	Monthly Percentage of Average	WYTD Percentage of 1981-2010 Average *	Last Year Percentage of Average
Precipitation			
Mountain Precipitation	150%	91%	85%
Valley Precipitation	127%	98%	90%
Basin Precipitation	142%	94%	86%
	Percentage of Average	Percentage of Capacity (Total)	Last Year Percentage of Average
Reservoir Storage			
Basin-Wide Storage	106%	61%	110%
	50 % Exceedance Forecast Percentage of Average	50 % Exceedance Forecast % of Last Year's Flows	Last Year Percentage of Average
Streamflow Forecast			
Basin-Wide Apr-July	92%	84%	108%

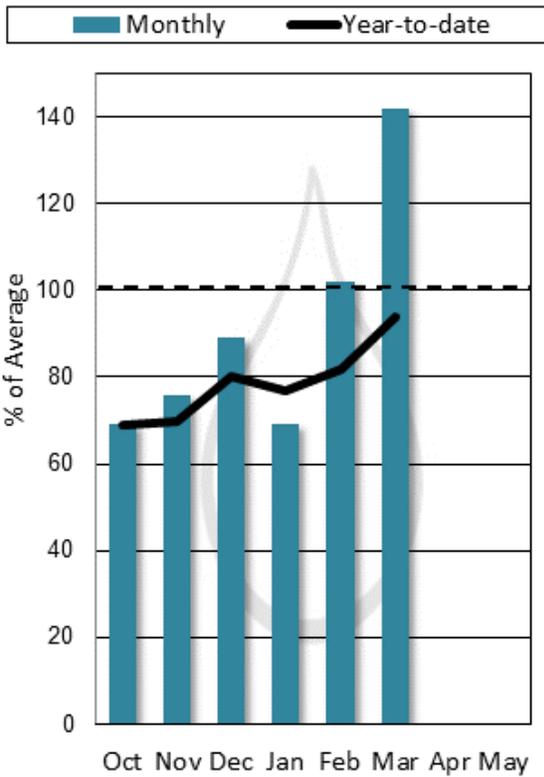
*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

**Basin-wide streamflows are an average of the individual streamflow points within the basin for the 50 percent exceedance forecast. Consult the individual streamflow forecasts in the table below for the range of forecasts at an individual point.

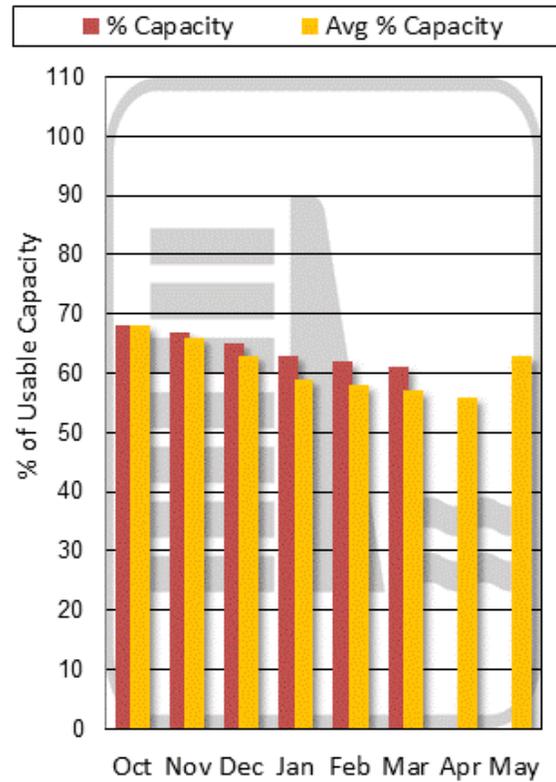
Lower Yellowstone River Basin Snowpack with Non-Exceedence Projections
Based on provisional SNOTEL daily data as of 4/1/2016



Mountain and Valley Precipitation

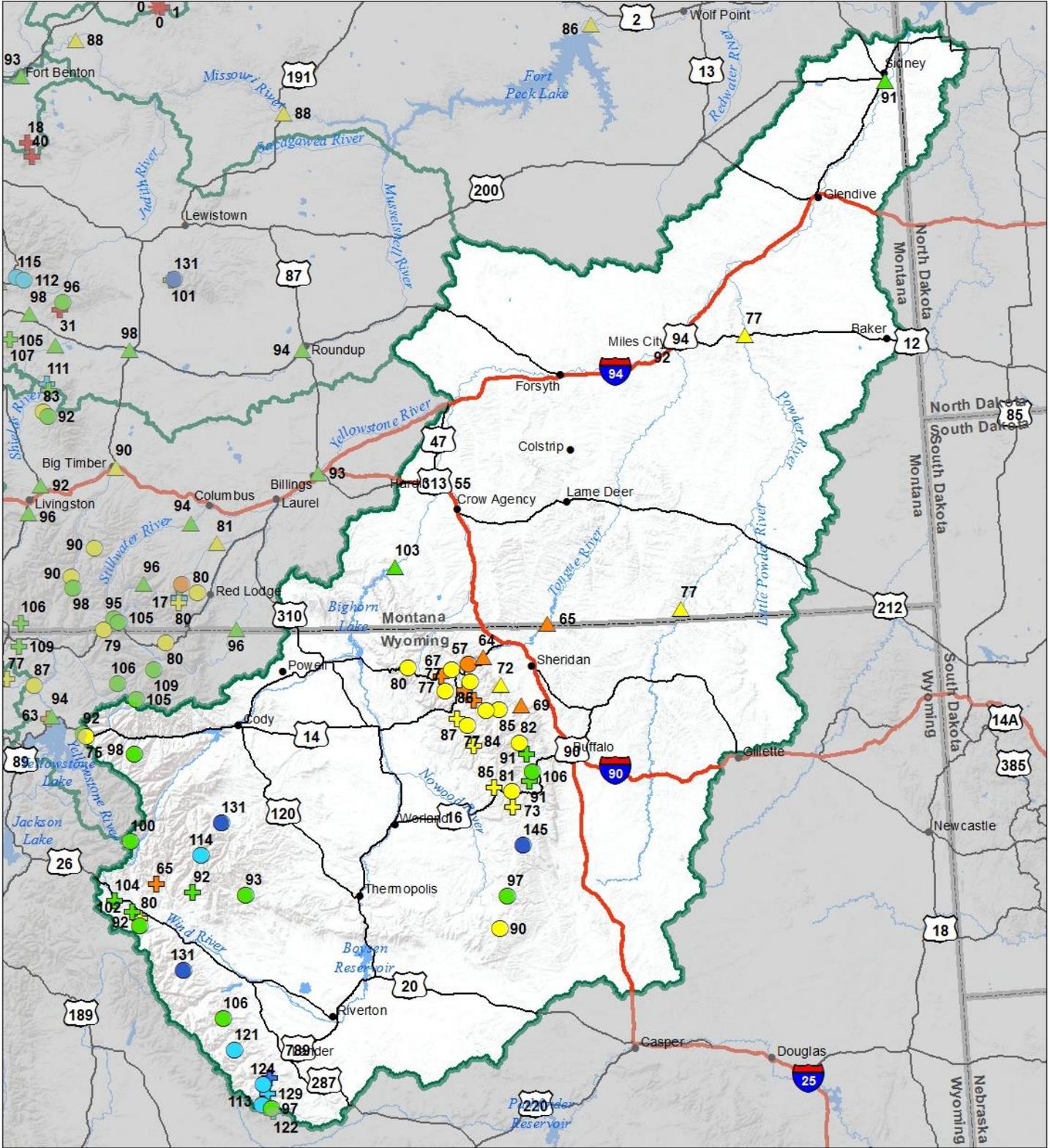


End of Month Reservoir Storage



Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Lower Yellowstone River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Normal April 1, 2016



Snow Water Equivalent Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%
- 0%

Snowcourse

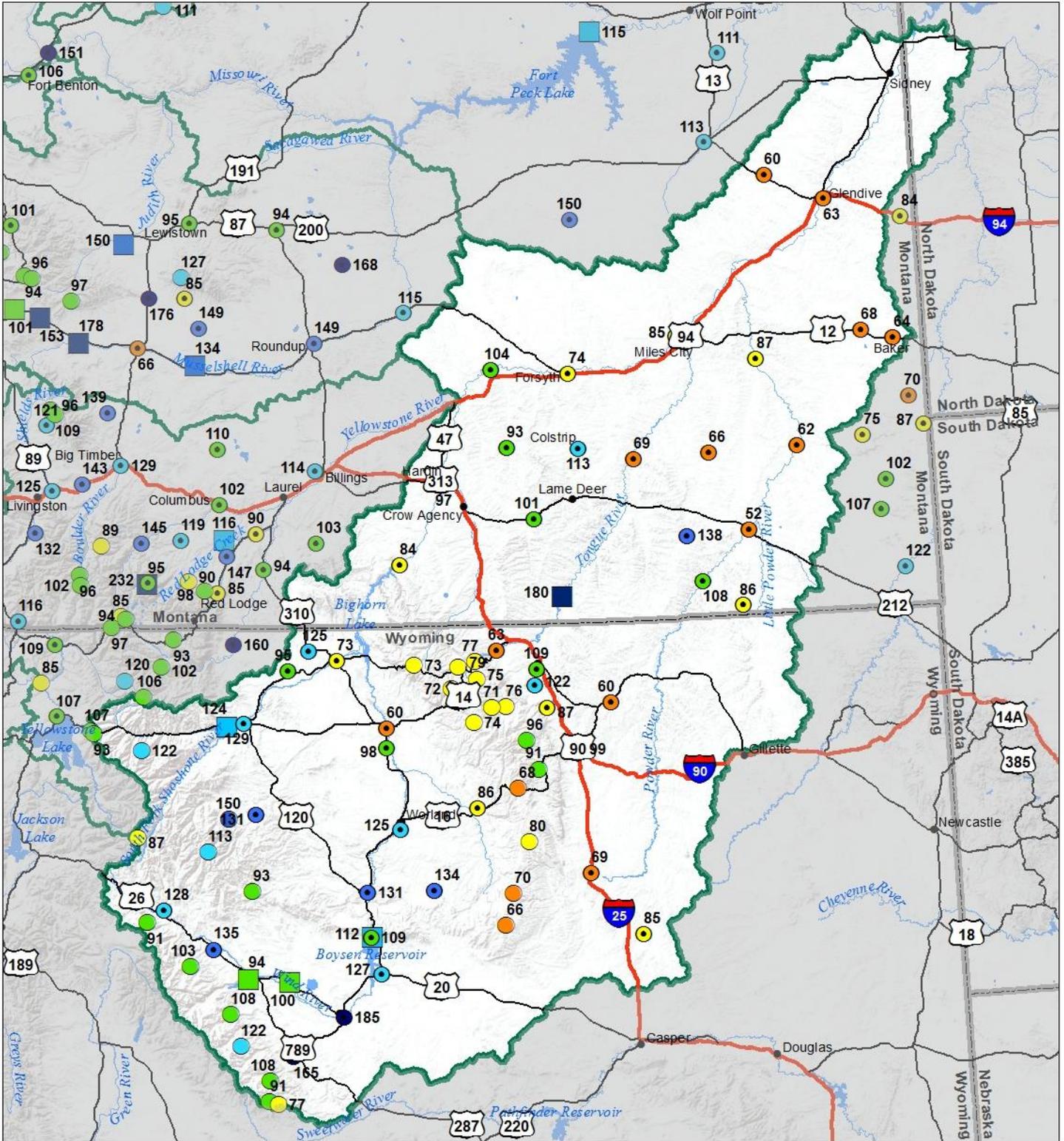
- ⊕ > 150%
- ⊕ 131 - 150%
- ⊕ 111 - 130%
- ⊕ 91 - 110%
- ⊕ 71 - 90%
- ⊕ 51 - 70%
- ⊕ 1 - 50%
- ⊕ 0%

Streamflow Forecast Percent of Average Flows

- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



Lower Yellowstone River Basin Water Year to Date Precipitation and Reservoir Levels Percentage of Normal April 1, 2016



Precipitation Percent of Normal

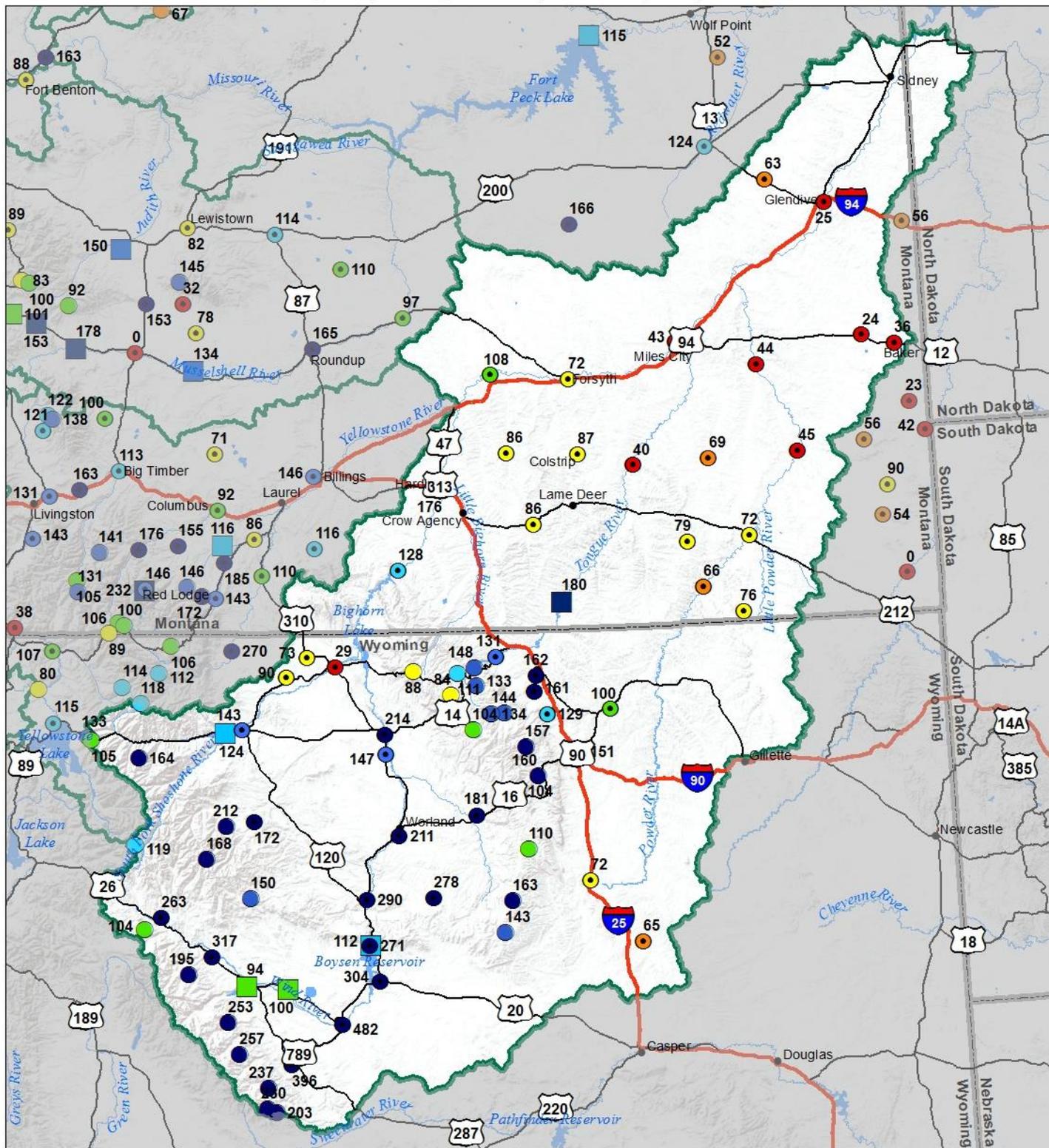
SNOTEL		COOP/ACIS	
● > 150%	● 71 - 90%	● > 150%	● 71 - 90%
● 131 - 150%	● 51 - 70%	● 131 - 150%	● 51 - 70%
● 111 - 130%	● 1 - 50%	● 111 - 130%	● 1 - 50%
● 91 - 110%		● 91 - 110%	

Reservoirs Percent of Normal

■ > 150%
■ 131 - 150%
■ 111 - 130%
■ 91 - 110%
■ 71 - 90%
■ 51 - 70%
■ 1 - 50%



Lower Yellowstone River Basin Monthly Precipitation and Reservoir Levels Percentage of Normal April 1, 2016 (March 1, 2016 - April 1, 2016)



Precipitation Percent of Normal

SNOTEL

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

COOP/ACIS

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%

Reservoirs Percent of Normal

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%



Lower Yellowstone River Basin (Wyoming) Streamflow Forecasts - April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

LOWER YELLOWSTONE RIVER BASIN (Wyoming)	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Bighorn R nr St. Xavier ²	APR-JUL	810	1170	1420	103%	1670	2030	1380
	APR-SEP	800	1220	1500	103%	1780	2200	1460
Little Bighorn R nr Hardin	APR-JUL	10.3	35	52	53%	69	94	98
	APR-SEP	15	42	61	55%	80	107	111
Tongue R nr Dayton ²	APR-JUL	26	42	53	62%	64	80	86
	APR-SEP	33	51	63	64%	75	93	98
Big Goose Ck nr Sheridan	APR-JUL	16.1	26	32	70%	38	48	46
	APR-SEP	23	32	39	72%	46	55	54
Little Goose Ck nr Bighorn	APR-JUL	10.4	16.3	20	65%	24	30	31
	APR-SEP	16.2	23	27	69%	31	38	39
Tongue River Reservoir Inflow ²	APR-JUL	25	84	124	64%	164	225	193
	APR-SEP	35	98	140	65%	182	245	215
Yellowstone R at Miles City ²	APR-JUL	2990	3840	4420	92%	5000	5850	4780
	APR-SEP	3210	4290	5030	92%	5770	6850	5450
Powder R at Moorehead	APR-JUL	22	90	137	77%	184	250	177
	APR-SEP	32	103	151	77%	199	270	196
Powder R nr Locate	APR-JUL	17.6	100	156	78%	210	295	199
	APR-SEP	22	110	170	77%	230	320	220
Yellowstone R nr Sidney ²	APR-JUL	2740	3740	4420	92%	5100	6100	4830
	APR-SEP	2810	4080	4940	91%	5800	7070	5430

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

Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bighorn Lake	813.4	848.6	787.5	1356.0
Tongue River Res	58.3	56.1	32.3	79.1
Basin-wide Total	871.7	904.7	819.8	1435.1
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
WIND RIVER (Wyoming)	19	106	76
SHOSHONE RIVER (Wyoming)	4	95	75
BIGHORN RIVER (Wyoming)	18	91	85
LITTLE BIGHORN (Wyoming)	3	76	86
TONGUE RIVER (Wyoming)	10	74	80
POWDER RIVER (Wyoming)	8	92	91
LOWER YELLOWSTONE RIVER BASIN (Wyoming)	47	93	81

Data Summary (SNOTEL and Snowcourse)

MONTANA	Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Albro Lake	SNOTEL	8300	65	17.9	17.7	101	14.2	80
Ambrose	SC	6480			10.4		8.0	77
Arch Falls	SC	7350	35	8.2	10.8	76	7.6	70
Ashley Divide	SC	4820	7	2.2	4.4	50	0.0	0
Badger Pass	SNOTEL	6900	65	25.6	29.8	86	27.1	91
Banfield Mountain	SNOTEL	5600	43	14.5	17.2	84	8.2	48
Baree Creek	SC	5500	88	33.1	34.9	95	17.1	49
Baree Midway	SC	4600	64	18.0	27.8	65	7.1	26
Baree Trail	SC	3800	14	4.2	7.2	58	0.0	0
Barker Lakes	SNOTEL	8250	51	14.7	13.9	106	11.6	83
Basin Creek	SNOTEL	7180	38	10.1	7.5	135	6.3	84
Bassoo Peak	SC	5150	19	6.7	7.8	86	0.0	0
Beagle Springs	SNOTEL	8850	48	11.5	8.8	131	5.9	67
Bear Basin	SC	8150	64	19.4	17.7	110		
Bear Mountain	SNOTEL	5400	114	49.2	54.3	91	24.5	45
Beartooth Lake	SNOTEL	9360	64	16.8	21.0	80	18.9	90
Beaver Creek	SNOTEL	7850	62	17.1	16.6	103	13.0	78
Big Snowy	SC	7150	59	18.4	18.2	101	14.8	81
Bisson Creek	SNOTEL	4920	22	7.9	10.0	79	4.9	49
Black Bear	SNOTEL	8170	99	31.9	36.3	88	25.0	69
Black Mountain	SC	7750	52	14.0	14.1	99	11.5	82
Black Pine	SNOTEL	7210	27	8.9	9.6	93	7.0	73
Blacktail	SC	5650	29	9.8	12.0	82	5.6	47
Blacktail Mtn	SNOTEL	5650	27	10.3			2.8	
Bloody Dick	SNOTEL	7600	46	14.3	10.9	131	9.7	89
Bots Sots	SC	7750	9	1.2	7.0	17	3.1	44
Boulder Mountain	SNOTEL	7950	71	20.8	19.4	107	16.3	84
Box Canyon	SNOTEL	6670	24	7.7	8.6	90	3.6	42
Boxelder Creek	SC	5100	1	0.1	7.1	1	0.0	0
Brackett Creek	SNOTEL	7320	59	20.7	19.0	109	21.6	114
Bristow Creek	SC	3900	13	4.2	7.0	60	0.4	6
Brush Creek Timber	SC	5000	14	5.6	6.1	92	0.0	0
Bull Mountain	SC	6600	18	5.4	5.6	96	4.2	75
Burnt Mtn	SNOTEL	5880	13	2.8	4.4	64	0.0	0
Cabin Creek	SC	5200	1	0.1	5.0	2	0.2	4
Calvert Creek	SNOTEL	6430	21	7.2	7.1	101	0.0	0
Camp Senia	SC	7890	32	6.1	5.4	113	9.0	167
Canyon	SNOTEL	7870	41	10.7	12.3	87	9.6	78
Carrot Basin	SNOTEL	9000	87	24.8	25.2	98	18.3	73
Chessman Reservoir	SC	6200	14	4.1	2.6	158	1.1	42
Chicago Ridge	SC	5800	99	37.4			20.4	
Chicken Creek	SC	4060	37	12.5	13.8	91	10.8	78
Clover Meadow	SNOTEL	8600	57	15.0	15.6	96	10.3	66
Cole Creek	SNOTEL	7850	55	10.8	13.5	80	11.6	86
Combination	SNOTEL	5600	4	1.5	4.2	36	0.0	0
Copper Bottom	SNOTEL	5200	0	0.0			0.0	
Copper Camp	SNOTEL	6950	70	27.6			29.8	
Copper Mountain	SC	7700	38	13.2	9.9	133	10.5	106
Cottonwood Creek	SC	6400	28	8.3	7.3	114	3.0	41
Coyote Hill	SC	4200	13	4.0	7.0	57	1.0	14
Crevice Mountain	SC	8400	40	10.0	9.4	106		

MONTANA	<i>Network</i>	<i>Elevation (ft)</i>	<i>Depth (in)</i>	<i>SWE (in)</i>	<i>Median (in)</i>	<i>% Median</i>	<i>Last Year SWE (in)</i>	<i>Last Year % Median</i>
Crystal Lake	SNOTEL	6050	52	15.6	11.9	131	9.8	82
Dad Creek Lake	SC	8800			13.4			
Daisy Peak	SNOTEL	7600	40	9.4	9.8	96	8.6	88
Daly Creek	SNOTEL	5780	28	9.1	9.6	95	5.2	54
Darkhorse Lake	SNOTEL	8600	90	31.3	26.2	119	29.2	111
Deadman Creek	SNOTEL	6450	35	11.2	9.7	115	6.6	68
Desert Mountain	SC	5600		12.2	12.6	97	7.4	59
Discovery Basin	SC	7050	31	8.7	9.2	95	8.4	91
Divide	SNOTEL	7800	41	10.2	9.8	104	6.3	64
Dix Hill	SC	6400	19	7.6	9.1	84	1.6	18
Dupuyer Creek	SNOTEL	5750	6	1.3	8.6	15	0.0	0
Eagle Creek	SC	7000	34	12.7	11.6	109	9.3	80
East Boulder Mine	SNOTEL	6335	14	3.6			0.0	
El Dorado Mine	SC	7800	37	11.5	17.4	66	9.4	54
Elk Horn Springs	SC	7800	34	9.0	8.0	113	7.4	93
Elk Peak	SNOTEL	7600	60	21.8			16.7	
Elk Peak	SC	8000	47	13.7	12.8	107	10.9	85
Emery Creek	SNOTEL	4350	35	14.6	13.7	107	7.3	53
Fatty Creek	SC	5500	62	22.4	21.2	106	17.0	80
Fish Creek	SC	8000			9.0		7.8	87
Fisher Creek	SNOTEL	9100	87	28.5	30.1	95	29.3	97
Flattop Mtn.	SNOTEL	6300	124	41.6	42.0	99	35.1	84
Fleecer Ridge	SC	7500	32	9.6	9.5	101	8.2	86
Foolhen	SC	8280	50	14.6	14.4	101	11.6	81
Forest Lake	SC	6400	30	11.1	10.0	111	5.9	59
Four Mile	SC	6900	29	8.4	7.0	120	2.4	34
Freight Creek	SC	6000	21	6.6	11.9	55	3.4	29
Frohner Meadow	SNOTEL	6480	29	7.4	7.4	100	2.1	28
Garver Creek	SNOTEL	4250	28	10.2	9.1	112	5.9	65
Gibbons Pass	SC	7100		21.7	20.0	109		
Goat Mountain	SC	7000			8.0		4.6	58
Government Saddle	SC	5270	85	30.8			15.6	
Grave Creek	SNOTEL	4300	30	11.8	13.8	86	6.2	45
Griffin Creek Divide	SC	5150	22	7.7	8.4	92	4.0	48
Hand Creek	SNOTEL	5035	23	9.1	11.1	82	1.9	17
Hawkins Lake	SNOTEL	6450	83	29.7	23.4	127	21.1	90
Haymaker	SC	8050			10.6			
Hebgen Dam	SC	6550	30	10.4	9.8	106	4.6	47
Hell Roaring Divide	SC	5770	77	26.6	25.8	103	21.8	84
Herrig Junction	SC	4850	64	21.0	24.1	87	17.4	72
Highwood Divide	SC	5650	10	2.7	6.7	40	0.0	0
Highwood Station	SC	4600	3	0.7	3.8	18	0.0	0
Holbrook	SC	4530	4	1.2	6.8	18	0.0	0
Hoodoo Basin	SNOTEL	6050	100	36.7	38.9	94	25.8	66
Humboldt Gulch	SNOTEL	4250		8.4	9.1	92	1.2	13
Jakes Canyon	SC	9040	58	15.0	11.2	134		
Johnson Park	SC	6450	5	1.3	4.2	31	3.0	71
Kishenehn	SC	3890			6.6		1.8	27
Kraft Creek	SNOTEL	4750	21	8.3			0.0	
Lake Camp	SC	7780	31	5.5	8.8	63		
Lakeview Canyon	SC	6930	31	10.1	9.5	106	0.5	5
Lakeview Ridge	SNOTEL	7400	29	10.0	10.4	96	0.0	0
Lemhi Ridge	SNOTEL	8100	44	12.8	9.7	132	8.5	88

MONTANA	Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Lick Creek	SNOTEL	6860	39	10.4	11.2	93	7.0	63
Little Park	SC	7400	54	14.9	13.7	109	11.8	86
Logan Creek	SC	4300	14	4.8	5.8	83	3.9	67
Lolo Pass	SNOTEL	5240	61	24.0	27.1	89	16.5	61
Lone Mountain	SNOTEL	8880	60	18.1	16.7	108	13.7	82
Lookout	SNOTEL	5140	61	22.1	26.2	84	5.5	21
Lower Twin	SNOTEL	7900	68	18.5	16.6	111	13.5	81
Lubrecht Flume	SNOTEL	4680	0	0.0	1.6	0	0.0	0
Lubrecht Forest No 3	SC	5450	3	1.0	4.6	22	0.0	0
Lubrecht Forest No 4	SC	4650	0	0.0	0.4	0	0.0	0
Lubrecht Forest No 6	SC	4040	0	0.0	0.6	0	0.0	0
Lubrecht Hydroplot	SC	4200	0	0.0	0.6	0	0.0	0
Lupine Creek	SC	7380	27	8.1	7.4	109	0.0	0
Madison Plateau	SNOTEL	7750	70	21.5	21.3	101	12.8	60
Many Glacier	SNOTEL	4900	21	6.7	12.4	54	0.0	0
Marias Pass	SC	5250	27	9.6	14.4	67	4.4	31
Mineral Creek	SC	4000		9.0	15.4	58	1.6	10
Monument Peak	SNOTEL	8850	70	18.5	18.8	98	17.6	94
Moss Peak	SNOTEL	6780	105	38.9	35.1	111	41.7	119
Moulton Reservoir	SC	6850			6.3		0.0	0
Mount Allen No 7	SC	5700						
Mount Lockhart	SNOTEL	6400	44	14.2	18.4	77	14.7	80
Mudd Lake	SC	7650			17.2			
Mule Creek	SNOTEL	8300	52	15.5	13.8	112	14.0	101
N Fk Elk Creek	SNOTEL	6250	32	10.2	10.6	96	8.2	77
Nevada Ridge	SNOTEL	7020	43	13.0	13.9	94	11.9	86
New World	SC	6900	44	11.2	12.8	88	6.7	52
Nez Perce Camp	SNOTEL	5650	33	12.3	13.0	95	9.4	72
Noisy Basin	SNOTEL	6040	112	45.5	39.3	116	41.0	104
Norris Basin	SC	7550	24	6.8	8.8	77	3.5	40
North Fork Jocko	SNOTEL	6330	104	39.3	40.3	98	34.6	86
Northeast Entrance	SNOTEL	7350	26	7.6	9.6	79	4.8	50
Onion Park	SNOTEL	7410	50	13.7	13.0	105	13.2	102
Ophir Park	SC	7150	37	12.1	14.8	82	9.4	64
Parker Peak	SNOTEL	9400	70	20.0	18.8	106	19.9	106
Peterson Meadows	SNOTEL	7200	42	11.5	9.6	120	7.6	79
Pickfoot Creek	SNOTEL	6650	34	10.8	9.5	114	5.7	60
Pike Creek	SNOTEL	5930	22	7.7			0.0	
Pipestone Pass	SC	7200	23	8.3	4.6	180	2.8	61
Placer Basin	SNOTEL	8830	67	14.9	16.6	90	13.9	84
Poorman Creek	SNOTEL	5100	84	33.8	35.1	96	13.7	39
Porcupine	SNOTEL	6500	16	4.9	5.9	83	0.0	0
Potomageton Park	SC	7150	45	14.2	12.0	118	5.3	44
Revais	SC	4800	0	0.0	0.2	0	0.0	0
Rock Creek Mdws	SC	3400	26	11.2			6.4	
Rocker Peak	SNOTEL	8000	47	12.8	12.4	103	12.6	102
Rocky Boy	SNOTEL	4700	0	0.0	3.8	0	0.0	0
Roland Summit	SC	5120	76	34.4	31.0	111	14.4	46
S Fork Shields	SNOTEL	8100	54	14.1	15.3	92	12.0	78
Sacajawea	SNOTEL	6550	37	14.1	14.8	95	10.6	72
Saddle Mtn.	SNOTEL	7940	68	24.8	22.9	108	23.0	100
Short Creek	SNOTEL	7000	20	5.9	5.7	104	0.5	9
Shower Falls	SNOTEL	8100	77	20.1	20.7	97	18.3	88

MONTANA	Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Skalkaho Summit	SNOTEL	7250	55	19.6	21.4	92	17.2	80
Sleeping Woman	SNOTEL	6150	38	13.6	13.9	98	9.6	69
Slide Rock Mountain	SC	7100	42	14.8	12.9	115	12.2	95
Spotted Bear Mountain	SC	7000	26	9.2	12.2	75	4.3	35
Spur Park	SNOTEL	8100	74	21.8	19.5	112	20.5	105
Stahl Peak	SNOTEL	6030	103	39.3	33.3	118	27.9	84
Stemple Pass	SC	6600	31	8.4	8.3	101	6.2	75
Storm Lake	SC	7780	52	14.5	12.6	115	10.0	79
Stringer Creek	SNOTEL	6550	42	11.4	10.1	113	8.7	86
Stryker Basin	SC	6180	96	33.6	28.2	119	27.5	98
Stuart Mountain	SNOTEL	7400	84	30.0	30.6	98	32.0	105
Taylor Road	SC	4080	1	0.1	1.0	10	0.0	0
Ten Mile Lower	SC	6600	25	7.2	5.7	126	4.7	82
Ten Mile Middle	SC	6800	36	9.9	9.8	101	8.3	85
Tepee Creek	SNOTEL	8000	52	15.2	13.3	114	7.7	58
Timberline Creek	SC	8850	41	9.7	12.1	80	10.7	88
Tizer Basin	SNOTEL	6880	26	8.4	9.4	89	5.2	55
Trinkus Lake	SC	6100	106	43.3	37.2	116	38.8	104
Truman Creek	SC	4060	0	0.0	2.5	0	0.0	0
Twelvemile Creek	SNOTEL	5600	35	12.2	14.5	84	10.5	72
Twenty-One Mile	SC	7150	50	12.7	14.7	86	6.8	46
Twin Lakes	SNOTEL	6400	87	37.2	35.4	105	30.1	85
Upper Holland Lake	SC	6200	80	29.4	29.6	99	25.2	85
Waldron	SNOTEL	5600	21	5.8	10.7	54	4.2	39
Warm Springs	SNOTEL	7800	69	20.7	19.0	109	21.6	114
Weasel Divide	SC	5450	76	26.9	29.0	93	18.9	65
West Yellowstone	SNOTEL	6700	34	10.5	10.2	103	3.4	33
Whiskey Creek	SNOTEL	6800	50	13.4	15.0	89	7.7	51
White Elephant	SNOTEL	7710	77	25.8	25.7	100	13.3	52
White Mill	SNOTEL	8700	66	22.7	21.6	105	23.0	106
Wolverine	SNOTEL	7650	32	9.9	9.1	109	6.1	67
Wood Creek	SNOTEL	5960	20	6.5	8.5	76	2.2	26
Wrong Creek	SC	5700	19	6.8	10.2	67	4.2	41
Wrong Ridge	SC	6800	24	8.0	13.5	59	8.4	62
Younts Peak	SNOTEL	8350	42	14.1	14.1	100		

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Montana
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Report
Natural Resources Conservation Service

