

Montana Water Supply Outlook Report as of May 1st, 2015

Snowpack

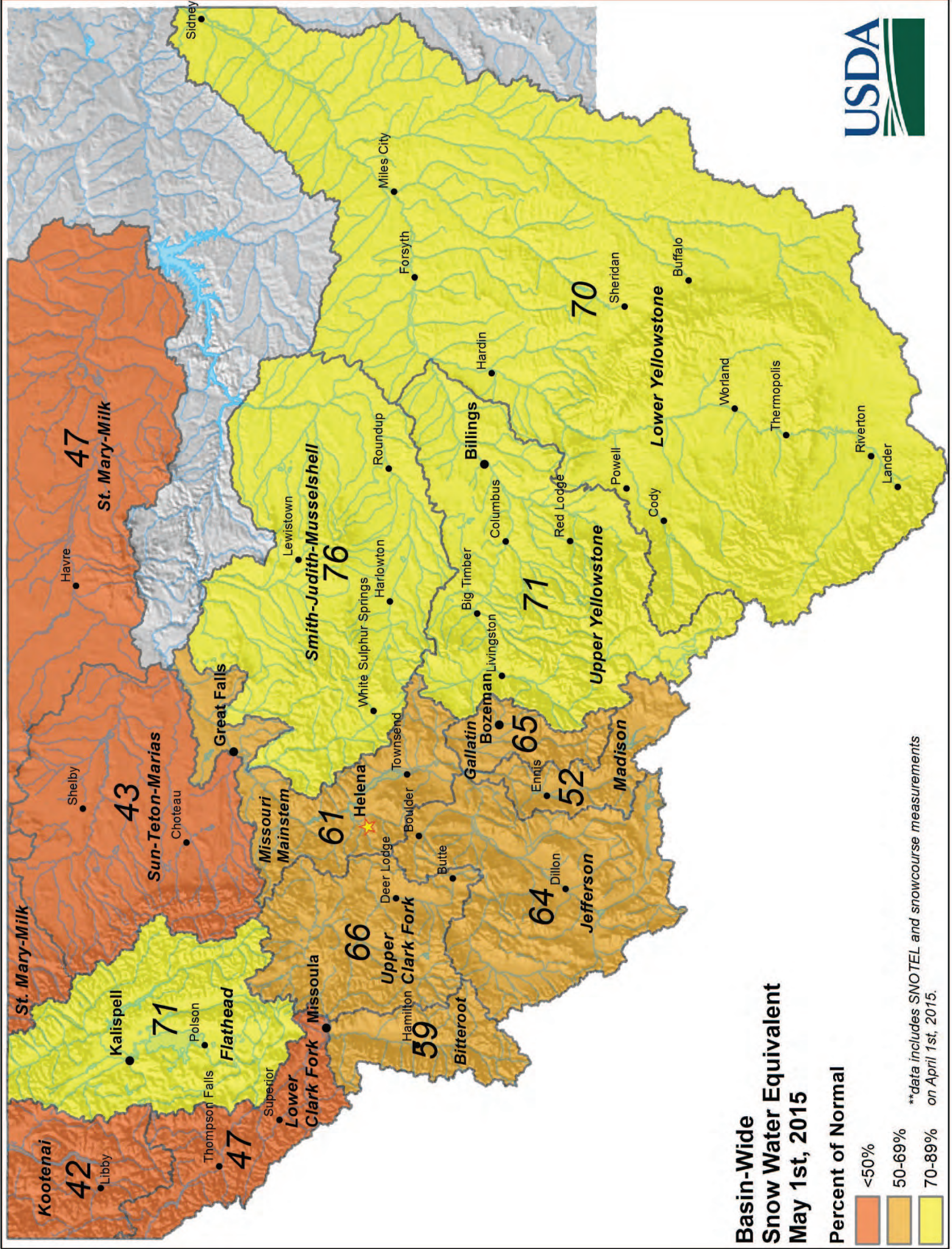
Compared to many of the western states Montana is in decent shape snowpack wise this spring, but that doesn't mean the situation around the state is good. It has been a record breaking year snowfall wise, but not the type of records that are good to break. On April 1st there were 47 measurement locations that set new period of record low snow water equivalent values for that date, and there were 36 locations that set new records for May 1st. This isn't to imply that conditions have improved, as many of the sites that set records in April were low-elevation and typically melt out before May 1st. What it does mean is that the well below normal snowfall and well above average temperatures have persisted this month, transitioning some of the mid and high elevation sites into this category for May 1st, leaving us with a historically low snowpack in some locations for our period of measurement.

Typically the snowpack in Montana reaches peak accumulation between April 1st and May 1st depending on the location and elevation. Low elevations made the transition to melt during the middle of March, the remaining snowpack at higher elevations made the transition during the middle of April. In most locations snowpack peaks were 2 to 3 weeks early this spring, low-elevations peaked during the beginning to the middle part of March, while upper elevations peaked during the middle to end of April.

All basins across the state are well below normal for May 1st, down yet again from April 1st due to the melting at almost all elevations during the month. Four basins in the northern part of the state have less than 50 percent of normal snowpack for this date (Kootenai – 42%, Lower Clark – 47%, Sun-Teton-Marias – 43%, St-Mary-Milk – 47%). There was no improvement during the last month, something we have been hoping for all winter, and the snowpack contribution to streamflow will be well below normal this year in most basins.

On May 1st state-wide snowpack is 61 percent of normal, and 39 percent of last year at this time. It is easy to compare this year to last year as it is in recent memory, but there should be no uncertainty that this year is completely different snowpack wise. The message this month may be disappointing but that may make it easier to remember for quite some time.

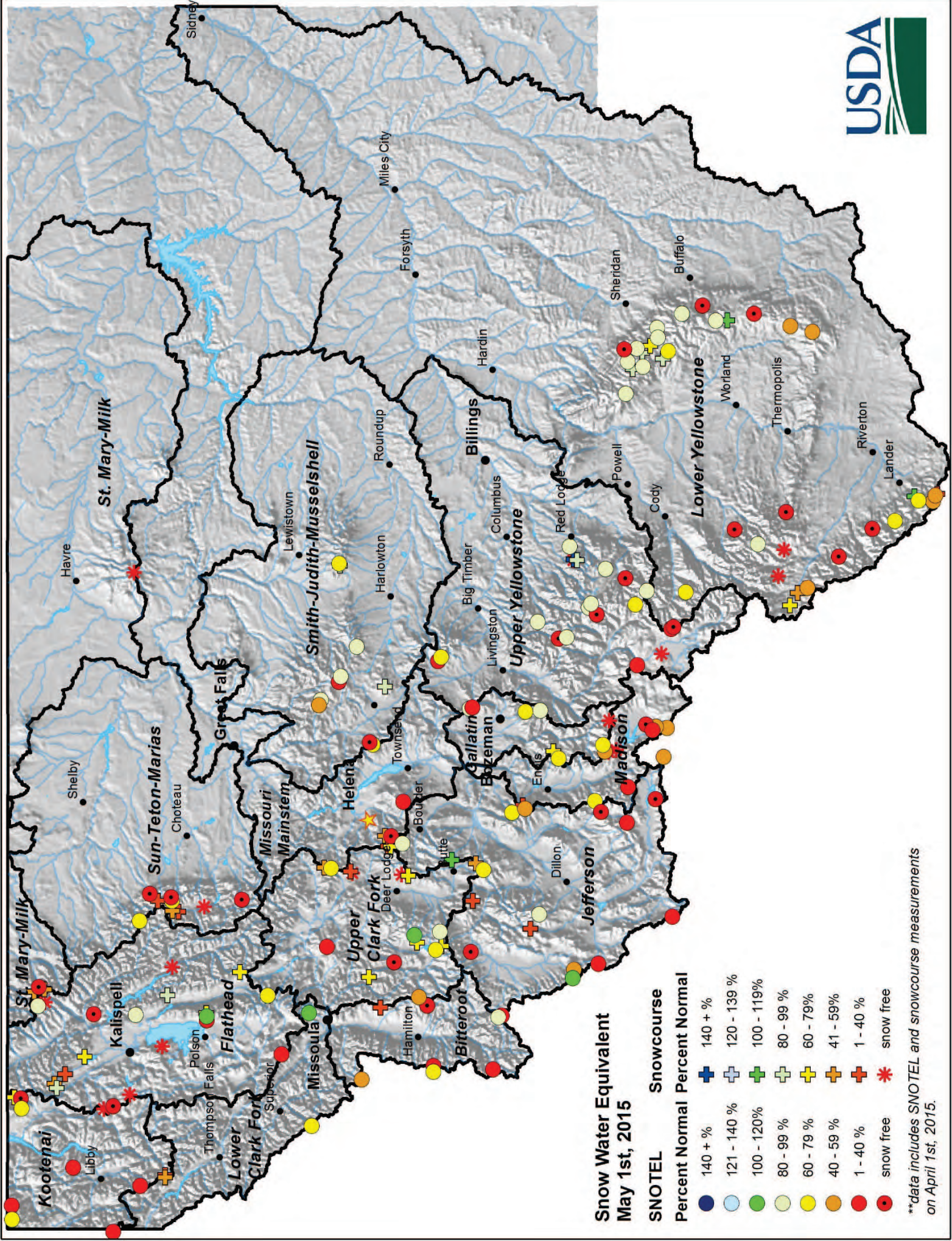
<i>Snow Water Equivalent</i>		
<i>5/1/2015</i>	% Normal	% Last Year
Columbia River Basin	62%	39%
Kootenai in Montana	42%	29%
Flathead in Montana	71%	46%
Upper Clark Fork	66%	41%
Bitterroot	59%	31%
Lower Clark Fork	47%	29%
Missouri River Basin	58%	39%
Jefferson	64%	45%
Madison	52%	39%
Gallatin	65%	44%
Headwaters Mainstem	61%	34%
Smith-Judith-Musselshell	76%	48%
Sun-Teton-Marias	43%	24%
St. Mary-Milk	47%	32%
Yellowstone River Basin	72%	46%
Upper Yellowstone	71%	43%
Lower Yellowstone	70%	47%
East of Divide	63%	41%
West of Divide	62%	39%
Montana State-Wide	61%	39%



Basin-Wide Snow Water Equivalent May 1st, 2015



**data includes SNOTEL and snowcourse measurements on April 1st, 2015.



**Snow Water Equivalent
May 1st, 2015**

SNOTEL	Snowcourse
140 + %	140 + %
121 - 140 %	120 - 139 %
100 - 120%	100 - 119%
80 - 99 %	80 - 99 %
60 - 79 %	60 - 79%
40 - 59 %	41 - 59%
1 - 40 %	1 - 40 %
snow free	snow free

**data includes SNOTEL and snowcourse measurements on April 1st, 2015.

Precipitation

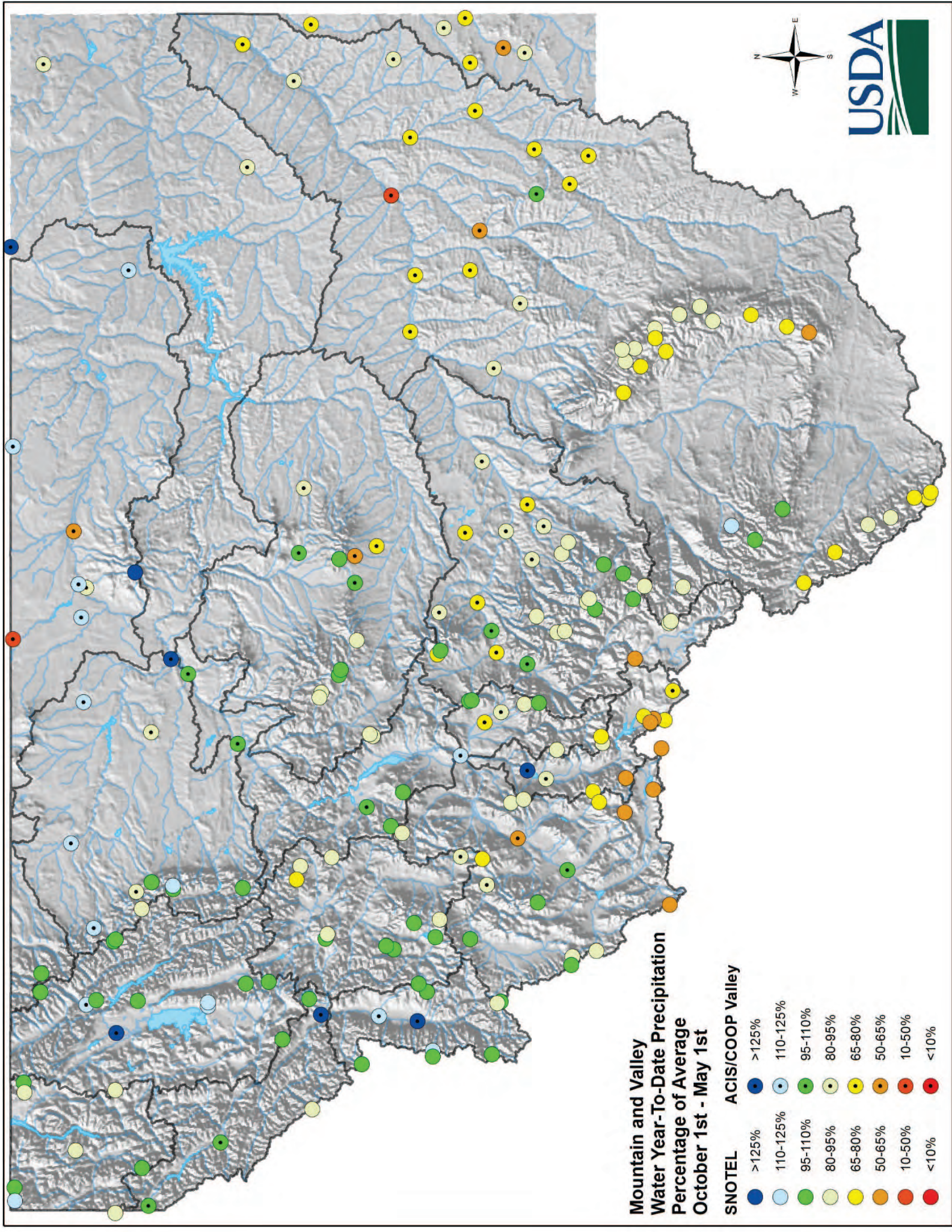
Compared to the snowpack percentages of normal water year-to-date precipitation percentages across the state are closer to normal conditions for May 1st in the central and northern halves of the state. The abundance of precipitation in the form of rain in place of snowfall through April 1st west of the Divide had boosted the water year totals for that date, but the month of April did not continue this trend. West of the Divide, only 51 percent of the normal April monthly precipitation fell causing all basins to decline. The coming months will be critical for the west-side basins as snowpack is extremely below average in some locations.

The months of April, May and June are historically favored for precipitation east of the Divide, but the basins did not receive normal precipitation this month. East of the Divide basins received 75 percent of their normal monthly precipitation during the month, but some of the northern basins (St. Mary-Milk, Sun-Teton-Marias) more closely resembled the west-side receiving well below average precipitation. In general, the further south you are in the state the lower the water-year-to-date precipitation values are. The southwest corner of the state in the Beaverhead, Ruby and Madison River basins experienced another month of well below normal precipitation. In this area where the snowpack is extremely below average a change to a wetter pattern would be welcome by irrigators this spring and summer.

Changes in precipitation patterns can happen rapidly as they did in 2011 (not that we want THAT much precipitation all at once), and considering the lack of snowpack in many basins it will be needed to supplement the flows in our streams this runoff season.

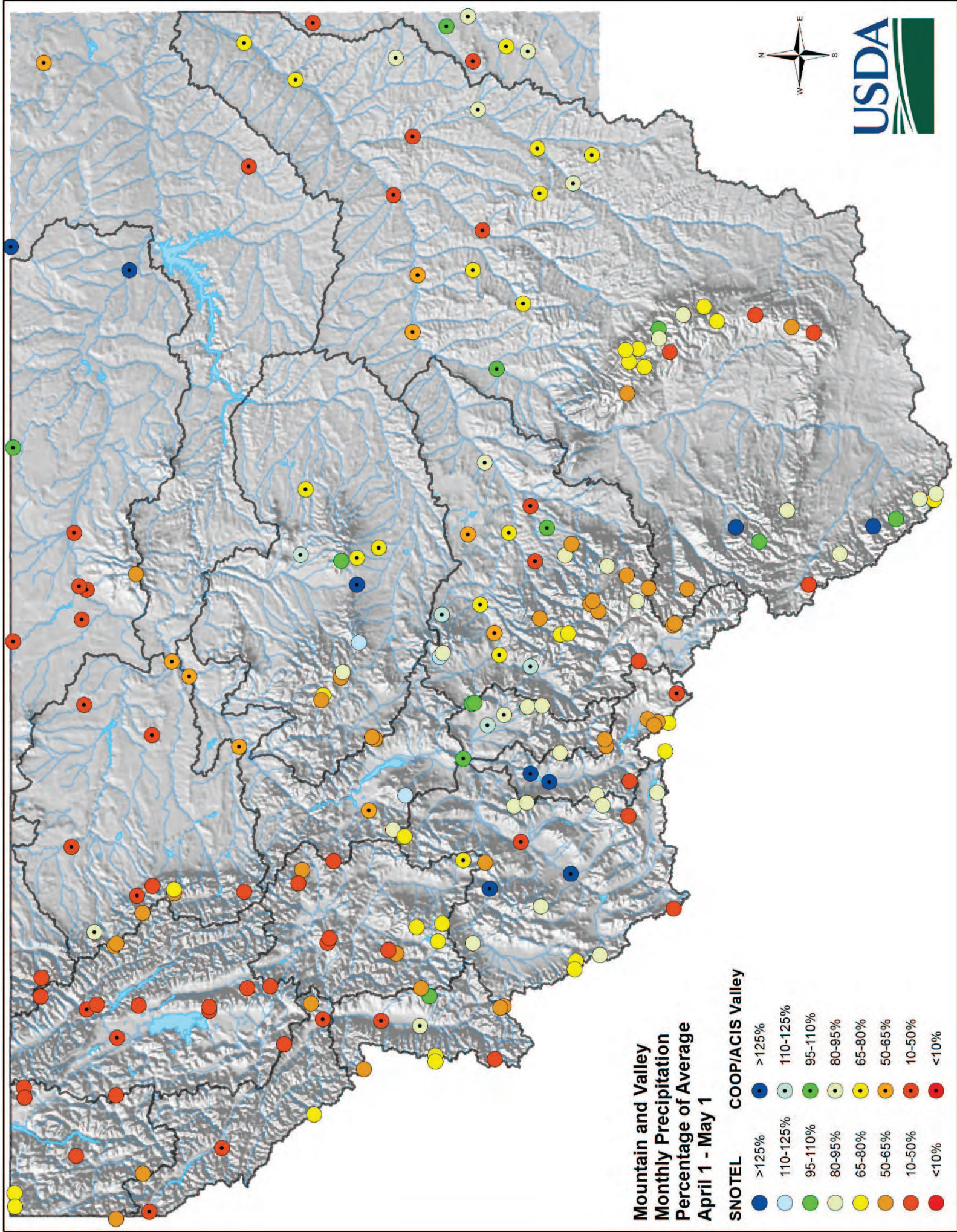
State-wide precipitation for the month of April was 65 percent of normal, and is currently 94 percent of the water year-to-date average for May 1st.

<i>Precipitation</i>			
<i>5/1/2015</i>	Monthly % Avg	Water Year % Avg	WY % Last Year
Columbia River Basin	51%	99%	89%
Kootenai in Montana	51%	98%	97%
Flathead in Montana	41%	103%	92%
Upper Clark Fork	54%	94%	82%
Bitterroot	64%	102%	83%
Lower Clark Fork	51%	99%	93%
Missouri River Basin	74%	88%	77%
Jefferson	73%	82%	75%
Madison	73%	74%	65%
Gallatin	87%	91%	74%
Headwaters Mainstem	74%	94%	73%
Smith-Judith-Musselshell	81%	91%	77%
Sun-Teton-Marias	52%	101%	88%
St. Mary-Milk	60%	109%	105%
Yellowstone River Basin	75%	85%	66%
Upper Yellowstone	74%	89%	66%
Lower Yellowstone	74%	81%	66%
East of Divide	73%	87%	73%
West of Divide	51%	99%	89%
Montana State-Wide	65%	94%	82%



**Mountain and Valley
Water Year-To-Date Precipitation
Percentage of Average
October 1st - May 1st**

SNOTEL	ACIS/COOP Valley
● >125%	● >125%
● 110-125%	● 110-125%
● 95-110%	● 95-110%
● 80-95%	● 80-95%
● 65-80%	● 65-80%
● 50-65%	● 50-65%
● 10-50%	● 10-50%
● <10%	● <10%



**Mountain and Valley
Monthly Precipitation
Percentage of Average
April 1 - May 1**

SNOTEL	COOP/IACIS Valley
● >125%	● >125%
● 110-125%	● 110-125%
● 95-110%	● 95-110%
● 80-95%	● 80-95%
● 65-80%	● 65-80%
● 50-65%	● 50-65%
● 10-50%	● 10-50%
● <10%	● <10%



Reservoirs

State-wide snowpack may be in poor shape for May 1st, but reservoir storage is the silver lining to this year's water story, and is above average for the date. This is due in large part to carryover storage from last year when snowpack provide ample runoff and water users had less demand on reservoirs for irrigation. West of the Divide where precipitation fell in the form of rain this winter in place of snow, water managers have been able to add to reservoir contents by storing this water as it entered the river systems. Since snowpack across the state is well below normal and will contribute less water to our rivers this year reservoirs will play a large role in the delivery of water, as will future precipitation during the summer.

As water demand increases later in the spring and summer due to below normal snowpack contribution to annual runoff future reservoir contents could change from above average to below depending on water usage. It is important for water users to remember wise management of reservoirs will not only be important to this year, but next year as well.

State-wide reservoir storage is currently 122 percent of average for May 1st, and 120 percent of last year at this time.

<i>Reservoir Storage</i>		
<i>5/1/2015</i>	Current % Avg	Current % LY
Columbia River Basin	139%	130%
Kootnenai in Montana	158%	136%
Flathead in Montana	127%	126%
Upper Clark Fork	111%	110%
Bitterroot	151%	126%
Lower Clark Fork	104%	100%
Missouri River Basin	116%	116%
Jefferson	91%	115%
Madison	117%	108%
Gallatin	121%	170%
Headwaters Mainstem	116%	116%
Smith-Judith-Musselshell	152%	115%
Sun-Teton-Marias	120%	124%
St. Mary-Milk	298%	148%
Yellowstone River Basin	110%	117%
Upper Yellowstone	106%	112%
Lower Yellowstone	110%	117%
East of Divide	116%	116%
West of Divide	139%	130%
Montana State-Wide	122%	120%

Streamflow

It should be no surprise to water users in the state that the snowpack this year has been less than disappointing. Since snowmelt plays such a large role in our spring runoff, snowmelt contributions to streamflow will be well below average this spring/summer. Many forecasts in the Montana basins are well below average for this date, in some cases we could see near record low streamflows if warm and dry weather patterns persist.

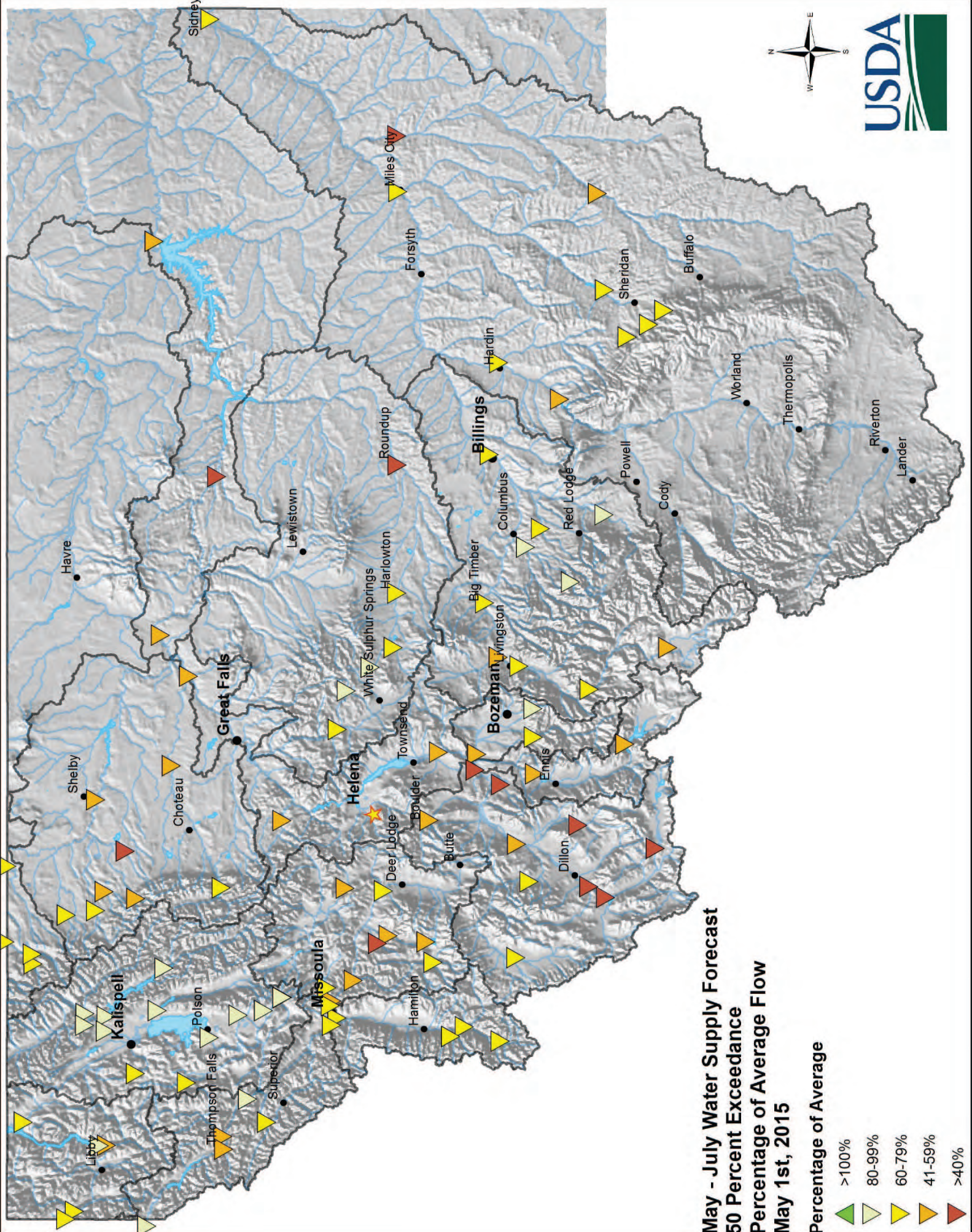
Streamflow forecasts within individual basin reports are presented as a range forecast. Water users should be aware of how to interpret these forecasts, as you can make multiple management decisions. For example, a 70 or 90 percent exceedance forecast indicates this should occur 70 or 90 percent of the time and could be used if you would like to make the most conservative water management decisions. If below normal precipitation occurs in the coming months this scenario would be more likely as a 50 percent forecast anticipate average precipitation during the period. On the other hand, a 10 or 30 percent forecast represents the high end of runoff and could be used for more optimistic decisions, or if anomalously wet conditions occur. 50 percent exceedance forecasts could be considered the most likely scenario, but considering the overall range of the forecasts for an individual point is important to understand the possible outcomes.

Please consult the individual basin reports for a more comprehensive guide to individual basin conditions as they can vary widely this water year. State-wide streamflow forecasts for the May-July time period are currently 69 percent of average, and 50 percent of what occurred last year.

Following are streamflow forecasts for the period April 1 through July 31. **THE FIGURES IN THE TABLE BELOW ARE AN AVERAGE OF ALL FORECASTS WITHIN THE PARTICULAR BASIN AT THE 50 PERCENT EXCEEDANCE ONLY. ALL 50 PERCENT EXCEEDANCE FORECASTS ASSUME NEAR NORMAL WEATHER THROUGH THE END OF THE FORECAST PERIOD.**

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

May-July Streamflow		
5/1/2015	% Average	% Last Year
Columbia River Basin	80%	59%
Kootnenai in Montana	80%	70%
Flathead in Montana	87%	60%
Upper Clark Fork	60%	42%
Bitterroot	70%	42%
Lower Clark Fork	77%	46%
Missouri River Basin	47%	39%
Jefferson	42%	36%
Madison	50%	52%
Gallatin	59%	50%
Headwaters Mainstem	46%	38%
Smith-Judith-Musselshell	65%	44%
Sun-Teton-Marias	58%	40%
St. Mary	75%	52%
Yellowstone River Basin	67%	45%
Upper Yellowstone	74%	51%
Lower Yellowstone	63%	40%
East of Divide	56%	42%
West of Divide	80%	59%
Montana State-Wide	69%	50%



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	-2.7	1.8
Tobacco	-2.7	1.6
Kootenai Ft. Steele to Libby Dam	-0.9	1.0
Kootenai below Libby Dam	2.1	1.8
Fisher	-3.3	1.4
Yaak	-2.4	1.3
North Fk. Flathead	-2.5	1.8
Middle Fk. Flathead	-1.5	1.9
South Fk. Flathead	2.7	3.0
Flathead at Columbia Falls	0.2	1.8
Swan	-0.7	2.9
Flathead at Polson	-1.6	2.1
Mission Valley	-0.3	-1.7
Little Bitterroot	-0.9	3.5
Clark Fork above Milltown	-2.5	2.3
Blackfoot	-3.1	2.7
Clark Fork above Missoula	-2.9	2.7
Bitterroot	-2.5	2.5
Clark Fork River below Bitterroot	-2.8	2.6
Clark Fork River below Flathead	-2.0	2.3
Beaverhead	-3.1	-1.9
Ruby	-4.0	-0.5
Big Hole	-1.1	2.1
Boulder (Jefferson)	-2.4	2.1
Jefferson	-3.3	1.9
Madison	-3.8	0.7
Gallatin	-2.9	2.4
Missouri above Canyon Ferry	-3.6	1.9
Missouri below Canyon Ferry	-3.3	0.8
Smith	-0.8	2.4
Sun	-2.2	1.2
Teton	-1.0	1.9
Birch/Dupuyer Creeks	-0.7	-0.8
Marias	-0.4	2.7
Musselshell	-0.2	2.6
Missouri above Fort Peck	-0.9	0.4
Missouri below Fort Peck	-0.9	-0.1
Milk		
Dearborn near Craig	-2.7	2.0
Yellowstone above Livingston	-2.5	3.1
Shields	-2.4	2.6
Boulder (Yellowstone)	-2.9	3.5
Stillwater	-1.6	3.0
Rock/Red Lodge Creeks	-1.3	2.9
Clarks Fork Yellowstone	-1.8	3.4
Yellowstone above Bighorn River	-2.3	3.0
Bighorn below Bighorn Lake	-0.7	2.2
Little Bighorn	-1.8	2.5
Yellowstone below Bighorn	-1.6	2.5
Tongue	-1.4	2.7
Powder	-2.5	2.7
Upper Judith	-1.4	1.1
Saint Mary	-2.2	1.8

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