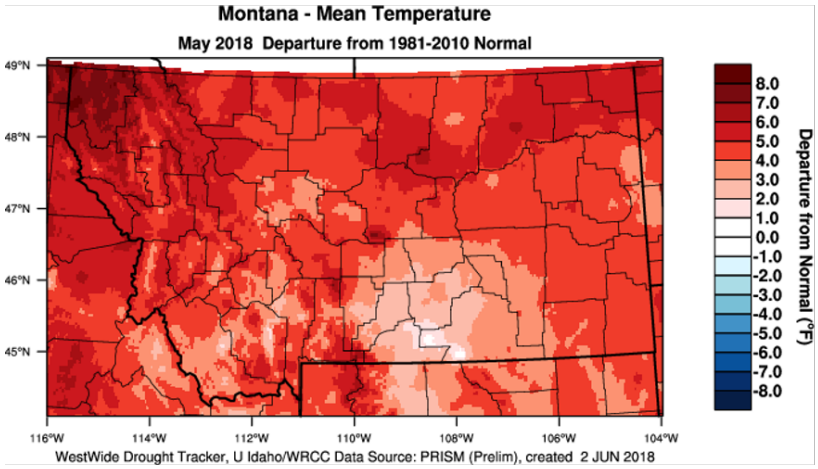
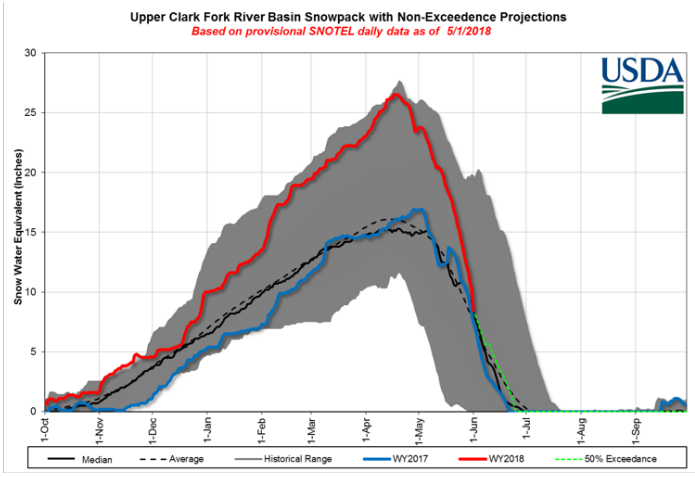
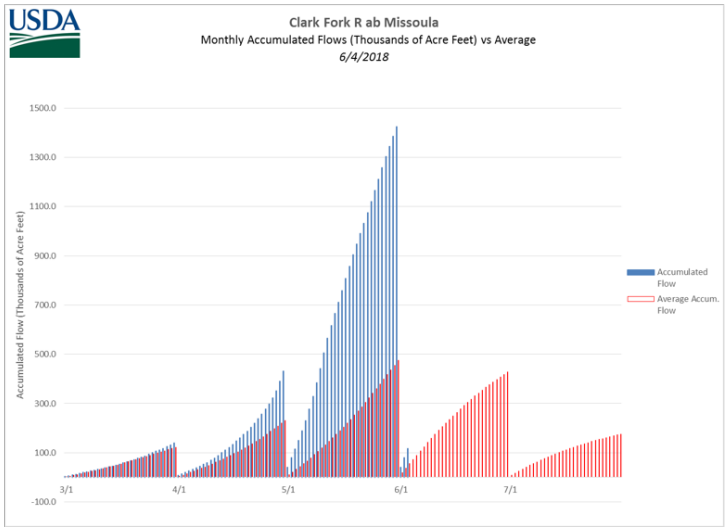
Montana
Water Supply Outlook Report
June 1st, 2018







What happens when you take well above to record-breaking snowpack, add well above average temperatures and abundant sunshine for a month? Rapid snowmelt and extremely high river volumes. Both east and west of the Divide, rivers, and small streams swelled during the month of May. Across the state of Montana new records were set at 52 streamgage locations for monthly flows, or the total amount of water to pass through the river for during the month. An additional 12 gauges were the second highest on record. In the example above for the Clark Fork River above Missoula, more water passed through the river during May (1,424,000 acre-feet) than typically passes through in a typical runoff SEASON (April 1st – Sept. 30th Average: 1,420,000 acre-feet). Snowmelt driven peak flows have likely occurred on most rivers across, except those in south-central MT which are driven by high elevation snowpack. With much of the state's snowpack melted by June 1st the snowmelt-driven "Tsunami of 2018" may finally be coming to an end.

For more water supply and resource management information, contact:

Lucas Zukiewicz
Water Supply Specialist
Federal Building
10 East Babcock, Room 443
Bozeman, MT 59715
Phone 406-587-6843
lucas.zukiewicz@mt.usda.gov
http://www.nrcs.usda.gov/wps/portal/nrcs/main/mt/snow/

Montana Water Supply Outlook Report as of June 1st, 2018

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.

The United States Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs and marital or familial status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint, write the Secretary of Agriculture, U.S. Department of Agriculture, Washington, D.C., 20250, or call 1-800-245-6340 (voice) or (202) 720-1127 (TDD). USDA is an equal employment opportunity employer.

Snowpack – Overview

What happened to spring? In contrast to the winter weather patterns this year when cold temperatures and above normal precipitation was the normal, the month of May yielded well above average daily temperatures and abundant sunshine. This is the perfect recipe for rapid snowmelt, which occurred this month across the state. The snowpack that was well above normal to record-setting for May 1st moved quickly into the river systems across the state resulting in snowpack totals for June 1st that are near to slightly above normal in some basins, and below normal in other basins. Low-elevation snow measurement locations melted rapidly during the first half of the month, and there is no snow remaining. Mid-elevations also saw significant melt rates through the month and have generally melted out by June 1st. The snow that currently remains in most river basins is at the higher elevations, where 40 to 70% of this year's peak snow water remains to enter the river systems. The high elevations typically sustain the flows in the rivers and streams through late spring and summer but are melting quickly due to the persistent sunny weather with above average temperatures.

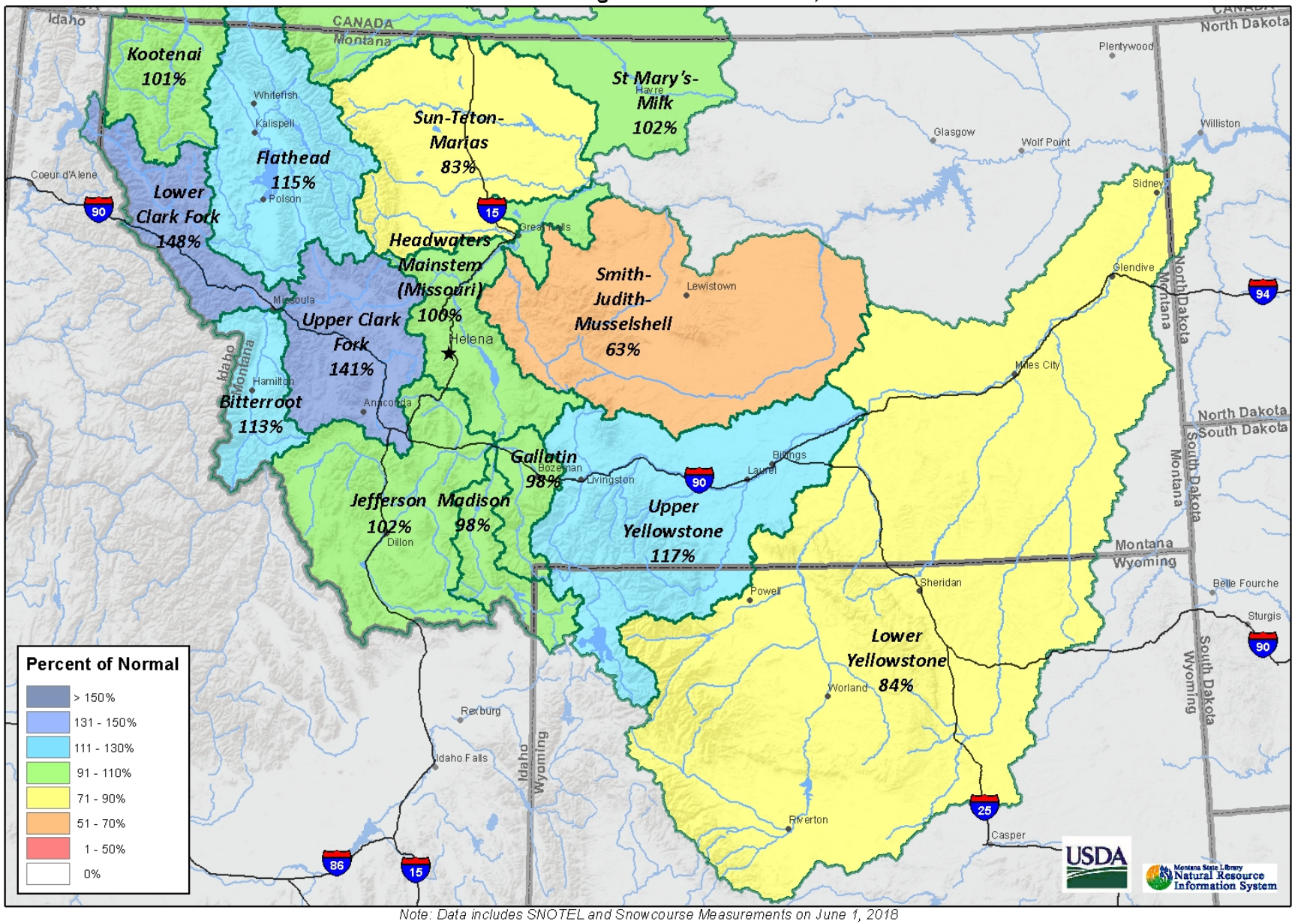
One thing is for sure, snowmelt this year started earlier than normal and has been rapid since it began. As we move forward into summer, this could be of concern. The promise of a record-setting snowpack delivering abundant water supply through the summer could easily turn into record-setting flows for a few months, and water shortages later in the summer when irrigation demand is high. As always, it all comes down to the future weather. If rapid snowmelt persists, the need for summer precipitation will become increasingly important for those water users that are not along a reservoir controlled system. For more on streamflow forecasts and water supply, please consult the streamflow section of this report.

Snow Water Equivalent

6/1/2018	***% Normal***	***% Last Year***
Columbia River Basin	116	86
Kootnenai in Montana	101	70
Flathead in Montana	115	79
Upper Clark Fork	141	127
Bitterroot	113	116
Lower Clark Fork	88	117
Missouri River Basin	96	91
Jefferson	102	99
Madison	98	87
Gallatin	98	98
Headwaters Mainstem	100	130
Smith-Judith-Musselshell	63	98
Sun-Teton-Marias	83	58
St. Mary-Milk	102	76
Yellowstone River Basin	105	56
Upper Yellowstone	117	82
Lower Yellowstone	84	32

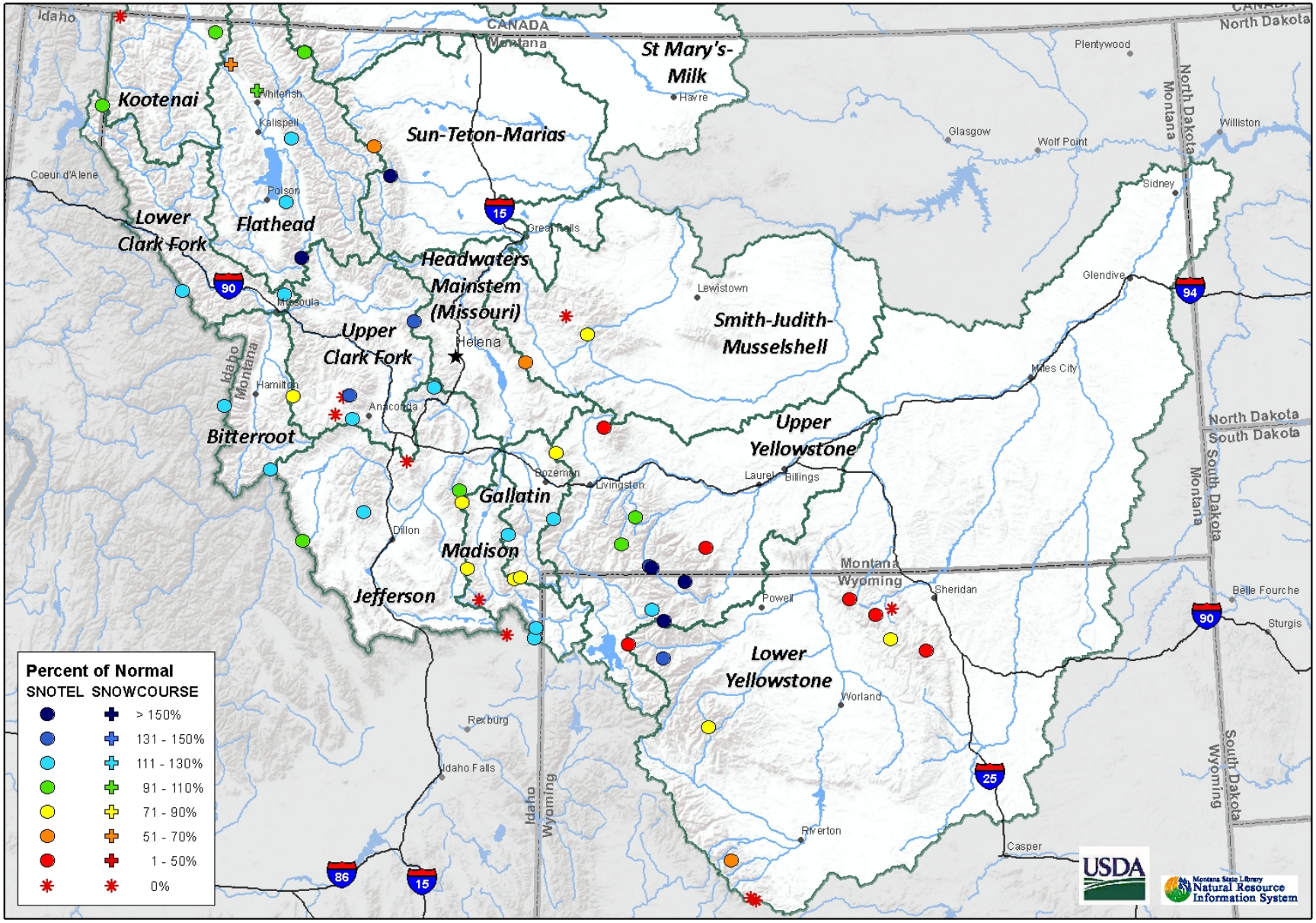
West of Divide	116	86
East of Divide	100	66
Montana State-Wide	111	87

Montana Data Collection Office
Current Snow Water Equivalent
Basin Percentage of Normal - June 1, 2018



Note: Data includes SNOTEL and Snowcourse Measurements on June 1, 2018

Montana Data Collection Office
Current Snow Water Equivalent
June 1, 2018



Precipitation - Overview

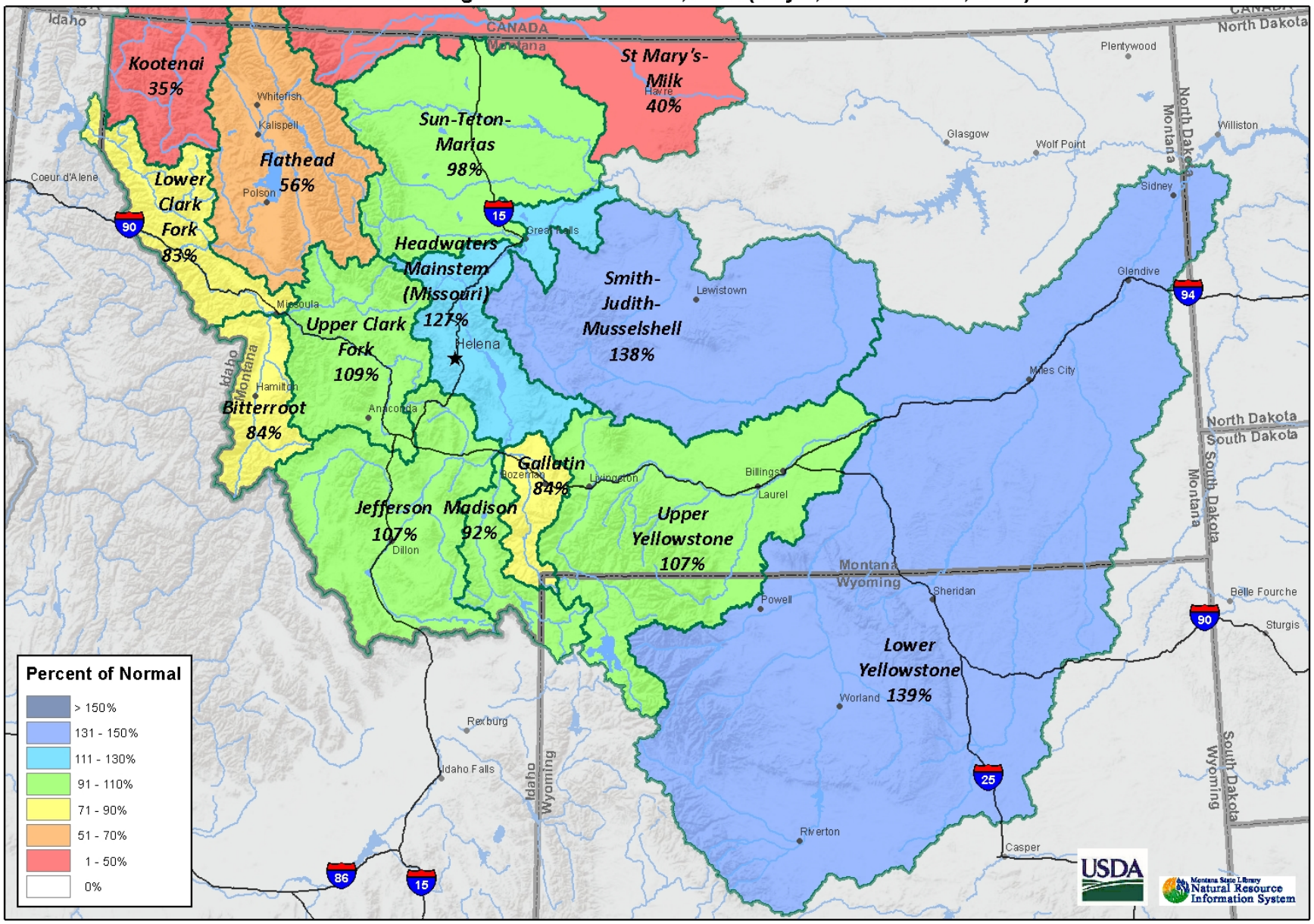
Precipitation during May was hit or miss, depending on where you live in the state. In some regions of the northwest, precipitation was record-setting, but not the kind of records we have been setting for snowfall this winter. 7 SNOTEL sites in the Kootenai and Flathead River basins received their lowest monthly precipitation totals on record for May, ranging from 24 to 40% of average for the month. Although it wasn't record-setting low across the entire basins, precipitation across the northwest was well below average for May. Some regions in southwest and south-central Montana (Upper Beaverhead, Ruby, Lower Madison and Upper Yellowstone) received below normal precipitation for May. Other regions along the Divide received above normal to well-above normal precipitation, so it truly was a mixed bag over the course of the month. Water year-to-date precipitation totals remain above average across the state, numbers which are boosted by the well above normal snowfall this winter. There are some important takeaway points as we make the transition into June. May and June are typically two of the "wettest" months for basins east of the Divide, and although not the wettest months of the year in western basins, they still make up for a significant amount of moisture. If the warm and dry pattern continues, this water will not make it into the rivers and streams as we venture further into summer, and could have significant impacts on the amount of water in rivers and streams. Snowmelt plays a role how much water is in the rivers on an annual basis, but it isn't the only component that drives flows. The following months, and precipitation during those months will play an important role in the demand for water by irrigators, and how much is available later in the water year.

Precipitation

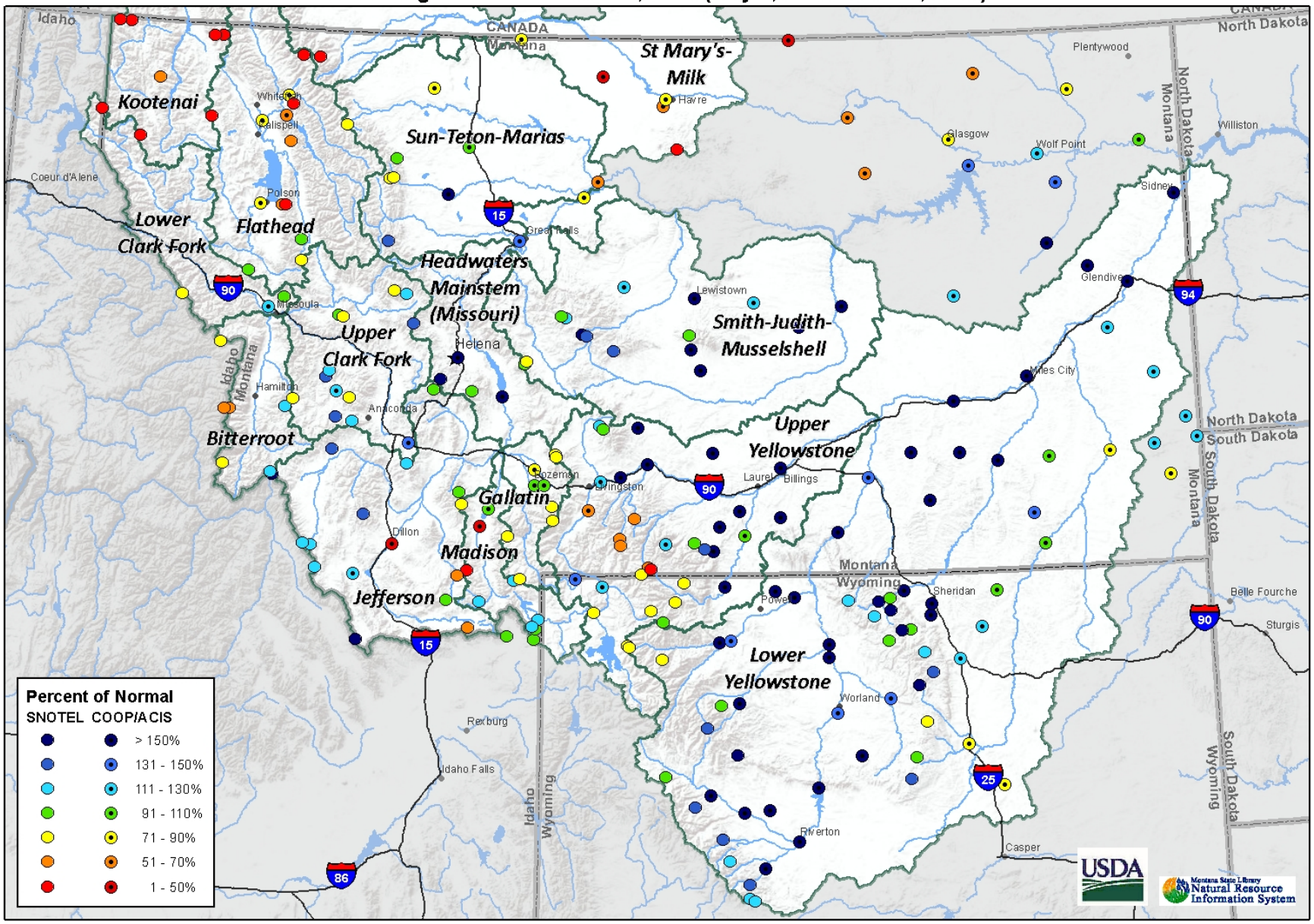
6/1/2018	***Monthly % Avg***	***Water Year % Avg***	***WY % Last Year***
Columbia River Basin	77	119	98
Kootnenai in Montana	35	109	84
Flathead in Montana	56	121	94
Upper Clark Fork	109	129	116
Bitterroot	84	118	105
Lower Clark Fork	83	114	90
Missouri River Basin	105	117	101
Jefferson	107	113	100
Madison	92	113	90
Gallatin	84	122	102
Headwaters Mainstem	127	132	121
Smith-Judith-Musselshell	138	121	117
Sun-Teton-Marias	98	128	106
St. Mary-Milk	40	110	87
Yellowstone River Basin	129	123	90
Upper Yellowstone	107	134	102
Lower Yellowstone	139	115	83

West of Divide	77	119	98
East of Divide	112	119	96
Montana State-Wide	101	122	101

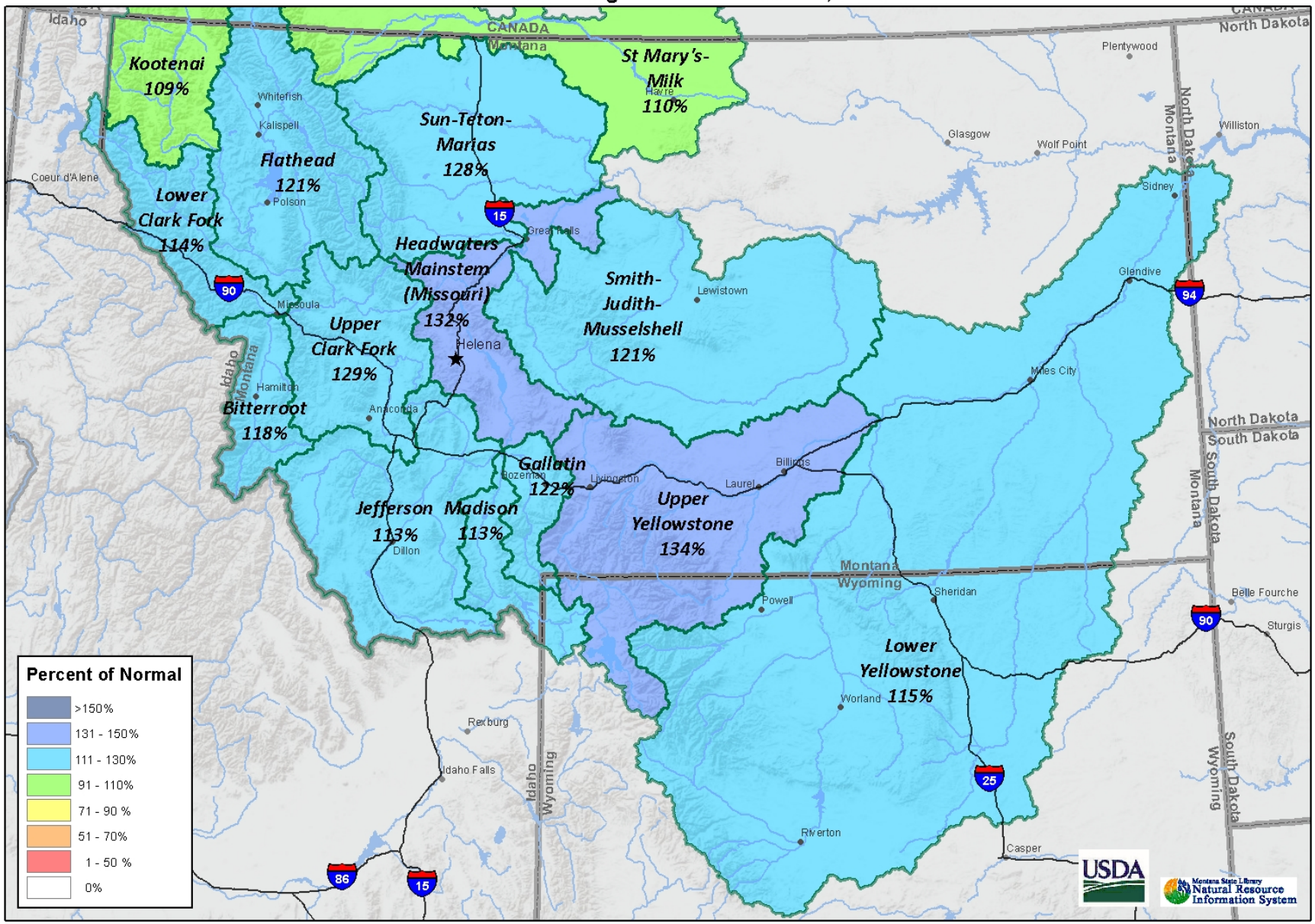
Montana Data Collection Office
Monthly Precipitation
Basin Percentage of Normal - June 1, 2018 (May 1, 2018 - June 1, 2018)



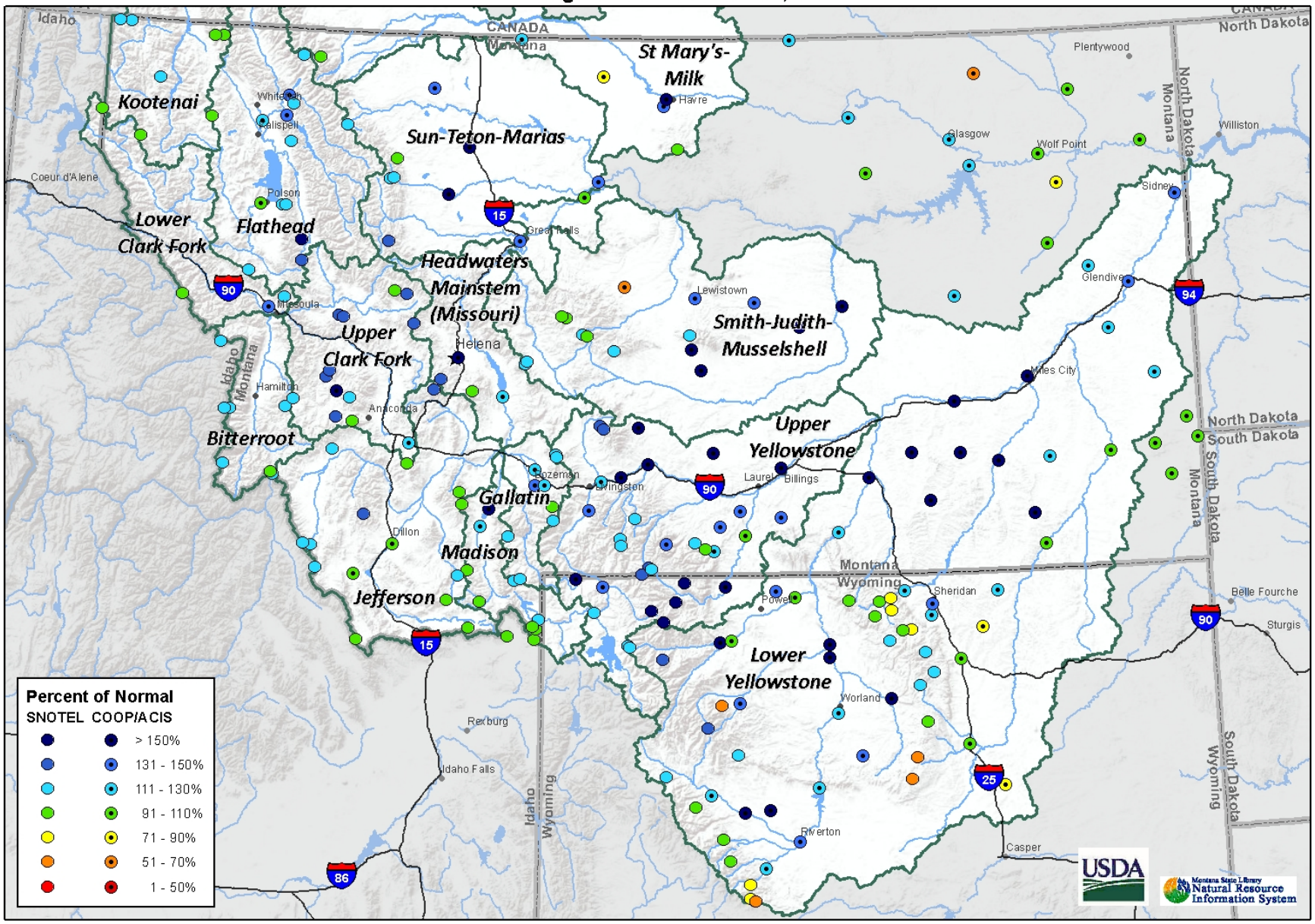
Montana Data Collection Office
Monthly Precipitation
Percentage of Normal - June 1, 2018 (May 1, 2018 - June 1, 2018)



Montana Data Collection Office
Water Year to Date Precipitation
Basin Percentage of Normal - June 1, 2018



Montana Data Collection Office
Water Year to Date Precipitation
Percentage of Normal - June 1, 2018



Reservoirs - Overview

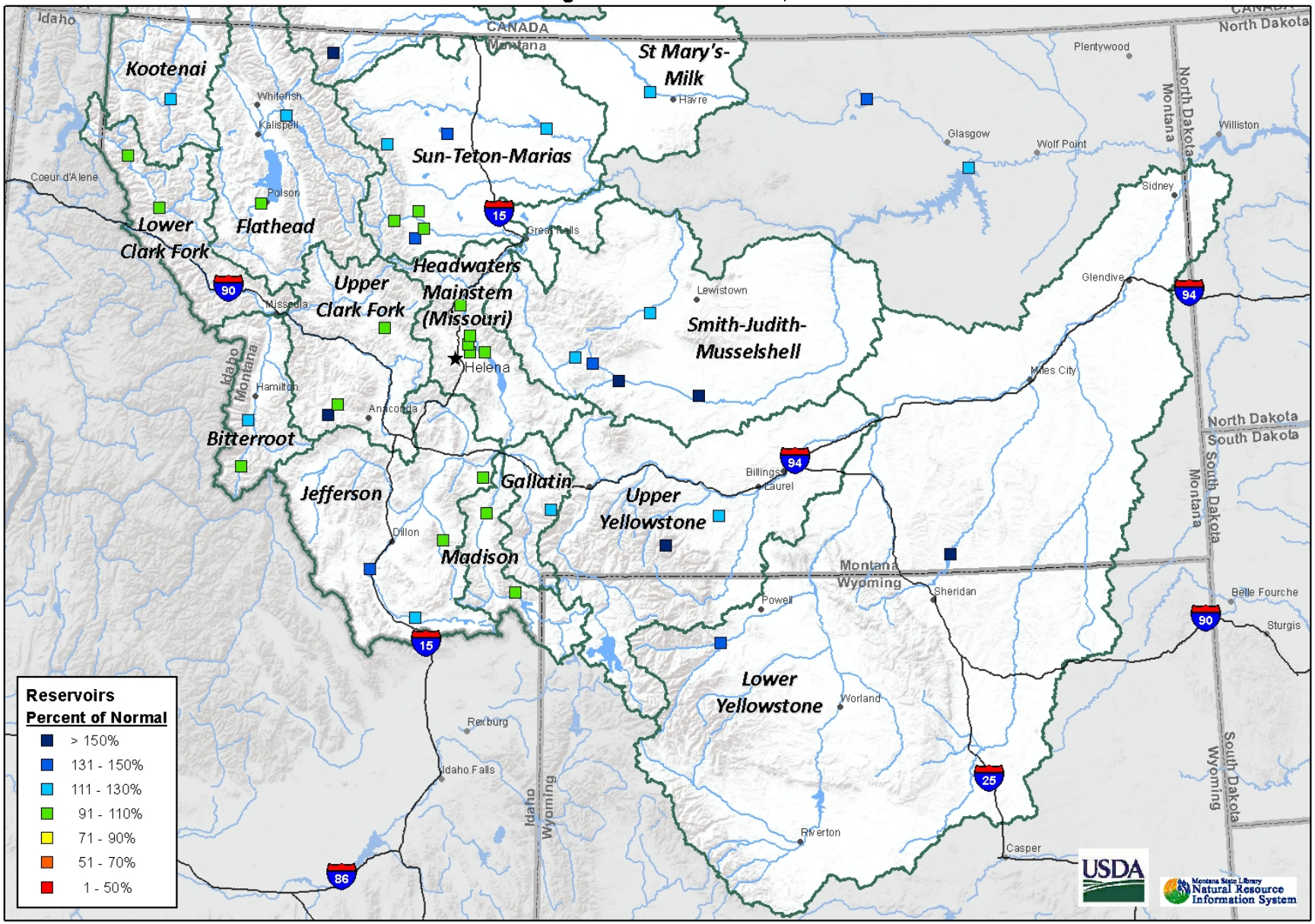
As you might expect from the well above average to record-setting runoff during May, most reservoirs across the state of Montana are full and spilling at the time of this report. In some cases, reservoir managers have never seen the amount of total inflow that occurred during May, a direct result of the well above normal to record-setting snowpack this winter, and anomalously sunny and hot weather experienced during the month. Inflow to Hungry Horse this month was 991 KAF (Thousands of Acre Feet), compared to the 1981-2010 Average of 459 KAF. That's over double the amount of water that normally enters the reservoir. Fortunately, water managers across the state recognized early on that snowmelt-driven flows would be well above average this year, and made room in the reservoirs for the amount of water coming. What many of them didn't anticipate is the rate at which the water would enter the reservoirs. Snowmelt driven peaks across the river have occurred on most rivers by June 1st, so flows should begin to taper off over the next few weeks, allowing for lower inflows. Ideally, water managers and water users hope for a slow inflow to the reservoirs from snowmelt to help prolong the amount of water in the reservoirs later into summer when demand typically increases. It all came down at once this year. The good news is that the reservoirs are full, and future summer precipitation and closer to normal temperatures could help alleviate need later this summer.

Reservoir Storage

6/1/2018	***% Average***	***% Capacity***	***% Last Year***
Columbia River Basin	115	85	117
Kootnenai in Montana	120	78	135
Flathead in Montana	111	90	106
Upper Clark Fork	118	101	110
Bitterroot	108	106	102
Lower Clark Fork	102	98	101
Missouri River Basin	125	89	107
Jefferson	127	79	117
Madison	105	93	103
Gallatin	120	101	107
Headwaters Mainstem	130	92	108
Smith-Judith-Musselshell	148	104	107
Sun-Teton-Marias	114	72	104
St. Mary-Milk	138	77	113
Yellowstone River Basin	113	71	126
Upper Yellowstone	134	82	122
Lower Yellowstone	112	70	126

West of Divide	115	85	117
East of Divide	125	88	108
Montana State-Wide	122	87	111

Montana Data Collection Office
Reservoir Levels
Percentage of Normal - June 1, 2018



Streamflow - Overview

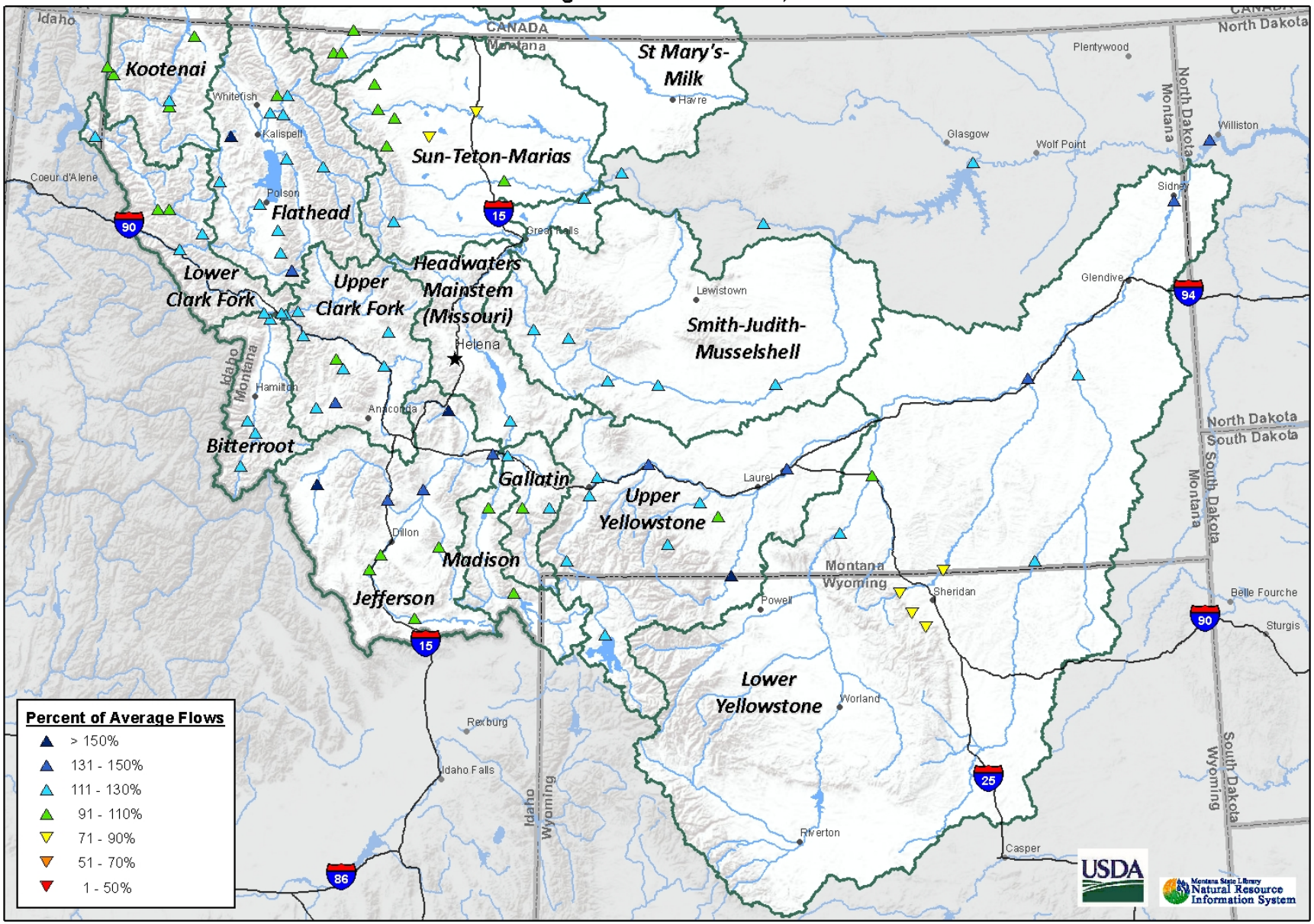
The month of May might go down as "The Tsunami of 2018" when you look at how much water came down the rivers. It has been highlighted throughout the winter that there was record-setting snowpack available for runoff this spring, but few anticipated the rate at which it would enter the rivers over the last month. Prolonged periods of well above average temperatures across the state, coupled with abundant sunshine lead to rapid snowmelt runoff on all rivers. Many stream gages new records for total monthly flow (total amount of water to pass by a stream gage) for the month May. The Clark Fork above Missoula, which has been of concern throughout the month, had a total of 1,424 KAF (thousands of acre-feet) of water pass through the river from May 1st – May 31st. To put that in context, the average for the April 1st – September 30th period is 1,420 KAF. That is the most water that has passed through the river during May on record (90 years), and more water passed through Missoula than a typical runoff *SEASON* (April1-Sept30). The Clark Fork was not alone in setting records this month. Total monthly flows (not peak daily flow) were the highest on record for 52 stream gages in the state, and second highest at an additional 12 locations. At this point, snowmelt-driven peaks have already occurred on most river systems, but a few high elevation basins in south-central Montana could see additional peaks in the next week or two if well above average temperatures persist. Snowmelt has been abundant, and it has been early this year. The reduction in snowpack over the month has resulted in streamflow forecasts which have dropped from May 1st for the June 1st – September 30th period. Water users are encouraged to look at their basin of interest for individual streamflow forecasts for the summer months as forecasts range widely depending on the region and river basin.

JUN-JUL Streamflow Forecasts

6/1/2018	*Basin Average*
Columbia River Basin	**116%**
Kootnenai in Montana	108%
Flathead in Montana	123%
Upper Clark Fork	119%
Bitterroot	116%
Lower Clark Fork	114%
Missouri River Basin	**116%**
Jefferson	132%
Madison	103%
Gallatin	112%
Headwaters Mainstem	127%
Smith-Judith-Musselshell	123%
Sun-Teton-Marias	107%
St. Mary-Milk	111%
Yellowstone River Basin	**120%**
Upper Yellowstone	133%
Lower Yellowstone	107%

West of Divide	**116%**
East of Divide	**119%**
Montana State-Wide	***118%***

Montana Data Collection Office
Streamflow Forecast
Percentage of Normal - June 1, 2018



Kootenai River Basin

After receiving well above average precipitation this winter in the Kootenai River Basin, the month of May marked a major change as it only brought 35 percent of average precipitation. The most significant storm occurred during the second week in May, the storm only dropped about 0.5 inches of rain across the basin. With that said, the Kootenai snowpack peaked well above normal in mid-April at all sites except Hawkins Lake SNOTEL, which peaked above normal later in the month. These peaks were slightly later than typical for the region. After peaking, anomalously warm and dry weather in early May transitioned the snowpack into rapid melt, almost as if spring was skipped and we went straight to summer. Melt rates reached nearly 2 inches of snowmelt discharge per day at times, which is well above average. Streams responded to this melt peaking at near record levels in early May, which is a couple weeks early for the region. Also worth noting is the massive amount of water that moved through basin in May. The Yaak River near Troy in May recorded over 315 KAF, which ranks in the 90 percentile of 63 years of record and the Kootenai River at Leonia saw the highest volume of flow for May in 93 years of record.

Kootenai River Basin Data Summary

Snowpack	**Percent of 1981-2010 Normal (Median)**	**Last Year Percentage of Normal (Median)**
KOOTENAY in CANADA	1%	85%
KOOTENAI MAINSTEM	139%	152%
TOBACCO	109%	158%
FISHER	%	%
YAAK	0%	101%
KOOTENAI RIVER BASIN in MONTANA	101%	145%
KOOTENAI ab BONNERS FERRY	83%	145%
Basin-Wide Snowpack	**101%**	**145%**

Precipitation	**Monthly Percentage of Average**	**WYTD Percentage of 1981-2010 Average***	**WYTD Last Year Percentage of Average**
Mountain Precipitation	35%	109%	130%
Valley Precipitation	%	%	%
Basin-Wide Precipitation	**35%**	**109%**	**130%**

**WYTD Precipitation is October 1st- Current*

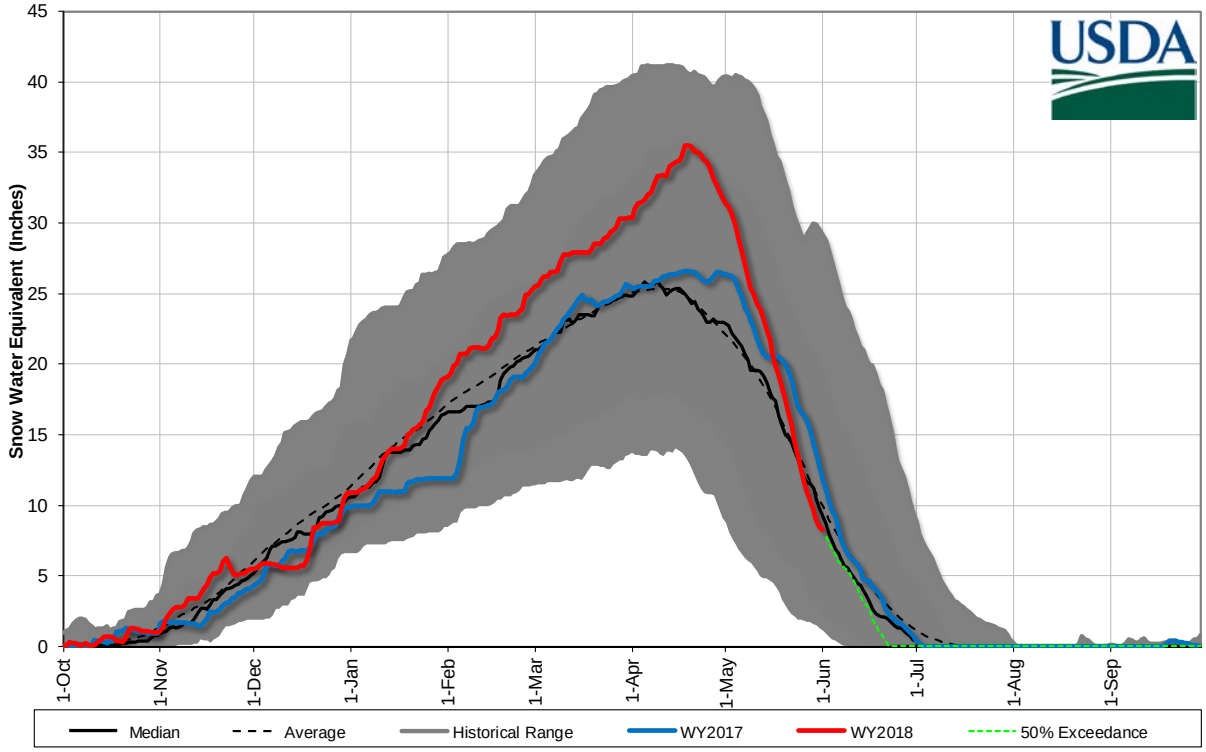
Reservoir Storage	**Percentage of Average**	**Percentage of Capacity (Total)**	**Last Year Percentage of Average**
Basin-Wide Reservoir Storage	**120%**	**78%**	**89%**

**See Reservoir Storage Table for storage in individual reservoirs*

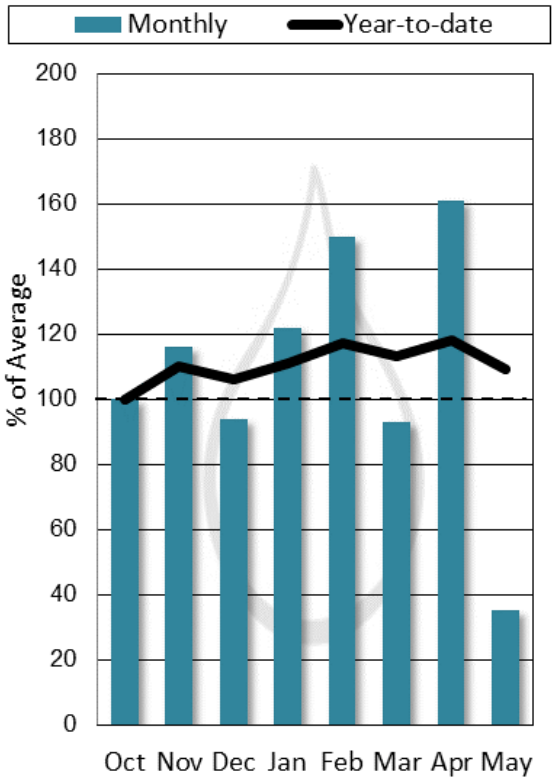
Reservoir Storage End of May, 2018	**Current (KAF)**	**Last Year (KAF)**	**Average (KAF)**	**Capacity (KAF)**	**% Average**	**% Capacity**
Lake Koocanusa	4502	3331	3736	5748	**120%**	**78%**

Kootenai River Basin Snowpack with Non-Exceedence Projections

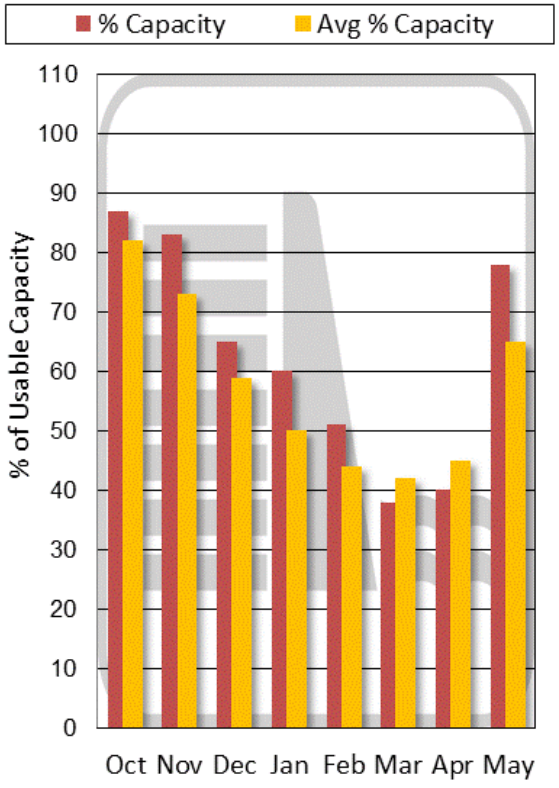
Based on provisional SNOTEL daily data as of 5/1/2018



Mountain and Valley Precipitation



End of Month Reservoir Storage



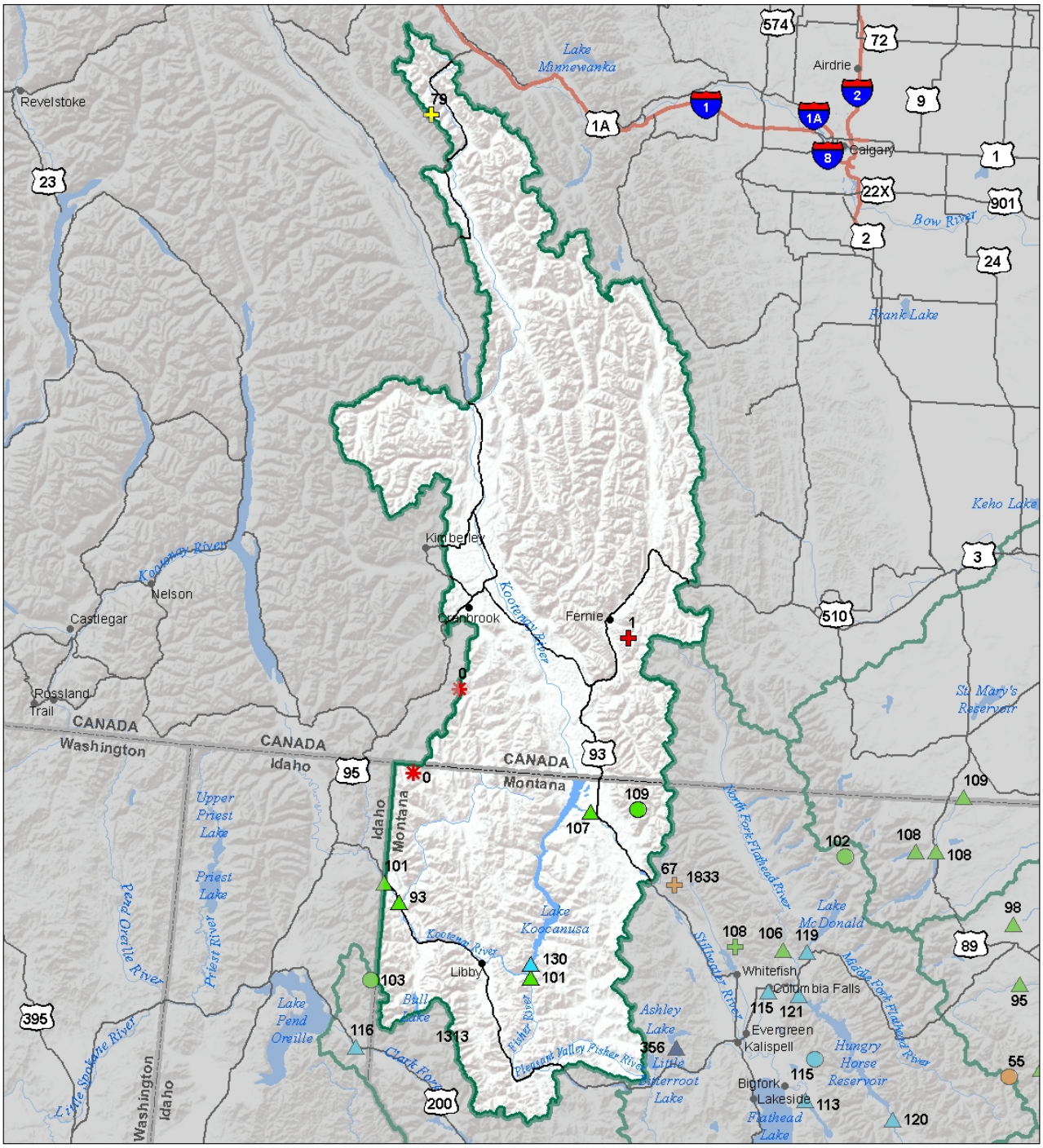
Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Streamflow Forecast Summary

KOOTENAI RIVER BASIN in MONTANA	Forecast Period	Chance Actual Volume Will Exceed Forecasted Volume						
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Tobacco R nr Eureka	JUN-JUL	45	55	63	*109%*	70	80	58
	JUN-SEP	54	67	76	*107%*	85	98	71
Libby Reservoir Inflow1	JUN-JUL	3770	4210	4410	*136%*	4610	5060	3240
	JUN-SEP	4580	5130	5380	*130%*	5630	6190	4150
Fisher R nr Libby	JUN-JUL	42	54	62	*102%*	70	82	61
	JUN-SEP	53	66	76	*101%*	85	99	75
Yaak R nr Troy	JUN-JUL	74	101	118	*91%*	136	163	130
	JUN-SEP	91	120	139	*93%*	159	188	150
Kootenai R at Leonia1,2	JUN-JUL	2830	3420	3690	*101%*	3960	4560	3640
	JUN-SEP	3630	4350	4680	*101%*	5010	5730	4640

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

Kootenai River Basin
Streamflow Forecast, Snow Water Equivalent
Percentage of Normal
June 1, 2018



Snow Water Equivalent
Percent of Normal

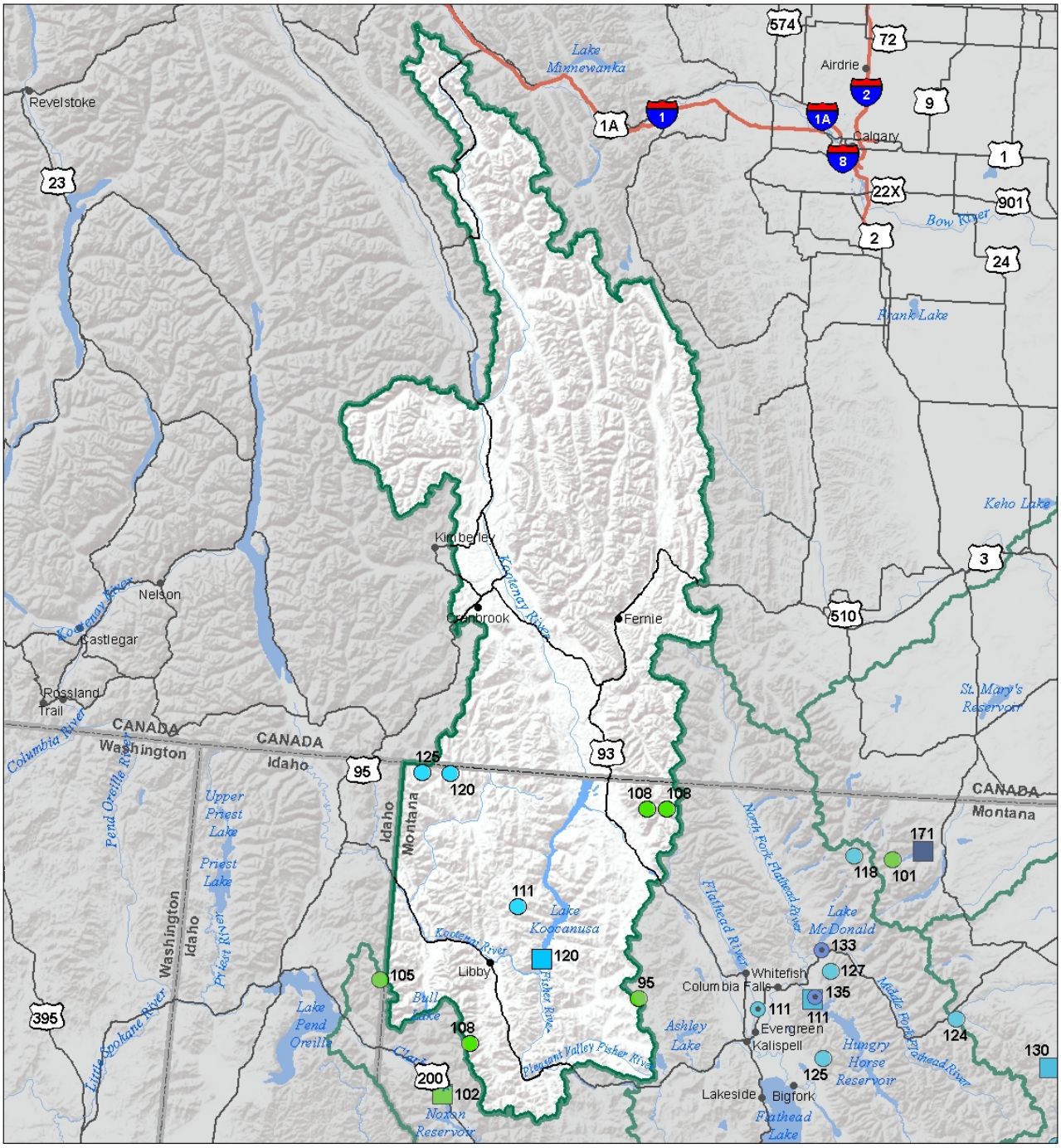
SNOTEL			Snowcourse		
> 150%	71 - 90%		> 150%	71 - 90%	
131 - 150%	51 - 70%		131 - 150%	51 - 70%	
111 - 130%	1 - 50%		111 - 130%	1 - 50%	
91 - 110%	0%		91 - 110%	0%	

Streamflow Forecast
Percent of Average Flows

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

USDA
Montana State Library Natural Resource Information System

Kootenai River Basin
Water Year to Date Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018



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%	

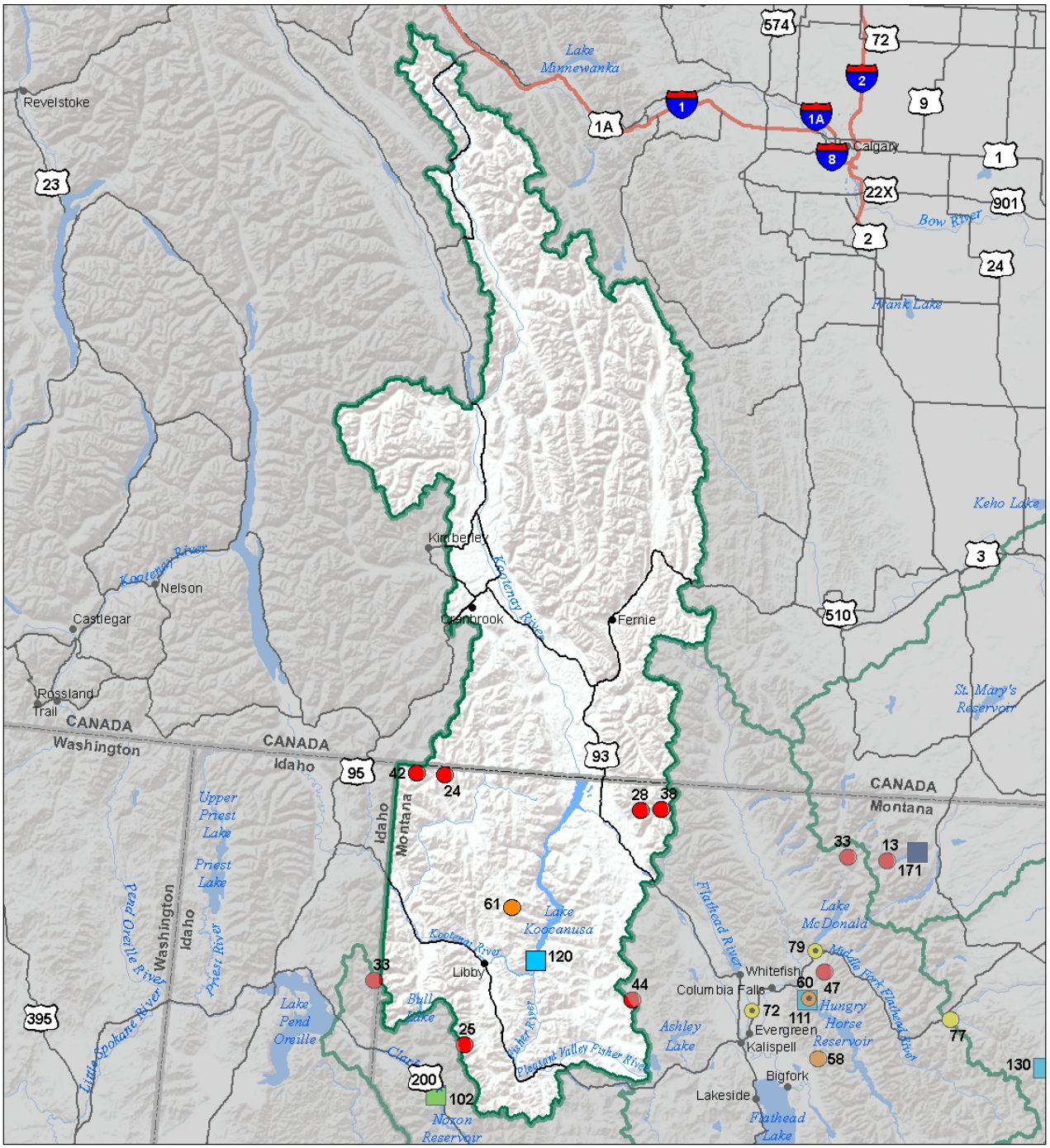
Reservoirs
Percent of Normal

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

USDA

Montana State Library Natural Resource Information System

Kootenai River Basin
Monthly Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018 (May 1, 2018 - June 1, 2018)



Precipitation
Percent of Normal

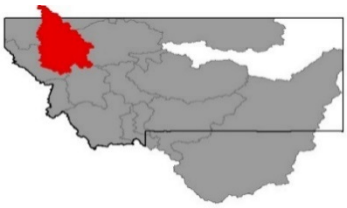
SNOTEL		COOP/ACIS	
> 150%	71 - 90%	> 150%	71 - 90%
131 - 150%	51 - 70%	131 - 150%	51 - 70%
111 - 130%	1 - 50%	111 - 130%	1 - 50%
91 - 110%		91 - 110%	

Reservoirs
Percent of Normal

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

USDA

Montana State Library Natural Resource Information System



Flathead River Basin

The faucet has finally been turned down in the Flathead River basin, but the drain has been fully opened. After setting a record for most precipitation during February, May was the first month this water year to have below average precipitation, and at 54% it was well below average. 4 SNOTEL sites recorded their lowest may precipitation on record. On a positive note, all SNOTEL sites within the basin reached well above normal snow water peaks this year. One example is Noisy Basin, which peaked in early May at just under 70 inches of snow water and 171 inches of depth, which is 160 percent of its normal peak. The basin-wide snowpack peaked in late April, which is slightly later than normal. About the time it started to melt the region was experiencing abundant sunshine with well above average temperatures. Snow melt rates reached up to 2 inches per day during the first half of May. This drove stream flows up drastically. On May 9th the Flathead River at Columbia Falls reached its snowmelt peak of 50,200 cfs, which was the maximum flow recorded for that day. In addition, all three of the Flathead Rivers saw their largest total volume of water on record for May.

Flathead River Basin Data Summary

Snowpack	**Percent of 1981-2010 Normal (Median)**	**Last Year Percentage of Normal (Median)**
NF FLATHEAD in CANADA	%	%
NF FLATHEAD in MONTANA	113%	168%
MIDDLE FORK FLATHEAD	85%	137%
SOUTH FORK FLATHEAD	115%	123%
STILLWATER-WHITEFISH	98%	215%
SWAN	143%	119%
MISSION VALLEY	114%	131%
LITTLE BITTERROOT-ASHLEY	%	%
JOCKO	173%	119%
FLATHEAD in MONTANA	115%	146%
Basin-Wide Snowpack	***115%***	***146%***

Precipitation	**Monthly Percentage of Average**	**WYTD Percentage of 1981-2010 Average***	**WYTD Last Year Percentage of Average**
Mountain Precipitation	54%	122%	127%
Valley Precipitation	79%	105%	160%
Basin-Wide Precipitation	**56%**	**121%**	**129%**

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

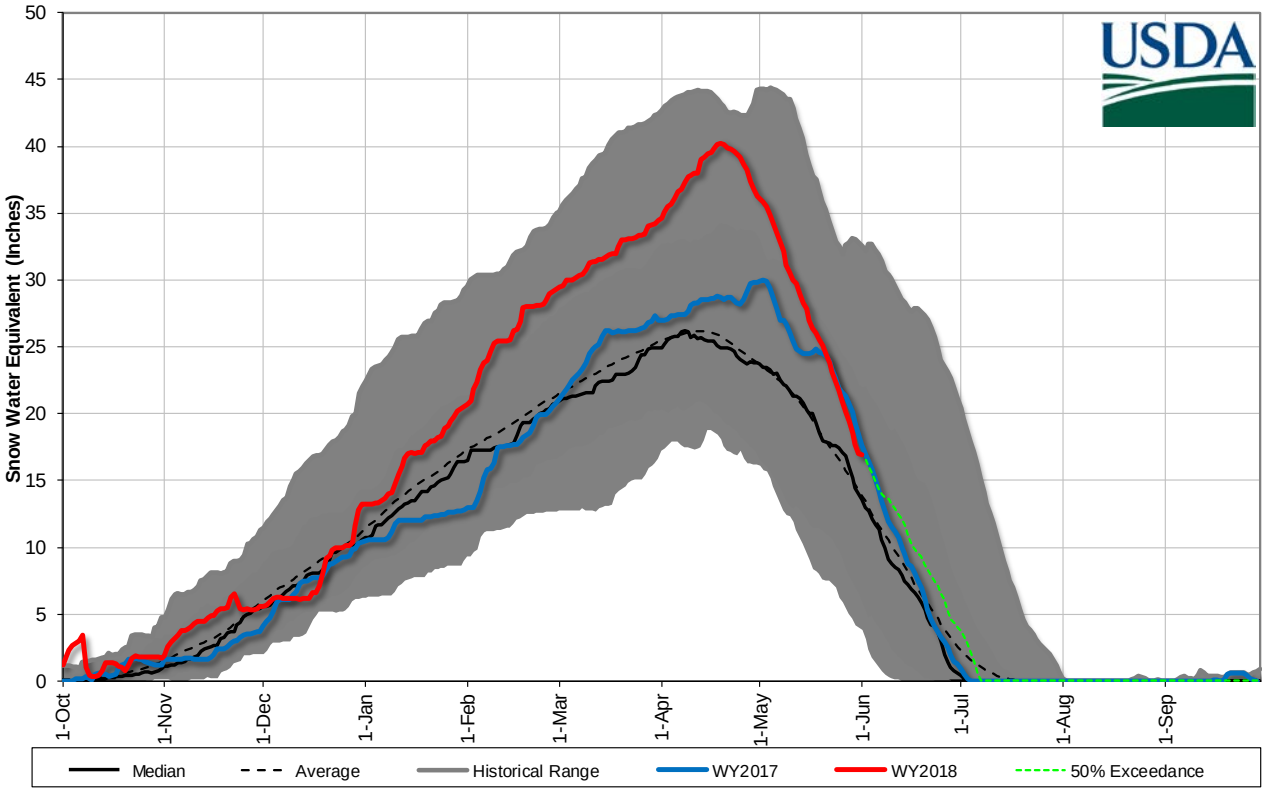
Reservoir Storage	**Percentage of Average**	**Percentage of Capacity (Total)**	**Last Year Percentage of Average**
Basin-Wide Reservoir Storage	111%	90%	105%

**See Reservoir Storage Table for storage in individual reservoirs*

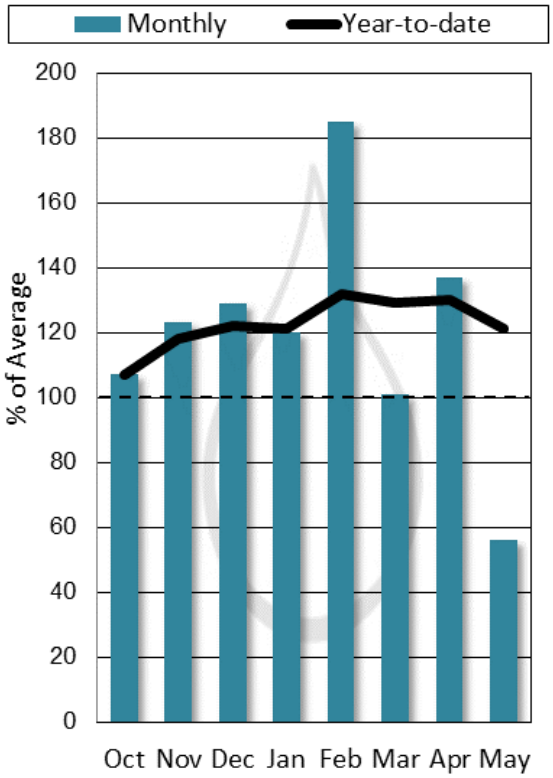
Reservoir Storage End of May, 2018	**Current (KAF)**	**Last Year (KAF)**	**Average (KAF)**	**Capacity (KAF)**	**% Average**	**% Capacity**
Camas (4)		37	29	45		
Lower Jocko Lake		5	4	6		
Mission Valley (8)		77	63	100		
Hungry Horse Lake	3023	2962	2733	3451	**111%**	**88%**
Flathead Lake	1698	1514	1538	1791	**110%**	**95%**

Flathead River Basin Snowpack with Non-Exceedence Projections

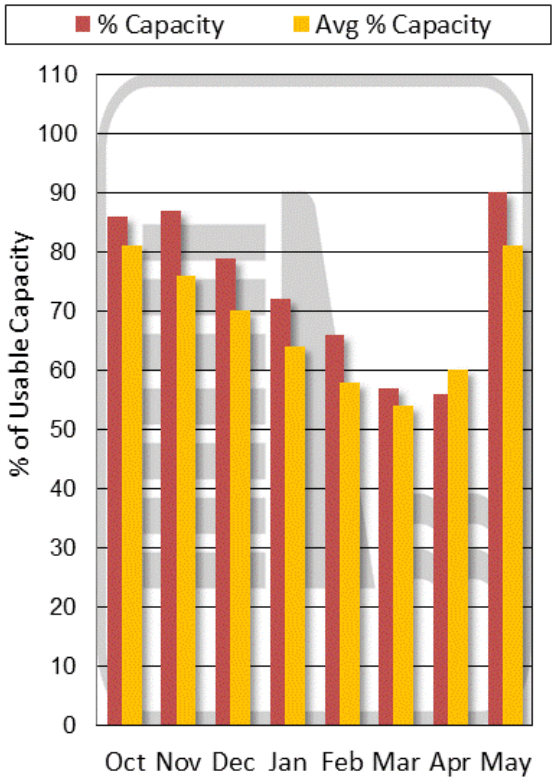
Based on provisional SNOTEL daily data as of 5/1/2018



Mountain and Valley Precipitation



End of Month Reservoir Storage



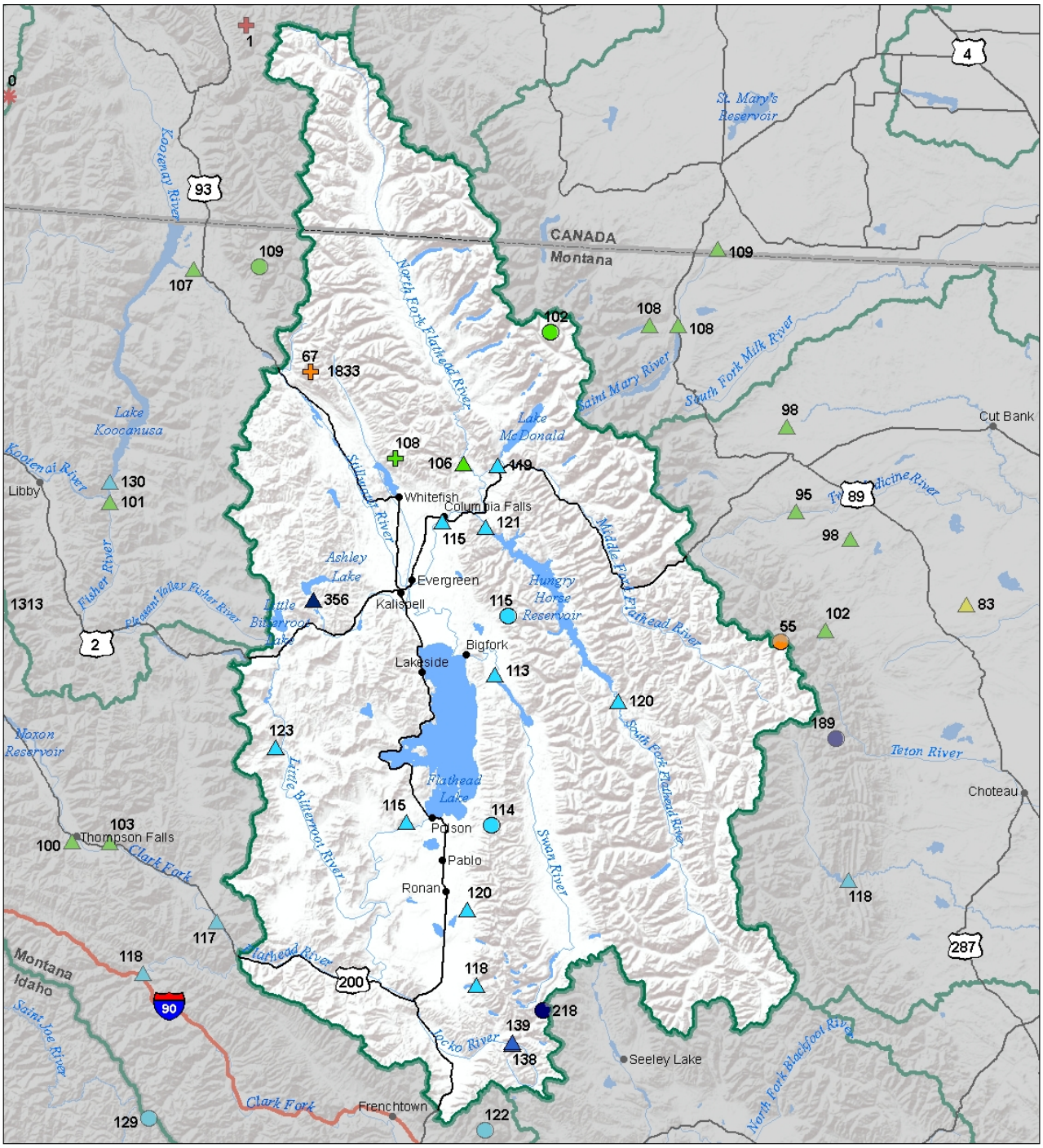
Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Streamflow Forecast Summary

FLATHEAD RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Chance Actual Volume Will Exceed Forecasted Volume						
NF Flathead R nr Columbia Falls	JUN-JUL	640	750	825	*106%*	895	1010	775
	JUN-SEP	785	910	995	*106%*	1080	1200	935
MF Flathead R nr West Glacier	JUN-JUL	720	835	915	*121%*	995	1110	755
	JUN-SEP	855	980	1060	*119%*	1150	1270	890
Sf Flathead R nr Hungry Horse	JUN-JUL	580	650	700	*121%*	750	820	580
	JUN-SEP	655	730	785	*120%*	840	915	655
Hungry Horse Reservoir Inflow1,2	JUN-JUL	795	970	1050	*122%*	1130	1300	860
	JUN-SEP	915	1100	1190	*121%*	1280	1460	980
Flathead R at Columbia Falls2	JUN-JUL	2310	2640	2860	*116%*	3080	3410	2460
	JUN-SEP	2720	3080	3330	*115%*	3580	3940	2890
Ashley Ck nr Marion2	MAY-JUL	3.7	4.6	*5.2*	*133%*	5.8	6.7	3.9
	JUN-SEP	0.2	1.32	2.1	*356%*	2.8	4	0.59
Swan R nr Bigfork	JUN-JUL	265	295	315	*113%*	335	365	280
	JUN-SEP	340	375	400	*113%*	425	460	355
Flathead Lake Inflow1,2	JUN-JUL	2500	3050	3300	*115%*	3550	4100	2860
	JUN-SEP	2900	3530	3820	*115%*	4110	4740	3320
Mill Ck ab Bassoo ck nr Niarada	JUN-JUL	1.01	1.34	1.56	*125%*	1.78	2.1	1.25
	JUN-SEP	1.35	1.7	1.94	*123%*	2.2	2.5	1.58
South Crow Ck nr Ronan	JUN-JUL	6.2	7.2	7.9	*122%*	8.6	9.6	6.5
	JUN-SEP	7.5	8.7	9.5	*120%*	10.3	11.5	7.9
Mission Ck nr St. Ignatius	JUN-JUL	17.7	19.4	21	*119%*	22	23	17.7
	JUN-SEP	22	24	26	*118%*	27	30	22
SF Jocko R nr Arlee	JUN-JUL	21	23	25	*146%*	26	28	17.1
	JUN-SEP	25	28	29	*138%*	31	34	21
NF Jocko R bl Tabor Feeder Canal	JUN-JUL	19.2	21	22	*143%*	23	25	15.4
	JUN-SEP	21	23	24	*139%*	26	28	17.3

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

Flathead River Basin
Streamflow Forecast, Snow Water Equivalent
Percentage of Normal
June 1, 2018



Snow Water Equivalent
Percent of Normal

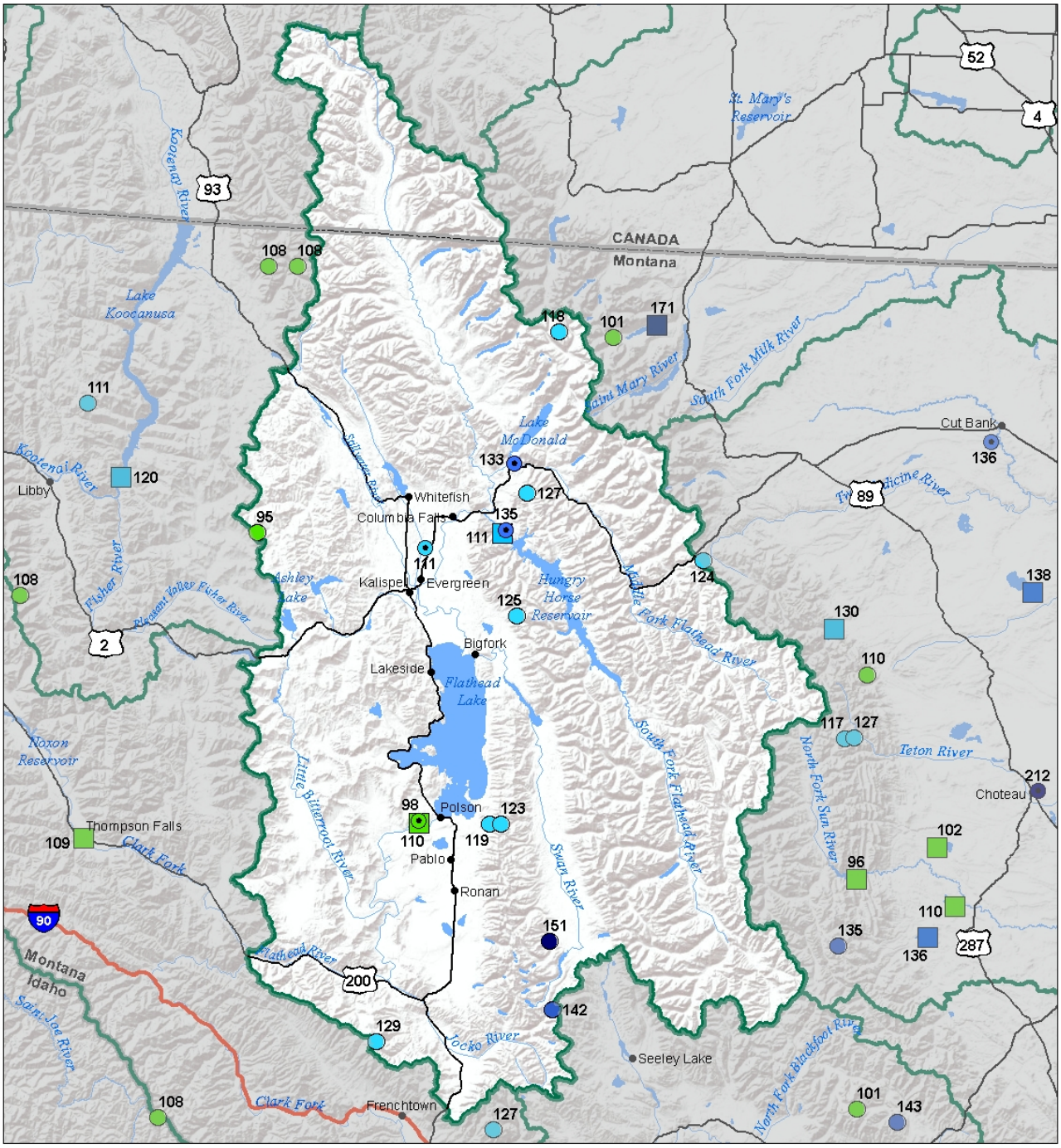
SNOTEL				Snowcourse			
> 150%	71 - 90%	> 150%	71 - 90%
131 - 150%	51 - 70%	131 - 150%	51 - 70%
111 - 130%	1 - 50%	111 - 130%	1 - 50%
91 - 110%	0%	91 - 110%	0%

Streamflow Forecast
Percent of Average Flows

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

USDA
Montana State Library Natural Resource Information System

Flathead River Basin
Water Year to Date Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018



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%	

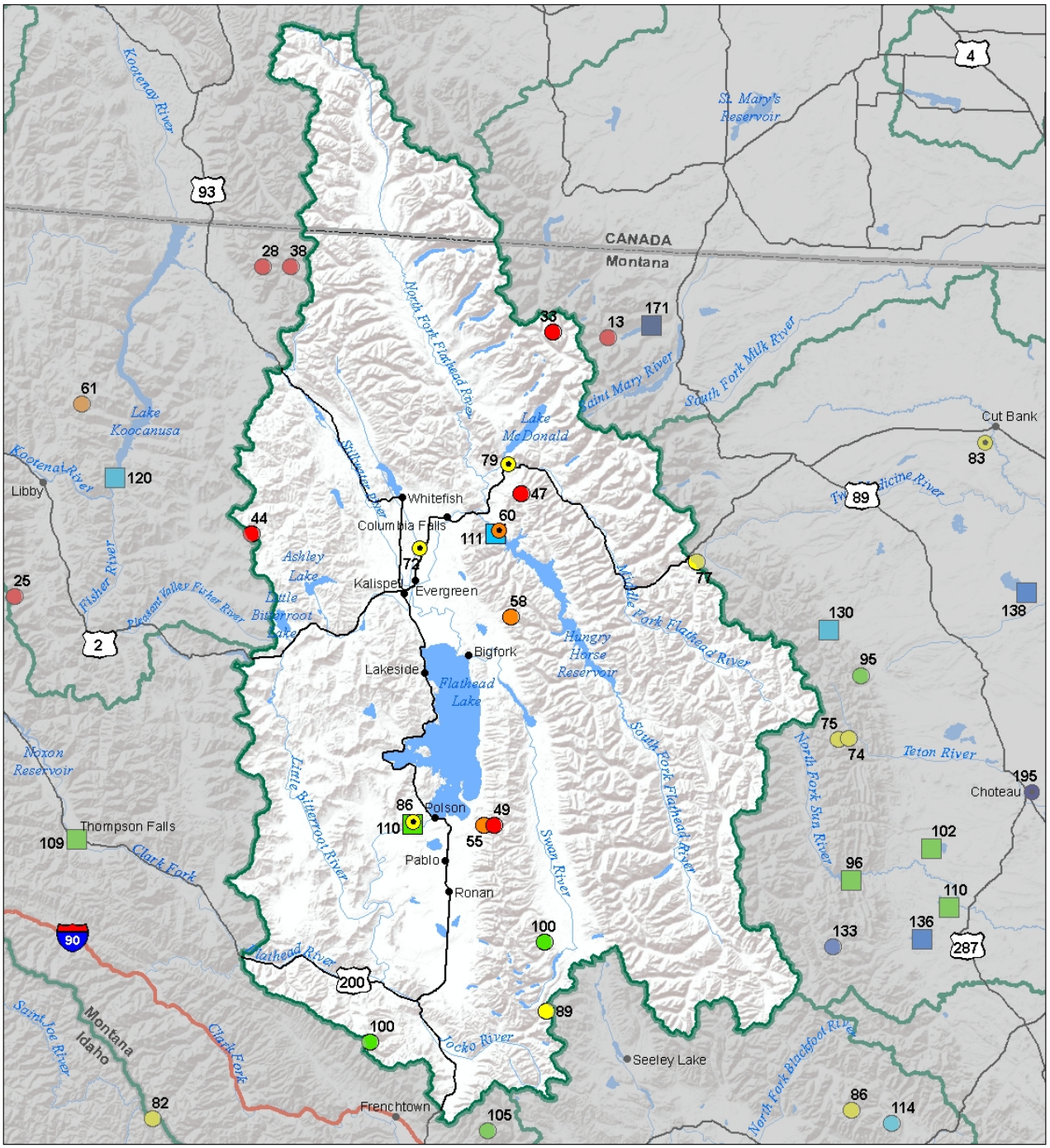
Reservoirs
Percent of Normal

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

USDA

Montana State Library Natural Resource Information System

Flathead River Basin
Monthly Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018 (May 1, 2018 - June 1, 2018)



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%

USDA

Montana State Library Natural Resource Information System

Upper Clark Fork River Basin

After receiving an astonishing amount of snow this winter, the last thing the Upper Clark Fork River basin needed in May was more precipitation. Precipitation fell as rain at all elevations at the end of the first week of May, which added water to the rivers which were already swelling with snowmelt. However, this was a short lived event, and it should be noted that the primary driver of the massive amount of snowmelt that occurred in May was the anomalous well above average temperatures and abundant sunshine during late April and May. Maximum temperatures reached mid-70 degrees during the first couple weeks of the month and melt rates exceeded 1.5 inches per day, which drove the Upper Clark Fork and its tributaries to record breaking levels. In May alone, the total flow past the Clark Fork above Missoula USGS gage was 1,424 KAF (thousand acre-feet), which is the average amount of water that passes through the river during a typical runoff SEASON (April 1st – September 30th: Avg = 1,420 KAF). At this point the low and mid-elevation snowpack is currently melted out and upper elevation snow has only 30% to 50% remaining. The bulk of the snowpack has entered the river systems by June 1st, and it did so at a rapid rate in May. What remains of the snowpack will continue to feed the rivers over the coming weeks, but rivers will recede due to the lack of snowpack to drive high flows. Like the snowpack in the Upper Clark Fork River basin this year, the streamflows during May were record breaking and historic. Forecasts for the June 1st – September 30th period remain above average for most streams in the basin, but have dropped substantially from May 1st due to the quick melting of the record snowpack.

Upper Clark Fork River Basin Data Summary

Snowpack	**Percent of 1981-2010 Normal (Median)**	**Last Year Percentage of Normal (Median)**
CLARK FORK ab FLINT CREEK	131%	96%
FLINT CREEK	0%	473%
ROCK CREEK	62%	99%
CLARK FORK ab BLACKFOOT	117%	106%
BLACKFOOT	171%	122%
Basin-Wide	**141%**	**111%**

Precipitation	**Monthly Percentage of Average**	**WYTD Percentage of 1981-2010 Average***	**WYTD Last Year Percentage of Average**
Mountain Precipitation	107%	128%	110%
Valley Precipitation	130%	150%	126%
Basin-Wide Precipitation	**109%**	**129%**	**111%**

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

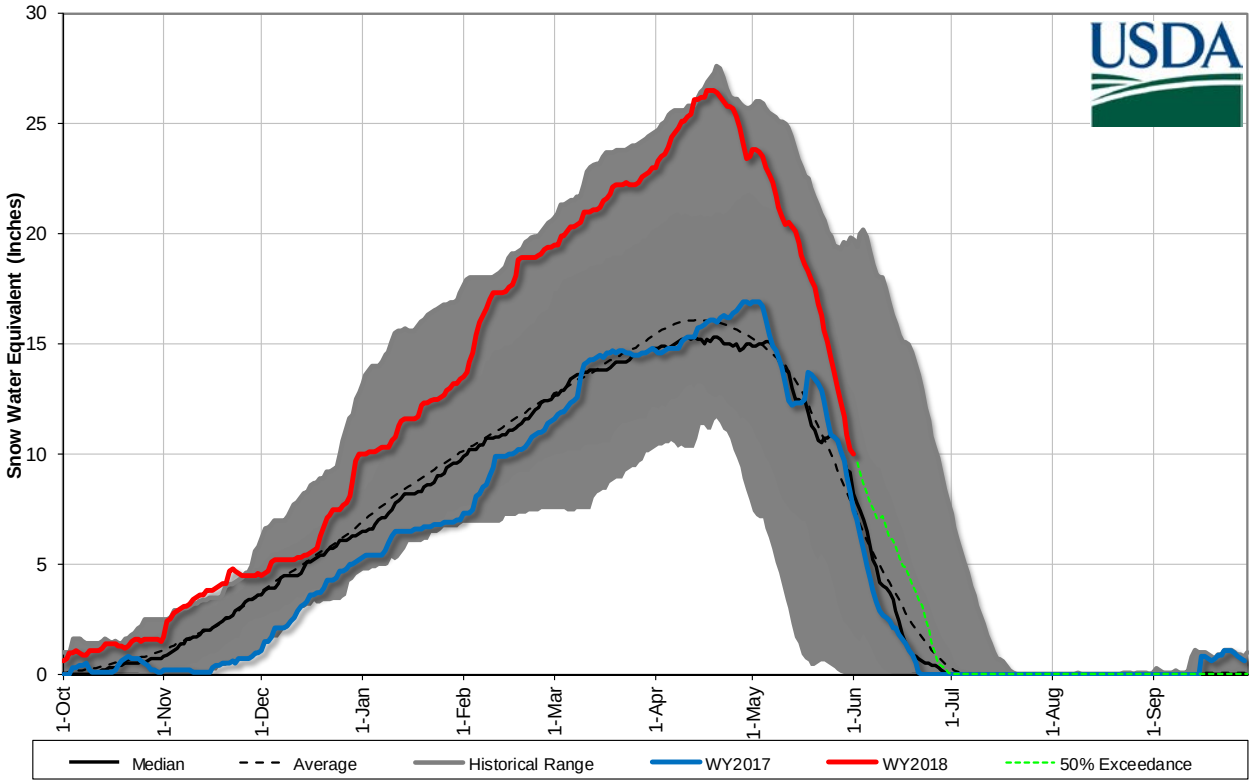
Reservoir Storage	**Percentage of Average**	**Percentage of Capacity (Total)**	**Last Year Percentage of Average**
Basin-Wide Storage	**118%**	**101%**	**107%**

**See Reservoir Storage Table for storage in individual reservoirs*

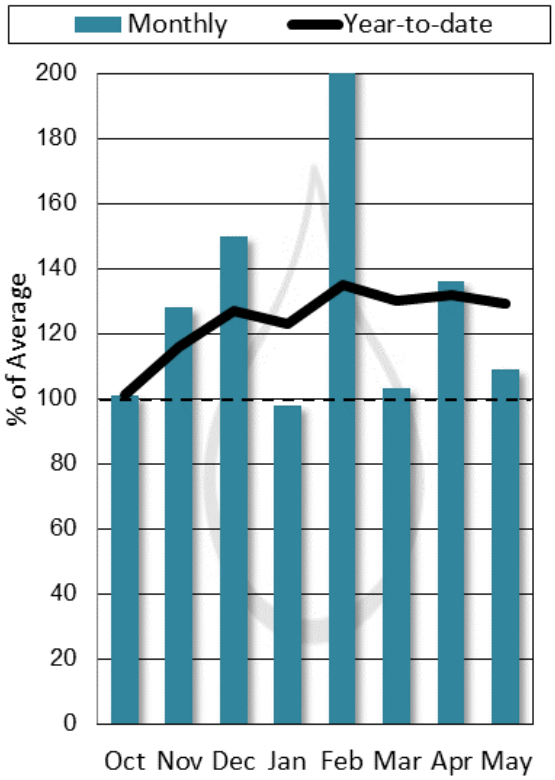
Reservoir Storage End of May, 2018	**Current (KAF)**	**Last Year (KAF)**	**Average (KAF)**	**Capacity (KAF)**	**% Average**	**% Capacity**
East Fork Rock Creek Res	16	12	11	16	**152%**	**152%**
Georgetown Lake	32	30	29	31	**110%**	**110%**
Lower Willow Creek Reservoir			5	5		
Nevada Creek Res	12	11	11	13	**106%**	**106%**

Upper Clark Fork River Basin Snowpack with Non-Exceedence Projections

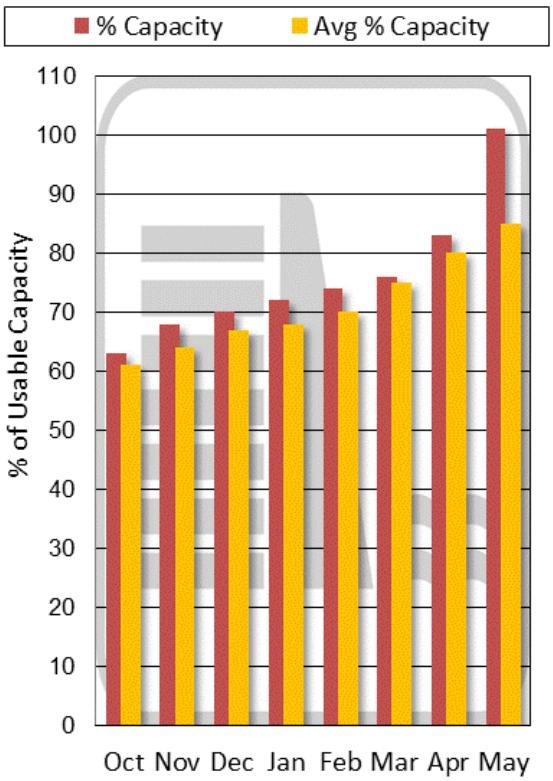
Based on provisional SNOTEL daily data as of 5/1/2018



Mountain and Valley Precipitation



End of Month Reservoir Storage



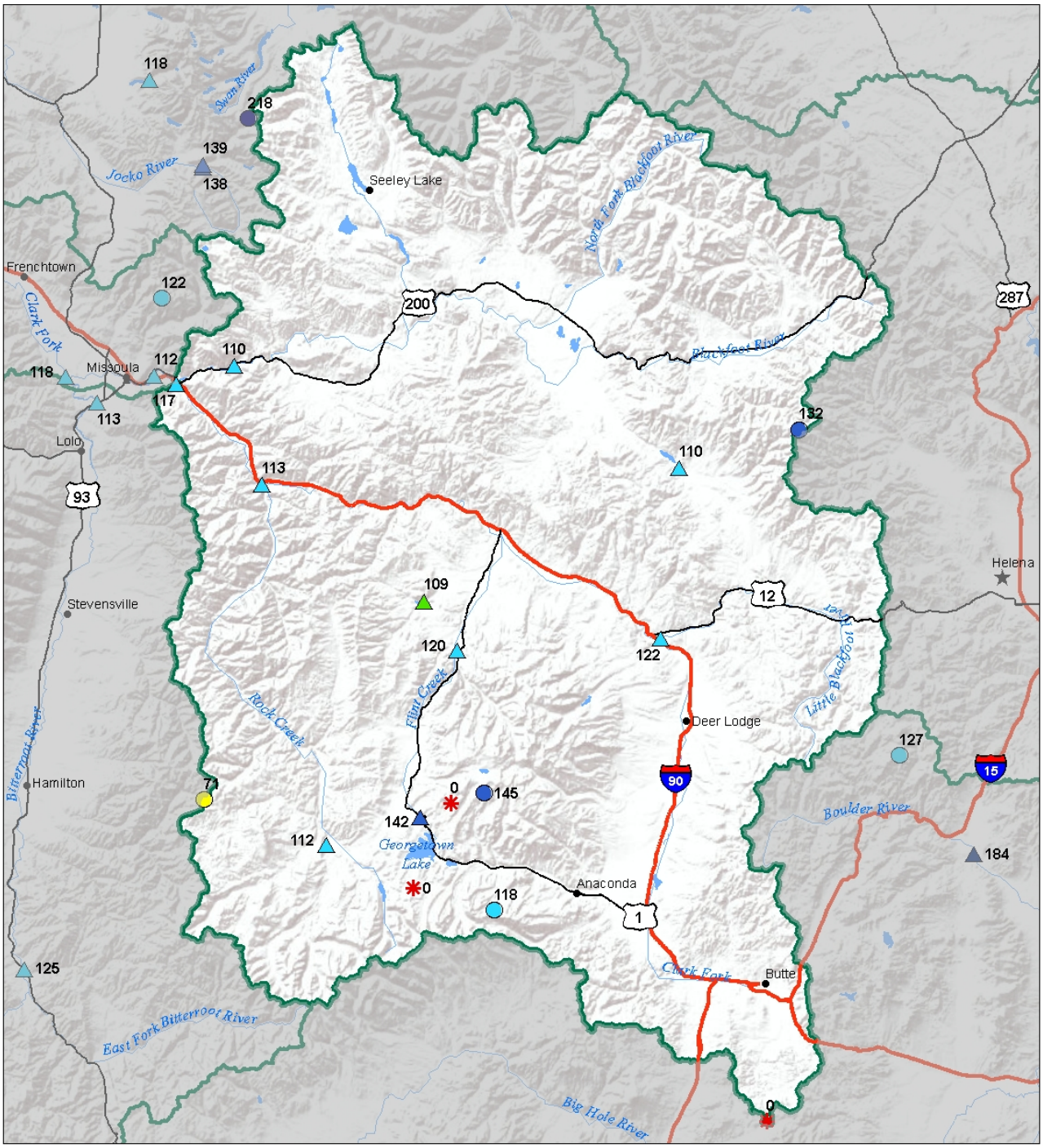
Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Streamflow Forecast Summary

UPPER CLARK FORK RIVER BASIN	Forecast Period	Chance Actual Volume Will Exceed Forecasted Volume						30yr Avg (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	*% Avg*	30% (KAF)	10% (KAF)	
Little Blackfoot nr Garrison	JUN-JUL	23	31	37	*128%*	42	51	29
	JUN-SEP	28	38	44	*122%*	51	61	36
Flint Ck nr Southern Cross	JUN-JUL	5.9	8.1	9.6	*141%*	11.1	13.3	6.8
	JUN-SEP	7.9	10.8	12.8	*142%*	14.8	17.8	9
Flint Ck bl Boulder Ck	JUN-JUL	27	35	41	*132%*	46	55	31
	JUN-SEP	35	46	53	*120%*	61	71	44
Lower Willow Ck Reservoir Inflow2	JUN-JUL	1.67	3.1	4	*111%*	4.9	6.3	3.6
	JUN-SEP	2.3	3.8	4.9	*109%*	5.9	7.5	4.5
MF Rock Ck nr Philipsburg	JUN-JUL	26	33	38	*112%*	43	51	34
	JUN-SEP	31	40	46	*112%*	51	60	41
Rock Ck nr Clinton	*JUN-JUL*	97	128	148	*113%*	168	199	131
	JUN-SEP	128	162	186	*113%*	210	245	164
Clark Fork R ab Milltown	JUN-JUL	192	265	315	*117%*	365	440	270
	JUN-SEP	270	355	415	*117%*	475	565	355
Nevada Ck nr Helmville	JUN-JUL	4	5.4	6.4	*110%*	7.4	8.8	5.8
	JUN-SEP	5.2	6.8	7.9	*110%*	9	10.6	7.2
Blackfoot R nr Bonner	JUN-JUL	285	330	360	*111%*	390	435	325
	JUN-SEP	365	410	445	*110%*	480	525	405
Clark Fork R ab Missoula	JUN-JUL	505	605	675	*113%*	745	845	595
	JUN-SEP	660	780	860	*112%*	940	1060	765

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

Upper Clark Fork River Basin
Streamflow Forecast, Snow Water Equivalent
Percentage of Normal
June 1, 2018



Snow Water Equivalent
Percent of Normal

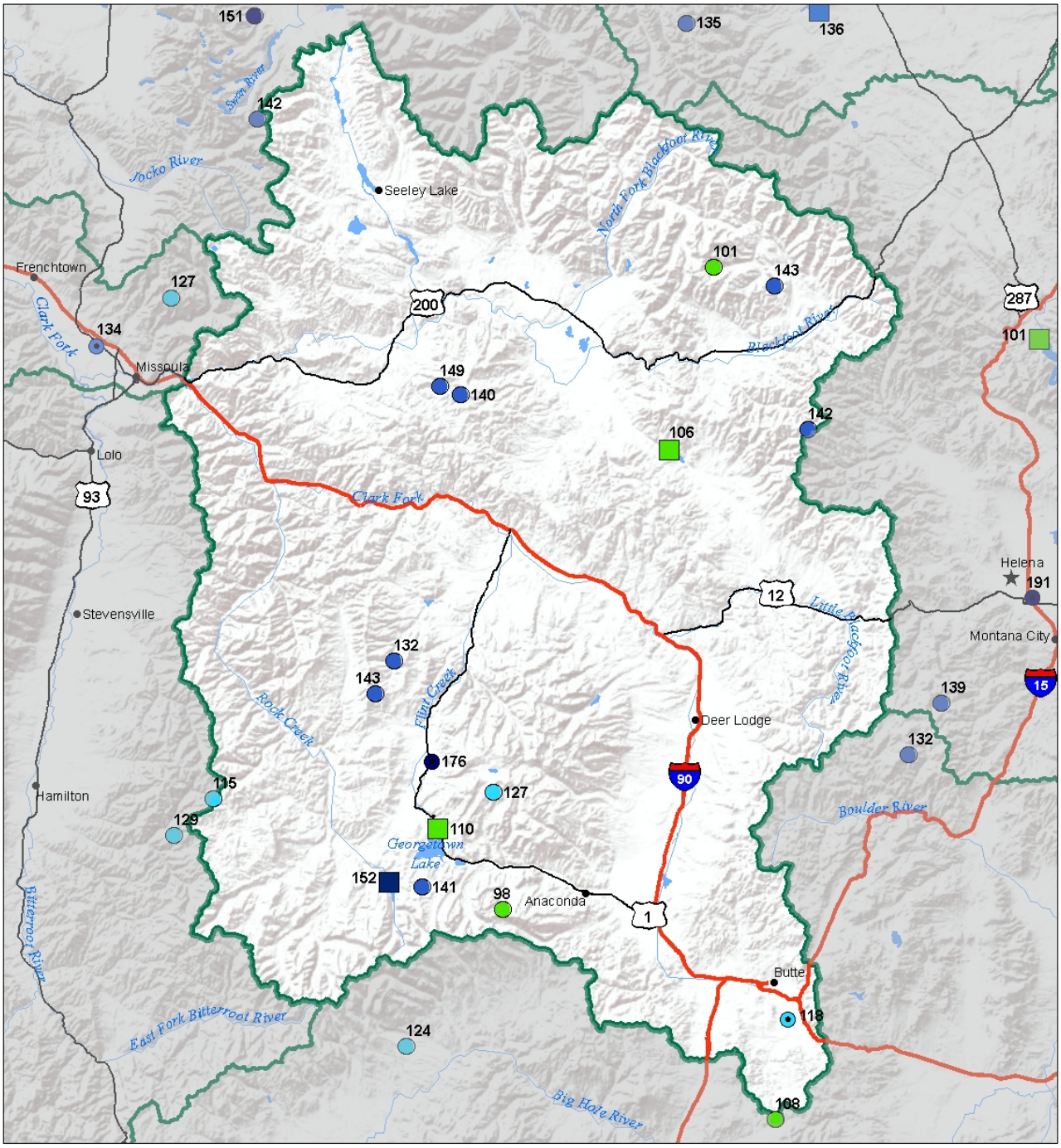
SNOTEL			Snowcourse		
> 150%	71 - 90%		> 150%	71 - 90%	
131 - 150%	51 - 70%		131 - 150%	51 - 70%	
111 - 130%	1 - 50%		111 - 130%	1 - 50%	
91 - 110%	0%		91 - 110%	0%	

Streamflow Forecast
Percent of Average Flows

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

USDA
Montana State Library Natural Resource Information System

Upper Clark Fork River Basin
Water Year to Date Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018



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%	

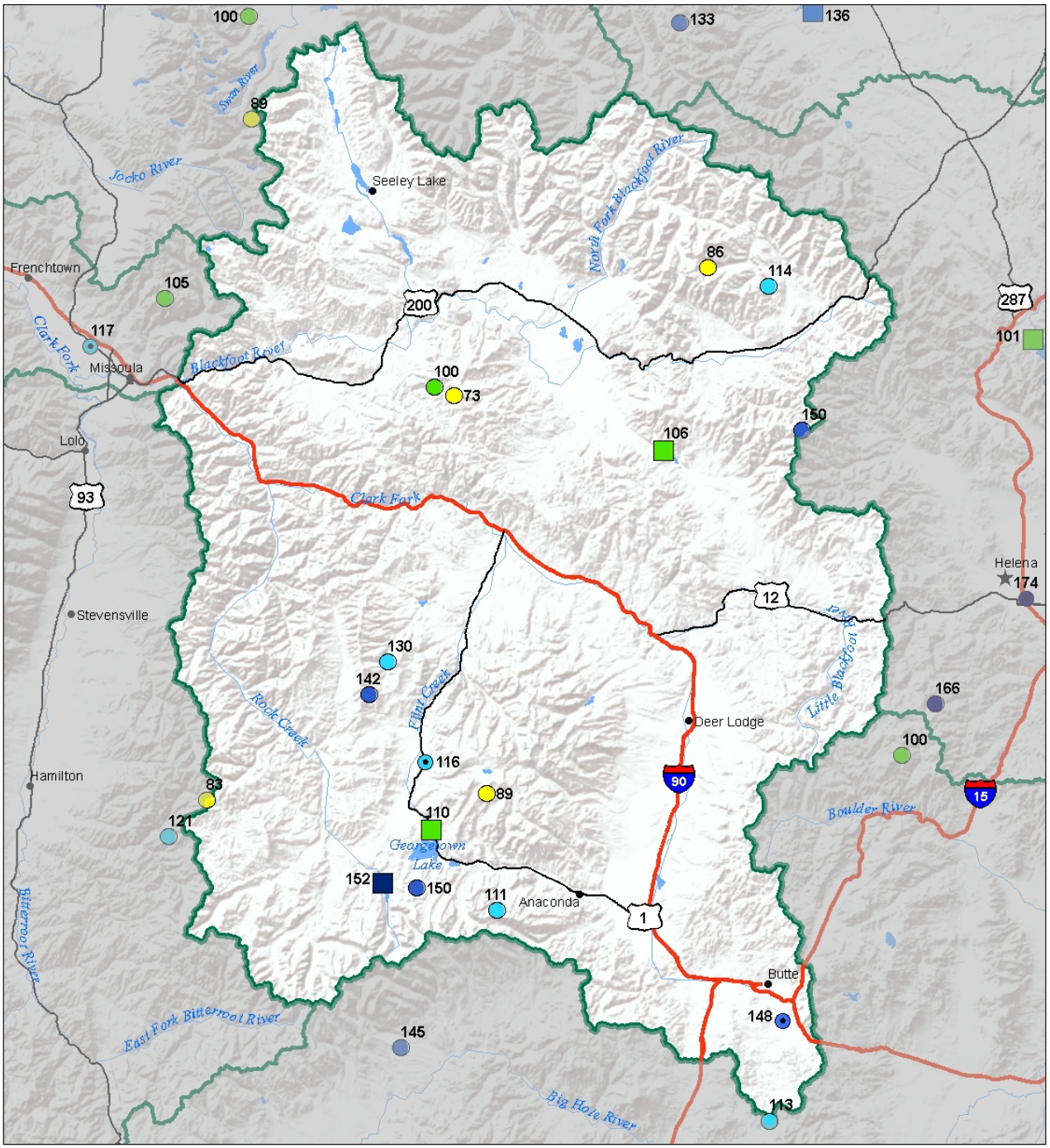
Reservoirs
Percent of Normal

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

USDA

Montana State Library Natural Resource Information System

Upper Clark Fork River Basin
Monthly Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018 (May 1, 2018 - June 1, 2018)



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%

USDA

Montana State Library Natural Resource Information System

Bitterroot River Basin

Although it wasn't a record setting winter in the Bitterroot River basin snowfall wise, there was no lack of precipitation. January and May were the only 2 months with below average precipitation. SNOTEL sites within the basin reached their snow water peak in mid-April, which was a couple weeks later than normal. All sites did have peak snowpack that was well above normal. For example, Saddle Mountain SNOTEL peaked at 150% of normal. The mid-low elevation snowpack is currently gone and high elevation snowpack is 70% melted out. The Bitterroot River at Missoula was flowing at record high levels for nearly the entire month of May. Also, all USGS stream gages in the basin recorded their largest total volume of water for May on record. This can be attributed to warm sunny temperatures during the first 2 weeks in May that drove snow melt rates of up reached up to 1.5 inches per day. The good news is the quick snowmelt indicates that river levels are should recede in the coming weeks.

Bitterroot River Basin Data Summary

Snowpack	**Percent of 1981-2010 Normal (Median)**	**Last Year Percentage of Normal (Median)**
WEST FORK BITTERROOT	128%	114%
EAST SIDE BITTERROOT	104%	104%
WEST SIDE BITTERROOT	127%	89%
Basin-Wide	**113%**	**97%**

Precipitation	**Monthly Percentage of Average**	**WYTD Percentage of 1981-2010 Average***	**WYTD Last Year Percentage of Average**
Mountain Precipitation	84%	118%	112%
Valley Precipitation	%	%	%
Basin-Wide Precipitation	**84%**	**118%**	**112%**

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

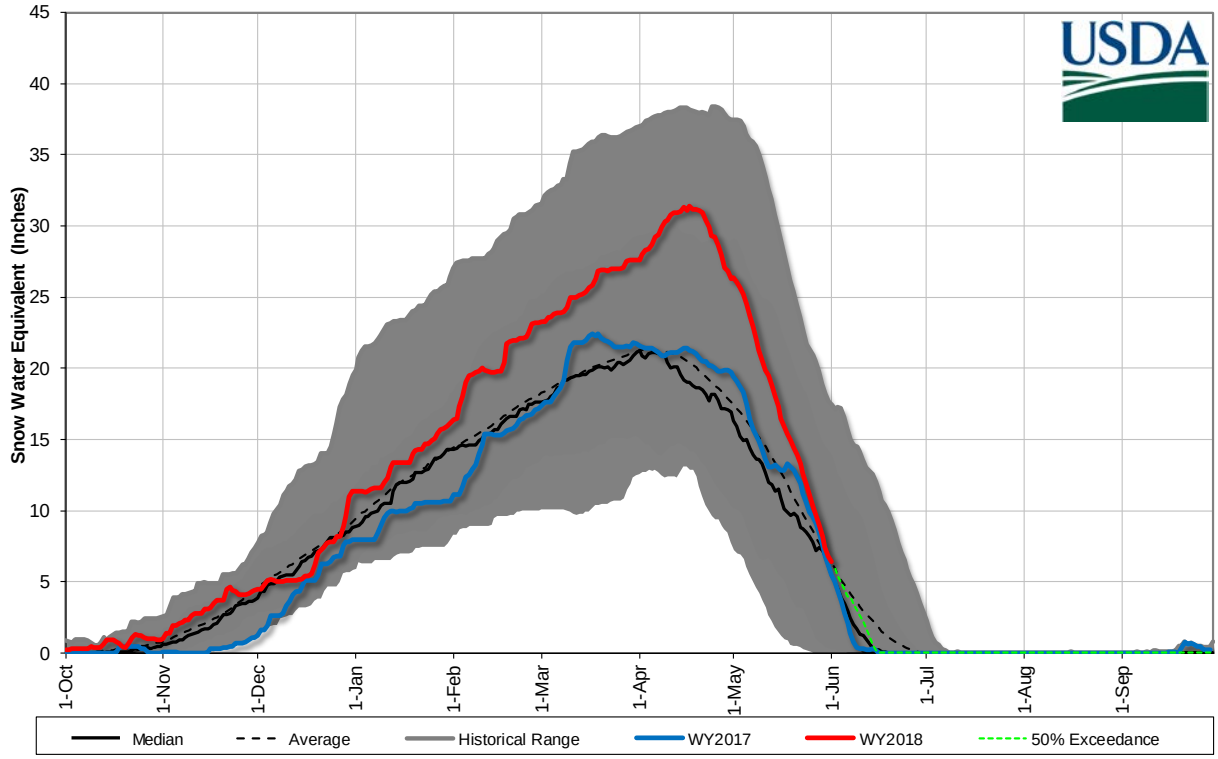
	Percentage of Average	**Percentage of Capacity (Total)**	**Last Year Percentage of Average**
Basin-Wide Storage	**108%**	**106%**	**106%**

**See Reservoir Storage Table for storage in individual reservoirs*

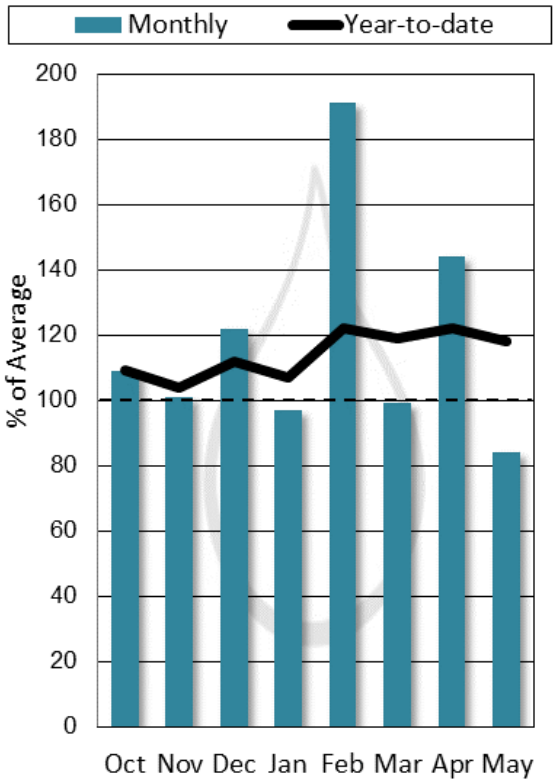
Reservoir Storage End of May, 2018	**Current (KAF)**	**Last Year (KAF)**	**Average (KAF)**	**Capacity (KAF)**	**% Average**	**% Capacity**
Painted Rocks Lake	34.1	33.8	32.3	31.7	**106%**	**108%**
Lake Como	36.8	35.5	33.2	34.9	**111%**	**105%**

Bitterroot River Basin Snowpack with Non-Exceedence Projections

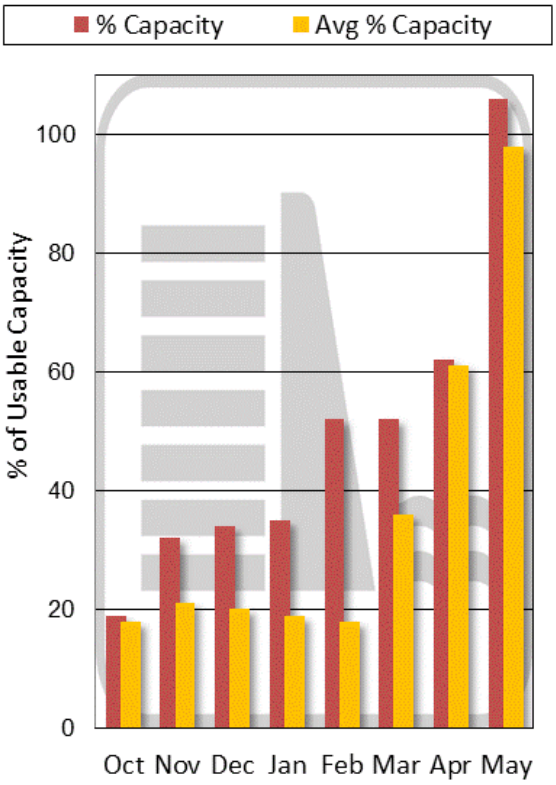
Based on provisional SNOTEL daily data as of 5/1/2018



Mountain and Valley Precipitation



End of Month Reservoir Storage

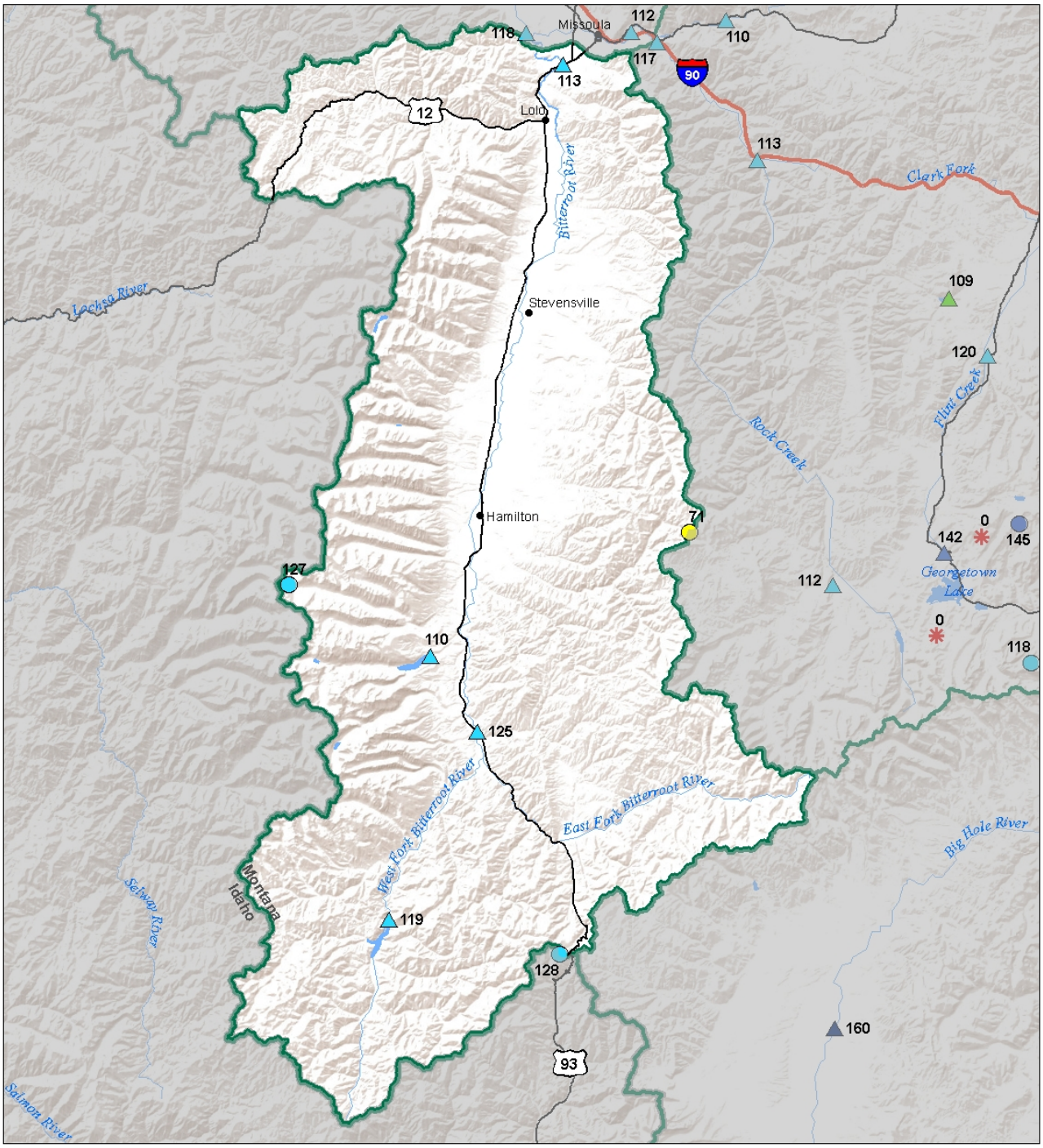


Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Streamflow Forecast Summary

BITTERROOT RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Chance Actual Volume Will Exceed Forecasted Volume						
WF Bitterroot R Nr Conner2	JUN-JUL	54	62	68	*121%*	74	82	56
	JUN-SEP	60	72	80	*119%*	88	100	67
Bitterroot R Nr Darby	JUN-JUL	205	225	240	*117%*	255	275	205
	JUN-SEP	255	280	300	*125%*	320	345	240
Como Reservoir Inflow2	JUN-JUL	28	36	41	*108%*	46	54	38
	JUN-SEP	32	40	46	*110%*	52	60	42
Bitterroot R nr Missoula	JUN-JUL	565	640	695	*116%*	750	825	600
	JUN-SEP	650	735	795	*113%*	855	940	705

Bitterroot River Basin
Streamflow Forecast, Snow Water Equivalent
Percentage of Normal
June 1, 2018



Snow Water Equivalent
Percent of Normal

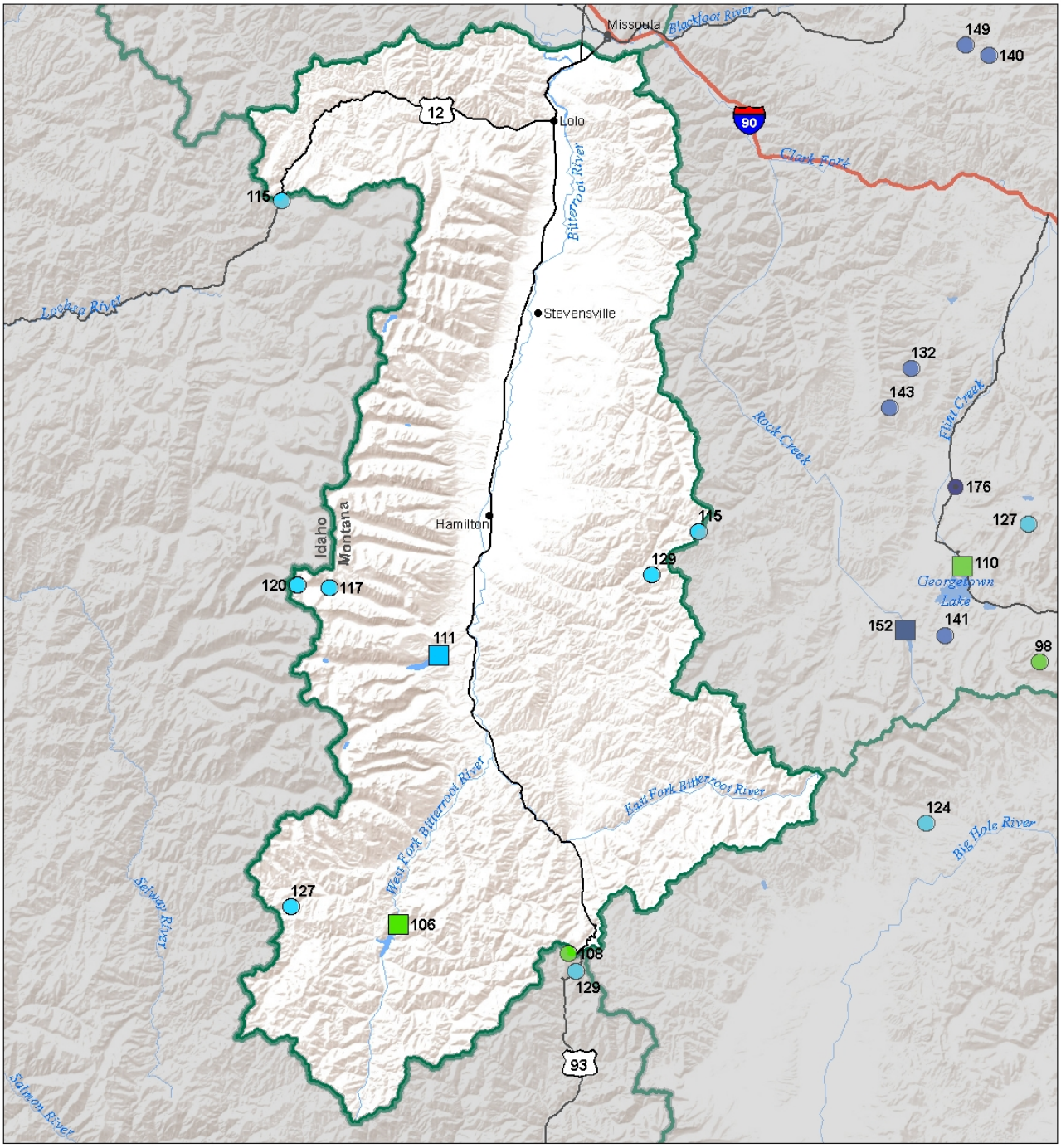
SNOTEL		Snowcourse	
> 150%	71 - 90%	> 150%	71 - 90%
131 - 150%	51 - 70%	131 - 150%	51 - 70%
111 - 130%	1 - 50%	111 - 130%	1 - 50%
91 - 110%	0%	91 - 110%	0%

Streamflow Forecast
Percent of Average Flows

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

USDA
Montana State Library Natural Resource Information System

Bitterroot River Basin
Water Year to Date Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018



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%	

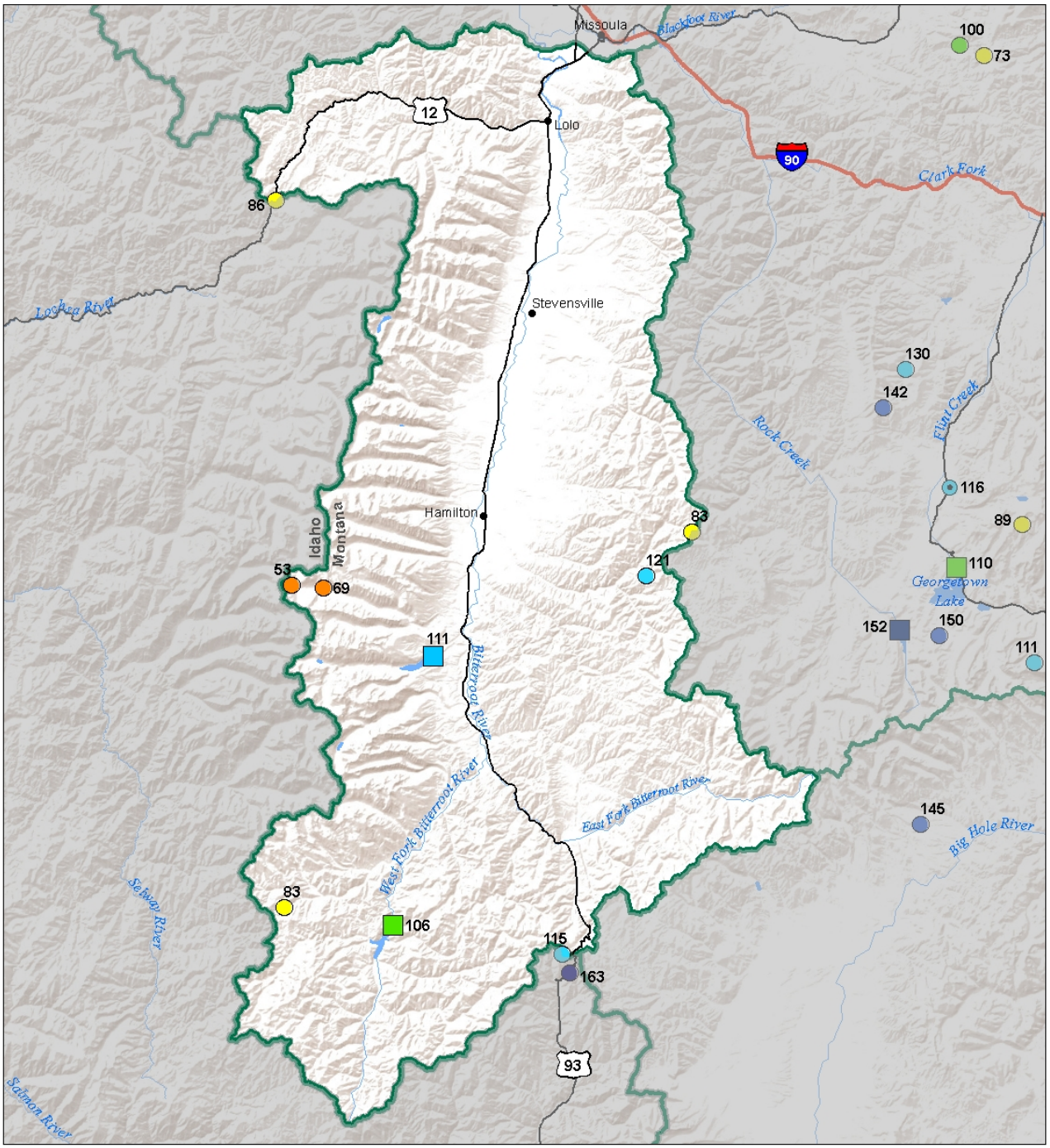
Reservoirs
Percent of Normal

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

USDA

Montana State Library Natural Resource Information System

Bitterroot River Basin
Monthly Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018 (May 1, 2018 - June 1, 2018)



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%

USDA

Montana State Library Natural Resource Information System

Lower Clark Fork River Basin

The Lower Clark Fork received only slightly below average precipitation in May with the exception of the Cabinet region where record low precipitation was recorded. This of course followed a winter with a plentiful amount of snow. SNOTEL sites within the basin reached their snow water peaks in mid-to-late April at well above normal amounts. These peaks were 1-2 weeks later than normal. The onset of mountain temperatures reaching the mid-70s drove significant snow melt across the basin in early May. Melts rates reached 2 inches per day at SNOTEL sites during this time. By early May most tributaries to the Lower Clark were reaching their snowmelt driven peaks. One of several examples, is the Thompson River which peaked on May 7th, about 230% larger, and 15 days earlier than its average peak. The Clark Fork River at Plains actually recorded it highest total flow for May on record. Fortunately these large flows were stored in Noxon Rapids Reservoir which is currently near capacity and should provide ample water supply down downstream through the summer.

Lower Clark For River Basin Data Summary

Snowpack	**Percent of 1981-2010 Normal (Median)**	**Last Year Percentage of Normal (Median)**
LOWER CLARK FORK RIVER BASIN	148%	161%
Basin-Wide	**148%**	**161%**

Precipitation	**Monthly Percentage of Average**	**WYTD Percentage of 1981-2010 Average***	**WYTD Last Year Percentage of Average**
Mountain Precipitation	80	114	127
Valley Precipitation	117	134	146
Basin-Wide Precipitation	**83%**	**114%**	**127%**

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

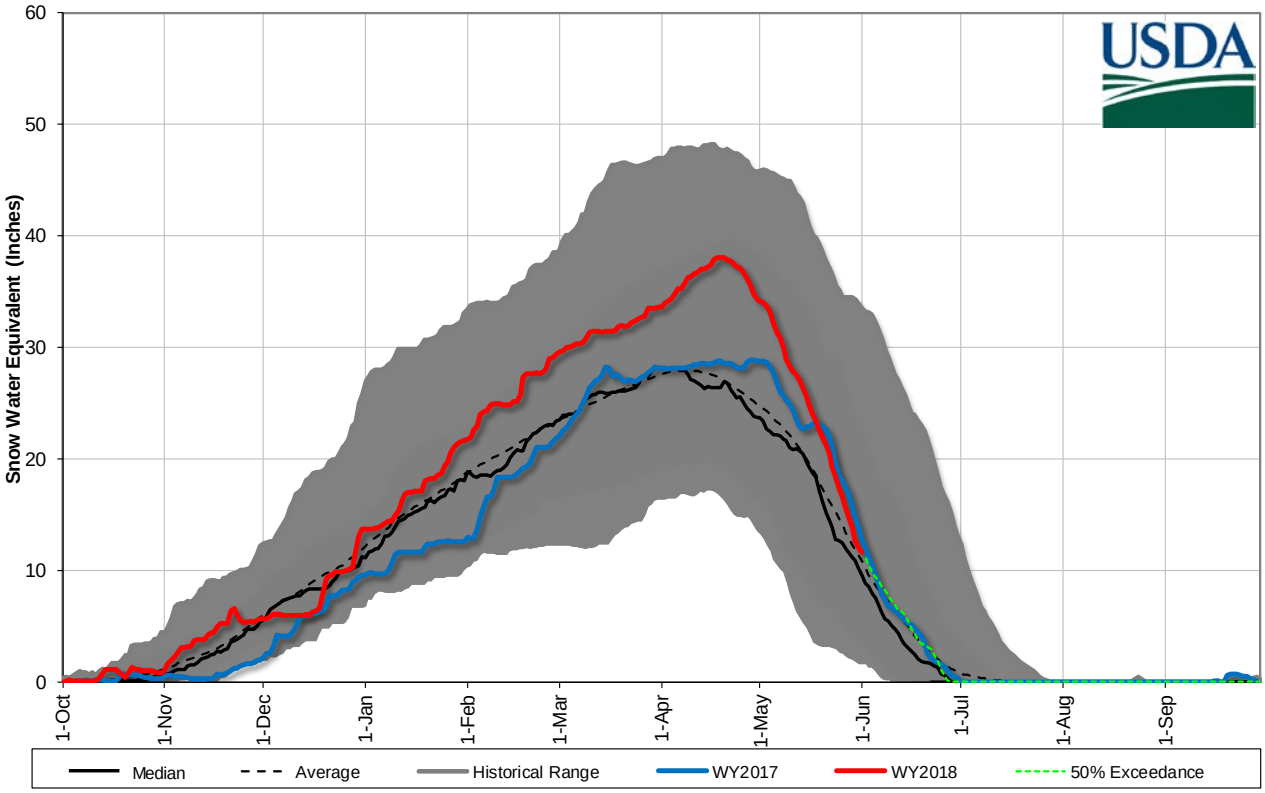
Reservoir Storage	**Percentage of Average**	**Percentage of Capacity (Total)**	**Last Year Percentage of Average**
Basin-Wide Storage	**102%**	**98%**	**101%**

**See Reservoir Storage Table for storage in individual reservoirs*

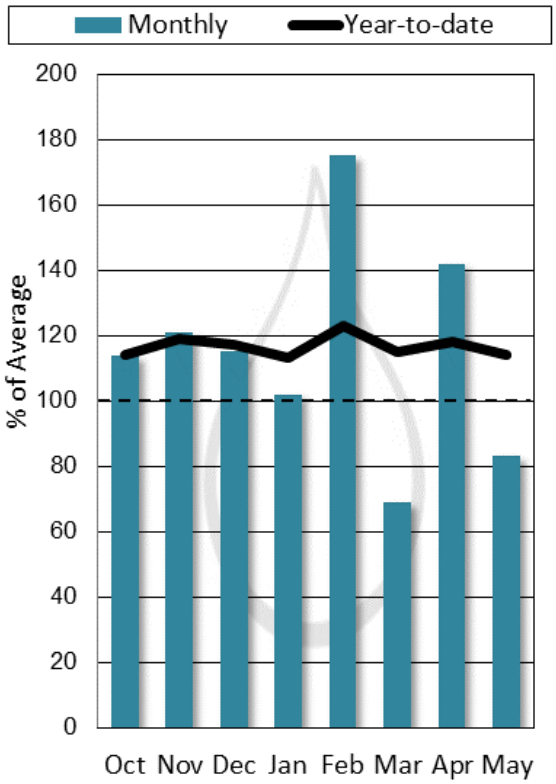
Reservoir Storage End of May, 2018	**Current (KAF)**	**Last Year (KAF)**	**Average (KAF)**	**Capacity (KAF)**	**% Average**	**% Capacity**
Noxon Rapids Reservoir	329.9	328.6	324.2	335	**102%**	**98%**

Lower Clark Fork River Basin Snowpack with Non-Exceedence Projections

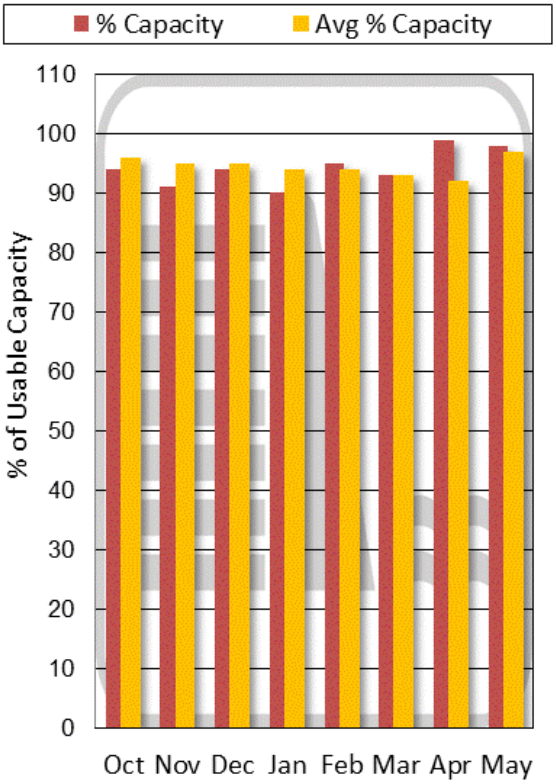
Based on provisional SNOTEL daily data as of 5/1/2018



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.

Streamflow Forecast Summary

LOWER CLARK FORK RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Chance Actual Volume Will Exceed Forecasted Volume						
Clark Fork R bl Missoula	JUN-JUL	1190	1350	1460	*122%*	1570	1730	1200
	JUN-SEP	1420	1610	1730	*118%*	1850	2040	1470
Clark Fork R at St. Regis1	JUN-JUL	1430	1730	1870	*122%*	2010	2310	1530
	JUN-SEP	1720	2060	2220	*118%*	2380	2720	1880
Clark Fork R nr Plains1,2	JUN-JUL	4360	5050	5370	*118%*	5690	6380	4540
	JUN-SEP	5100	5930	6310	*117%*	6690	7520	5410
Thompson nr Tompson Falls	JUN-JUL	55	66	73	*104%*	80	91	70
	JUN-SEP	75	88	96	*103%*	105	118	93
Prospect Ck at Thompson Falls	JUN-JUL	29	33	36	*103%*	38	42	35
	JUN-SEP	36	41	43	*100%*	46	50	43
Clark Fork R at Whitehorse Rapids1,2	JUN-JUL	4850	5600	5940	*117%*	6280	7030	5070
	JUN-SEP	5740	6640	7040	*116%*	7440	8340	6090

Lower Clark Fork River Basin
Streamflow Forecast, Snow Water Equivalent
Percentage of Normal
June 1, 2018

Snow Water Equivalent
Percent of Normal

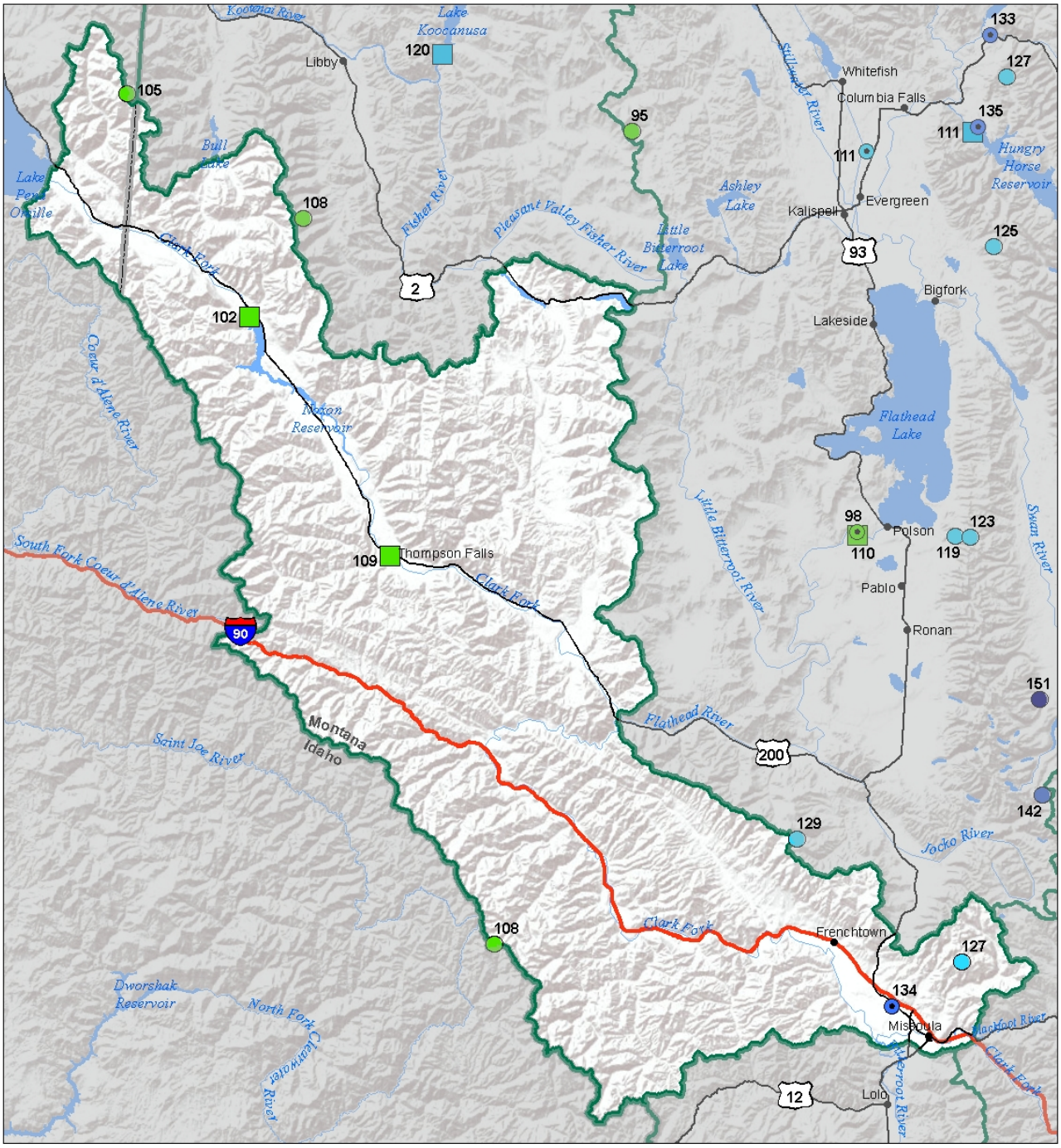
SNOTEL			Snowcourse		
> 150%	71 - 90%		> 150%	71 - 90%	
131 - 150%	51 - 70%		131 - 150%	51 - 70%	
111 - 130%	1 - 50%		111 - 130%	1 - 50%	
91 - 110%	0%		91 - 110%	0%	

Streamflow Forecast
Percent of Average Flows

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

USDA
Montana State Library Natural Resource Information System

Lower Clark Fork River Basin
Water Year to Date Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018



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%	

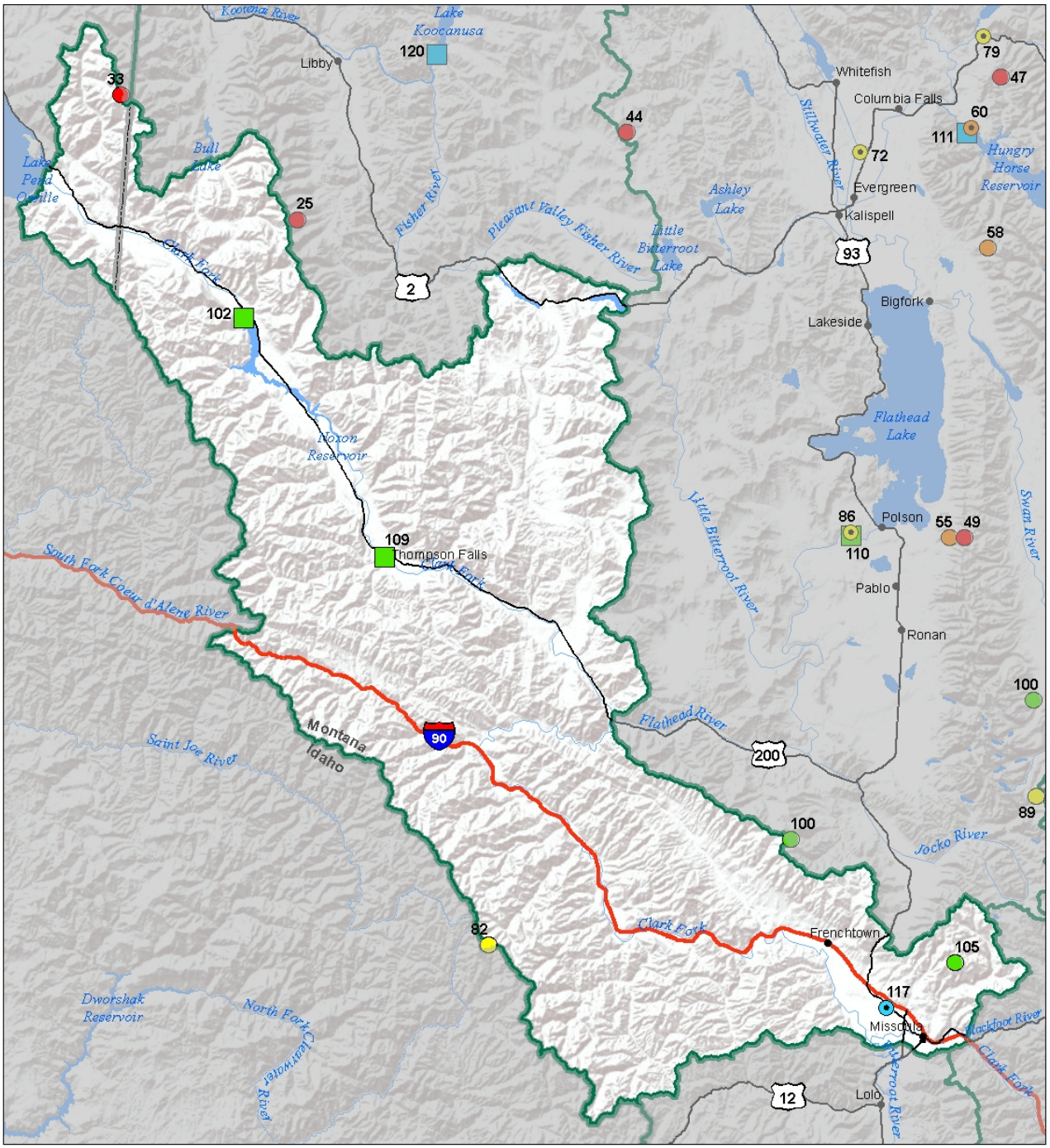
Reservoirs
Percent of Normal

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

USDA

Montana State Library Natural Resource Information System

Lower Clark Fork River Basin
Monthly Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018 (May 1, 2018 - June 1, 2018)



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%	

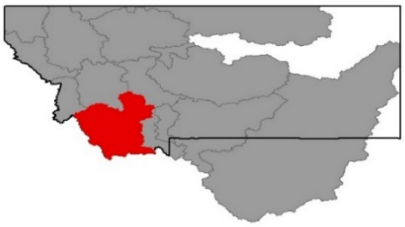
Reservoirs
Percent of Normal

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

USDA

Montana State Library Natural Resource Information System

Jefferson River Basin



Snowpack in the Jefferson River basin peaked during April with lower elevations peaking mid-month and higher elevations peaking at the end of the month. Since then, snowpack has been exiting the mountains quickly due to the prolonged periods of well above average temperatures and abundant sunshine. As a result, snowpack can be found at high elevations at this time as low and mid-elevation SNOTEL sites melted out during May. High-elevation snowpack in the Big Hole River basin remains near to slightly above normal for this date, but in other ranges of the basin, the high elevation snowpack is near to below normal for May 1st. Rapid snowmelt caused substantial increases in river volumes over the month, and a substantial amount of the snow water from the snowpack has passed through the rivers by June 1st. The Big Hole River at Melrose was the third highest on record (95 years) for May monthly flows, or total water to pass by a gage, with 438 thousand acre-feet passing through the river during the month. Many rivers were in the minor to moderate flood stage during the month due to the abundant snowmelt runoff, and remained there through the end of the month. Looking forward, the abundant snowmelt during May has reduced the streamflow forecasts for the remainder of the summer season. June 1st – September 30th forecasts range from near to slightly below average in the southern regions of the Jefferson, to near or slightly above average in the northern basins. Water users are encouraged to view the forecasts below to determine the potential runoff in their basin(s) of interest.

Jefferson River Basin Data Summary

Snowpack	**Percent of 1981-2010 Normal (Median)**	**Last Year Percentage of Normal (Median)**
RUBY	90%	93%
BIGHOLE	113%	106%
BOULDER	124%	78%
JEFFERSON RIVER BASIN	102%	103%
Basin-Wide	**%**	**%**

Precipitation	**Monthly Percentage of Average**	**WYTD Percentage of 1981-2010 Average***	**WYTD Last Year Percentage of Average**
Mountain Precipitation	109%	113%	113%
Valley Precipitation	65%	101%	132%
Basin-Wide Precipitation	**107%**	**113%**	**113%**

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

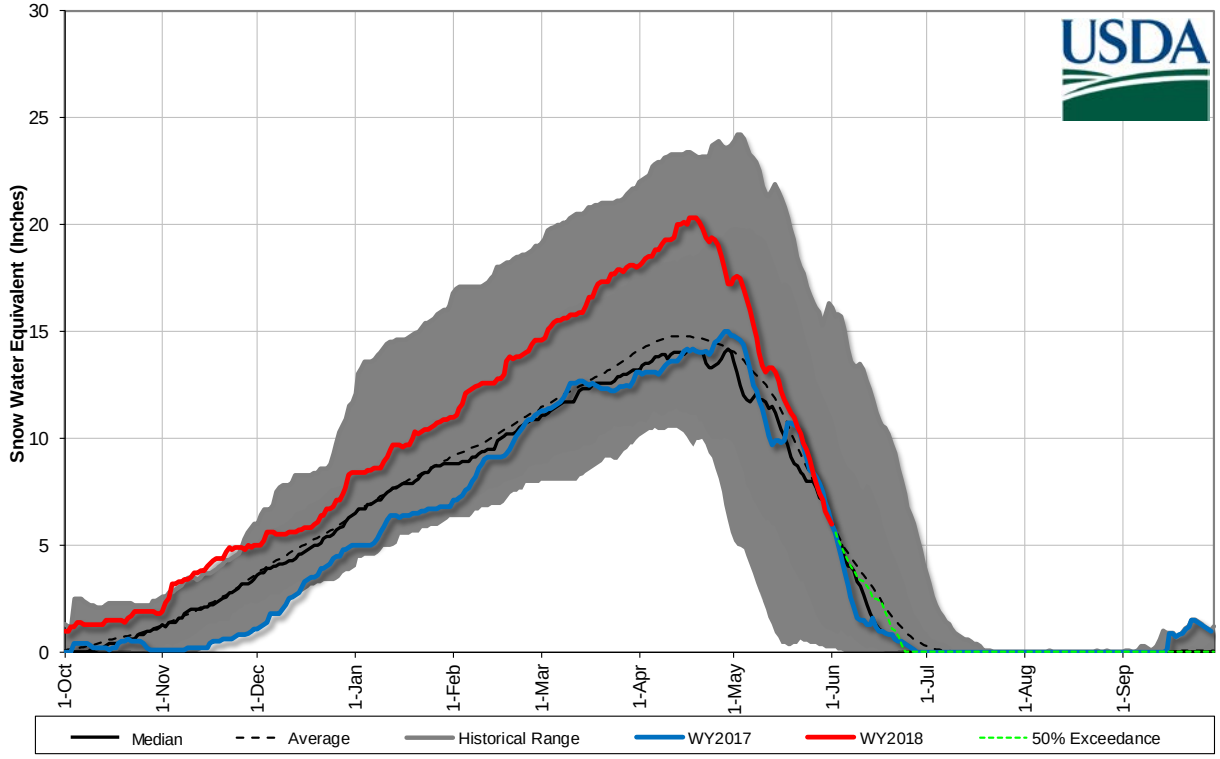
Reservoir Storage	**Percentage of Average**	**Percentage of Capacity (Total)**	**Last Year Percentage of Average**
Basin-Wide Storage	**127%**	**79%**	**109%**

**See Reservoir Storage Table for storage in individual reservoirs*

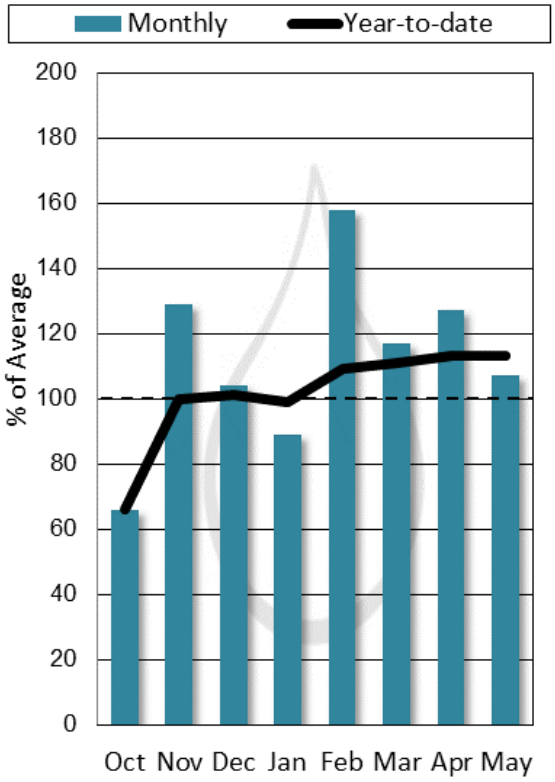
Reservoir Storage End of May, 2018	**Current (KAF)**	**Last Year (KAF)**	**Average (KAF)**	**Capacity (KAF)**	**% Average**	**% Capacity**
Clark Canyon Res	188.2	142.2	137.1	255.6	**137%**	**74%**
Ruby River Reservoir	38.5	38.5	37.1	38.8	**104%**	**99%**
Basin-wide Total	299.6	256.3	235.6	378.4	**127%**	**79%**

Jefferson River Basin Snowpack with Non-Exceedence Projections

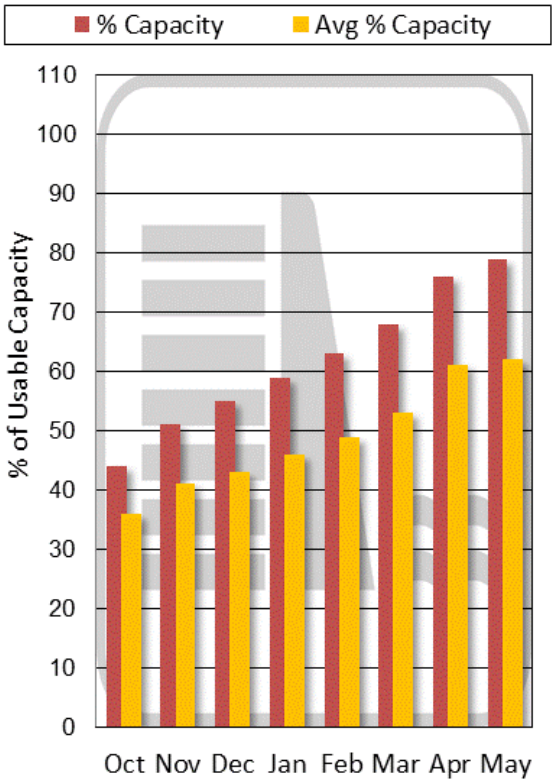
Based on provisional SNOTEL daily data as of 5/1/2018



Mountain and Valley Precipitation



End of Month Reservoir Storage

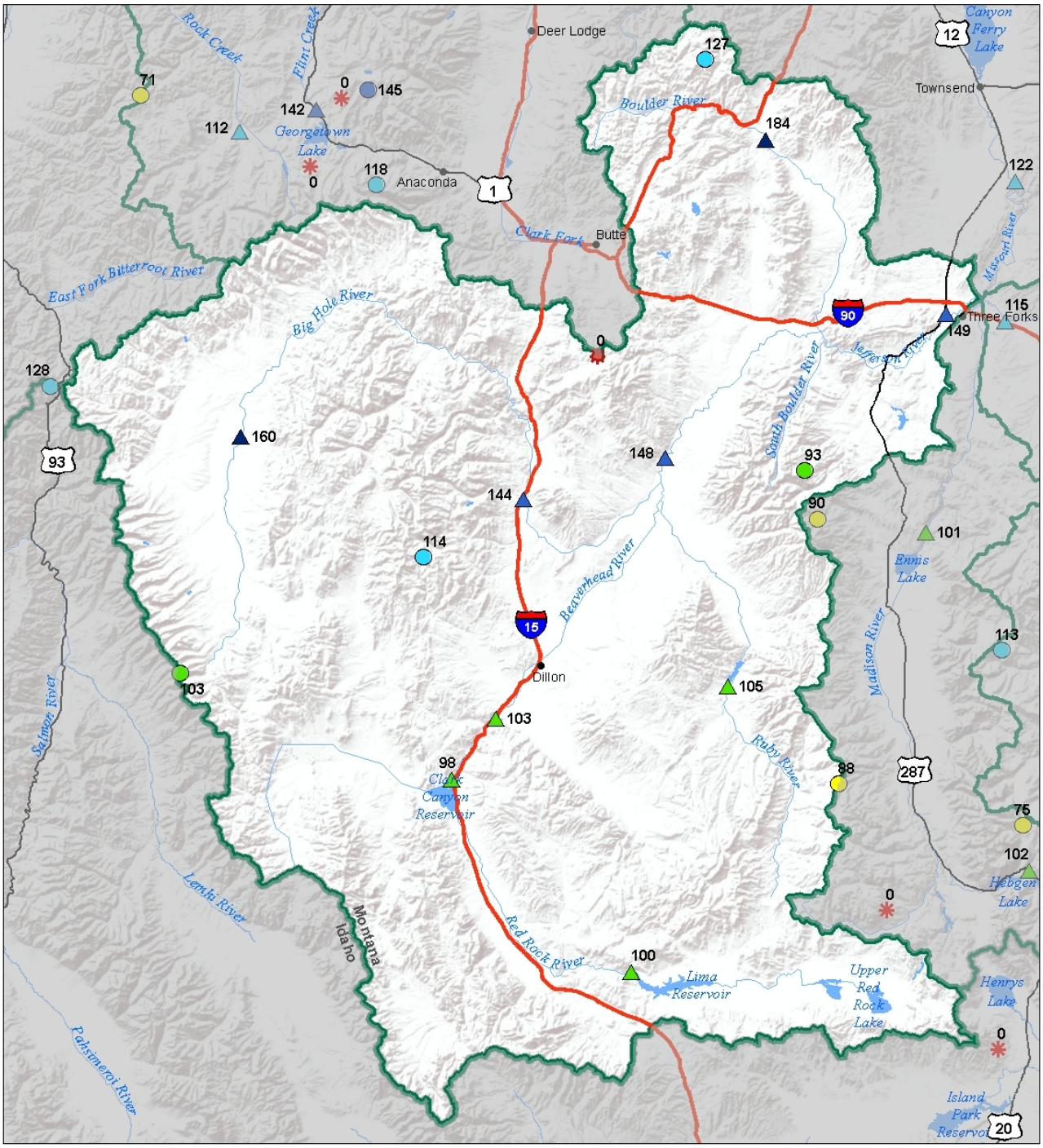


Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Streamflow Forecast Summary

JEFFERSON RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Chance Actual Volume Will Exceed Forecasted Volume						
Lima Reservoir Inflow2	JUN-JUL	15.2	22	27	*100%*	32	39	27
	JUN-SEP	18.4	27	33	*100%*	39	48	33
Clark Canyon Inflow2	JUN-JUL	1.97	20	33	*94%*	46	64	35
	JUN-SEP	11.8	37	54	*98%*	71	96	55
Beaverhead R at Barretts2	JUN-JUL	15.4	37	51	*104%*	65	87	49
	JUN-SEP	31	58	77	*103%*	96	123	75
Ruby R Reservoir Inflow2	JUN-JUL	28	37	43	*105%*	49	58	41
	JUN-SEP	42	52	59	*105%*	66	76	56
Big Hole R at Wisdom	JUN-JUL	35	58	74	*161%*	90	113	46
	JUN-SEP	40	66	83	*160%*	100	126	52
Big Hole R nr Melrose	JUN-JUL	305	360	400	*148%*	440	495	270
	JUN-SEP	340	410	455	*144%*	500	570	315
Jefferson R nr Twin Bridges2	JUN-JUL	270	385	460	*144%*	540	650	320
	JUN-SEP	225	350	525	*148%*	520	650	355
Boulder R nr Boulder	JUN-JUL	42	53	61	*191%*	68	80	32
	JUN-SEP	46	59	68	*184%*	78	91	37
Willow Ck Reservoir Inflow2	JUN-JUL	6.7	10.4	12.9	*124%*	15.4	19.1	10.4
0	JUN-SEP	275	430	620	*149%*	645	805	415
	0	0	0	0	*0*	0	0	0

Jefferson River Basin
Streamflow Forecast, Snow Water Equivalent
Percentage of Normal
June 1, 2018



Snow Water Equivalent
Percent of Normal

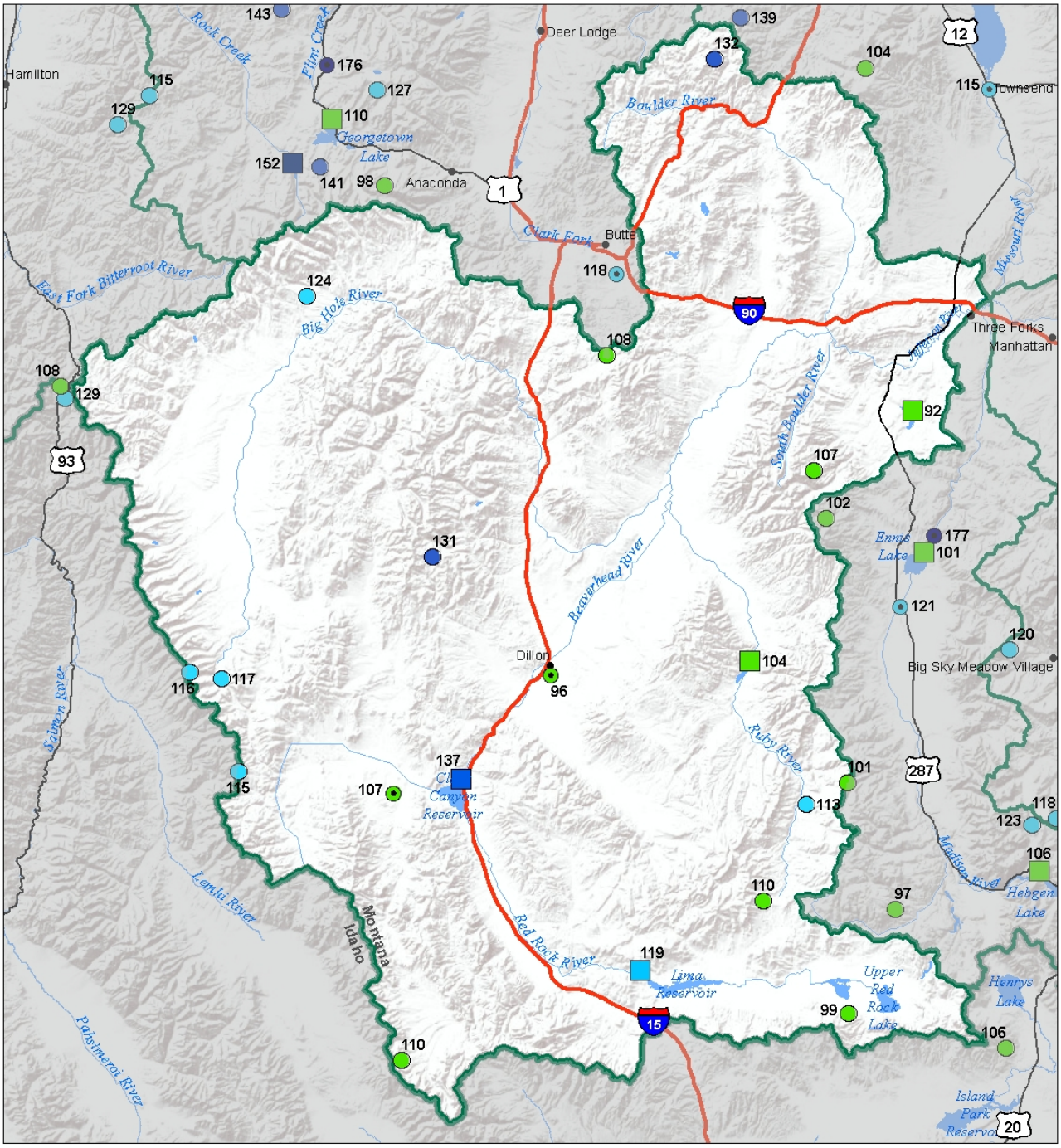
SNOTEL		Snowcourse	
> 150%	71 - 90%	> 150%	71 - 90%
131 - 150%	51 - 70%	131 - 150%	51 - 70%
111 - 130%	1 - 50%	111 - 130%	1 - 50%
91 - 110%	0%	91 - 110%	0%

Streamflow Forecast
Percent of Average Flows

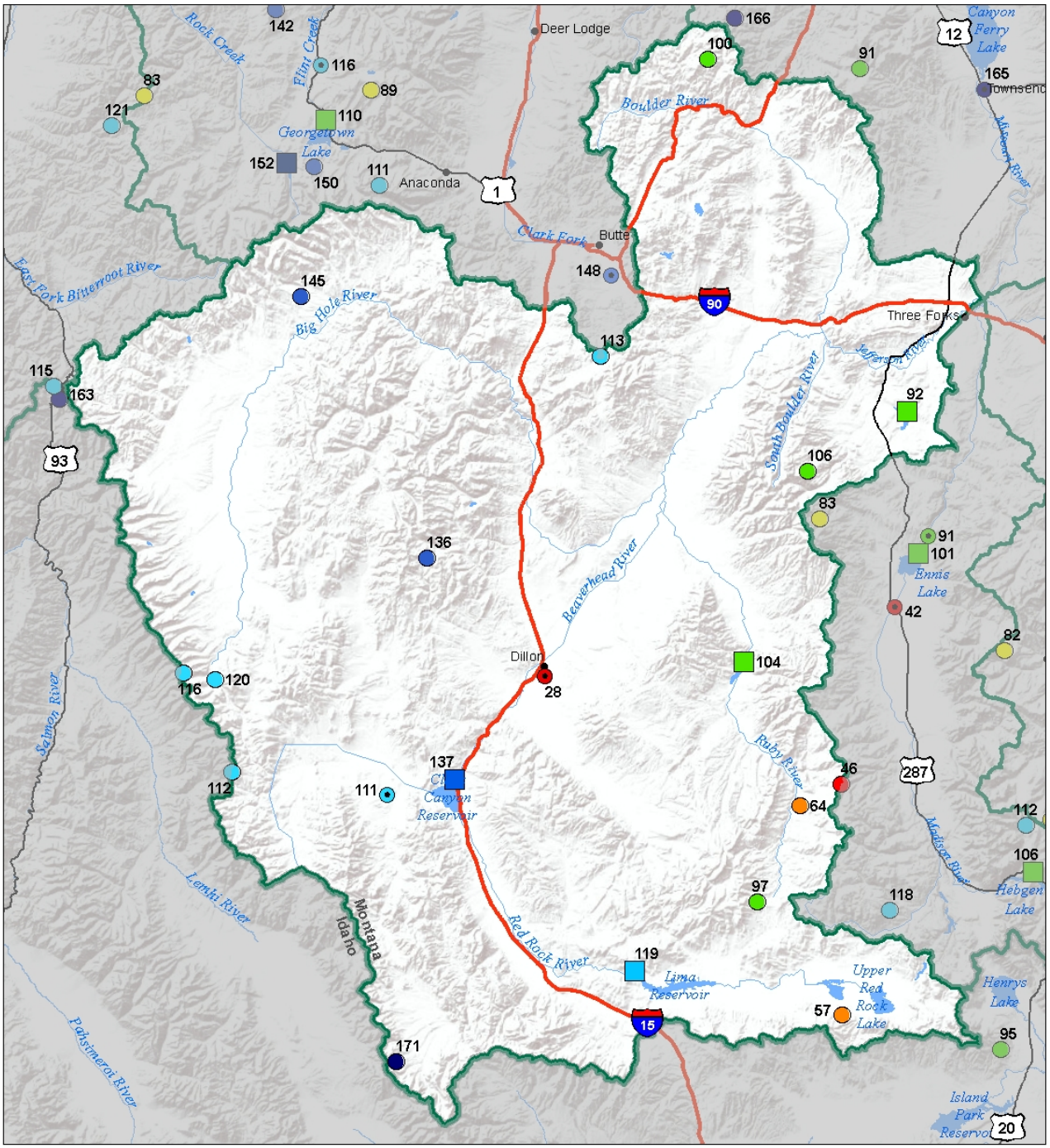
- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%

USDA
Montana State Library Natural Resource Information System

Jefferson River Basin
Water Year to Date Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018



Jefferson River Basin
Monthly Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018 (May 1, 2018 - June 1, 2018)

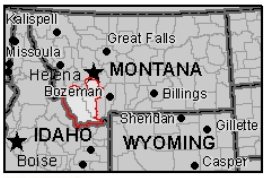


Precipitation
Percent of Normal

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

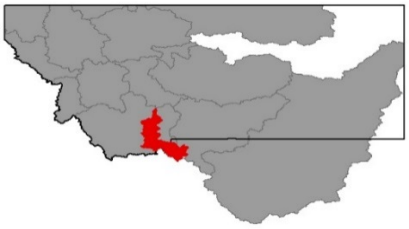
- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%



USDA

Montana State Library Natural Resource Information System

Madison River Basin



Melt has been fast and furious in the Madison River basin during May, prolonged periods of above average temperatures and abundant sunshine release snow water stored in the snowpack into the rivers at a rapid rate. Snowpack peaked near normal date-wise in the Upper Madison basin, but the mountains that feed the Lower stretches of the Madison peaked one to two weeks early during mid to late April. Snowpack above Hebgen remains above normal for June 1st, while most monitoring locations in the Lower Madison are below normal for June 1st. One benefit to the increased runoff during May is that Northwest Energy was able to do flushing flows from Hebgen Reservoir to coincide with the high flows. These flushing flows help to remove built-up sediment from the river bottom, benefitting the health of the overall river system in future years. The early and abundant snowmelt, and below average May precipitation has led to reduced forecasts for the June 1st – Sept 30th period since last issued on May 1st, but they remain near normal. Fortunately, the early runoff was able to put significant water into the reservoirs of the basin, so they should be able to augment flows if the weather takes a turn to the dry side over the summer months.

Madison River Basin Data Summary

Snowpack	**Percent of 1981-2010 Normal (Median)**	**Last Year Percentage of Normal (Median)**
MADISON abv HEBGEN LAKE	129%	151%
MADISON blw HEBGEN LAKE	86%	97%
Basin-Wide	**98%**	**113%**

Precipitation	**Monthly Percentage of Average**	**WYTD Percentage of 1981-2010 Average***	**WYTD Last Year Percentage of Average**
Mountain Precipitation	94%	111%	125%
Valley Precipitation	70%	152%	142%
Basin-Wide Precipitation	**92%**	**113%**	**126%**

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

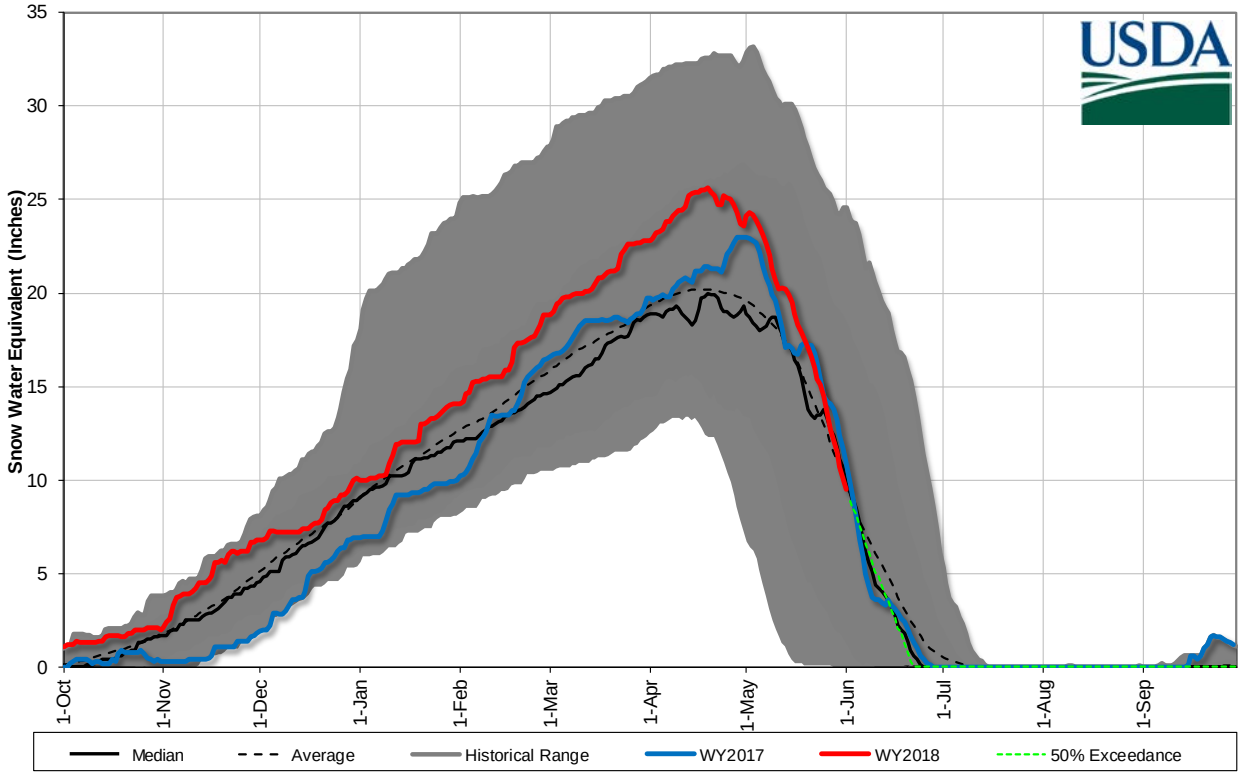
Reservoir Storage	**Percentage of Average**	**Percentage of Capacity (Total)**	**Last Year Percentage of Average**
Basin-Wide Storage	**105%**	**93%**	**102%**

**See Reservoir Storage Table for storage in individual reservoirs*

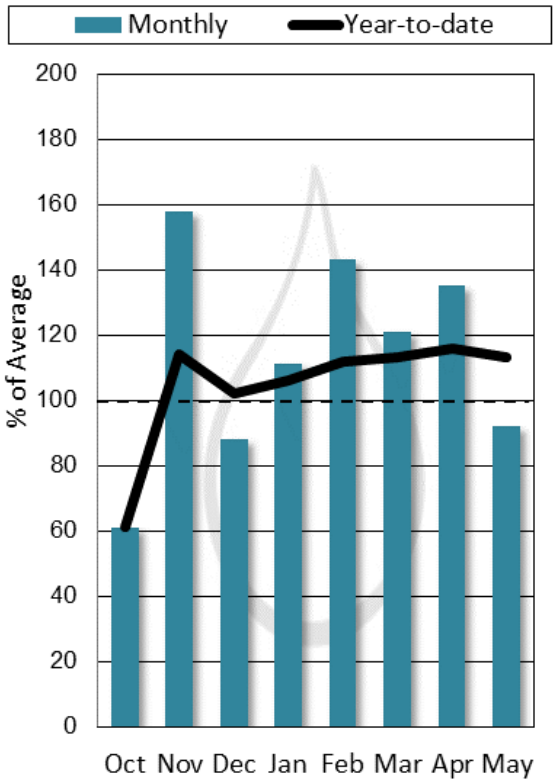
Reservoir Storage End of May, 2018	**Current (KAF)**	**Last Year (KAF)**	**Average (KAF)**	**Capacity (KAF)**	**% Average**	**% Capacity**
Ennis Lake	35.8	36.2	35.6	41.0	**101%**	**87%**
Hebgen Lake	354.8	343.4	336.2	378.8	**106%**	**94%**

Madison River Basin Snowpack with Non-Exceedence Projections

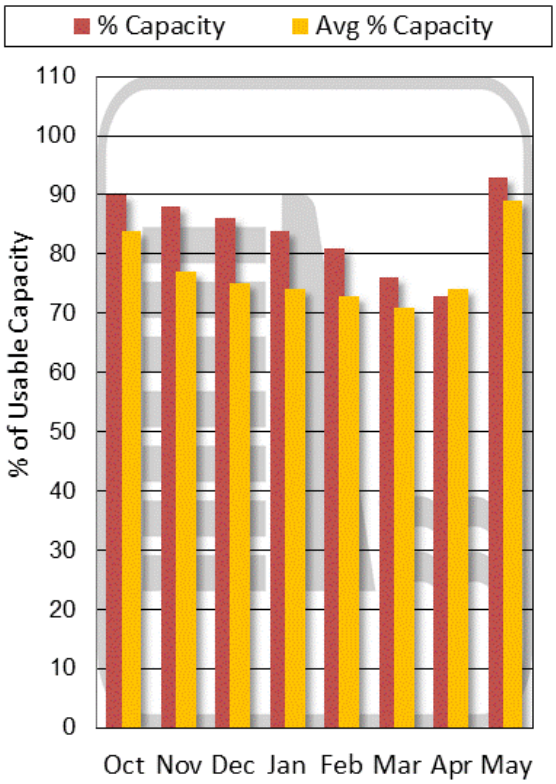
Based on provisional SNOTEL daily data as of 5/1/2018



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.

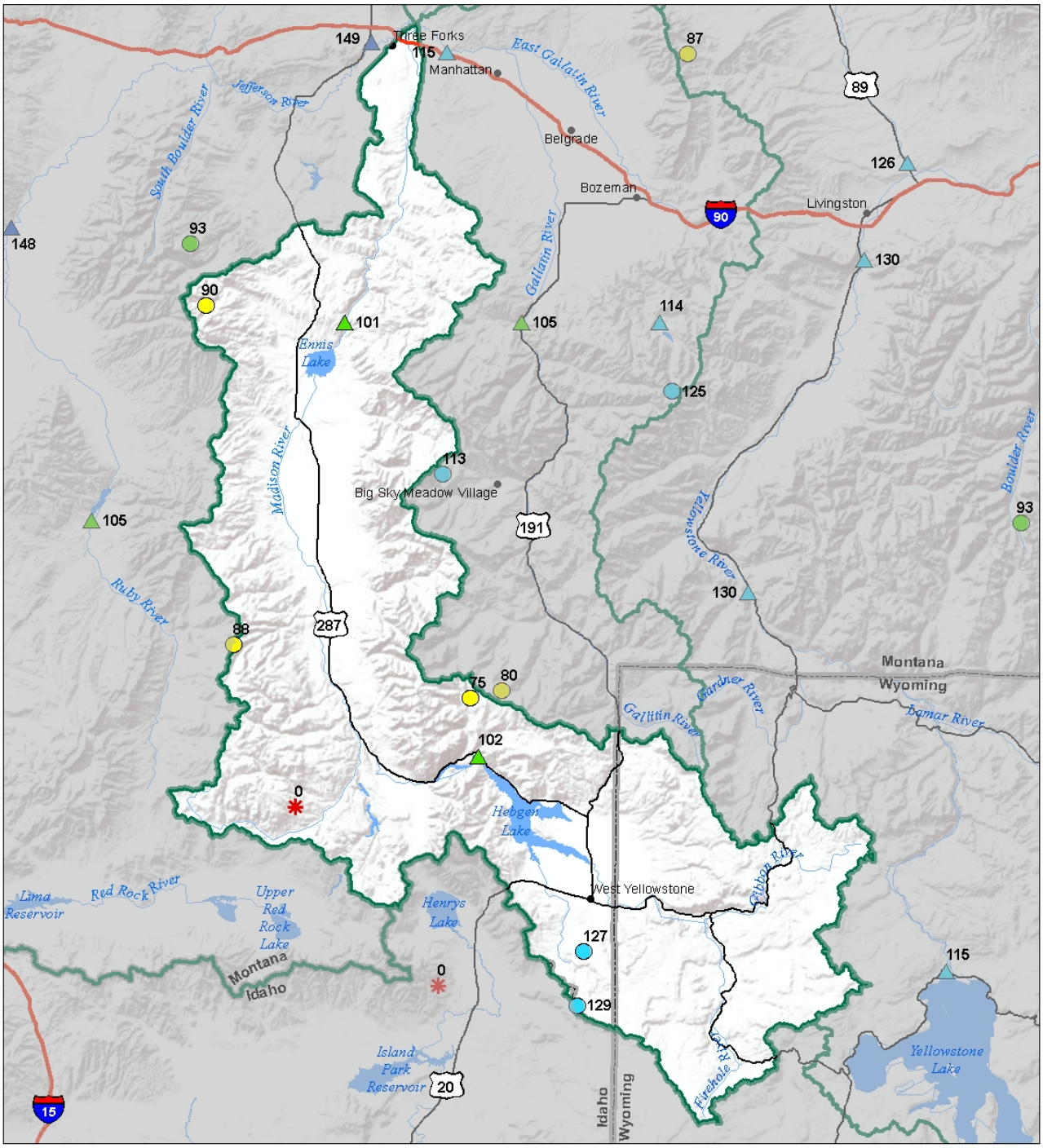
Streamflow Forecast Summary

MADISON RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Chance Actual Volume Will Exceed Forecasted Volume						
Hebgen Reservoir Inflow2	JUN-JUL	144	168	184	*103%*	200	225	178
	JUN-SEP	225	260	285	*102%*	310	345	280
Ennis Reservoir Inflow2	JUN-JUL	265	310	340	*103%*	370	415	330
	JUN-SEP	385	450	490	*101%*	530	590	485

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

Madison River Basin
Streamflow Forecast, Snow Water Equivalent
Percentage of Normal
June 1, 2018



Snow Water Equivalent
Percent of Normal

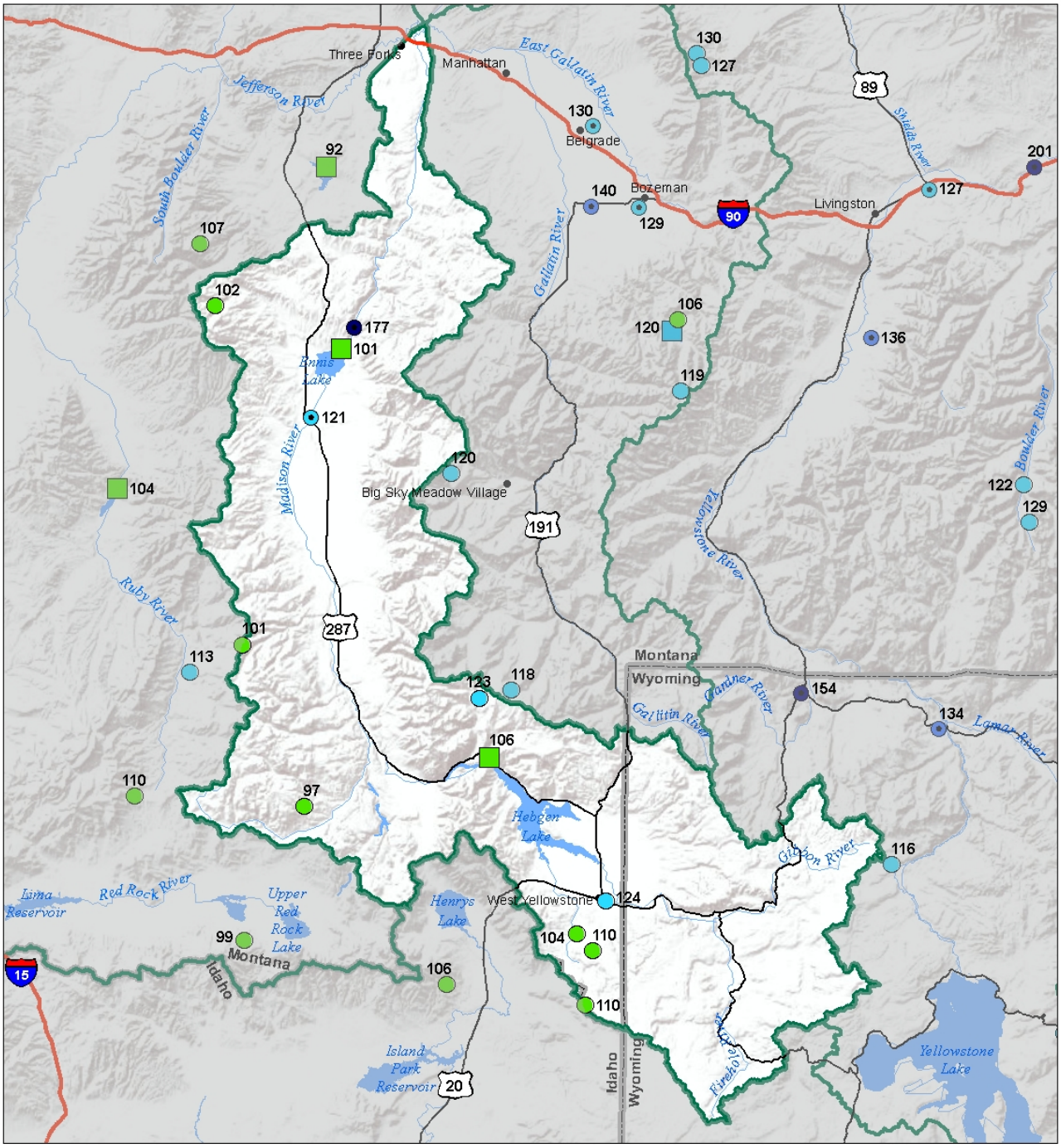
SNOTEL		Snowcourse	
> 150%	71 - 90%	> 150%	71 - 90%
131 - 150%	51 - 70%	131 - 150%	51 - 70%
111 - 130%	1 - 50%	111 - 130%	1 - 50%
91 - 110%	0%	91 - 110%	0%

Streamflow Forecast
Percent of Average Flows

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

USDA
Montana State Library Natural Resource Information System

Madison River Basin
Water Year to Date Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018



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%	

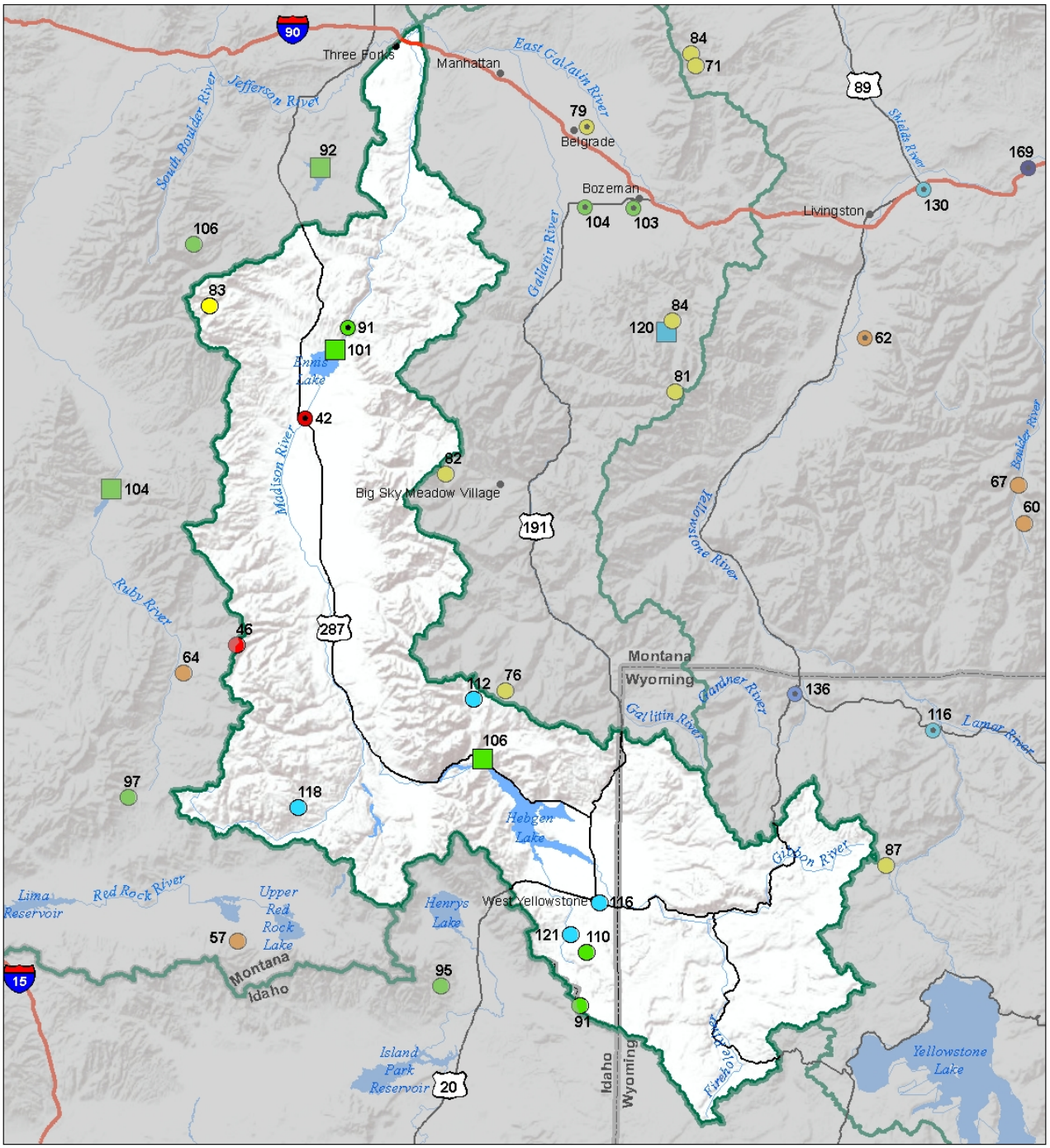
Reservoirs
Percent of Normal

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

USDA

Montana State Library Natural Resource Information System

Madison River Basin
Monthly Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018 (May 1, 2018 - June 1, 2018)



Precipitation
Percent of Normal

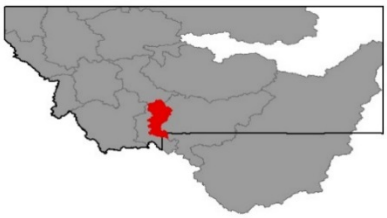
SNOTEL		COOP/ACIS	
> 150%	71 - 90%	> 150%	71 - 90%
131 - 150%	51 - 70%	131 - 150%	51 - 70%
111 - 130%	1 - 50%	111 - 130%	1 - 50%
91 - 110%		91 - 110%	

Reservoirs
Percent of Normal

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

USDA

Montana State Library Natural Resource Information System



Gallatin River Basin

It wasn't a record-setting snowpack in the Gallatin River basin this year, but it peaked well above normal at most mountain locations. On May 1st it seemed as though prolonged flows in the Gallatin were a done deal, assuring a long supply of water this summer. Mother Nature had a different idea. Snowpack peaked at mid and low-elevation during the middle of April, while higher elevation sites peaked during the first week in May. Since peaking, snowmelt has been rapid due to the prolonged periods of well above average temperatures and abundant sunshine. Flows during the month on the mainstem of the Gallatin were well above normal throughout the month and reached 6,390 cfs @ Gateway on June 1st and 6,730cfs at Logan on June 2nd. In fact, both the Gallatin River at Gateway and Logan set new records for total flow for May, or the total amount of water to move down the river over the course of the month. It took a significant amount of snowmelt to drive these high flows through May. As a result, snowpack totals for June 1st have decreased from May 1, and snowpack ranges from below normal in the high elevations of the Upper Gallatin, to slightly above normal as you move north in Gallatin and Madison Ranges. What does this mean for long-term water supply this spring and summer? Forecasts for the June 1st – September 30th period have dropped since the last publication due to the early melt of snowpack this year, but median forecast remain slightly above average for the summer period. A dry summer could reduce the streamflow prospects, and increase demand, as we approach the dry summer months.

Gallatin River Basin Data Summary

Snowpack	**Percent of 1981-2010 Normal (Median)**	**Last Year Percentage of Normal (Median)**
UPPER GALLATIN	*86%*	*105%*
HYALITE	*125%*	*99%*
BRIDGER	*87%*	*42%*
Basin-Wide	**98%**	**100%**

Precipitation	**Monthly Percentage of Average**	**WYTD Percentage of 1981-2010 Average***	**WYTD Last Year Percentage of Average**
Mountain Precipitation	83%	121%	120%
Valley Precipitation	92%	129%	118%
Basin-Wide Precipitation	**84%**	**122%**	**120%**

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

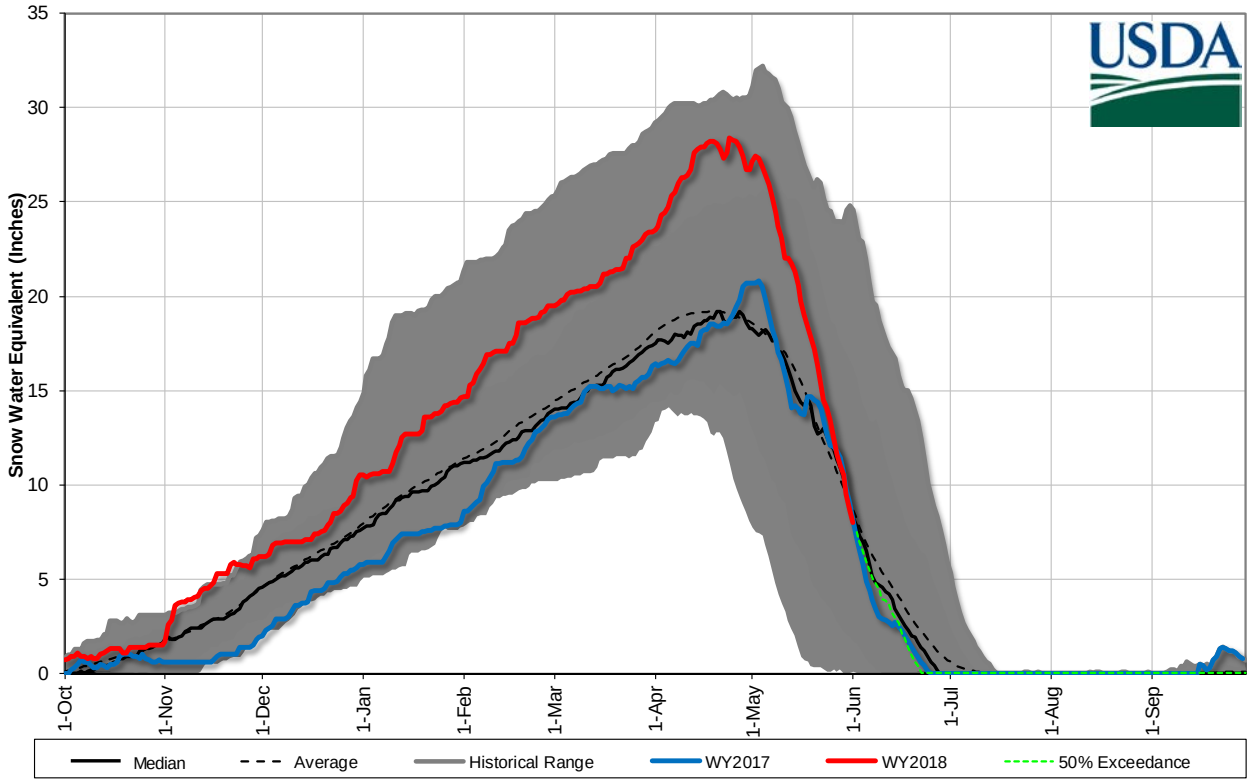
Reservoir Storage	**Percentage of Average**	**Percentage of Capacity (Total)**	**Last Year Percentage of Average**
Basin-Wide Storage	**120%**	**101%**	**120%**

**See Reservoir Storage Table for storage in individual reservoirs*

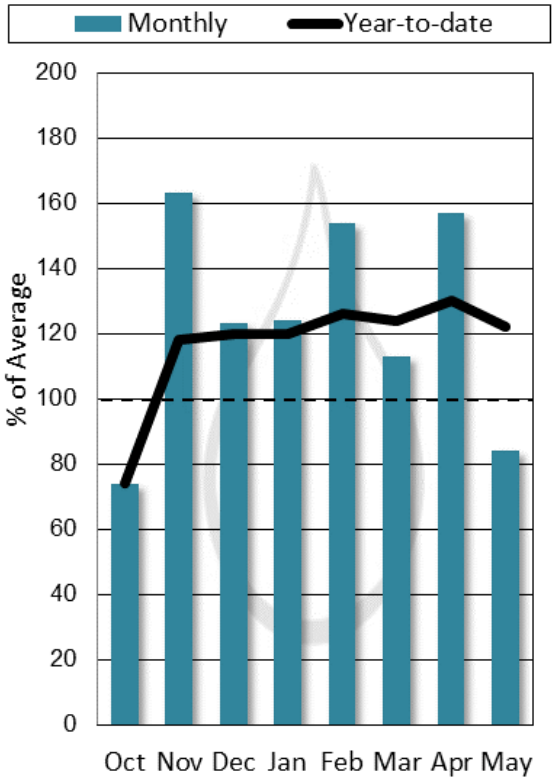
Reservoir Storage End of May, 2018	**Current (KAF)**	**Last Year (KAF)**	**Average (KAF)**	**Capacity (KAF)**	**% Average**	**% Capacity**
Middle Creek Res	10.3	10.3	8.6	10.2	**120%**	**101%**

Gallatin River Basin Snowpack with Non-Exceedence Projections

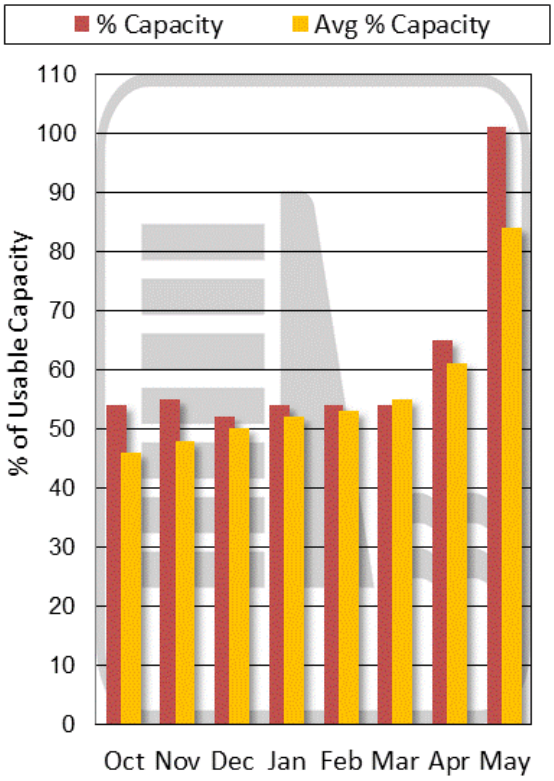
Based on provisional SNOTEL daily data as of 5/1/2018



Mountain and Valley Precipitation



End of Month Reservoir Storage



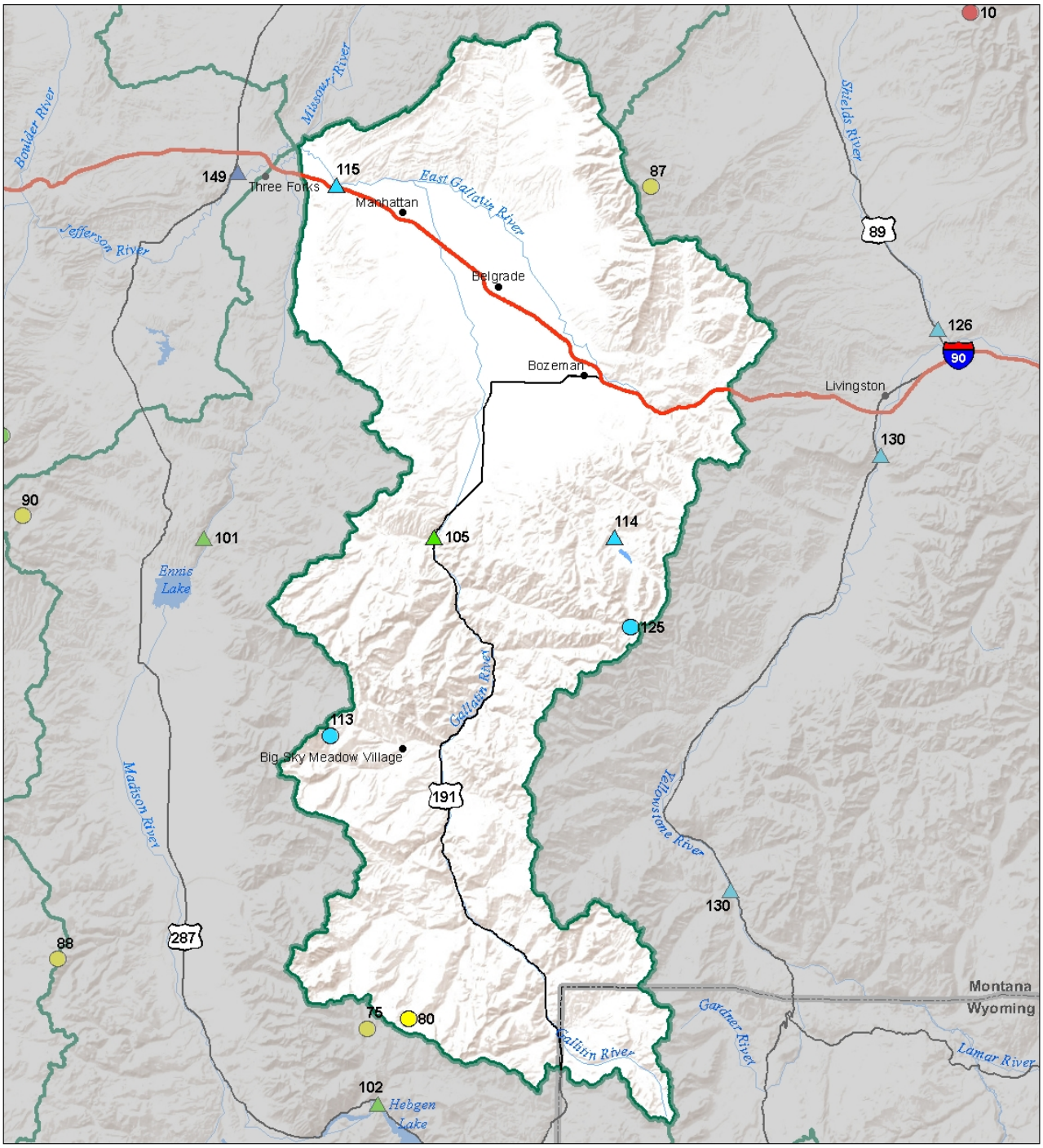
Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Streamflow Forecast Summary

GALLATIN RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Chance Actual Volume Will Exceed Forecasted Volume						
Gallatin R nr Gateway	JUN-JUL	220	250	270	*106%*	290	320	255
	JUN-SEP	270	310	335	*105%*	360	400	320
Hyalite Reservoir Inflow2	JUN-JUL	12.1	13.6	14.6	*113%*	15.6	17.1	12.9
	JUN-SEP	14.7	16.6	17.9	*114%*	19.1	21	15.7
Gallatin R at Logan	JUN-JUL	196	250	285	*116%*	325	380	245
	JUN-SEP	240	310	355	*115%*	405	475	310

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

Gallatin River Basin
Streamflow Forecast, Snow Water Equivalent
Percentage of Normal
June 1, 2018



Snow Water Equivalent
Percent of Normal

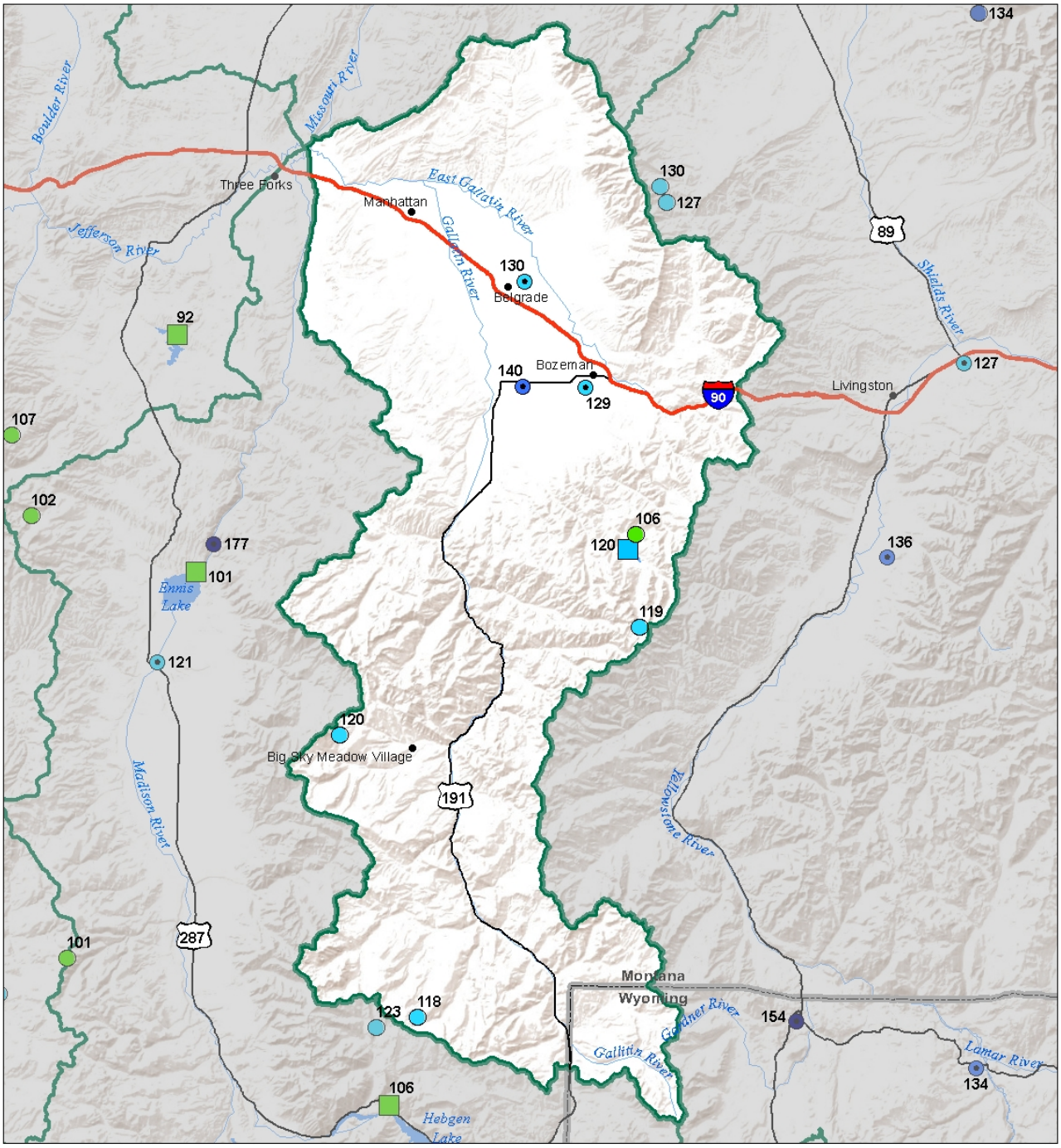
SNOTEL		Snowcourse	
> 150%	71 - 90%	> 150%	71 - 90%
131 - 150%	51 - 70%	131 - 150%	51 - 70%
111 - 130%	1 - 50%	111 - 130%	1 - 50%
91 - 110%	0%	91 - 110%	0%

Streamflow Forecast
Percent of Average Flows

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

USDA
Montana State Library Natural Resource Information System

Gallatin River Basin
Water Year to Date Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018



Precipitation
Percent of Normal

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

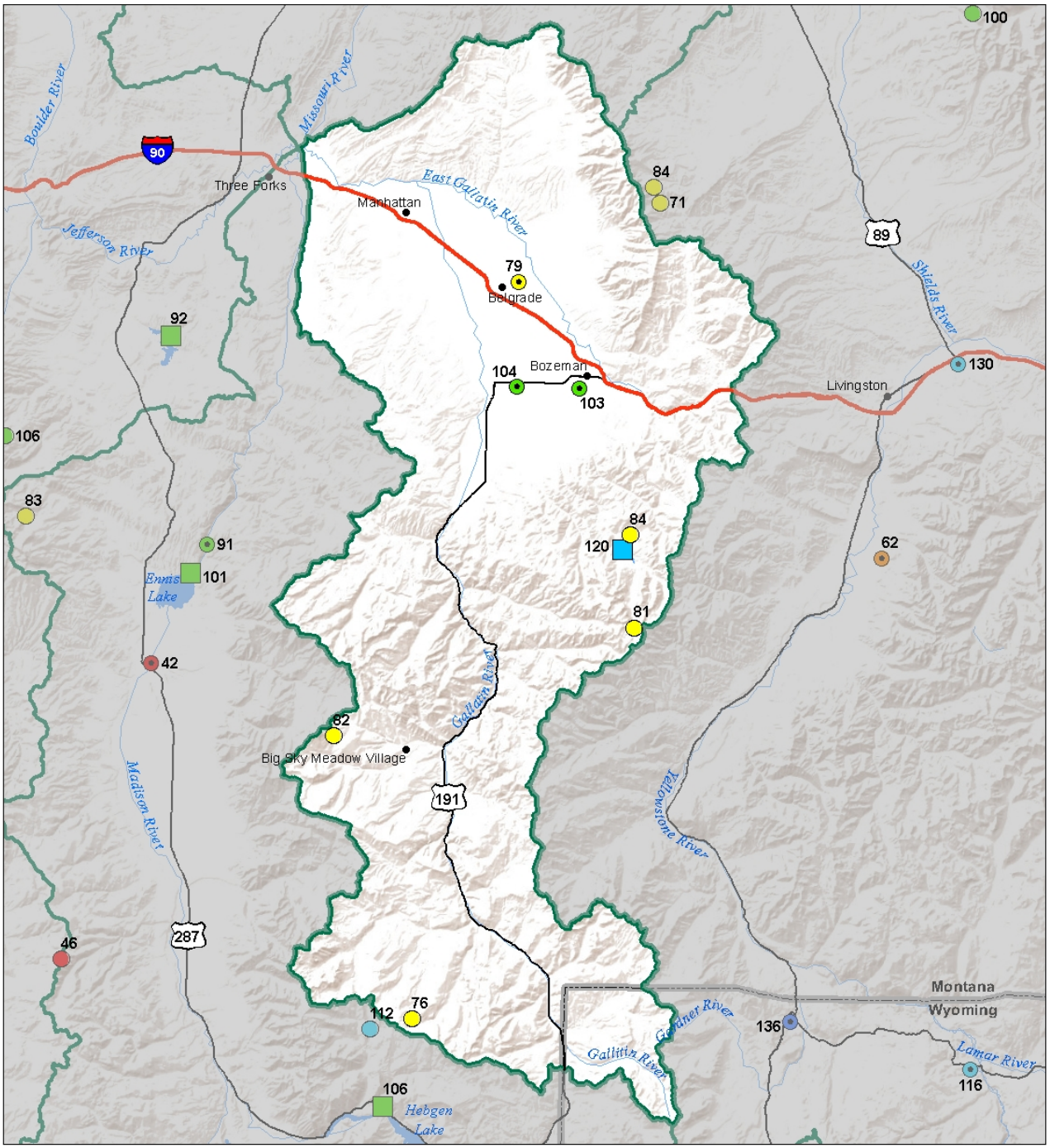
COOP/ACIS
- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%

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

USDA

Montana State Library Natural Resource Information System

Gallatin River Basin
Monthly Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018 (May 1, 2018 - June 1, 2018)



Precipitation
Percent of Normal

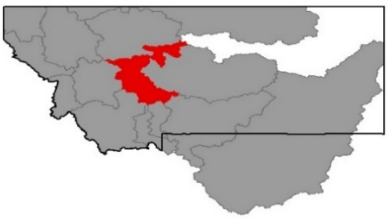
SNOTEL		COOP/ACIS	
> 150%	71 - 90%	> 150%	71 - 90%
131 - 150%	51 - 70%	131 - 150%	51 - 70%
111 - 130%	1 - 50%	111 - 130%	1 - 50%
91 - 110%		91 - 110%	

Reservoirs
Percent of Normal

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

USDA

Montana State Library Natural Resource Information System



Headwaters Mainstem (Missouri) River Basin

What happens when you take a well above normal, or record, snowpack and move it all in one big push? I think the answer is clear to that question if you were in the Helena valley over the last month, you have a very large amount of water in creeks and significant impacts to populations along those streams. Snowmelt rates during May were well above average, driven by the persistently above average and sunny weather than dominated the month. Melt continued through the month at all elevations, and even though snowpack peaked above average, SNOTEL sites in the basin melted out 7 to 10 days early. As of June 1st, only the high elevations have snowpack remaining, and the snowmelt drive peaks have occurred in the basin. Streamflow forecasts across the basin reflect the loss of snowpack during May and have dropped since May 1st. It looks like the worst of the snowmelt-driven impacts have passed, and this year will go down as anomalous for both snowfall totals and how fast the snowmelt came out of the mountains.

Headwaters Missouri Mainstem River Basin Data Summary

Snowpack	**Percent of 1981-2010 Normal (Median)**	**Last Year Percentage of Normal (Median)**
SMITH-JUDITH-MUSSELSHELL	63%	64%
SUN-TETON-MARIAS	83%	142%
MAINSTEM ab FT PECK RES	84%	100%
MILK RIVER BASIN	%	%
MISSOURI MAINSTEM BASIN	84%	100%
Basin-Wide	**%**	**%**

Precipitation	**Monthly Percentage of Average**	**WYTD Percentage of 1981-2010 Average***	**WYTD Last Year Percentage of Average**
Mountain Precipitation	118%	129%	107%
Valley Precipitation	170%	156%	130%
Basin-Wide Precipitation	**127%**	**132%**	**109%**

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

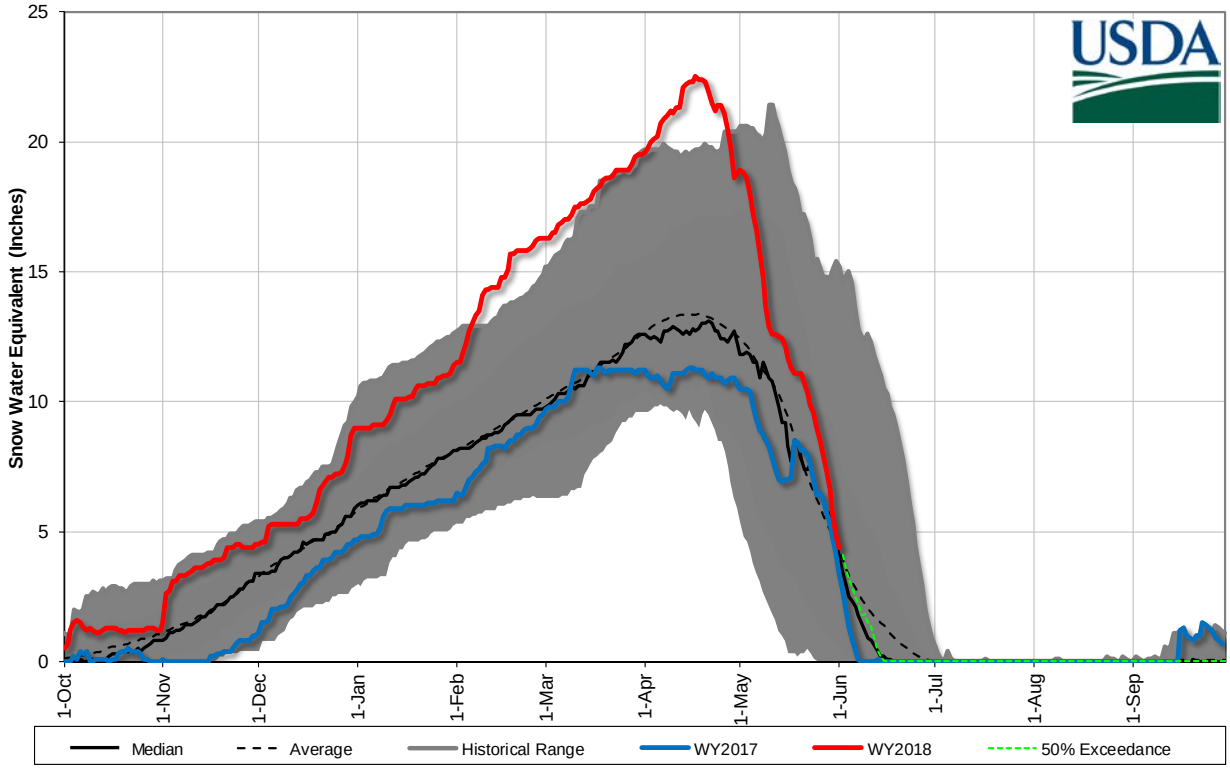
Reservoir Storage	**Percentage of Average**	**Percentage of Capacity (Total)**	**Last Year Percentage of Average**
Basin-Wide Storage	**127%**	**91%**	**118%**

**See Reservoir Storage Table for storage in individual reservoirs*

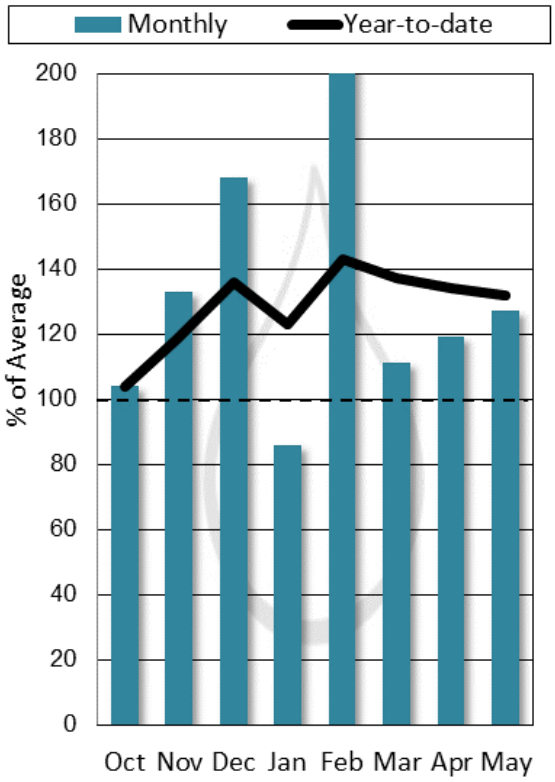
Reservoir Storage End of May, 2018	**Current (KAF)**	**Last Year (KAF)**	**Average (KAF)**	**Capacity (KAF)**	**% Average**	**% Capacity**
Helena Valley Reservoir	7.4	8.2	7.9	9.2	**94%**	**81%**
Lake Helena	11.0	11.0	10.9	12.7	**101%**	**87%**
Hauser Lake & Lake Helena	74.3	74.3	73.8	74.6	**101%**	**100%**
Holter Lake	81.4	81.2	80.4	81.9	**101%**	**99%**
Fort Peck Lake	17336.9	16095.4	13383.0	18910.0	**130%**	**92%**
Basin-wide Total	19228.8	17934.1	15195.0	21131.4	**127%**	**91%**

Missouri River Basin below Toston above Smith River Inflow Snowpack with Non-Exceedence Projections

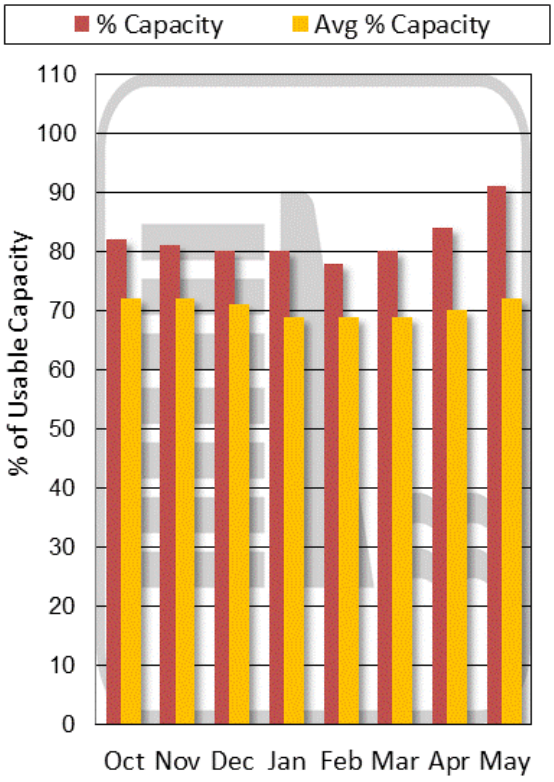
Based on provisional SNOTEL daily data as of 5/1/2018



Mountain and Valley Precipitation



End of Month Reservoir Storage



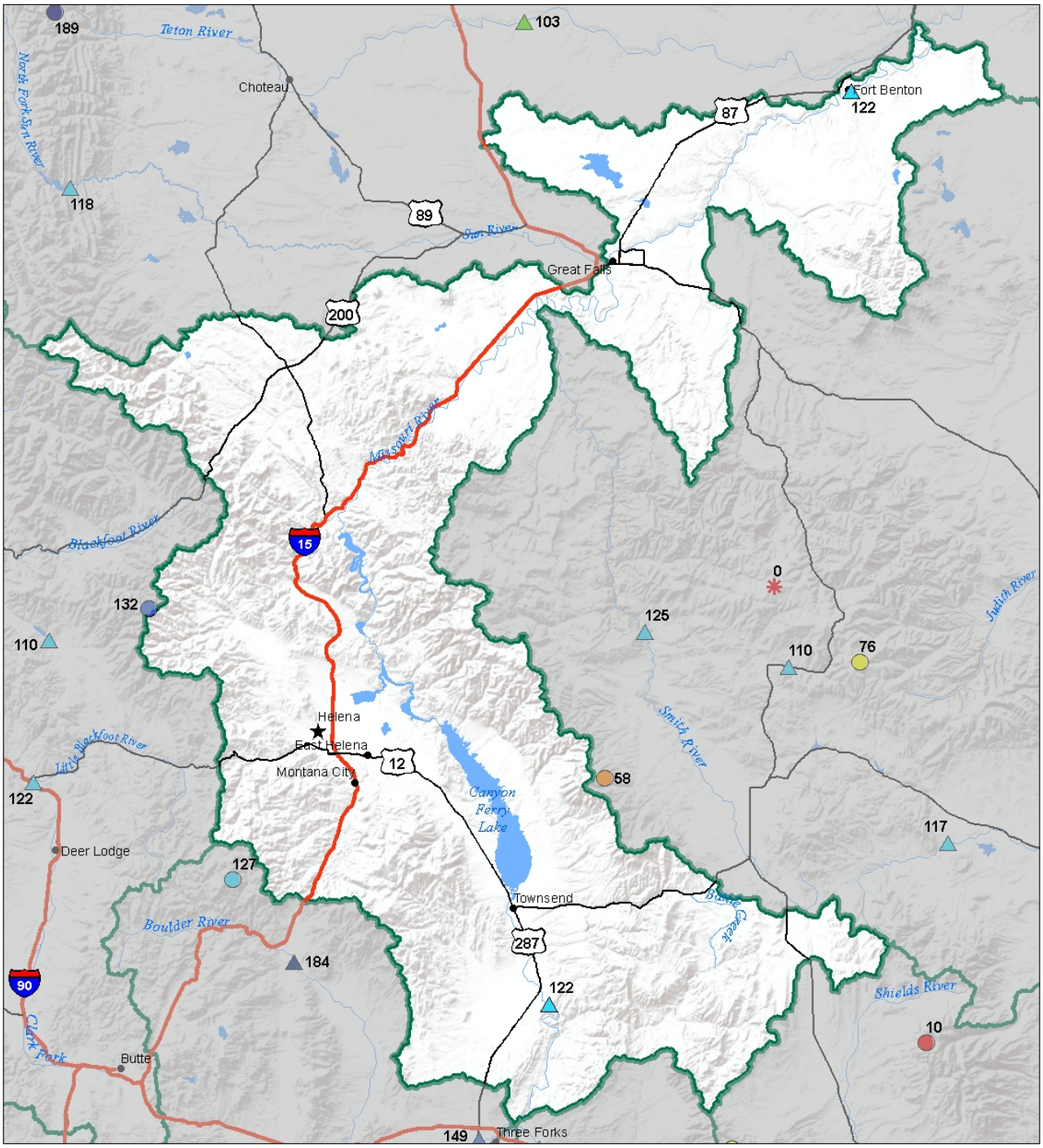
Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Streamflow Forecast Summary

MISSOURI MAINSTEM BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Chance Actual Volume Will Exceed Forecasted Volume						
Missouri R at Toston2	JUN-JUL	845	1060	1200	*128%*	1350	1560	940
	JUN-SEP	1010	1300	1490	*122%*	1690	1970	1220
Dearborn R nr Craig								
Missouri R at Fort Benton2	JUN-JUL	1240	1570	1790	*127%*	2010	2330	1410
	JUN-SEP	1590	2020	2320	*122%*	2610	3050	1900
Missouri R nr Virgelle2	JUN-JUL	1400	1740	1980	*124%*	2210	2550	1600
	JUN-SEP	1740	2200	2520	*119%*	2840	3310	2120
Missouri R nr Landusky2	JUN-JUL	1520	1890	2140	*125%*	2390	2760	1710
	JUN-SEP	1890	2380	2720	*120%*	3060	3550	2260
Missouri R bl Fort Peck Dam2	JUN-JUL	1410	1850	2150	*126%*	2450	2890	1710
	JUN-SEP	1550	2180	2600	*120%*	3030	3660	2170
Lake Sakakawea Inflow2	JUN-JUL	4990	6100	6860	*136%*	7610	8730	5060
	JUN-SEP	5610	7120	8140	*132%*	9160	10700	6150

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

Headwaters Mainstem (Missouri) River Basin
Streamflow Forecast, Snow Water Equivalent
Percentage of Normal
June 1, 2018



Snow Water Equivalent
Percent of Normal

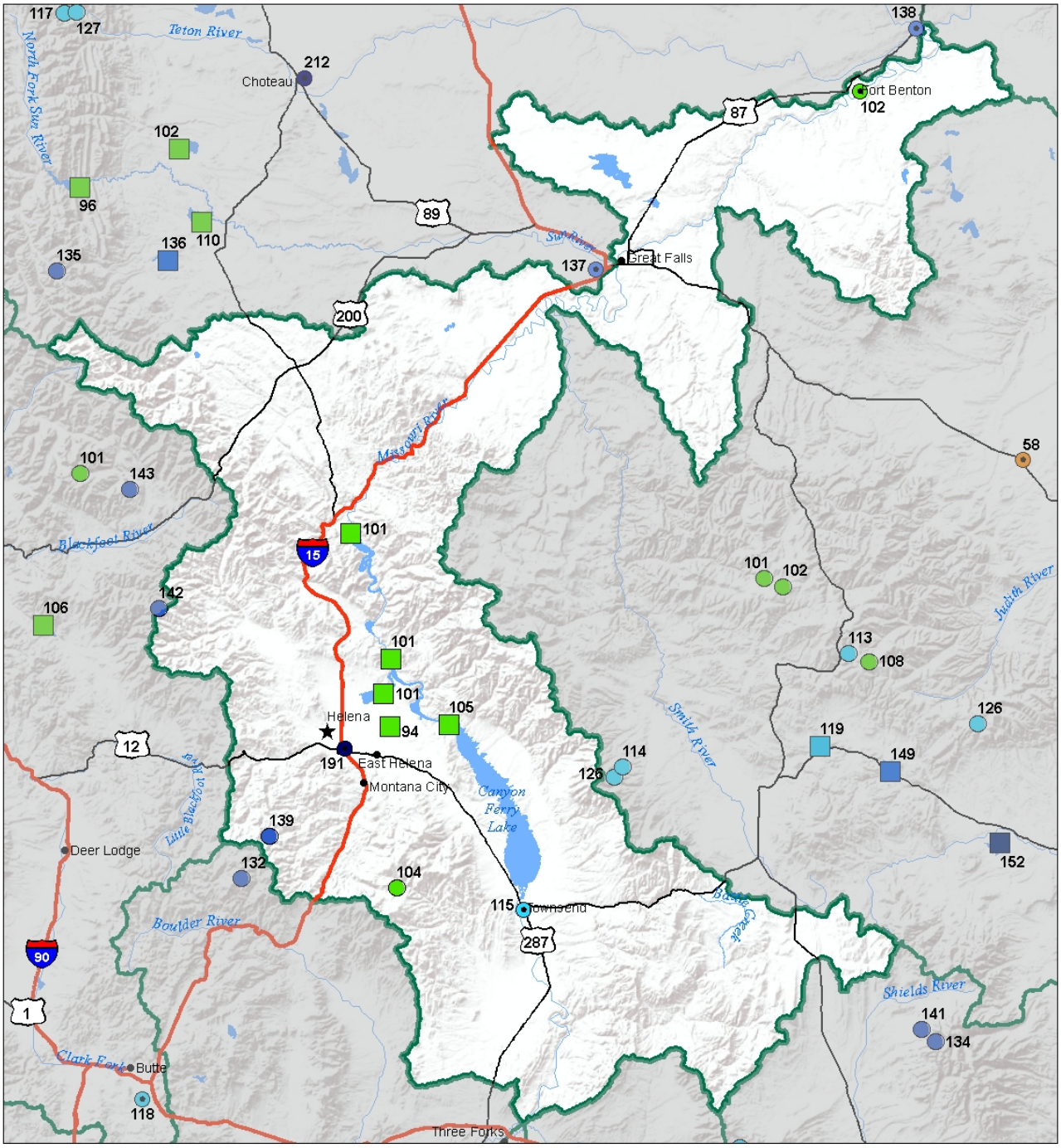
SNOTEL				Snowcourse			
> 150%	71 - 90%			> 150%	71 - 90%		
131 - 150%	51 - 70%			131 - 150%	51 - 70%		
111 - 130%	1 - 50%			111 - 130%	1 - 50%		
91 - 110%	0%			91 - 110%	0%		

Streamflow Forecast
Percent of Average Flows

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

USDA
Montana State Library Natural Resource Information System

Headwaters Mainstem (Missouri) River Basin
Water Year to Date Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018



Precipitation
Percent of Normal

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

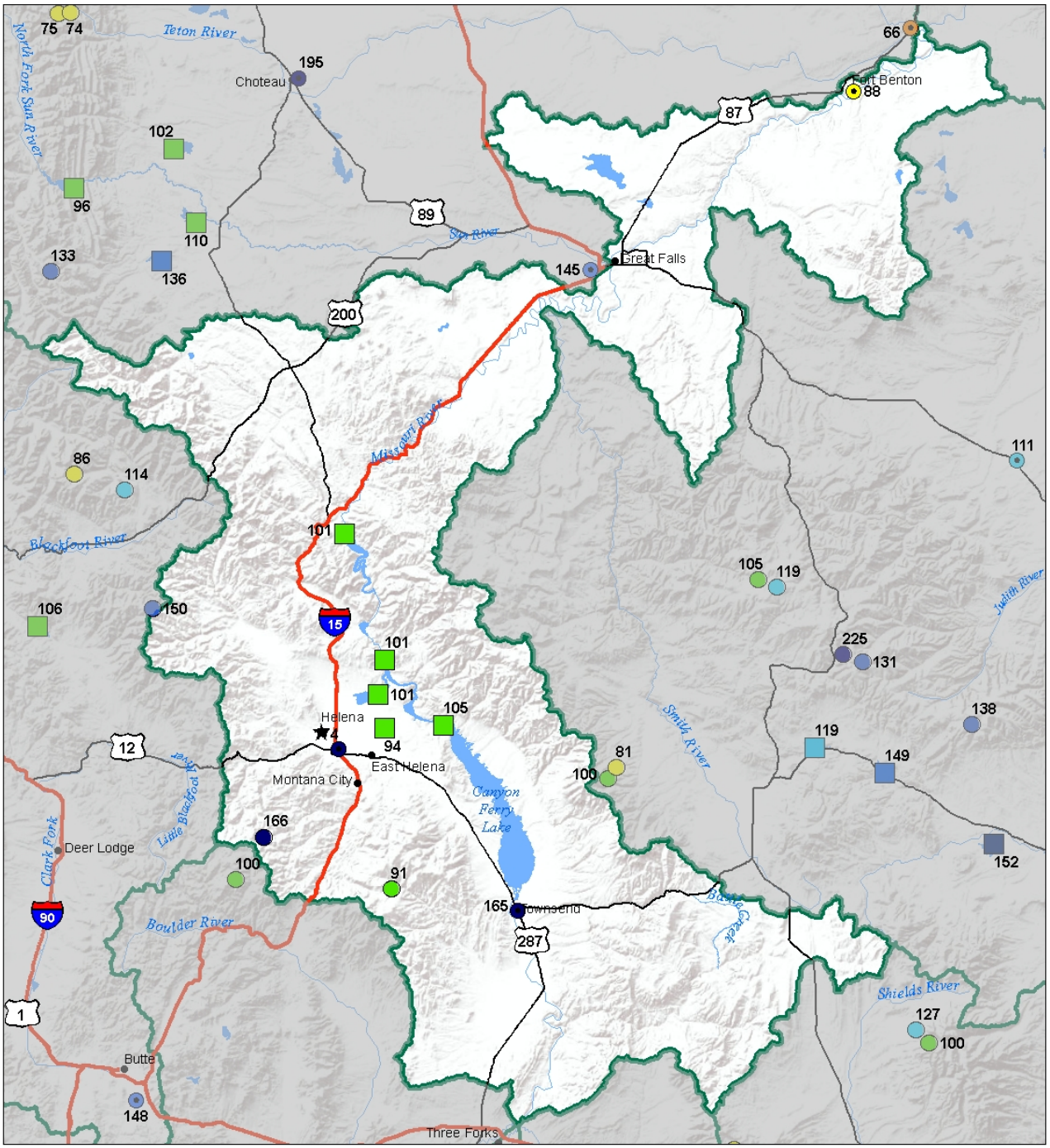
COOP/ACIS
- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%

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

USDA

Montana State Library Natural Resource Information System

Headwaters Mainstem (Missouri) River Basin
Monthly Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018 (May 1, 2018 - June 1, 2018)



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%	

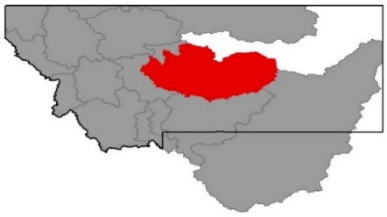
Reservoirs
Percent of Normal

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

USDA

Montana State Library Natural Resource Information System

Smith-Judith-Musselshell River Basin



Above average temperatures were experienced across the state, with minimum temperature anomalies ranging from +5 to +7° F experienced specifically in the Smith, Judith and Musselshell River Drainages. Not surprisingly, all three rivers saw their snowmelt runoff peak as of May 12th, which typical occurs in late May to early June. In addition to this, above average valley precipitation fell throughout the region, producing small additions to the snowmelt peaks seen in the respective drainages. Snotel sites throughout the region were already a third through melt out at mid-May, and many have melted out completely by June 1st, with only the highest elevation snow in the Little Belt Mountains remaining, specifically Spur Park Snotel at 8100 ft. This early runoff has moved a lot of water downriver, past many water users before it could be utilized. As odd as it is to think about after an above average winter (150%-300% of normal) in much of the Big Belts, Little Belts, Castle and Big Snowy Mountains, water users are likely to see just above average flows in these drainages through the summer. We sure have seen it all this winter with the roller-coaster ride from flooding on the Musselshell to potential low flows towards the end of the irrigation season. Hopefully the full reservoirs can help to augment flows later in the growing season if summer precipitation is below average. Reference your forecast point below to find specific flows for your region to plan accordingly.

Smith Judith Musselshell River Basin Data Summary

Snowpack	**Percent of 1981-2010 Normal (Median)**	**Last Year Percentage of Normal (Median)**
SMITH	63%	64%
HIGHWOOD	%	%
JUDITH	76%	86%
MUSSELSHELL	%	%
Basin-Wide	**63%**	**64%**

Precipitation	**Monthly Percentage of Average**	**WYTD Percentage of 1981-2010 Average***	**WYTD Last Year Percentage of Average**
Mountain Precipitation	123%	116%	102%
Valley Precipitation	196%	157%	111%
Basin-Wide Precipitation	**138%**	**121%**	**103%**

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

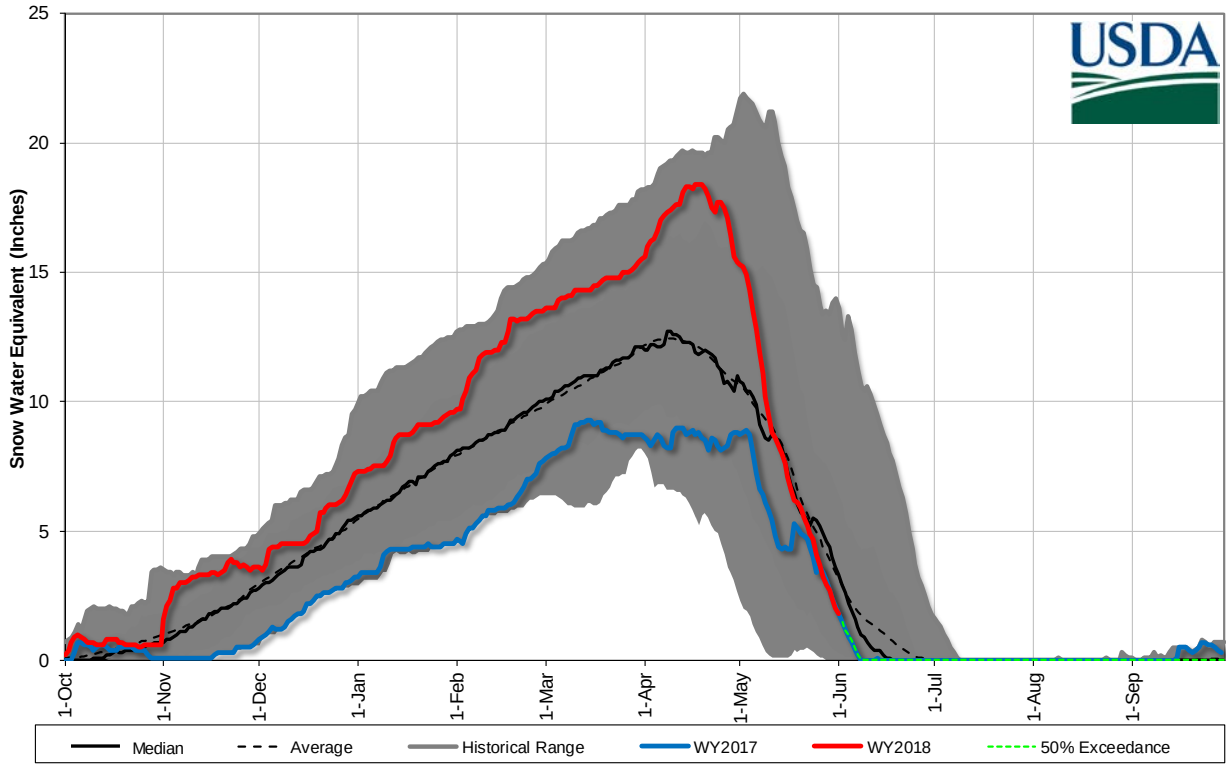
Reservoir Storage	**Percentage of Average**	**Percentage of Capacity (Total)**	**Last Year Percentage of Average**
Basin-Wide Storage	**148%**	**104%**	**138%**

**See Reservoir Storage Table for storage in individual reservoirs*

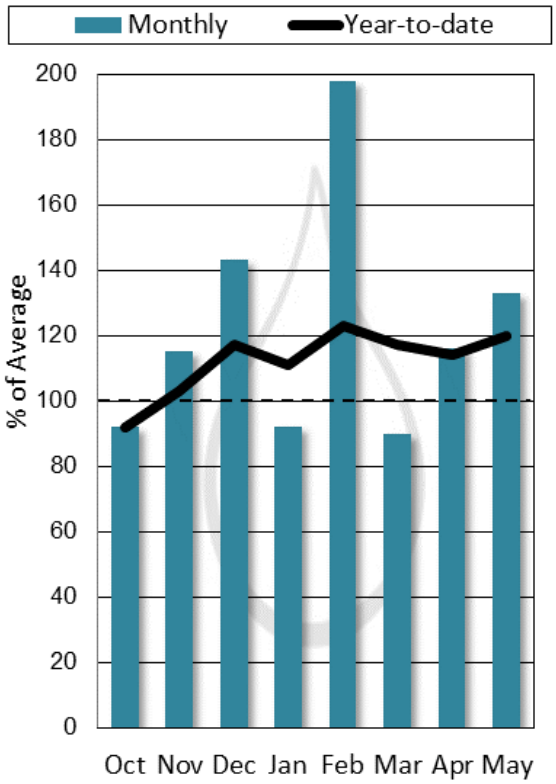
Reservoir Storage End of May, 2018	**Current (KAF)**	**Last Year (KAF)**	**Average (KAF)**	**Capacity (KAF)**	**% Average**	**% Capacity**
Smith River Res	11.8	10.3	9.9	10.6	**119%**	**111%**
Ackley Lake	6.0	6.5	4.6	7.0	**130%**	**85%**
Bair Res	7.3	5.6	4.9	7.0	**149%**	**104%**
Martinsdale Res	23.1	22.9	15.2	23.1	**152%**	**100%**
Deadman's Basin Res	75.9	70.4	49.2	72.2	**154%**	**105%**

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

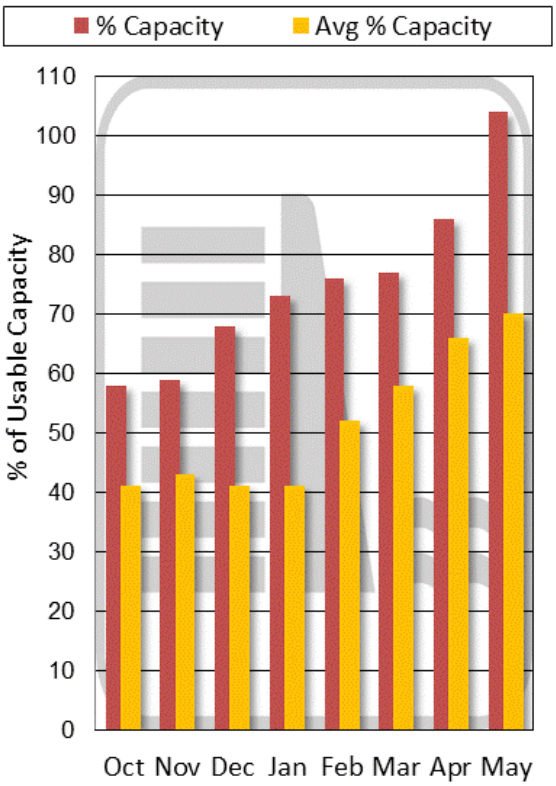
Based on provisional SNOTEL daily data as of 5/1/2018



Mountain and Valley Precipitation



End of Month Reservoir Storage



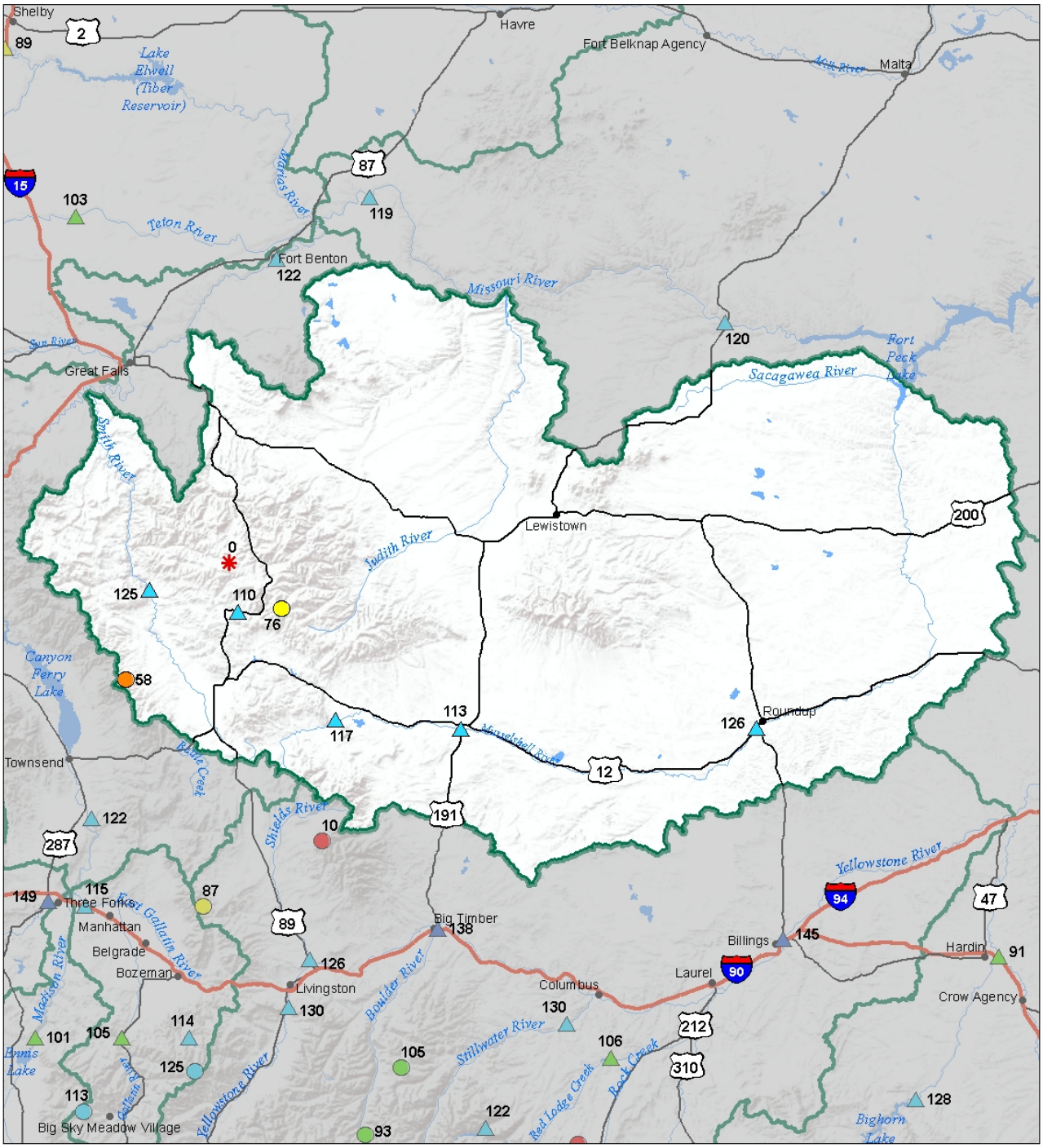
Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Streamflow Forecast Summary

SMITH-JUDITH-MUSSELSHELL	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Chance Actual Volume Will Exceed Forecasted Volume						
Sheep Ck nr White Sulphur Springs	JUN-JUL	5.5	7.7	9.2	*114%*	10.7	12.9	8.1
	JUN-SEP	7	10	12	*110%*	14	17	10.9
Smith R bl Eagle Ck2	JUN-JUL	36	56	70	*130%*	84	104	54
	JUN-SEP	35	63	81	*125%*	99	127	65
NF Musselshell R nr Delpine								
SF Musselshell R ab Martinsdale	JUN-JUL	5.1	16.3	24	*120%*	32	43	20
	JUN-SEP	6.8	18.8	27	*117%*	35	47	23
Musselshell R at Harlowton2	JUN-JUL	10.9	24	33	*118%*	42	55	28
	JUN-SEP	6.8	23	34	*113%*	45	61	30
Musselshell R nr Roundup2	JUN-JUL	2.6	28	45	*132%*	62	87	34
	JUN-SEP	0.57	26	43	*126%*	60	85	34

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

Smith-Judith-Musselshell River Basin
Streamflow Forecast, Snow Water Equivalent
Percentage of Normal
June 1, 2018



Snow Water Equivalent
Percent of Normal

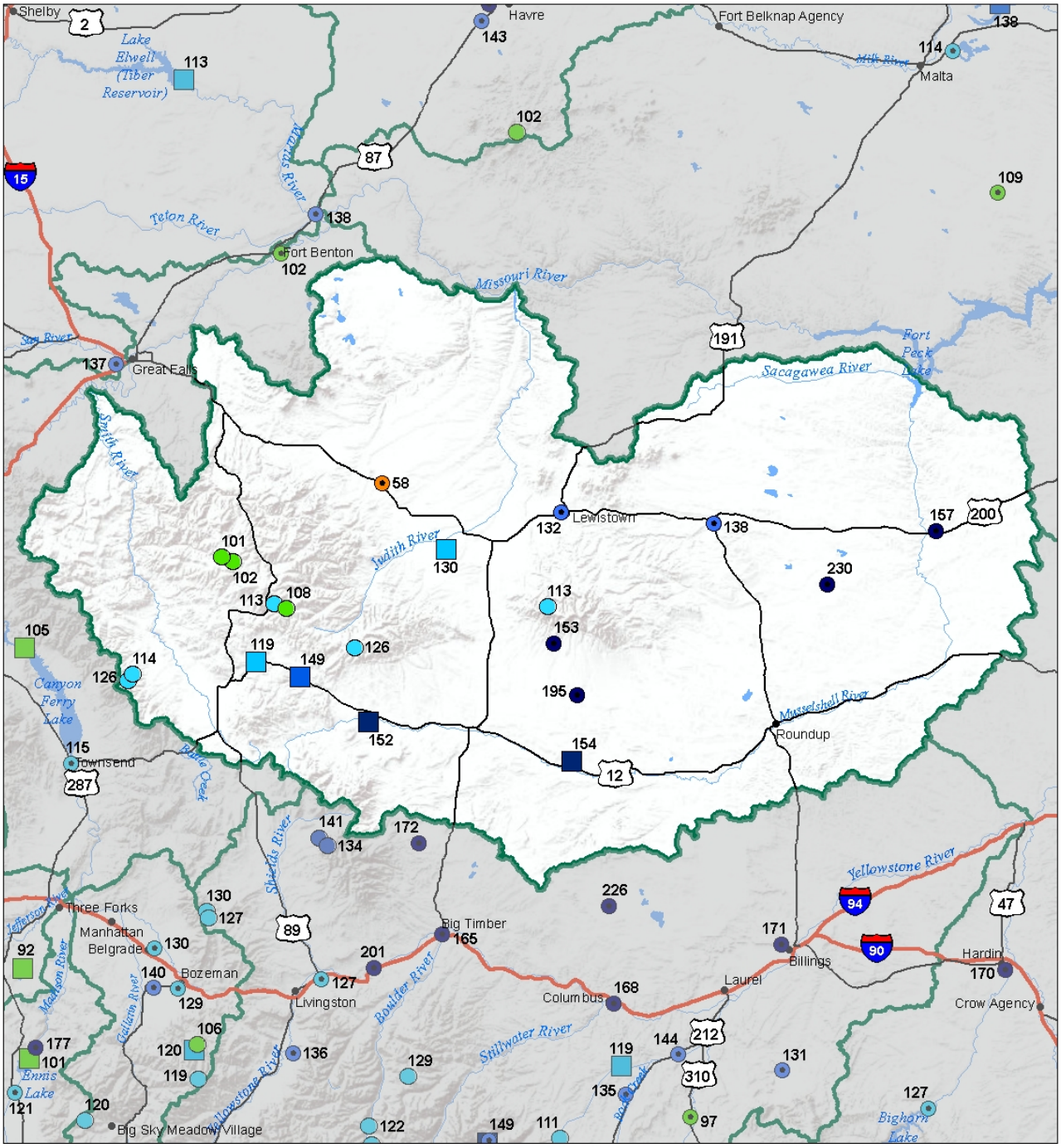
SNOTEL		Snowcourse	
> 150%	71 - 90%	> 150%	71 - 90%
131 - 150%	51 - 70%	131 - 150%	51 - 70%
111 - 130%	1 - 50%	111 - 130%	1 - 50%
91 - 110%	0%	91 - 110%	0%

Streamflow Forecast
Percent of Average Flows

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

USDA
Montana State Library Natural Resource Information System

Smith-Judith-Musselshell River Basin
Water Year to Date Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018



Precipitation
Percent of Normal

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

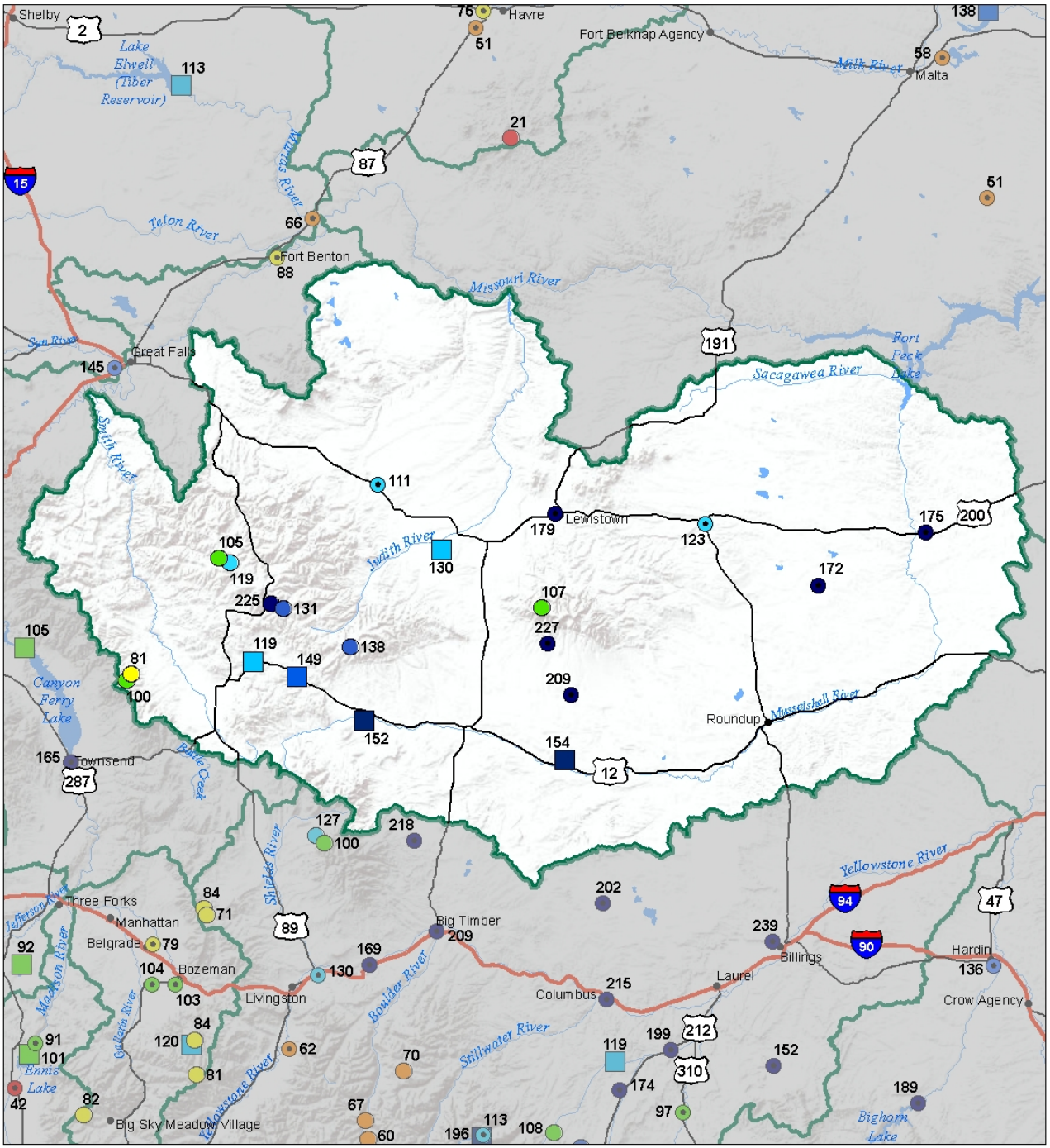
COOP/ACIS
- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%

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

USDA

Montana State Library Natural Resource Information System

Smith-Judith-Musselshell River Basin
Monthly Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018 (May 1, 2018 - June 1, 2018)



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%	

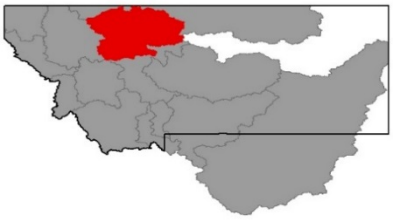
Reservoirs
Percent of Normal

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

USDA

Montana State Library Natural Resource Information System

Sun-Teton-Marias River Basin



Rapid runoff has been the story of this water supply outlook report and the Sun, Teton and Marias Rivers have followed suit. Snowpack across the region was almost twice that of normal, with record-breaking SWE at Wood Creek Snotel and near record-breaking at Waldron. We hoped that this snowpack would melt off slowly to allow water managers to drain down reservoirs while irrigators are just ramping up for the season, but spring runoff progressed rather quickly. The Sun River above Gibson Reservoir doubled discharge in just nine days with ~4000 CFS from the South Fork and ~3000 CFS from the North Fork, filling Gibson Reservoir to near capacity in only 21 days (adding 36 KAF). Water managers thankfully were on top of the discharge and are now passing inflow, and will fill to capacity towards the end of the melt out season. Only 5.5" SWE remains at Mount Lockhart Snotel, the highest elevation snow monitoring site in the drainage. Two Medicine River reached its snowmelt-driven peak on May 11th at ~3600 CFS, while Cut Bank Creek peaked after the prairie snowmelt in late April, fueling the Marias River two peak discharge – the low elevation valley snow, and the high elevation Front Range mountain snowpack. Lake Elwell caught this run off, and has been filling since mid-March, currently just over 900 KAF (112% of average). There should be ample water supply for irrigators and recreationists alike from reservoir storage, though demand will surely dictate availability later this summer.

Sun-Teton-Marias River Basin Data Summary

Snowpack	**Percent of 1981-2010 Normal (Median)**	**Last Year Percentage of Normal (Median)**
SUN	189%	144%
TETON	189%	144%
MARIAS	55%	142%
Basin-Wide	**83%**	**142%**

Precipitation	**Monthly Percentage of Average**	**WYTD Percentage of 1981-2010 Average***	**WYTD Last Year Percentage of Average**
Mountain Precipitation	89%	122%	118%
Valley Precipitation	126%	175%	151%
Basin-Wide Precipitation	**98%**	**128%**	**121%**

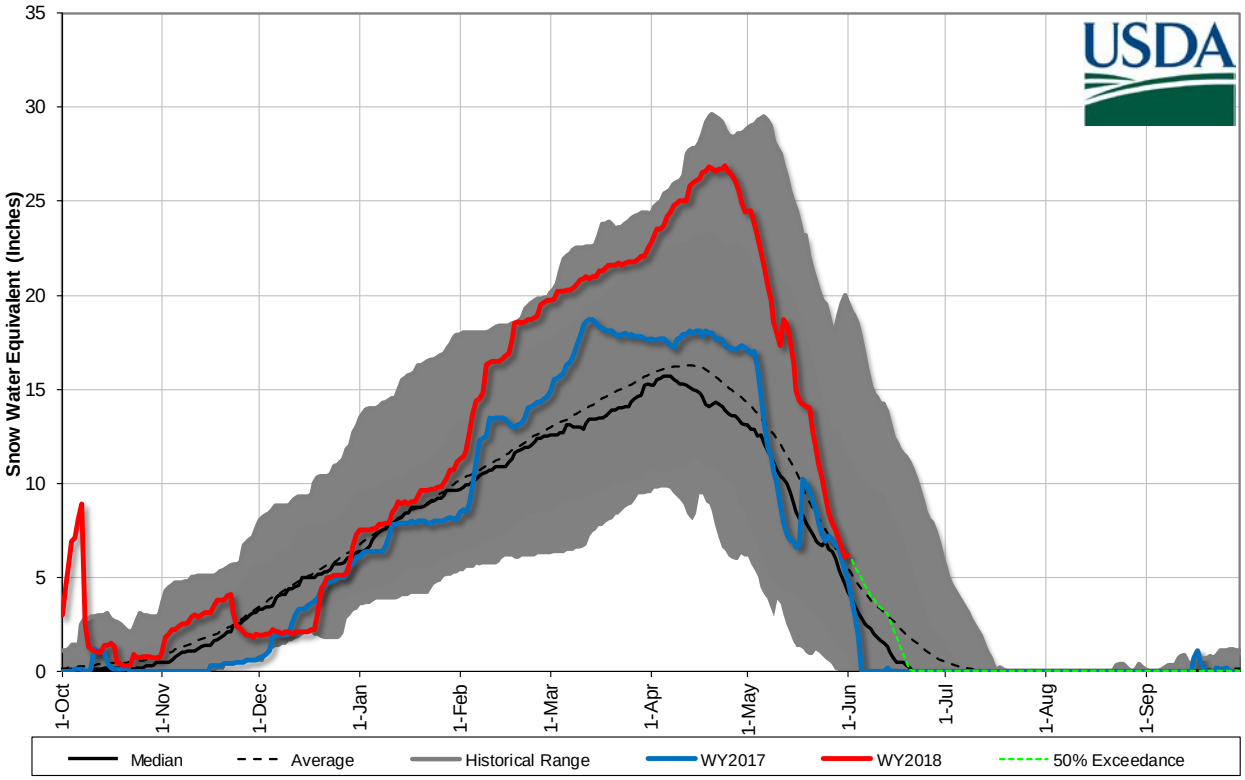
*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

Reservoir Storage	**Percentage of Average**	**Percentage of Capacity (Total)**	**Last Year Percentage of Average**
Basin-Wide Storage	**114%**	**72%**	**110%**

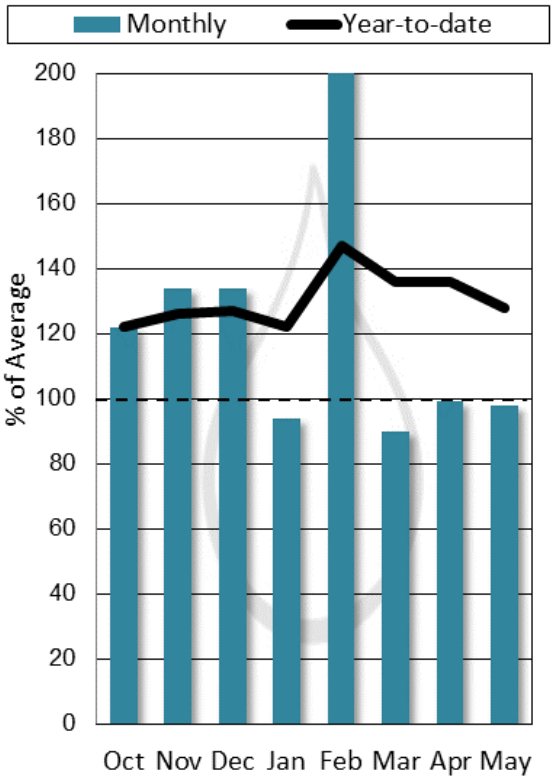
Reservoir Storage End of May, 2018	**Current (KAF)**	**Last Year (KAF)**	**Average (KAF)**	**Capacity (KAF)**	**% Average**	**% Capacity**
Gibson Res	86.1	90.6	89.8	99.1	**96%**	**87%**
Pishkun Res	30.3	29.6	29.8	32.0	**102%**	**95%**
Willow Creek Res - Augusta	31.2	30.9	28.3	32.2	**110%**	**97%**
Lower Two Medicine Lake		12.5	12.0	11.9		
Four Horns Lake		12.5	11.6	19.2		
Swift Res	30.1	18.3	23.1	30.0	**130%**	**100%**
Lake Frances	102.2	86.5	73.9	112.0	**138%**	**91%**
Lake Elwell (Tiber)	903.5	891.3	796.1	1347.0	**113%**	**67%**
Nilan Reservoir	11.5	11.1	8.5	11.0	**136%**	**105%**

Sun-Teton-Marias River Basin Snowpack with Non-Exceedence Projections

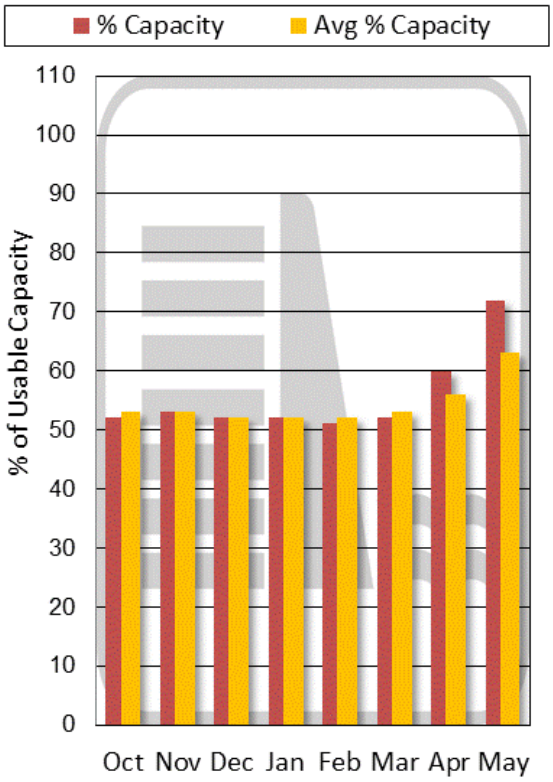
Based on provisional SNOTEL daily data as of 5/1/2018



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.

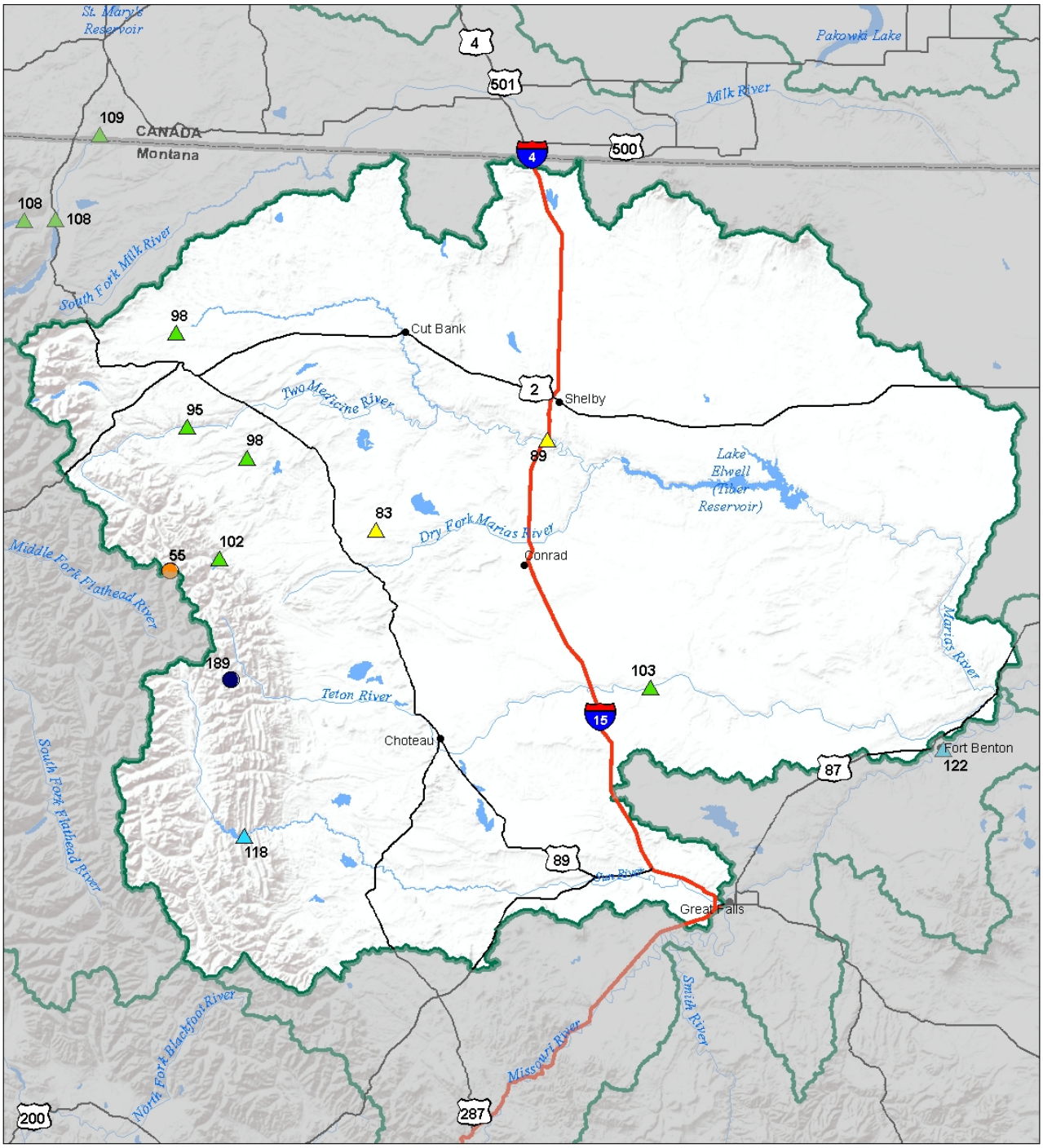
Streamflow Forecast Summary

SUN-TETON-MARIAS	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Chance Actual Volume Will Exceed Forecasted Volume						
Gibson Reservoir Inflow	JUN-JUL	205	230	250	*119%*	270	295	210
	JUN-SEP	240	275	295	*118%*	315	345	250
Two Medicine R nr Browning2	JUN-JUL	54	68	78	*95%*	88	102	82
	JUN-SEP	61	78	89	*95%*	100	117	94
Badger Ck nr Browning	JUN-JUL	30	39	46	*100%*	53	62	46
	JUN-SEP	41	52	60	*98%*	68	79	61
Swift Reservoir Inflow2	JUN-JUL	23	28	32	*107%*	36	41	30
	JUN-SEP	29	37	42	*102%*	47	55	41
Dupuyer Ck nr Valier	JUN-JUL	2.1	3.8	4.9	*91%*	6	7.7	5.4
	JUN-SEP	2	4.2	5.7	*83%*	7.2	9.4	6.9
Cut Bank Ck nr Browning	JUN-JUL	22	31	37	*97%*	44	53	38
	JUN-SEP	25	36	43	*98%*	50	61	44
Marias R nr Shelby2	JUN-JUL	55	106	140	*90%*	174	225	156
	JUN-SEP	52	112	153	*89%*	194	255	172
Teton R nr Dutton	JUN-JUL	0.8	12.4	25	*104%*	38	56	24
	JUN-SEP	1	14.9	30	*103%*	45	67	29

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

Sun-Teton-Marias River Basin
Streamflow Forecast, Snow Water Equivalent
Percentage of Normal
June 1, 2018



Snow Water Equivalent
Percent of Normal

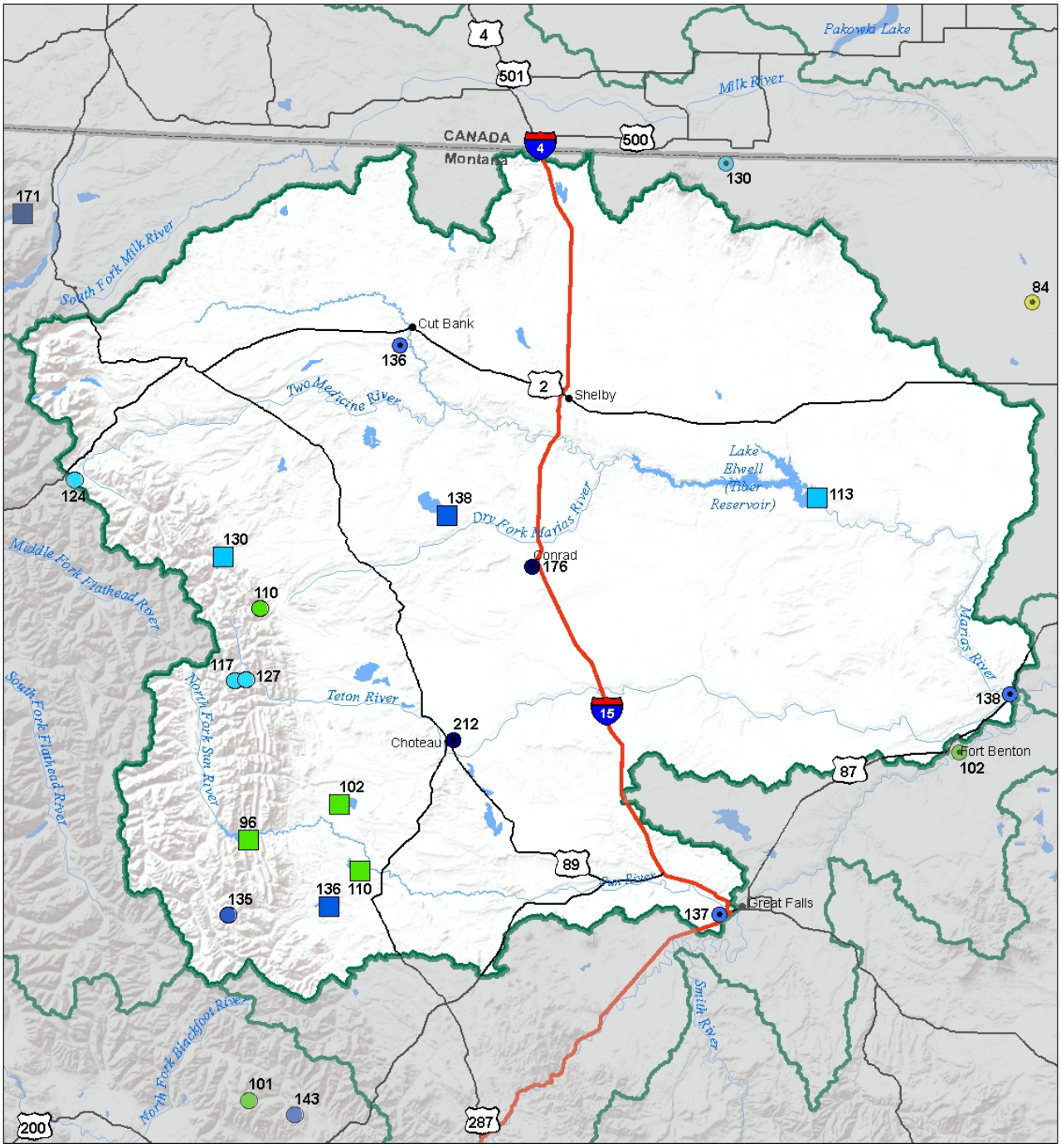
SNOTEL				Snowcourse			
> 150%	71 - 90%			> 150%	71 - 90%		
131 - 150%	51 - 70%			131 - 150%	51 - 70%		
111 - 130%	1 - 50%			111 - 130%	1 - 50%		
91 - 110%	0%			91 - 110%	0%		

Streamflow Forecast
Percent of Average Flows

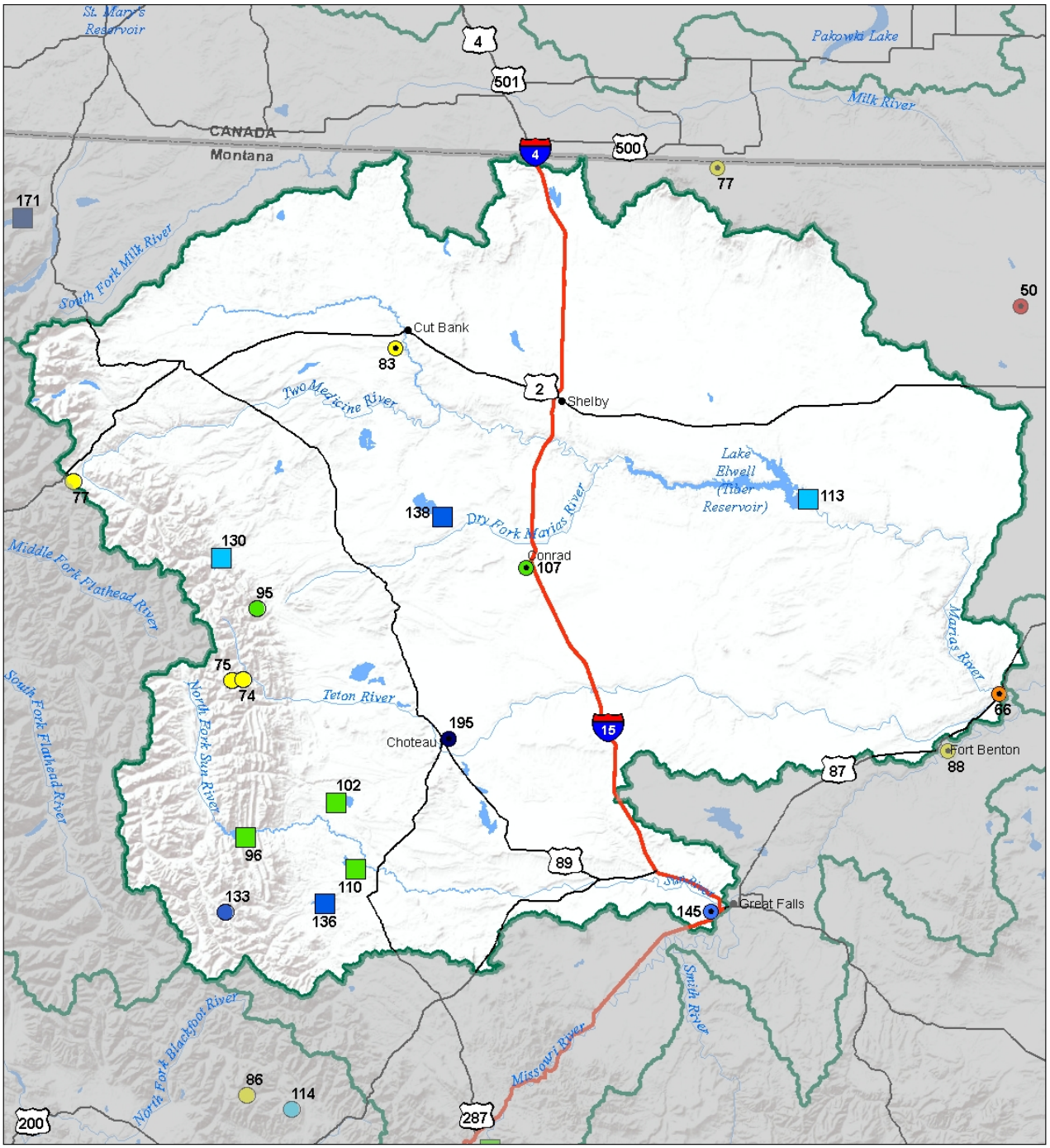
- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%

USDA
Montana State Library Natural Resource Information System

Sun-Teton-Marias River Basin
Water Year to Date Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018



Sun-Teton-Marias River Basin
Monthly Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018 (May 1, 2018 - June 1, 2018)



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%

USDA

Montana State Library Natural Resource Information System

St. Mary-Milk River Basin

The St. Mary and Milk Rivers received below average precipitation in both mountain and valley sites during May while snowpack is near normal in both basins. All the valley snow in the Milk River drainage has melted which is typical for this time of year, and only the high elevation sites in the St. Mary River drainage continue to hold Snow. Many Glacier SNOTEL at 4900' is snow free while Flattop Mountain SNOTEL at 6300' is only half melted out with 30" of SWE left to go; what a difference a little elevation makes. Flattop has been melting quickly though, with above average temperatures which have been eating away at the above average snowpack we received this year (136% of normal down to 102% in just the month of May). Lake Sherburne has steadily been catching this snowmelt since the end of April, currently at 85% of capacity and 171% of average. Flooding along the Milk River has subsided as the prairie snowpack has melted off and flows have returned to precipitation dominated, instead of a snowmelt-driven system. The St. Mary River has been in flood stage since early May and just waned under action flood stage in early June. This wet spring has many farmers a couple weeks behind in planting crops as fields dry out sufficiently; thankfully water managers have planned accordingly to supply irrigation demands in the coming months. The 50% exceedance streamflow forecast for the St. Mary is predicted to be 111% of normal, providing ample water supply for users downstream.

St. Mary-Milk River Basin Data Summary

Snowpack	**Percent of 1981-2010 Normal (Median)**	**Last Year Percentage of Normal (Median)**
ST. MARY	102%	135%
BEARPAW MOUNTAINS	%	%
CYPRESS HILLS, CANADA	%	%
MILK RIVER BASIN	%	%
Basin-Wide	**102**	**135**

Precipitation	**Monthly Percentage of Average**	**WYTD Percentage of 1981-2010 Average***	**WYTD Last Year Percentage of Average**
Mountain Precipitation (St. Mary)	25%	111%	127%
Mountain Precipitation (Bearpaw Mtns)	21%	102%	115%
Valley Precipitation	58%	110%	132%
Basin-Wide Precipitation	**40%**	**110%**	**127%**

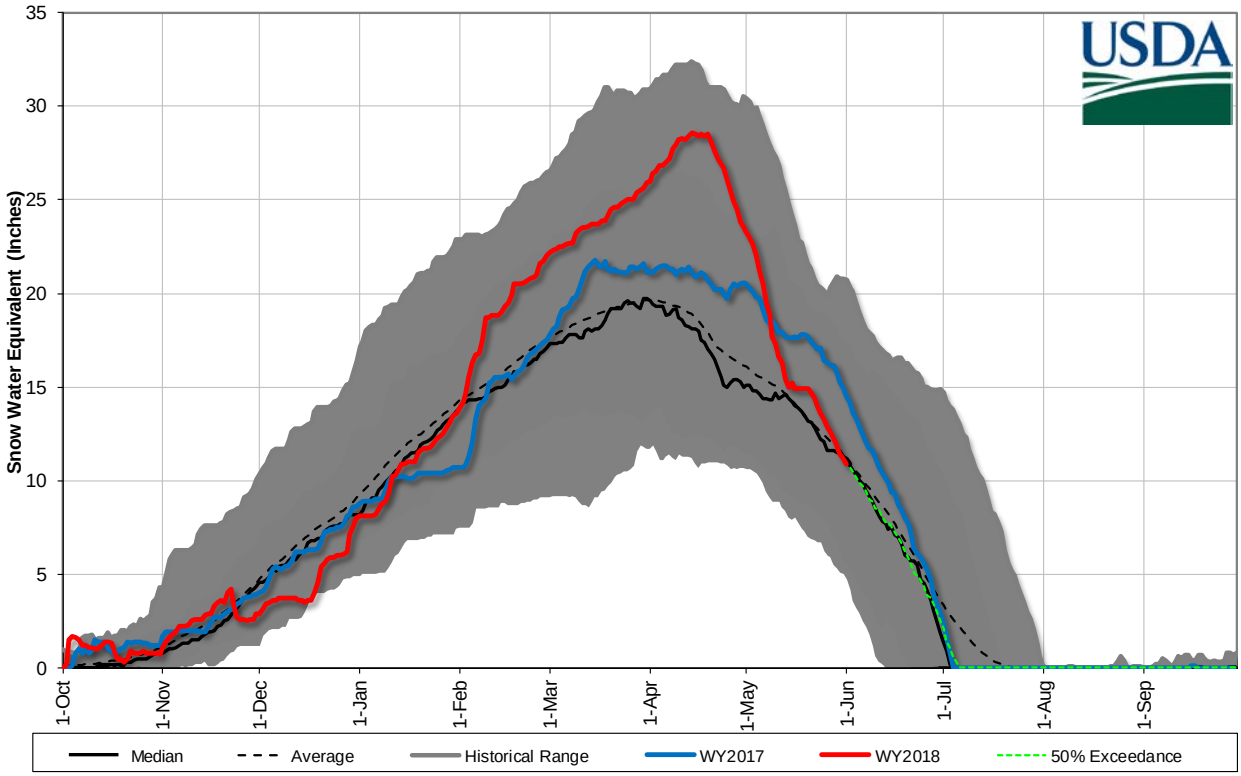
*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

Reservoir Storage	**Percentage of Average**	**Percentage of Capacity (Total)**	**Last Year Percentage of Average**
Basin-Wide Storage	**138%**	**77%**	**122%**

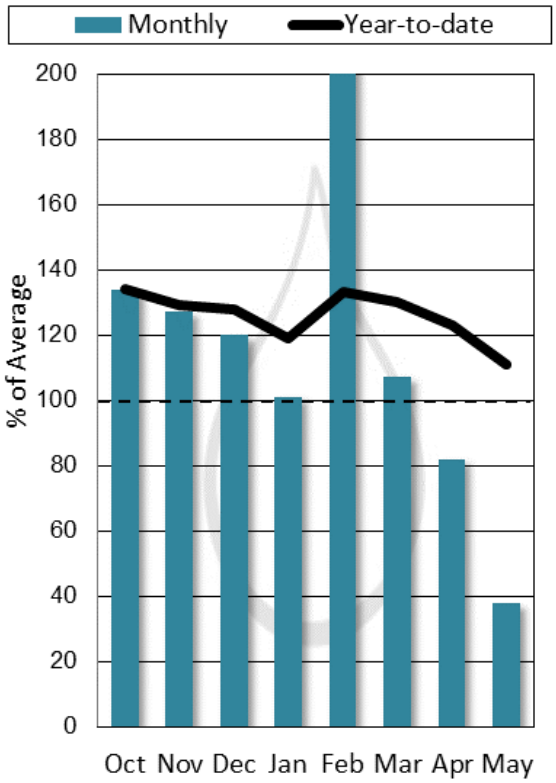
Reservoir Storage End of May, 2018	**Current (KAF)**	**Last Year (KAF)**	**Average (KAF)**	**Capacity (KAF)**	**% Average**	**% Capacity**
Lake Sherburne	54.5	49.8	31.8	64.3	**171%**	**85%**
Fresno Res	88.8	71.3	71.9	127.0	**123%**	**70%**
Nelson Res	55.0	54.2	40.0	66.8	**138%**	**82%**

Saint Mary-Milk River Basin Snowpack with Non-Exceedence Projections

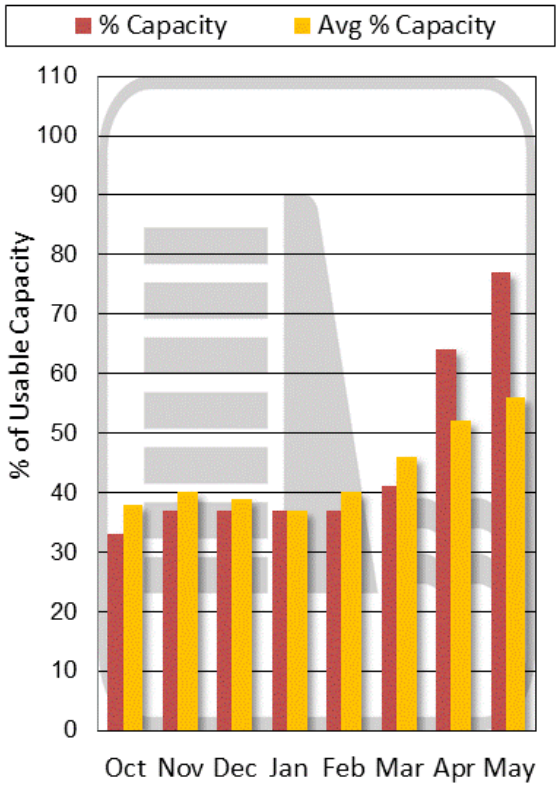
Based on provisional SNOTEL daily data as of 5/1/2018



Mountain and Valley Precipitation



End of Month Reservoir Storage



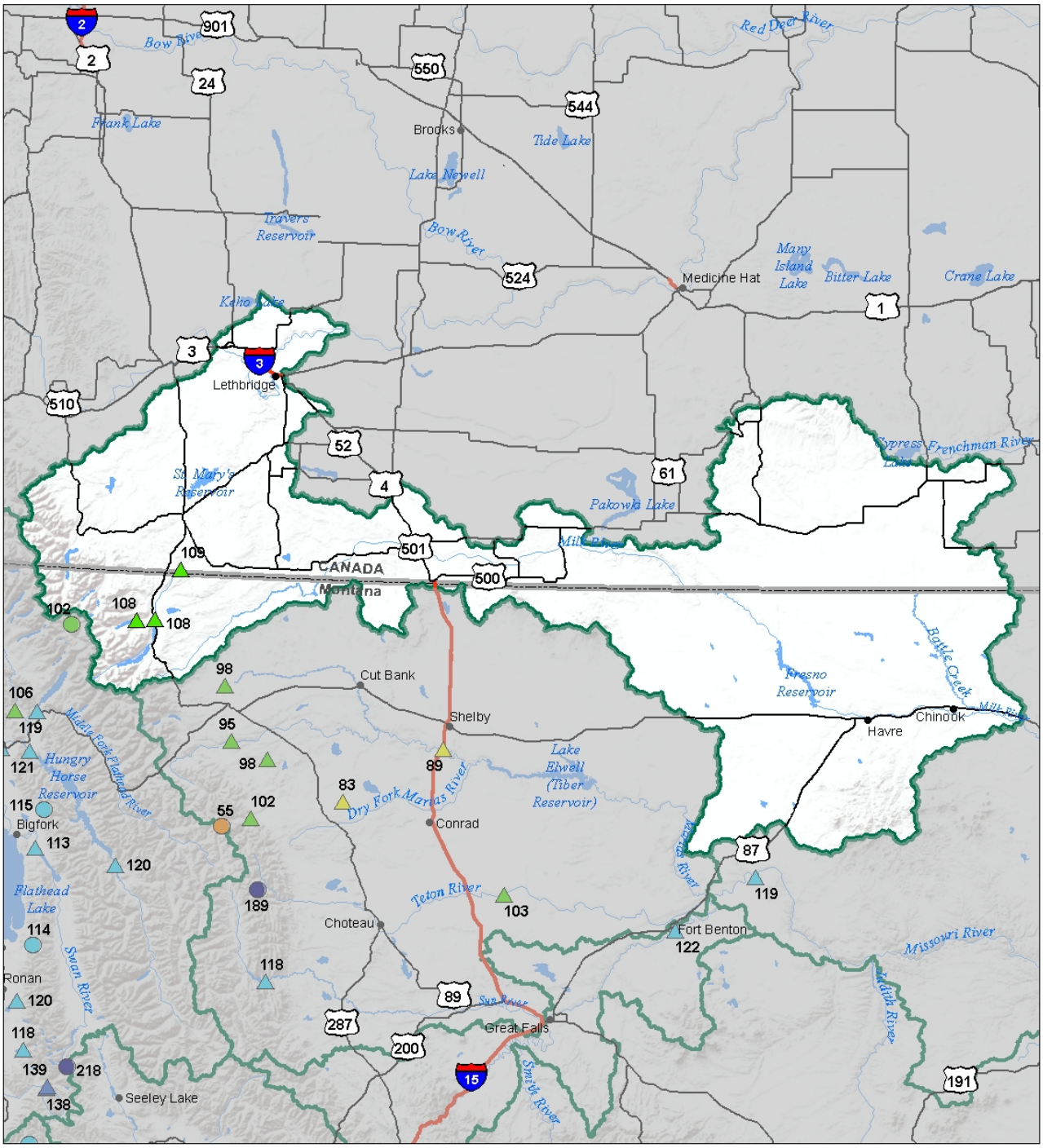
Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Streamflow Forecast Summary

ST. MARY & MILK BASINS	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Chance Actual Volume Will Exceed Forecasted Volume						
Lake Sherburne Inflow	JUN-JUL	46	55	62	*111%*	68	77	56
	JUN-SEP	59	69	77	*108%*	84	95	71
Two Medicine R nr Browning2	JUN-JUL	193	230	260	*111%*	285	325	235
	JUN-SEP	240	285	320	*108%*	350	395	295
Badger Ck nr Browning	JUN-JUL	210	265	305	*111%*	340	395	275
	JUN-SEP	270	330	375	*109%*	415	475	345

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

St Mary's-Milk River Basin
Streamflow Forecast, Snow Water Equivalent
Percentage of Normal
June 1, 2018



Snow Water Equivalent
Percent of Normal

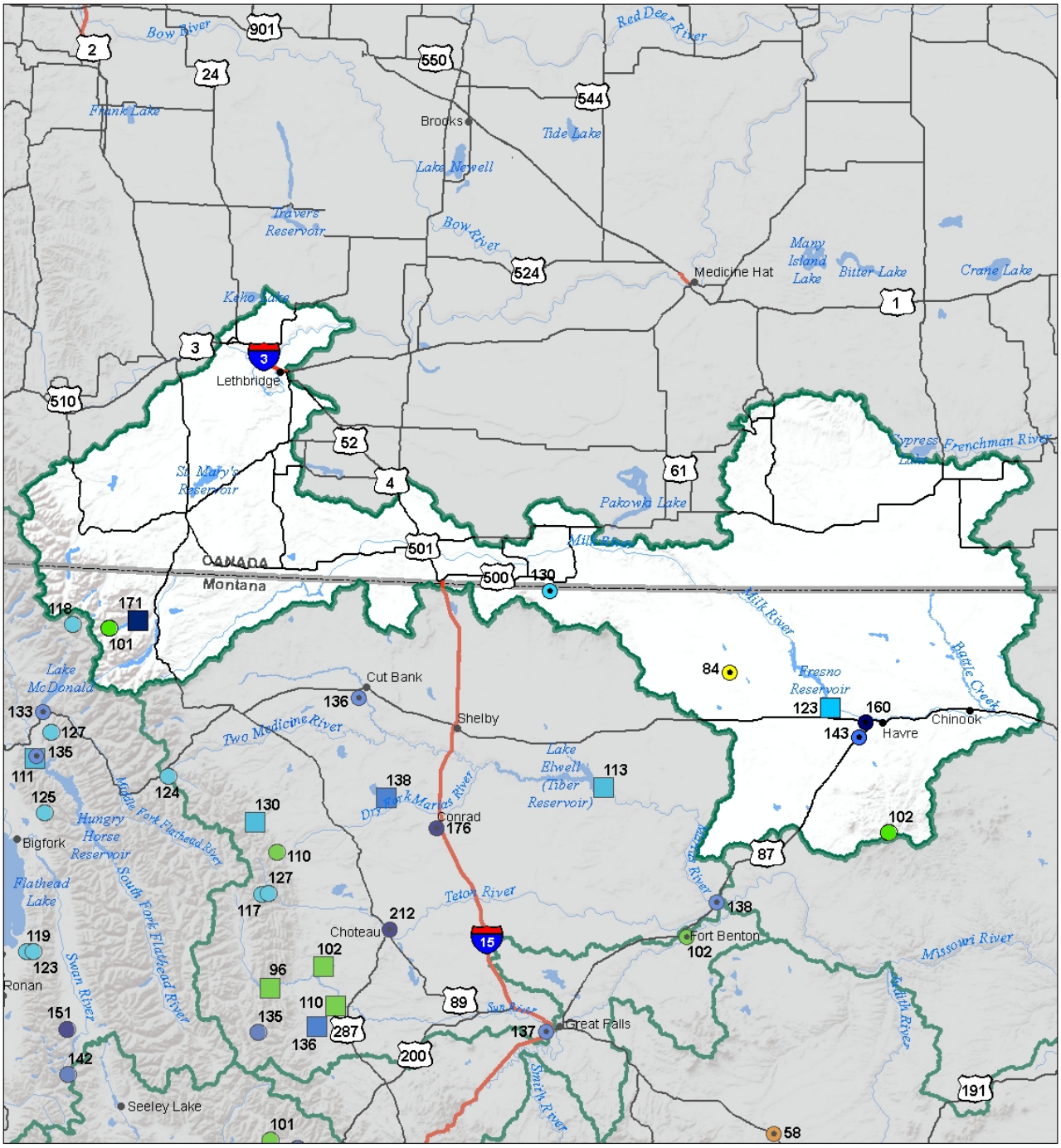
SNOTEL		Snowcourse	
> 150%	71 - 90%	> 150%	71 - 90%
131 - 150%	51 - 70%	131 - 150%	51 - 70%
111 - 130%	1 - 50%	111 - 130%	1 - 50%
91 - 110%	0%	91 - 110%	0%

Streamflow Forecast
Percent of Average Flows

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

USDA
Montana State Library Natural Resource Information System

St Mary's-Milk River Basin
Water Year to Date Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018



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%	

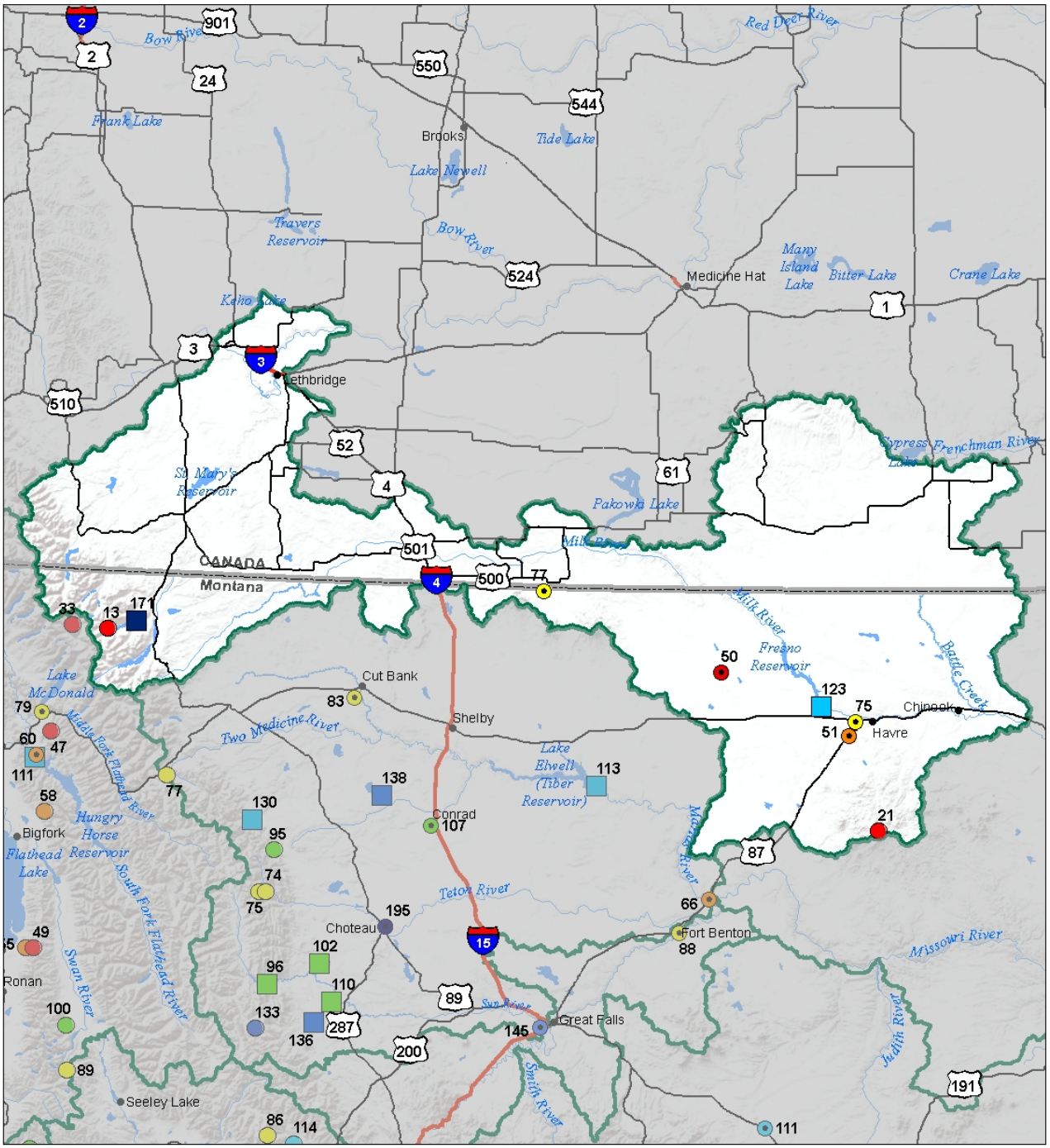
Reservoirs
Percent of Normal

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

USDA

Montana State Library Natural Resource Information System

St Mary's-Milk River Basin
Monthly Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018 (May 1, 2018 - June 1, 2018)



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%

USDA

Montana State Library Natural Resource Information System

Upper Yellowstone River Basin

There were a lot of records set in the Upper Yellowstone River basin over the course of the winter, so why should May be any different? Snowpack peaked this year at well above normal to record-setting levels in the basin but made a quick transition to melt this water year. Almost like spring was skipped entirely, snowmelt began in earnest at low to mid-elevations during the latter half of April, and at all elevations by the beginning of May. Rivers across the basin rose rapidly due to the abundant snowpack available for melt and streamflows were well above average throughout the month. Although peak daily streamflows (instantaneous CFS) have remained below record levels in many of the river basins, the total amount of water that moved down the rivers during the month has set new records. The Yellowstone at Corwin, Livingston, and Billings all set new records for total monthly flows for May. Not to be outdone, the Boulder at Big Timber, Shields River at Livingston, and Clark's Fork also set new May monthly records. So what does this mean? In addition to having a snowpack that peaked above normal, runoff is occurring earlier than normal this year. The long periods of well above average temperatures and abundant sunshine might have been nice to thaw everyone out after a long winter, but it might impact streamflow prospects later in the summer as demand on water resources increases. Streamflow forecasts for the June 1st – September 30th period reflect the rapid melt and have dropped since the May 1st report, but remain near to well above average across the basin. Water users should consult the streamflow forecast section below for their rivers of interest.

Upper Yellowstone River Basin Data Summary

Snowpack	**Percent of 1981-2010 Normal (Median)**	**Last Year Percentage of Normal (Median)**
YELLOWSTONE ab LIVINGSTON	127%	140%
SHIELDS	30%	97%
BOULDER-STILLWATER	99%	101%
RED LODGE-ROCK CREEK	7%	116%
CLARK'S FORK	155%	160%
Basin-Wide	**117%**	**143%**

Precipitation	**Monthly Percentage of Average**	**WYTD Percentage of 1981-2010 Average***	**WYTD Last Year Percentage of Average**
Mountain Precipitation	85%	129%	130%
Valley Precipitation	183%	160%	139%
Basin-Wide Precipitation	**107%**	**134%**	**132%**

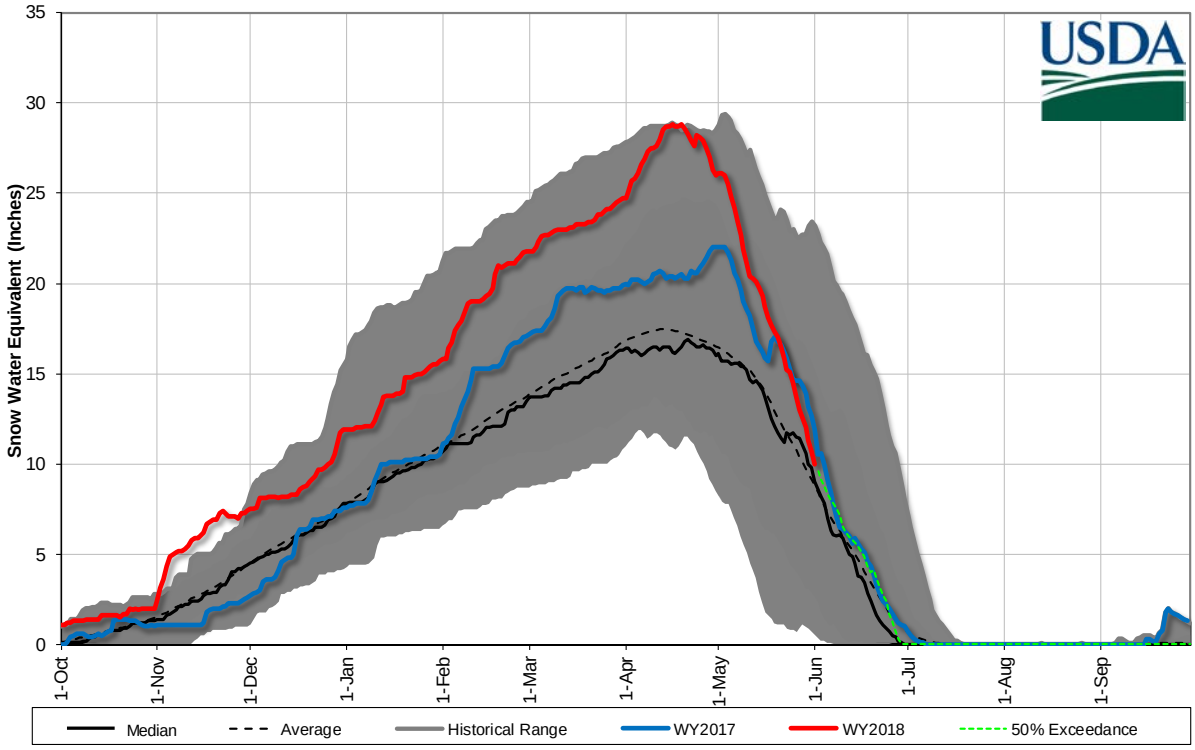
*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

Reservoir Storage	**Percentage of Average**	**Percentage of Capacity (Total)**	**Last Year Percentage of Average**
Basin-Wide Storage	**134%**	**82%**	**110%**

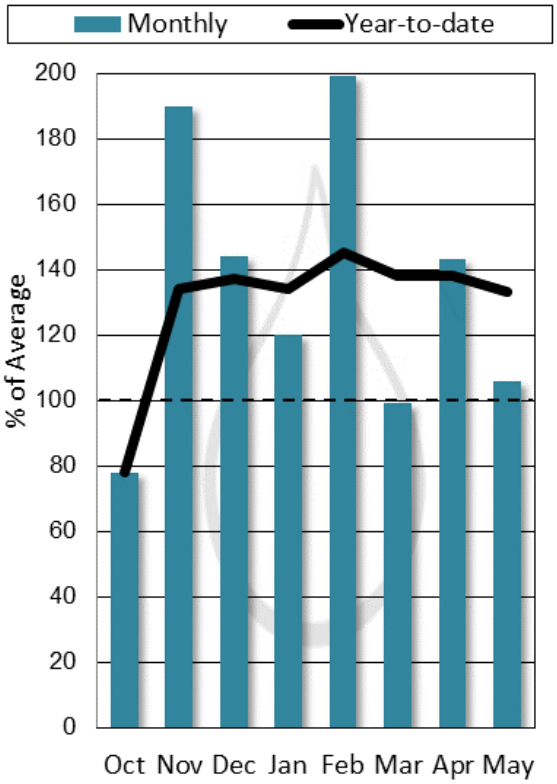
Reservoir Storage End of May, 2018	**Current (KAF)**	**Last Year (KAF)**	**Average (KAF)**	**Capacity (KAF)**	**% Average**	**% Capacity**
Mystic Lake	11.3	4.2	5.8	21.0	**196%**	**54%**
Cooney Res	28.3	28.2	23.7	27.4	**119%**	**103%**

Upper Yellowstone River Basin Snowpack with Non-Exceedence Projections

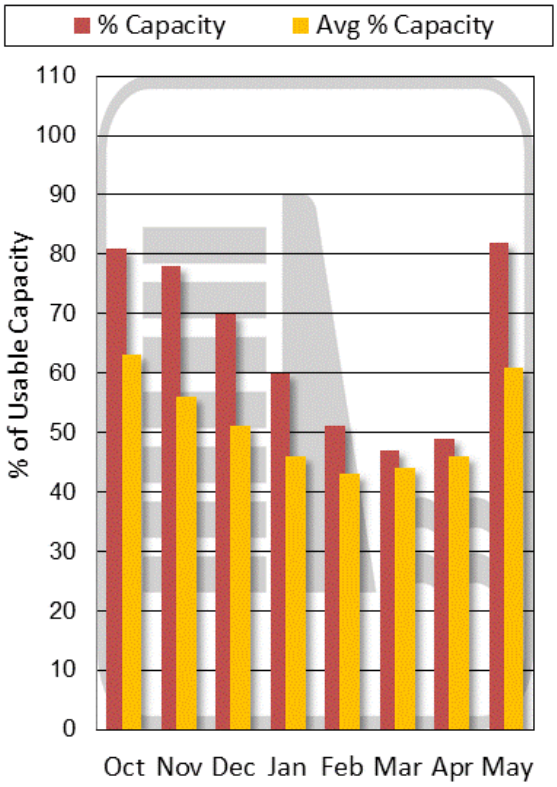
Based on provisional SNOTEL daily data as of 5/1/2018



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.

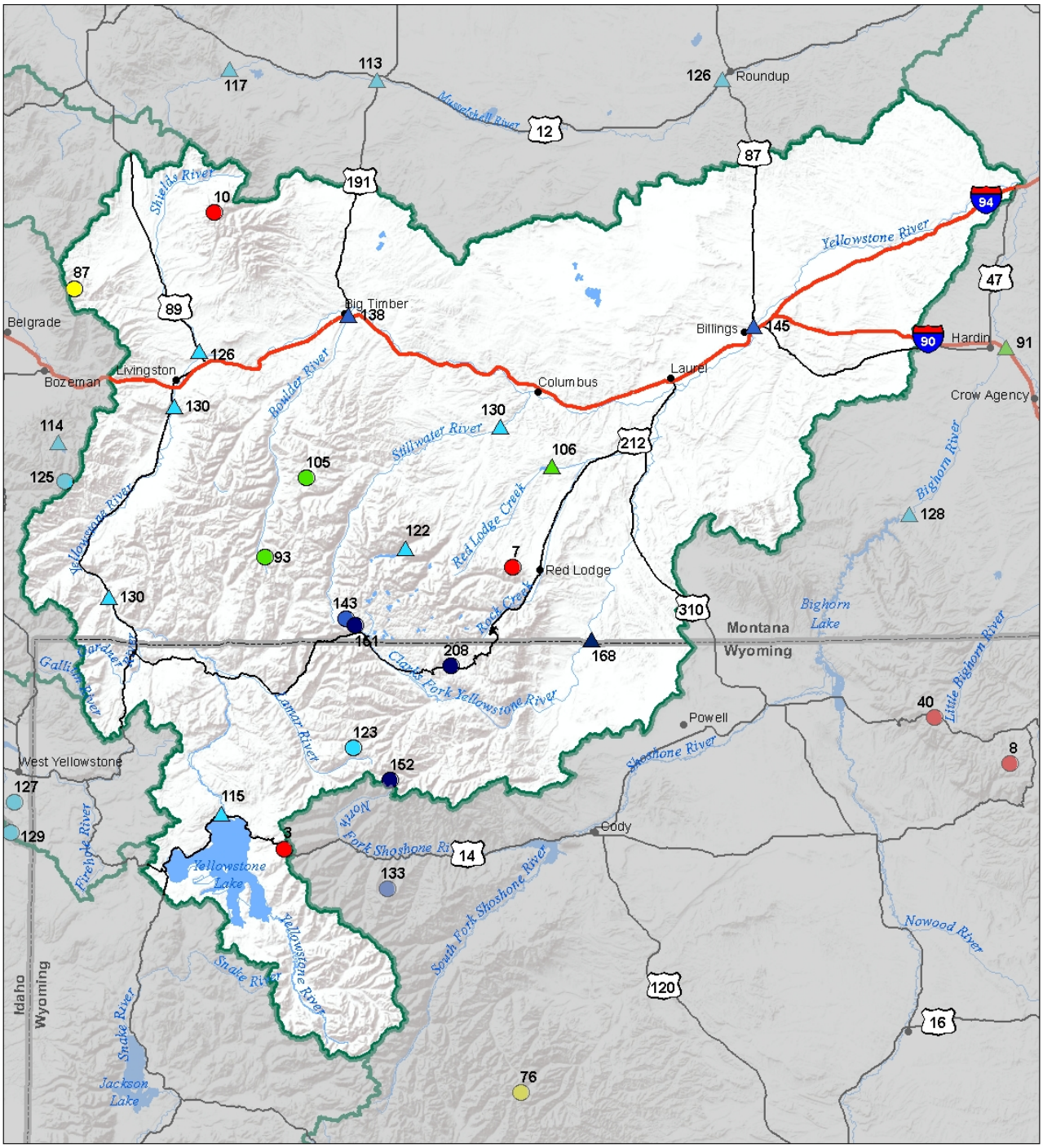
Streamflow Forecast Summary

UPPER YELLOWSTONE RIVER BASIN	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Chance Actual Volume Will Exceed Forecasted Volume						
Yellowstone R at Yellowstone Lake Outlet	JUN-JUL	410	485	535	*115%*	580	655	465
	JUN-SEP	615	700	755	*115%*	815	900	655
Yellowstone R at Corwin Springs	JUN-JUL	1160	1280	1370	*132%*	1450	1570	1040
	JUN-SEP	1470	1620	1730	*130%*	1830	1980	1330
Yellowstone R at Livingston	JUN-JUL	1320	1470	1570	*133%*	1680	1830	1180
	JUN-SEP	1670	1860	1980	*130%*	2110	2300	1520
Shields R nr Livingston	JUN-JUL	45	68	83	*134%*	99	122	62
	JUN-SEP	52	78	96	*126%*	114	140	76
Boulder R at Big Timber	JUN-JUL	230	260	285	*143%*	305	335	200
	JUN-SEP	245	285	310	*138%*	340	380	225
Mystic Lake Inflow2	JUN-JUL	51	55	58	*123%*	61	65	47
	JUN-SEP	67	73	77	*122%*	81	87	63
Stillwater R nr Absarokee2	JUN-JUL	355	395	425	*131%*	460	500	325
	JUN-SEP	420	480	520	*130%*	560	620	400
Clarks Fk Yellowstone R nr Belfry	JUN-JUL	515	560	595	*170%*	625	670	350
	JUN-SEP	570	625	665	*168%*	700	755	395
Cooney Reservoir Inflow	JUN-JUL	12	18.5	23	*105%*	27	34	22
	JUN-SEP	19.8	28	33	*106%*	38	46	31
Yellowstone R at Billings	JUN-JUL	2600	2950	3190	*147%*	3430	3790	2170
	JUN-SEP	3080	3540	3850	*145%*	4160	4610	2660

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

Upper Yellowstone River Basin
Streamflow Forecast, Snow Water Equivalent
Percentage of Normal
June 1, 2018



Snow Water Equivalent
Percent of Normal

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

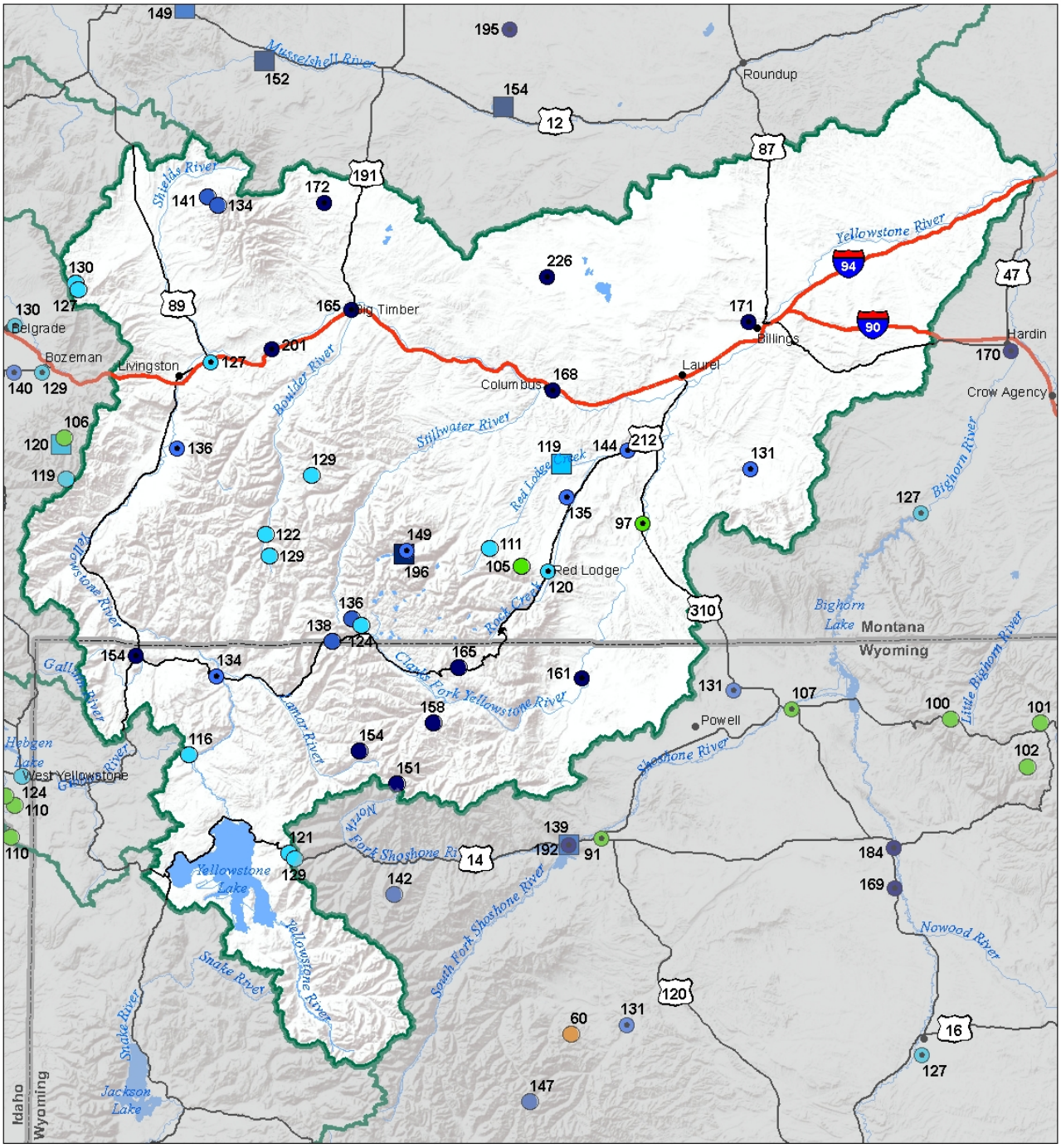
Streamflow Forecast
Percent of Average Flows

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

USDA

Montana State Library Natural Resource Information System

Upper Yellowstone River Basin
Water Year to Date Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018



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%	

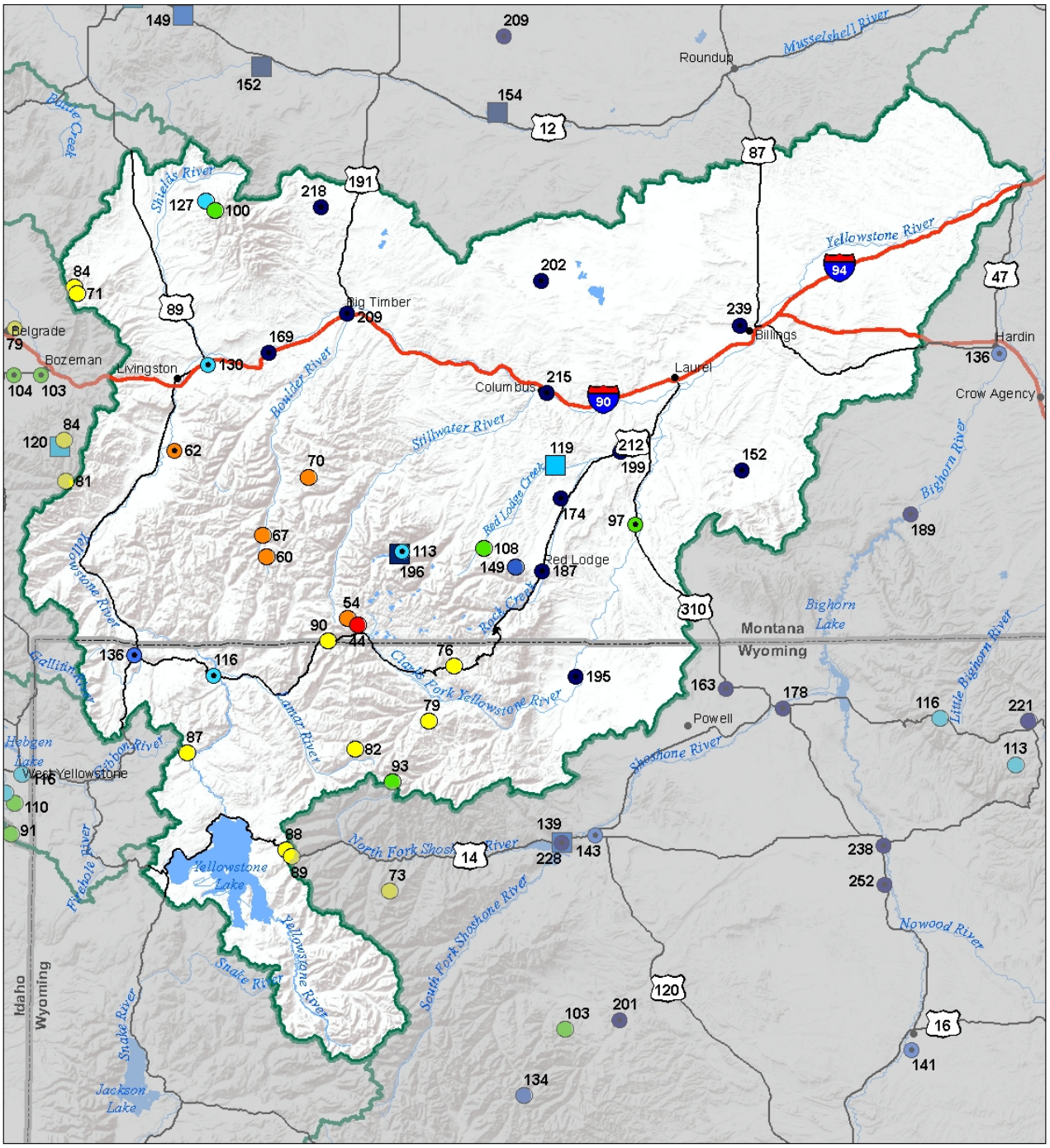
Reservoirs
Percent of Normal

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

USDA

Montana State Library Natural Resource Information System

Upper Yellowstone River Basin
Monthly Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018 (May 1, 2018 - June 1, 2018)



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%	

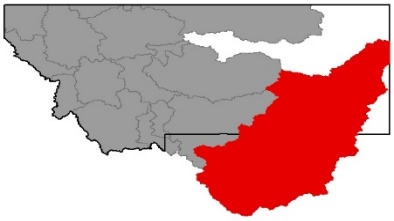
Reservoirs
Percent of Normal

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

USDA

Montana State Library Natural Resource Information System

Lower Yellowstone River Basin



Snowmelt was in full force during May in the Lower Yellowstone Basin. The majority of the SNOTEL sites in the basin had melted out by the third week in May. By June 1st the well above normal snowpack in the Powder River Basin was completely gone, but elevations above 9000 feet in the headwaters of the Tongue and Shoshone Rivers and over 10,000 feet in the Wind River Range were still holding onto some snow. Togwotee Pass SNOTEL in the headwaters of the Wind River and Blackwater SNOTEL in the headwaters of the Shoshone River still had over 20" of snow water on June 1st which is well above normal for this time of year. The rapid snowmelt was reflected in streamflow volumes across the basin. However, the big streamflow story this month was due to a precipitation event. Over Memorial Day the northern Big Horn Mountains received over 2 inches of rain in some locations. The headwaters of the Tongue River recorded the largest amounts of rain, and the Tongue River at Dayton rose 1500 cfs as a direct result of this event bringing the river up to just a few tenths of feet below flood stage. Current streamflow forecasts for the June and July call for the main stem of the Yellowstone, the Bighorn near St. Xavier and the Powder River to continue to flow above normal and the Tongue River to be slightly below normal. As we saw this past month, one large precipitation event can overtake the snowmelt signal in the Tongue and Powder Rivers so it will be important to stay abreast of short-term weather forecasts over the next month.

Lower Yellowstone River Basin Data Summary

Snowpack	**Percent of 1981-2010 Normal (Median)**	**Last Year Percentage of Normal (Median)**
WIND RIVER BASIN	88%	451%
SHOSHONE RIVER BASIN	121%	167%
BIGHORN RIVER BASIN	88%	168%
LITTLE BIGHORN BASIN	40%	128%
TONGUE RIVER BASIN	40%	238%
POWDER RIVER BASIN	10%	300%
Basin-Wide	**84%**	**261%**

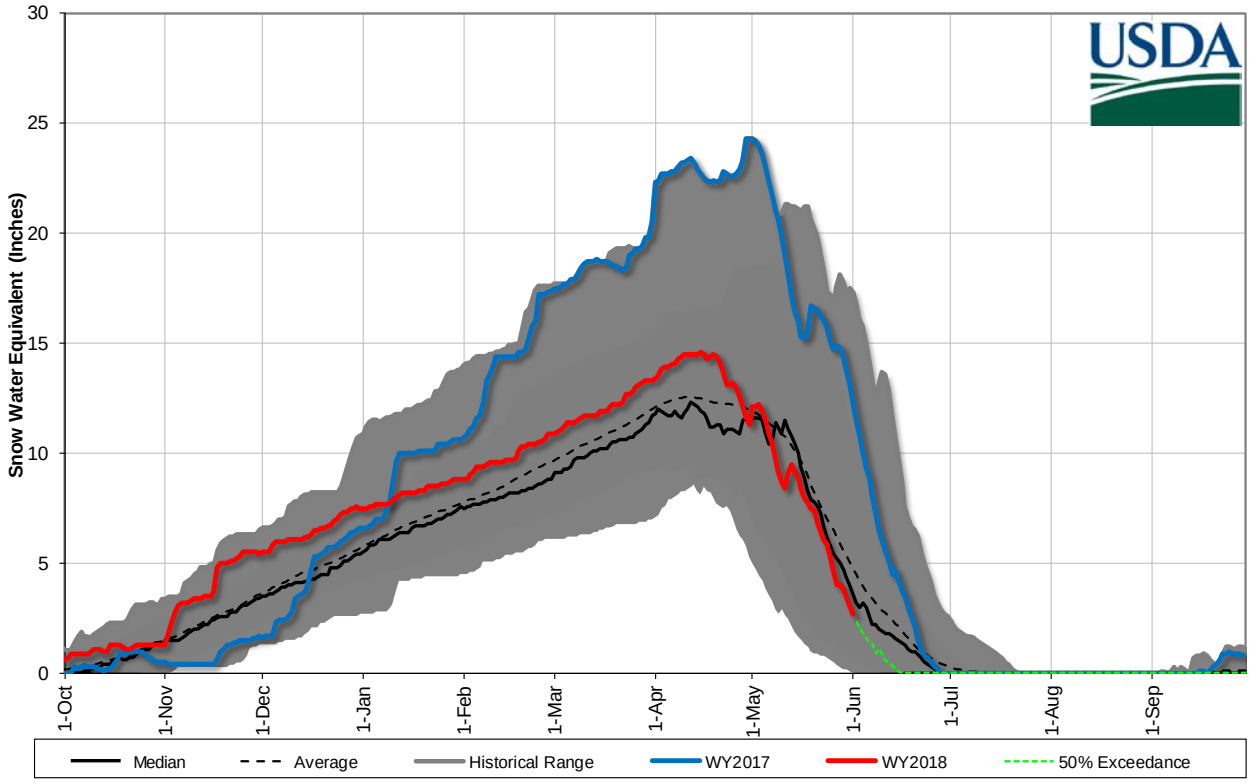
Precipitation	**Monthly Percentage of Average**	**WYTD Percentage of 1981-2010 Average***	**WYTD Last Year Percentage of Average**
Mountain Precipitation	122%	107%	139%
Valley Precipitation	157%	131%	138%
Basin-Wide Precipitation	**139%**	**115%**	**139%**

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

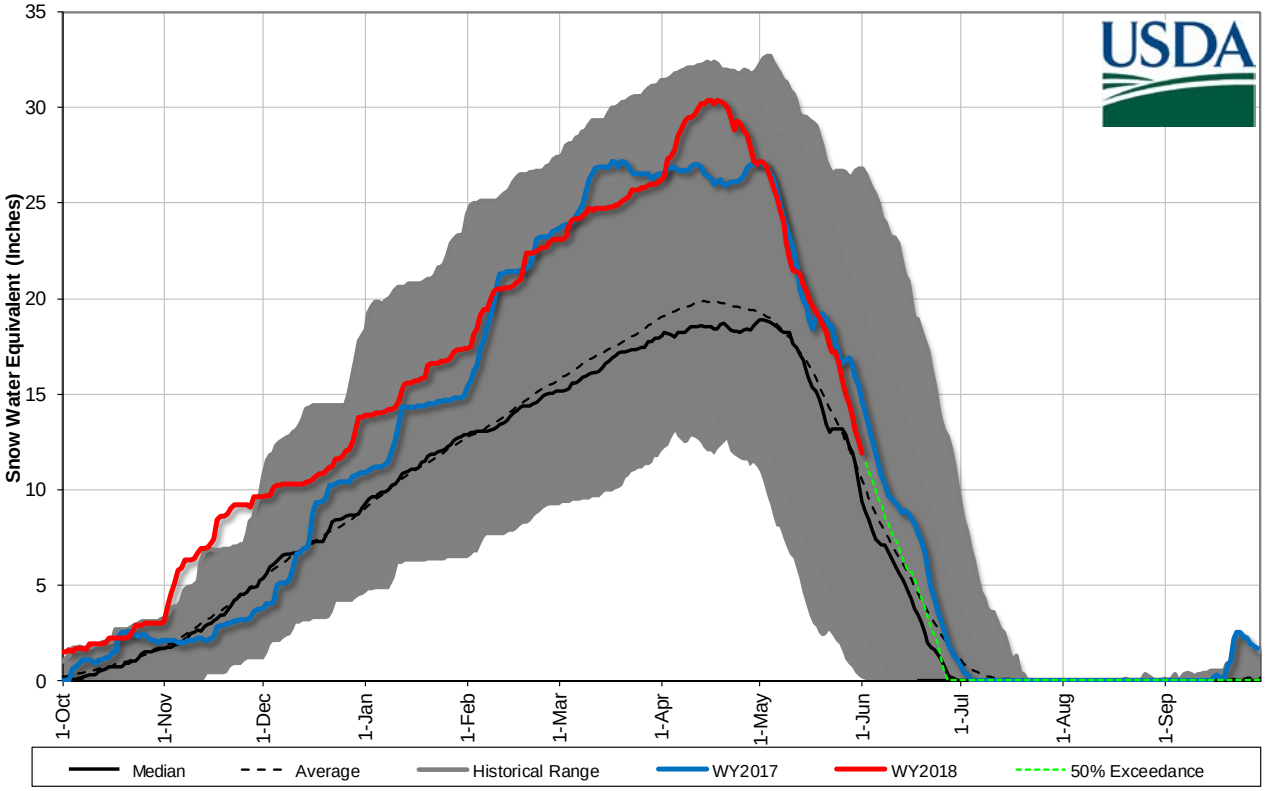
Reservoir Storage	**Percentage of Average**	**Percentage of Capacity (Total)**	**Last Year Percentage of Average**
Basin-Wide Storage	**112%**	**70%**	**89%**

Reservoir Storage End of May, 2018	**Current (KAF)**	**Last Year (KAF)**	**Average (KAF)**	**Capacity (KAF)**	**% Average**	**% Capacity**
Bighorn Lake	926.4	722.7	848.0	1356.0	**109%**	**68%**
Tongue River Res	83.3	81.2	52.6	79.1	**158%**	**105%**

Wind River Basin Snowpack with Non-Exceedence Projections
Based on provisional SNOTEL daily data as of 5/1/2018

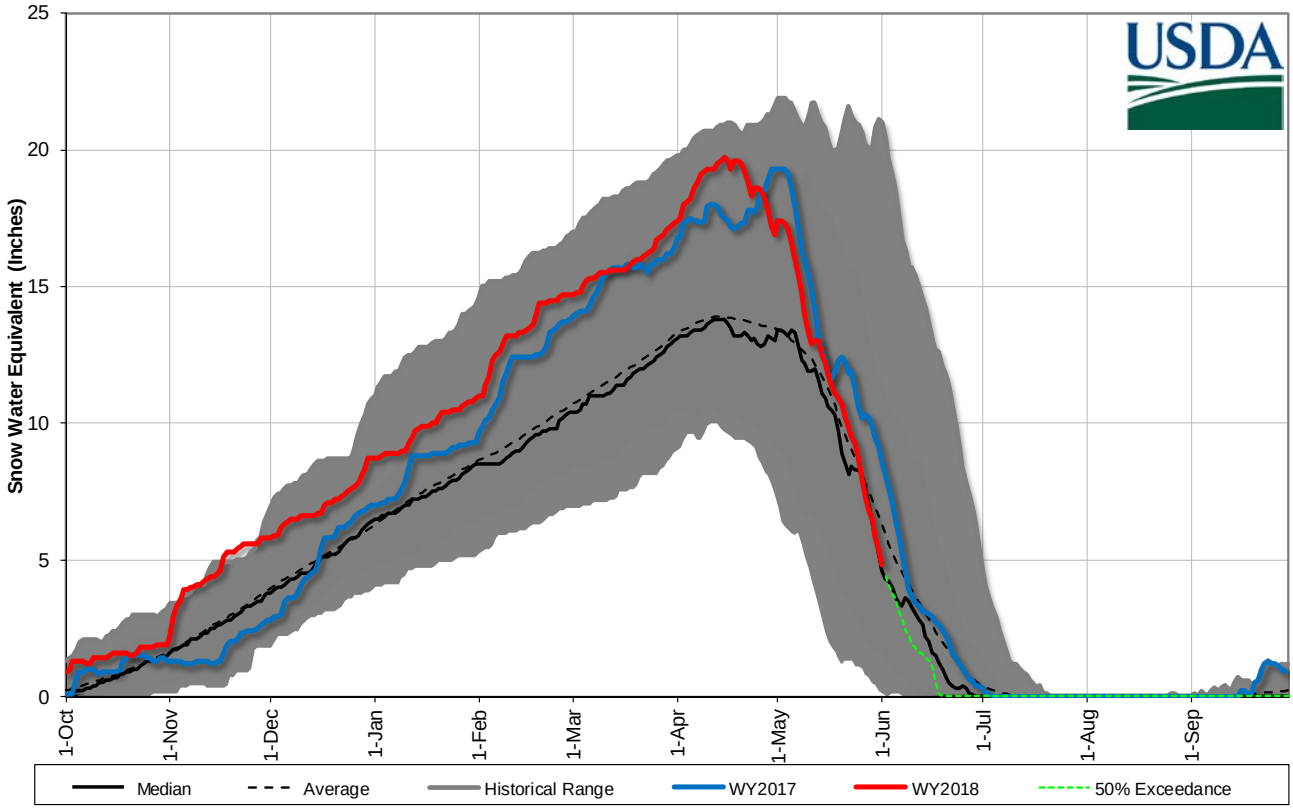


Shoshone River Basin Snowpack with Non-Exceedence Projections
Based on provisional SNOTEL daily data as of 5/1/2018



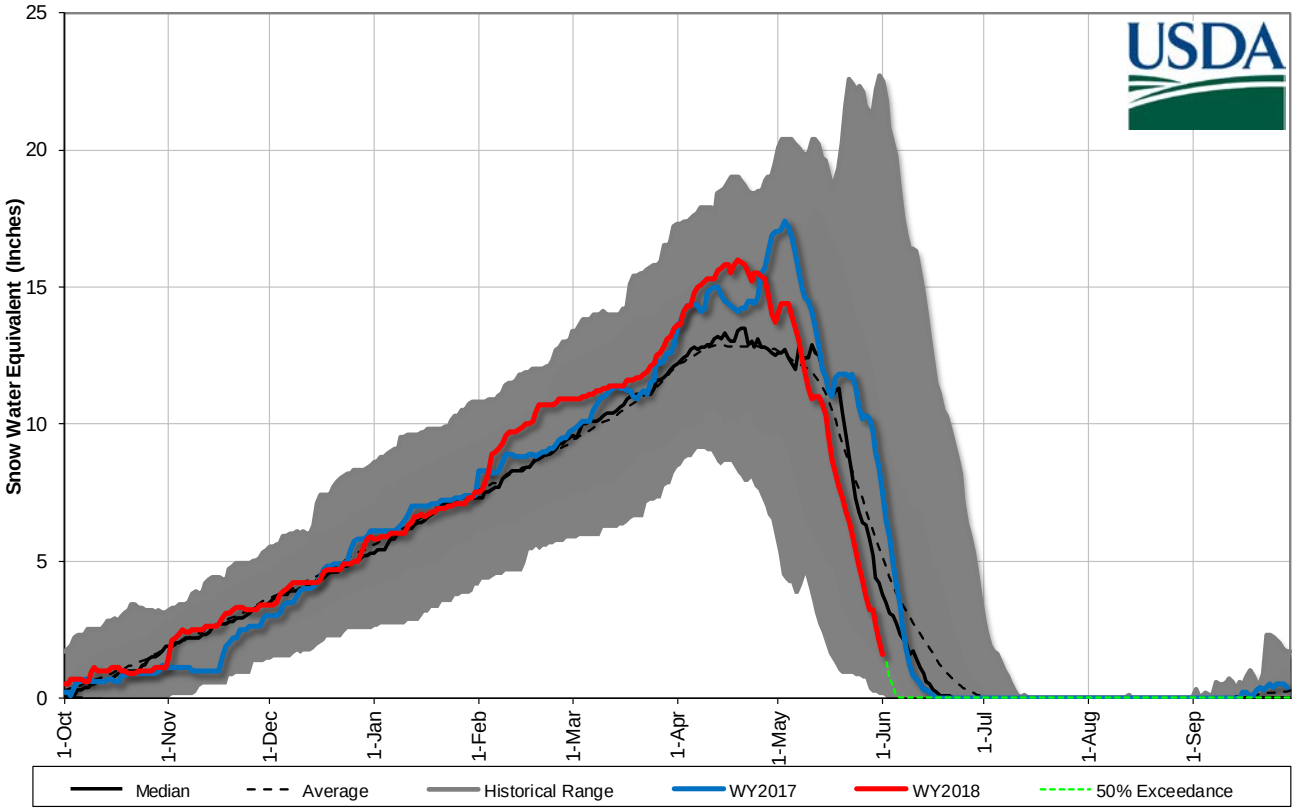
Bighorn River Basin Snowpack with Non-Exceedence Projections

Based on provisional SNOTEL daily data as of 5/1/2018



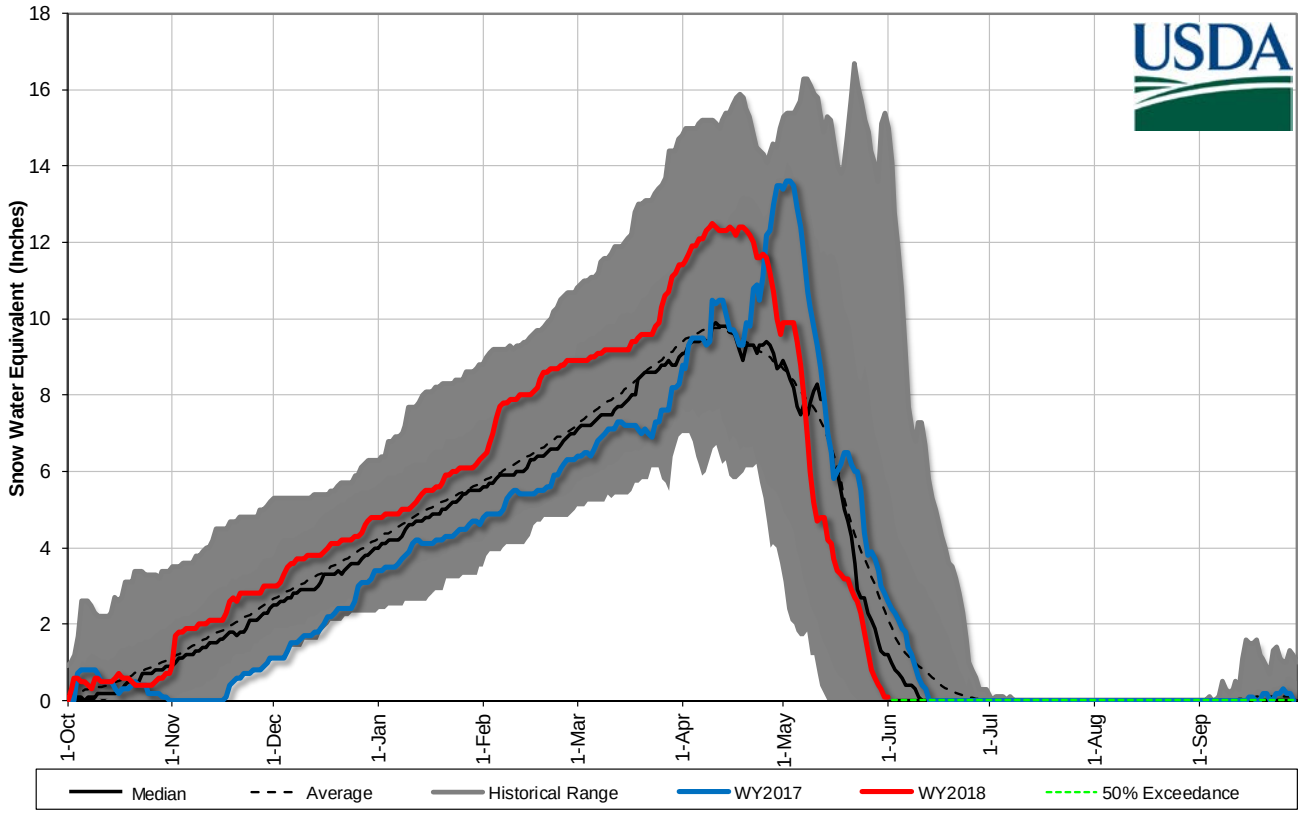
Tongue River Basin Snowpack with Non-Exceedence Projections

Based on provisional SNOTEL daily data as of 5/1/2018

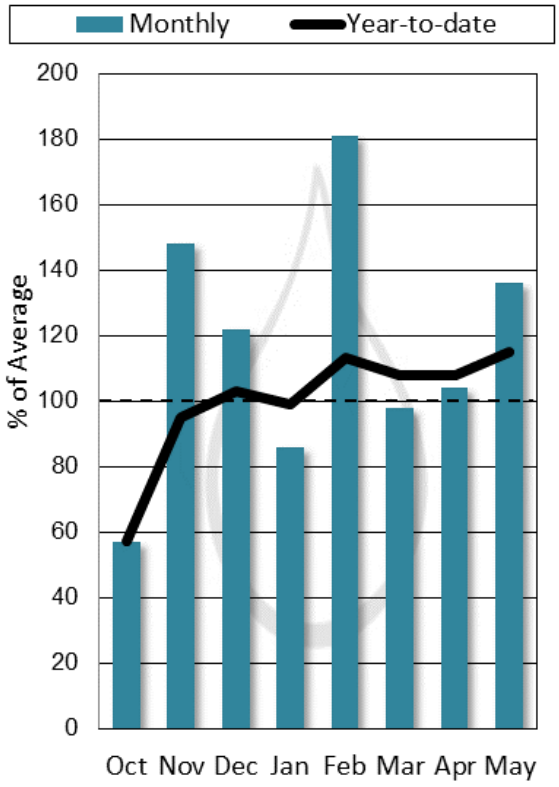


Powder River Basin Snowpack with Non-Exceedence Projections

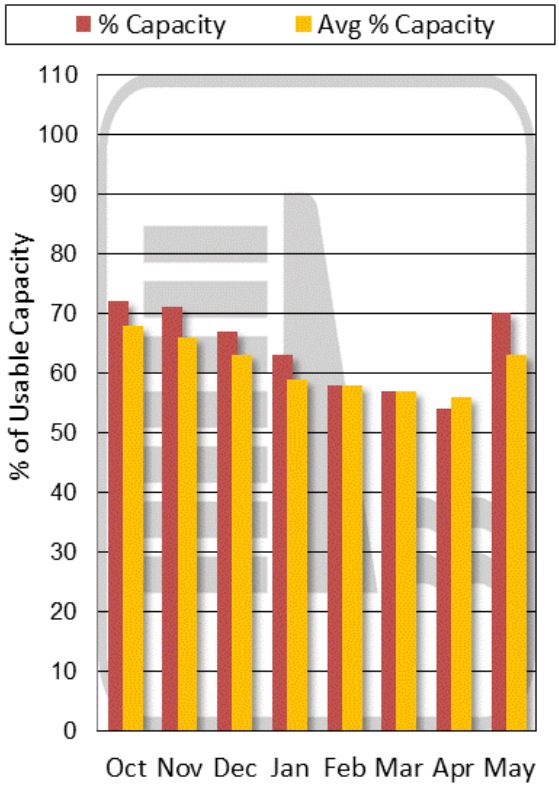
Based on provisional SNOTEL daily data as of 6/1/2018



Mountain and Valley Precipitation



End of Month Reservoir Storage



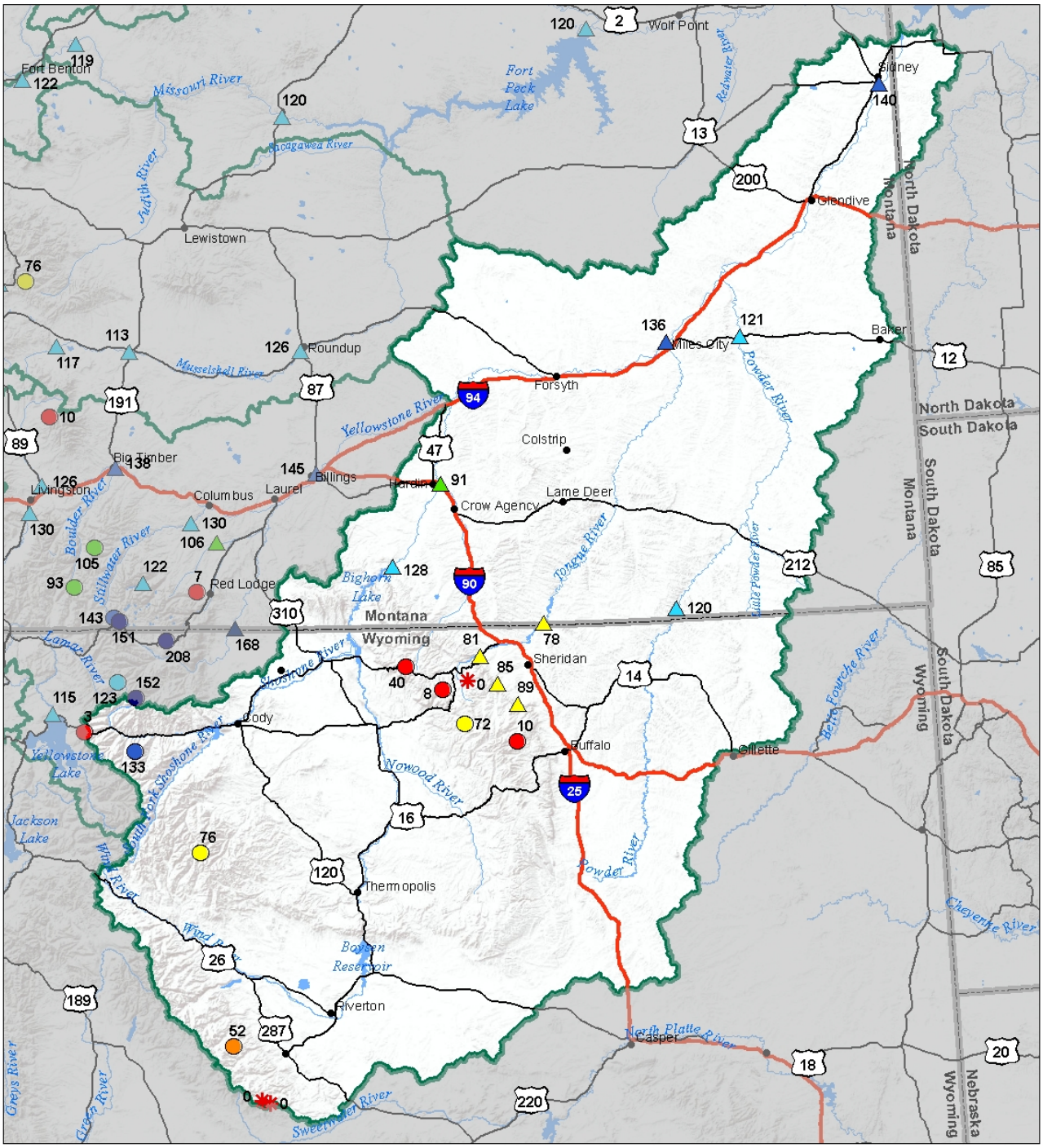
Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.

Streamflow Forecast Summary

LOWER YELLOWSTONE RIVER BASIN (WY)	Forecast Period	Chance Actual Volume Will Exceed Forecasted Volume						
		90% (KAF)	70% (KAF)	50% (KAF)	*% Avg*	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Bighorn R nr St. Xavier2	JUN-JUL	840	1040	1180	*128%*	1320	1520	920
	JUN-SEP	880	1120	1290	*128%*	1460	1700	1010
Little Bighorn R nr Hardin	JUN-JUL	20	37	48	*91%*	60	76	53
	JUN-SEP	27	47	60	*91%*	74	94	66
Tongue R nr Dayton2	JUN-JUL	23	33	39	*80%*	45	55	49
	JUN-SEP	32	43	50	*81%*	58	69	62
Big Goose Ck nr Sheridan	JUN-JUL	13.9	20	25	*81%*	29	36	31
	JUN-SEP	21	28	33	*85%*	37	44	39
Little Goose Ck nr Bighorn	JUN-JUL	11.8	14.6	16.5	*86%*	18.4	21	19.1
	JUN-SEP	18.1	22	24	*89%*	27	31	27
Tongue River Reservoir Inflow2	JUN-JUL	37	65	84	*76%*	104	132	110
	JUN-SEP	47	81	104	*78%*	127	162	134
Yellowstone R at Miles City2	JUN-JUL	3400	4000	4410	*138%*	4820	5420	3200
	JUN-SEP	3970	4750	5280	*136%*	5810	6590	3870
Powder R at Moorehead	JUN-JUL	57	91	114	*124%*	137	171	92
	JUN-SEP	66	105	132	*120%*	159	198	110
Powder R nr Locate	JUN-JUL	50	95	125	*124%*	155	200	101
	JUN-SEP	61	113	148	*121%*	184	235	122
Yellowstone R nr Sidney2	JUN-JUL	3390	4080	4540	*140%*	5000	5680	3240
	JUN-SEP	3870	4760	5360	*140%*	5970	6860	3840

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

Lower Yellowstone River Basin
Streamflow Forecast, Snow Water Equivalent
Percentage of Normal
June 1, 2018



Snow Water Equivalent
Percent of Normal

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

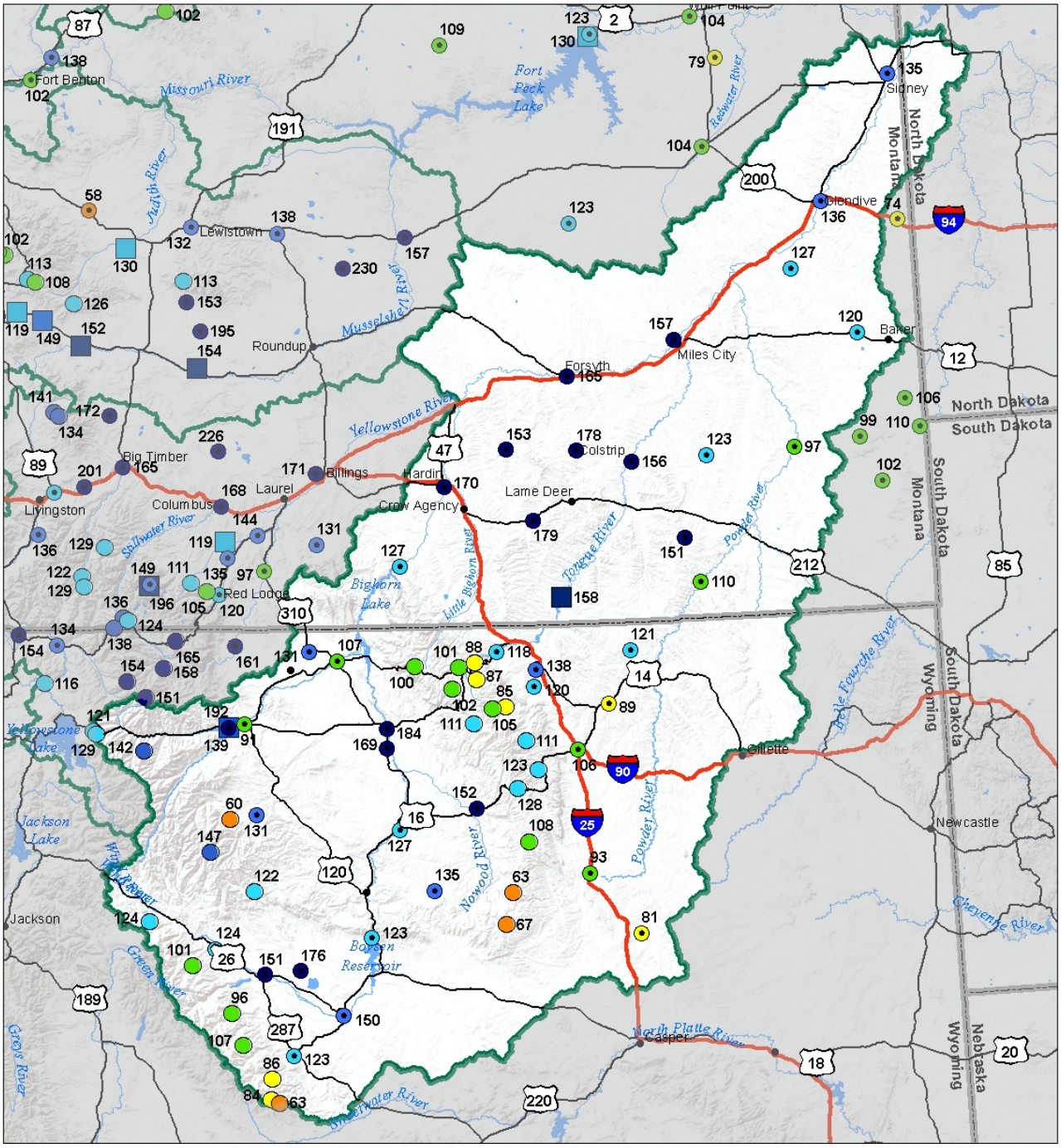
Streamflow Forecast
Percent of Average Flows

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

USDA

Montana State Library Natural Resource Information System

Lower Yellowstone River Basin
Water Year to Date Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018



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%	

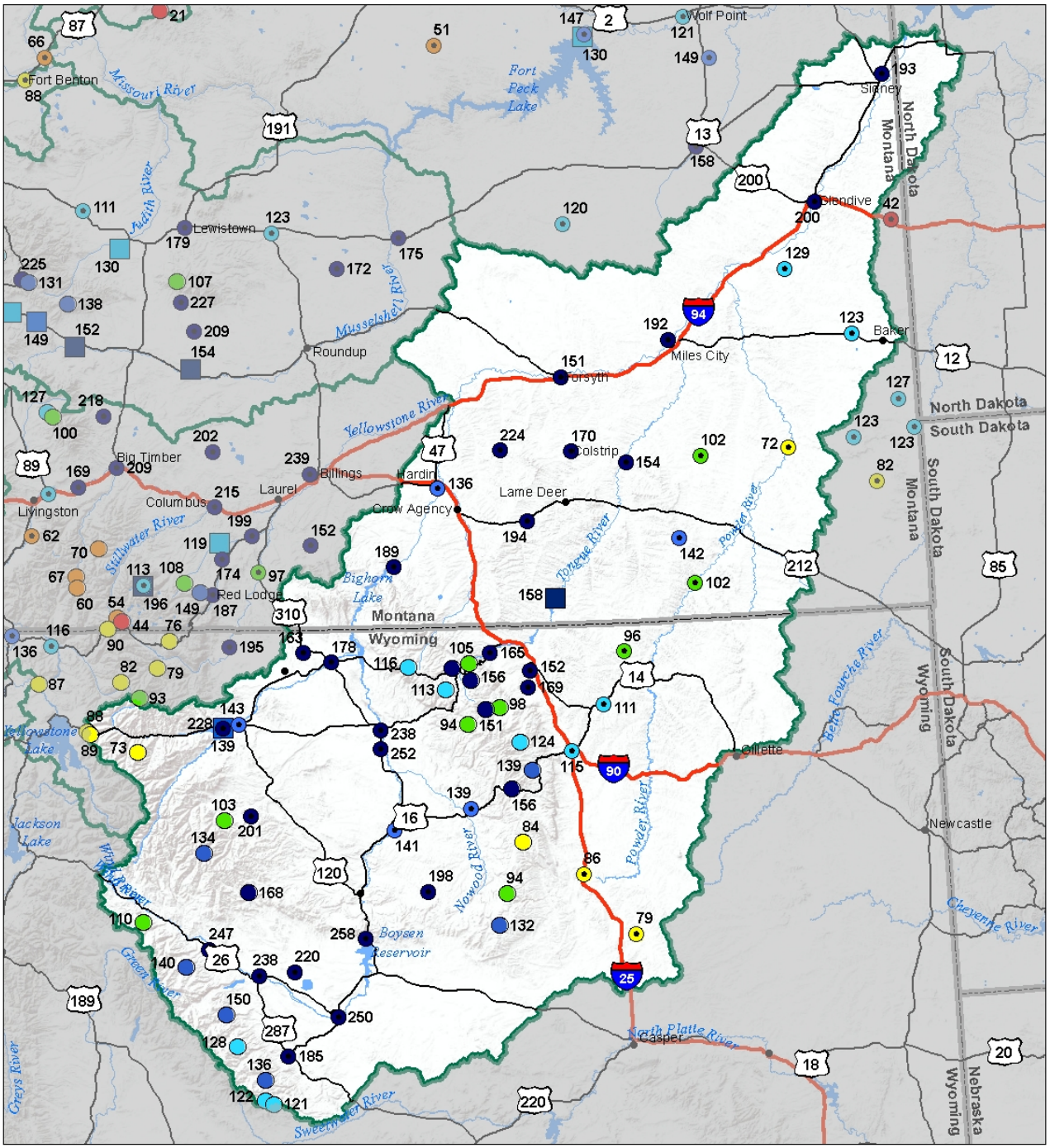
Reservoirs
Percent of Normal

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

USDA

Montana State Library Natural Resource Information System

Lower Yellowstone River Basin
Monthly Precipitation and Reservoir Levels
Percentage of Normal
June 1, 2018 (May 1, 2018 - June 1, 2018)



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%

USDA

Montana State Library Natural Resource Information System

Issued by:

Leonard Jordan
Chief (Acting)
Natural Resources Conservation Service
U.S. Department of Agriculture

Released by:

Lori Ziehr
State Conservationist (Acting)
Natural Resources Conservation Service
Bozeman, Montana

Report Created by:

Montana Snow Survey Staff
10 East Babcock St, Room 443
Bozeman, MT 59715
Email: MT-nrcs-snow@one.usda.gov

Montana Water Supply Outlook Report

Natural Resources Conservation Service