USDA United States Department of Agriculture

Natural Resources Conservation Service

Montana

Water Supply Outlook Report

June 1, 2023

Photo: W. Weaver, 5/29/2023

Faster than normal snowmelt during May resulted in a decrease in snowpack percentages from last month and the seasonal snowpack at many monitoring stations melted out earlier than normal. The snowpack only remains at the highest elevations across Montana. While much of the seasonal snow has melted, the total volume of snow water equivalent accumulated this year was near to above normal in all but part of northwest Montana and the northern Rocky Mountain Front. Last month's rapid snowmelt resulted in reduced water supply forecasts for the summer at most stream gages. Given the quick melt, a normal amount of precipitation over the next several months will be necessary to sustain normal streamflows late into the summer.

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https://www.nrcs.usda.gov/wps/portal/wcc/home/quicklinks/states/montana/

Precipitation

May precipitation totals varied significantly across Montana. The mountains of the Madison, Gallatin, and Upper Yellowstone River basins only received one to two inches of precipitation in May, which is about 50% of normal. May can be a wet month in southwest Montana, but last month most SNOTEL stations in that region received their lowest May precipitation in 30 years. In comparison, last year in May SNOTEL stations in southwest and southcentral Montana received six to ten inches of precipitation, the highest on record. The northern Flathead and Saint Mary River basins also only received one to two inches of precipitation last month, about 50% of normal, however there were several relatively localized precipitation events in northwest Montana and the southern Rocky Mountain Front during the first and last weeks of May. SNOTEL stations received four to six inches of precipitation in that region during May, about 150-200% of normal. Upper elevation SNOTEL stations in the Little Belt and Big Snowy Mountains of central Montana also received about four to six inches of precipitation during May, about 120% of normal. May precipitation was overall near normal in the Kootenai, Flathead, Lower Clark Fork, Upper Clark Fork, Smith-Judith-Musselshell, and Powder River basins. All other major river basins in Montana received about 70-90% of normal May precipitation.

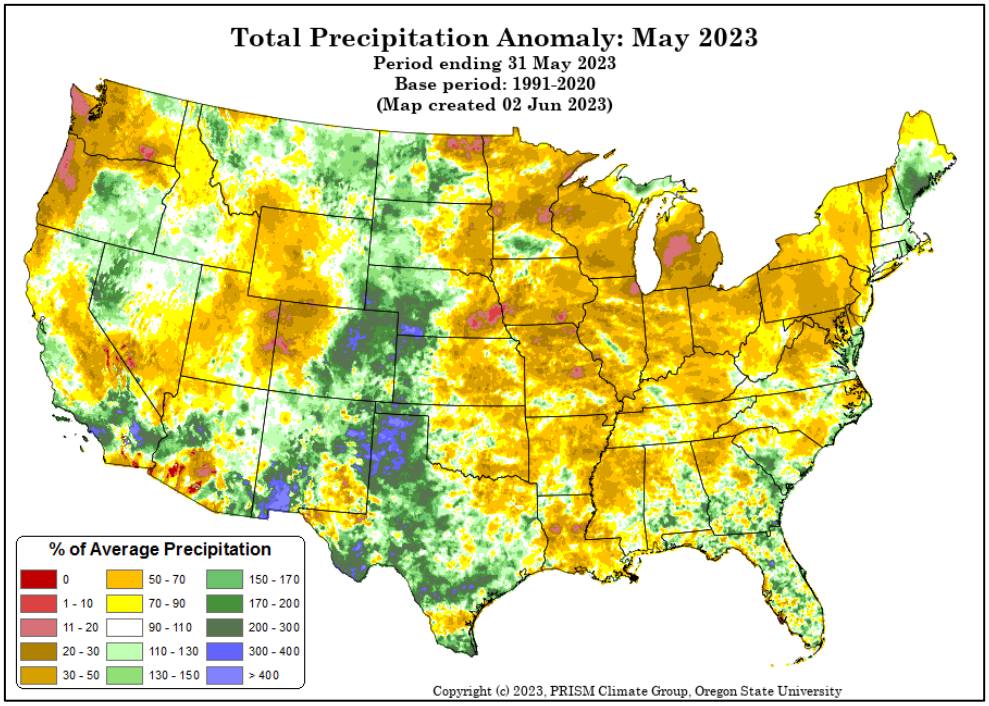
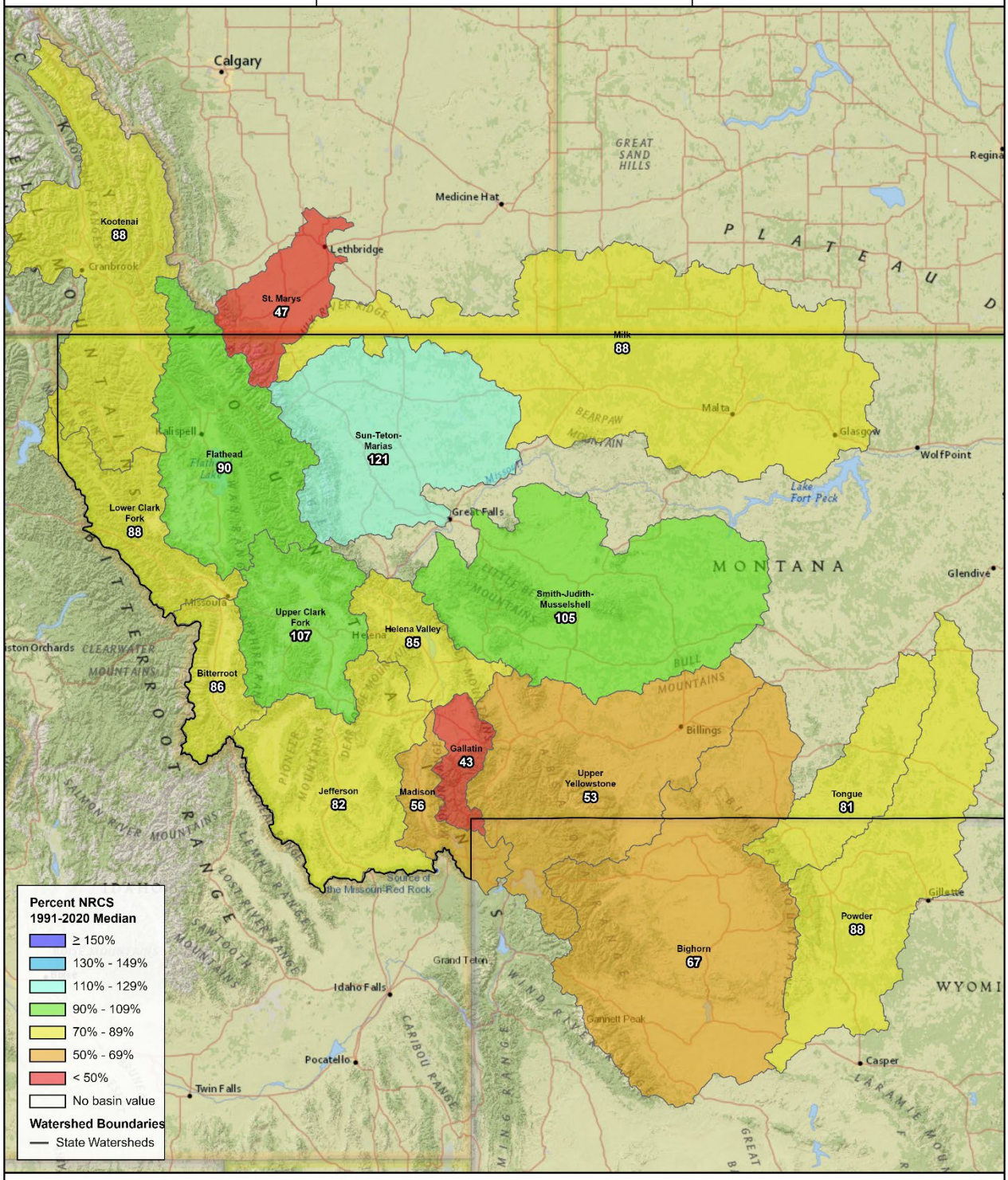


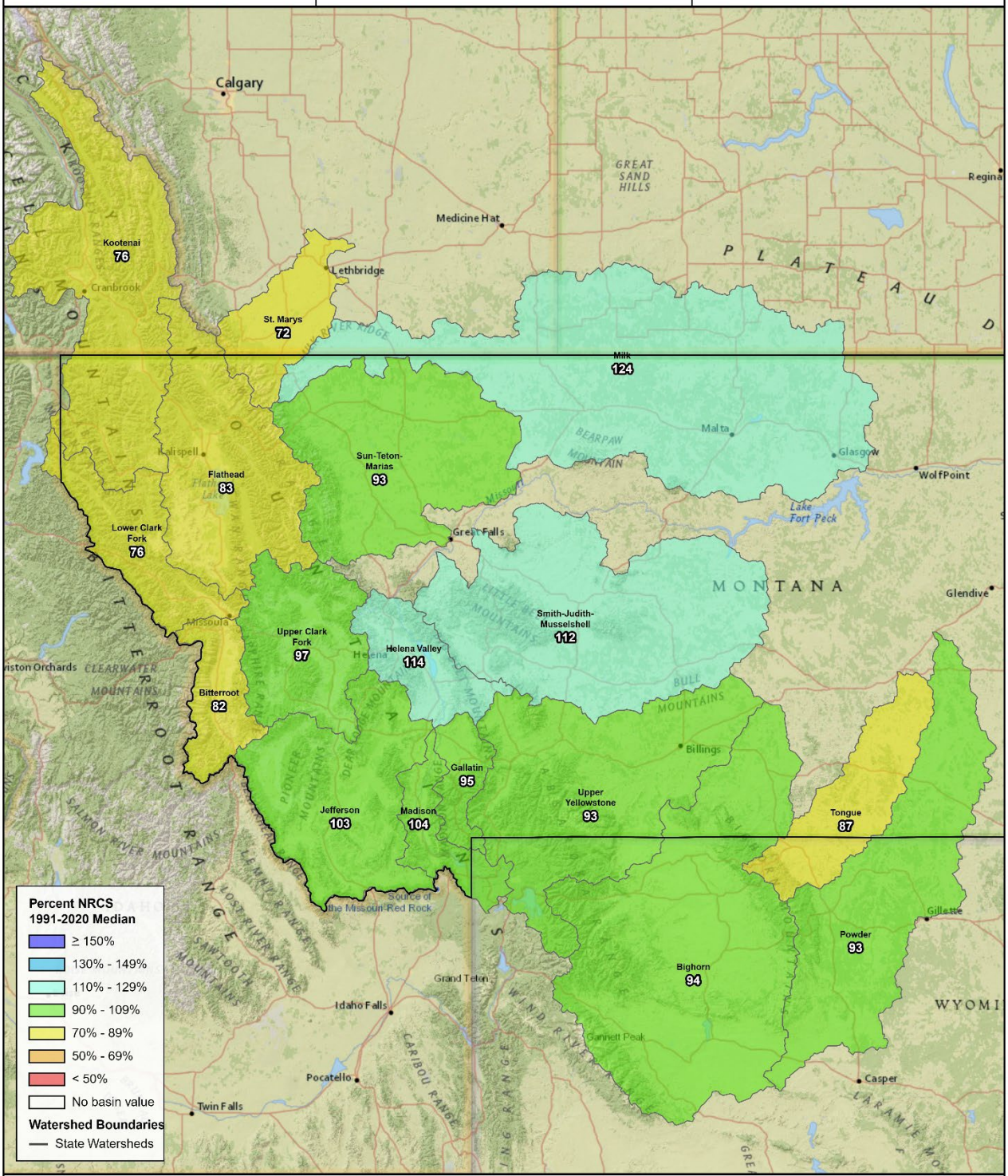
Figure: May precipitation compared to average (1991-2020). PRISM Climate Group

Despite the substantial precipitation in several basins west of the Continental Divide last month, it wasn't enough to buffer the lack of precipitation early this winter. From late December to early May several SNOTEL stations northwest of Flathead Lake only received 4-7 inches of precipitation, a similar amount to what was received in May alone in that area. That is about 50% of normal and the lowest on record for that time period. Water year precipitation is currently about 75% of normal in the Kootenai and Lower Clark Fork, about 80% of normal in the Flathead and Bitterroot, and near normal in the Upper Clark Fork River basin. East of the divide, relatively consistent precipitation through mid-April was enough to buffer the lack of precipitation since then, and water year precipitation totals are closer to normal. Water year precipitation east of the divide currently ranges from above normal in central Montana (110-120%) to near normal in all but the Saint Mary River basin, where in Glacier National Park precipitation has been about 70% of normal since October 1. Regardless of location, above normal precipitation would be ideal in June before heading into the drier months of summer, especially given the rate at which the snowpack melted out this year.

1 month Precipitation	Monthly SNOTEL Precipitation Percent NRCS 1991-2020 Median	May 1, 2023 - May 31, 2023



Water Year to Date Precipitation	Water Year SNOTEL Precipitation Percent NRCS 1991-2020 Median	October 1, 2022 - May 31, 2023



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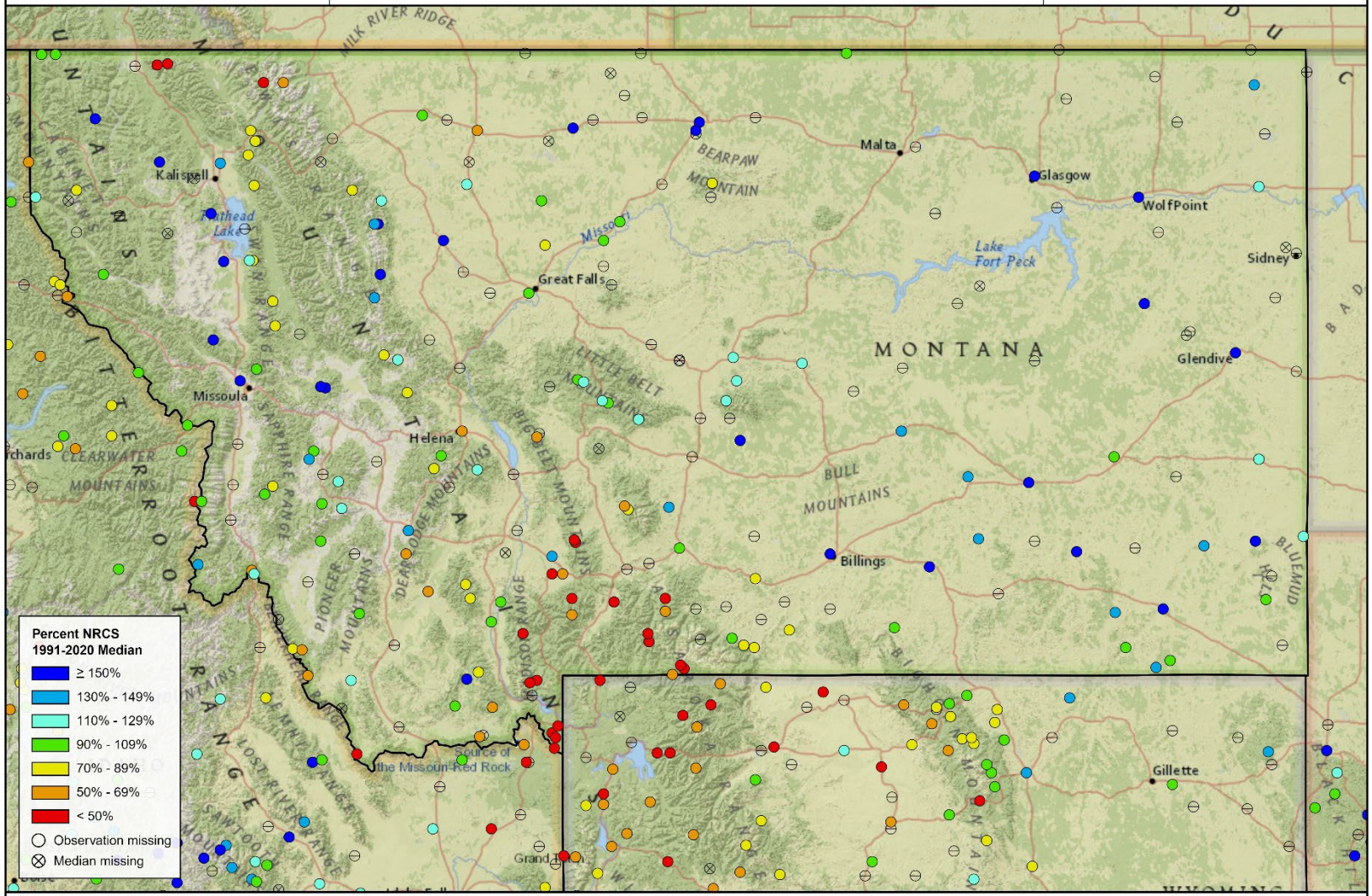
1 month Precipitation	Monthly Precipitation Percent NRCS 1991-2020 Median	May 1, 2023 - May 31, 2023



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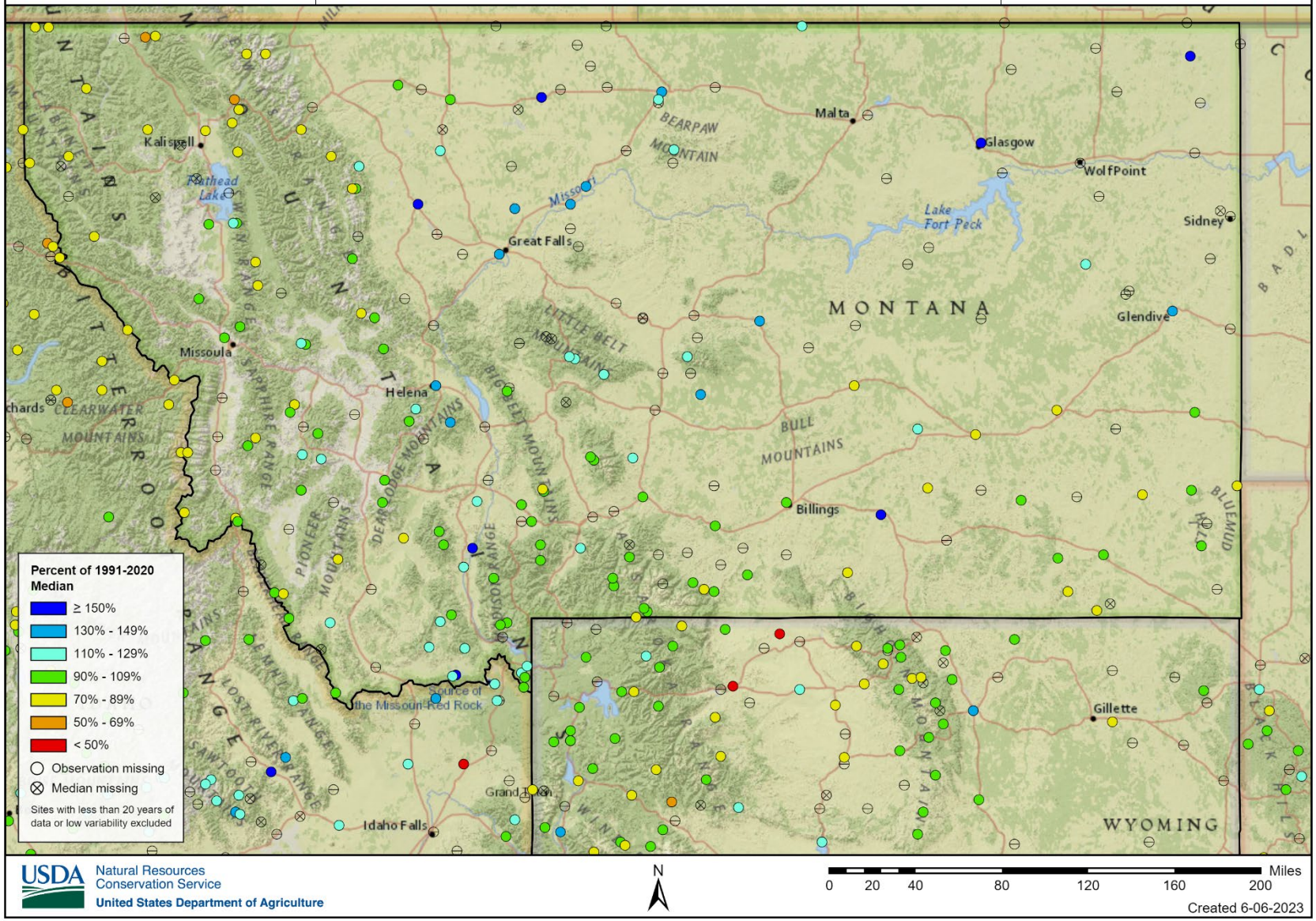
Water Year to Date Precipitation	Water Year Precipitation Percent of 1991-2020 Median	October 1, 2022 - May 31, 2023



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Snowpack

If it seems to you like the snow disappeared quickly this spring, you are not wrong. Snowpack percentages dropped from near-to-above normal in all but part of northwest Montana, to less than 50% of normal in nearly all basins since May 1. The only exception is part of southwest Montana, which had a near record snowpack along the Idaho border. Several SNOTEL stations in that area still have an above normal snowpack which is currently bumping the basin wide snowpack up to about 50-70% of normal in the Gallatin, Madison, and Jefferson River basins. The large drop in snowpack percentages was the result of weeks of faster than normal snowmelt. Snowmelt in May at high mountain elevations across Montana is typically about 0.5-1.5 inches of snow water equivalent per day. Last month snowmelt rates exceeded 2.5 inches of snow water equivalent per day, particularly mid-month when skies were clear and temperatures were warmer than normal. Snowpack percentages represent the current snowpack on an individual day compared to the median value for that given day. In other words, they don't necessarily represent the entire snow year. For example, this was a relatively large snow year in much of Montana. Snowpack percentages in central and southwest Montana along the Idaho border were 110-140% through May 1. The rest of the region was within about 10% of normal most of the year except the northern portion of the Kootenai and Flathead River basins, and the northern Rocky Mountain Front, which all had a well below normal snow season. In early May percentages dropped quickly in all basins due to the above normal snowmelt rates. Fortunately, peak snow water equivalent levels were near normal at a normal date this year in most locations. That is good news in terms of overall snowmelt this season, unfortunately the bulk of that might have already occurred.

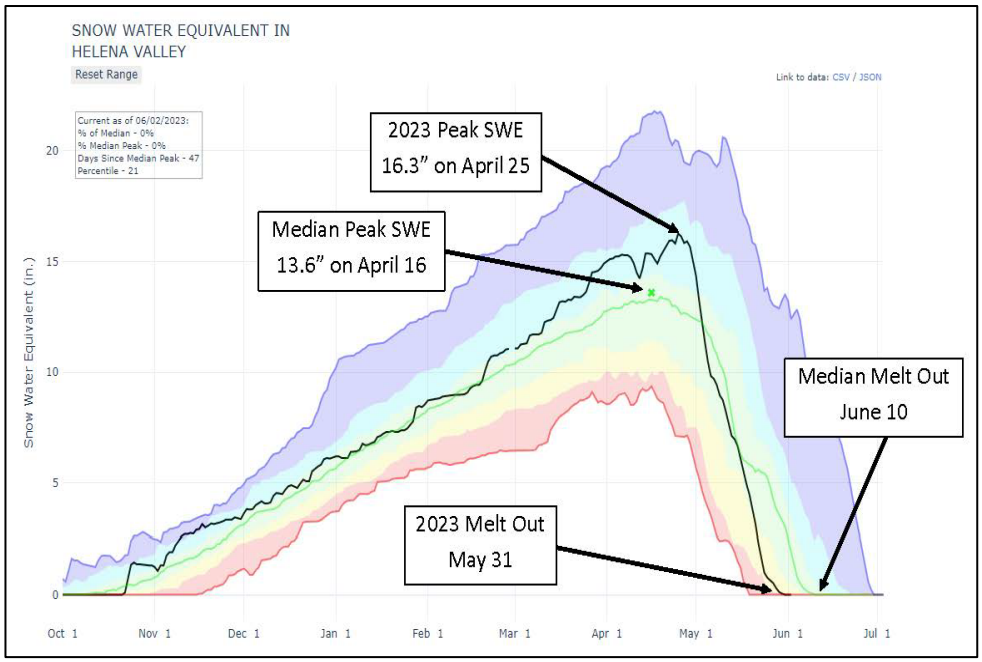


Figure: SWE at SNOTEL stations surrounding Helena showing late and above normal peak SWE on April 25, that melted out earlier than normal this year.

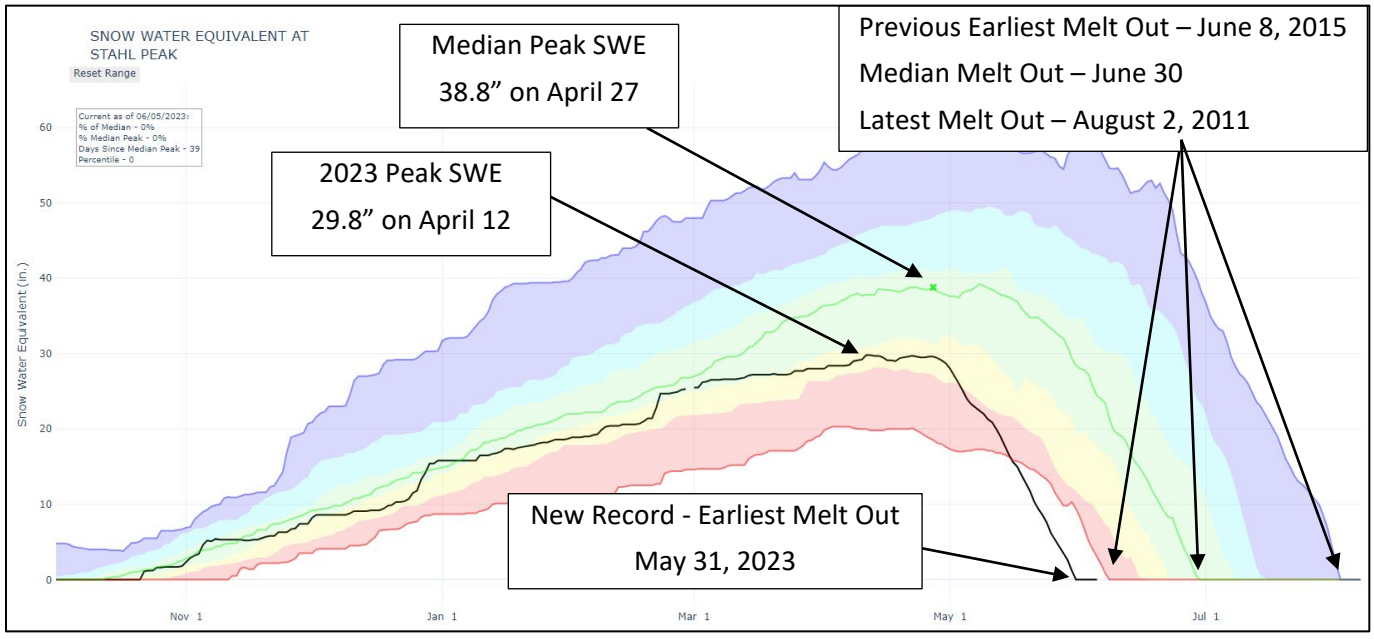
Normally the seasonal snowpack completely melts out in mid-to-late June at the highest elevation SNOTEL stations in Montana. Lower elevation SNOTEL stations start melting out in late April. The quick melt this spring caused SNOTEL stations to melt out about 10-20 days earlier than normal. Currently 69 of 100 NRCS snow monitoring stations measured on June 1 in Montana are snow free and the highest elevation stations only have 10-20 inches of snow water equivalent remaining. Last year when melt out dates were later than normal only 39 of 100 were snow free on June 1, and the highest elevations still had 35-50 inches of snow water equivalent remaining. This year is particularly notable in locations which had a low snowpack all year, such as the northern Flathead and Kootenai River basins. Stahl Peak SNOTEL melted out 30 days before normal and Hawkins Lake SNOTEL melted out 21 days before normal. Those were their earliest or second earliest melt outs on record and

Flattop Mountain SNOTEL in Glacier National Park is on track to have its earliest melt out also. Several other early melt out years in that region were 1992, 1994, and 2015. It can snow any time of the year in Montana. Additional snowfall in June would require cooler temperatures than recently experienced, and the outlook currently favors rain. Regardless, normal to above normal precipitation in the next month will be needed across the state, given that most of this winter's snow has already melted.

November - June 2023: Monthly Snow Water Equivalent Percent of Normal (1991-2020 Median)

Basin	Side of Divide	November 1 SWE % of Normal	December 1 SWE % of Normal	January 1 SWE % of Normal	February 1 SWE % of Normal	March 1 SWE % of Normal	April 1 SWE % of Normal	May 1 SWE % of Normal	June 1 SWE % of Normal
Bighorn	East	58%	98%	108%	115%	114%	114%	114%	45%
Gallatin	East	124%	118%	123%	109%	113%	123%	118%	52%
Helena Valley	East	156%	116%	115%	110%	116%	137%	155%	0%
Jefferson	East	118%	126%	112%	105%	102%	117%	127%	54%
Madison	East	119%	135%	136%	121%	116%	129%	135%	74%
Milk	East	0%	200%	159%	172%	167%	252%	1180%	0%
Powder	East	105%	120%	113%	114%	117%	118%	113%	10%
Smith-Judith-Musselshell	East	127%	125%	119%	123%	126%	135%	135%	25%
St. Marys	East	118%	90%	111%	85%	96%	91%	94%	30%
Sun-Teton-Marias	East	154%	118%	121%	86%	97%	95%	105%	0%
Tongue	East	46%	102%	103%	108%	115%	117%	105%	0%
Upper Yellowstone	East	69%	103%	111%	100%	105%	116%	113%	45%
Bitterroot	West	147%	127%	100%	82%	84%	96%	103%	12%
Flathead	West	135%	121%	117%	90%	94%	92%	88%	24%
Kootenai	West	114%	108%	106%	82%	84%	85%	81%	1%
Lower Clark Fork	West	133%	124%	113%	86%	89%	90%	93%	28%
Upper Clark Fork	West	129%	102%	103%	95%	103%	114%	123%	40%

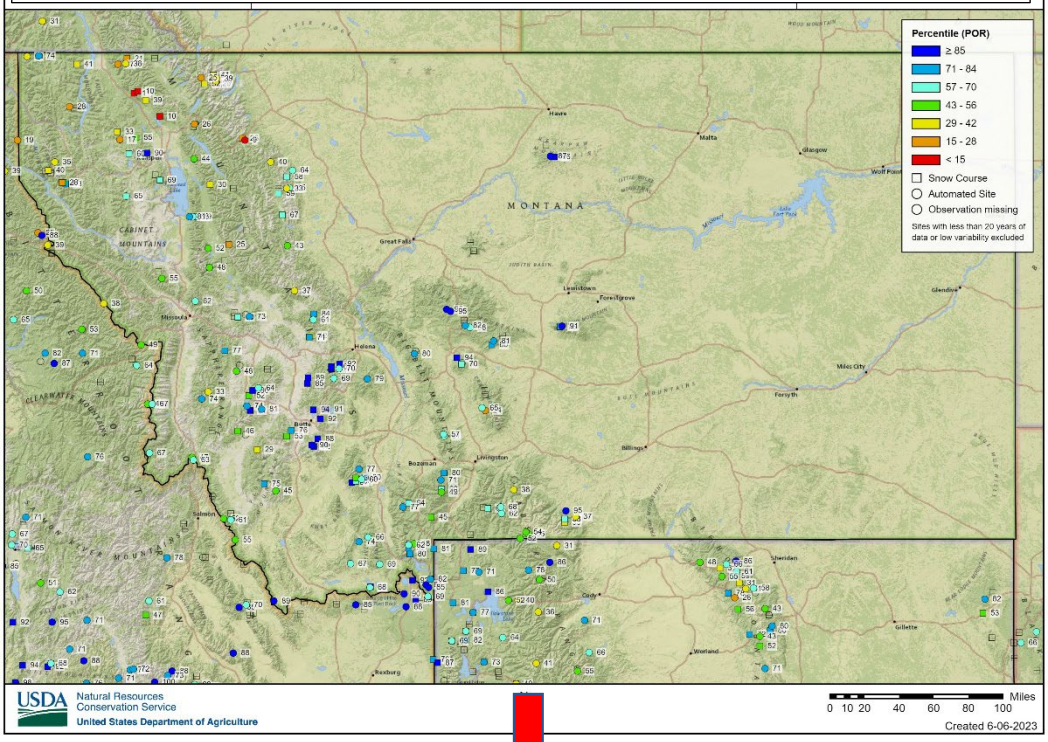
Stahl Peak SNOTEL - Water Year 2023 Snow Water Equivalent Compared to Record - [Data]



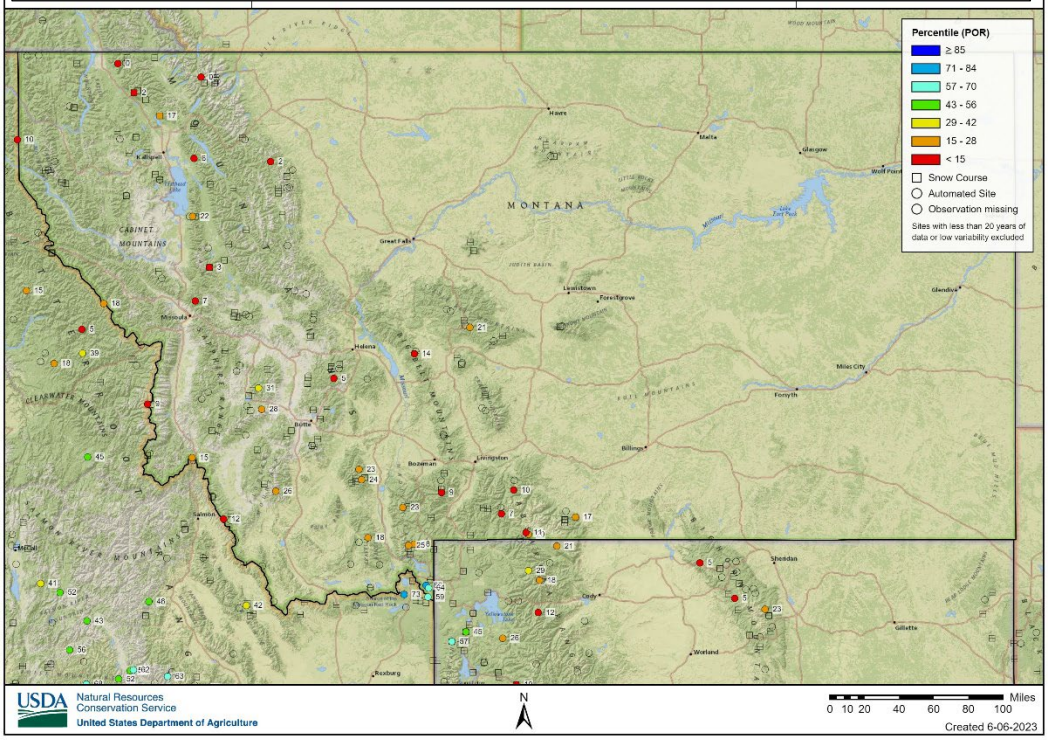
Sub-Basin Snow Water Equivalent – Current Compared to Last Month

River Basin Name	May 1, 2023 SWE % Normal	June 1, 2023 SWE % Normal	SWE % Difference
Bear Paw	1180%	0%	-1180%
Beaverhead	123%	74%	-49%
Big Hole	116%	51%	-65%
Big Horn	104%	16%	-88%
Bitterroot	103%	12%	-91%
Blackfoot	101%	28%	-73%
Boulder (Jefferson)	157%	21%	-136%
Boulder (Yellowstone)	116%	12%	-104%
Clarks Fork Yellowstone	107%	59%	-48%
Fisher	96%	0%	-96%
Flathead Lake	107%	49%	-58%
Flint	126%	76%	-50%
Gallatin ab Gateway	116%	55%	-61%
Greybull-Wood	110%	0%	-110%
Helena Valley	155%	0%	-155%
Judith	133%	41%	-92%
Kootenai in Canada	78%	0%	-78%
Kootenai in Montana	77%	1%	-76%
Little Bitterroot	164%	0%	-164%
Lower Clark Fork	93%	28%	-65%
Madison ab Hebgen	149%	104%	-45%
Madison bw Hebgen	126%	54%	-72%
Marias	100%	0%	-100%
Middle Fork Flathead	82%	19%	-63%
Musselshell	131%	41%	-90%
North Fork Flathead	73%	10%	-63%
Northern Gallatin	117%	37%	-80%
Owl	167%	0%	-167%
Powder	113%	10%	-103%
Rock (Clark Fork)	118%	0%	-118%
Rock (Yellowstone)	112%	44%	-68%
Ruby	118%	50%	-68%
Shields	98%	0%	-98%
Shoshone	95%	41%	-54%
Smith	133%	25%	-108%
South Fork Flathead	88%	28%	-60%
Southern Flathead	98%	45%	-53%
St. Marys	94%	30%	-64%
Stillwater (Flathead)	68%	0%	-68%
Stillwater (Yellowstone)	110%	41%	-69%
Sun	112%	0%	-112%
Swan	98%	41%	-57%
Teton	114%	0%	-114%
Tongue	105%	0%	-105%
Upper Clark	157%	67%	-90%
Wind	133%	79%	-54%
Yaak	87%	0%	-87%
Yellowstone ab Livingston	115%	53%	-62%

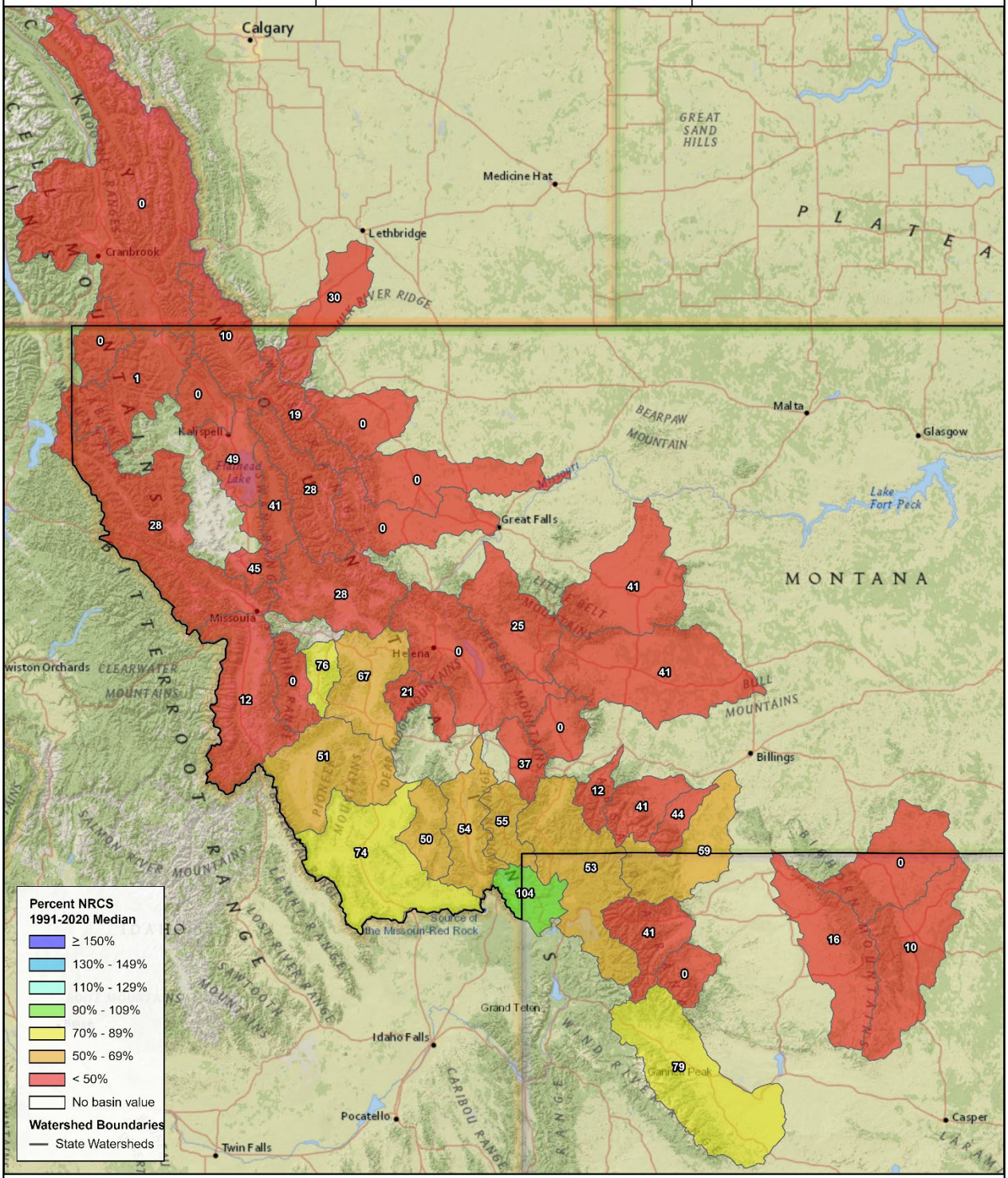
May 1, 2023, Snow Water Equivalent Percentile (Period of Record)



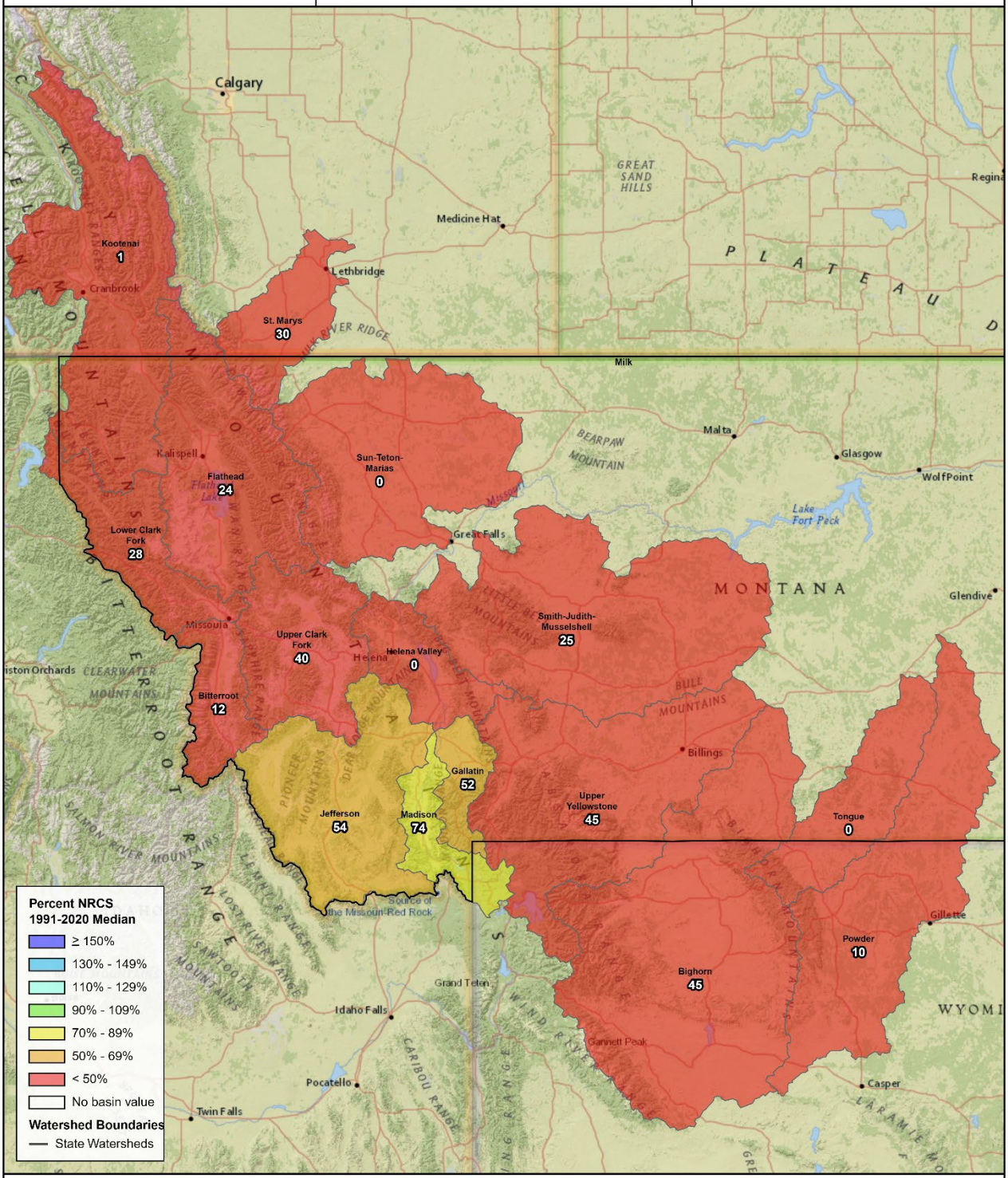
June 1, 2023, Snow Water Equivalent Percentile (Period of Record)



Snow Water Equivalent	Sub-Basin Snow Water Equivalent Percent NRCS 1991-2020 Median	June 1st, 2023



Snow Water Equivalent	Major Basin Snow Water Equivalent Percent NRCS 1991-2020 Median	June 1st, 2023



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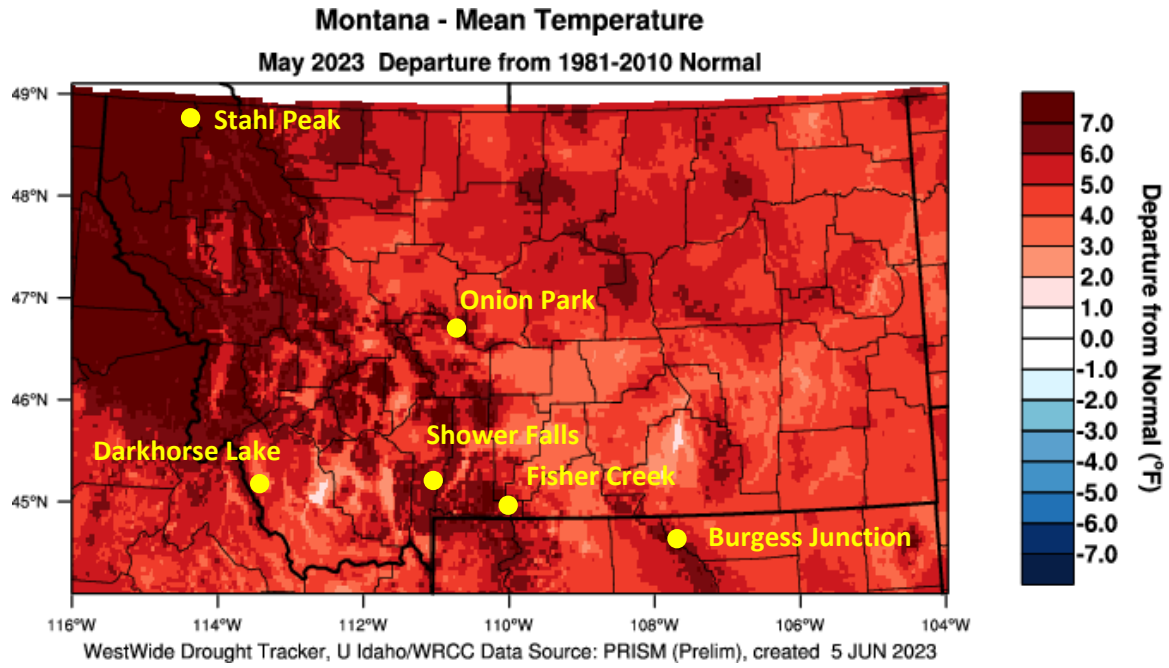
Temperature

Temperatures during May in Montana were largely above normal. The warmest days were the first several days of May and around about May 18-21, when high mountain elevations across Montana reached 70 degrees. Outside of those dates daily average temperatures were closer to normal, but still predominantly above normal. Mean monthly temperatures for all of May were 5-7 degrees warmer than normal west of the Continental Divide and in part of central and southcentral Montana. The remainder of the state was about 2-5 degrees warmer than normal, except for near Dillon and Hardin, where mean monthly mean temperature for May was near normal.

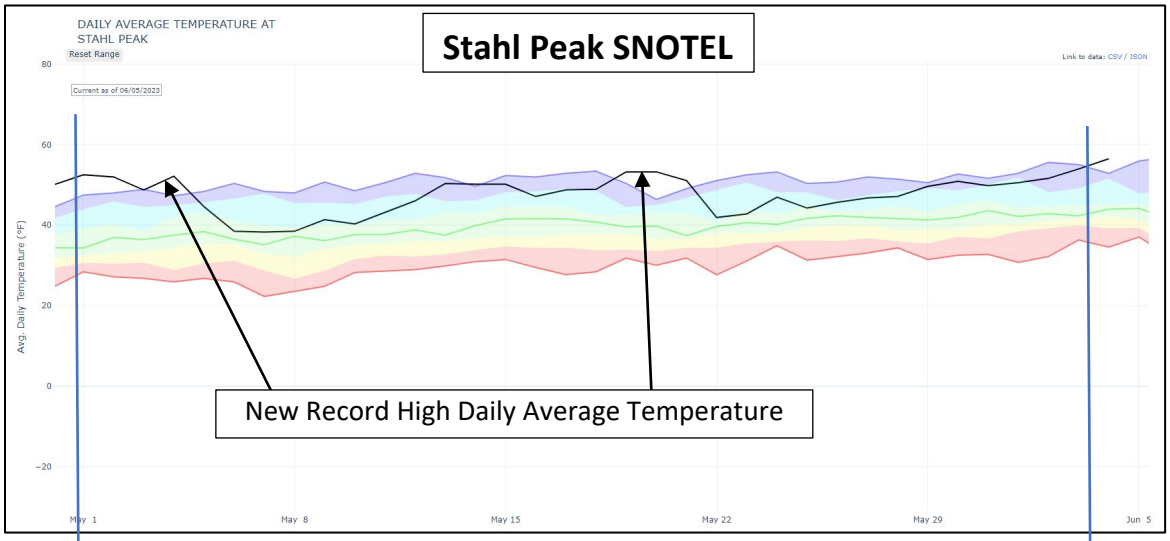


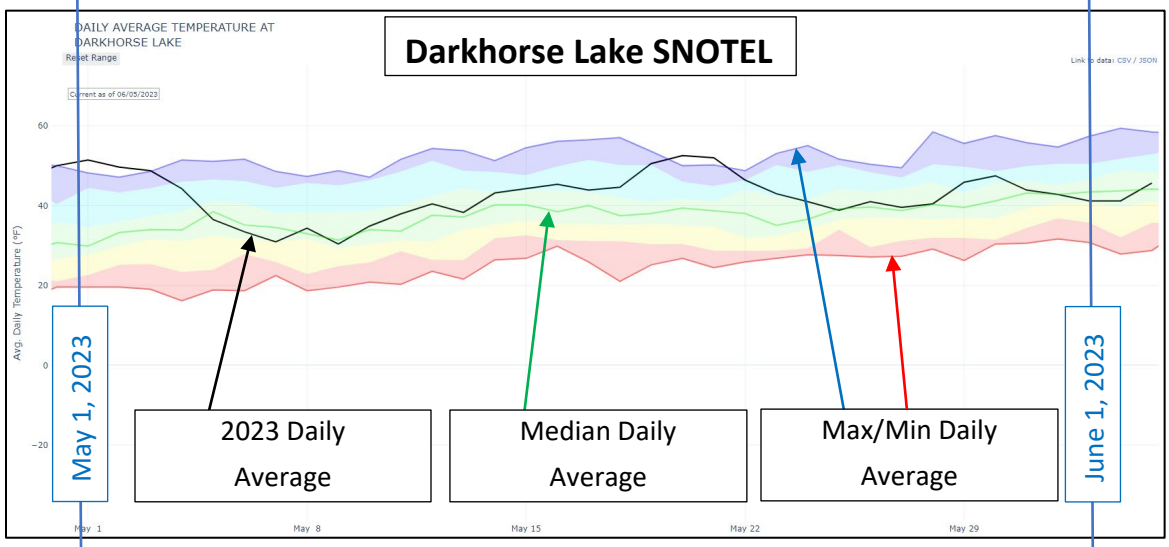
Many SNOTEL stations across Montana experienced daily minimum temperatures above freezing for extended periods of time during May, which accelerated snowmelt to above normal rates. The temperature did not drop below freezing at several SNOTEL stations in northwest Montana during May, including Stahl Peak, which is the highest elevation SNOTEL in the Whitefish Range. The following table shows May 2023 temperature statistics for select SNOTEL stations in Montana and northern Wyoming:

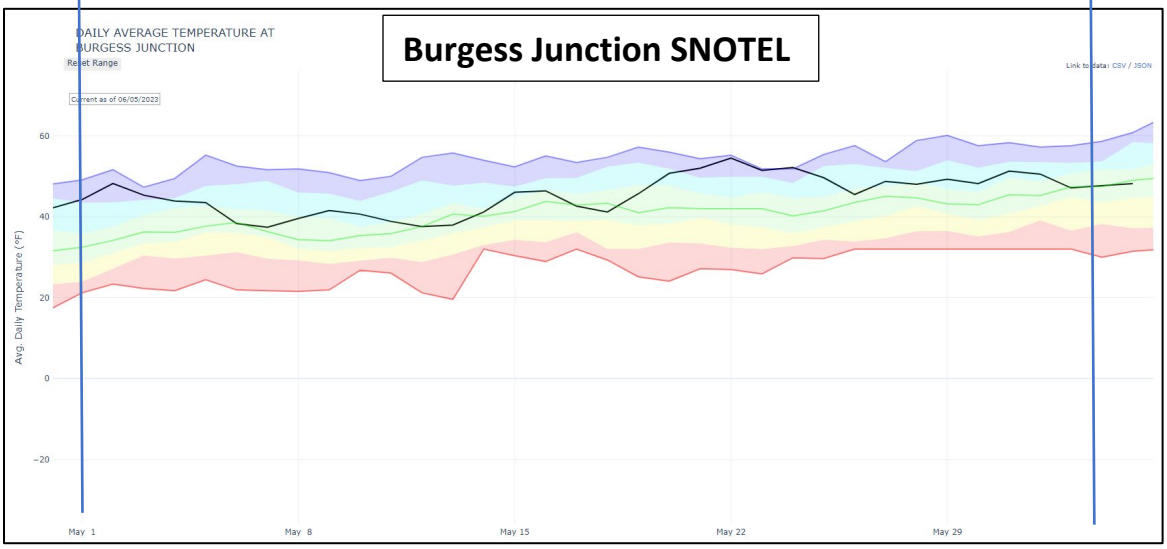
Temperature and Snowmelt Statistics for May 2023 – Example Data

SNOTEL	Mountain Range	Elevation (ft)	Days Minimum Temperature Above 32 F	Days Maximum Temperature Above 70 F	Days Average Temperature Above 40 F	Maximum Daily Melt (SWE Change)	Date Maximum Daily SWE Decrease
Stahl Peak	Whitefish	6030	31	17	28	-1.4	20-May
Darkhorse Lake	Beaverhead	8945	23	9	21	-1.3	29-May
Shower Falls	Gallatin	8100	24	9	21	-1.3	20-May
Fisher Creek	Beartooth	9100	20	8	22	-2.6	18-May
Onion Park	Little Belt	7410	25	12	23	-2.7	17-May
Burgess Junction	Bighorn	7880	23	14	25	-1.4	23-May

Daily Average Temperature for May 2023 at Select SNOTEL Stations – Link







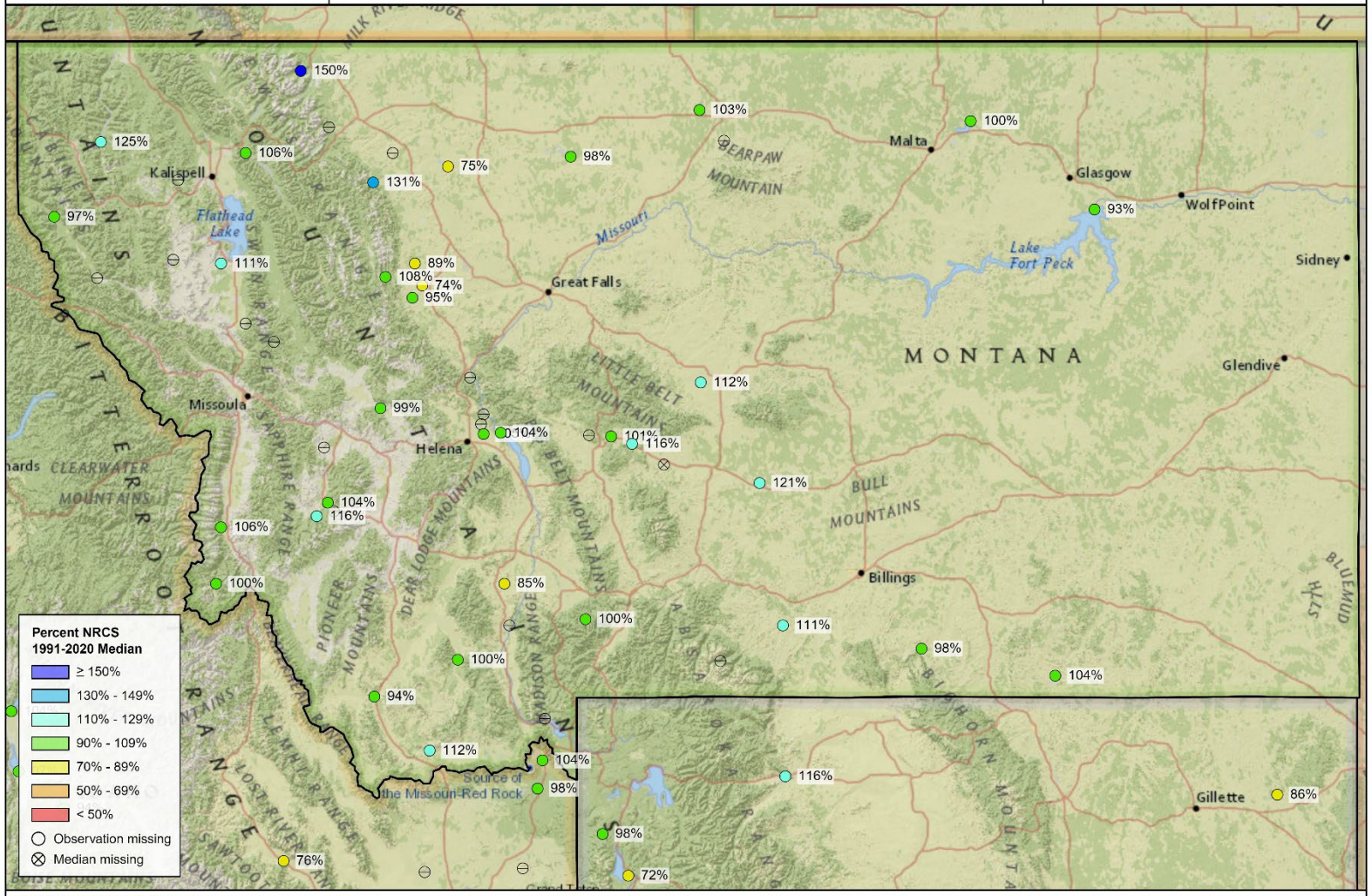
Reservoirs

June 1 reservoir storage levels are mostly normal or above normal across Montana. Ackley, Bair, Cooney, Deadman's, East Fork Rock Creek, Flathead Lake, Koocanusa, Sherburne, Lima, Mystic, and Swift Reservoir are currently well above normal and generally higher than last year at this time. Lake Frances, Pishkun, and both Willow Creek Reservoirs (Augusta and Harrison) are slightly below normal for this time of year. All other reservoirs are currently at near normal capacity.

Reservoir Storage – Current Compared to Last Month and Last Year

Reservoir	% of Median (1991-2020)		
	June 1, 2023	May 1, 2023	June 1, 2022
Ackley Lake	112%	96%	54%
Bair Res	116%	88%	50%
Bighorn Lake	98%	100%	99%
Canyon Ferry Lake	104%	91%	82%
Clark Canyon Res	94%	86%	71%
Cooney Res	111%	114%	113%
Deadman's Basin Res	121%	84%	65%
East Fork Rock Creek Res	116%	91%	82%
Ennis Lake	na	102%	102%
Flathead Lake	111%	90%	91%
Fort Peck Lake	93%	90%	88%
Fresno Res	103%	102%	41%
Georgetown Lake	104%	98%	99%
Gibson Res	108%	42%	65%
Hebgen Lake	96%	93%	93%
Helena Valley Reservoir	105%	101%	95%
Holter Lake	100%	100%	100%
Hungry Horse Lake	106%	98%	100%
Lake Como	106%	68%	88%
Lake Elwell (Tiber)	98%	94%	96%
Lake Frances	75%	64%	66%
Lake Helena	99%	99%	101%
Lake Koocanusa	125%	116%	64%
Lake Sherburne	150%	122%	50%
Lima Reservoir	112%	58%	74%
Middle Creek Res	100%	89%	88%
Mystic Lake	122%	38%	45%
Nelson Res	100%	76%	39%
Nevada Creek Res	99%	92%	80%
Nilan Reservoir	95%	57%	55%
Noxon Rapids Reservoir	97%	93%	98%
Painted Rocks Lake	100%	58%	102%
Pishkun Res	89%	92%	99%
Ruby River Reservoir	100%	88%	101%
Smith River Res	101%	100%	58%
Swift Res	131%	111%	111%
Thompson Falls Res	101%	93%	100%
Tongue River Res	104%	133%	97%
Willow Creek Res (Harrison)	85%	76%	81%
Willow Creek Res - Augusta	74%	60%	97%

Reservoir Storage	Reservoir Storage Percent NRCS 1991-2020 Median	June 1st, 2023



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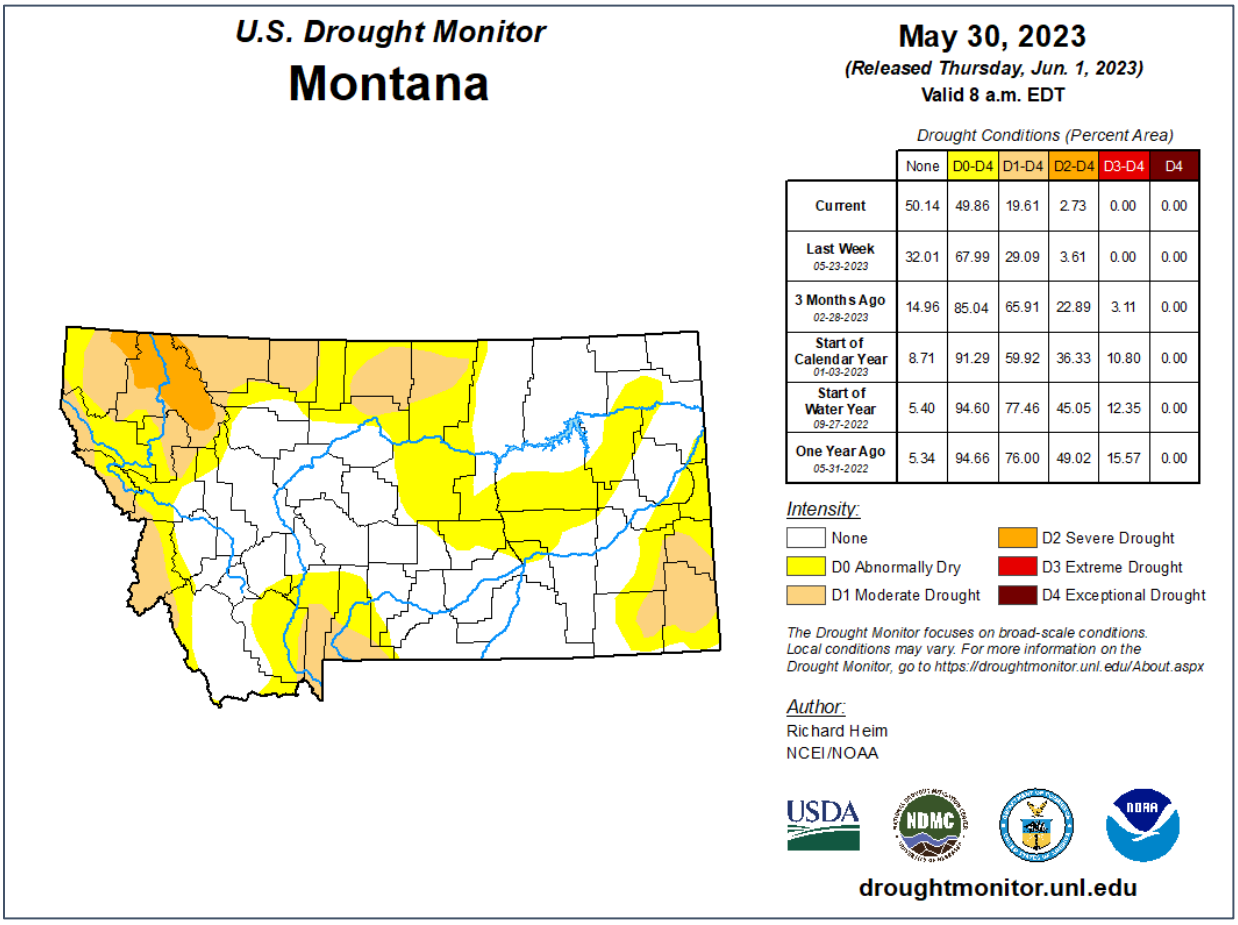
Drought Status

The most recent U.S. Drought Monitor map, released on June 1, 2023, classifies 50% of Montana as D0 (abnormally dry conditions), D1 (moderate drought), or D2 (severe drought). There are currently no regions in Montana that are classified in the D3 (extreme drought) category or above. This is a significant improvement from November 1, 2022, when 90% of Montana was designated in the D0-D3 category and 42% of Montana was designated D2-D3 (severe drought-extreme drought).

Above normal precipitation and improvement in 60-day standardized precipitation evapotranspiration index (SPEI) in part of northwest and eastern Montana have warranted a one to two class change since last month. Southcentral Montana and the northern Rocky Mountain front have been exceptionally dry and 90-day SPEI has recently warranted a one to two class degradation over the last month in those regions.

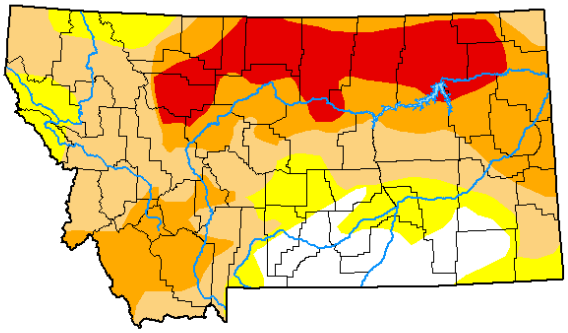
Drought Links:

- U.S. Drought Monitor
- National Integrated Drought Information System
- USDA Drought Portal (News and Resources)
- Farm Services Agency Montana News Releases (Information on Programs and Deadlines)
- Farm Services Agency Disaster Assistance Programs
- Montana Department of Natural Resources and Conservation Drought Management



U.S. Drought Monitor

Montana



November 1, 2022

(Released Thursday, Nov. 3, 2022)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	10.43	89.57	74.32	41.97	15.61	0.00
Last Week *10-25-2022*	10.43	89.57	74.32	41.97	15.61	0.00
3 Months Ago *08-02-2022*	60.80	39.20	21.17	15.35	3.51	0.00
Start of Calendar Year *01-04-2022*	7.36	92.64	89.33	86.35	53.93	13.87
Start of Water Year *09-27-2022*	5.40	94.60	77.46	45.05	12.35	0.00
One Year Ago *11-02-2021*	0.00	100.00	100.00	100.00	69.68	22.59

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:

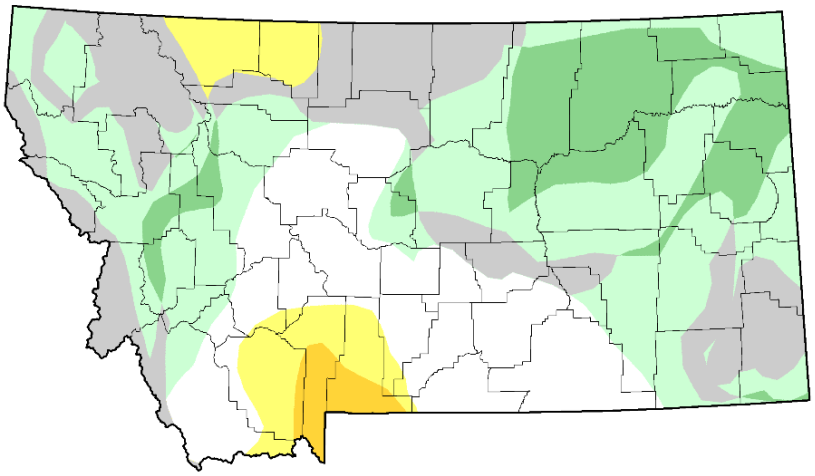
Brian Fuchs

National Drought Mitigation Center

droughtmonitor.unl.edu

U.S. Drought Monitor Class Change - Montana

4 Week



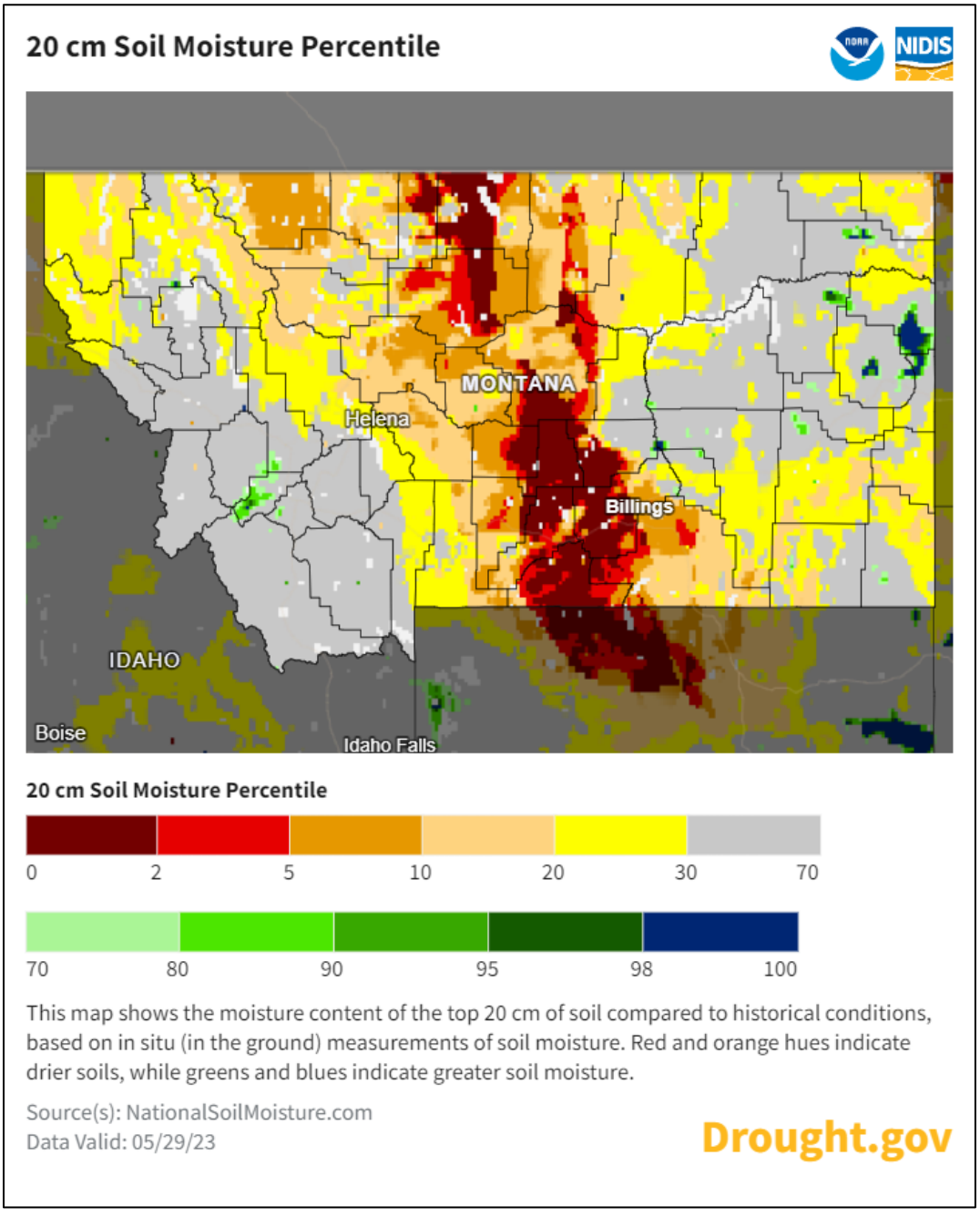
May 30, 2023 compared to May 2, 2023

- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement

droughtmonitor.unl.edu

Soil Moisture

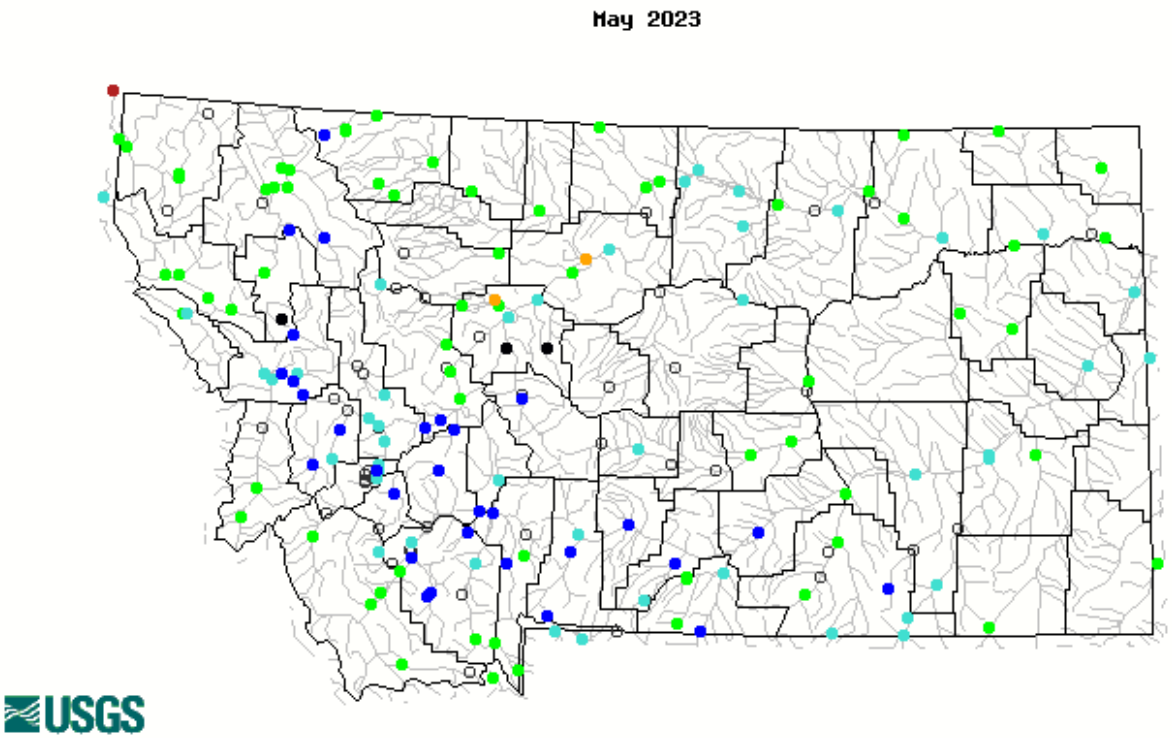
Soil moisture in the top 20 cm is currently lowest in the region from southcentral to northcentral Montana, where conditions are in the 5th percentile or lower. Soil moisture in part of northwest and eastern Montana is in the 20th to 30th percentile. Soil moisture in the top 20 cm is near normal across most of southwest Montana and part of western and eastern Montana. Given current soil moisture conditions across the state and lack of recent precipitation in most of the state, above normal precipitation in June and increased soil moisture would be ideal before heading into the warmer and drier months of summer.



Current Streamflow

Active snowmelt began over a month ago at all elevations across Montana. Above normal temperatures statewide during May accelerated snowmelt to well above normal rates and a significant amount of the seasonal snowpack was released into Montana's rivers last month. As a result, the total volume of water passing by stream gages in May was largely above normal. Locations that held more snow than normal released a near record amount of water last month. Total streamflow volumes during May near Missoula, Butte, Helena, Bozeman and Billings and their surrounding areas were in the 80th to 90th percentile. The result of an exceptional snowpack in the Little Belt Mountains was record total flow in May in both the Smith River and Belt Creek. The Smith River was flowing above 2000 cfs from May 2 to May 29. In comparison, the Smith River near Eden peaked at 898 cfs in 2021 and 1400 cfs in 2022. Most rivers appear to have already reached their snowmelt driven peak for the season. Those peaks were generally earlier than normal across Montana. A later and higher peak is still possible in some locations, but would likely require the influence of rain.

Total Monthly Streamflow Volume Compared to Record - Link

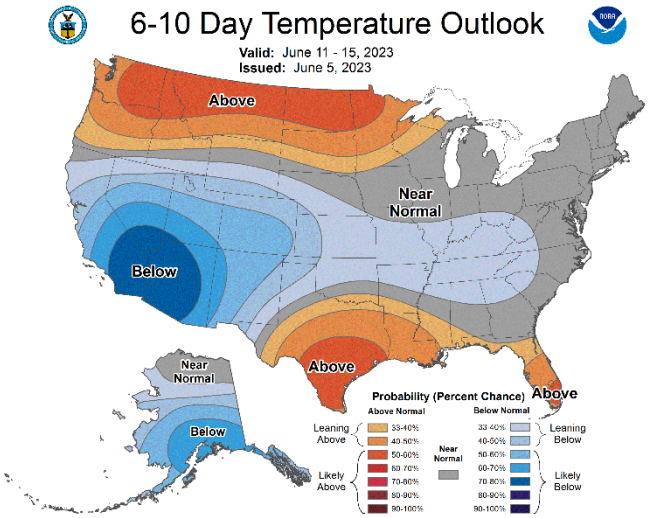


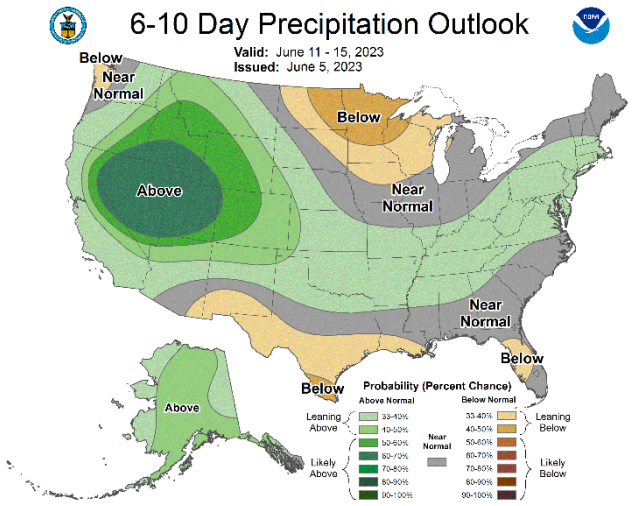
Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

Weather and Climate Outlook

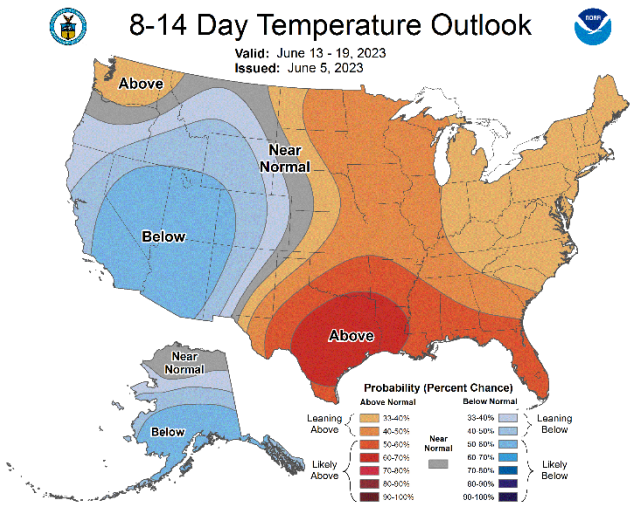
The NOAA Climate Prediction Center's 6–10 day outlook indicates that above average temperatures and above normal precipitation will likely occur across most of Montana during the week of June 11-15. The 8–14 day outlook indicates above normal precipitation is likely across Montana June 13-19, and that temperatures will likely be near to below normal during that time. NOAA's 1-month outlook indicates above normal temperature and precipitation are most probable for June. There are equal chances of above or below normal precipitation in Montana for June-July-August, but the outlook indicates above normal temperatures are likely.

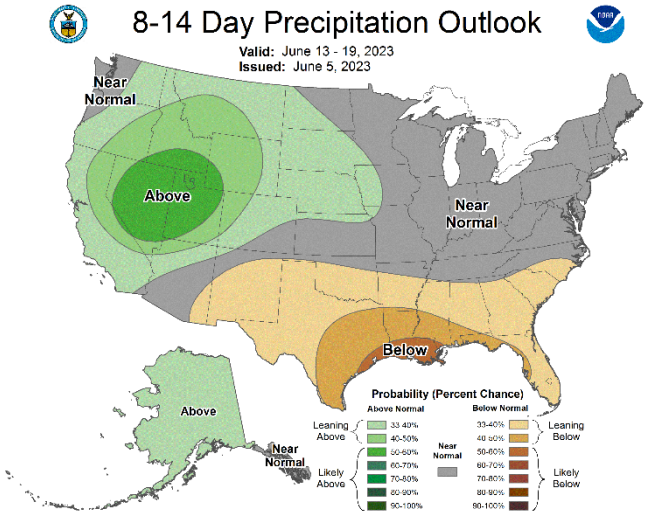
6-10 Day Outlook



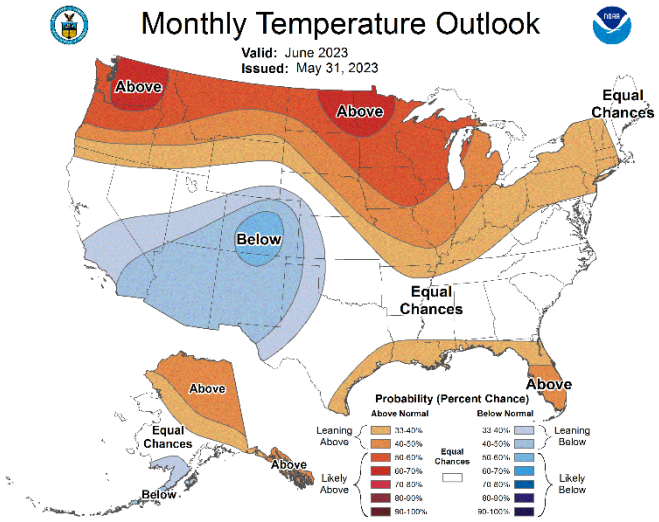


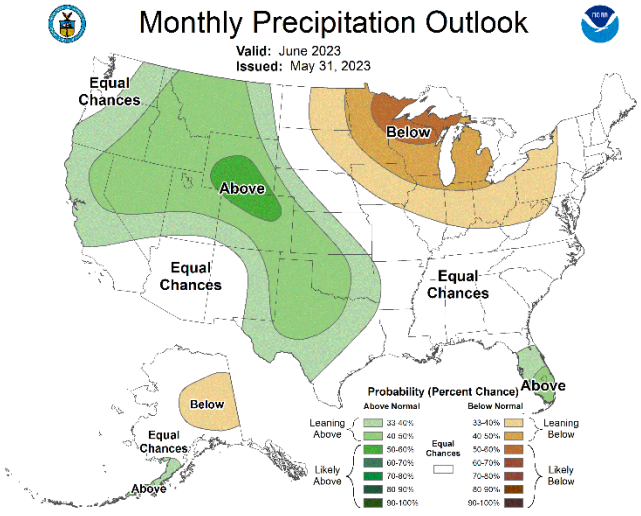
8-14 Day Outlook



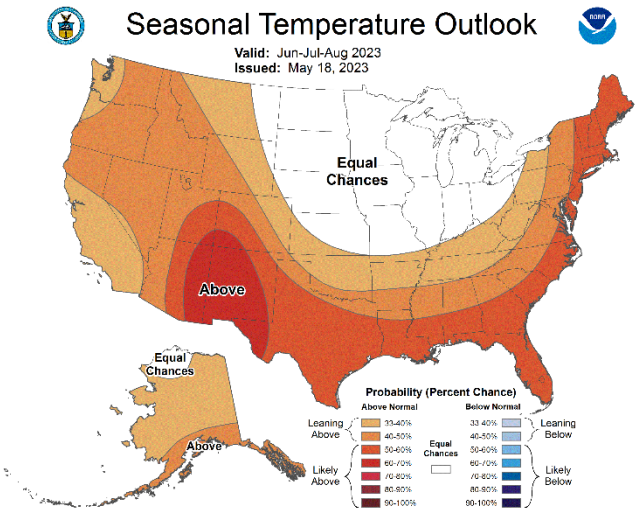


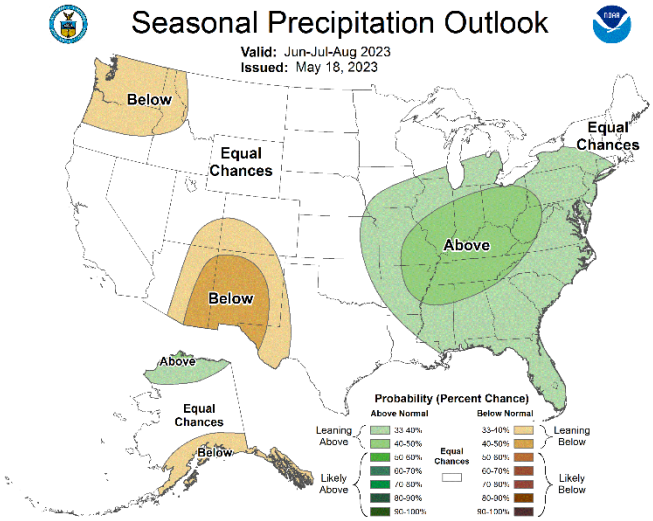
1 Month Outlook





3 Month Outlook





Official Water Supply Forecasts

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.

Snowpack measurements 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. At automated stations, snow depth and snow water equivalent as well as precipitation and temperature are monitored on a daily basis. 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 in the coming months; 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 forecasts.

Summary – June 1, 2023

Rapid snowmelt and generally dry conditions for much of Montana during May resulted in a decrease from last month's forecasts when compared to normal. The exception is part of the Beaverhead River basin, which due to above normal water year precipitation and an exceptional snowpack earlier this season, saw an increase in its water supply forecasts as they compare to normal. June-July streamflow forecasts are above normal in the Beaverhead, Ruby, Smith, Boulder (Jefferson), Musselshell, and Madison River basins. June-July water supply forecasts are lowest in northwest Montana and the northern Rocky Mountain Front. The Lower Clark Fork River, all forks of the Flathead River, the Tobacco River, and the upper Marias River are all forecasted to have less than 60% of normal June-July streamflows.

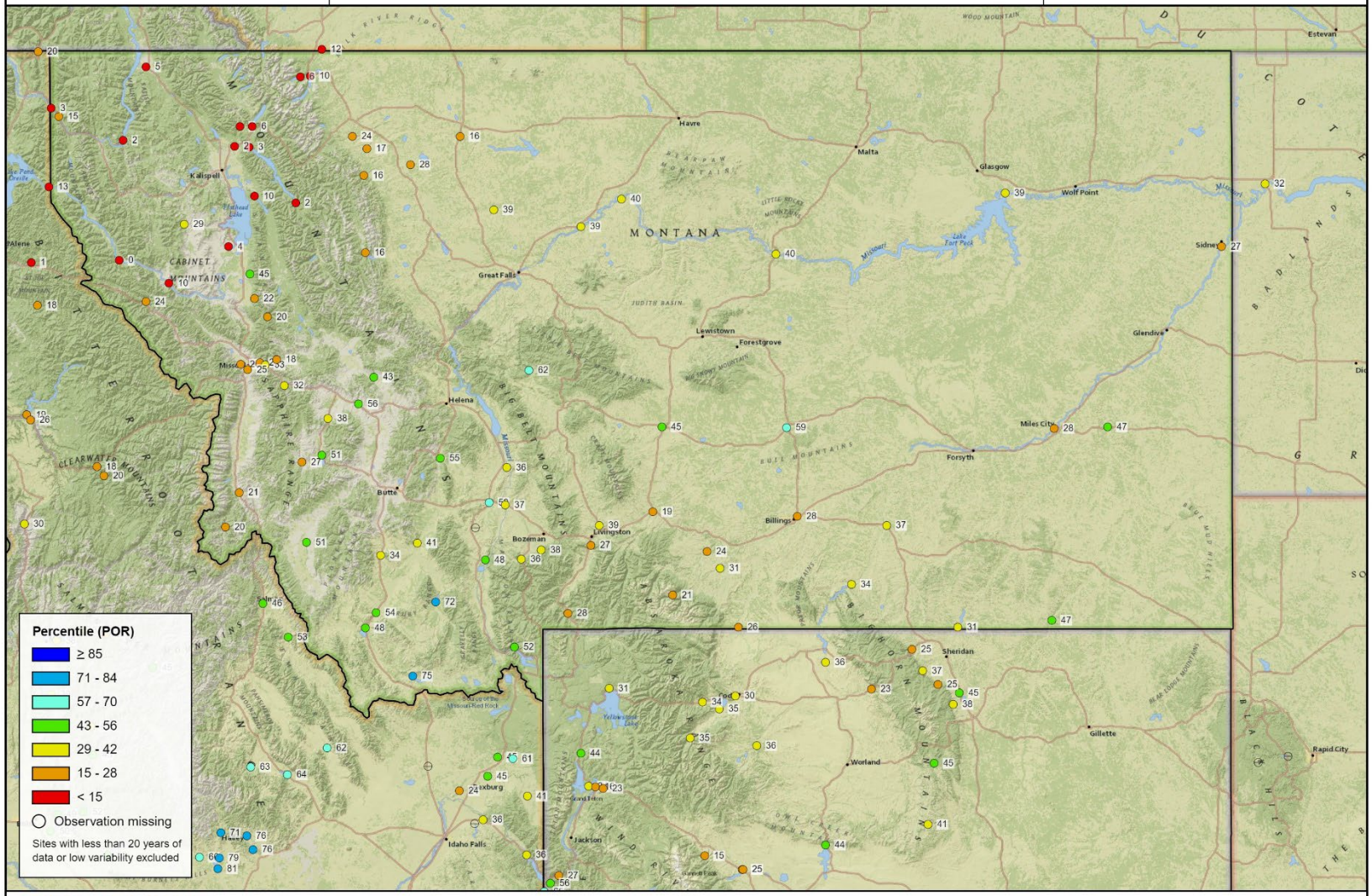
June-September forecasts in the northern Flathead, Lower Clark Fork, Kootenai, and Saint Mary River basins rank in the 10th percentile or less. June-September forecasts in the Upper Clark Fork, southwest and central Montana largely rank in the 50th to 75th percentile. Forecasts across the rest of Montana are generally in the 20th to 50th percentile. Current June-September water supply forecasts for Hungry Horse and Koocanusa Reservoirs are the second lowest on record. The forecast published on June 1, 2001, is the lowest on record for Lake Koocanusa and the forecast published on June 1, 1941, is the lowest for Hungry Horse Reservoir.

Forecast Volume,
50% Exceedance Probability

June 1, 2023 Water Supply Forecasts Compared to Record

Percentile (POR)

June - September, June 1, 2023



Forecast Volume, 50% Exceedance Probability	Second Lowest June 1, 2023 Water Supply Forecasts on Record Records (POR)	June - September, June 1, 2023

USDA Natural Resources Conservation Service
United States Department of Agriculture

N

0 20 40 80 120 160 200 Miles

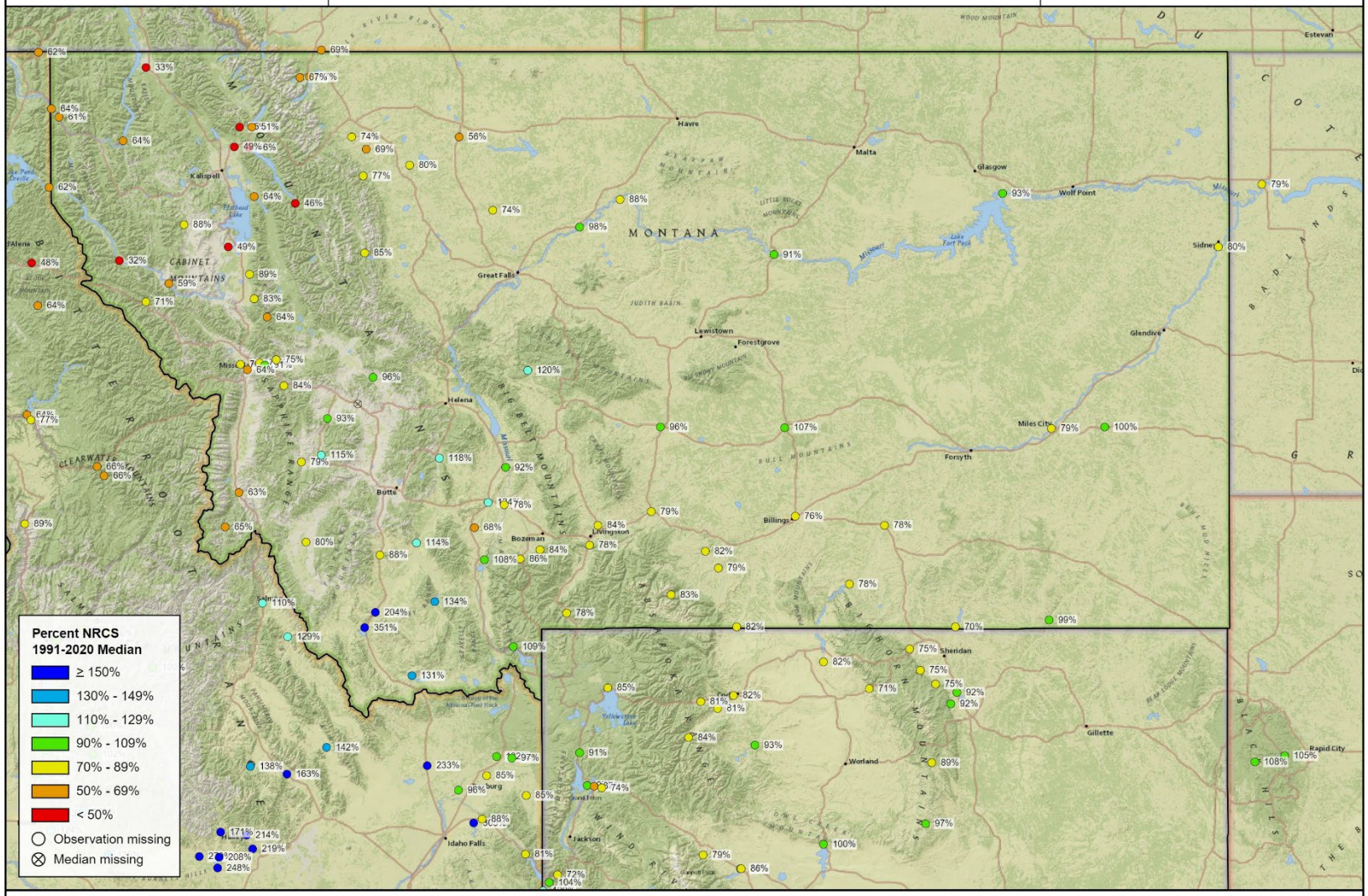
Created 6-06-2023

Forecast Volume,
50% Exceedance Probability

June 1 Water Supply Forecasts

Percent NRCS 1991-2020 Median

June - July, June 1, 2023



USDA Natural Resources Conservation Service
United States Department of Agriculture

N

0 20 40 80 120 160 200 Miles

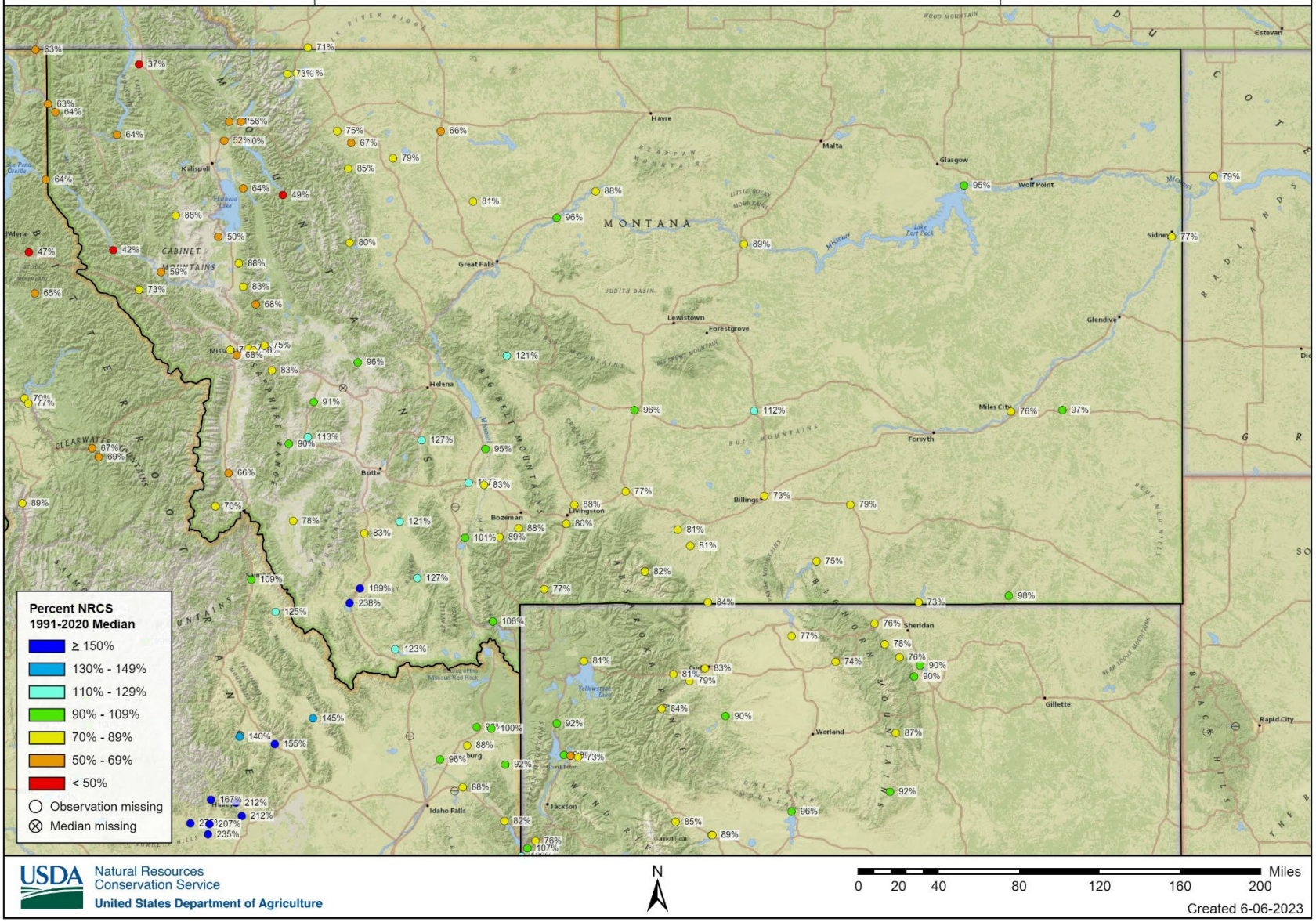
Created 6-06-2023

Forecast Volume,
50% Exceedance Probability

June 1 Water Supply Forecasts

Percent NRCS 1991-2020 Median

June - September, June 1, 2023



USDA Natural Resources Conservation Service
United States Department of Agriculture

N

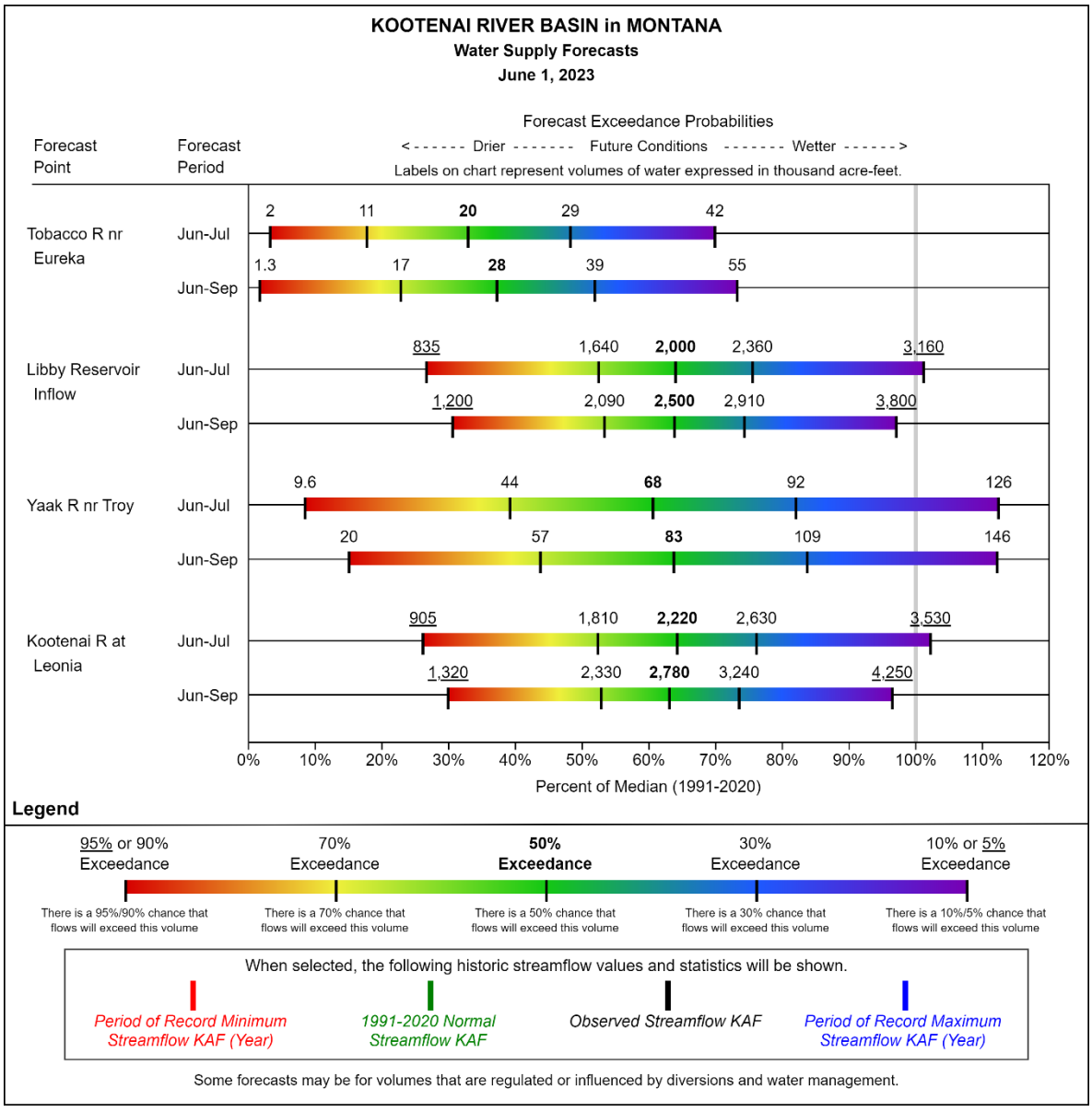
0 20 40 80 120 160 200 Miles

Created 6-06-2023

Water Supply Forecast Charts

Interpreting Water Supply Forecast Charts - Link

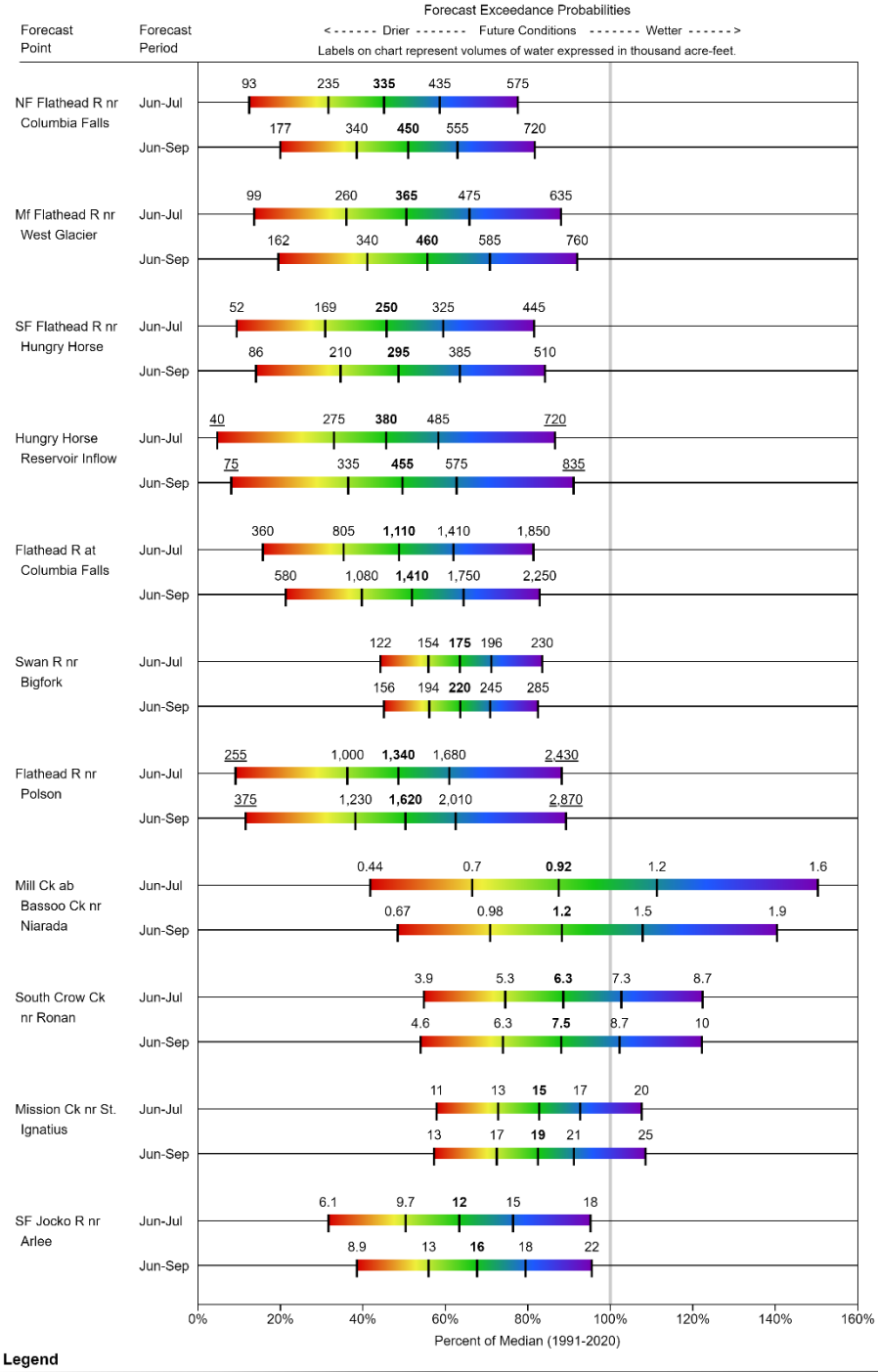
Water Supply Forecast Charts - Link



FLATHEAD RIVER BASIN

Water Supply Forecasts

June 1, 2023



Legend

95% or 90% Exceedance — There is a 95%/90% chance that flows will exceed this volume

70% Exceedance — There is a 70% chance that flows will exceed this volume

50% Exceedance — There is a 50% chance that flows will exceed this volume

30% Exceedance — There is a 30% chance that flows will exceed this volume

10% or 5% Exceedance — There is a 10%/5% chance that flows will exceed this volume

When selected, the following historic streamflow values and statistics will be shown.

Period of Record Minimum Streamflow KAF (Year)

1991-2020 Normal Streamflow KAF

Observed Streamflow KAF

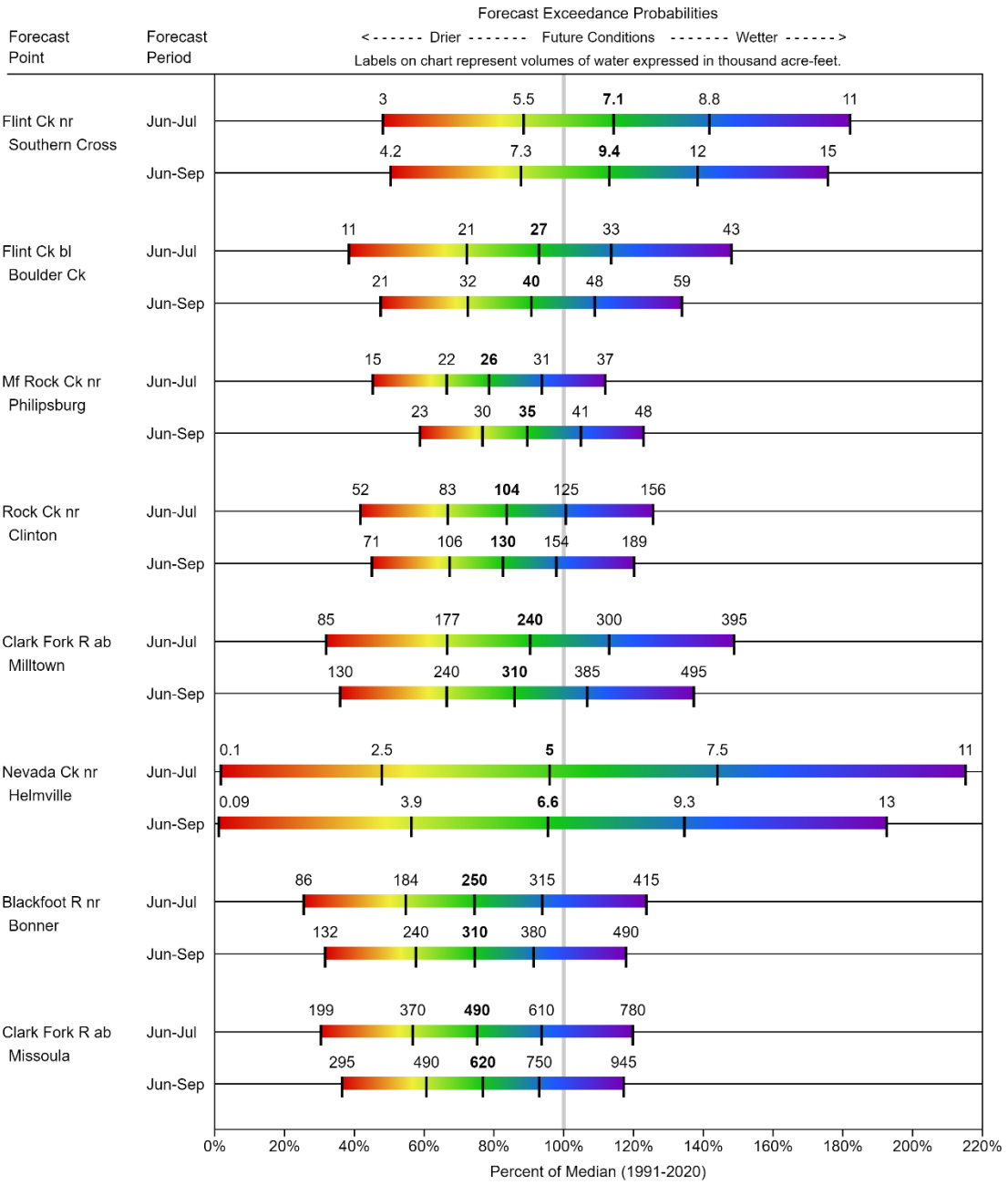
Period of Record Maximum Streamflow KAF (Year)

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

UPPER CLARK FORK RIVER BASIN

Water Supply Forecasts

June 1, 2023



Legend

95% or 90% Exceedance	70% Exceedance	**50% Exceedance**	30% Exceedance	10% or 5% Exceedance
There is a 95%/90% chance that flows will exceed this volume	There is a 70% chance that flows will exceed this volume	There is a 50% chance that flows will exceed this volume	There is a 30% chance that flows will exceed this volume	There is a 10%/5% chance that flows will exceed this volume

When selected, the following historic streamflow values and statistics will be shown.

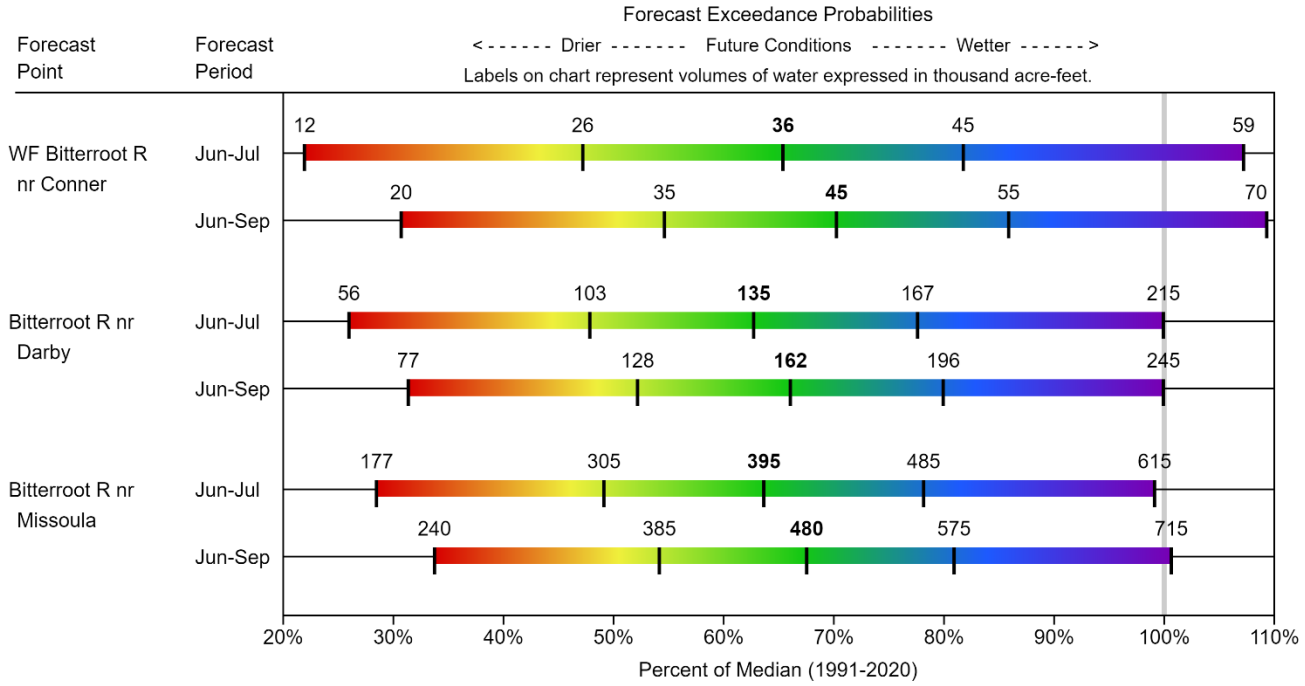
Period of Record Minimum Streamflow KAF (Year)	*1991-2020 Normal Streamflow KAF*	*Observed Streamflow KAF*	*Period of Record Maximum Streamflow KAF (Year)*

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

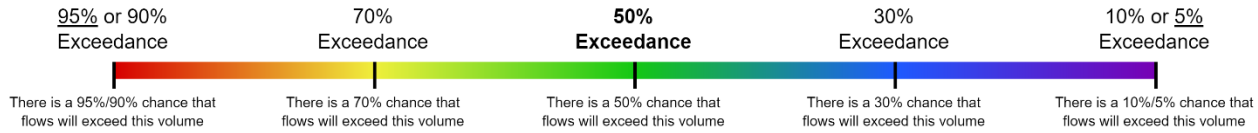
BITTERROOT RIVER BASIN

Water Supply Forecasts

June 1, 2023



Legend



When selected, the following historic streamflow values and statistics will be shown.

Period of Record Minimum Streamflow KAF (Year)

1991-2020 Normal Streamflow KAF

Observed Streamflow KAF

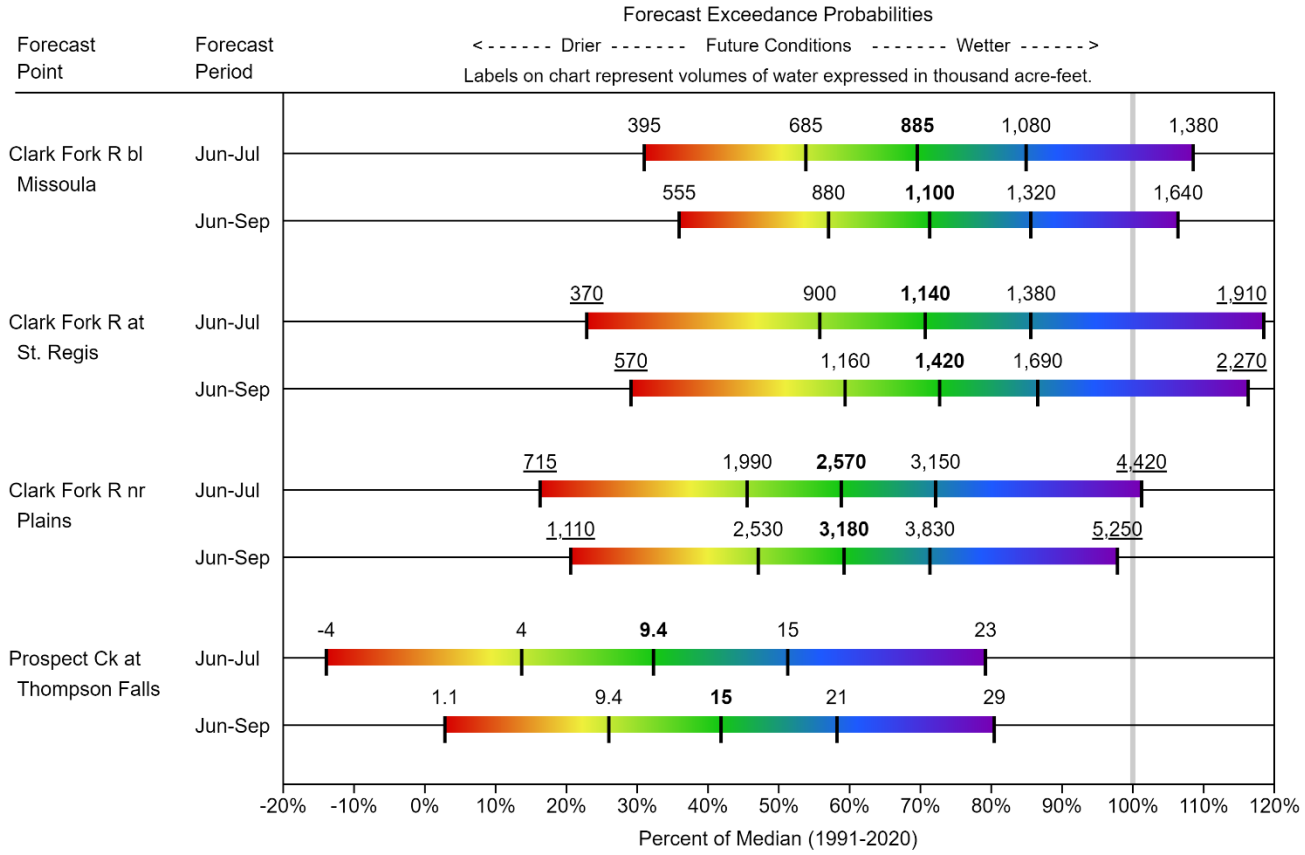
Period of Record Maximum Streamflow KAF (Year)

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

LOWER CLARK FORK RIVER BASIN

Water Supply Forecasts

June 1, 2023



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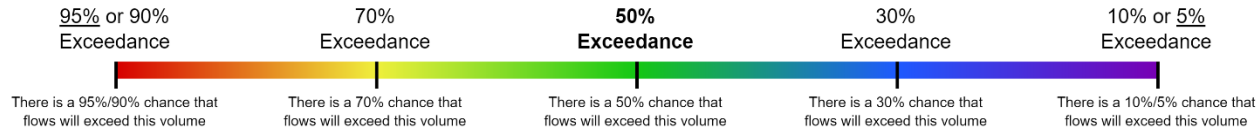


When selected, the following historic streamflow values and statistics will be shown.

Period of Record Minimum Streamflow KAF (Year)

1991-2020 Normal Streamflow KAF

Observed Streamflow KAF

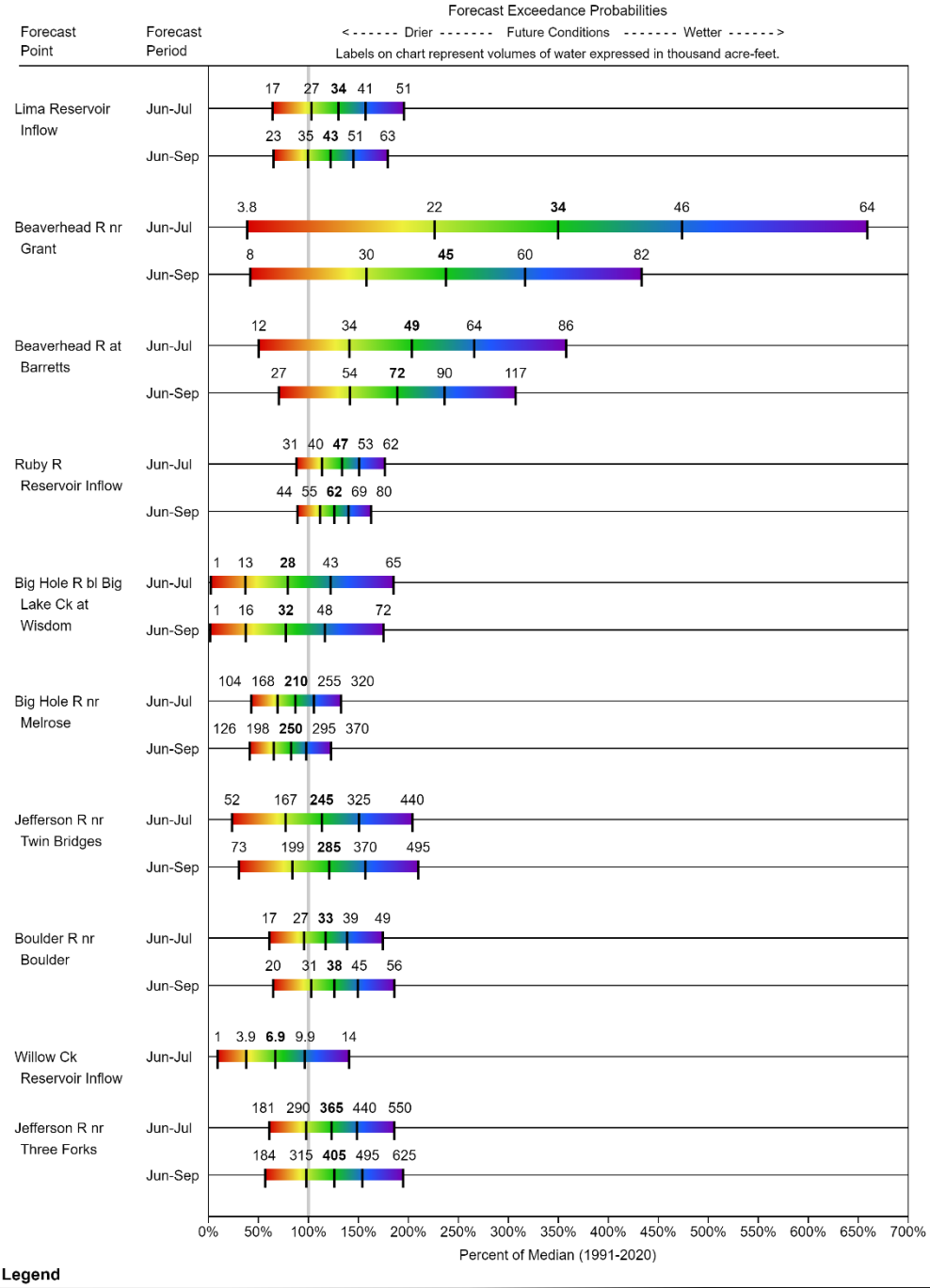
Period of Record Maximum Streamflow KAF (Year)

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

JEFFERSON RIVER BASIN

Water Supply Forecasts

June 1, 2023



Legend

95% or 90% Exceedance	70% Exceedance	**50% Exceedance**	30% Exceedance	10% or 5% Exceedance
There is a 95%/90% chance that flows will exceed this volume	There is a 70% chance that flows will exceed this volume	There is a 50% chance that flows will exceed this volume	There is a 30% chance that flows will exceed this volume	There is a 10%/5% chance that flows will exceed this volume

When selected, the following historic streamflow values and statistics will be shown.

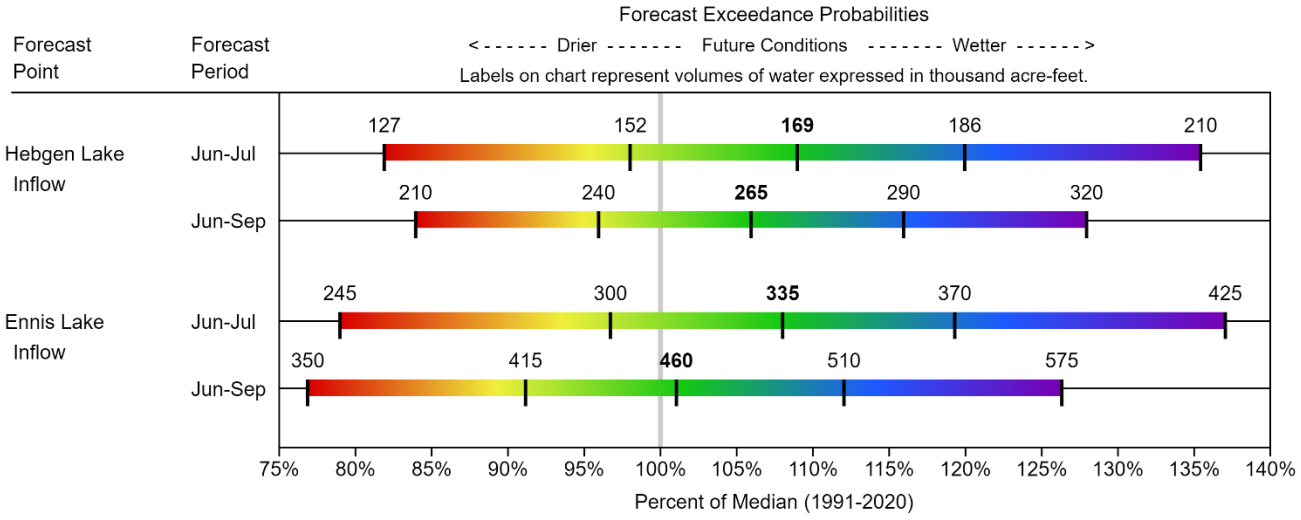
Period of Record Minimum Streamflow KAF (Year) | *1991-2020 Normal Streamflow KAF* | *Observed Streamflow KAF* | *Period of Record Maximum Streamflow KAF (Year)*

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

MADISON RIVER BASIN

Water Supply Forecasts

June 1, 2023



Legend

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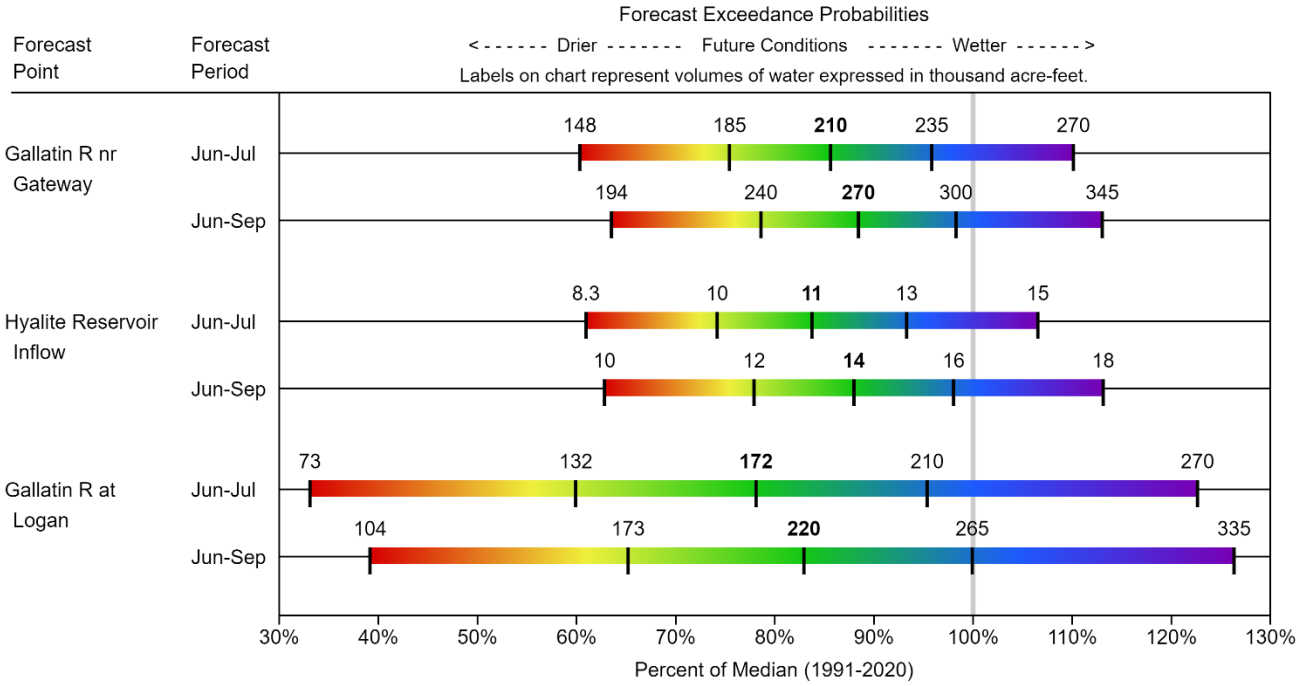
Period of Record Minimum Streamflow KAF (Year)	*1991-2020 Normal Streamflow KAF*	*Observed Streamflow KAF*	*Period of Record Maximum Streamflow KAF (Year)*

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

GALLATIN RIVER BASIN

Water Supply Forecasts

June 1, 2023



Legend

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When selected, the following historic streamflow values and statistics will be shown.

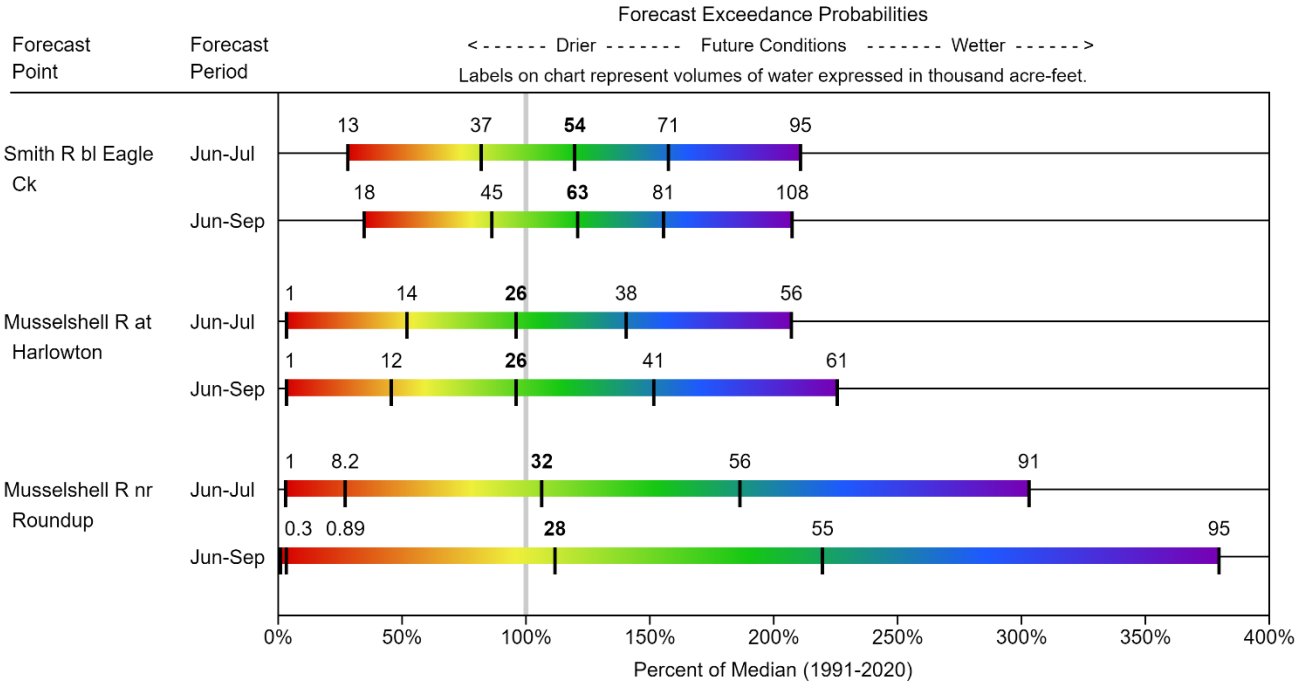
Period of Record Minimum Streamflow KAF (Year)	*1991-2020 Normal Streamflow KAF*	*Observed Streamflow KAF*	*Period of Record Maximum Streamflow KAF (Year)*

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

SMITH-JUDITH-MUSSELSHELL

Water Supply Forecasts

June 1, 2023



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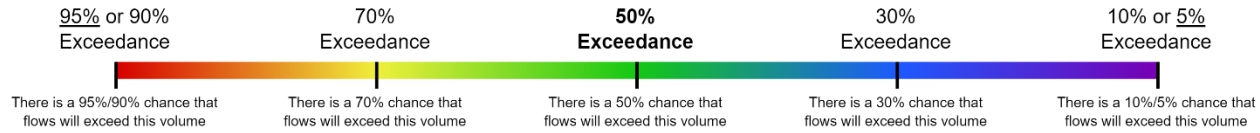


When selected, the following historic streamflow values and statistics will be shown.

Period of Record Minimum Streamflow KAF (Year)

1991-2020 Normal Streamflow KAF

Observed Streamflow KAF

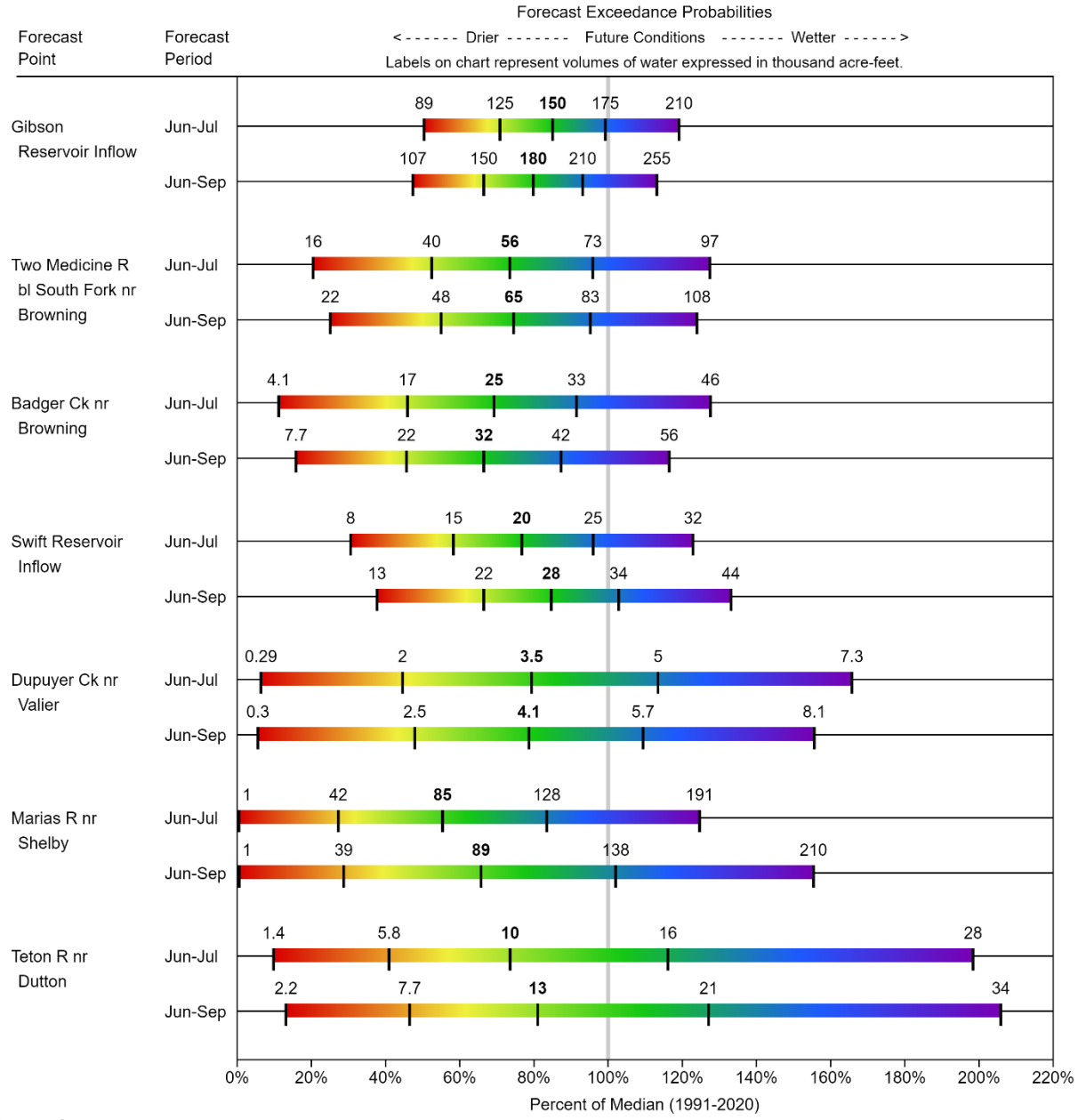
Period of Record Maximum Streamflow KAF (Year)

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

SUN-TETON-MARIAS

Water Supply Forecasts

June 1, 2023



Legend

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30% Exceedance — There is a 30% chance that flows will exceed this volume

10% or 5% Exceedance — There is a 10%/5% chance that flows will exceed this volume

When selected, the following historic streamflow values and statistics will be shown.

Period of Record Minimum Streamflow KAF (Year)

1991-2020 Normal Streamflow KAF

Observed Streamflow KAF

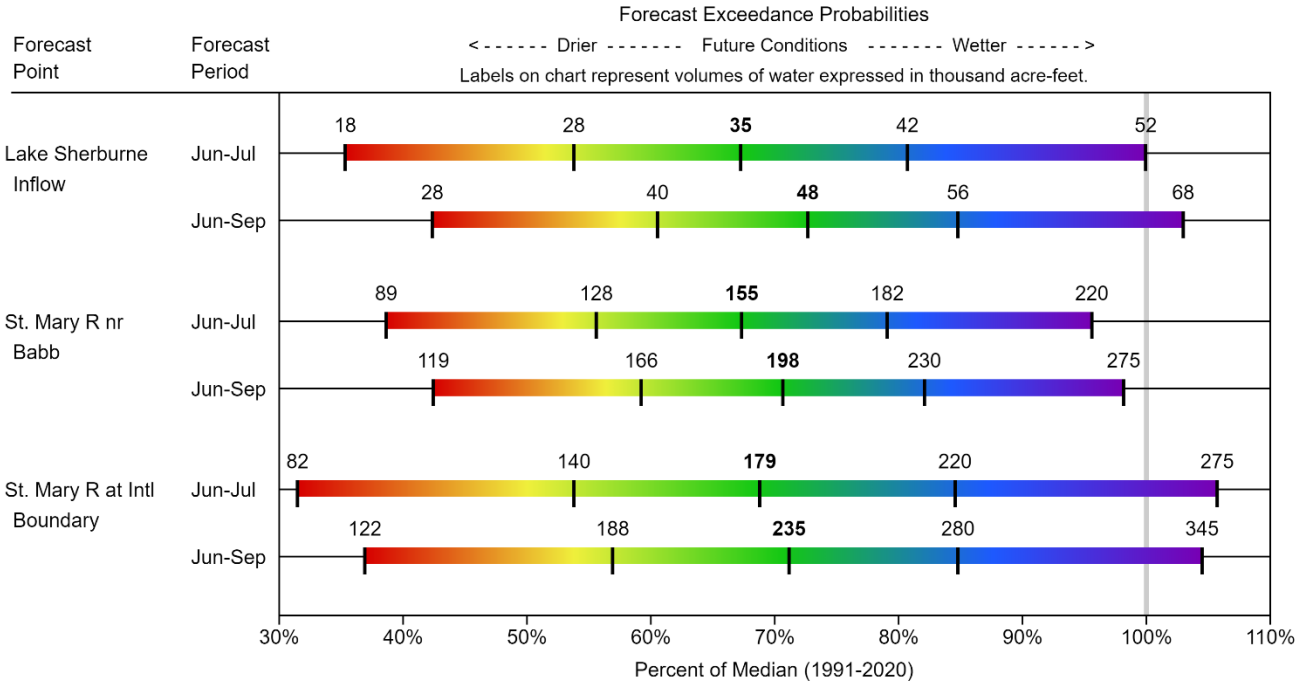
Period of Record Maximum Streamflow KAF (Year)

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

ST. MARY & MILK BASINS

Water Supply Forecasts

June 1, 2023



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When selected, the following historic streamflow values and statistics will be shown.

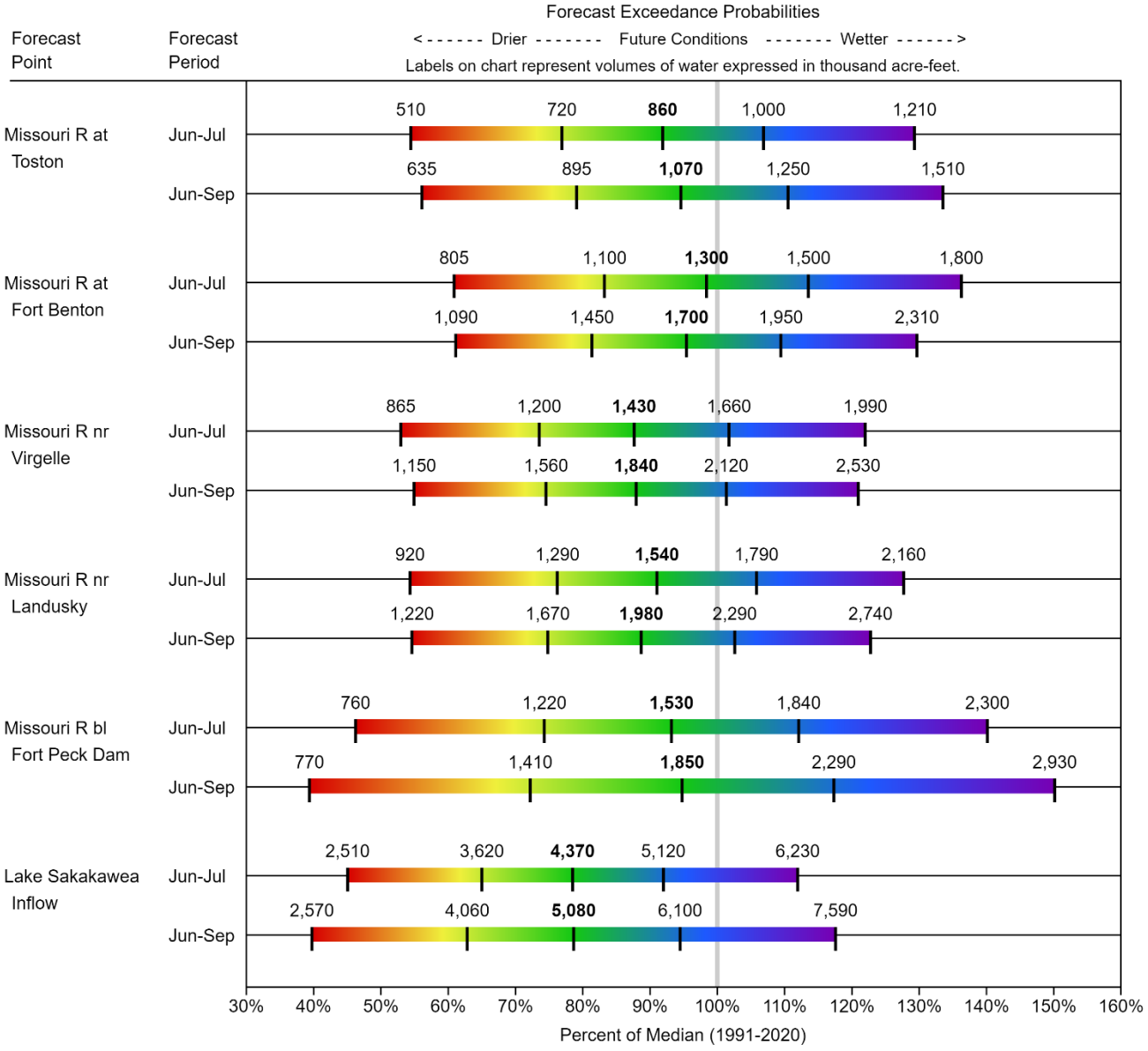
Period of Record Minimum Streamflow KAF (Year)	*1991-2020 Normal Streamflow KAF*	*Observed Streamflow KAF*	*Period of Record Maximum Streamflow KAF (Year)*

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

MISSOURI MAINSTEM BASIN

Water Supply Forecasts

June 1, 2023



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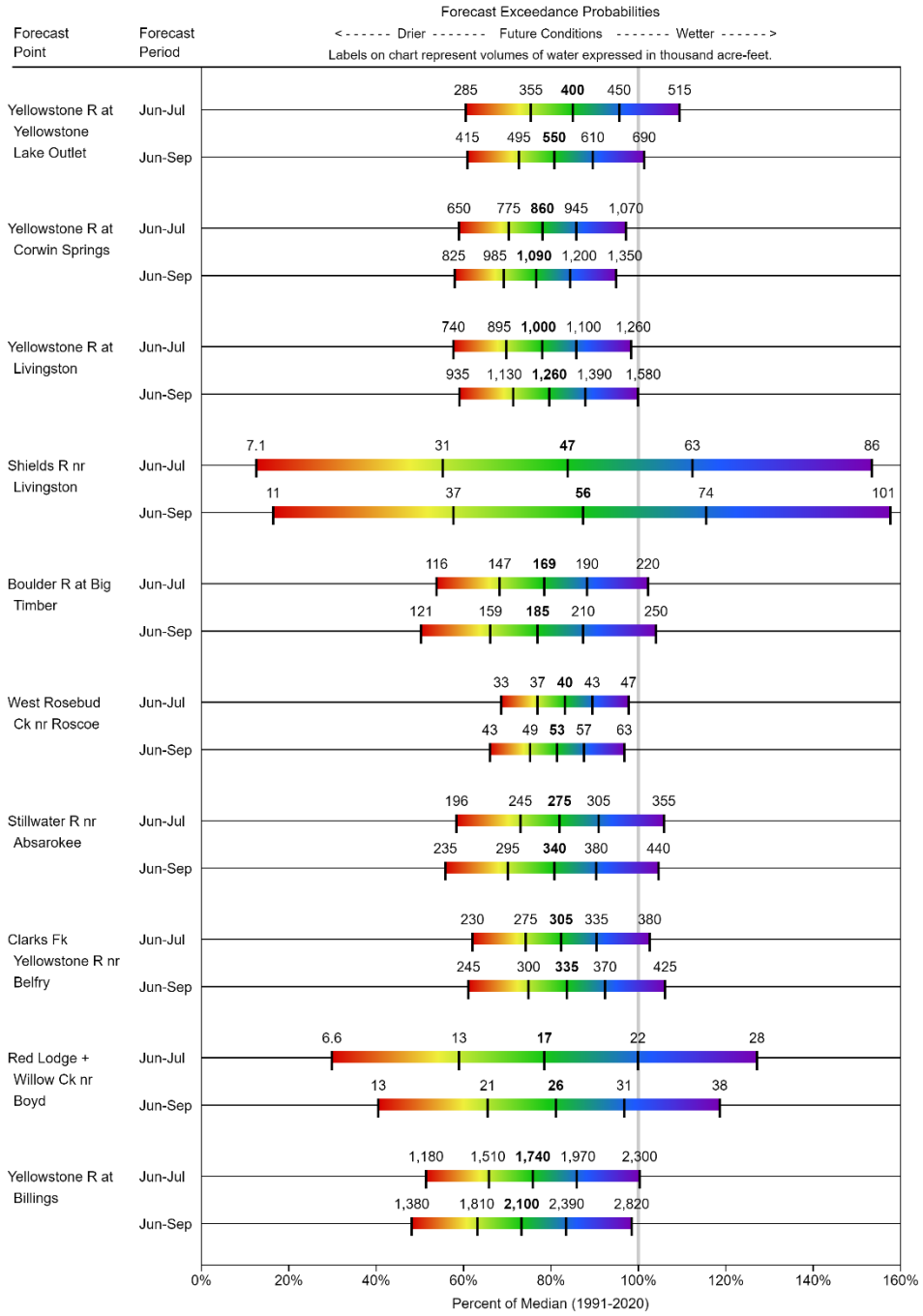
Period of Record Minimum Streamflow KAF (Year) | *1991-2020 Normal Streamflow KAF* | *Observed Streamflow KAF* | *Period of Record Maximum Streamflow KAF (Year)*

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

UPPER YELLOWSTONE RIVER BASIN

Water Supply Forecasts

June 1, 2023



Legend

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70% Exceedance — There is a 70% chance that flows will exceed this volume

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30% Exceedance — There is a 30% chance that flows will exceed this volume

10% or 5% Exceedance — There is a 10%/5% chance that flows will exceed this volume

When selected, the following historic streamflow values and statistics will be shown.

Period of Record Minimum Streamflow KAF (Year)

1991-2020 Normal Streamflow KAF

Observed Streamflow KAF

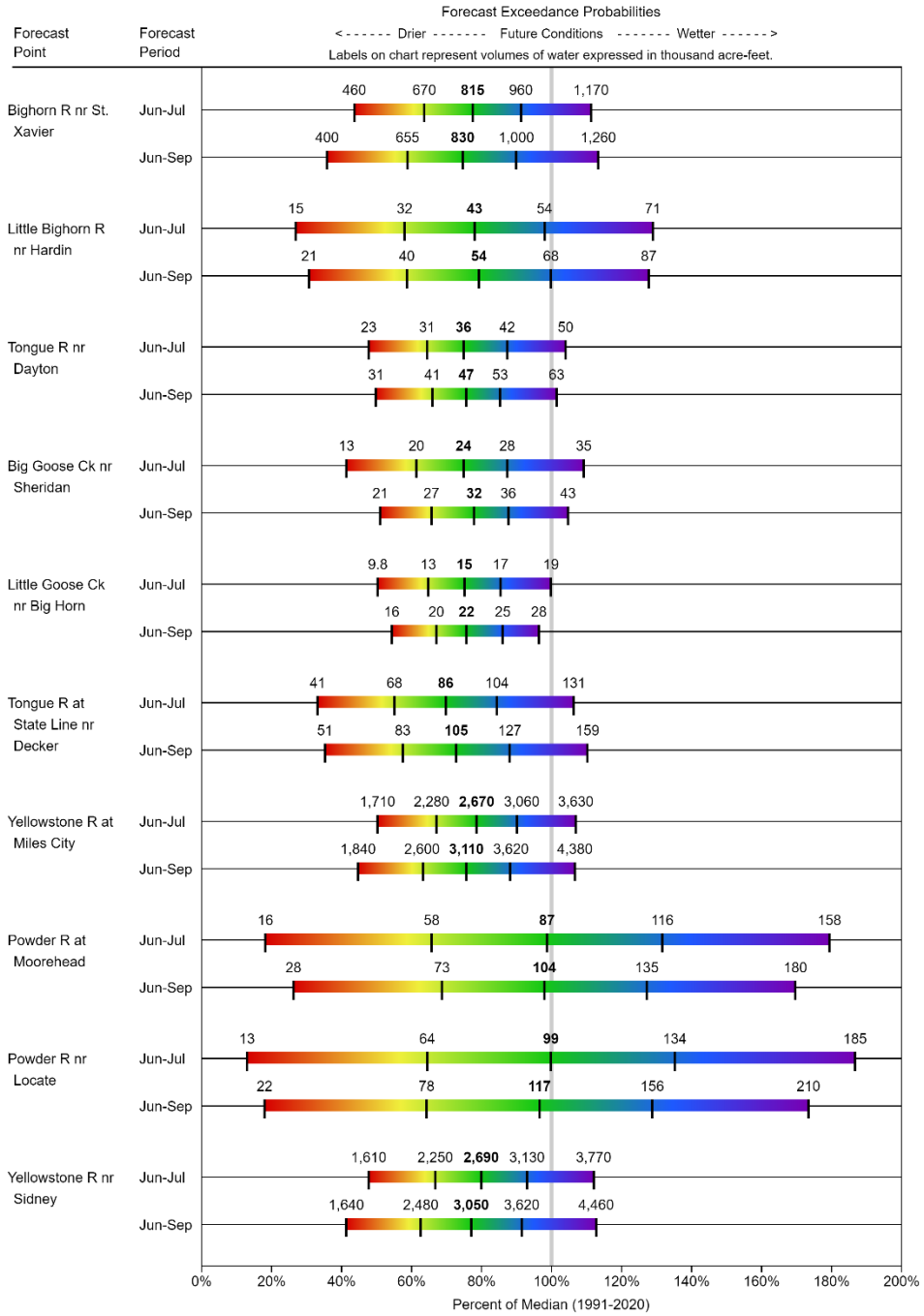
Period of Record Maximum Streamflow KAF (Year)

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

LOWER YELLOWSTONE RIVER BASIN (Wyoming)

Water Supply Forecasts

June 1, 2023



Legend

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Period of Record Minimum Streamflow KAF (Year) | *1991-2020 Normal Streamflow KAF* | *Observed Streamflow KAF* | *Period of Record Maximum Streamflow KAF (Year)*

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

Water Supply Outlook Report - Webpage Access

The following links will take you to Snow Survey webpages dedicated to Montana's major river basins and a statewide overview. Various water supply related maps are available using the drop-down menus. Hover over and click on points or basins of interest to view data and charts.

Monthly Data - Interactive Web Pages		
Monthly Data - Statewide Overview		
Monthly Statewide Overview		
Monthly Data - River Basin Summaries		
Columbia River Basin	Missouri River Basin	Yellowstone River Basin
Kootenai	Jefferson	Upper Yellowstone
Flathead	Madison	Bighorn-Powder-Tongue
Upper Clark	Gallatin	
Bitterroot	Helena Valley	
Lower Clark	Smith-Judith-Musselshell	
	Sun-Teton	
	St. Mary	
	Milk	

Links and Resources

The following links will take you to the external (non-NRCS) resources used in this report:

Precipitation

- PRISM Climate Group – Oregon State University
- West Wide Drought Tracker
- Montana Climate Office – University of Montana
    - Drought Indicator Dashboard

Temperature

- West Wide Drought Tracker
- NOAA NWS – Climate Offices

Drought Information

- Montana | U.S. Drought Monitor (unl.edu)
- Outlooks | U.S. Drought Monitor (unl.edu)
- Montana | Drought.gov

Soil Moisture

- USDA – National Agricultural Statistics Service – National Crop Progress
- NOAA NWS Climate Prediction Center - Calculated Soil Moisture Ranking Percentiles

Current Streamflow

- USGS WaterWatch -- Streamflow conditions

Weather and Climate Predications

- Climate Prediction Center (noaa.gov)

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Montana Water Supply Outlook Report

Natural Resources Conservation Service