USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

# Montana Water Supply Outlook Report

June 1, 2026

Crow Creek at Highway 93 swells as late May storms bring heavy rains and rapid snowmelt, triggering flooding across the Mission Mountain drainages. In the north Missions, Moss Peak and Bisson Creek SNOTELs recorded around 4 to 6 inches of rain from May 29 to June 1. While May showers favored the Flathead basin, southwestern Montana received well below normal precipitation. Variable rainfall, coupled with warmer than normal May temperatures, accelerated snowmelt and further degraded the season's snowpack. (Photo: Cody T. Goklish, Program Hydrologist, CSKT Natural Resources Department – 6/1/2026)

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For more water supply information, contact:

Eric Larson
Supervisory Hydrologist
Montana Data Collection Office
USDA NRCS Montana Snow Survey and Water Supply Forecasting Program
eric.larson@usda.gov

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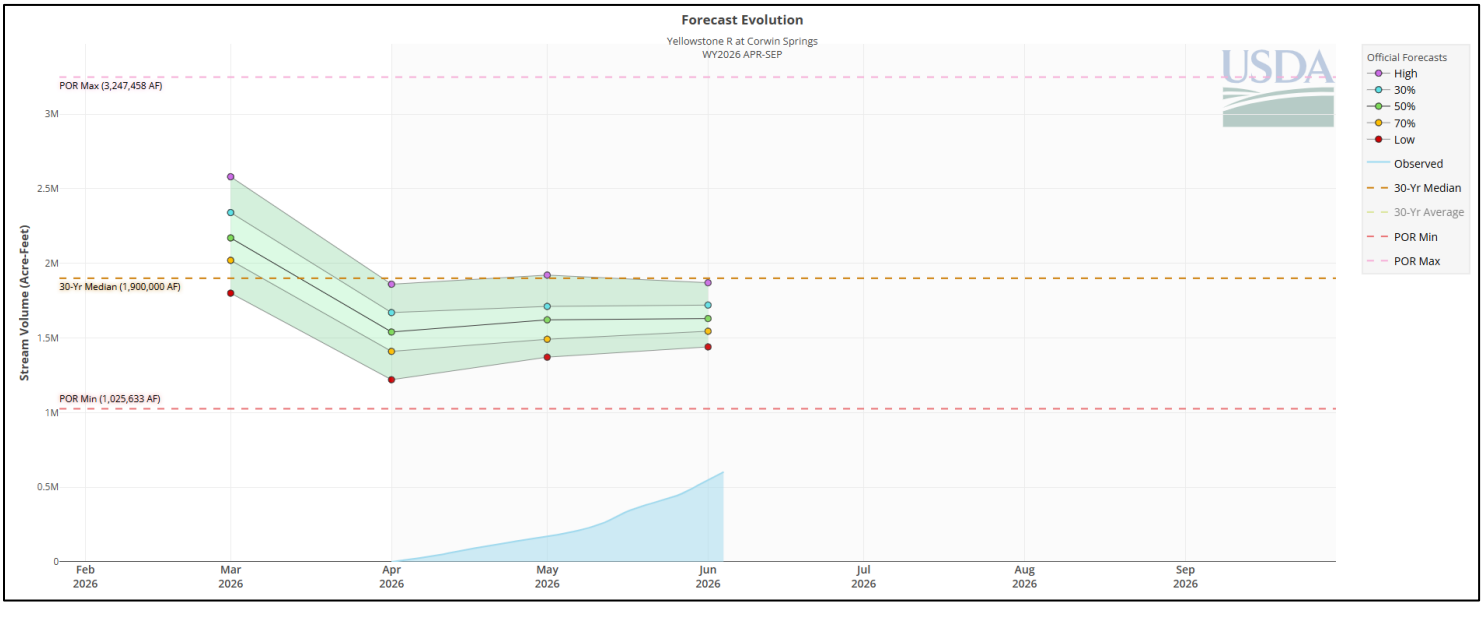
# Statewide Overview

## Summary

The June 1 Water Supply Outlook Report is the last one of the season. The overarching themes of the winter and spring have set the stage for water supply heading into summer. Warmer than normal temperatures influenced where snowpack was able to accumulate and how fast the snow melted. Higher elevations were favored for snowpack accumulation due to temperatures being cool enough to have precipitation fall in the form of snow. Although snowpack was lacking in most areas, near to above normal water-year-to-date precipitation has been observed in most basins. Rainfall isn't as sustaining as snowpack for summer water supply. However, the precipitation we've received has helped in regions where it has been abundant. Recent storms have provided more moisture in the form of rain and have increased streamflows. Especially in northwest Montana as seen on the cover.

Forecast Evolution Plots are a newer product to visualize streamflow forecasts. These plots can provide an insightful visual as to how the forecasts have evolved throughout the year. As mentioned in previous reports, forecast uncertainty decreases as we progress towards summer. This can be shown in the plots by the constricting of the forecast value range. The decrease in uncertainty is due to having more data available for forecast variables and a decreased influence of harder to predict factors, such as spring precipitation. The forecast evolution plots also show the actual observed streamflow values for that point. By selecting previous years you can see how well the forecasts performed compared to the actual streamflow measured. The plot below shows the forecast for the Yellowstone River at Corwin Springs. The monthly forecasts show the diminishing influence of early season moisture and increasing snowpack deficits. The April-September stream volume this season is unlikely to exceed the median value but is also unlikely to drop below the minimum value of 1025.6 KAF that occurred in 1919. As mentioned, the range of the forecast exceedance values has decreased as we approach summer. Thus, showing how the uncertainty has decreased with more data to build the forecast from. However, there is still some uncertainty as we progress into summer.

Snowpack accumulation season has ended and water supply deficits are unlikely to be fully recovered in the driest areas east of the Divide. However, future precipitation could help to mitigate the effects of the snowpack deficits and increased precipitation will be vital to help mitigate these deficits and drought conditions.



# Statewide Overview

## Precipitation

May precipitation was variable across Montana. Basins on the southern and far western portions of the state had below normal monthly precipitation. The Missouri Headwaters, Upper Yellowstone, Powder, and Tongue basins had well below normal May precipitation. The Kootenai, Upper Clark Fork, Upper Missouri, and Smith-Judith-Musselshell were all near normal. The Flathead, Sun-Teton-Marias, Bear Paw, and St. Mary all had above normal precipitation. The above normal monthly precipitation at these basins can be mostly attributed to the precipitation event starting around May 29 and ending around June 1. At Bisson Creek SNOTEL in the Mission Mountains, this precipitation event brought 4.3 inches of rain. The monthly total for May was 6.3 inches at this site. Other SNOTELs in the surrounding area also had similar precipitation increases near the end of the month.

Water-year-to-date precipitation is near to above normal for most basins. The Powder and Tongue basins are the only basins with below normal water-year-to-date precipitation. Most basins in the northwest part of the state have above normal water-year-to-date precipitation from continued spring storms. For the rest of the state, water-year-to-date precipitation has been sustained by the above normal precipitation from the start of the water year. Near or above normal precipitation in the following months will be needed to sustain water-year-to-date precipitation.

This year's water-year precipitation has a higher proportion of rainfall to snowfall, resulting from the widespread above normal temperatures. Precipitation that fell during the last month was mostly in the form of rain. Only a handful of SNOTELs observed any measurable snowfall, which is uncommon for May. As the snowpack continues to melt, rainfall over the following months will determine drought conditions and streamflow levels.

**May - Highest Total Accumulated Precipitation - SNOTEL/SNOLITE**

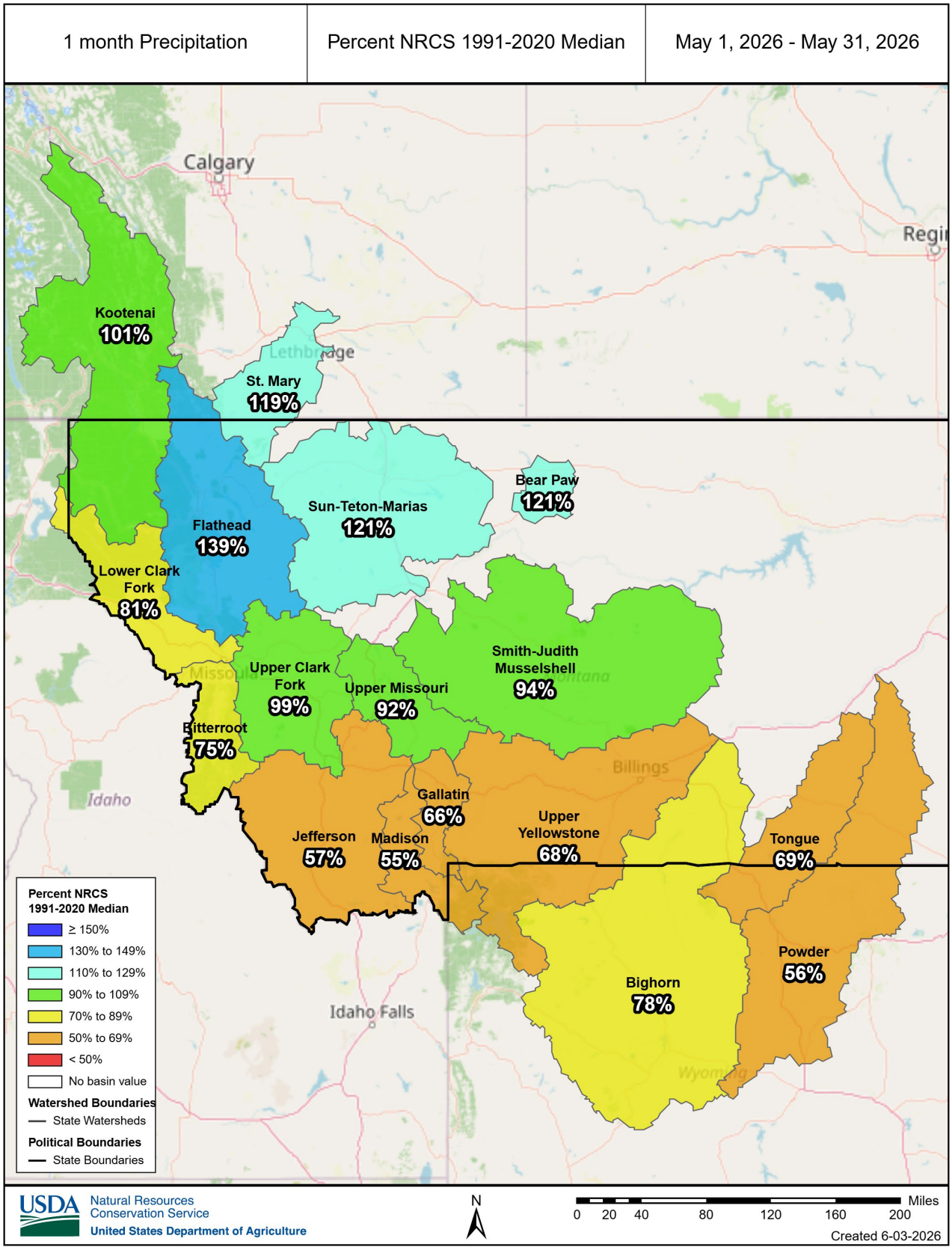
| Station | Precipitation (Inches) | Median (Inches) | Elevation | Basin |
|---|---|---|---|---|
| **Moss Peak** | 8.7 | 5.3 | 6760 | Flathead |
| **Noisy Basin** | 8.3 | 5.4 | 6070 | Flathead |
| **Bisson Creek** | 6.3 | 3.5 | 4880 | Flathead |
| **Badger Pass** | 6.0 | 4.5 | 6870 | Sun-Teton-Marias |
| **Emery Creek** | 5.9 | 3.3 | 4340 | Flathead |

**May - Lowest Total Accumulated Precipitation- SNOTEL/SNOLITE**

| Station | Precipitation (Inches) | Median (Inches) | Elevation | Basin |
|---|---|---|---|---|
| **Tepee Creek** | 0.7 | 2.9 | 7950 | Madison |
| **West Yellowstone** | 0.9 | 2.2 | 6680 | Madison |
| **Thumb Divide** | 1.0 | 2.6 | 7970 | Upper Yellowstone |
| **Calvert Creek** | 1.1 | 2.4 | 6410 | Jefferson |
| **Hanson Sawmill** | 1.1 | 3.4 | 8360 | Powder |

# Statewide Overview

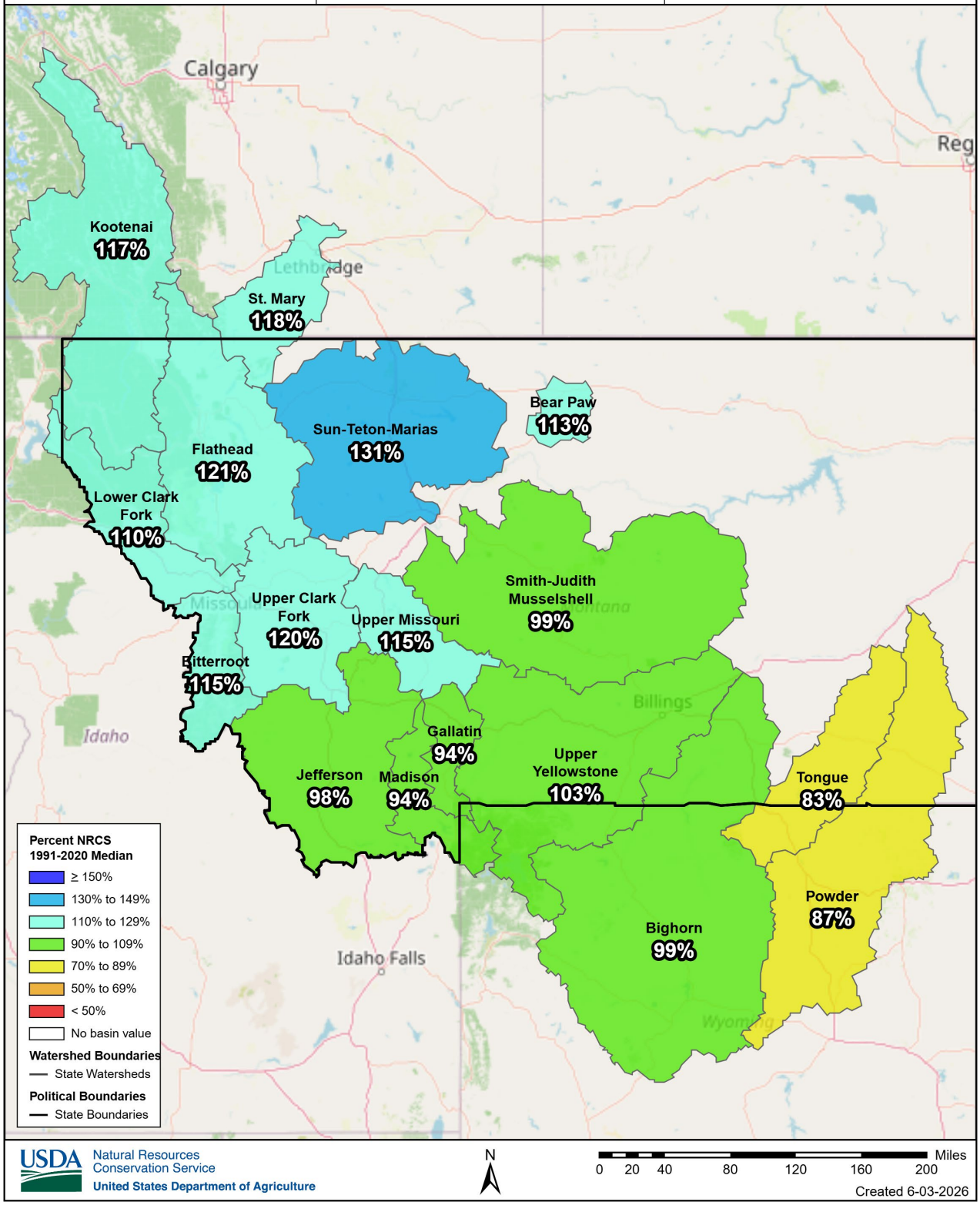
## Precipitation (Continued)



# Statewide Overview

## Precipitation (Continued)

| Water Year to Date Precipitation | Percent NRCS 1991-2020 Median | October 1, 2025 - May 31, 2026 |
|---|---|---|



# Statewide Overview

## Snowpack

Snowpack across Montana is well below normal for June 1. Snowpack ranges from around 55% to 70% of median in the northwest and is at or below 50% of median across the rest of the state. On May 1, snowpack statewide largely ranged from 55% to 90% of normal. Most of the season's snowpack quickly melted in May due to periods of unseasonably warm temperatures and an end of month rain on snow event. Of the 145 SNOTELs associated with Montana basins, 111 have melted out, 66 experienced their earliest or second earliest melt out (reached zero snow) on record. Only a few pockets across the state are holding onto a meaningful amount of the seasons remaining snowpack. A handful of high elevation SNOTELs in the Clark Fork basin and Beartooth Mountains are reporting near to above normal snowpack for June 1, while other high elevation stations in the Flathead and Beartooths are reporting around 70% to 80% of median snowpack.

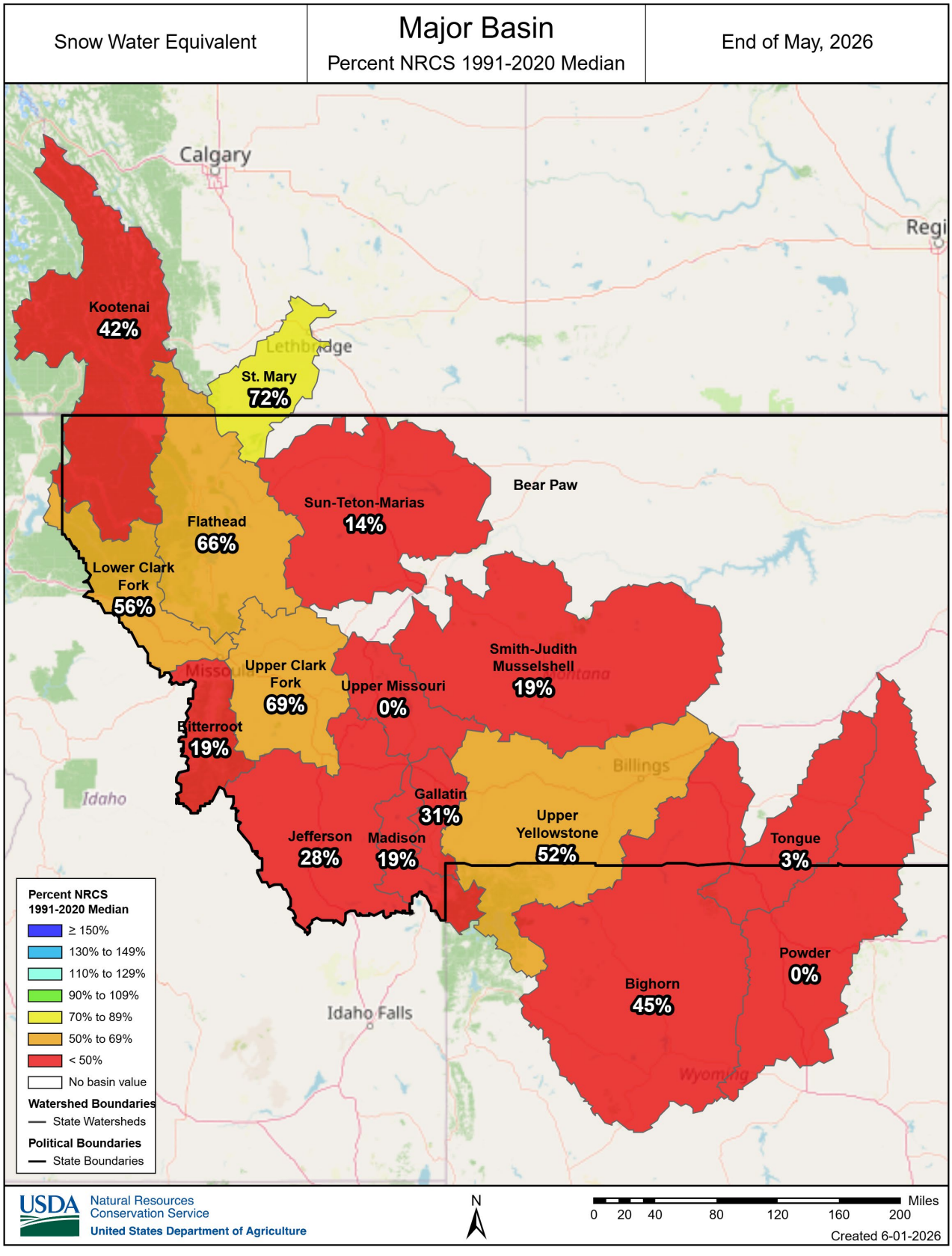
However, looking at the snowpack on June 1 provides an incomplete snapshot of the winter. It is more telling to look back on the season's snowpack, particularly peak snowpack accumulation and timing of snowmelt. Snowpack accumulation varied substantially throughout the state, depending on elevation and weather patterns. Higher elevation SNOTELs that benefitted from the season's storms, such as those in the Absoaroka-Beartooth Mountains, Bitterroot, Clark Fork, and Flathead basins, saw near to above normal snowpack accumulation for the season. Higher elevation SNOTEL sites in regions not favored by the storms received only 65% to 90% of a typical season's snowpack. Warm temperatures depressed lower elevation snowpack statewide, with many low elevation SNOTELs recording less than 65% of their normal season's snowpack. Snowpack accumulation peaked and transitioned to melt in mid-March, about a month earlier than usual. As a result, much of the snowmelt driven runoff will also occur earlier than normal this season.

**Water Year 2026 - Major Basin - Snowpack Percent of Normal ('91-'20)**

| Basin | Nov 1 | Dec 1 | Jan 1 | Feb 1 | Mar 1 | Apr 1 | May 1 | Jun 1 |
|---|---|---|---|---|---|---|---|---|
| Kootenai | 198 | 68 | 107 | 95 | 86 | 86 | 84 | 42 |
| Flathead | 208 | 93 | 109 | 82 | 73 | 76 | 84 | 66 |
| Upper Clark Fork | 161 | 60 | 101 | 84 | 84 | 84 | 87 | 69 |
| Bitterroot | 116 | 29 | 90 | 75 | 77 | 79 | 74 | 19 |
| Lower Clark Fork | 266 | 51 | 86 | 67 | 66 | 70 | 64 | 56 |
| Jefferson | 73 | 40 | 93 | 79 | 79 | 69 | 68 | 28 |
| Madison | 97 | 43 | 96 | 89 | 86 | 61 | 65 | 19 |
| Gallatin | 110 | 53 | 107 | 86 | 82 | 63 | 61 | 31 |
| Upper Missouri | 116 | 58 | 99 | 80 | 83 | 81 | 71 | - |
| Smith-Judith-Musselshell | 66 | 57 | 100 | 79 | 72 | 74 | 73 | 19 |
| Sun-Teton-Marias | 182 | 75 | 116 | 86 | 73 | 67 | 54 | 14 |
| St. Mary | 155 | 76 | 117 | 88 | 67 | 58 | 83 | 72 |
| Upper Yellowstone | 99 | 58 | 120 | 98 | 89 | 71 | 74 | 52 |
| Bighorn | 80 | 50 | 111 | 98 | 94 | 61 | 54 | 44 |
| Powder | 126 | 49 | 89 | 79 | 68 | 26 | 26 | - |
| Tongue | 40 | 28 | 73 | 68 | 63 | 49 | 54 | 2 |
| Bear Paw | - | 122 | 100 | 46 | 28 | - | - | - |

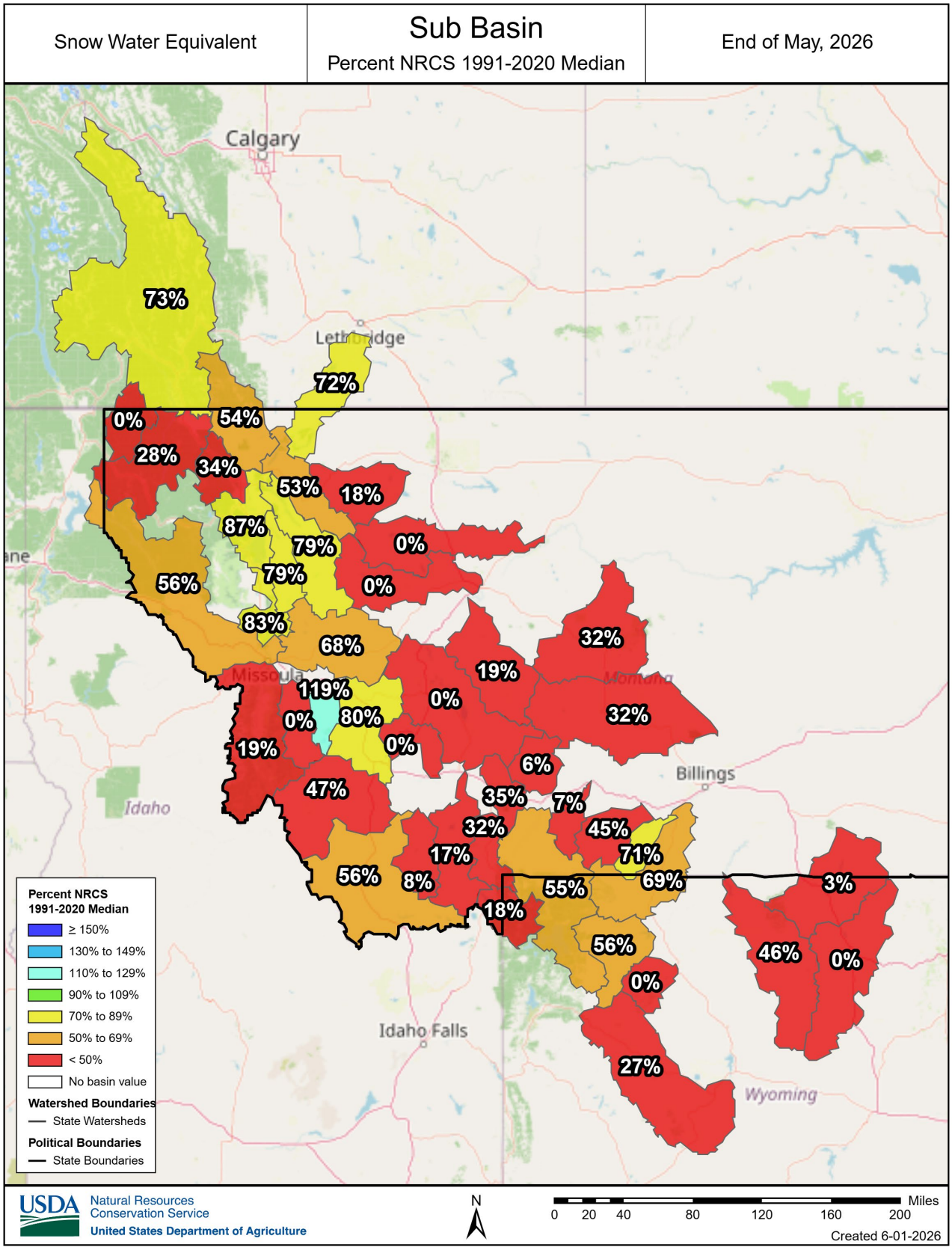
# Statewide Overview

## Snowpack (Continued)



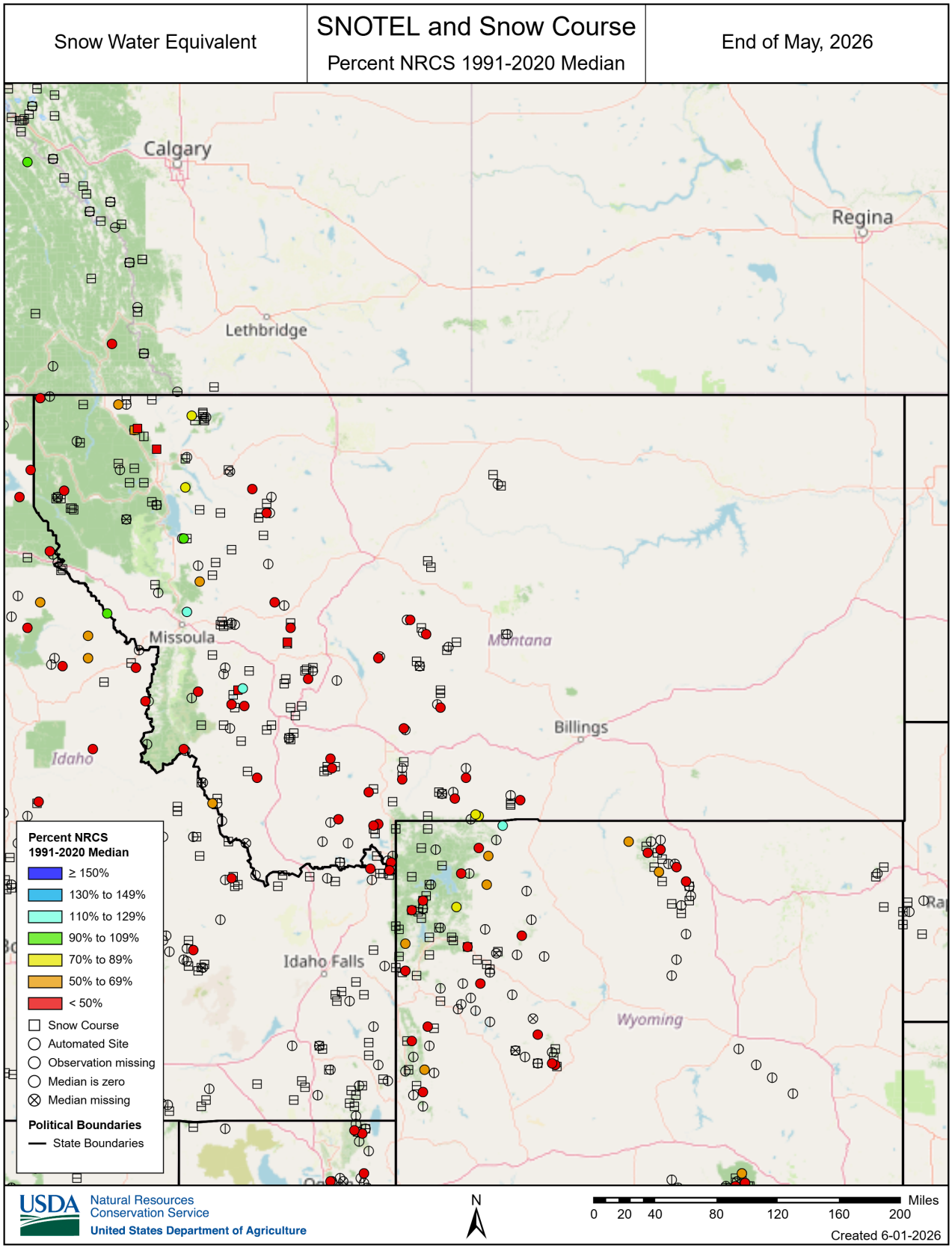
# Statewide Overview

## Snowpack (Continued)



# Statewide Overview

## Snowpack (Continued)



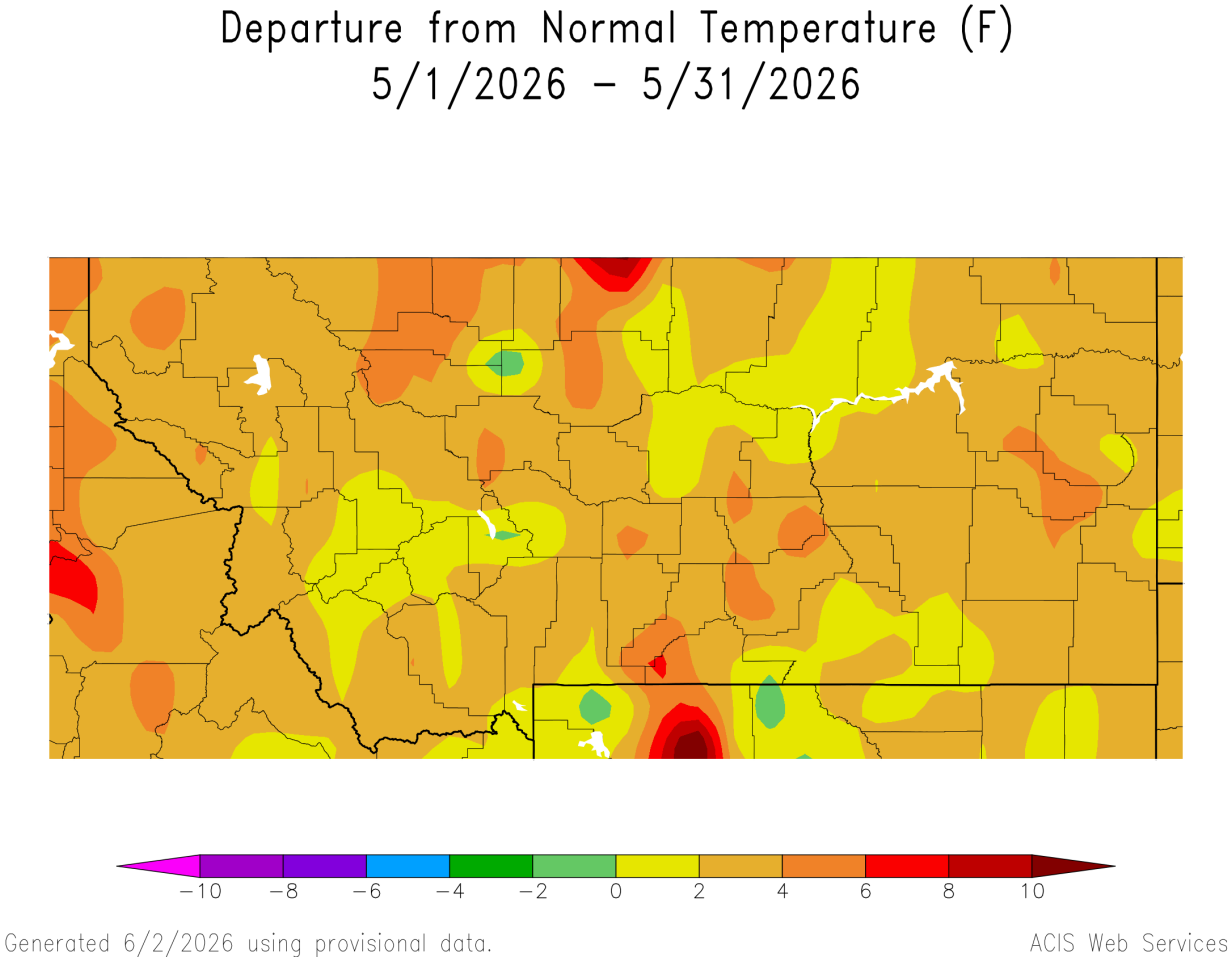
# Statewide Overview

## Temperature

May temperatures were mostly above normal in Montana. Only a few isolated areas had temperatures slightly below normal. Most of the state had monthly temperatures that were 2 to 4 °F above normal. Near the Beartooth Plateau and northern Hill County temperatures reached greater than 6 °F above normal for the month.

SNOTELs in Montana observed the above normal temperatures in the mountainous areas of the state. However, there were several brief periods where temperatures were near or below normal. Temperatures dipped slightly below normal around May 5. From around May 14 to May 22, temperatures dropped below normal. The coolest temperatures were recorded around May 17. Temperatures also dipped below normal after May 30 and into the start of June. Where snowpack persists, these time periods briefly slowed snowmelt rates.

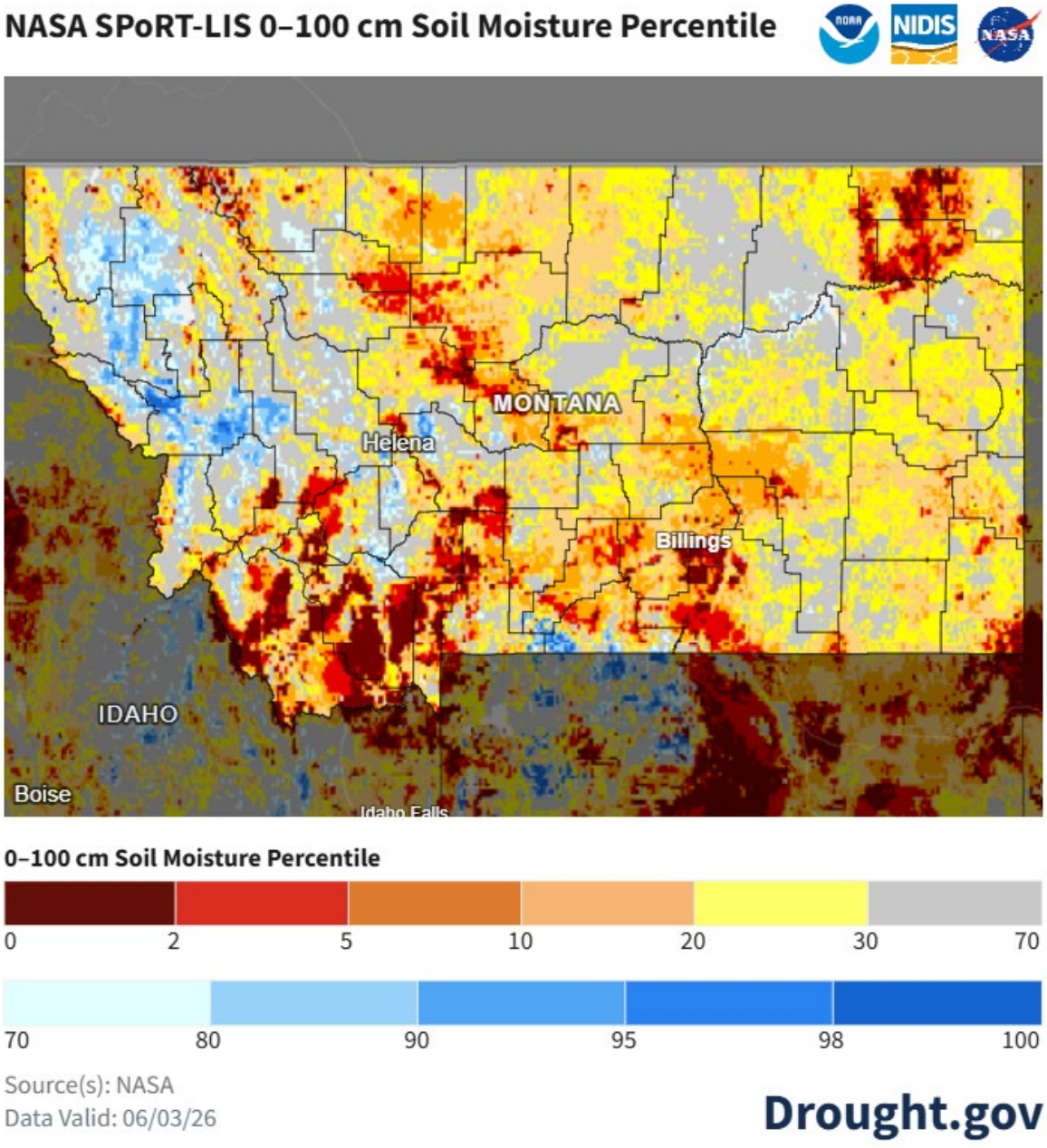
A general theme of this season's Water Supply Outlook Reports has been above normal temperatures. The effects and consequences of this are seen in diminished snowpack accumulation, increased snowmelt rates, and early runoff peaks. As we progress into summer, temperatures will affect the melt of the remaining snowpack, soil moisture, and evapotranspiration.



# Statewide Overview

## Soil Moisture

Soil moisture in Montana has decreased since last month. Areas in the Absaroka-Beartooth region and the northwest portion of the state still have the highest soil moisture percentiles. With some locations in these areas remaining above the 95th percentile. Widespread areas in the southwest, north central, northeast, and southern parts of the state have soil moisture below the 5th percentile. Most of these areas have had percentile decreases since last month.



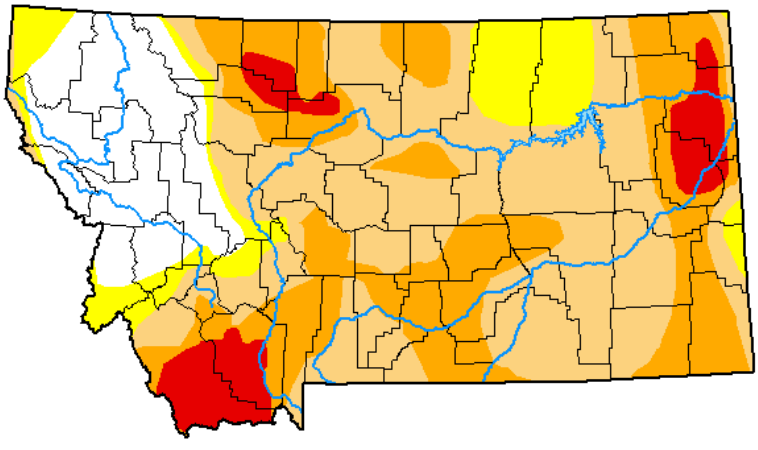
# Statewide Overview

## Drought Monitor

Drought conditions have intensified across the state of Montana this month. The total drought affected area remains similar to May 1, with around 85% of the state currently experiencing drought conditions. Within that area, 75% of the state is now experiencing moderate to extreme drought (D1-D4), a degradation from 58% last month. Most of Montana east of the Continental Divide is facing moderate (D1) to severe (D2) drought. Areas of extreme drought (D3) have expanded into eastern Montana and intensified in southwest Montana. However, the late May precipitation event reduced the extent of extreme drought in the Golden Triangle region of north central Montana. With good soil moisture and precipitation, most of Montana west of the Divide currently does not have drought conditions.

***U.S. Drought Monitor***

**Montana**



**June 2, 2026**

***(Released Thursday, Jun. 4, 2026)***

**Valid 8 a.m. EDT**

*Drought Conditions (Percent Area)*

| | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 |
|---|---|---|---|---|---|---|
| **Current** | 15.45 | 84.55 | 74.65 | 33.14 | 7.04 | 0.00 |
| **Last Week** 05-26-2026 | 12.72 | 87.28 | 76.00 | 40.83 | 10.36 | 0.00 |
| **3 Months Ago** 03-03-2026 | 5.21 | 94.79 | 66.73 | 19.70 | 4.17 | 0.00 |
| **Start of Calendar Year** 01-06-2026 | 48.61 | 51.39 | 19.79 | 8.08 | 1.46 | 0.00 |
| **Start of Water Year** 09-30-2025 | 27.06 | 72.94 | 40.74 | 31.81 | 8.55 | 0.00 |
| **One Year Ago** 06-03-2025 | 18.45 | 81.55 | 52.87 | 23.45 | 0.00 | 0.00 |

*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:*

Adam Allgood

NOAA/NWS/NCEP/CPC

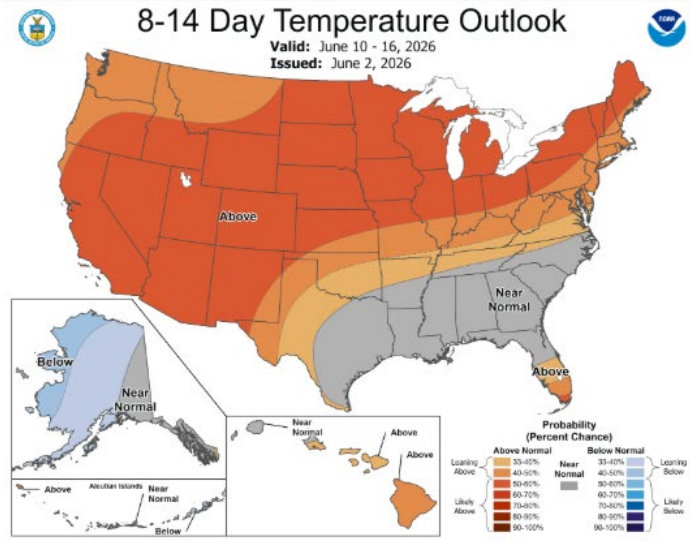
**droughtmonitor.unl.edu**

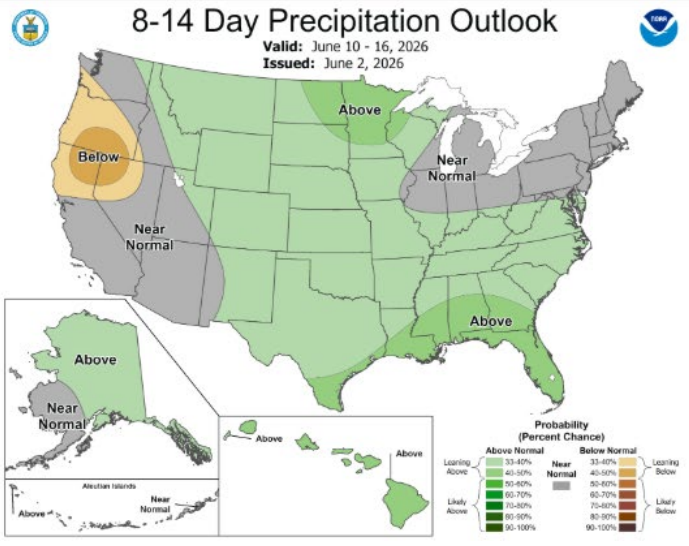
# Statewide Overview

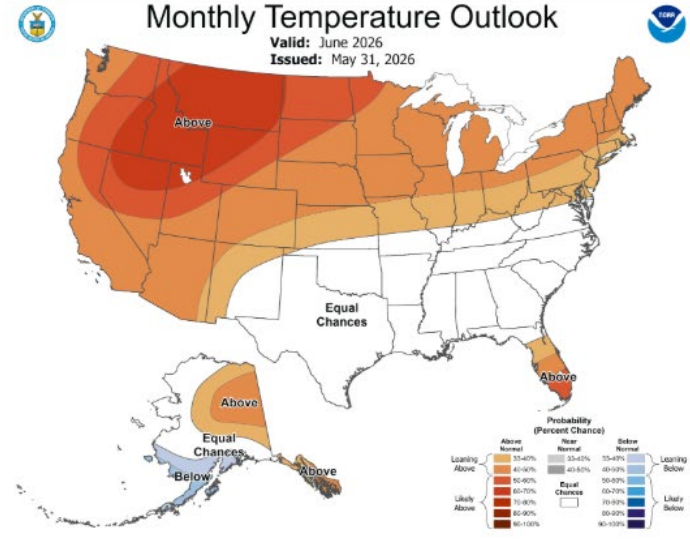
## Weather Outlook

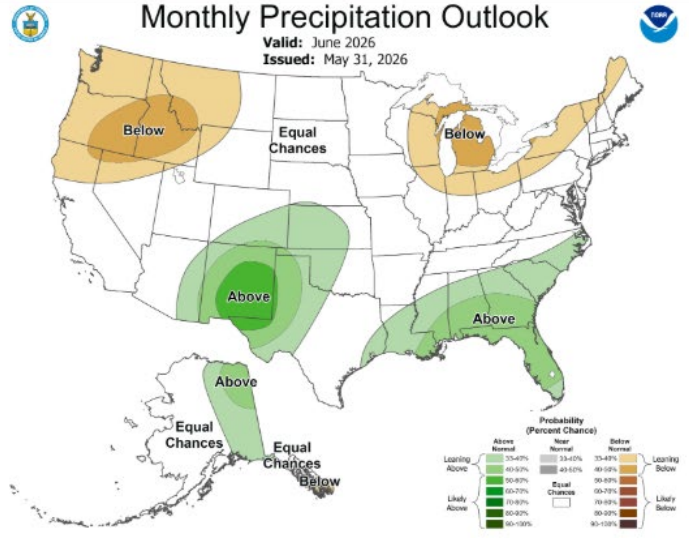
From the NOAA Climate Prediction Center, both temperature and precipitation have a probability of being above normal in the next 8-14 days. Above normal temperatures are likely, with the probability increasing towards the southeast part of the state. Statewide, precipitation leans towards above normal precipitation during this period.

The monthly temperature outlook shows temperatures are likely to remain above normal for the whole state. For monthly precipitation, lower than normal precipitation is more likely for the western half of the state. The eastern part of the state shows equal chances of above or below normal precipitation.



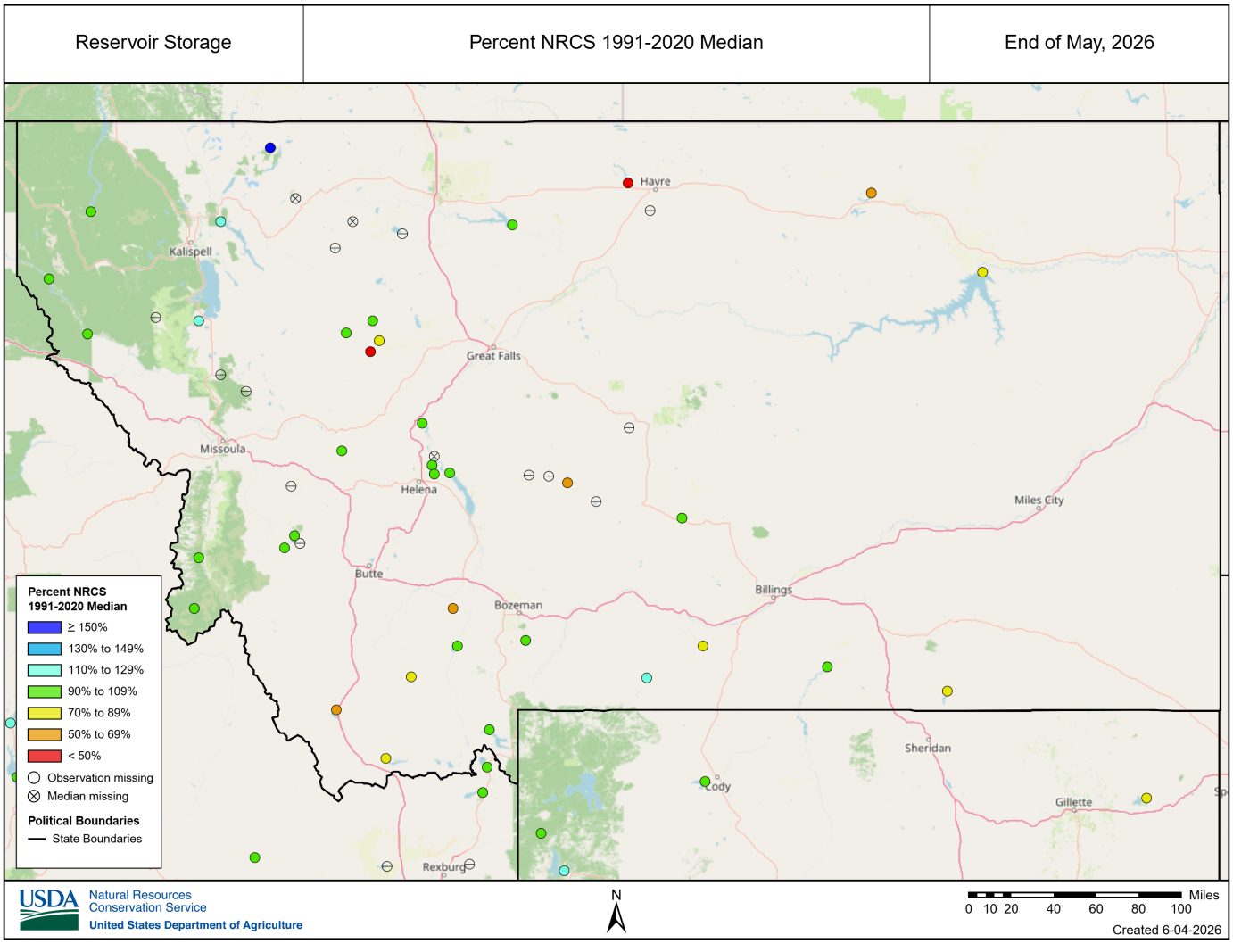



# Statewide Overview

## Reservoirs

Most Montana reservoirs reported near to below normal end of May storage levels. Flathead Lake, Hungry Horse Lake, and Mystic Lake Reservoirs reported above normal reservoir levels of 110-125% of median for the end of May. Lake Sherburne Reservoir reported well above normal reservoir levels at 150% of median. Cooney, Fort Peck, Lima, Ruby River, Tongue River, and Willow Creek – Augusta Reservoirs had below normal end of May reservoir levels of 70-90% of median. Bair, Clark Canyon, Nelson, and Willow Creek- Harrison Reservoirs reported well below normal reservoir fill at 50-70% of median. Fresno and Nilan Reservoirs recorded less than 50% of normal end of May reservoir fill. The remaining reservoir storage facilities across the state reported near normal reservoir fill. While early snowmelt driven runoff helped fill reservoirs this spring, it remains to be seen how the below normal snowpack will sustain reservoir levels into the summer.



# Statewide Overview

## Reservoirs (Continued)

### End of May - Reservoir Storage Percent of Capacity

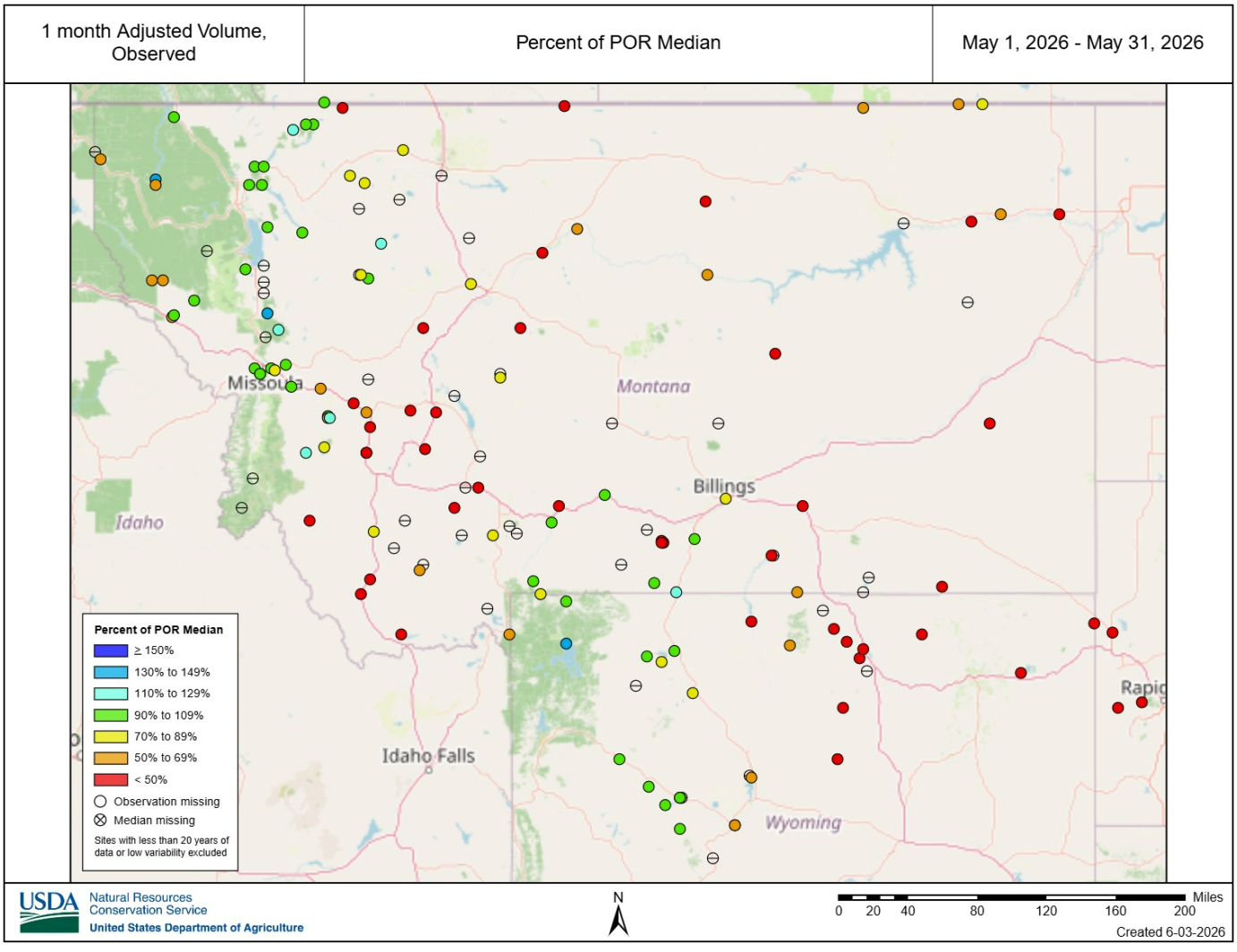
| Reservoir | Basin | Current % Capacity | Last Year % Capacity | Median % Capacity |
|---|---|---|---|---|
| **Lake Sherburne** | St. Mary | 88 | 92 | 59 |
| **Clark Canyon Res** | Jefferson | 36 | 55 | 52 |
| **Lima Reservoir** | Jefferson | 73 | 91 | 84 |
| **Ruby River Reservoir** | Jefferson | 81 | 97 | 99 |
| **Ennis Lake** | Madison | 92 | 89 | 87 |
| **Hebgen Lake** | Madison | 97 | 91 | 91 |
| **Middle Creek Res** | Gallatin | 100 | 101 | 97 |
| **Canyon Ferry Lake** | Upper Missouri | 78 | 83 | 81 |
| **Helena Valley Reservoir** | Upper Missouri | 88 | 86 | 93 |
| **Holter Lake** | Upper Missouri | 99 | 99 | 99 |
| **Lake Helena** | Upper Missouri | 86 | 86 | 86 |
| **Bair Res** | Smith-Judith-Musselshell | 46 | 70 | 83 |
| **Deadman's Basin Res** | Smith-Judith-Musselshell | 89 | 105 | 87 |
| **Smith River Res** | Smith-Judith-Musselshell | - | 109 | 108 |
| **Gibson Res** | Sun-Teton-Marias | 97 | 77 | 92 |
| **Lake Elwell (Tiber)** | Sun-Teton-Marias | 64 | 54 | 61 |
| **Lake Frances** | Sun-Teton-Marias | - | 34 | 77 |
| **Swift Res** | Sun-Teton-Marias | - | 89 | 77 |
| **Fort Peck Lake** | Lower Missouri | 68 | 73 | 76 |
| **Fresno Res** | Milk | 28 | 21 | 65 |
| **Nelson Res** | Milk | 41 | 62 | 79 |
| **Cooney Res** | Upper Yellowstone | 78 | 103 | 92 |
| **Mystic Lake** | Upper Yellowstone | 32 | 20 | 27 |
| **Bighorn Lake** | Bighorn | 59 | 64 | 64 |
| **Boysen** | Bighorn | 64 | 67 | 67 |
| **Buffalo Bill** | Bighorn | 74 | 72 | 69 |
| **Bull Lake** | Bighorn | 46 | 43 | 63 |
| **Tongue River Res** | Tongue | 84 | 100 | 102 |
| **Lake Koocanusa** | Kootenai | 66 | 80 | 69 |
| **Georgetown Lake** | Upper Clark Fork | 98 | 97 | 96 |
| **Nevada Creek Res** | Upper Clark Fork | 91 | 53 | 89 |
| **Noxon Rapids Reservoir** | Lower Clark Fork | 96 | 95 | 98 |
| **Lake Como** | Bitterroot | 112 | 96 | 103 |
| **Painted Rocks Lake** | Bitterroot | 105 | 105 | 104 |
| **Flathead Lake** | Flathead | 98 | 85 | 86 |
| **Hungry Horse Lake** | Flathead | 95 | 89 | 86 |

# Statewide Overview

## Streamflow

May streamflow was variable across the state. Northwest Montana has the most stations with above normal monthly streamflow. East of the Divide, the rest of the state had mostly below normal monthly streamflow. This is due to the early timing of runoff and the decreased monthly precipitation and snowpack in those basins. There are a few exceptions east of the Divide with near normal streamflow. These include stations in higher elevation watersheds in the Yellowstone and Bighorn Basins.

At the start of June, recent precipitation and runoff have increased streamflow values in most locations. However, the timing of this wasn't early enough to bring May streamflow volumes to near or above normal in most locations. The current conditions show more stations with closer to or above normal daily streamflow. Precipitation in the following months will be critical to maintain streamflow volumes.



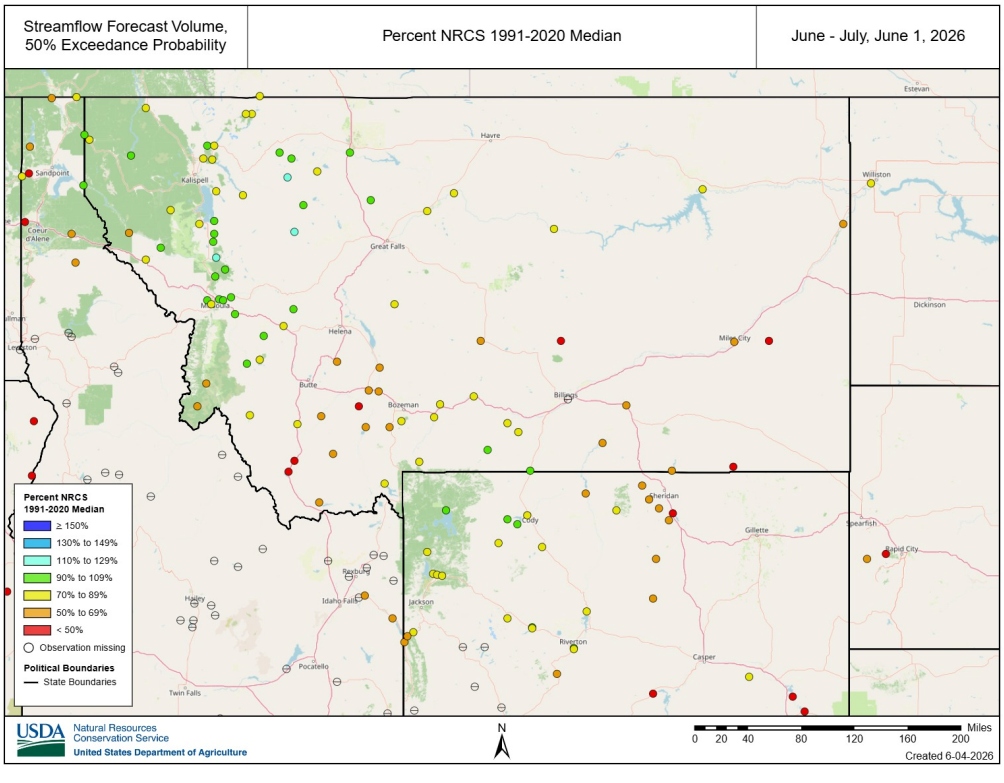
# Statewide Overview

## Water Supply Forecasts

Streamflow forecasts vary with snowpack and precipitation patterns across the state. West of the Divide, more optimistic streamflows are expected. Regions that received significant rainfall from the late May storm, such as the Mission Mountains and Rocky Mountain Front, saw improvements to streamflow predictions. East of the Divide, except for higher elevation watersheds of the Upper Yellowstone and Bighorn basins, significantly reduced streamflows are predicted.

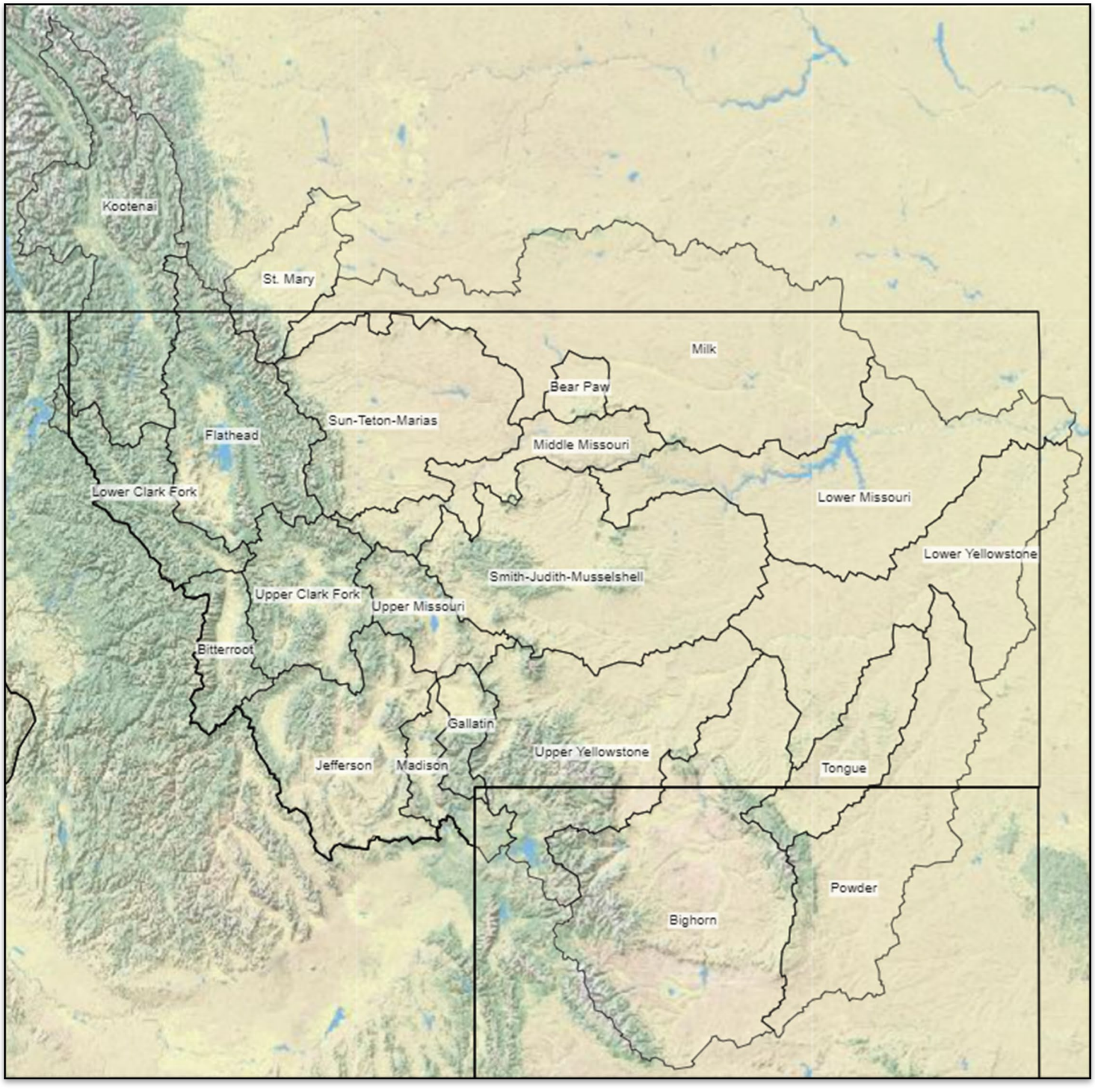
Streamflows are forecasted in ranges to account for uncertainty in the forecast and future summer precipitation. The 50% exceedance volume is reflective of what streamflow volumes could be with typical summer conditions. A wet June and July could increase forecasts toward the 30% or 10% exceedance values, while a dry summer could decrease forecasts toward the 70% or 90% exceedance values. Considering the full suite of forecast exceedances will best support water management decisions. Streamflow volumes are forecast for both the June-July period, reflecting early season irrigation needs, and the June-September period, which includes late season irrigation demands.

For the June-July forecast period at the 50% exceedance level, streamflows are largely expected to be near normal in the Clark Fork and Kootenai basins, with some forecast points below normal. Streamflow from the Mission Mountains and Rocky Mountain Front is predicted to be near to above normal. The Flathead and St. Mary Basins are predicted to see 80% to 90% of normal streamflow. Rapid snowmelt decreased Bitterroot forecasts to around 60% of median streamflow. The Jefferson, Madison, Gallatin, Smith, and Musselshell basins are forecast to have 70% or less than normal streamflow. The Upper Yellowstone basin is forecasting 70% to 80% of normal streamflow, while the Bighorn and Lower Yellowstone are predicting 60% to 70% of normal streamflows. Higher elevation watersheds that drain the Absaroka-Beartooth and Wind River ranges are forecasting 75% to 100% of normal streamflow. The Powder and Tongue basins are predicting severely reduced streamflows of less than 60% of median.



# Basin Overview

## Montana River Basin Definitions

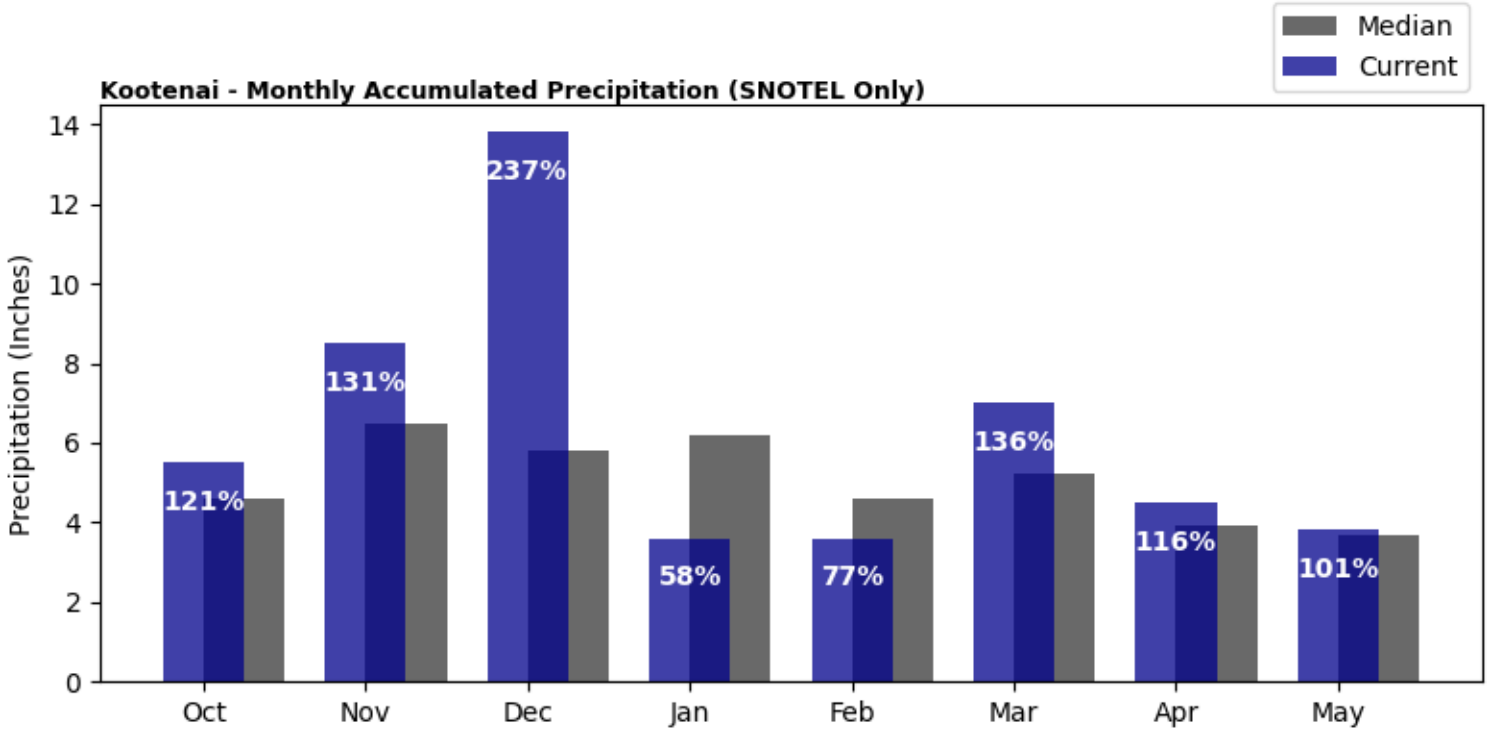


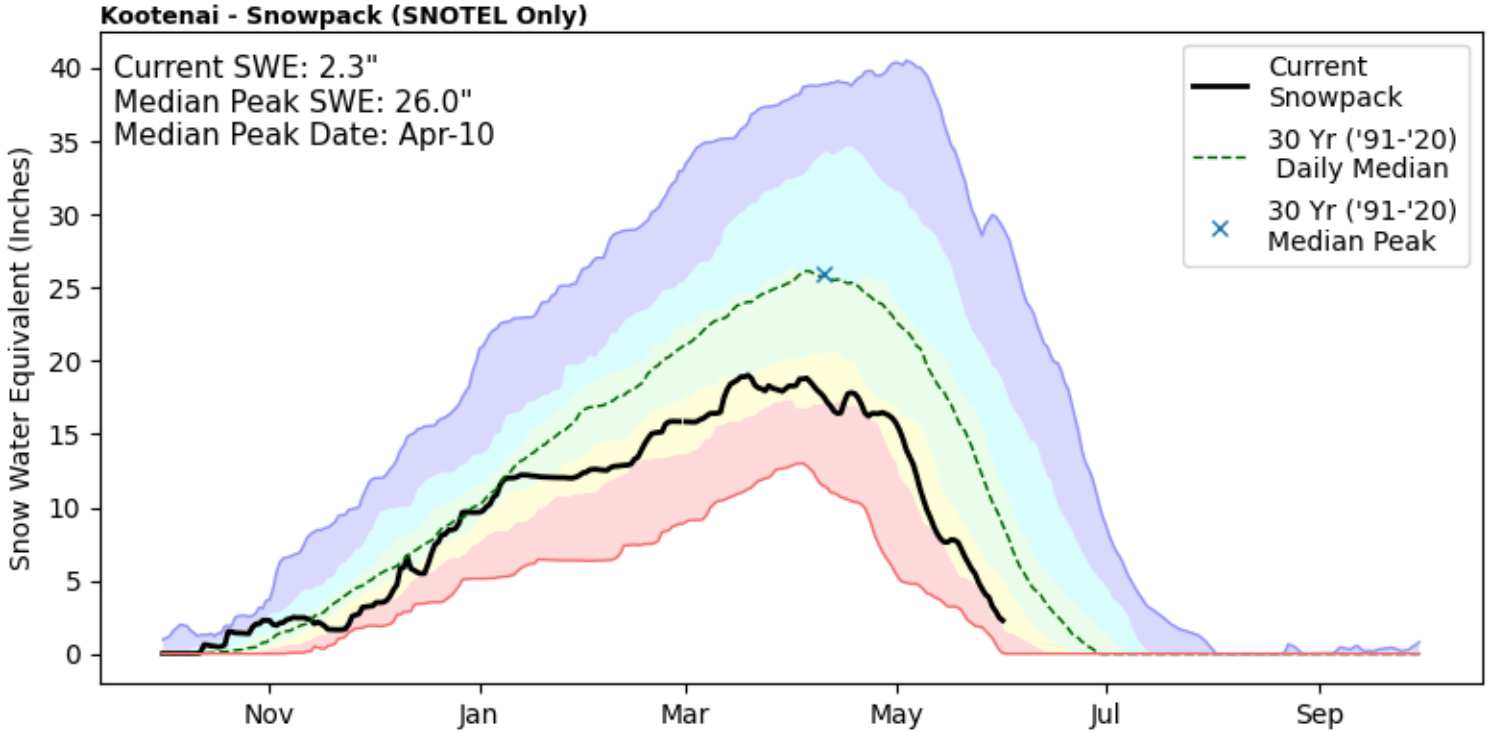

The following basin overview sections only include basins that have SNOTEL sites. For example, there is no basin overview for the Lower Yellowstone, because there are no SNOTEL sites associated with that basin. Water supply information for basins not included in the following sections can be found at https://nwcc-apps.sc.egov.usda.gov/

# Basin Overview

## Kootenai

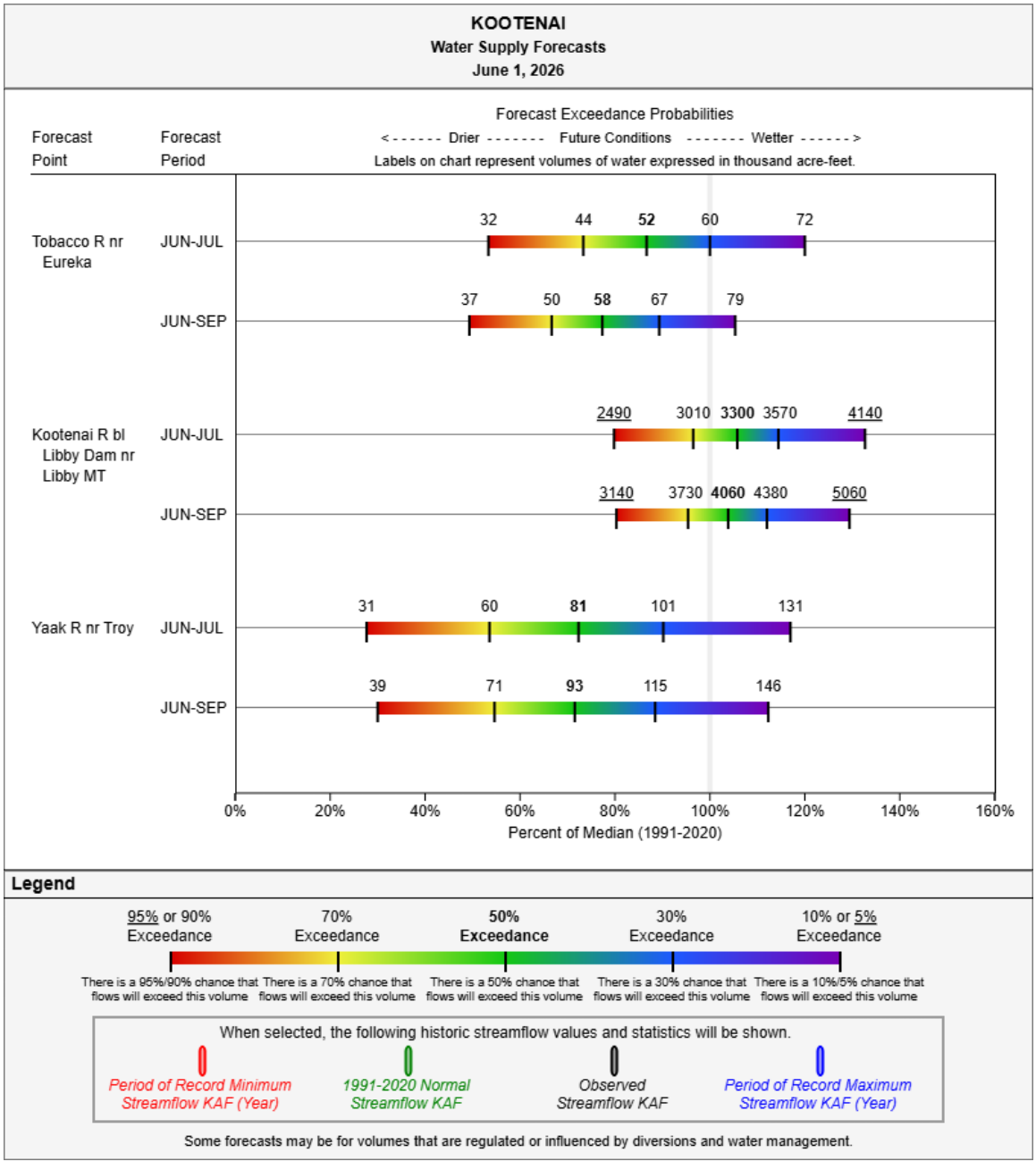
Precipitation in May was near normal at 101%, which brings the seasonal accumulation (October-May) to 117% of median. The snowpack in the Kootenai is well below normal at 42% of median, compared to 49% at this time last year.



# Basin Overview

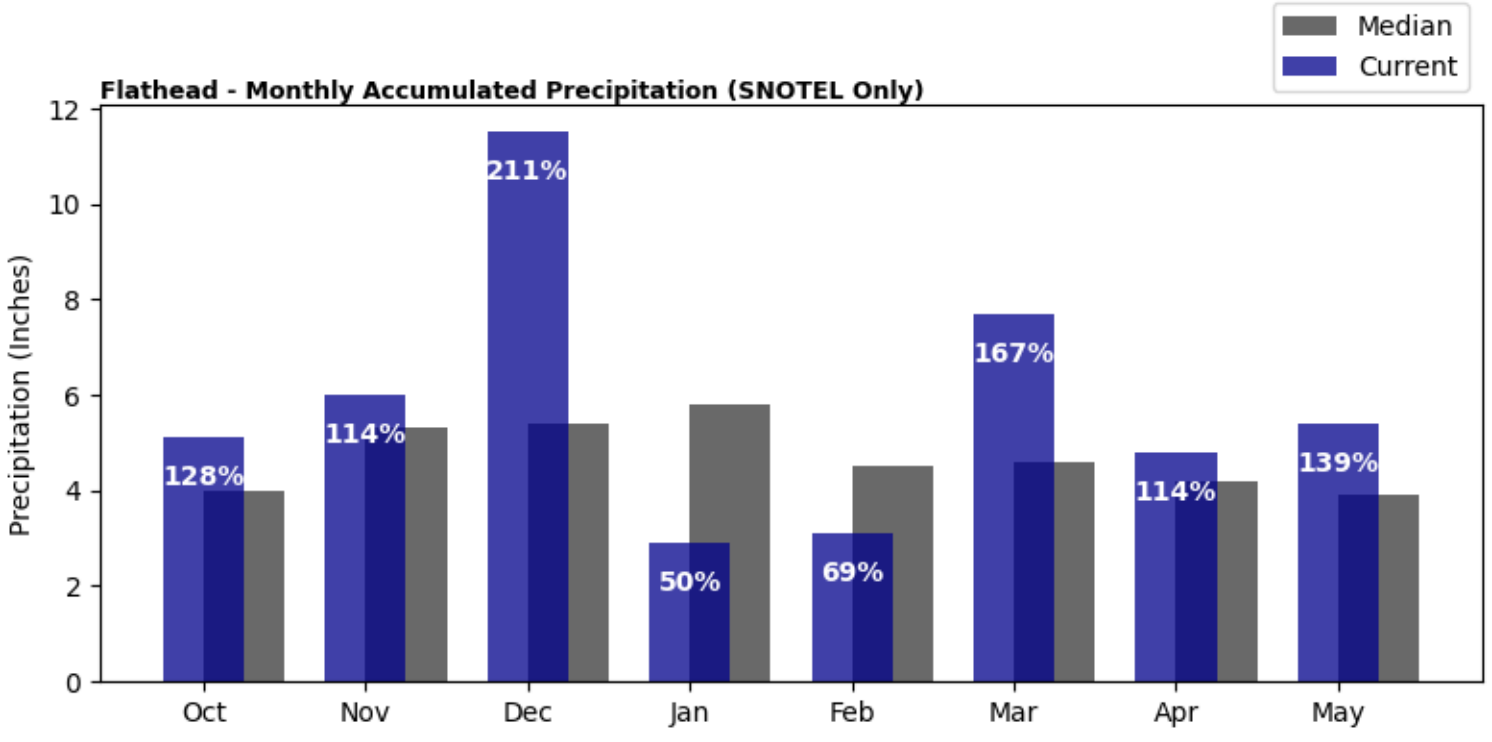
## Kootenai (Continued)

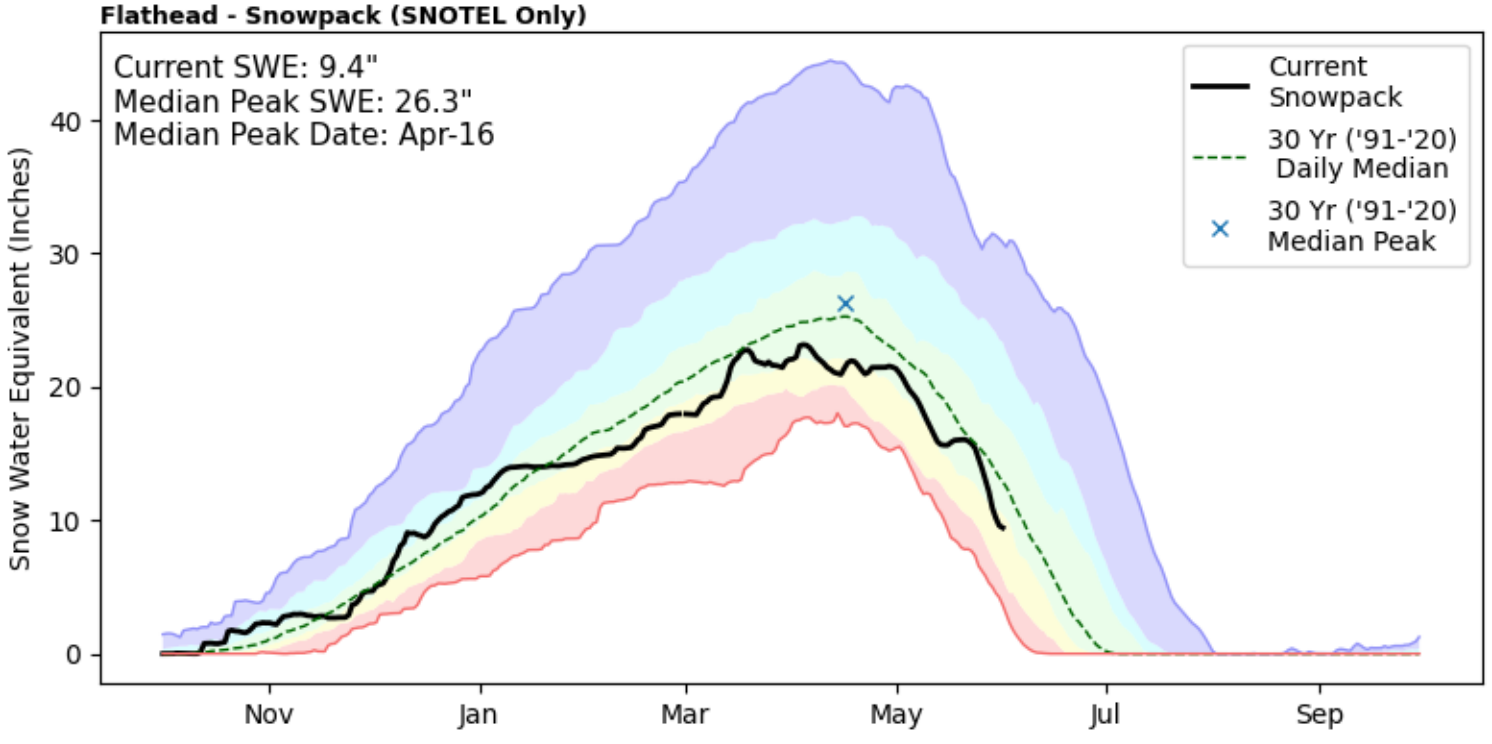


# Basin Overview

## Flathead

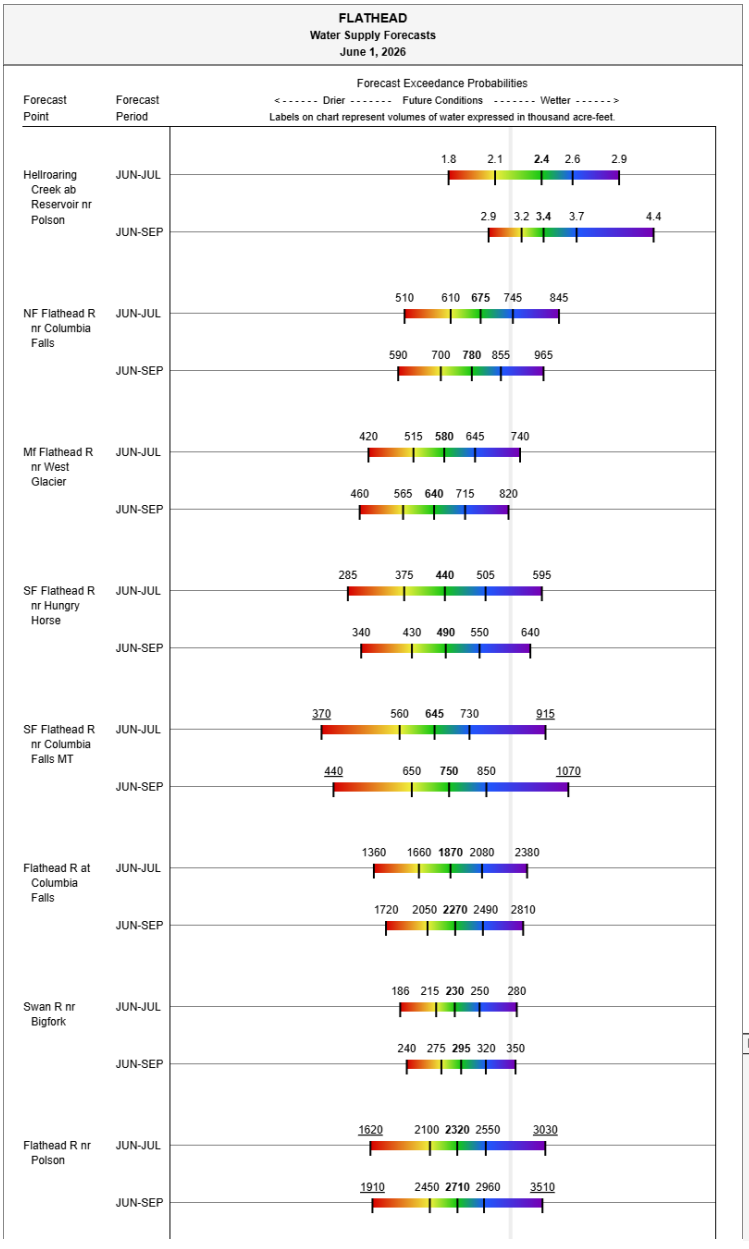
Precipitation in May was well above normal at 139%, which brings the seasonal accumulation (October-May) to 121% of median. The snowpack in the Flathead is well below normal at 66% of median, compared to 60% at this time last year.

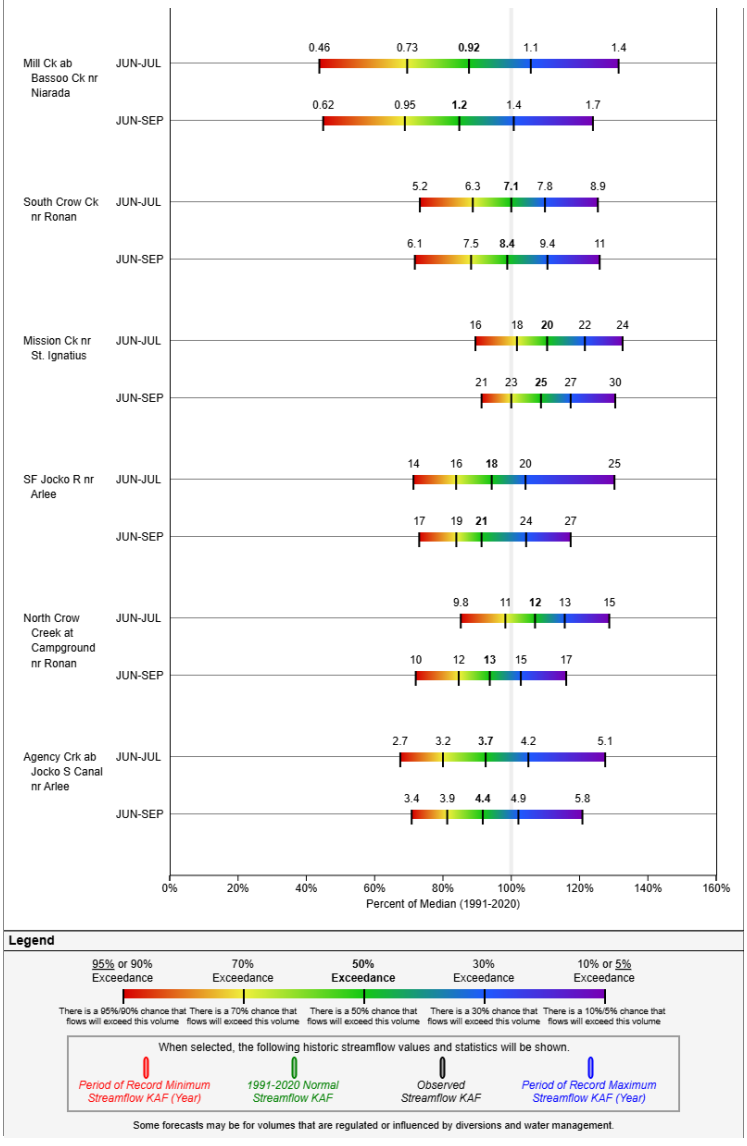


# Basin Overview

## Flathead (Continued)

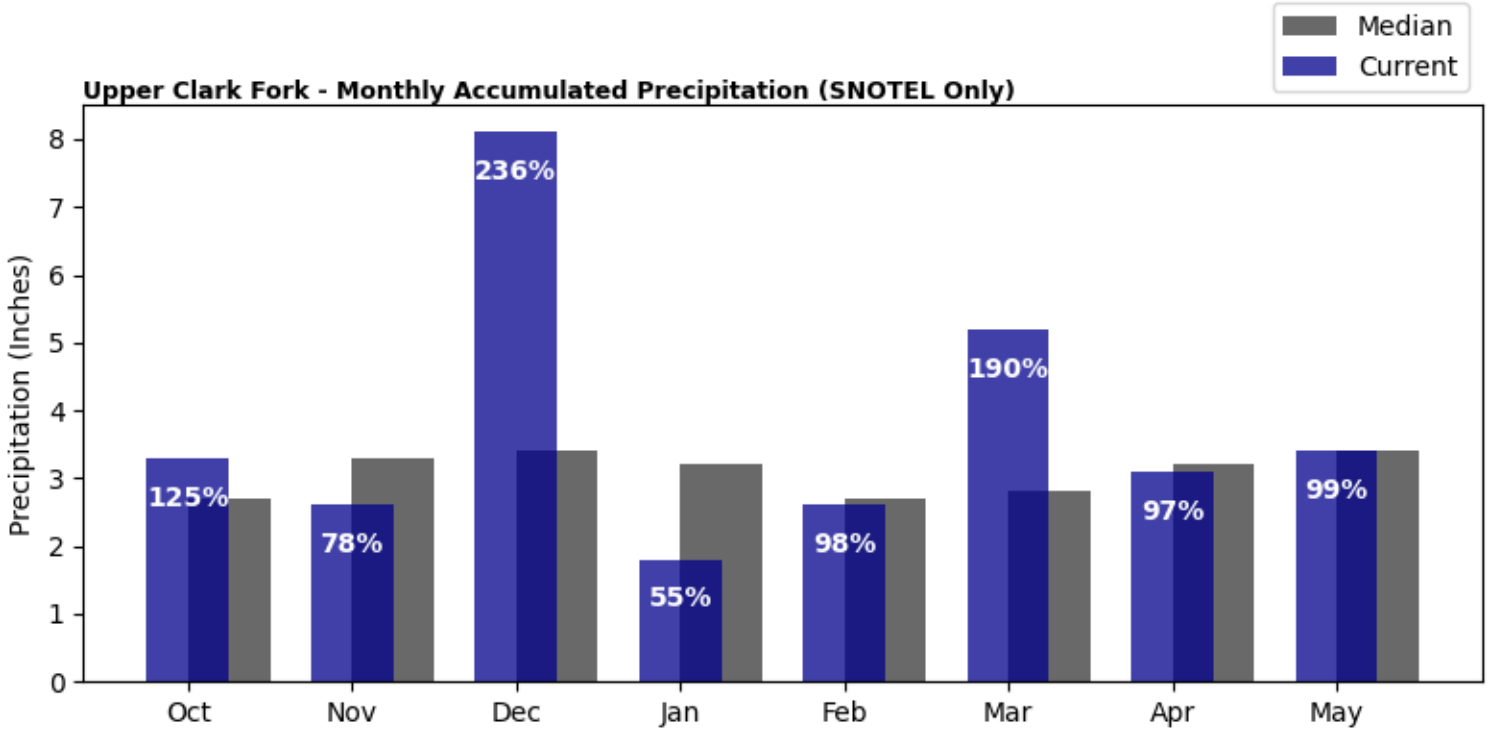


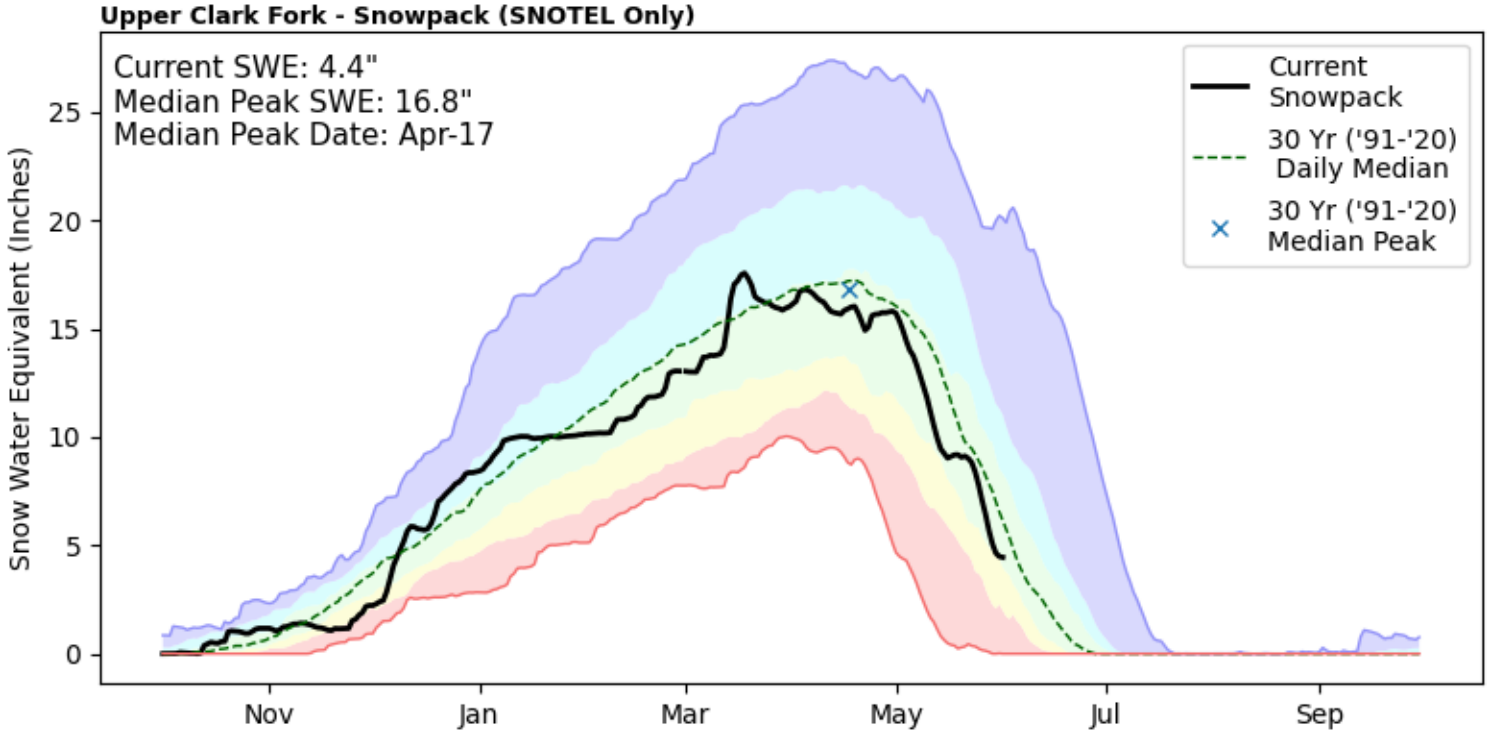



# Basin Overview

## Upper Clark Fork

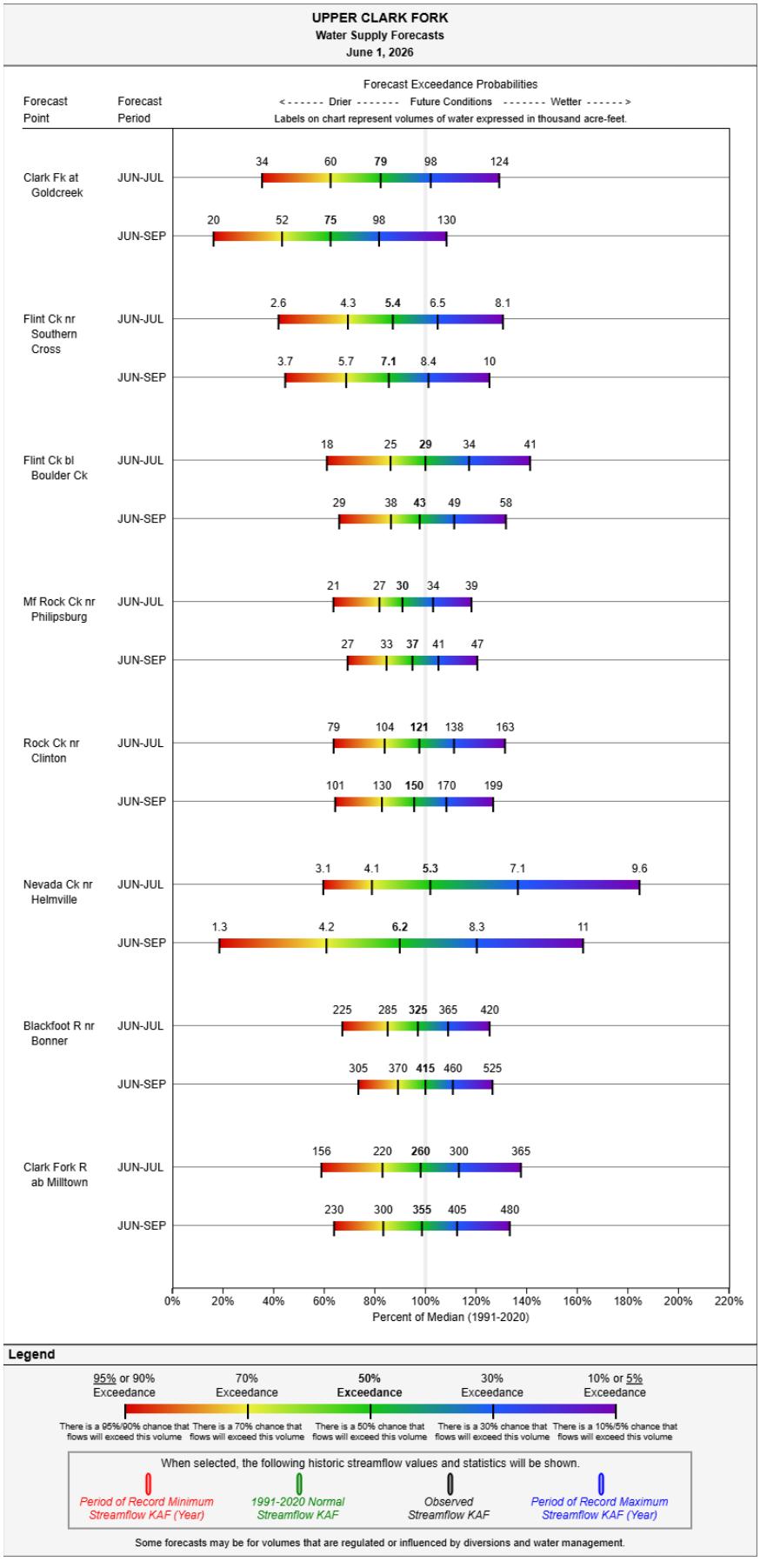
Precipitation in May was near normal at 99%, which brings the seasonal accumulation (October-May) to 120% of median. The snowpack in the Upper Clark Fork is well below normal at 69% of median, compared to 65% at this time last year.



# Basin Overview

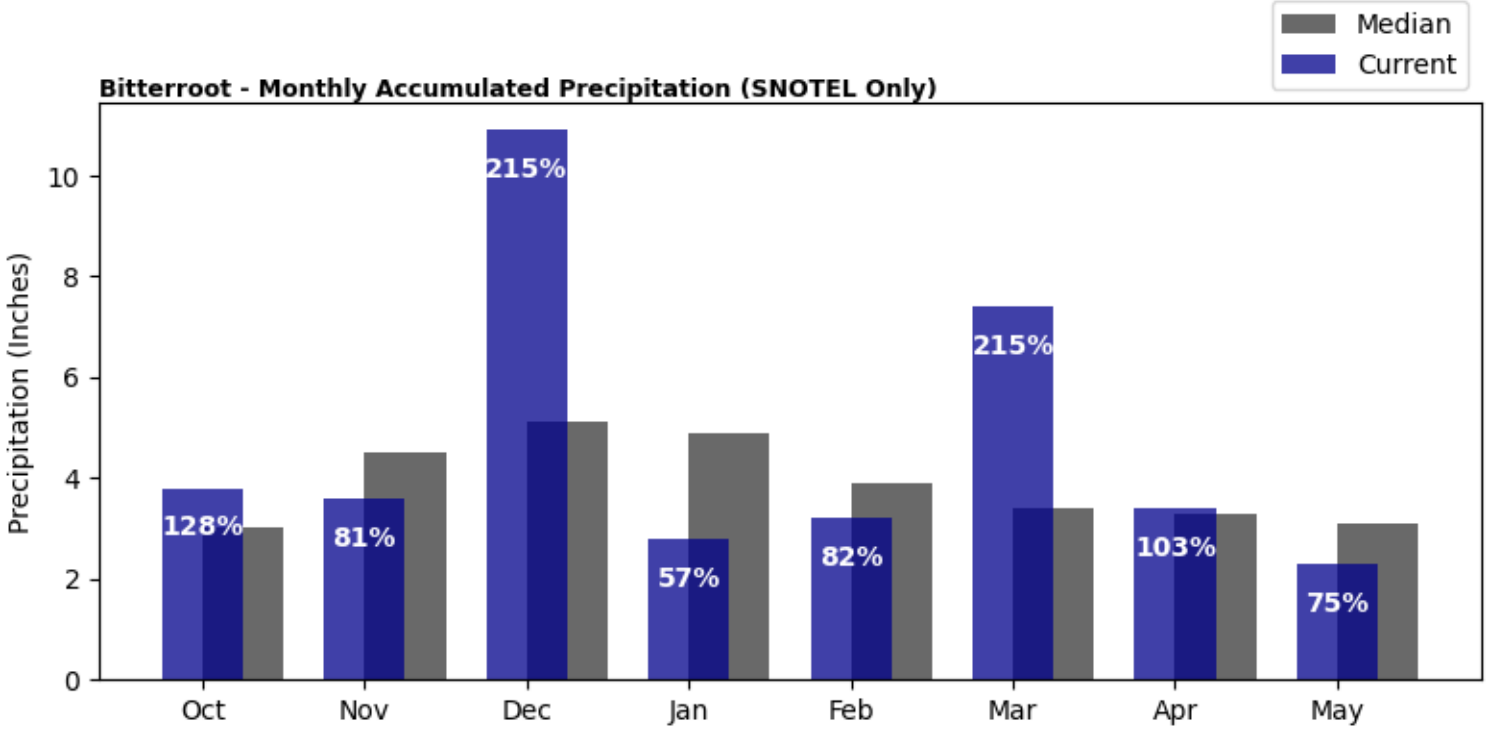
## Upper Clark Fork (Continued)

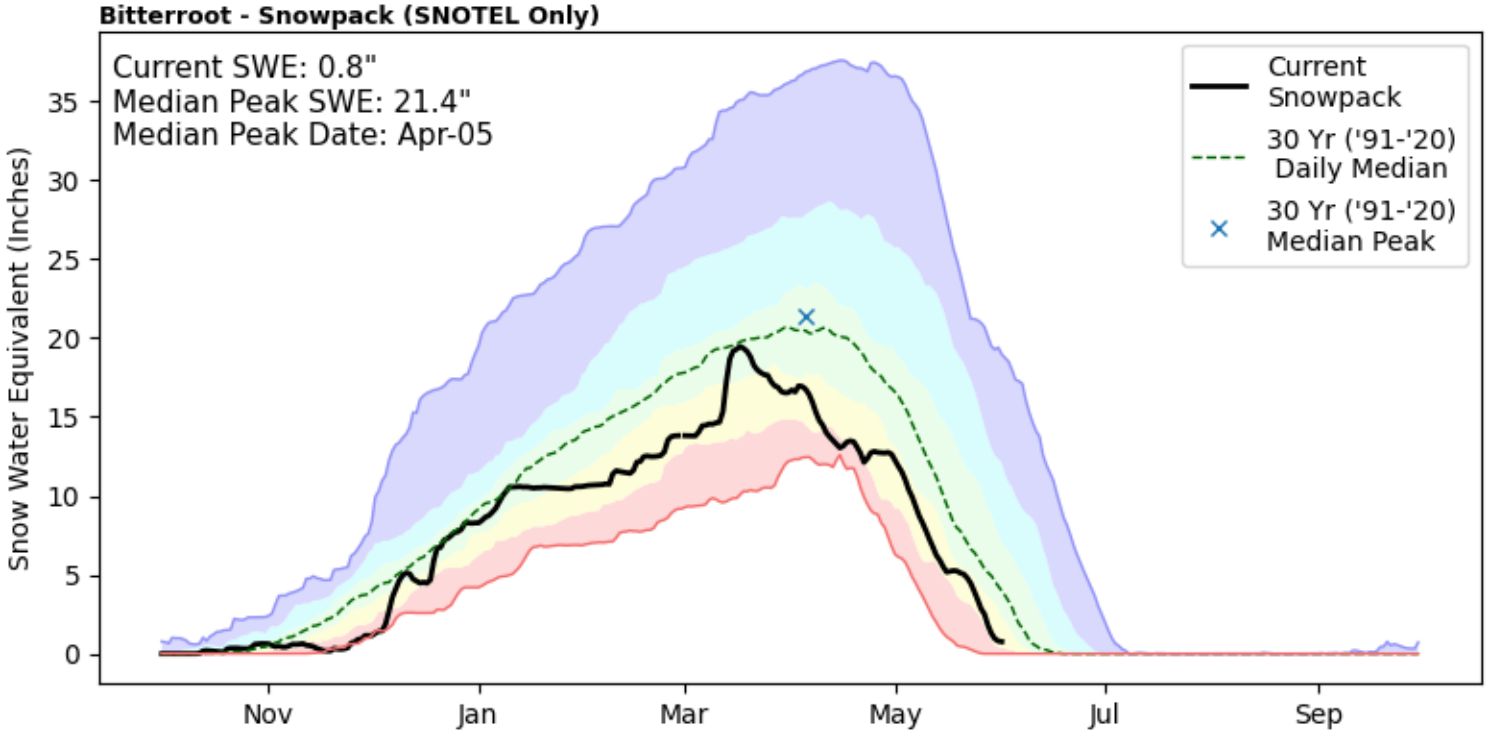


# Basin Overview

## Bitterroot

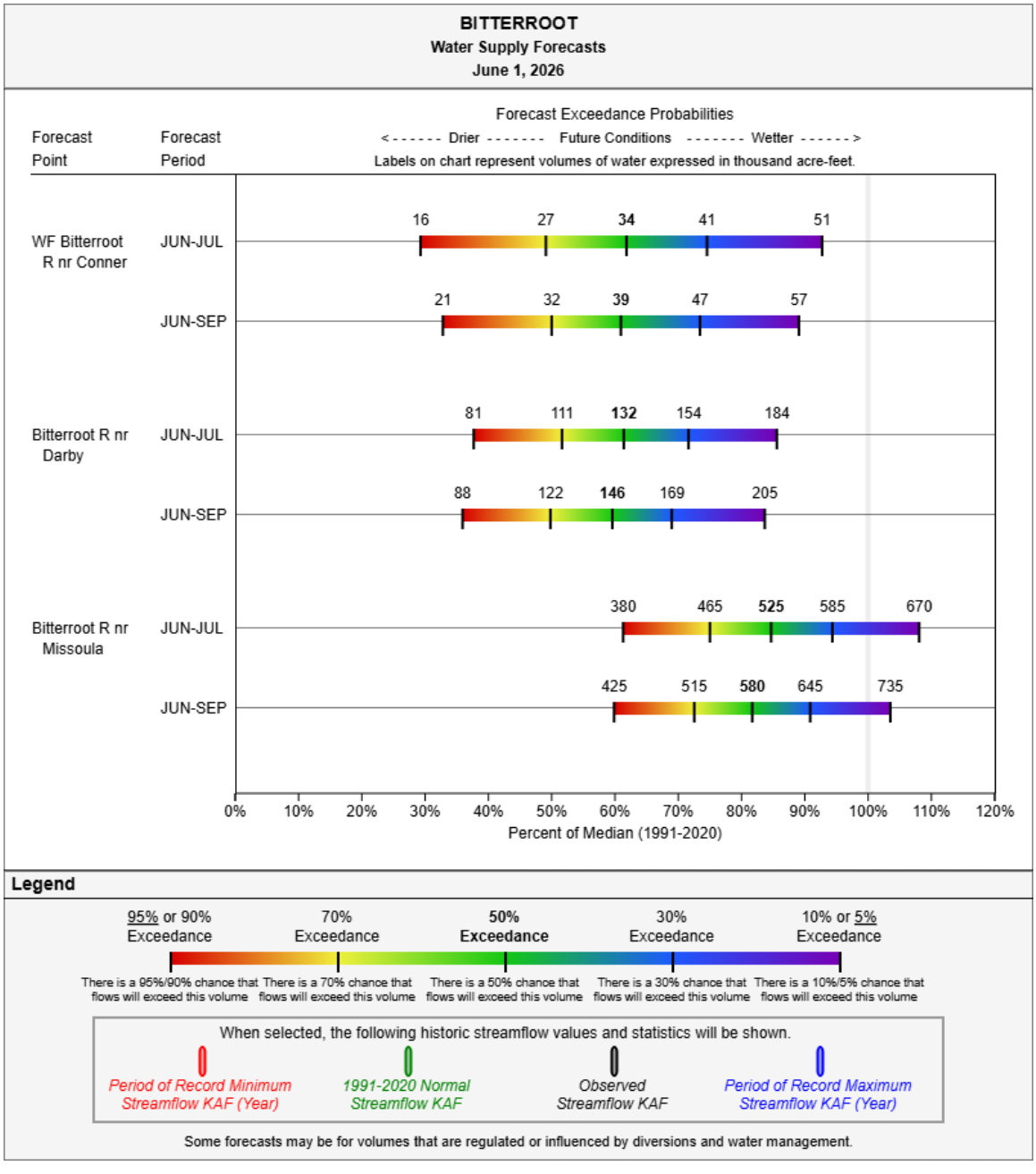
Precipitation in May was well below normal at 75%, which brings the seasonal accumulation (October-May) to 115% of median. The snowpack in the Bitterroot is well below normal at 19% of median, compared to 27% at this time last year.



# Basin Overview

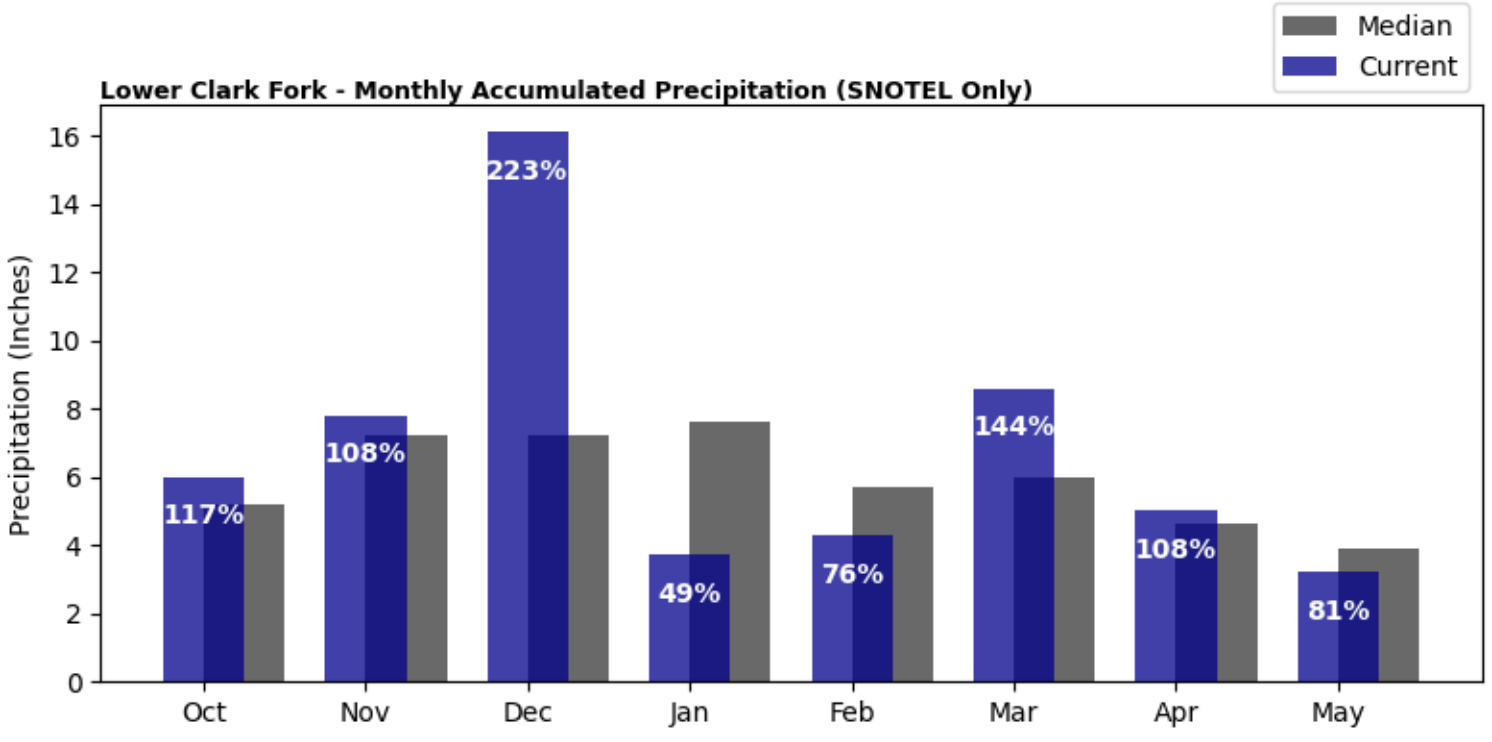
## Bitterroot (Continued)

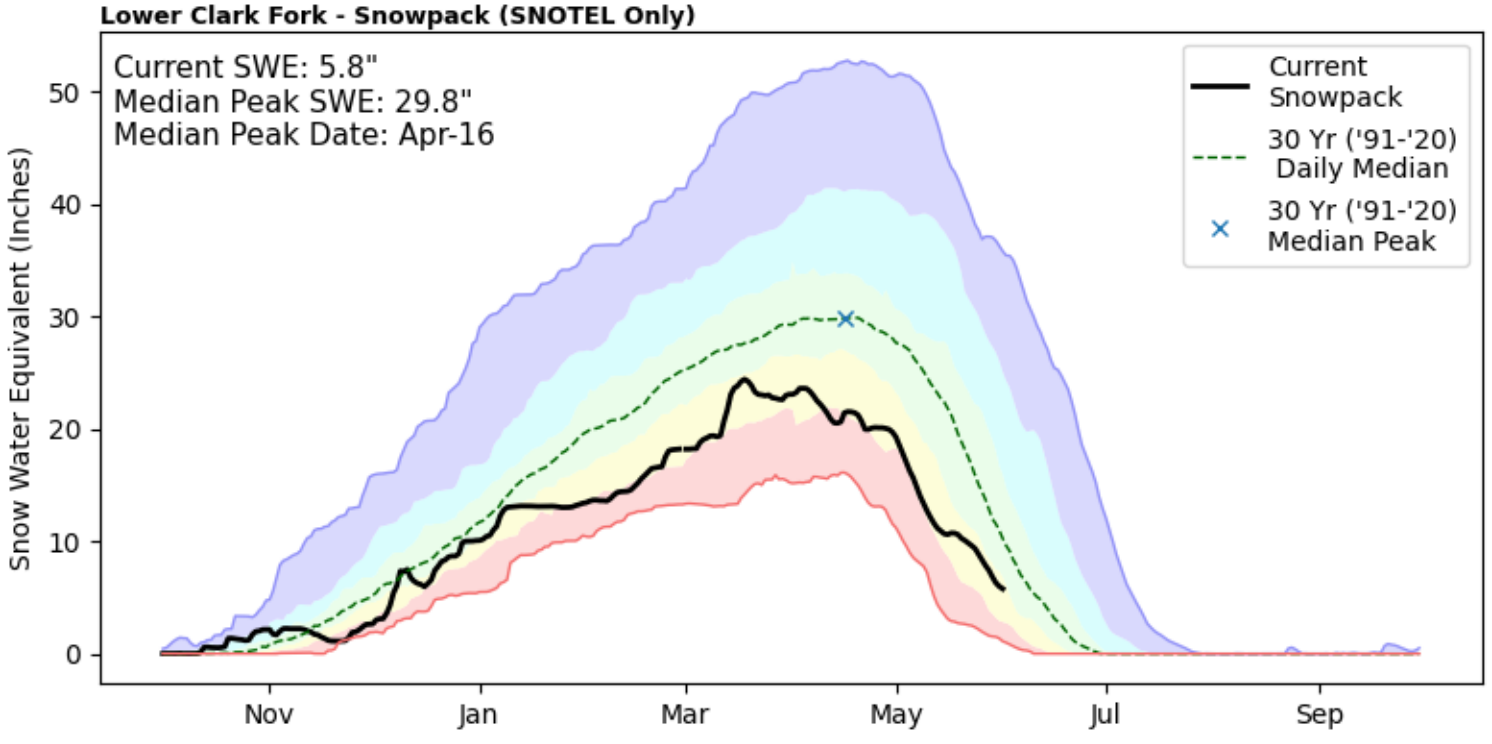


# Basin Overview

## Lower Clark Fork

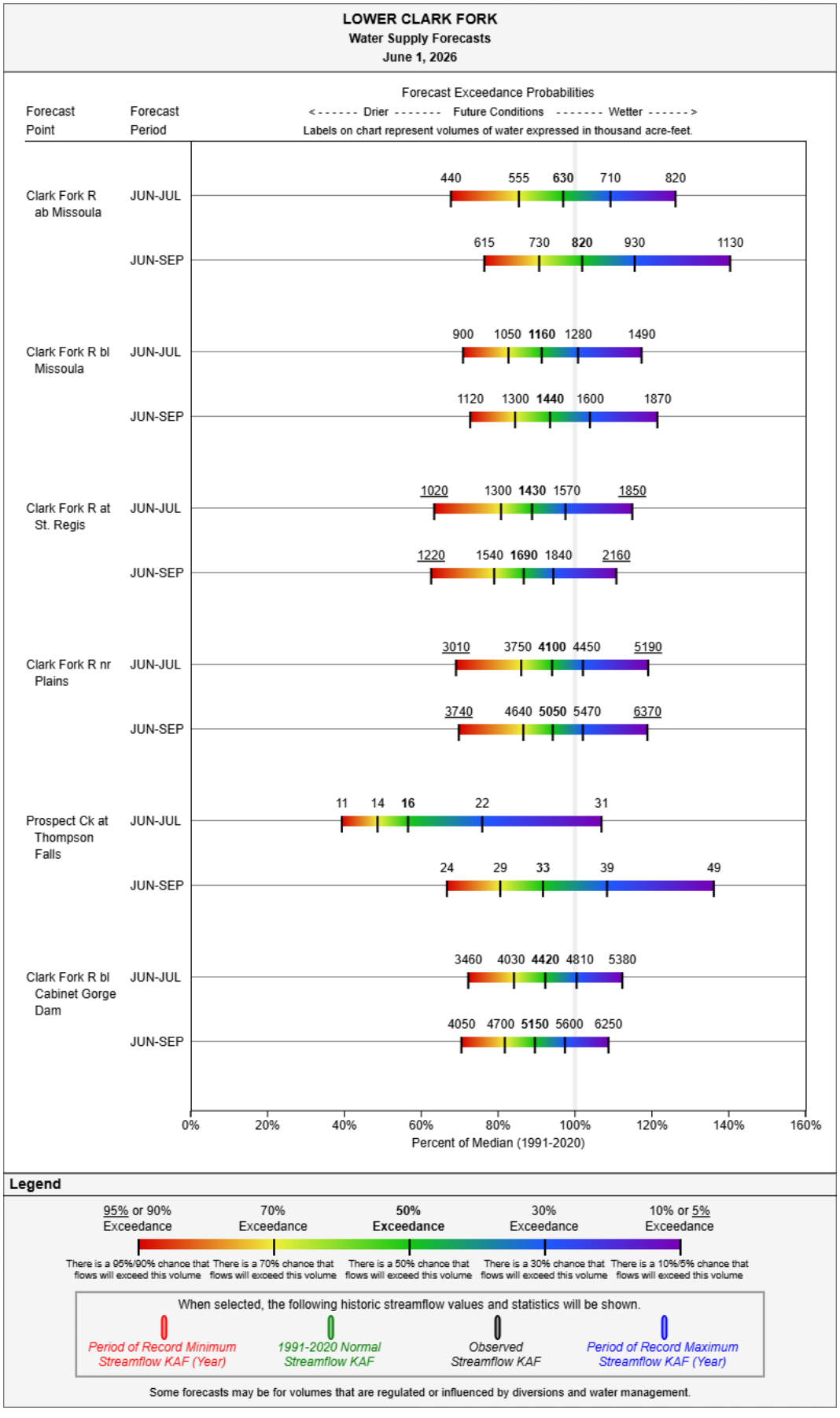
Precipitation in May was below normal at 81%, which brings the seasonal accumulation (October-May) to 110% of median. The snowpack in the Lower Clark Fork is well below normal at 56% of median, compared to 68% at this time last year.



# Basin Overview

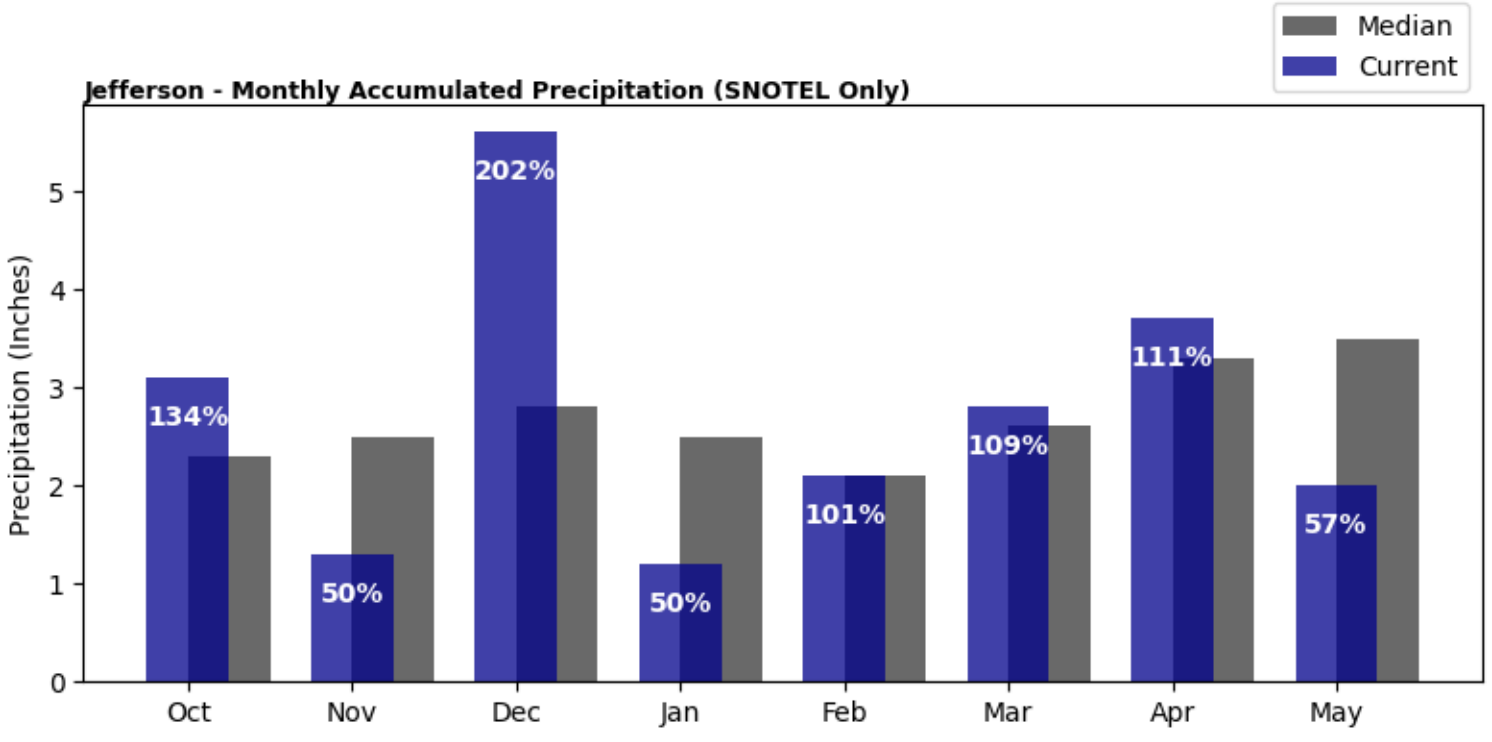
## Lower Clark Fork (Continued)

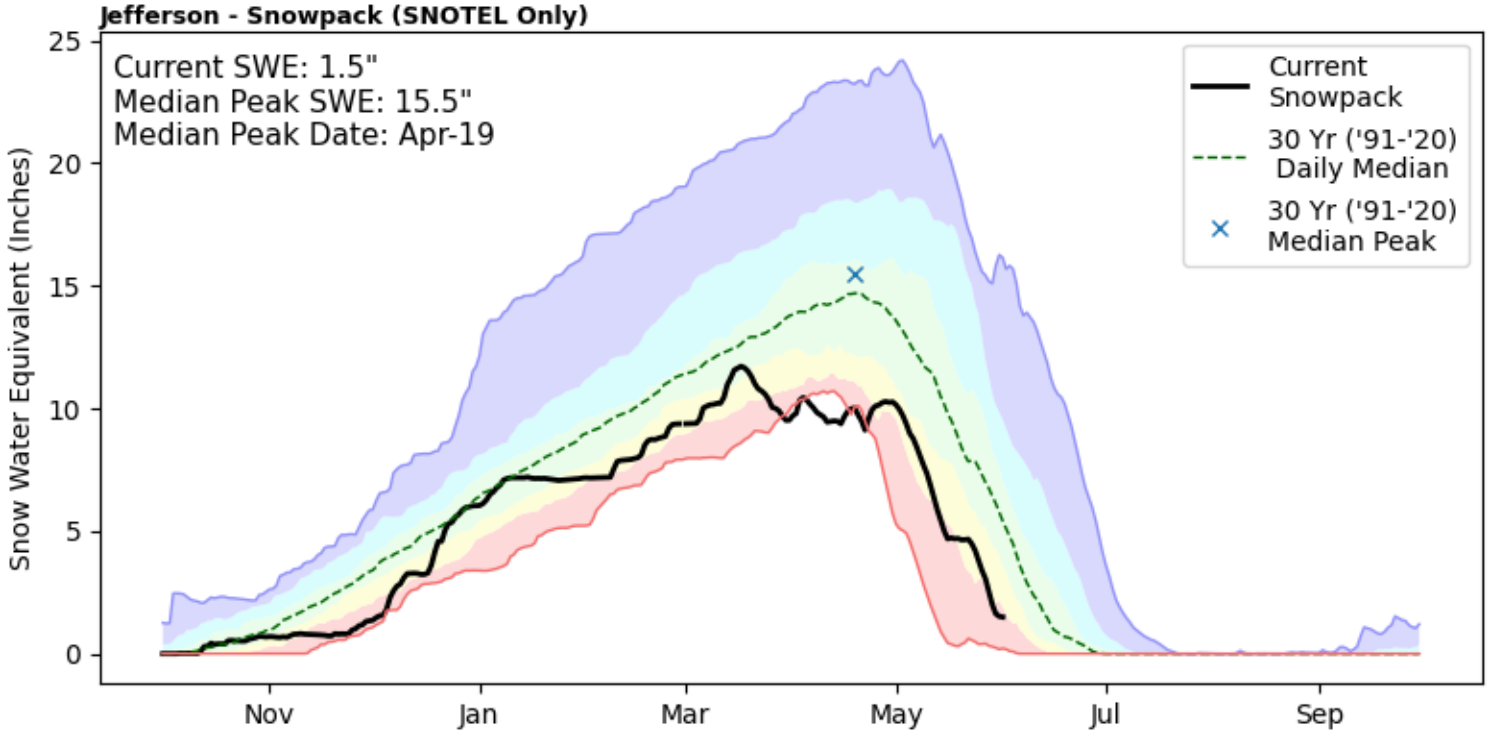


# Basin Overview

## Jefferson

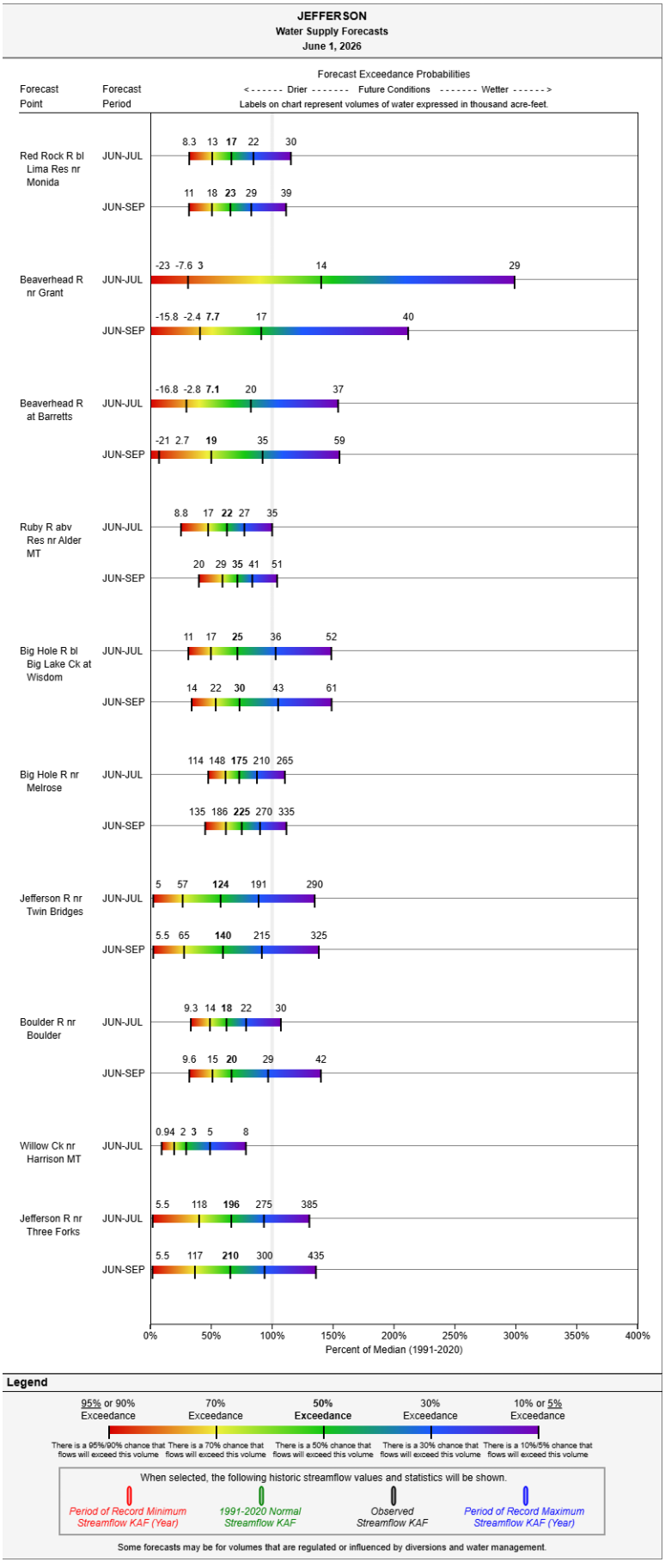
Precipitation in May was well below normal at 57%, which brings the seasonal accumulation (October-May) to 98% of median. The snowpack in the Jefferson is well below normal at 28% of median, compared to 66% at this time last year.



# Basin Overview

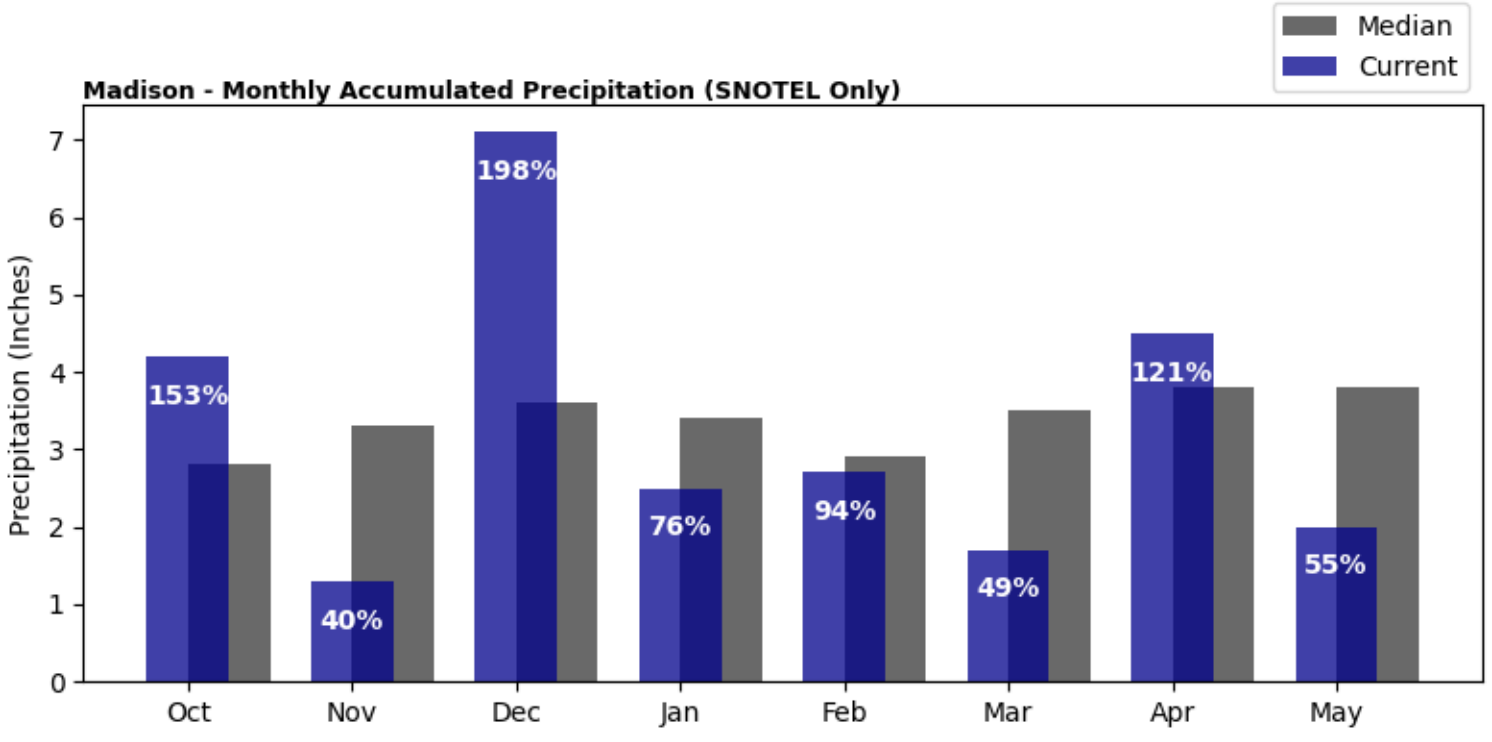
## Jefferson (Continued)

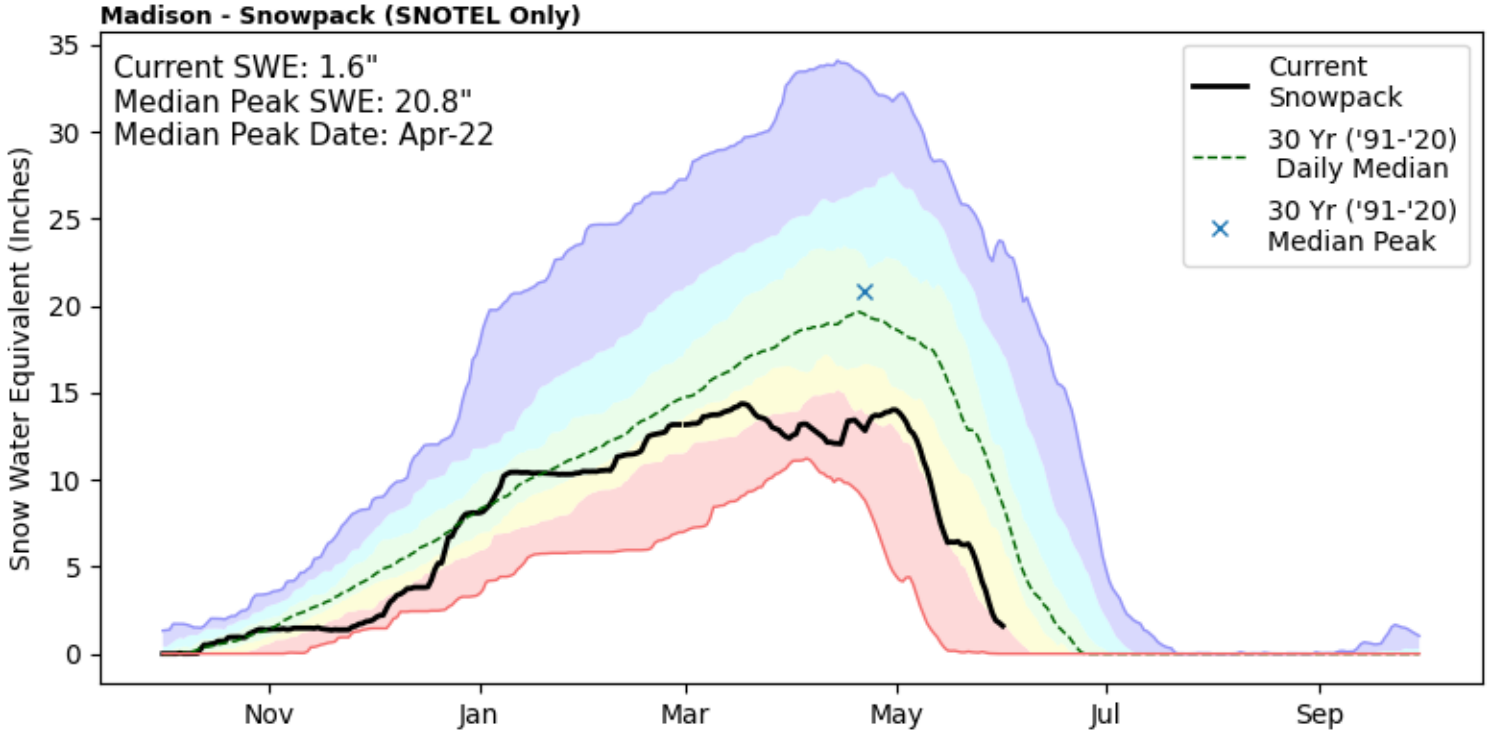


# Basin Overview

## Madison

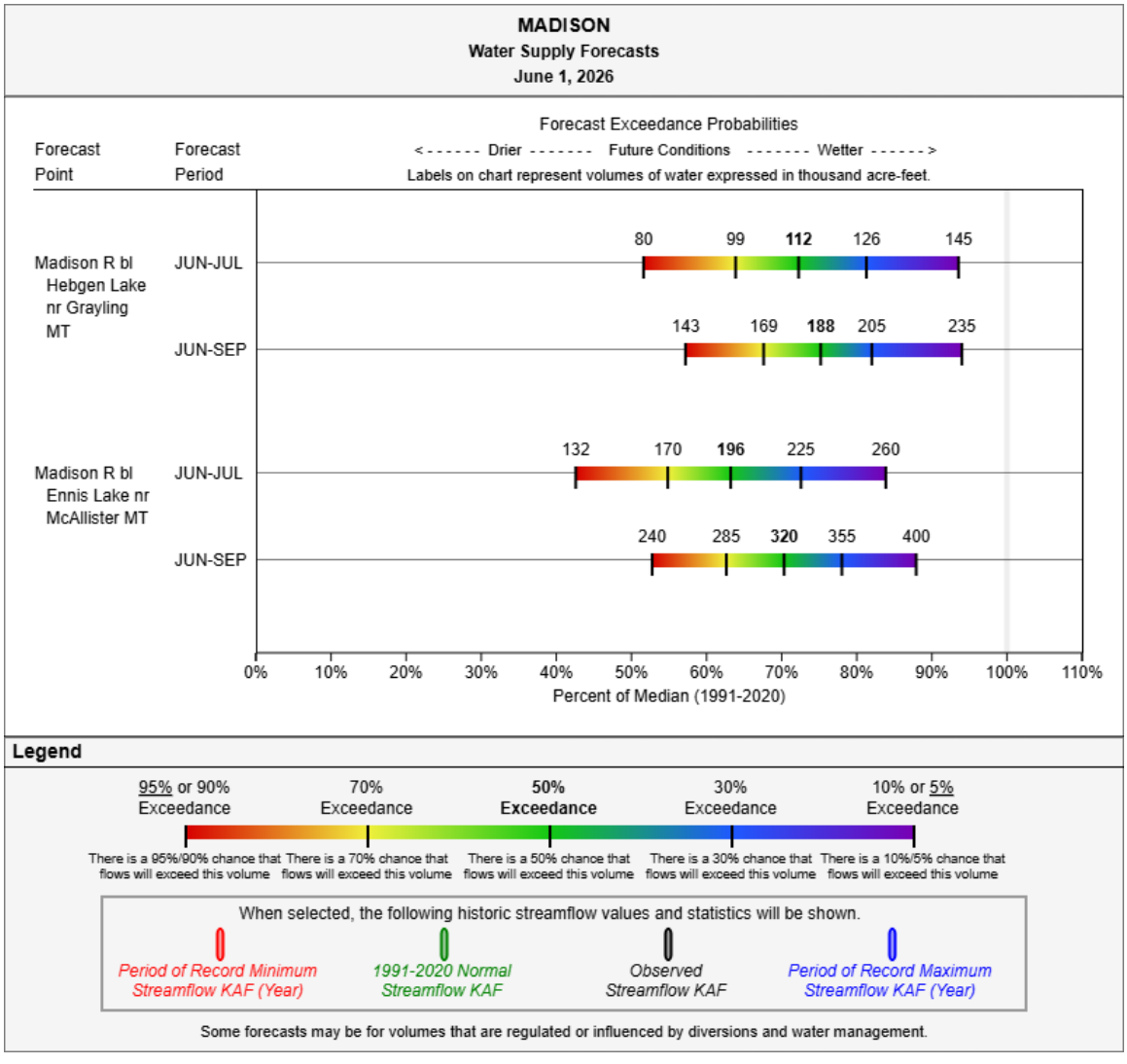
Precipitation in May was well below normal at 55%, which brings the seasonal accumulation (October-May) to 94% of median. The snowpack in the Madison is well below normal at 19% of median, compared to 56% at this time last year.



# Basin Overview

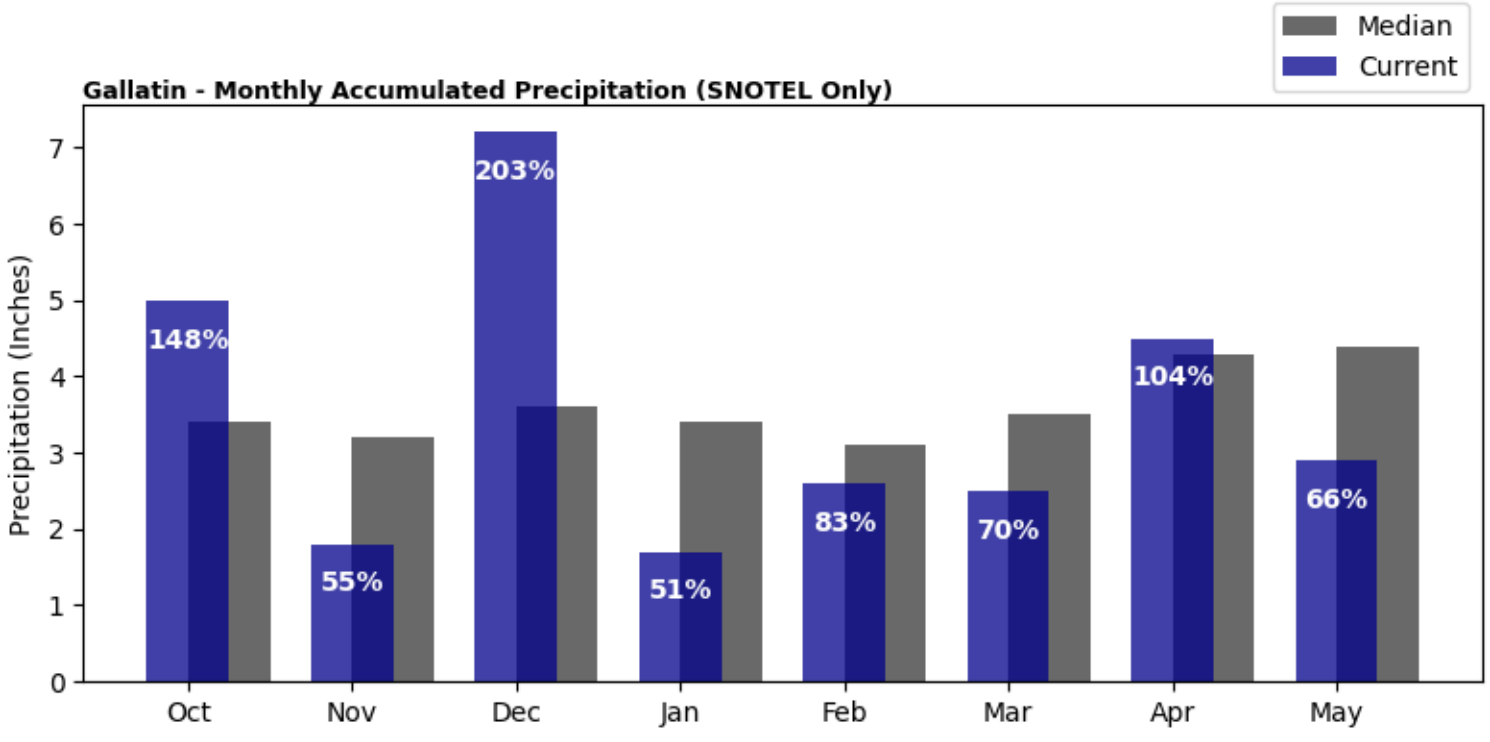
## Madison (Continued)

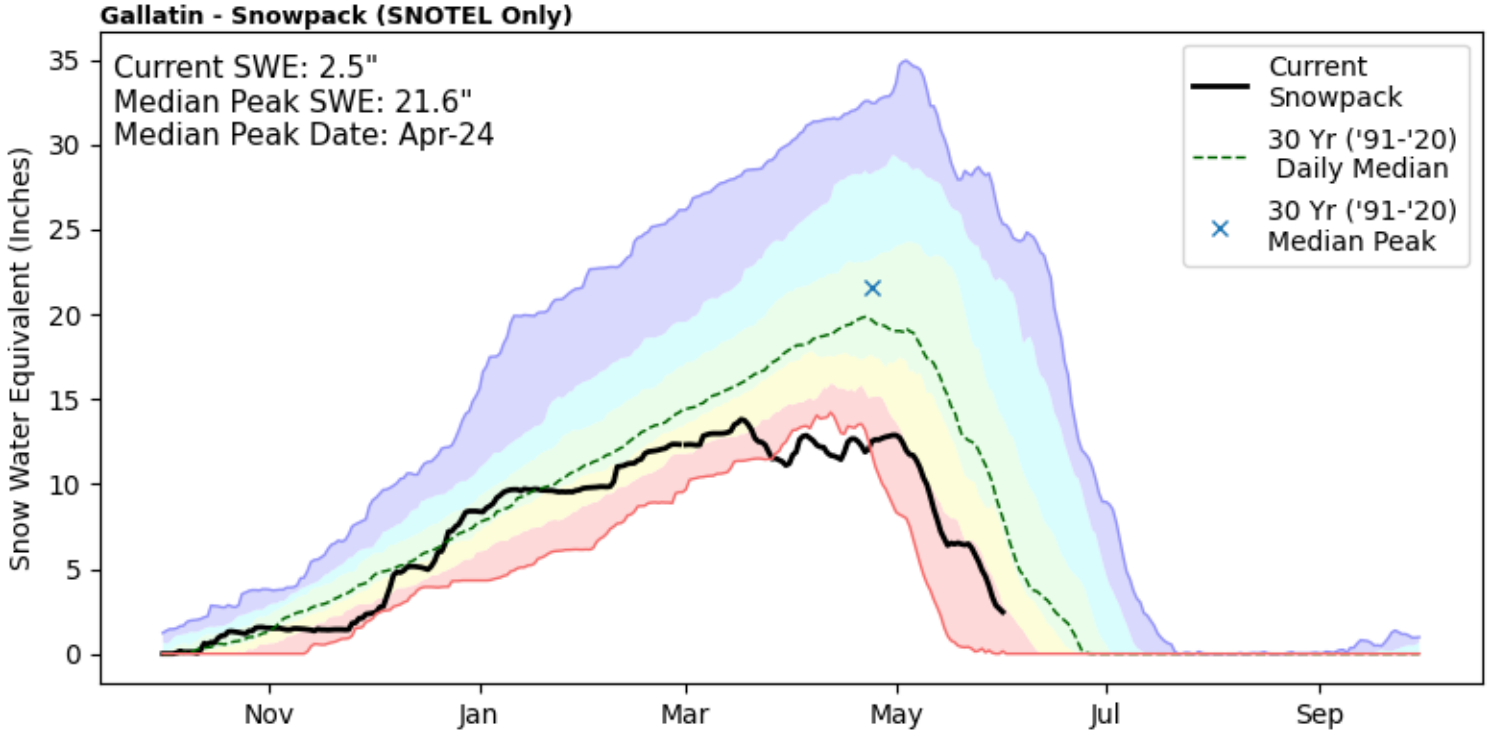


# Basin Overview

## Gallatin

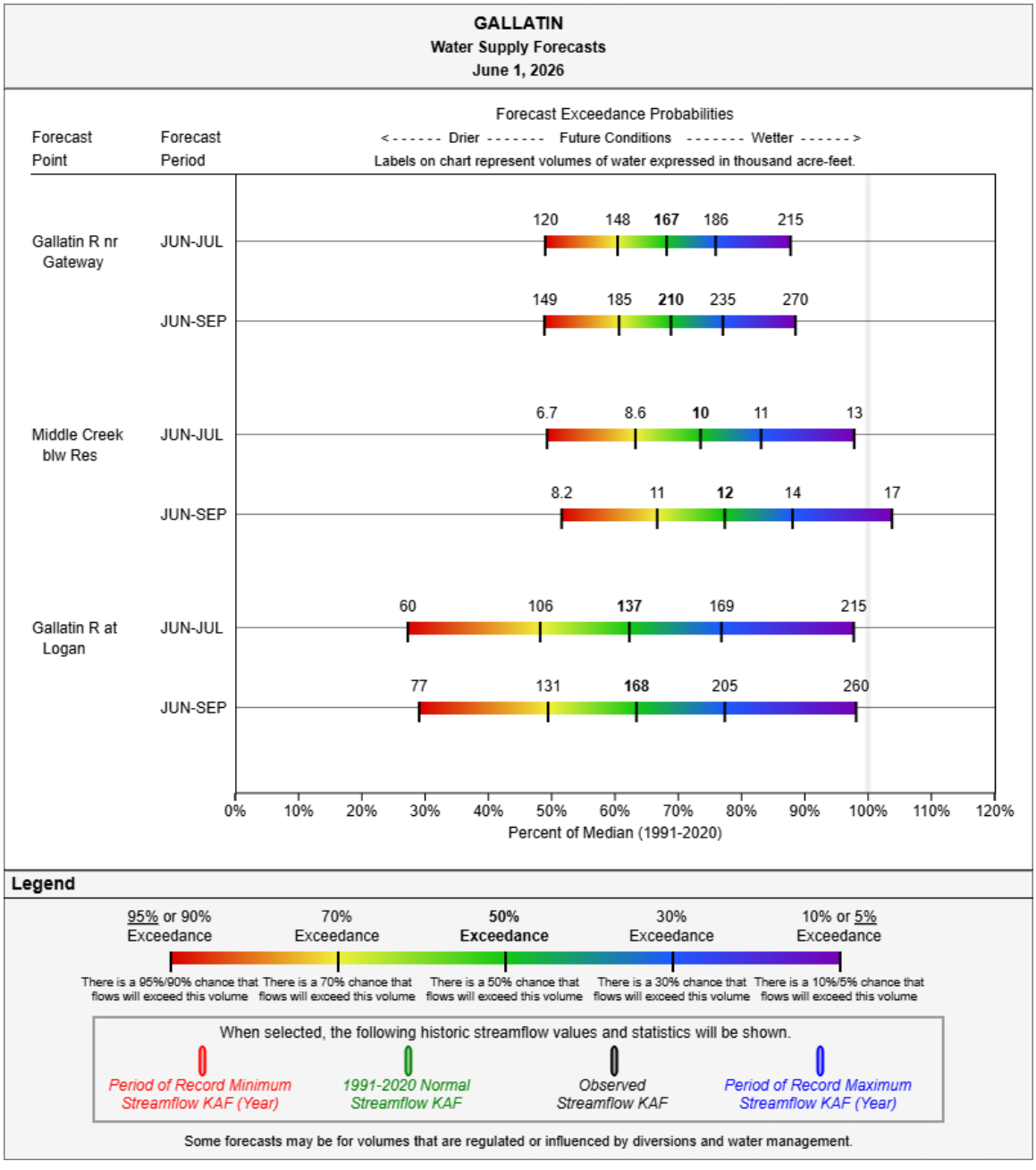
Precipitation in May was well below normal at 66%, which brings the seasonal accumulation (October-May) to 94% of median. The snowpack in the Gallatin is well below normal at 31% of median, compared to 66% at this time last year.



# Basin Overview

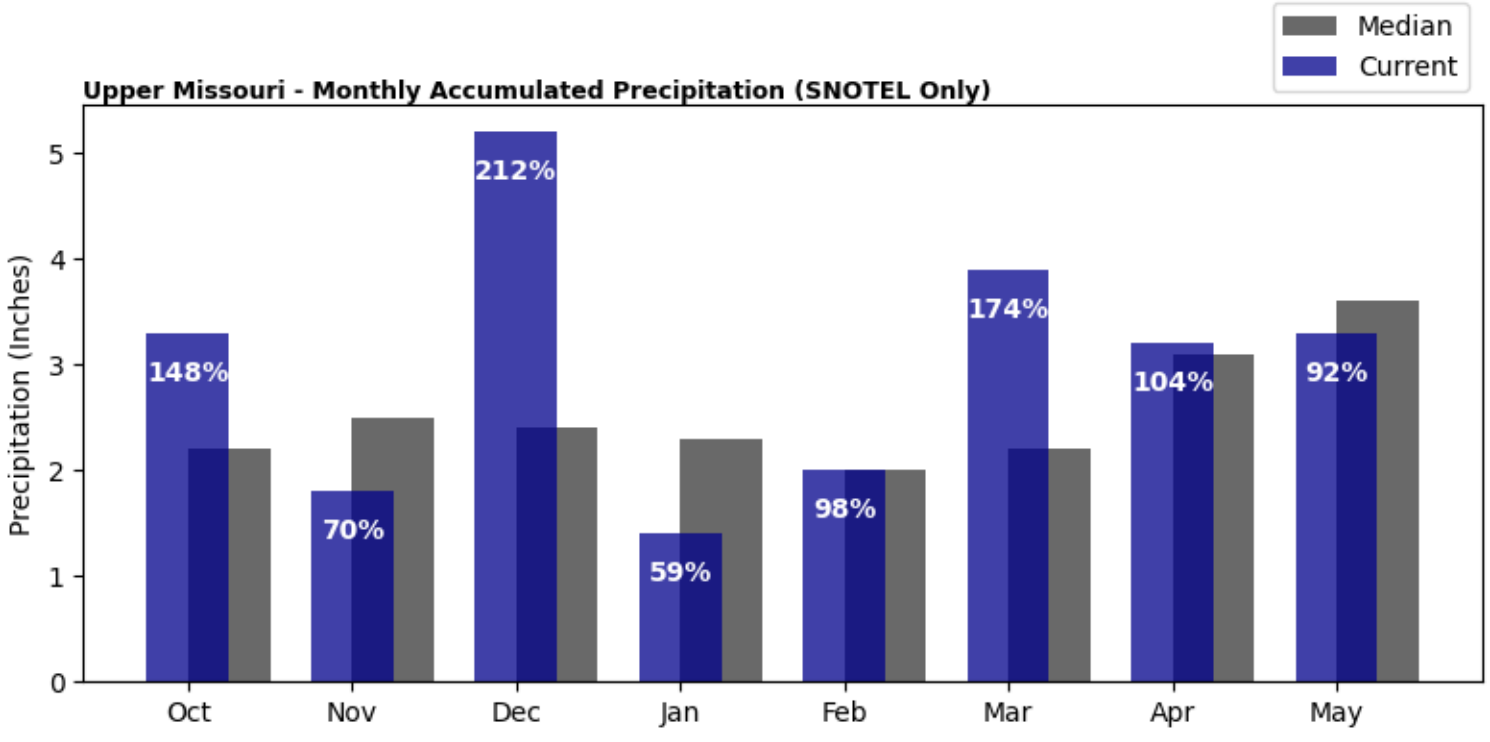
## Gallatin (Continued)

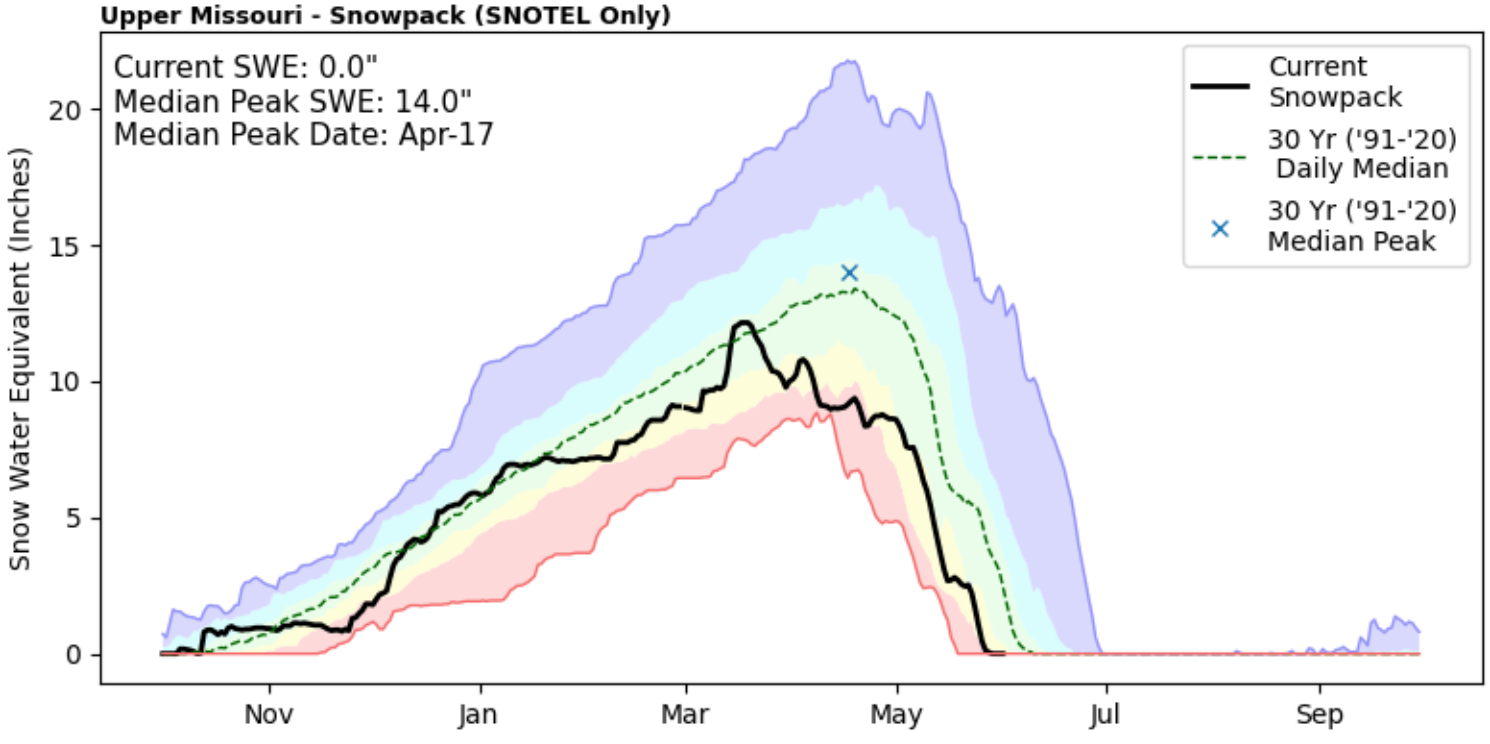


# Basin Overview

## Upper Missouri

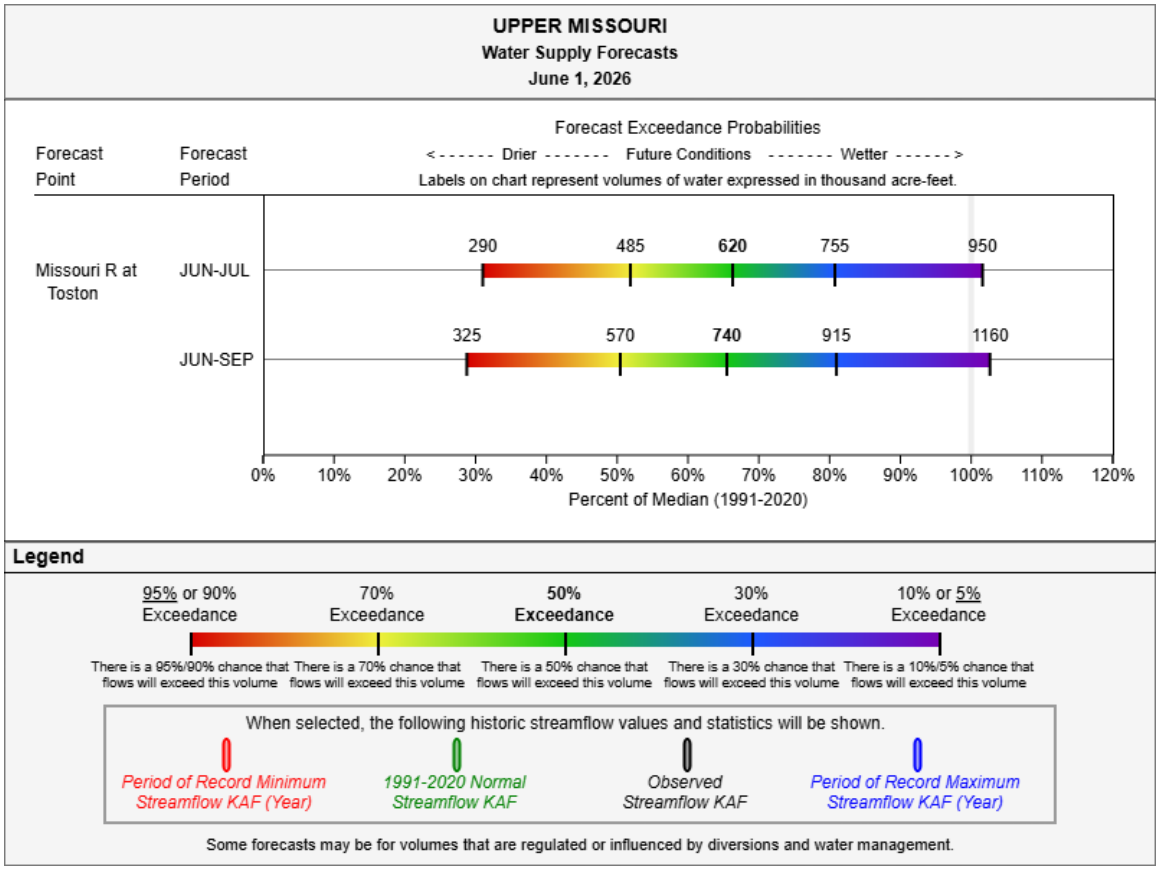
Precipitation in May was below normal at 92%, which brings the seasonal accumulation (October-May) to 115% of median. The snowpack in the Upper Missouri is None at None% of median, compared to None% at this time last year.



# Basin Overview

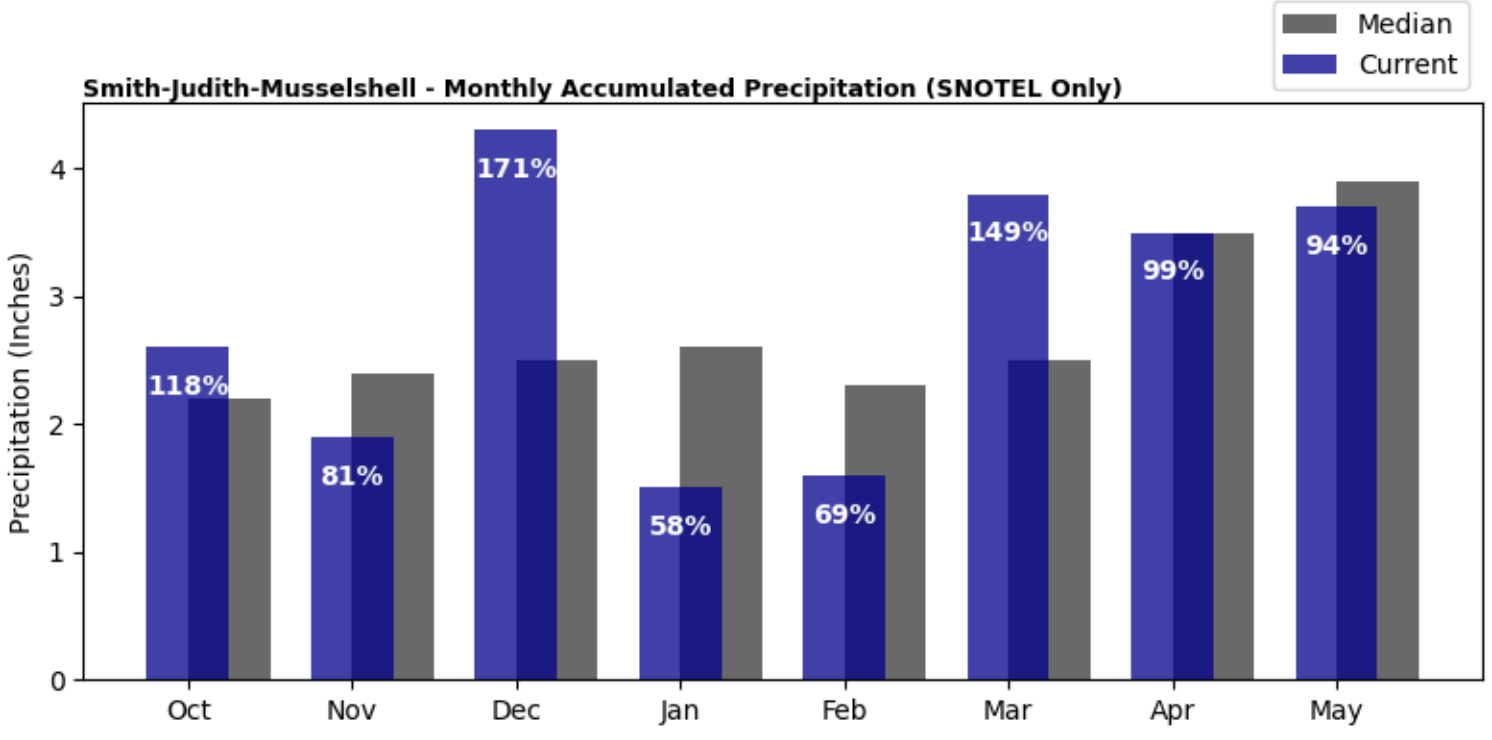
## Upper Missouri (Continued)

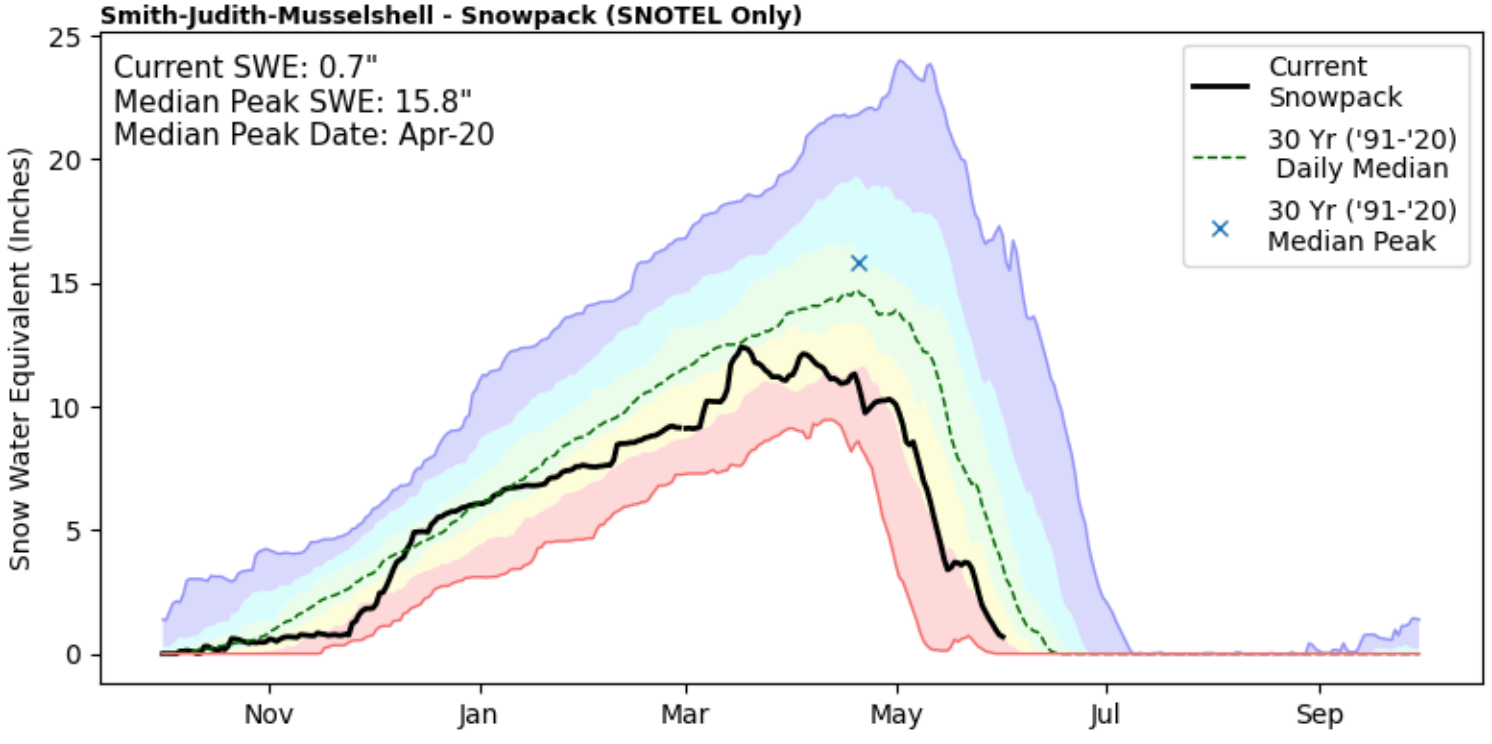


# Basin Overview

## Smith-Judith-Musselshell

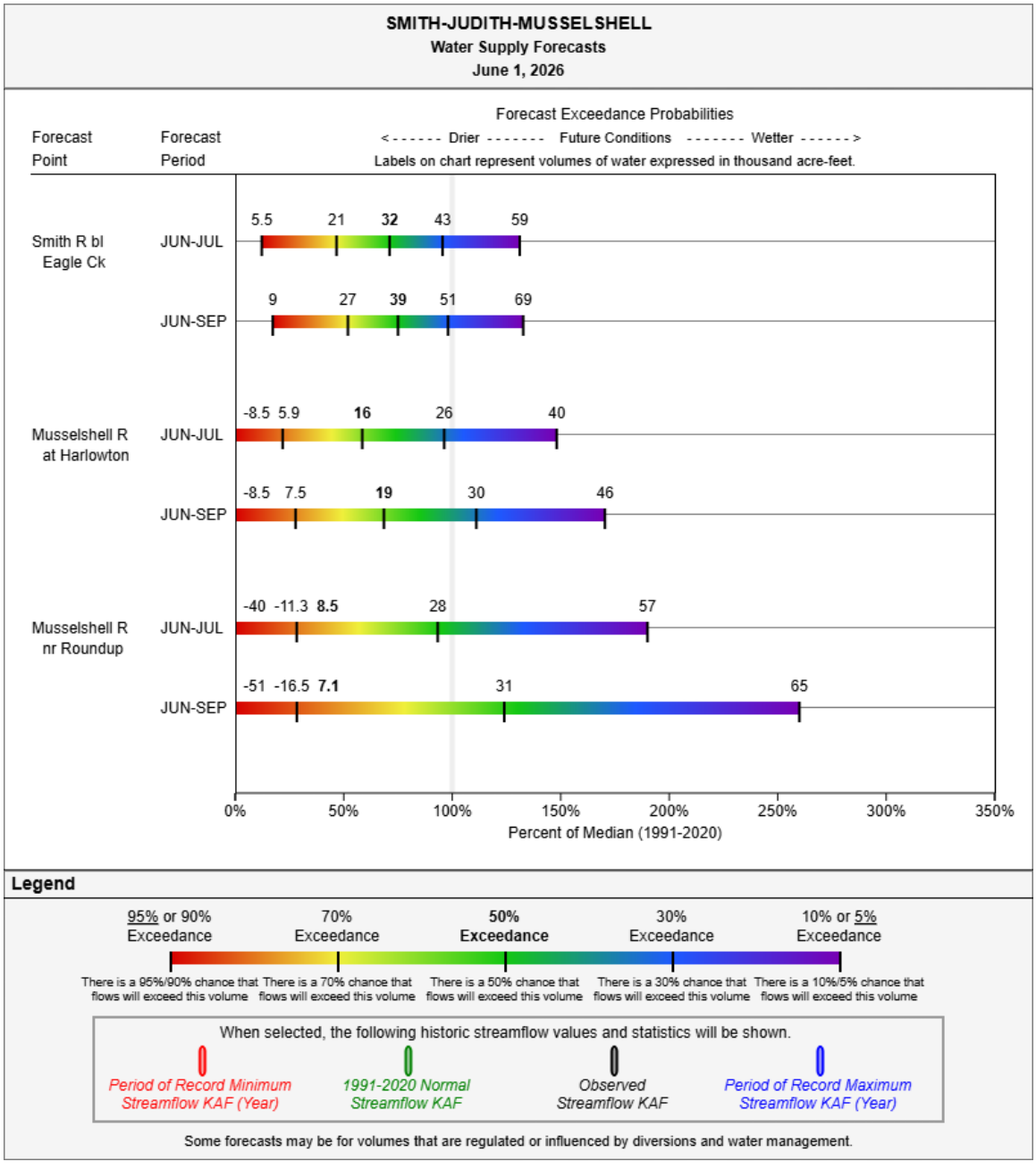
Precipitation in May was below normal at 94%, which brings the seasonal accumulation (October-May) to 99% of median. The snowpack in the Smith-Judith-Musselshell is well below normal at 19% of median, compared to 54% at this time last year.



# Basin Overview

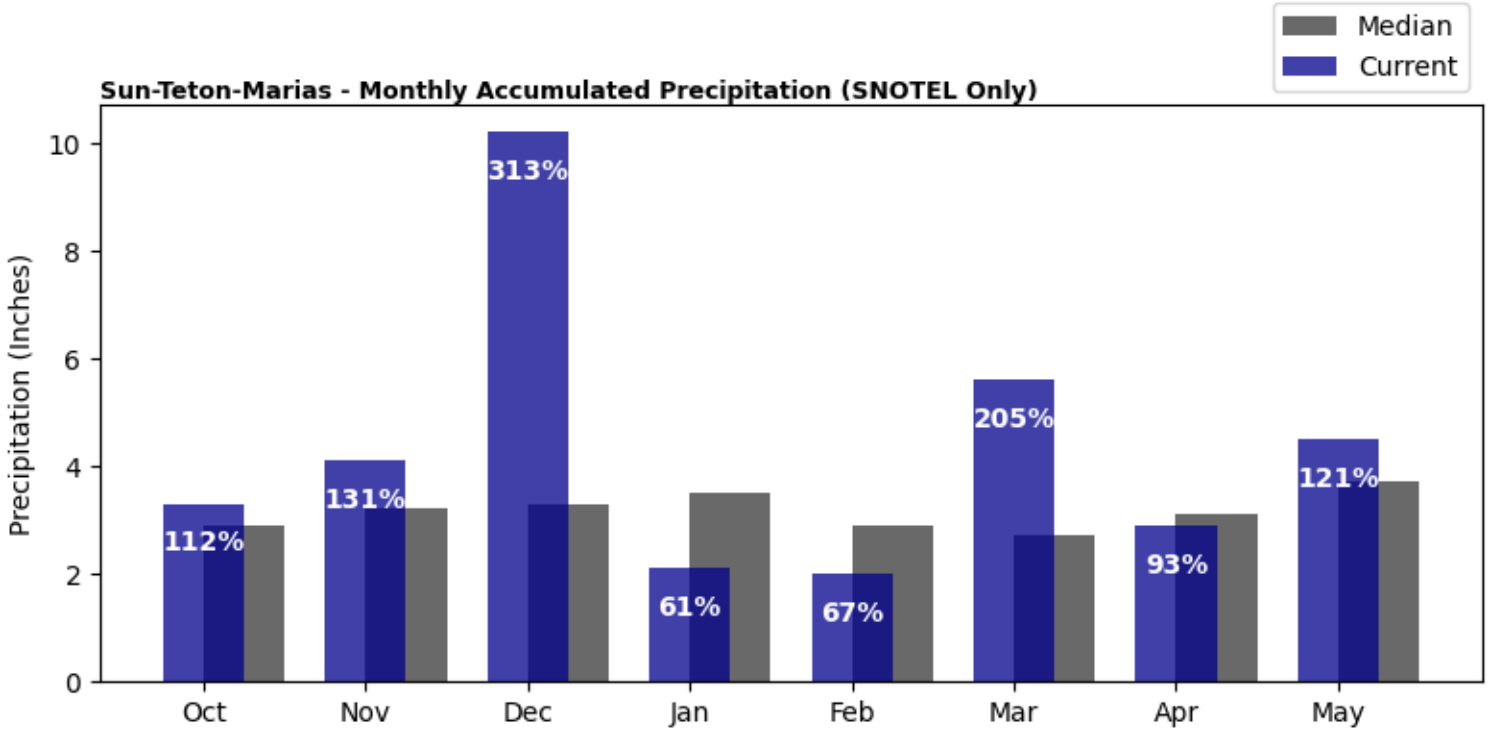
## Smith-Judith-Musselshell (Continued)

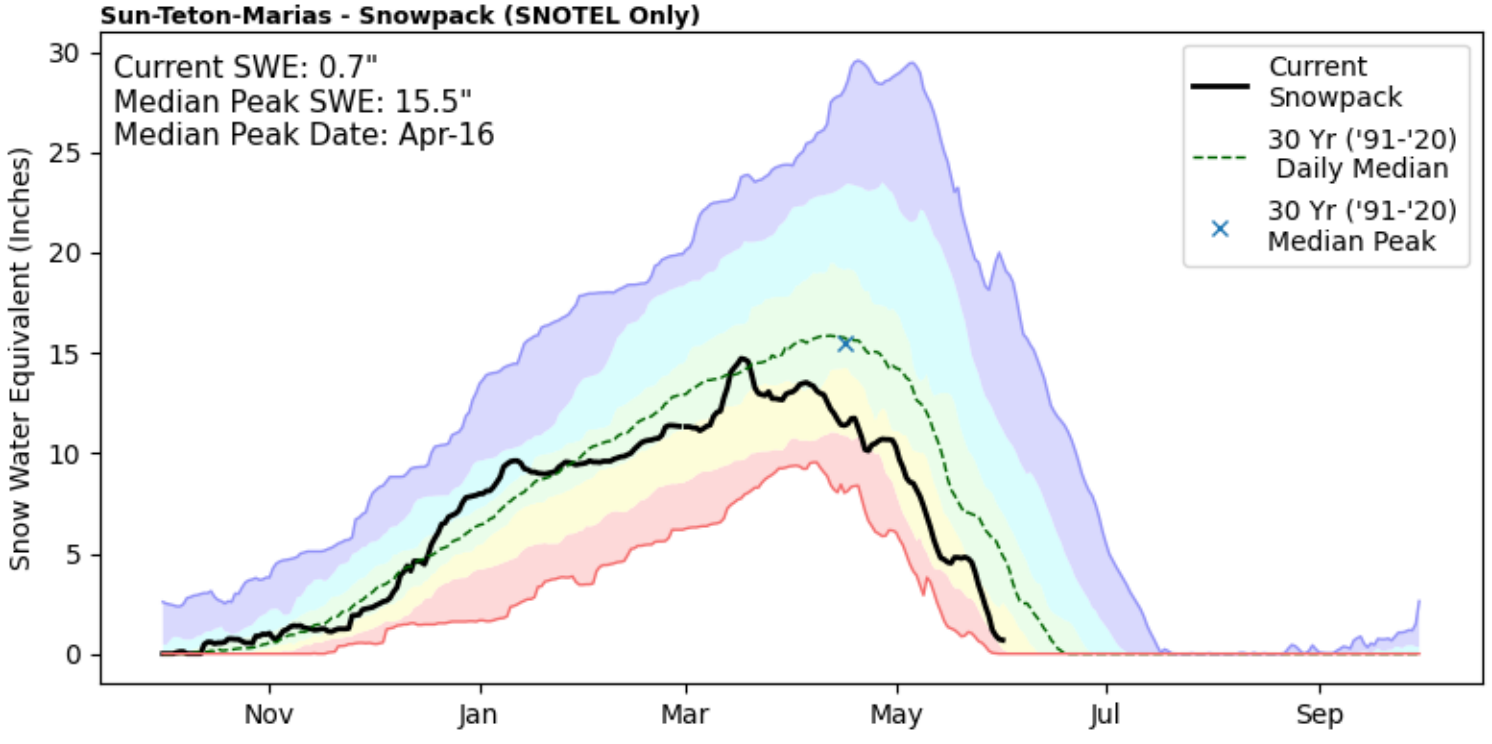


# Basin Overview

## Sun-Teton-Marias

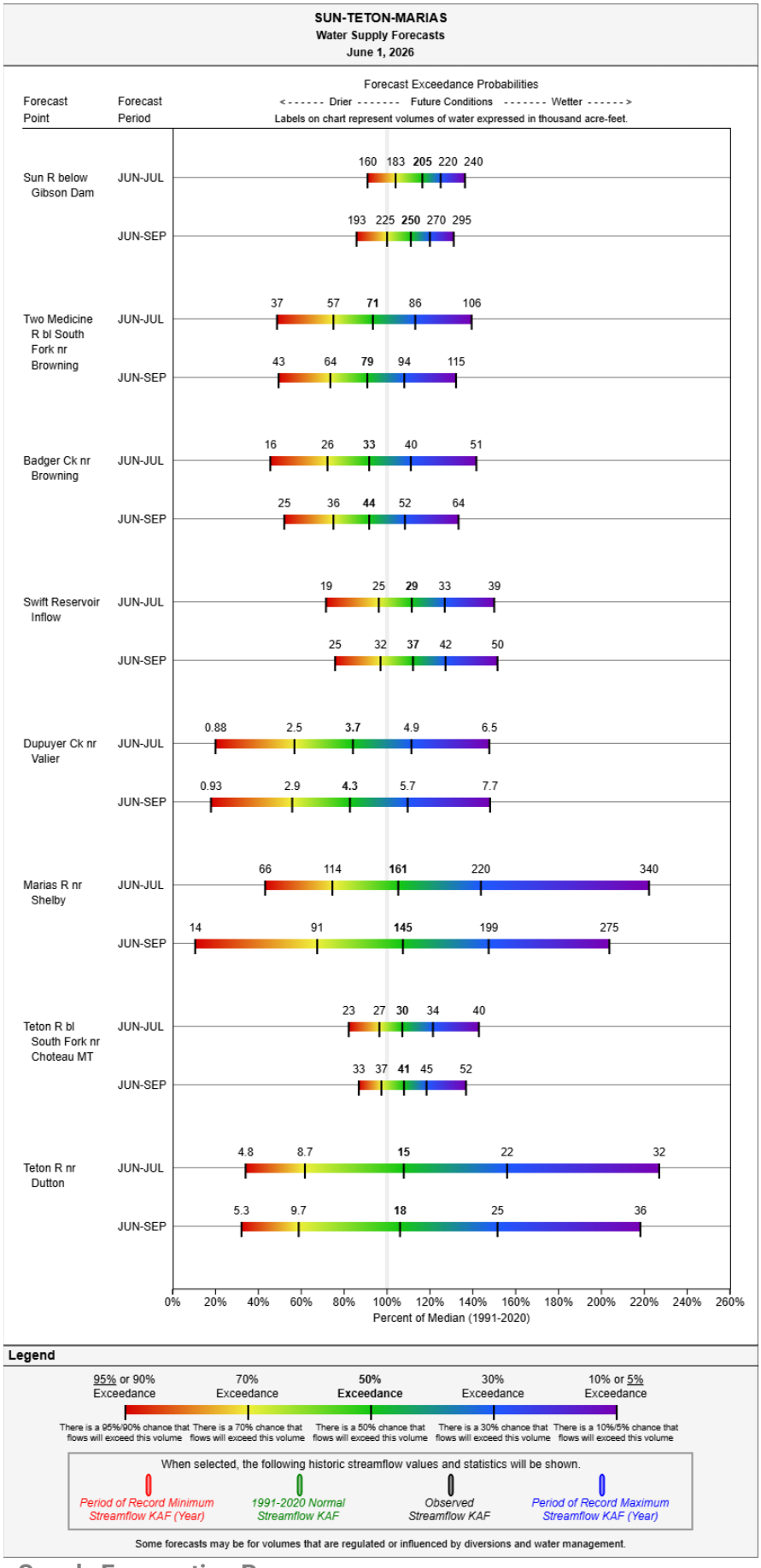
Precipitation in May was well above normal at 121%, which brings the seasonal accumulation (October-May) to 131% of median. The snowpack in the Sun-Teton-Marias is well below normal at 14% of median, compared to None% at this time last year.



# Basin Overview

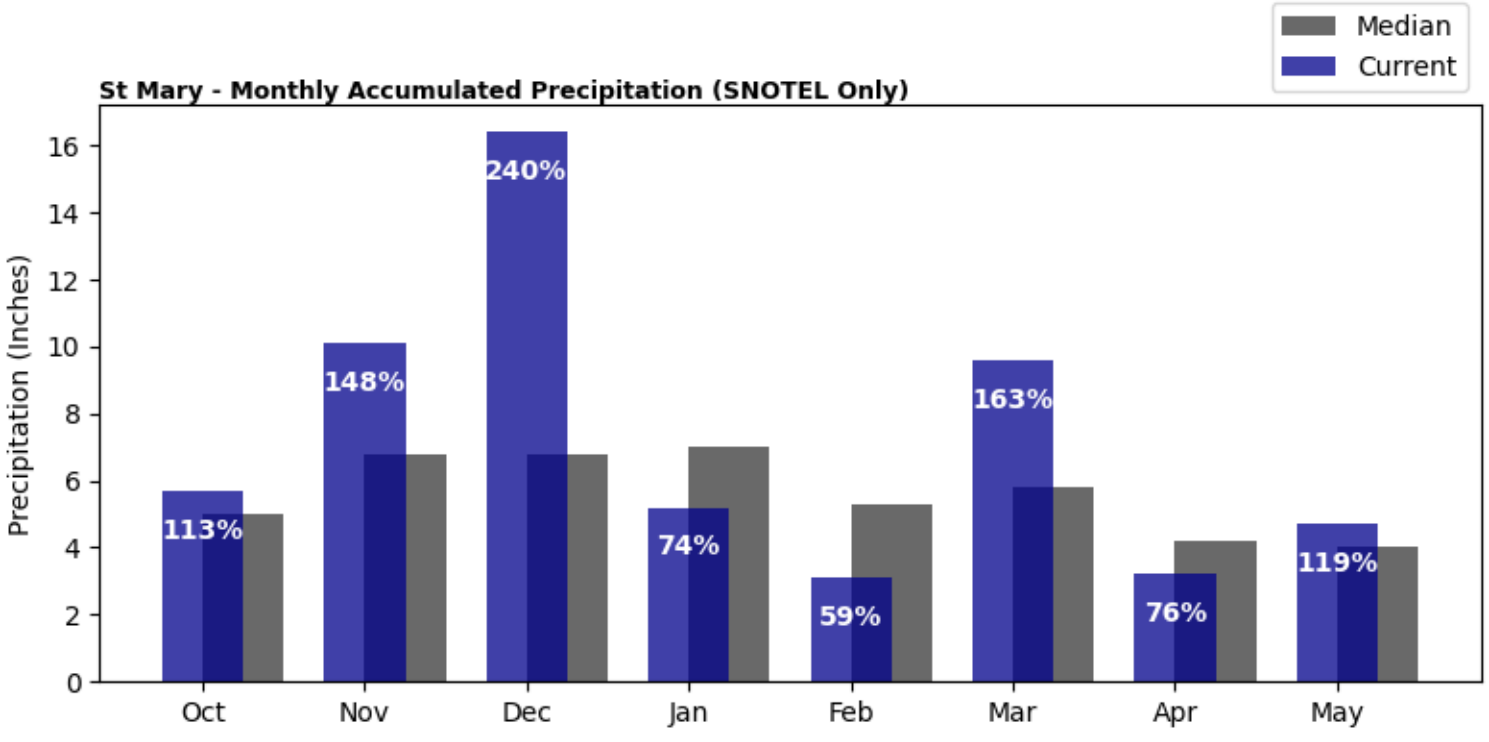
## Sun-Teton-Marias (Continued)

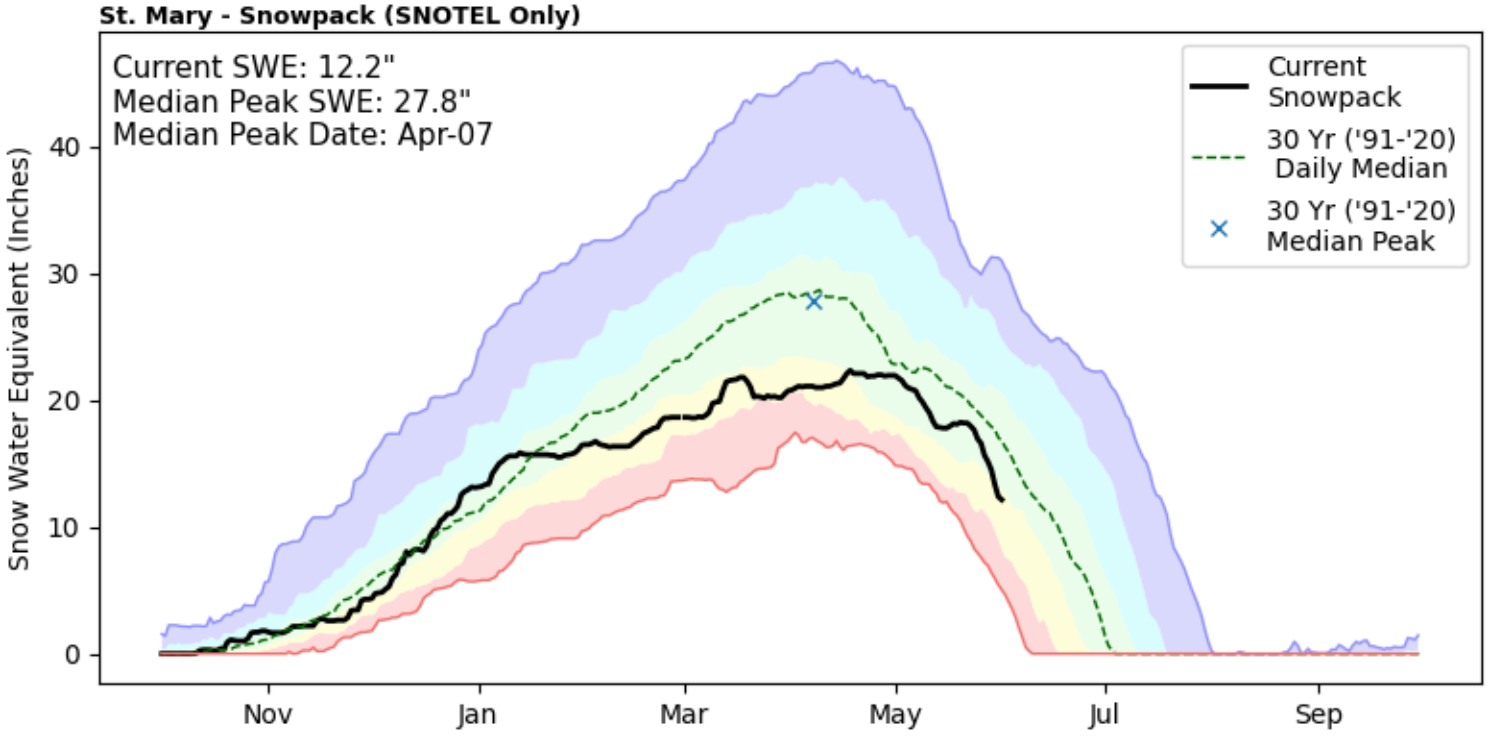


# Basin Overview

## St. Mary

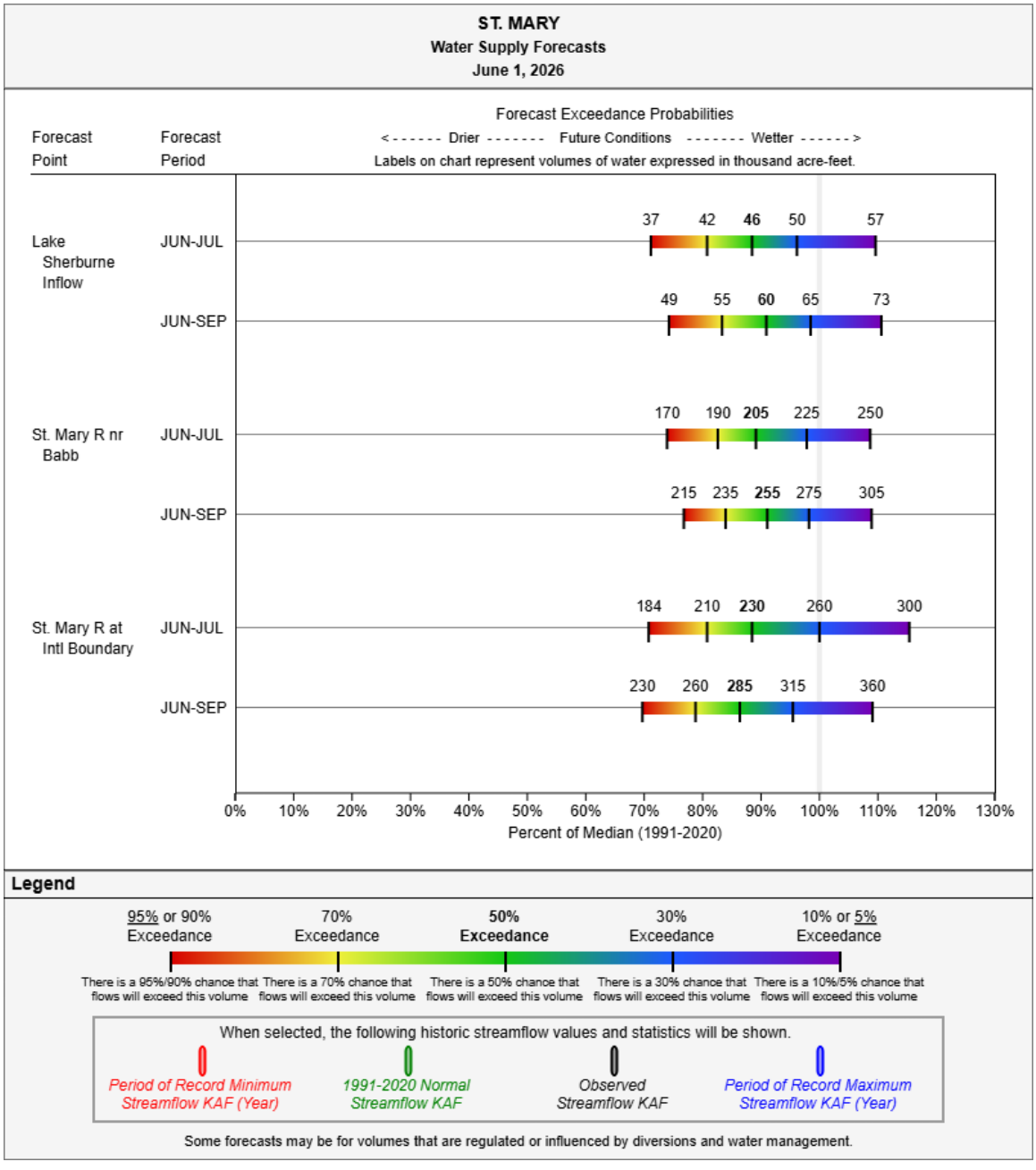
Precipitation in May was above normal at 119%, which brings the seasonal accumulation (October-May) to 118% of median. The snowpack in the St. Mary is well below normal at 72% of median, compared to 50% at this time last year.



# Basin Overview

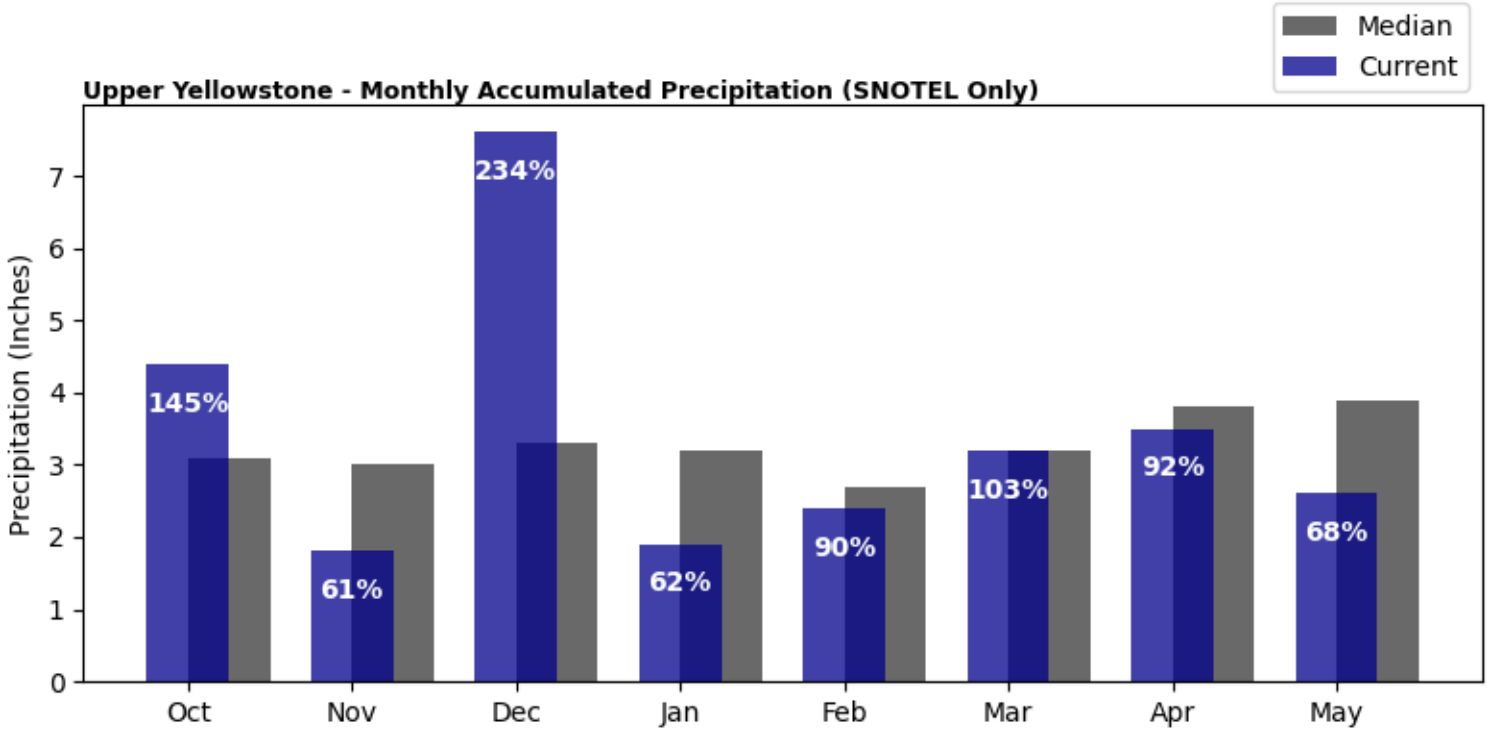
## St. Mary (Continued)

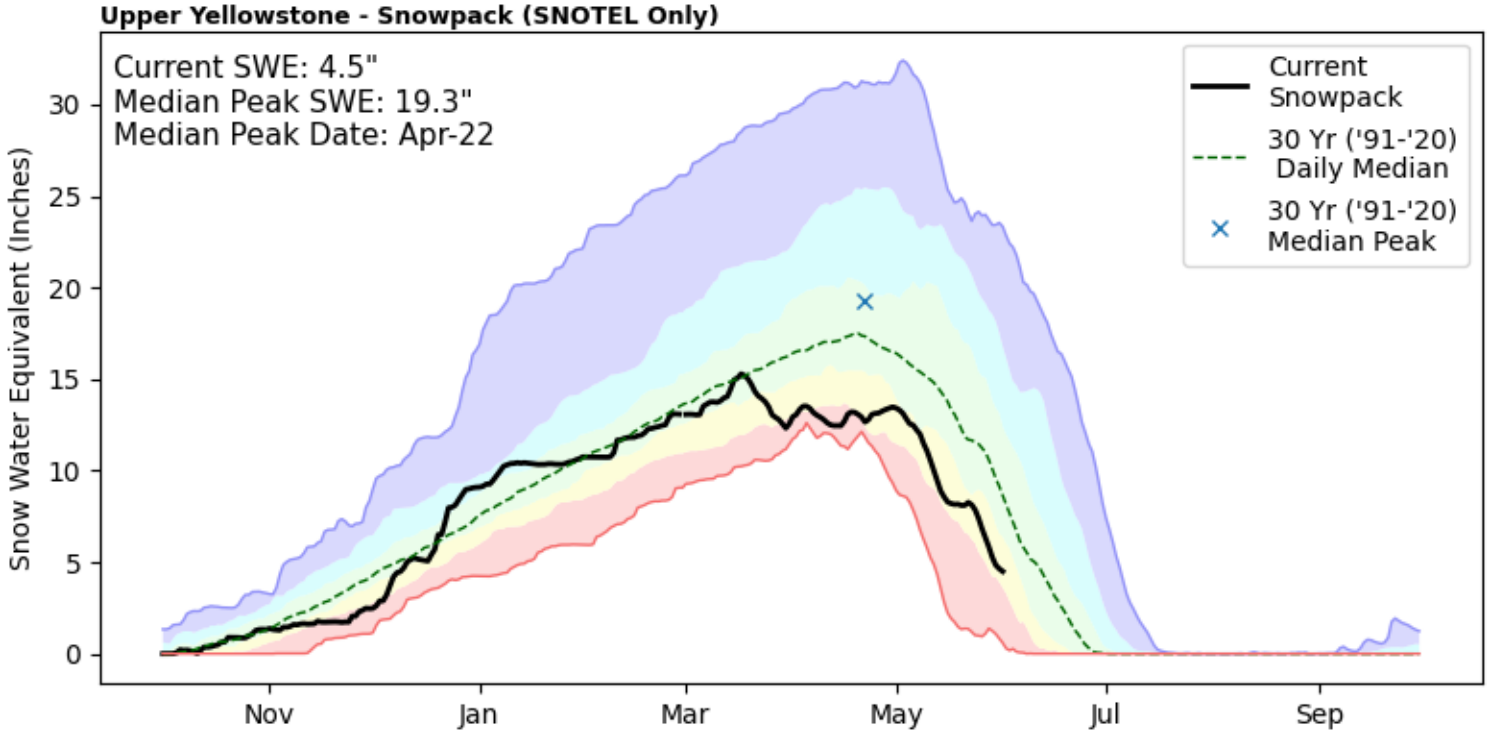


# Basin Overview

## Upper Yellowstone

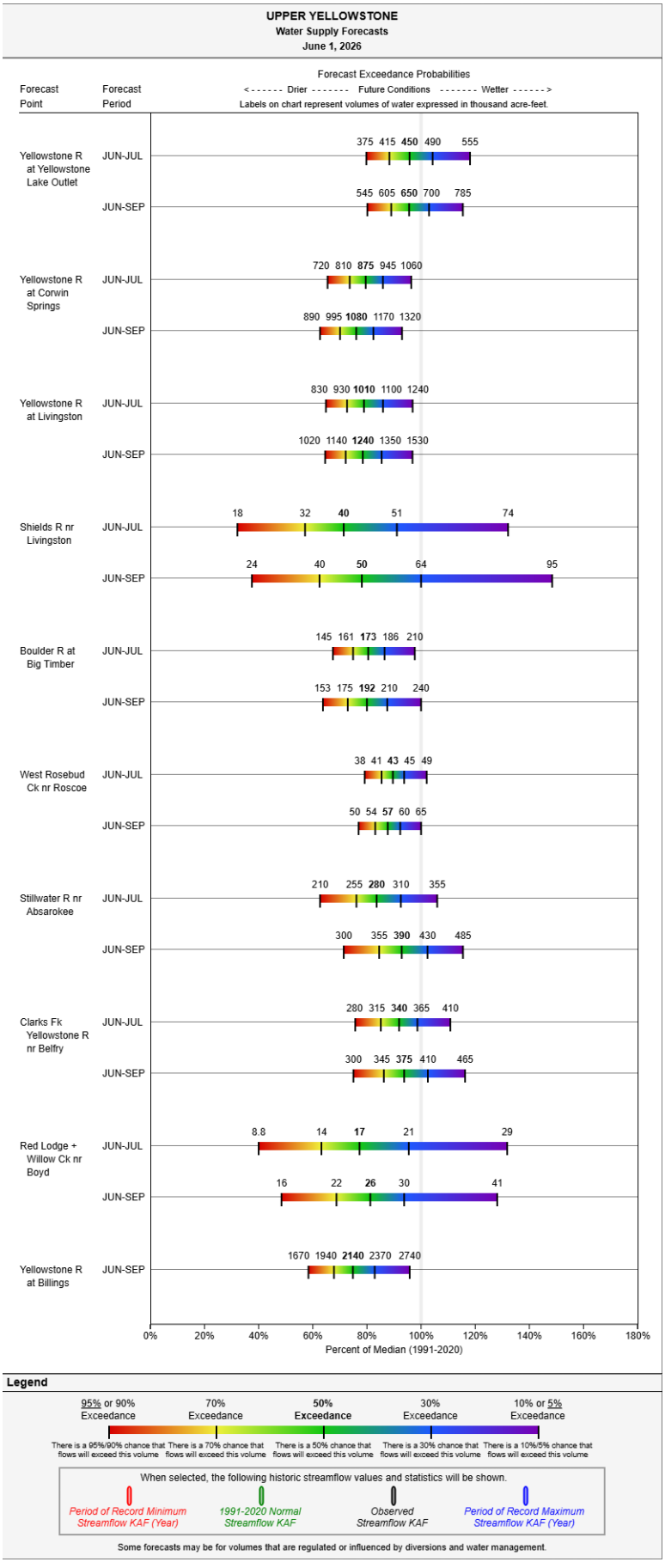
Precipitation in May was well below normal at 68%, which brings the seasonal accumulation (October-May) to 103% of median. The snowpack in the Upper Yellowstone is well below normal at 52% of median, compared to 63% at this time last year.



# Basin Overview

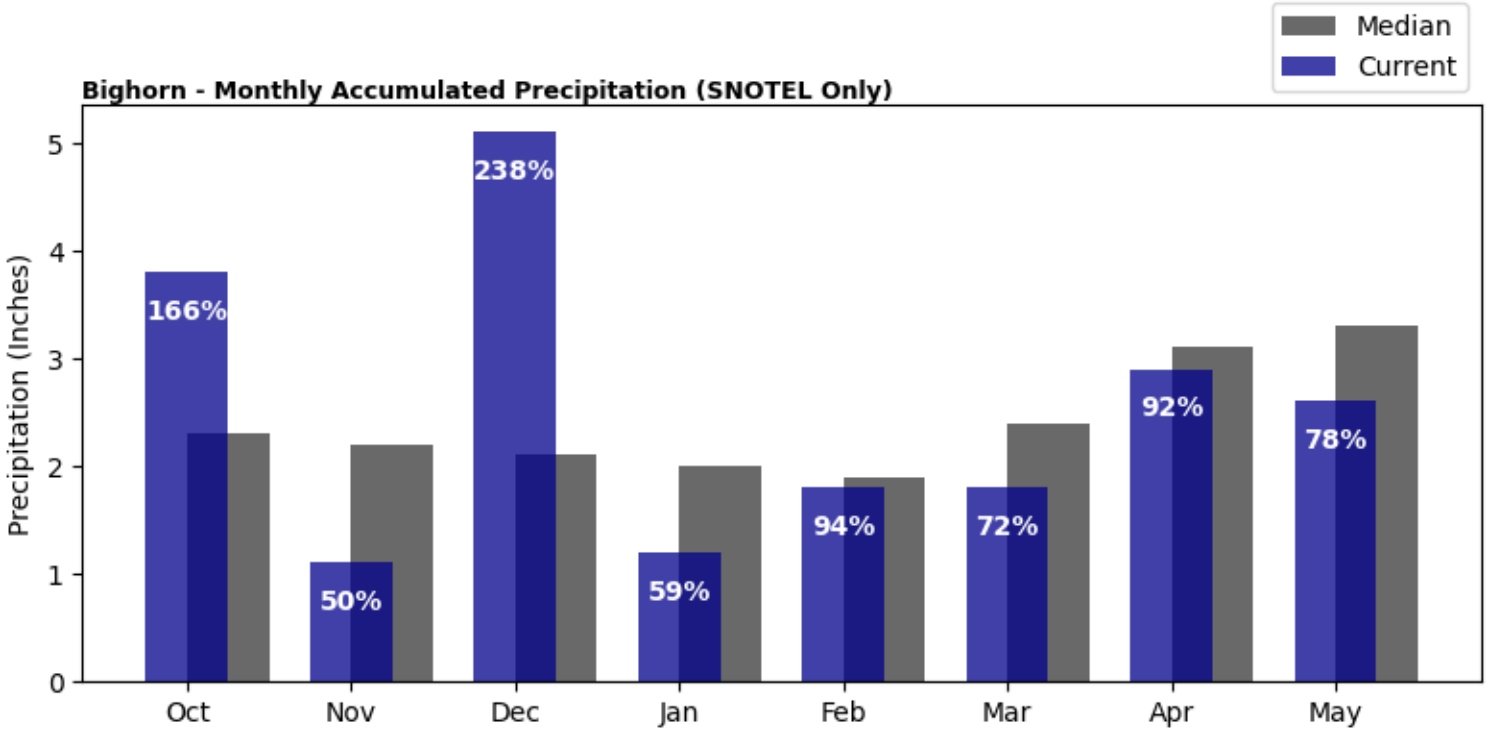
## Upper Yellowstone (Continued)

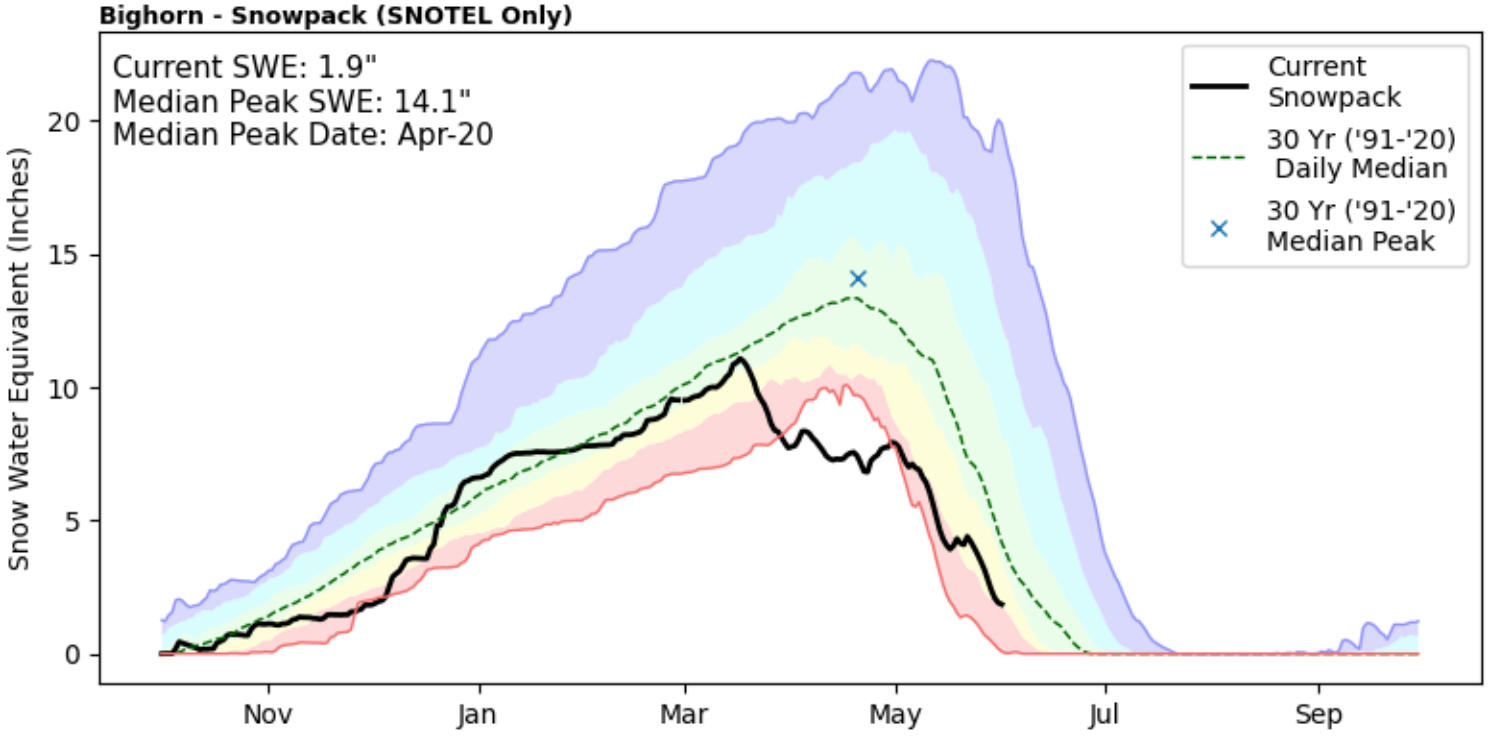


# Basin Overview

## Bighorn

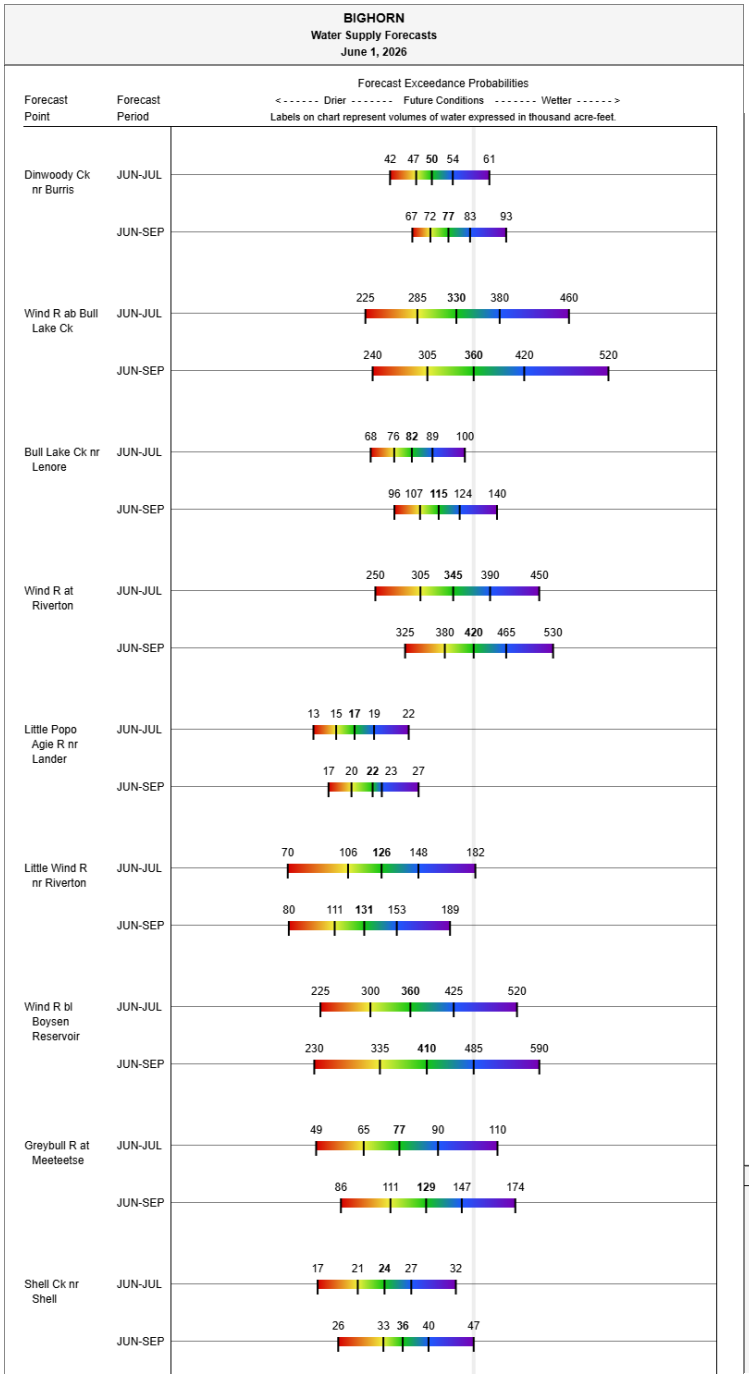
Precipitation in May was well below normal at 78%, which brings the seasonal accumulation (October-May) to 99% of median. The snowpack in the Bighorn is well below normal at 44% of median, compared to 66% at this time last year.

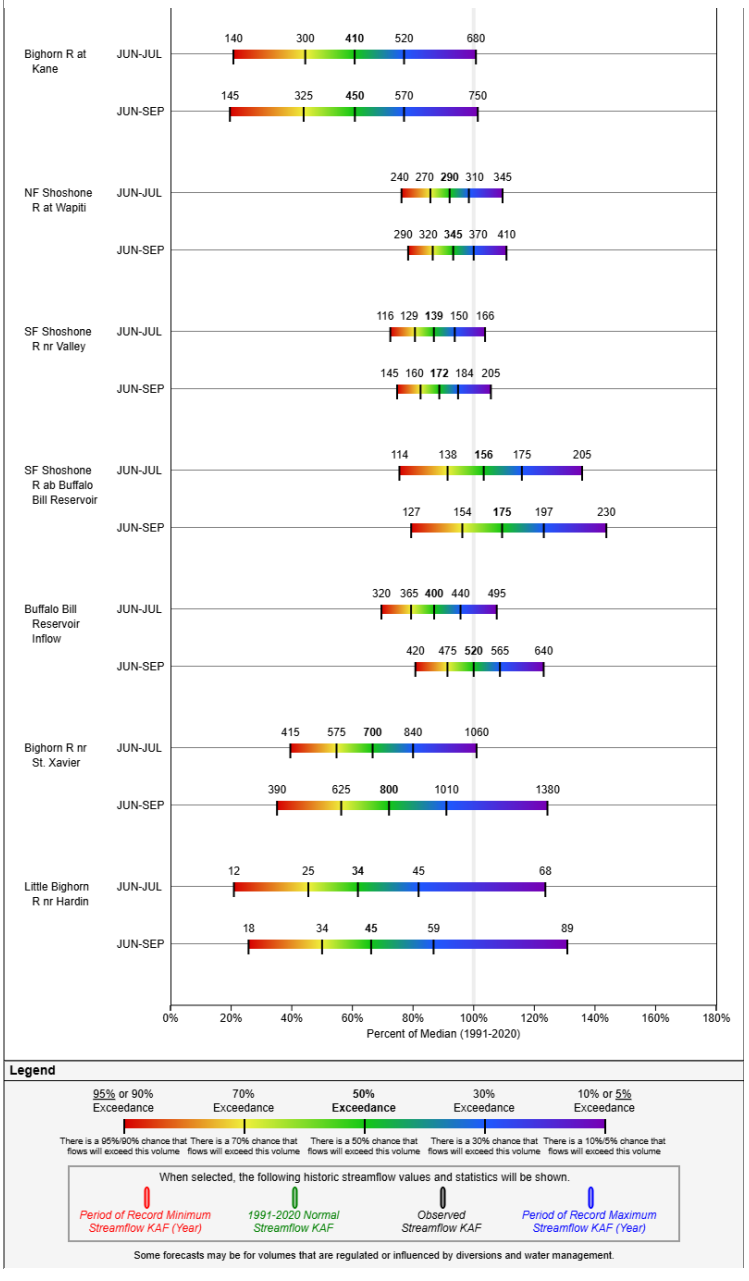


# Basin Overview

## Bighorn (Continued)

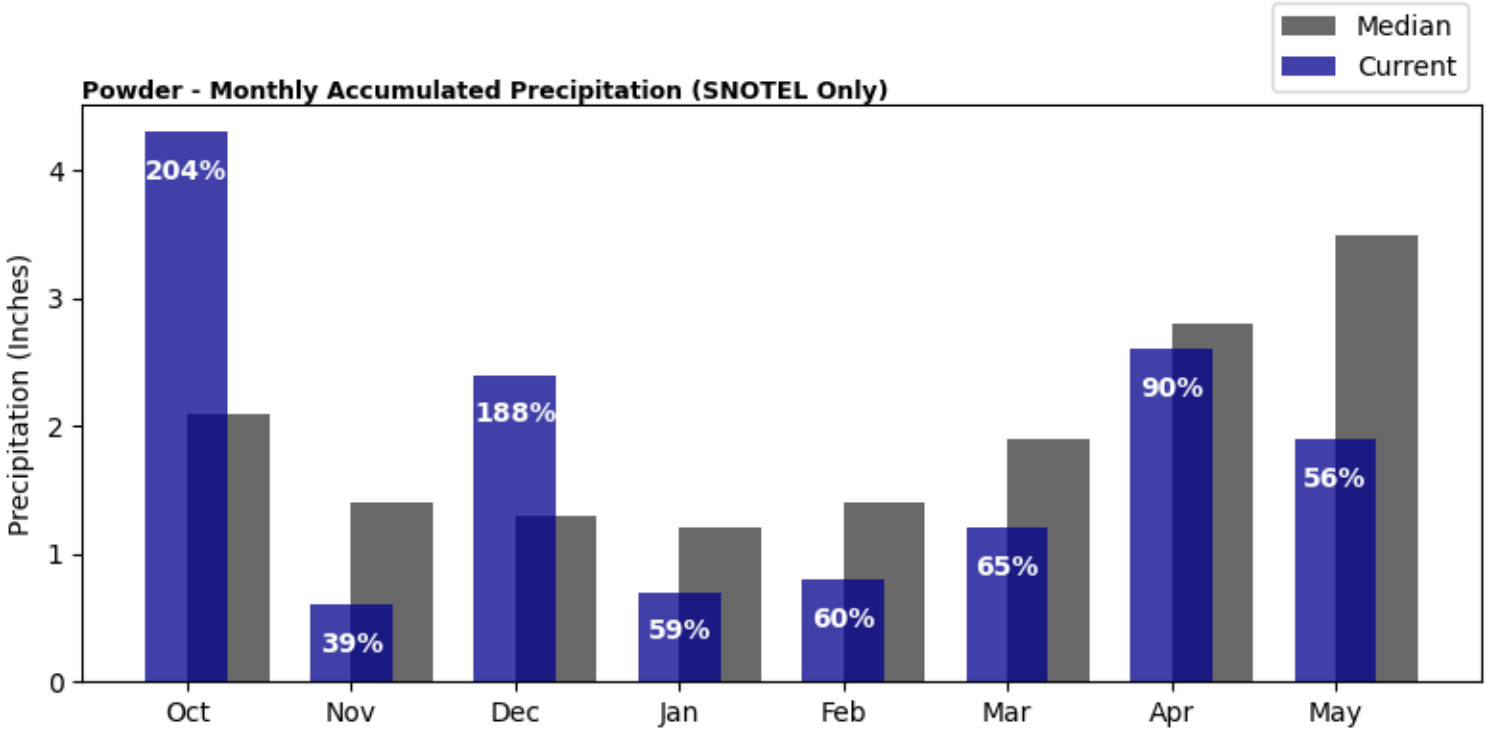


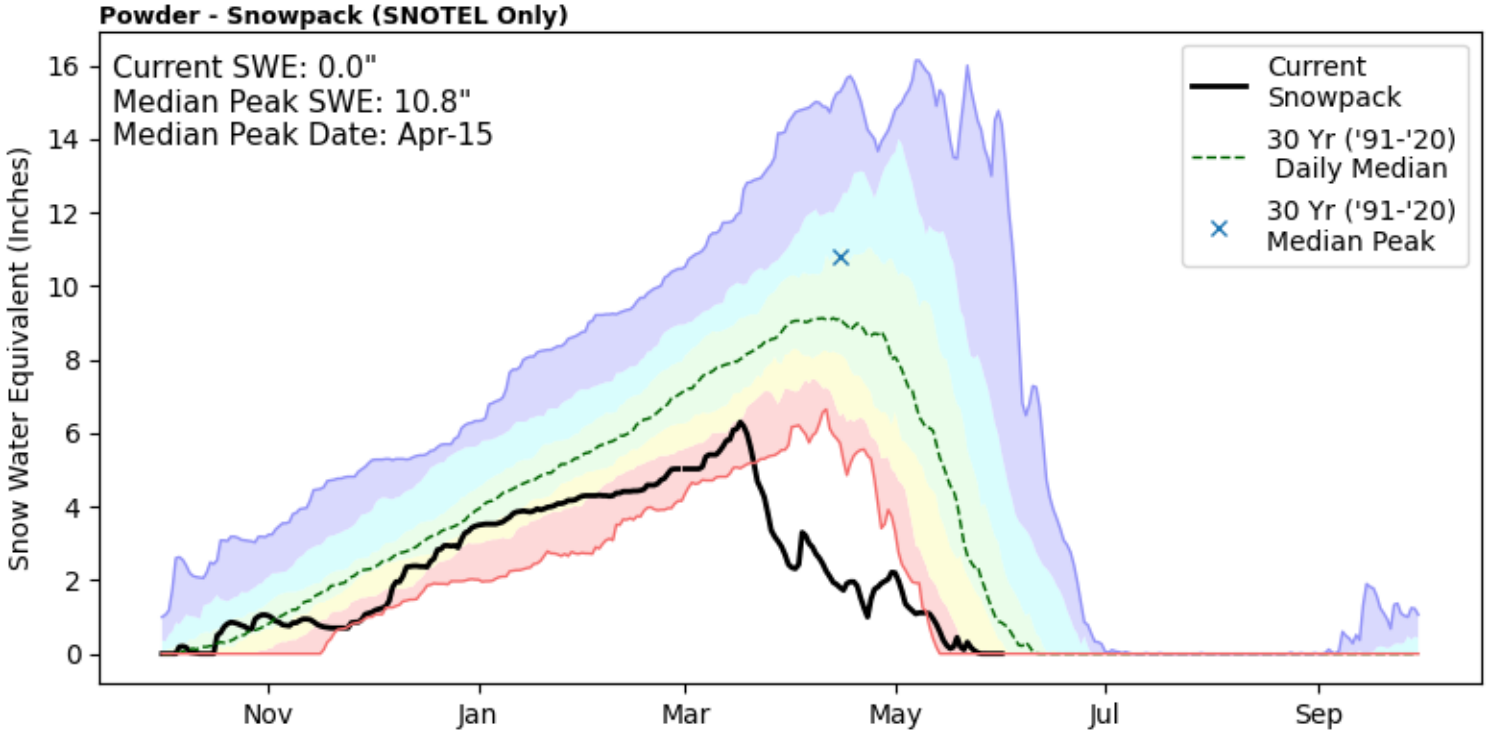



# Basin Overview

## Powder

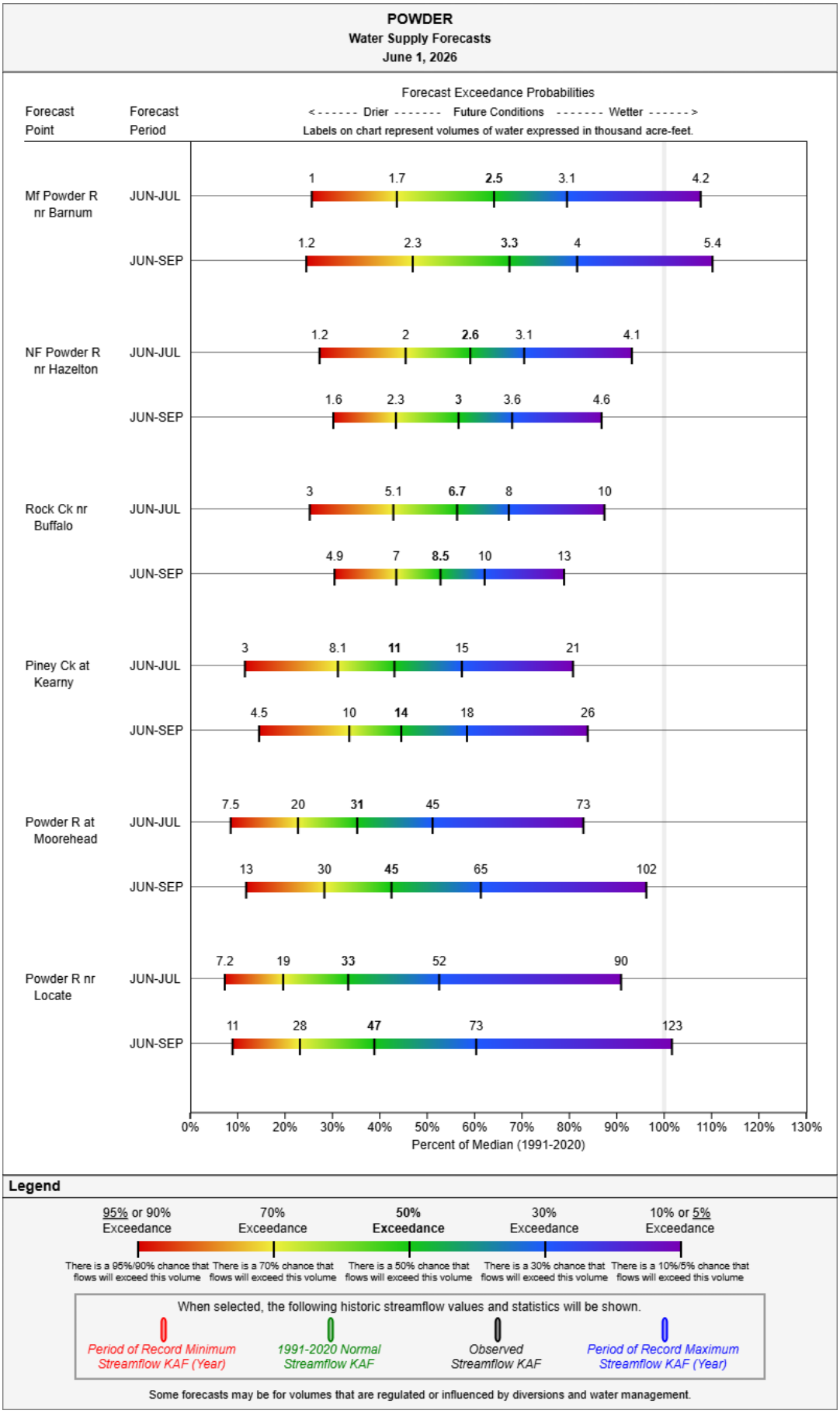
Precipitation in May was well below normal at 56%, which brings the seasonal accumulation (October-May) to 87% of median. The snowpack in the Powder is None at None% of median, compared to 78% at this time last year.



# Basin Overview

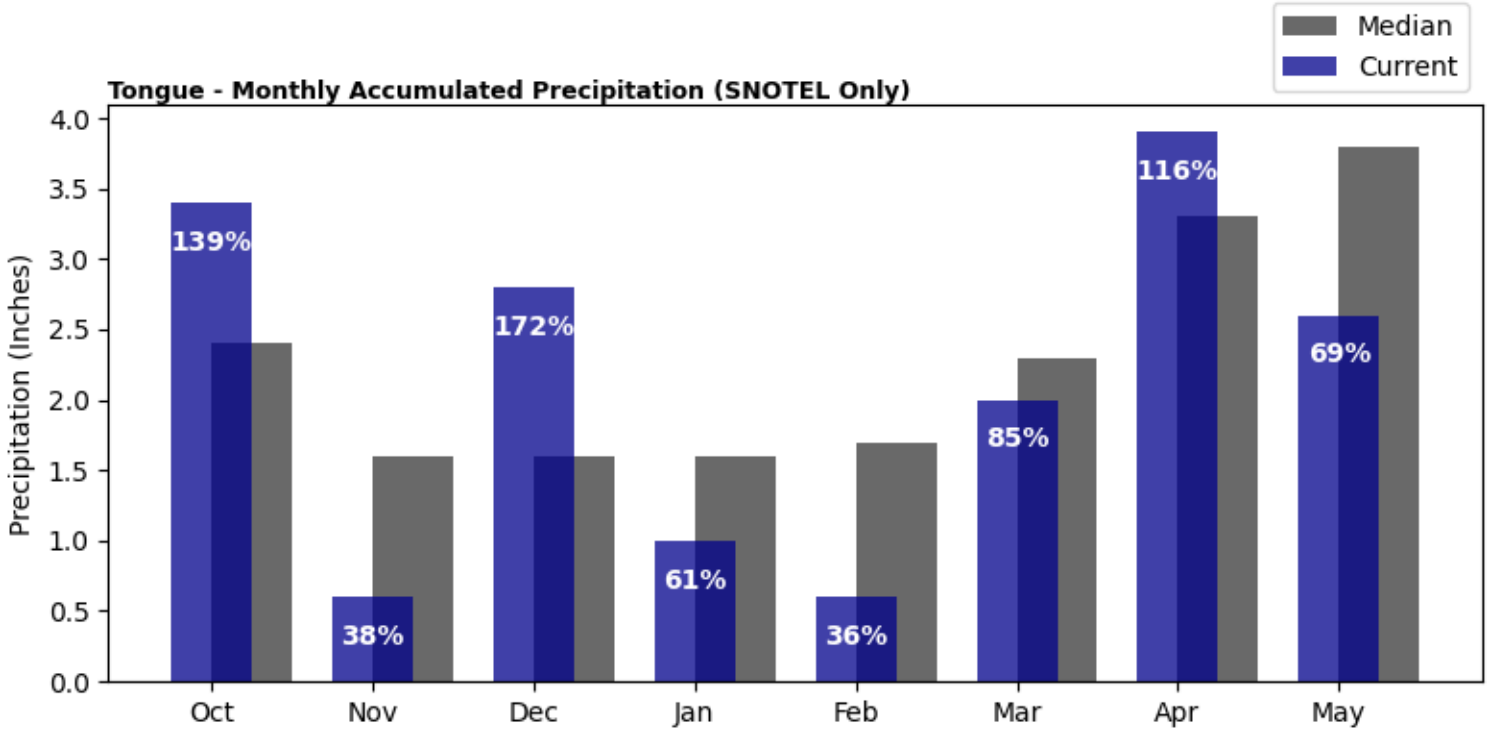
## Powder (Continued)

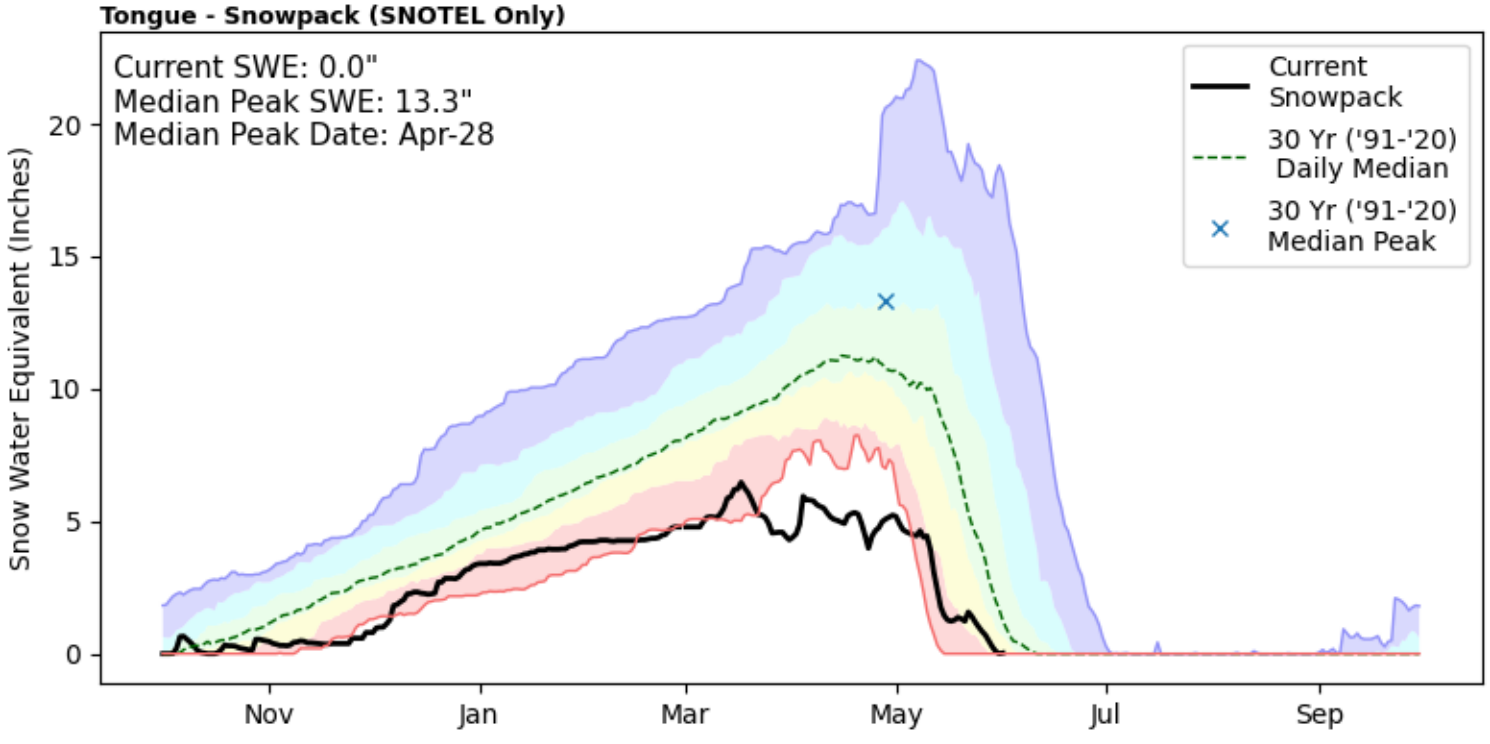


# Basin Overview

## Tongue

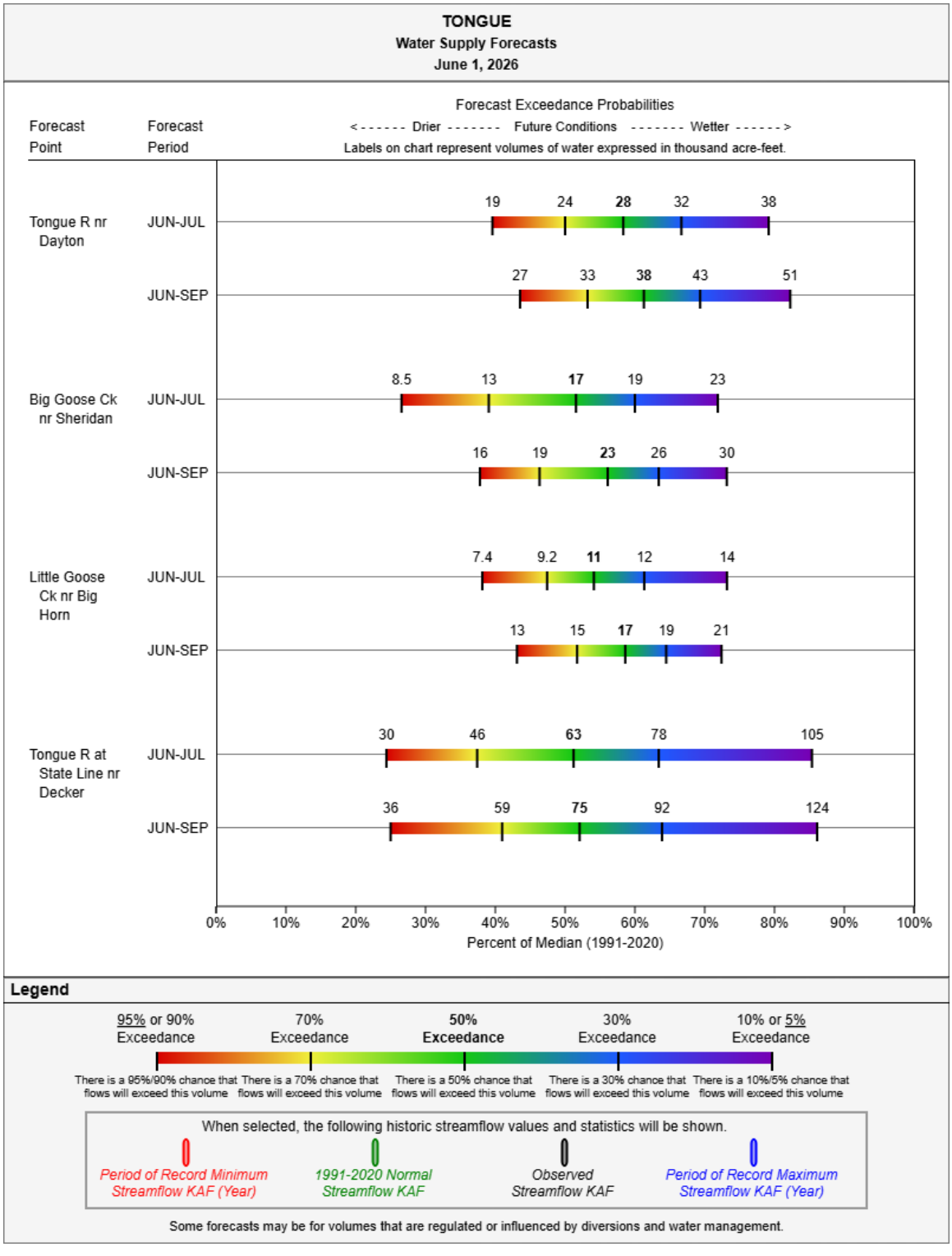
Precipitation in May was well below normal at 69%, which brings the seasonal accumulation (October-May) to 83% of median. The snowpack in the Tongue is well below normal at 2% of median, compared to 118% at this time last year.



# Basin Overview

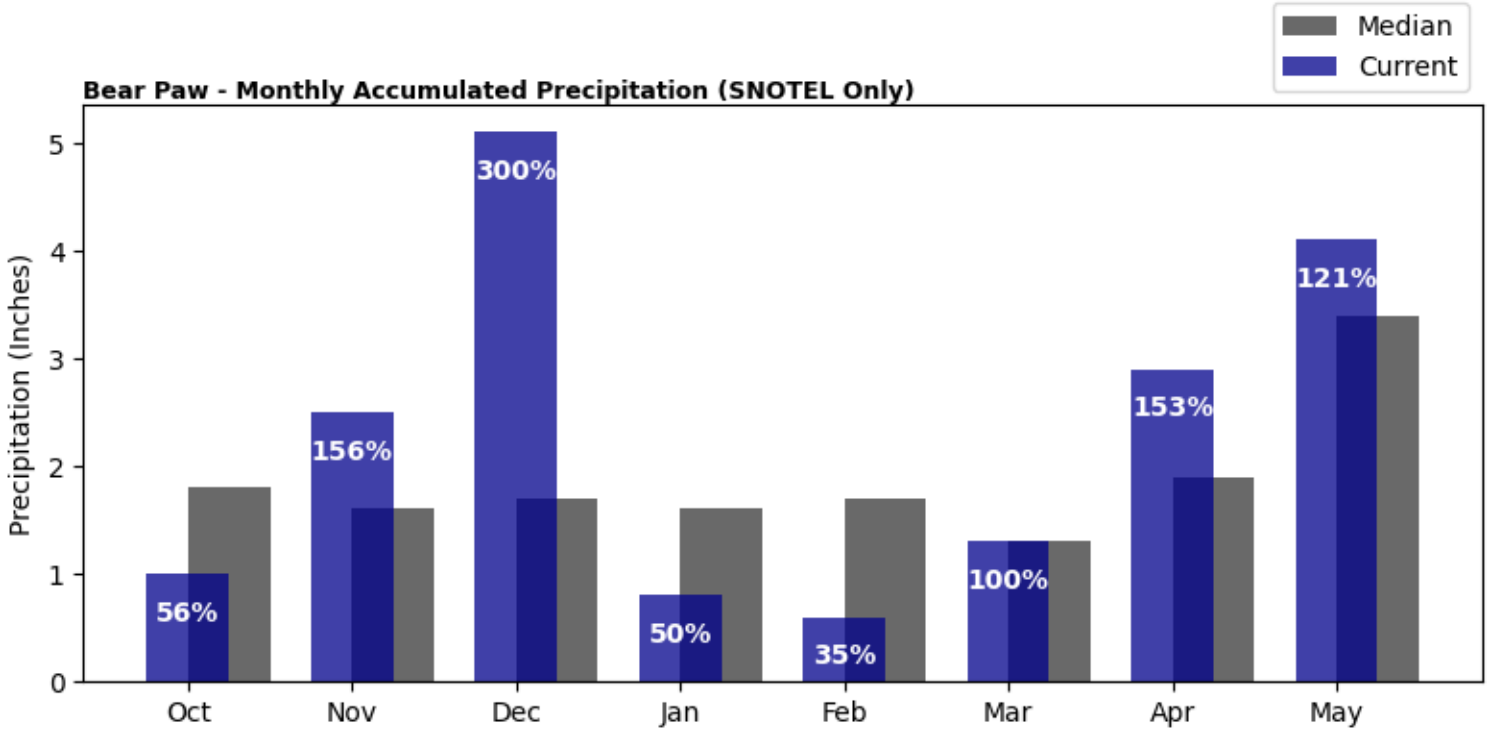
## Tongue (Continued)

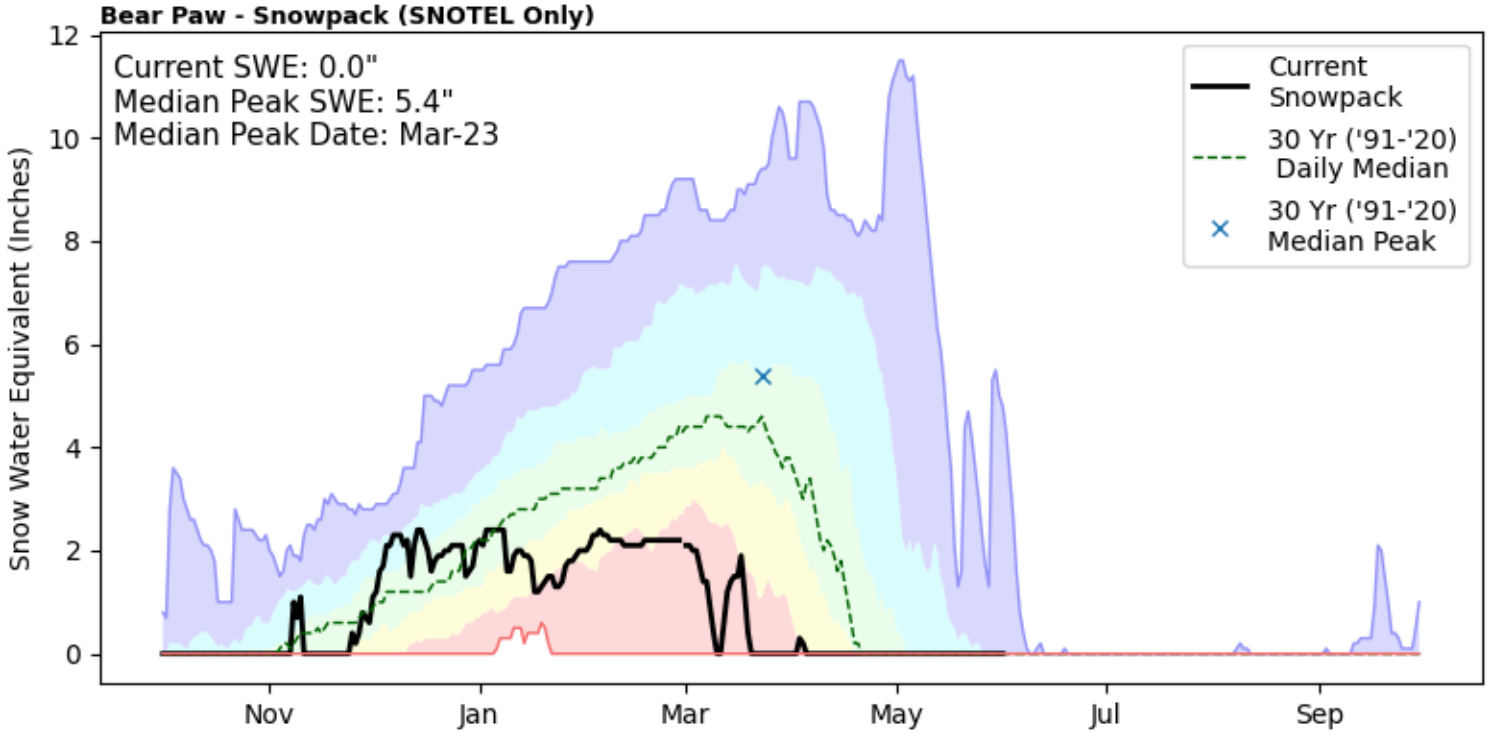


# Basin Overview

## Bear Paw

Precipitation in May was well above normal at 121%, which brings the seasonal accumulation (October-May) to 113% of median. The snowpack in the Bear Paw is None at None% of median, compared to None% at this time last year.



# Appendix

## Water Supply Forecast Information

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.

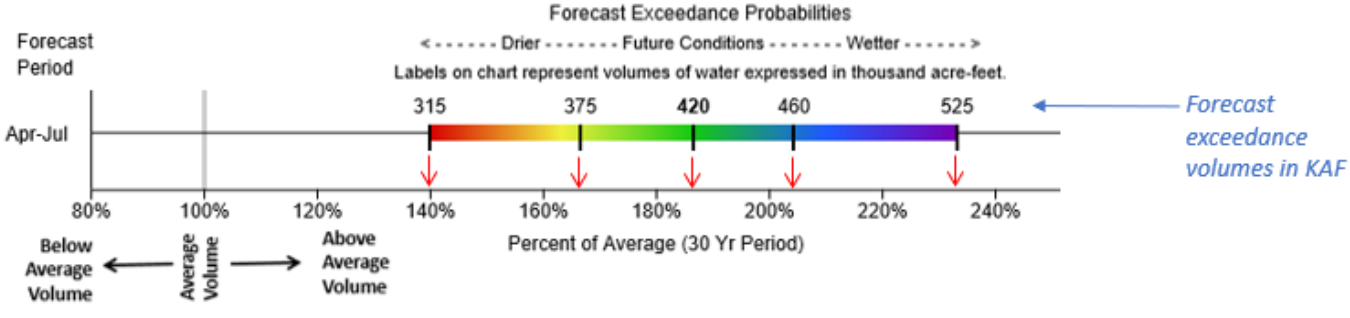
Forecast uncertainty originates from two sources: (1) uncertainty of future hydrologic and climatic conditions, and (2) error in the forecasting procedure. To express the uncertainty in the most probable forecast, four additional forecasts are provided. The actual streamflow can be expected to exceed 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.

### Interpreting Water Supply Forecast Charts

Typically, the Natural Resources Conservation Service (NRCS) has presented streamflow forecasts as a table format showing the five exceedance probabilities compared to the 30-year average as follows:

| | Forecast Exceedance Probabilities for Risk Assessment<br>Chance that actual volume will exceed forecast | | | | | | |
|---|---|---|---|---|---|---|---|
| Forecast Period | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
| APR-JUL | 315 | 375 | 420 | 187% | 460 | 525 | 225 |

The Forecast Chart provides a visual alternative to the table. The forecast range is represented by a colored bar. Vertical lines on the bar signify the five forecast exceedances. Below is an example. The numbers above the forecast bar are the five exceedance probability volumes in thousand acre-feet (KAF). Each exceedance forecasts percent of median can be estimated by looking at the horizontal axis. The gray line centered above 100% on the horizontal axis represents the 1991-2020 historical median streamflow for the forecast period.



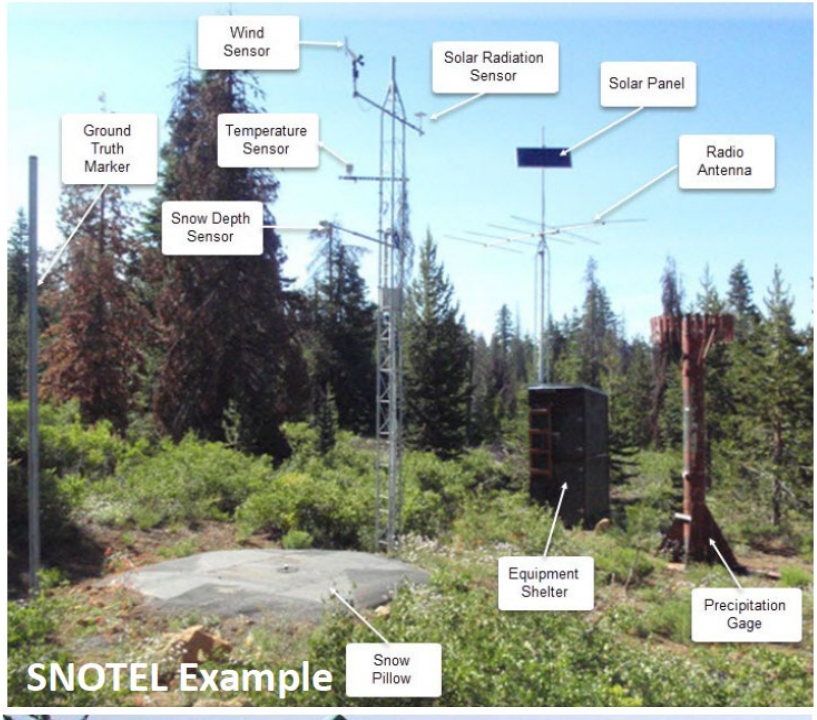

In the example, the entire forecast bar is shifted right of the gray line indicating a forecast for above normal streamflow. The 50% exceedance is represented by the black line in the green portion of the colored bar. This represents a forecast volume of 420KAF which is ~185% of average. If drier than normal future conditions occur the 70% exceedance forecast may be more likely (375KAF or ~165% of average). If future conditions turn wetter than normal, the 30% exceedance forecast may be more likely (460KAF or ~205% of average). Water users are encouraged to consider the range of forecast exceedances instead of relying solely only on the 50% forecast.

# Appendix

## Monitoring Station Overview

### SNOTEL

The NRCS operates an extensive, automated data collection network called SNOTEL (short for Snow Telemetry). SNOTEL sites are designed to operate unattended in remote mountain locations. Data are collected and transmitted hourly and available on the internet. Daily data (midnight values) are quality checked by NRCS hydrologists on at least a weekly basis. SNOTEL sites provide snowpack water content data via a pressure-sensing snow pillow. Other data include snow depth, water year precipitation accumulation, air temperature with daily maximums, minimums, and averages. The earliest NRCS SNOTEL sites have data back to the mid-1970s.



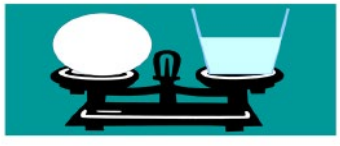

### Snow Course

Snow courses are measurement transects where snow tubes are used by snow surveyors during the winter season to determine the depth and water content of the snowpack. Hollow snow tubes are used to vertically core the snowpack. The tubes are then weighed to determine the water content of the snow. Generally, snow courses are situated in meadows or forest openings protected from the wind. A snow course measurement is the average of a number of sample points, typically 5 or 10. Snow courses are measured on a monthly basis typically between January 1 and June 1. Snow courses provide a longer record than SNOTEL. The earliest snow courses in the Montana have data back to the 1920s.


### Snow Water Equivalent (SWE)

Sometimes also called snow water content, this is the amount of water contained within the snowpack. It can be thought of as the depth of water (in inches) that would result if you melted the snowpack. For example, if a snowpack containing 12 inches of SWE melted instantaneously, there would be a puddle of water 12 inches deep on the ground.

SWE measurements made by snow pillows or snow tubes rely on the fact that water weighs the same whether it is liquid or frozen.



Weight of frozen water = Weight of liquid water

Snow core inside snow tubes

# Appendix

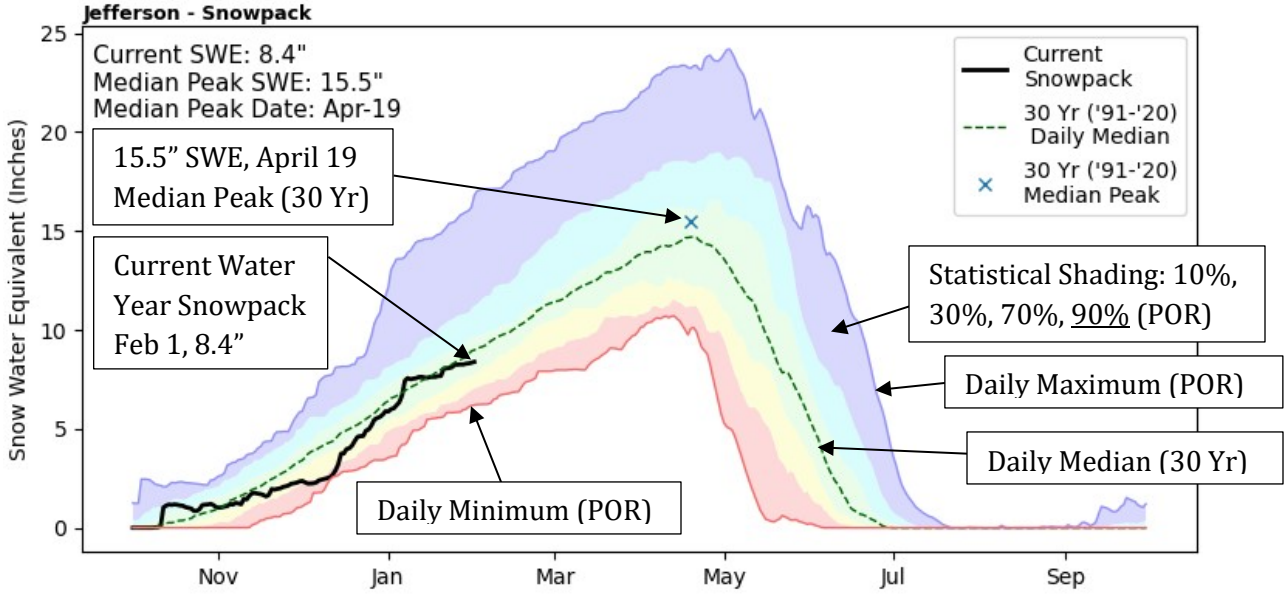
## Additional Information

### Climatic and Hydrologic Normals

The Snow Survey and Water Supply Forecasting (SSWSF) normals are site-specific measures of central tendency (either the median or average) for a data type, such as snow water equivalent (SWE). The statistics are calculated over a 30-year period and updated each decade, in agreement with World Meteorological Organization (WMO) standards. This 30-year reference period was chosen to characterize the current hydroclimatology at each station. The most recent medians and averages have been updated to include data for the water years 1991-2020. The National Water and Climate Center (NWCC) also provides medians and averages for the 1981-2010 and 1971-2000 reference periods for stations with sufficient data. The normals available from the NWCC include the median and average for SWE, snow depth (snow courses only), precipitation, volumetric streamflow, and reservoir storage. Values are calculated from data collected by NRCS-managed stations and external agencies such as the U.S. Geological Survey (USGS), National Weather Service (NWS), state agencies, and private organizations. Normal is calculated for various durations including daily, month-to-date, semi-monthly, monthly, seasonal, and annual based on the data type. More information is available here: https://www.nrcs.usda.gov/resources/data-and-reports/climatic-and-hydrologic-normals

### Interpreting Snowpack Charts

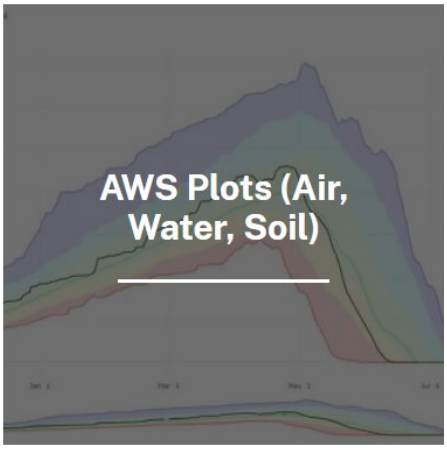
Snowpack charts displayed in this report are created using daily (midnight) snow water equivalent (SWE) values at SNOTEL sites determined to represent the basin. Snow Course data is not included. Plotted lines are the average of each SNOTEL's individual values. For example, the "Current Snowpack" on January 1st is the average all SNOTEL SWE values in that basin for that day. The "30 Yr. ('91-'20) Daily Median" is the average of each SNOTEL's median SWE value for a given day. The upper and lower extent (blue/red lines) show the maximum/minimum daily SWE values, which is determined using the "Current Snowpack" SWE value for all days in the period of record (POR). Snowpack peak SWE dates differ from season to season, as a result the high point on the "30 Yr. ('91-'20) Daily Median" line is not the true median peak SWE. The point "X" is plotted by calculating the median peak date and median peak value independently. Similar charts with other basin definitions are available here: https://nwcc-apps.sc.egov.usda.gov/basin-plots/#mt

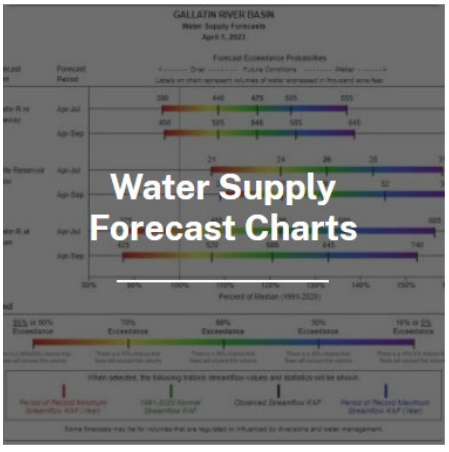


# Appendix

## Links and Resources

**Products and Reports** (click image)





**Interactive Map Predefined Links**

Snow

- Snow Water Equivalent > Daily > Percent of 1991-2020 Median > **Stations** | **Basins**
- Snow Water Equivalent > End of Previous Month (SNOTEL and Snow Course) > Percent of 1991-2020 Median > **Stations** | **Basins**
- Snow Depth > Daily > **Stations**
- Snow Density > End of Previous Month (SNOTEL and Snow Course) > **Stations**

Precipitation

- Month-to-Date > Daily > **Stations**
- Water Year-to-Date > Daily > Percent of 1991-2020 Median > **Stations** | **Basins**
- Previous Month > Percent of 1991-2020 Median > **Stations** | **Basins**
- Previous 3 Months > Percent of 1991-2020 Average > **Stations** | **Basins**

Streamflow

- Observed (Adjusted Volume) > Previous Month > Percent of 1991-2020 Median > **Stations** | **Basins**
- Forecast (Adjusted Volume) > Most Recent (Available March 1 through June 1) > Percent of 1991-2020 Median > **Stations** | **Basins**

Reservoir Storage

- End of Previous Month > Percent of 1991-2020 Median > **Stations**

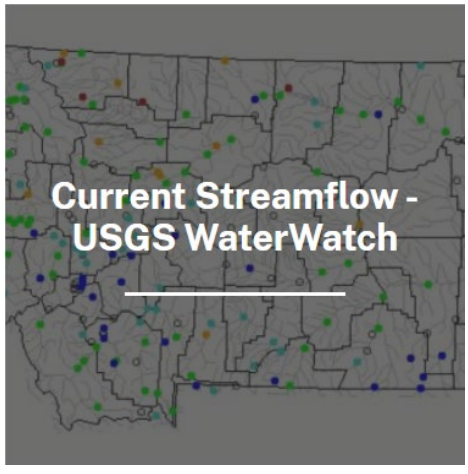
Other

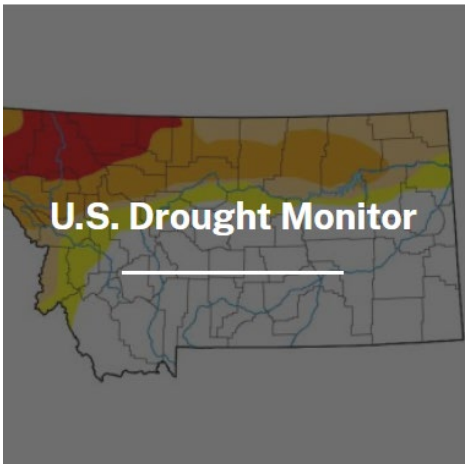
- Snow Water Equivalent > Daily > Compared to POR > **Stations**
- Snow Water Equivalent > End of Previous Month (SNOTEL and Snow Course) > Percentile > **Stations**
- Water Year-to-Date Precipitation > Daily > Compared to POR > **Stations**

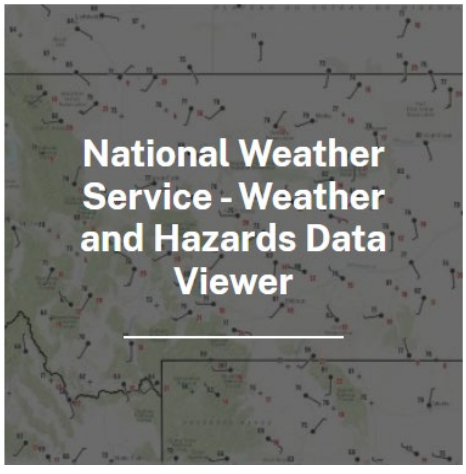
# Appendix

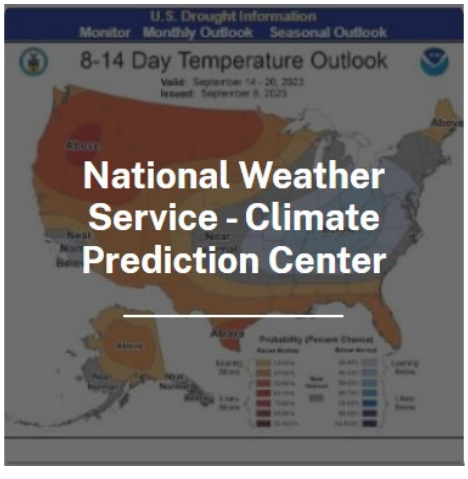
## Links and Resources (Continued)

**External Agencies** (click image)






**Additional Drought Information**

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

**Snow Survey Program FAQ**

Frequently Asked Snow Survey Questions - Montana | Natural Resources Conservation Service (usda.gov)

**Issued by:**

Colton L. Buckley

Chief

Natural Resources Conservation Service

U.S. Department of Agriculture

**Released by:**

Gayle Barry

State Conservationist

Natural Resources Conservation Service

Bozeman, Montana

**Report Created by:**

Montana Snow Survey Staff

Bozeman, Montana

mt-nrcs-snow@usda.gov

https://www.nrcs.usda.gov/montana/snow-survey

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