

Wyoming Basin & Water Supply Outlook Report

March 1, 2022



Photo courtesy of Wyoming Snow Survey

Basin Outlook Reports

And

Federal - State - Private Cooperative Snow Surveys

For more Wyoming water supply information, contact:

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How forecasts are made

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

Note: The **median** is the official normal for snowpack (SWE), precipitation, reservoir storage, and streamflow calculations. Please refer to the **Appendix** of this report for more detailed information.

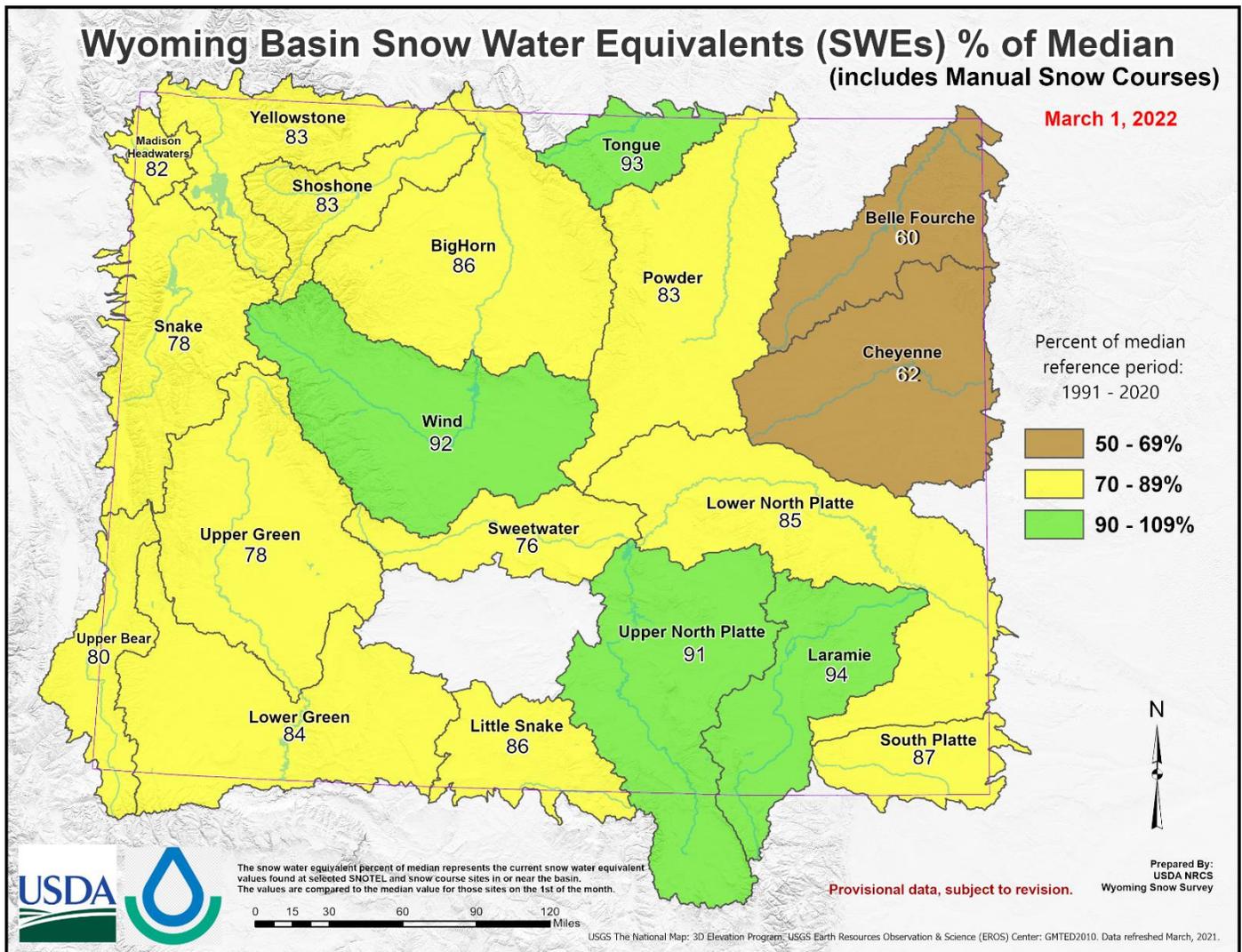
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Summary

- Wyoming snowpack and/or snow water equivalents (SWEs) were **below** median by March 1st.
- Precipitation totals across Wyoming for February were **well below** median. Water year precipitation totals are near median.
- Overall reservoir storages for late February continue to be **below** median.
- Stream flow snowmelt volumes during April through July across Wyoming are forecasted to be generally **below** median.

Snowpack/SWEs

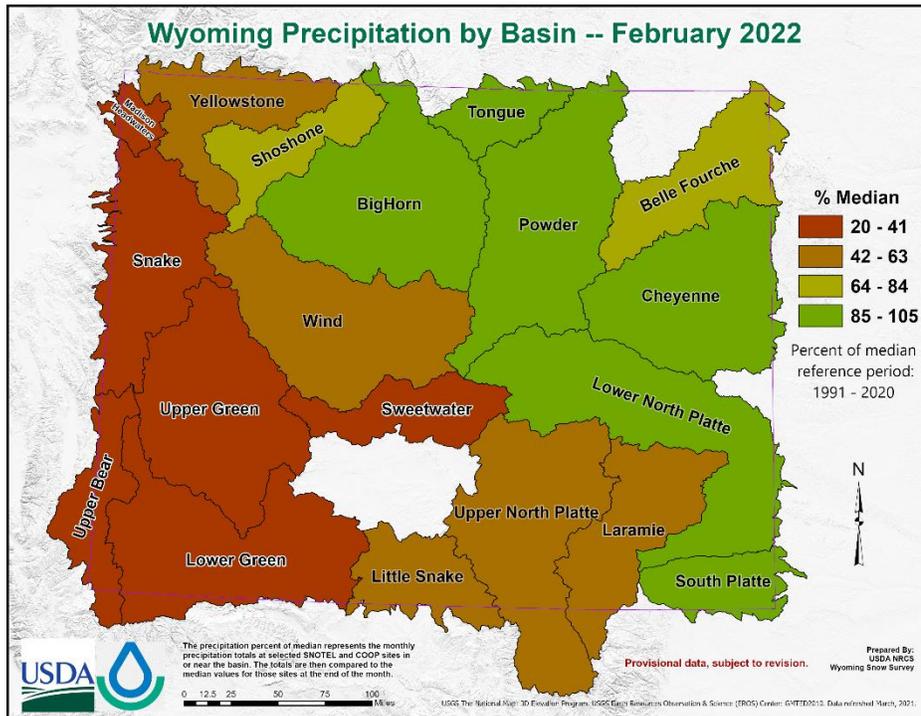
Snow water equivalents (SWEs) across Wyoming for March 1st were around **80%** of median. SWEs in the Laramie and Tongue Watersheds were the highest at near **95%** of median, while SWEs in the Belle Fourche and Cheyenne River Basins were the lowest at near **60%** of median. Last year, SWEs across the state were **87%** of median. (For complete **tabular data**, see attachment to report)



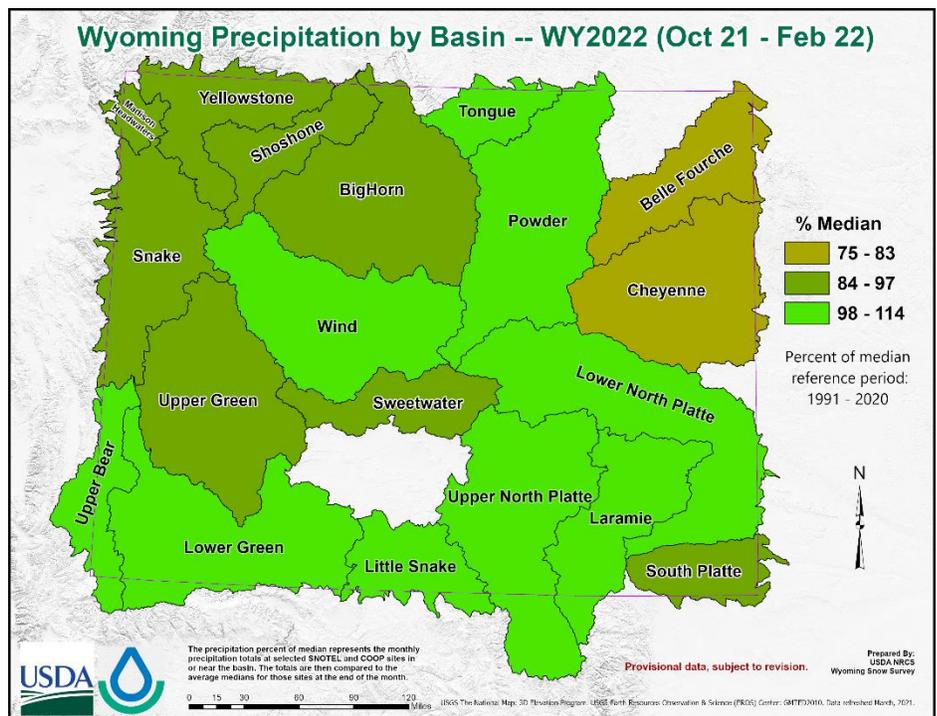
Map 1. Wyoming SWEs—March 1, 2022.

Precipitation

Basin precipitation across Wyoming was near **60%** of median during February. The Laramie and Lower North Platte and Tongue River Watersheds had the highest precipitation totals for the month at **105%** of median. The Upper Green and Upper Bear River Basins had the lowest precipitation amounts at near **20%** of median. Water year precipitation (October – February) is currently about **96%** of median. (For complete **tabular data**, see attachment to report)



Map 2. Current monthly precipitation by basin.



Map 3. Water year to date precipitation by basin.

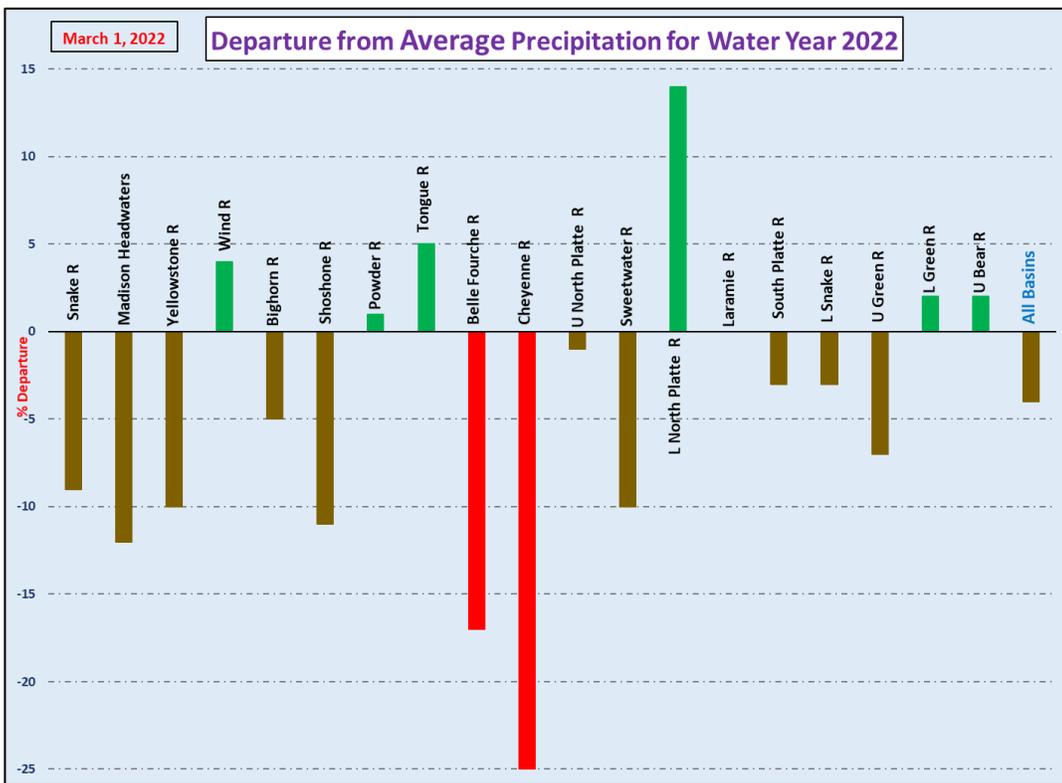
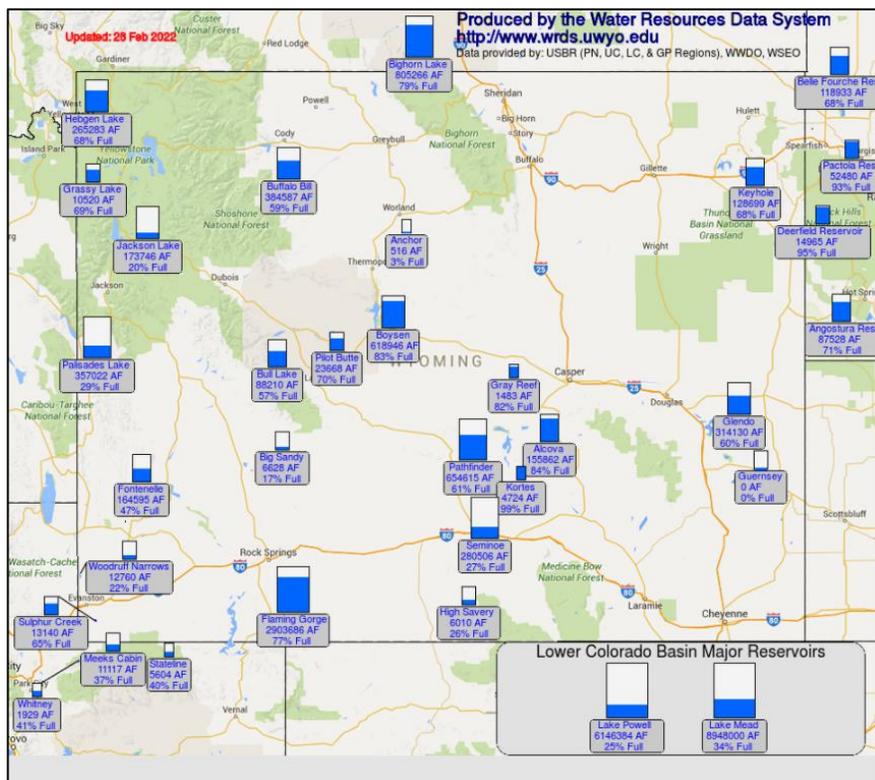


Chart 1. Departure from median precipitation (water year).

Reservoirs

Reservoirs across Wyoming were averaging near **62%** of capacity--down from **72%** of capacity last year. Overall reservoir storages for late February are below median at **88%** (**101%** last year). The Wind River Basin had reservoir storages at **106%** of median, while the Snake River Basin had reservoir storages at **28%** of median. (For complete **tabular data**, see attachment to report)



Map 4. Reservoir storage (teacup diagram) by basin.

Stream Flows

Snowmelt runoff stream flow volumes across the state are expected to be **below** median at around **85%**. The highest forecasted stream flows due to snowmelt are across the Wind and Laramie Basins at between **95 to 105%** of median. The lowest snowmelt runoff volumes are expected across the Powder, Upper Green, and Cheyenne Drainages between **65% and 75%** of median. (For complete **tabular data**, see attachment to report)

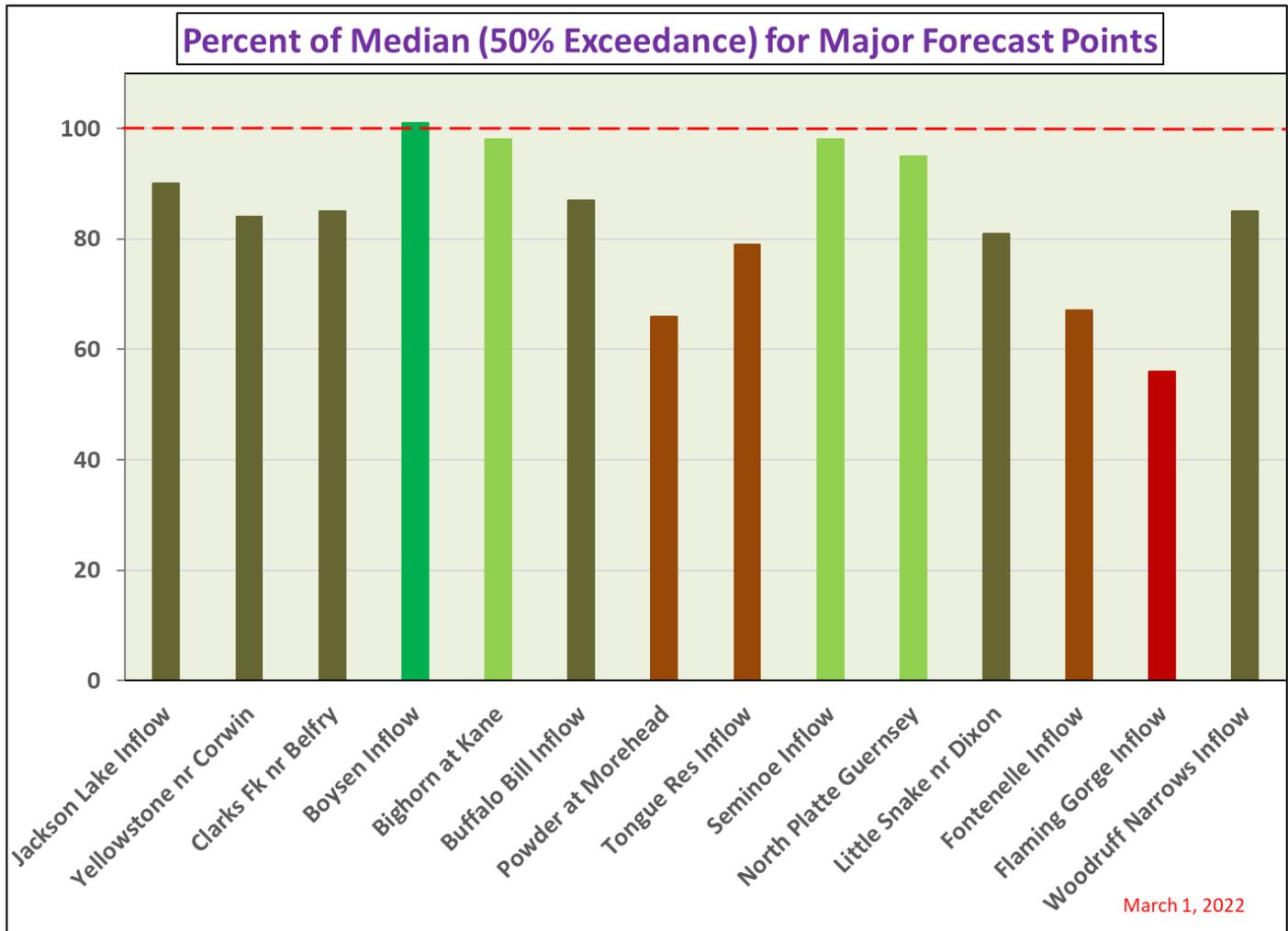
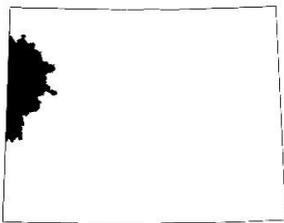


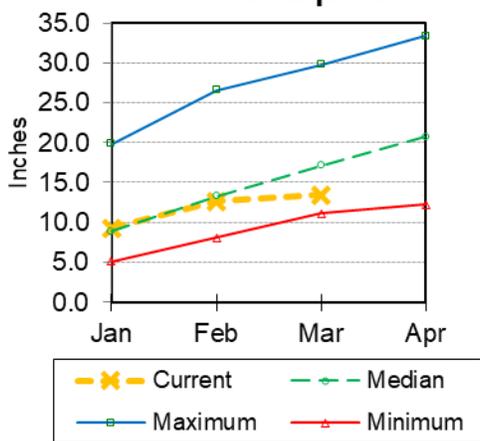
Chart 2. Percent of Median (50% exceedance) for major forecast points.



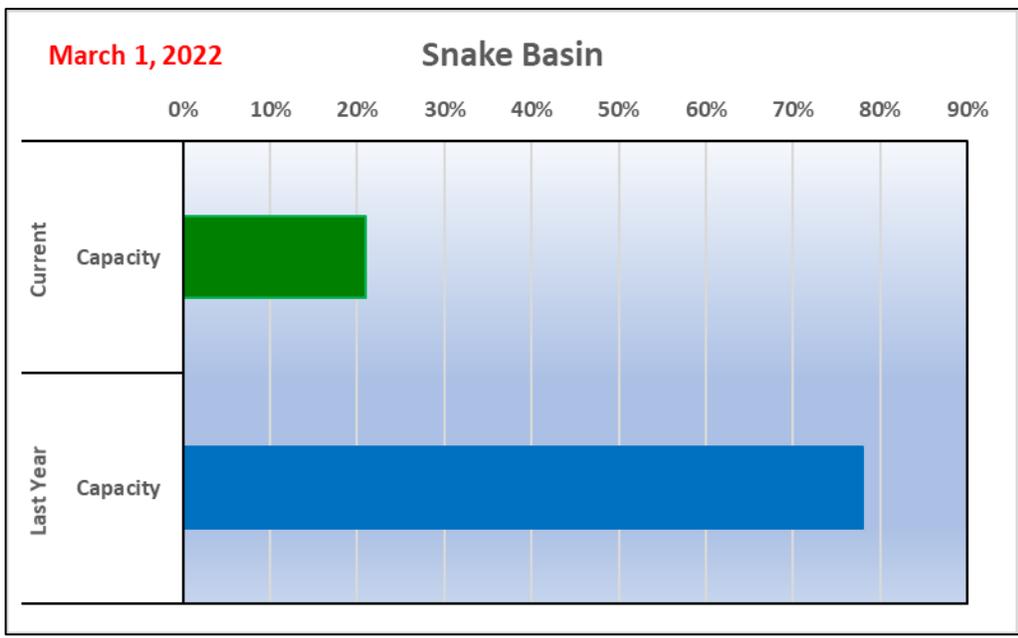
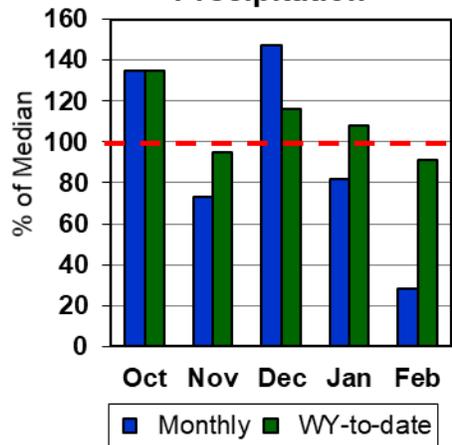
Snake River Basin

- The overall Snake River Basin SWE is near **80%** of median.
- Last month's precipitation for the Snake River Basin was near **30%** of median. Water-year-to-date precipitation is near **90%** of median.
- Current reservoir storage is near **30%** of median for the two main reservoirs in the basin.
- The streamflow forecasts for April through July are **below** median (**80%**) for this basin. Jackson Lake inflows are to be **90%** of median.

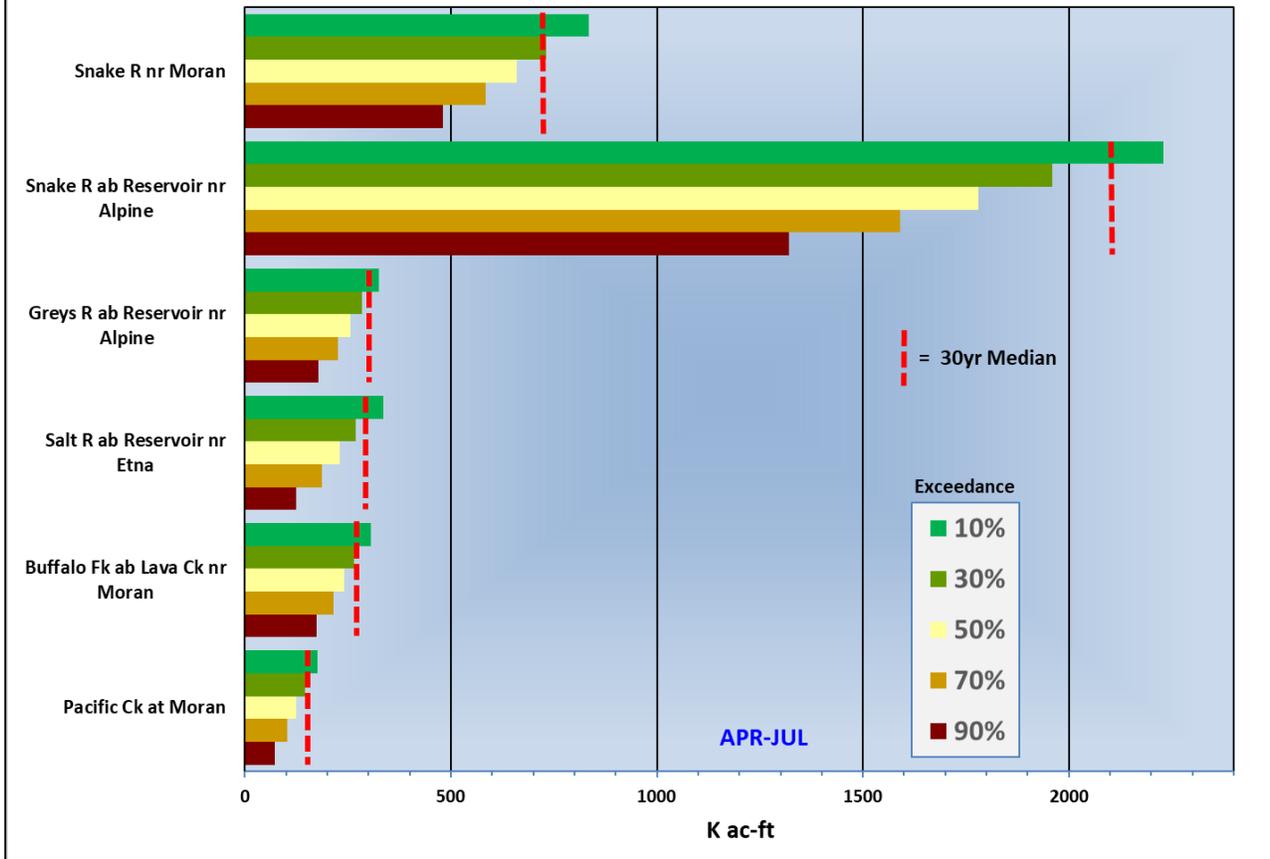
**Snake River Basin
Snow Water Equivalent**

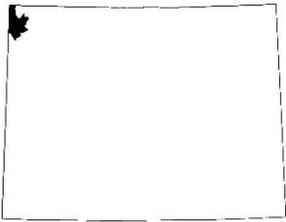


**Snake River Basin
Precipitation**



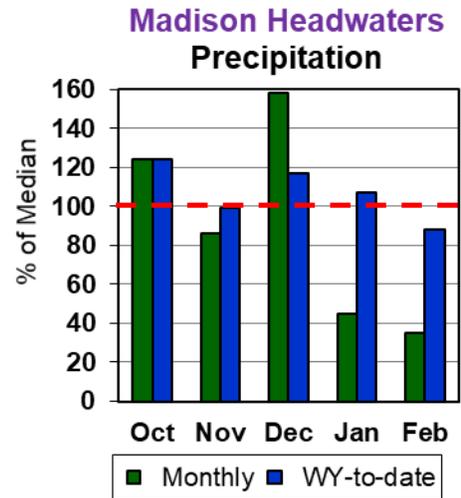
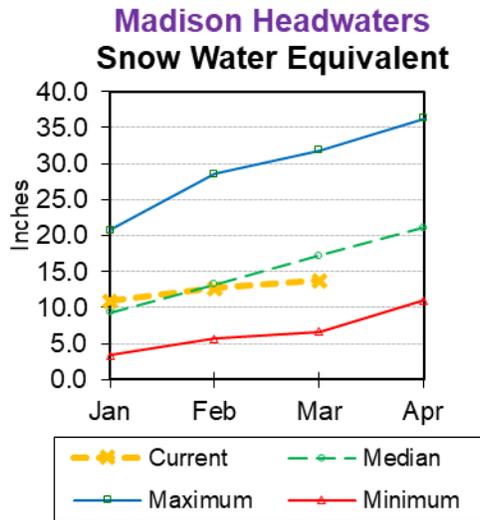
Snake River Basin Streamflow Forecasts -- March 1, 2022





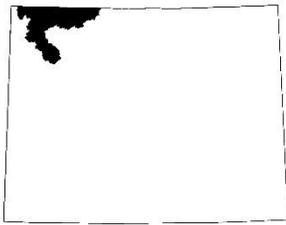
Madison Headwaters Basin

- The overall basin SWE is around **80%** of median.
- Last month's precipitation for the basin was near **35%** of median. Water-year-to-date precipitation is around **90%** of median.



No reservoir data for the basin.

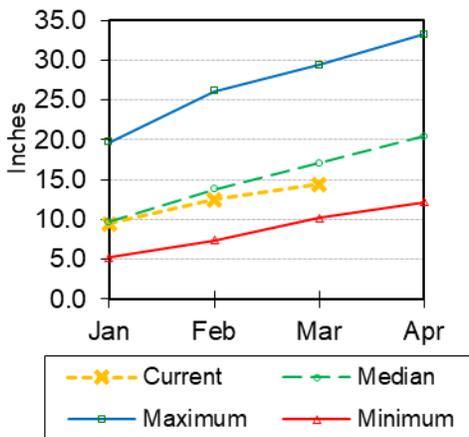
There are no streamflow forecast points for the basin.



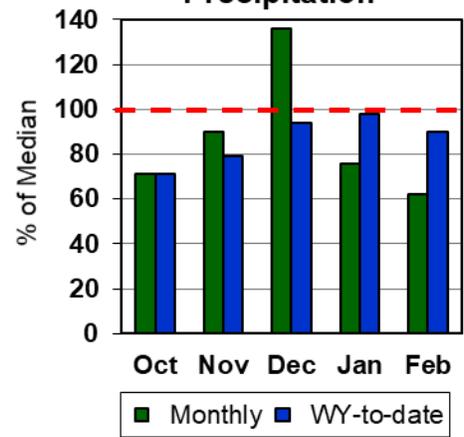
Yellowstone River Basin

- The overall Yellowstone River Basin SWE is near **85%** of median.
- Last month's precipitation for the Yellowstone River Basin was near **60%** of median. Water-year-to-date precipitation is near **90%** of median.
- The 50% exceedance forecasts for April through July are **below** median (**85%**) for this basin. Clarks Fork near Belfry is forecasted to have flows at **85%** of median.

**Yellowstone River Basin
Snow Water Equivalent**

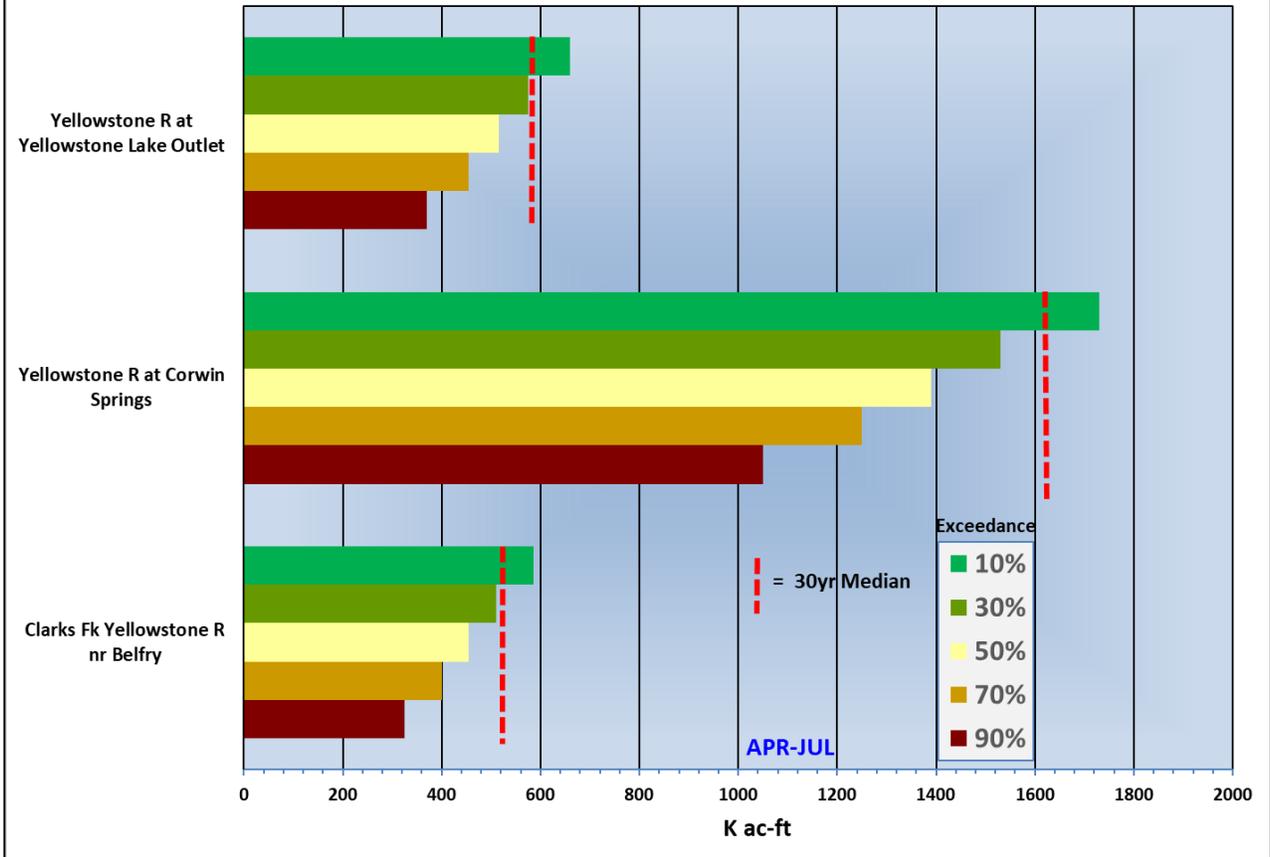


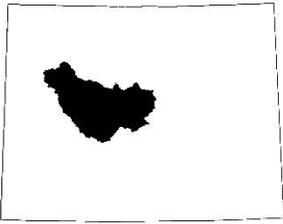
**Yellowstone River Basin
Precipitation**



No reservoir data for the basin.

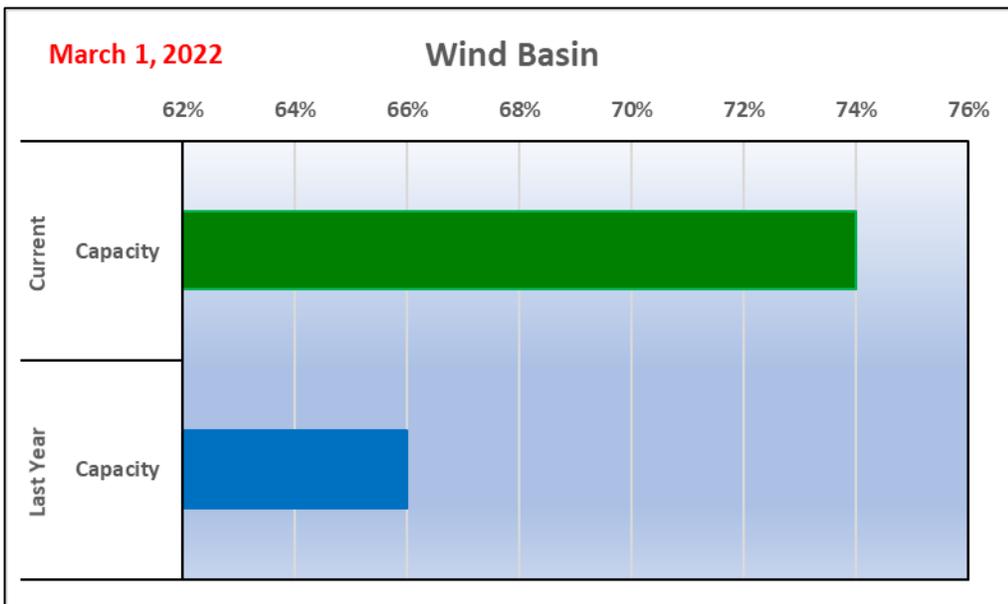
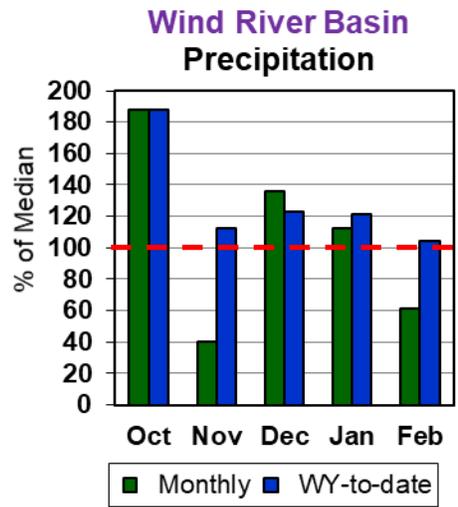
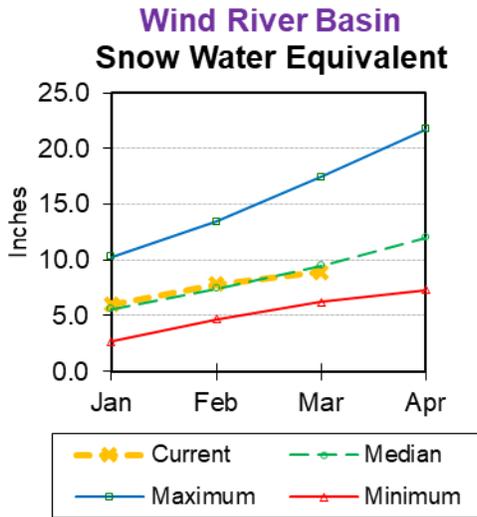
Yellowstone River Basin Streamflow Forecasts -- March 1, 2022



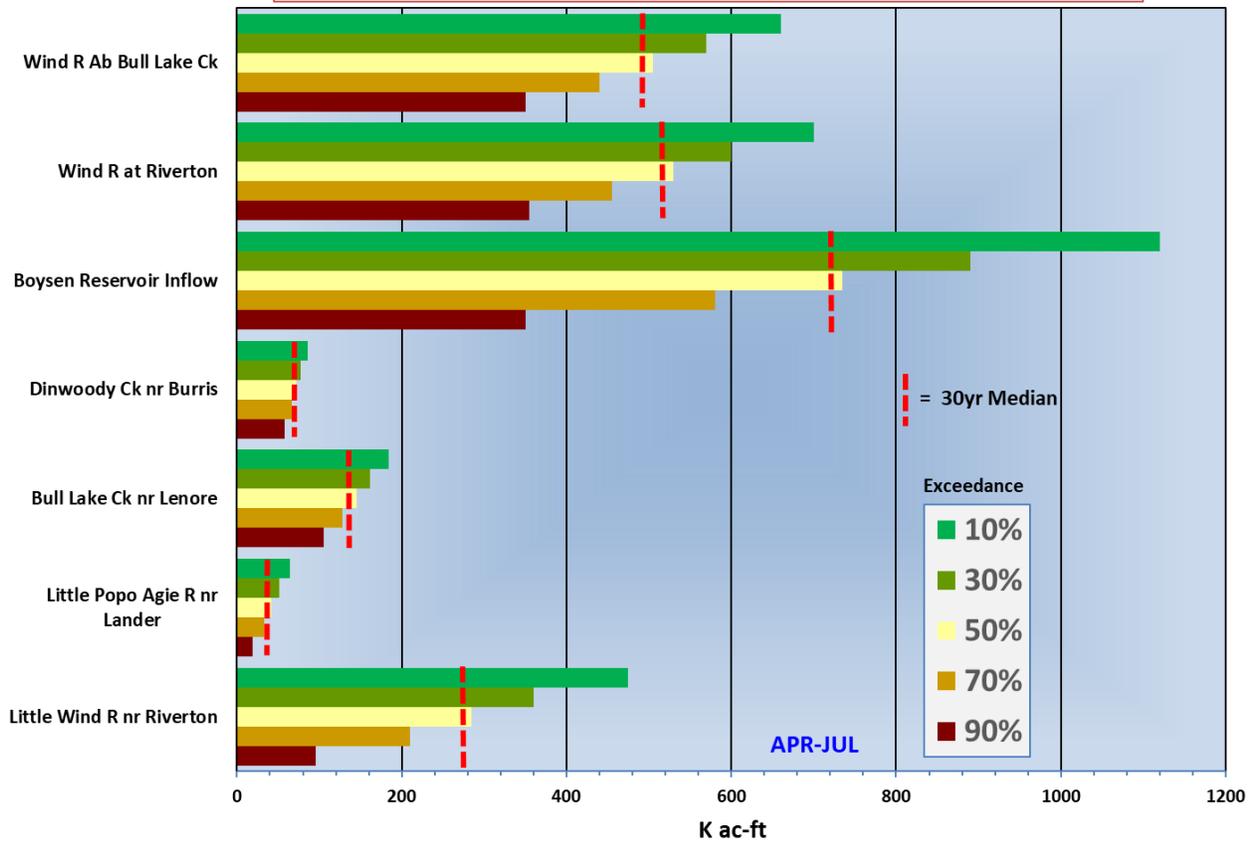


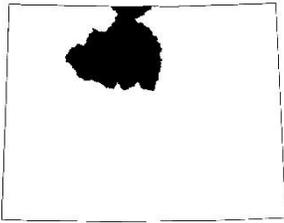
Wind River Basin

- The overall Wind River Basin SWE is near **90%** of median.
- Last month's precipitation for the Wind River Basin was near **60%** of median. Water-year-to-date precipitation is around **105%** of median.
- Current reservoir storage is around **105%** of median for three main reservoirs in the basin.
- The streamflow forecasts for April through July are **above** median (**103%**) for this basin. Boysen Reservoir inflows are expected to be **101%** of median.



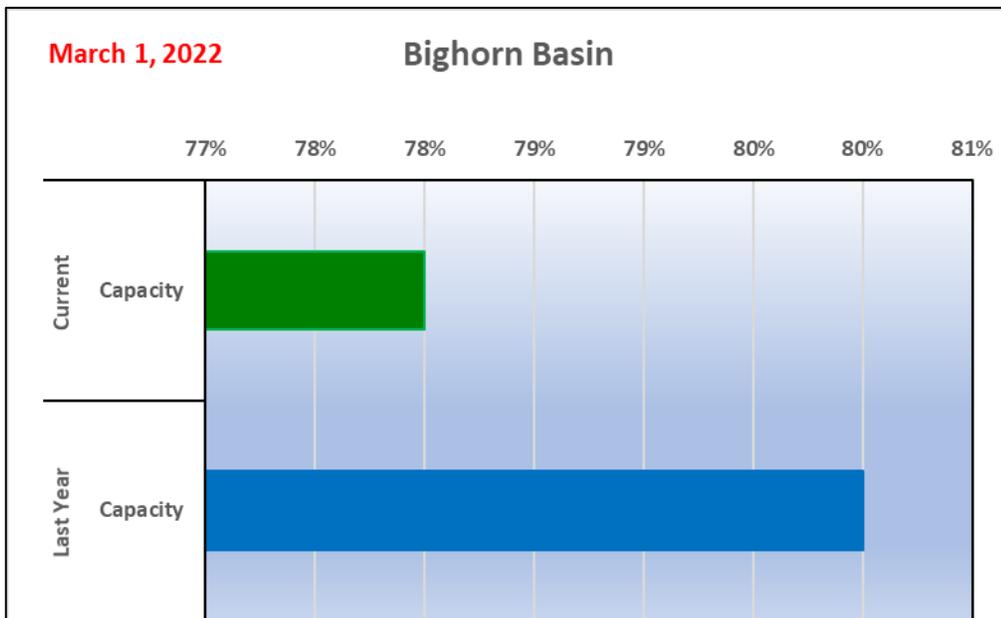
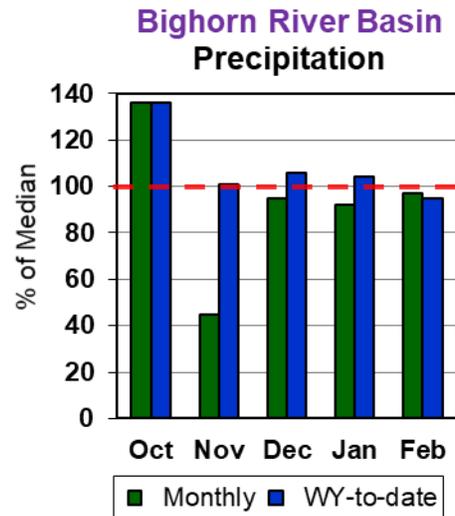
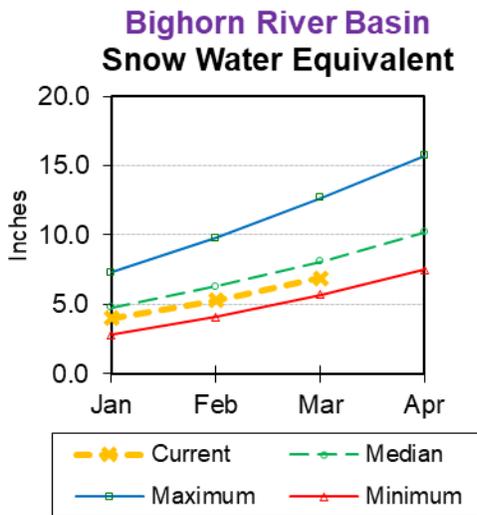
Wind River Basin Streamflow Forecasts -- March 1, 2022



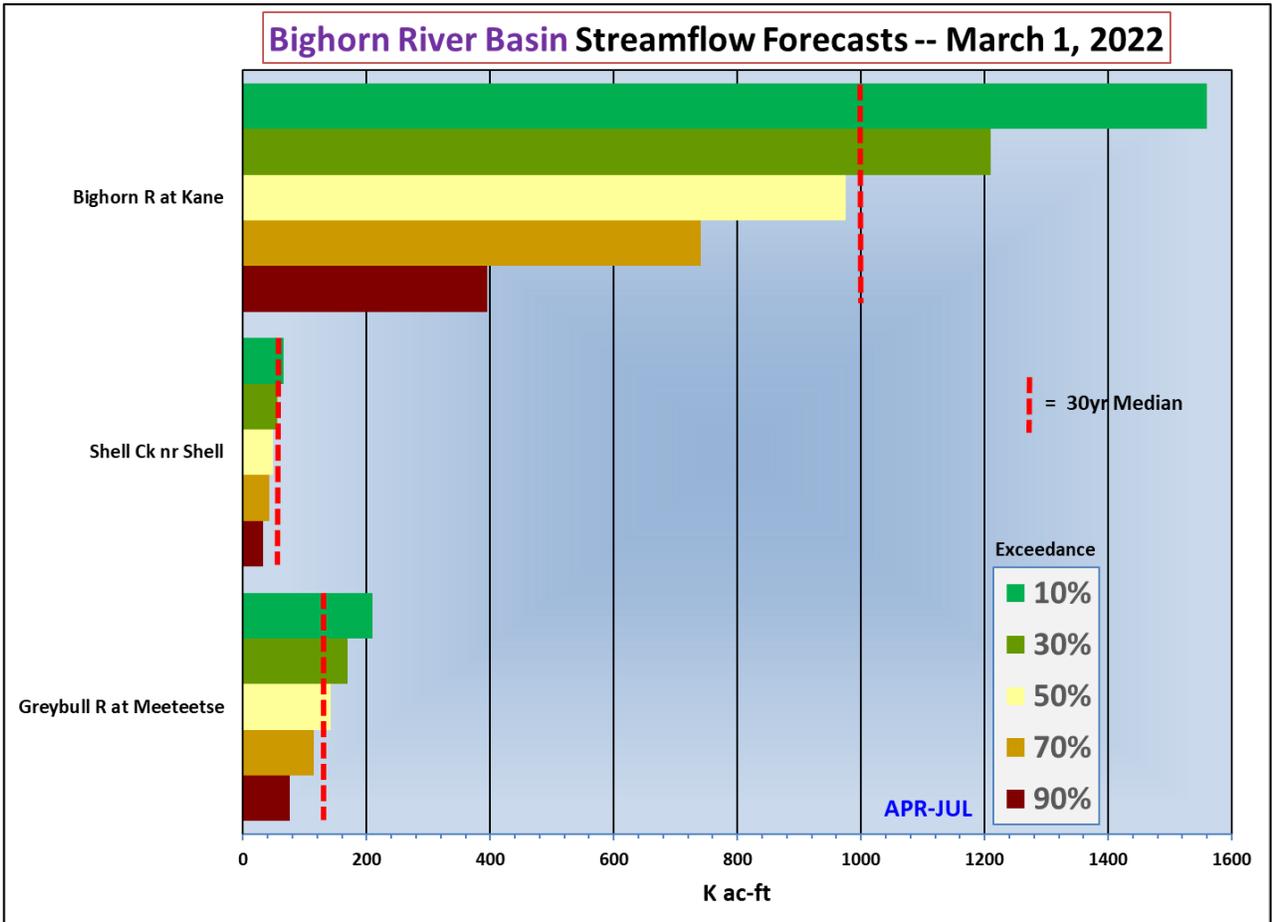


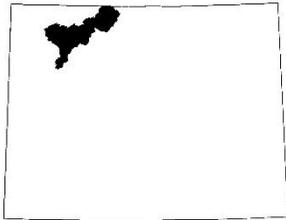
Bighorn River Basin

- The overall Bighorn River Basin SWE is near **85%** of median.
- Last month's precipitation for the Bighorn River Basin was near **95%** of median. Water-year-to-date precipitation is also about **95%** of median.
- Current reservoir storage is near **95%** of median for one main reservoir in the basin.
- The 50% exceedance forecasts for April through July are **below** median (**94%**) for this basin.



Bighorn River Basin Streamflow Forecasts -- March 1, 2022

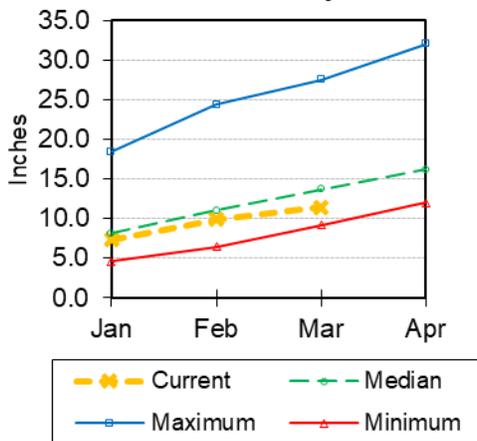




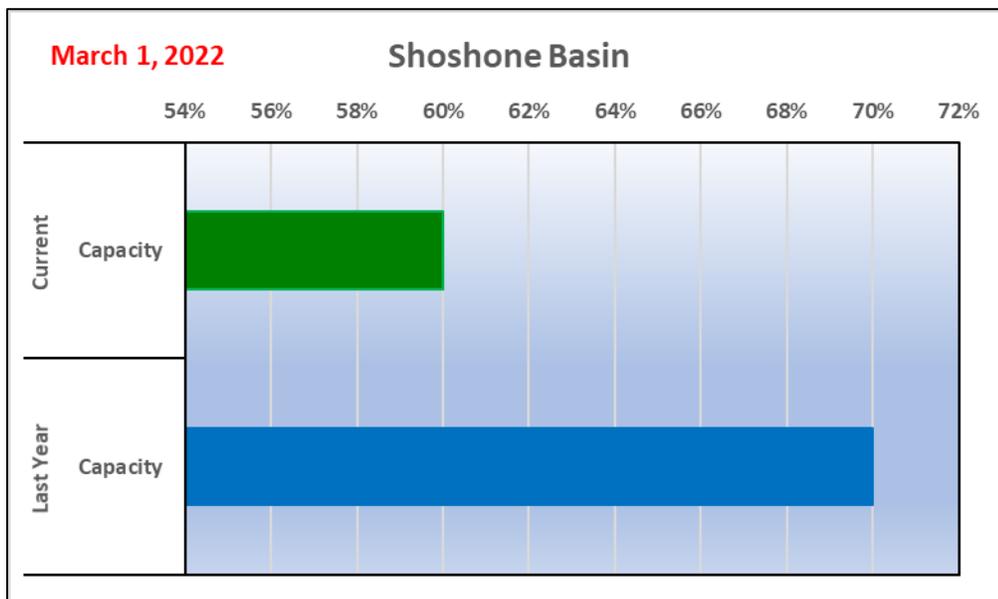
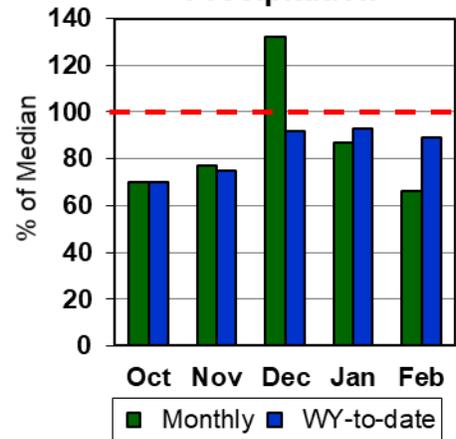
Shoshone River Basin

- The overall Shoshone River Basin SWE is around **85%** of median.
- Last month's precipitation for the Shoshone River Basin was close to **65%** of median. Water-year-to-date precipitation is around **90%** of median.
- Current reservoir storage is near **85%** of median for one main reservoir in the basin.
- Streamflow forecasts for April through July are **below** median (**90%**) for this basin. Buffalo Bill Reservoir inflows are expected to be **90%** of median

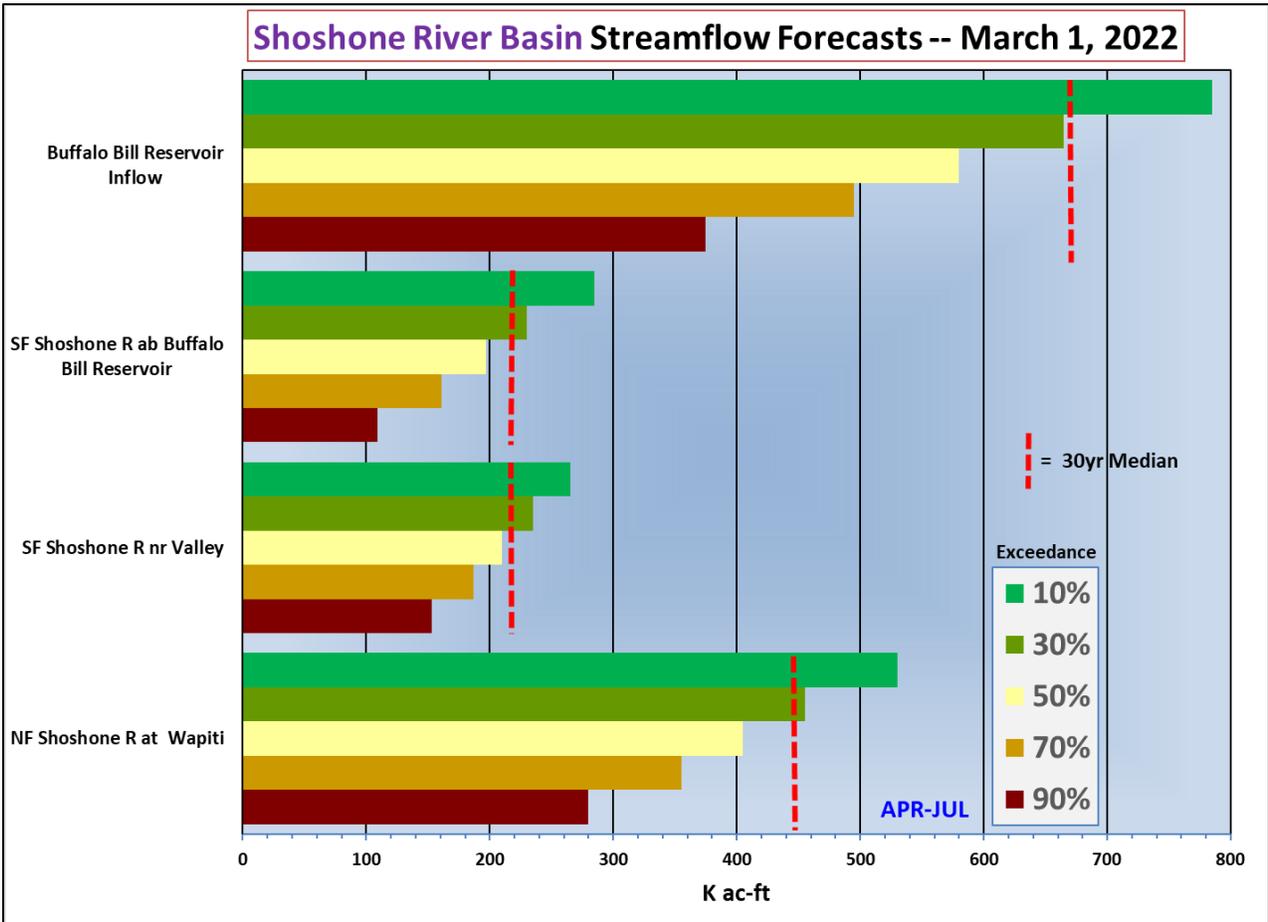
**Shoshone River Basin
Snow Water Equivalent**

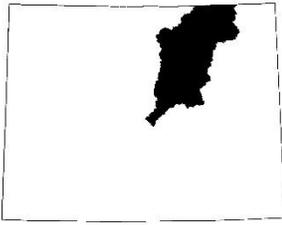


**Shoshone River Basin
Precipitation**



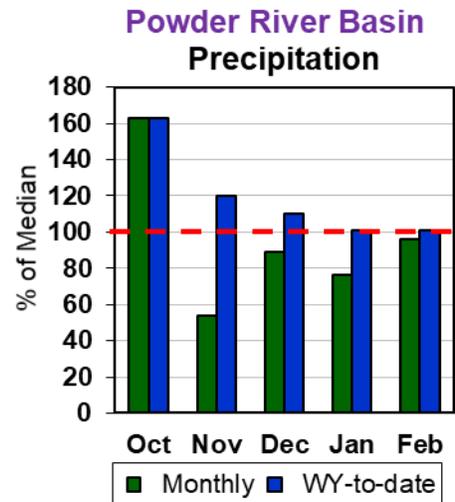
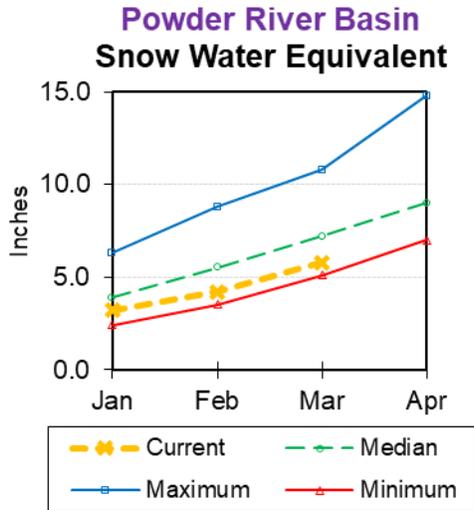
Shoshone River Basin Streamflow Forecasts -- March 1, 2022





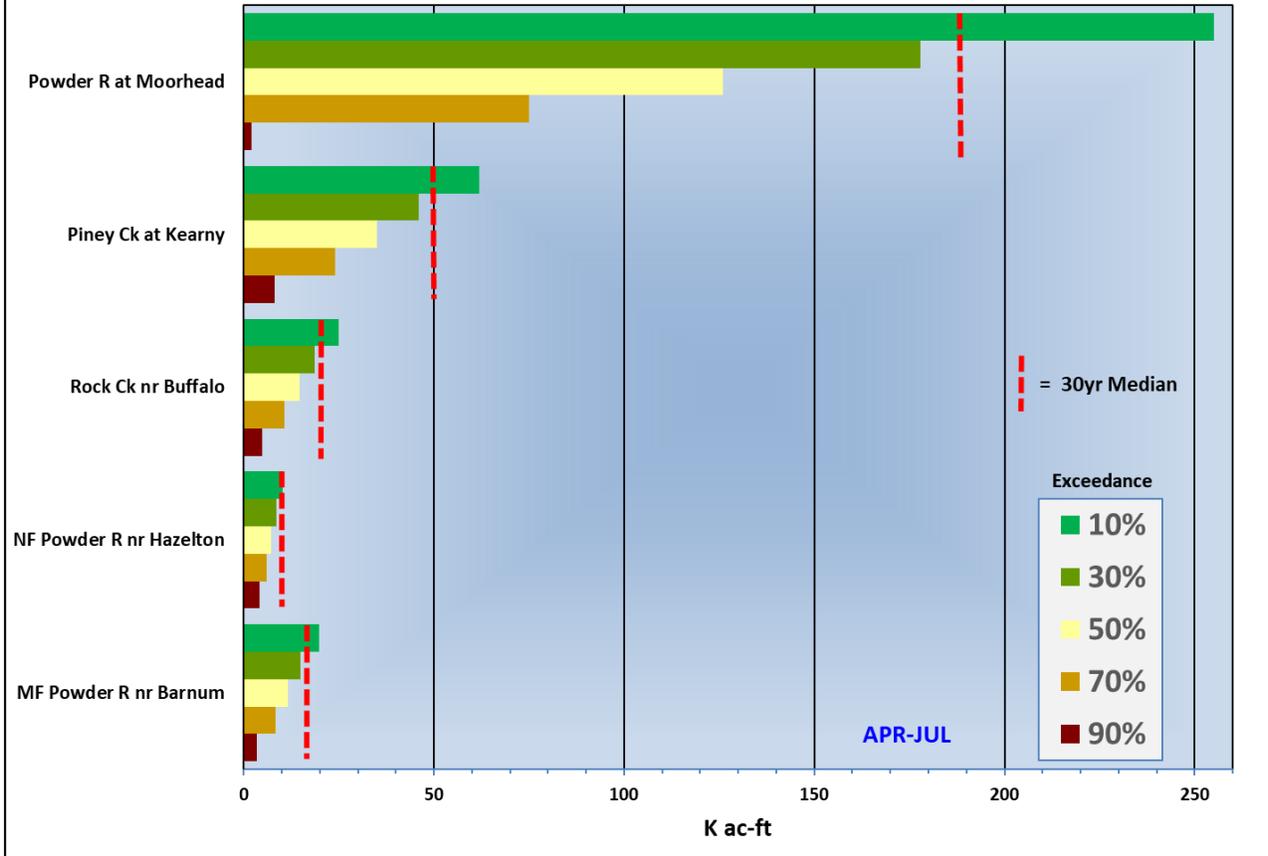
Powder River Basin

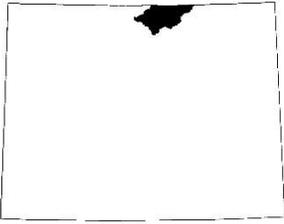
- The overall Powder River Basin SWE is near **85%** of median.
- Last month's precipitation for the Powder River Basin was near **95%** of median. Water-year-to-date precipitation is near **100%** of median.
- The 50% exceedance forecasts for April through July are **below** median (**70%**) for this basin.



No reservoir data for the basin.

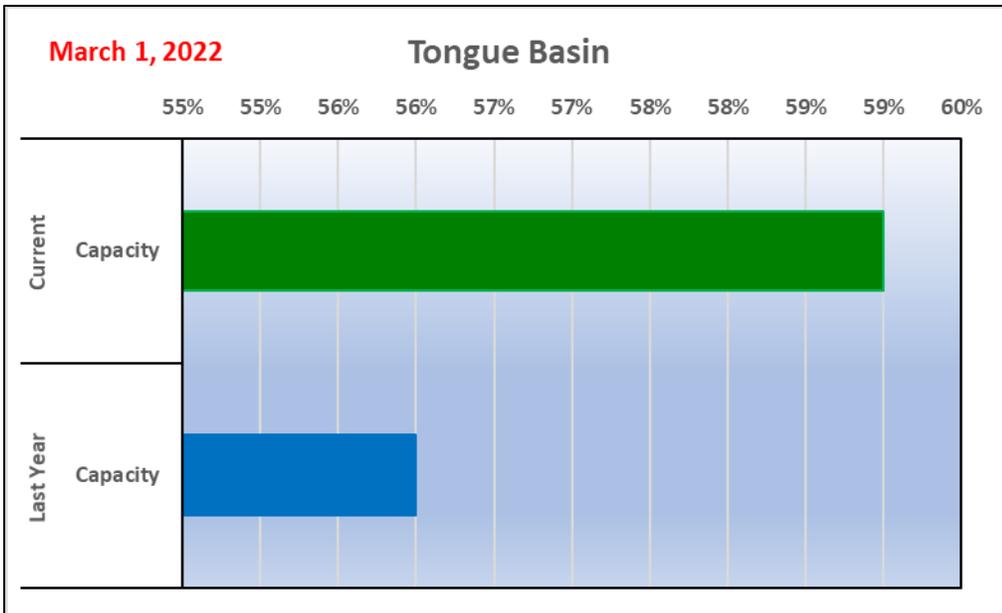
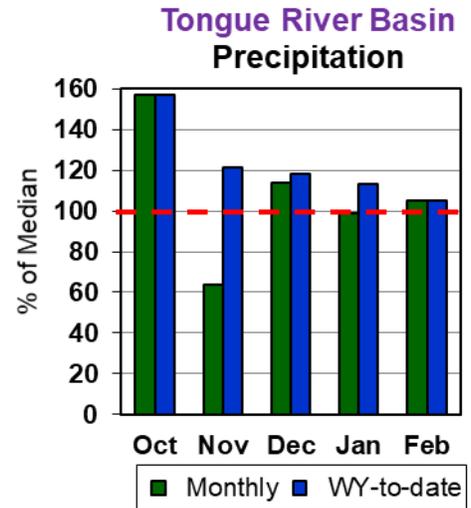
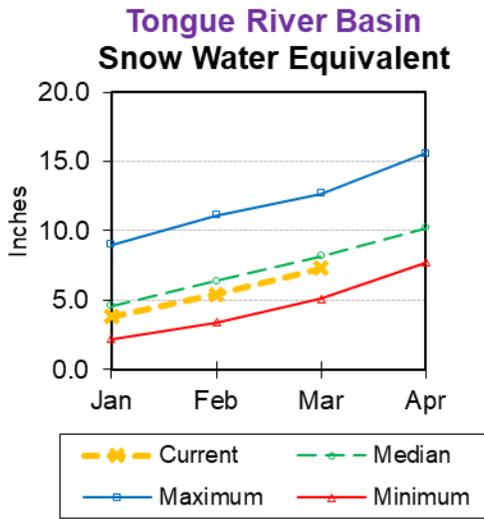
Powder River Basin Streamflow Forecasts -- March 1, 2022



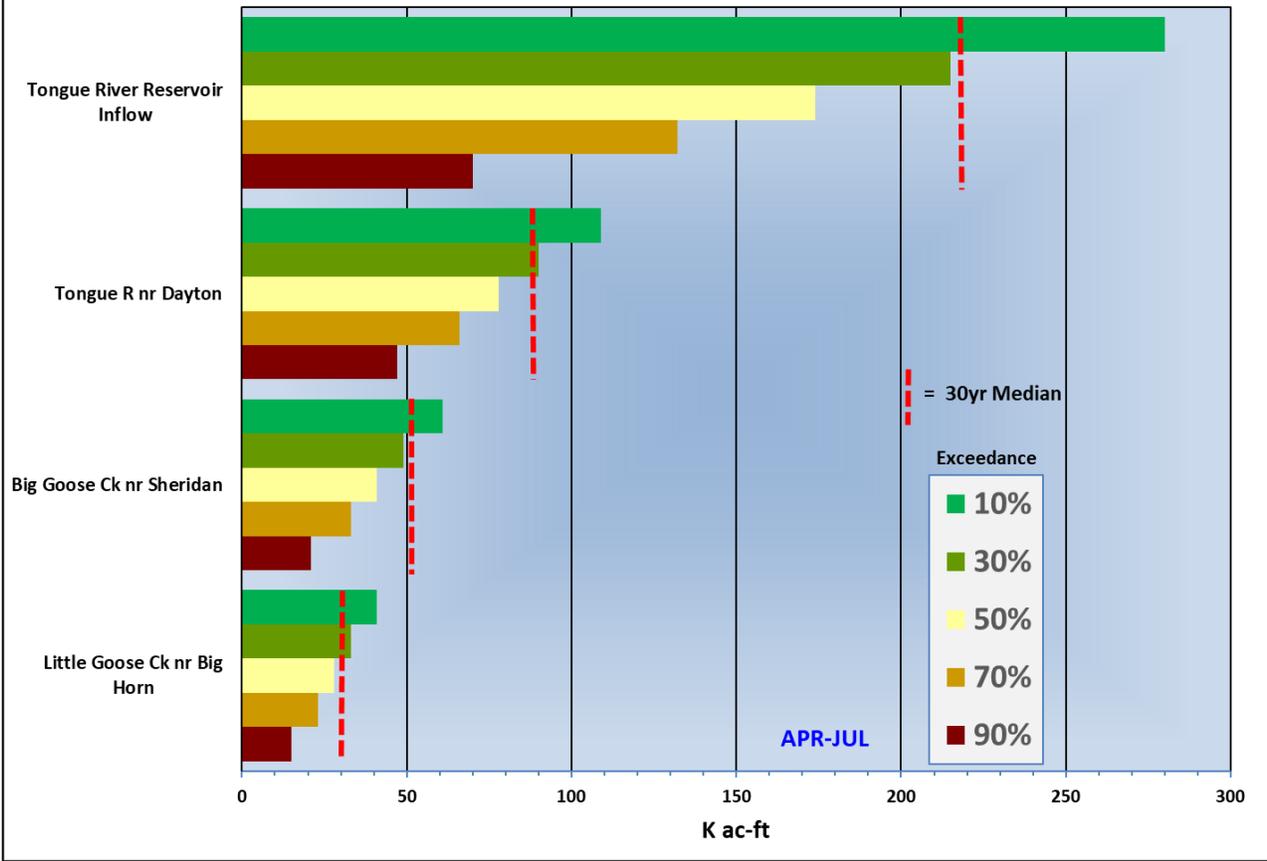


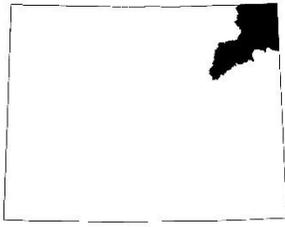
Tongue River Basin

- The overall Tongue River Basin SWE is near **95%** of median.
- Last month's precipitation for the Tongue River Basin was at **105%** of median. Water-year-to-date precipitation is also at **105%** of median.
- Current reservoir storage is near **105%** of median for one main reservoir in the basin.
- The 50% exceedance forecasts for April through July are **below** median (**84%**) for this basin. Tongue River Reservoir is forecasted to have inflows at **79%** of median.



Tongue River Basin Streamflow Forecasts -- March 1, 2022

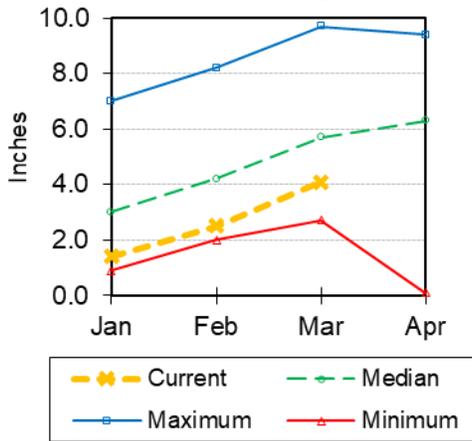




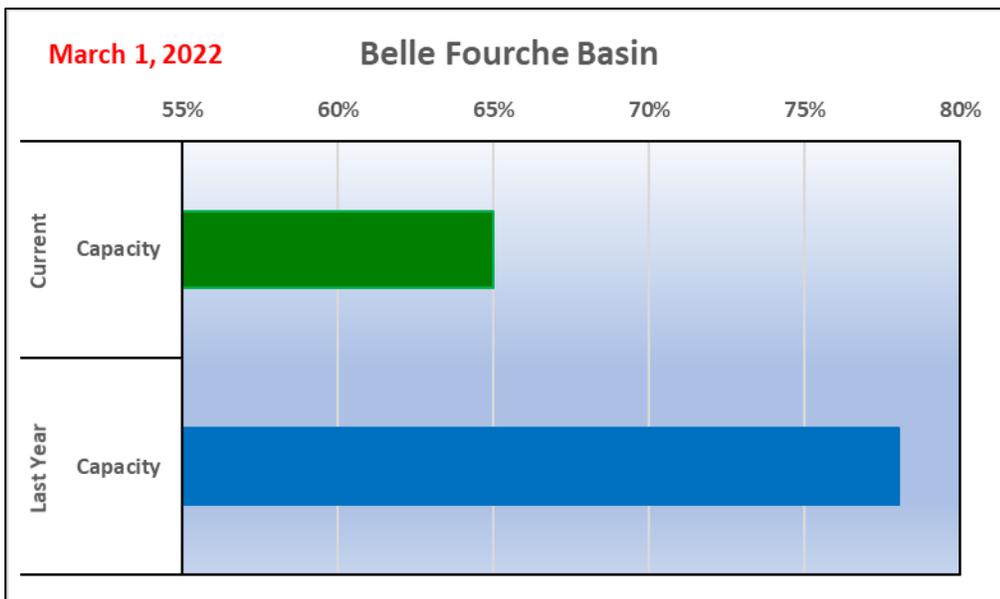
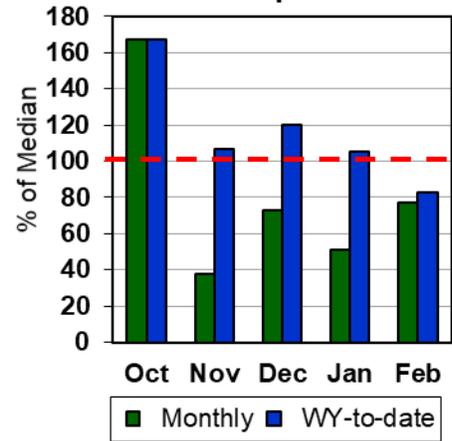
Belle Fourche River Basin

- The overall Belle Fourche River Basin SWE is close to **60%** of median.
- Last month's precipitation for the Belle Fourche River Basin was near **75%** of median. Water-year-to-date precipitation is around **85%** of median.
- Current reservoir storage is near **95%** of median for three main reservoirs in the basin.

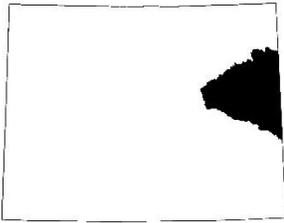
**Belle Fourche River Basin
Snow Water Equivalent**



**Belle Fourche River Basin
Precipitation**



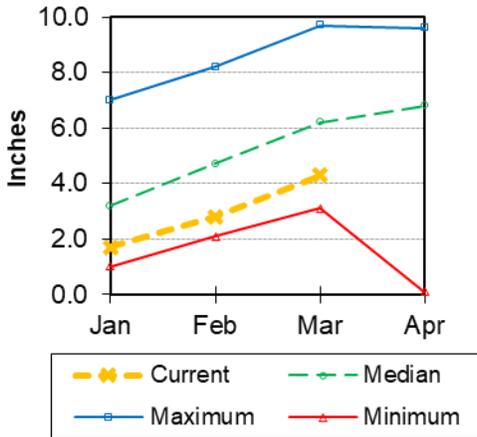
There are no streamflow forecast points for the basin.



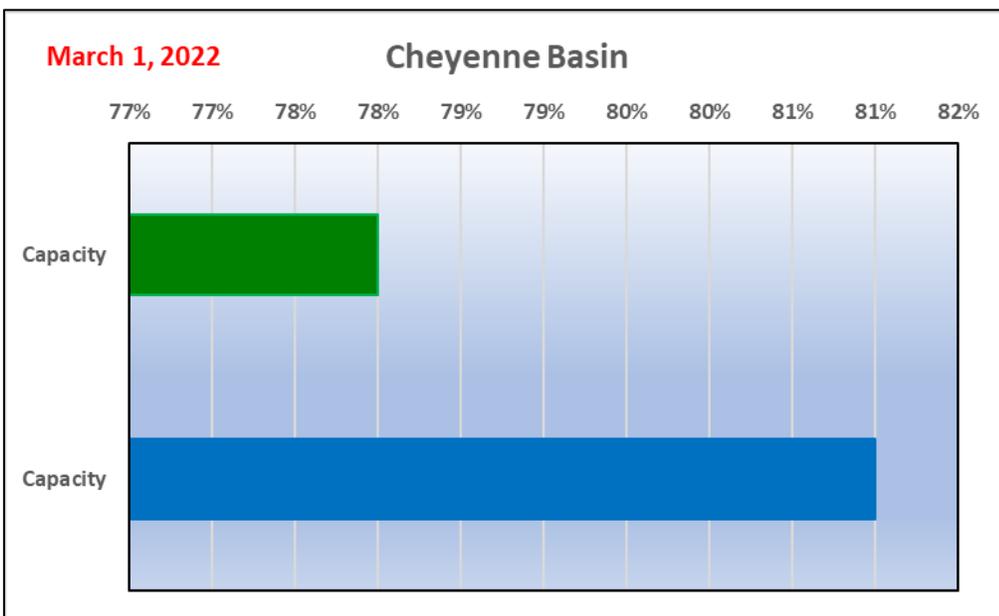
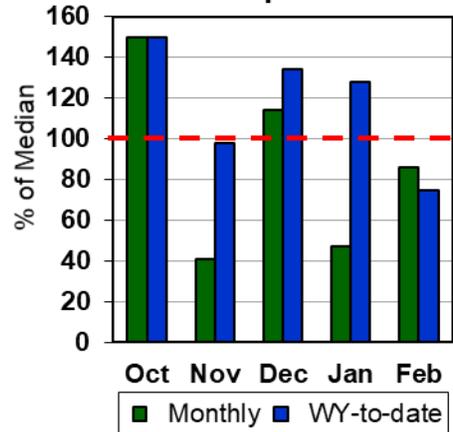
Cheyenne River Basin

- The overall Cheyenne River Basin SWE is near **70%** of median.
- Last month's precipitation for the Cheyenne River Basin was near **85%** of median. Water-year-to-date precipitation is around **75%** of median.
- Current reservoir storage is near **90%** of median for three main reservoirs in the basin.
- The 50% exceedance forecasts for April through July are **below** median (**68%**) for this basin. Pactola Reservoir inflows are forecasted to be only **58%** of median.

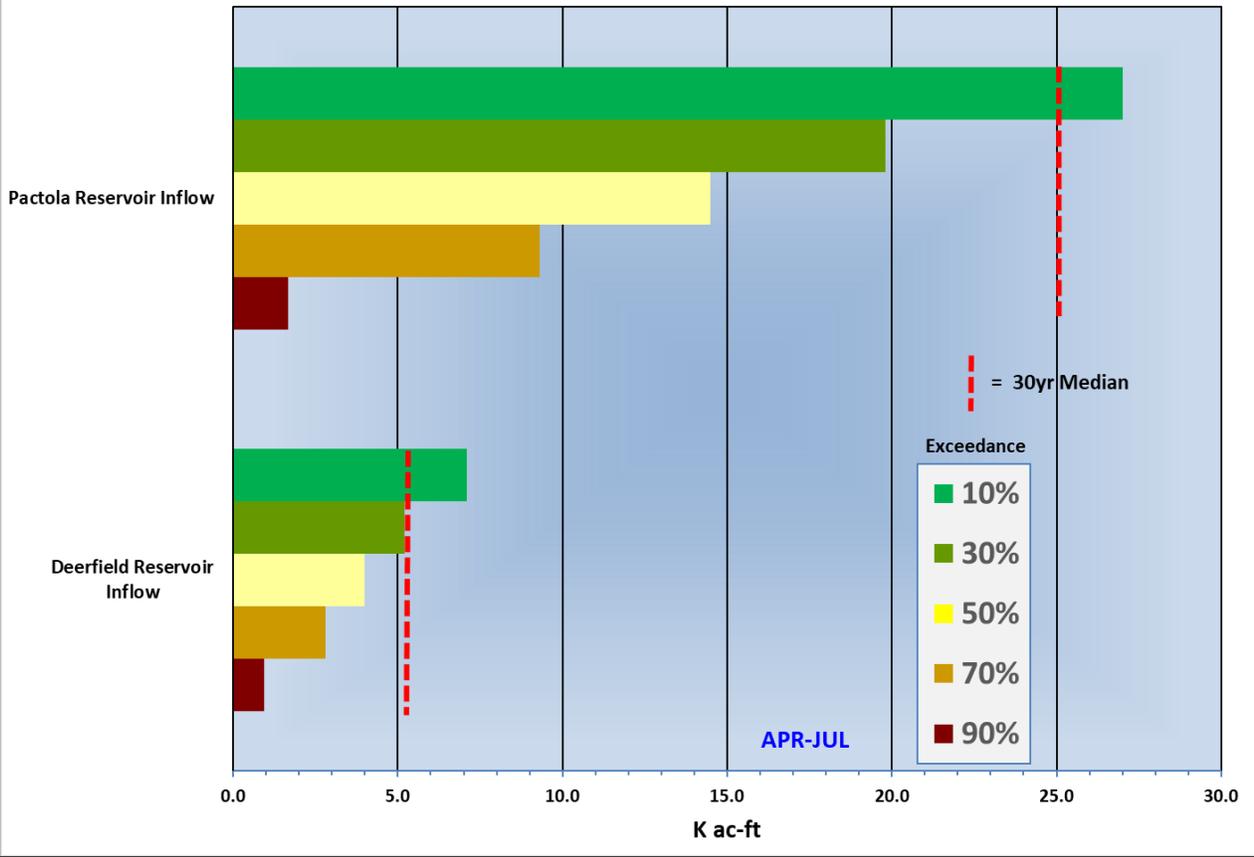
**Cheyenne River Basin
Snow Water Equivalent**

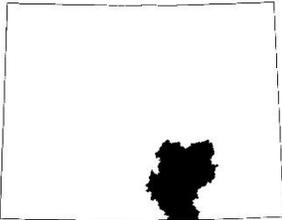


**Cheyenne River Basin
Precipitation**



Cheyenne River Basin Streamflow Forecasts -- March 1, 2022

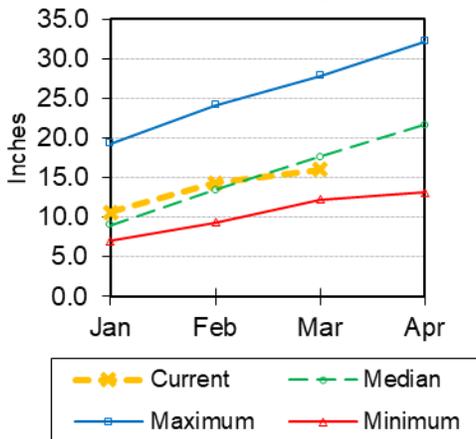




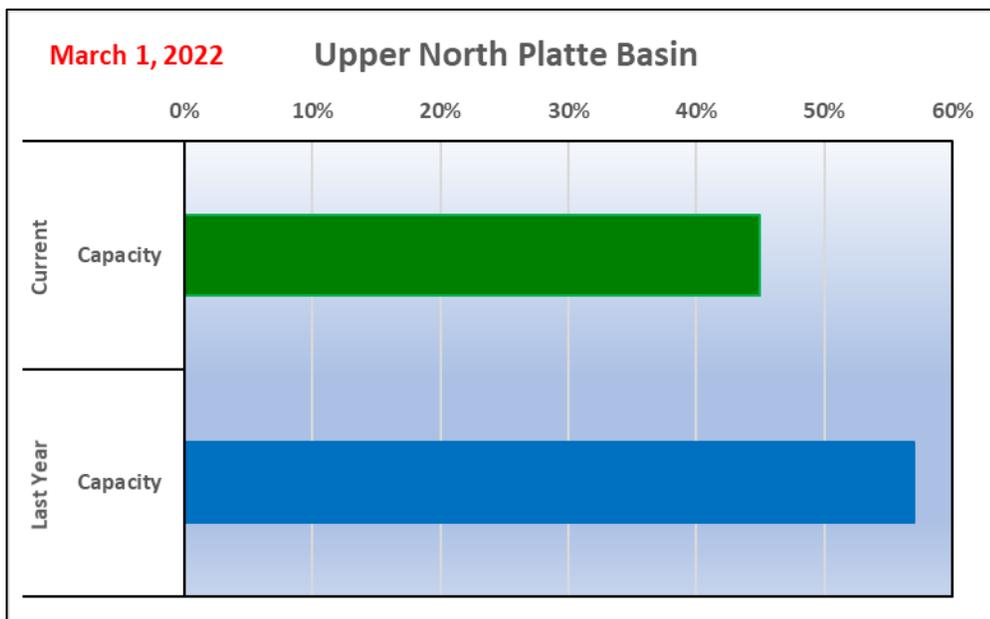
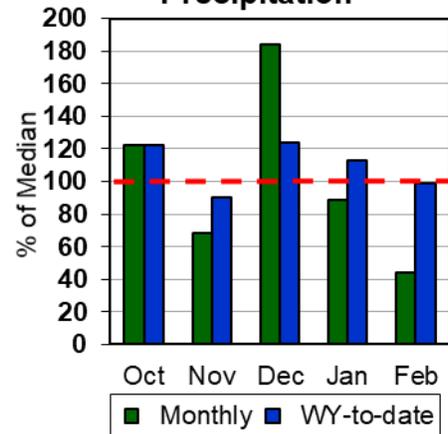
Upper North Platte River Basin

- The overall Upper North Platte River Basin SWE is around **90%** of median.
- Last month's precipitation for the Upper North Platte River Basin was near **45%** of median. Water-year-to-date precipitation is around **100%** of median.
- Current reservoir storage is near **80%** of median for two main reservoirs in the basin.
- Streamflow forecasts for April through July are near median (**97%**) for this basin. Seminoe Reservoir inflows are forecasted to be **98%** of median.

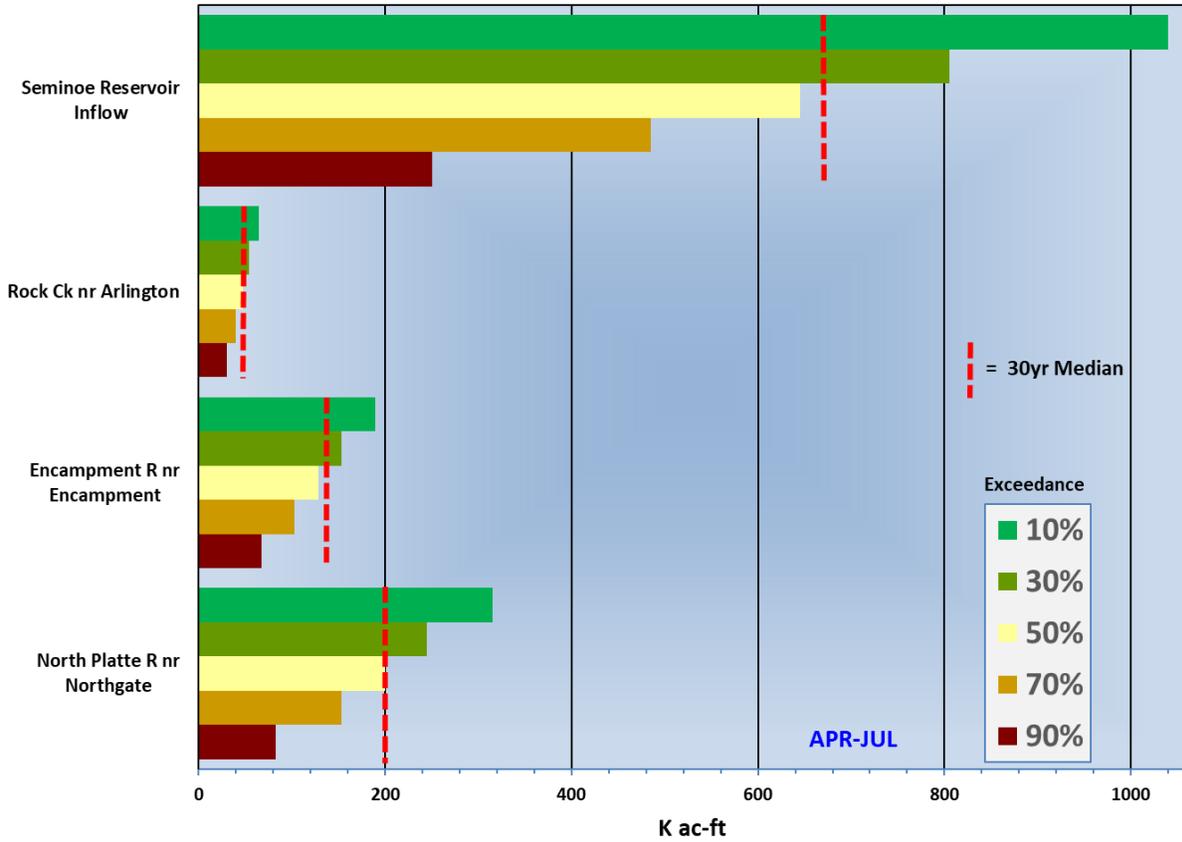
**Upper North Platte Basin
Snow Water Equivalent**

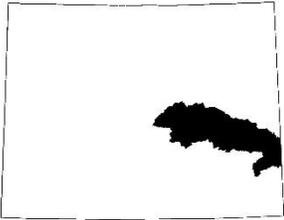


**Upper North Platte Basin
Precipitation**



Upper North Platte River Basin Streamflow Forecasts -- March 1, 2022

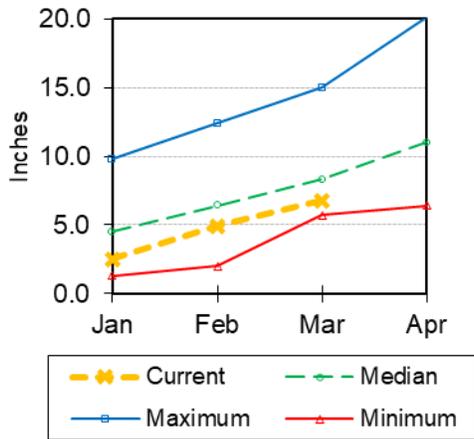




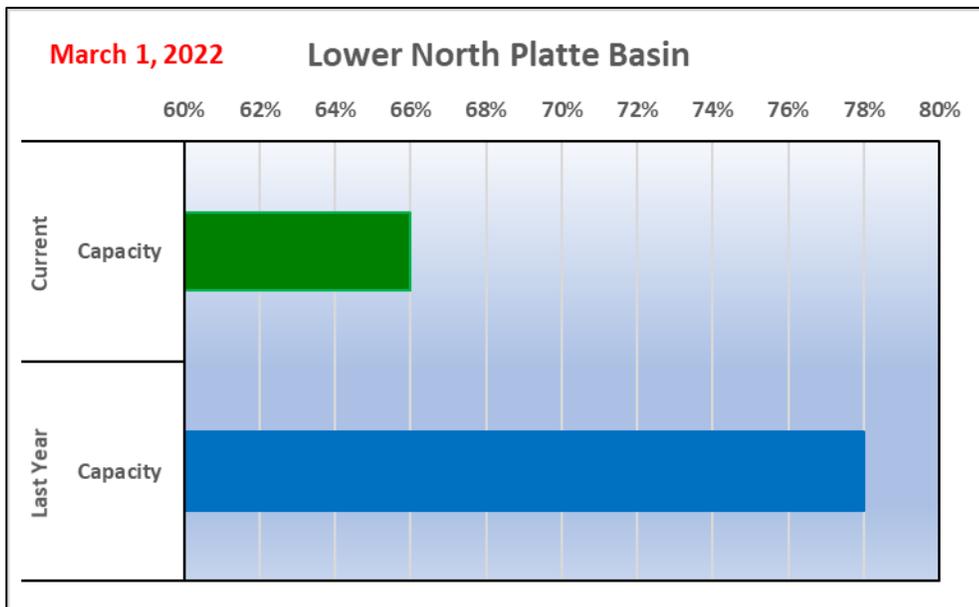
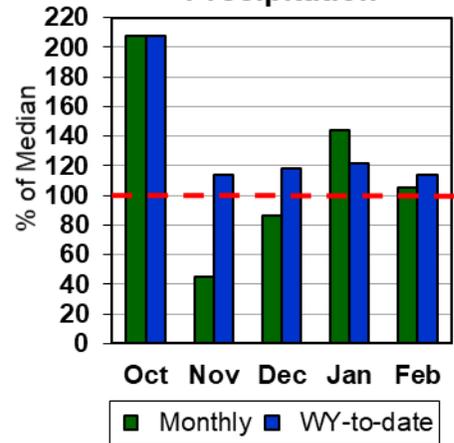
Lower North Platte River Basin

- The overall Lower North Platte River Basin SWE is near **85%** of median.
- Last month's precipitation for the Lower North Platte River Basin was near **105%** of median. Water-year-to-date precipitation is around **115%** of median.
- Current reservoir storage is near **95%** of median for three main reservoirs in the basin.
- The 50% exceedance forecasts for April through July are **below** median (**92%**) for this basin. La Prele Creek near Douglas is forecasted to have flows at **86%** of median.

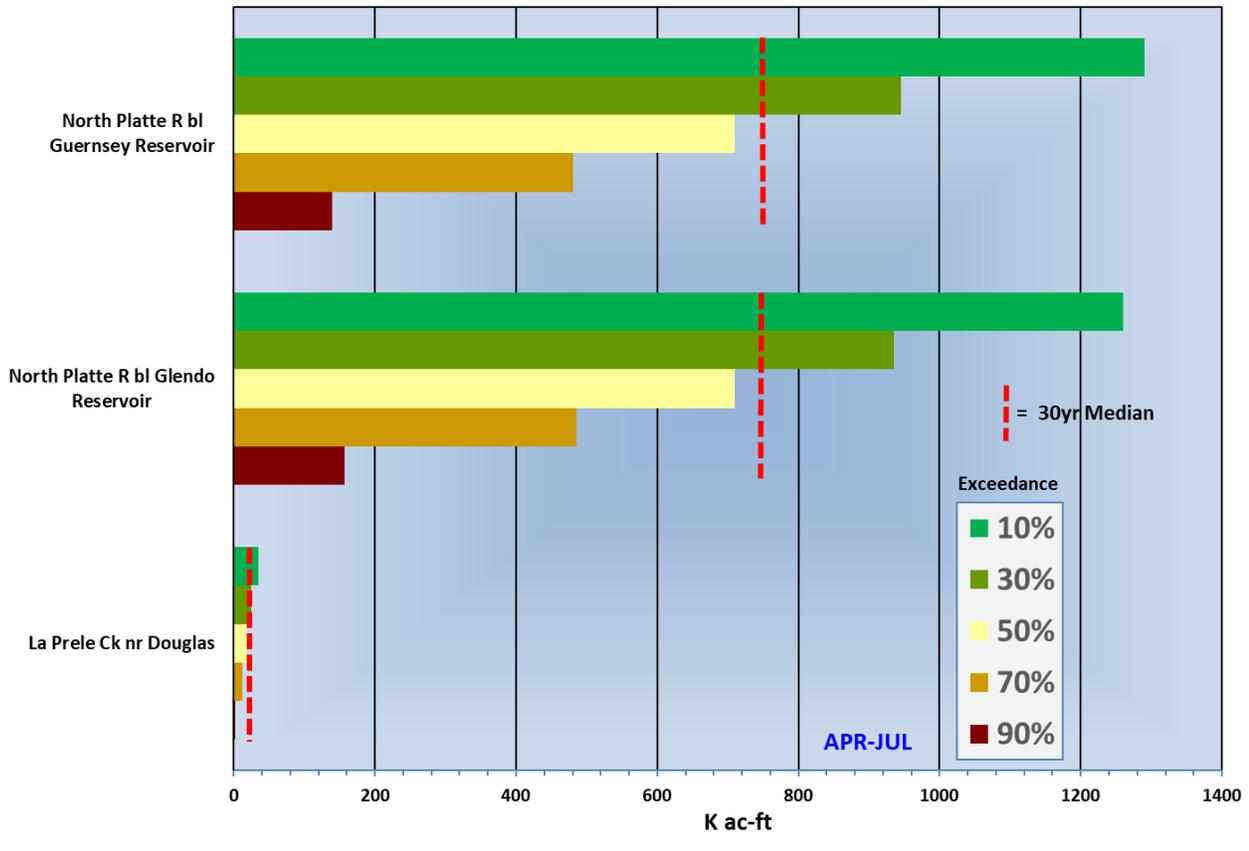
**Lower North Platte Basin
Snow Water Equivalent**

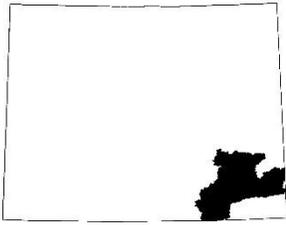


**Lower North Platte Basin
Precipitation**



Lower North Platte River Basin Streamflow Forecasts -- March 1, 2022

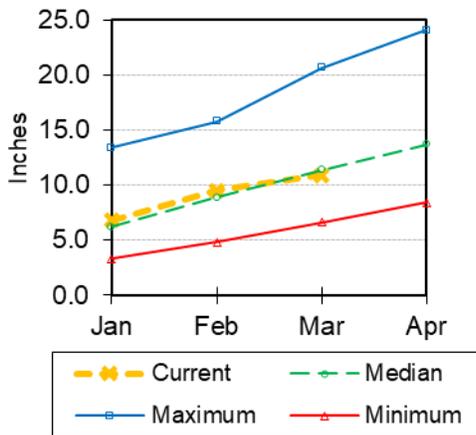




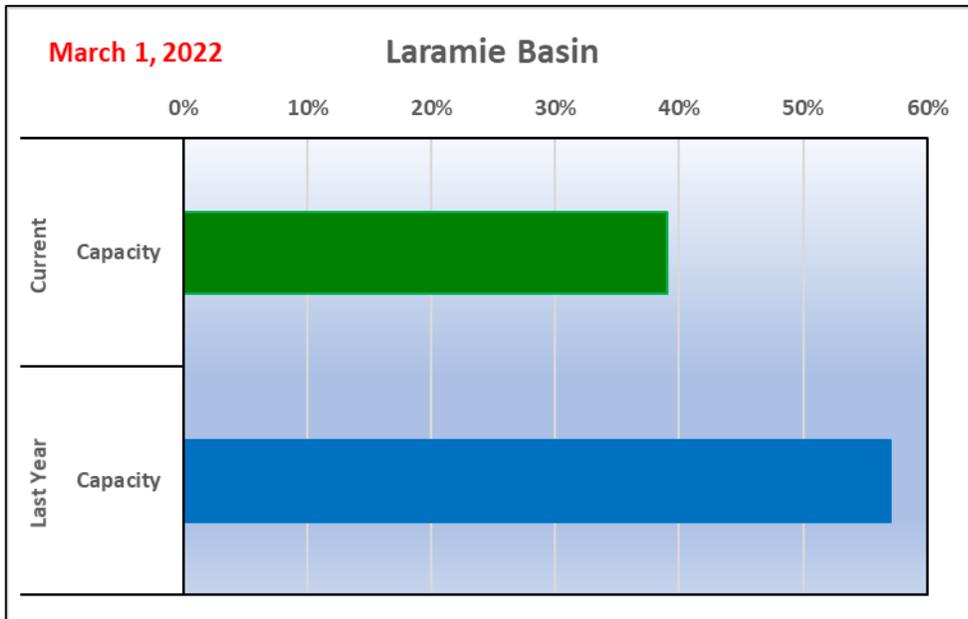
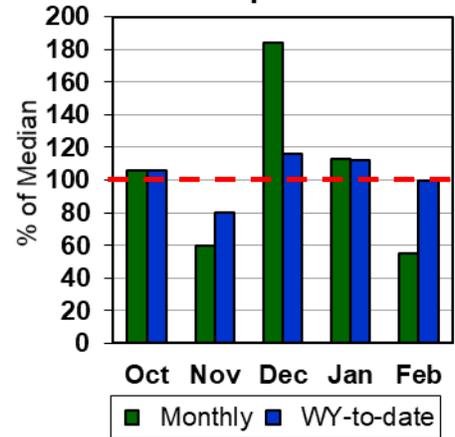
Laramie River Basin

- The overall Laramie River Basin SWE is around **95%** of median.
- Last month's precipitation for the Laramie River Basin was at **55%** of median. Water-year-to-date precipitation is at **100%** of median.
- Current reservoir storage is around **80%** of median for one main reservoir in the basin.
- Streamflow forecasts for April through July are near median (**99%**) for this basin. Little Laramie River near Filmore is expected to have flows at **94%** of median.

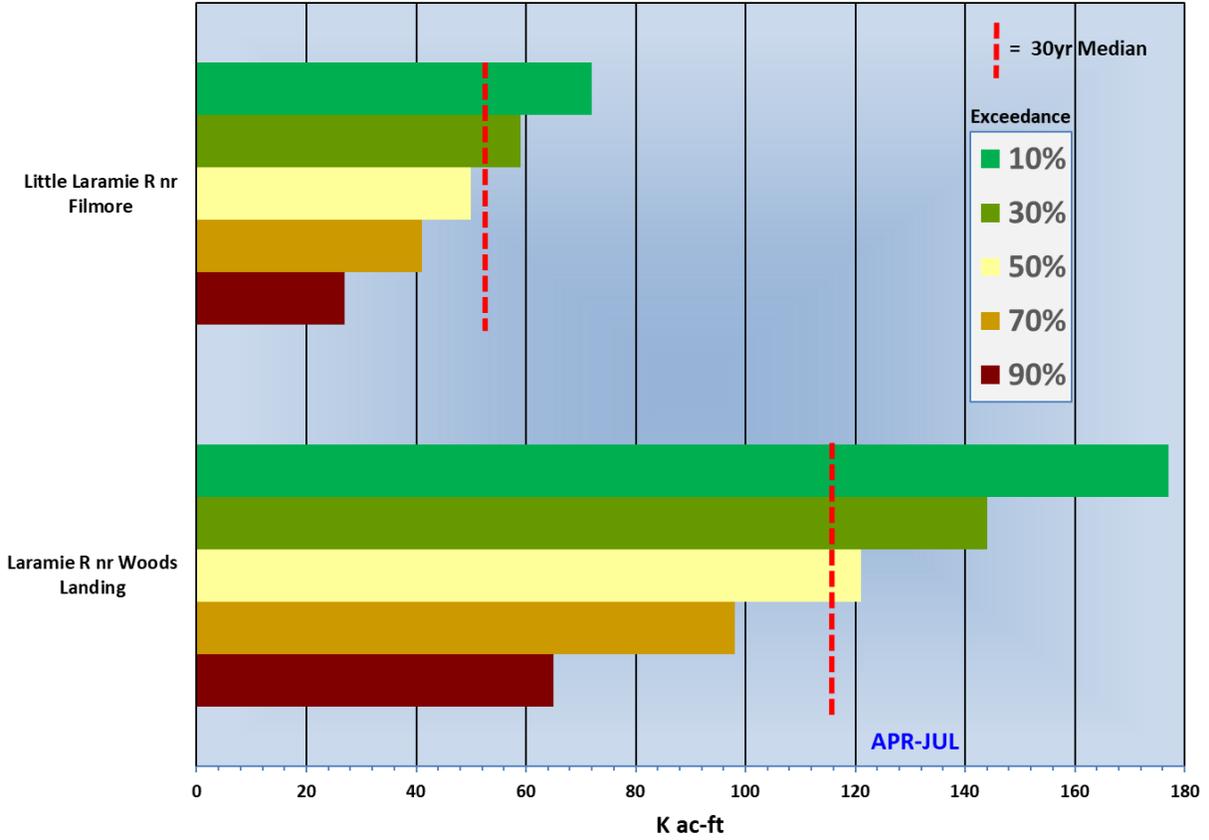
**Laramie River Basin
Snow Water Equivalent**

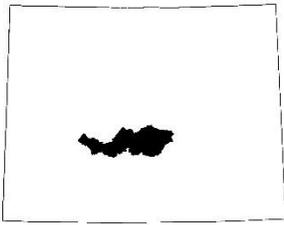


**Laramie River Basin
Precipitation**



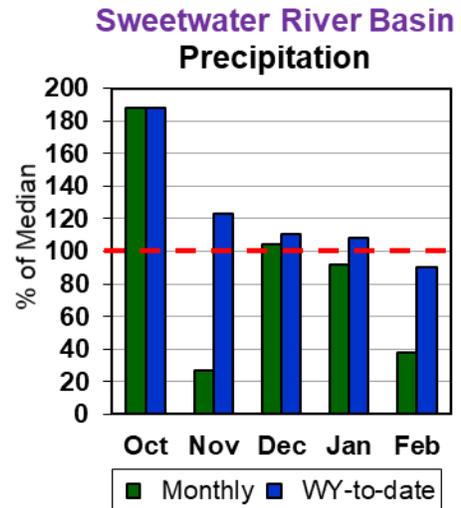
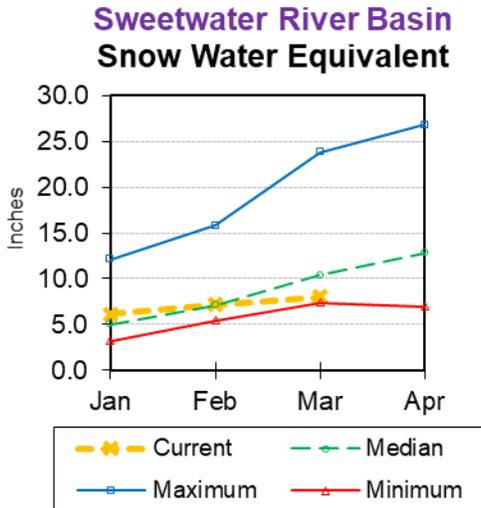
Laramie River Basin Streamflow Forecasts -- March 1, 2022





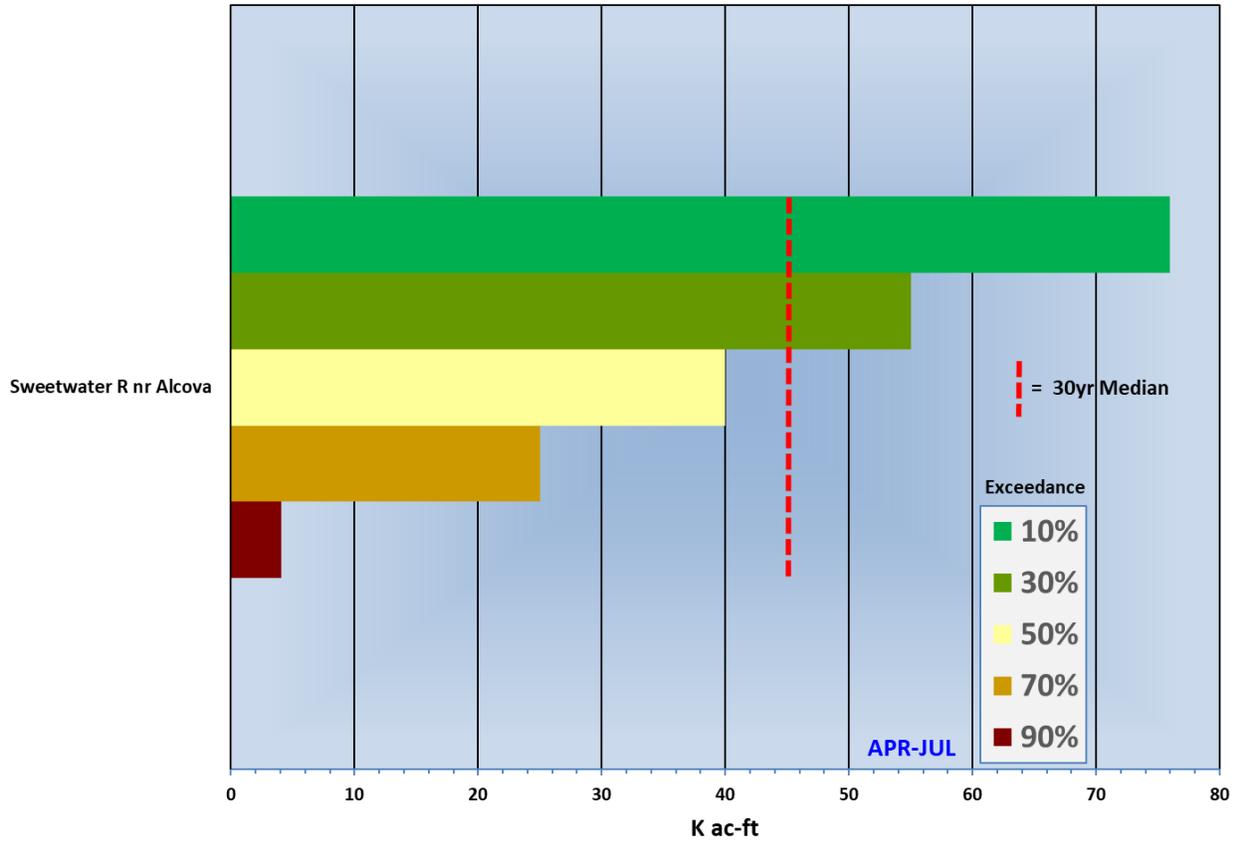
Sweetwater River Basin

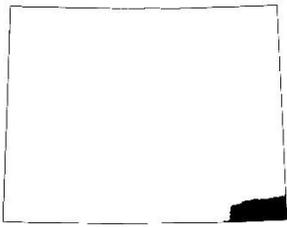
- The overall Sweetwater River Basin SWE is close to **75%** of median.
- Last month's precipitation for the Sweetwater River Basin was close to **40%** of median. Water-year-to-date precipitation is at **90%** of median.
- Streamflow forecasts for April through July are **below** median (**89%**) for this basin.



No reservoir data for the basin.

Sweetwater River Basin Streamflow Forecast -- March 1, 2022

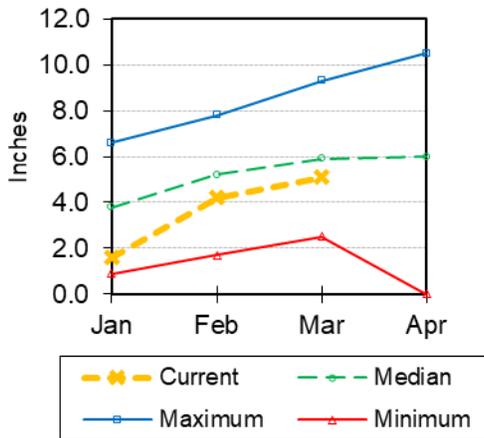




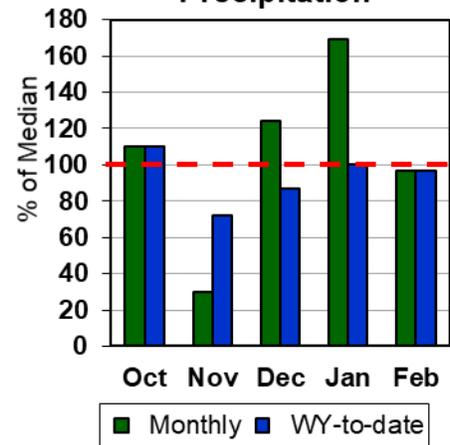
South Platte River Basin (WY)

- The overall South Platte River Basin SWE is around **85%** of median.
- Last month's precipitation for the South Platte River Basin was near **95%** of median. Water-year-to-date precipitation is close to **95%** of median.

**South Platte River Basin
Snow Water Equivalent**

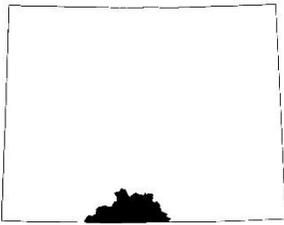


**South Platte River Basin
Precipitation**



No reservoir data for the basin.

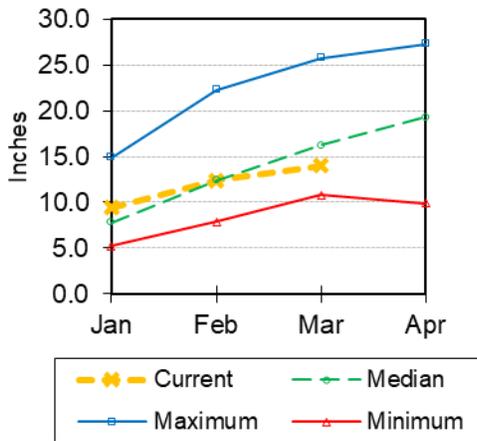
There are no streamflow forecast points for the basin.



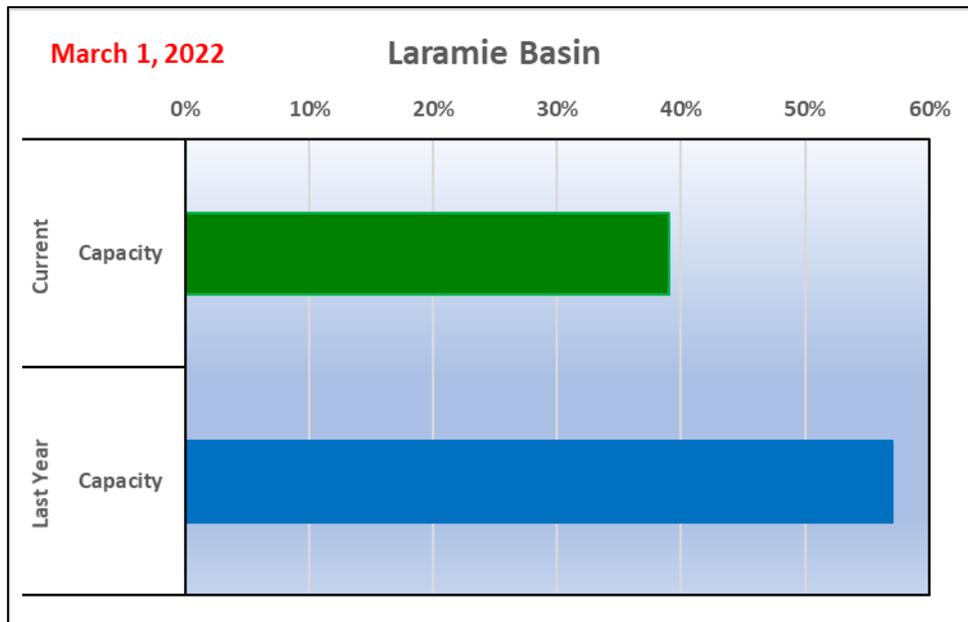
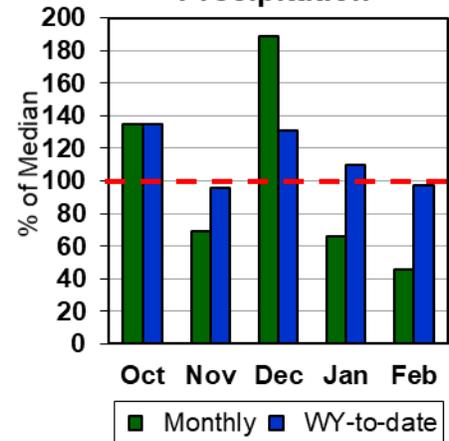
Little Snake River Basin

- The overall Little Snake River Basin SWE is near **85%** of median.
- Last month's precipitation for the Little Snake River Basin was near **45%** of median. Water-year-to-date precipitation is about **95%** of median.
- Current reservoir storage is near **50%** of median for one main reservoir in the basin.
- The 50% exceedance forecasts for April through July are **below** median (**83%**) for this basin.

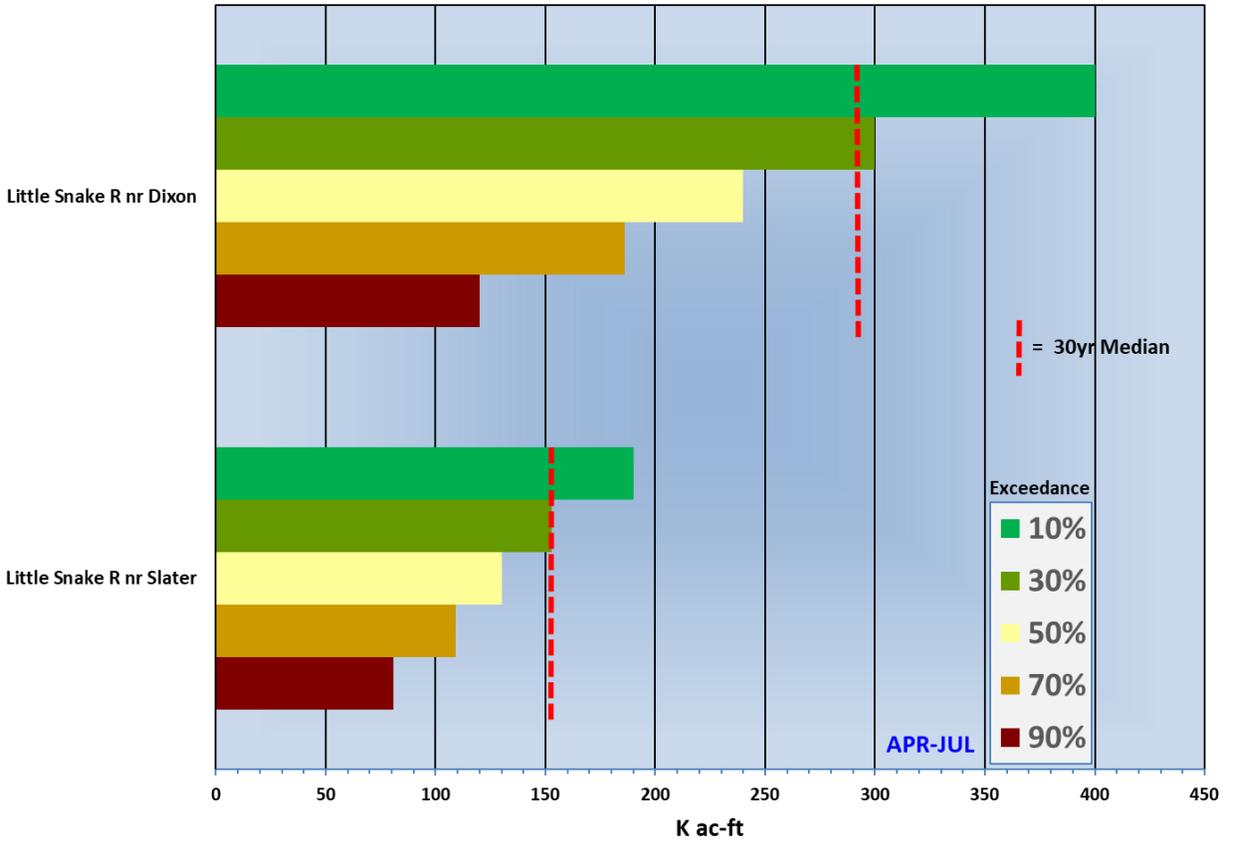
**Little Snake River Basin
Snow Water Equivalent**

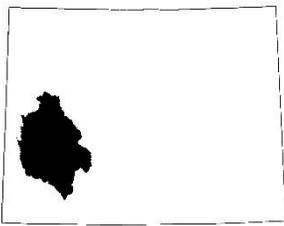


**Little Snake River Basin
Precipitation**



Little Snake River Basin Streamflow Forecasts -- March 1, 2022

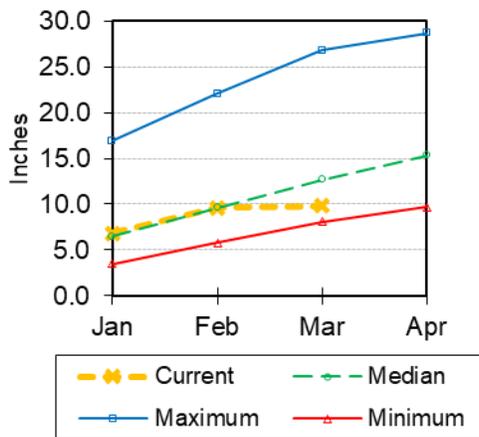




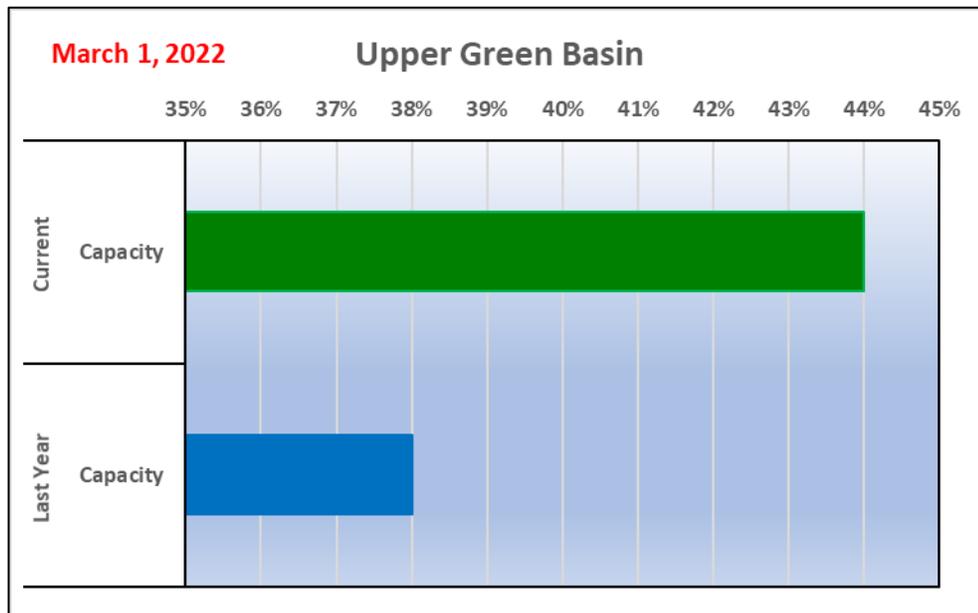
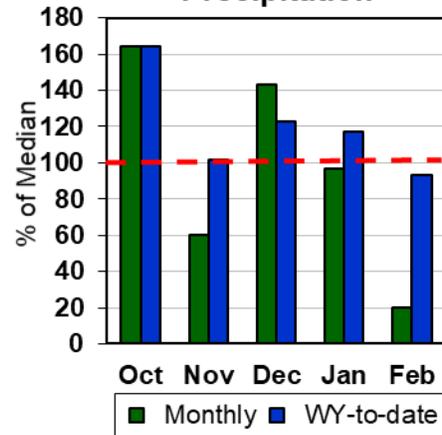
Upper Green River Basin

- The overall Upper Green River Basin SWE is near **80%** of median.
- Last month's precipitation for the Upper Green River Basin was near **20%** of median. Water-year-to-date precipitation is around **95%** of median.
- Current reservoir storage is close to **110%** of median for two main reservoirs in the basin.
- Streamflow forecasts for April through July are **below** median (**74%**) for this basin. Fontenelle Reservoir inflows are expected to be **67%** of median.

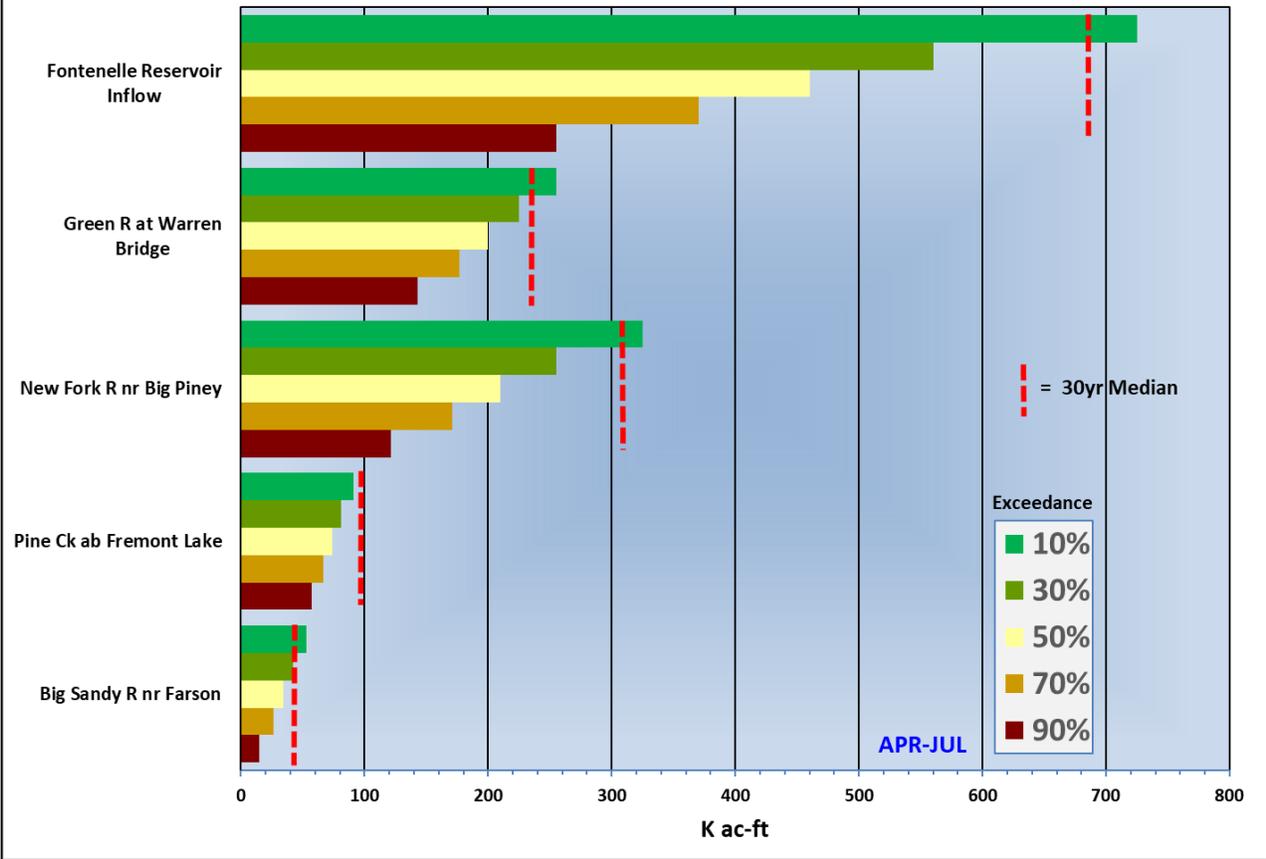
**Upper Green River Basin
Snow Water Equivalent**

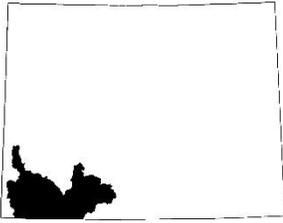


**Upper Green River Basin
Precipitation**



Upper Green River Basin Streamflow Forecasts -- March 1, 2022

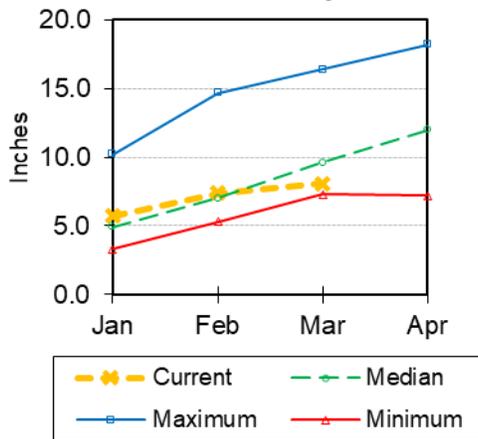




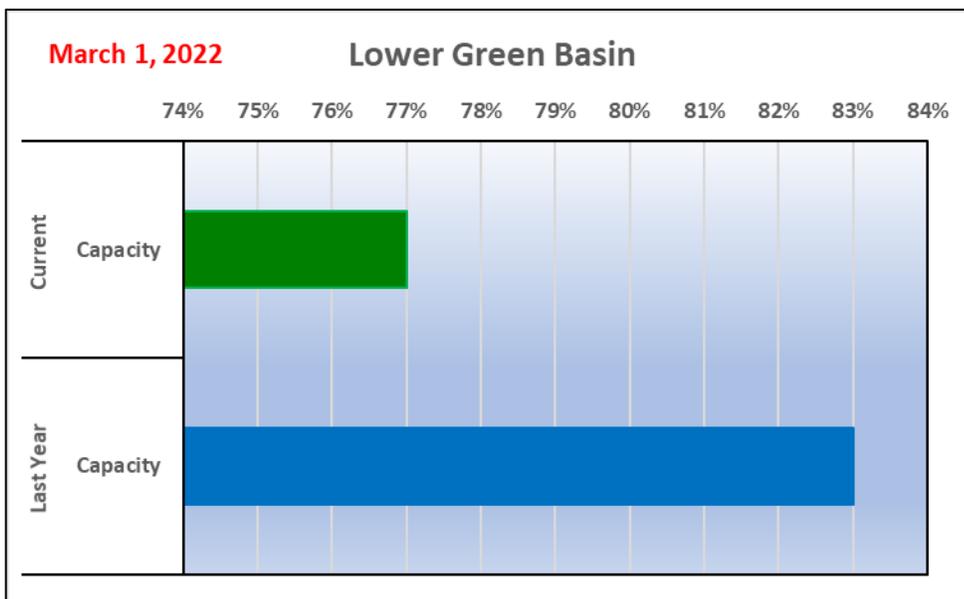
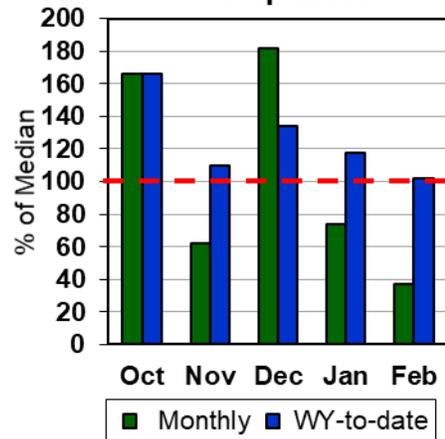
Lower Green River Basin

- The overall Lower Green River Basin SWE is near **85%** of median.
- Last month's precipitation for the Lower Green River Basin was near **35%** of median. Water-year-to-date precipitation is around **100%** of median.
- Current reservoir storage is **90 to 95%** of median for four main reservoirs in the basin.
- Streamflow forecasts for April through July are **below** median (**65%**) for this basin. Flaming Gorge Reservoir inflows are forecasted to be **56%** of median.

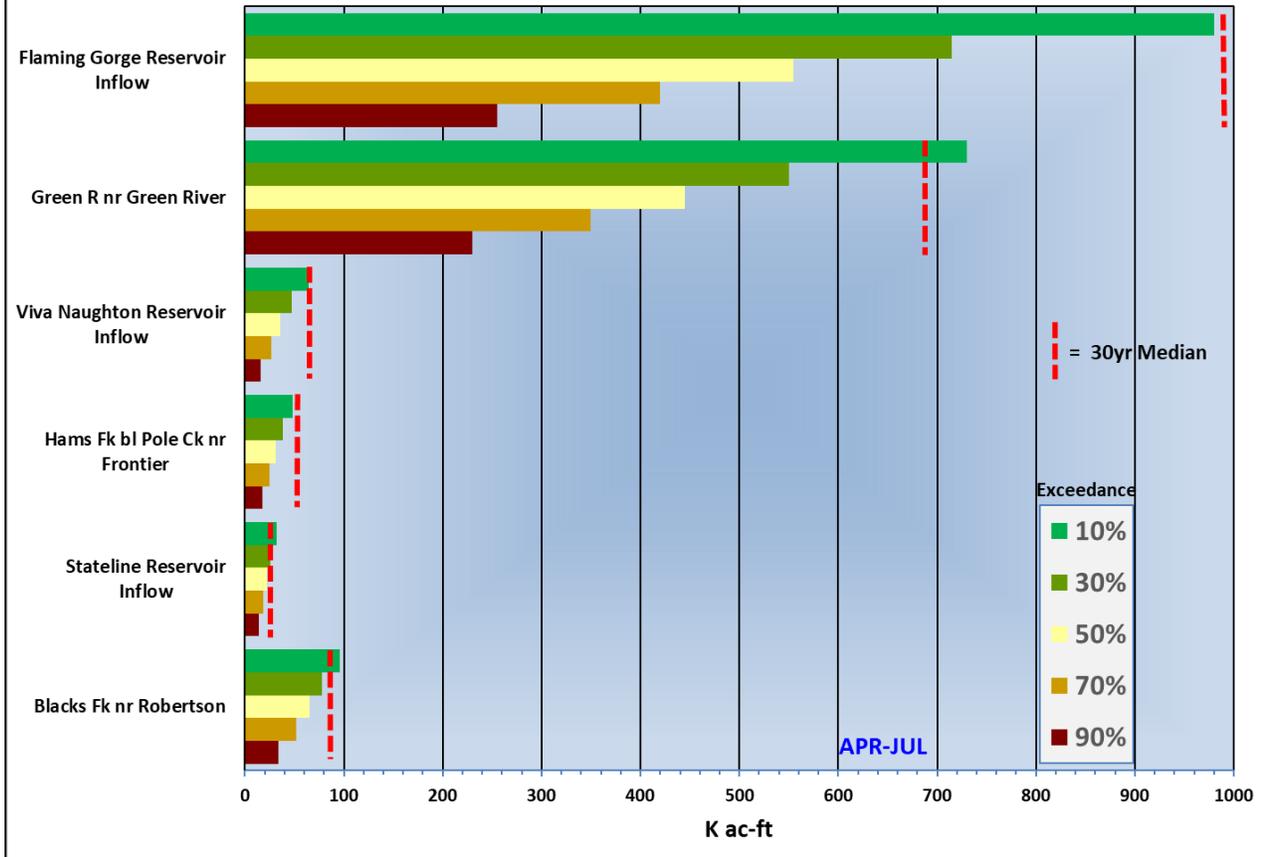
**Lower Green River Basin
Snow Water Equivalent**

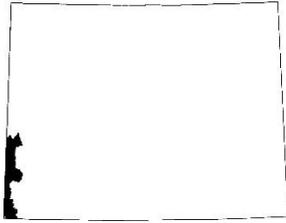


**Lower Green River Basin
Precipitation**



Lower Green River Basin Streamflow Forecasts -- March 1, 2022

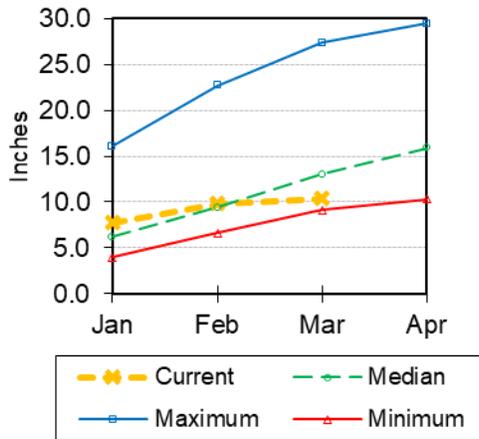




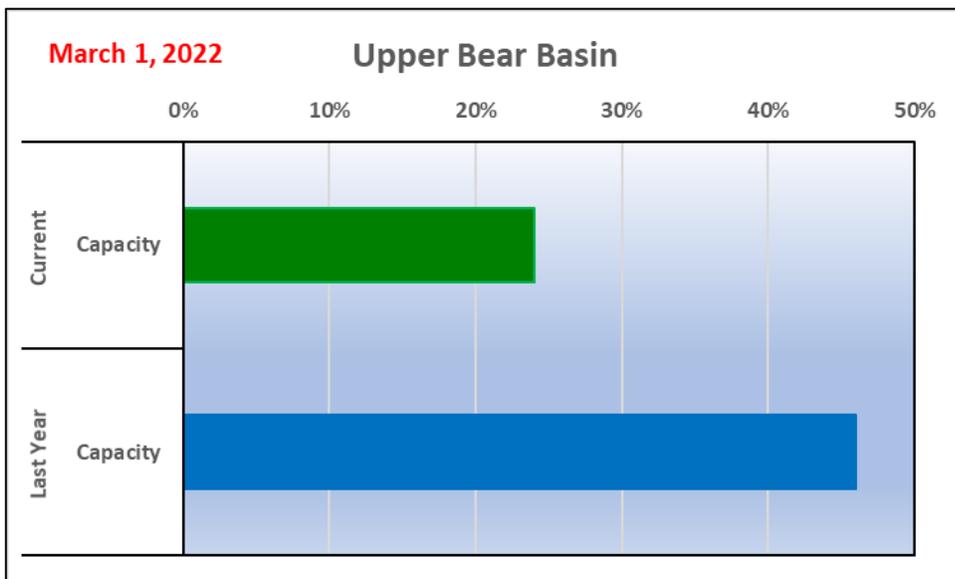
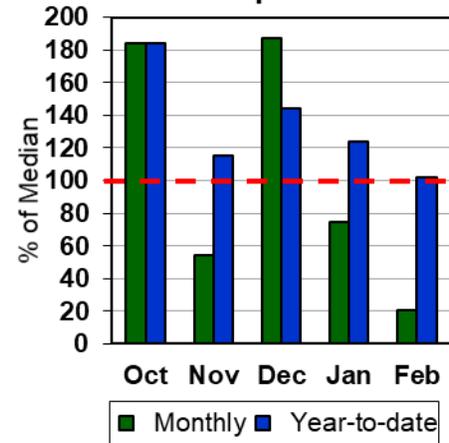
Upper Bear River Basin

- The overall Upper Bear River Basin SWE is close to **80%** of median.
- Last month's precipitation for the Upper Bear River Basin was near **20%** of median. Water-year-to-date precipitation is around **100%** of median.
- Current reservoir storage is near **35%** of median for two main reservoirs in the basin.
- The 50% exceedance forecasts for April through July are **below** median (**81%**) for this basin. Bear River above Woodruff Narrows Reservoir is expected to have flows at **85%** of median.

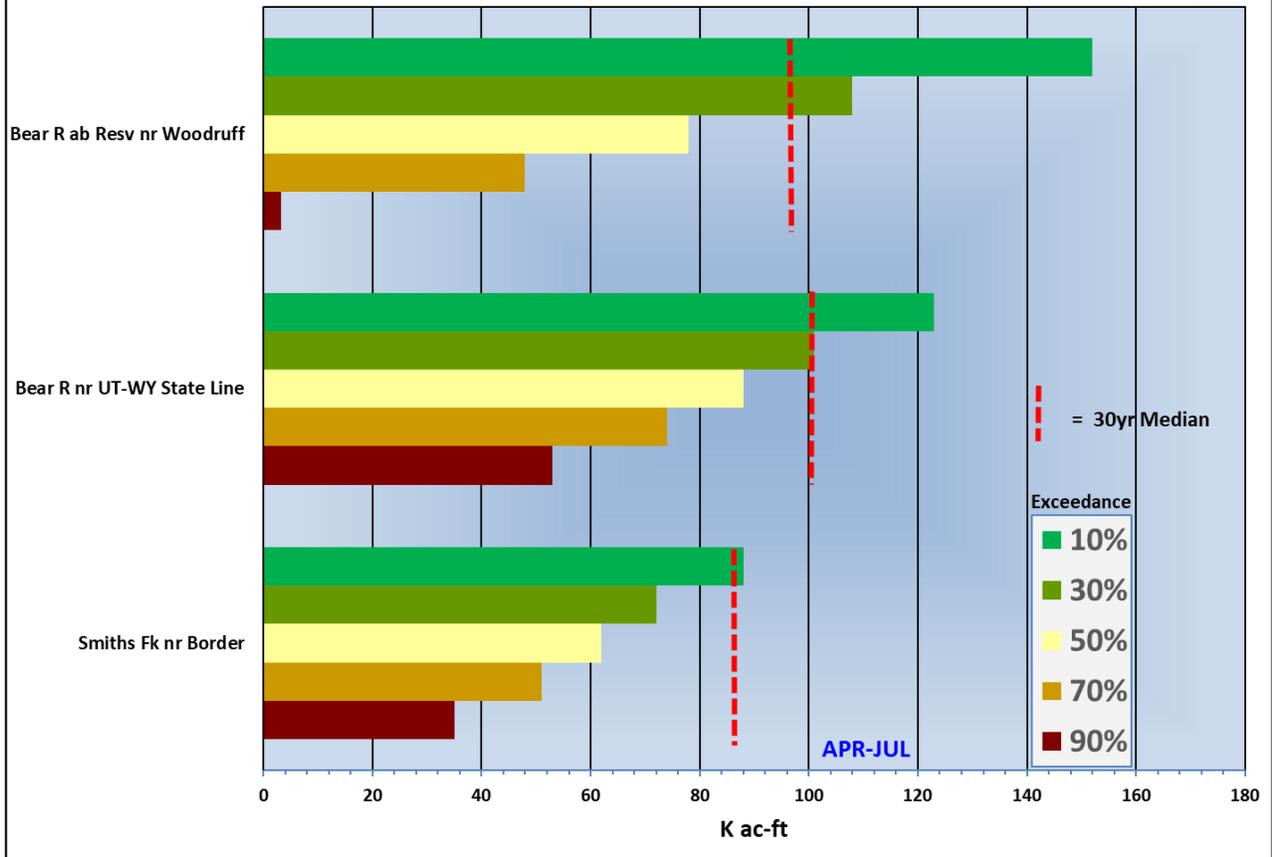
**Upper Bear River Basin
Snow Water Equivalent**



**Upper Bear River Basin
Precipitation**



Upper Bear River Basin Streamflow Forecasts -- March 1, 2022



Appendix

MEDIAN INFORMATION

Transitioning from 1981 – 2010 **Averages** to 1991 – 2020 **Medians**

Starting January 2022, the NRCS will use the 30-year **median** as the official normal for snowpack (SWE), precipitation, reservoir storage, and streamflow calculations. The National Water and Climate Center (NWCC) will continue to publish and distribute 30-year averages for alternate normal calculations.

The 30-yr reference period for median and normal calculations has also been recently updated from 1981-2010 to 1991-2020.

Please refer to this NWCC website or more information about the significant changes in data and forecast computations:

<https://www.nrcs.usda.gov/wps/portal/wcc/home/snowClimateMonitoring/30YearNormals/>

Topics include:

- **1991 – 2020 Median/Averages Overview**
- **Calculation Methods**
- **Differences Between 1991-2020 and Previous Normals**
- **Median vs. Average**
- **Retrieving 1991-2020 Normals**

For specific seasonal streamflow normal comparisons for NRCS forecasted stations, please refer to:

https://www.wcc.nrcs.usda.gov/ftpref/support/srvo_norms_comps/

LINKS (for more information/graphics)

National Water Climate Center (NWCC)

- Interactive maps featuring current conditions of snow, precipitation, reservoir storages:

<https://www.nrcs.usda.gov/wps/portal/wcc/home/quicklinks/predefinedMaps/>

Water Resources Data System and State Climate Office (WRDS)

- Clearinghouse of hydrological and climatological data for the State of Wyoming:

<http://www.wrds.uwyo.edu/>

USGS WaterWatch

- Tools and products to monitor streamflow, runoff, drought, and floods:

<https://waterwatch.usgs.gov/index.php>

Wyoming Basin Outlook Report

National Resources Conservation Service

Casper, Wyoming

Issued by:

Terry Cosby (Chief)
U.S.D.A.
Natural Resources Conservation Service
Washington D.C.

Released by:

James Bauchert
Acting State Conservationist
N R C S
Casper, Wyoming

The Following Agencies and Organizations Cooperate with the Natural Resources Conservation Service with Snow Surveys and/or with Data:

FEDERAL:

United States Department of the Interior (National Park Service)

United States Department of the Interior (Bureau of Reclamation)

United States Department of Agriculture (Forest Service)

United States Department of Commerce NOAA (National Weather Service)

STATE:

The Wyoming State Engineer's Office

The University of Wyoming

LOCAL:

The City of Cheyenne