

Wyoming Basin & Water Supply Outlook Report May 1, 2022



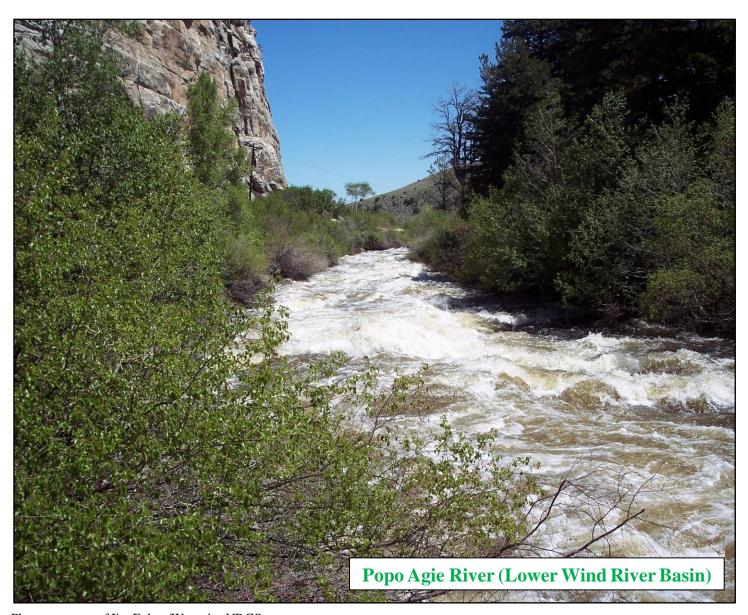


Photo courtesy of Jim Fahey/Wyoming NRCS

Basin Outlook Reports

Federal - State - Private Cooperative Snow Surveys

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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 uncertainthe 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.

<u>Note</u>: The <u>median</u> 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.

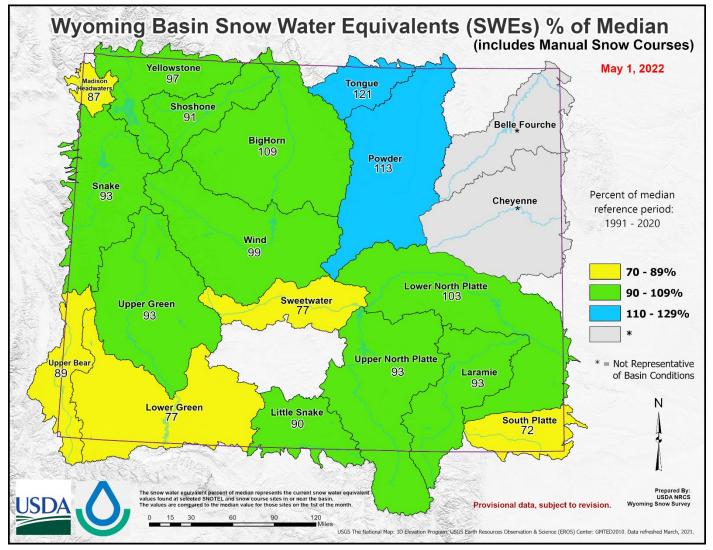
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Summary

- ullet Wyoming snowpack and/or snow water equivalents (SWEs) improved during April but were still **below** median by May 1st.
- Precipitation totals across Wyoming for April were **above** median. Water year precipitation totals remained just **below** median.
- Overall reservoir storages for late April continue to be below median.
- Stream flow snowmelt volume forecasts during May through July across Wyoming have improved but are still overall **below** median.

Snowpack/SWEs

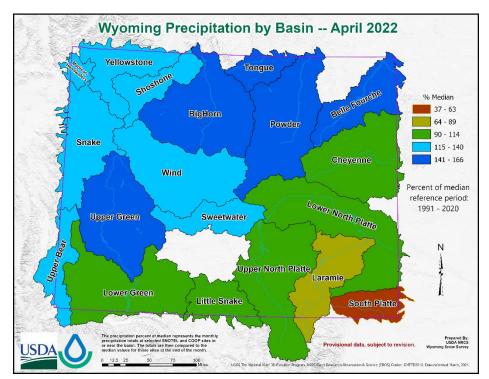
Snow water equivalents (SWEs)across Wyoming $\underline{\text{improved}}$ around 20% during April and were near 95% of median by May 1st. SWEs in the Powder and Tongue Watersheds were the $\underline{\text{highest}}$ at near 115 to 120% of median, while SWEs in the Lower Green, Sweetwater, and South Platte River Basins were the $\underline{\text{lowest}}$ at 70 to 75% of median. Last year, SWEs across the state were 90% of median. (For complete $tabular\ data$, see attachment to report)



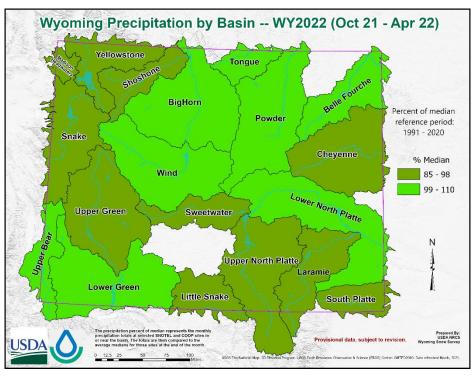
Map 1. Wyoming SWEs—May 1, 2022.

Precipitation

Basin precipitation across Wyoming was near 120% of median during April. The Tongue, Belle Fourche, and Upper Green Watersheds had the https://doi.org/10.105% of median. The South Platte Drainage had the lowest precipitation amounts at 35 to 40% of median. Water year precipitation (October - April) is currently about 95% 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.

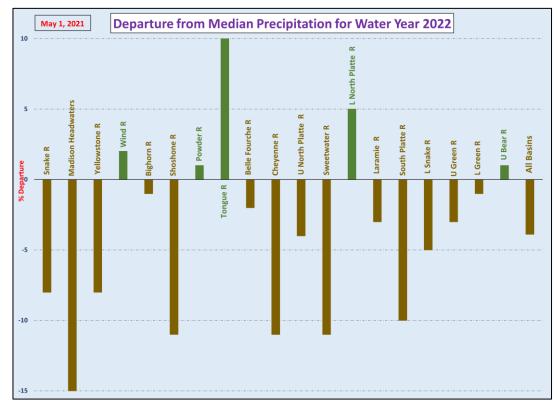
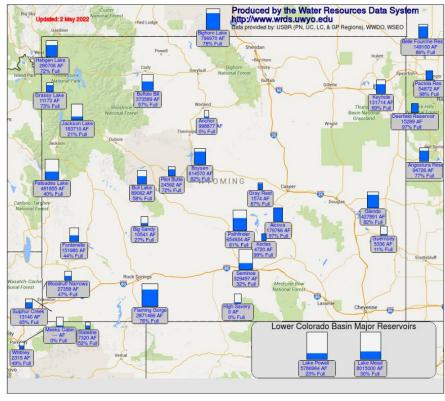


Chart 1. Departure from median precipitation (water year).

Reservoirs

Reservoirs across Wyoming were averaging near 65% of capacity—down from 75% of capacity <u>last</u> year. Overall reservoir storages for late April are below median at 90% (103% last year). The Tongue River Basin had reservoir storages near 115% of median, while the Snake River Basin had reservoir storages near 30% of median. (For complete *tabular data*, see attachment to report)



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

Stream Flows

May-July snowmelt runoff stream flow volume forecasts have <u>improved</u> across the state but remain **below** median at around **85 to 90**%. The <u>highest</u> forecasted stream flows due to snowmelt are across the Bighorn and Tongue Basins at <u>just below</u> **100**% of median. The <u>lowest</u> snowmelt runoff volumes are expected across the Lower Green and Cheyenne Drainages at **60**% and **65**% of median. (For complete **tabular data**, see attachment to report)

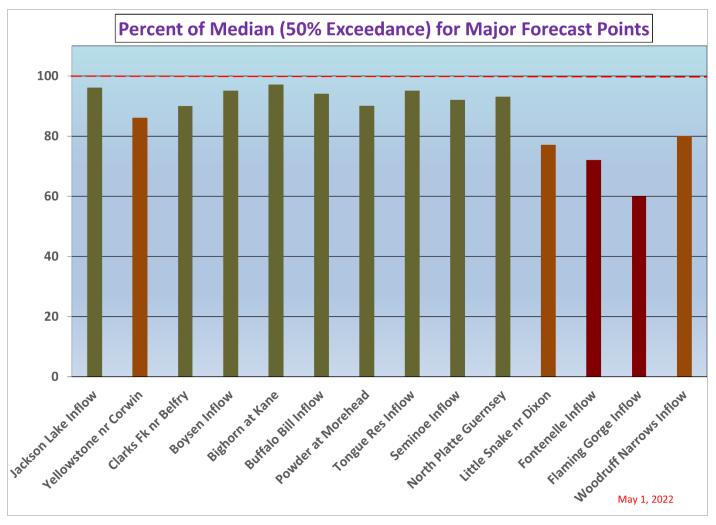


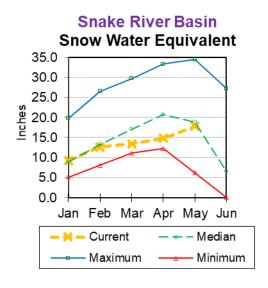
Chart 2. Percent of Median (50% exceedance) for major forecast points.

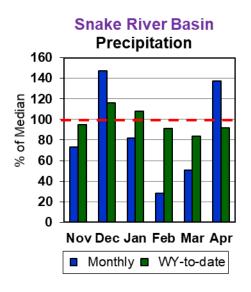
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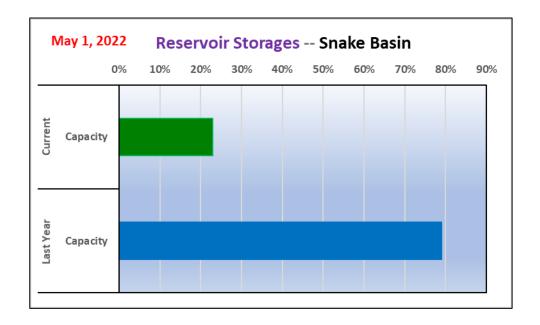


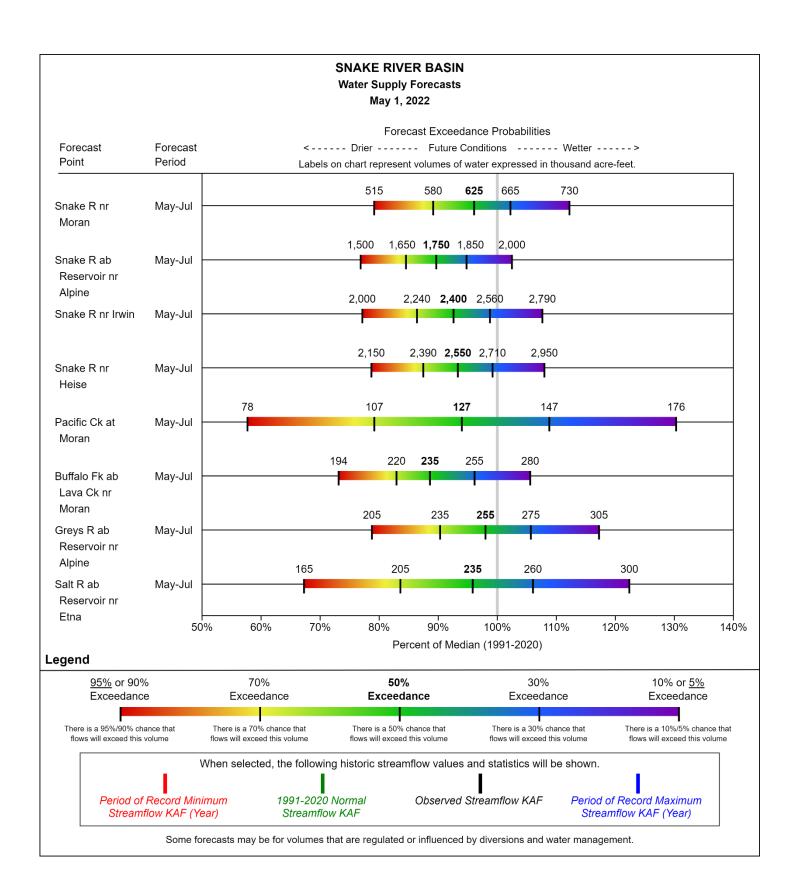
Snake River Basin

- The overall Snake River Basin SWE improved to near 95% of median.
- Last month's precipitation for the Snake River Basin was near 135% of median. Water-year-to-date precipitation is near 90% of median.
- ullet Current reservoir storage remains near 30% of median for the two main reservoirs in the basin.
- The streamflow forecasts for May through July improved but remain **below** median (90-95%) for this basin. Jackson Lake inflows are also forecasted to be near 95% of median.





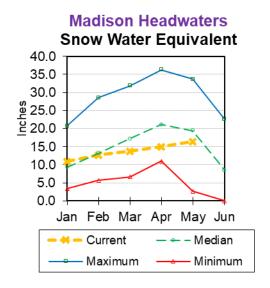


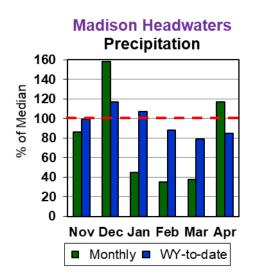




Madison Headwaters Basin

- The overall basin SWE is around 85% of median.
- Last month's precipitation for the basin was near 115% of median. Water-year-to-date precipitation is around 85% of median.





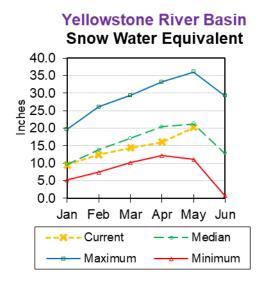
No reservoir data for the basin.

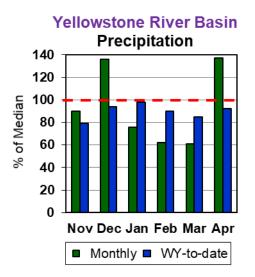
There are no streamflow forecast points for the basin.



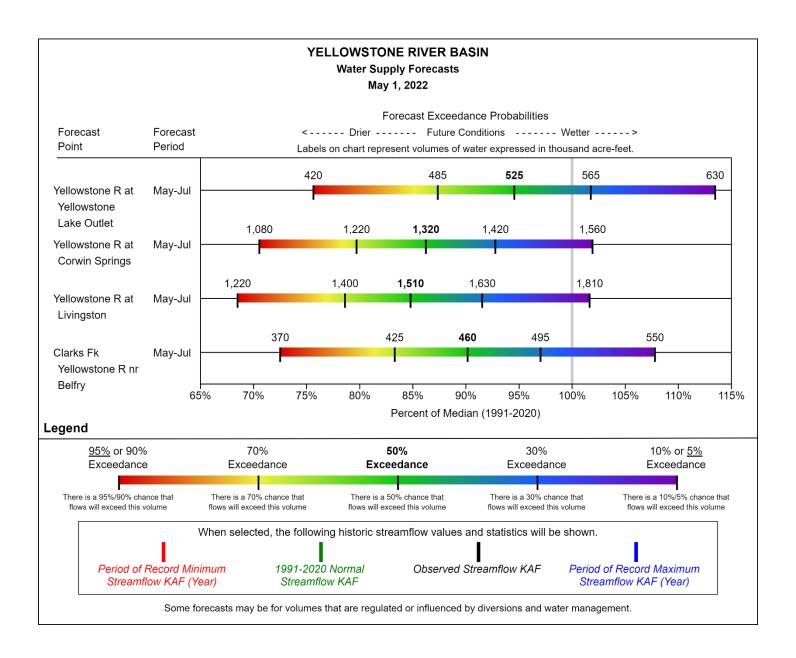
Yellowstone River Basin

- The overall Yellowstone River Basin SWE improved to near 95% of median.
- Last month's precipitation for the Yellowstone River Basin was near 135% of median. Water-year-to-date precipitation is near 90% of median.
- The 50% exceedance forecasts for May through July are **below** median (**90**%) for this basin. Clarks Fork near Belfry is forecasted to have flows at **90**% of median.





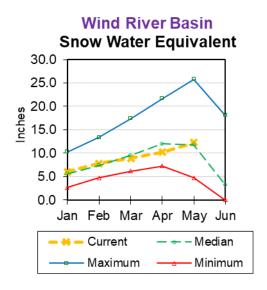
 $\underline{\text{No}}$ reservoir data for the basin.

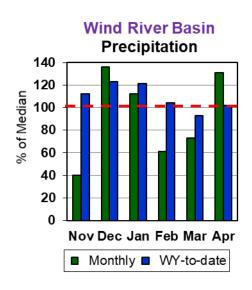


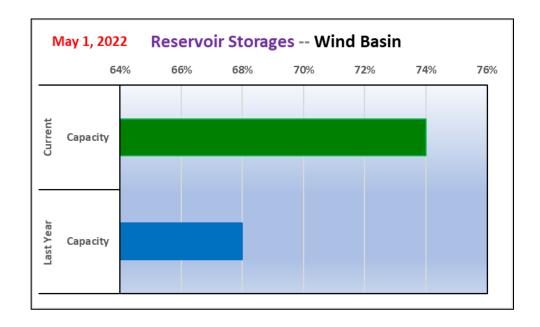


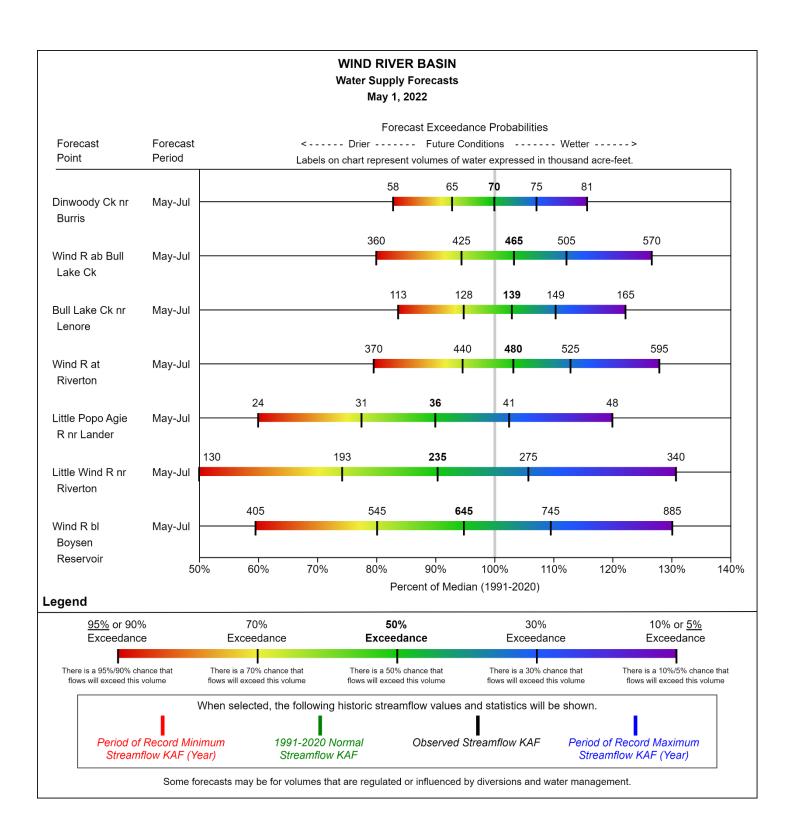
Wind River Basin

- The overall Wind River Basin SWE improved to near 100% of median.
- Last month's precipitation for the Wind River Basin was near 130% of median. Wateryear-to-date precipitation is around 100% of median.
- Current reservoir storage remains close to 110% of median for three main reservoirs in the basin.
- The streamflow forecasts for May through July are <u>just</u> below median (98%) for this basin. Boysen Reservoir inflows are expected to be 95% of median.





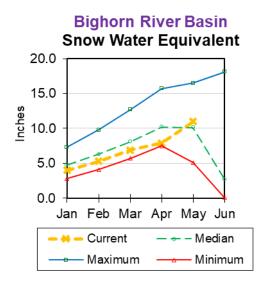


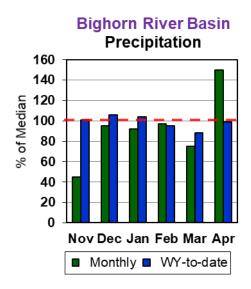


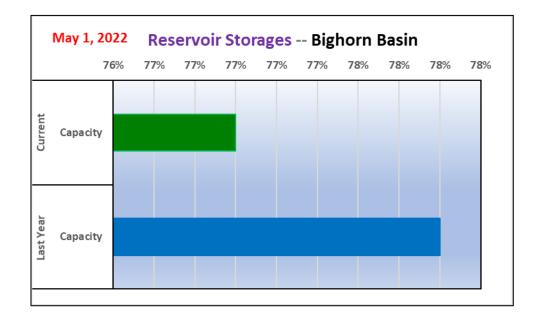


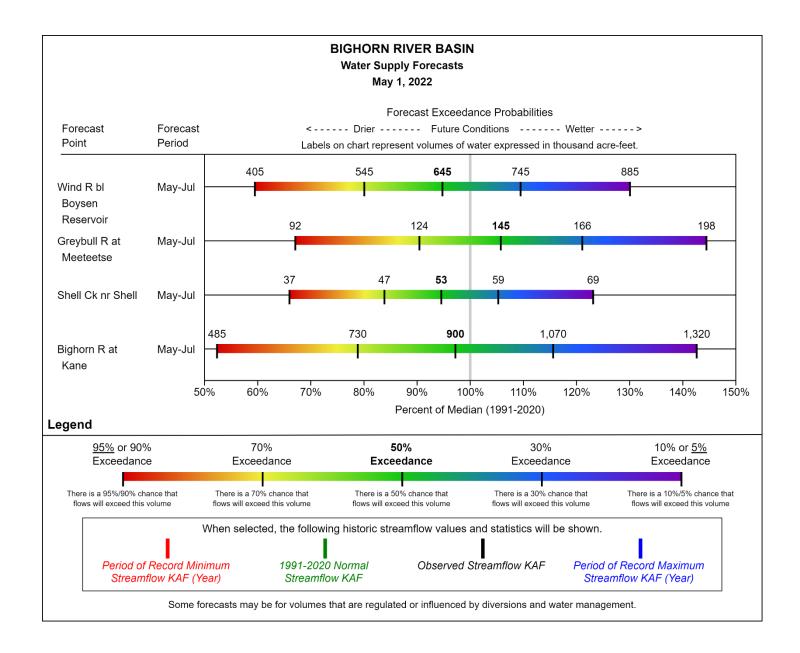
Bighorn River Basin

- The overall Bighorn River Basin SWE improved to near 110% of median.
- Last month's precipitation for the Bighorn River Basin was near 150% of median. Water-year-to-date precipitation is also about 100% of median.
- \bullet Current reservoir storage is at $100\,\%$ of median for one main reservoir in the basin.
- The 50% exceedance forecasts for May through July improved to <u>just</u> **below** median (**99**%) for this basin.





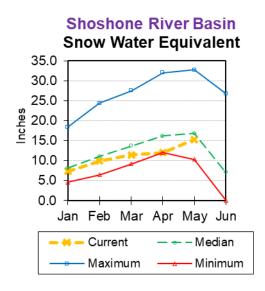


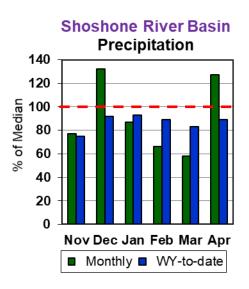


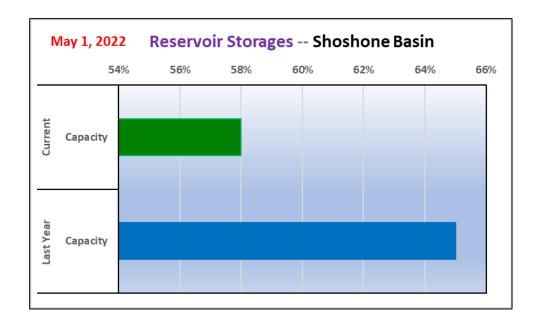


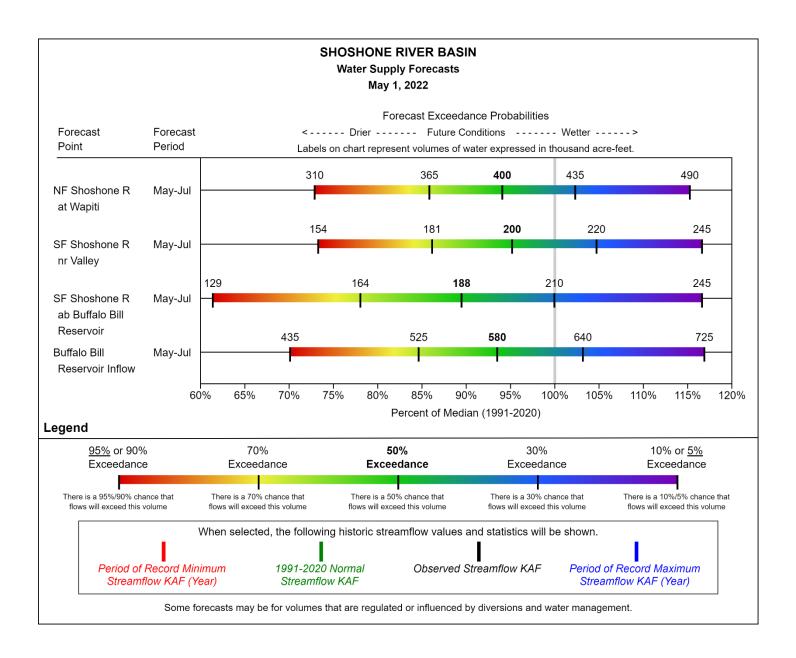
Shoshone River Basin

- The overall Shoshone River Basin SWE is around 90% of median.
- Last month's precipitation for the Shoshone River Basin was close to 125% of median. Water-year-to-date precipitation is around 90% of median.
- Current reservoir storage is near 95% of median for one main reservoir in the basin.
- Streamflow forecasts for May through July are **below** median (93%) for this basin. Buffalo Bill Reservoir inflows are expected to be 94% of median







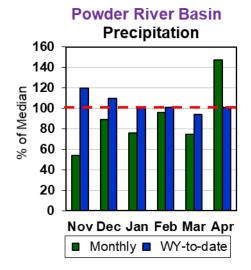




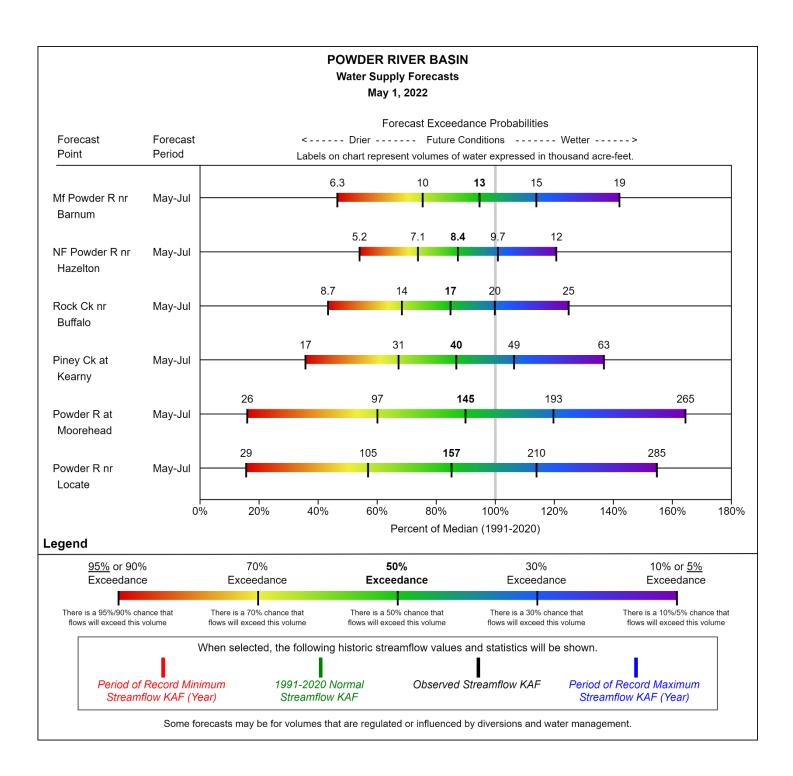
Powder River Basin

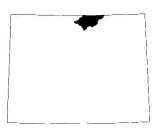
- The overall Powder River Basin SWE improved to near 115% of median.
- Last month's precipitation for the Powder River Basin was near 145% of median. Water-year-to-date precipitation is near 100% of median.
- The 50% exceedance forecasts for May through July continue to be below median (89%) for this basin.

Snow Water Equivalent 15.0 10.0 5.0 Jan Feb Mar Apr May Jun Current Maximum Minimum



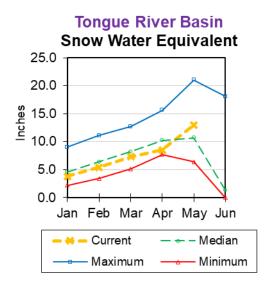
No reservoir data for the basin.

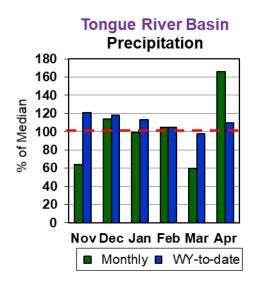


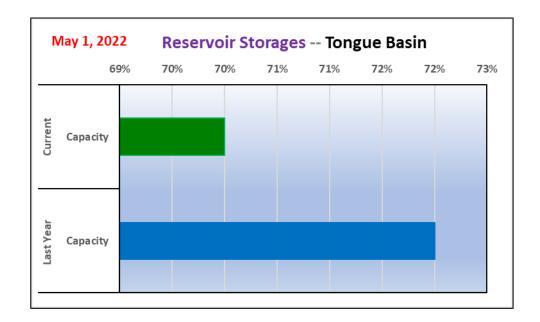


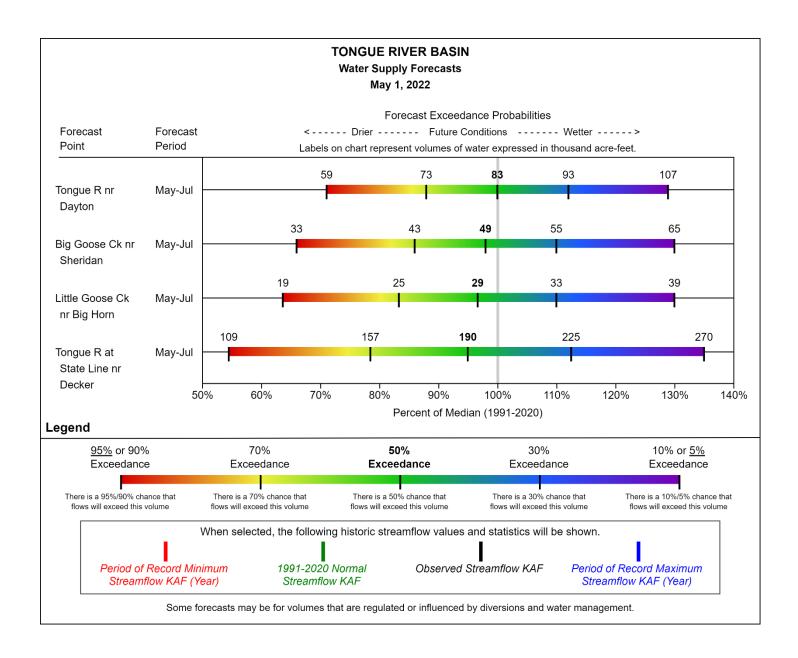
Tongue River Basin

- The overall Tongue River Basin SWE improved to near 120% of median.
- Last month's precipitation for the Tongue River Basin was at 165% of median. Water-year-to-date precipitation is close to 110% of median.
- Current reservoir storage is near 115% of median for one main reservoir in the basin.
- The 50% exceedance forecasts for May through July improved to be just **below** median (98%) for this basin. Tongue River Reservoir is forecasted to have inflows at 95% of median.





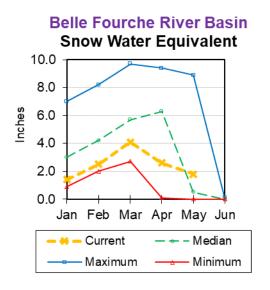


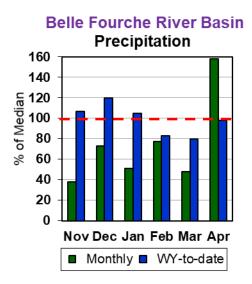


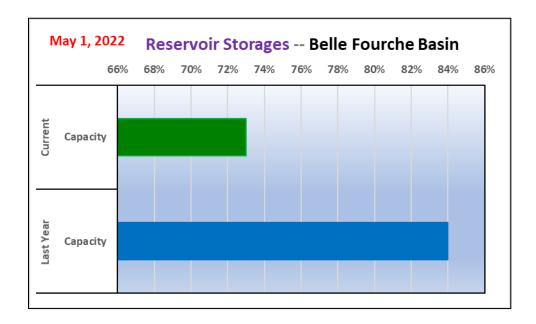


Belle Fourche River Basin

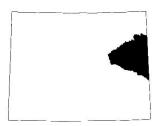
- The Belle Fourche River Basin snowpack has nearly melted out by May 1st.
- Last month's precipitation for the Belle Fourche River Basin was near 160% of median. Water-year-to-date precipitation is around 100% of median.
- Current reservoir storage is near 90% of median for three main reservoirs in the basin.





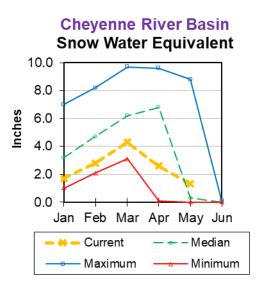


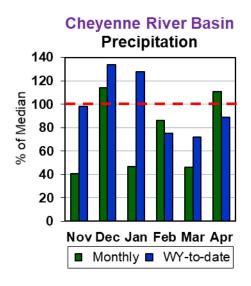
There are no streamflow forecast points for the basin.

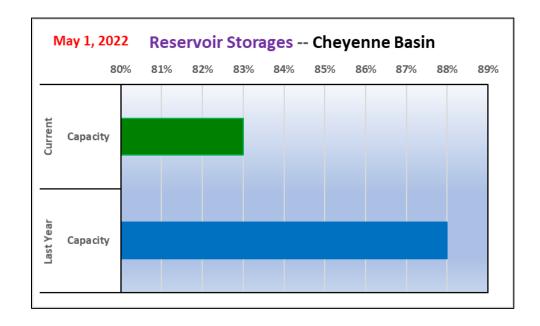


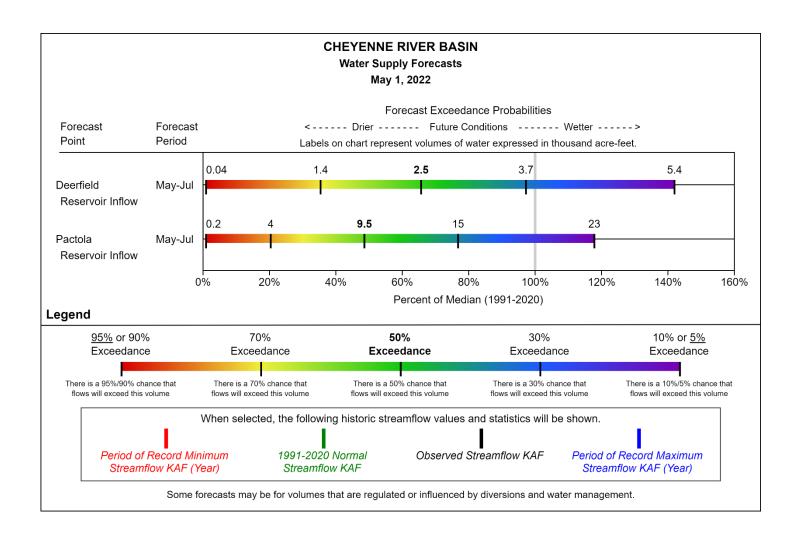
Cheyenne River Basin

- The Cheyenne River Basin snowpack has nearly melted out by May 1st.
- Last month's precipitation for the Cheyenne River Basin was near 110% of median. Water-year-to-date precipitation is around 90% of median.
- \bullet Current reservoir storage remains near 90% of median for three main reservoirs in the basin.
- The 50% exceedance forecasts for May through July are **well below** median (58%) for this basin. Pactola Reservoir inflows are forecasted to be only around 50% of median.





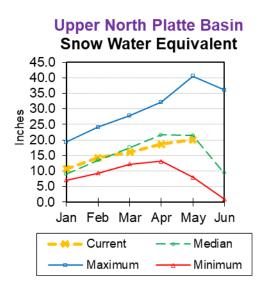


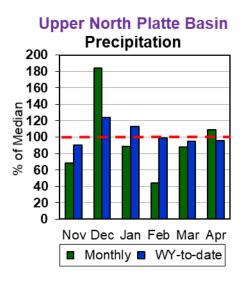


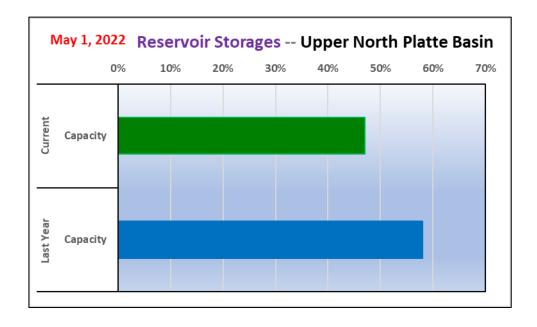


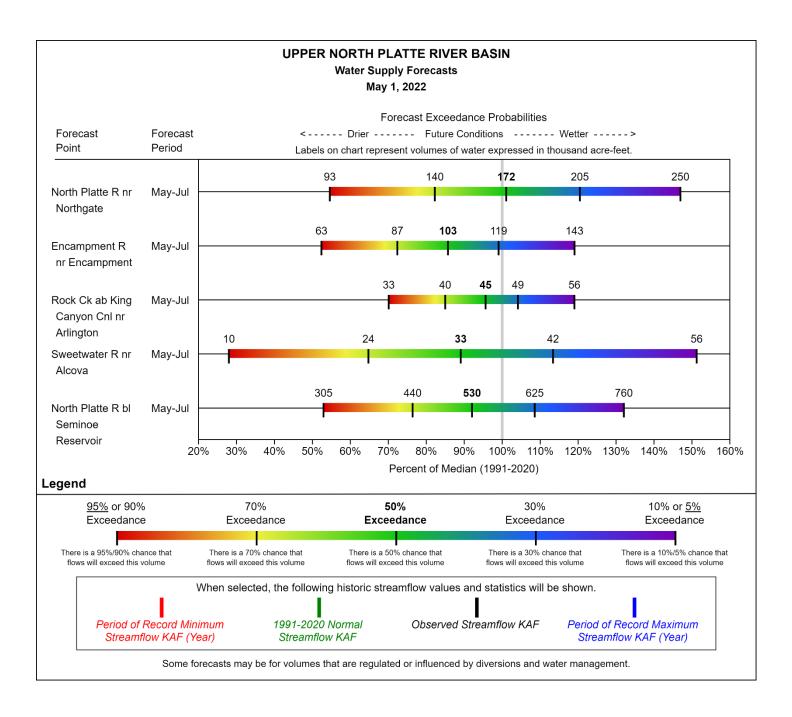
Upper North Platte River Basin

- The overall Upper North Platte River Basin SWE is around 95% of median.
- Last month's precipitation for the Upper North Platte River Basin was near 110% of median. Water-year-to-date precipitation is around 95% of median.
- Current reservoir storage is near **85**% of median for two main reservoirs in the basin.
- Streamflow forecasts for May through July have remained **below** median (94%) for this basin. Seminoe Reservoir inflows are forecasted to be 92% of median.





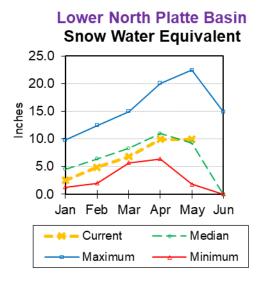


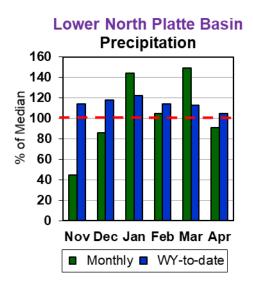


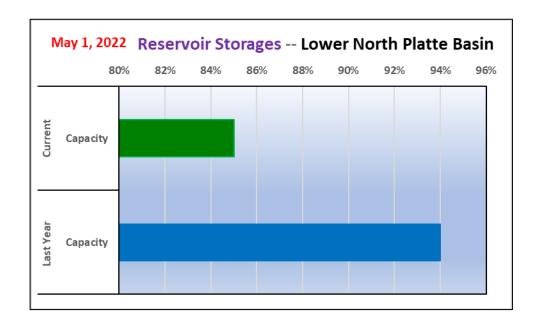


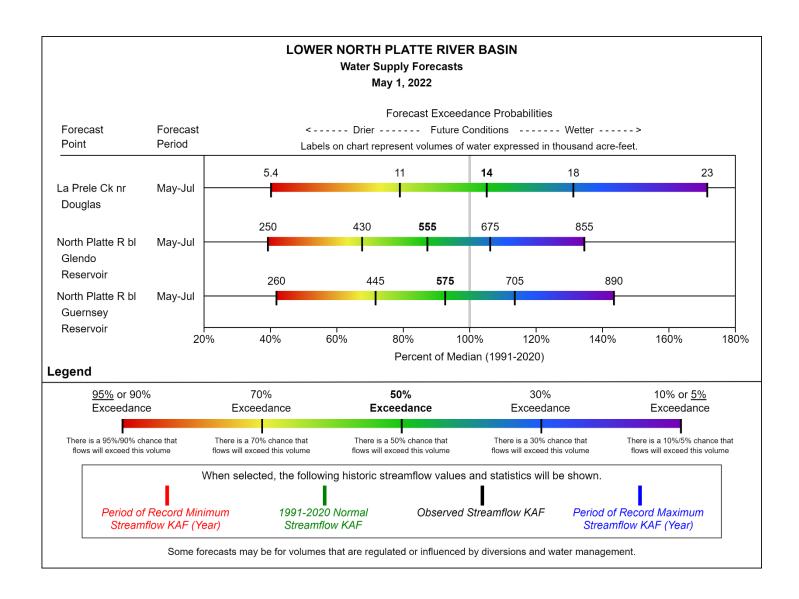
Lower North Platte River Basin

- The overall Lower North Platte River Basin SWE improved to near 105% of median.
- Last month's precipitation for the Lower North Platte River Basin was near 90% of median. Water-year-to-date precipitation remains around 105% of median.
- Current reservoir storage remains near **95**% of median for three main reservoirs in the basin.
- The 50% exceedance forecasts for May through July are **below** median (95%) for this basin. La Prele Creek near Douglas is forecasted to have flows at 105% of median.





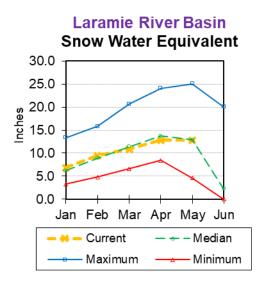


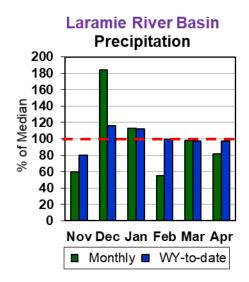


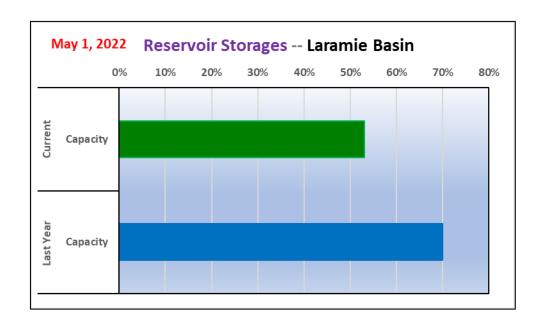


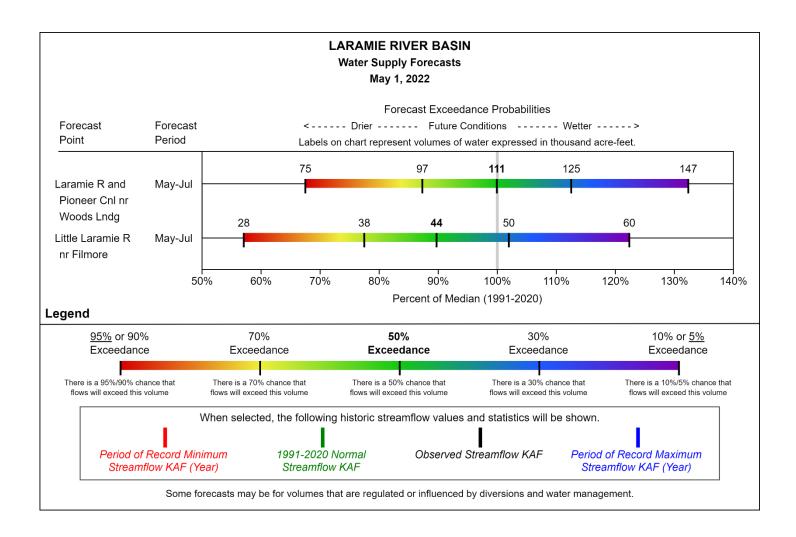
Laramie River Basin

- The overall Laramie River Basin SWE is around 95% of median.
- Last month's precipitation for the Laramie River Basin was near **80**% of median. Water-year-to-date precipitation is close to **95**% of median.
- Current reservoir storage remains around 80% of median for one main reservoir in the basin
- Streamflow forecasts for May through July remain **below** median (95%) for this basin. Laramie River near Woods Landing is expected to have flows at 100% of median.









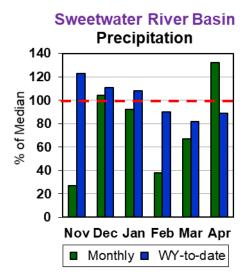


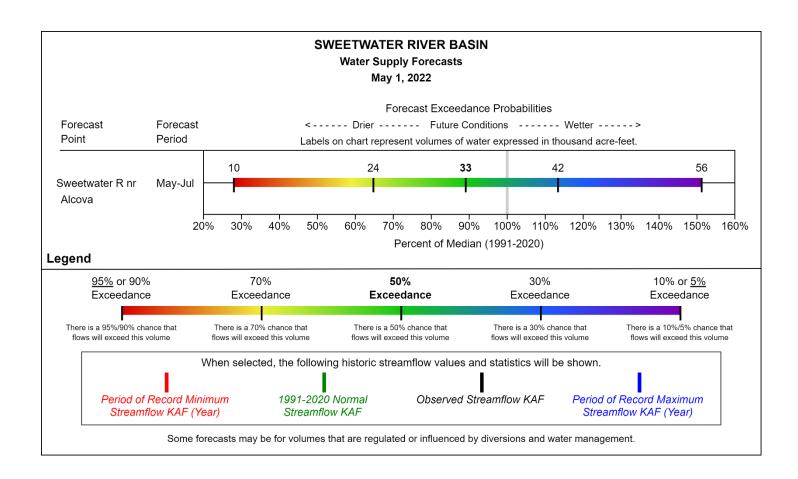
Sweetwater River Basin

- The overall Sweetwater River Basin SWE is close to 75% of median.
- Last month's precipitation for the Sweetwater River Basin was close to 130% of median. Water-year-to-date precipitation is near 90% of median.
- Streamflow forecasts for May through July remain below median (89%) for this basin.

Sweetwater River Basin Snow Water Equivalent 30.0 25.0 20.0 15.0 10.0 Jan Feb Mar Apr May Jun — Current — Median — Maximum — Minimum



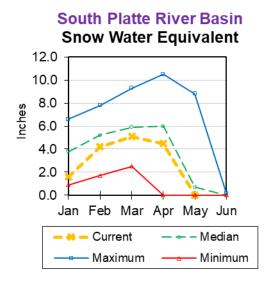


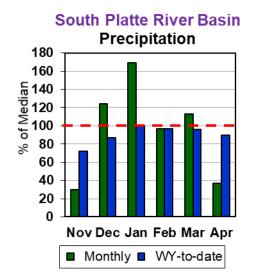




South Platte River Basin (WY)

- The overall South Platte River Basin SWE is around 70% of median.
- Last month's precipitation for the South Platte River Basin was between 35 and 40% of median. Water-year-to-date precipitation is near 90% of median.





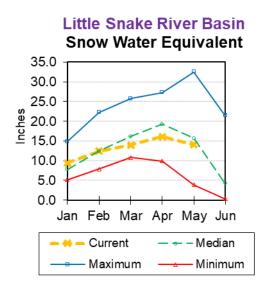
No reservoir data for the basin.

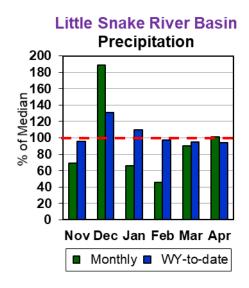
There are \underline{no} streamflow forecast points for the basin.

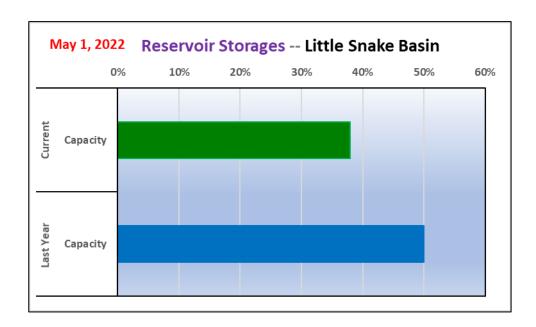


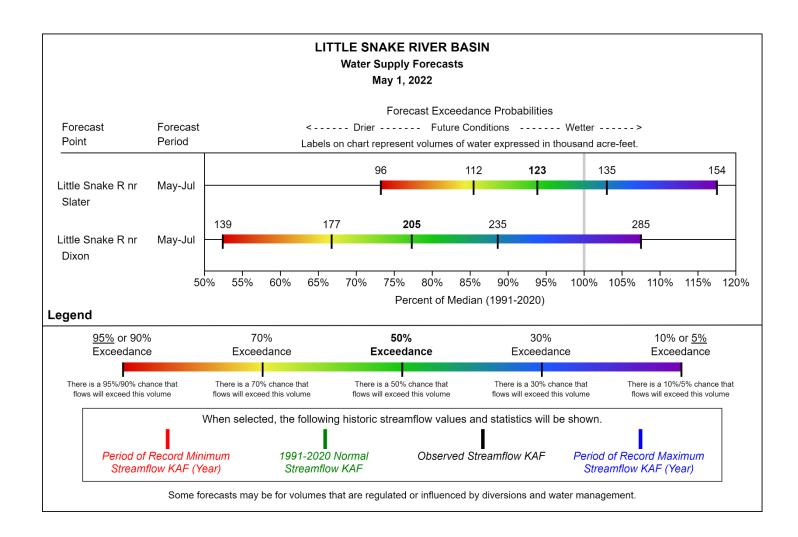
Little Snake River Basin

- The overall Little Snake River Basin SWE is near 90% of median.
- Last month's precipitation for the Little Snake River Basin was near 100% of median. Water-year-to-date precipitation remains close to 95% of median.
- Current reservoir storage remains near **55**% of median for one main reservoir in the basin
- The 50% exceedance forecasts for May through July remain below median (86%) for this basin.





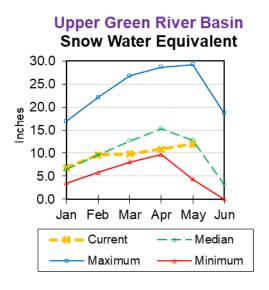


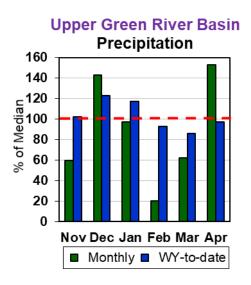


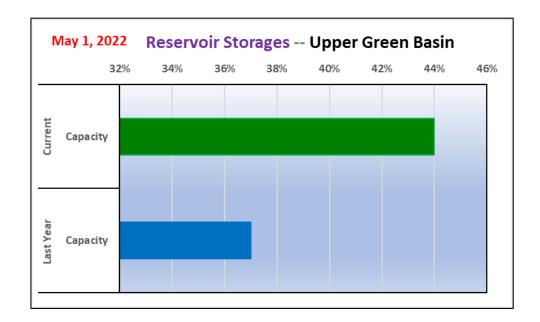


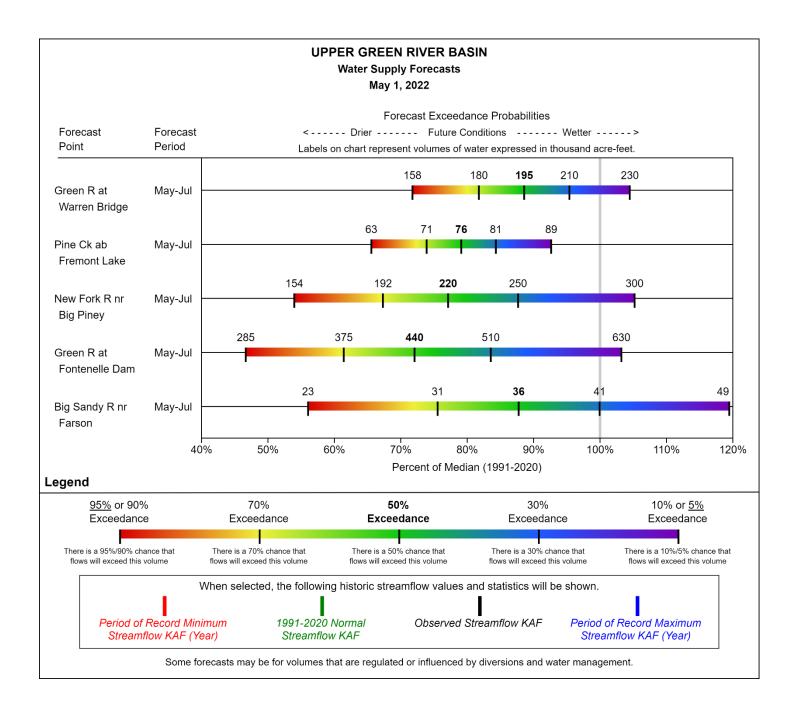
Upper Green River Basin

- The overall Upper Green River Basin SWE improved to near 95% of median.
- Last month's precipitation for the Upper Green River Basin was near 155% of median. Water-year-to-date precipitation is around 95% of median.
- ullet Current reservoir storage is close to 105% of median for two main reservoirs in the basin.
- Streamflow forecasts for May through July have improved but remain **below** median (81%) for this basin. Fontenelle Reservoir inflows are expected to be 72% of median.





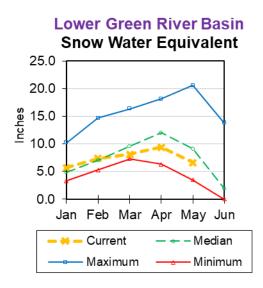


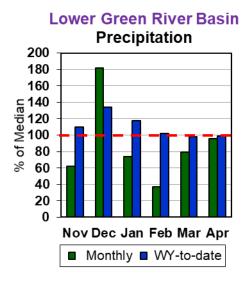


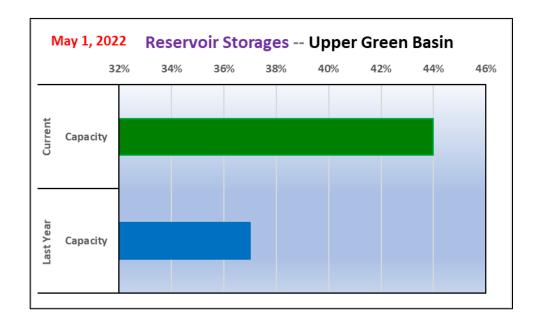


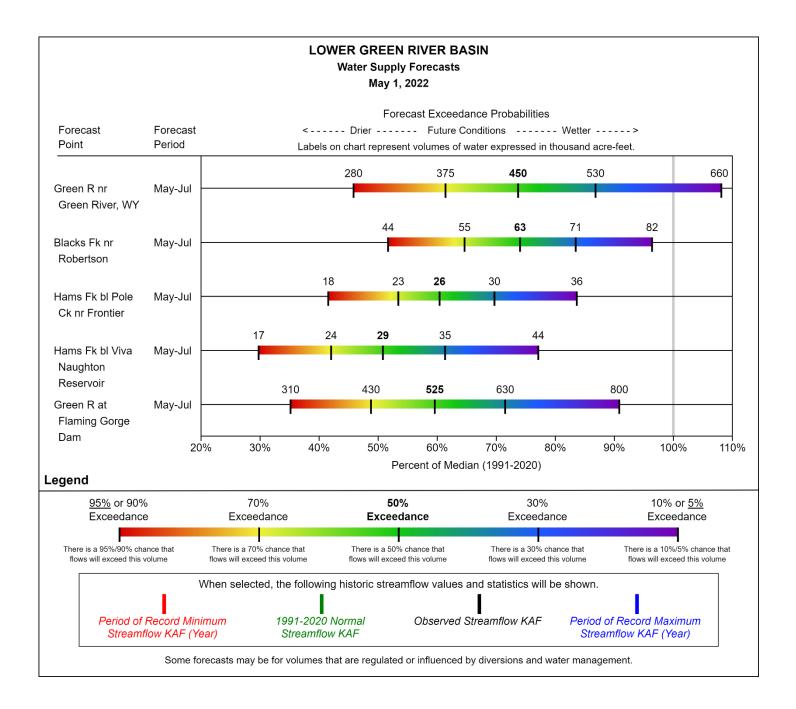
Lower Green River Basin

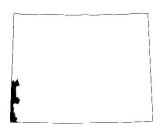
- The overall Lower Green River Basin SWE is near 75% of median.
- Last month's precipitation for the Lower Green River Basin was near 95% of median. Water-year-to-date precipitation remains around 100% of median.
- Current reservoir storage remains 95% of median for four main reservoirs in the basin.
- Streamflow forecasts for May through July remained **well below** median (67%) for this basin. Flaming Gorge Reservoir inflows are forecasted to be 60% of median.





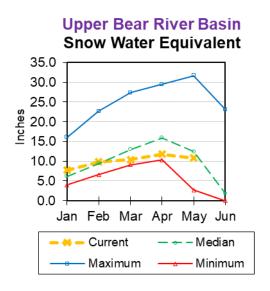


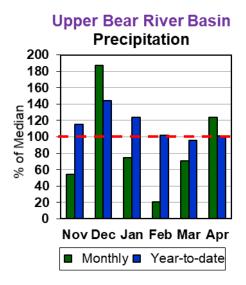


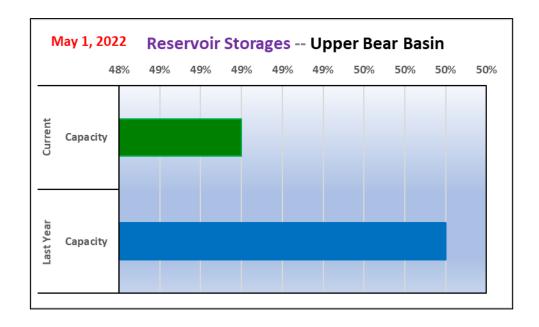


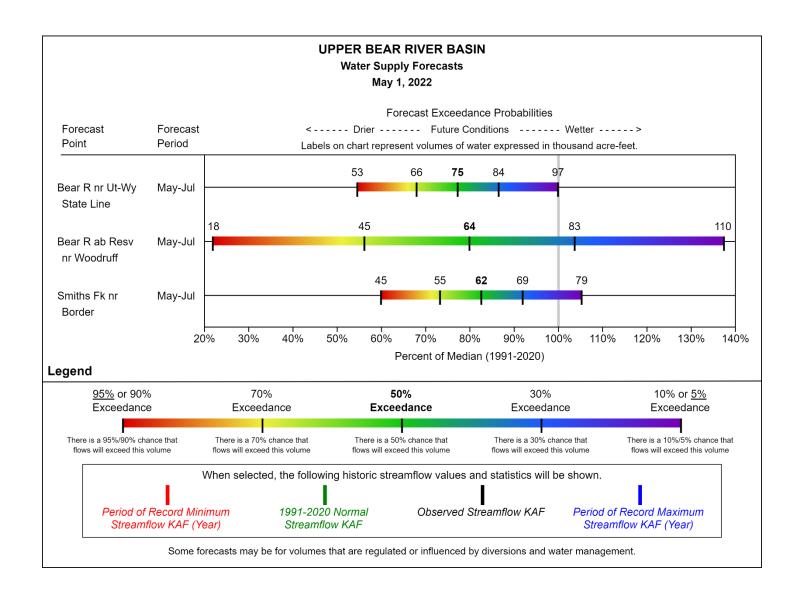
Upper Bear River Basin

- The overall Upper Bear River Basin SWE improved to near 90% of median.
- Last month's precipitation for the Upper Bear River Basin was near 125% of median. Water-year-to-date precipitation is around 100% of median.
- \bullet Current reservoir storage is near $50\,\%$ of median for two main reservoirs in the basin.
- The 50% exceedance forecasts for May through July improved but remain **below** median (80%) for this basin. Bear River above Woodruff Narrows Reservoir is expected to have flows at 80% of median.









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 <u>streamflow</u> 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

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Issued by:

Released by:

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

Astrid Martinez 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