

May 1, 2019 Water Supply Forecast Discussion

The [Colorado Basin River Forecast Center \(CBRFC\)](#) geographic forecast area includes the Upper Colorado River Basin, Lower Colorado River Basin, and Eastern Great Basin.

Water Supply Forecast Summary:

The majority of the Upper Colorado River and Great Basin April-July water supply forecasts increased between April and May. The forecasts at locations that did not increase had minimal changes from early April.

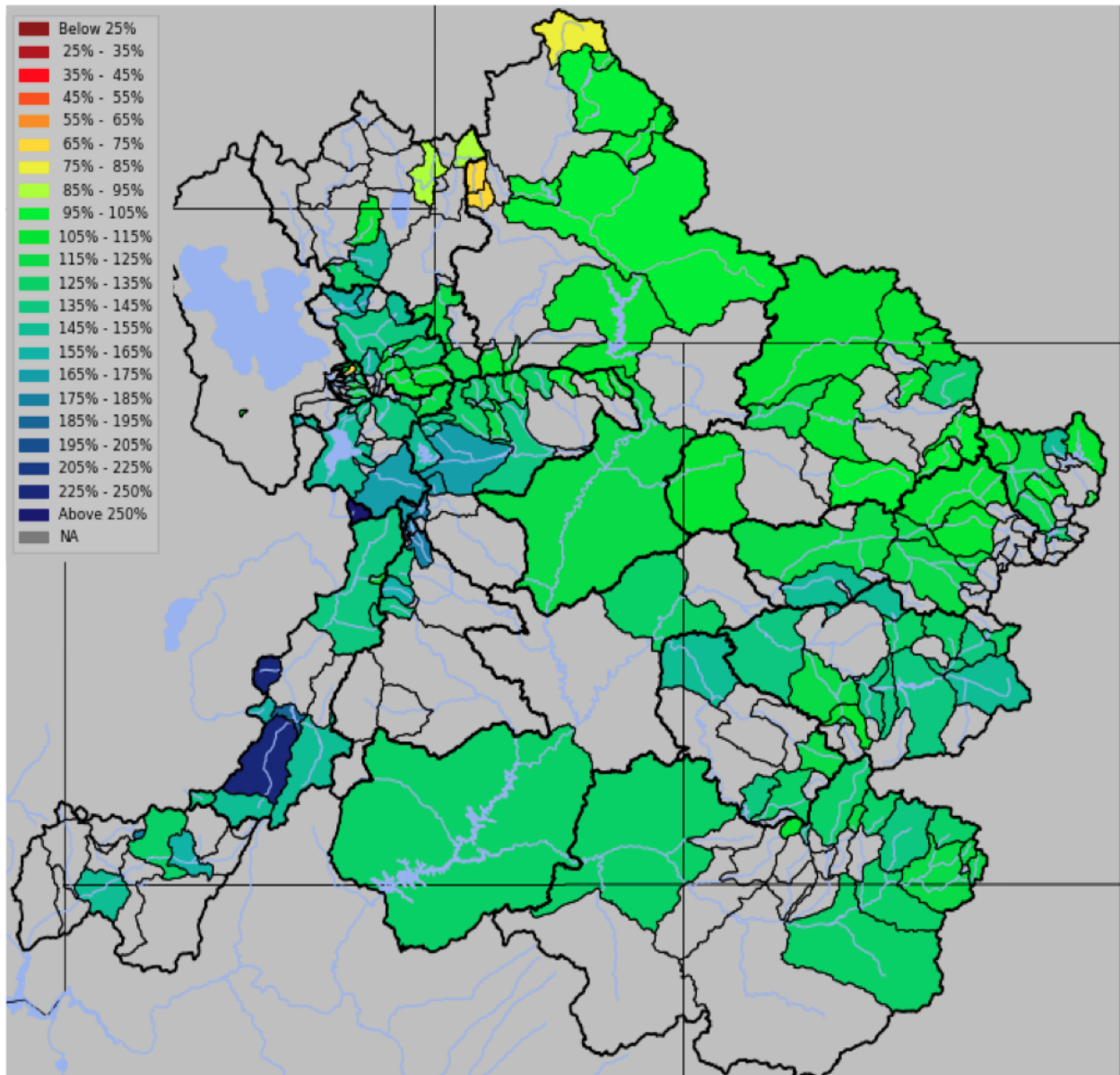
Widespread significant precipitation occurred over the Green River Basin in Wyoming, the Great Basin and the Sevier and San Rafael River basins during the first half of April. The remainder of the Upper Colorado River Basin was mostly dry and received minimal precipitation the first half of the month. However, river basins in Colorado benefited from a significant precipitation event the last four days of the month. Specifically, the Gunnison River basin and Upper Colorado River basin headwaters received up to or more than the average monthly total precipitation during this time period.

The largest increases in water supply forecasts between April 1st and May 1st occurred in the Green River basin in Wyoming, and the San Juan, Gunnison, and Dolores River Basins. Significant increases also occurred throughout the Great Basin, Duchesne, San Rafael and Sevier River Basins in Utah. Forecasts in the Upper Colorado River headwaters and Yampa River basins had slight increases or remained similar to the April 1st forecasts. April-July runoff volume forecasts now range from near 115 to 200 percent of average. Currently only a few northern headwater basins of the Green River Basin in Wyoming and the Great Basin (Bear River Basin) have forecasts below average for the 2019 season.

Very dry soil moisture conditions were widespread entering the winter season. These may have some impact on the overall yield of runoff that ends up in the streams depending on how the snow melt plays out. In areas with significant snowpack or where snowmelt is delayed the impacts of dry soils may be lessened.

April-July unregulated inflow forecasts for some of the major reservoirs in the Upper Colorado River Basin include Fontenelle Reservoir 740 KAF (102% average), Flaming Gorge 1050 KAF (108% of average), Blue Mesa Reservoir 970 KAF (144% of average), McPhee Reservoir 420 KAF (142% of average), and Navajo Reservoir 930 KAF (127% of average). The Lake Powell inflow forecast is 9.20 MAF (128% of average).

Seasonal Water Supply Forecasts:



Upper Colorado, Great, Virgin River Basins: 2019 April-July forecast volumes as a percent of 1981-2010 average (50% exceedance probability forecast)

For specific site water supply forecasts, refer to: <https://www.cbrfc.noaa.gov/rmap/wsuf/wsulist.php>

Water Supply Discussion

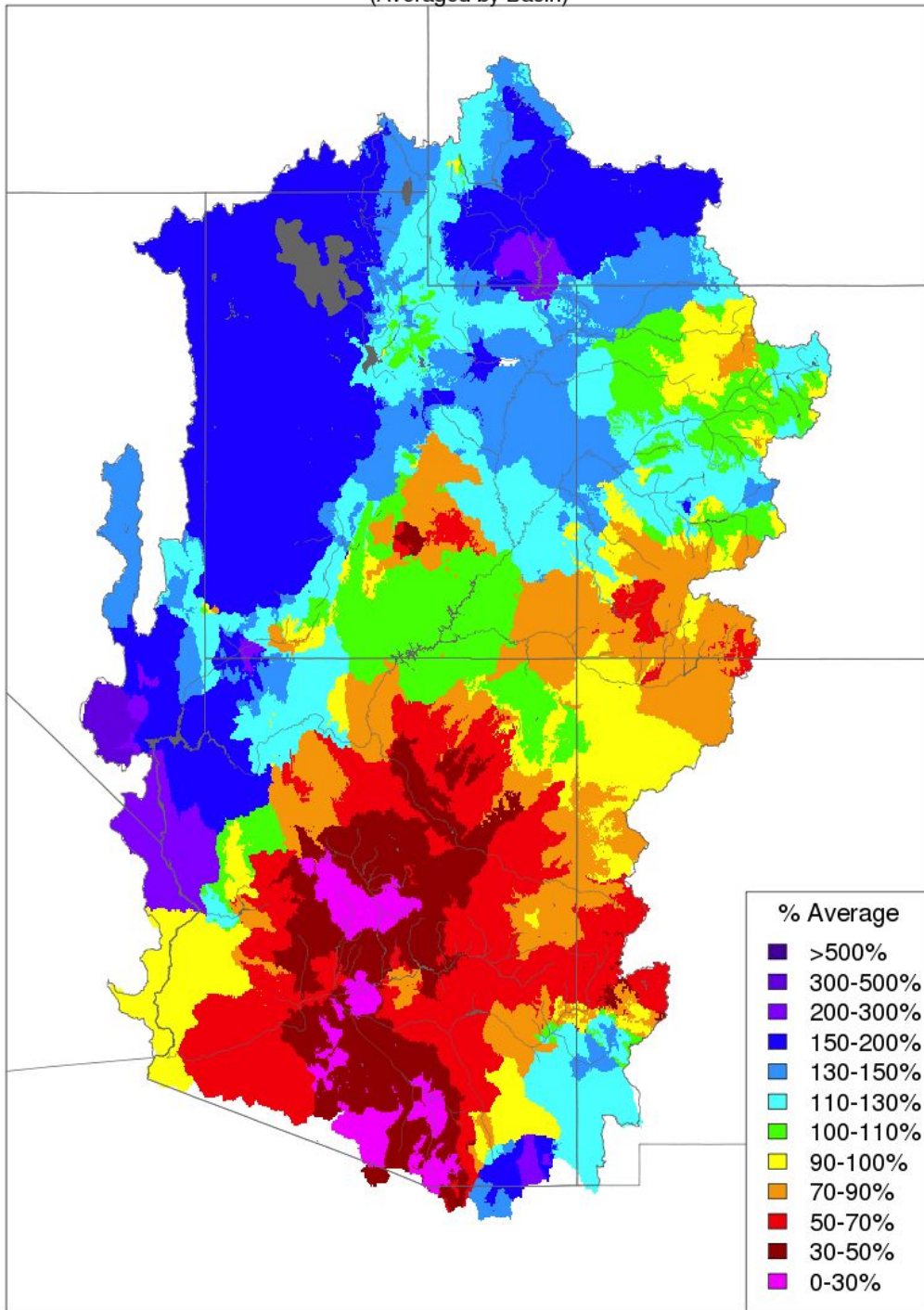
April Weather Synopsis-Precipitation-Temperature:

Storm systems favored central/northern Utah and southwest Wyoming for the first half of April. Areas including the Great Basin, Sevier River Basin and the Green River Basin received above average precipitation for the first two weeks of April. River basins in Colorado did not benefit from the storm track early in the month. However, areas in Colorado benefited from a significant precipitation event the last four days of the month which continued into the first few days of May. Specifically, the Gunnison River basin and Upper Colorado River basin headwaters received up to or more than the average monthly total precipitation during this time period.

By the end of the month, the highest wet anomalies (in percent of normal terms) were across the Green River basin in Wyoming, the Duchesne River Basin, parts of central Utah and the Great Basin including the Bear, Weber, Six Creeks, Provo, and Sevier River basins where precipitation was 120-140% of average. Other basins including the Upper Colorado Headwaters, Gunnison River Basin and the Yampa River Basin ended the month with precipitation near 100-105% of average. These areas would have ended the month with below average precipitation and a resulting decrease in water supply forecasts had it not been for the storm at the end of the month. The San Juan River Basin, Dolores River Basin and the Lower Colorado River Basin in Arizona all received below average precipitation for April.

Monthly Precipitation - April 2019

(Averaged by Basin)



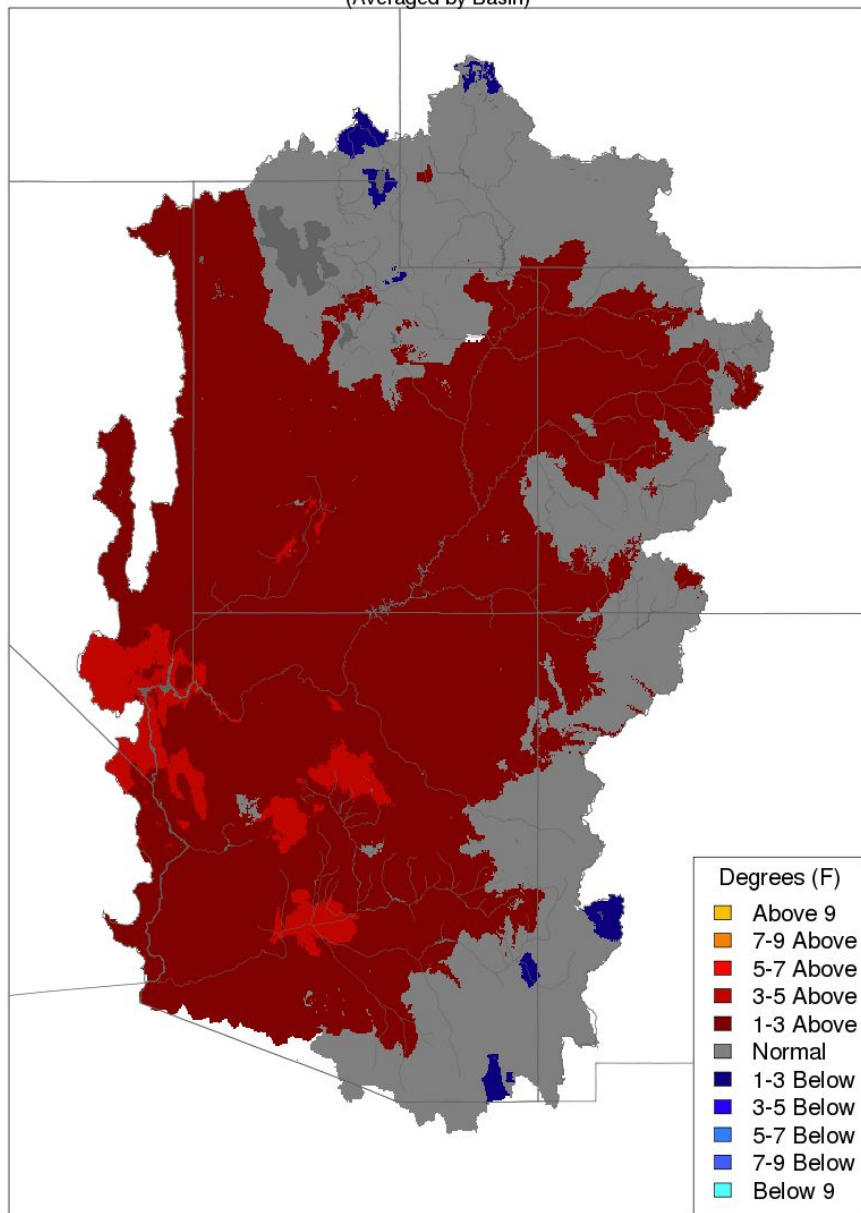
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Salt Lake City, Utah, www.cbrfc.noaa.gov

April 2019 Percent of Normal Precipitation
(Averaged by basins defined in the CBRFC hydrologic model)

April was slightly warmer than normal over most of the CBRFC forecast area with the exception of the northern Great Basin and Wyoming which had near normal temperatures. Also it is important to note that the highest elevations also had near normal temperatures. The above normal temperatures resulted in low and mid elevation snowmelt but minimal melt occurred at high elevations.

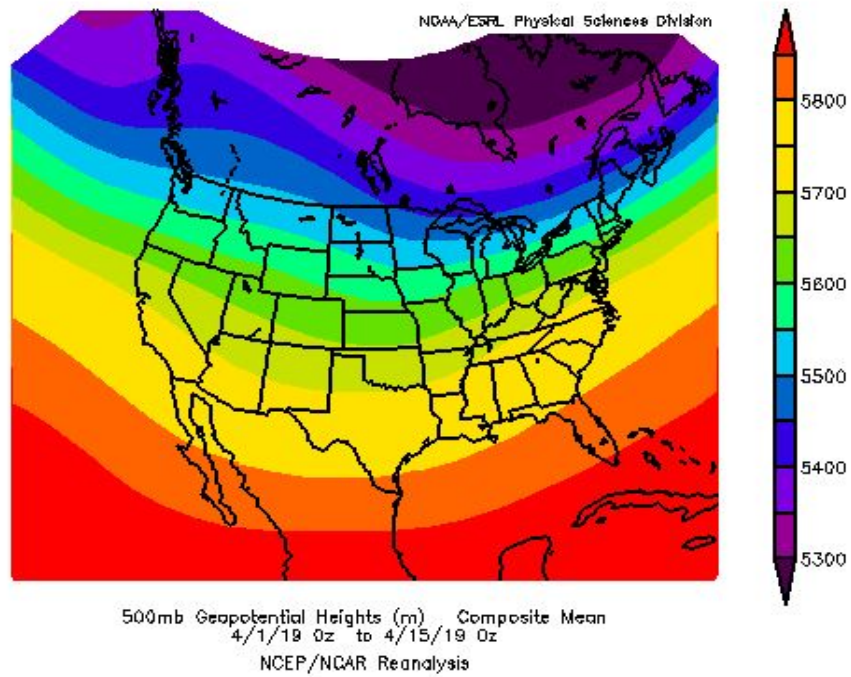
Max Temp - Monthly Deviation - April 2019

(Averaged by Basin)

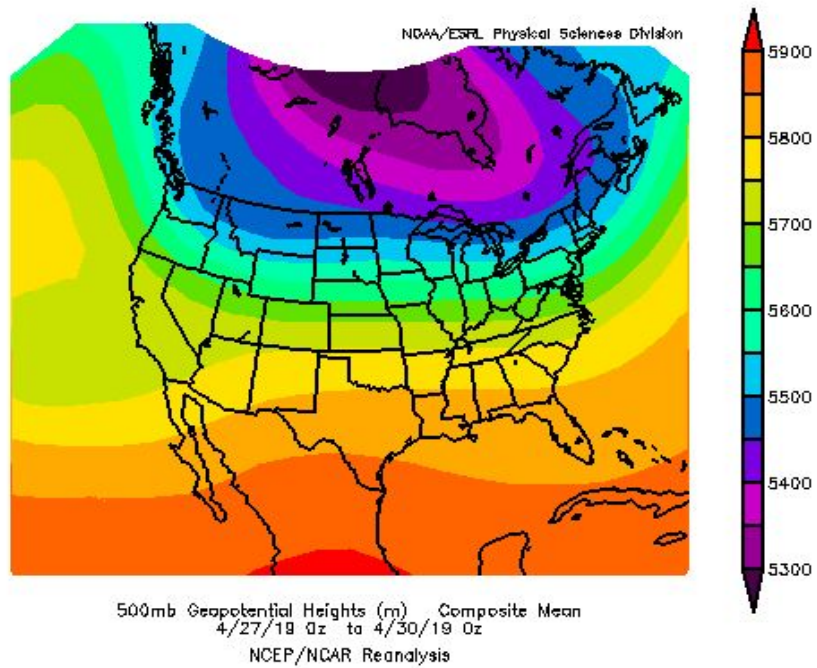


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*April 2019 Mean Monthly Maximum Temperature (Deviation from normal)
(Averaged by basins defined in the CBRFC hydrologic model)*



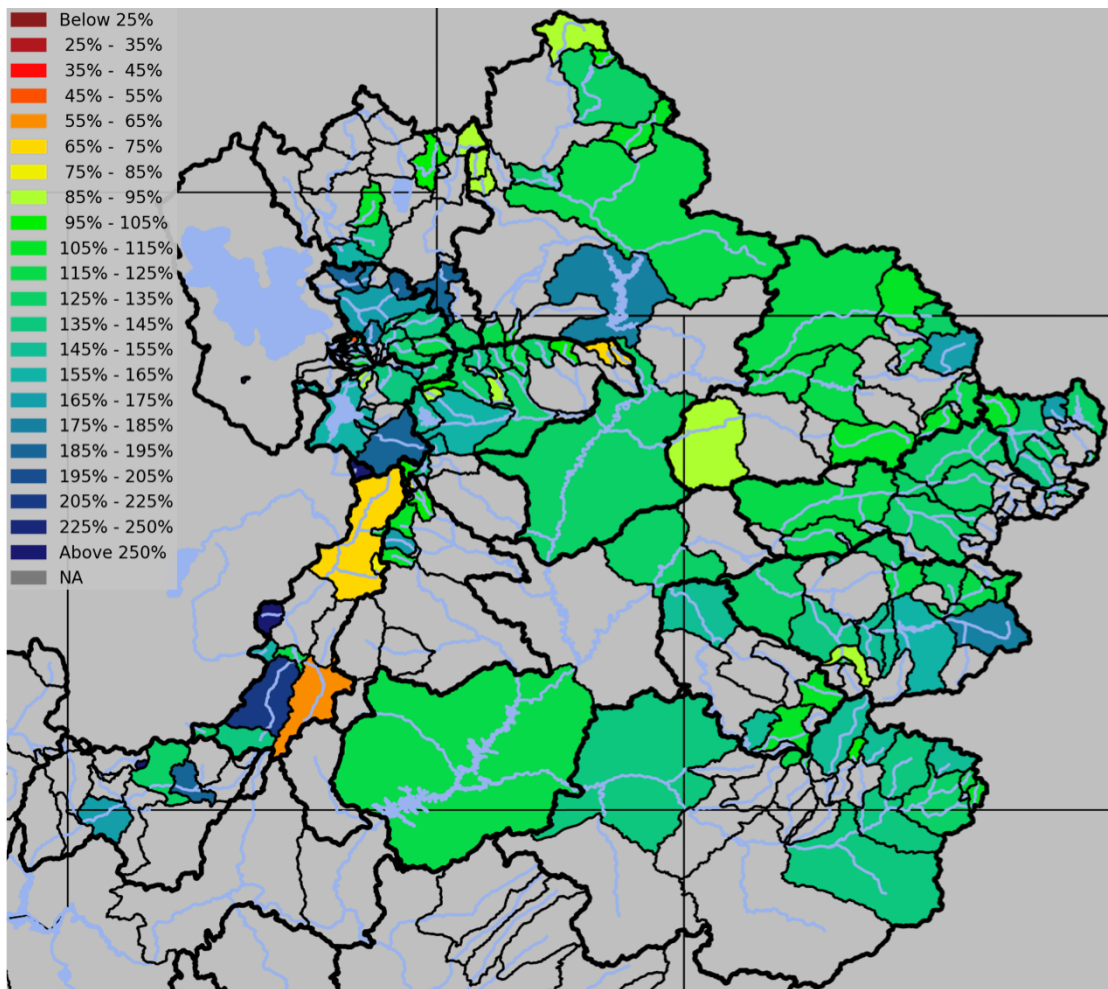
Mean 500mb height pattern from April 1-15.



Mean 500mb height pattern from April 27-30.

Observed Flow:

Above normal April temperatures caused significant snowmelt at lower and mid elevations and above average streamflows across most of the Upper Colorado Basin and Great Basin. Largest April flows, as a percent of the 1981-2010 average, occurred in the Great Basin and southwest Utah, where many sites had upwards of 200 percent of the average. Observed April streamflow in most Upper Colorado River basins ranged between 115-150 percent of average and generally increased from north to south.



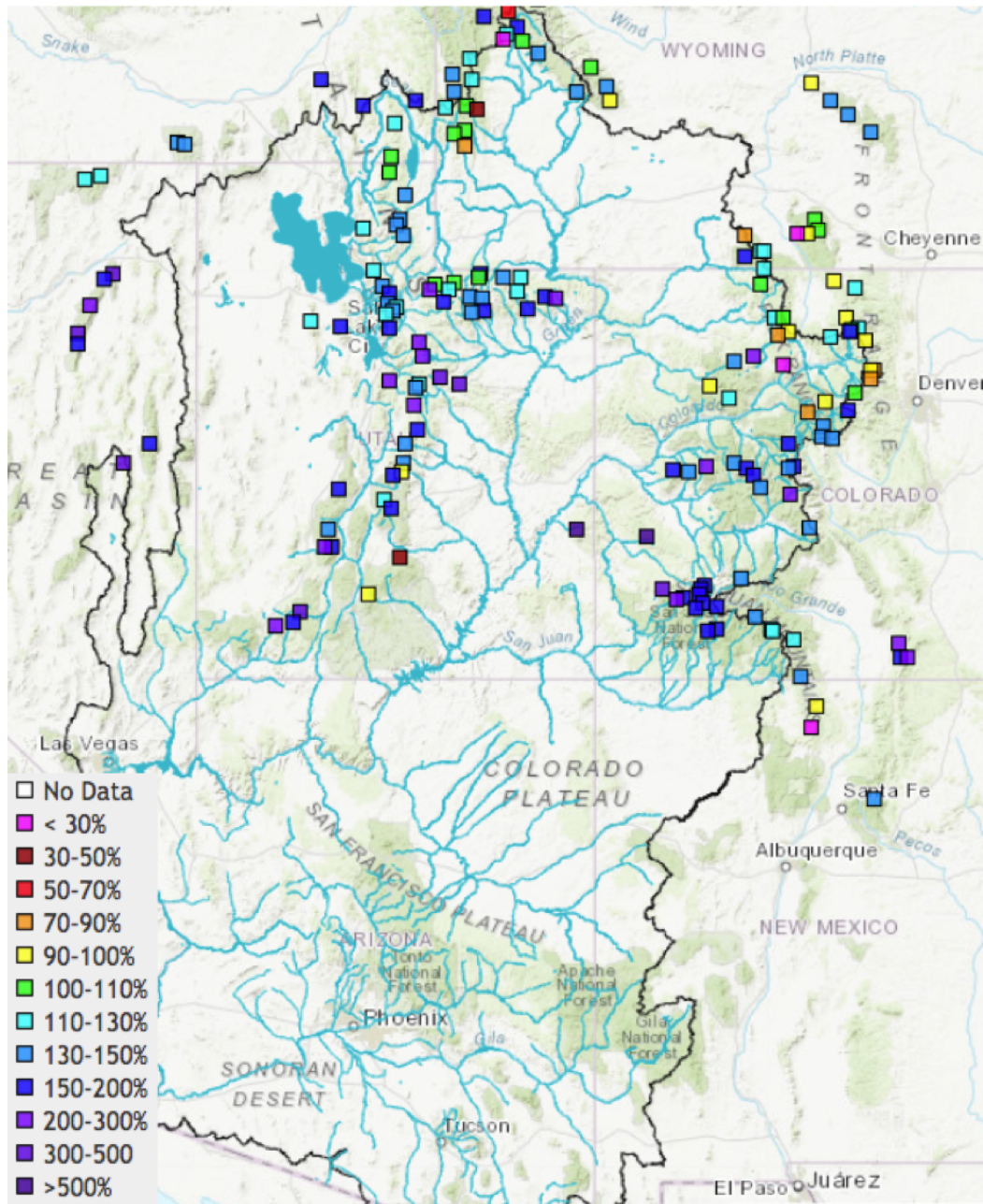
Upper Colorado, Great, Virgin River Basins April 2018 unregulated volumes as a percent of the 1981-2010 average.

Snowpack:

In the spring after the normal time of peak snowpack has passed, percent median snow water equivalent (SWE) can be misleading and vary significantly from day to day, as well as site to site, depending on the rate of snowmelt, new snow accumulation, and the magnitude of the median value. That being said, much above normal (median) snow conditions exist across much of Utah and western Colorado and are generally higher in locations farther south.

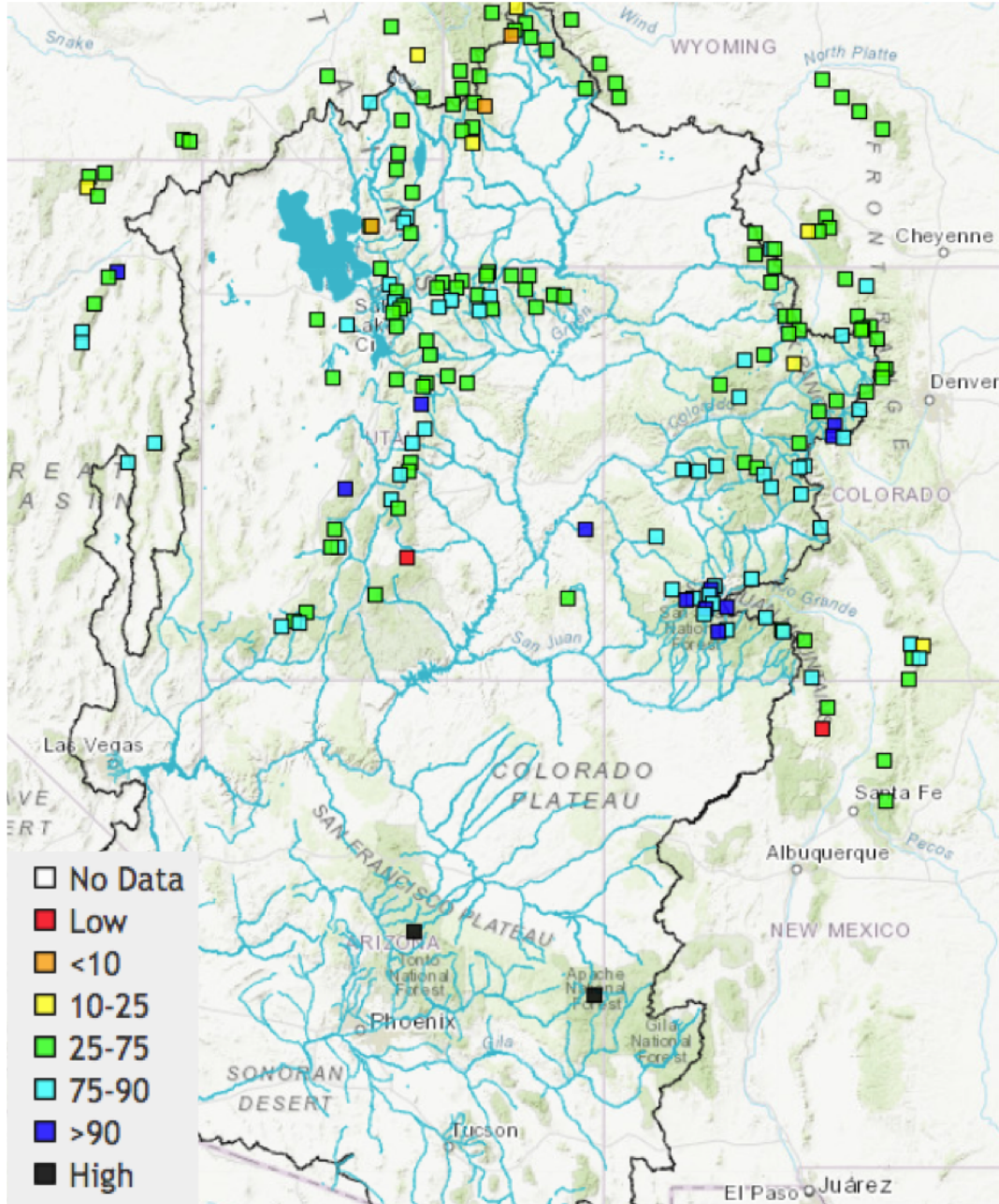
The following maps show the SNOTEL sites as a percent of normal (1981-2010 median) and also as a historical ranking for their period of record. The snow as represented in the CBRFC hydrologic model is also displayed.

The image below displays the SNOTEL sites as a percent of their historical median as of May 3, 2019. Sites in the dark blue currently exceed 150 percent of median (or normal) for this time of year while sites in purple are at 200 percent or more of normal.



Percent median SNOTEL conditions as of May 3, 2019.

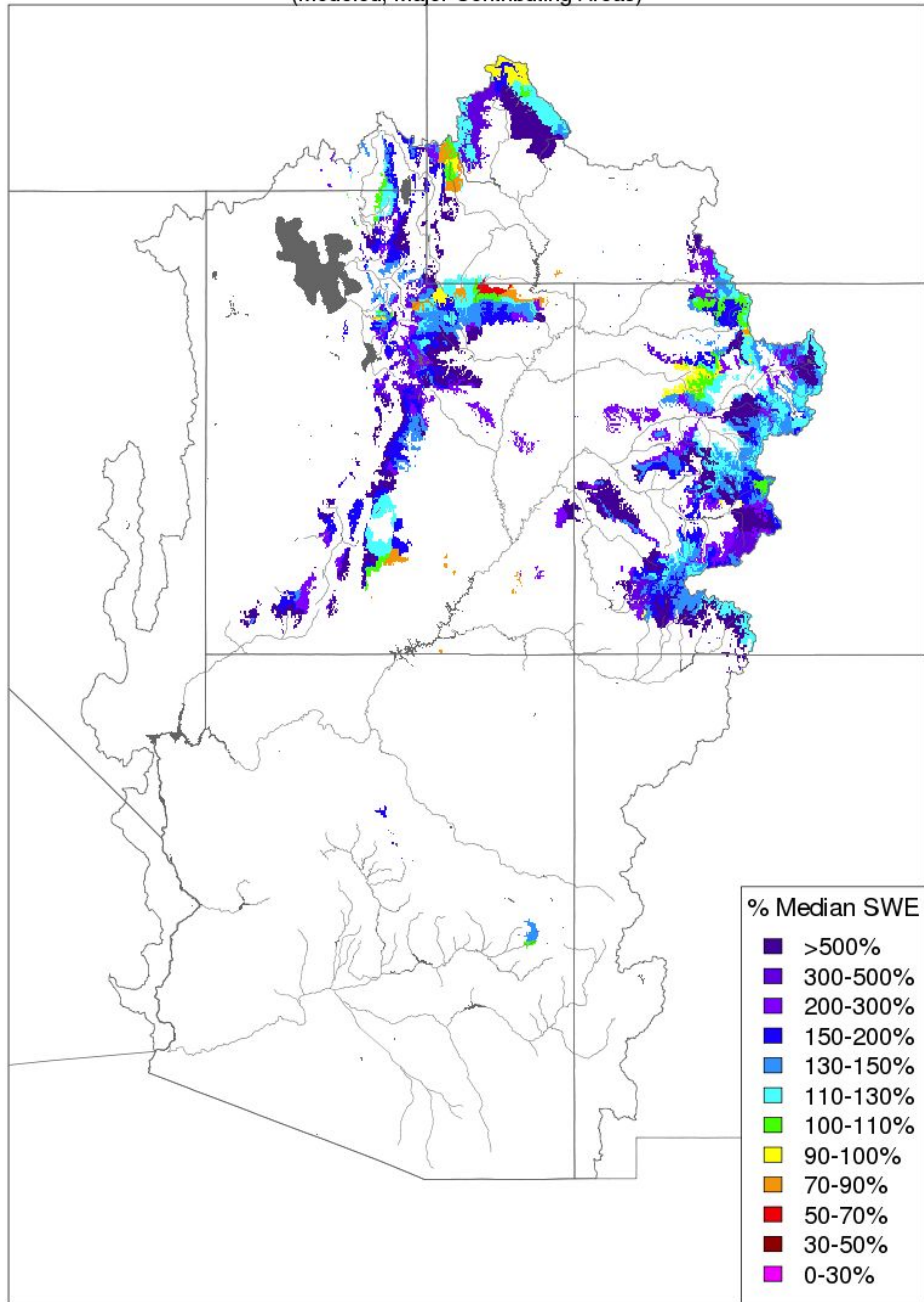
The snow percentile image displayed below indicates where the current snow measurement ranks in the historical record (typically 35-40 years) for each site. Sites in the dark blue are in the top 3 of their historical record, while those in the brighter blue are in the top ten. This map helps highlight the areas with unusually high snowpack at this time, such as the San Juan basin in southwest Colorado. It should be noted that the snow water equivalent at the two sites in Arizona is currently near zero.



Percentile ranking of SNOTEL conditions as of May 3, 2019.

The image below is the representation of snow in the CBRFC hydrologic model. Model snow conditions correlate closely to the SNOTEL sites throughout the Upper Colorado River Basin and Great Basin. This map also shows that the percent of normal snow in elevations below approximately 9500 feet is greater than the percent of normal snow at higher elevations.

Snow Conditions - May 03 2019
(Modeled, Major Contributing Areas)



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Salt Lake City, Utah, www.cbrfc.noaa.gov

CBRFC hydrologic model snow from May 3, 2019.

For updated SNOTEL information refer to: <https://www.cbrfc.noaa.gov/lmap/lmap.php?interface=snow>

For CBRFC hydrologic model snow: <https://www.cbrfc.noaa.gov/rmap/grid800/index.php?type=snow>

Soil Moisture:

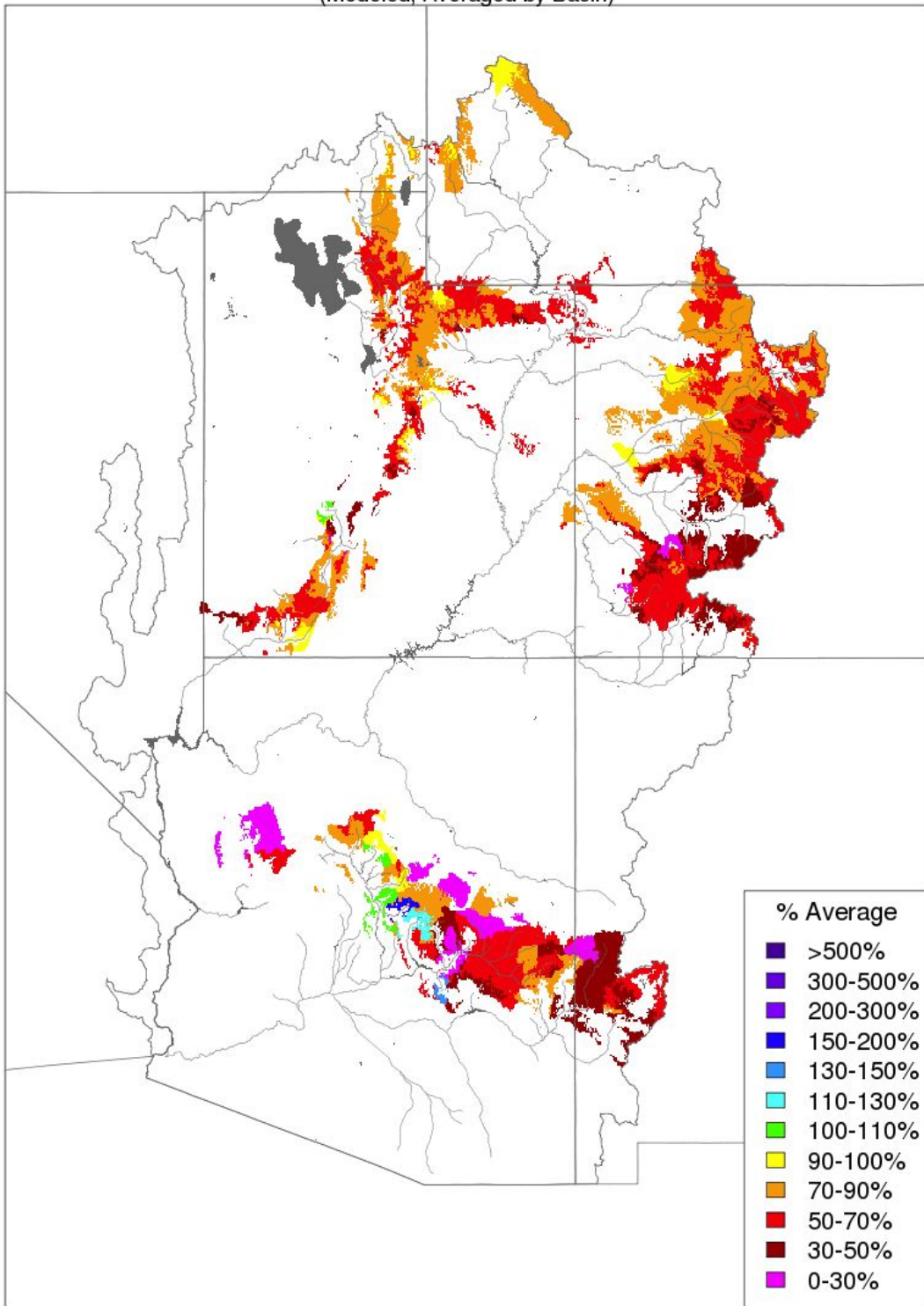
Soil moisture conditions in the higher elevation headwater areas are important entering the winter, prior to snowfall, as it can influence the efficiency of the snowmelt runoff the following spring. The effects are most pronounced when soil moisture conditions and snowpack conditions are both much above or much below average. In areas where the soil moisture was below average entering the winter and the current snowpack is also much below median, spring runoff may be further reduced.

Modeled soil moisture conditions as of November 15th were below average over most of the Upper Colorado River Basin and Great Basin. In the Upper Colorado River Mainstem River Basin, soil moisture conditions were below average in headwater basins along the Continental Divide, and closer to average downstream. Soil moisture conditions in the Gunnison, Dolores, and San Juan basins were much below average.

In the map below areas in cool colors (e.g. blue and purple) are above the historical model soil moisture average while those in the warm colors (e.g. red and orange) indicate below average conditions. Only the higher elevations which contribute the most to runoff are displayed.

Soil Moisture - November 15 2018

(Modeled, Averaged by Basin)

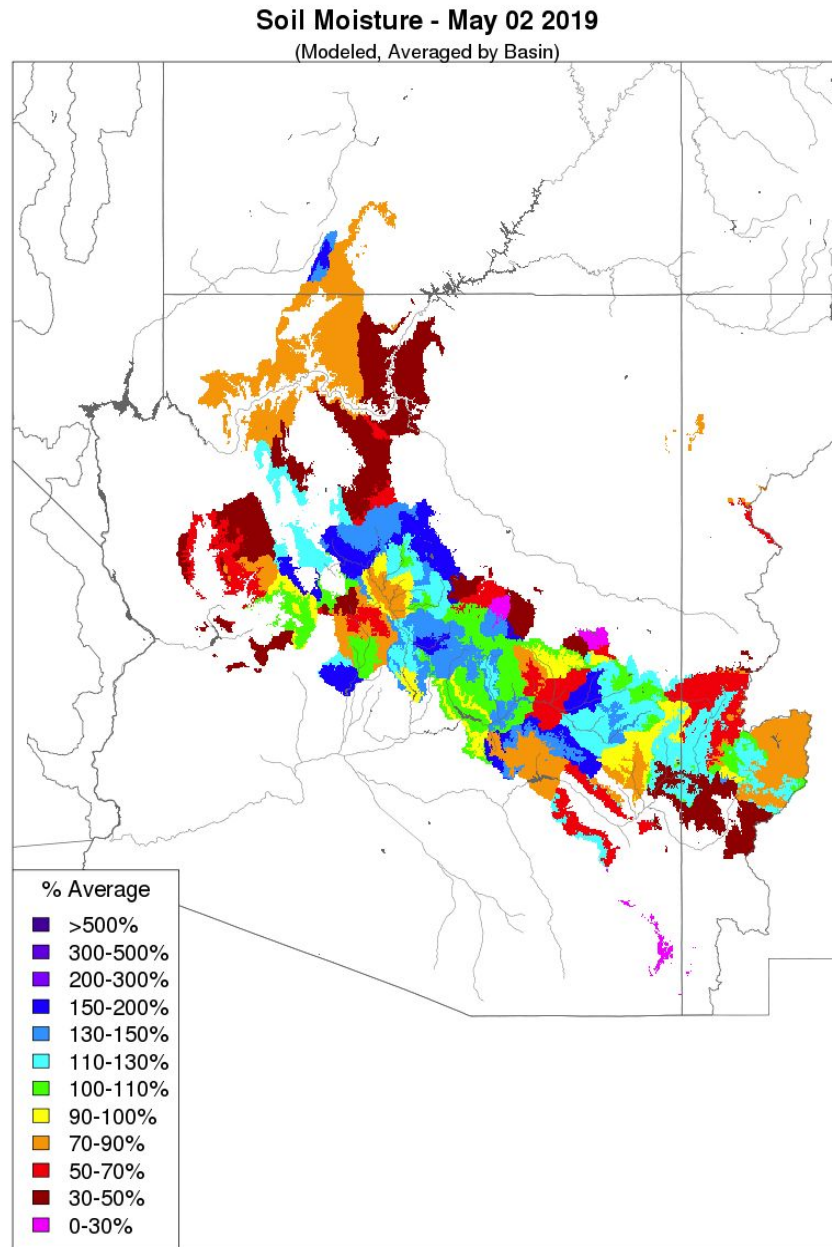


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CBRFC hydrologic model soil moisture entering the winter season.

Soil moisture conditions tend to fluctuate more in the Lower Colorado River Basin of Arizona and New Mexico in the winter due to the frequency of rain events and snow accumulation/melt. Soil conditions in the fall are less informative than they are in the northern basins that remain under snowpack throughout the winter season.

Early May soil moisture conditions are near to above average across much of the Lower Colorado River Basin due to a combination of precipitation events and snowmelt throughout the water year. Basins with above average soil moisture conditions can be expected to experience more efficient runoff from additional rainfall or snowmelt. However, large precipitation events become increasingly more unlikely in the Lower Colorado River Basin this time of year.

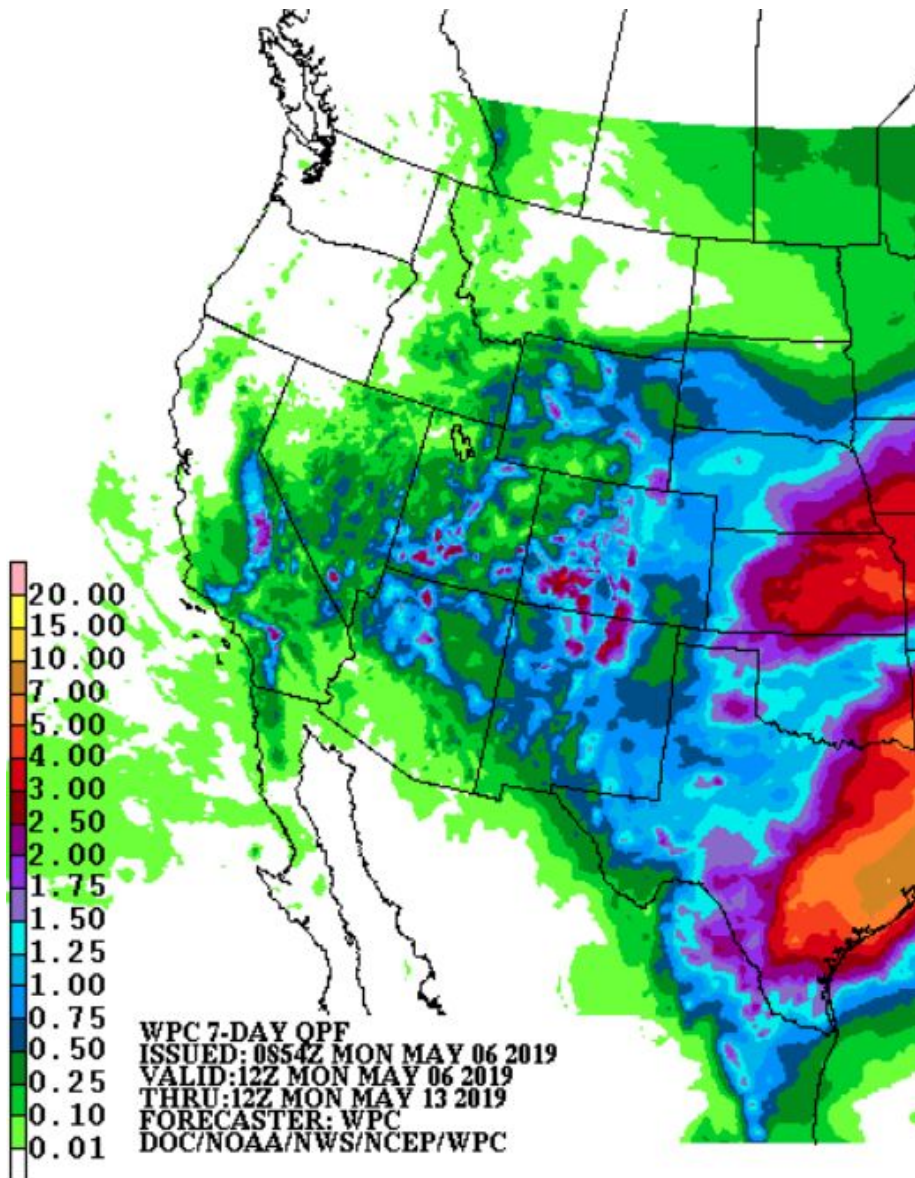


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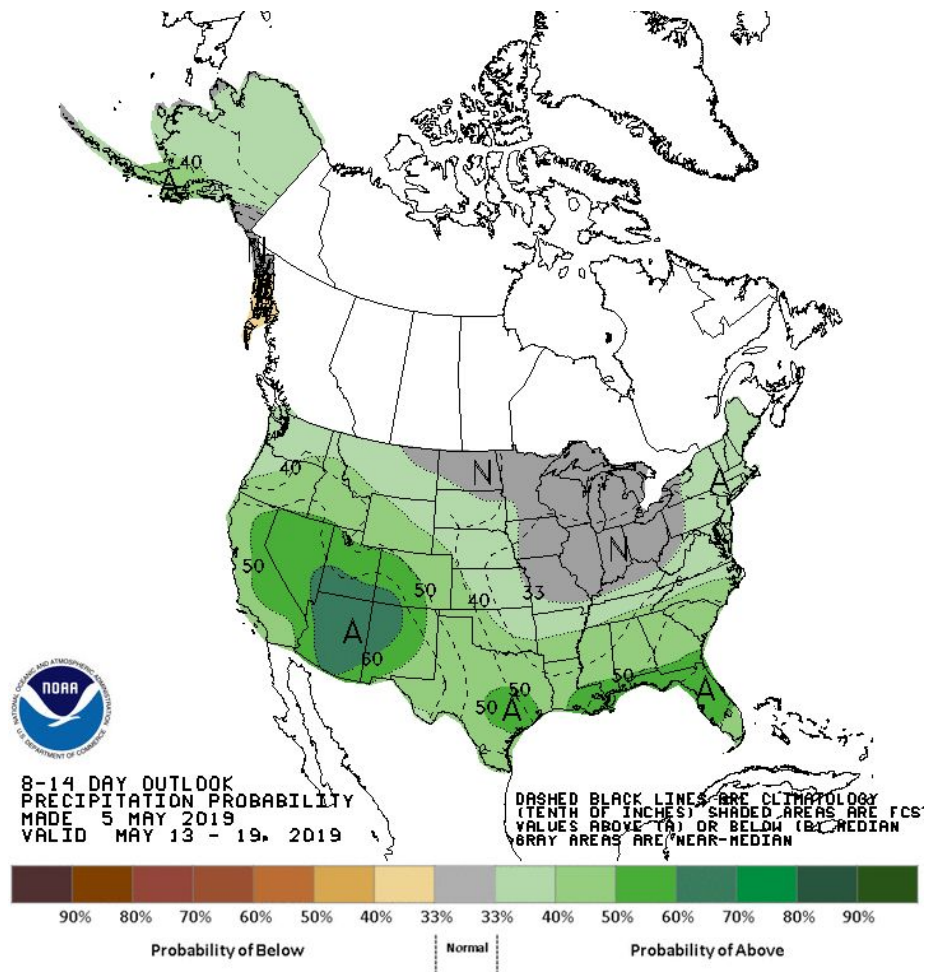
Lower Colorado River Basin (AZ/NM) CBRFC model soil moisture as of May 2, 2019.

Upcoming Weather:

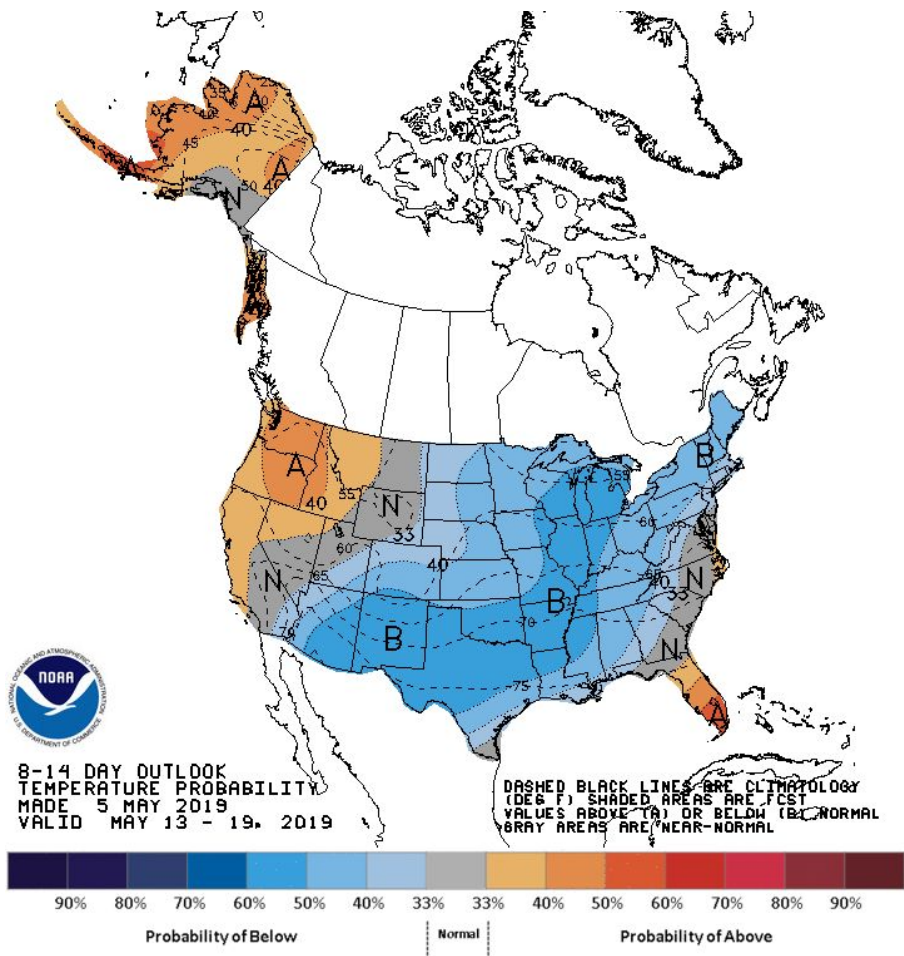
Snowmelt is expected to increase due to above average temperatures and mostly sunny skies during the first weekend of May. A closed low will be approaching the California coast and it's forecast track is currently looking similar to the previous low that was observed at the end of April / beginning of May. There is general agreement among the longer range weather models that another wet and cool period for eastern Utah and western Colorado will occur during the second week of May. Initially, snow levels are forecast to be 9,000 - 10,000 feet, with liquid precipitation potential in the 0.50 - 2.0 inch range. There is more uncertainty in the pattern beyond the second week of May, however models are currently favoring unsettled conditions to continue. The Climate Prediction Center is forecasting increased chances of above normal precipitation and near or below normal temperatures during May 13-19 across most of the CBRFC forecast domain.



NWS Weather Prediction Center precipitation forecast for May 6-13, 2019.



NWS Climate Prediction Center precipitation probability forecast for May 13-19, 2019.



NWS Climate Prediction Center precipitation probability forecast for May 13-19, 2019.

For our online publication that contains basin conditions, summary graphics, and end of month reservoir content tables, refer to: <https://www.cbrfc.noaa.gov/wsupsup/pub2/map/html/cpub.php>