

April 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:

With the exception of the Green River Basin of Wyoming all of the Upper Colorado River Basin experienced an increase in the April-July water supply forecasts between early March and early April. Similarly, much of the Great Basin noted increases with the exception of some of the northernmost sections.

Widespread significant precipitation occurred over most of the area during the first half of March. Storm systems with a sub-tropical moisture source, similar to those that occurred in February, resulted in large precipitation amounts that extended from southwest and central Utah into parts of southwest and central Colorado. In the areas that experienced the heaviest precipitation, snowpack conditions now range in the top three of the historical records dating back 35-40 years.

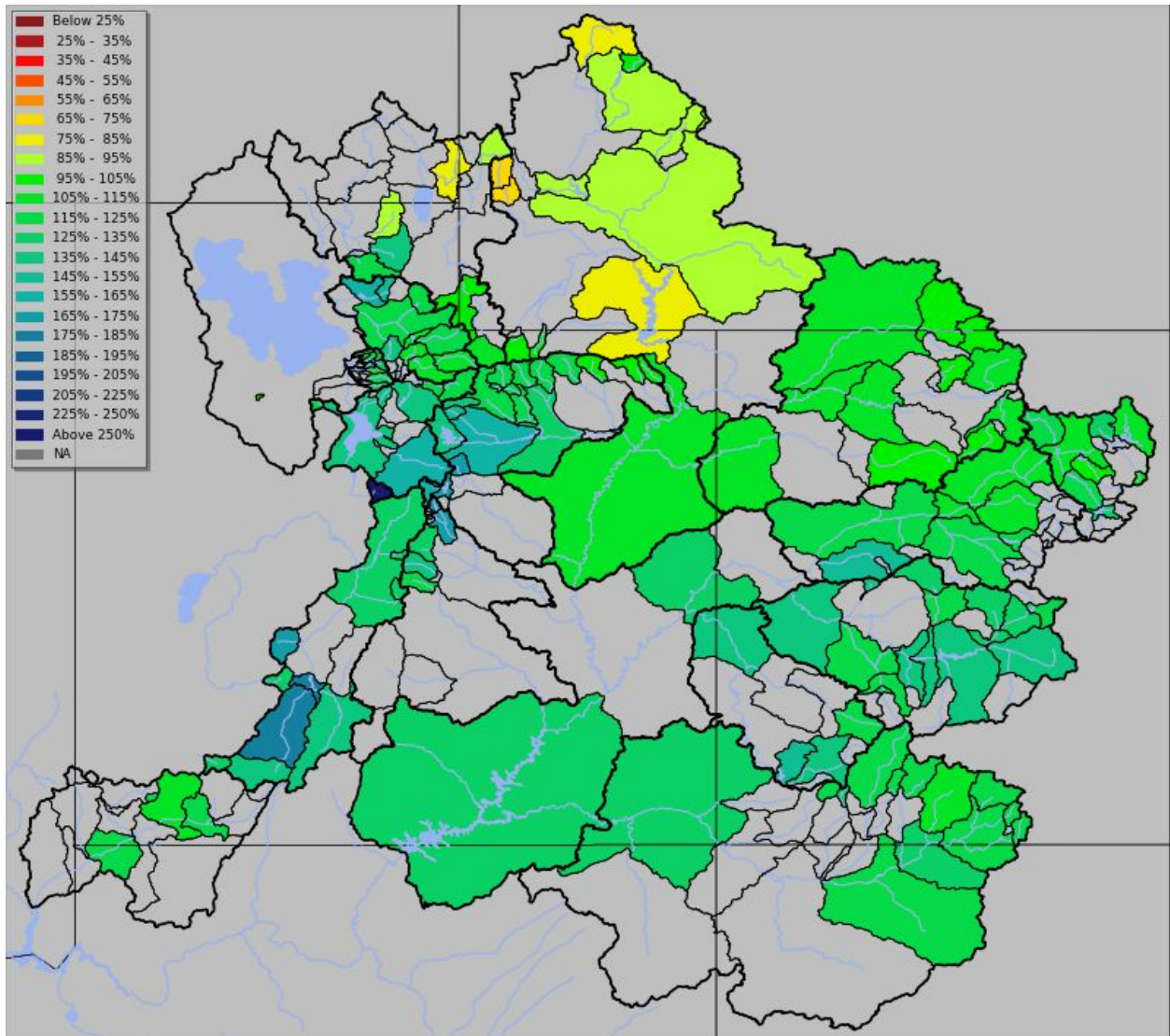
The largest increases in water supply forecasts between March 1st and April 1st occurred in the San Juan, Gunnison, and Dolores River Basins. Significant increases also occurred throughout the San Rafael and Sevier River Basins in central and southwest Utah. Due to record February-March precipitation amounts in these areas, April-July runoff volume forecasts range from near 115 to 200 percent of average. Currently only parts of the Green River Basin in Wyoming and the northern 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.

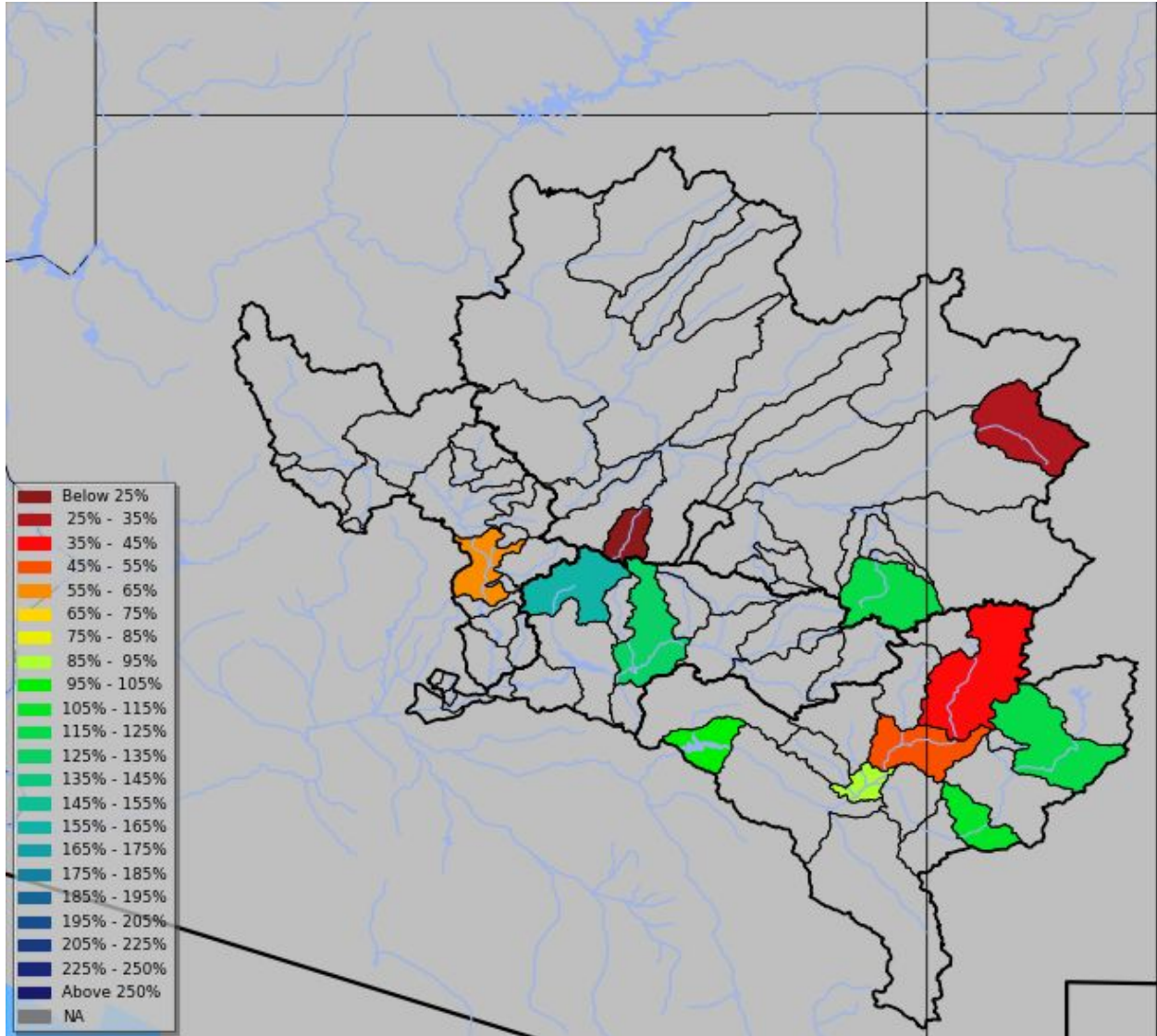
April-July unregulated inflow forecasts for some of the major reservoirs in the Upper Colorado River Basin include Fontenelle Reservoir 630 KAF (87% average), Flaming Gorge 830 KAF (85% of average), Blue Mesa Reservoir 925 KAF (137% of average), McPhee Reservoir 430 KAF (146% of average), and Navajo Reservoir 920 KAF (125% of average). The Lake Powell inflow forecast is 9.20 MAF (128% of average).

The Lower Colorado River Basin also started out March very wet particularly in the Gila, Salt, Little Colorado and Virgin River Basins. These areas were also very wet in February. While this area typically experiences drier weather over the next couple of months, many sites in Arizona and New Mexico have already reached their historical seasonal median Jan-May volumes due to rainfall and snowmelt over the past couple of months. April-July runoff volumes in the Virgin River Basin are expected to range from 115-120 percent of average (175-205 percent of median).

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)



Lower Colorado Basin (AZ/NM): 2019 April-May forecast volumes as a percent of 1981-2010 median (50% exceedance probability forecast)

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

Water Supply Discussion

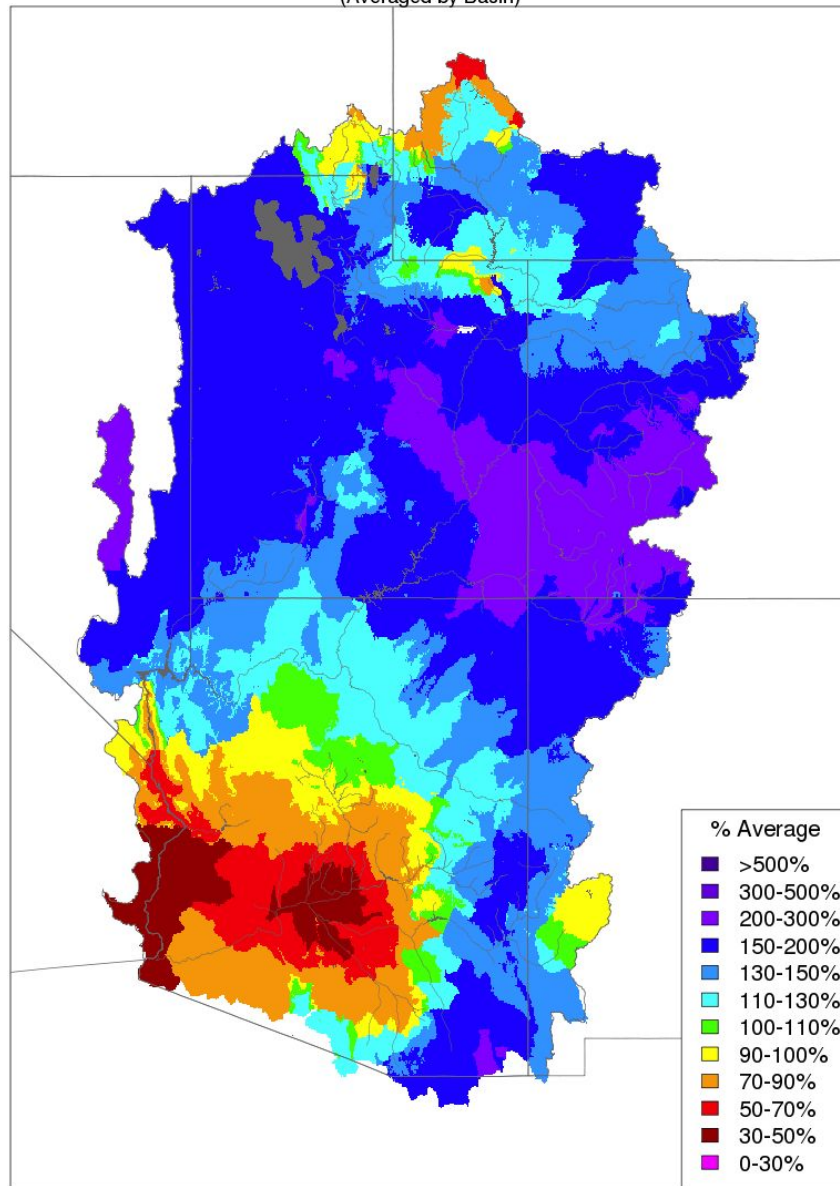
March Weather Synopsis-Precipitation-Temperature:

Following a wet February across much of the Colorado River Basin, the first two weeks of March were a game changer with significantly above normal precipitation across much of Utah and Colorado. An anomalous trough across the Western U.S. during the first half of March was responsible for bringing multiple, moisture-laden storm systems through the Colorado River Basin. By the end of the month, the highest wet anomalies (in percent of normal terms) were across the San Juan, Dolores, and Gunnison Basins where 200-300% of average precipitation fell. Over

much of Utah and the Upper Colorado Headwaters, 130-200% of average was observed. In general, the only area that saw below normal monthly precipitation was the Green River Basin of Wyoming. Over Arizona, precipitation was mostly near to slightly above normal but increased to much above normal in the Gila River Basin and eastern Salt River Basin. The combination of two successive very wet months across much of the Colorado River Basin (particularly Utah/Colorado) has dramatically improved seasonal snowpack and resulting water supply forecasts.

Monthly Precipitation - March 2019

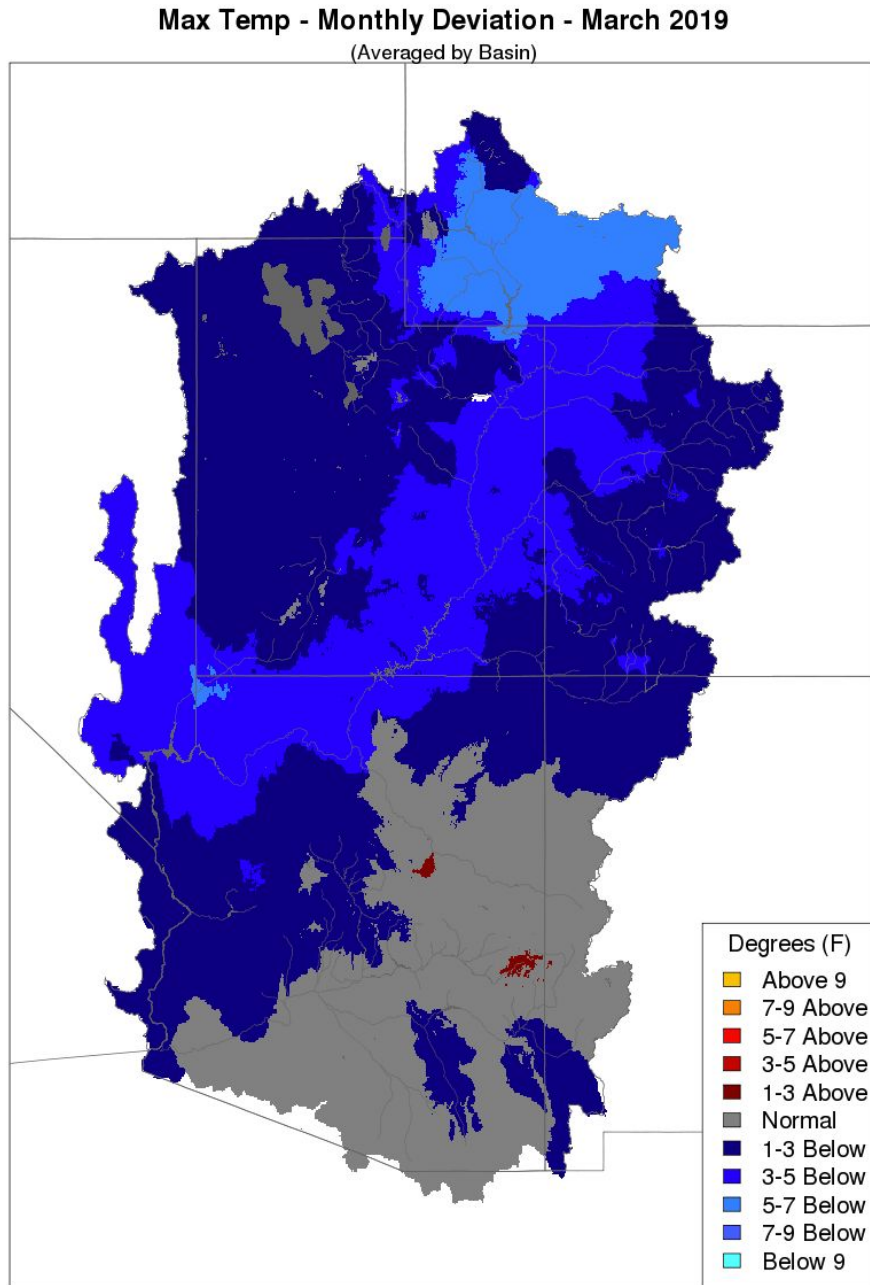
(Averaged by Basin)



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

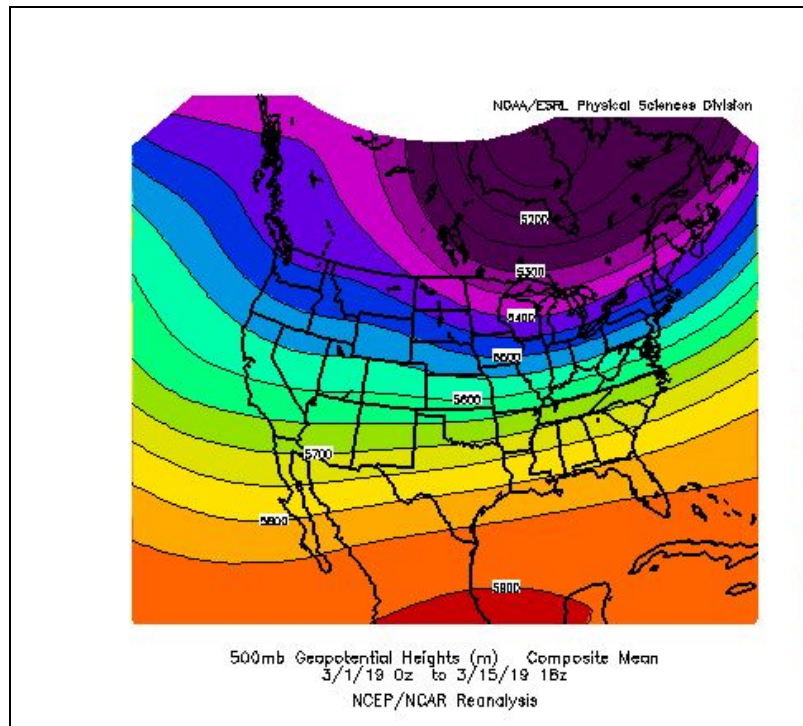
March 2019 Percent of Normal Precipitation
(Averaged by basins defined in the CBRFC hydrologic model)

March was cooler than normal over most of the CBRFC forecast area. This acted to preserve snowpack, even at lower elevations, that will contribute to the overall April-July runoff volumes.



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



Mean 500mb height pattern from March 1-15. Note the anomalous trough pattern across the Western U.S. that was responsible for the very wet first two weeks of March across much of Utah and Colorado.

Snowpack:

Much above normal (median) snow conditions exist across much of Utah and western Colorado and are generally higher in locations farther south. Currently, the only basin that does not have above normal snow is the Upper Green River in Wyoming which is near normal overall.

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 April 2nd 2019. Those sites in the dark blue currently exceed 150 percent of median (or normal) for this time of year while those in the dark purple are at 200 percent or more of normal.

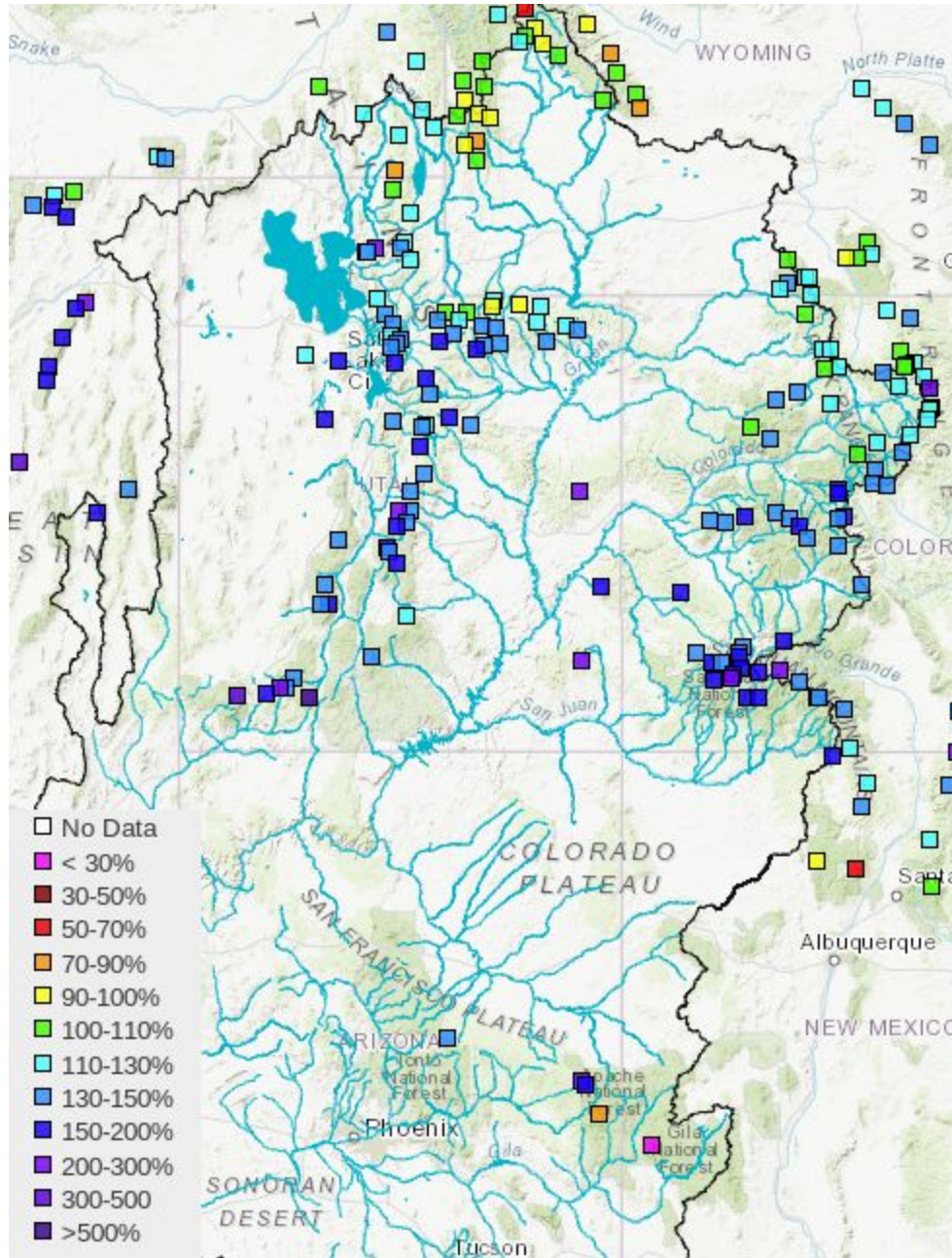


Image: Percent Median Snow Conditions as of April 2nd 2019 (SNOTEL)

The snow percentile image displayed below indicates where the current snow measurement ranks in the historical record (typically 35-40 years) for each site. Those sites in black are the highest on record. Those 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 and Dolores basins in southwest Colorado.

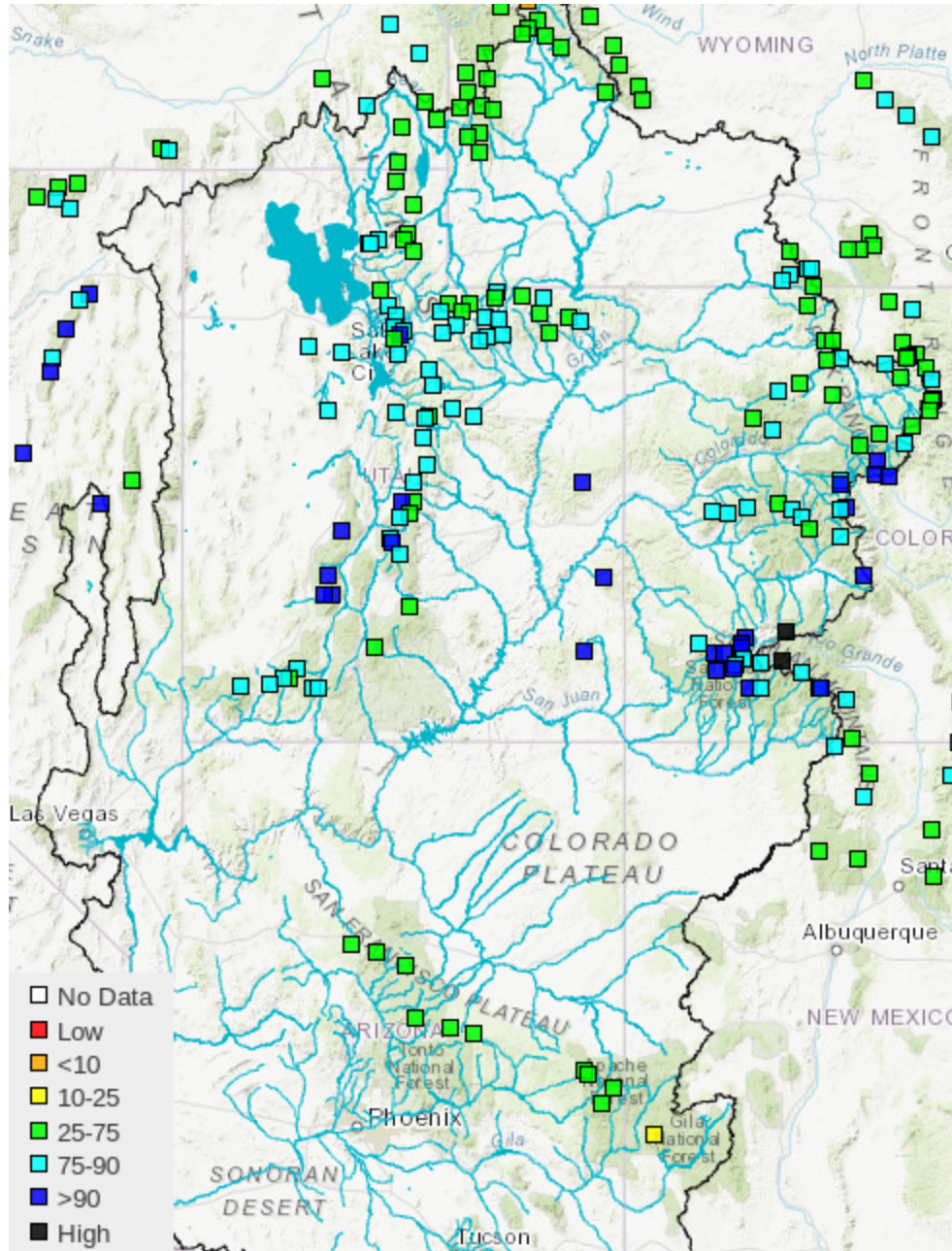


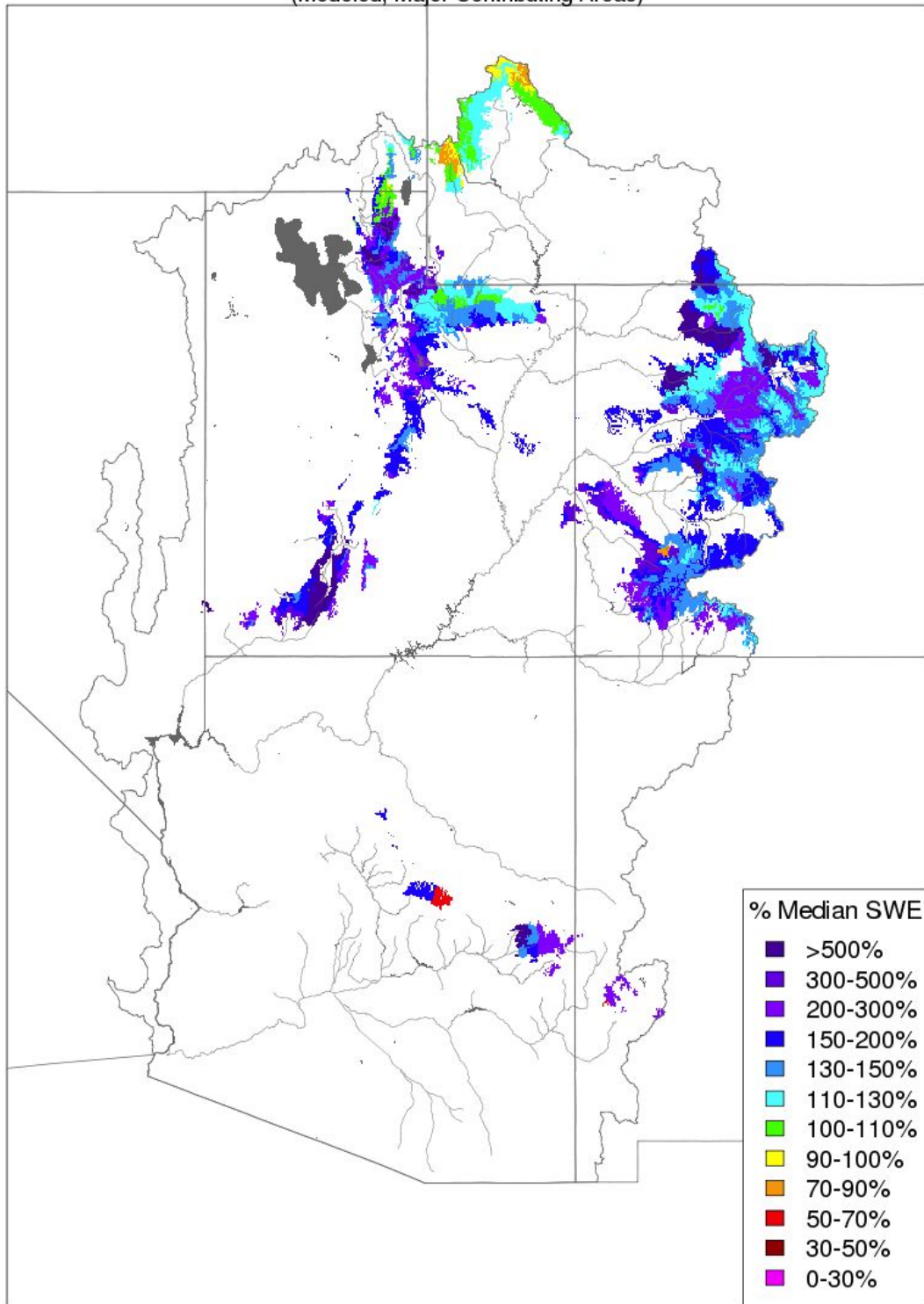
Image: Percentile Ranking of Snow Conditions as of April 2nd 2019 (SNOTEL)

The image below is the representation of snow in the CBRFC hydrologic model.

Throughout the Upper Colorado River Basin and Great Basin model snow conditions correlate closely to the SNOTEL sites. 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 - April 02 2019

(Modeled, Major Contributing Areas)



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Modeled Snow: Snow representation from the CBRFC hydrologic model April 2nd 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:

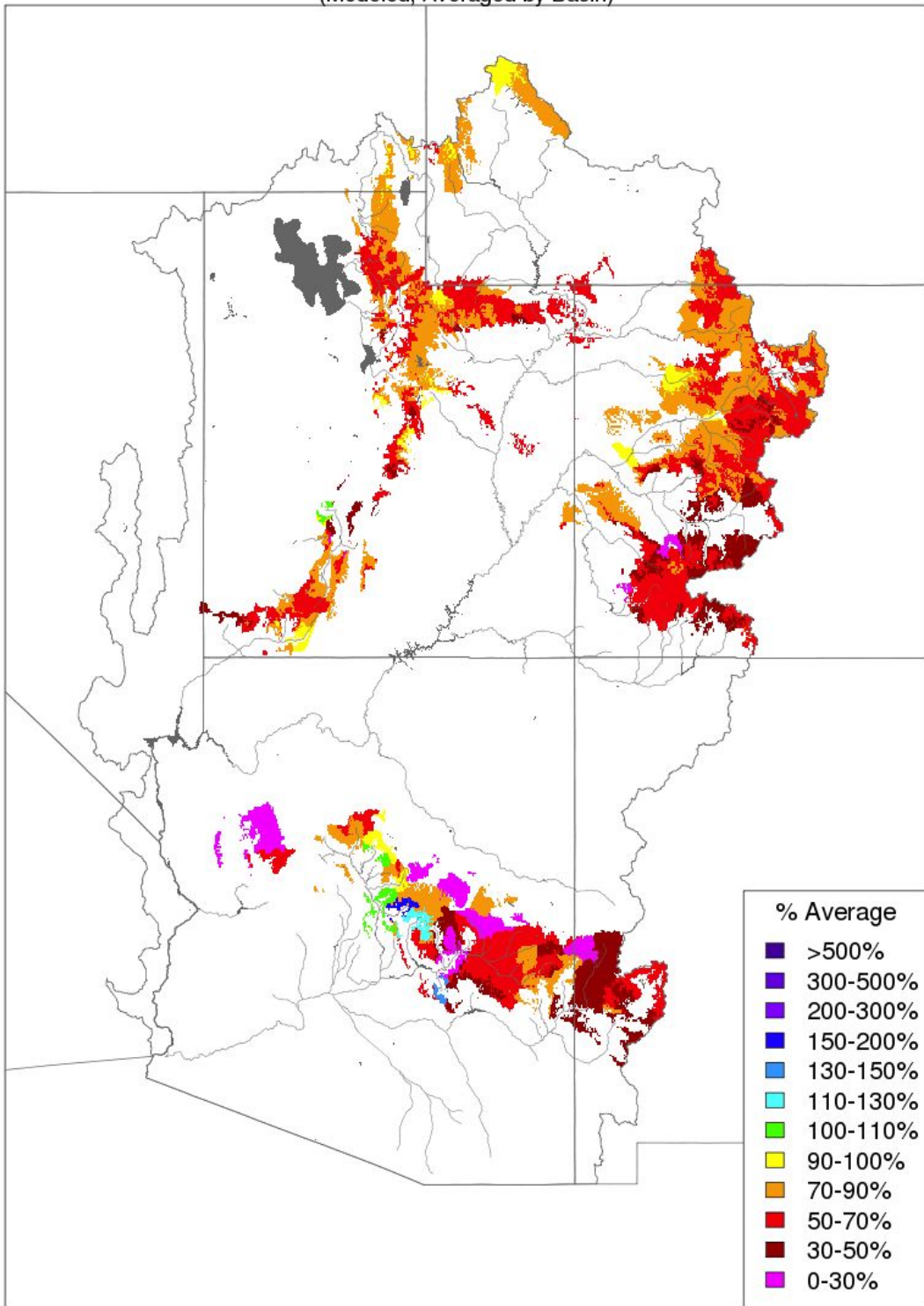
Soil moisture conditions in the higher elevation headwater areas are important entering the winter, prior to snowfall, as it can influence the efficiency of the snowmelt runoff the following spring. The effects are most pronounced when soil moisture conditions and snowpack conditions are both much above 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.

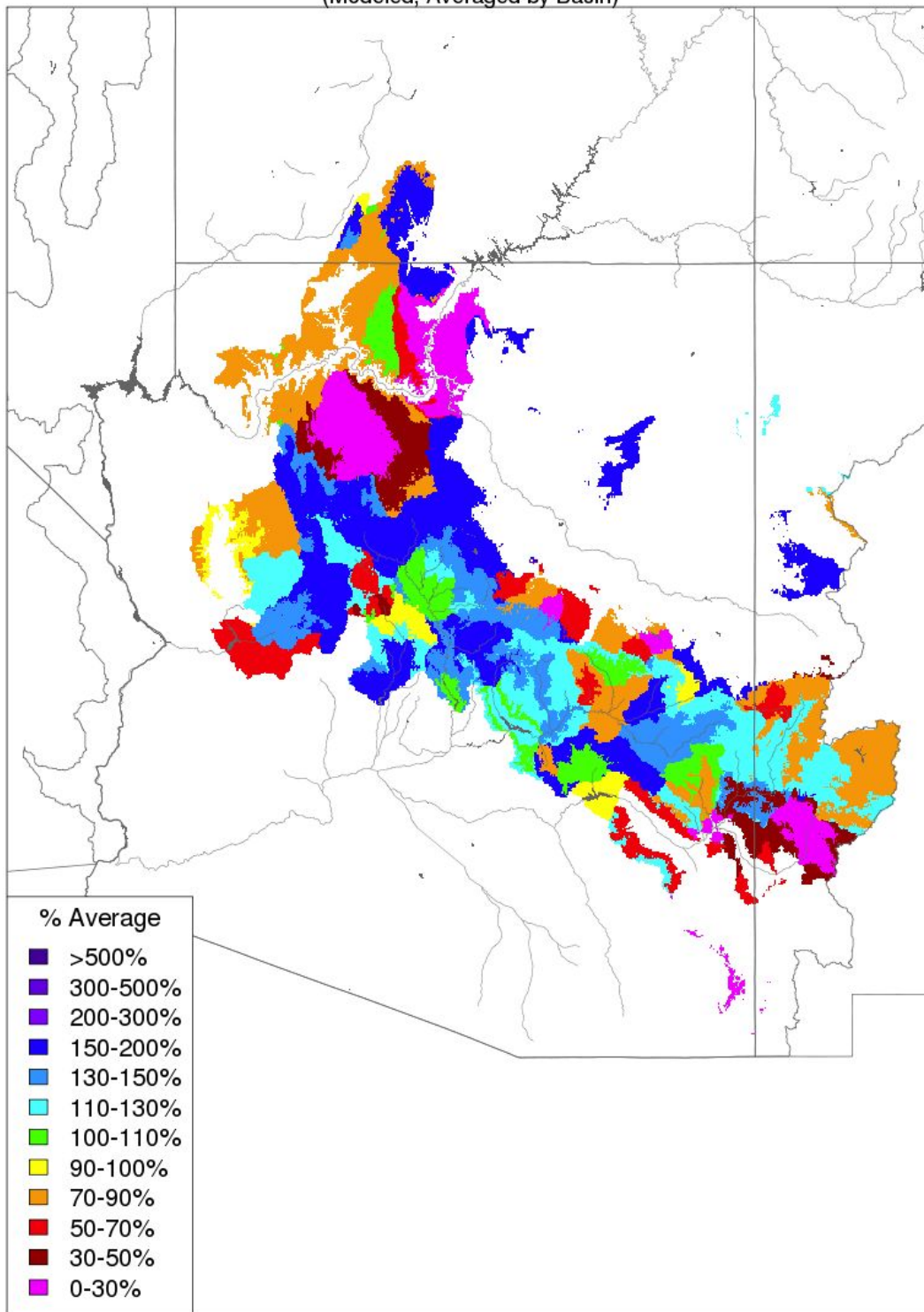
Soil moisture conditions tend to fluctuate more in the Lower Colorado River Basin of Arizona and New Mexico in the winter due to the frequency of rain events and snow accumulation/melt. Soil conditions in the fall are less informative than they are in the northern basins that remain under snowpack throughout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

Early April soil moisture conditions are now near to above average across much of the Lower Colorado River Basin. Improvements since the beginning of March have occurred in the Salt and Gila River headwaters due to a combination of precipitation events during the middle of the month and snowmelt.

Basins with above average soil moisture conditions can be expected to experience more efficient runoff from rainfall or snowmelt. However, areas other than the Salt River headwaters are pretty much out of snow and we have entered the time of year when large precipitation events become increasingly more unlikely in these basins.

Soil Moisture - April 02 2019

(Modeled, Averaged by Basin)

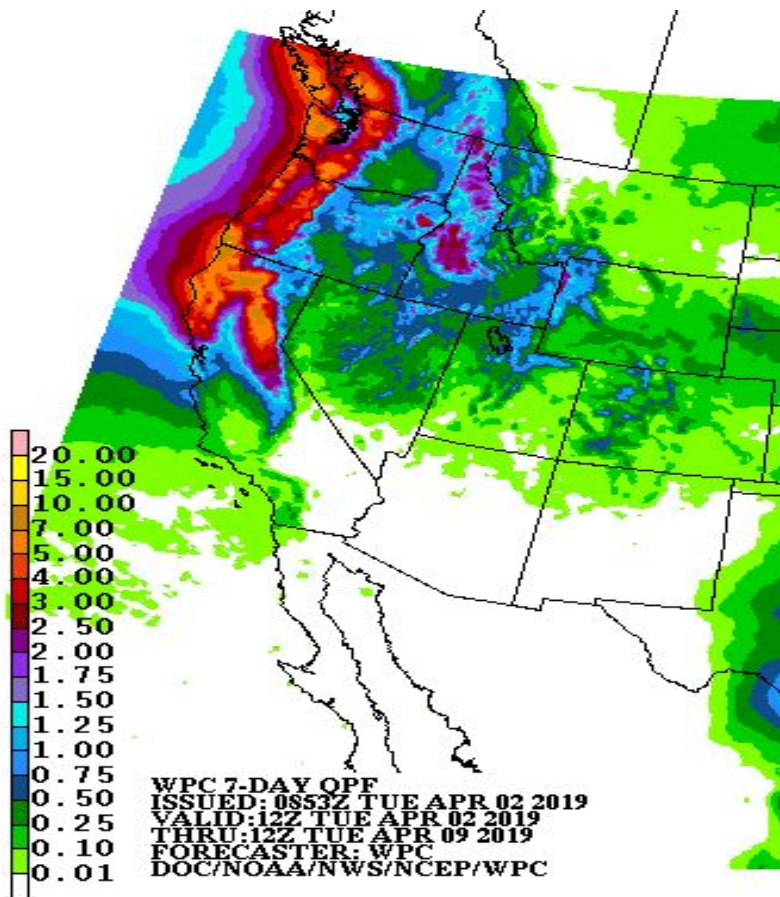


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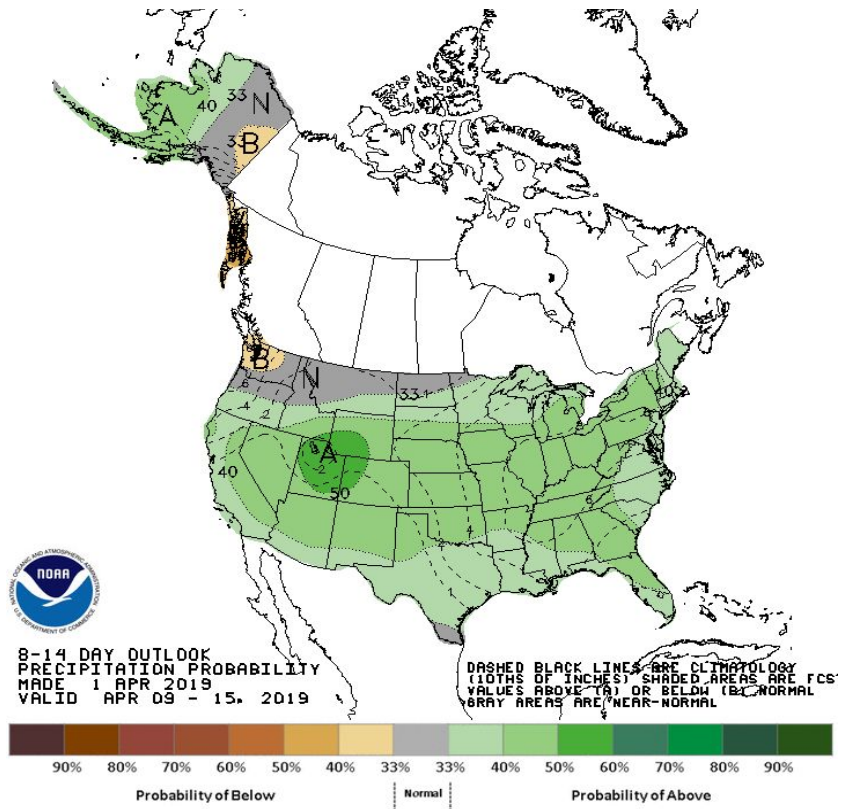
Lower Colorado River Basin (AZ/NM) CBRFC model soil moisture as of April 2nd 2019.

Upcoming Weather:

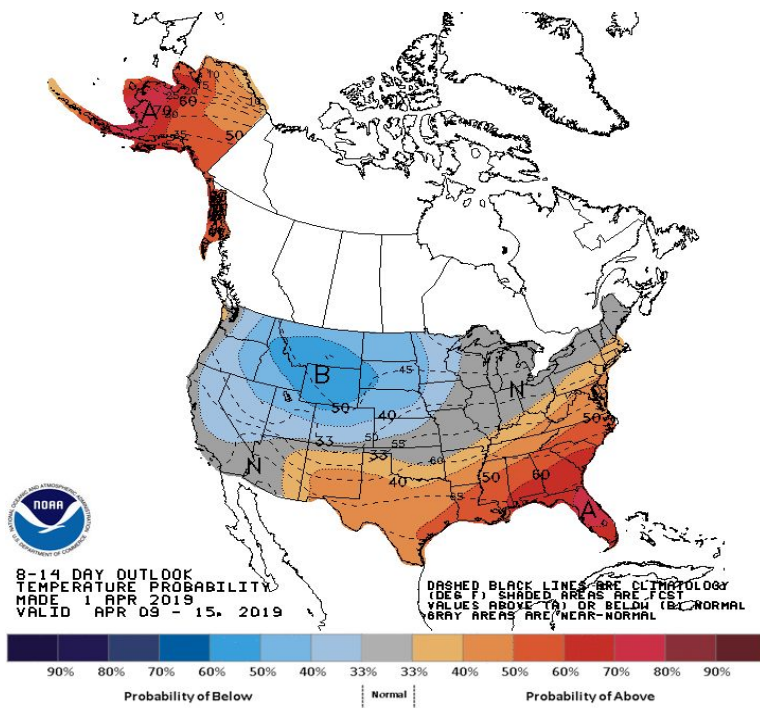
The first week of April will start out drier than the past two months, with weak storm systems impacting mainly the Upper Colorado and Great Basin regions. A weak trough will move across Utah and Colorado on April 2-3, causing scattered snow showers across the mountains (above 7000 feet) and rain showers across the valleys. Another weak system will impact northern portions of Utah/Colorado and Wyoming by April 6-7, bringing modest precipitation amounts. Overall, these systems are not expected to bring widespread heavy precipitation to the mountains as they are moving into a mean ridge over the Intermountain West. Temperatures will be slightly above normal for early April. There is more uncertainty in the pattern for the second week of April, however models suggest a progressive storm system could impact the Upper Colorado region by April 9-11. The odds tilt toward slightly above normal precipitation and slightly below normal temperatures during the second week of April. The Lower Colorado region will see limited precipitation from these troughs, as the storm track shifts northward during the month of April.



NWS Weather Prediction Center precipitation forecast for April 2-9, 2019.



NWS Climate Prediction Center precipitation probability forecast for April 9-15, 2019.



NWS Climate Prediction Center precipitation probability forecast for April 9-15, 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/wsup/pub2/map/html/cpub.php>