

## January 7, 2021 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

Early January water supply volume forecasts are below to much below average throughout the Colorado River Basin and Great Basin. Upper Colorado River Basin water supply forecasts generally range between 40-80% of the 1981-2010 historical April-July average. Great Basin water supply forecasts are less favorable at 40-65% of average. Lower Colorado River Basin January-May water supply runoff volumes are fairing the worst at 10-40% of the historical median. Water supply forecast ranges by basin:

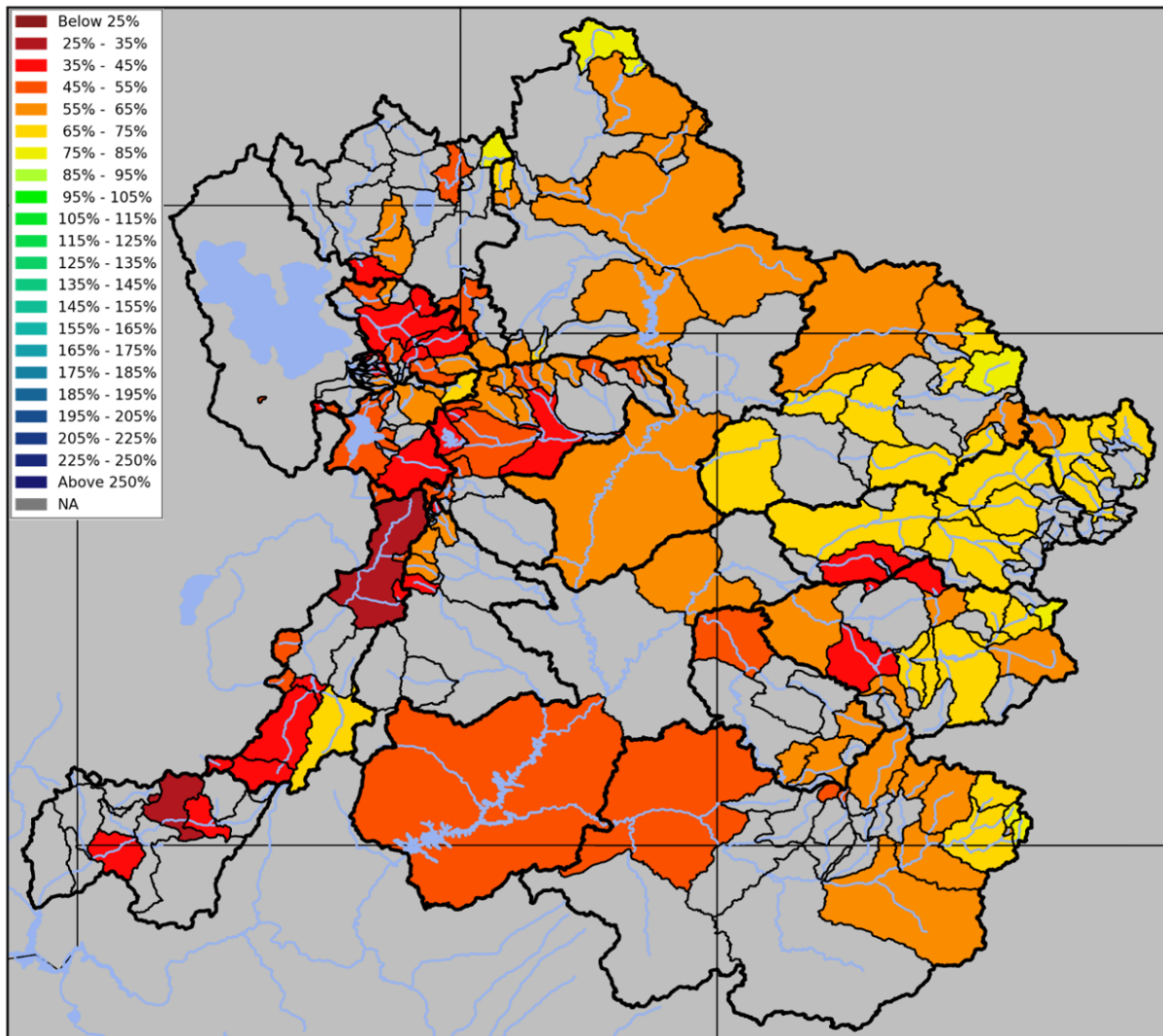
<b>Basin</b>	<b>Water Supply Forecast Range</b>
Upper Green	60-80%
Duchesne	40-60%
Yampa/White	60-80%
Upper Colorado Mainstem	40-80%
Gunnison	40-80%
Dolores	50-60%
San Juan	45-80%
Bear	40-80%
Weber	40-60%
Six Creeks	35-60%
Provo/Utah Lake	40-65%
Virgin	30-45%
Sevier	35-75%
Little Colorado	10-20%
Upper Gila	25-30%
Salt	15-25%
Verde	40%

Water year 2021 is off to a poor start over much of the region with below to much below normal precipitation. Many SNOTEL sites in the Colorado River and Great Basins are below the 20th percentile for water year precipitation. In addition, the period from April-December was one of the driest on record. As a result, antecedent soil moisture conditions entering the winter are worse compared to a year ago due to record low April-October precipitation across the region and a below average runoff last spring. Modeled soil moisture is generally in the bottom five across the Upper Colorado over the 1981-2020 40-year period.

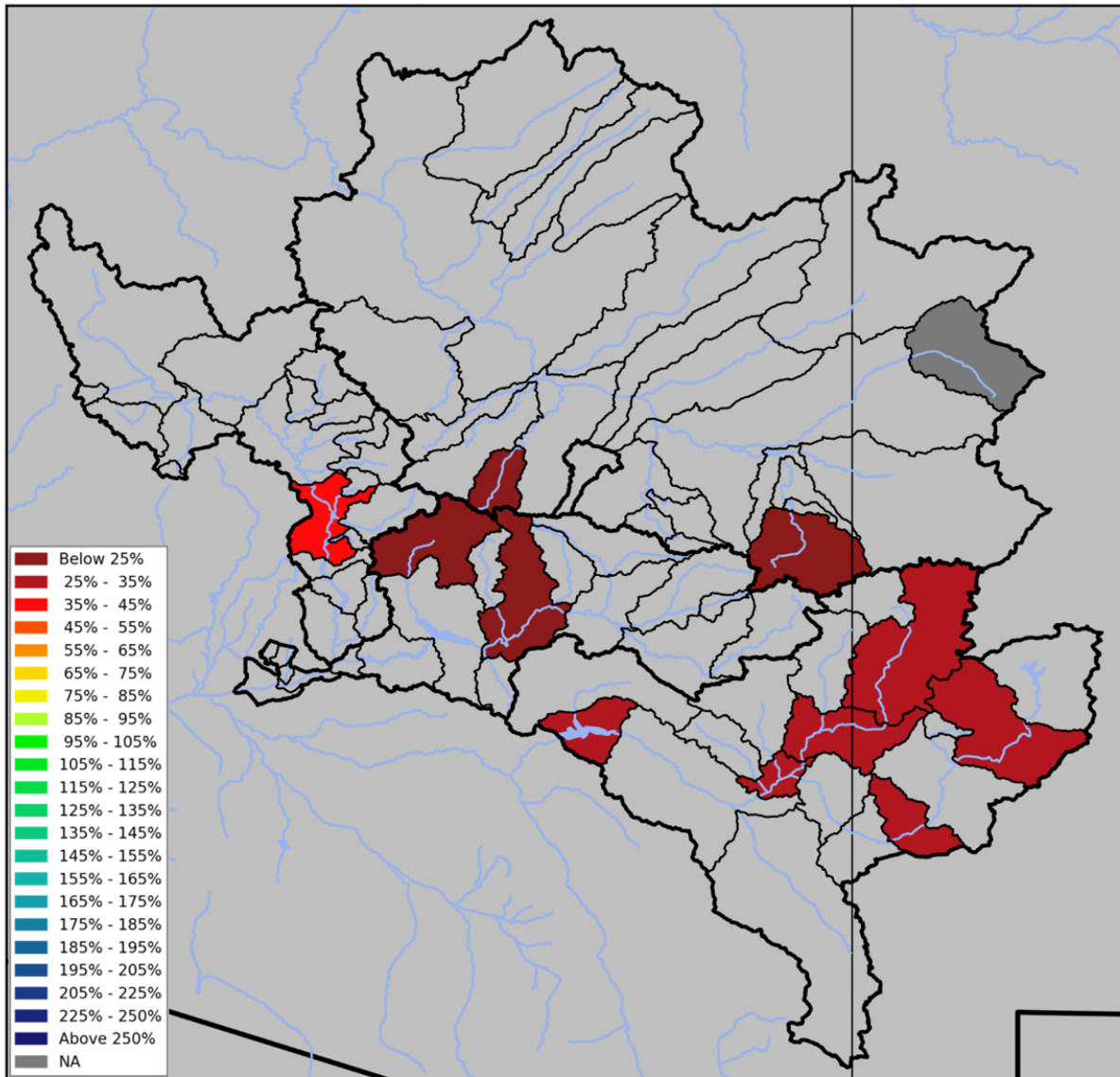
Much below average October precipitation across the region resulted in a slow start to the high elevation snow accumulation season. Early January snow water equivalent (SWE) conditions are below to much below normal (median) throughout the CBRFC forecast area. Given the dry conditions, an above normal snowpack or a wet spring will be needed to see near average water supply volumes.

April-July unregulated inflow forecasts for some of the major reservoirs in the Upper Colorado River Basin include Fontenelle 460 KAF (63% average), Flaming Gorge 585 KAF (60%), Green Mountain 190 KAF (69%), Blue Mesa 470 KAF (70%), McPhee 170 KAF (58%), and Navajo 450 KAF (61%). The Lake Powell inflow forecast is 3.8 MAF (53% of average).

## Seasonal Water Supply Forecasts



Upper Colorado, Great, Virgin River Basins: Jan 2021 April-July forecast volumes as a percent of 1981-2010 average (50% exceedance probability forecast).



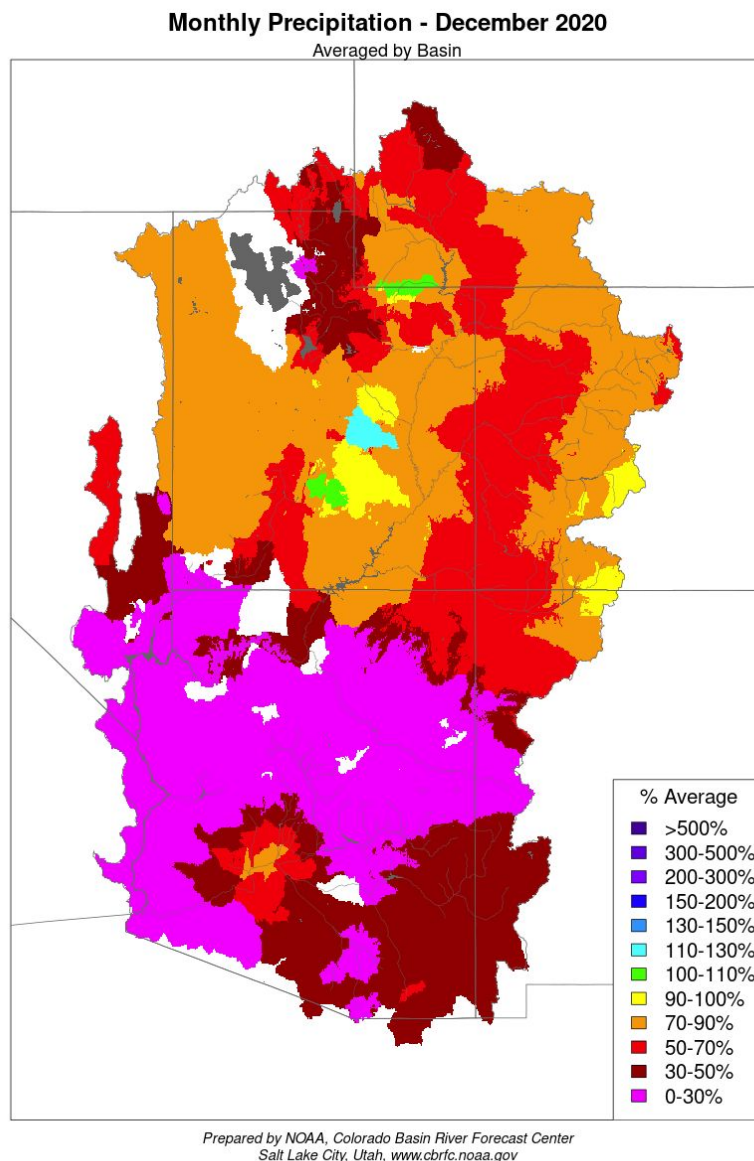
Lower Colorado Basin (AZ/NM): 2021 January-May forecast volumes as a percent of 1981-2010 median (50% exceedance probability forecast).

For specific site water supply forecasts click [here](#)

## Water Supply Discussion

### December Precipitation

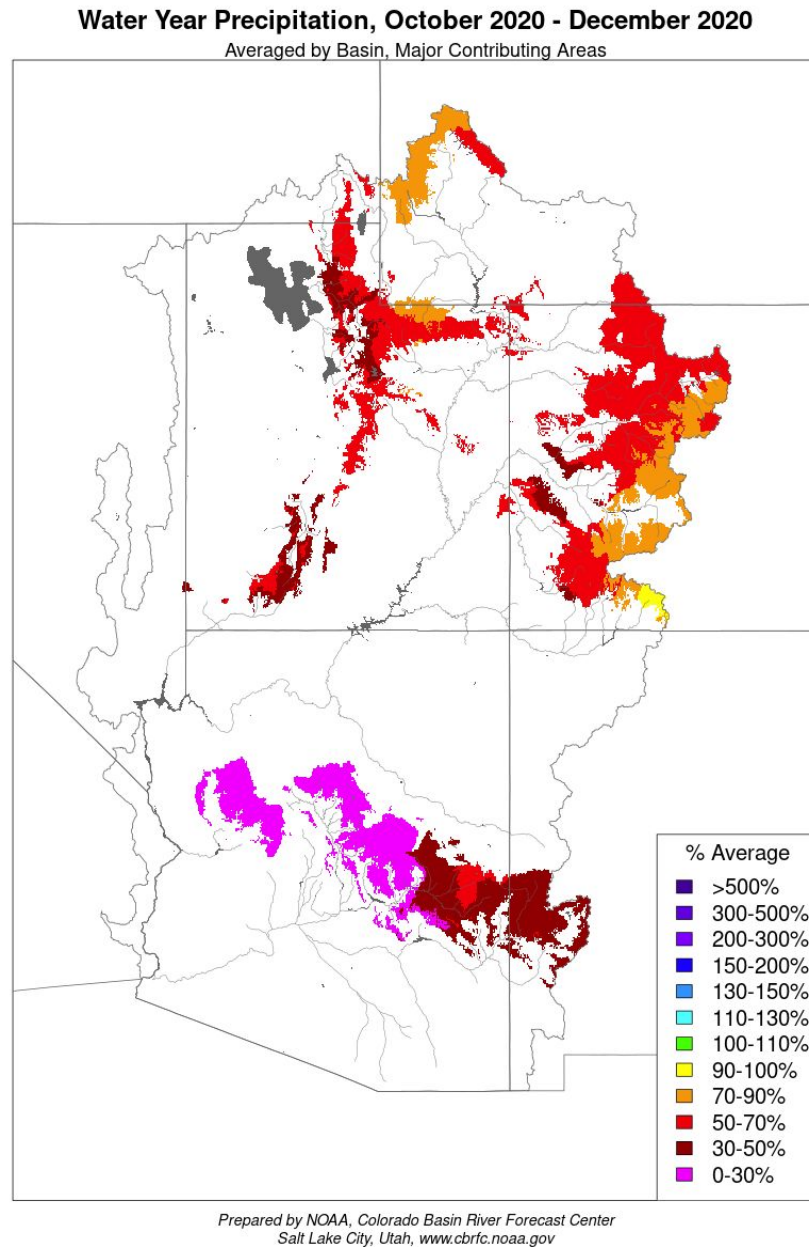
The precipitation in December was mostly below to well below normal over much of the Colorado River Basin and Great Basin. The first 10 days of the month were exceptionally dry as a strong ridge was located across the Intermountain West. A weak storm system brought modest precipitation amounts to the Lower Basin and into southwest Colorado on December 10-11. A more significant storm system moved across southern Utah and Colorado on December 28, producing over 1.5 inches of precipitation in the San Juans and widespread 0.5-1.0 inches across the rest of the Colorado mountains. The higher amounts with this system resulted in near normal monthly precipitation for the headwaters of the San Juan/Gunnison basins.



December 2020 percent of normal precipitation.  
(Averaged by basins defined in the CBRFC hydrologic model)

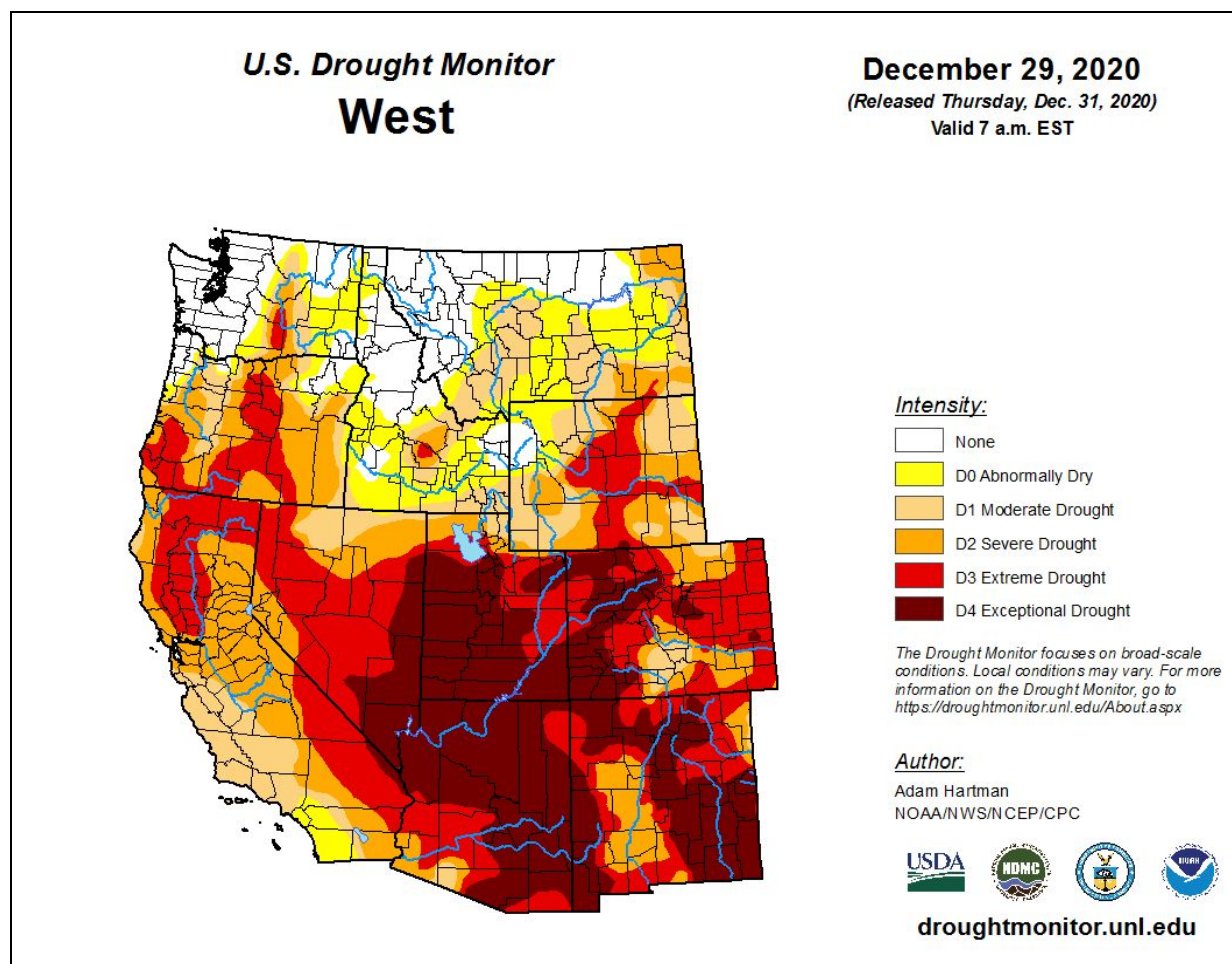
## Water Year Precipitation

The water year precipitation can be used as a good indicator of early season water supply conditions. The 2021 water year is off to a rather dismal start over much of the region with below to well below normal precipitation. In fact, many of the SNOTELs in the Colorado River and Great Basins are below the 20th percentile for water year precipitation. In addition, the period from April-December was one of the driest on record. As a result of the prolonged period of below normal precipitation since last spring, drought conditions continue to worsen across much of the region.



Water Year 2021 percent of normal precipitation.  
(Averaged by basins defined in the CBRFC hydrologic model)





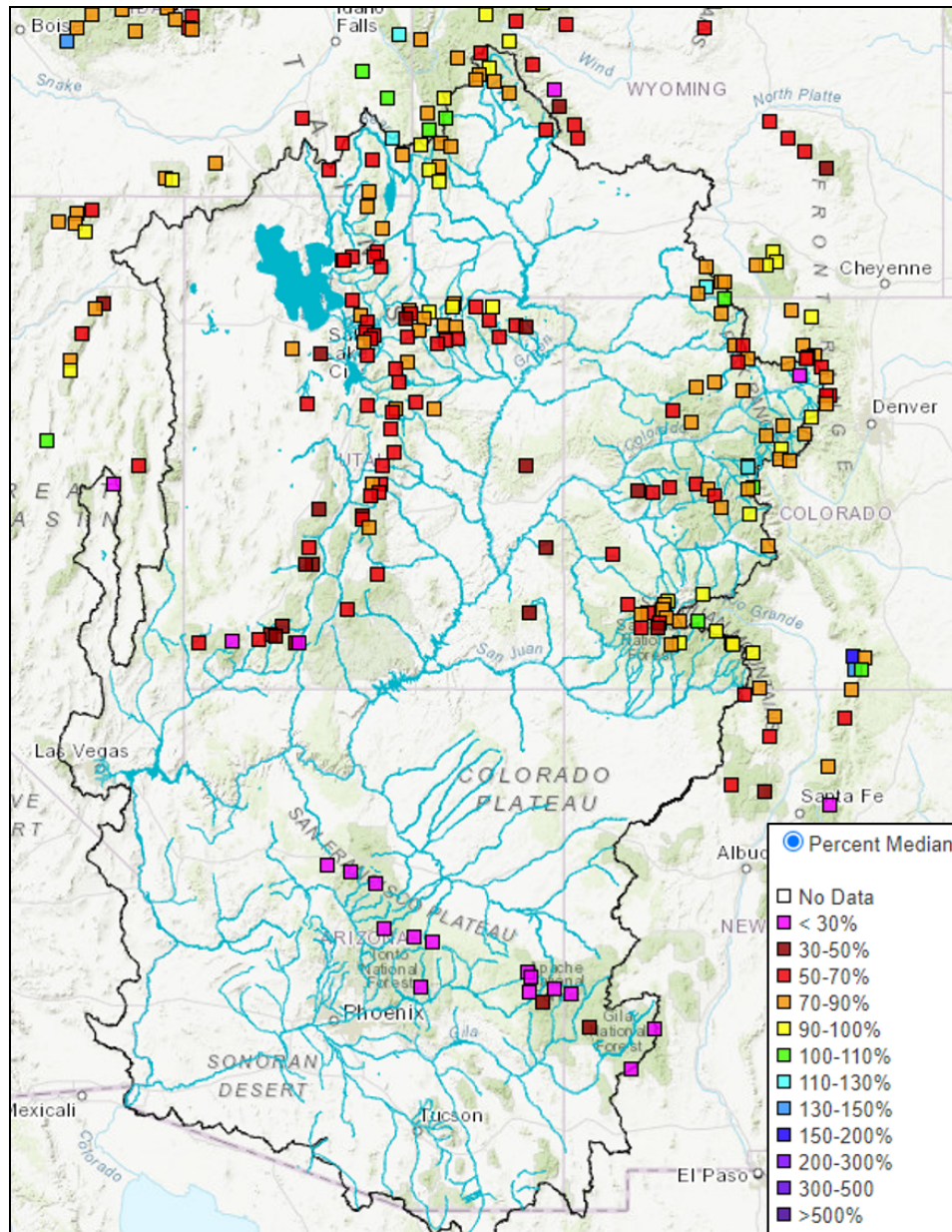
U.S. Drought Monitor showing Extreme to Exceptional Drought covering an extensive area of the Colorado River and Great Basins.

## Snowpack

Much below average October precipitation across the region resulted in a slow start to the high elevation snow accumulation season. As of early January, snow water equivalent (SWE) conditions are below to much below normal (median) throughout the CBRFC forecast area. Snowpack conditions generally range from 60-80% of the 1981-2010 historical median across the Upper Colorado River Basin. While the majority of SNOTEL sites are reporting below normal SWE conditions, there are a few SNOTEL stations reporting near to above normal snow conditions scattered throughout the region, most notably in the Upper Green River Basin near the Utah/Wyoming/Idaho border and the headwaters of the San Juan River Basin in southwest Colorado. SWE above Lake Powell is around 75% of normal.

Early January Great Basin snow conditions are well below normal and generally range between 50-70% of the historical median. Lower Colorado River Basin SWE conditions are very poor at 5-40% of median. It should be noted that snowpack conditions in the Lower Colorado River Basin are more variable and tend to fluctuate more frequently over time.

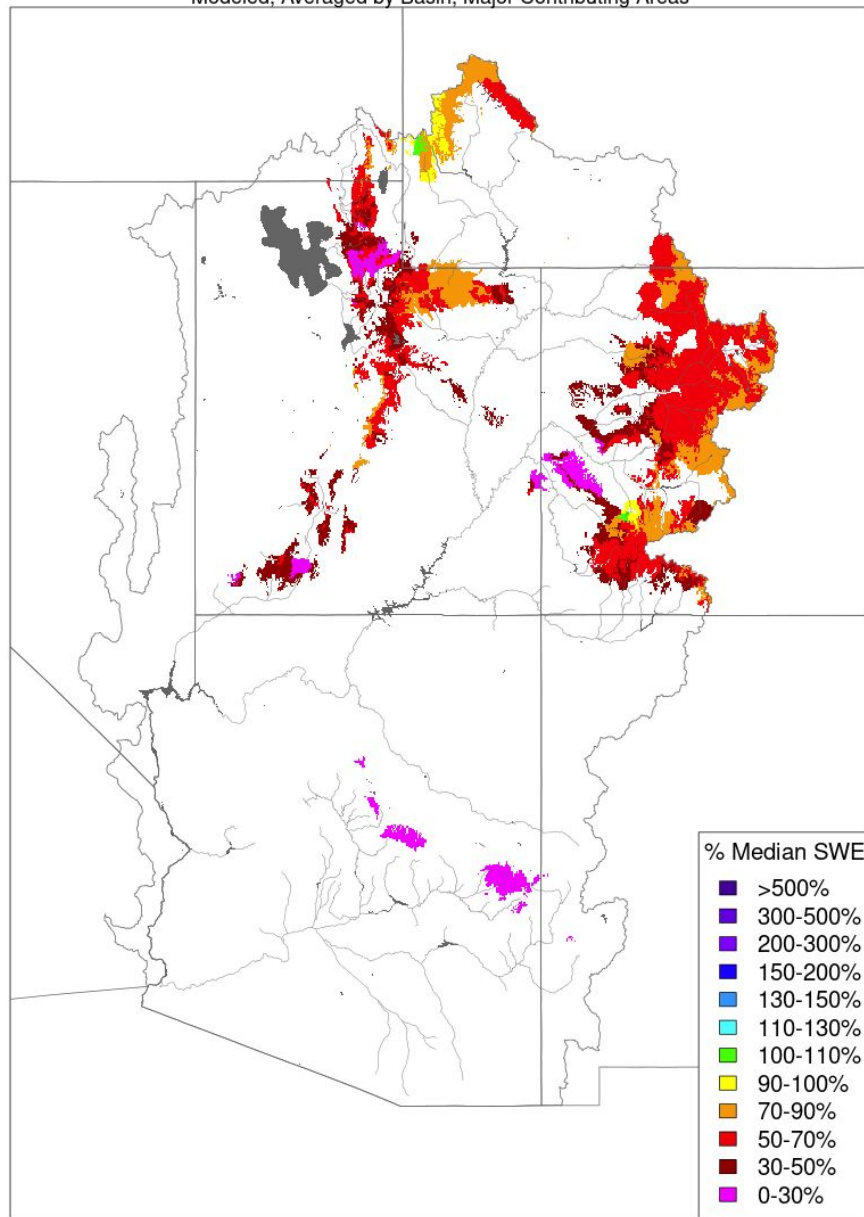
The images below show the observed snow conditions and CBRFC hydrologic model snow conditions. Model snow conditions closely correlate to SNOTEL conditions throughout the Colorado River and Great Basins.



Observed percent of median SWE values at SNOTEL sites as of January 7, 2021.

## Snow Conditions - January 07 2021

Modeled, Averaged by Basin, Major Contributing Areas



Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

CBRFC hydrologic model snow conditions as of January 7, 2021.

For updated SNOTEL information refer to click [here](#)

For CBRFC hydrologic model snow click [here](#)

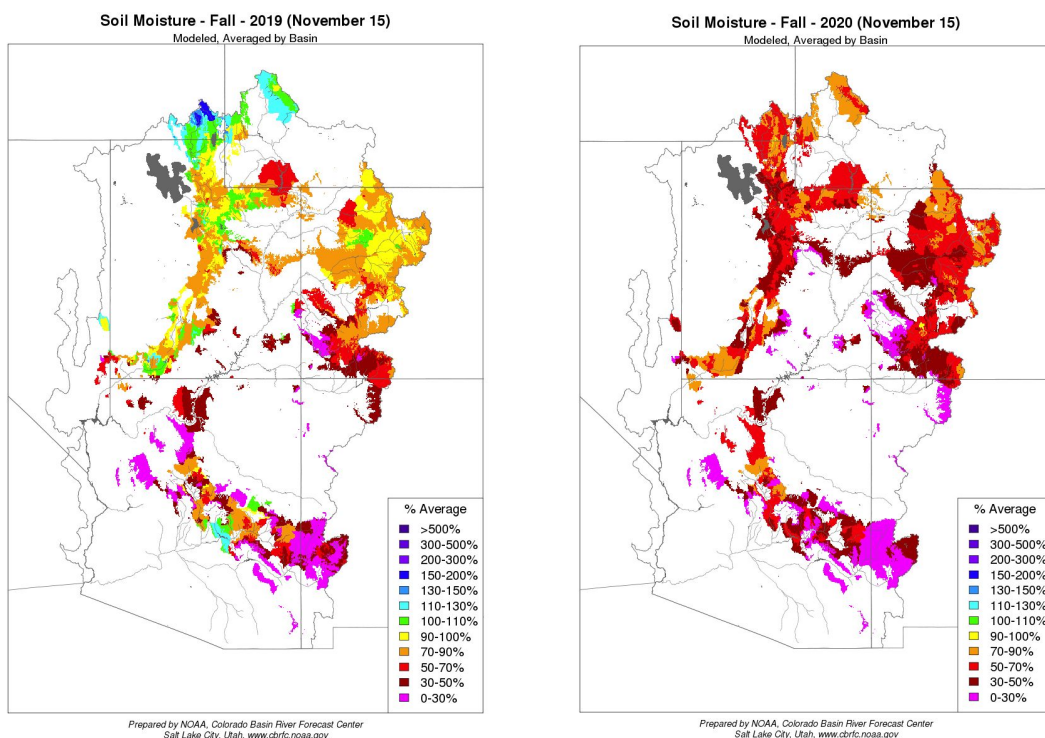


## Soil Moisture

CBRFC hydrologic model soil moisture states are adjusted in the fall after the irrigation season and prior to the winter snowpack accumulation to accurately reflect observed baseflow conditions. CBRFC model fall soil moisture conditions impact early season water supply forecasts and potentially the efficiency of spring runoff. Above average fall soil moisture conditions have a positive impact on early season water supply forecasts while below average conditions have a negative impact. The impacts are most pronounced when soil moisture conditions and snowpack conditions are both much above or much below average.

Modeled soil moisture conditions as of November 15th were below average across the entire Upper Colorado River Basin and Great Basin. Hydrologic model soil moisture conditions entering the winter are worse compared to a year ago due to record low April-October precipitation across the region and a below average runoff last spring. Modeled soil moisture is generally in the bottom five of the 1981-2020 40-year period across the Upper Colorado. San Juan and Dolores basin soil moisture conditions fall in the bottom three with some areas being record dry. Two consecutive years of poor monsoon seasons have exacerbated the dry conditions in southwest Colorado.

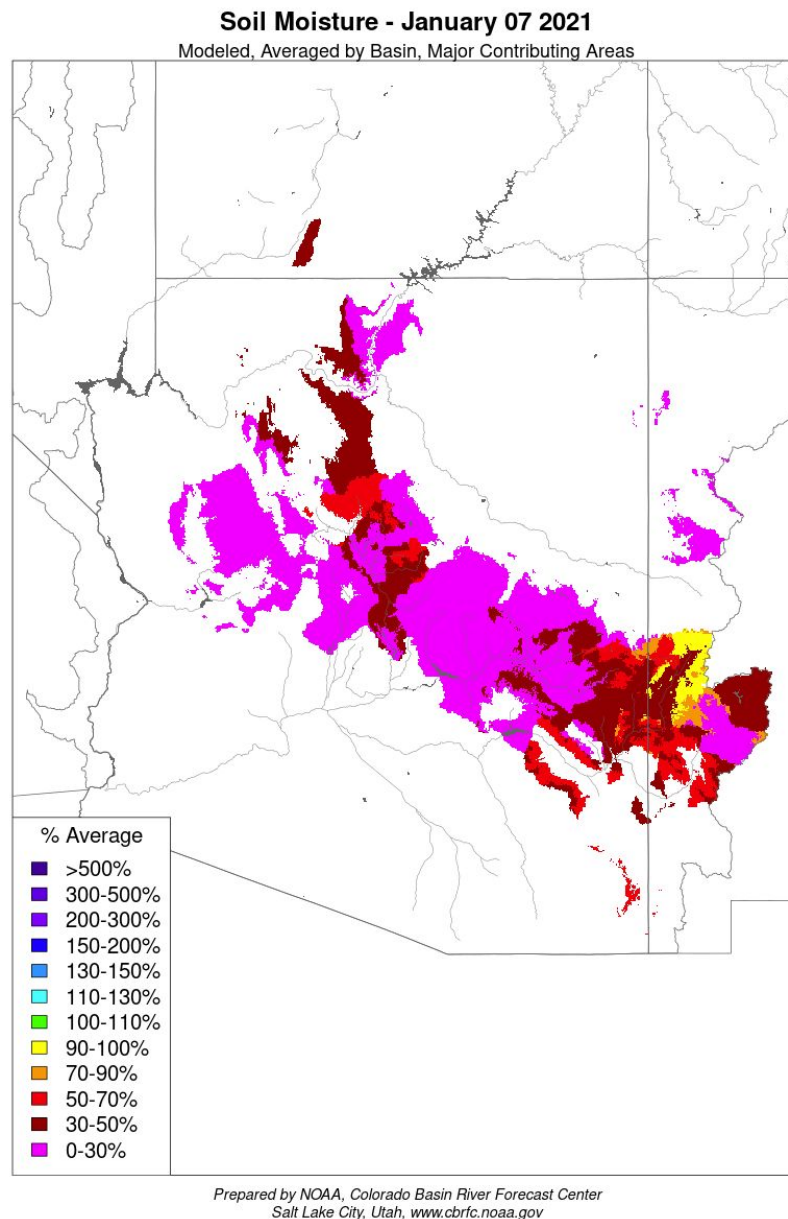
It is not often that such widespread poor soil moisture conditions exist across the region. Similar, but not as poor conditions, existed in the fall of 2002, 2012, and 2018. To produce average runoff, an above normal snowpack or a wet spring will likely be needed to overcome these large soil moisture deficits.



Comparison of November 2019 (left) and November 2020 (right) CBRFC hydrologic model soil moisture conditions 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 possibility of melting snow. Soil conditions in the fall are less informative than they are in the northern basins that remain under snowpack throughout the winter season.

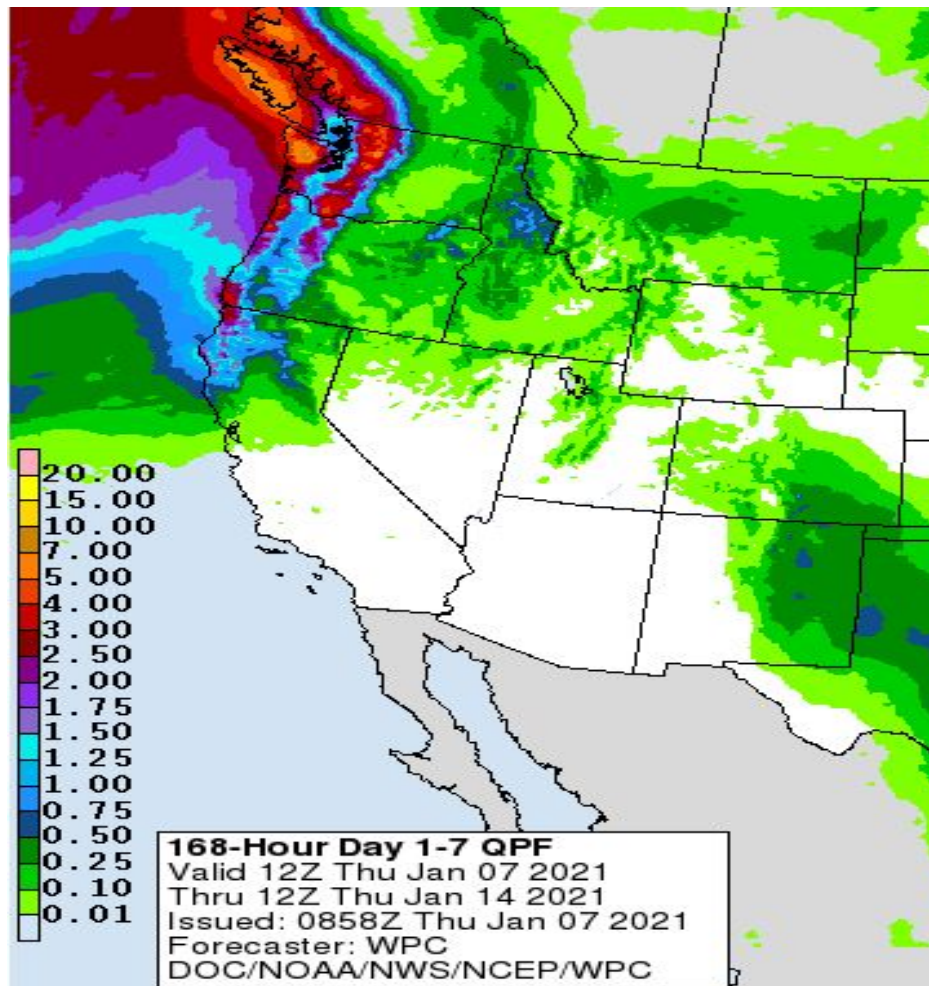
After another unfavorable summer monsoon season and then the very dry autumn, early January soil moisture conditions across Arizona are very dry. This generally means that it will take a few rain events before any significant runoff is generated and that much of any snow melt that occurs will be absorbed into the soil instead of contributing to increased streamflow. The dry soil conditions, along with the poor start to the snow season across the mountains of Arizona, are contributing to the very low water supply forecasts.



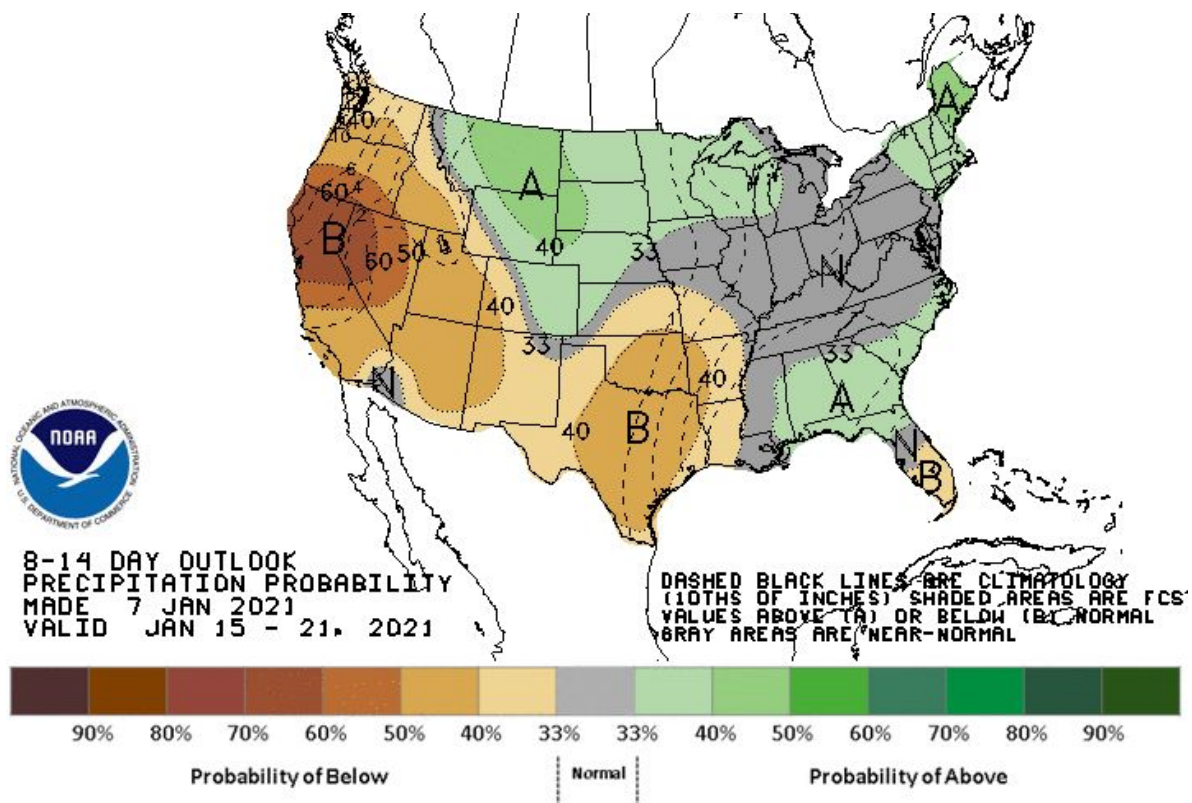
Lower Colorado River Basin (AZ/NM) model soil moisture as of January 7, 2021.

## Upcoming Weather

A ridge of high pressure will dominate the weather pattern through the middle of next week. As such, there will be a lack of significant storms to impact the region. A weak storm system is forecasted to move across Utah/Colorado on Saturday, with only light precipitation amounts (generally less than a half inch). Thus, we continue to be locked into an anomalous ridge pattern with another mostly dry week ahead for the Colorado River and Great Basins.



.NWS Weather Prediction Center precipitation forecast for Jan 7-14, 2021.



NWS Climate Prediction Center precipitation probability forecast for Jan 15-21, 2021.

While there is somewhat more uncertainty looking ahead to the third week of January, the weather models suggest that general ridging will remain in place over much of the Western U.S. There is some indication that storm systems will begin to clip the Upper Green and Upper Colorado basins in northwesterly flow. However, drier than normal conditions are favored for much of the Utah and the Lower Colorado region. With little indication of a significant change to a wetter pattern through at least the third week of January, it is likely that ESP water supply volume guidance will decrease in the next few weeks over much of the region.

#### End Of Month Reservoir Content Tables

[Green River Basin](#)  
[Upper Colorado River Basin](#)  
[San Juan River Basin](#)  
[Great Salt Lake Basin](#)  
[Sevier Basin](#)

#### Basin Conditions and Summary Graphics

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[Sevier River Basin](#)  
[Virgin River Basin](#)