February 4, 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 February 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 35-80% of the 1981-2010 historical April-July average. Great Basin water supply forecasts are 10-80% of average. Lower Colorado River Basin January-May water supply runoff volumes are 20-65% of the historical median. Water supply forecast ranges (percent of normal) by basin:

Basin	Water Supply Forecast Range
Upper Green	50-70%
Duchesne	35-60%
Yampa/White	50-65%
Upper Colorado Mainstem	40-75%
Gunnison	40-75%
Dolores	45-55%
San Juan	40-80%
Bear	20-70%
Weber	35-55%
Six Creeks	35-60%
Provo/Utah Lake	40-65%
Virgin	35-50%
Sevier	10-80%
Little Colorado	20-25%
Upper Gila	20-35%
Salt	20-25%
Verde	65%

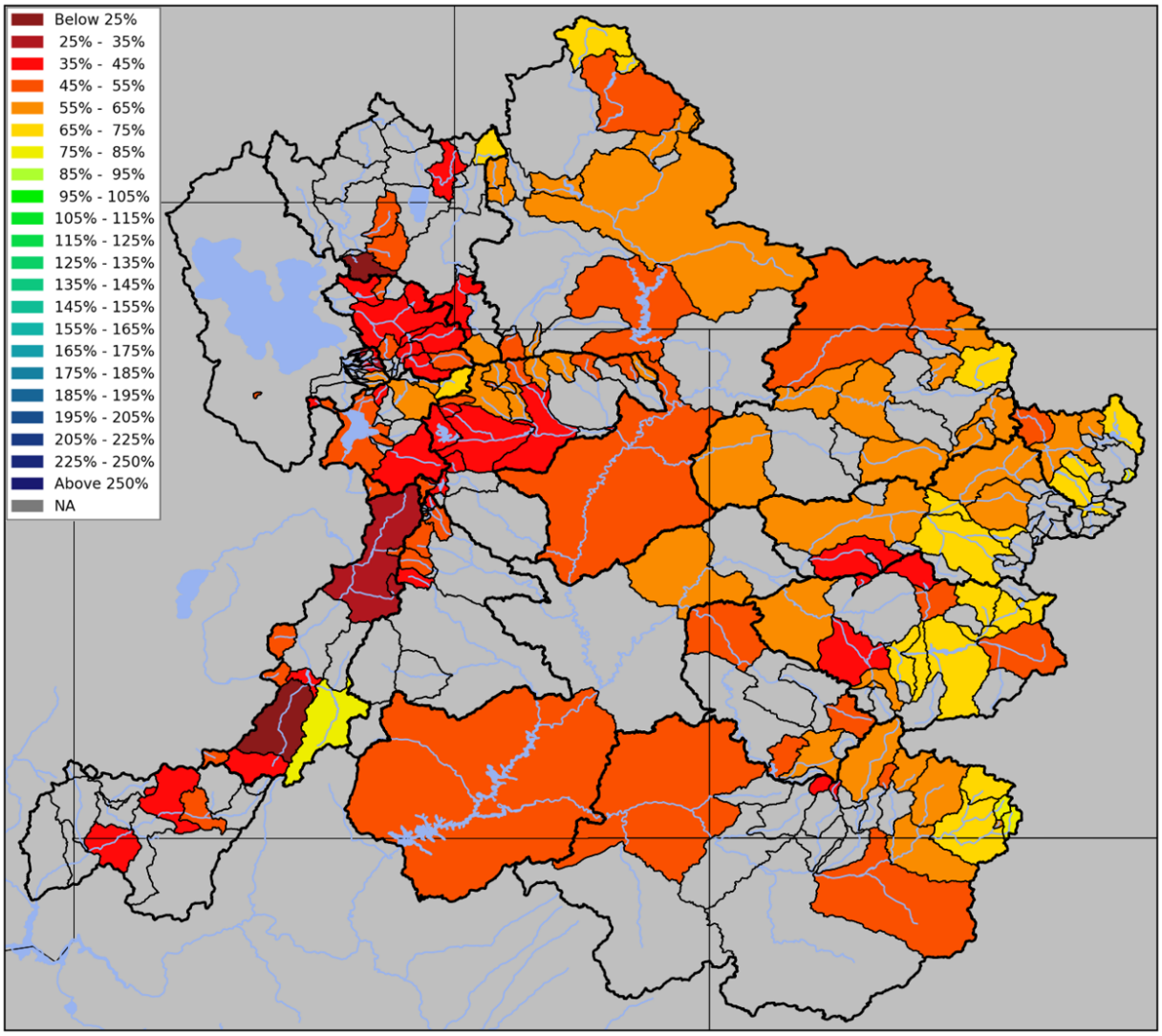
The first three weeks of January were very dry across the region. The weather pattern transitioned to a deep trough during the last 10 days of the month, with multiple cold storm systems impacting the area. The storms produced widespread precipitation over the entire region and especially targeted the Lower Basin, southern Utah, and southwest Colorado. January precipitation ended up near to above normal in those areas. However, January precipitation came in below normal across the majority of the Upper Colorado River Basin and Great Basin.

Early February snow water equivalent (SWE) conditions are mostly below to much below normal (median) throughout the CBRFC forecast area. Snowpack conditions generally range from 60-90% of the 1981-2010 historical median across the Upper Colorado River Basin. SWE at most SNOTEL stations across the Great Basin are in the bottom (driest) ten on record, with many stations having a 30 to 40 year period of record. SWE conditions in the Verde River Basin (central Arizona) have improved significantly since early January and are now slightly above normal, but SWE conditions across much of the Lower Basin remain well below normal.

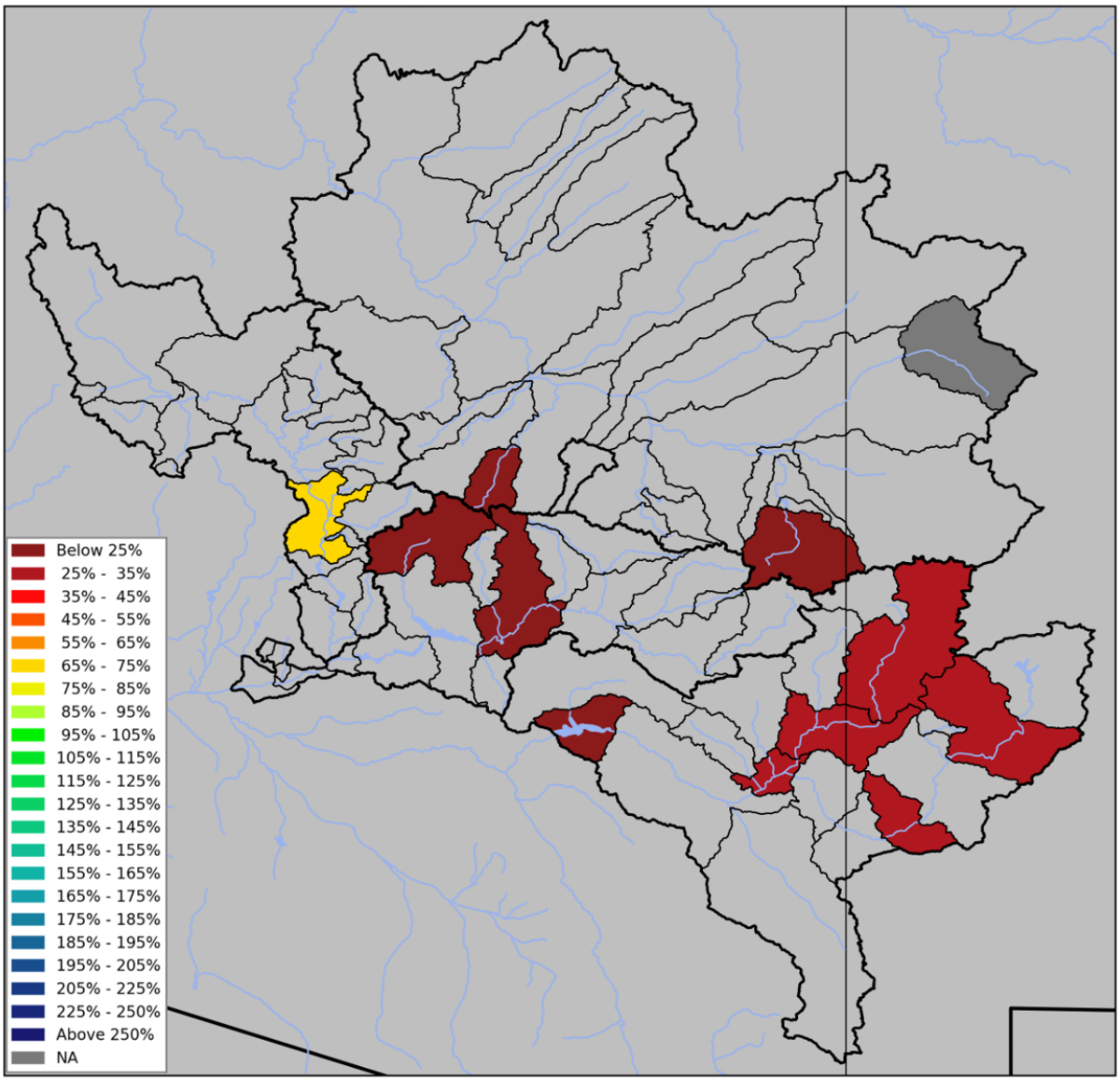
CBRFC hydrologic model soil moisture is generally in the bottom five across the Upper Colorado over the 1981-2020 40-year period. Given the dry conditions, an above normal snowpack or a wet spring will be needed to see near average water supply volumes.

April-July unregulated inflow forecasts for some of the major reservoirs in the Upper Colorado River Basin include Fontenelle 400 KAF (55% average), Flaming Gorge 500 KAF (51%), Green Mountain 180 KAF (65%), Blue Mesa 470 KAF (70%), McPhee 150 KAF (51%), and Navajo 450 KAF (61%). The Lake Powell inflow forecast is 3.3 MAF, a seven percent decrease from January.

Seasonal Water Supply Forecasts



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



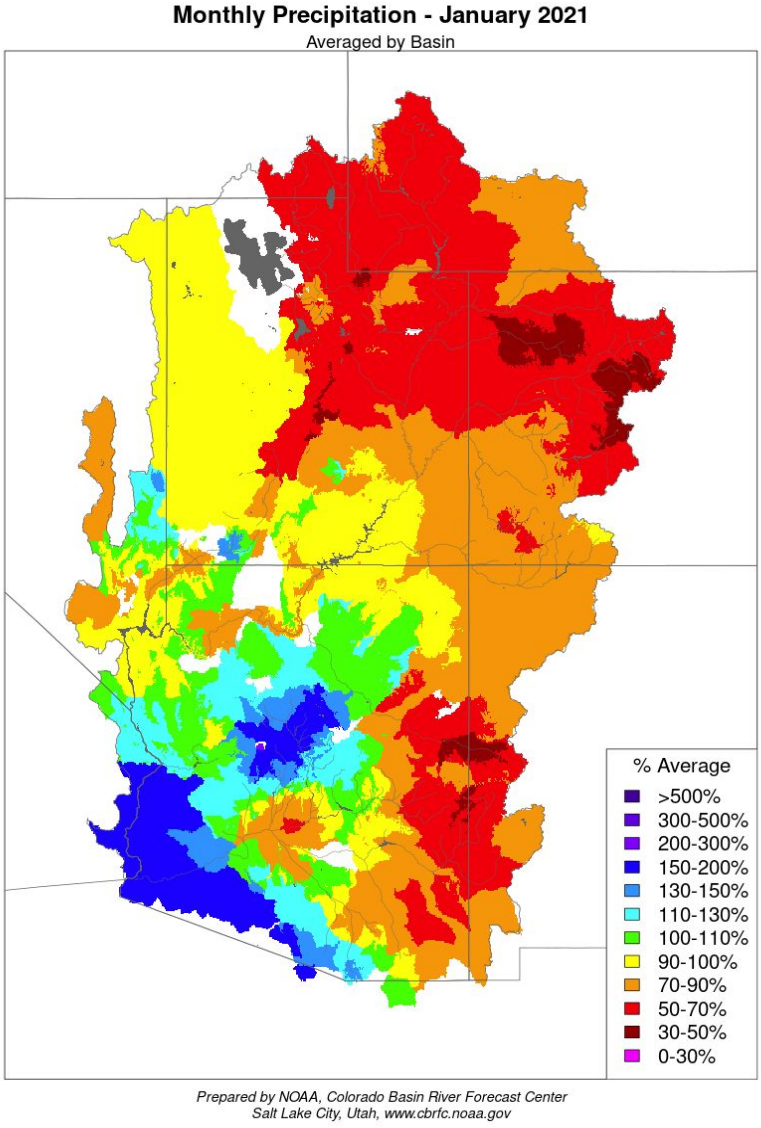
Lower Colorado Basin (AZ/NM): February 2021 January-May forecast volumes as a percent of 1981-2010 median. (50% exceedance probability forecast).

For specific site water supply forecasts click here

Water Supply Discussion

January Precipitation

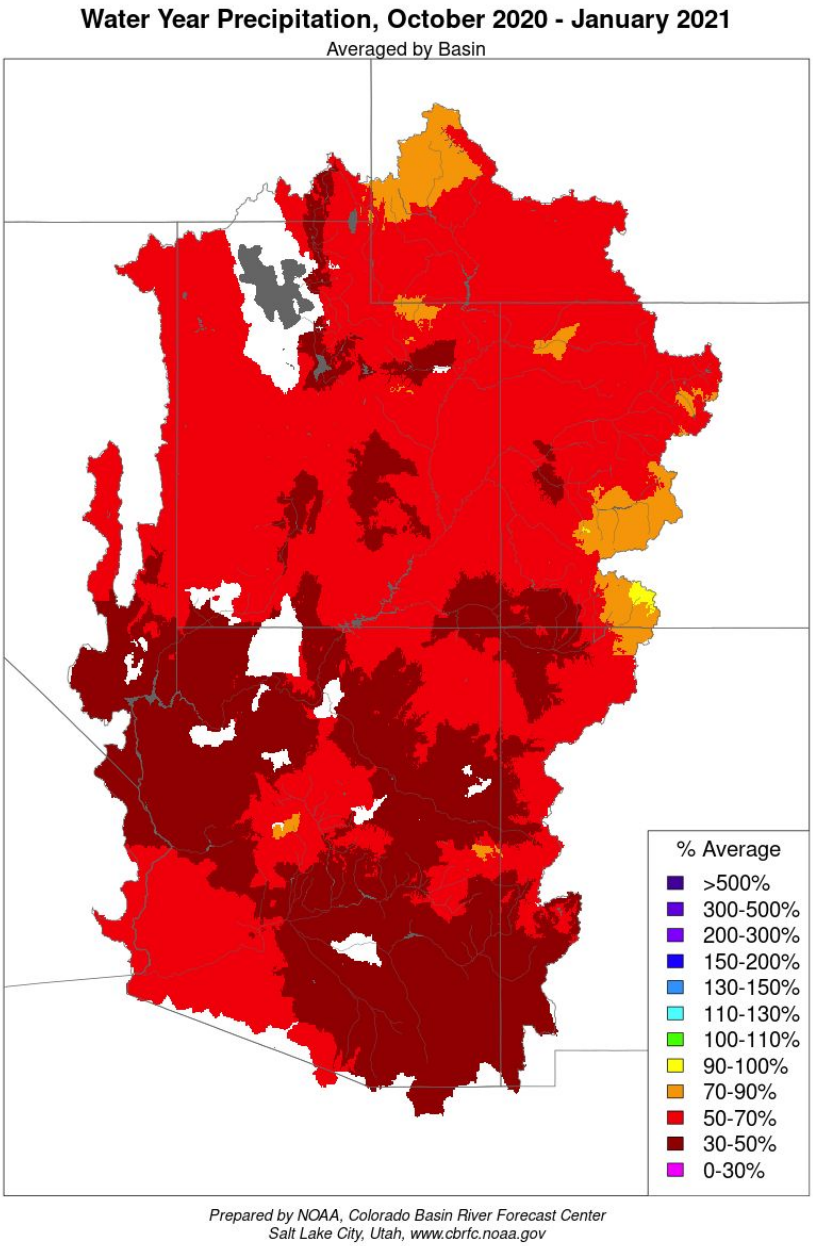
January precipitation was variable across the region with mostly below normal precipitation over the Upper Colorado River Basin and Great Basin, and near to above normal precipitation across portions of the Lower Basin. The first three weeks of the month were very dry across much of the region as stubborn high pressure persisted across the Western U.S. However, the weather pattern transitioned to a deep trough over the last 10 days of the month, with multiple cold storm systems impacting the area. The storms produced widespread precipitation over the entire region, but especially targeted the Lower Basin and southern Utah and southwest Colorado. The Verde River Basin in Arizona was the real winner with 3-5 inches of observed precipitation along the Mogollon Rim. Due to the cold nature of these storms and low snow levels, the hydrologic response was largely muted across the Lower Basin.



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

Water Year Precipitation

Much of the Upper Colorado River Basin saw below normal precipitation in January, and water year precipitation deficits continue to grow. Many of the SNOTELs in the Upper Colorado River and Great Basins are below the 25th percentile for water year precipitation. In addition, the period from April-January 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)

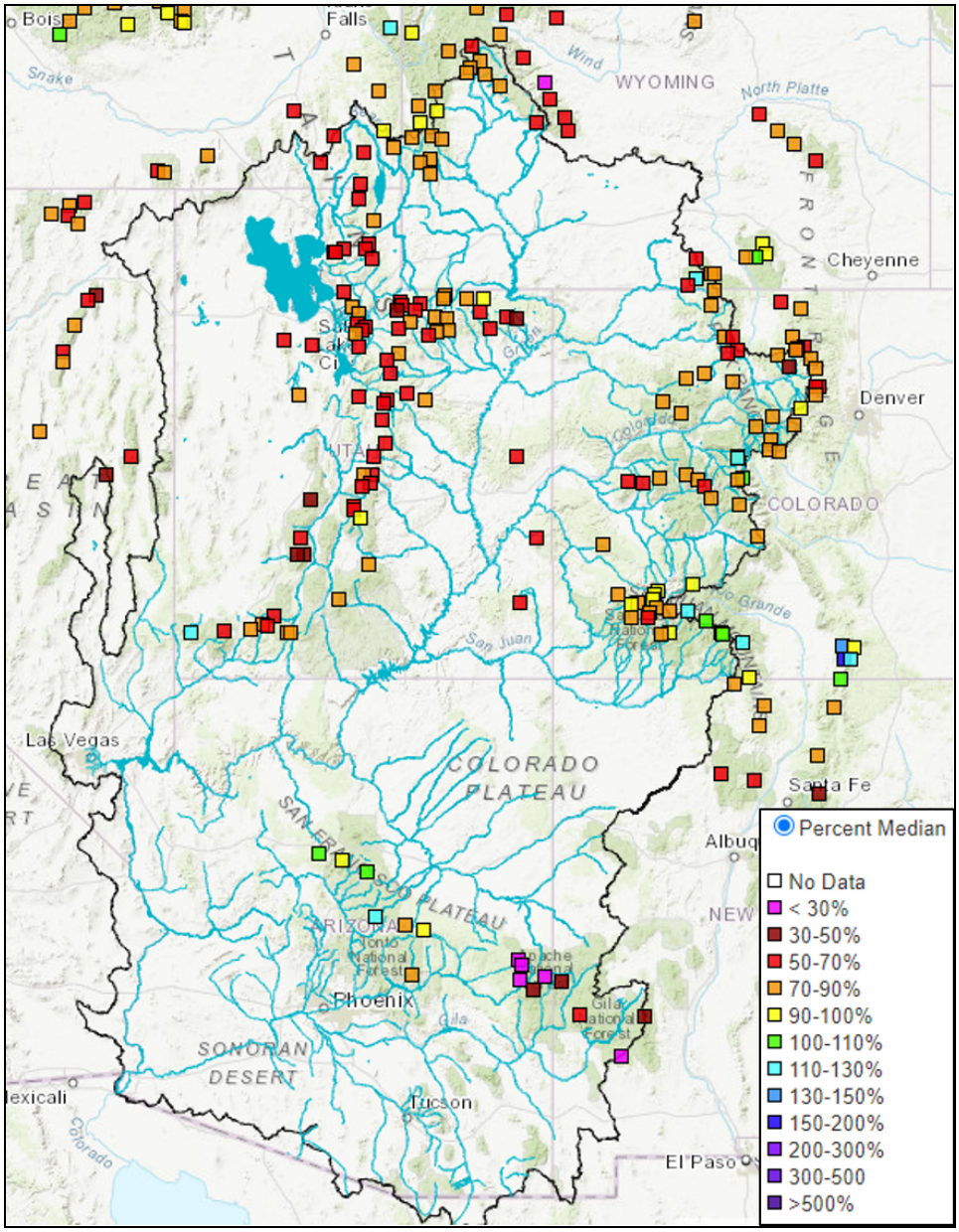
Snowpack

Early February snow water equivalent (SWE) conditions are mostly below to much below normal (median) throughout the CBRFC forecast area. Snowpack conditions generally range from 60-90% of the 1981-2010 historical median across the Upper Colorado River Basin. SWE conditions are near normal (90%) in the San Juan Basin and below normal elsewhere across the Upper Colorado River Basin - around 80% in the Upper Green and Dolores Basins and around 70% across the White-Yampa, headwaters of the Upper Colorado River, Gunnison, and Virgin River Basins. While the majority of SNOTEL sites across the region are reporting below normal SWE conditions, a few SNOTEL stations are reporting near to above normal snow conditions, most notably in the headwaters of the San Juan River Basin in southwest Colorado.

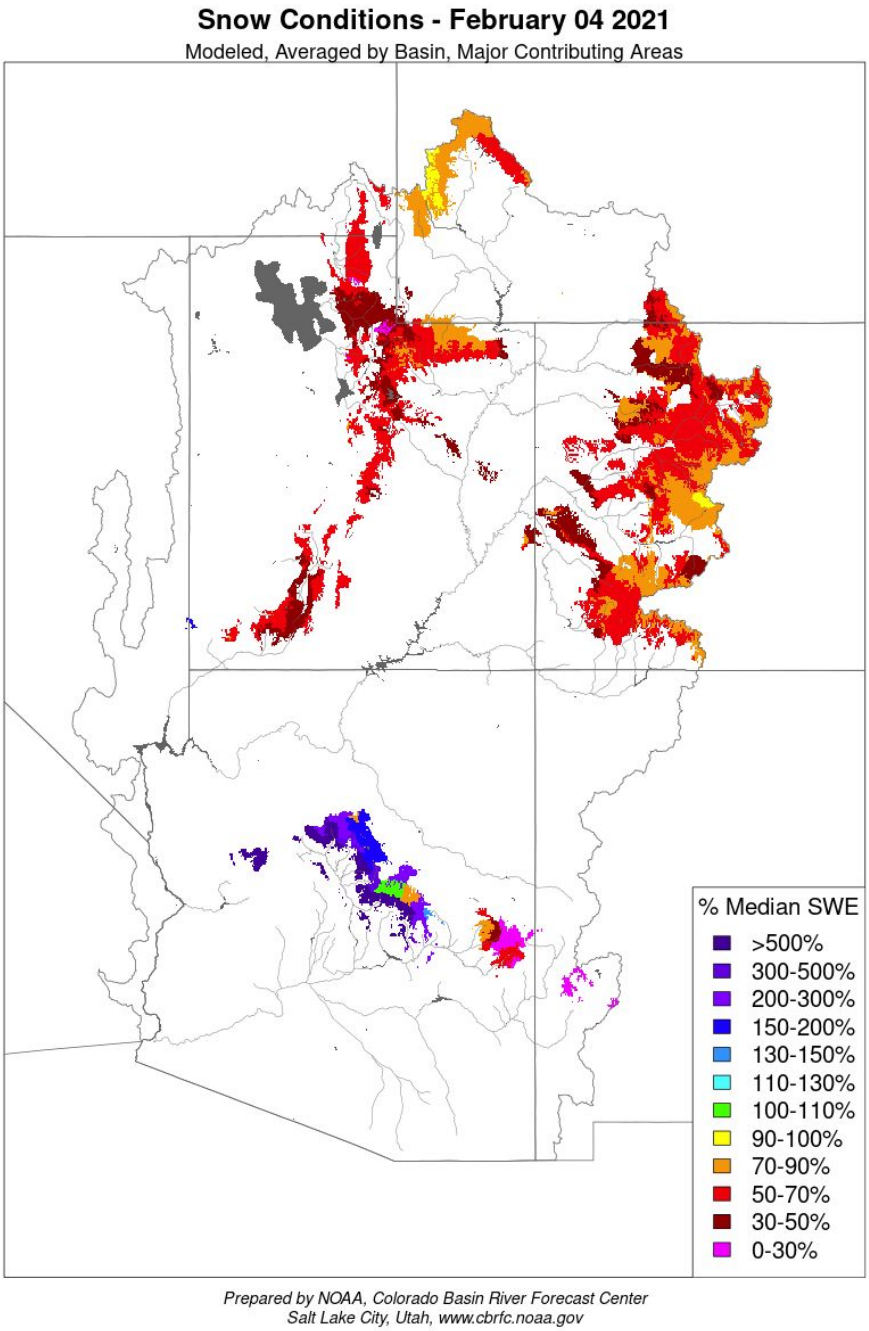
Early February Great Basin snow conditions remain well below normal and generally range between 55-65% of the 1981-2010 historical median. SWE at most SNOTEL stations across the Great Basin are in the bottom (driest) ten on record, with many stations having a 30 to 40 year period of record.

SWE conditions as a percent of the historical median have improved across the Lower Colorado River Basin since early January. Verde River Basin SWE conditions have improved significantly from a month ago and are now slightly above normal. However, Little Colorado, Upper Gila, and Salt basin SWE conditions remain well below normal. 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.



February 4, 2021 observed SNOTEL SWE conditions (percent of historical median).



February 4, 2021 CBRFC hydrologic model snow conditions (percent of median).

For updated SNOTEL information refer to click here

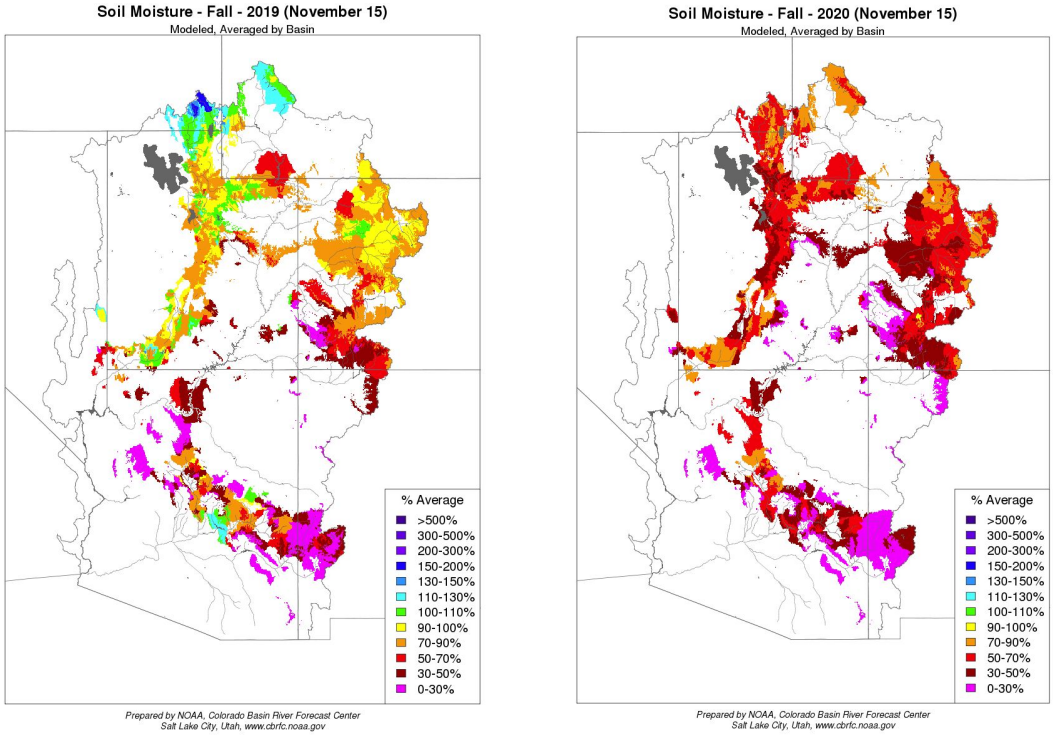
For CBRFC hydrologic model snow click here

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 basins 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.

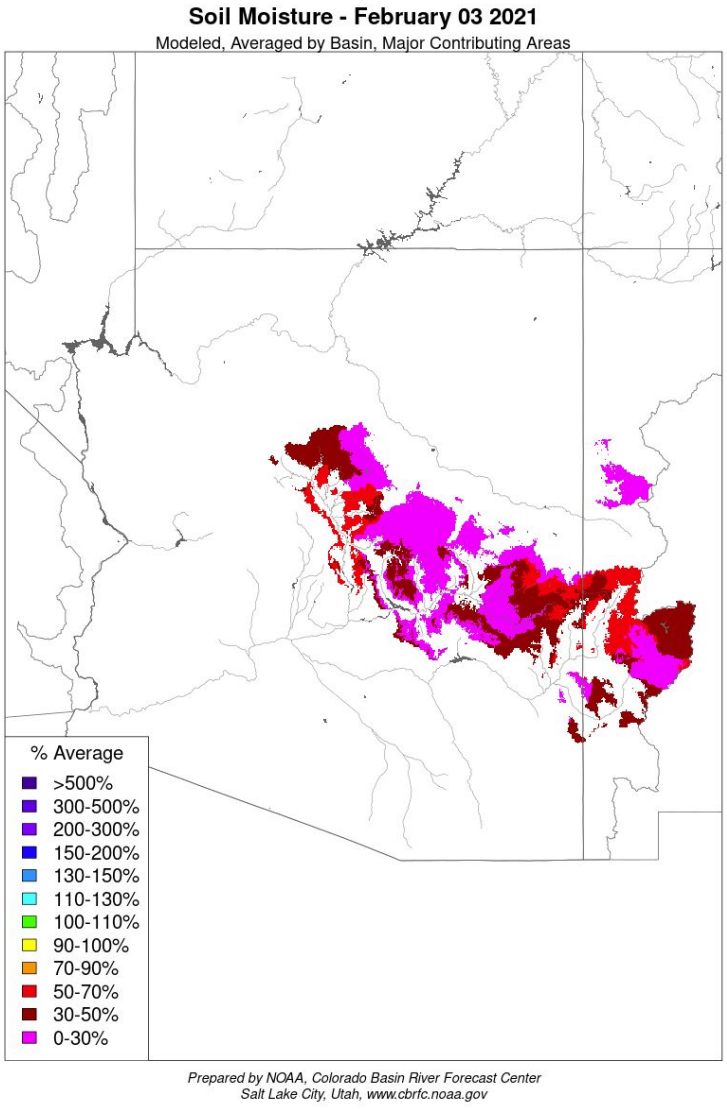
It is not often that such widespread poor soil moisture conditions exist across the region. Similar, but not as poor conditions, existed in the fall of 2002, 2012, and 2018. To produce average runoff, an above normal snowpack or a wet spring will likely be needed to overcome these large soil moisture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

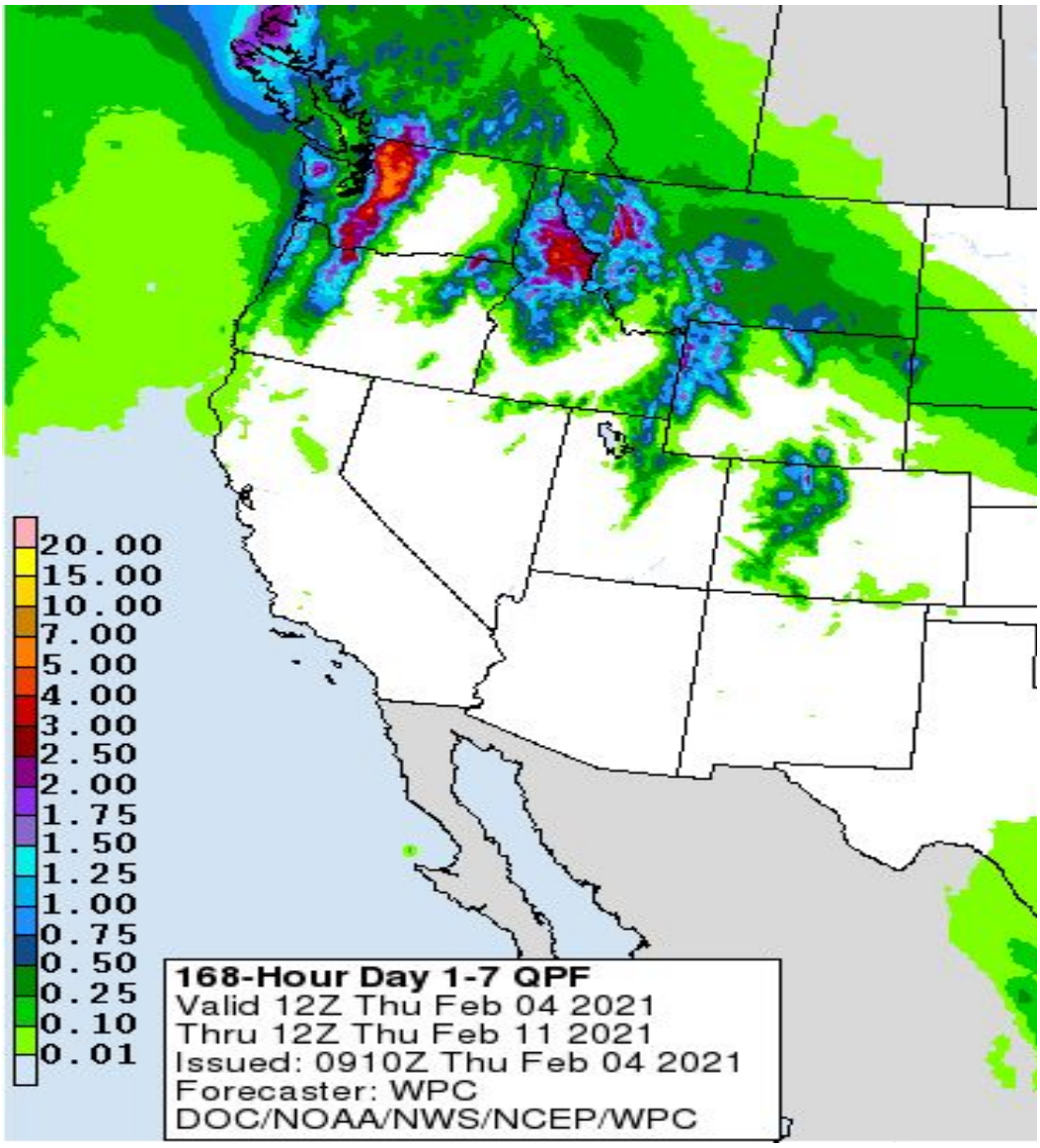
Although winter soil moisture conditions have improved slightly since early January in parts of the Verde and Salt River Basins due to recent precipitation, soil moisture conditions in the Lower Colorado River Basin still remain below to much below average, as shown in the image below. This generally means that a portion of any runoff that occurs from rainfall or snowmelt will be absorbed into the soil before contributing to streamflow.



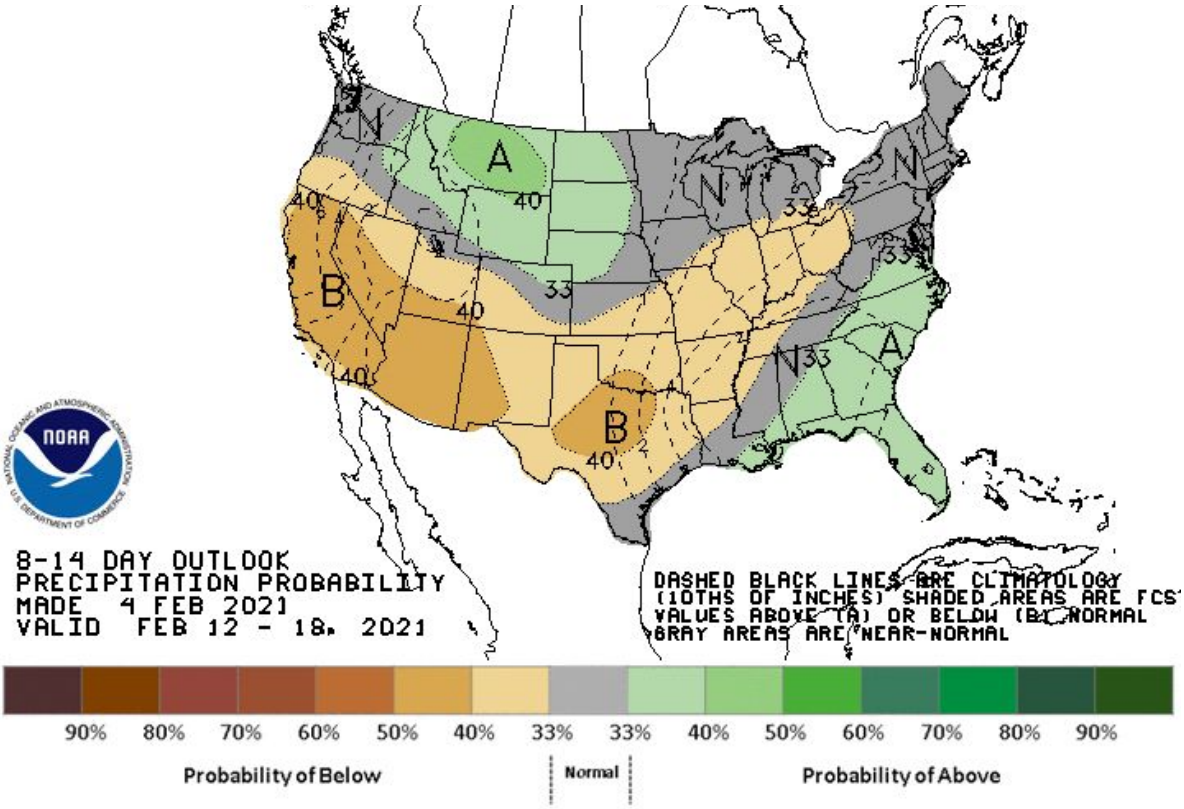
Lower Colorado River Basin (AZ/NM) model soil moisture as of February 3, 2021.

Upcoming Weather

The weather pattern over the first week of February is favorable for bringing beneficial precipitation to Wyoming and the northern half of Utah and Colorado. A storm system moved across the region over the past 24 hours, producing widespread 0.5-1.0 inches of precipitation over the Upper Colorado and Great Basins. Northwesterly flow will persist through the weekend (February 7), with forecasted precipitation amounts of 1.0-1.5 inches over the Upper Green, Yampa, and Upper Colorado River headwater basins, in addition to portions of northern Utah. The weather pattern becomes more uncertain by the latter half of next week, however the general consensus among weather models is to keep northwesterly flow in place across the Intermountain West. This would favor slightly elevated odds for above normal precipitation across the north and below normal precipitation across the southern half of Utah/Colorado and the Lower Basin.



.NWS Weather Prediction Center precipitation forecast for Feb 4-11, 2021.



NWS Climate Prediction Center precipitation probability forecast for Feb 12-18, 2021.

Basin Conditions and Summary Graphics

- Green River Basin
- Upper Colorado River Basin
- San Juan River Basin
- Great Salt Lake Basin
- Sevier River Basin
- Virgin River Basin

End Of Month Reservoir Content Tables

- Green River Basin
- Upper Colorado River Basin
- San Juan River Basin
- Great Salt Lake Basin
- Sevier Basin