January 1, 2020 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

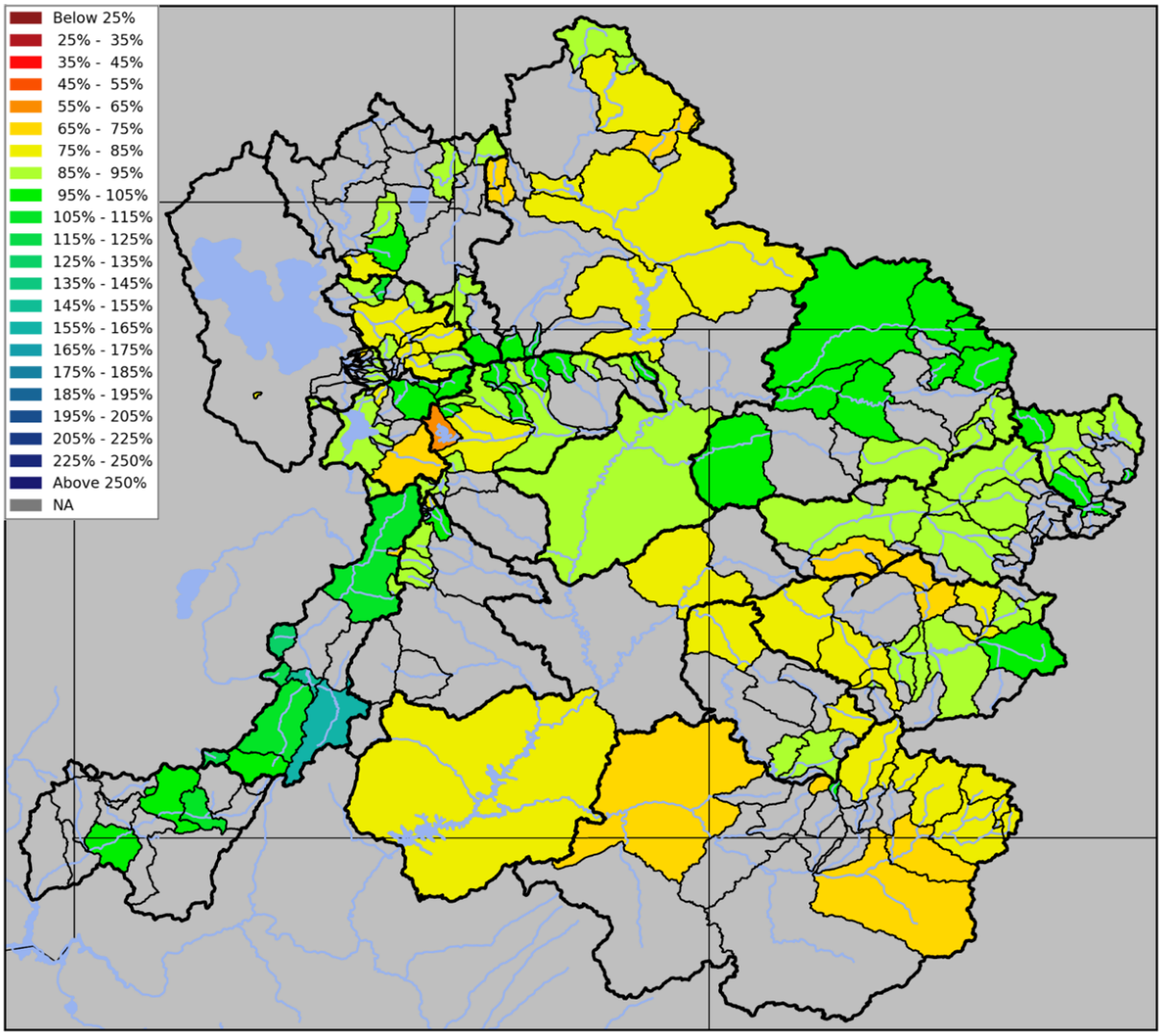
April-July water supply volume forecasts are generally near to below average throughout the Upper Colorado River Basin and Great Basin as of early January. Upper Colorado River Basin water supply conditions are near average in the Yampa, White, Duchesne, and Upper Colorado River headwaters, and below average in the Upper Green, Gunnison, Dolores, and San Juan basins. Forecasted water supply runoff volumes in the Great Basin are below average in the Weber basin and closer to average in the Bear, Six Creeks, and Utah Lake basins.

Water supply forecasts are near to above the 1981-2010 historical April-July average in the Sevier and Virgin basins. In the Lower Colorado River Basin, water supply volume forecasts are much above (>150%) the historical January-May median in the Salt and Verde basins, near median in the Little Colorado basin, and slightly below median in the Upper Gila basin.

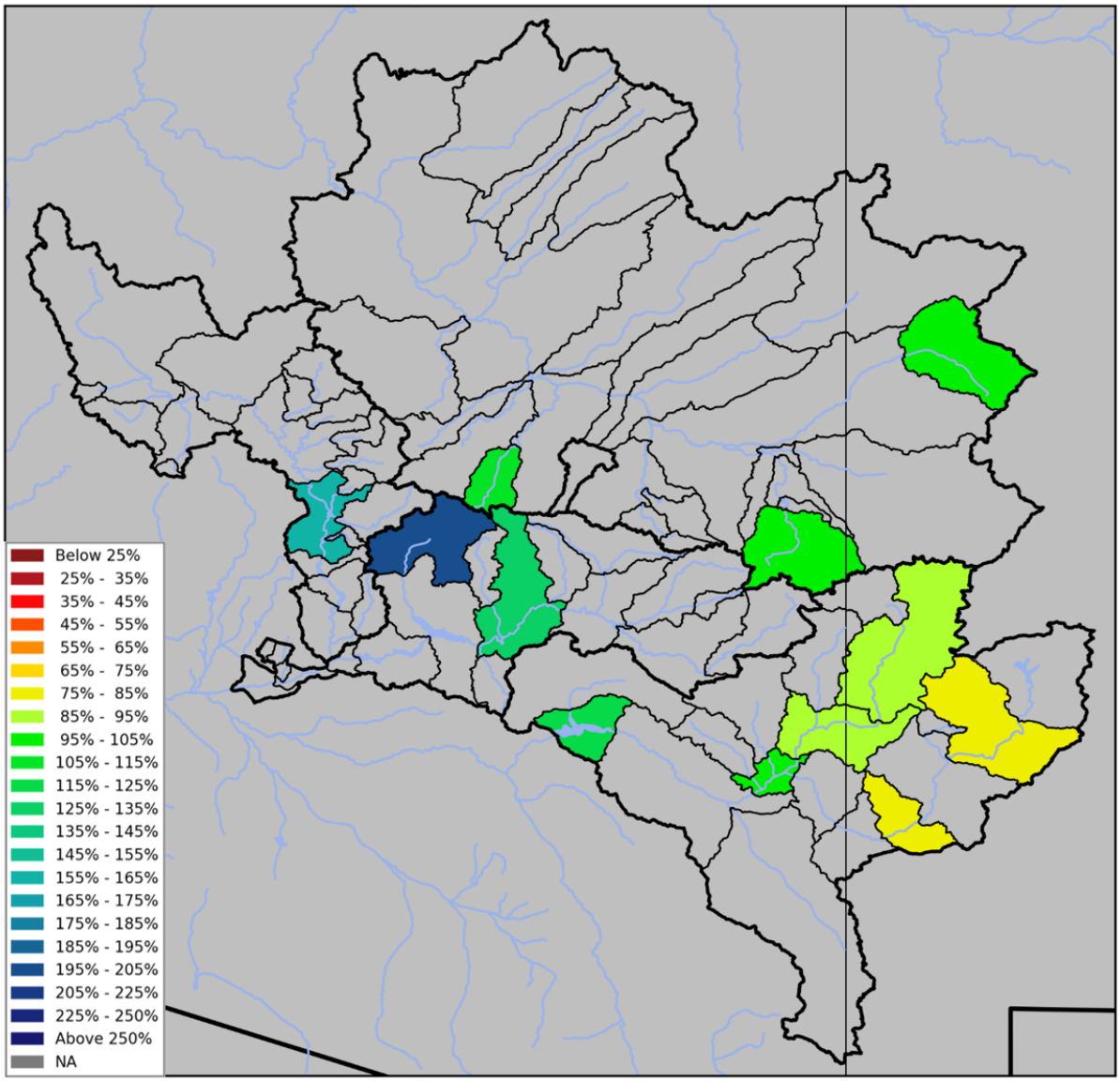
Snowpack conditions are much better in most areas compared to this time last year and current snow water equivalent (SWE) values are generally above normal (median) throughout the CBRFC forecast area. Hydrologic model soil moisture conditions are also improved compared to a year ago, but still below average throughout most of the Upper Colorado and Great Basins. Snowpack and soil moisture conditions as of early January are most favorable in the Lower Colorado River Basin following the above average November and December precipitation.

April-July unregulated inflow forecasts for some of the major reservoirs in the Upper Colorado River Basin include Fontenelle Reservoir 570 KAF (79% average), Flaming Gorge 830 KAF (85% of average), Blue Mesa Reservoir 590 KAF (87% of average), McPhee Reservoir 260 KAF (88% of average), and Navajo Reservoir 550 KAF (75% of average). The Lake Powell inflow forecast is 5.9 MAF (82% of average).

Seasonal Water Supply Forecasts



Upper Colorado, Great, Virgin River Basins: Jan 2020 April-July forecast volumes as a percent of 1981-2010 average (50% exceedance probability forecast).



Lower Colorado Basin (AZ/NM): 2020 January-May forecast volumes as a percent of 1981-2010 median (50% exceedance probability forecast).

For specific site water supply forecasts click here

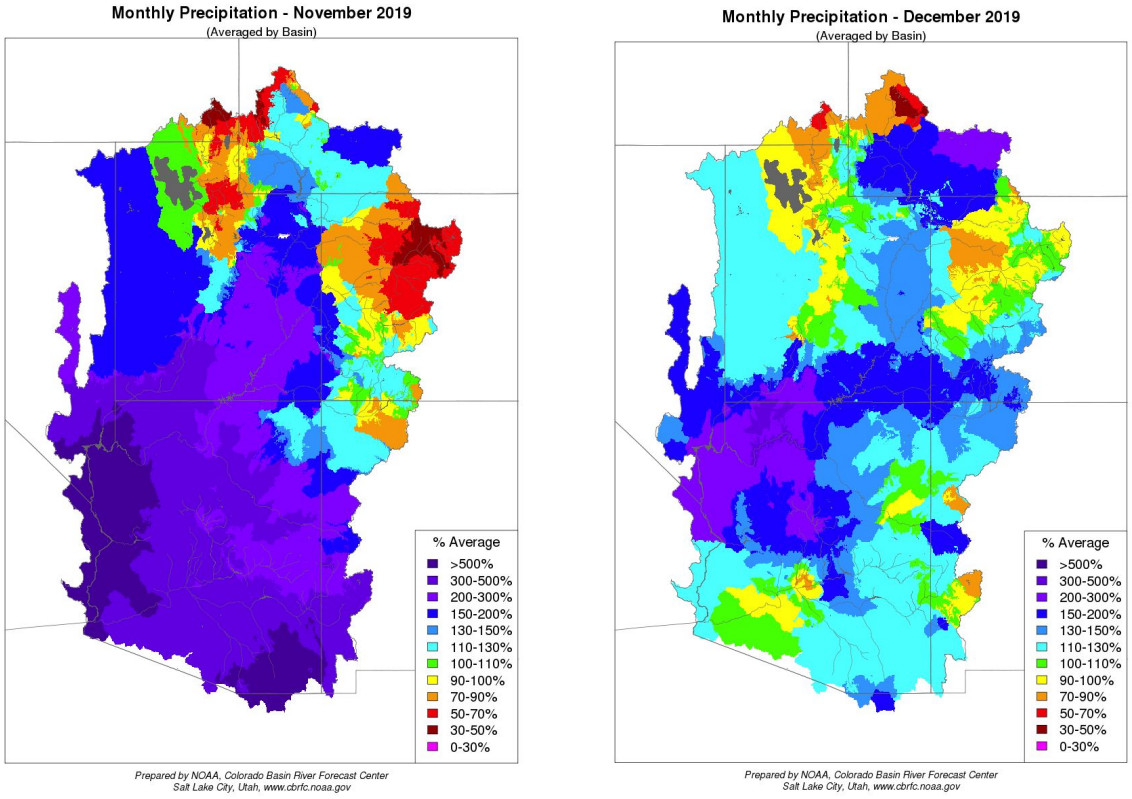
Water Supply Discussion

Precipitation

November/December

The first three weeks of November were very dry across the entire basin. An active storm pattern impacted the Lower Colorado River basin and parts of southern and central Utah during the last week of the month. As a result, the Lower Colorado, Virgin, and Sevier River Basins had above average precipitation. These areas received as much as 300-500% of average and also had significant snow accumulations at high elevations. The Great Basin, Upper Green River headwaters, and most of Colorado did not benefit from the storm track and ended the month with below normal precipitation.

The precipitation in December was more of a mixed bag across the basin. The majority of the areas in the basin received average to near average precipitation with the exception of the Upper Green River above Fontenelle and parts of the lower Bear River in Idaho which ended the month with below normal precipitation. The storm track favored areas in parts of Lower Colorado River Basin, southwest Utah, and southwest Colorado. These areas received much above average precipitation. Unfortunately, many of the areas that received the highest precipitation in December were in the low elevations that typically do not have a significant contribution to water supply.

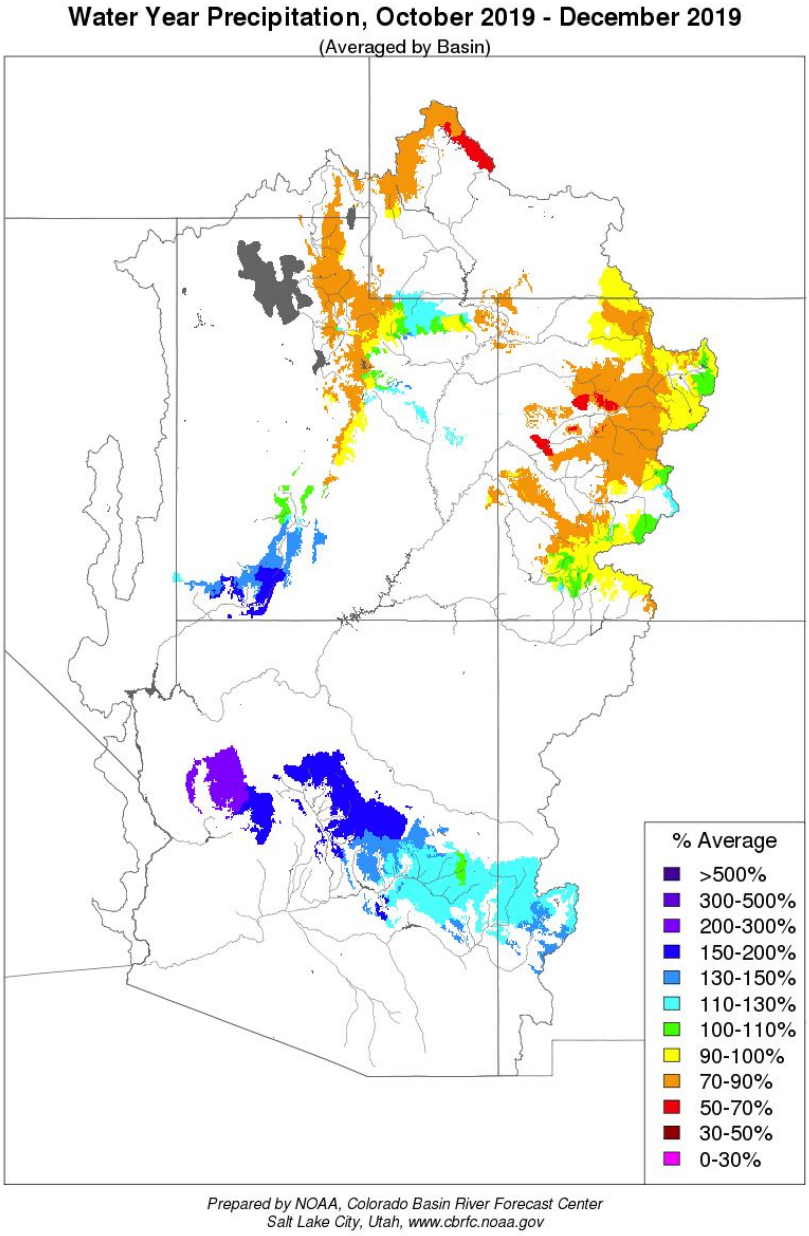


November 2019 and December 2019 percent of normal precipitation.
(Averaged by basins defined in the CBRFC hydrologic model)

Water Year Precipitation

The water year precipitation can be used as a good indicator of early season water supply conditions. Water year precipitation is near to below average in the majority of the Upper Colorado River basin with the exception of parts of the Duchesne, Virgin, and Sevier River basins that have above average water year precipitation. October was extremely dry and resulted in a slow start to the water year in many areas.

As previously mentioned, the Lower Colorado River basin benefited from an active weather pattern in late November and December which resulted in much above average water year precipitation.

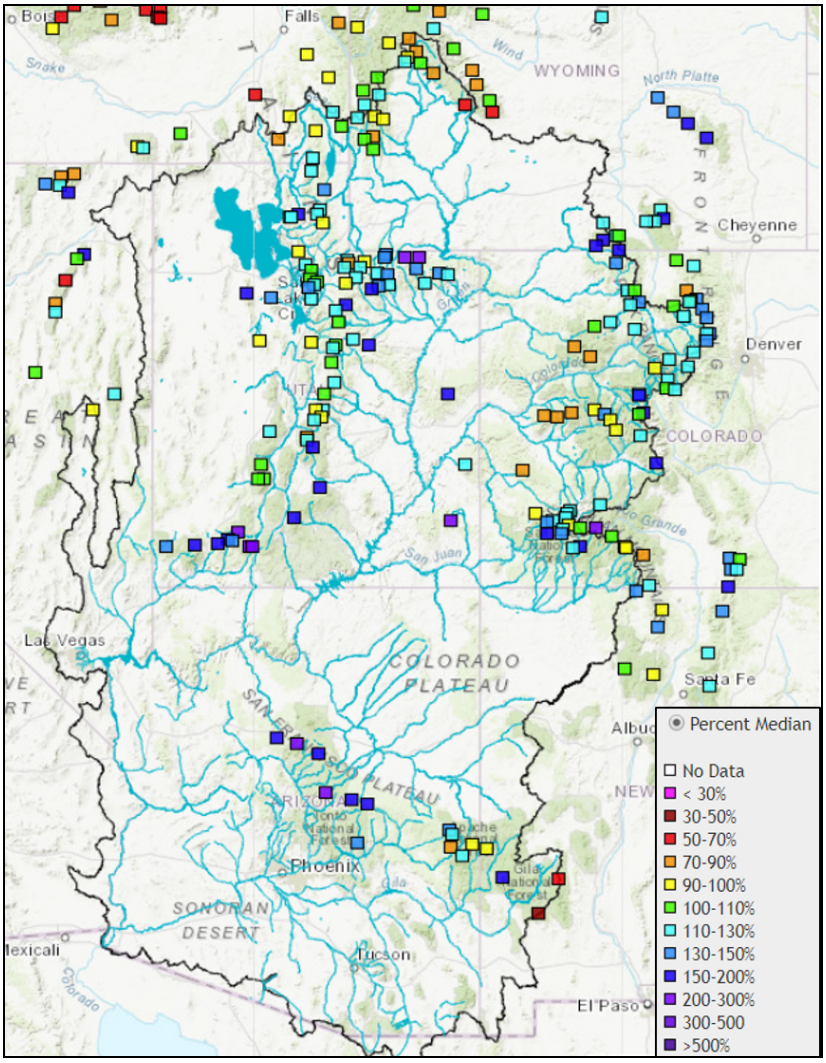


Water Year 2020 percent of normal precipitation.
(Averaged by basins defined in the CBRFC hydrologic model)

Snowpack

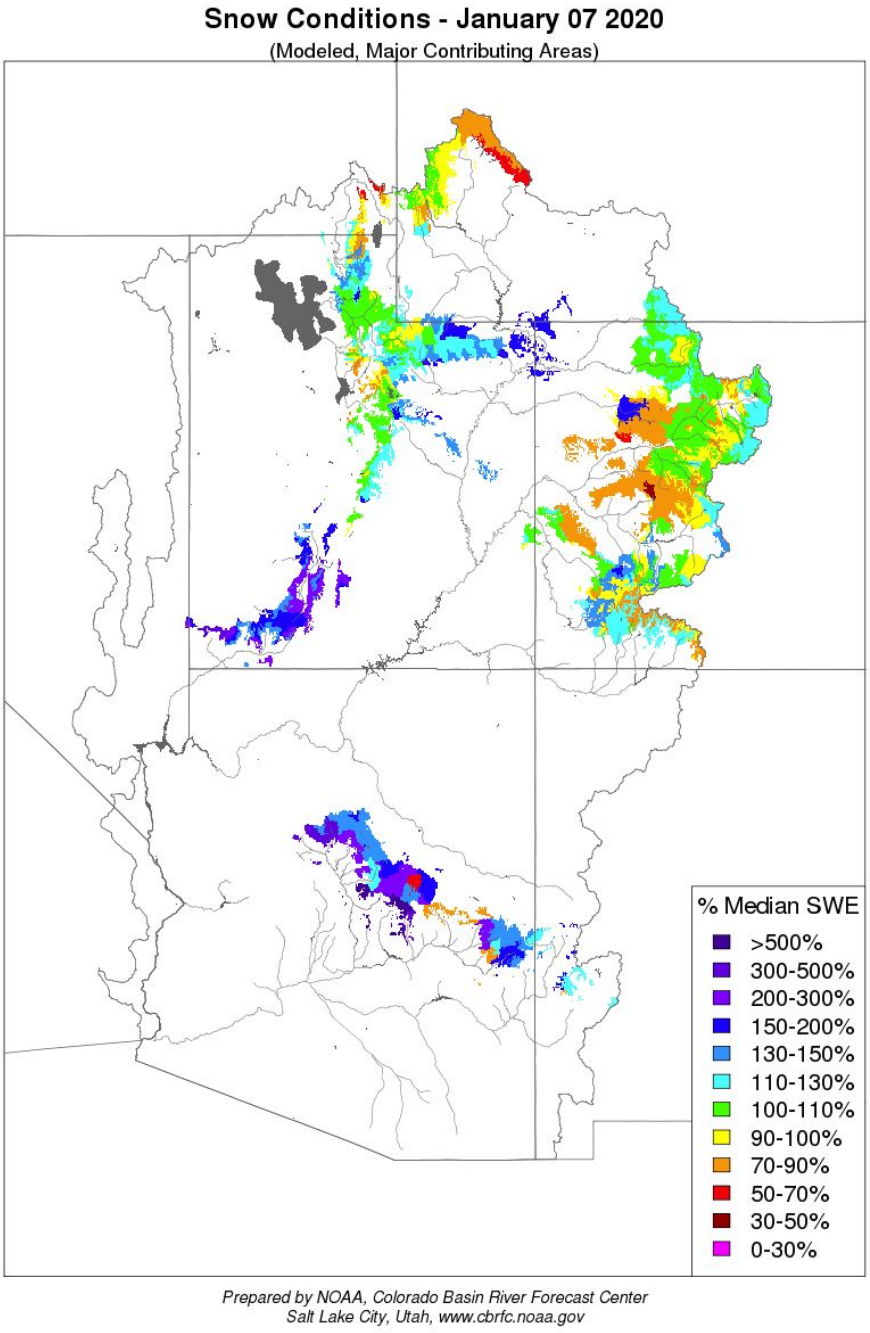
Snow conditions as of early January are generally above normal (median) throughout the CBRFC forecast area, with the exception of the Green River headwaters above Fontenelle Reservoir. Snowpack is most favorable (>150% of median) in the Virgin, Verde, and Little Colorado drainages within the Lower Colorado River Basin. It should be noted that snowpack conditions in the Lower Colorado River Basin are more variable and tend to fluctuate more frequently over time.

Snow water equivalent (SWE) conditions in the Upper Colorado River Basin generally range from 100-150% of the historical median. Snow conditions are most encouraging (125-150% of median) in the Lower Green, Duchesne, and Dolores basins. Colorado SWE conditions are above average along the Continental Divide and trend towards near average conditions from east to west. The lowest snowpack with respect to the 1981-2010 historical median exists in the headwaters of the Upper Green basin, and the White River Basin, where conditions are near to below normal. SWE is above normal across the Great Basin and generally ranges from 115-125% of the historical median as of early January. It's worth mentioning that much below average October precipitation in southwest Colorado resulted in a slow start to the high elevation snow accumulation season, especially within the San Juan Basin.



Observed percent median snow conditions as of January 7, 2020.

The image below is the representation of snow in the CBRFC hydrologic model. Model snow conditions closely correlate to SNOTEL conditions throughout the Colorado River and Great Basins.



CBRFC hydrologic model snow conditions as of January 7, 2020.

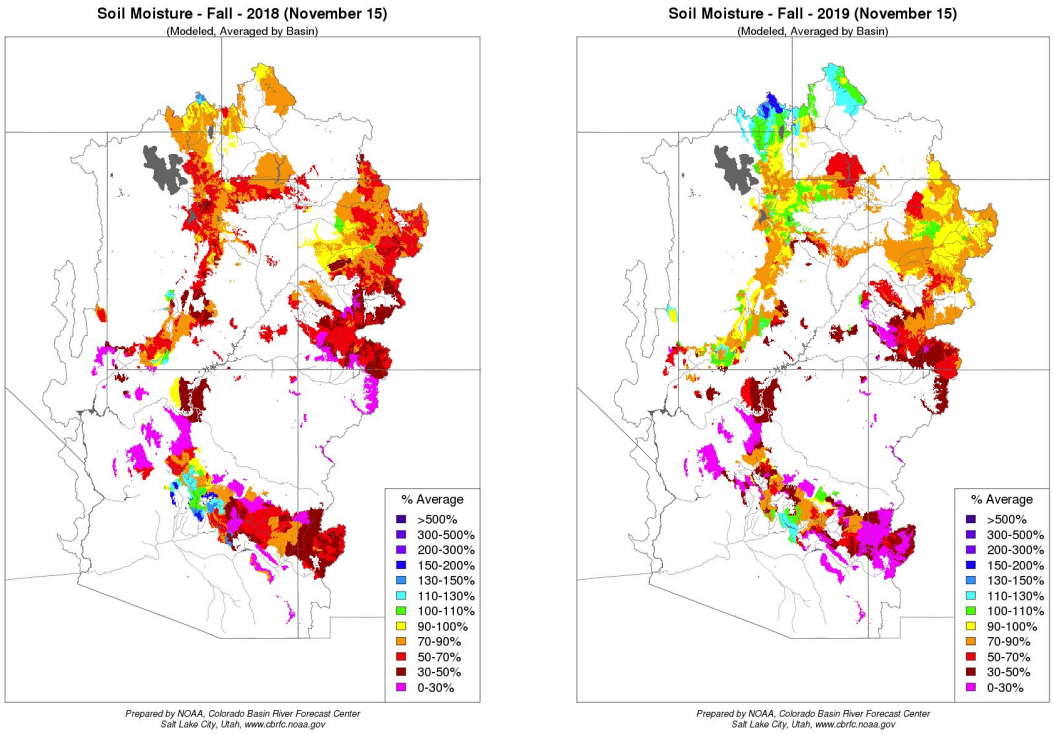
For updated SNOTEL information refer to click here
For CBRFC hydrologic model snow click here

Soil Moisture

CBRFC hydrologic model soil moisture parameters 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 variable across the Upper Colorado River Basin and Great Basin, with conditions generally declining from north to south. In the Great Basin, soil moisture conditions were near average. Within the Upper Colorado River Basin, the Upper Green and Duchesne basins entered the winter with the most favorable soil moisture conditions, while the White, Yampa, and Colorado River mainstem basins entered the winter with below average soil moisture conditions. Hydrologic model soil moisture conditions entering the winter are generally better compared to a year ago due to the above average runoff last spring and precipitation that fell over the last several weeks, but still below average throughout most of the Upper Colorado and Great Basins.

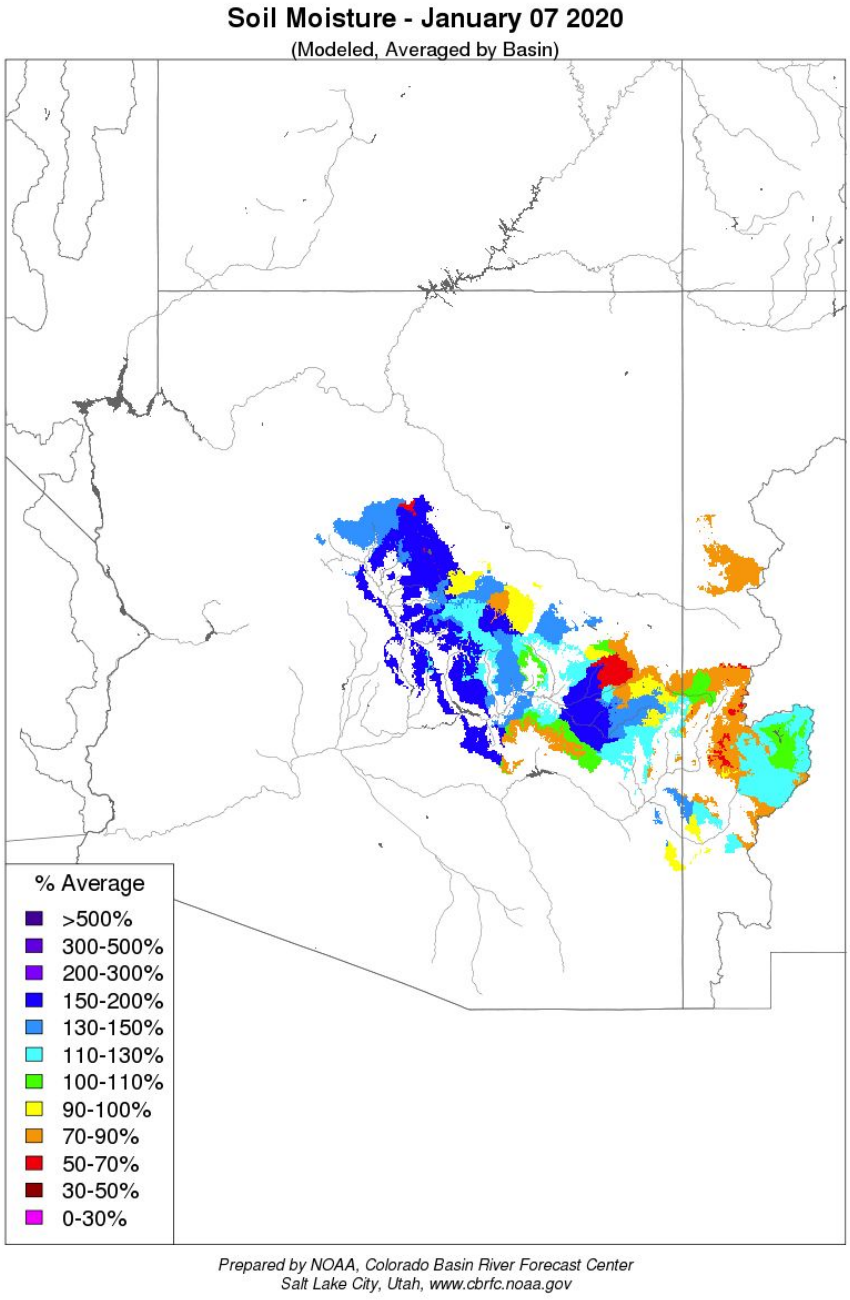
The Gunnison, Dolores, and San Juan basins in southwest Colorado entered the winter season with much below average soil moisture conditions, in part due to the poor 2019 monsoon season. For the southwest US, the 2019 monsoon season was the 9th driest and 3rd hottest, with records dating back to 1895.



Comparison of November 2018 (left) and November 2019 (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.

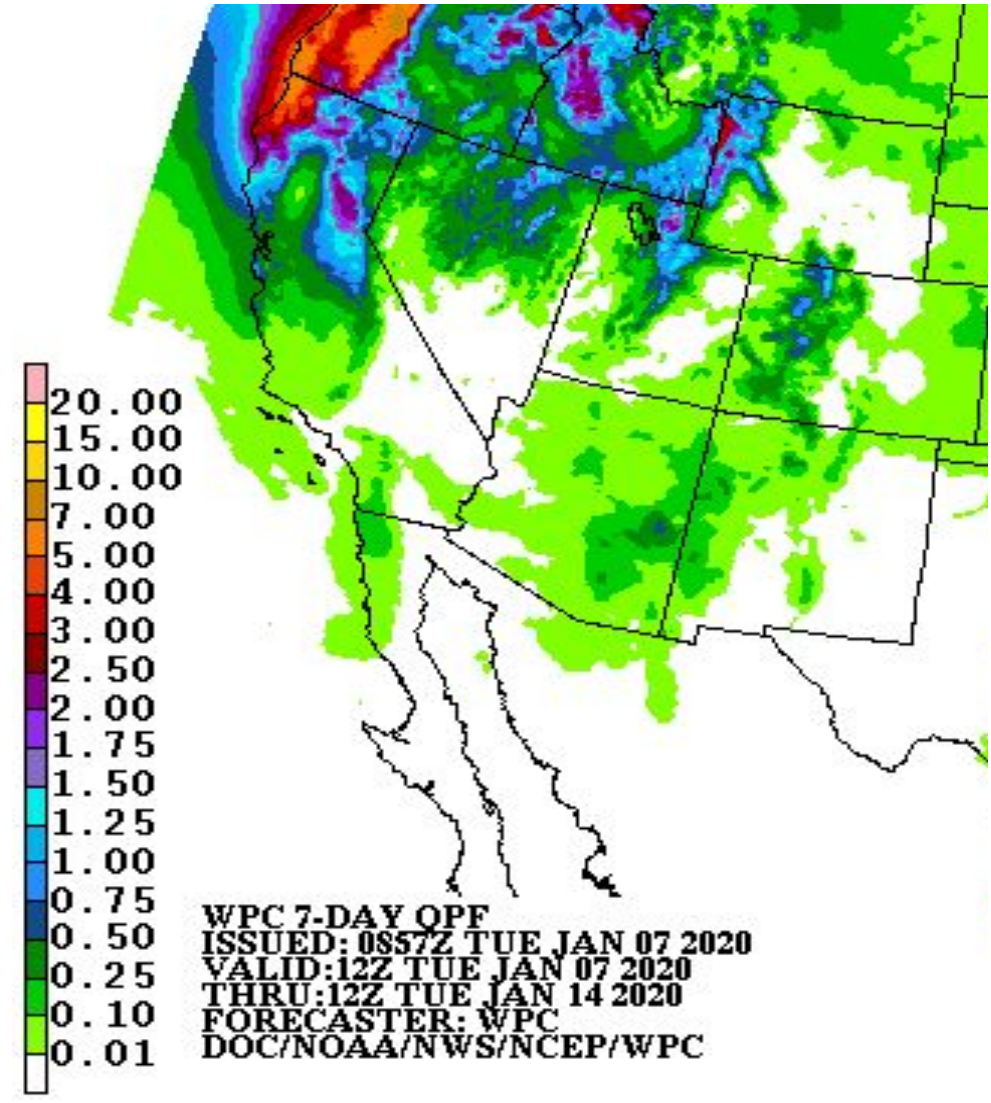
After the unfavorable 2019 monsoon season, winter soil moisture conditions have improved throughout the Lower Colorado River Basin over the past several weeks due to recent precipitation events. Above average model soil moisture conditions exist throughout the majority of the Lower Colorado River Basin as of early January. This generally indicates a positive impact to water supply volumes due to more efficient rainfall and snowmelt runoff.



Lower Colorado River Basin (AZ/NM) model soil moisture as of January 7, 2020.

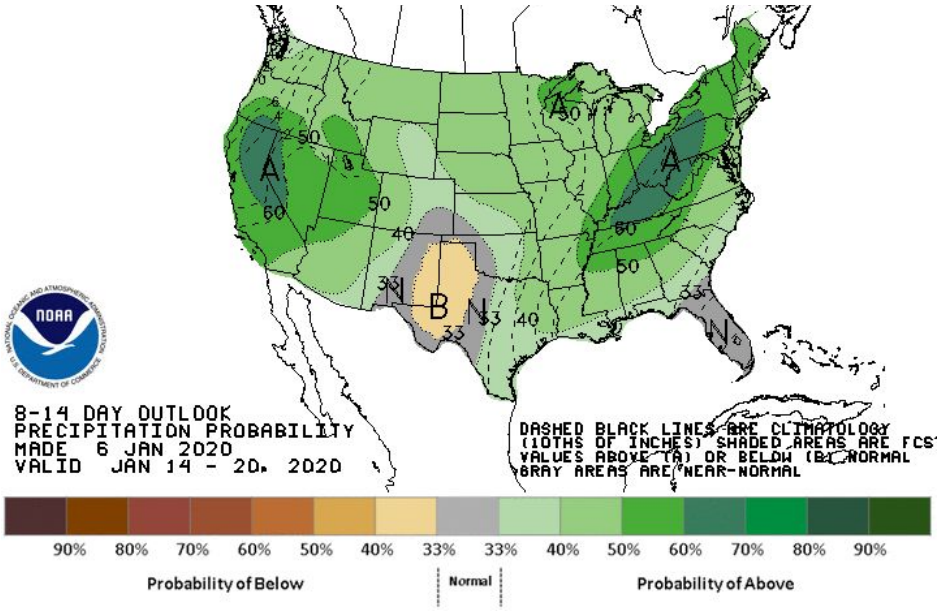
Upcoming Weather

A couple of storm systems have already impacted some northern portions of the CBRFC area during the first week of January bringing above average precipitation for the month to date to those areas. Current weather forecast models are indicating that the weather pattern will become more active over the Upper Colorado River Basin and Great Basin over the next two weeks. The image below shows the current forecast precipitation totals over the next week when multiple storm systems are forecast to bring chances of significant precipitation to the mountains of northern Utah, Colorado and southwest Wyoming, with the possibility of some precipitation spreading south into Arizona as well.



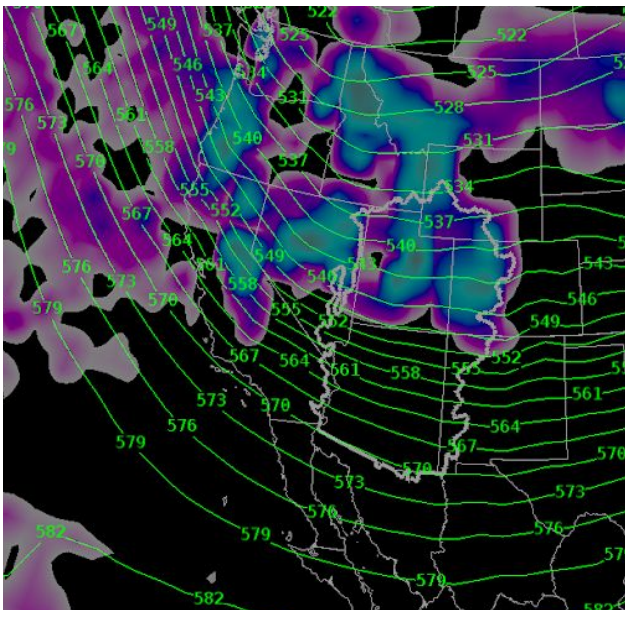
NWS Weather Prediction Center precipitation forecast for Jan 7-14, 2020.

Models are hinting at a continuation of this pattern into the second week as well, indicating increased chances for above normal precipitation during that period across the entire Colorado Basin River Forecast Center area, as seen in the image below.



NWS Climate Prediction Center precipitation probability forecast for Jan 14-20, 2020.

The image below is a snapshot of one meteorological forecast model for January 14 showing a trough over the CBRFC area with the shading indicating areas of precipitation. This pattern is typical of the types of systems that are being forecast to move through the area during the next two weeks. The positive take away from this is that currently there is no long term ridge indicated in the meteorological models and chances for at or above normal precipitation across the northern portions of the basin for the month of January are looking good.



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

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