January 6, 2022 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

Following a dry spring and early summer, the Southwest monsoon brought much needed widespread precipitation to the region. As a result, fall (antecedent) soil moisture conditions have improved from a year ago but remain below average across many of the major runoff producing areas. Snow started accumulating in mid-October across high elevation basins, but snowpack conditions declined during a warm and mostly dry November/early December. The weather pattern during the last three weeks of December brought multiple storm systems and above average precipitation to the region resulting in near to much above normal (90-175%) early January snow water equivalent (SWE) conditions.

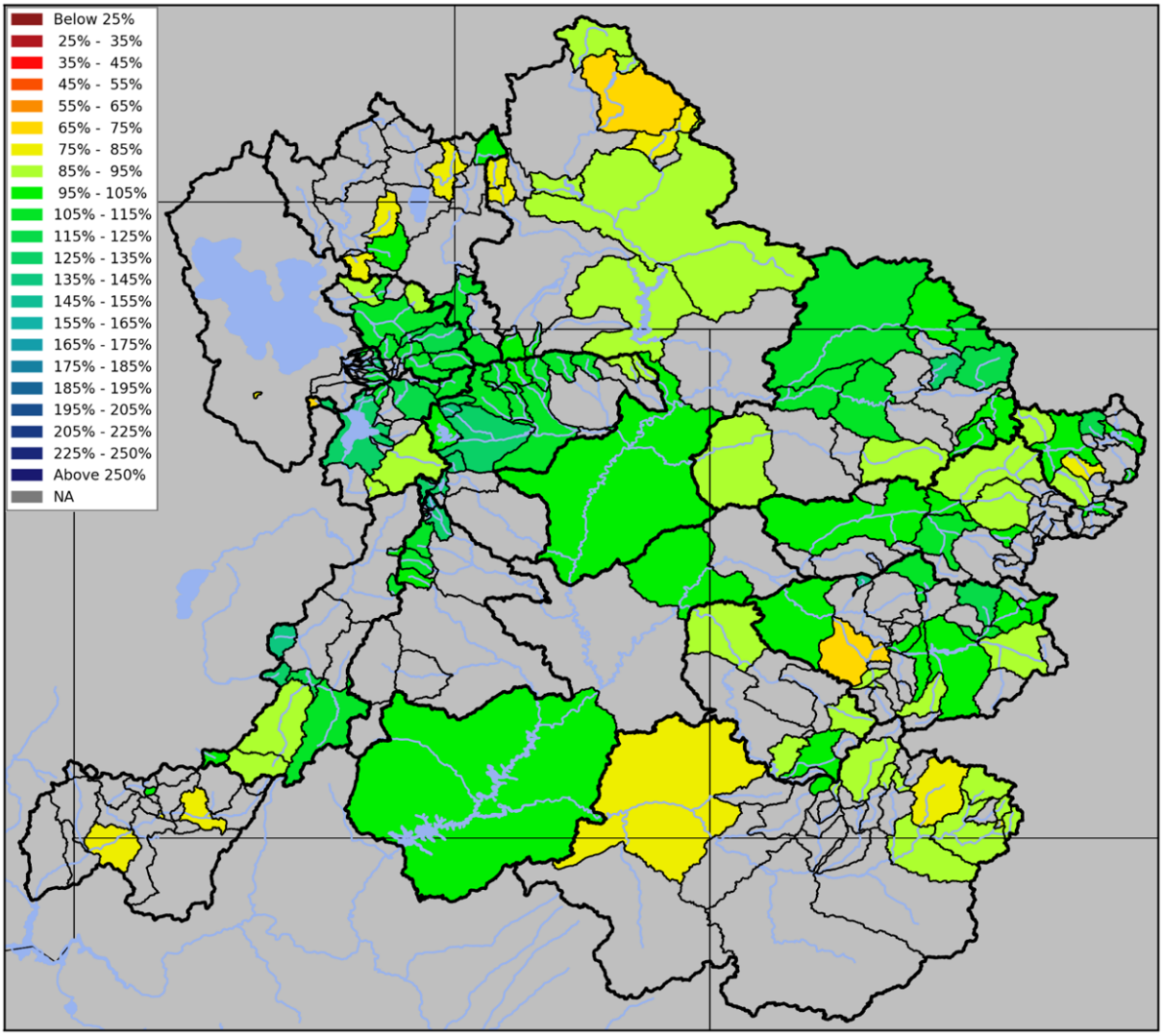
Upper Colorado River Basin January water supply forecasts generally range between 75-140% of the 1991-2020 historical April-July average. Great Basin water supply forecasts are 70-140% of average. Lower Colorado River Basin January-May water supply runoff forecast volumes are 40-155% of the historical median.

Water supply forecast ranges by basin:

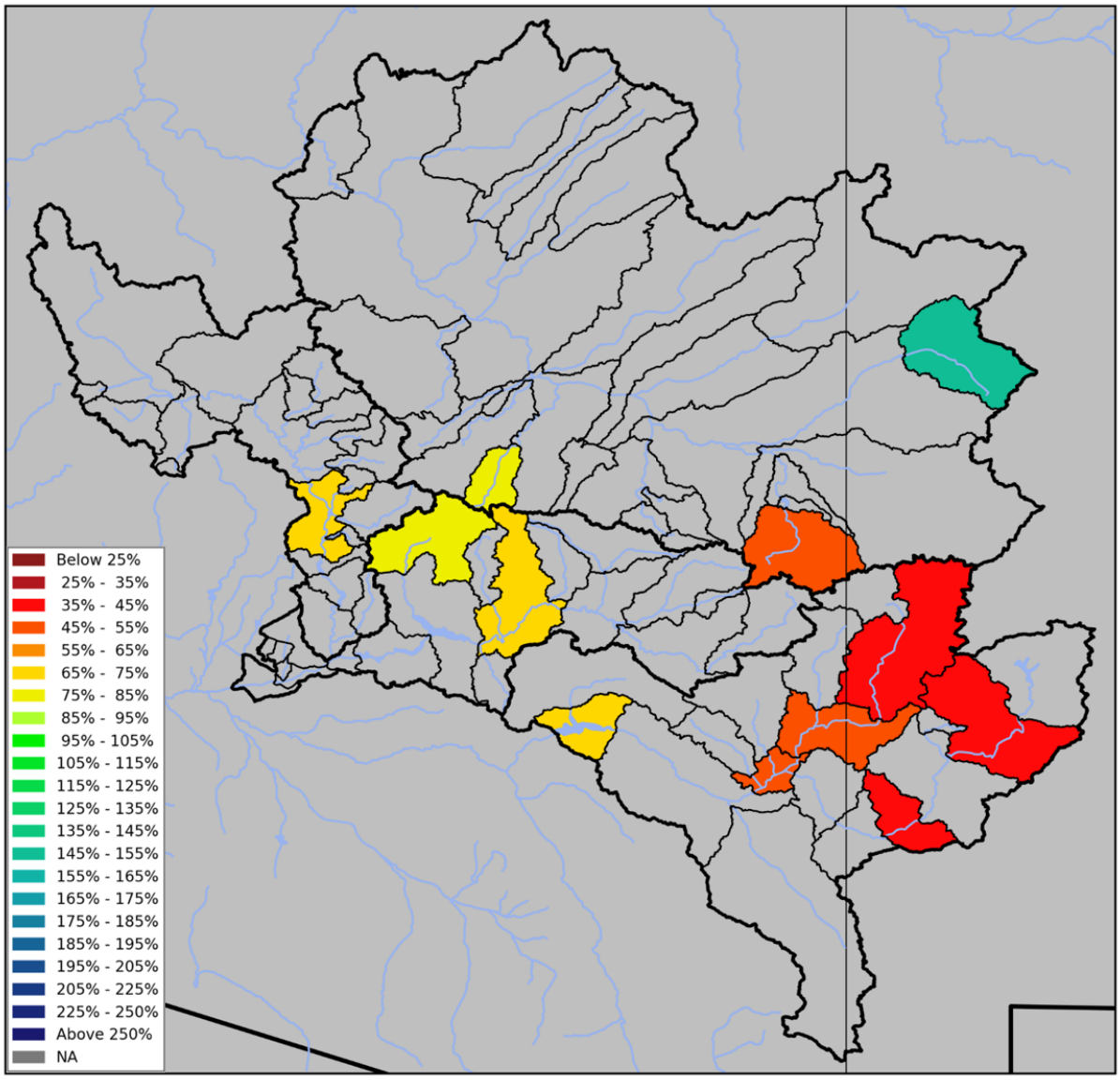
Basin	Water Supply Forecast Range
Upper Green	75-105%
Duchesne	85-140%
Yampa/White	90-125%
Upper Colorado Mainstem	85-120%
Gunnison	90-135%
Dolores	90-95%
San Juan	80-95%
Bear	80-115%
Weber	95-115%
Six Creeks	100-130%
Provo/Utah Lake	70-130%
Virgin	80-100%
Sevier	90-140%
Little Colorado	50-155%
Upper Gila	40-65%
Salt	75-80%
Verde	70%

April-July unregulated inflow forecasts for some of the major reservoirs in the Upper Colorado River Basin include Fontenelle 650 KAF (88% average), Flaming Gorge 840 KAF (87%), Green Mountain 265 KAF (95%), Blue Mesa 650 KAF (102%), McPhee 235 KAF (92%), and Navajo 550 KAF (87%). The Lake Powell inflow forecast is 6.3 MAF (99% of average).

Seasonal Water Supply Forecasts



Upper Colorado, Great Basin, and Virgin River Basins
January 2022 April-July forecast volumes as a percent of 1991-2020 average
(50% exceedance probability forecast).



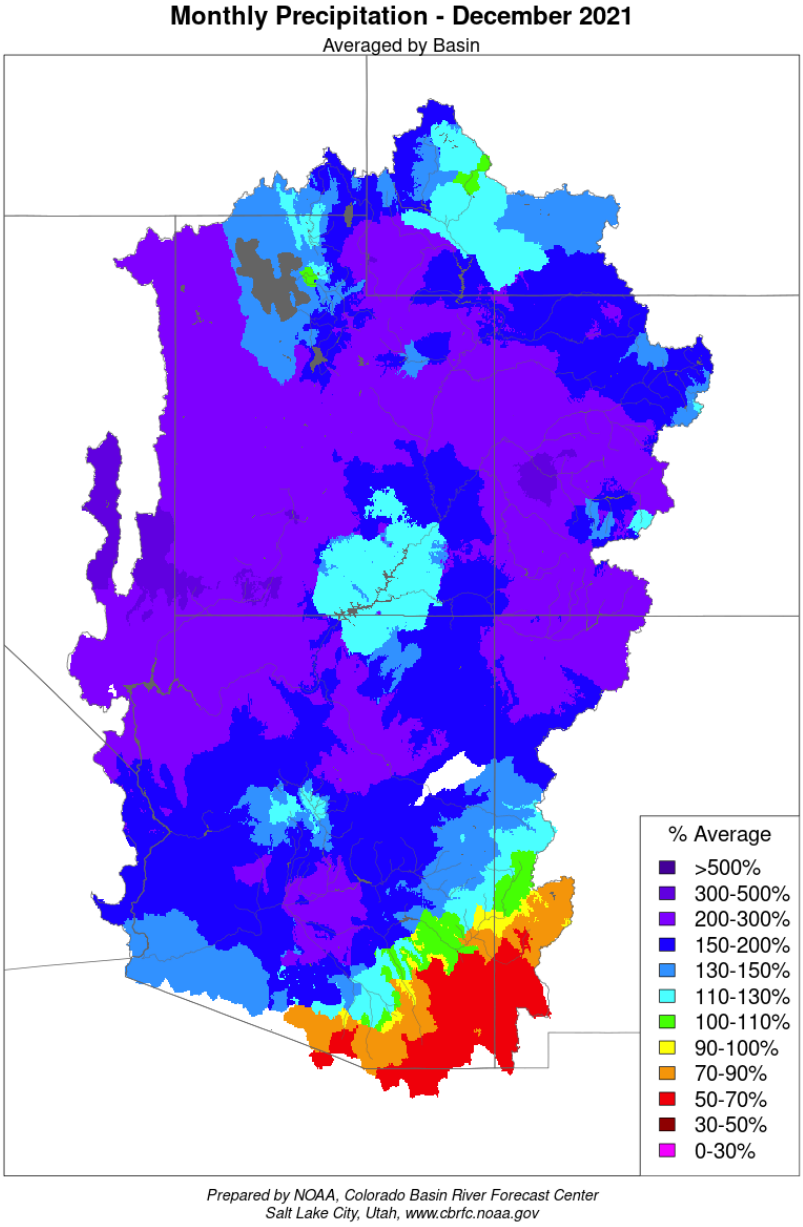
Lower Colorado River Basin (AZ/NM)
2022 January-May forecast volumes as a percent of 1991-2020 median
(50% exceedance probability forecast).

For specific site water supply forecasts click here

Water Supply Discussion

December Precipitation

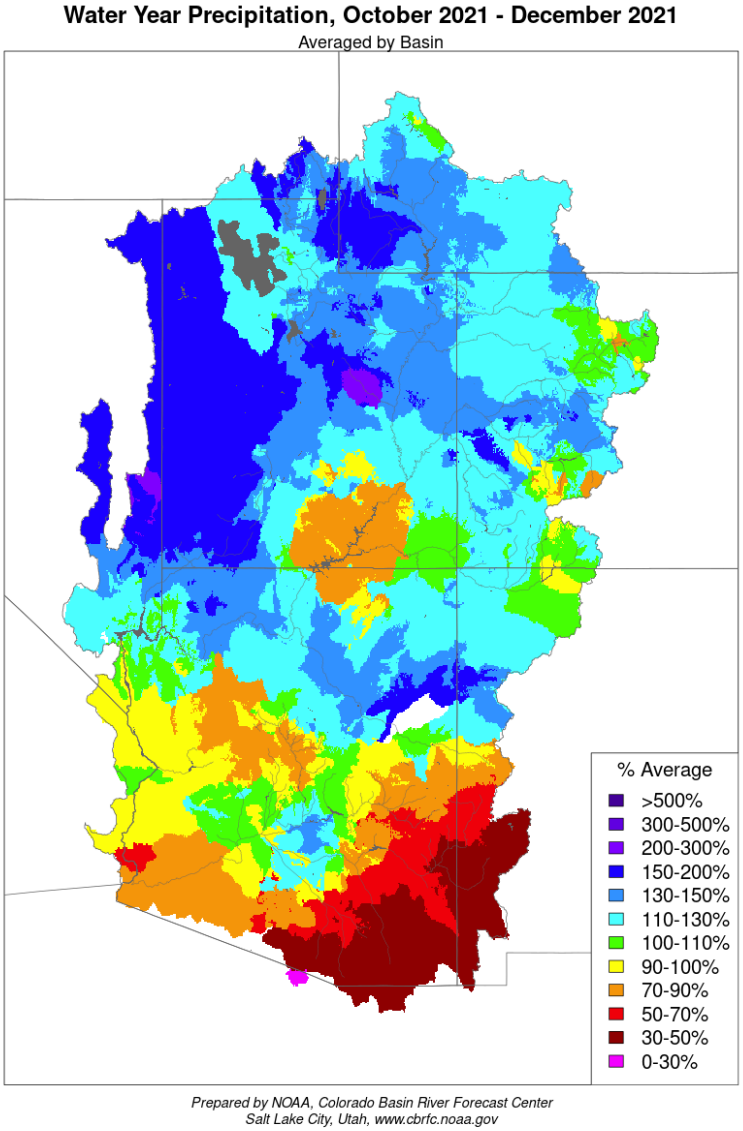
November's warm and dry weather pattern continued through the first week of December across the region. The weather pattern shifted during the second week of December towards colder and wetter conditions and featured multiple storm systems that brought widespread precipitation to most of the region during the last three weeks of the month. The majority of SNOTEL sites across Utah and western Colorado and a few sites across central Arizona reported December precipitation values that ranked in the wettest five on record.



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

Water Year Precipitation

Water year precipitation can be used as a good indicator of early season water supply conditions. October precipitation was well above average across much of the region including southwest Wyoming, most of Utah, and northern Arizona. Western Colorado had near average October precipitation while southern Arizona had below average precipitation during the month. November's weather pattern was very warm and dry with much below average monthly precipitation across most of the region. The few storms that did occur during November developed primarily over northern basins including parts of the Upper Green, the northern Great Basin, and lower elevations across northwest Colorado. November precipitation fell in the bottom five at numerous SNOTEL stations across Utah, southwest Colorado, and central Arizona. After a dry start to December, the weather pattern during the last three weeks of the month brought continuous storm activity and above average precipitation throughout the region. Water year precipitation-to-date (October-December) is generally near to above average across the region.



Water Year 2022 percent of normal precipitation.
(Averaged by basins defined in the CBRFC hydrologic model)

Snowpack

Water year 2022 began with a mid-October high elevation snowpack across much of the Great Basin and Upper Colorado River Basin. Snow water equivalent (SWE) conditions fell behind during a warm and mostly dry November with the few storms that did occur during the month being mixed rain/snow events that did little to build the high elevation snowpack. After a dry start to December, a series of storm systems brought widespread precipitation to the region during the last three weeks of the month delivering snow to higher elevations and rain to lower elevations.

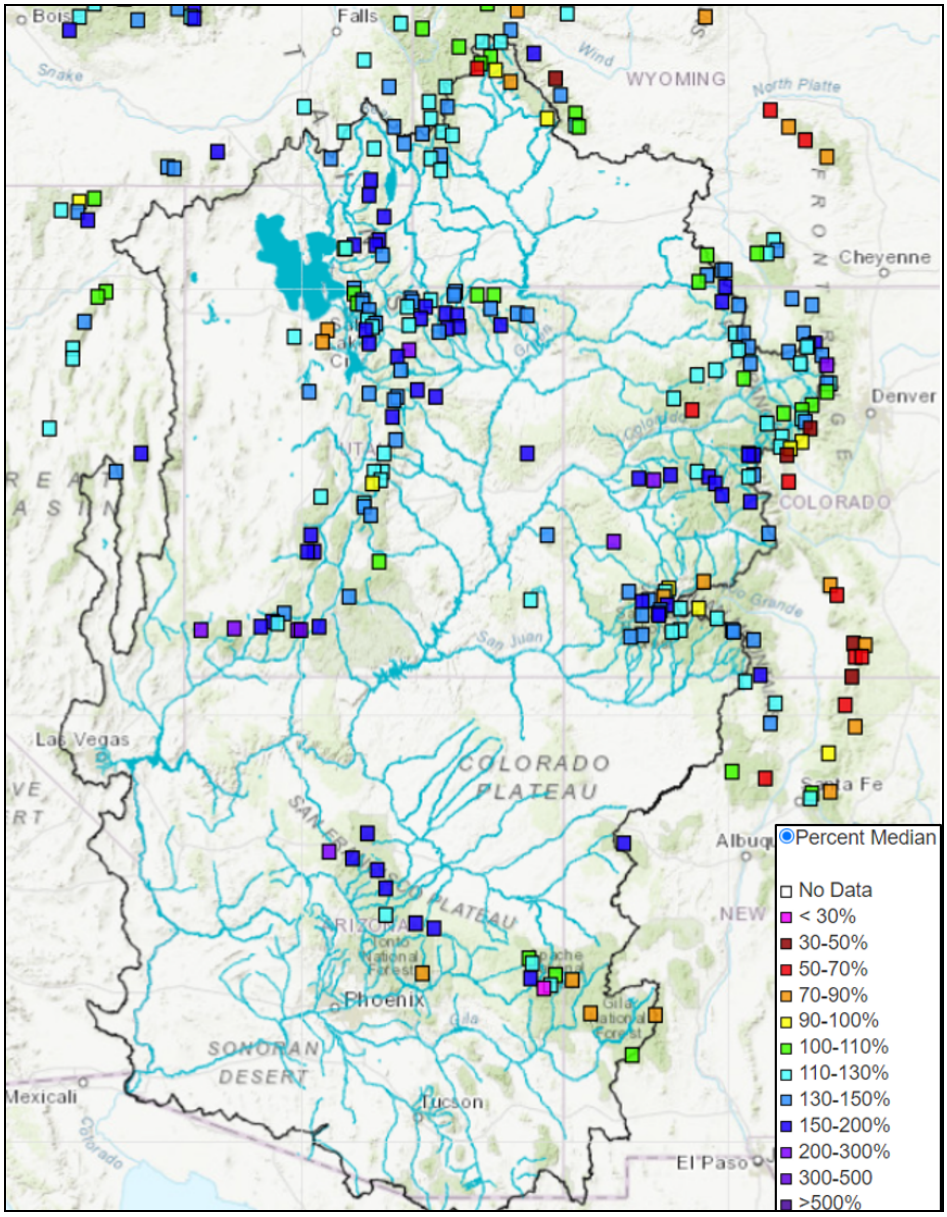
A December 8-10 storm system brought widespread 1-2 inches of SWE to most of Utah and Colorado's Western Slope with locally higher amounts across southwest Colorado (Gunnison, Dolores, and San Juan Basins). The Upper Green River Basin in southwest Wyoming received considerably lower precipitation amounts during this event. The next major widespread storm system occurred around the middle of the month and brought another 1-2 inches of SWE to Utah's higher elevations and southwest Colorado, with widespread 0.5-1.0 inches of SWE elsewhere across the region. A December 23-24 event brought even higher widespread precipitation amounts with most SNOTEL stations reporting 1-3 inches of observed SWE and 3-5" locally higher amounts reported at around a dozen sites around the region. Precipitation continued through the end of December and further improved SWE conditions across the region.

Early January SWE conditions across the Upper Colorado River Basin generally range between 105-155% of the 1991-2020 historical median. Upper Green SWE conditions are around normal (105%) while Lower Green and Duchesne SWE conditions are above normal (130-150%). Percent median SWE values generally increase from north to south across western Colorado with the White/Yampa and Colorado River headwaters at near to slightly above normal (105-120%) and the Gunnison, Dolores, and San Juan Basins in southwest Colorado with above normal (130-155%) snow conditions.

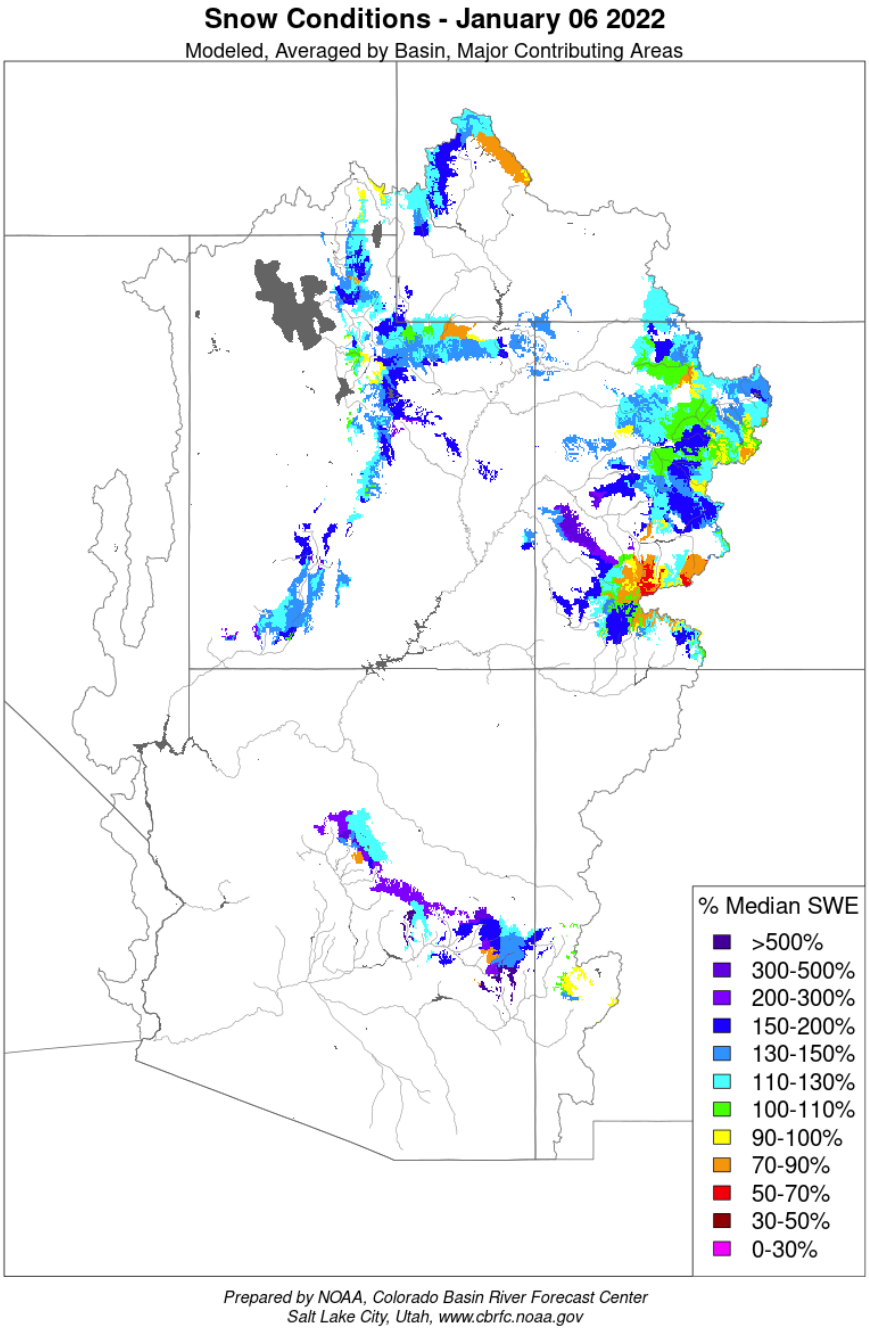
Snowpack conditions in the Lower Colorado River Basin are more variable and tend to fluctuate more frequently over time. Early January SWE across the Lower Colorado River Basin generally ranges between 90-175% of normal: Virgin (175%), Verde (165%), Little Colorado (130%), Upper Gila (90%), and Salt (120%).

Current observed snowpack conditions across the Great Basin are fairly uniform and generally range between 130-140% of normal: Provo/Utah Lake and Weber (130%), Six Creeks (130%), Sevier and Bear (140%).

The images below show the observed snow conditions and CBRFC hydrologic model snow conditions.



Observed percent of median SWE values at SNOTEL sites as of January 6, 2022.



CBRFC hydrologic model snow conditions as of January 6, 2022.

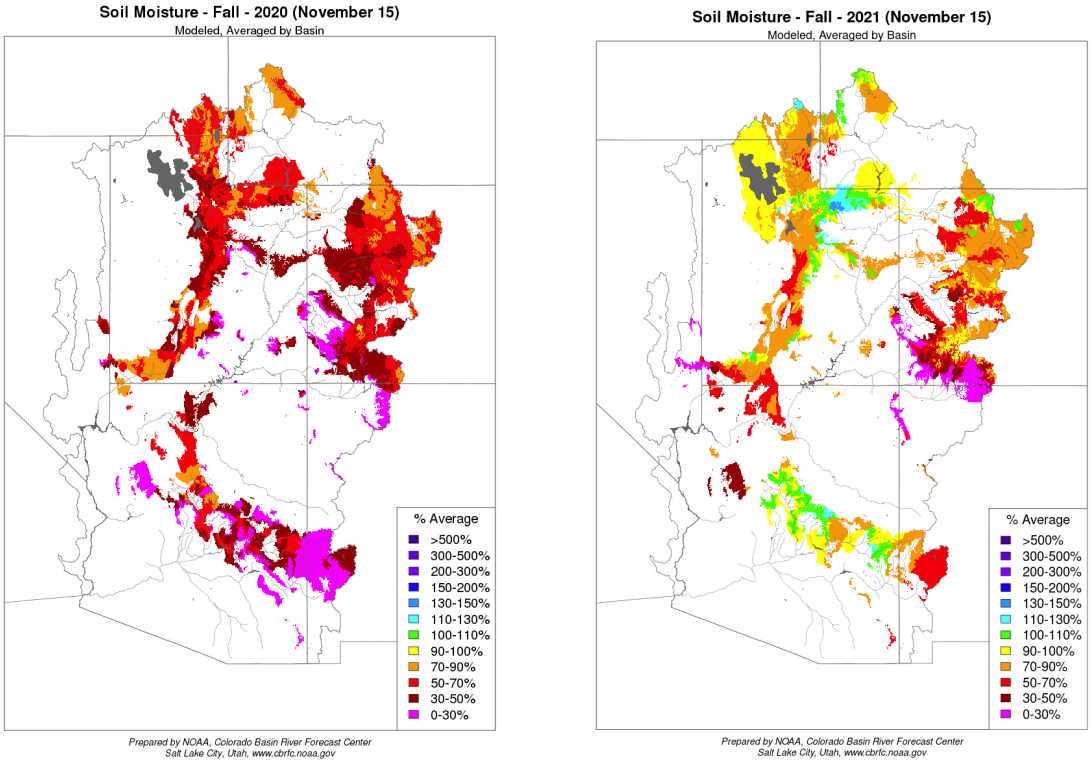
For updated SNOTEL information refer to click here

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 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. The timing and magnitude of spring runoff is ultimately a result of SWE conditions, spring weather (precipitation/temperature), and antecedent soil moisture conditions.

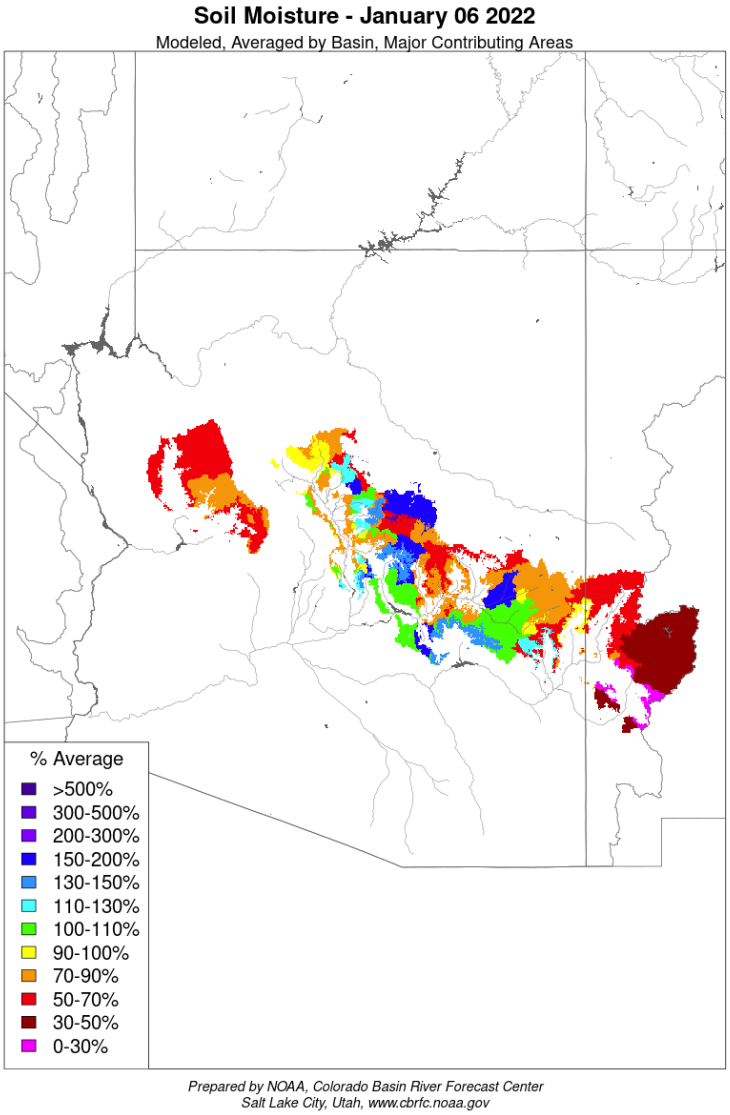
A wet monsoon season and above average October precipitation improved soil moisture conditions, especially across Utah and Arizona. Fall (antecedent) soil moisture conditions are improved from a year ago but remain below average across many of the major runoff producing areas. Larger than normal antecedent soil moisture deficits exist across much of western Colorado and are expected to negatively impact early spring runoff efficiency. Fall model soil moisture conditions are closer to normal across southwest Wyoming and Utah and even above normal in parts of the Duchesne River Basin.



Comparison of November 2020 (left) and November 2021 (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. Basins with above average soil moisture conditions can be expected to experience more efficient runoff from rainfall or snowmelt while basins with below average soil moisture conditions can be expected to have lower runoff efficiency until soil moisture deficits are fulfilled.

Model soil moisture conditions across the Lower Colorado River Basin have improved considerably from a year ago as a result of above average monsoon season precipitation and recent storm activity that has occurred during December. Early January model soil moisture across the Lower Colorado River Basin is variable with near to above average conditions across central Arizona (portions of the Salt, Verde, and Agua Fria River Basins) and below to much below average conditions as you move away from central Arizona.

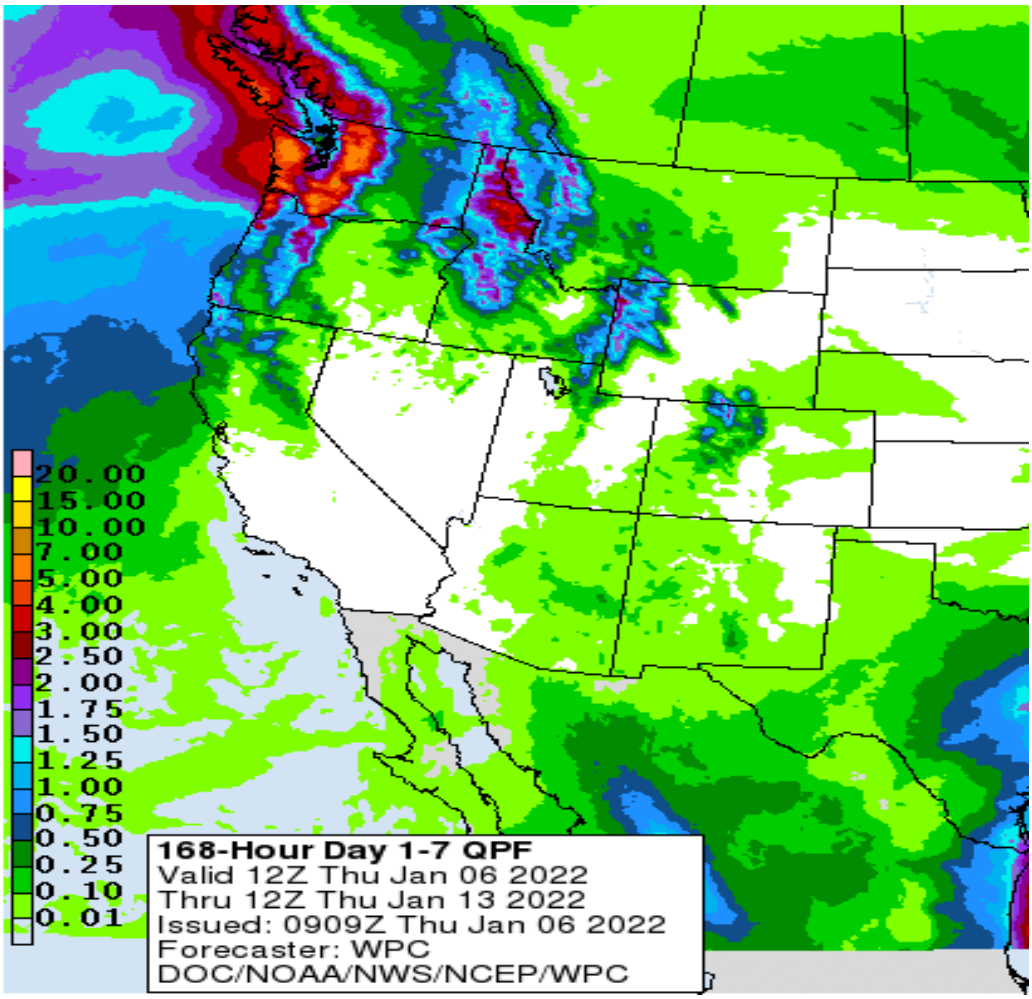


Lower Colorado River Basin (AZ/NM) model soil moisture as of January 6, 2022.

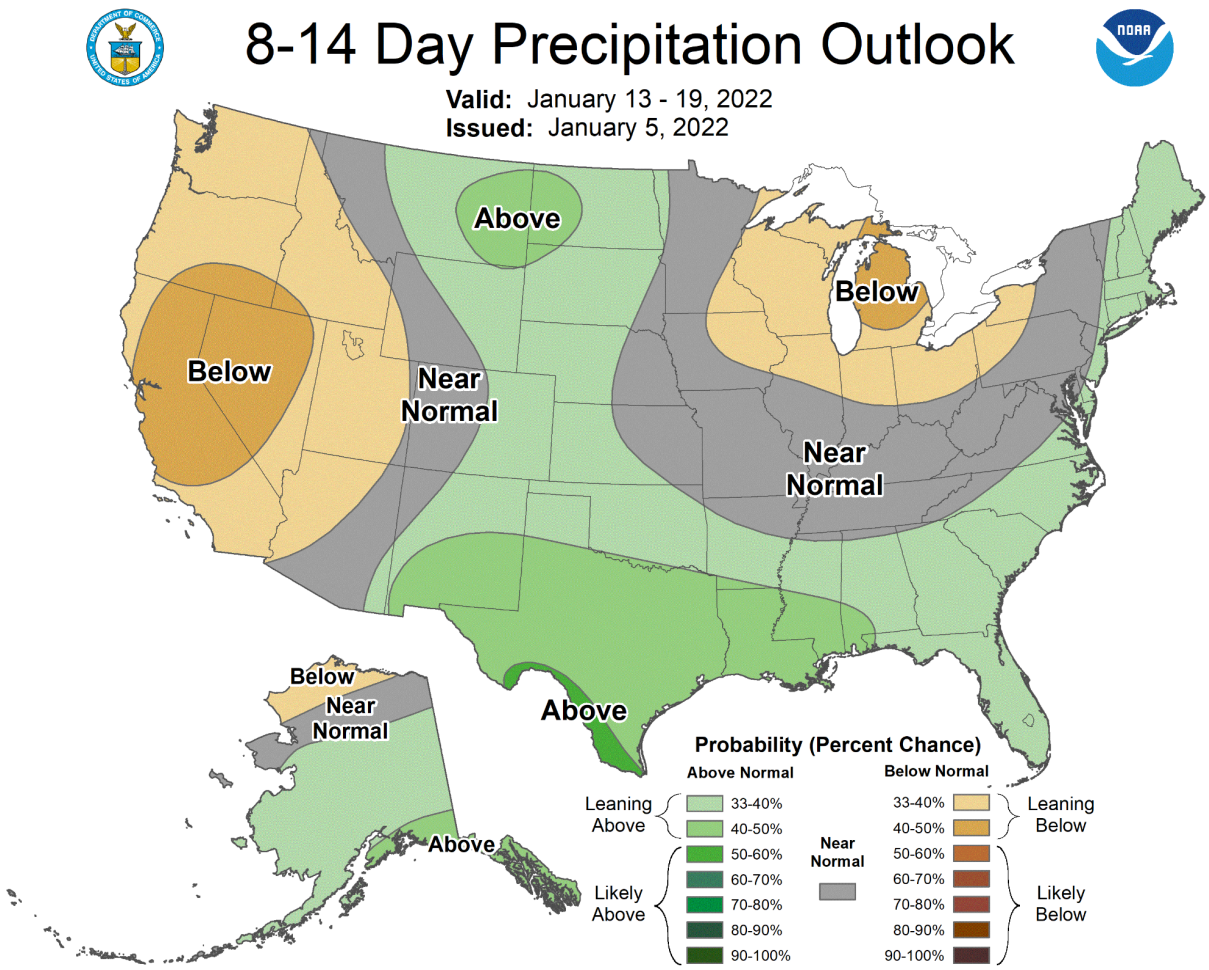
Upcoming Weather

The start of the forecast period will begin with a quick period of precipitation moving across northern Utah, southwest Wyoming, and northwest Colorado. This period of precipitation will be short in duration, ending Saturday with accumulations generally less than one inch. A ridge will quickly build over the Western U.S., bringing an end to precipitation chances through the remainder of the week.

Long range weather models are in general consensus of a ridge remaining in place over the Western U.S. throughout the remainder of the 14-day period. Due to this ridge, below normal precipitation and above normal temperatures are expected across the region. A short wave trough is indicated to move to the south of this ridge around the middle of next week allowing for a chance of precipitation across central and southern AZ and CO.



NWS Weather Prediction Center precipitation forecast forJanuary 6-13, 2022.



NWS Climate Prediction Center precipitation probability forecast for January 13-19, 2022.

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