

March 16, 2016 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.

Seasonal Water Supply Forecasts:

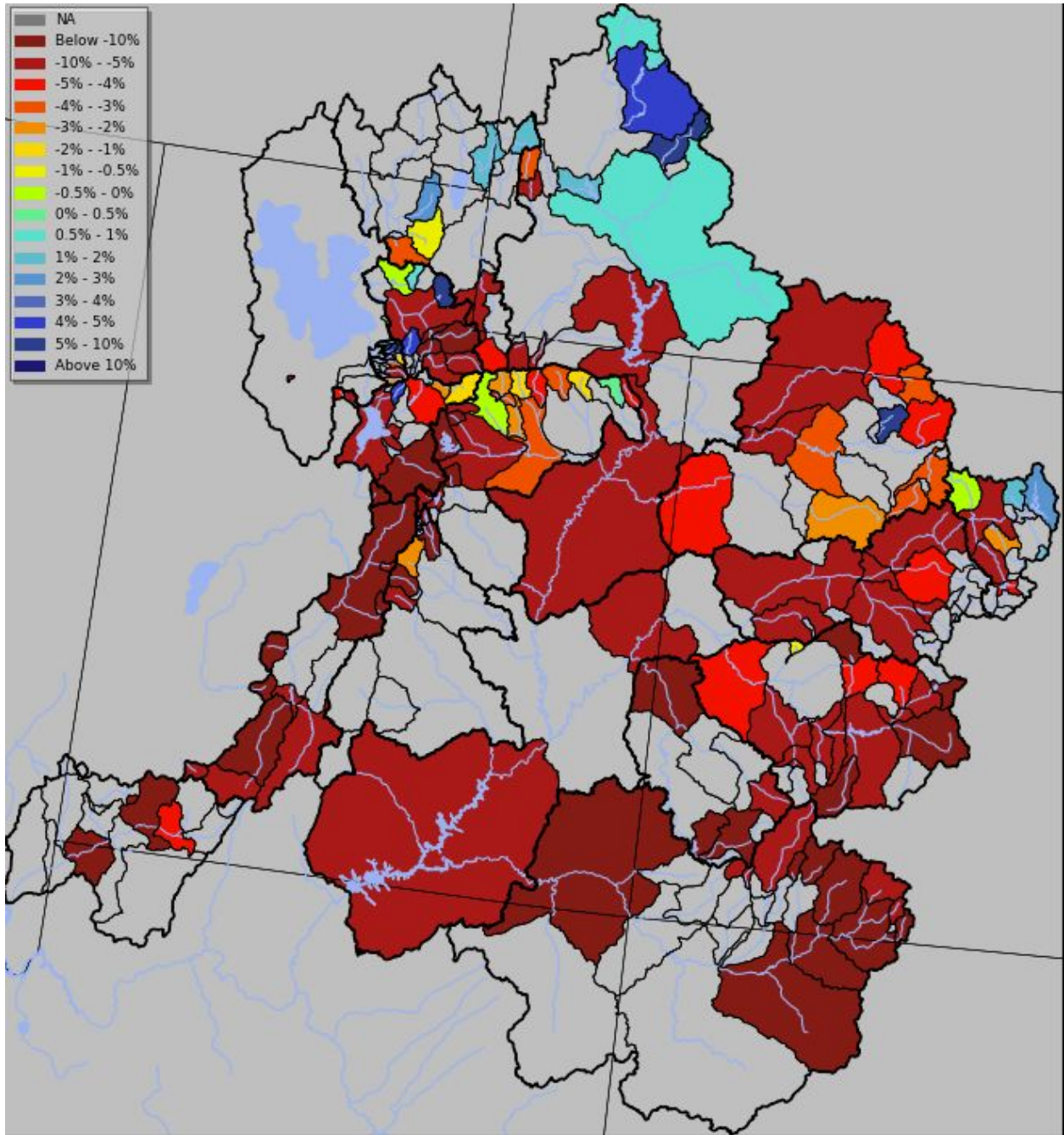
Water Supply Forecast Summary (Mid March Update):

The weather pattern has been more active thus far in March than it was in February with storm systems moving through the western U.S. However, these storm systems were quick moving, weakening, and in general not big precipitation producers and primarily confined to the northern half of the CBRFC forecast area. The result has been below average precipitation over most of the area during the first half of March, snow conditions that have fallen further behind normal conditions, and a decrease in anticipated water supply streamflow runoff volumes.

CBRFC raw model guidance has trended water supply forecasts downward over much of the Upper Colorado River and Eastern Great Basin forecast areas since March 1st. Exceptions are some basins in the northern parts of both areas where model guidance is indicating similar or slightly higher runoff volumes compared to the beginning of the month. This includes the Green River Basin above Fontenelle Reservoir, northern parts of the Bear River Basin, and the very headwaters of the Colorado River. In general, outside of the aforementioned basins, the decreases in model guidance get bigger as you move south.

Mid March forecasts for some of the major upper Colorado River Basin reservoirs include Fontenelle remaining steady at 71 percent of average, Flaming Gorge decreased from 67 percent to 64 percent of average, Blue Mesa decreased from 86 percent to 79 percent of average, McPhee decreased from 100 percent to 92 percent of average, and Navajo decreased from 88 percent to 78 percent of average. The Lake Powell inflow forecast decreased by 500 KAF, from 80 percent to 73 percent of average, and is now at 5.2 million acre-feet.

Model guidance also decreased seasonal volumes in the Lower Colorado River Basin of Arizona where January-May volumes vary, with near median volumes in the upper Gila and Little Colorado and below median volumes elsewhere. Recent forecasts have been taking into account the increased possibility of winter storms due to the strong El Niño conditions, however the anticipated wet conditions typically associated with El Niño have so far failed to develop.



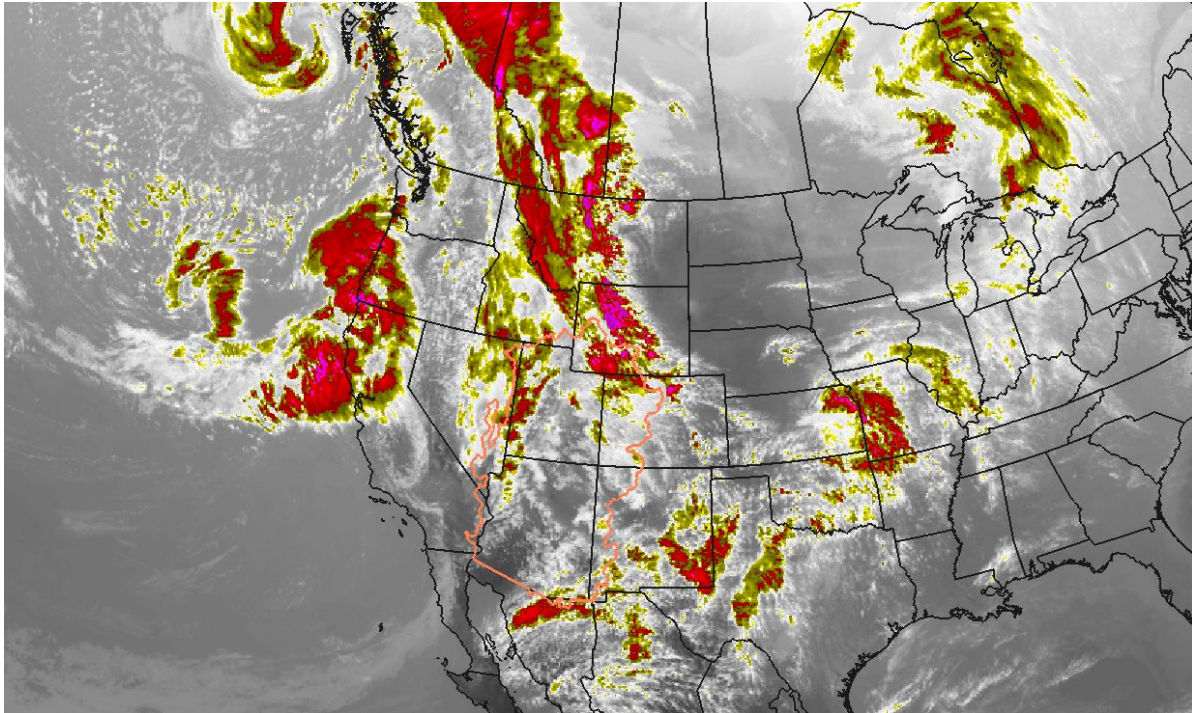
Trend in the April-July runoff volume forecasts since March 1st (Change in April-July percent of average)
 Most areas experienced decreases due to below average precipitation the first half of March

[Click here for the latest water supply model guidance](#)

Water Supply Discussion

Weather Synopsis:

The weather pattern transitioned from that of a mean ridge of high pressure over the western U.S. to a more progressive pattern during the first half of March. Although storm activity increased with this pattern, precipitation has been on the light side, and primarily confined to the northern half of the CBRFC forecast area. Temperatures have also been on the mild side reaching several degrees above normal for this time of year between storm systems.



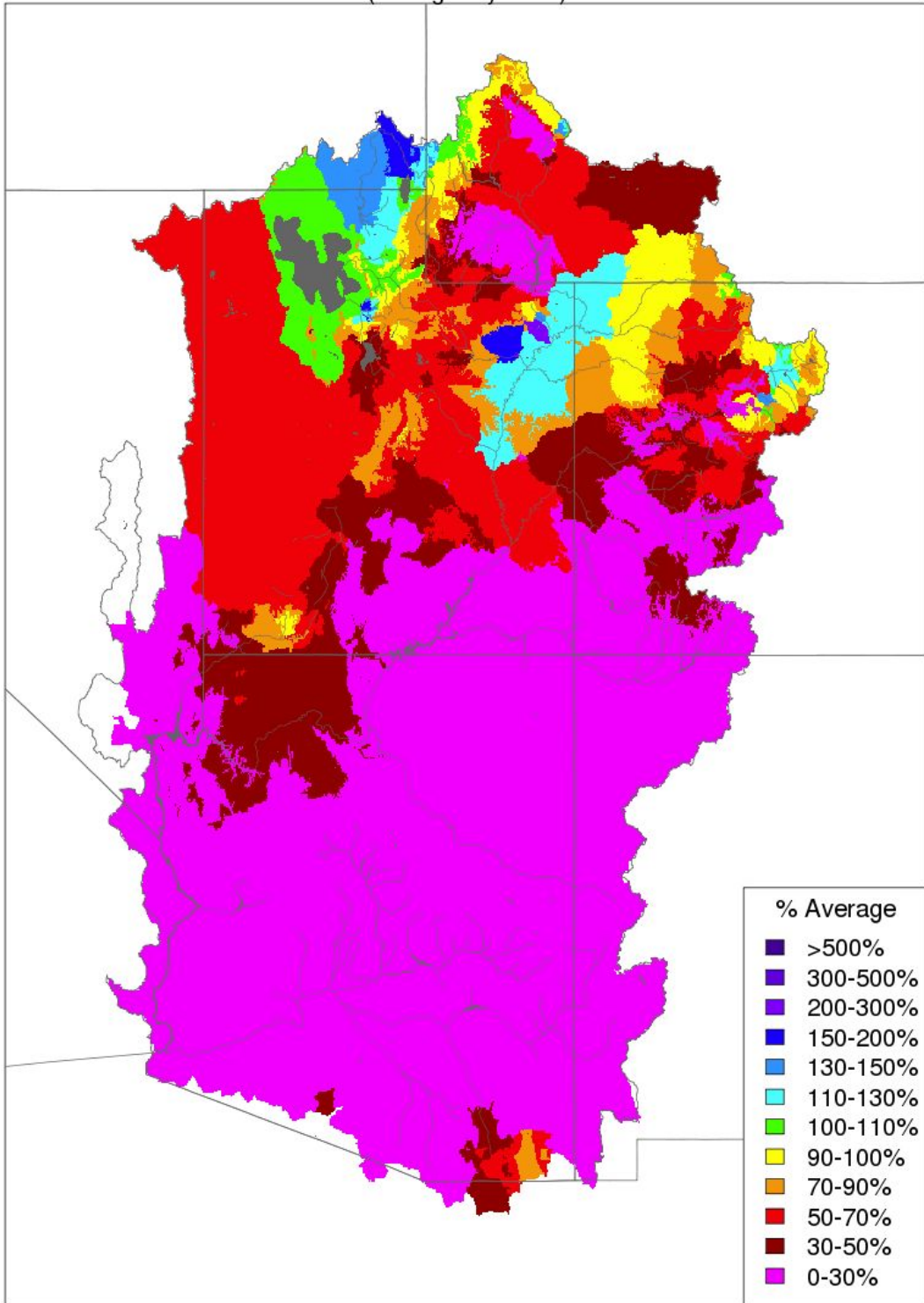
Satellite image for March 6th 2016 shows a storm system moving through the intermountain west. While storms have moved through the CBRFC forecast area this March, they have not produced significant precipitation. Many areas have below average precipitation for the first half of the month.

Precipitation and Temperatures:

The image below shows the extent of the dry conditions over the CBRFC forecast area through the first 15 days of the month.

Month to Date Precipitation - March 15 2016

(Averaged by Basin)

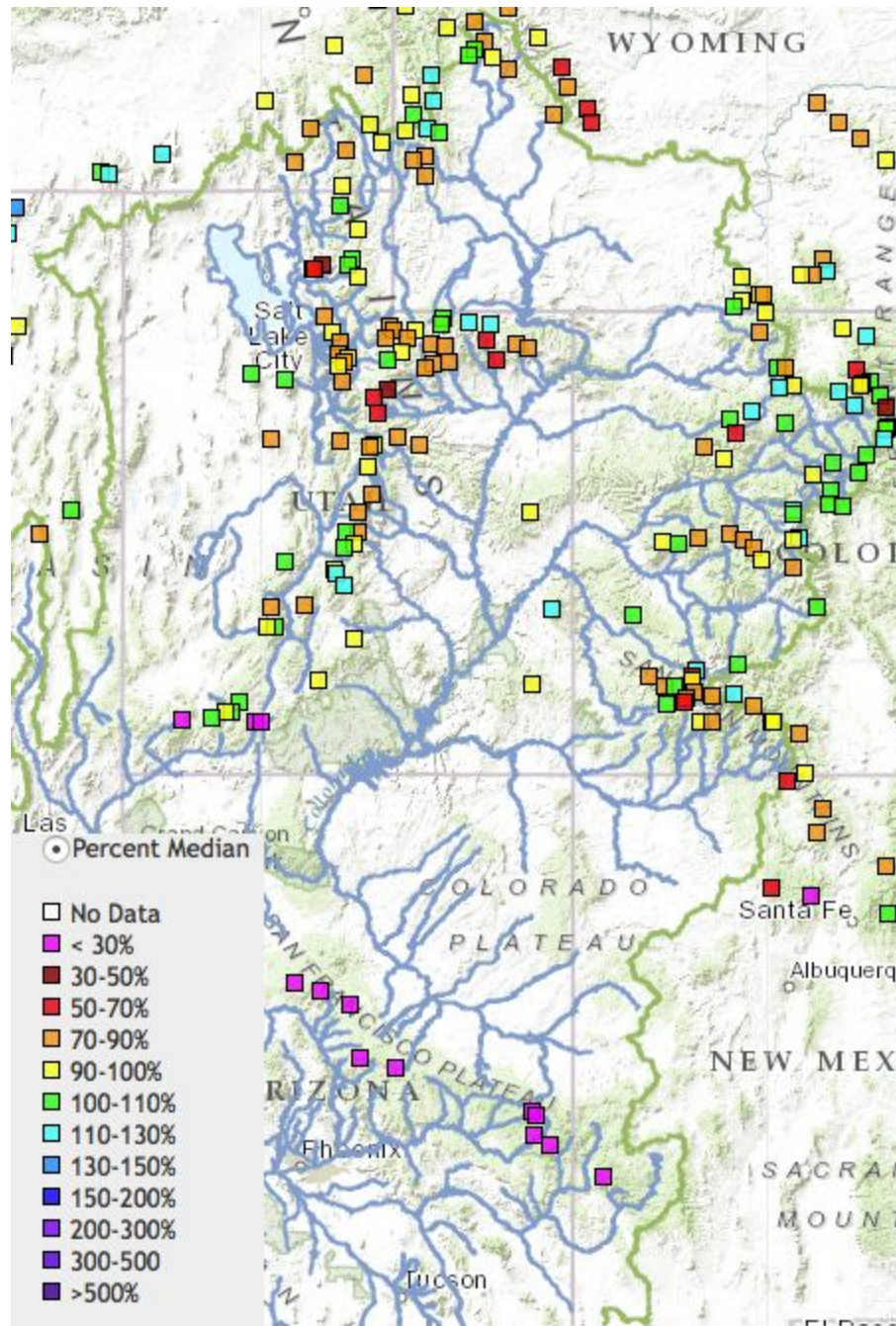


Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

March 1-15 percent of average precipitation

Snowpack:

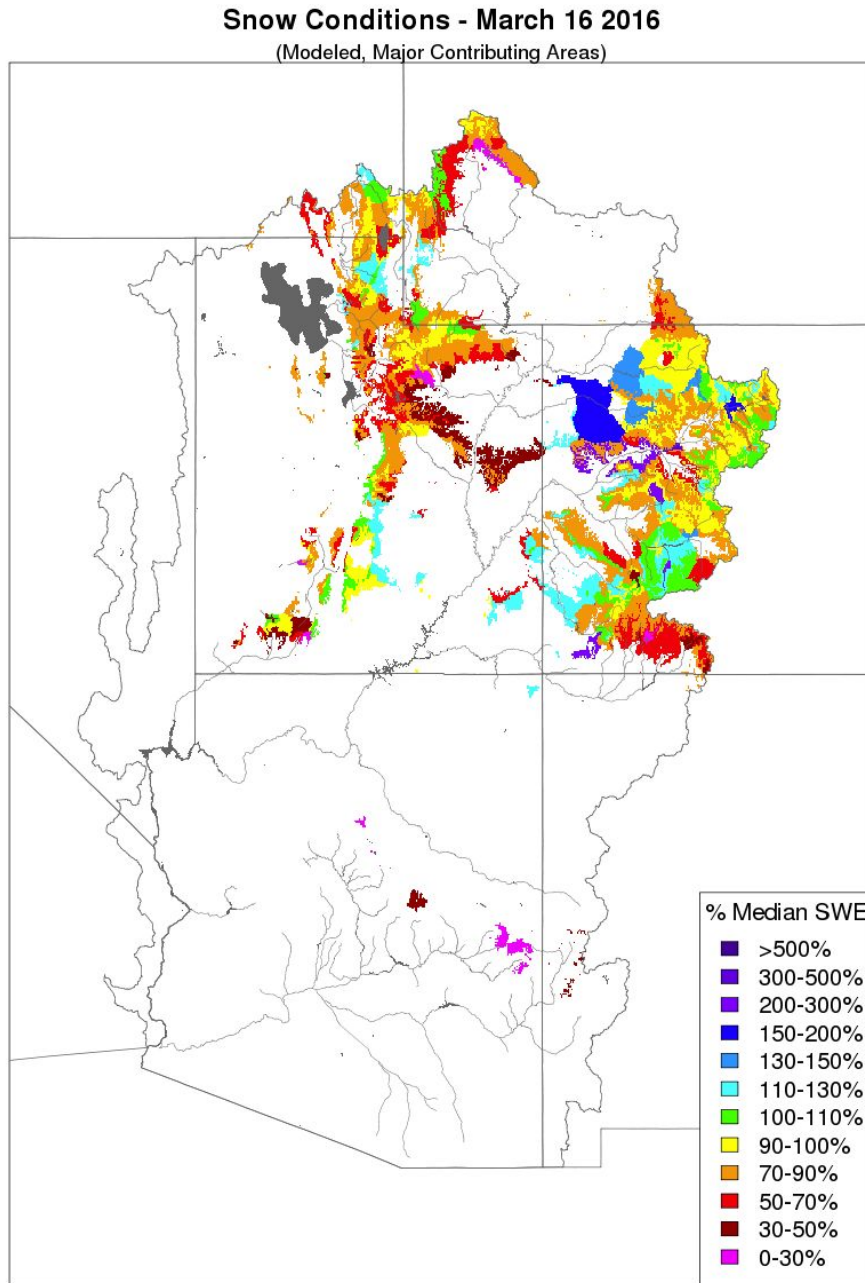
Snow conditions decreased as a percent of the historical median during the first half of March in the Upper Colorado River and Eastern Great Basin areas. The decrease was mostly due to lack of precipitation although some melt has been occurring below about 9,000 feet. The snowpack is just about depleted in the Lower Colorado River Basin of Arizona.



SNOTEL Sites - Percent Median Snow condition as of March 16, 2016

For the latest snow conditions click [here](#)

The snow condition as represented by the CBRFC hydrologic forecast model is depicted in the image below. Very little snow still exists in the model in the Lower Colorado River Basin that includes the Salt River, Verde River, Gila River, and Little Colorado River Basins, where melt has been occurring over the last month or so.



*Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov*

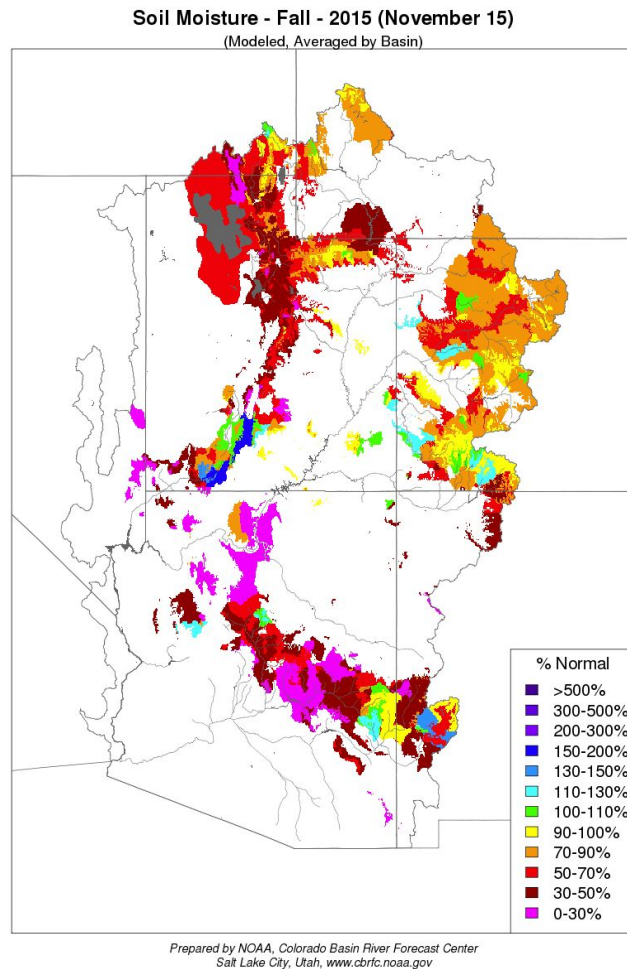
Snow conditions as seen by the hydrologic model on March 16, 2016
Trimmed to show those areas with the greatest contribution to seasonal runoff volumes.

Soil Moisture:

Soil moisture conditions in the higher elevation headwater areas are important entering the winter, prior to snowfall, as it influences the efficiency of the snowmelt runoff the following spring. Modeled soil moisture conditions as of November 15th were generally below or much below average. Soil moisture was exceptionally low in much of the Great Basin of central and northern Utah. Soil moisture conditions were more favorable in parts of the San Juan and Dolores River Basin as well as parts of the Sevier and Virgin River Basins in southwest Utah. There were also a few isolated basins near or above average in the Bear, Duchesne, Gunnison, and White River Basins but generally conditions were not as favorable.

Soil moisture conditions tend to fluctuate more in the Lower Colorado River Basin in the winter due to the frequency of rain events and possibility of melting snow. Fall soil moisture conditions in the lower basin are less informative than they are in the northern basins that remain under snowpack throughout the winter season.

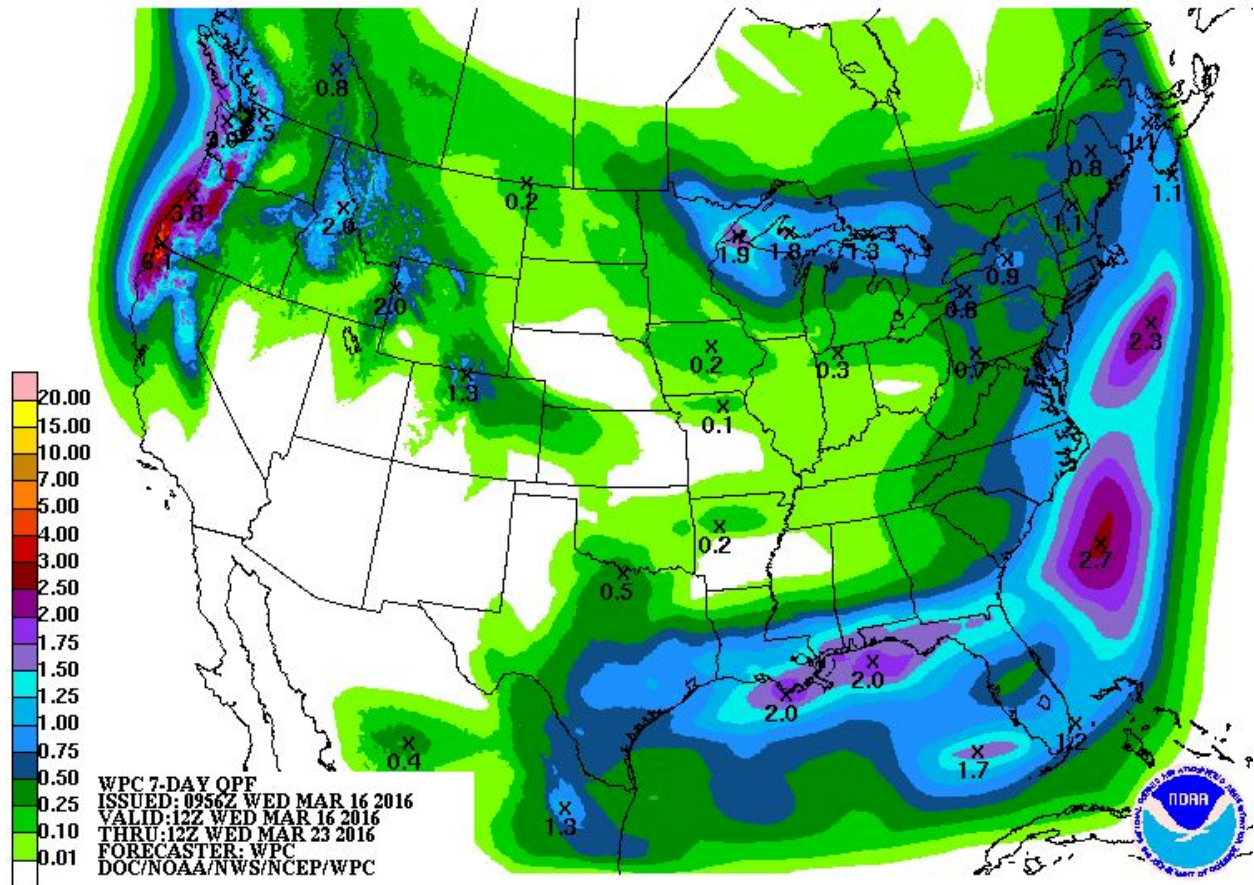
In the map below, areas in the blue are above the historical model soil moisture average while those in the yellow, orange, and red are below average. Only the higher elevation areas that have greatest impact to runoff volumes are displayed. The areas in white are not included.



Modeled soil moisture entering the winter season (as of November 15 2015)

Weather Outlook:

Another storm system is expected to move through the CBRFC forecast area during the middle of the fourth week of March, but like previous systems earlier in the month precipitation amounts are likely to be on the light side. Given the current forecasts, it is likely that March precipitation totals will end up below average for most of the area.

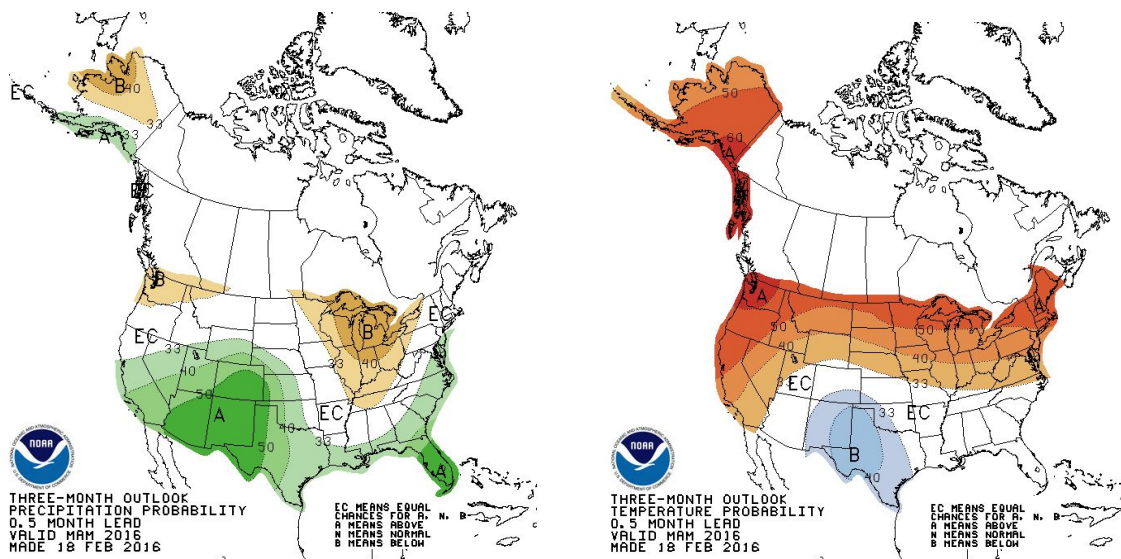


Precipitation outlook for March 16-March 23 from the Weather Prediction Center.

Climate Outlook:

El Niño Southern Oscillation (ENSO) conditions currently exist. Over the past 6 weeks positive sea surface temperature anomalies persisted across most of the equatorial Pacific Ocean but are decreasing toward normal (neutral) conditions. Models suggest ENSO neutral conditions are favored by the May/June/July 2016 period. Models also suggest the chance of La Niña conditions developing increasing to 50% in the September/October/November 2016 period. The current El Niño is anticipated to be among the 3 strongest on record dating back to 1950.

The Climate Prediction Center indicates enhanced chances of above average precipitation over the Colorado River and Great Basins during the March through May period. The enhanced chance for above average precipitation extends into the May/June/July period, however with a lower probability. The Climate Prediction Center indicates enhanced chances for above average temperatures during the March/April/May period over the northern Great Basin and Green River Basin of Wyoming. This area of enhanced chances of above average temperatures expands to cover most of the CBRFC forecast area during the May/June/July period.



Climate Prediction Center Precipitation and Temperature Outlooks as of Feb 18 2016

Conclusion:

Below average precipitation during the first half of March over much of the CBRFC forecast area has resulted in decreasing water supply forecast guidance in most basins. Snow conditions have decreased as a percent of the historical median during the first half of March due to lack of precipitation as well as some melt at lower elevations.

The weather pattern for the remainder of March indicates chances for additional precipitation but is not expected to bring monthly precipitation values back to average over most of the CBRFC forecast area.

The El Niño event remains strong but has shown signs of weakening recently and is expected to revert to a neutral condition by later this spring. Forecasts indicate neutral conditions over the summer then increasing chances of La Niña conditions by Fall 2016.