April 18, 2015 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:

Quick Summary:

CBRFC raw model guidance further decreased runoff volumes across most the CBRFC forecast area between April 1st and April 15th. Although cooler temperatures were prevalent during the first part of April below average precipitation was still fairly widespread. Areas in the northern Great Basin and parts of the upper Green River Basin in Wyoming faired a little better than other areas with storms early in the month. It is in these areas where the decrease in runoff volumes were generally minor or showed little to no change.

Decreases were larger in areas farther south including the Colorado River headwaters and mainstem, Gunnison River Basin, and San Juan River Basin. Model guidance decreased runoff volumes up to 10% of average in these areas. In the Virgin River Basin and Lower Colorado River basin of Arizona changes were insignificant as forecast volumes were already very low and much of the area has been depleted of snow.

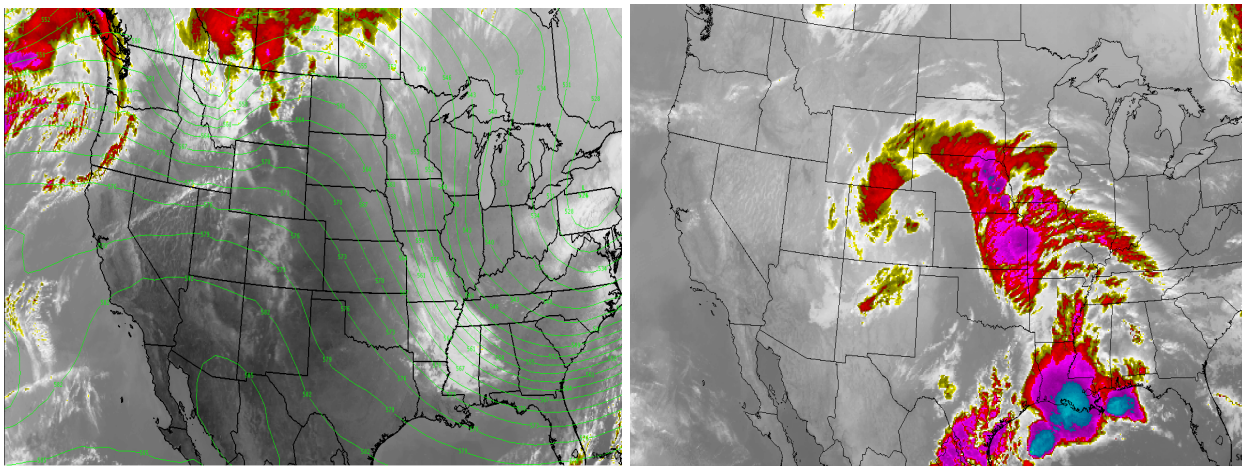
Mid April forecasts for some of the major upper Colorado River Basin reservoirs included Fontenelle inflow decreasing from 80 to 77 percent of average and Flaming Gorge inflow from 66 to 64 percent of average. In the Gunnison Basin Blue Mesa inflow decreased from 71 to 67 percent of average. In the Dolores River Basin Mcphee inflow dropped from 49 to 42 percent of average and in the San Juan Basin the forecast for inflow to Navajo Reservoir dropped from 42 to 38 percent of average. The Lake Powell inflow forecast decreased 350 thousand acre-feet, from 52 to 47 percent of average and is now at 3.40 million acre-feet.

Click here for the latest water supply model guidance

Water Supply Discussion

Weather Synopsis:

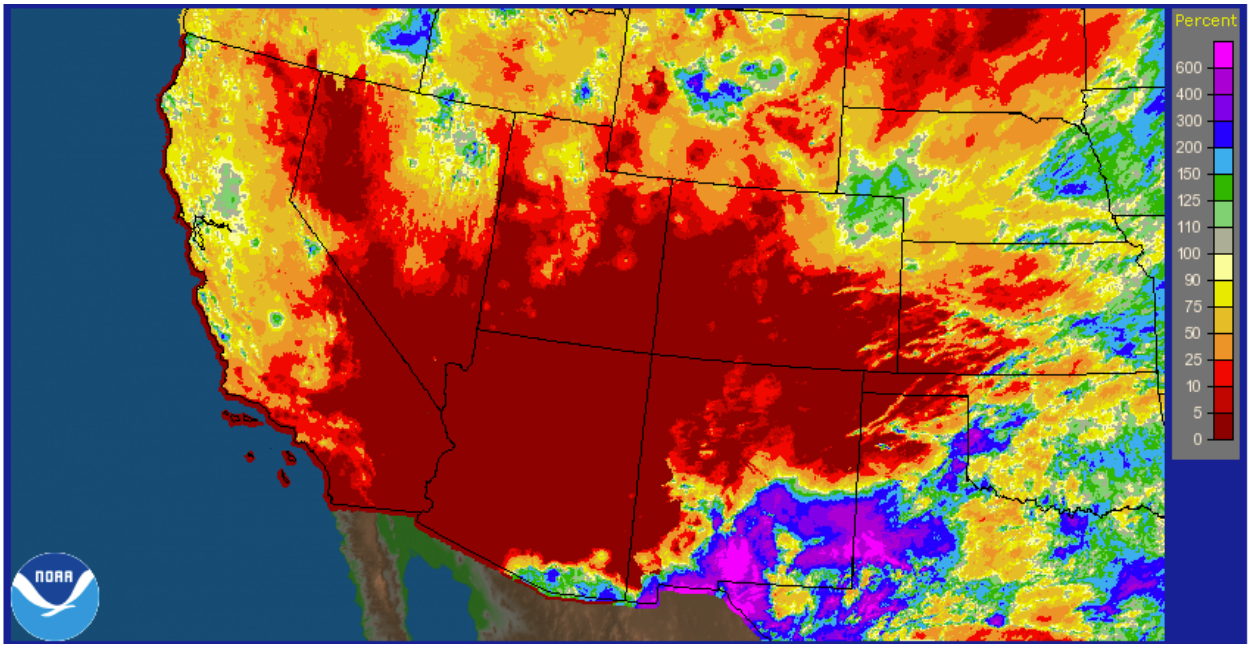
April brought a cooler and more active weather pattern with a storm system affecting northern parts of the CBRFC forecast area, particularly the northern Great Basin and upper Green River Basin, the first few days of the month. A much stronger system arrived from the northwest April 15th, just as the mid month water supply forecasts were being updated. This system ended up as a closed low pressure near the Four Corners area before moving very slowly east through much of the upper Colorado River Basin.



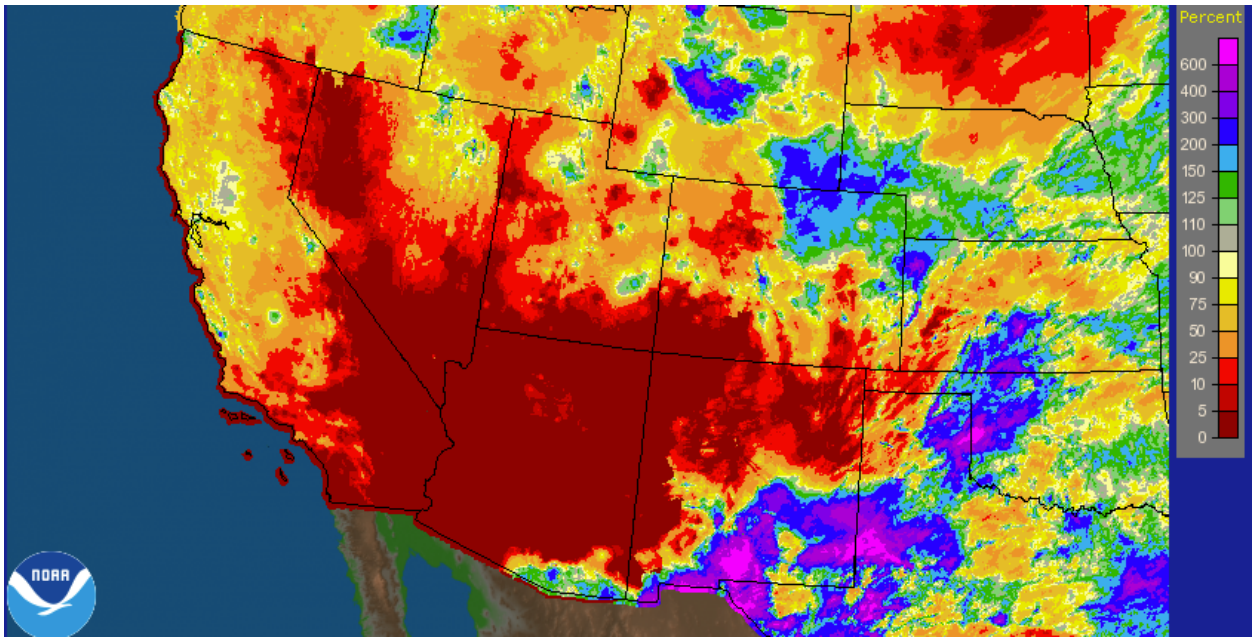
LEFT: Satellite image for March 28th 2015 shows a storm system along the Pacific Northwest Coast poised to move over the northern Great Basin and upper Green River Basin during the first week of April.
RIGHT: Satellite image for April 15th 2015 shows a large closed low pressure system moves slowly eastward over the upper Colorado River Basin.

Precipitation and Temperatures:

Below average precipitation was fairly widespread the first 15 days of April. A weakening storm system the first week of the month helped boost some areas in the northern Great Basin and Green River Basin to near average. Cooler weather the first half of April reduced snow melt at higher elevations with a corresponding reduction in stream flows. The first image below does not include the storm system that moved through the area after April 15th as that was beyond the time updated water supply forecasts were issued. The second image does include part of the mid-month storm impact, however it was still moving through the area as this discussion was being prepared. Water supply forecast updates made prior to the mid-month storm accounted for forecast precipitation associated with the storm.



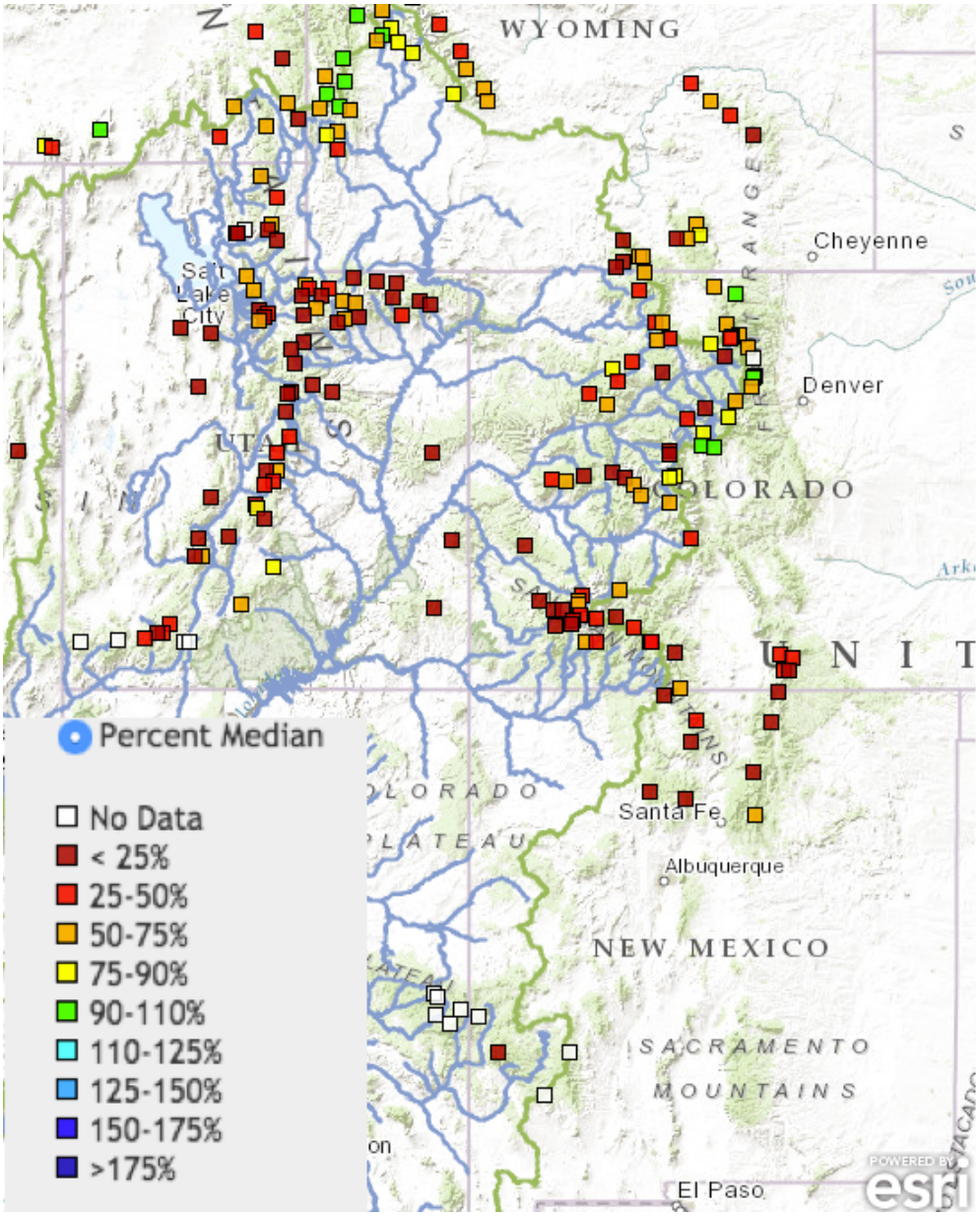
April 1-15 percent of average precipitation for the Colorado River Basin.



April 1-17 percent of average precipitation for the Colorado River Basin

Snowpack:

Snowpack is much below average throughout the CBRFC forecast area. Only a couple of sites near the ridgelines in the Colorado River headwaters and upper Green River Basin are near average, however the extent of the impact is minimal. Numerous sites are in the bottom 3 of their historical record which generally ranges between 30-37 years. As of mid April several sites have already melted out of snow, several their earliest on record. The dismal snow conditions that have been prevalent all winter can be attributed to much below average precipitation combined with a record warm winter season in many areas. The snow distribution was even quite varied within individual river basins with melt occurring as early as February. The latest snow conditions map for mid April is show below:



SNOTEL Sites - Percent Median Snow condition as of April 16, 2015

For the latest snow conditions click here

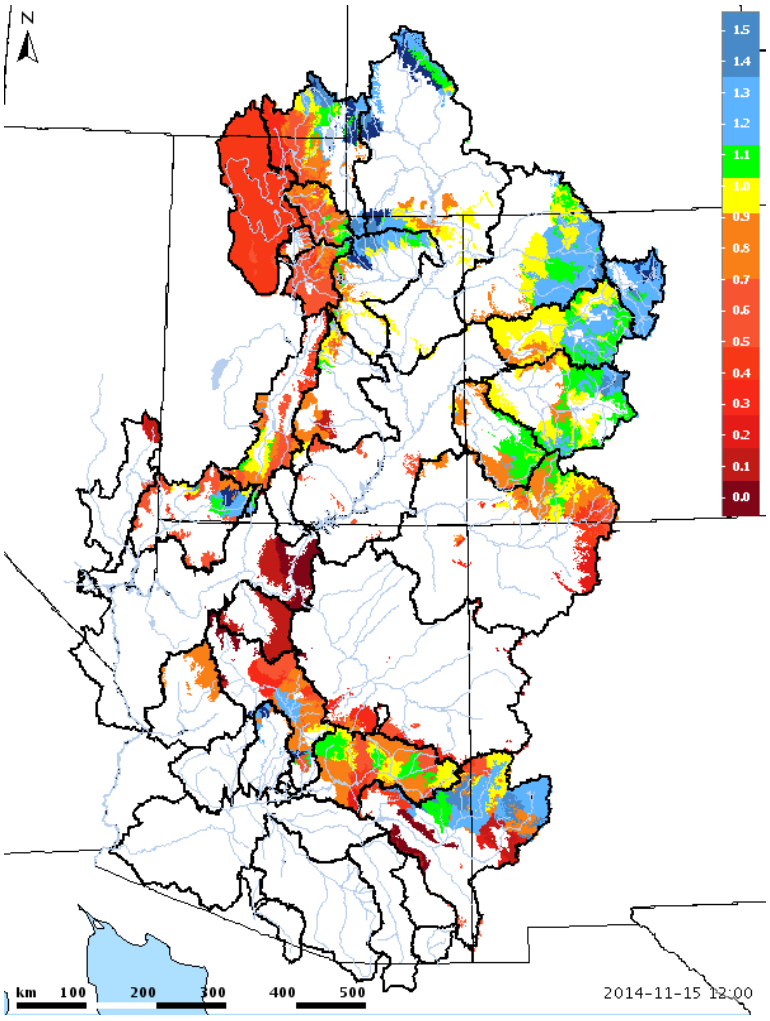
Soil Moisture:

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 above average over much of the Green River Basin above Fontenelle, headwaters of the Yampa and White River Basins, and the Colorado River headwaters above Kremmling. Above average soil moisture also existed over much of the Uinta Mountain range that drains into the Bear River, Duchesne River, and Green River above Flaming Gorge.

Soil moisture conditions were below average over the lower Bear River Basin, Weber River Basin, Provo River Basin, and Six Creeks Basins. The Sevier, San Juan, and most of the Virgin River Basins had below average soil moisture conditions entering the winter. In the Lower Colorado River Basins of Arizona conditions vary with most areas below average. However in this area, the January-May runoff volumes are primarily influenced by the frequency and magnitude of winter rain events.

In the map below, areas in blue are above the historical model soil moisture average while those in the red and orange are below average. Only the higher elevation areas are displayed. The areas in white are not included.

Any positive impact of above average soil moisture has been reduced in areas where snowpack conditions are much below average such as in the Duchesne River Basin.

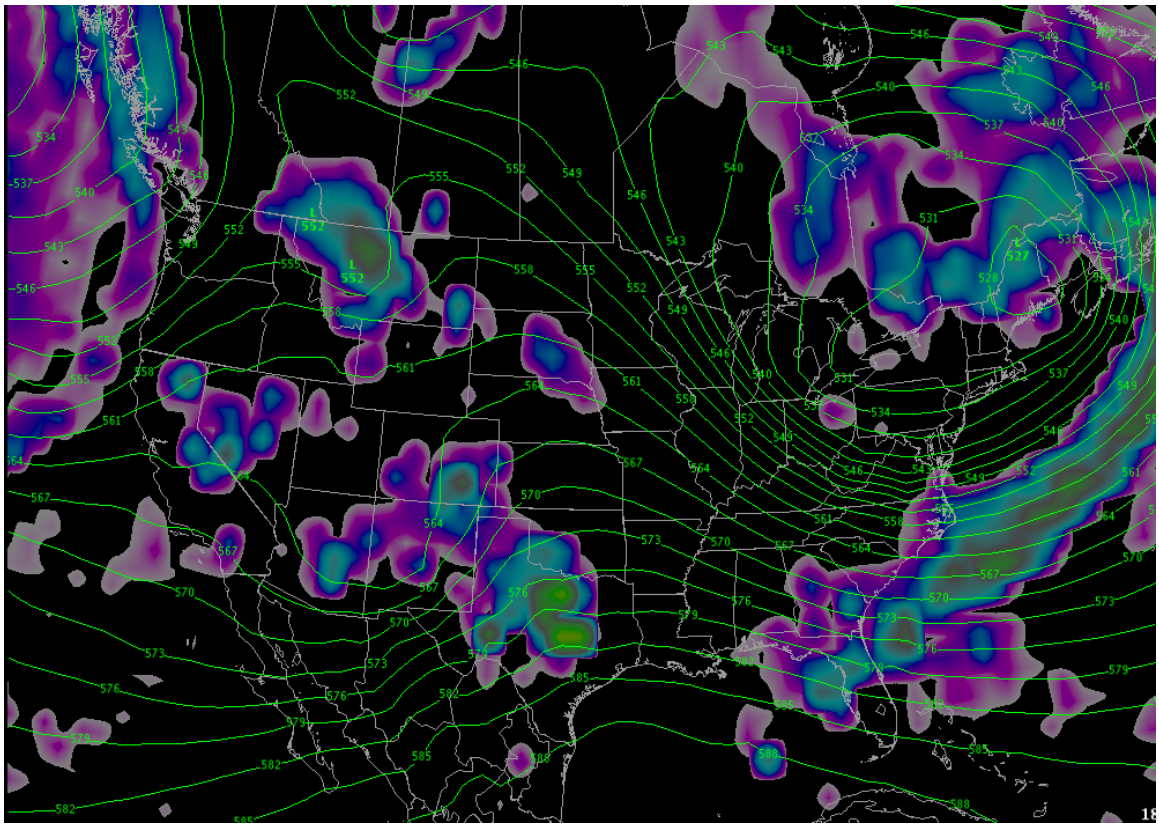


Modeled soil moisture entering the winter season (as of November 15 2014)

Weather Outlook:

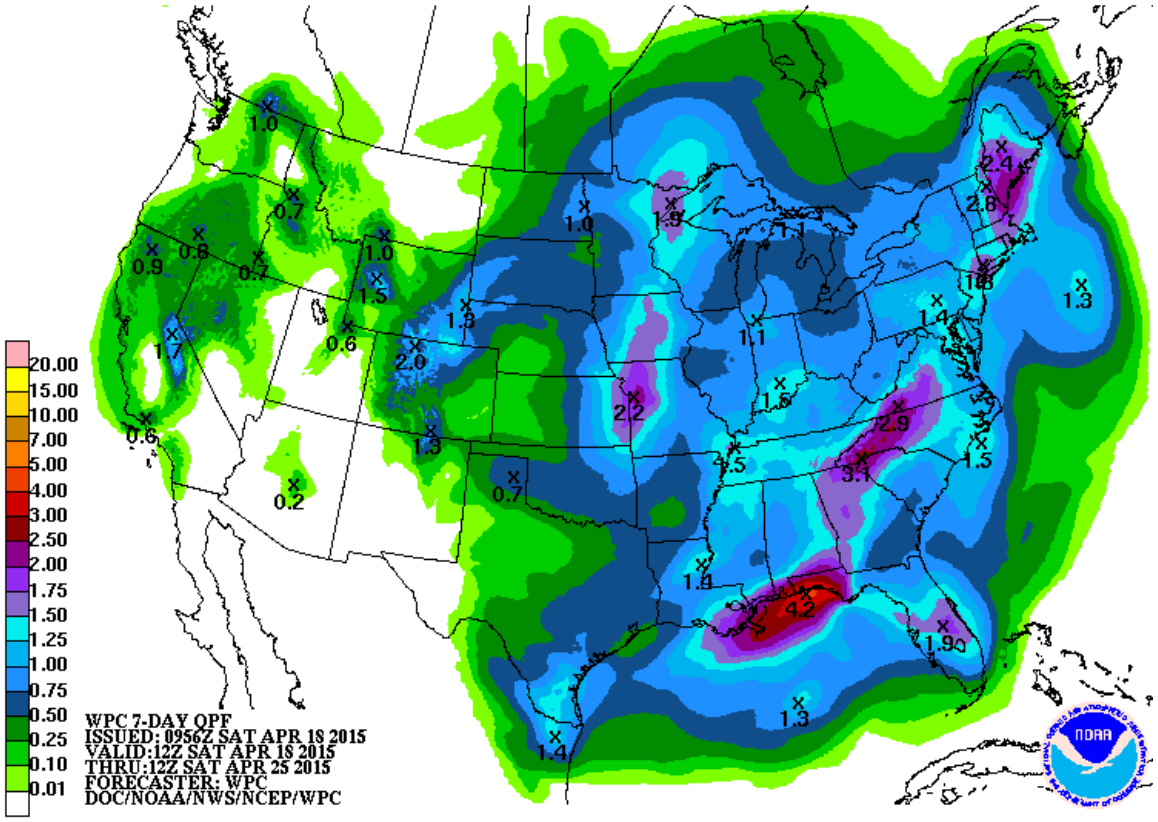
While the weather pattern is expected to remain active over the CBRFC forecast area for the next 7-10 days there is less confidence in how much precipitation may be received. The most recent meteorological models suggest initially

storm systems will move into the CBRFC forecast area in a splitting nature, affecting different parts of the area every few days. Models bring in subsequent storm systems into the area through the end of April but precipitation amounts may end up on the light side.



One possible forecast scenario from the ECMWF forecast model indicating weak storm energy splitting as it moves through the CBRFC forecast areas. This is valid for Friday April 24th - shaded areas are precipitation.

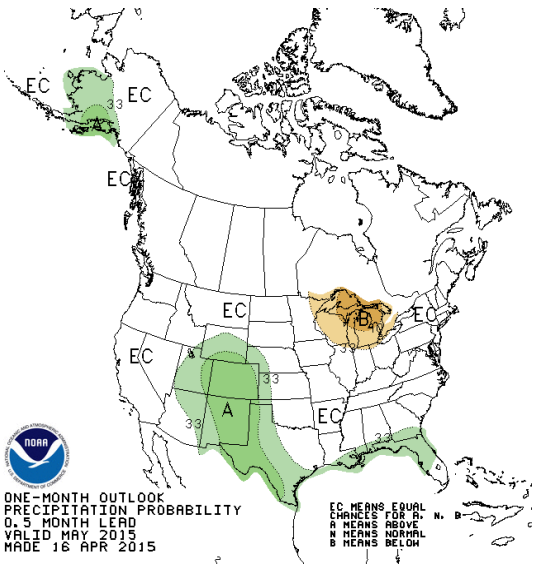
The latest precipitation forecast from the Weather Prediction Center has the greatest precipitation amounts for the next 7 days over the upper Green River Basin extending into headwater areas of the Yampa and Colorado River.

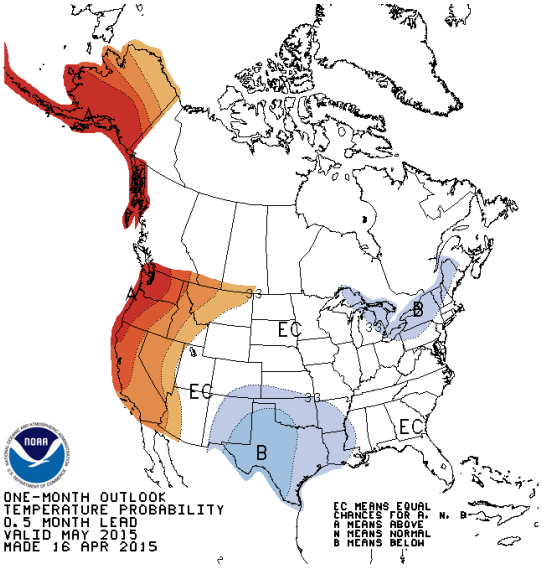


Precipitation outlook for April 18 - April 25 from the Weather Prediction Center.

Climate Outlook:

A weak El Nino Southern Oscillation (ENSO) condition currently exists and is expected to persist throughout 2015. However due to the expected weak strength of this event widespread impacts to precipitation and temperatures are not anticipated at this time. Impacts over the CBRFC forecast area not expected to affect water supply forecasts at this point in the season. The Climate Prediction Center indicates enhanced chances of above normal precipitation during the April 2015 period over much of the Colorado River and eastern Great Basin. There are equal chances for above or below normal temperatures over the forecast area during the month of April.





Conclusion:

Record warm temperatures during the winter season combined with much below average precipitation resulted in record low snowpack over much of the CBRFC forecast area. Although the first half of April was cooler with some precipitation occurring over northern areas, the general trend in streamflow runoff volume forecasts continued to decrease. Much below average runoff volumes will be widespread this year.

Snow has melted out of many lower and some middle elevations with significant snow melt at high elevations. Many sites have snowpack conditions in the bottom 3 of their historical record. Several sites melted out on the earliest dates in their historical record.

Entering the season soil moisture conditions were most favorable in the upper Green River Basin above Fontenelle, Colorado River headwaters, and in some tributaries of the Duchesne River Basins. While there may still be some benefit in the upper Green River and Colorado River headwaters, the dismal snow conditions elsewhere are likely to counter any benefits from favorable soil moisture. In the Great Basin where both soil moisture and snow conditions are poor some of the lowest runoff volumes are expected.

In the Lower Colorado River Basin below to much below median April-May volumes are anticipated. Snow has been depleted in the Virgin River Basin of southwest Utah and throughout the Salt, Verde, and Gila River Basins and the next couple of months are typically a drier period in these areas.

Cooler weather the first half of April has slowed high elevation snow melt and reduced stream flows in several locations. Additional storm activity is expected through the end of the month, however early indications are these systems may be splitting or weakening therefore lowering confidence in significant precipitation.