

March 16, 2017 Water Supply Forecast Discussion

The [Colorado Basin River Forecast Center \(CBRFC\)](#) geographical forecast area includes the Upper Colorado River Basin, Lower Colorado River Basin, and Eastern Great Basin.

Water Supply Forecast Summary:

The first two weeks of March were very dry across most of the Colorado River Basin and Eastern Great Basin with the exception of the Green River headwaters in Wyoming and parts of the Bear River Basin in southeast Idaho. Above average temperatures near the middle of the month led to considerable melting of lower elevation snowpack and subsequently increased streamflow.

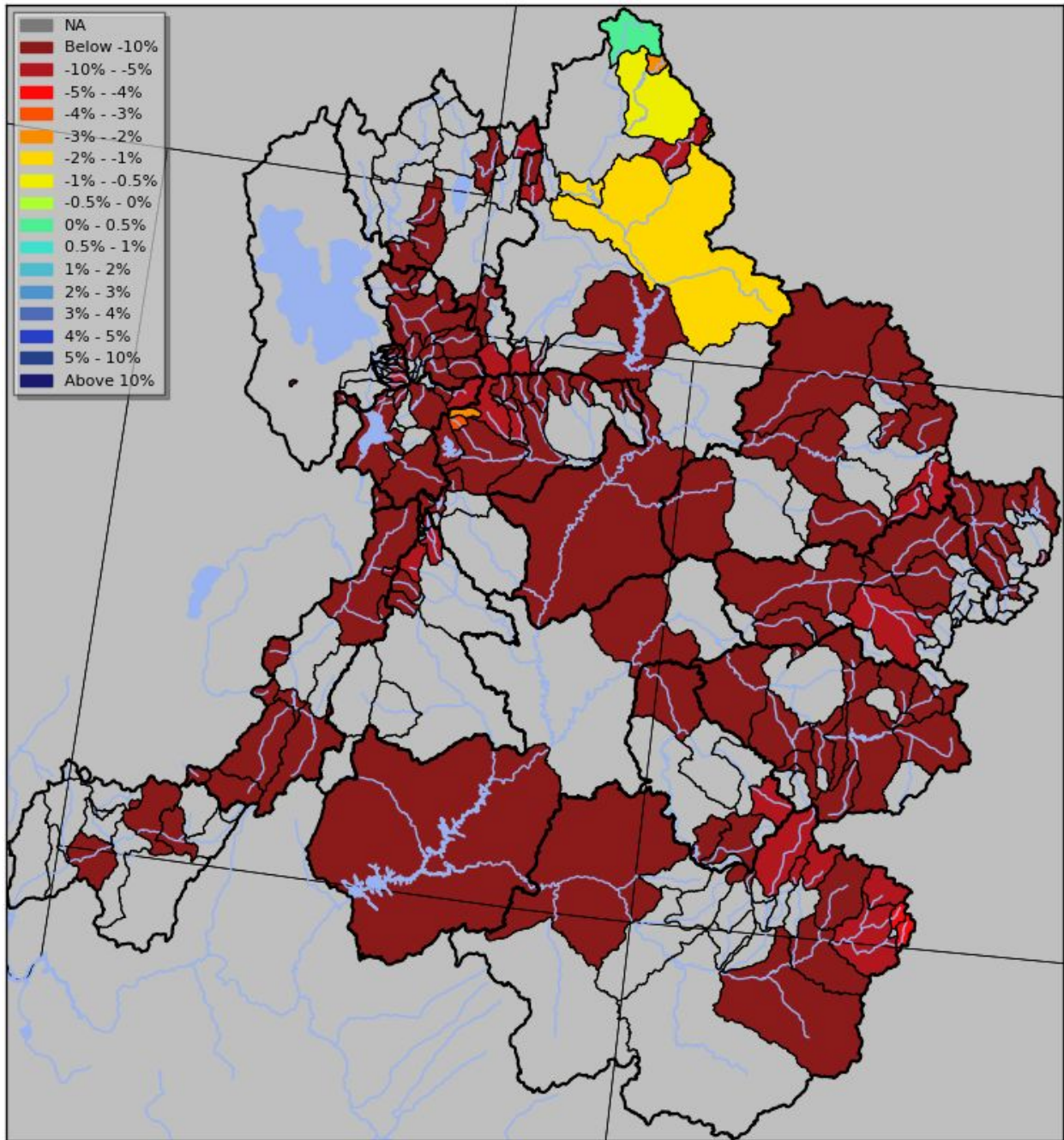
However, upper elevation snowpack conditions throughout the Upper Colorado River Basin and Great Basin remain high as of mid March. Many areas had snow conditions that exceeded 110 percent of the historical median for this time with some areas over 150 percent of median and a handful exceeding 200 percent of median.

Due to the warm, dry weather dominating much of the area during the first half of March, water supply guidance for April-July runoff volumes has decreased at most locations. Some of that water has shifted into March due to early snowmelt, but a large part of it is due to the lack of precipitation to this point of the month. Even with the decreased guidance, near to much above average runoff is expected across the area.

Mid March forecast updates for some of the major Upper Colorado River Basin reservoirs include Fontenelle with no change at 232 percent of average, Flaming Gorge with a decrease from 231 to 222 percent of average, Taylor Park with a decrease from 129 to 116 percent of average, Blue Mesa decreasing from 144 to 136 percent of average, McPhee decreasing from 149 to 141 percent of average, and Navajo Reservoir decreasing from 114 to 103 percent of average. Lake Powell decreased from 145 to 138 percent of average and is now at 9.9 million acre-feet for the April-July forecasted inflow. The inflow forecasts for Fontenelle Reservoir and Flaming Gorge Reservoir are both the 2nd highest on record.

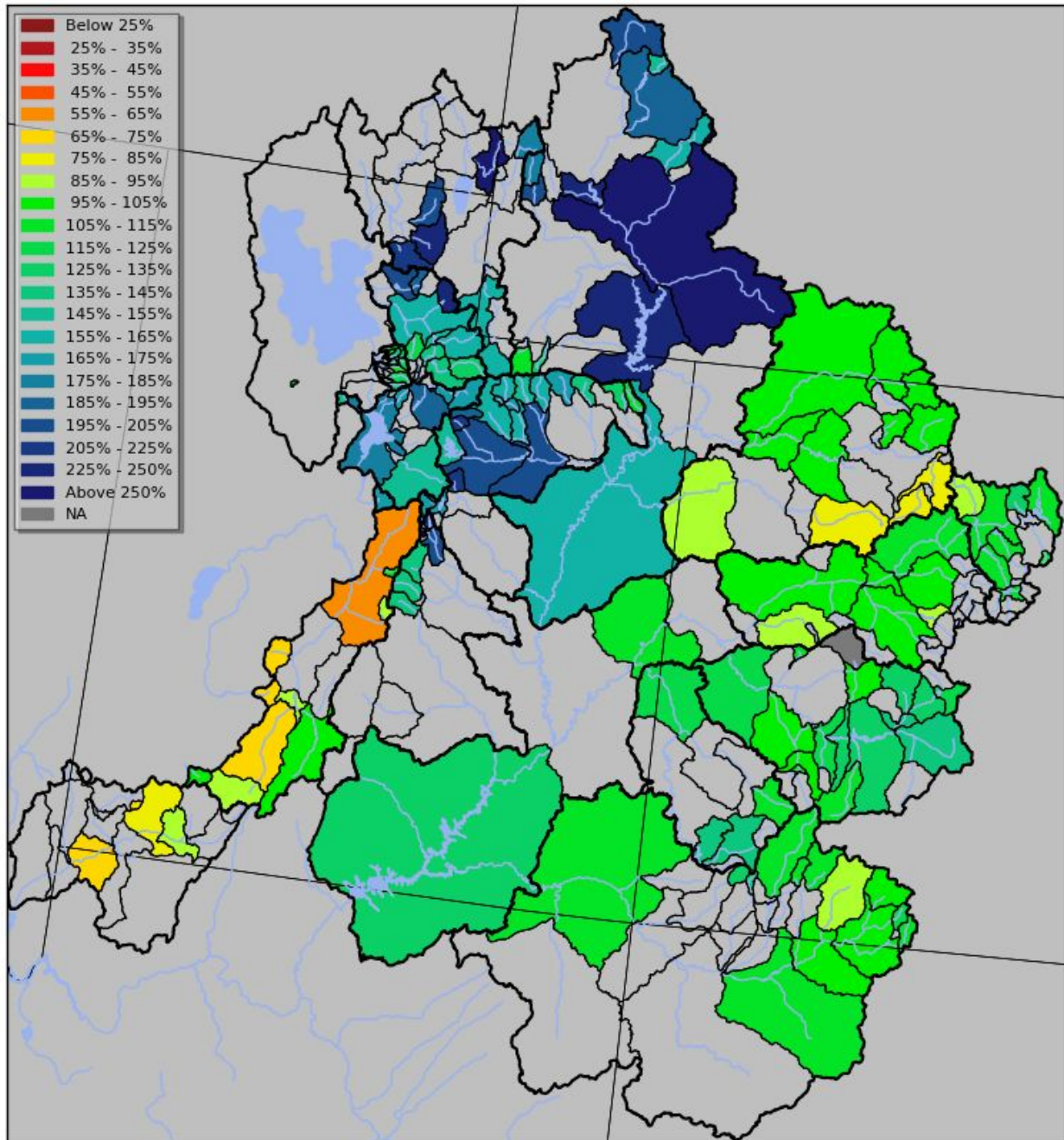
The Lower Colorado River Basin has had little to no precipitation since the beginning of March and has experienced rapid snowmelt over the last two weeks. Little snow remains in the highest elevations of the basins in Arizona and western New Mexico, while the Virgin River basin still has above median snowpack for this time of year. Forecast guidance for the January through May runoff volume for the Verde River Basin, Gila River Basin, and Little Colorado River Basin have decreased since the beginning of the month but are still much above median. Forecast guidance for the April through July runoff volume in the Virgin River basin has also decreased so that expected volumes are now below average, but still above median.

Change in Seasonal Water Supply Forecasts:



Trend in the April-July runoff volume forecast guidance since March 1st 2017
Decreases occurred throughout the area with little to no change in the Green River Basin of Wyoming
(Change in April-July percent of average)

Seasonal Water Supply Forecasts:



Upper Colorado, Great, Virgin River Basins
April-July runoff volume guidance as of March 15 2017
(50% exceedance probability as a percent of 1981-2010 average)

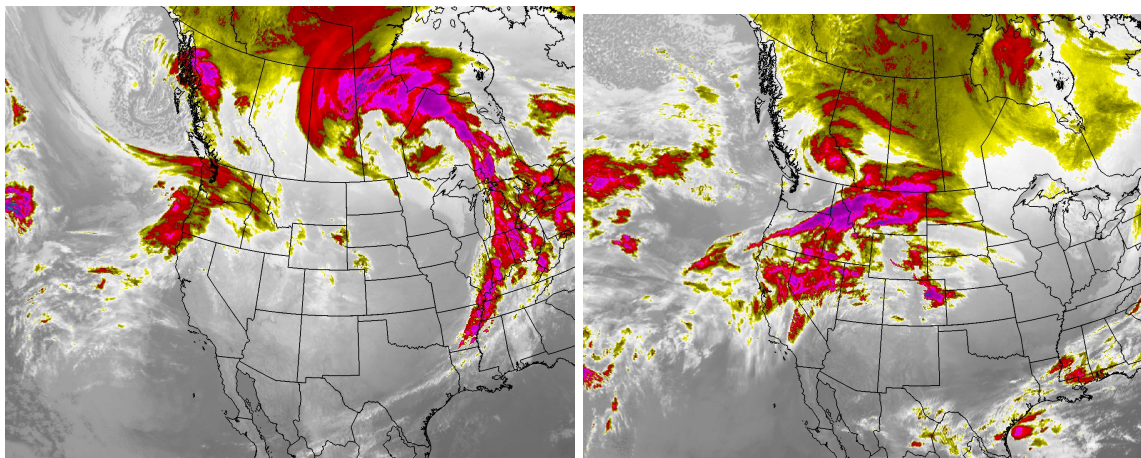
[Click here for the latest water supply model guidance](#)

Water Supply Discussion

Weather Synopsis:

March started out quite the opposite of the past few months with generally very dry conditions area wide. The pattern became mild and dry as a west to northwest flow dominated the first week and half of the month. The primary storm track was north of the CBRFC forecast area impacting only the extreme northern section of the Green River Basin in Wyoming and the Bear River Basin in Idaho.

As the middle of the month approached, the storm track lifted farther north in response to a strong high pressure ridge building over much of the Colorado River and Great Basins. This brought much above average temperatures as well as snowmelt and increasing streamflow at lower elevations.



Left: Satellite image from March 7th 2017 - Dry west / northwest flow over the area

Right: Satellite image from March 10th 2017 - Primary storm track lifting north of the forecast area.

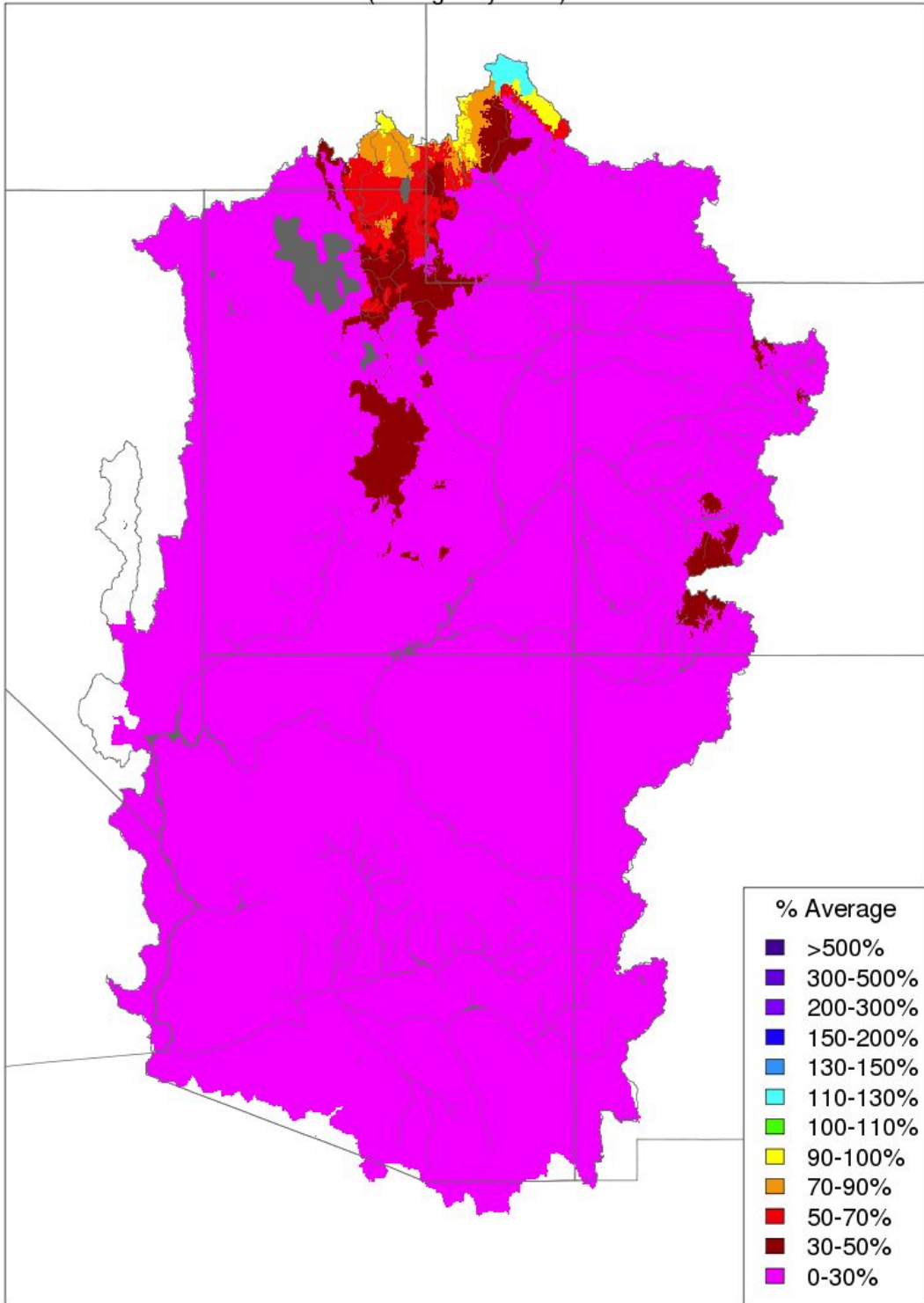
Precipitation and Temperature:

It has been a dry start to March with the exception of the extreme northern Bear and Green River Basins. As of March 15, month to date precipitation was less than 30% of average over almost the entire area, with southern portions of the basin, such as Arizona, receiving little to no precipitation. The exception was the very northern portion of the basin where the Green River headwaters in Wyoming and parts of the Bear River Basin in southeast Idaho received enough precipitation from storms March 6 through March 10 to put them in the near to slightly below average precipitation category.

Temperatures near the middle of the month rose to much above average, with daily maximum temperature records broken at several places throughout the area.

Month to Date Precipitation - March 15 2017

(Averaged by Basin)



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

Snowpack:

A considerable snowpack exists across much of the Upper Colorado River Basin and Great Basin. With the exception of the Yampa River Basin and the Sevier River Basin, most individual snotels in these areas are above 110 percent of median with quite a few above 150 percent of median.

The highest snowpack conditions with respect to the historical median exist in the headwaters of the Green River, headwaters of the Gunnison River, Duchesne River Basin, Bear River Basin, and Provo River Basin.

The SNOTEL map image below indicates a widespread heavy snowpack across much of the CBRFC forecast area. Those sites depicted by a dark blue or purple marker have a snowpack ranging from 150 to 300 percent of median for mid March.

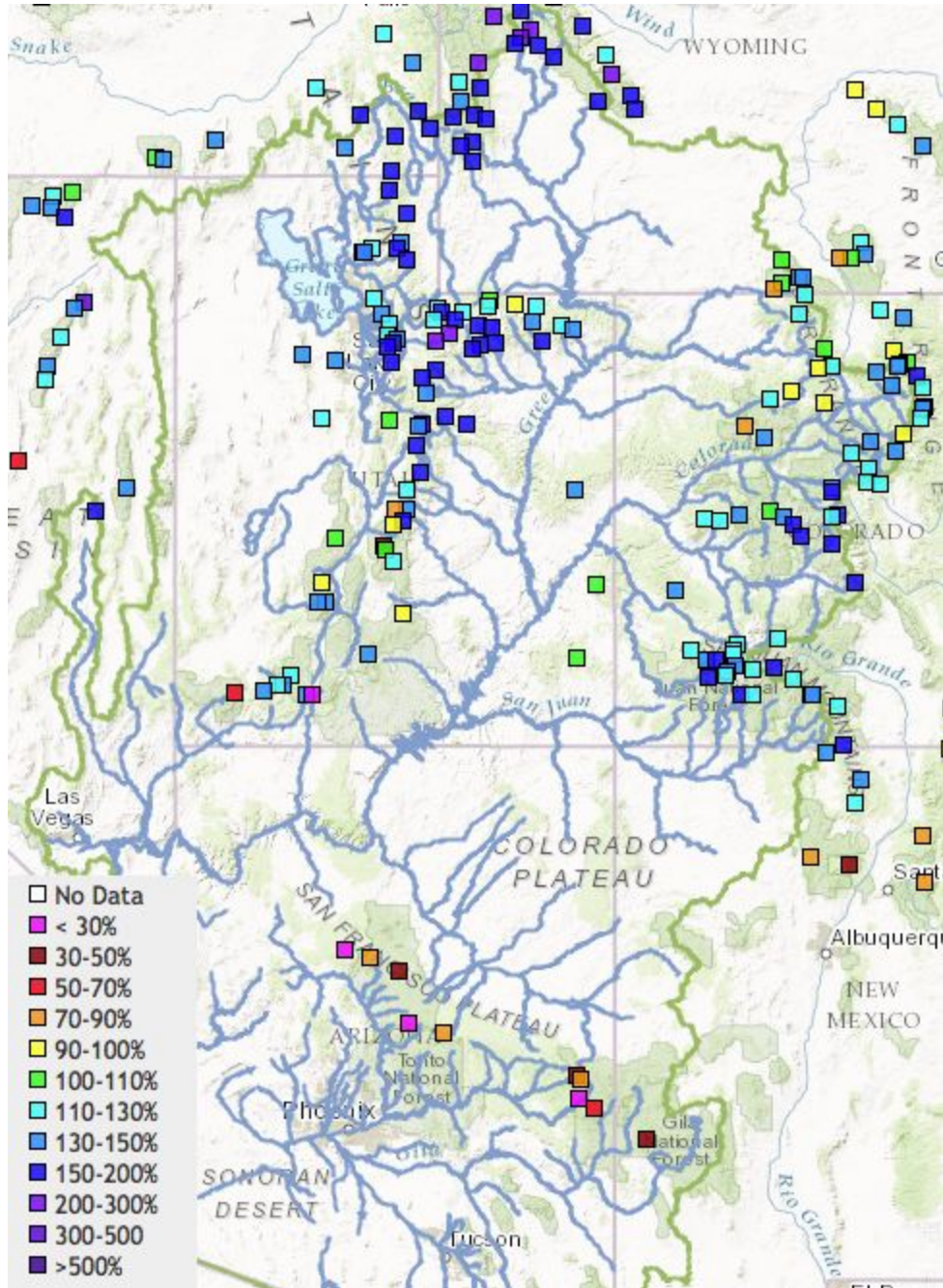
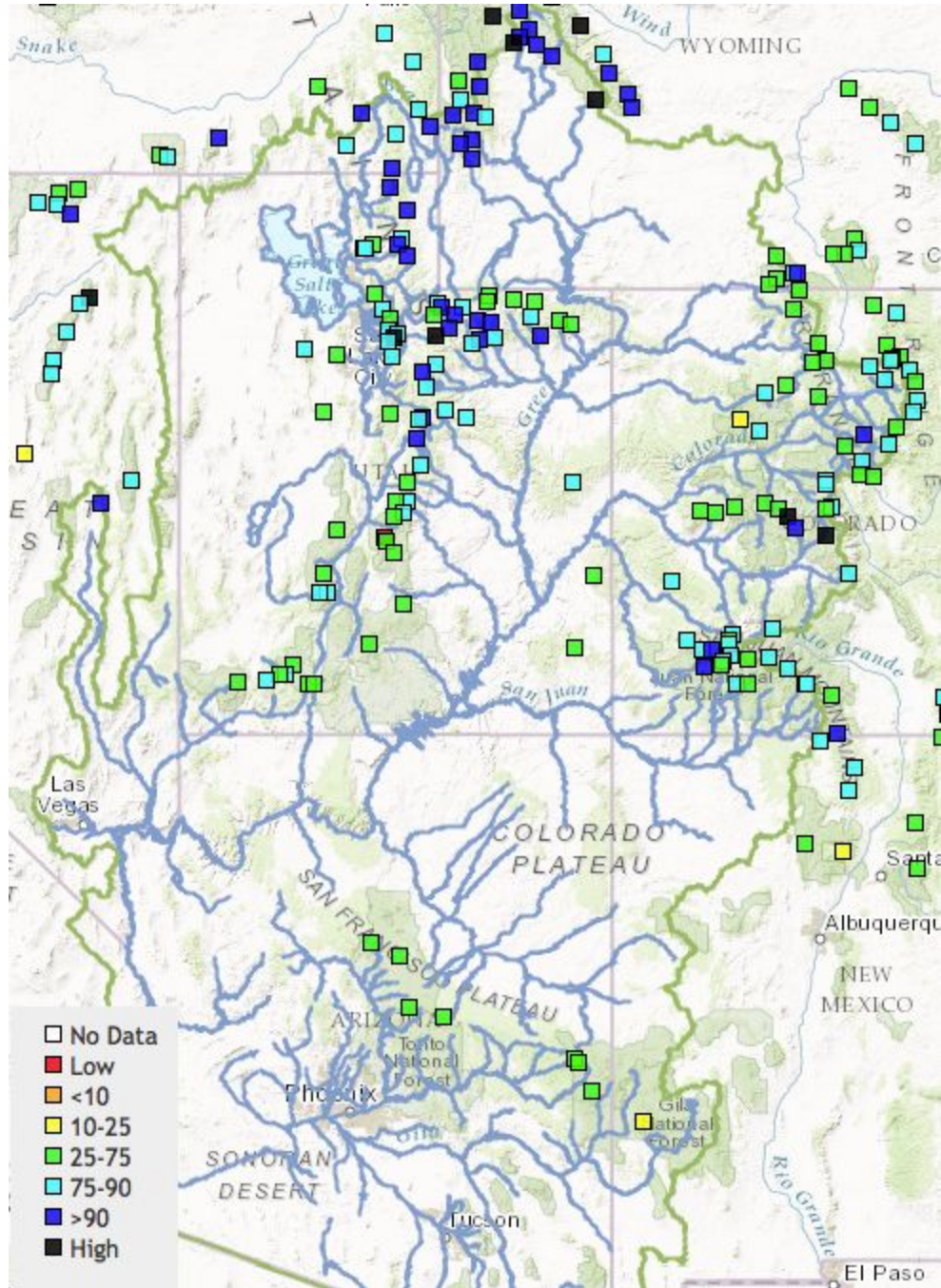


Image: Percent Median Snow Conditions as of March 15 2017

The snow percentile image displayed below indicates where the current snow measurement ranks in the historical record for each site. A few sites are depicted with black boxes indicating these are the highest values on record for this time of year. Sites in the dark blue are in the top 10 of record (typically 34-39 years) with most ranking as either the 2nd or 3rd highest for this time of year.

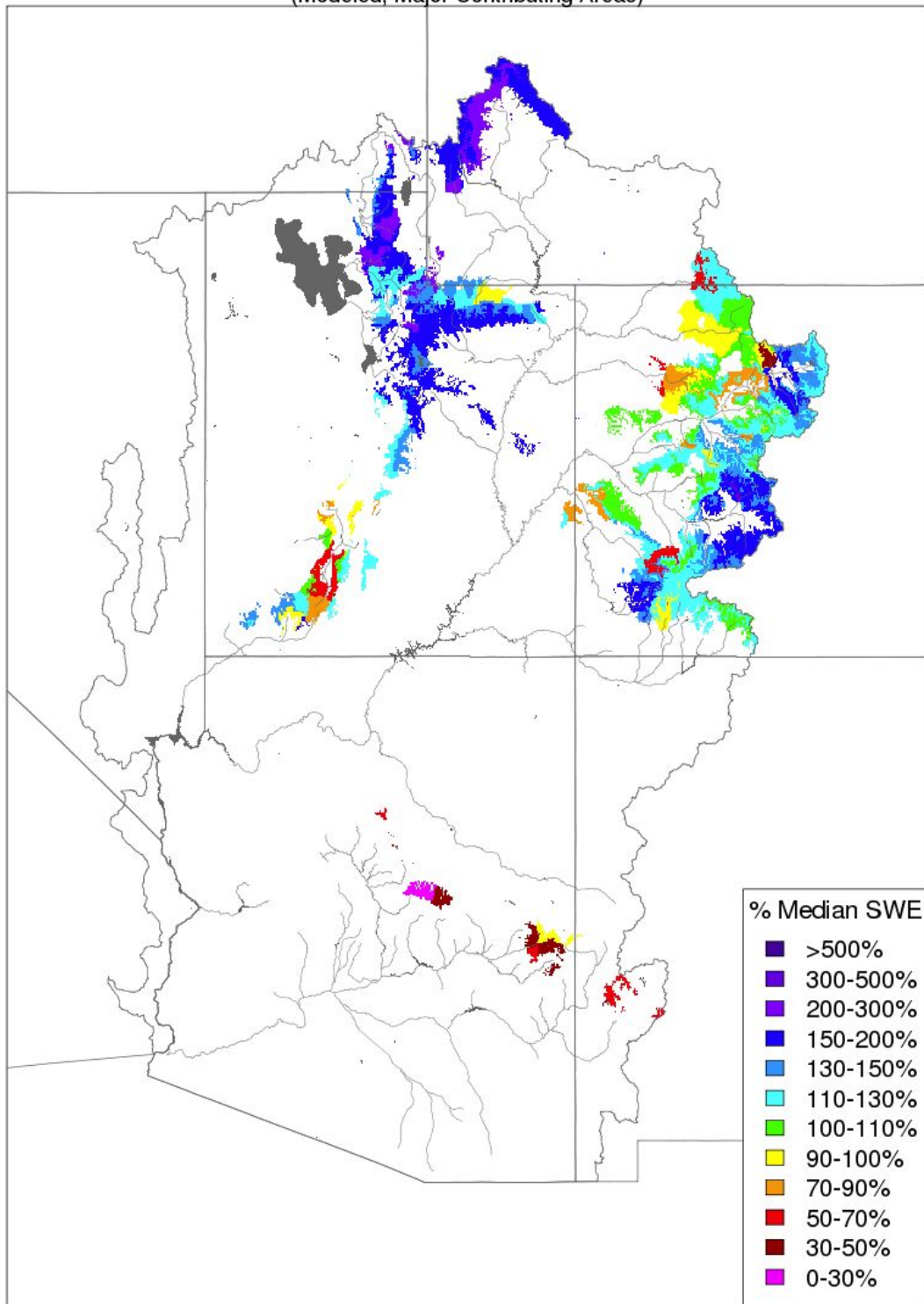


Snow Percentile Image: Historical SNOTEL ranking as of March 15 2017

The image below is the representation of snow in the CBRFC hydrologic model. Only those areas that provide the greatest contribution to the April-July runoff volumes are displayed. The snow represented in the model closely mirrors the SNOTEL image. The takeaway message is significant snowpack is widespread as indicated by the hydrologic model. Largest snowpack areas compared to the historical median extend from central Utah through northern Utah into Wyoming and include primarily the Duchesne Basin, northern Great Basin, and the Green River Basin of Wyoming, as well as the Gunnison River headwaters in Colorado. Largest streamflow volumes with respect to average are forecast for these areas.

Snow Conditions - March 15 2017

(Modeled, Major Contributing Areas)



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

Modeled Snow: Snow representation from the CBRFC hydrologic model March 15 2017

For updated SNOTEL information refer to click [here](#)
For CBRFC hydrologic model snow 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 16th were above average over much of the Upper Green River Basin, Bear River Basin, and Duchesne River basins. Elsewhere in both the Great Basin and Upper Colorado River basin the modeled soil moisture conditions were below average. Given the significant snowpack over the area the impact of drier soils may be lessened this year than compared to years with a normal or below normal snowpack. Those areas with above average fall soil moisture combined with a significant snowpack may experience enhanced runoff conditions this spring.

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. Soil conditions in the fall are less informative than they are in the northern basins that remain under snowpack throughout the winter season. As seen in the image below current model soil moisture conditions are above average in most of the Salt, Verde, and Gila River Basins with drier conditions in the Little Colorado River Basin. Any additional rainfall over the next few weeks will likely result in efficient runoff and higher streamflows due to the fairly wet soils in these areas.

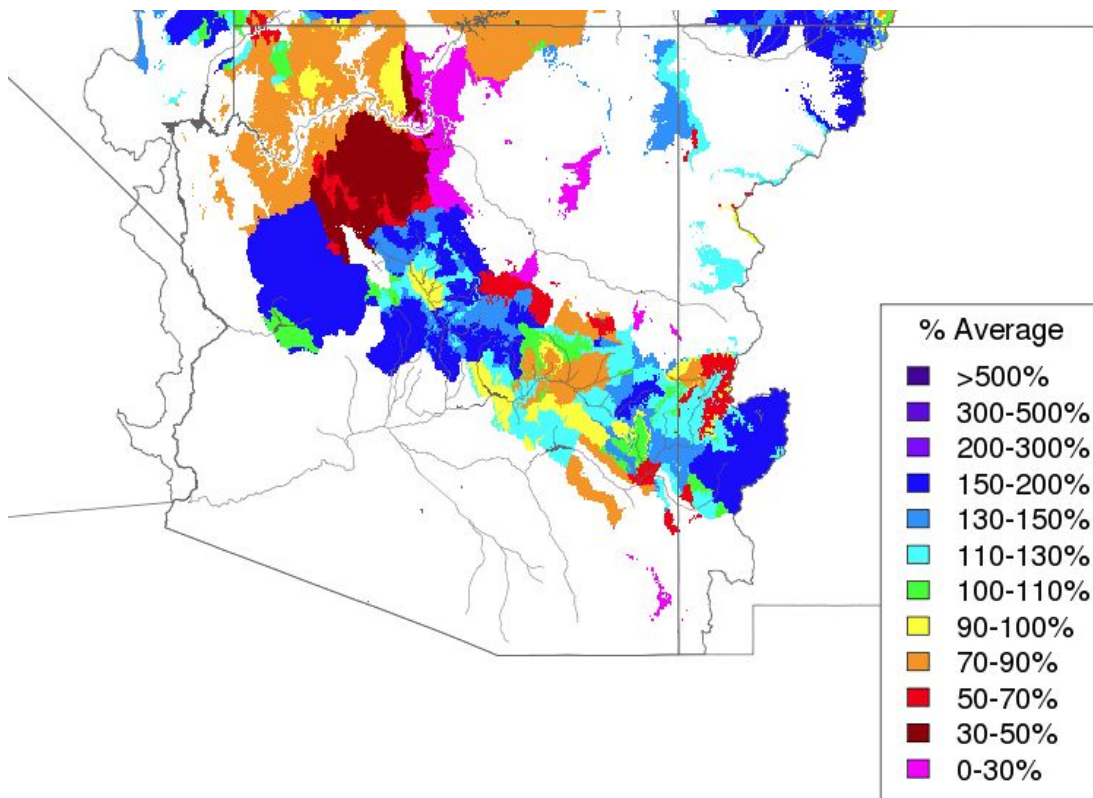
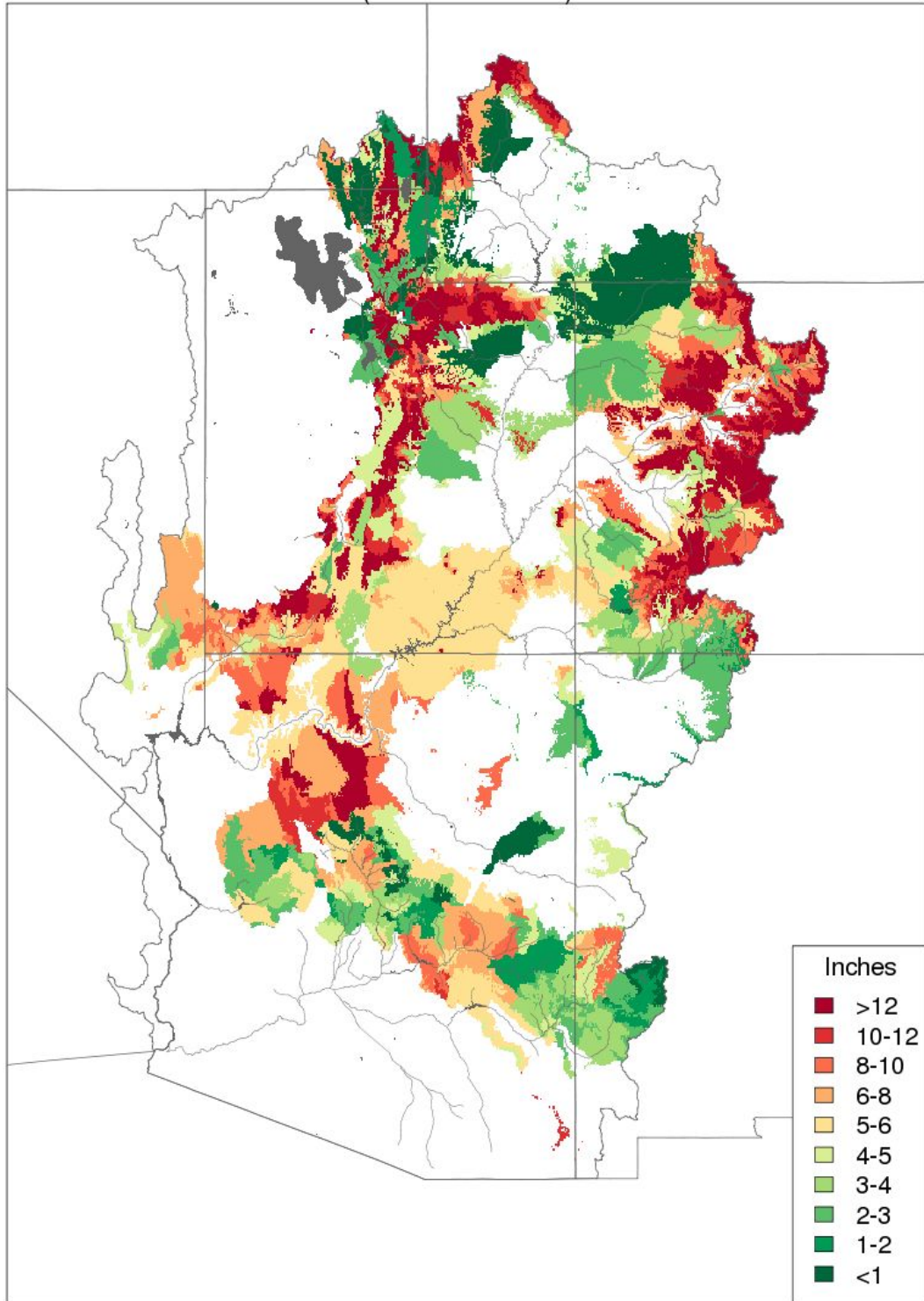


Image: Model soil moisture Lower Colorado River Basin (AZ/NM) as of March 15 2017

The following image is from the CBRFC hydrologic model and it indicates where the model suggests soils are becoming saturated. Typically it does not have much meaning during the winter season in the Upper Colorado River Basin and Great Basin as soil conditions remain fairly static under the snowpack. Higher elevations typically fall into red and orange categories this time of year prior to snowmelt. Dark green areas indicated in the model suggest soils are becoming saturated and these areas would experience more efficient runoff from snowmelt or additional rain. The darker green areas across lower elevations of the Bear River Basin in northern Utah and southern Idaho are near saturation according to the model. This area has already experienced some flood related issues and will continue to experience very efficient runoff from additional snowmelt or rainfall this spring. Another area that is saturated are lower elevations in southwest Wyoming but they are not shown on this particular image. In the Lower Colorado River Basin the Gila River headwaters and parts of the Salt and Verde River basins are also near saturation in the model due to recent snowmelt.

Soil Moisture - March 15 2017

(Inches to Saturation)



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

Image: Model soil saturation as of March 15 2017.

Upcoming Weather:

In the short term, the next five days look to remain warm and dry across the area. Lower and mid elevation snowmelt will accelerate during this time. Longer range guidance suggests the last week or two of March could become more active again and hopefully bring wetter conditions than the first half of the month.

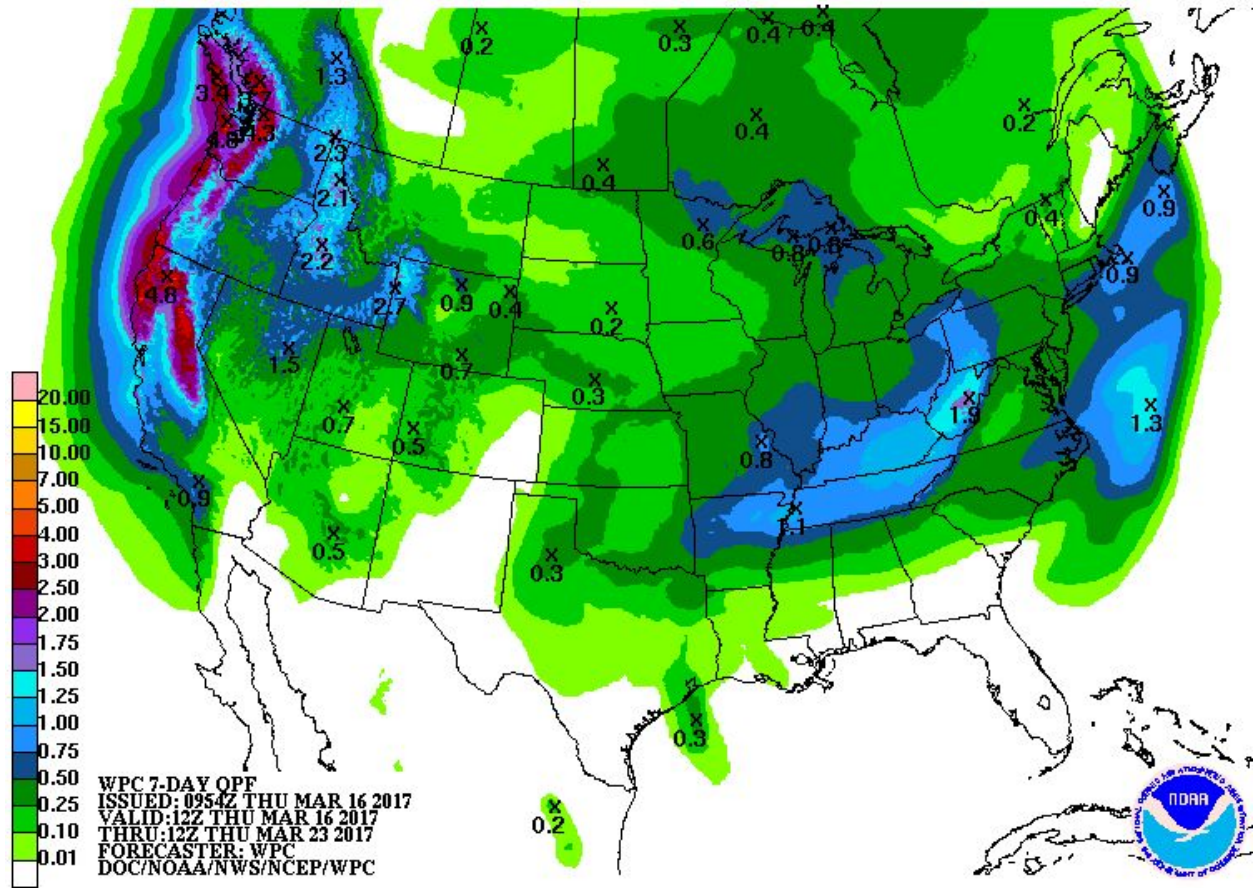


Image: NWS Weather Prediction Center precipitation forecast for Mar 16th - Mar 23rd 2017