# March 1, 2020 Water Supply Forecast Discussion

The <u>Colorado Basin River Forecast Center (CBRFC</u>) 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. The highest forecast volumes with respect to average are in the Upper Colorado River mainstem and White/Yampa basins, where volume forecasts are generally near the 1981-2010 historical average. Volume forecasts during the past month increased around 5-10% in the White/Yampa basins and as much as 30% in the Upper Colorado River mainstem basins. The improvement in forecast guidance was due to above average precipitation and increased snowpack in these areas during February. Water supply volume forecasts in the Virgin, Gunnison, Dolores, and San Juan basins declined during the past month due to below average February precipitation. Below average soil moisture conditions entering the winter season continue to negatively impact water supply forecasts in southwest Colorado.

April-July unregulated inflow forecasts for some of the major reservoirs in the Upper Colorado River Basin include Fontenelle Reservoir 620 KAF (86% average), Flaming Gorge 850 KAF (87% of average), Blue Mesa Reservoir 525 KAF (78% of average), McPhee Reservoir 190 KAF (64% of average), and Navajo Reservoir 440 KAF (60% of average). The Lake Powell inflow forecast did not change from February and is 5.7 MAF (80% of average).

Water supply volume forecasts in the Great Basin have decreased as much as 25% since early February in central and southern Utah. Conditions in the Provo and Utah Lake Basins range from near normal in the headwaters of the Provo to below and much below normal for Utah Lake and Spanish Fork locations. Conditions in the Six Creeks basins decreased slightly but remain near normal with the exception of City Creek and Red Butte Creek, which are now below normal. Water supply volume forecasts in the Weber and Bear River basins have decreased, with the exception of the northeastern Bear basin.

February precipitation in southern/eastern Arizona within the Lower Colorado River Basin was generally near to above average. March-May volume guidance forecasts increased in the Upper Gila basin, remained about the same in the Salt basin, and decreased slightly in the Verde basin.

## **Seasonal Water Supply Forecasts**



Upper Colorado, Great, Virgin River Basins: March 2020 April-July forecast volumes as a percent of 1981-2010 average.



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

For specific site water supply forecasts click here

# Water Supply Discussion

#### Weather Synopsis / February Precipitation

A persistent jet stream combined with moisture streaming in from the Pacific produced significant precipitation across the mountainous areas of northern Utah/Colorado and Wyoming during the first week of February. This was followed by a weather system that brought moderate precipitation and high elevation snow to southern Arizona on February 10-11. Another system just after the middle of the month brought additional precipitation to northern portions of the basin. Arizona and southern Utah benefited from a heavier precipitation event on February 22-23 associated with a weather system that had a favorable Pacific moisture tap.

February precipitation was much above (175%) average across the Upper Colorado River mainstem, with many SNOTEL sites recording monthly precipitation totals in the top five of their period of record during the month. February precipitation was above average (130%) in the White/Yampa basins and near average in the Upper Green. February's weather pattern was not conducive to bringing storm systems to most of Utah and southwest Colorado, which resulted in much below average precipitation totals for the month in the Duchesne, Virgin, Gunnison, Dolores, and San Juan basins. Many locations in the Dolores and San Juan basins recorded monthly precipitation totals in the bottom three of their period of record. February precipitation across the Lower Colorado River Basin was a mixed bag; above average in the Gila basin, near average in the Little Colorado and Salt basins, and below average in the Verde basin. February precipitation across the Great Basin was generally below normal, with the exception of the Six Creeks basin. The Bear and Weber basins received slightly below normal precipitation, while the Provo/Utah Lake and Sevier basins received well below normal precipitation during February.



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

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

#### Snowpack

Observed snow water equivalent (SWE) conditions as of early March are generally near normal (median) across the Upper Colorado River Basin and Great Basin and below normal across the Lower Colorado River Basin. SWE conditions as a percent of the 1981-2010 median improved the most during February in the Upper Colorado River headwaters, where early March snow conditions are currently around 120% of normal. Early March SWE values at a number of SNOTEL sites along the Continental Divide in central/northern Colorado currently rank in their top ten of record for this time of year. The White/Yampa and parts of the Upper Green have above normal snow conditions as of early March, while Duchesne and Virgin basin snow conditions are near normal. Although well below average February precipitation resulted in a further decline in Gunnison, Dolores, and San Juan basin snow conditions, southwest Colorado SWE conditions remain near to slightly below median as of early March.

SWE conditions as a percent of the 1981-2010 median generally declined across the Lower Colorado River Basin during February. Early March snow conditions are below normal in the Salt and Upper Gila basins, and much below normal in the Verde and Little Colorado basins. It's worth noting that SWE conditions in the Lower Colorado River Basin are more variable and tend to fluctuate more frequently over time.

Across the Great Basin, early March snowpack conditions remain above normal in the Six Creek basin, and near average in the Bear, Weber, Provo/Utah Lake, and Sevier basins. Early March observed (SNOTEL) conditions as a percent of the 1981-2010 historical median are shown in the image below.



Observed (SNOTEL) percent median SWE conditions as of March 4, 2020.

The image below is the representation of early March CBRFC model snow conditions in areas that provide the greatest contribution of April-July runoff. Model snow conditions closely correlate to SNOTEL conditions throughout the Colorado River and Great Basins.



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CBRFC hydrologic model snow conditions in significant runoff areas as of March 4, 2020.

For updated SNOTEL information refer to click <u>here</u> For CBRFC hydrologic model snow click <u>here</u>

### **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 15, 2019 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. The Gunnison, Dolores, and San Juan basins in southwest Colorado entered the winter season with much below average soil moisture conditions, primarily due to the poor 2019 monsoon season.



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CBRFC hydrologic model soil moisture entering the winter season (percent of 1981-2010 average).

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 significantly throughout the Lower Colorado River Basin during the past several months due to a combination of near average water year (October-February) precipitation and snowmelt runoff. A summary of Lower Colorado River Basin model soil moisture conditions as of early March is shown in the image below.



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Lower Colorado River Basin (AZ/NM) model soil moisture as of March 4, 2020.

## **Upcoming Weather**

The first week of March is rather tranquil weather-wise with general ridging across much of the Intermountain West. A weak storm system will move into northern Utah/Colorado and Wyoming late this weekend into early next week, with only modest precipitation amounts. Overall, no significant storm systems are expected to impact the Colorado River Basin through March 10 and temperatures will generally be warmer than normal, especially Friday/Saturday. While the uncertainty is greater, a storm system with a better subtropical moisture tap could impact mainly the southern half of Utah/Colorado and the Lower Colorado River Basin by March 12-13, potentially resulting in heavy precipitation. The Climate Prediction Center forecast for the week 2 period suggests higher chances for above normal precipitation across these areas.



NWS Weather Prediction Center precipitation forecast for March 4-11, 2020.



NWS Climate Prediction Center precipitation probability forecast for March 11-17, 2020.

# **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

# **End Of Month Reservoir Content Tables**

<u>Green River Basin</u> <u>Upper Colorado River Basin</u> <u>San Juan River Basin</u> <u>Great Salt Lake Basin</u> <u>Sevier Basin</u>