NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

December 21, 2010

Precipitation and Snowpack

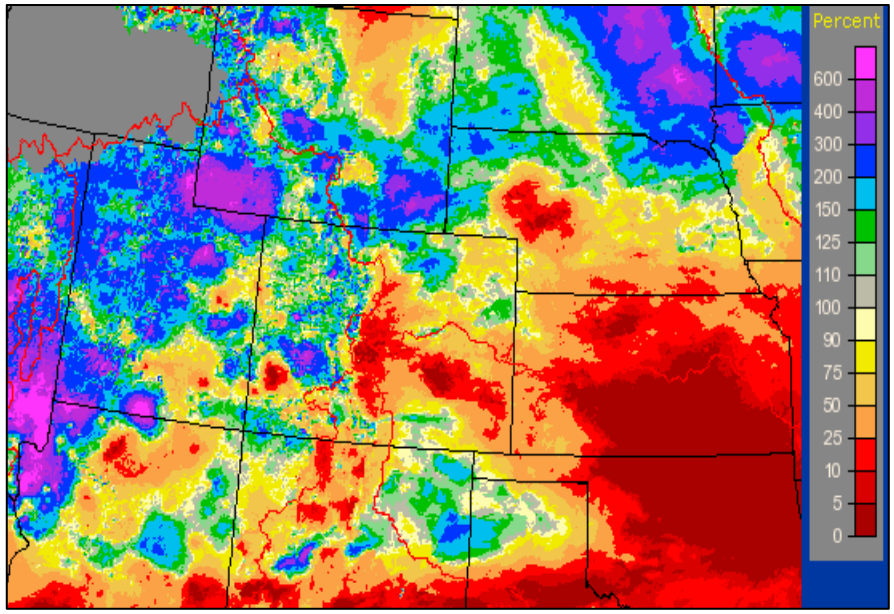


Fig. 1: December month-to-date precip as percent of average.

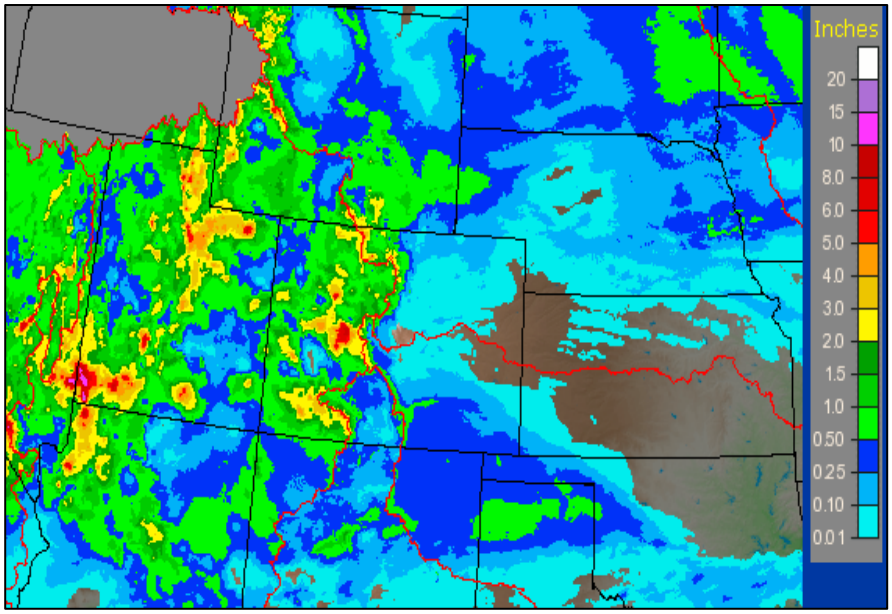


Fig. 2: December 14 – 20 precipitation in inches.

Most of the Upper Colorado River Basin (UCRB) received near or above average precipitation for November, while areas east of the UCRB remained dry—a pattern that has continued through December (Fig. 1). For the first three weeks of December, southwestern Wyoming has seen over 300% of its average precipitation. Much of northeastern Utah and the north-central mountains of Colorado have also received generous amounts of moisture. Some areas near the Four Corners, the Rio Grande basin, and the Arkansas basin have been remained dry, month-to-date.

Last week, most of the UCRB received half an inch to two inches of precipitation (Fig. 2). The Four Corners region received much needed moisture of around half an inch to an inch. The eastern plains of Colorado and the Rio Grande basin in southern Colorado remained fairly dry, only receiving around a tenth of an inch of precipitation in some areas.

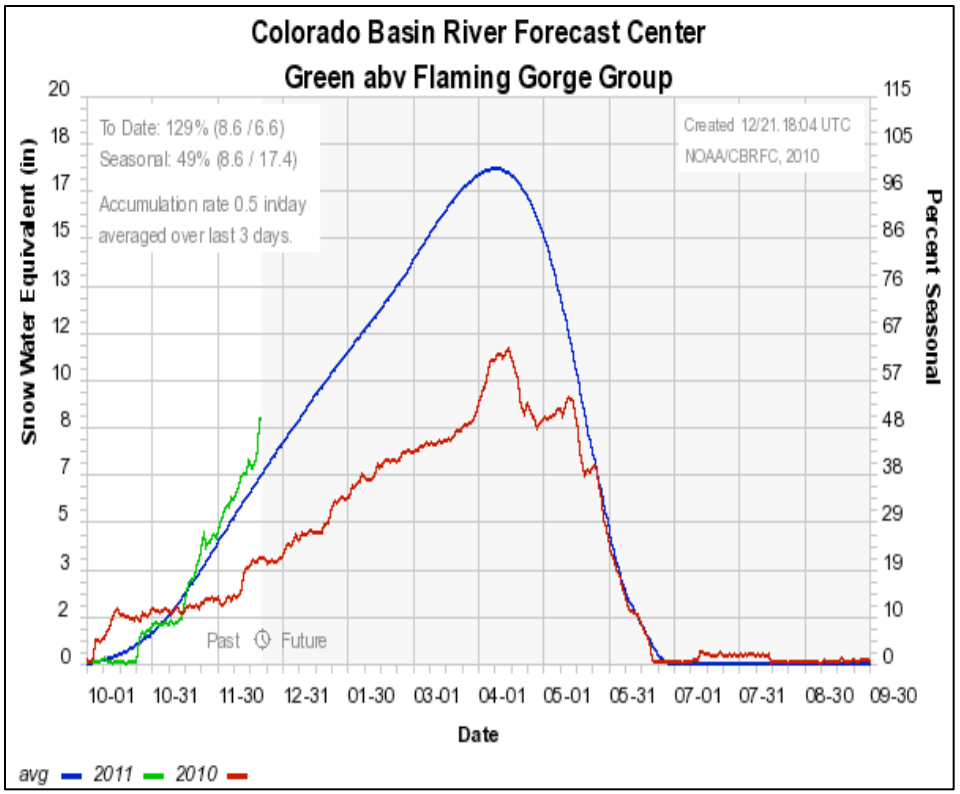


Fig. 3: SNOTEL WYTD accumulated snowpack averaged over the Upper Green River basin.

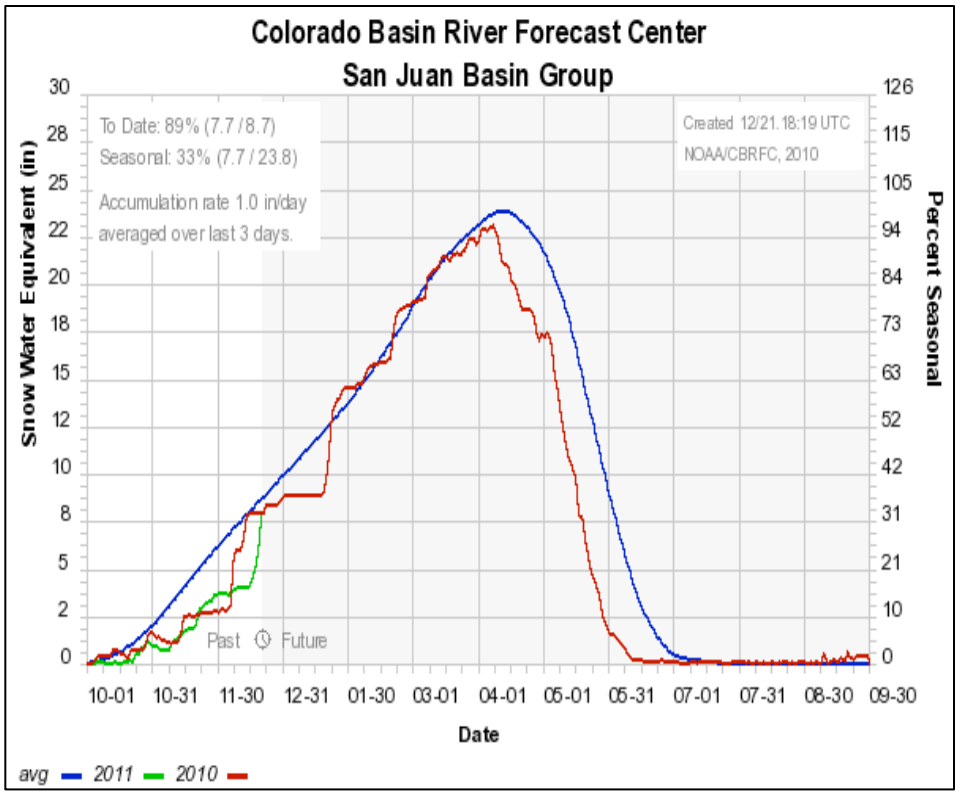


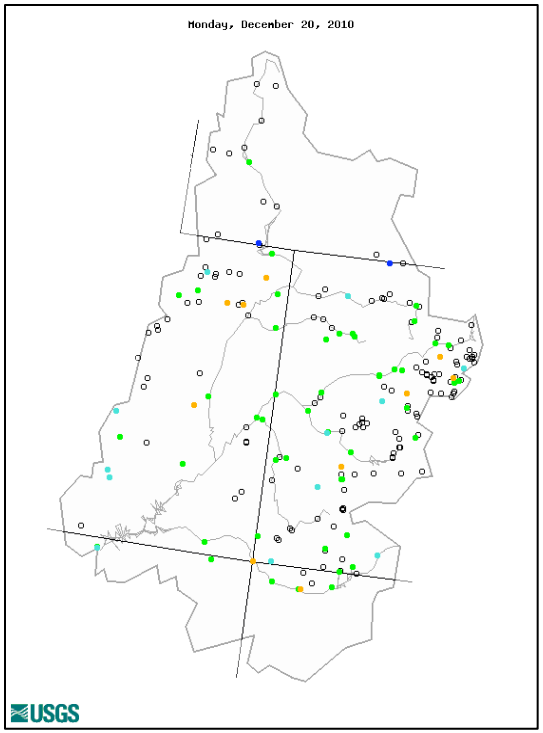
Fig. 4: SNOTEL WYTD accumulated snowpack averaged over the San Juan River basin.

The majority of sub-basins in the UCRB have received above average water-year-to-date (WYTD) precipitation according to SNOTEL stations. The Upper Green River basin is currently at 138% of average precipitation for the water year, and snowpack is currently at 129% of average (Fig. 3). This is a major improvement from last year when the snowpack at this time was well below average. Similarly, the Duchesne River in UT and the Colorado River above Kremmling in CO are well above average for WYTD precipitation and snowpack. The San Juan basin (in southwestern CO and southeastern UT) is the driest basin but has has recent improvement—WYTD precipitation is at 99% of average and current snowpack is at 89% of average, which is fairly similar to last year (Fig. 4). Averaged over the entire UCRB, above Lake Powell, snowpack is currently at 137% of average and WYTD precipitation is at 144% of average.

Streamflow

As of December 20th, about 85% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows (Fig. 5). Though an increasing number of streams have frozen over, the majority of gages still recording show good 7-day average flows for this time of year. Even in the driest region of the UCRB, around the Four Corners, most gages are still showing normal flows.

Looking at hydrographs around the UCRB, key sites are showing near normal discharges and are in good condition in terms of seasonal flow (Fig. 6). 7-day average discharge on the Colorado River at the CO-UT state line and on the San Juan River near Bluff, UT are at 83% and 95% of normal, respectively. The Green River near Green River, UT experienced a strong upsurge in flows last week and is currently at 139% of normal. This increase was likely due to unseasonably warm temperatures and the melting of upstream ice. All three gages show 7-day average discharge within the normal percentile range, though all show below normal cumulative runoff for the calendar year.



Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

Fig. 5: USGS 7-day average streamflow compared to historical streamflow for December 20th in the UCRB.

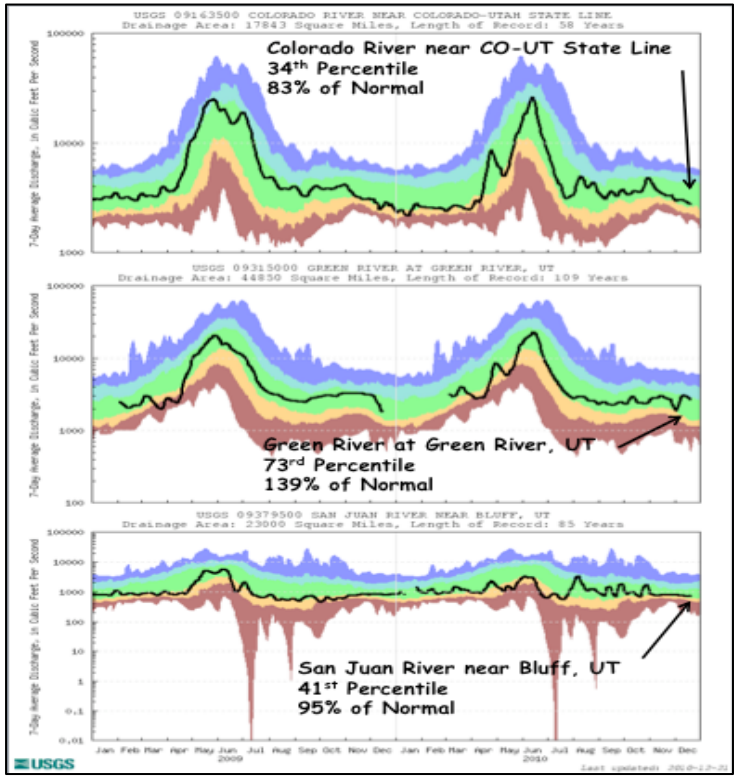


Fig. 6: USGS 7-day average discharge over time at the CO-UT state line (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Another week of warmer than average temperatures prevailed throughout the UCRB and surrounding areas. Temperatures were particularly warm (more than 9°F above average) over western CO and the Four Corners, with the rest of the basin around 3° to 6°F warmer than average for this time of year. While temperatures have been warm the air has been moist with a persisting flow of moist Pacific air since late last week. Soil conditions remained unchanged last week (Fig. 7) with dry soils showing up in eastern Colorado, in southwest WY, and near the Four Corners and good soil conditions in the mountains of CO and UT.

Only minor changes in storage amounts were seen in the reservoirs throughout the basin for the last week, with Blue Mesa and Lakes Granby and Dillon seeing slight increases in storage since December 1st. Blue Mesa, Flaming Gorge, Navajo Lake and Lake Granby are all above average for this time of year. Lake Powell's storage decreased by another 86,000 acre feet this past week bringing its month-to-date storage decrease to 277,000 acre feet. Lake Powell is currently at 77% of average for this time of year and around 60% of capacity.

Precipitation Forecast

A strong Pacific jet stream will continue to transport moist air over the UCRB, resulting in widespread, moderate snow over much of the high terrain. Several pieces of energy embedded in the flow will further enhance snowfall over the next two days and lead to impressive precipitation totals for many areas in the basin. After a brief lull in snowfall tonight, expect snow to again increase as the main trough begins to move eastward on Wednesday. This will shift the heaviest snow into the San Juan Mountains with southwest facing slopes receiving the greatest accumulations. Quantitative Precipitation fields show widespread accumulations of 1.0 inch of liquid over much of the basin, with the central and southern mountains of Colorado maxing out at 1.6 inches. The unusually warm nature of this system has kept the rain/snow line fairly high and led to the possibility of flooding rains across elevations below 8000 feet around the Four Corners area. The passage of the trough on Thursday will mark the end of this Pacific moisture feed into the region. Forecast models are hinting at the possibility of a developing storm in drought affected areas east of the Continental Divide, which could bring a chance of light precipitation to these areas if the eventual path of the storm is just right. Tranquil conditions will then prevail through the weekend with another trough building off the west coast.

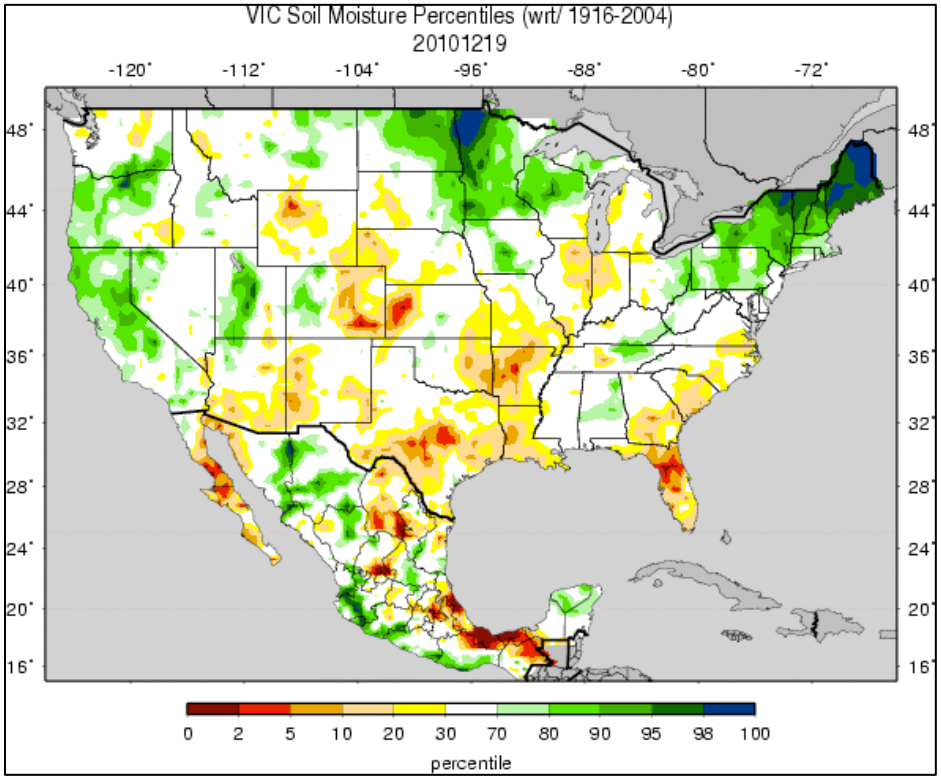
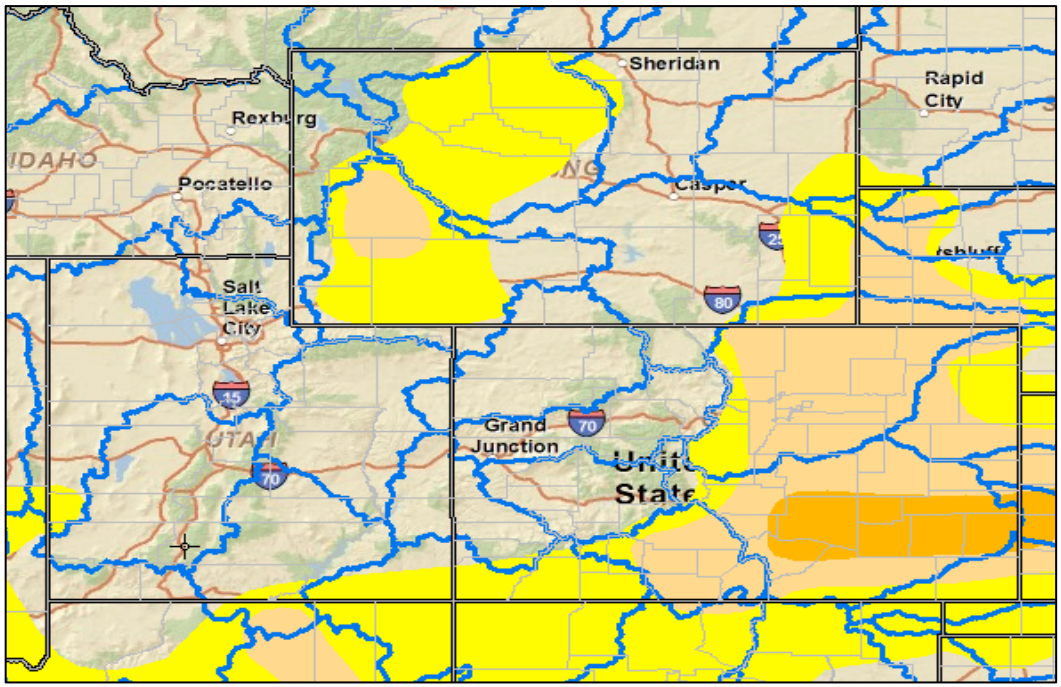
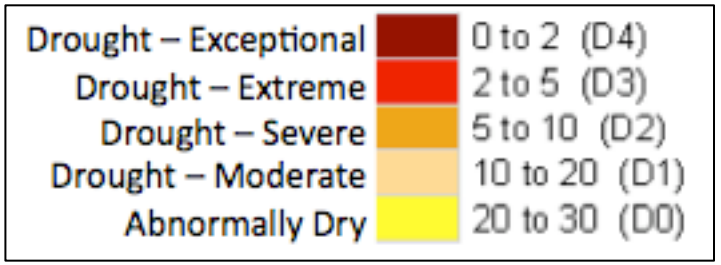


Fig. 7: VIC soil moisture percentiles as of December 19th.

Drought and Water Discussion





Drought categories and their associated percentiles

Fig. 8: December 14th release of U.S. Drought Monitor for the UCRB

No changes are currently being suggested for the current U.S. Drought Monitor (USDM) map (Fig. 8). Status quo has been recommended for Colorado east of the UCRB—some areas near the foothills in the Arkansas and South Platte basins did receive beneficial moisture this week, but not enough to counteract the long-term dryness that has been occurring in those regions.

The USDM author has suggested the possibility for drought category improvement in the Four Corners region as a result of the precipitation that has fallen throughout the area in the past week. At this time, it is recommended that we hold off on any improvements in that area for this week and reassess the situation in the next couple of weeks.