NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

January 17, 2012

Precipitation and Snowpack

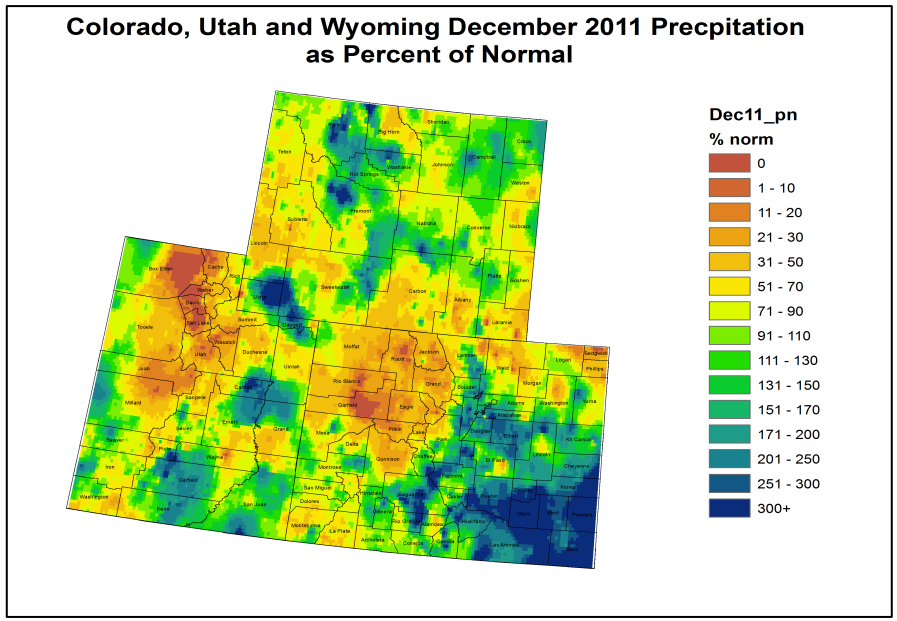


Fig. 1: December precipitation as a percent of average.

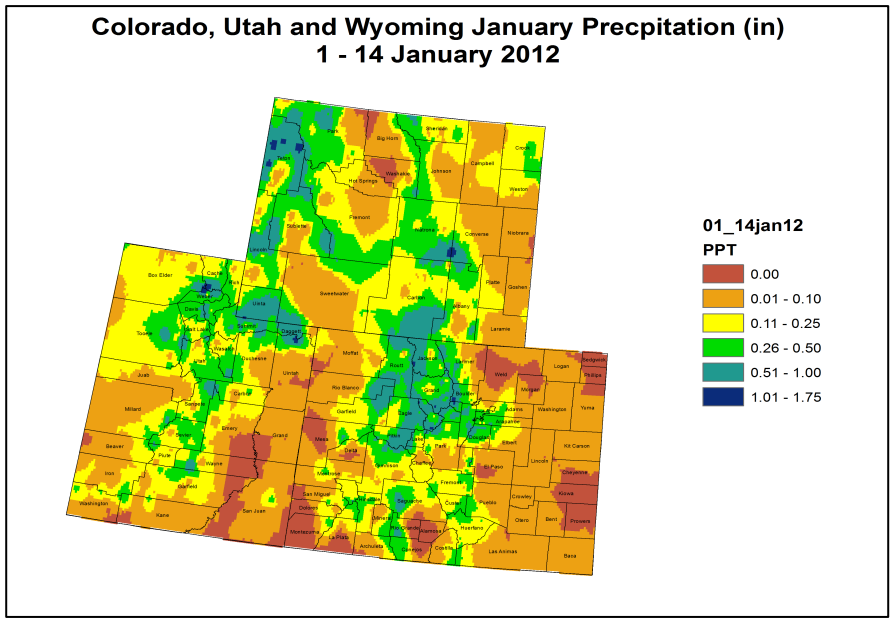


Fig. 2: January month-to-date precipitation in inches.

For the month of December, precipitation favored the southern and western portions of the Upper Colorado River Basin (UCRB, Fig. 1). The San Juan mountains and the Four Corners region received around 100% of its average December precipitation. Areas in eastern Utah and southwest Wyoming received over 150% of average precipitation for the month. Northwest Colorado was much drier in December, with most areas receiving less than 50% of average. The drought-stricken southeast CO saw significant improvement, with most of the region receiving over 200% of average precipitation for the month.

For the month of January so far, beneficial moisture has been concentrated over the higher elevations across the UCRB (Fig. 2). Accumulations in the Upper Green River basin, in the Wasatch mountains, the northern and central Rockies of CO, and the San Juan mountains have ranged between a quarter inch to an inch since the beginning of the month. The valleys and Four Corners have been drier, receiving less than a tenth of an inch over the past two weeks. The Denver Metro area has received over a quarter inch, while the rest of the CO plains have mostly seen less than a tenth of an inch.

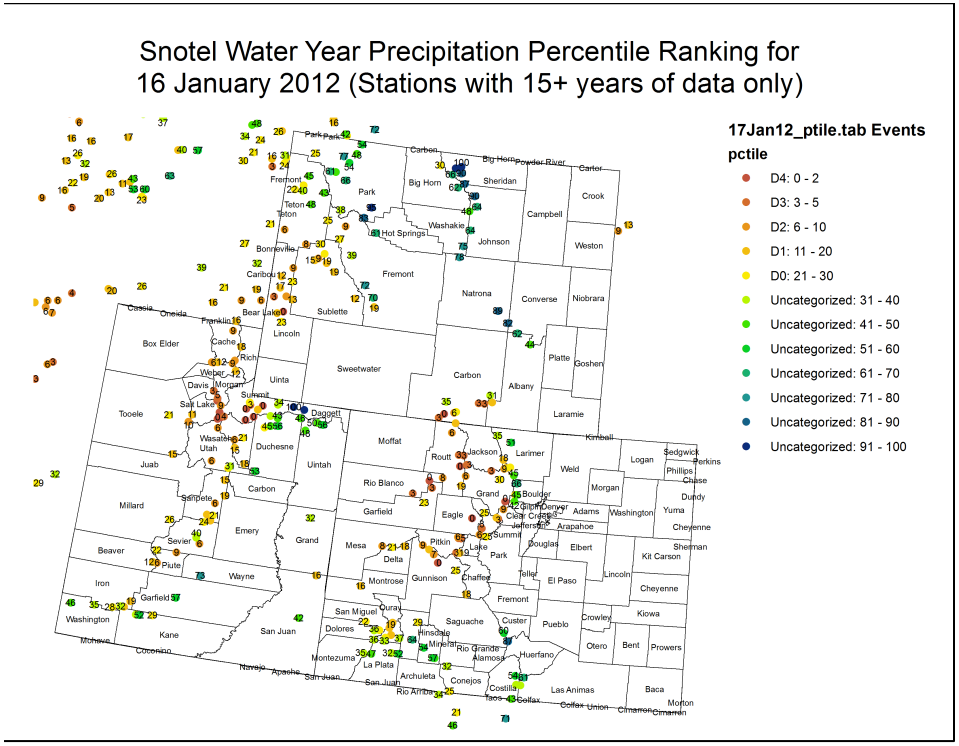


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21 – 30% is Drought Monitor D0 category).

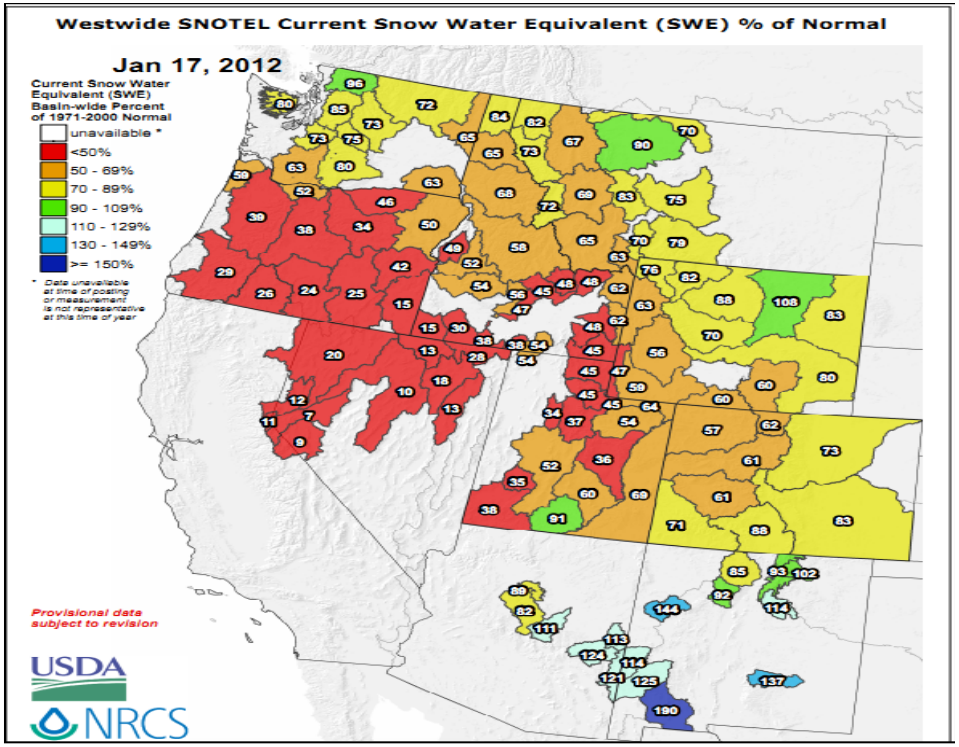


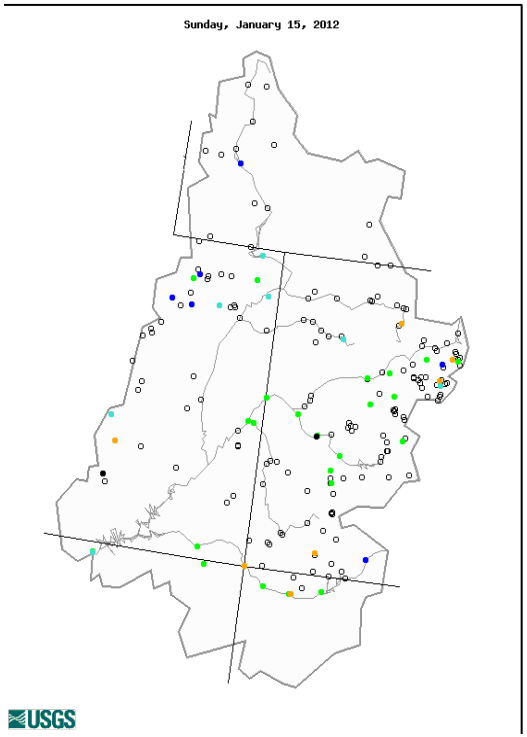
Fig. 4: Basin snow water equivalent (SWE) as a percent of average.

Water-year-to-date (WYTD), SNOTEL precipitation is slightly below average for the southern part of the UCRB and much below average for the northern portions of the basin (Fig. 3). The lowest percentiles are currently being observed around the Yampa basin in CO and along the Wasatch range in UT, with many sites recording below the 10th percentile. Many sites around the Green River headwaters in WY, around the Colorado River headwaters, and in the Gunnison basin in CO are also dry, with sites reporting below the 20th percentile. The Uintas in UT are recording higher percentiles, but this is mainly confined to the northern slopes. The San Juan basin in southern CO is recording higher precipitation percentiles (many sites around or above the 50th percentiles), but reports are that the south-facing slopes there have little to no snow cover. Snowpack conditions around the UCRB are all below normal (Fig. 4) with most of the sub-basins recording 60% of average or less for snowpack. The western part of the basin in UT is the driest, recording snowpack levels below 40% of average. The San Juan basin in southwest CO is currently faring the best, at 71% of average.

Streamflow

As of January 15th, 84% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows (Fig. 5). About 33% of the gages in the basin are recording above normal flows, while 16% of the gages in the basin are recording below normal flows. The number of reporting gages in the basin has decreased from over 100 in mid-November to just below 50, as many portions of the rivers are frozen over. There are currently 7 gages recording below normal flows with most those located near the Colorado River Headwaters region or in the San Juan basin.

Key gages on the Colorado River at the CO-UT state line and the San Juan River near Bluff, UT are all currently recording flows in the normal range at the 50th and 32nd percentiles, respectively (Fig. 6). The gage on the Green River at Green River, UT had been recording above normal flows, but as of last month has become "ice affected" and is not currently recording streamflow.



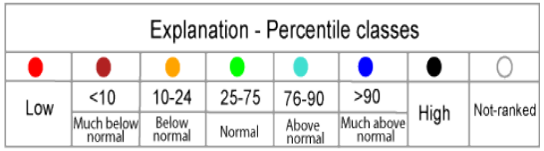


Fig. 5: 7-day average discharge compared to historical discharge for January 15th.

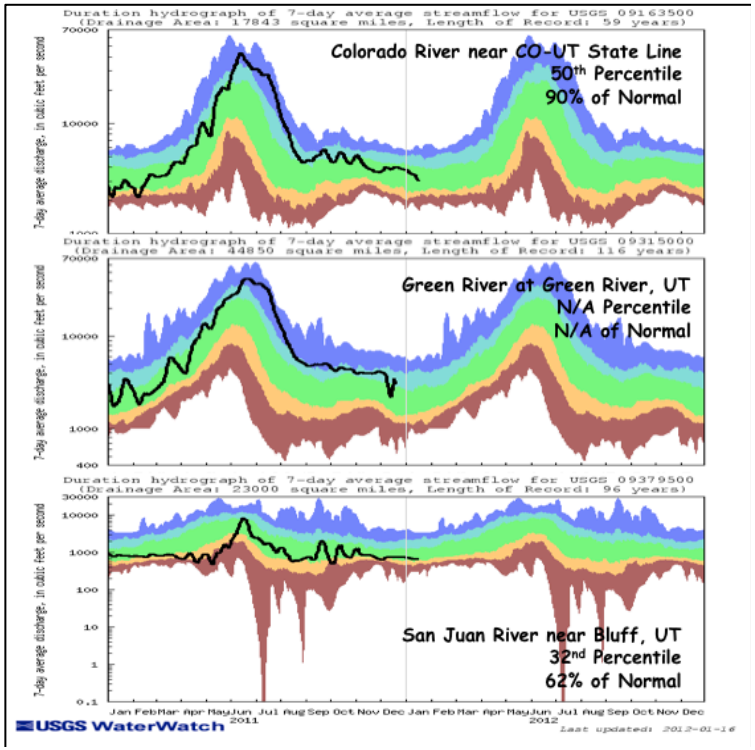


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Most of the UCRB and surrounding areas experienced warmer than average temperatures last week. The Colorado mountains along the Continental Divide saw cooler than average temperatures for the week. The VIC model continues to show dry soil moisture conditions in southeast CO and in UT around the Colorado River valley (Fig. 7). After recent snow accumulations around the Colorado River headwaters, soil conditions have improved in that area according to the VIC model. Near normal soil moisture conditions are being observed in the Four Corners and San Juan mountains region and in the northern part of the UCRB.

All of the major reservoirs above Lake Powell are above their January averages. Blue Mesa, Granby, and Green Mountain have seen larger decreases so far for the month of January, though all the reservoirs are seeing storage decreases that are normal for this time of year. Lake Dillon has seen a slight increase in levels since the beginning of the year. Lake Powell is currently at 65% of capacity and 85% of average.

Precipitation Forecast

The UCRB will be underneath cool and dry conditions ahead of the next series of Pacific storms set to impact the area, starting Wednesday. Abundant moisture carried in these disturbances will set the stage for a prolonged period of moderate mountain snowfall for a large portion of the basin. Elevated snow levels will also be likely with this event due to the warm nature of the airmass associated with this moist pattern. Initially the energy will be focused across the northern parts of the basin with the mountains of southern WY and northern CO receiving the brunt of precipitation during the middle part of the week. Additional energy will be quick to follow on Friday, this time dropping further south into the great basin and bringing a chance of accumulating precipitation to the entire UCRB. By Sunday expect liquid accumulations to range from 0.25 inches in the southern CO mountains and valley locations to over 1.00 inch in the northern CO mountains. Even higher amounts will be possible in the mountains of southeastern WY where liquid accumulations may exceed 2.00 inches. This pattern is expected to continue into next week as yet another push of Pacific energy moves onshore by Monday.

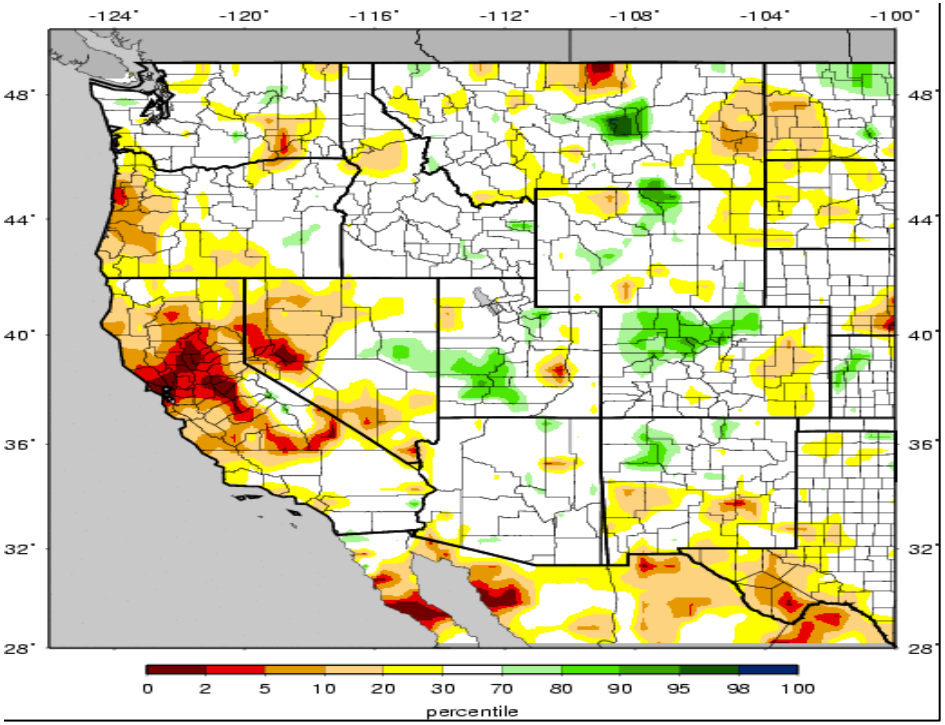


Fig. 7: VIC soil moisture percentiles as of January 14th.

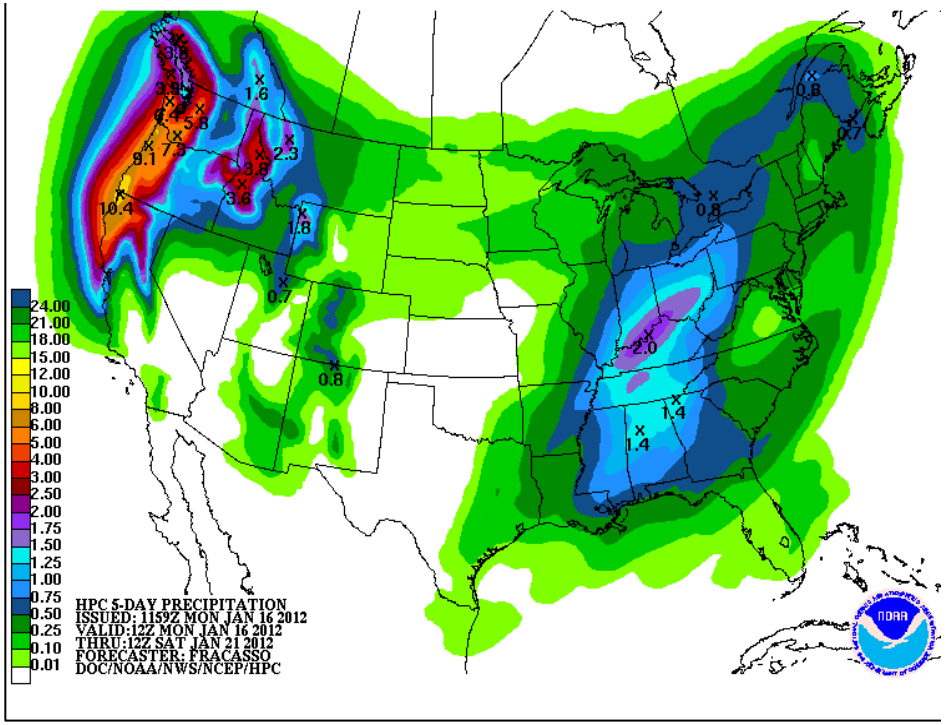
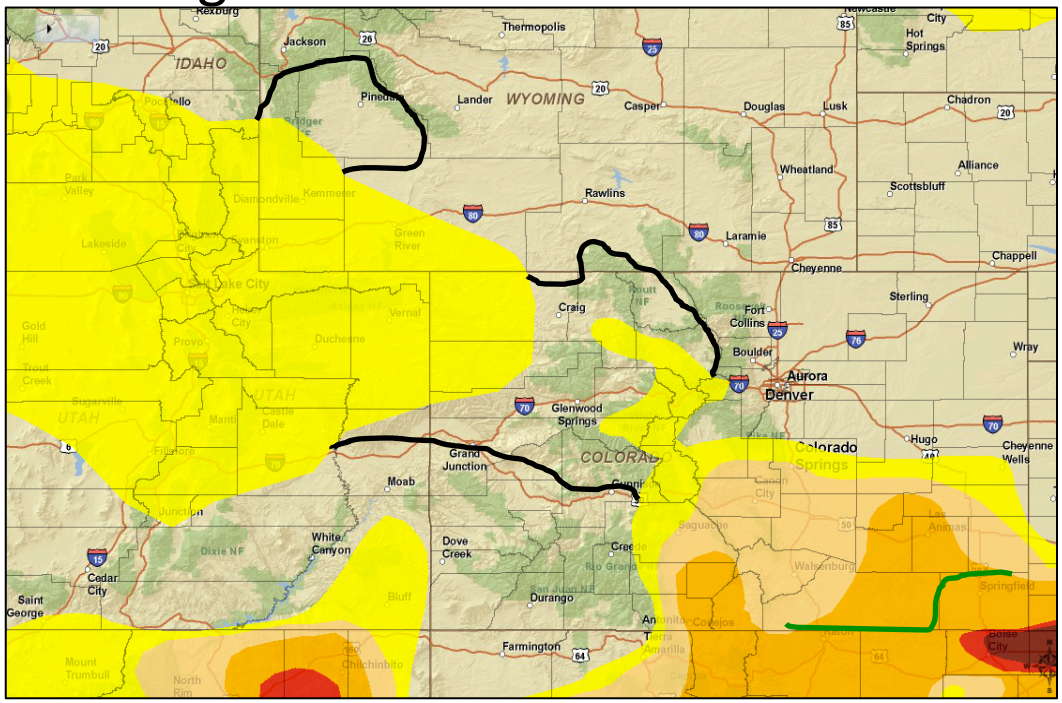


Fig. 8: HPC Quantitative Precipitation Forecast (QPF) through 12Z Saturday.

Drought and Water Discussion



Drought categories and their associated percentiles

Fig. 9: January 10th release of U.S. Drought Monitor for the UCRB

Further expansion of D0 is recommended for much of the northern half of the UCRB in the current U.S. Drought Monitor (USDM) map (Fig. 9, black lines). Due to very low SNOTEL precipitation percentiles, much below average SWE, and reported impacts to winter recreation, D0 should include the higher elevations in the Gunnison, Colorado headwaters, Yampa, and Upper Green River basins. Based on record low snowpack in the Wasatch mountains, the current USDM author has introduced D1 into that region.

In southeast CO, SPIs are positive throughout many of the counties on shorter time scales and only begin to show negative values on the 6-month time scale. Many of the negative SPIs don't warrant a D2, so improvements are recommended for that area (Fig. 9, green line), with a scaling back of the D2, but leaving it in Baca County and in the San Luis Valley. We defer to the USDM author on how to adjust those changes on the New Mexico side.