NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

January 31, 2012

Precipitation and Snowpack

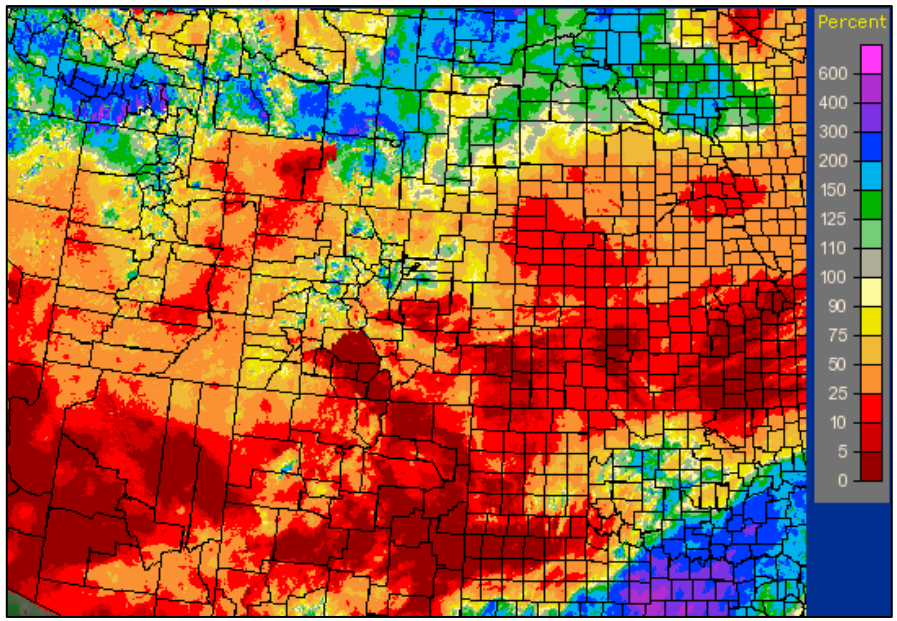


Fig. 1: January month-to-date precipitation as a percent of average.

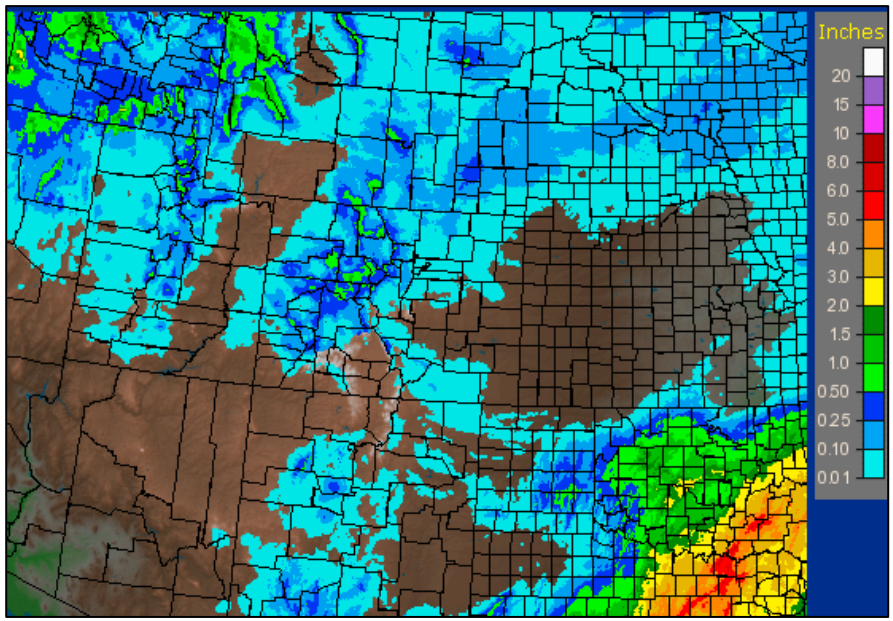


Fig. 2: January 25 – 31 precipitation in inches.

After a dry December through most of the Upper Colorado River Basin, drier than average conditions have again been observed across much of the UCRB for the month of January (Fig. 1). Spotty areas of near normal precipitation for the month show up in some of the higher elevations in the central Colorado mountains and in the Wasatch mountains in Utah. Near to above normal precipitation has been seen in the Upper Green River basin in Wyoming. Much of the lower elevations of the UCRB have received less than 75% of average precipitation for the month. Southeast CO has also been drier than average, month-to-date.

Last week, precipitation was focused over the higher elevations in the northern part of the basin (Fig. 2). The northern and central mountains of CO and the higher elevations in the Upper Green received between a quarter inch to an inch of precipitation for the week (which is about average for this time of year). Lower elevations and the Four-Corners region were dry, with some areas receiving nothing and spotty totals of less than a tenth of an inch in isolated areas. Eastern CO was also relatively dry, receiving between nothing and a tenth of an inch for the week.

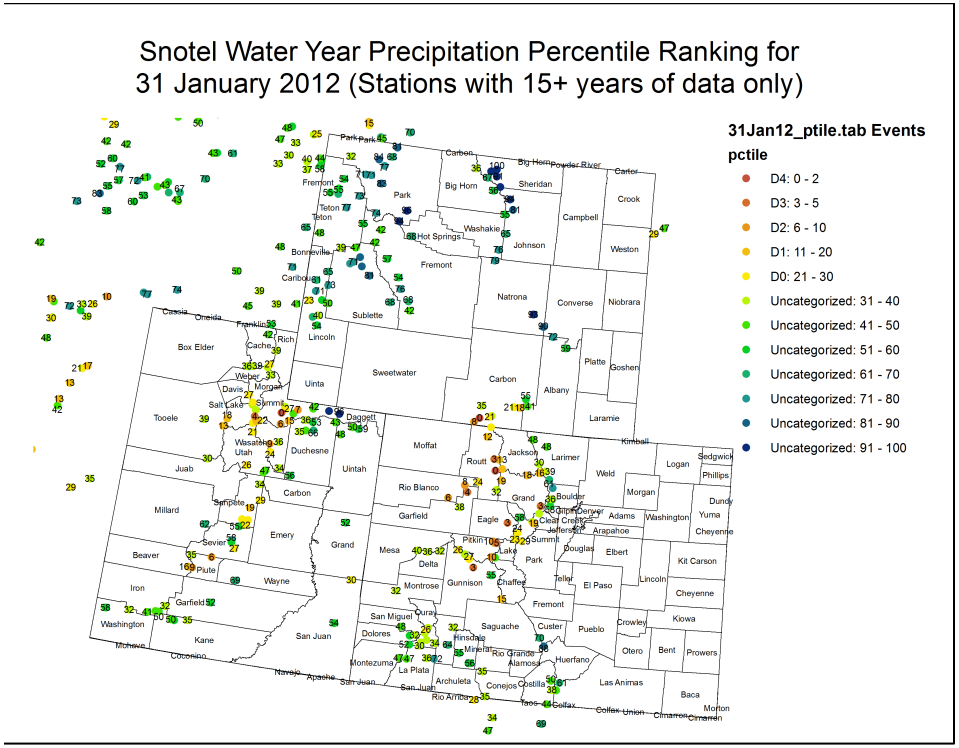


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21 – 30% is Drought Monitor D0 category).

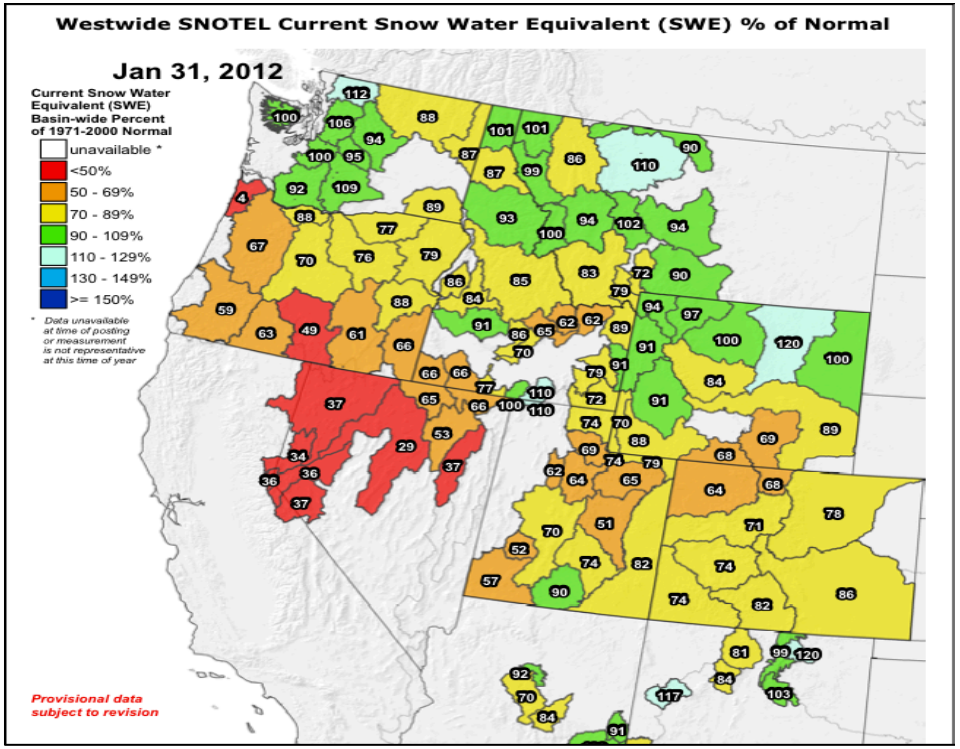


Fig. 4: Basin snow water equivalent (SWE) as a percent of average.

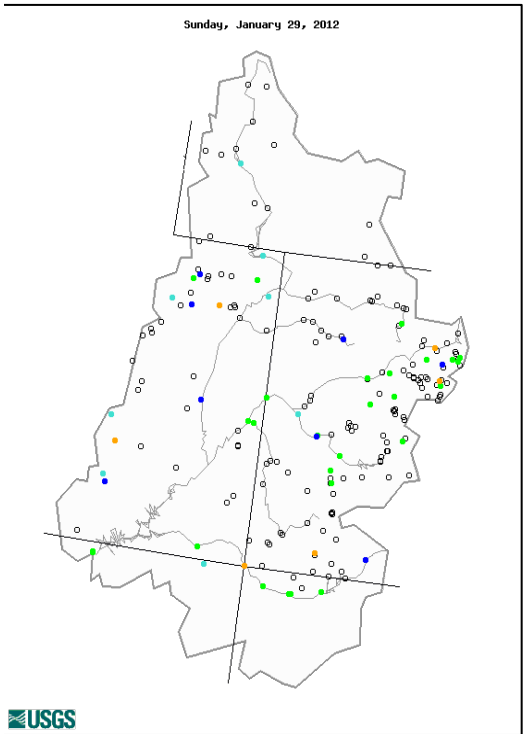
Water-year-to-date (WYTD), SNOTEL precipitation percentiles are low for much of the Yampa and Colorado headwaters basins, and along the Wasatch range in UT (Fig. 3). Percentiles in those areas range from the single digits to around the 20th percentile, with the higher values mainly on north facing slopes or east of the Continental Divide. Snotel percentiles in the Upper Green basin in WY are generally above the 50th percentile, and most in the San Juan basin in southern CO are near the 50th percentile.

Snowpack conditions around the UCRB are all below normal (Fig. 4) with most of the sub-basins recording 75% of average or less for snowpack. The southern part of the basin is showing around 75% to 80% of average snowpack for the season, while northwest CO and areas in northeast UT are drier, with less than 70% of average snowpack. The northern fringe of the basin in WY is currently faring the best, with snowpack at over 90% of average.

Streamflow

As of January 29th, 87% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows (Fig. 5). About 32% of the gages in the basin are recording above normal flows, while 12% 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 6 gages recording below normal flows with most of 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 currently recording flows in the normal range at the 51st and 36th percentiles, respectively (Fig. 6). The gage on the Green River at Green River, UT had become "ice affected" in mid-December and had stopped recording streamflow. In the last week, it has again begun recording much above normal flows, though there is some question about the accuracy of these most recent measurements.



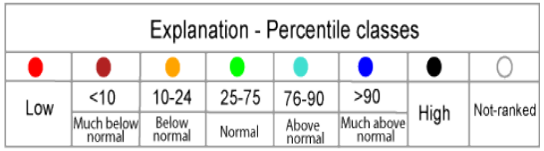


Fig. 5: 7-day average discharge compared to historical discharge for January 29th.

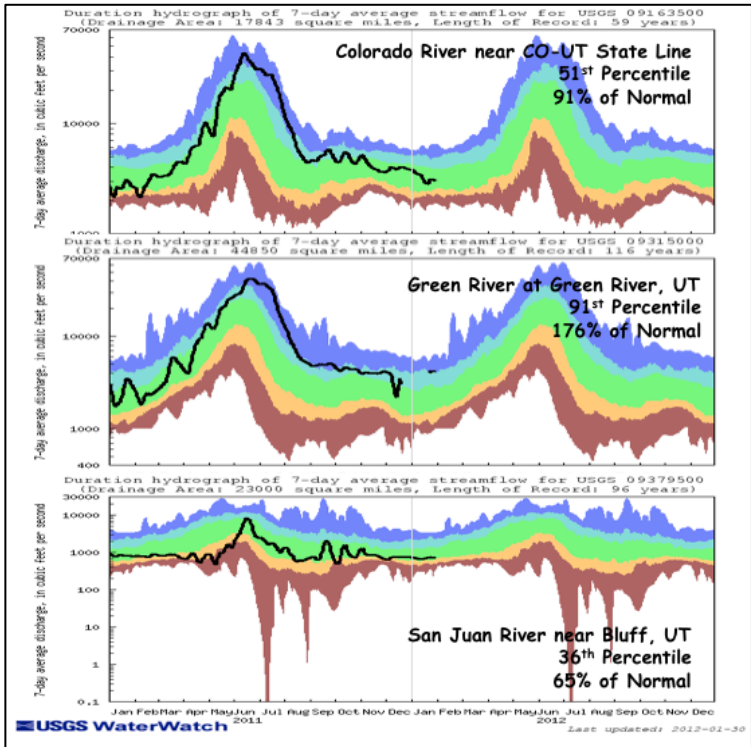


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Most of the UCRB and surrounding areas experienced warmer than average temperatures last week. The northern portion of the UCRB was much warmer than average, seeing temperatures between 5 and 10 degrees warmer than normal 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. Most reservoirs have seen storage decreases in January, which is normal for this time of year. Lake Dillon has seen a slight increase in levels since the beginning of the year, due to a halt in releases from the reservoir. Lake Powell is currently at 64% of capacity and 85% of average.

Precipitation Forecast

A complicated pattern is developing for the upcoming week as a potent storm system begins to form over the Pacific Northwest. Ahead of this system the UCRB will be under fairly tranquil conditions with only a few scattered snow showers expected over the San Juan mountains through Wednesday. Forecast models continue to struggle with the evolution of this next system with most showing snow breaking out across northern and western portions of the basin on Thursday. While the exact placement of the storm remains uncertain, all models agree that most of the energy will converge east of the divide, where the biggest precipitation event of the season is anticipated to occur across the CO plains sometime late this week. Despite this eastward bias, the deep moisture and strength associated with this system will be enough to produce liquid accumulations of 0.25 to 0.5 inches across western CO and eastern UT by Saturday, with areas along and east of the Continental Divide approaching 1.00 inches through the duration of the event (Fig. 8). Given the uncertainty associated with the storm's movement we may see wraparound precipitation lingering across eastern portions of the basin well into the weekend before a dryer airmass arrives early next week.

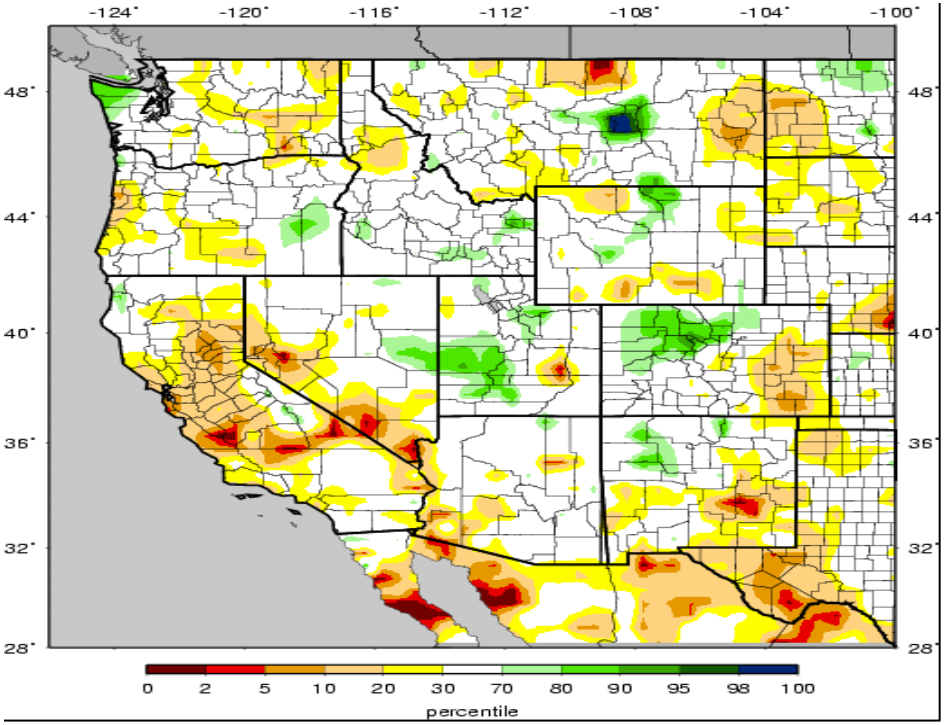


Fig. 7: VIC soil moisture percentiles as of January 29th.

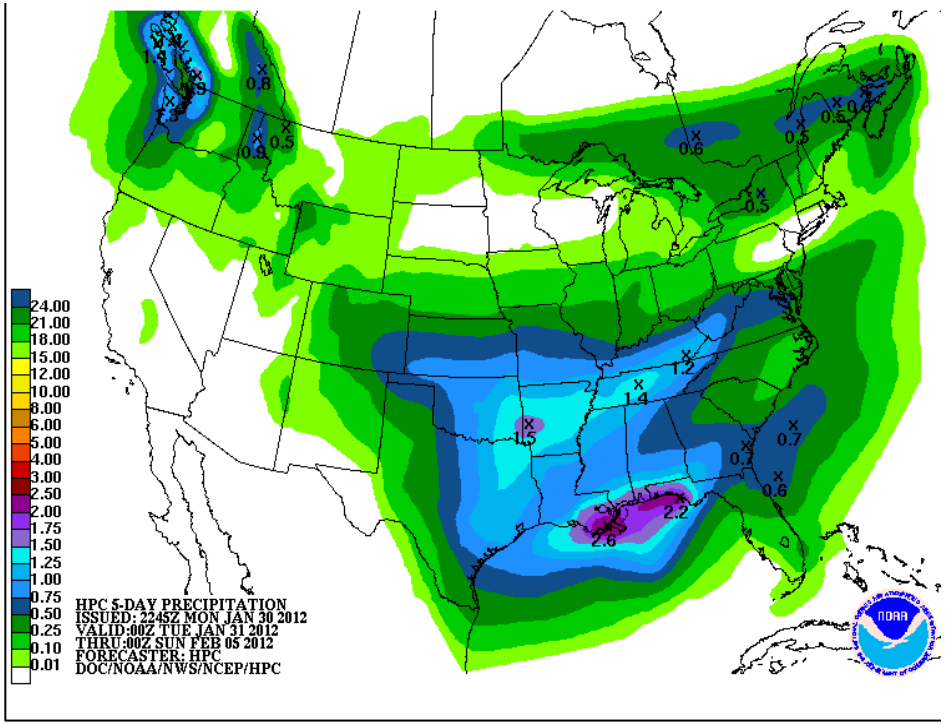
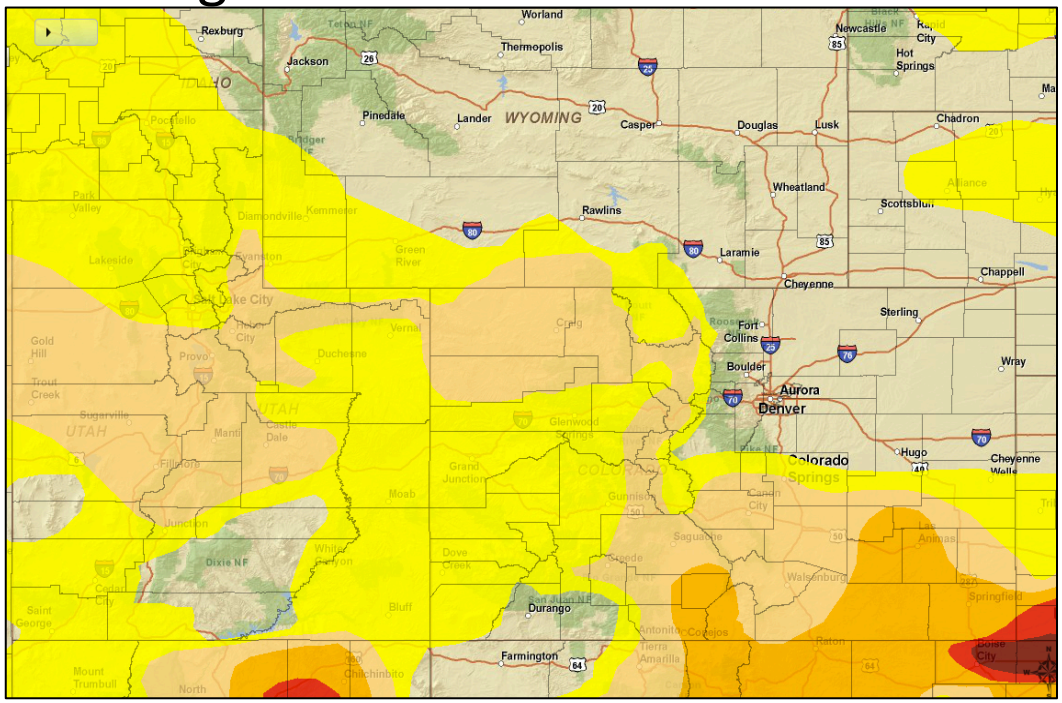


Fig. 8: HPC Quantitative Precipitation Forecast (QPF) through 0Z Sunday.

Drought and Water Discussion



Drought – Exceptional	0 to 2 (D4)
Drought – Extreme	2 to 5 (D3)
Drought – Severe	5 to 10 (D2)
Drought – Moderate	10 to 20 (D1)
Abnormally Dry	20 to 30 (D0)

Drought categories and their associated percentiles

Fig. 9: January 24th release of U.S. Drought Monitor for the UCRB

Status quo is recommended for the UCRB in the current depiction of the U.S. Drought Monitor (USDM) map (Fig. 9). Though recent precipitation has fallen in the higher elevations where D1 was recently added, not enough precipitation fell to warrant any improvements. Enough precipitation did fall however to hold off on any further degradations at this time.

Status quo is also recommended for eastern CO. After a fairly dry January in southeast CO, no further improvements are recommended at this time, though improvements could be warranted next week based on the precipitation forecast. This area will be closely monitored and discussed in the next week as actual precipitation totals from the passage of the next storm are known.