NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

December 13, 2011

Precipitation and Snowpack

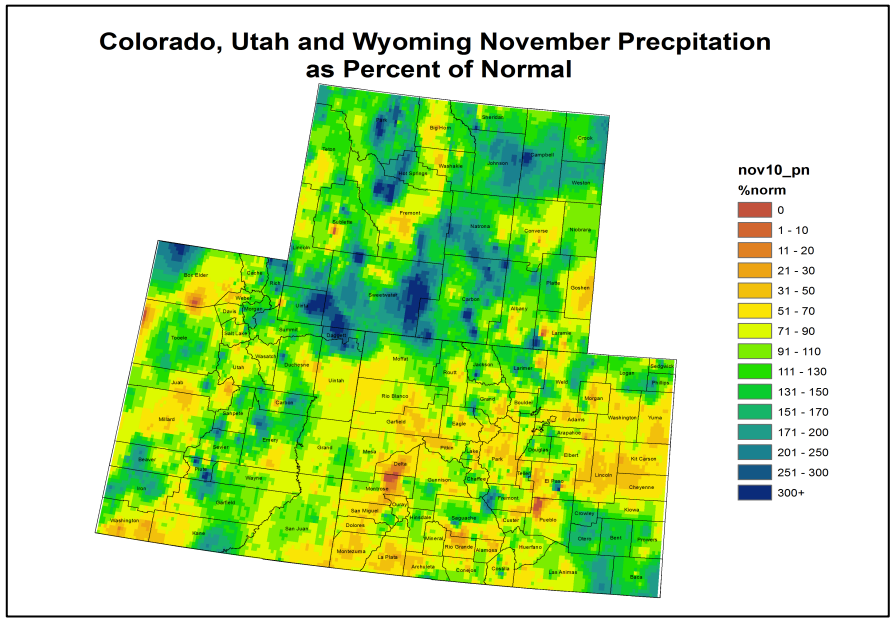


Fig. 1: November precipitation as a percent of average.

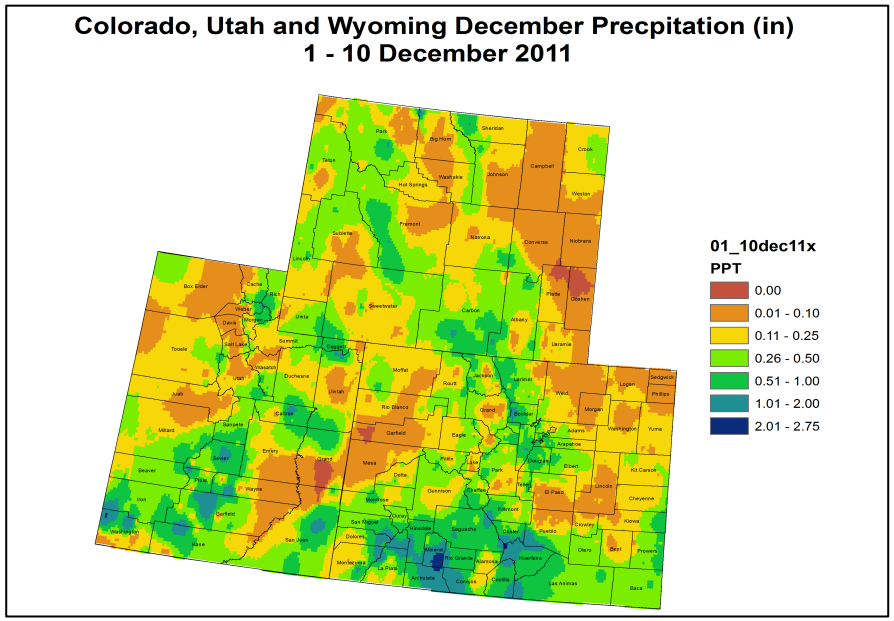


Fig. 2: December month-to-date precipitation in inches.

In November, near to above average precipitation fell over the northern and eastern parts of the Upper Colorado River Basin (UCRB) with parts of west and southwest Colorado receiving less than 70% of average for the month (Fig. 1). Parts of the Upper Green River basin, and the Yampa-White basin received over 110% of average precipitation for the month. The Colorado River valley out of CO and into UT received about 90 to 100% of average. Much of northern CO and southern WY saw well above average precipitation and southeast CO also received near to above average precipitation for the month.

Since the beginning of December, much of the UCRB has received spotty amounts of precipitation with the San Juan mountains faring the best and receiving over an inch of moisture (Fig. 2). Higher elevations elsewhere in the basin received between .25 to 1 inch of precipitation while the Colorado River valley received less than .10 inches in many places. The Denver metro area has received ample moisture so far, as has southeast CO, receiving between .25 and 1 inch so far for the month.

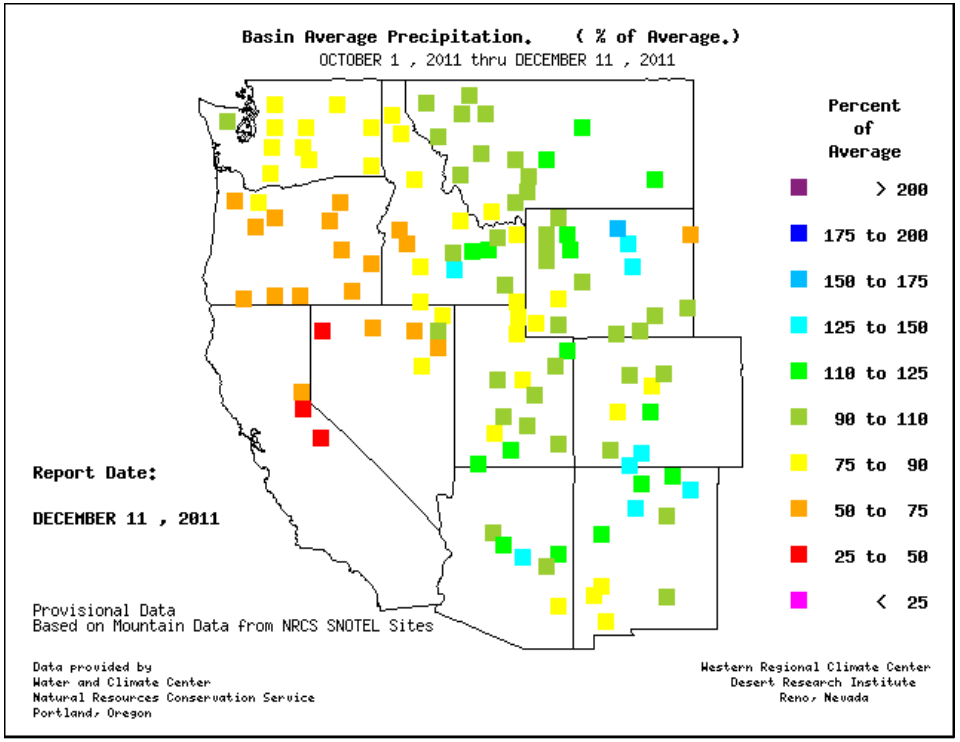


Fig. 3: SNOTEL WYTD precipitation percent of average.

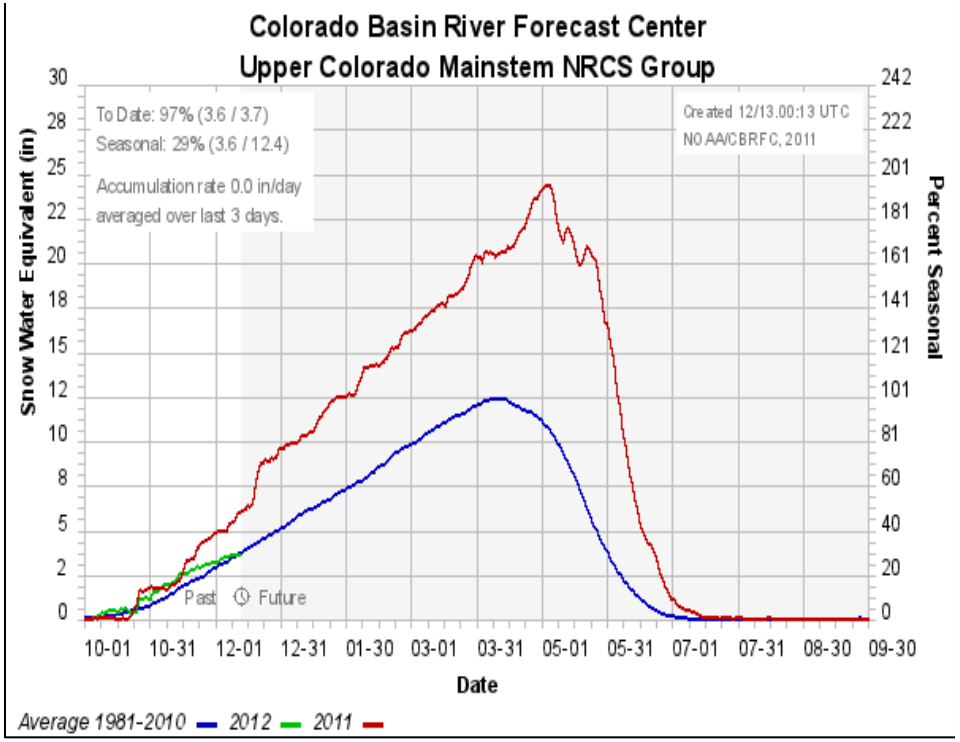


Fig. 4: Colorado headwaters WYTD snow water equivalent accumulation (green line) compared to the average (blue).

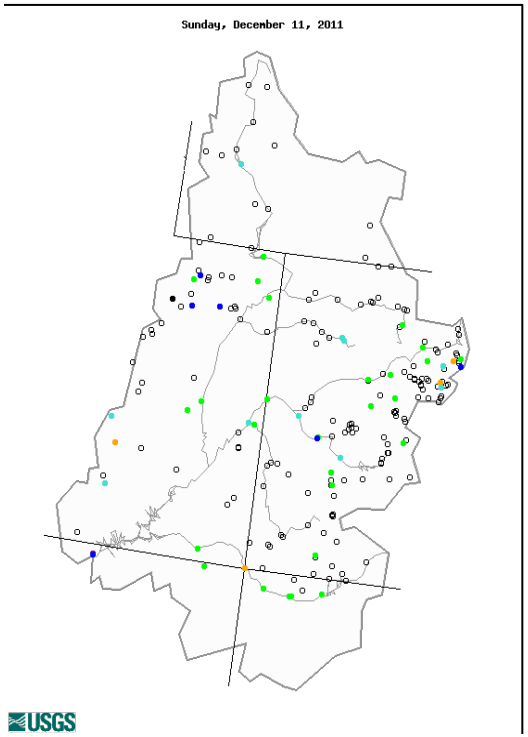
Water-year-to-date (WYTD), SNOTEL precipitation is near average for most of the UCRB (Fig. 3). The southern part of the basin is doing much better, with the San Juan mountains seeing over 125% of average while the Upper Green River basin in the northern region and the Gunnison basin in western CO are somewhat drier, between 75% and 90% of average. Eastern UT and the CO headwaters region are near average—this means that they have been below average recently since these areas were around the 90th percentiles for precipitation after the first month of the water year ended.

Around the headwaters of the Colorado River, snow accumulations have stagnated somewhat over the past couple of weeks (Fig. 4). Earlier in the water year, larger amounts of snow were quickly accumulating, similar to last year at this time. Though current snowpack is still near average, accumulations over the past week have been below average and snowpack could drop below average if this pattern persists.

Streamflow

As of December 11th, 90% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows (Fig. 5). About 36% of the gages in the basin are recording above normal flows, while 10% 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 50, as many portions of the rivers are freezing over. There are currently only 4 gages recording below normal flows and are scattered throughout the basin.

Key gages on the Colorado River at the CO-UT state line, the Green River near Green River, UT, and the San Juan River near Bluff, UT are all currently recording flows in the normal range at the 60th, 64th, and 44th percentiles, respectively (Fig. 6). Flows at the San Juan River site have increased over the past week, while flows at the Green River site have significantly decreased (likely due to some freezing upstream from the gage).



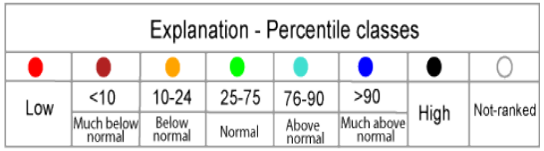


Fig. 5: 7-day average discharge compared to historical discharge for December 11th.

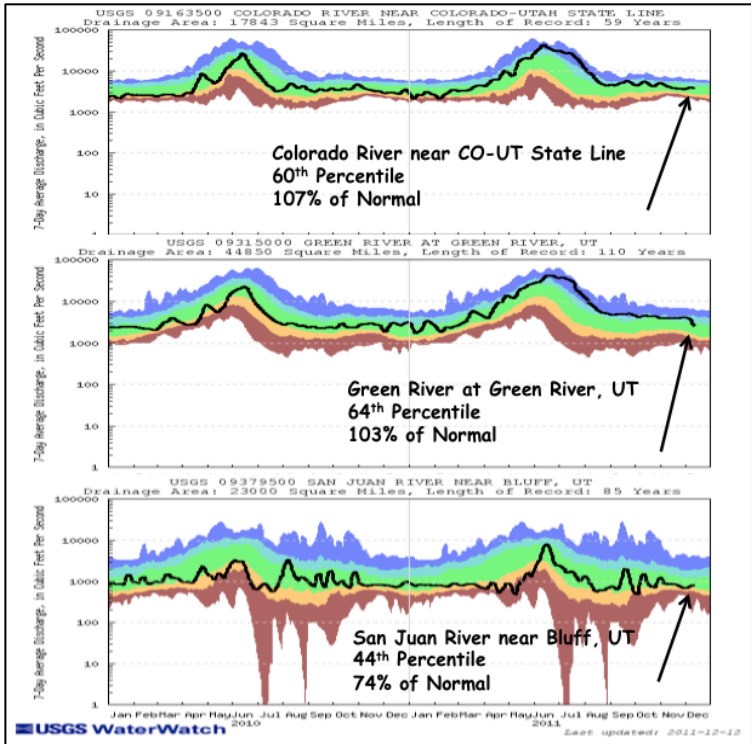


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Last week, the UCRB and the rest of CO saw much below average temperatures. Most of the UCRB observed temperatures 3 to 10 degrees below average, while southeast CO experienced temperatures more than 12 degrees below average. The VIC model continues to show dry soil moisture conditions in southeast CO (Fig. 7). Dry soil conditions are showing up in UT around the Colorado River valley and in the central CO mountains (west of Colorado Springs and Pueblo) and northern Sangre de Cristos. Wet soils can be seen in the northern CO mountains and eastward.

All of the major reservoirs above Lake Powell are above their December averages. Except for Navajo and Lake Granby, all of the major reservoirs in the UCRB are above their storage levels for the same time last year. Most of the reservoirs have seen (normal) decreasing levels since the beginning of the month while Flaming Gorge and Granby have stayed near steady. Lake Powell is currently at 68% of capacity and 87% average.

Precipitation Forecast

An active weather pattern will develop over the southern half of the UCRB today while northern areas will experience mostly dry conditions under the influence of high pressure. A strong area of low pressure currently over southern California will begin to lift northeast today and result in increasing snow chances across southeast UT and southwest CO (Fig. 8). While light snow will develop along most of the Continental Divide, the San Juan mountains will receive the brunt of this system with accumulations approaching 1.00 inches of liquid equivalent by Friday. Elsewhere, expect liquid accumulations to range from 0.50 inches around the Four Corners region and along the Continental Divide of CO to less than 0.25 inches northward into WY through the end of the week. Generally dry conditions will then overtake most of the UCRB for the weekend following the exit of this week's storm. Confidence in precipitation chances beyond the weekend remains low as forecast models struggle with the placement and timing of the next west coast trough. Expect to see unsettled conditions possible by early next week, with the best precipitation chances again favoring the southern half of the basin.

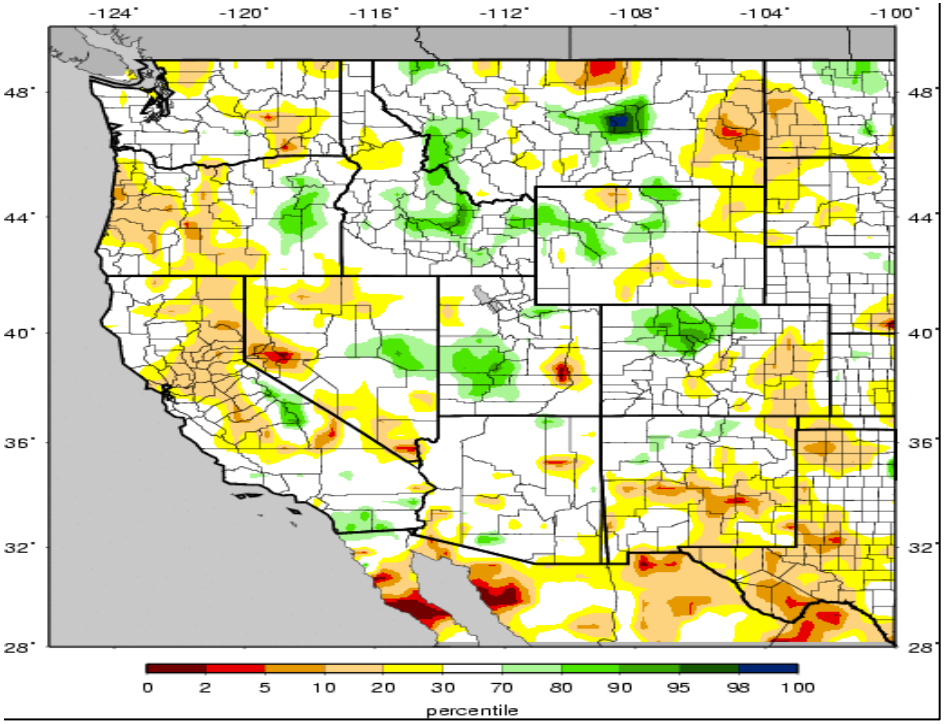


Fig. 7: VIC soil moisture percentiles as of December 11th.

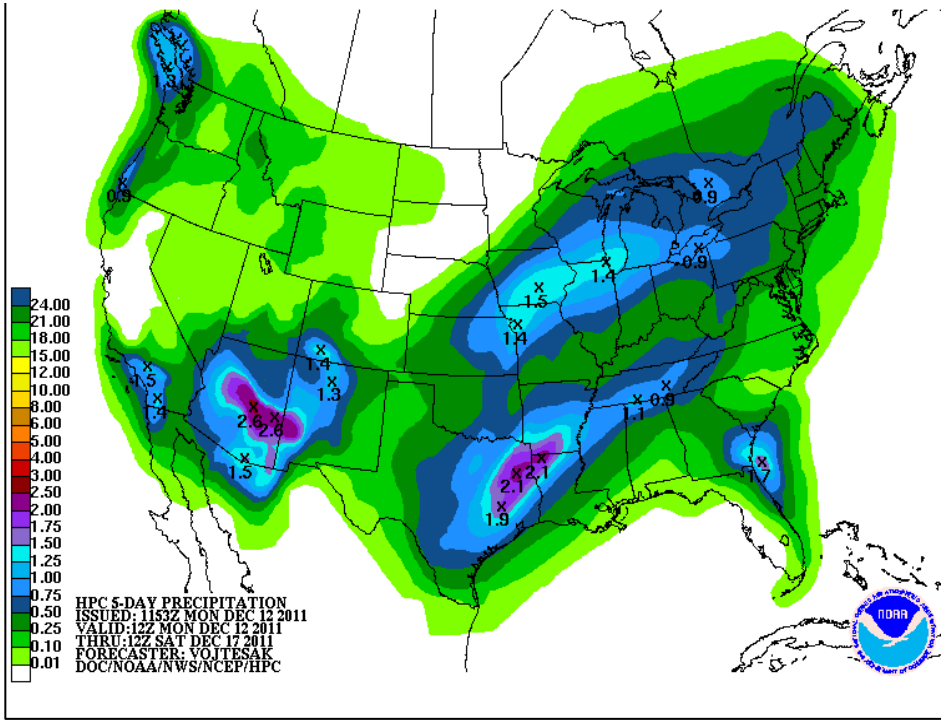
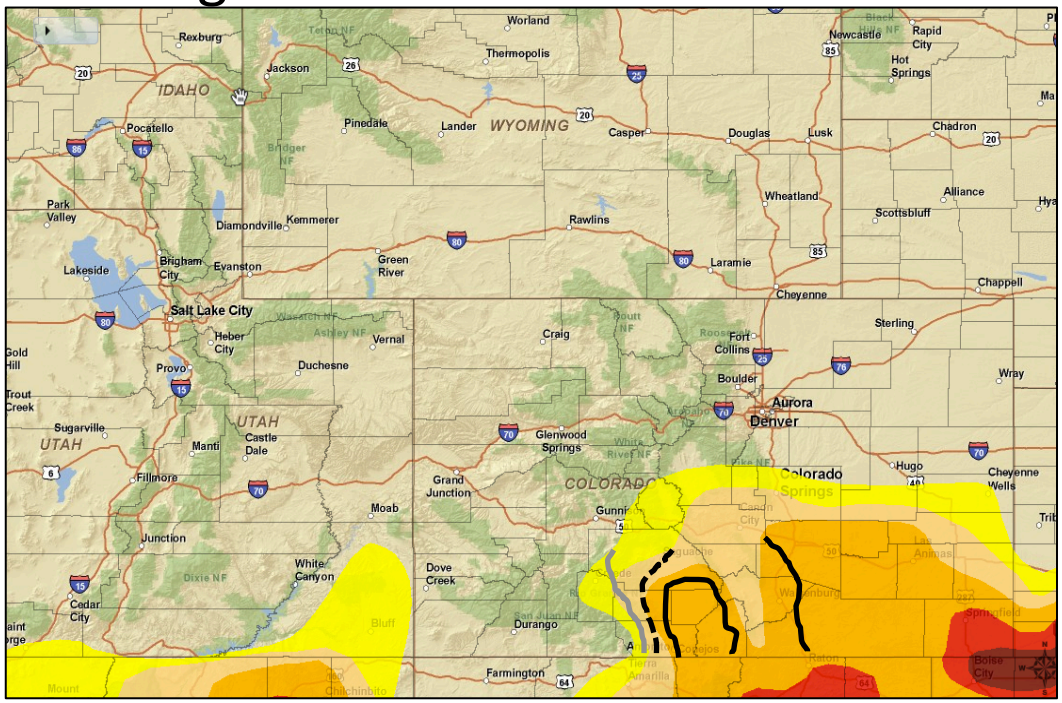
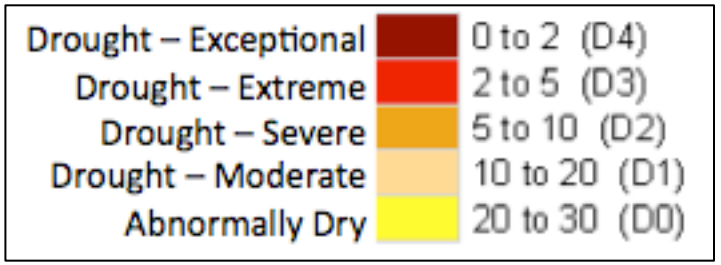


Fig. 8: HPC Quantitative Precipitation Forecast (QPF) through 12Z Saturday.

Drought and Water Discussion





Drought categories and their associated percentiles

Fig. 9: December 6th release of U.S. Drought Monitor for the UCRB

Some improvements are recommended in southern CO for the current depiction of the U.S. Drought Monitor (USDM) map (Fig. 9). Most of this winter's storm systems have been favoring the southern mountains, thus the San Juan mountains in the UCRB and the Sangre de Cristos and Wet mountains (east of the Continental Divide) have received enough beneficial moisture to ease much of the dry conditions from last year. It is recommended that D2 be reduced more (Fig. 9, black line) but stay in the San Luis Valley and through the lower elevations of southeast CO. It is also recommended that D1 (Fig. 9, dashed black line) and D0 (Fig. 9, grey line) be further scaled back along the San Juan mountains. Subsequent adjustments that need to be made in northern NM we leave to the discretion of the USDM author.

Status quo is recommended for the rest of the UCRB and the rest of Colorado.