NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

December 11, 2012

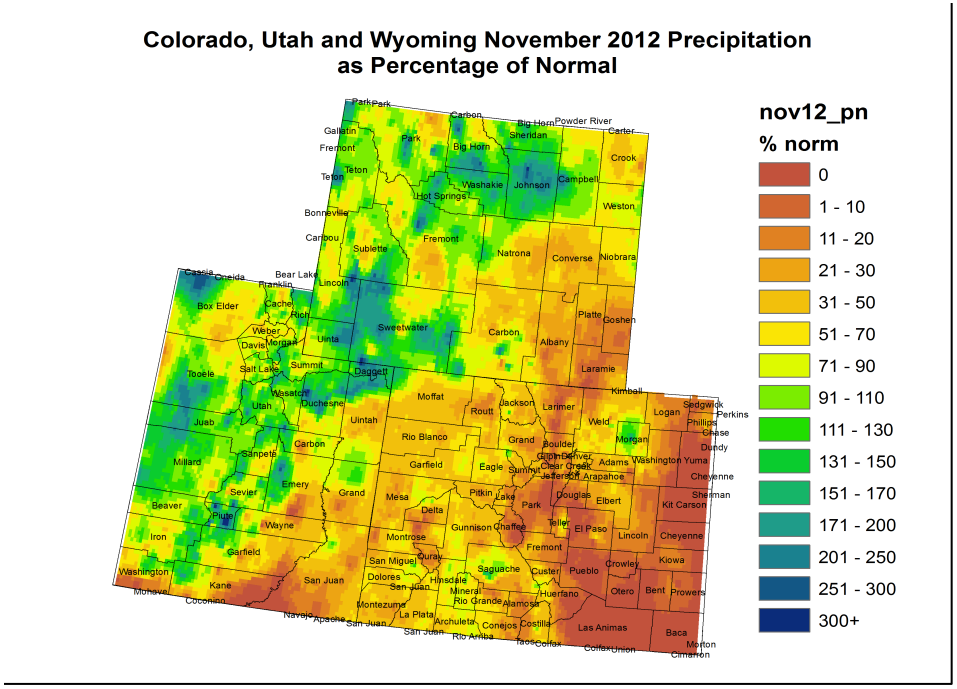


Fig. 1: November precipitation as a percent of average.

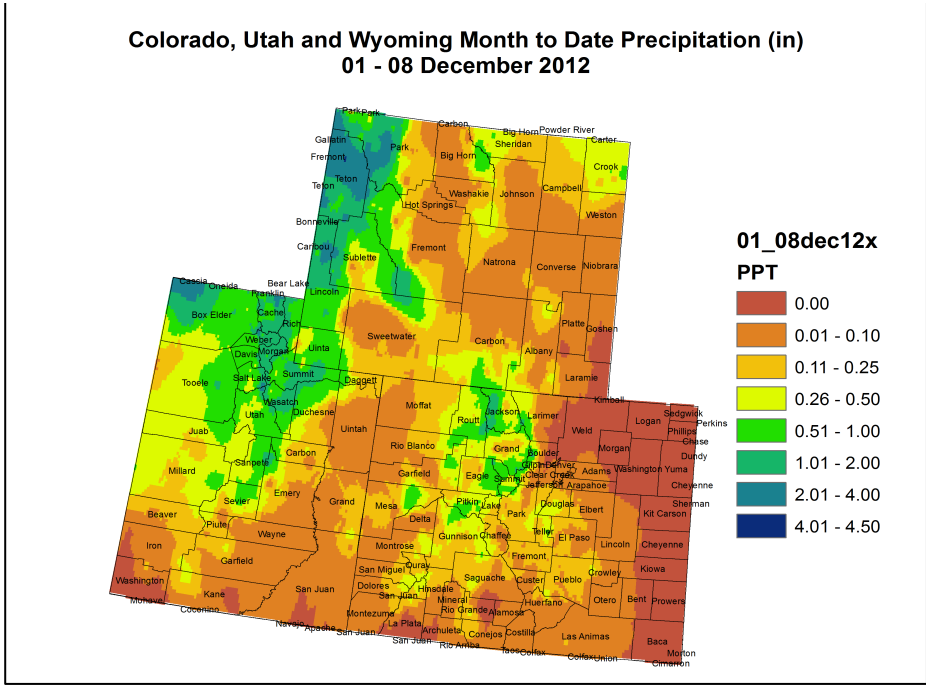


Fig. 2: December month-to-date precipitation in inches.

Precipitation

For the month of November, most of the Upper Colorado River Basin (UCRB) received below average precipitation (Fig. 1). The Wasatch and Uintah ranges in Utah received between 2 and 4 inches for the month, while much of the higher elevations of western Colorado and southwest Wyoming received between .5 and 2 inches. This is below average for most of the basin. Southeast UT and western CO saw between 10% and 50% of average precipitation for the month. East of the basin, the rest of CO was very dry, with most of eastern CO receiving less than .5 inches for the month and between 0% and 25% of the normal moisture received for November.

Since the beginning of December, most of the lower elevations of the UCRB have received less than .10 inches of precipitation while the higher elevations have seen between .5 and 1 inches (Fig. 2). Northeast UT and southwest WY were most heavily favored, receiving widespread amounts between .5 and 2 inches. Higher amounts in the CO mountains were not widespread. Most of eastern CO received less than .10 inches of precipitation through the 8th of December. Some isolated areas closer to the foothills received between .10 and .50 inches of precipitation.

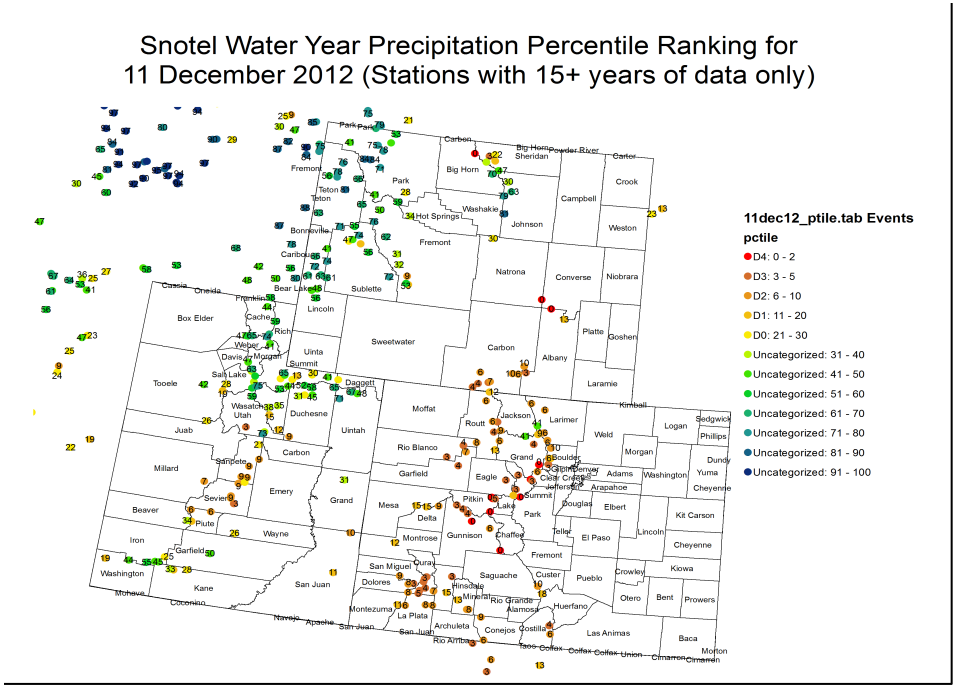


Fig. 3: SNOTEL water-year-to-date (WYTD) precipitation percentiles (50th is median, 21 – 30 percentile is drought category D0).

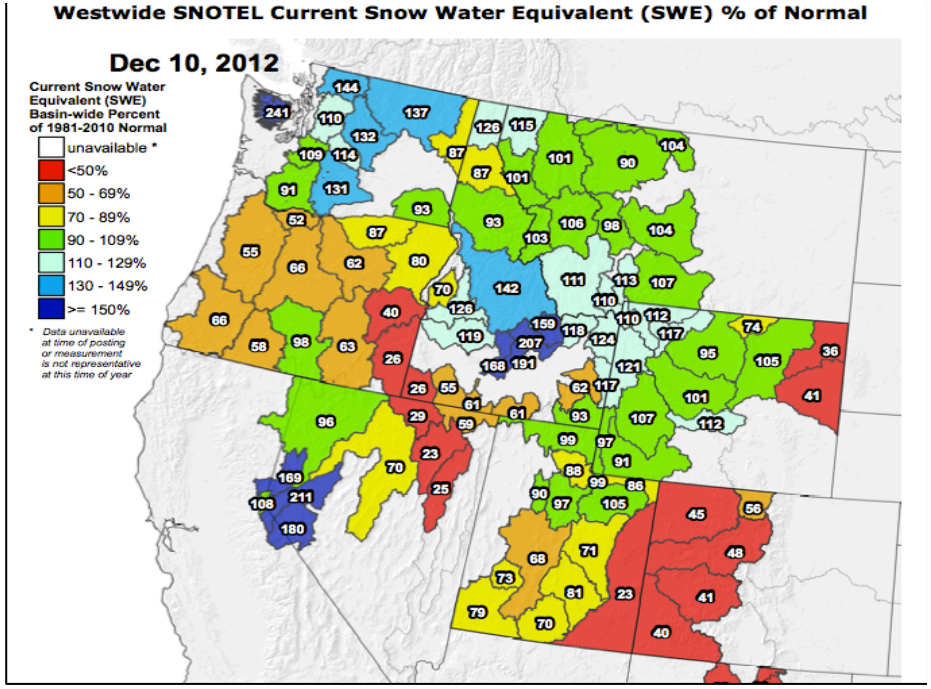


Fig. 4: Basin-averaged snow water equivalent as a percent of average, as of December 10th.

Snowpack

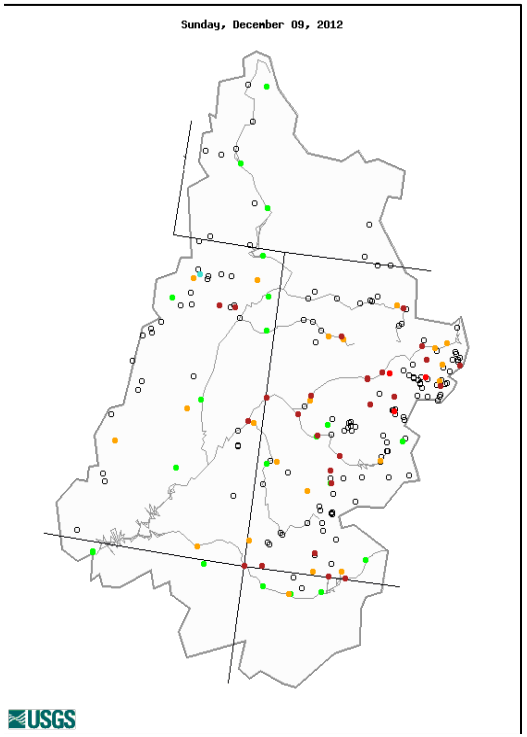
Water-year-to-date (WYTD) SNOTEL precipitation percentiles are close the median on the west side of the UCRB and much lower on the east side of the basin (Fig. 3). Along the northern Wasatch range and the Uintahs in UT, SNOTEL sites are between the 40th and 70th percentiles for precipitation, while the higher elevations around the Upper Green in WY are around the 50th to 70th percentiles. Percentiles throughout western CO are in the teens and single digits. Higher elevations around the Gunnison and Colorado headwaters are between the 0 and 4th percentile, with 3rd to 15th percentiles rankings throughout the San Juan mountains.

Accumulated snowpack is currently much less than average on the east side of the UCRB and near average on the west side of the basin (Fig. 4). Sub-basins in western CO and along the Colorado River valley in eastern UT are all between 20% and 50% of average snowpack. Northeast UT and southwest WY basins are around 100% of average snowpack. With warmer than average temperatures, there is a risk that as the snowpack builds, it is quickly melting away.

Streamflow

As of December 9th, about 32% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) to above normal 7-day average streamflows (Fig. 5). About 40% percent of the gages in the basin are recording much below normal or low (i.e. lowest on record) streamflows, and only one gage recorded above normal flows. Much below normal flows are concentrated around the Colorado River headwaters in CO. The best conditions (near normal) are concentrated around the Upper Green River. Many of the gages are under frozen conditions, and the number of reporting sites has decreased from 123 gages one month ago to 72 gages.

Flows on the three key gages around the basin increased over the past week (Fig. 6). Flows on the Colorado River near the CO-UT state line increased very slightly to the 9th percentile (in the much below normal range). Flows on the Green River at Green River, UT and the San Juan River near Bluff, UT increased to the 28th and 13th percentiles, respectively (with the Green River site increasing to the normal range).



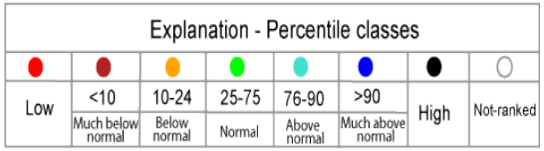


Fig. 5: 7-day average discharge compared to historical discharge for December 9th.

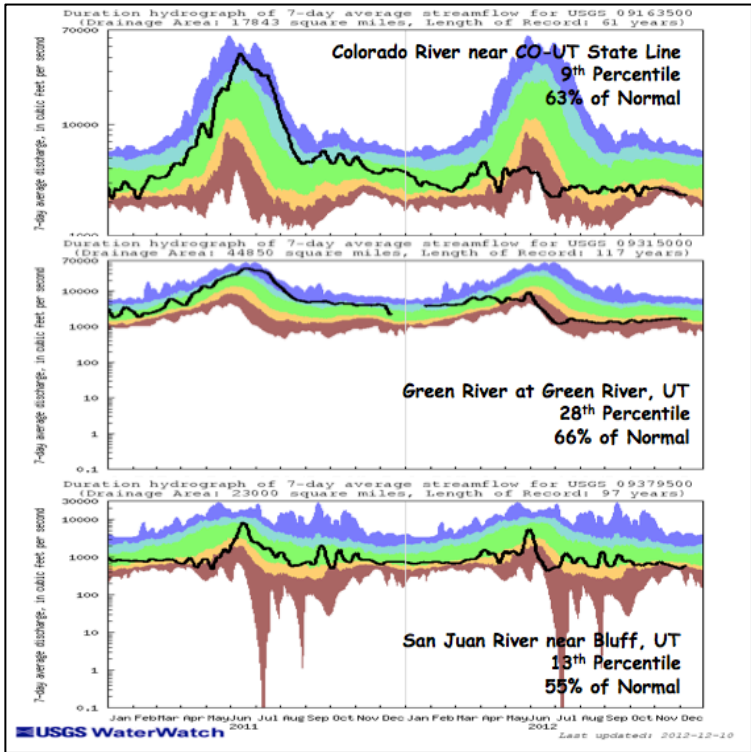


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Last week, temperatures across the UCRB were 4 to 16 degrees above average. Eastern CO was also much warmer than average, seeing temperatures 4 to 12 degrees above average. The VIC soil moisture model shows dry soils through most of WY, with soil dryness below the 20th percentile in northeast UT and northwest CO (Fig. 7). When modeled soil moisture is combined with snowpack (Fig. 5) much of western CO shows dryness below the 5th percentile, while northeast UT shows dryness below the 10th percentile. Dry soils also show up in southeast CO with near normal soil moisture in north-central CO and in the San Luis Valley in southern CO.

Last month, many of the major reservoirs in the UCRB saw smaller volume decreases than what is normal for this time of year, with Flaming Gorge staying near steady and Lake Granby seeing a slight increase. Dillon, Lake Powell, and McPhee saw larger decreases than what is normal for this time of year. Most of the reservoirs are between 60% and 80% of their December averages and around 60% to 80% of last year's volumes.

Precipitation Forecast

The UCRB will remain mostly dry through the early week with the exception of a few lingering snow showers over the Continental Divide. The next trough will begin to dig south along the west coast on Wednesday with moisture increasing over the basin during the end of the work week. This system appears to follow a more southerly path, and as a result expect to see snow shower activity begin over the southern half of the basin late day Friday. Forecast models show reasonably good agreement on bringing this storm through over the weekend with liquid accumulations of 0.25 to 0.50 inches possible by Sunday morning (Fig. 8). South facing aspects of the southern and central CO mountains will likely exceed these amounts, with liquid accumulations of 0.75 inches and isolated areas of 1.00 inches falling through Sunday. By late day Sunday expect the weekend storm to be on its way out, however the pattern is expected to remain active with another piece of energy moving into the area and keeping unsettled conditions over the basin moving into next week.

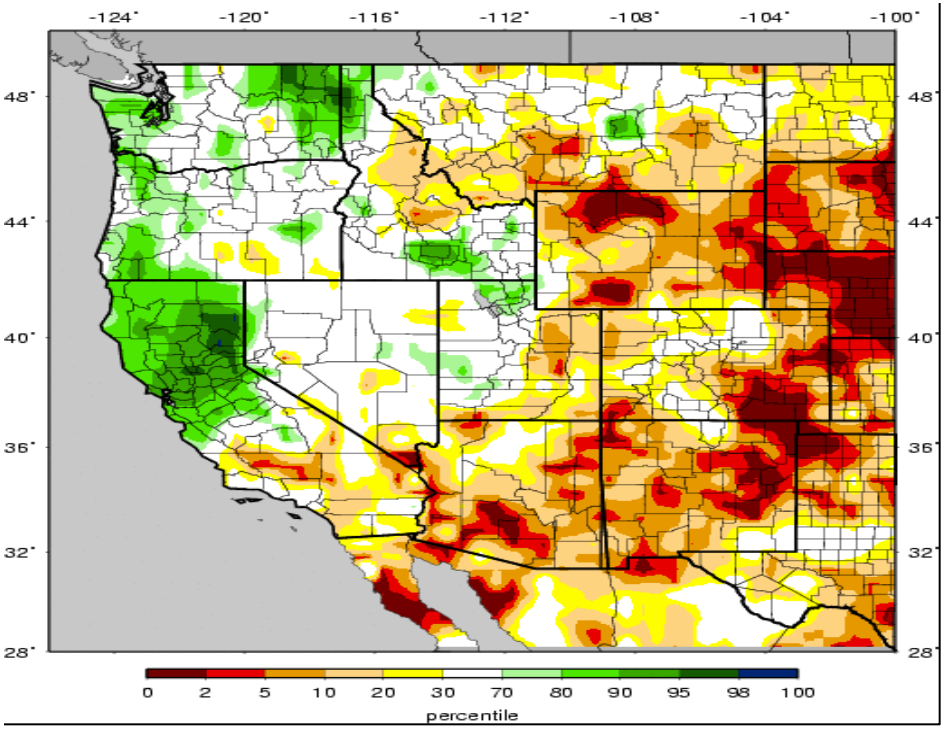
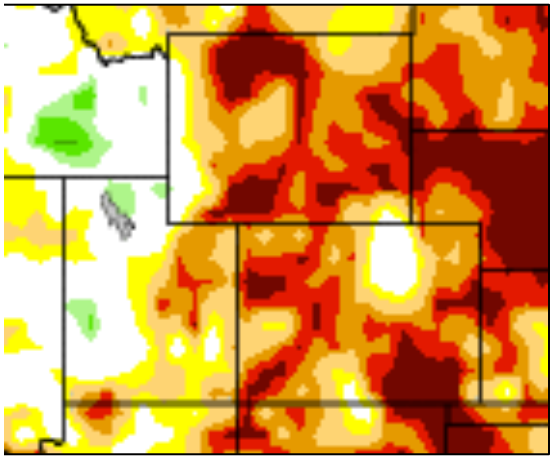


Fig. 7: VIC modeled soil moisture percentiles for the western U.S. as of December 9th. The map below combines soil moisture and SWE.



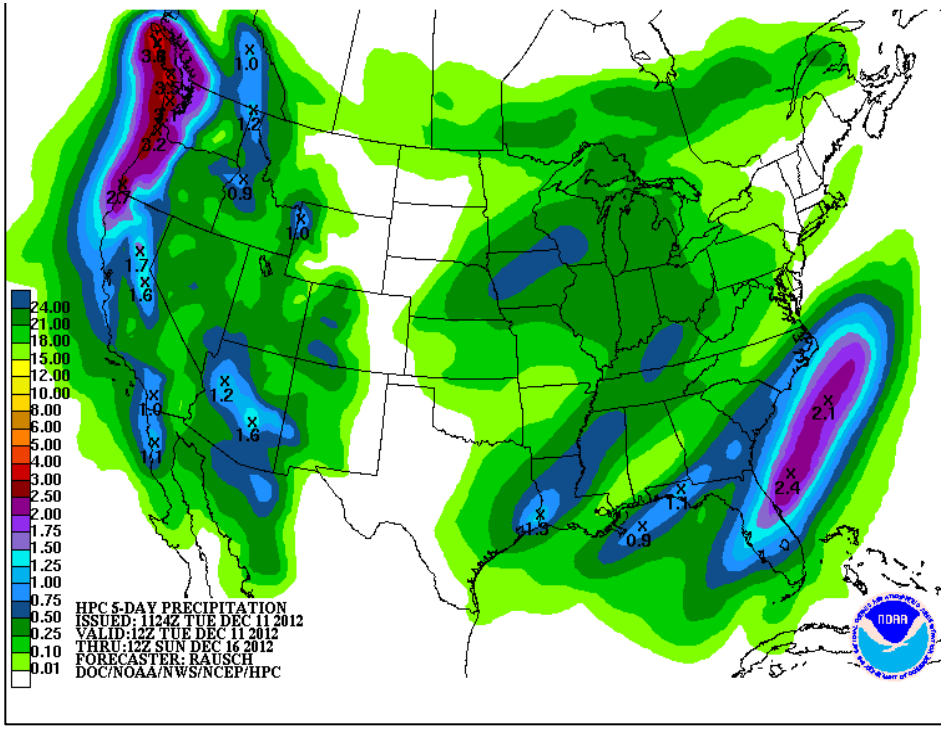
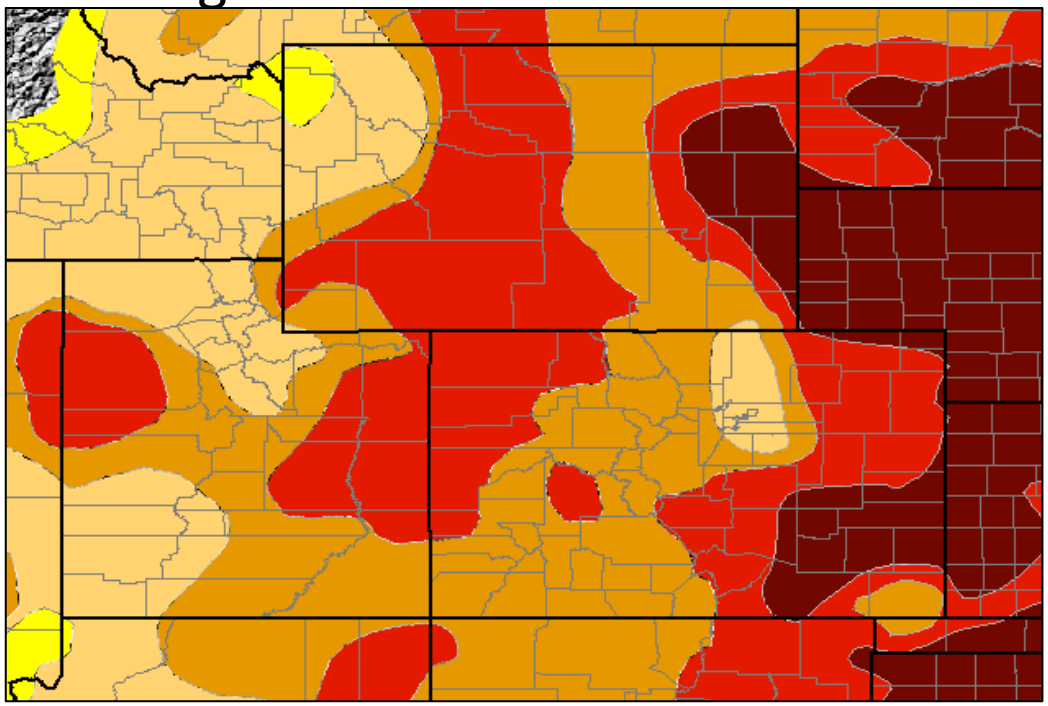
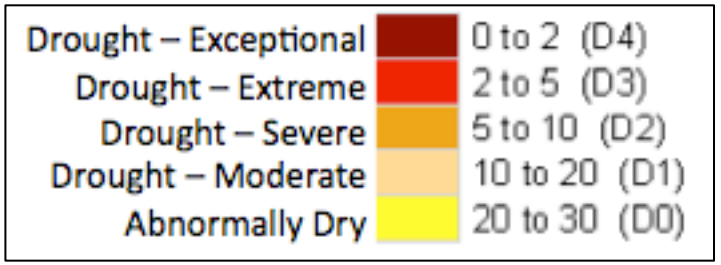


Fig. 8: Quantitative precipitation forecast (QPF) by the Hydrologic Prediction Center out to 12UTC Sunday.

Drought and Water Discussion





Drought categories and
their associated percentiles

Fig. 9: December 4th release of U.S. Drought Monitor for the UCRB.

UCRB: Status quo is recommended in the current depiction of the U.S. Drought Monitor (USDM) map (Fig. 7). Throughout western CO, very little snow has accumulated, temperatures have been above average, and there are large deficits in precipitation and snowpack. However, it is still early in the season, winter recreation impacts are minimal at this point, and the consensus is that the severity depicted (from previous long-term conditions) is sufficient for the short-term as well.

Eastern CO: Status quo is recommended for the rest of CO in the current depiction of the USDM map (Fig. 9).