NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

December 18, 2012

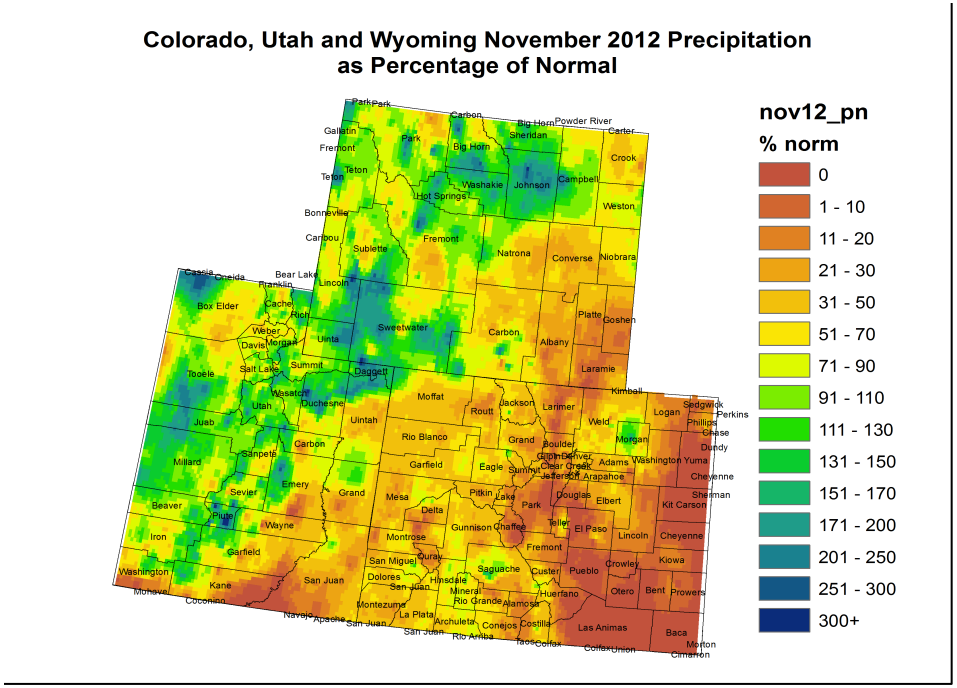


Fig. 1: November precipitation as a percent of average.

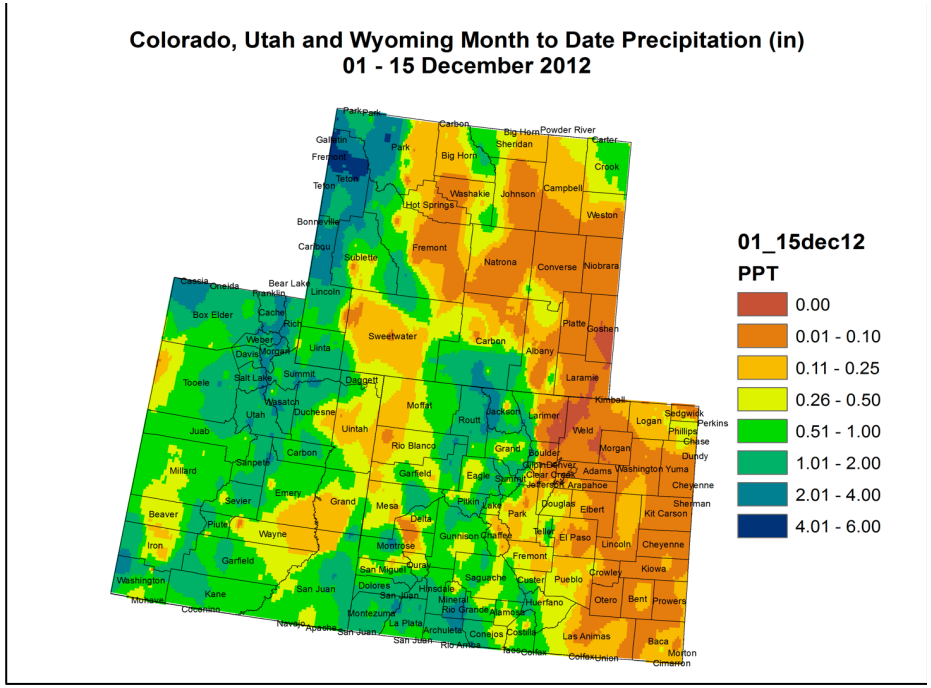


Fig. 2: December month-to-date precipitation in inches.

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 UCRB has received beneficial moisture, exceeding .5 to 2. inches in many areas (Fig. 2). Lower elevations along the state border lines have received less than .5 inches, while the higher elevations in all three states have received between 1 and 4 inches of precipitation since the beginning of the month. East of the UCRB, eastern CO has remained fairly dry, with widespread accumulations of less than .10 inches in most areas for the past two weeks.

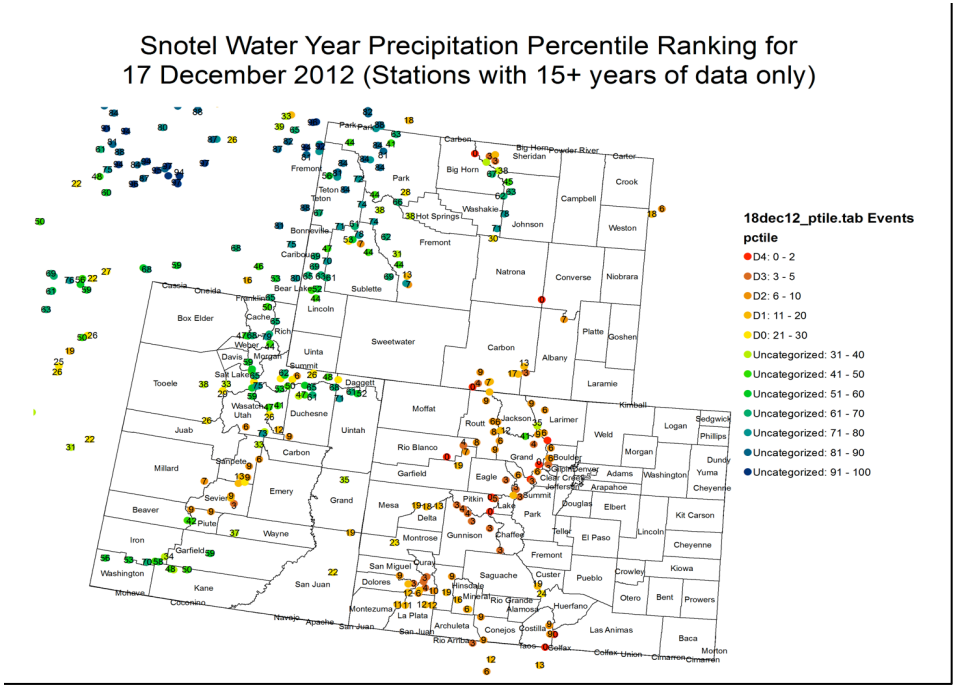


Fig. 3: SNOTEL water-year-to-date (WYTD) precipitation percentiles (50th is median, 21 – 30 percentile is drought category D0).

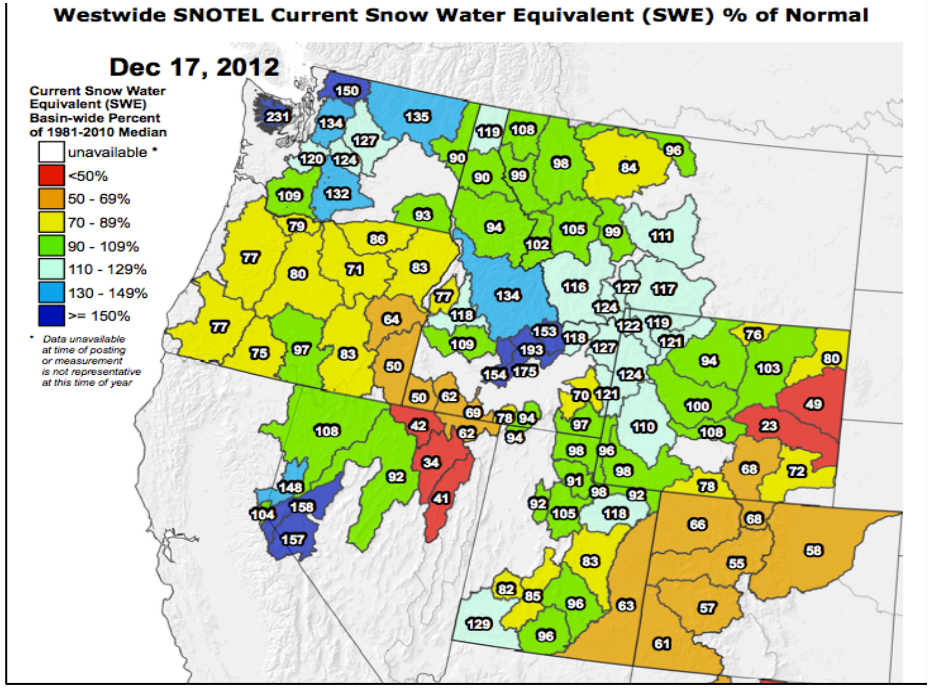


Fig. 4: Basin-averaged snow water equivalent as a percent of average, as of December 17th.

Snowpack

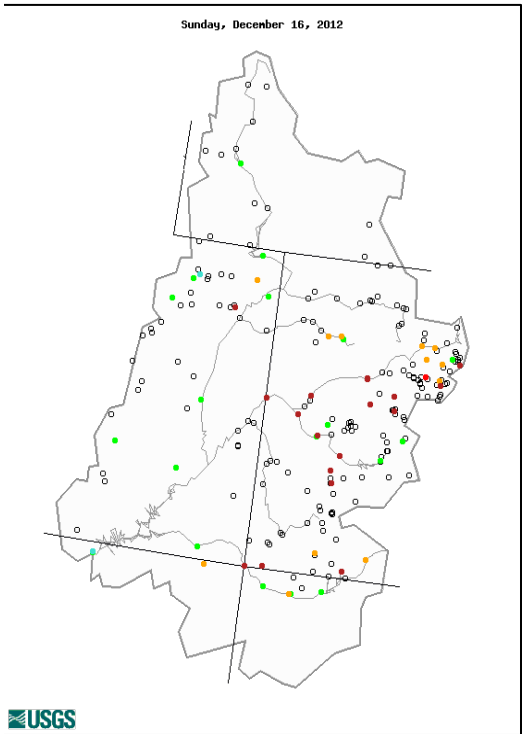
Water-year-to-date (WYTD) SNOTEL precipitation percentiles are close the median on the west side of the UCRB and much lower on the east side of the basin (Fig. 3). Along the northern Wasatch range and the Uintahs in UT, SNOTEL sites are between the 40th and 70th percentiles for precipitation, while the 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 in the lowest the 0 to 6th percentiles, with 3rd to 15th percentiles rankings throughout the San Juan mountains.

Accumulated snowpack is currently less than normal on the east side of the UCRB and near to above normal 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 50% and 60% of normal snowpack. This is a large improvement from last week, with percents of normal jumping about 20% throughout all the sub-basins. Northeast UT and southwest WY basins are around 100% of normal snowpack.

Streamflow

As of December 16th, about 39% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) to above normal 7-day average streamflows (Fig. 5). About 37% percent of the gages in the basin are recording much below normal or low (i.e. lowest on record) streamflows, and only two gages recorded above normal flows. Much below normal flows are concentrated around the Colorado and Gunnison rivers in western CO. The best conditions (near normal) are concentrated around the Lower Green River and the Colorado River above Lake Powell. Many of the gages are under frozen conditions, and the number of reporting sites has decreased from 86 gages one month ago to 52 gages.

Flows on two of the three key gages around the basin saw increases over the past week (Fig. 6). Flows on the Green River at Green River, UT and the San Juan River near Bluff, UT both increased over ten percentile points from last week and are both in the normal range, at the 43rd and 27th percentiles, respectively. The Colorado River near the CO-UT state line stayed nearly steady in the much below normal range at the 7th percentile.



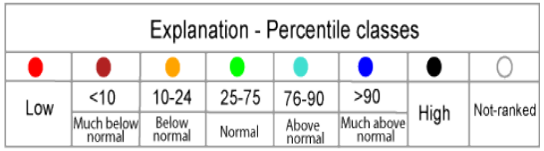


Fig. 5: 7-day average discharge compared to historical discharge for December 16th.

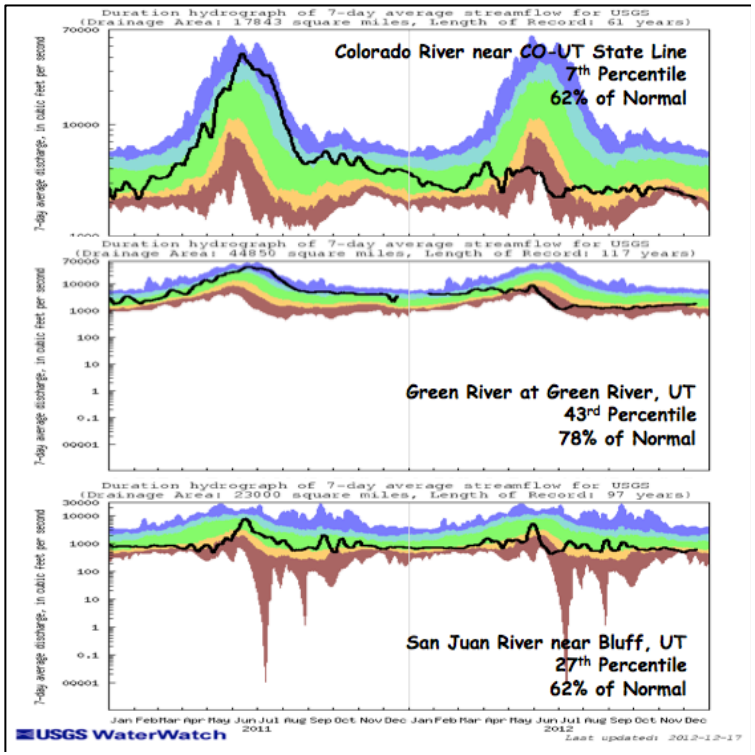


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Last week, much of the UCRB saw near average temperatures, with warmer than average temperatures showing up in the northern part of the basin. Most of eastern CO experienced near average temperatures, with cooler than average temperatures in southern CO. The VIC soil moisture model shows dry soils through most of WY with near normal soil moisture in far southwest WY. Soil dryness is below the 20th percentile in eastern UT and and below the 10th percentile for much of western CO (Fig. 7). Dry soils also show up in southeast CO and far eastern CO with near normal soil moisture in north-central CO and in the San Juan mountains in southwest 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 have seen minor decreases since the beginning of the month.

Precipitation Forecast

An active pattern will remain in place for the UCRB for the first half of the work week as moist Pacific flow interacts with a potent low pressure trough moving off the west coast. This feature will spread another significant round of snow across much of the basin throughout the day on Wednesday, gradually decreasing from northwest to southeast on Wednesday evening. By Thursday expect widespread liquid accumulations of 0.5 to 1.00 inches across the entire western slope of CO, with lesser amount of 0.25 to 0.50 inches in the lower elevations of extreme western CO and eastern UT (Fig. 8). Isolated accumulations exceeding 1.00 inches will be possible over the highest peaks of the northern and central CO mountains where several feet of snow is anticipated to fall. Thursday through Saturday the UCRB will see strong ridging ahead of yet another potent upper level trough moving off the Pacific. As a result, snow shower activity should begin to increase over the far western portions of the area on Monday ahead of the approaching trough. Forecast models continue to indicate the presence of an active jet stream over the region during this period, with the potential for additional snowfall persisting well into next week.

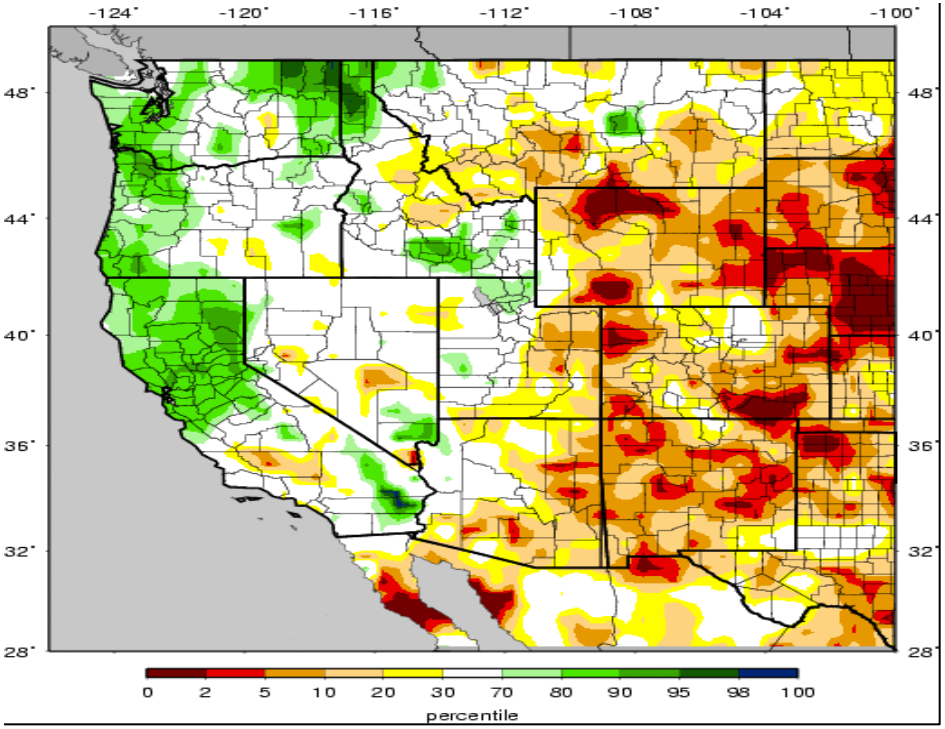
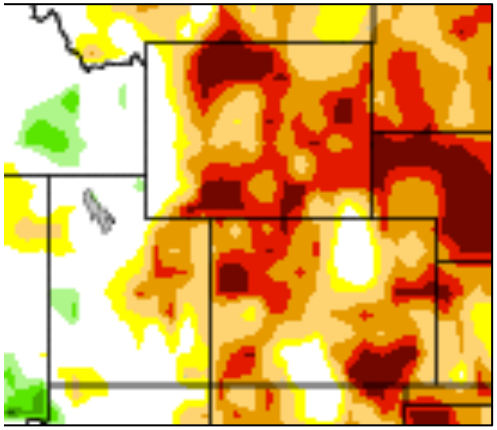


Fig. 7: VIC modeled soil moisture percentiles for the western U.S. as of December 16th. The map below combines soil moisture and SWE.



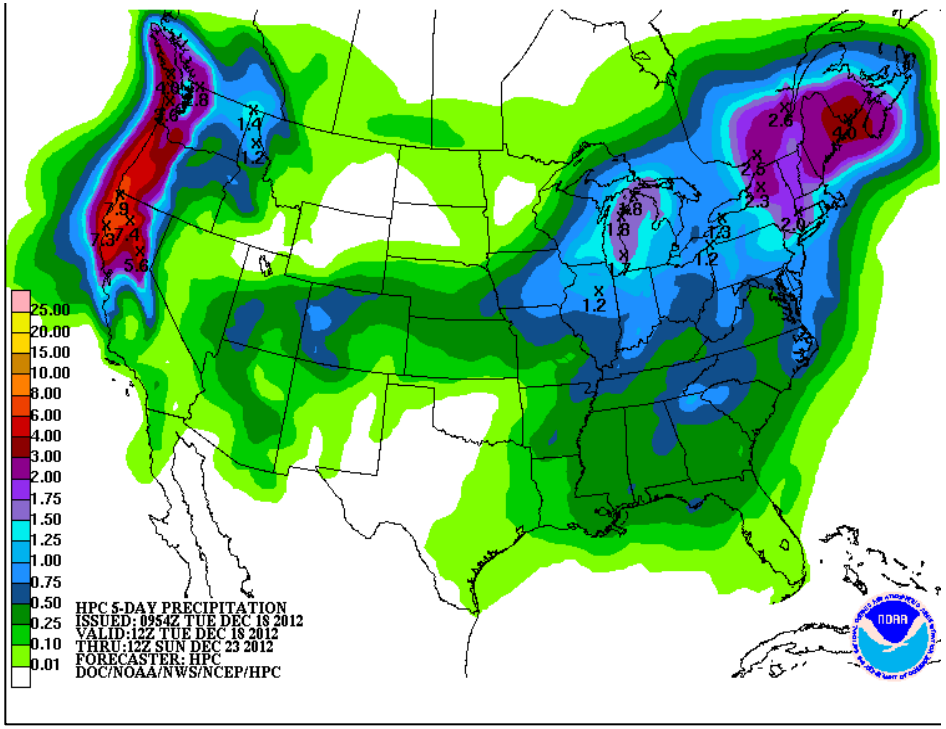
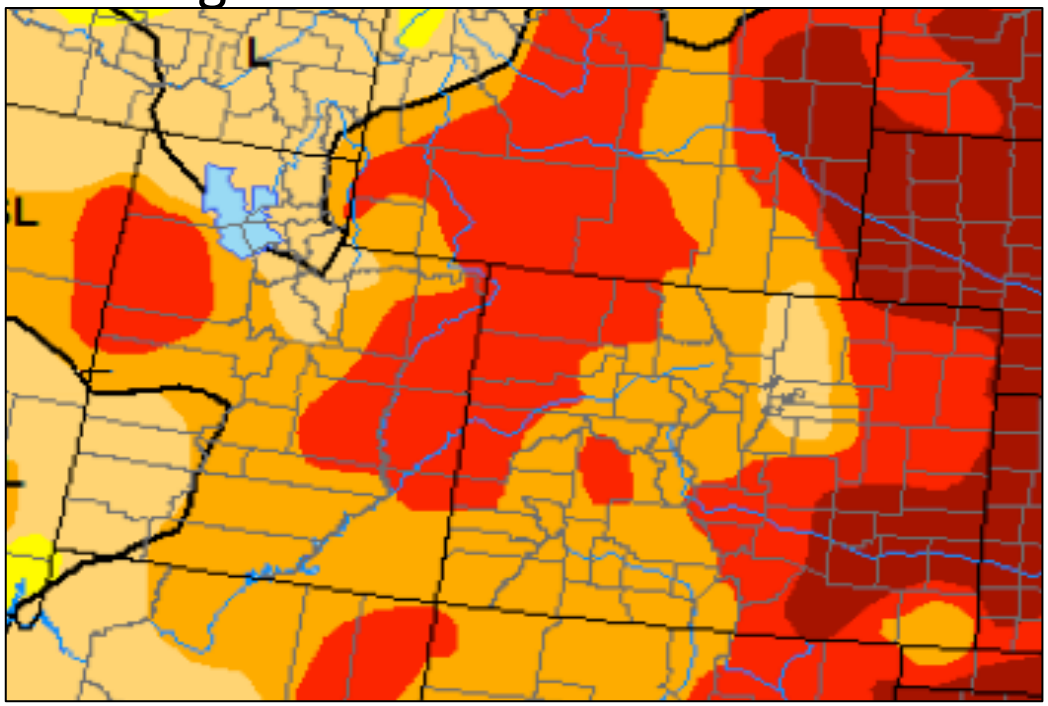


Fig. 8: Quantitative precipitation forecast (QPF) by the Hydrologic Prediction Center out to 12UTC Sunday.

Drought and Water Discussion



Drought – 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: December 11th 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. 9). Beneficial precipitation and snowpack has built up over the past week, thus there is no need for any degradations at this time. The region is still experiencing deficits though, so no improvements are warranted either.

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

Wyoming: Wyoming experts have proposed several changes for their state, including a small D4 introduction in Sweetwater County where long-term standardized precipitation indices are below -2 and a removal of D3 in far southwest WY where beneficial moisture has accumulated since the beginning of the water year. An expansion of the D3 in central WY in the North Platte Basin has also been recommended.