NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

April 3, 2012

Precipitation and Snowpack

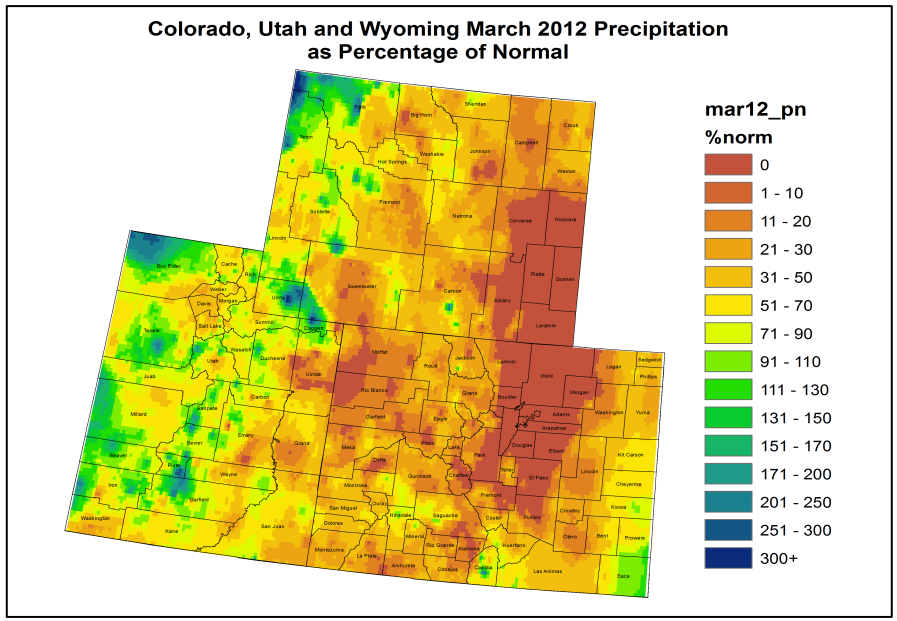


Fig. 1: March precipitation as a percent of average.

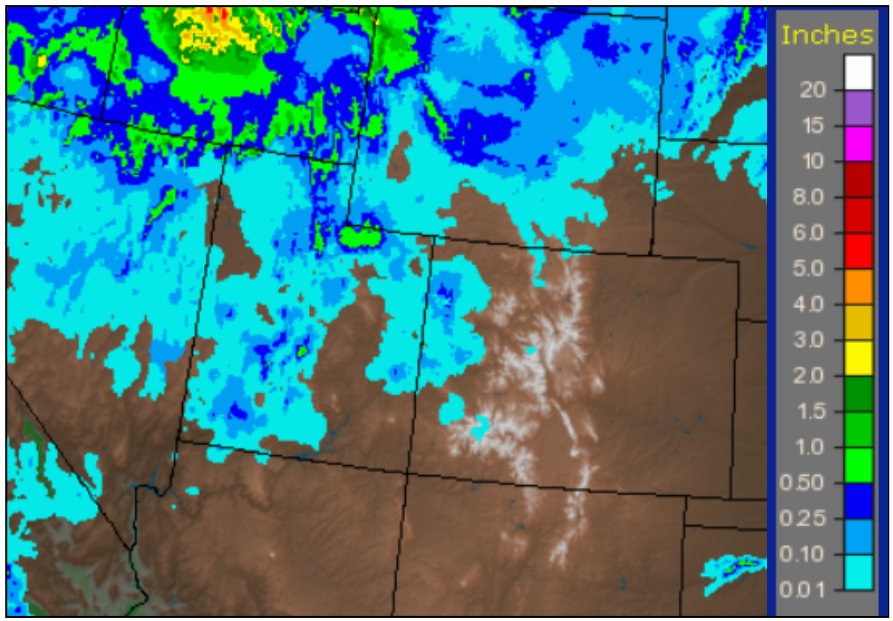


Fig. 2: AHPS March 27 – April 2 precipitation in inches.

For the month of March, most of the Upper Colorado River Basin (UCRB) was been drier than average (Fig. 1). Some spotty higher elevation locations in southwest Wyoming and northeast Utah received near to above average precipitation for the month. The Duchesne basin and the Wasatch range in UT have mostly seen between 50% and 90% of average March precipitation. The northern and central mountains of Colorado, the lower elevations of eastern UT and western CO, and the San Juans and Four Corners region have mostly seen less than 50% of average precipitation for the month. East of the basin, most of the CO Front Range has experienced an extremely dry March with the far eastern plains faring slightly better and receiving between 50% and 100% of average precipitation.

Last week, the heaviest precipitation fell in the northwestern portions of the UCRB (Fig. 2). Scattered accumulations between a tenth and a quarter of an inch fell in northwest CO, northeast UT, and southwest WY. The rest of the basin, including the northern and central mountains of CO and the San Juans, received little to no precipitation. Eastern CO has received some beneficial moisture in the last day (not shown).

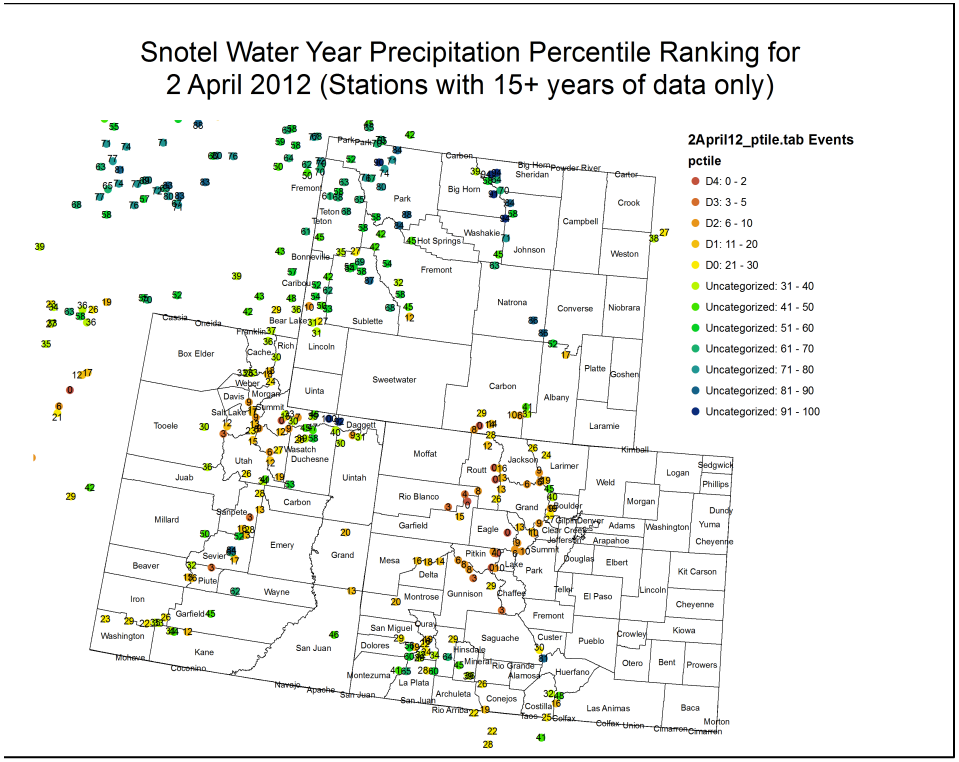


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21 – 30% is Drought Monitor D0 category).

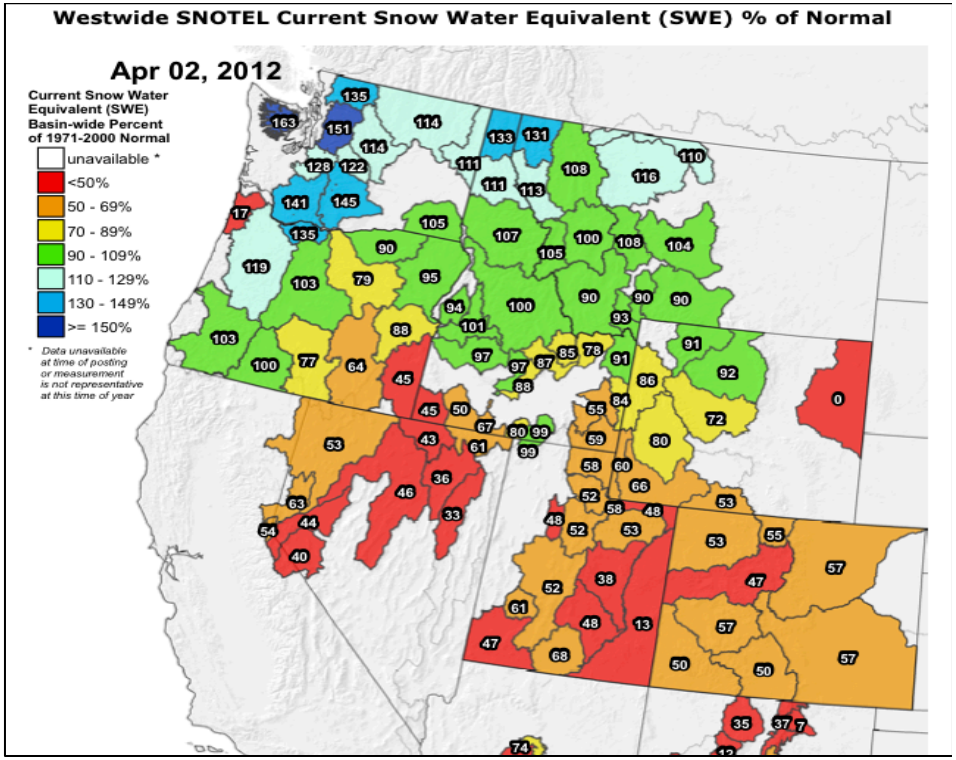


Fig. 4: Basin snow water equivalent (SWE) as a percent of average.

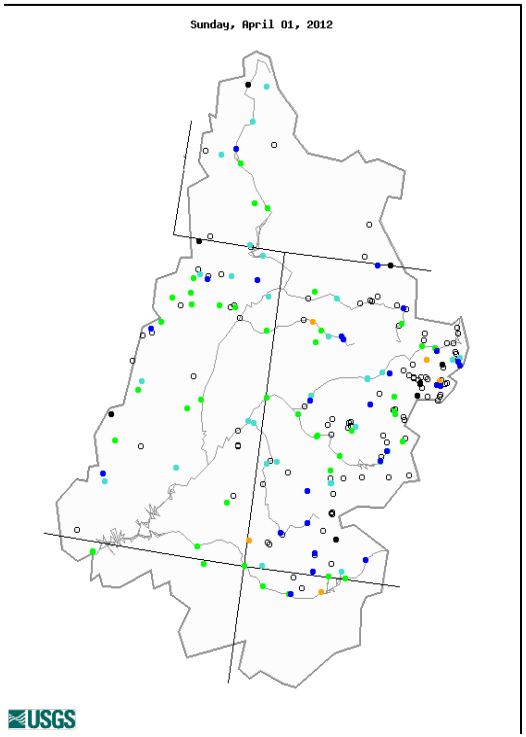
Water-year-to-date (WYTD), SNOTEL precipitation percentiles are lowest for the northern and central mountains of CO, with percentiles ranging from single digits to around the 20th percentile (Fig. 3). The Wasatch range in UT is also fairly dry, with many SNOTEL sites showing percentiles in the teens. SNOTEL percentiles in the Upper Green basin in WY are generally above the 50th percentile. In the San Juan basin, many SNOTEL percentiles are above 50, but there are an increasing number of SNOTELs now recording below the 30th percentile.

Snowpack conditions around the UCRB are all well below normal as a combined result of less than average seasonal snowpack accumulations and earlier melting than normal (Fig. 4). Most of the sub-basins in northeast UT and western CO are around 50% of average or less. The far eastern basin of UT is at a mere 13% of average, suggesting that the majority of the snowpack has melted out. The sub-basins in southwest WY are showing snow water equivalents between 60 and 80% of average.

Streamflow

As of April 1st, 95% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows (Fig. 5). About 56% of the gages in the basin are recording above normal flows (up from 40% last week), while about 5% of the gages in the basin are recording below normal flows. The number of reporting gages in the basin has increased from around 65 at the beginning of March to 111 at the beginning of April. 30% of the gages are recording much above normal flows or higher, and 8 gages are recording high flows.

The three key gages in the UCRB are all currently recording flows in the near normal range (Fig. 6). Flows on the Colorado River near the CO-UT state line and on the San Juan River near Bluff, UT have continued to rise and are at the 62nd and 36th percentiles, respectively. Flows on the Green River at Green River, UT have dropped over the past week and are now at the 70th percentile.



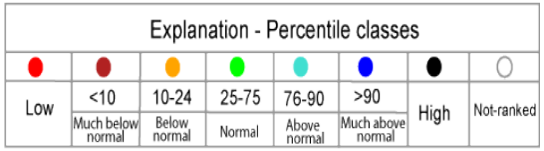


Fig. 5: 7-day average discharge compared to historical discharge for April 1st.

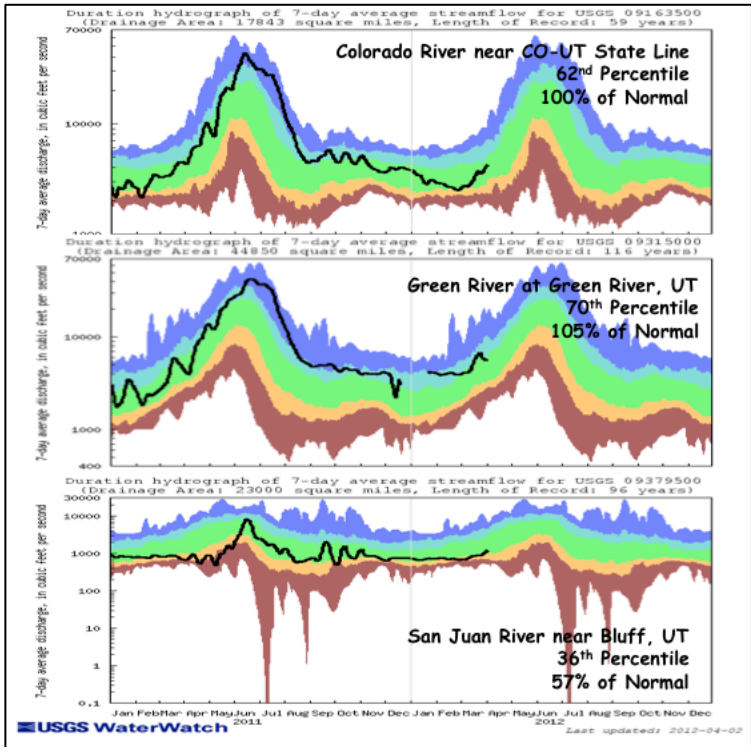


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

All of the UCRB and the rest of CO continued to experience warmer than average temperatures last week, with many areas of the basin seeing temperatures 8 to 16 degrees above average and eastern CO experiencing temperatures 12 to 16 degrees above average. The VIC model shows dry soil moisture conditions in eastern CO, in UT around the Colorado River valley, and in southern WY (Fig. 7). All of these dry regions have been expanding in areal size. The VIC shows very wet soils around the Colorado headwaters region (likely due to melting of snowpack infiltrating the soils). However, when VIC SWE and soil moisture are combined, this area shows a moisture storage deficit (Fig. 7).

All of the reservoirs above Lake Powell are currently above their April storage averages. For the month of March, Flaming Gorge, Green Mountain, and Lake Granby saw larger storage decreases, which is normal for this time of year. Blue Mesa, McPhee, and Navajo have begun to show storage increases while Lake Powell leveled off in March and has slowly begun to increase in storage. Lake Powell is currently at 83% of average and 64% of capacity (compared to 53% one year ago).

Precipitation Forecast

The UCRB is currently located in between a high pressure ridge over the great basin and an upper level low spinning over northern New Mexico. This compact low pressure center will continue to wrap moisture into extreme southeastern portions of the basin through Wednesday as it migrates eastward. Elesewhere, expect to see clearing skies with temperatures slowly warming to average while another Pacific trough begins to move onshore. Forecast models are in good agreement in lifting this next trough to the north as it progresses eastward on Friday, which should confine any measurable precipitation to the far northwestern parts of the basin. The majority of the UCRB will experience more wind than precipitation with this feature, as strong southwesterly flow develops ahead of the system and brings a return to above average temperatures. Another ridge is anticipated to build over the UCRB following the passage of Friday's trough and should lead to the persistence of above average temperatures and dry conditions moving into next week (Fig. 8).

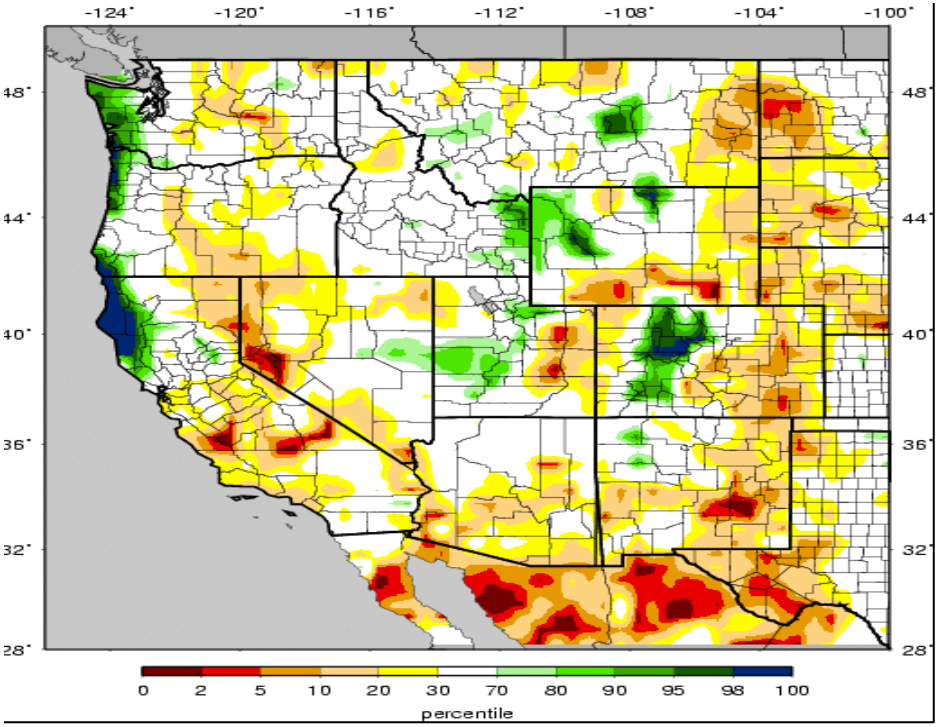


Fig. 7: VIC soil moisture percentiles as of April 1st, with total moisture storage (SWE and soil moisture) below.

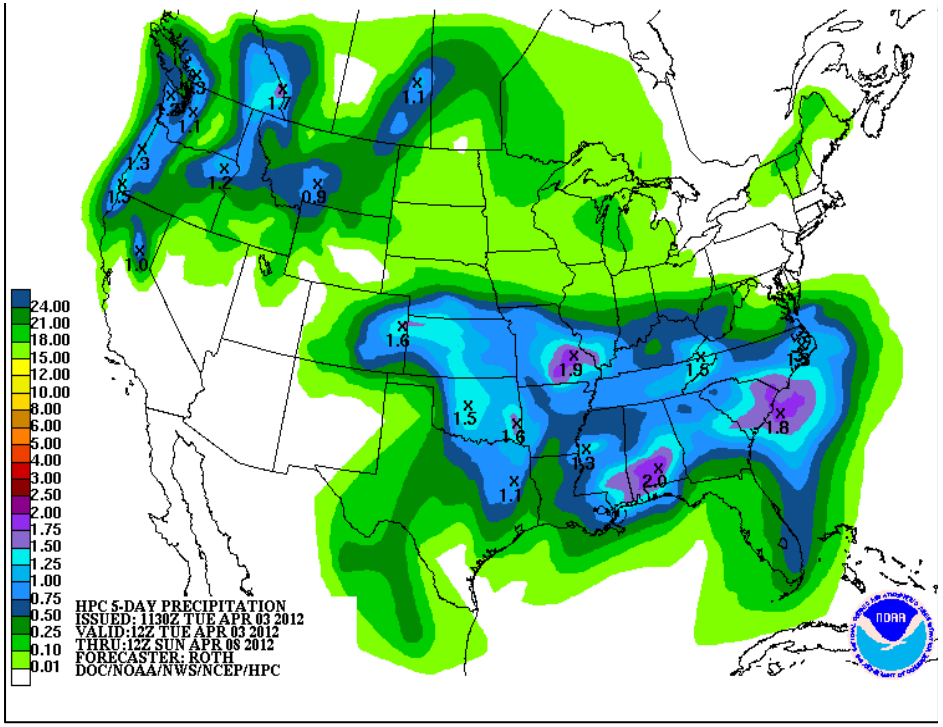
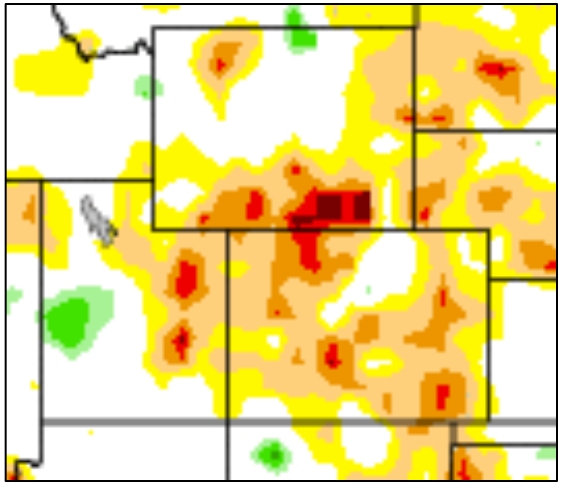
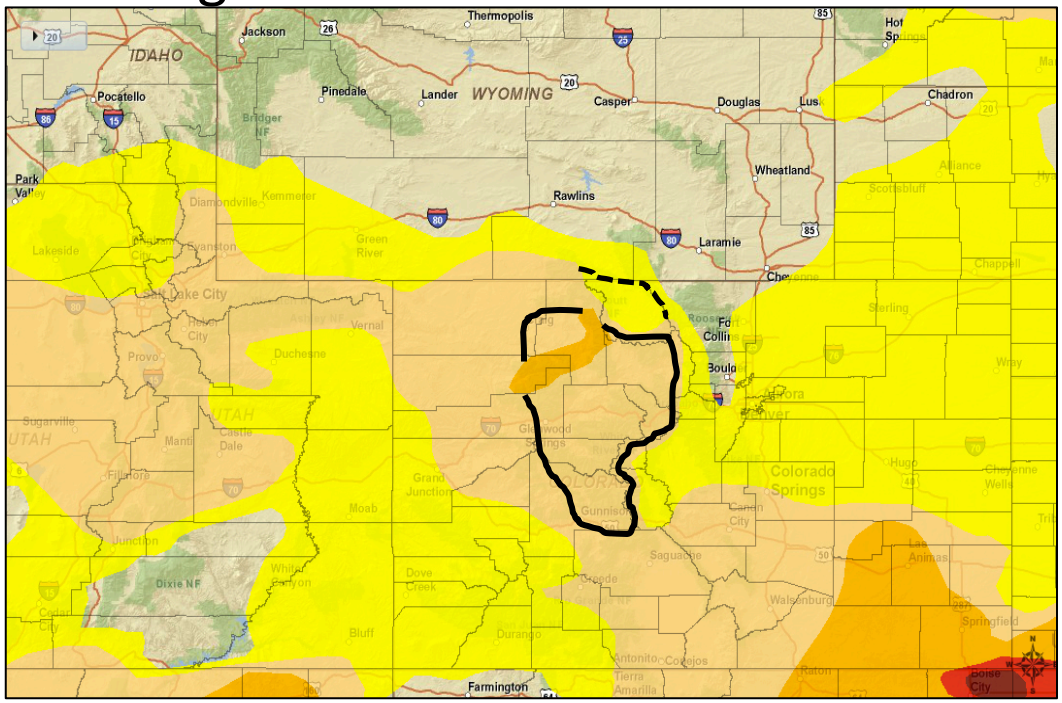


Fig. 8: Hydrologic Prediction Center's Quantitative Precipitation Forecast (QPF) through 12UTC Sunday.



Drought and Water Discussion



Drought categories and
their associated percentiles

Fig. 9: March 27th release of U.S. Drought Monitor for the UCRB.

The current U.S. Drought Monitor (USDM) author has already updated the current map depiction (Fig. 9). D0 has been expanded through the rest of northern CO and into southeast WY. D1 was expanded to cover all of the lower Green River valley in eastern UT and the Colorado River valley out of CO, and was also expanded slightly in southwest WY. D0 now covers the entire Four Corners region as well.

It is recommended that the D2 in northwest CO be expanded (Fig. 9, black lines). This expansion will capture more of the dryness in the Yampa basin, though with limited data, exact delineation is difficult. An initial expansion to around Craig is recommended, and a further expansion in the near future will be considered as impacts and other reports become available. The south and eastward expansion of the D2 will cover all SNOTEL precipitation sites reporting at or below the 10th percentile and the lower elevations reporting very dry ground conditions and fire impacts. It is also recommended that D1 be expanded to cover all of Jackson County (Fig. 9, dashed line).