NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

June 5, 2012

Precipitation and Snowpack

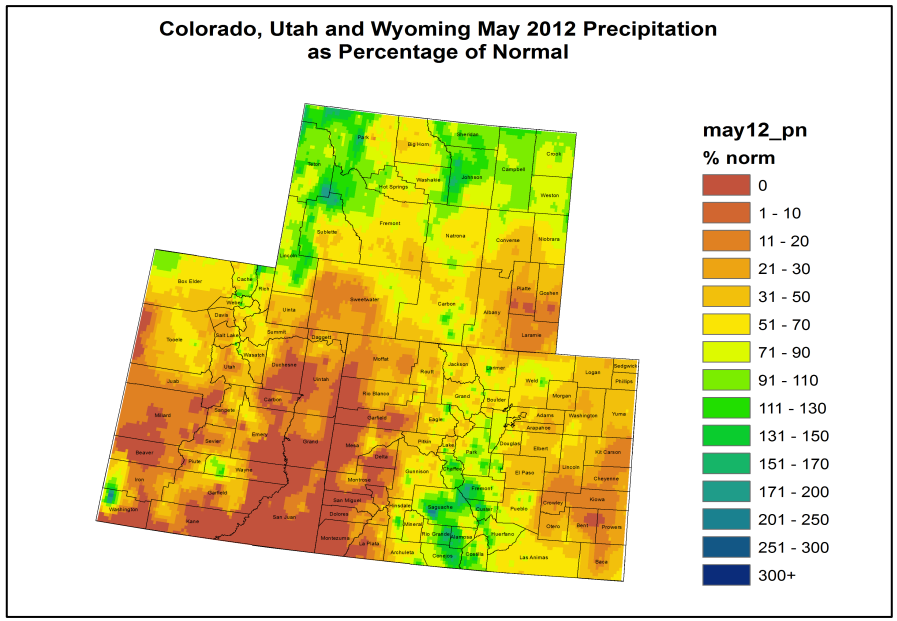


Fig. 1: May precipitation as a percent of average.

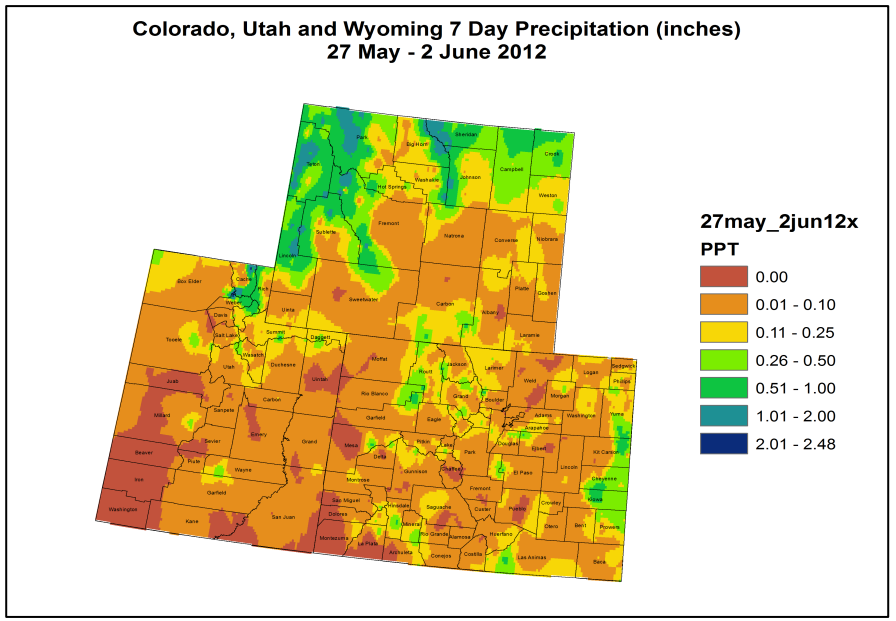


Fig. 2: May 27 – June 2 precipitation in inches.

For the month of May, near normal precipitation fell in the San Luis Valley and Sangre de Cristo mountains, and also along the northern-most higher elevations of the Upper Colorado River Basin (UCRB) in Wyoming (Fig. 1). The northern and central mountains of Colorado, the San Juan mountains, and the Wasatch mountains in Utah all saw between 20% and 70% of average precipitation. Much of the west slope of CO, eastern UT, and the Four Corners region were very dry, receiving less than 20% of average precipitation for the month. Most of eastern CO received between 20% and 50% of average precipitation in May.

Last week, only isolated showers fell in the UCRB, with spotty accumulations between a quarter inch and half an inch reported in some areas (Fig. 2). The northern-most higher elevations in WY received around a half inch of precipitation. However, most of the UCRB received less than .10 inches of moisture for the week, with some areas receiving no precipitation. Some beneficial moisture did fall in far eastern CO, between a quarter and half inch in Kit Carson, Cheyenne and Kiowa counties. Most of the rest of CO (east of the UCRB) received less than .10 inches last week.

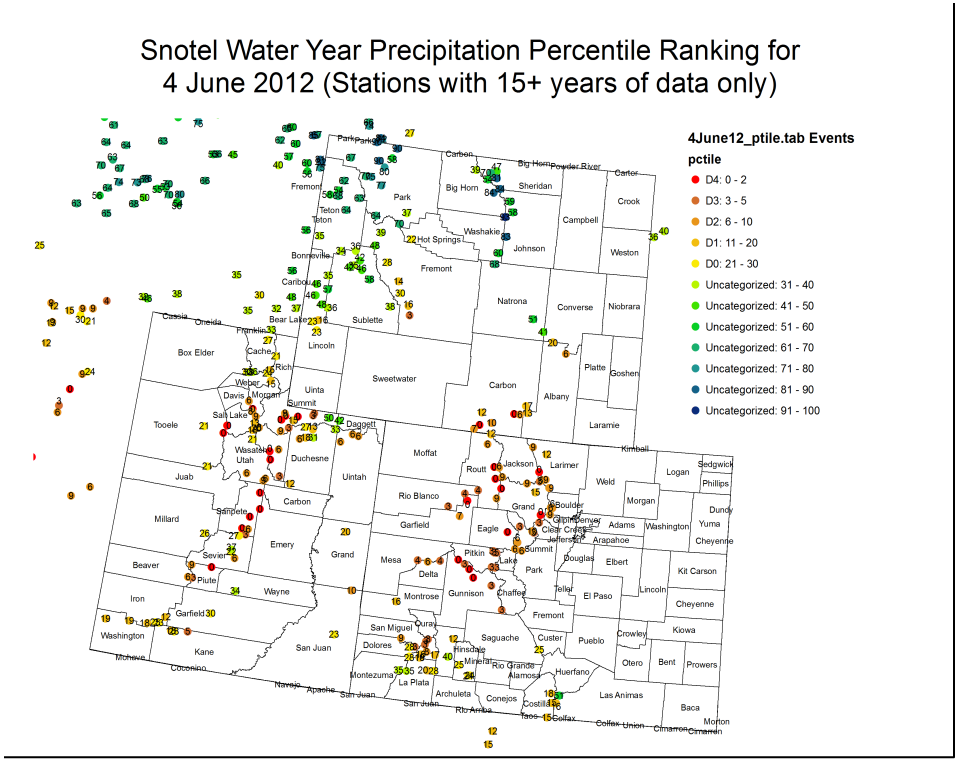


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21 – 30% is Drought Monitor D0 category).

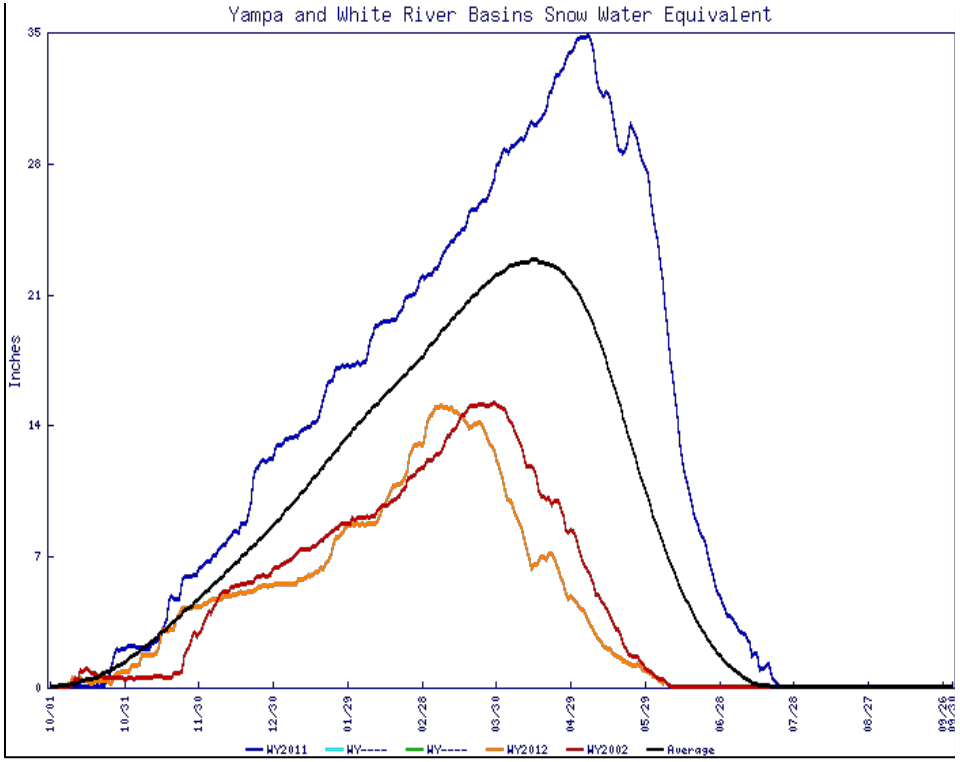


Fig. 4: SNOTEL WYTD SWE for the Yampa basin (orange line: current, black line: average, red line: 2002, blue line: 2011).

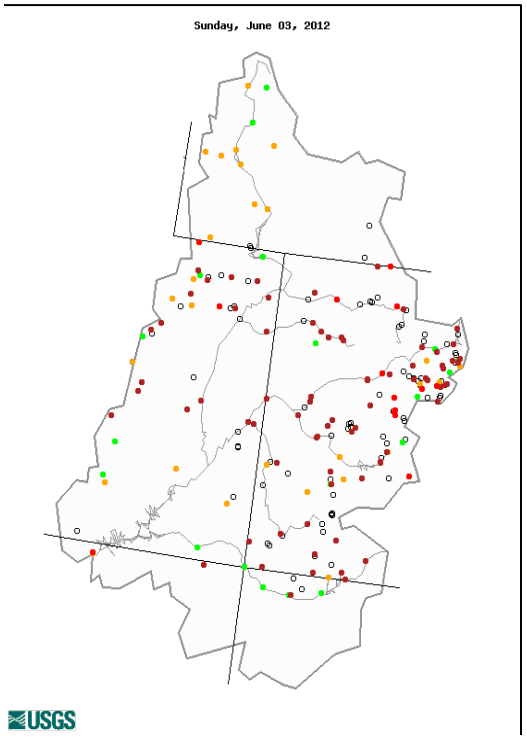
Water-year-to-date (WYTD), SNOTEL precipitation percentiles are lowest for the Yampa and Gunnison basins in CO, with many sites reporting in the lowest 5th percentile or below (Fig. 3). The Wasatch range in UT and the northern mountains of CO are also dry, with most precipitation percentiles in the single digits. SNOTEL percentiles in the Upper Green basin in WY are generally above the 40th percentile. In the San Juan basin, a few SNOTEL percentiles remain around the 30th percentile, but there are many SNOTEL sites now reporting percentiles in the teens and single digits.

Snowpack conditions around the UCRB are all well below average and many sites have completely melted out. This is a combined result of less than average seasonal snowpack accumulations and much earlier melting. In Figure 4, accumulated snow water equivalent around the Yampa basin peaked over a month earlier than average. Accumulations were similar to 2002 accumulations and melting has occurred earlier than 2002. This is similar for many of the sub-basins in the UCRB.

Streamflow

As of June 3rd, 15% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) 7-day average streamflows (Fig. 5). None of the gages in the basin are recording above normal flows, while about 85% of the gages in the basin are recording below normal flows. 65% percent of the gages in the basin are recording much below normal or low streamflows. The gages on the Upper Green River are showing mostly below normal flows while many gages on the San Juan River are recording near normal flows. Most gages on the Yampa, Colorado, Gunnison, and Dolores rivers are currently recording flows below the 10th percentile.

Flows on two of three key gages in the UCRB have decreased over the past week (Fig. 6). Flows on the Colorado River near the CO-UT state line and on the Green River at Green River, UT are currently recording at the 3rd and 8th percentiles, respectively. Flows on the San Juan River near Bluff, UT experienced an increase to the 38th percentile (from the 9th percentile two weeks ago). The increase in flows at several gages on the San Juan River is likely due to human regulations/releases from upstream Navajo Reservoir.



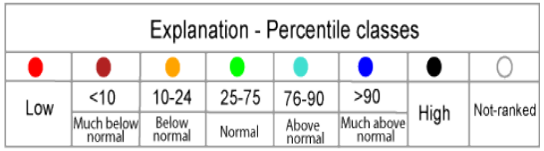


Fig. 5: 7-day average discharge compared to historical discharge for June 3rd.

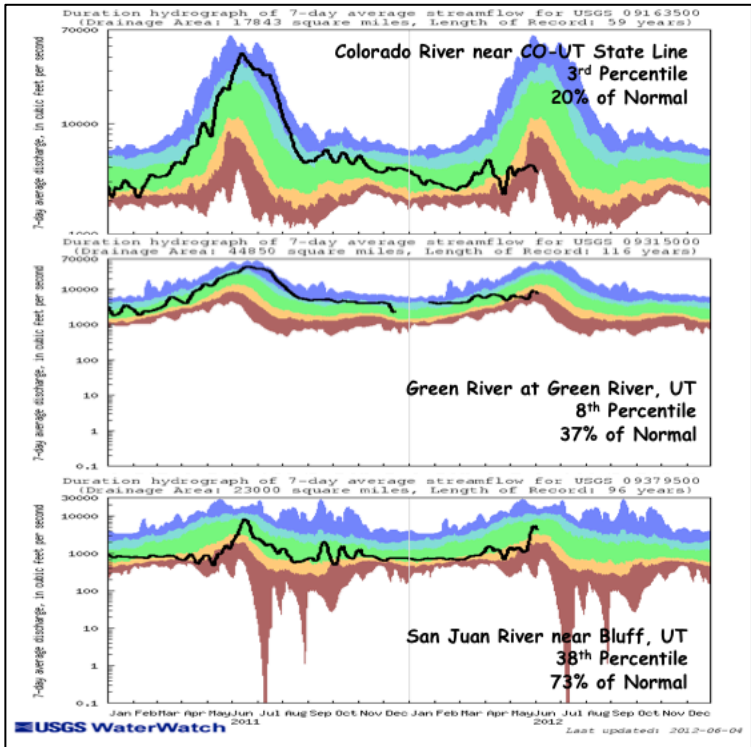


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Most of the UCRB experienced near to slightly above average temperatures for the week, with the west side of the basin seeing temperatures 2 to 4 degrees warmer than normal. Temperatures were mostly near average for the rest of CO. The VIC model shows extremely dry soil moisture conditions for almost all of the UCRB. Very dry soils in the lowest 5th percentile are modeled in western CO, eastern UT, and much of southern WY. Ver dry soils are also evident for most of CO east of the basin. Satellite vegetation conditions show the driest vegetation over northwest CO, with slightly better (but still dry) conditions over southwest WY and the Four Corners region (Fig. 7). Very dry vegetation is also showing up over northeast CO.

Blue Mesa, Flaming Gorge, McPhee, and Navajo reservoirs saw volume decreases during the month of May while the other reservoirs saw volume increases. All reservoirs normally experience large volume increases this time of year, but none of the reservoirs saw those large increases last month. McPhee and Flaming Gorge are currently above their June average volumes, while the rest of the reservoirs are slightly below their June averages. Daily inflows into the major reservoirs in the basin are much below average for this time of year.

Precipitation Forecast

The UCRB is currently in between a ridge of high pressure centered over Texas and a strong low pressure trough located over the Pacific northwest. This will put the region underneath brisk southwest flow through much of the week and advect dry air from the southwestern deserts over most of the basin. A weak, dry cool front is expected to pass through the basin through the day on Wednesday, returning temperatures to near normal and kicking up winds ahead of the front. Precipitation chances will remain very low through this period as any storms that do manage to form in the incredibly dry atmosphere will be high based, producing more in the way of wind than rain. Another cool front is set to pass through the area on Sunday, again bringing a reduction in temperatures but little to no accumulating precipitation west of the Continental Divide (Fig. 8). Conditions will remain mostly dry moving into next week with temperatures returning to normal following the passage of Sunday's cool front.

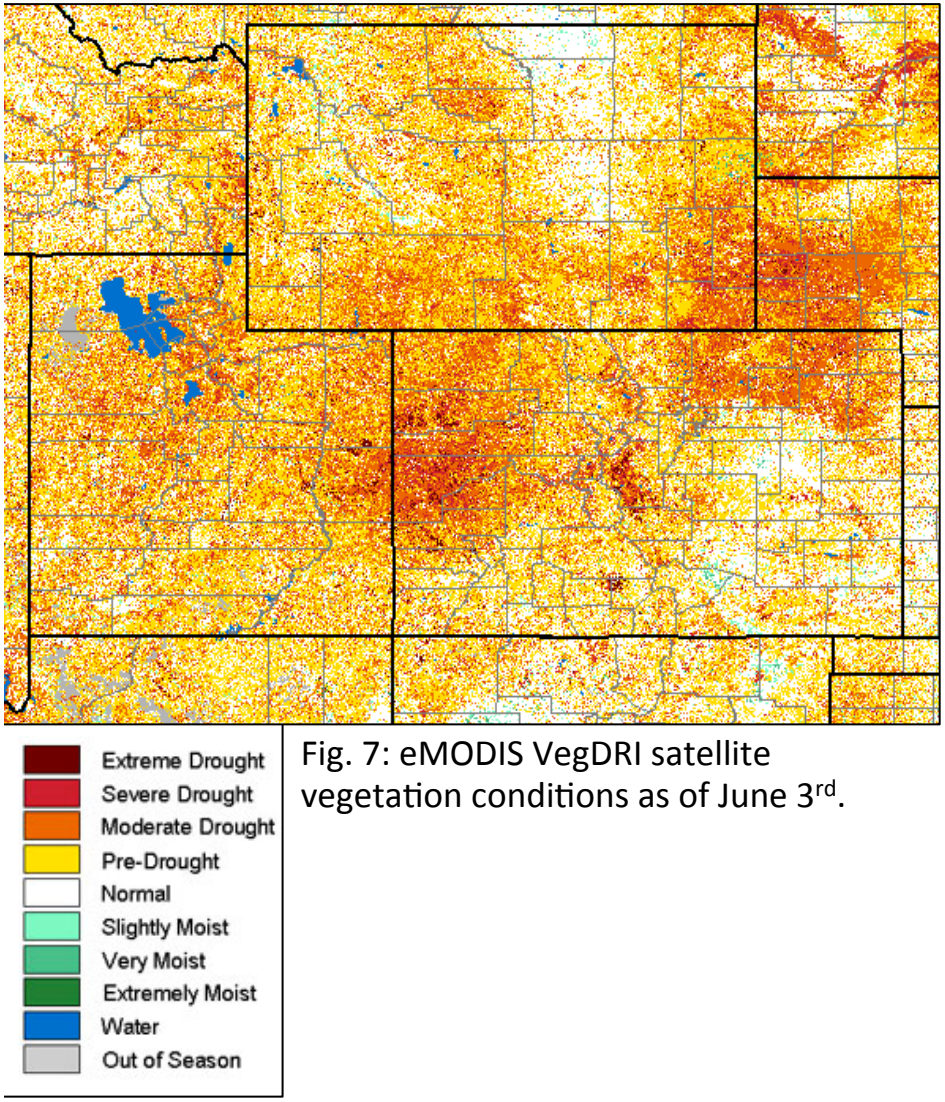


Fig. 7: eMODIS VegDRI satellite vegetation conditions as of June 3rd.

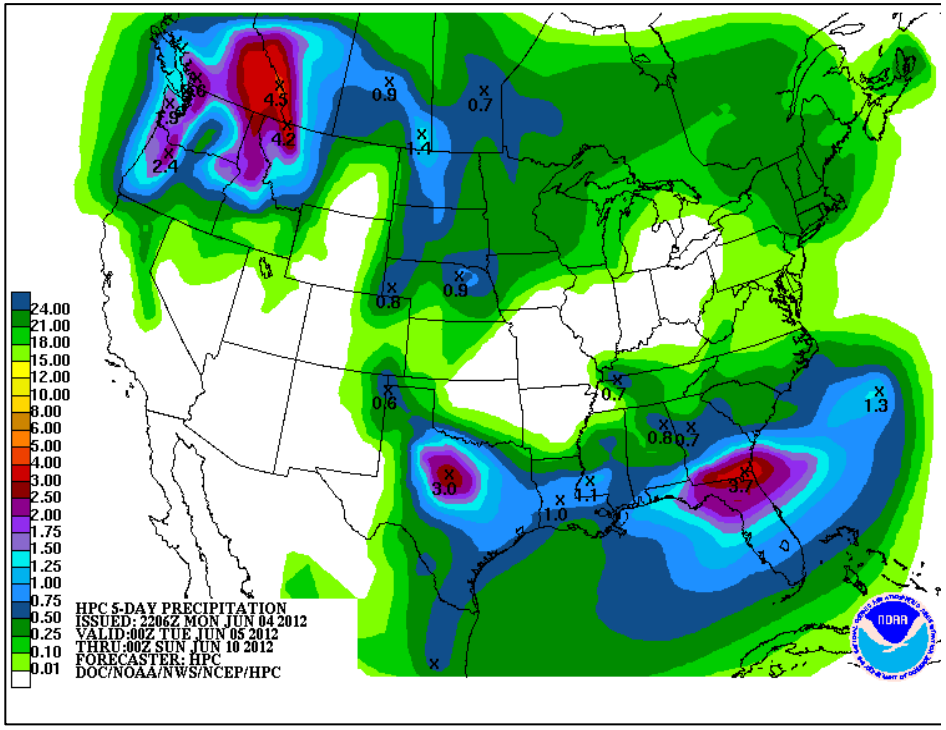
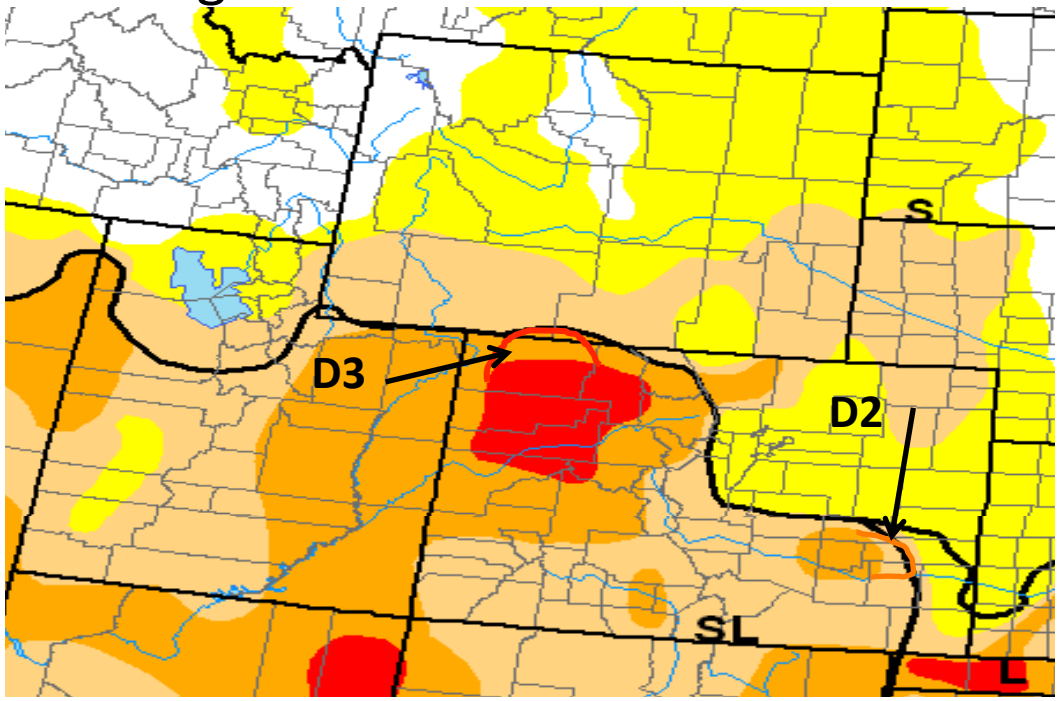
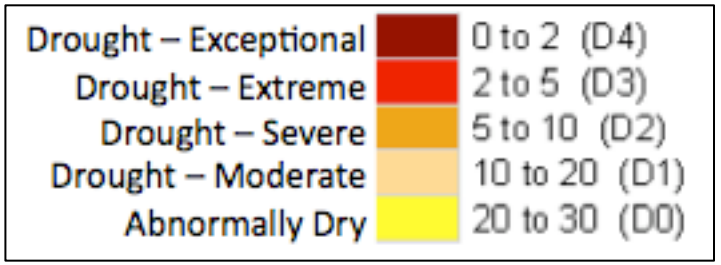


Fig. 8: Hydrologic Prediction Center's Quantitative Precipitation Forecast (QPF) through 00UTC Sunday.

Drought and Water Discussion





Drought categories and
their associated percentiles

Fig. 9: May 29th release of U.S. Drought Monitor for the UCRB.

One change is recommended for the current U.S. Drought Monitor (USDM) map depiction over the UCRB (Fig. 9). A slight northward expansion of the D3 in northwest CO is recommended (Fig. 9, red line). The D3 will then cover all of Little Snake River, which is recording below the 3rd percentile at all of its reporting gages. Also, it has been reported that conditions west of the D3, to the UT border are not much different than areas in D3, so the USDM author could also consider a slight westward expansion to the UT border. Conditions in eastern UT are reported as not being quite as bad as western CO, so should stay D2.

In southeast CO, crop conditions are extremely poor just north of the Arkansas River. Counties from Pueblo eastward to Prowers will be submitting drought disaster declarations. Crops are running ahead of schedule, and because of little water and very dry soils, many crops won't be planted at all. A further expansion of the D2 over Bent County is recommended this week (Fig. 9, orange line), and the situation will be monitored in the near future for further expansion and possible D3 introduction.