NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

May 29, 2012

Precipitation and Snowpack

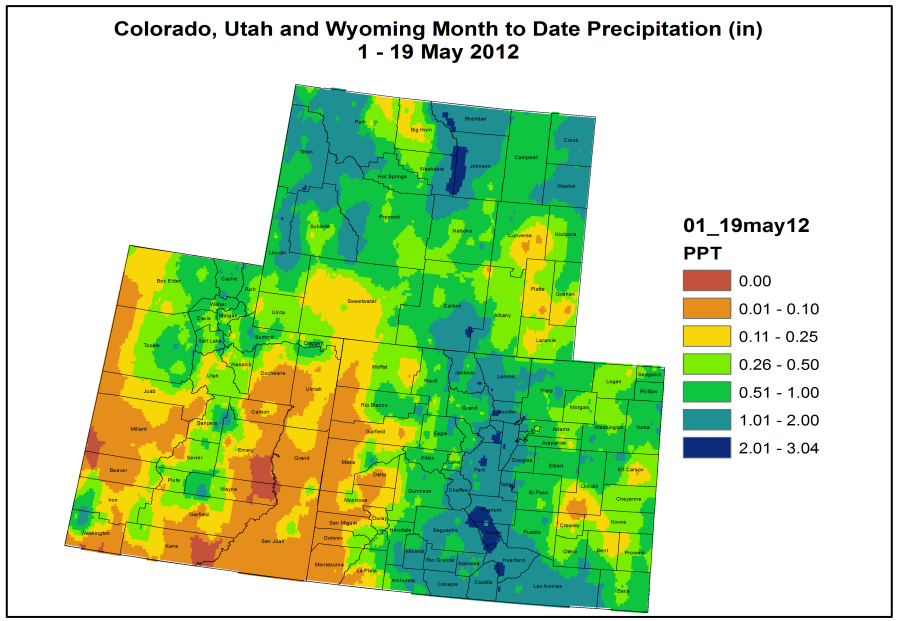


Fig. 1: May 1 – 19 precipitation in inches.

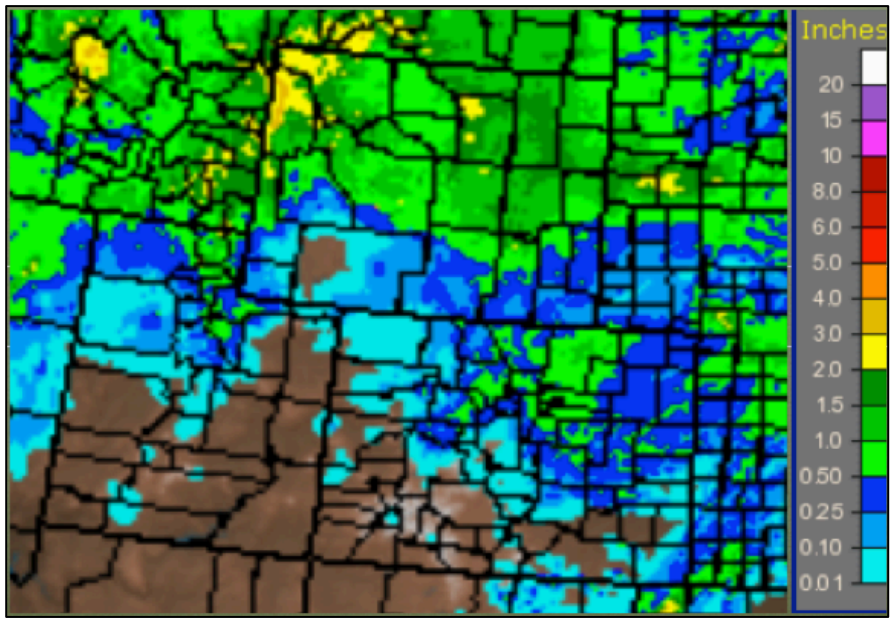


Fig. 2: May 20 – 27 precipitation in inches.

For the month of May so far, the heaviest precipitation has been concentrated along the Front Range of Colorado, just east of the Continental Divide and southern CO, with many of those areas, including the San Luis Valley, receiving between 1 and 2 inches of moisture (Fig. 1). Higher elevations in the UCRB have received between half an inch and 2 inches for the month, but most of the lower elevations have seen less than a qaurter of an inch. Most of eastern CO has received between a quarter inch and an inch of precipitation since the beginning of the month.

Last week, precipitation in the UCRB was mainly confined to the north, with some areas of northeast Utah receiving between a quarter inch to an inch of precipitation (Fig. 2). Some areas of southwest Wyoming and northwest CO received around a tenth of an inch of moisture for the week. Eastern UT, southwest CO, and the Four Corners area were dry for the week. Northern CO (east of the UCRB) received between a quarter inch to an inch, and southeast CO also received some spotty amounts of moisture for the week. The San Luis Valley did not see precipitation last week.

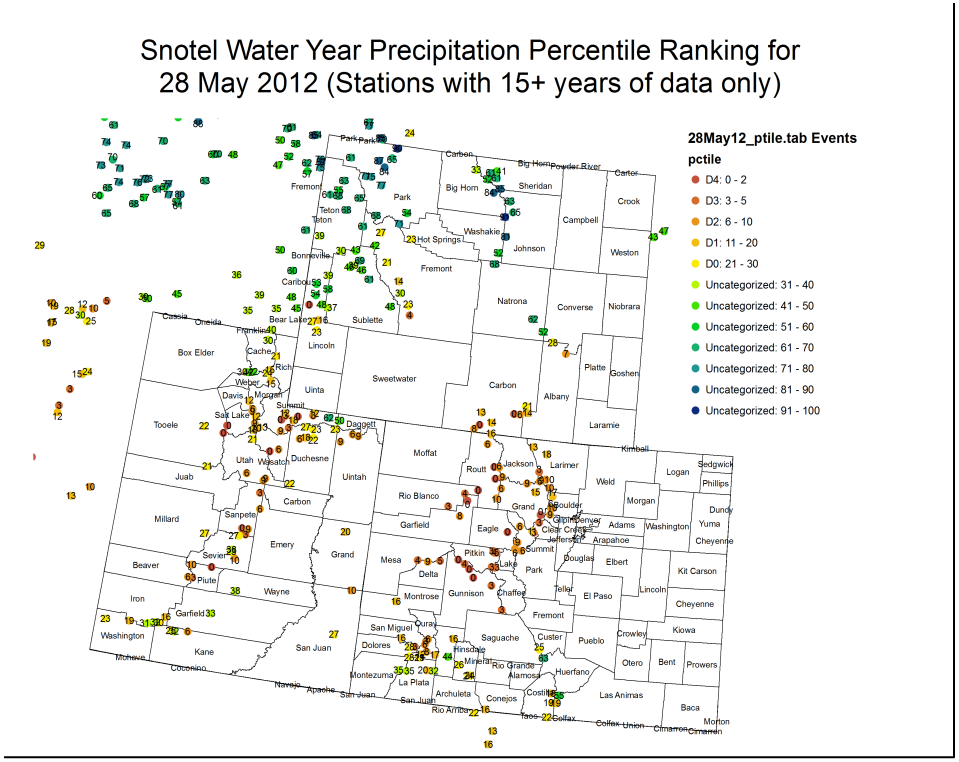


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21 – 30% is Drought Monitor D0 category).

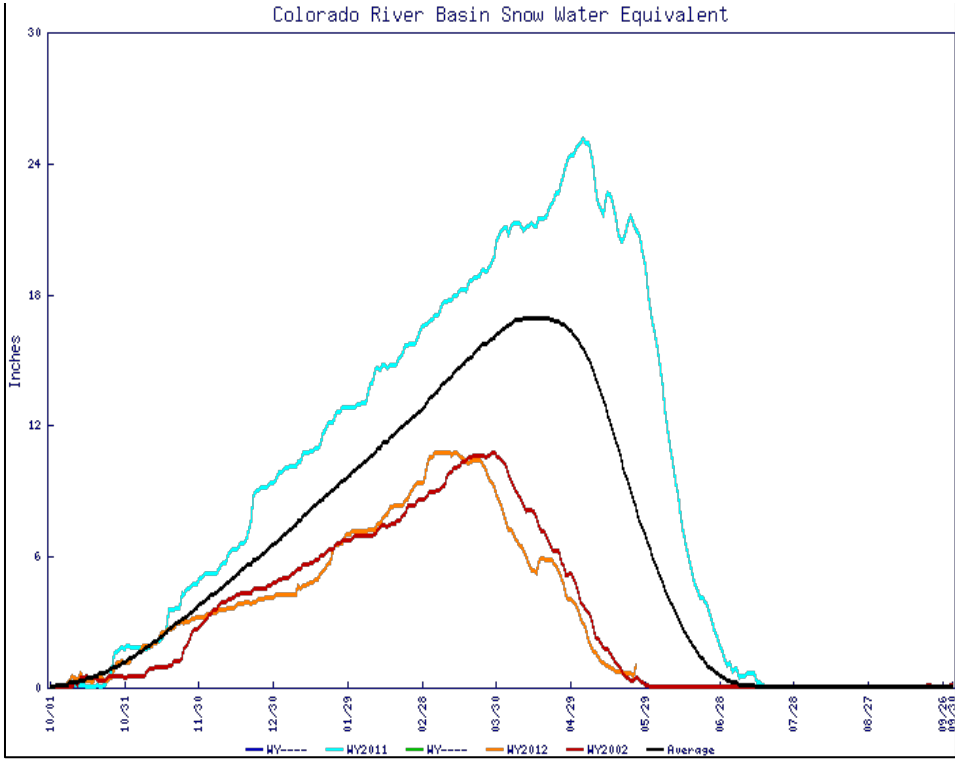


Fig. 4: SNOTEL WYTD SWE for the CO headwaters basin (orange line: current, black line: average, red line: 2002, blue line: 2011).

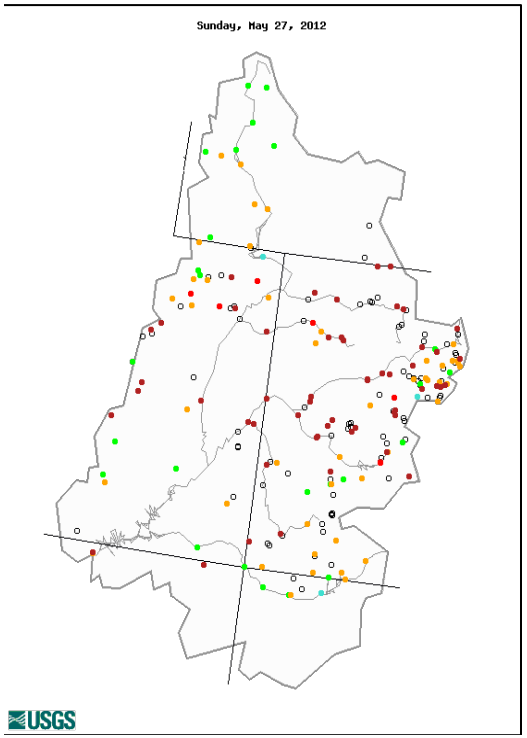
Water-year-to-date (WYTD), SNOTEL precipitation percentiles are lowest for the Yampa and Gunnison basins in CO, with many sites reporting in the lowest 5th percentile or below (Fig. 3). The Wasatch range in UT and the northern mountains of CO are also dry, with most precipitation percentiles in the teens. 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 above the 30th percentile, but there are many SNOTEL sites now reporting below the 30th percentile.

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 Colorado headwaters 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 May 27th, 21% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows (Fig. 5). Only 2% of the gages in the basin are recording above normal flows, while about 78% of the gages in the basin are recording below normal flows. The gages on the Upper Green River and the San Juan River are mixed between below normal and normal flows. Most gages on the Yampa, Colorado, Gunnison, and Dolores rivers are currently recording much below normal flows (below the 10th percentile). Higher flows are mostly located on smaller rivers, or in the northern part of the UCRB.

Flows on three key gages in the UCRB have increased 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 increased slightly and are currently recording at the 5th and 10th percentiles, respectively. Flows on the San Juan River near Bluff, UT saw a large increase to the 37th percentile (from the 9th percentile last week). This increase in flows on the San Juan River is likely due to human regulations/releases from upstream Navajo Reservoir.



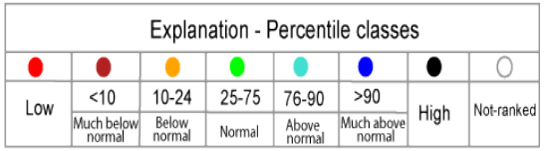


Fig. 5: 7-day average discharge compared to historical discharge for May 27th.

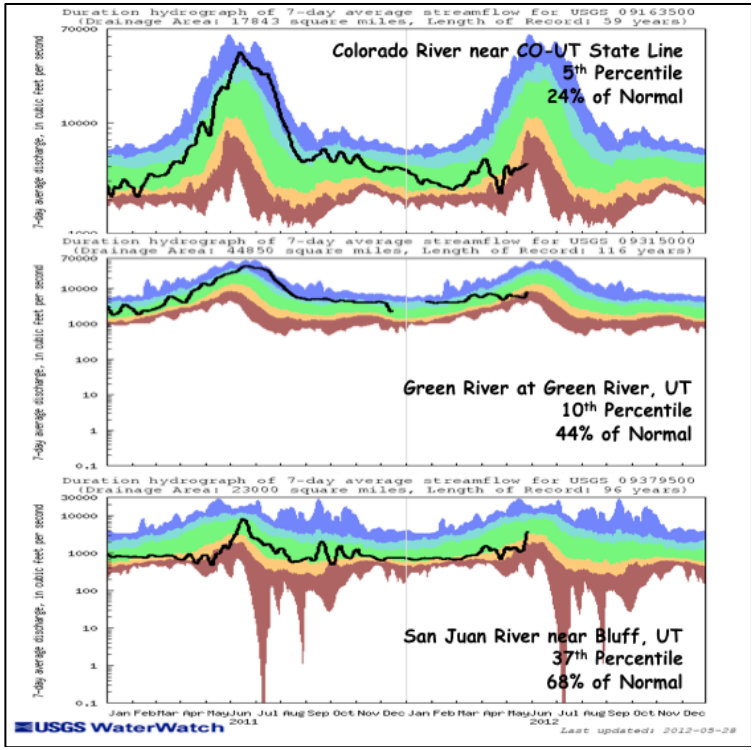


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Most of the UCRB experienced warmer than average temperatures last week, with the northern portion of the basin seeing near to slightly cooler than average temperatures and the Four Corners region seeing temperatures 4 to 8 degrees above average. The rest of CO was also warmer than average. 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. Dry soils are also evident through much of northeast and southeast CO. Satellite vegetation conditions show the driest vegetation over northwest CO and eastern UT, with slightly better (but still dry) conditions over southwest WY, the Four Corners region, and northeast CO (Fig. 7)

All of the reservoirs above Lake Powell are currently near or above their May storage averages. Flaming Gorge, Blue Mesa, and Navajo have seen volume decreases since the beginning of the month. The other reservoirs have seen slight increases, though they are observing volume increases much less than what is normally expected for this time of year. Lake Powell is currently at 79% of average and 64% of capacity. Daily inflows into the major reservoirs in the basin are much below average for this time of year.

Precipitation Forecast

An expansive area of high pressure over the western U.S. will again be the main feature of the UCRB forecast. Despite a few weak disturbances moving underneath the ridge, the very dry air associated with this high pressure center will severely limit the potential for any measurable precipitation. Current forecast models indicate that convection will be confined to the highest peaks of the CO mountains, especially around the San Juan mountains where a passing disturbance on Saturday will provide the best chance of any precipitation reaching the ground (Fig. 8). Elsewhere expect mostly sunny skies to prevail, with above average temperatures and dry conditions through the weekend. The next Pacific trough will begin to approach the west coast on Sunday, with the possibility of more significant moisture returning to far western sections of the basin by sometime early next week.

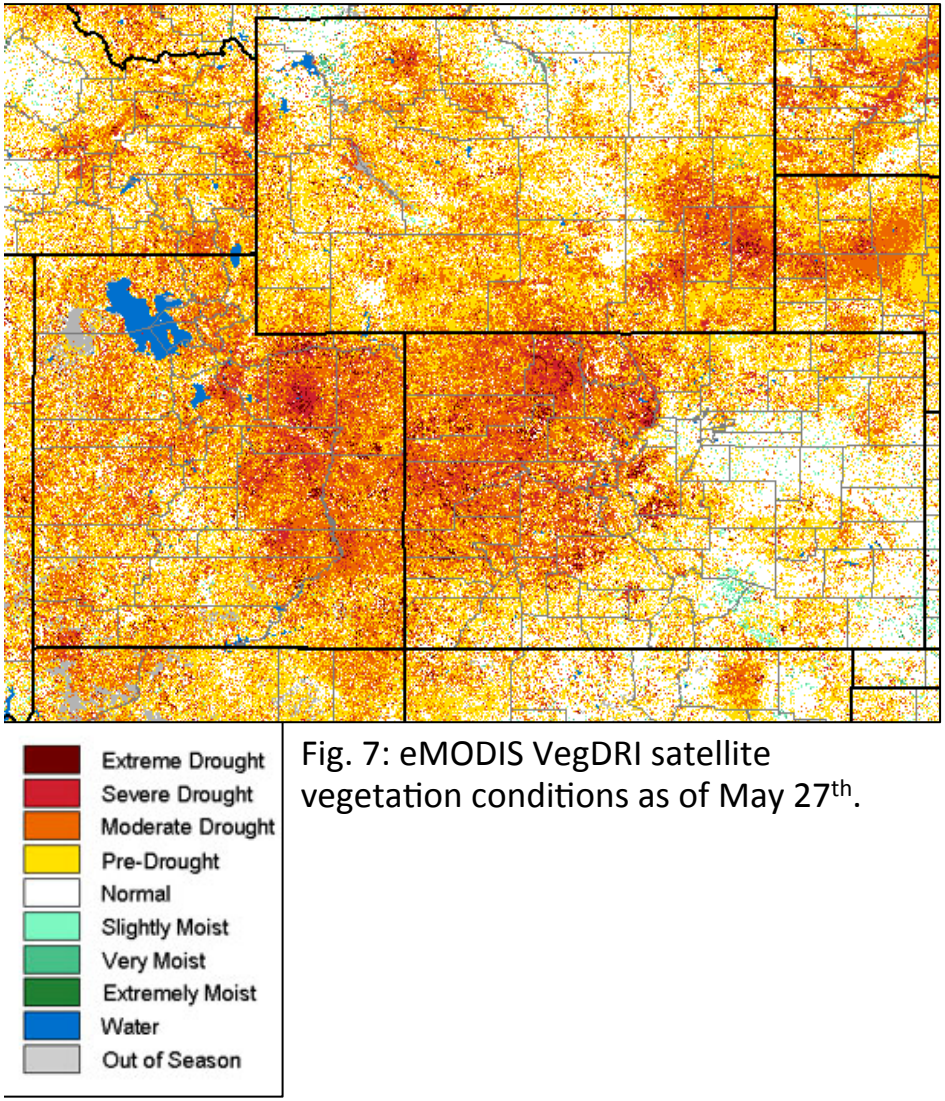


Fig. 7: eMODIS VegDRI satellite vegetation conditions as of May 27th.

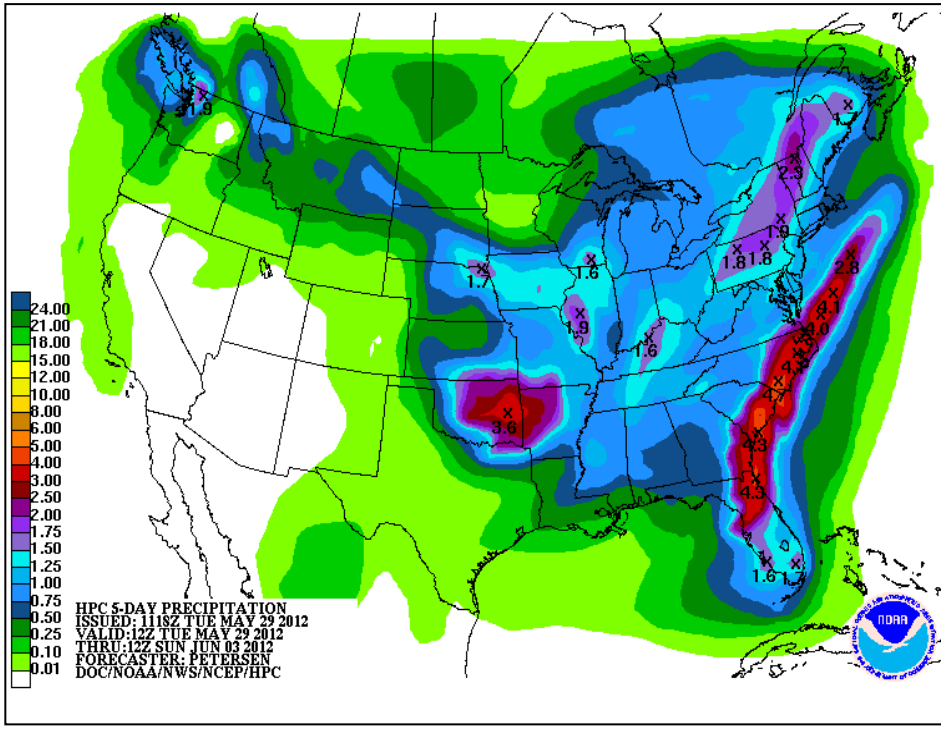
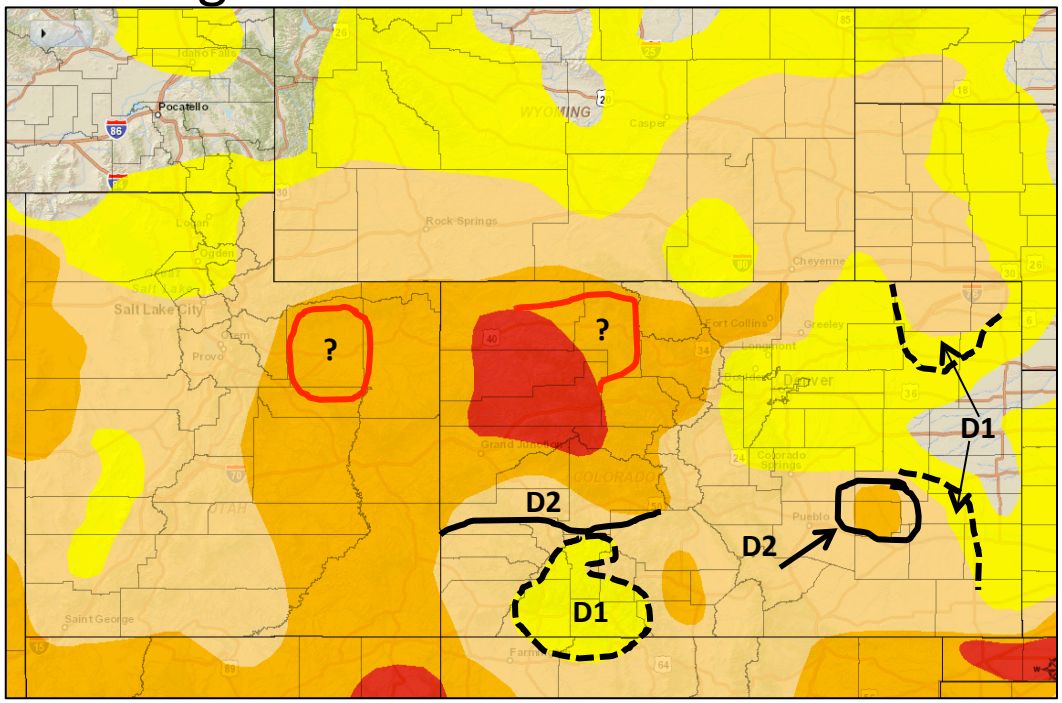
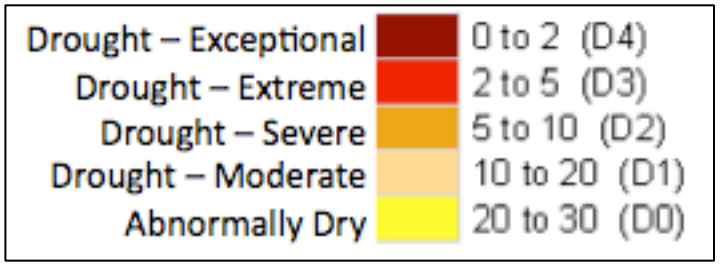


Fig. 8: Hydrologic Prediction Center's Quantitative Precipitation Forecast (QPF) through 12UTC Sunday.

Drought and Water Discussion





Drought categories and their associated percentiles

Fig. 9: May 22nd release of U.S. Drought Monitor for the UCRB.

Several changes are recommended for the current U.S. Drought Monitor (USDM) map depiction (Fig. 9). In the UCRB, it is recommended that the remaining D0 around the San Juan Mountains be filled in with D1 (Fig. 9, dashed line), and that the D2 be expanded to cover the remainder of Gunnison County and much of Montrose County (Fig. 9, solid black line). There are reports of wildfires, very dry and dusty conditions, and large precipitation deficits throughout that area. Also, expanding the D3 in northwest CO to cover more of Routt County should be considered (Fig. 9, red line). Many Routt County SNOTEL precipitation percentiles are below the 5th percentile and the VegDRI depicts this area as having extremely dry vegetation. Additionally, the USDM author may want to consider a D3 introduction in Duchesne County, UT where SPIs on several timescales are less than -2.0 and VegDRI also shows extremely dry vegetation (Fig. 9, red line). East of the UCRB, a D1 expansion into Washington County is recommended based on on-the-ground reports (Fig. 9, dashed line). A D1 and D2 expansion are recommended around Kiowa and Lincoln counties where very poor crop conditions are being reported (Fig. 9, dashed and solid black lines).