NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

June 28, 2011

Precipitation and Snowpack

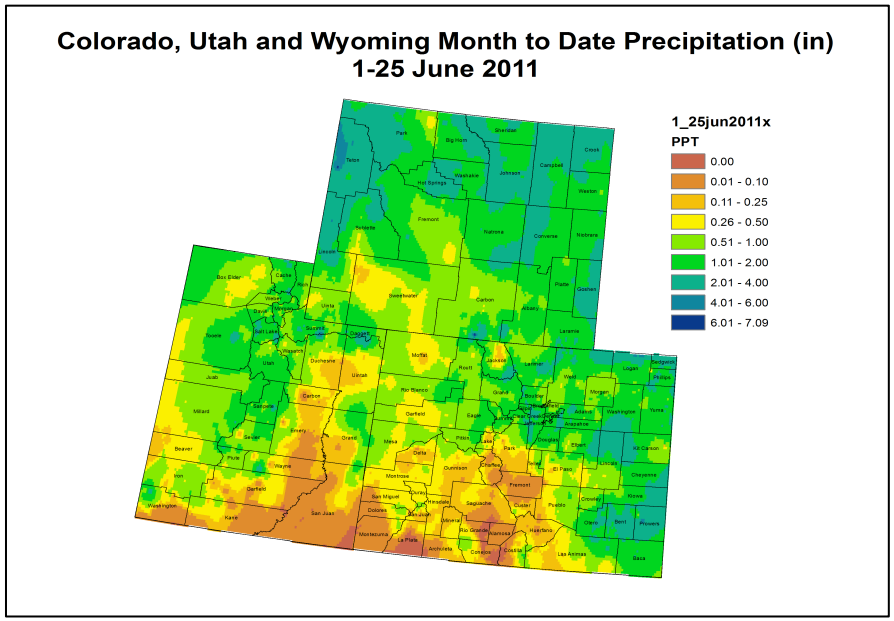


Fig. 1: June month-to-date precipitation in inches.

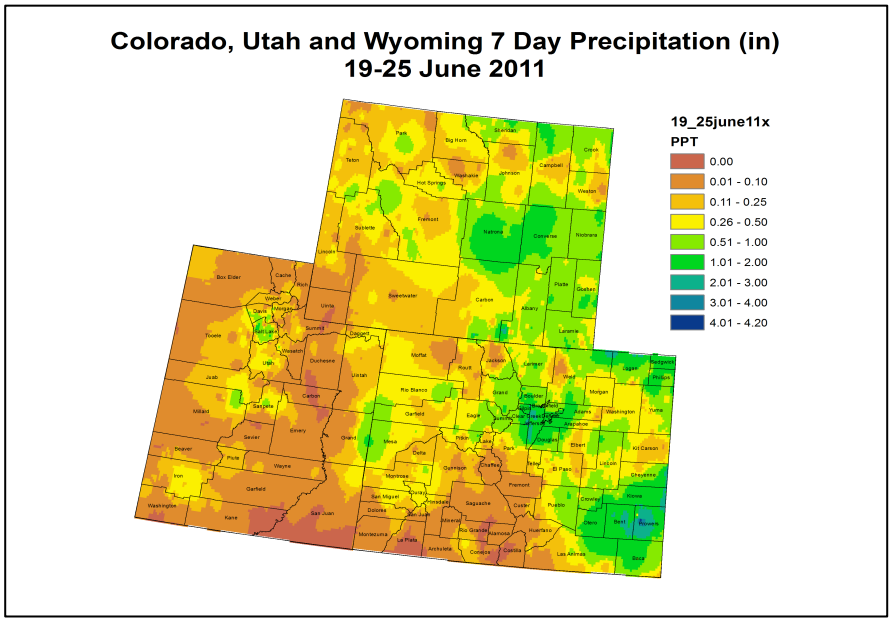


Fig. 2: June 19 – 25 precipitation in inches.

For the month of June, to date, much of the northern portions of the Upper Colorado River Basin (UCRB) has received over half an inch to over 2 inches of precipitation (Fig. 1). The Four Corners remains the driest region of the basin, receiving less than a tenth of an inch of moisture for the month so far. Northeastern and southeastern Colorado have seen 1 to 4 inches of accumulation since the first of the month. The San Luis Valley has remained dry for the month, receiving less than a tenth of an inch of precipitation.

Last week, the heaviest amounts of precipitation were concentrated over the northern Front Range of CO and in southeastern CO (Fig. 2). The accumulations of 1 to 3 inches were mostly the result of one storm that moved through the region early last week. Aside from a few isolated events resulting in half an inch of moisture in western CO, the majority of the UCRB was relatively dry for the week. The San Luis Valley in southern CO also remained fairly dry for the week.

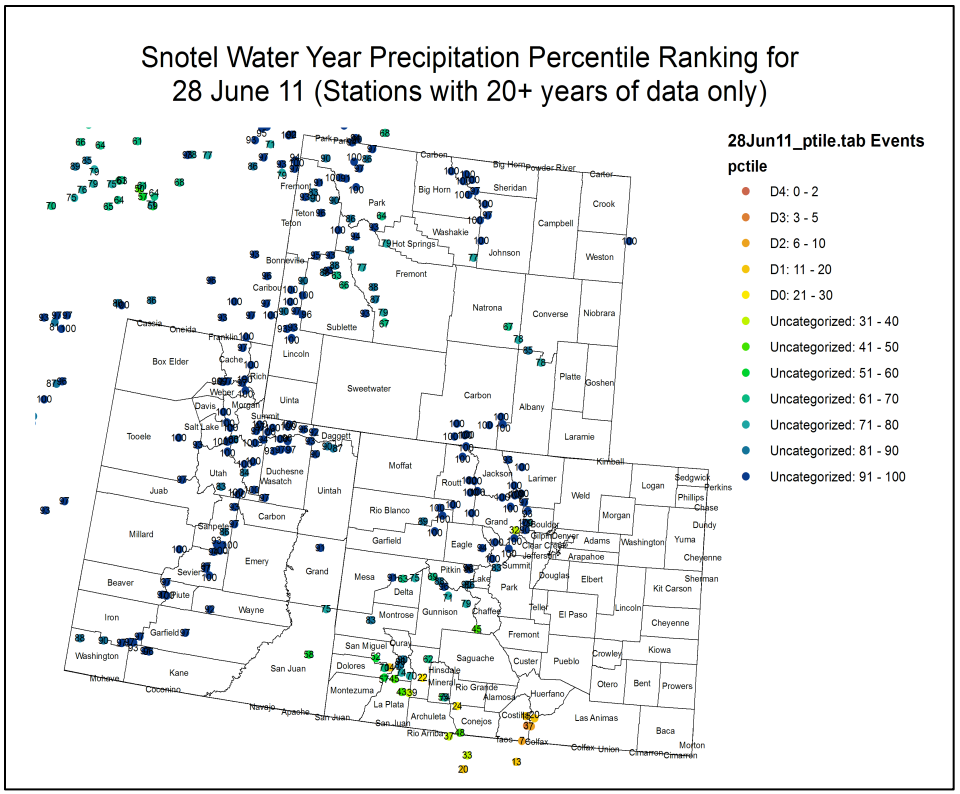


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21-30% is Drought Monitor's D0 category).

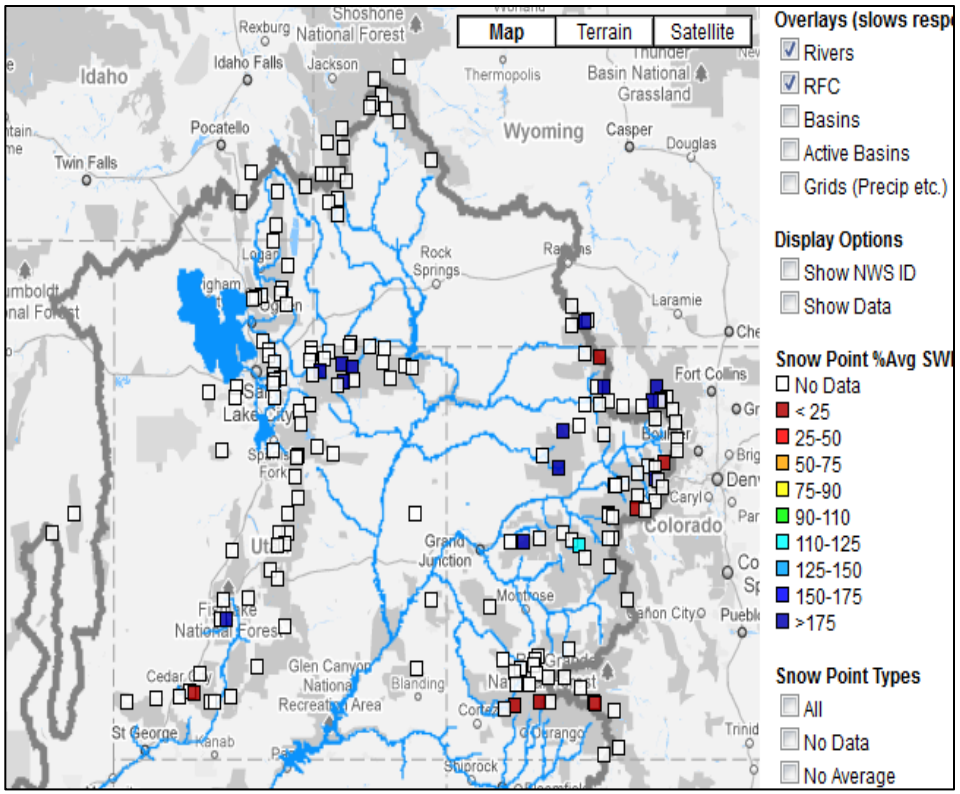


Fig. 4: SNOTEL WYTD accumulated snow water equivalent as a percent of average.

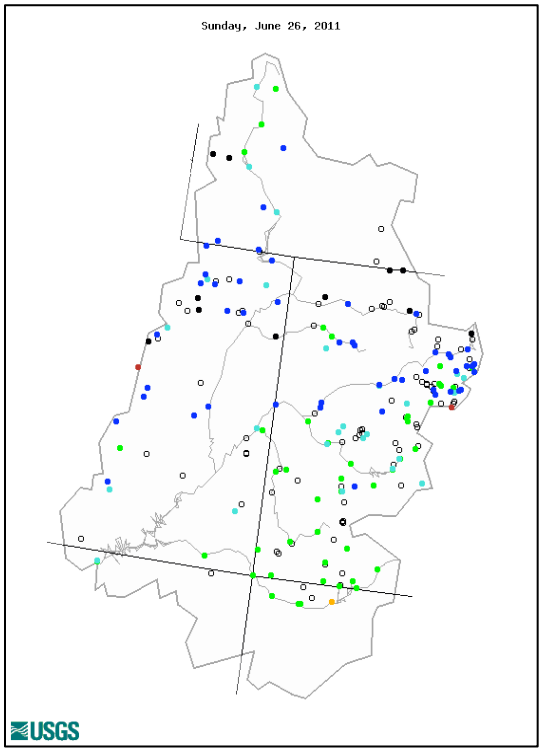
The majority of the SNOTEL sites in the UCRB are showing very high (and in many cases, record high) percentile rankings for water-year-to-date (WYTD) precipitation (Fig. 3). The Rio Grande and San Juan basins in southern CO are the driest, though the higher elevations of the San Juan basin have improved somewhat from the earlier part of the water year. Several sites in the Sangre de Cristos show percentiles worthy of D1 – D2.

After a near record season high for snowpack in the UCRB, the majority of the SNOTEL sites have now completely melted their accumulated snowpack for the season (Fig. 4 – white squares indicate sites that have completely melted out). Most of the sites with significant remaining snowpack are located in the higher elevations of the Duchesne River basin (Lakefork Basin still has 25 inches of snow water equivalent) and near the upper reaches of the Colorado and Yampa Rivers (the Tower site still has about 40 inches of snow water equivalent).

Streamflow

As of June 26th, about 97% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows with 63% of the gages recording flows above the 75th percentile (Fig. 5). As of June 21st, 2 gages were still exceeding the National Weather Service flood stage—one on the Colorado River and one on the Green River. Many of the gages in the northern part of the UCRB are still recording real-time flows at or above the 99th percentile, while flows in the southern part of the basin have receded.

Key gages on the Colorado River near the CO-UT state line and the Green River at Green River, UT have above normal 7-day average streamflow at the 91st and 95th percentiles, respectively (Fig. 6). Streamflow on the San Juan River near Bluff, UT is at the 37th percentile, down from the 66th percentile last week. Flows on the San Juan have decreased as a response to the decreased releases from Navajo combined with the lower snowpack now being completely melted out.



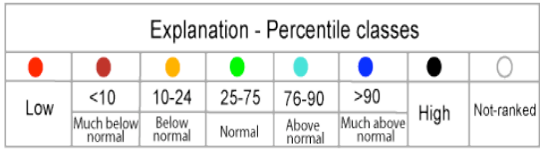


Fig. 5: 7-day average discharge compared to historical discharge for June 26th.

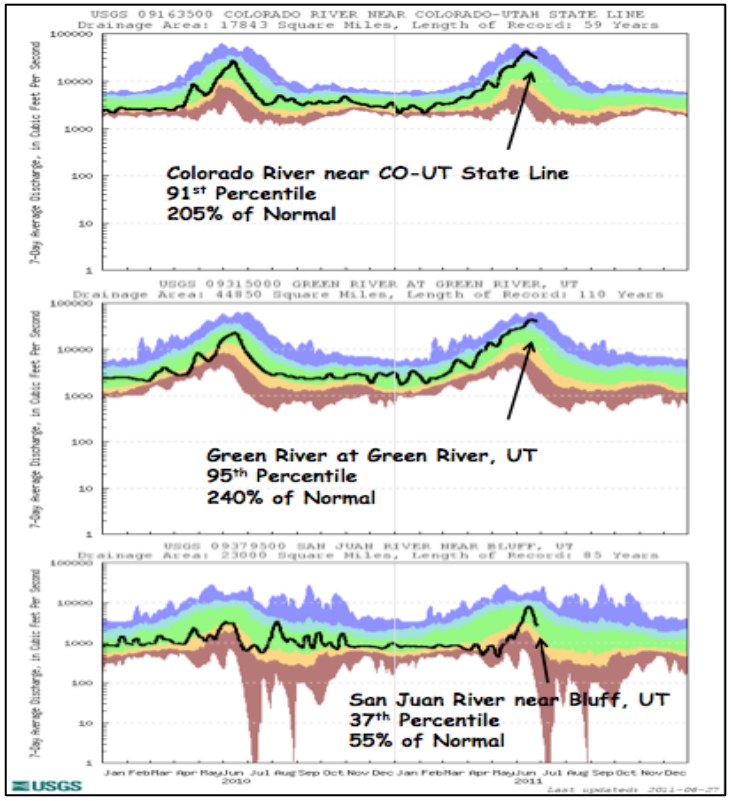


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Last week, near average temperatures were prevalent over the UCRB, with slightly warmer than average temperatures over the Four Corners and San Luis Valley. Soil moisture conditions remain poor for the San Luis Valley. Soil moisture is above average along the Wasatch range in UT, in the northern CO mountains, and in northeast CO (Fig. 7). Soil moisture models also indicate improved conditions over southeast CO as a response to the recent large storm, though the models could be erroneously overestimating moisture that is not actually being observed in the region.

All of the major reservoirs in the UCRB have experienced rapid storage increases in June. Daily inflows into Flaming Gorge, Blue Mesa, and Lake Powell are all well above their averages for this time of year. Inflows into Navajo have dipped below their average for this time of year. Lake Powell has seen large increases in volume and is now at 80% of average. It is projected that Lake Powell's elevation will continue to rise through late July—projected elevation levels would be the highest they've been since October 2001.

Summer Forecast

The La Niña that dominated over the winter has now been replaced by neutral conditions though the atmosphere continues to show lingering La Niña-like features. Models are predicting neutral conditions to continue through the summer, but are divided on what conditions will be later in the year—some trending back to La Niña while some shift to an El Niño pattern. Over the next week, a minor disturbance will move through the area, bringing the possibility for thunderstorms over the Four Corners area and mainly west of the Continental Divide. Temperatures in the UCRB are expected to remain near or above average. The introduction of monsoon flow into Arizona is expected over the next two weeks and could soon extend into the UCRB. For the summer, drier conditions are expected over parts of the UCRB and into eastern CO (Fig. 8). It is possible that the recent record snowpack and current wildfire season could delay and suppress this year's monsoon. Klaus Wolter's full forecast can be found at:
http://www.esrl.noaa.gov/psd/people/klaus.wolter/SWcasts/

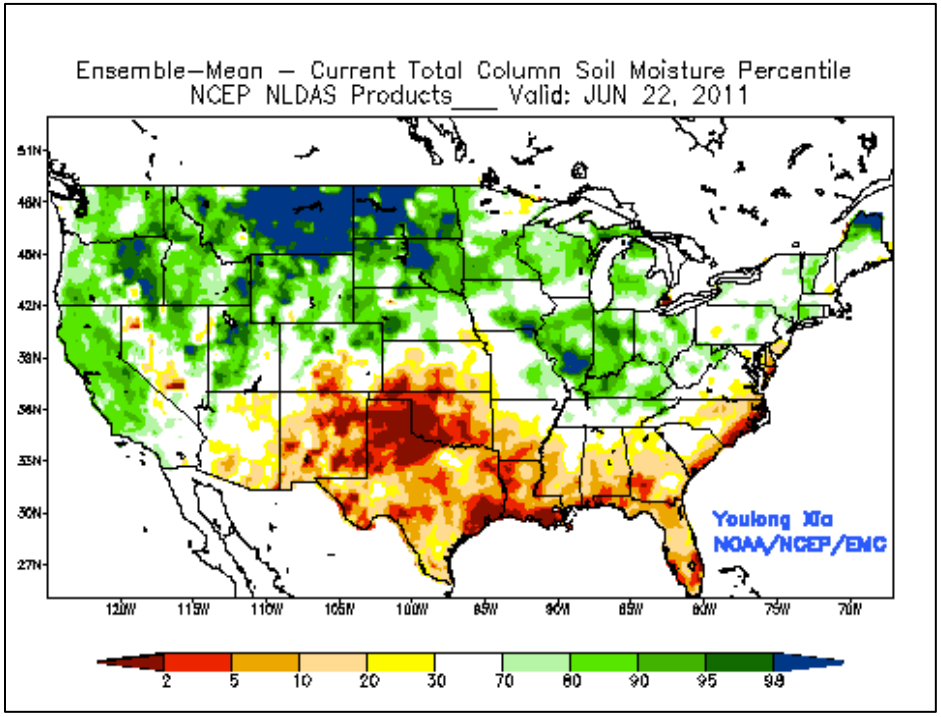


Fig. 7: NLDAS total column soil moisture percentiles for June 22nd.

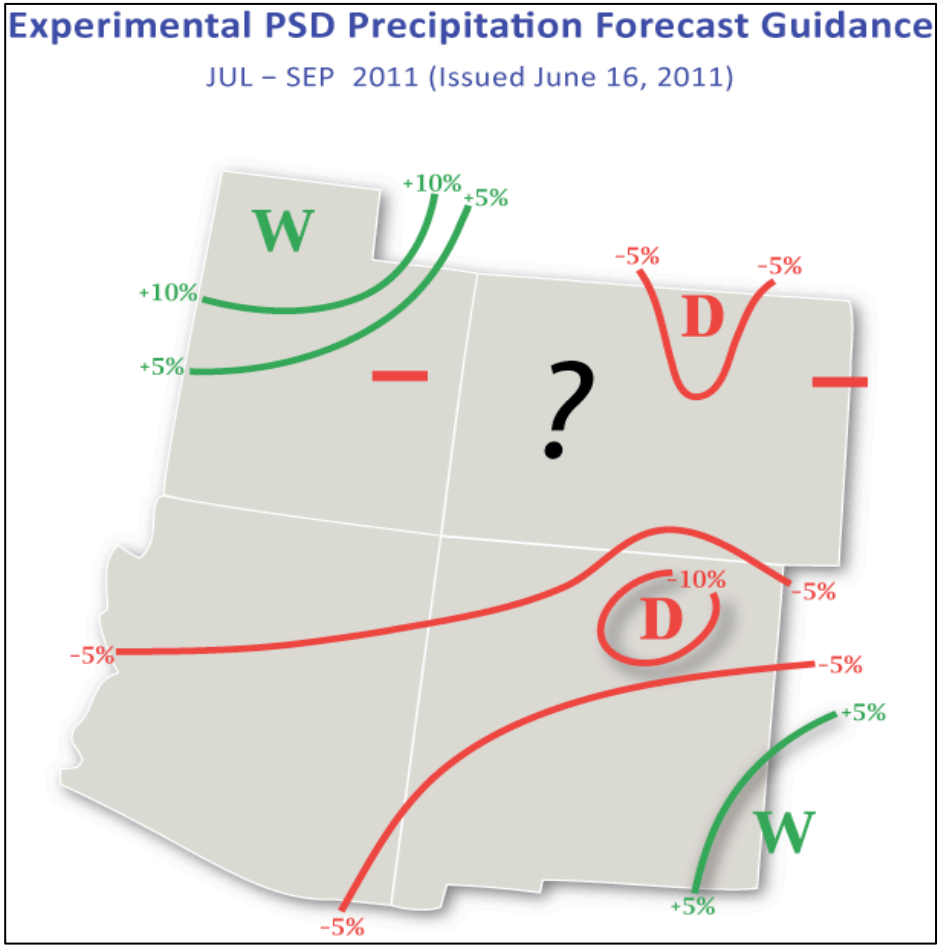
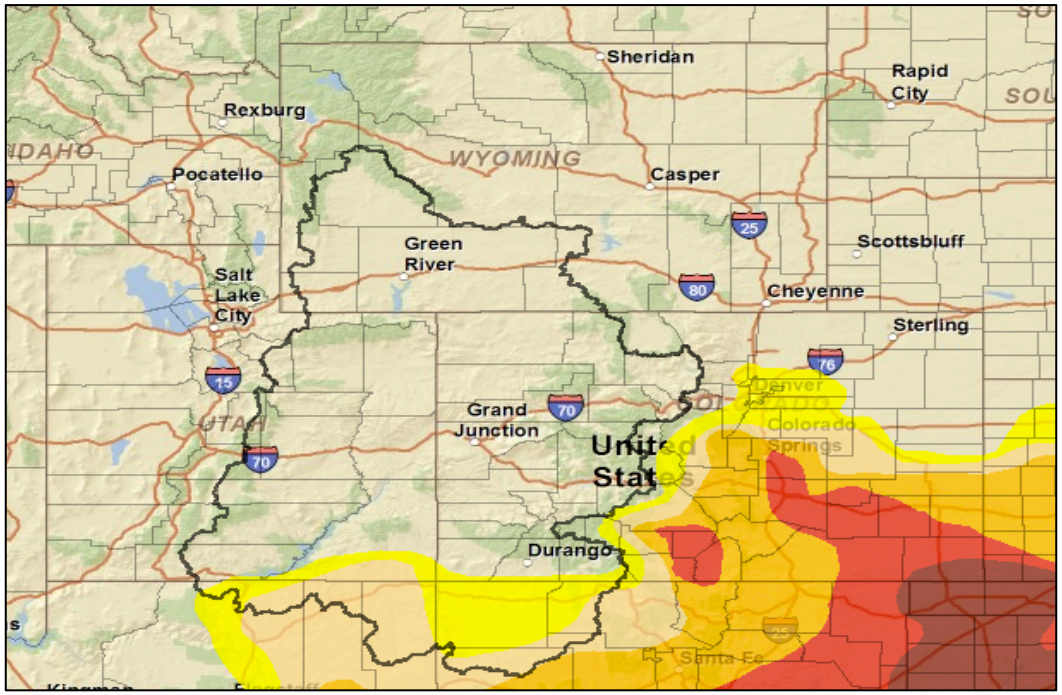
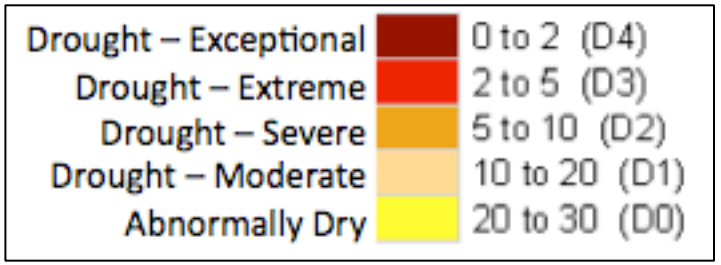


Fig. 8: July – September probablistic precipitation forecast issued by Klaus Wolter on June 16th.

Drought and Water Discussion





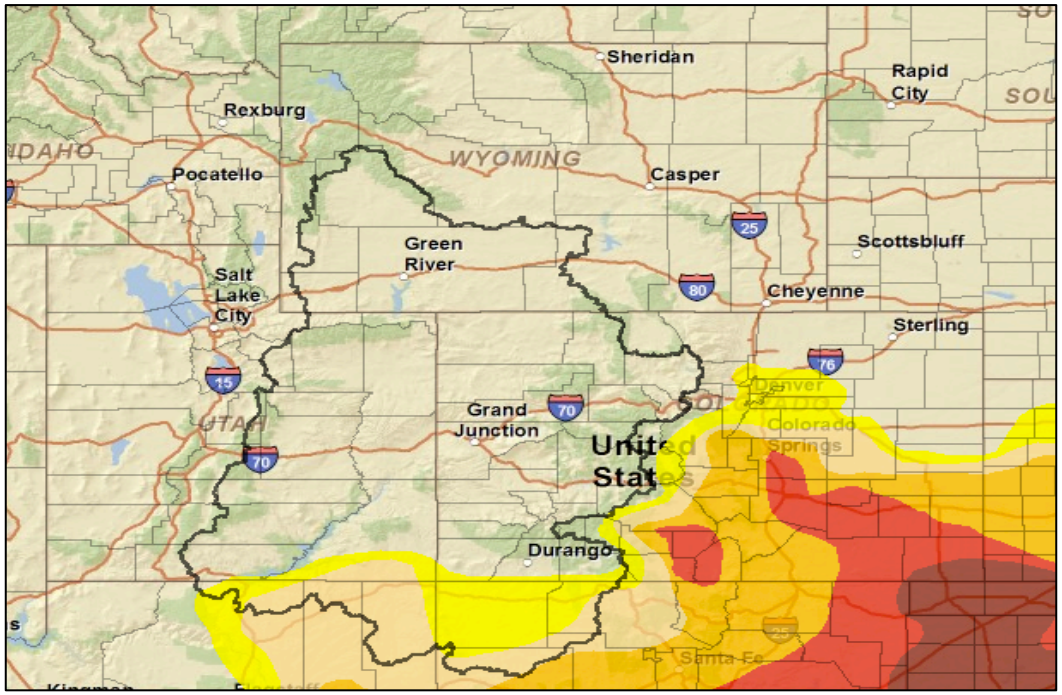
Drought categories and their associated percentiles

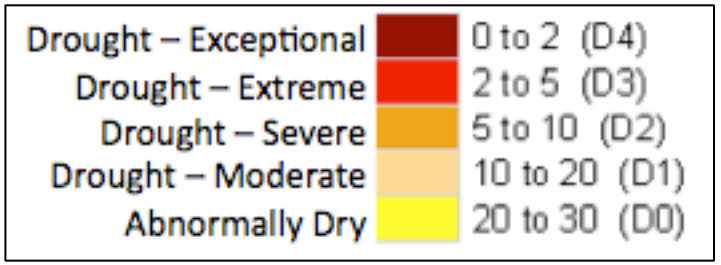
Fig. 9: June 21st release of U.S. Drought Monitor for the UCRB

In the UCRB, the current U.S. Drought Monitor (USDM) author expanded the D0 and D1 that is currently in the Four Corners region (Fig. 9). The D0 extends through Montezuma, La Plata, Hinsdale and Mineral counties, while D1 now extends eastward to the UT-CO border. Status quo is recommended for the rest of the UCRB.

More degradations are proposed for the San Luis Valley. D1 – D3 expansion would be justified westward through Rio Grande and Conejos counties. Eastward, the D3 could be expanded to cover more of the Sangre de Cristo mountains and into Huerfano County.

Drought and Water Discussion





Drought categories and their associated percentiles

Fig. 9: June 21st release of U.S. Drought Monitor for the UCRB

Short term SPIs and impacts in the region suggest a westward expansion of the D3 from El Paso and Pueblo counties into Fremont and Custer counties—this could likely be connected to the D3 in the San Luis Valley and Huerfano County. Major drought impacts and low SPIs in Chaffee and Park counties point to an expansion of the D0 to the Continental Divide and a westward expansion of D1.

Though recent precipitation events seemed to warrant improvements in southeast CO last week (Fig. 9), impacts from the area still suggest that the situation is not improved. It has been recommended by local experts that D3 be expanded to cover southern Lincoln County and more of western Kiowa County.