

NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

December 7, 2010

Precipitation and Snowpack

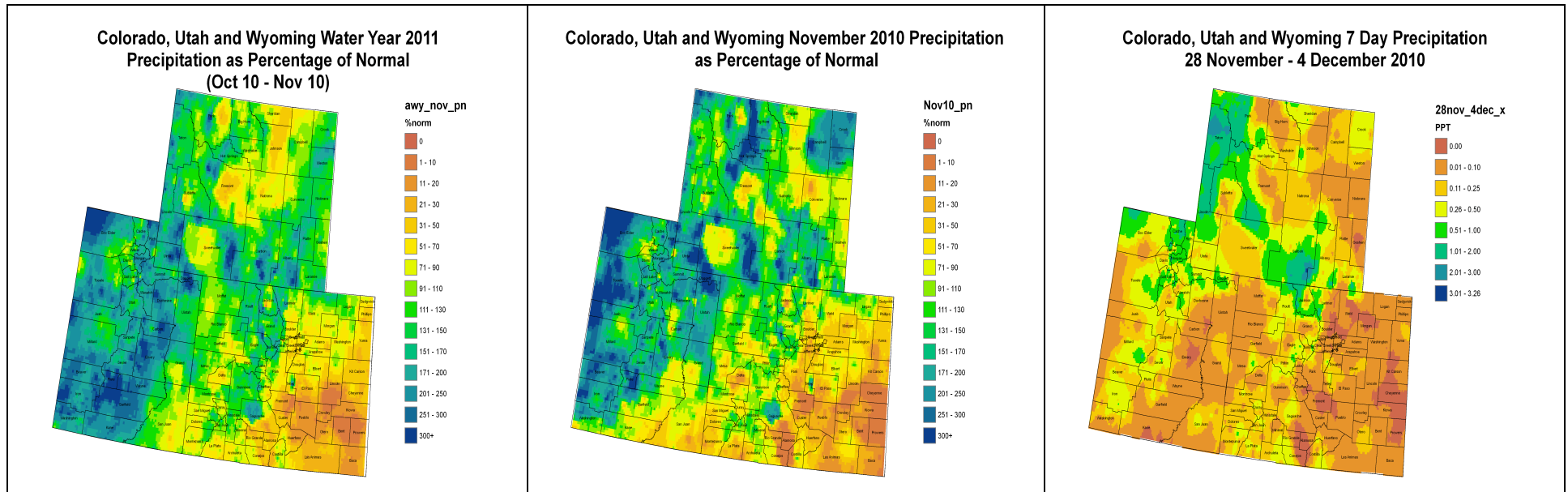


Fig. 1: WYTD precip as percent of ave.

Fig. 2: November precip as percent of ave.

Fig. 3: Nov. 28 – Dec. 4 precip in inches.

For the current water year (October – November 2010), the western portion of the Upper Colorado River Basin (UCRB) has received plenty of moisture with several counties in Utah seeing over 200% of average (Fig. 1). For the water year, and also for the month of November, the eastern plains of Colorado, the Rio Grande basin, and the four-corners region have been abnormally dry (Fig. 2). Parts of Sweetwater County, WY were also fairly dry for the month of November.

Last week, precipitation was mostly confined to the northern portion of the UCRB (Fig. 3). Parts of the Lower and Upper Green River basins received anywhere from a quarter of an inch to an inch of moisture for the past week. Areas of the North Platte basin received over an inch of precipitation. Much of the central part of the UCRB, the CO eastern plains and the Rio Grande basin stayed fairly dry for the week, with less than a tenth of an inch recorded throughout most of these areas.

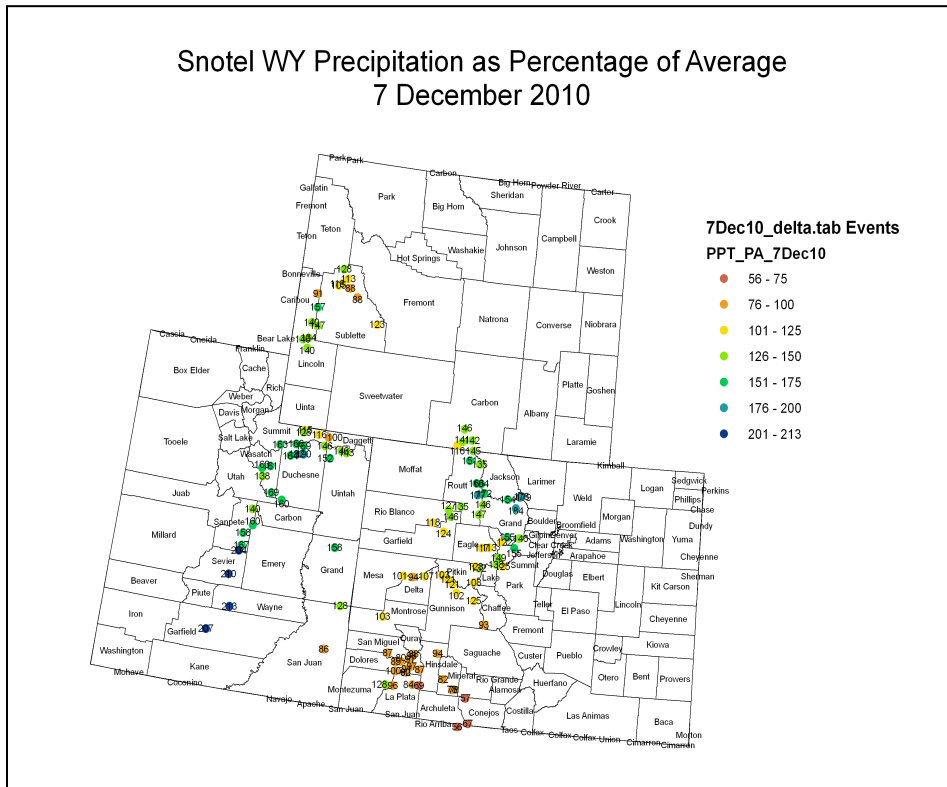


Fig. 4: SNOTEL WYTD precipitation percent of average.

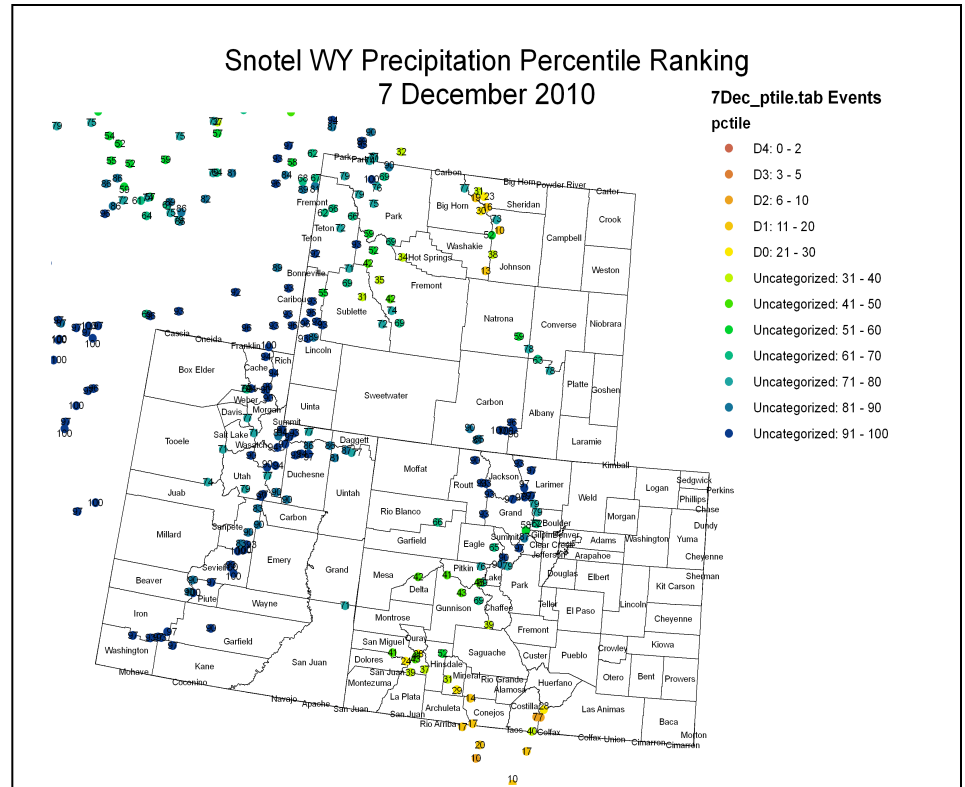


Fig. 5: SNOTEL WYTD precipitation percentiles (50% is median, 21-30% is Drought Monitor's D0 category).

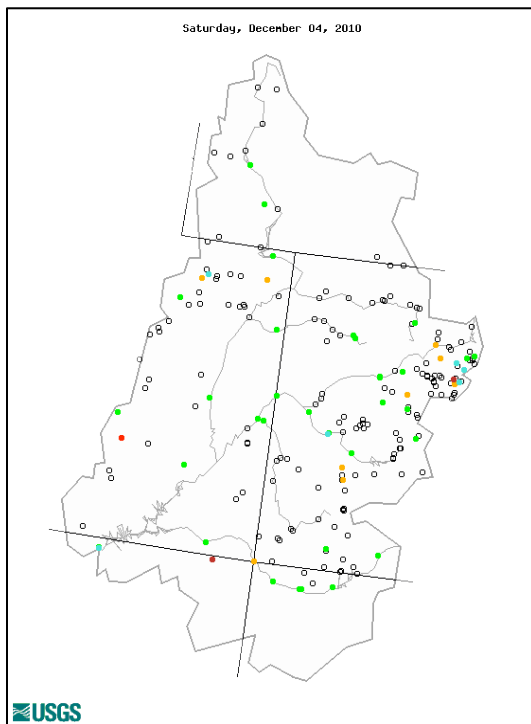
Though much of the central UCRB received below average precipitation for the week, the Colorado headwaters region still shows water-year-to-date (WYTD) percents of average over 100 (Fig. 4); much of the western UCRB in Utah is still over 150% of average for the water year. SNOTEL sites in the San Juan basin have received less than 100% of average precipitation for the water year. The Upper Green River basin saw some improvements this past week, with most sites now recording near 100% of average for the water year.

Percentile rankings for the SNOTEL stations around the UCRB show most stations ranked fairly high (Fig. 5). Aside from several stations in the Rio Grande basin, most stations are showing percentiles in the 70s to 90s—meaning less than thirty percent of the water years on record have been wetter by this time. The lowest percentiles in the south match up with areas of lowest percents of average, meaning that it is rare for these areas to have such dry beginnings to the water year.

Streamflow

As of December 4th, about 76% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows (Fig. 6). Though an increasing number of streams have frozen over, the majority of gages still recording show decent 7-day average flows for this time of year. The Colorado headwaters region currently has the highest density of gages reporting below normal flows.

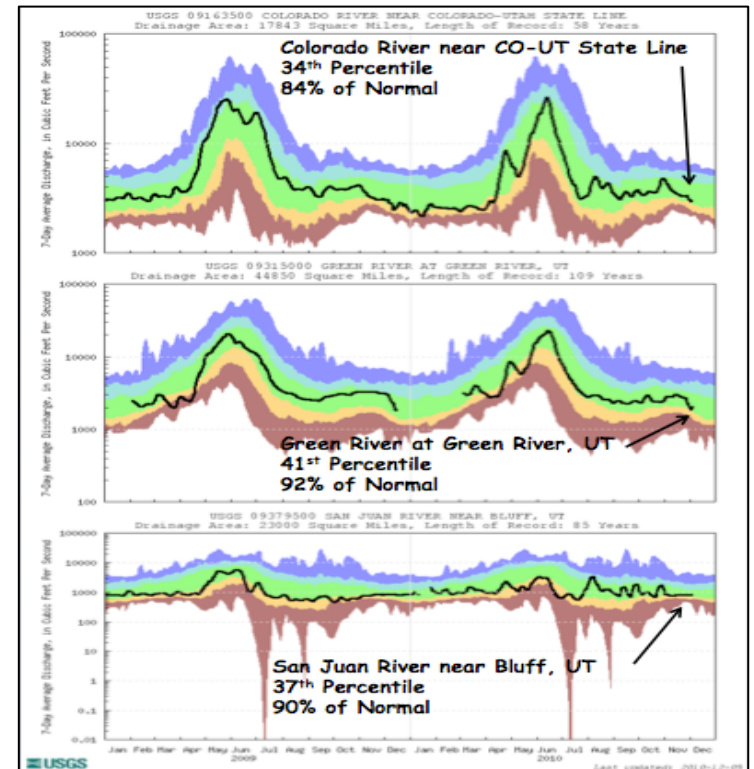
Looking at hydrographs around the UCRB, key sites are showing near normal discharges and look pretty good in terms of seasonal flow conditions (Fig. 7). 7-day average discharge at the Colorado River at the CO-UT state line is at 84% of normal, while discharges on the Green River at Green River, UT and on the San Juan River near Bluff, UT are both over 90% of normal. All three gages show 7-day average discharge within the normal percentile range, though all show below normal cumulative runoff for the calendar year. The San Juan River site is likely to see only 50% of its normal cumulative runoff for the calendar year.



Explanation - Percentile classes							
●	●	●	●	●	●	●	○
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

Fig. 6: USGS 7-day average streamflow compared to historical streamflow for December 4th in the UCRB.

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



Water Supply and Demand

Last week saw a return to above average temperatures for the UCRB. The northern region of the UCRB was the warmest with anomalies of +4° to +6°F. The eastern plains saw closer to average temperatures for the week. Soil conditions have continued to deteriorate just east of the UCRB, in the plains of Colorado (Fig. 8), and dry soil conditions are also still showing up in northwestern NM.

Most of the reservoirs in the UCRB stayed fairly steady over the past week, with storage drops of less than 1,000 acre feet. Only Lake Powell, Lake Dillon, and Green Mountain Reservoir are below average for this time of year. Even though below average, both Lake Dillon and Green Mountain saw November releases that were much less than normal releases for this time of year. Many of the other reservoirs also experienced much smaller releases than is normal for November, including Blue Mesa—storage for November increased by over 3,000 acre feet though normally its storage decreases by 47,000 acre feet from November to December. Lake Powell (currently at 78% of average and 62% of capacity) released more than what was projected for November, but inflows into the reservoir were also greater than projected.

Precipitation Forecast

Next week, the northern portion of the UCRB has the best possibility of receiving precipitation, though totals could be lower than what recent storms have brought to the region. The southern part of the UCRB and the plains east of the UCRB could remain fairly dry over the next week. After this week, longer range forecasts show the possibility for drier conditions across the region with only small chances for precipitation.

The La Nina has recently strengthened after about a month of weakening. During the winter, La Nina is likely to provide wetter conditions for the northern mountains of the UCRB with drier than average conditions common in the spring for most of the UCRB. With this year's strong La Nina, it is likely that the La Nina will continue into 2012, and the second consecutive years of La Nina are consistently drier than the first (Fig. 9). However, there could be some ambiguity in this second year forecast. Another recent study has shown a correlation between temperature differences in the Arabian Sea and precipitation in the UCRB which would suggest the possibility for a wetter second year.

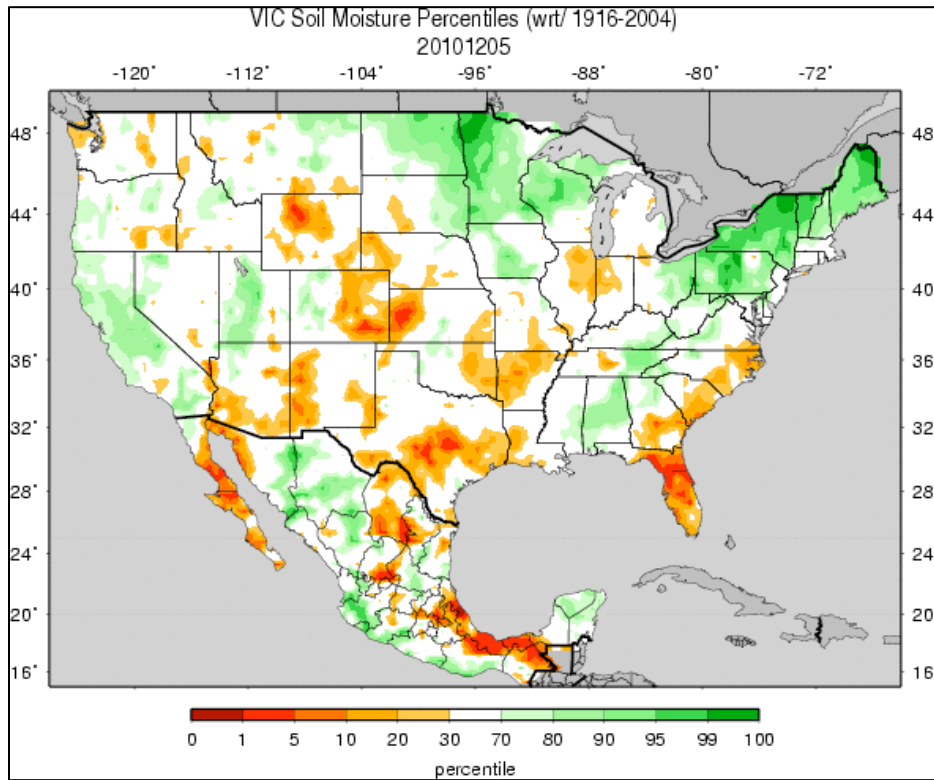


Fig. 8: VIC soil moisture percentiles as of December 5th.

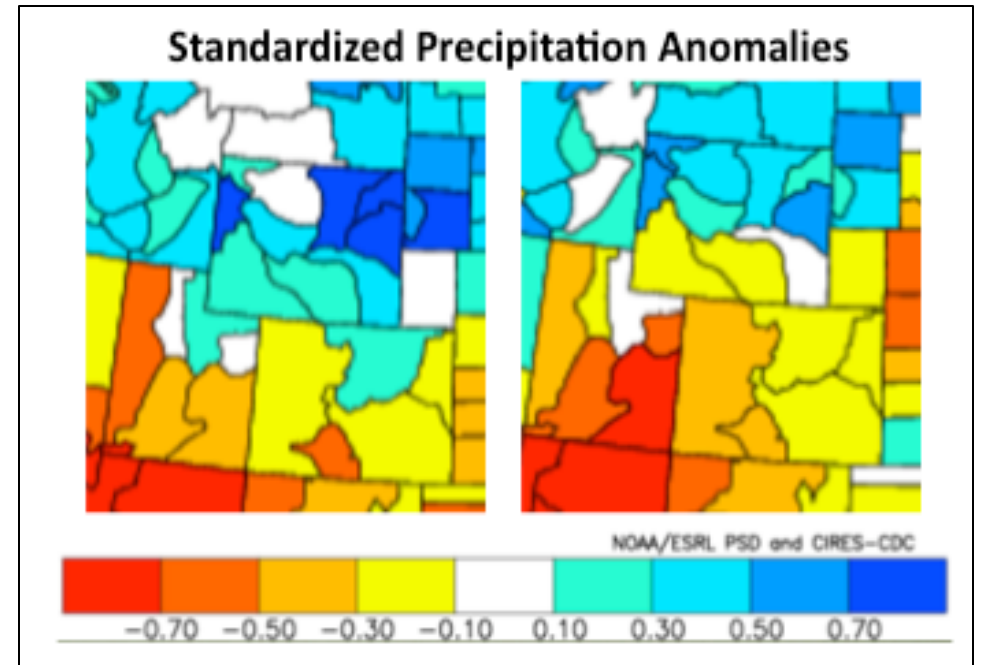


Fig. 9: Standardized precipitation anomalies for first year La Ninas (left) and second year La Ninas (right) compared to the long term average.

Drought and Water Discussion

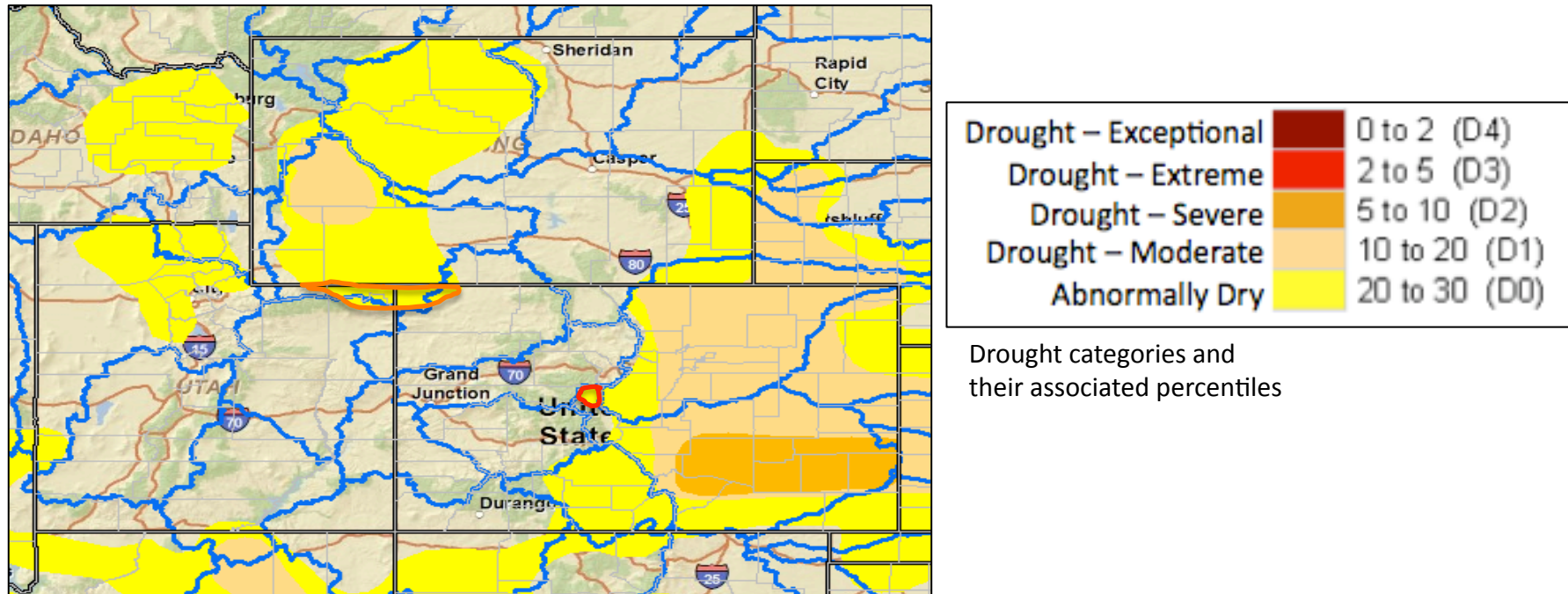


Fig. 10: November 30th release of U.S. Drought Monitor for the UCRB

A couple of suggestions have been made for the current U.S. Drought Monitor map (Fig. 10). First, the removal of D0 from Lake County, CO has been suggested (Fig. 10, red line). According to the Pueblo NWS office, Climax, CO in the region is currently at 136% of average precipitation for August – November.

It has also been suggested that D0 be removed from northeastern UT and northwestern CO (Fig. 10, orange line). Poor soil conditions in southwestern WY do not extend into CO or UT. Streamflow and SNOTEL in the area seem to be in good condition. Unfortunately, precipitation data are rather sparse in the area, so it is difficult to know exactly how to define the boundary between D0 and nothing.