NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

April 10, 2012

Precipitation and Snowpack

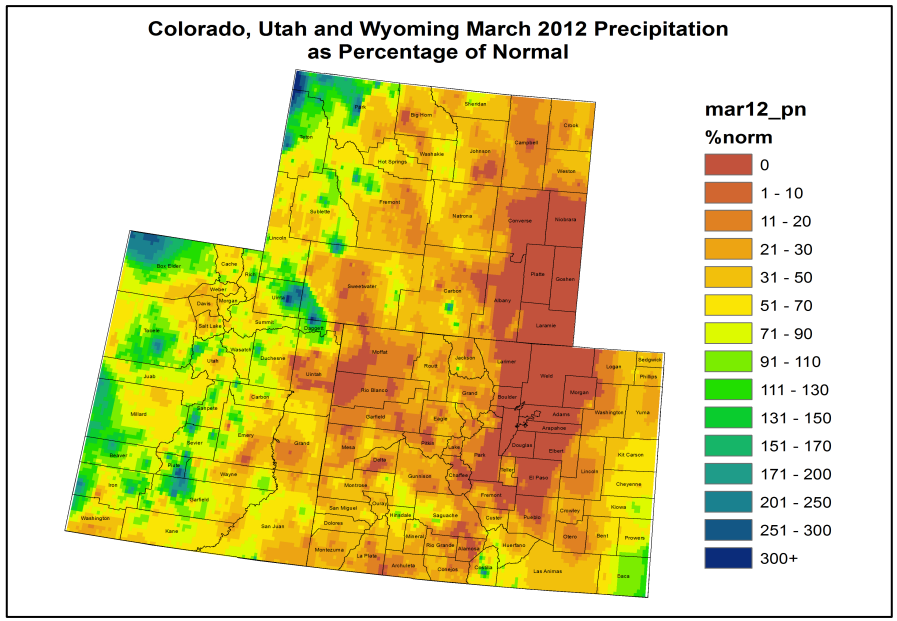


Fig. 1: March precipitation as a percent of average.

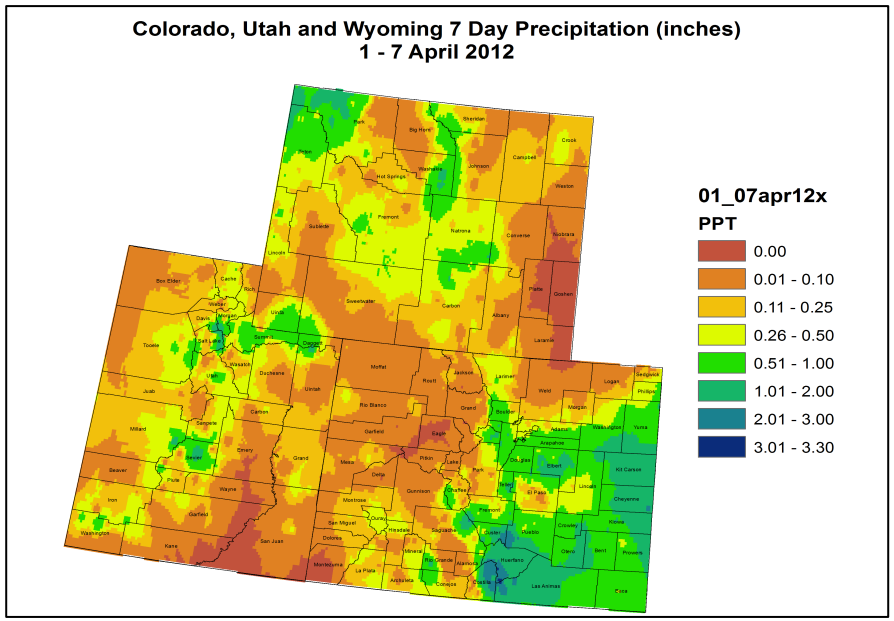


Fig. 2: April 1 – 7 precipitation in inches.

For the month of March, most of the Upper Colorado River Basin (UCRB) was 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. Most of the CO Front Range experienced an extremely dry March with the far eastern plains receiving between 50% and 100% of average precipitation.

Last week, the heaviest precipitation fell east of the UCRB (Fig. 2) with accumulations through much of eastern CO ranging between half an inch and two inches, and over 2 inches in parts of the Sangre de Cristos. In the UCRB, parts of northeast UT and southwest WY received between half an inch and an inch of precipitation for the week, with some isolated regions in the basin receiving between a tenth and a quarter of an inch. Most of the UCRB saw less than a tenth of an inch of moisture for the week.

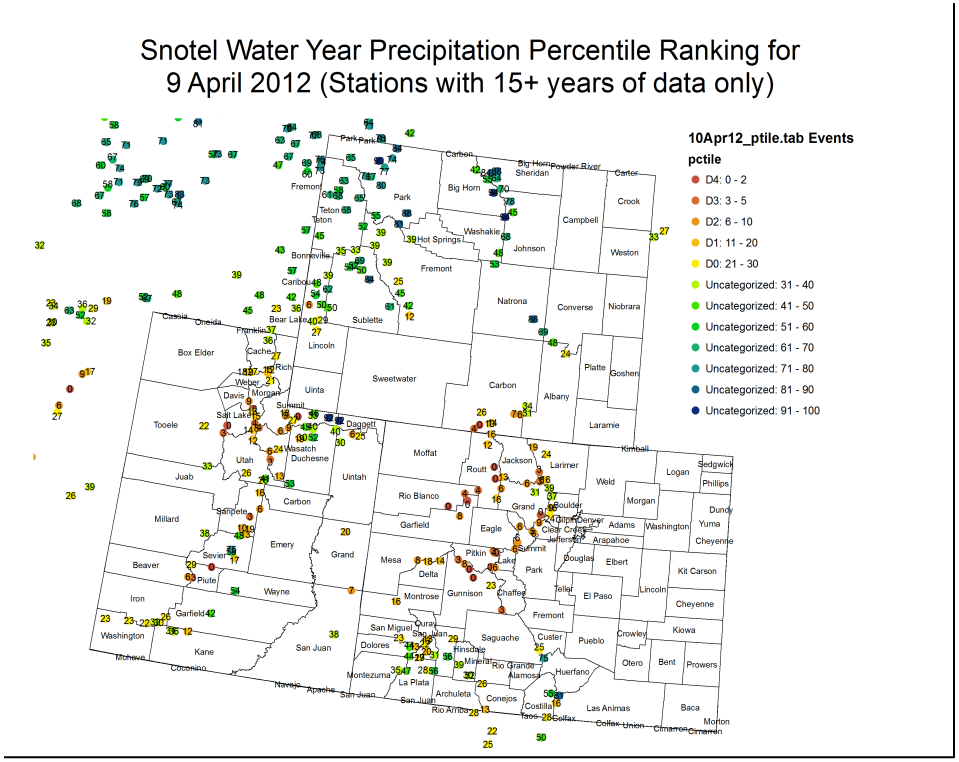


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21 – 30% is Drought Monitor D0 category).

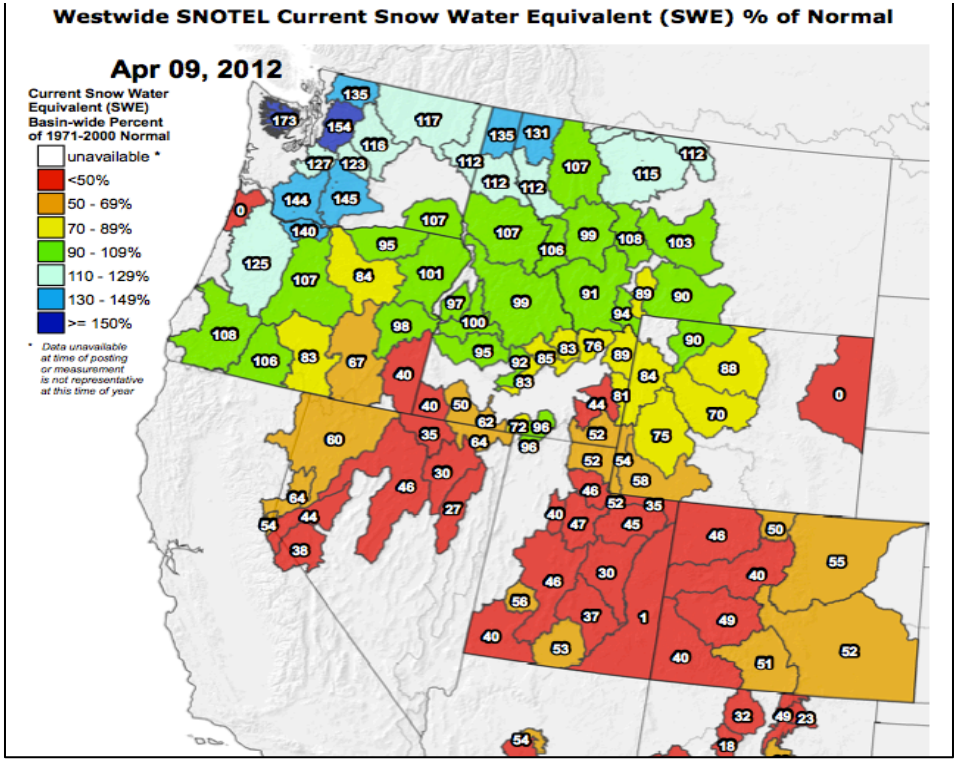


Fig. 4: Basin snow water equivalent (SWE) as a percent of average.

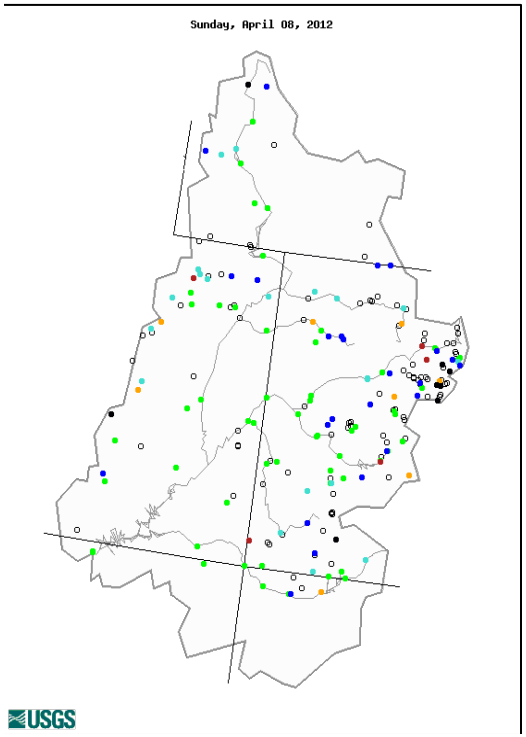
Water-year-to-date (WYTD), SNOTEL precipitation percentiles are lowest for the northern and central mountains of CO, with percentiles ranging from single digits to around the 20th percentile (Fig. 3). The Wasatch range in UT is also fairly dry, with many SNOTEL sites showing percentiles in the teens. 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 the 30th percentile, 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). All of the sub-basins in eastern UT and western CO are showing SWE values below 50% of average. Most of the snowpack in far eastern UT is entirely gone, as the basin snowpack there is at 1% of average. The sub-basins in southwest WY are still showing SWE values above 50% of average, but there is also rapid melting there too.

Streamflow

As of April 1st, 89% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows (Fig. 5). About 44% of the gages in the basin are recording above normal flows, while about 11% 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 122 currently recording. 28% of the gages are recording much above normal flows or higher, and 8 gages are recording high flows (with most of those near the Colorado headwaters region). These higher flows are likely due to early melt-off from unseasonably warm temperatures for the past month, and could mean lower peak flows later in the season.

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 have been rising, which is normal for this time of year and are at the 57th and 42nd percentiles, respectively. Flows on the Green River at Green River, UT are currently at the 71st percentile.



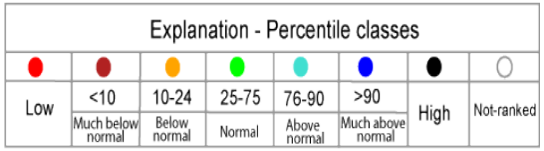


Fig. 5: 7-day average discharge compared to historical discharge for April 8th.

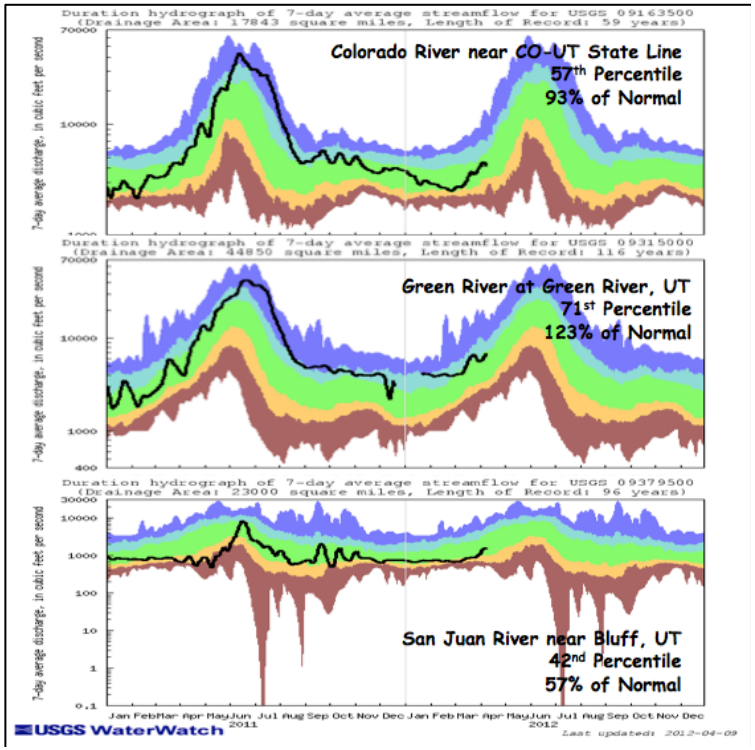


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Much of the UCRB saw closer to average temperatures for the week, with slightly cooler temperatures on the west side and warmer temperatures on the east side Northeast CO continued to experience above average temperatures . 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 84% of average and 64% of capacity (compared to 53% one year ago).

Precipitation Forecast

Warm and dry conditions will continue across the UCRB for one more day before the next potent spring storm begins to impact the area. Ahead of this trough gusty southwesterly winds will increase through the day on Wednesday, with ongoing fire weather concerns under the warm and dry flow. Expect to see isolated showers forming by Wednesday night through Thursday as moisture from the approaching trough begins to impinge on western sections of the basin. There will be a brief lull in activity on Friday before the bulk of the west coast energy drops south and forms a broad trough over the inter-mountain west. This large trough will result in an extended period of precipitation and cooler than average temperatures for the majority of the UCRB through the weekend. Anticipate liquid accumulation amounts of 0.50 across valley locations of western CO, while higher elevations could receive around 0.75 inches through Sunday with locally higher amounts approaching 1.00 inch possible over the highest peaks (Fig. 8). Unsettled conditions may persist into early next week as remnants from the storm linger over the southern half of the basin through Monday.

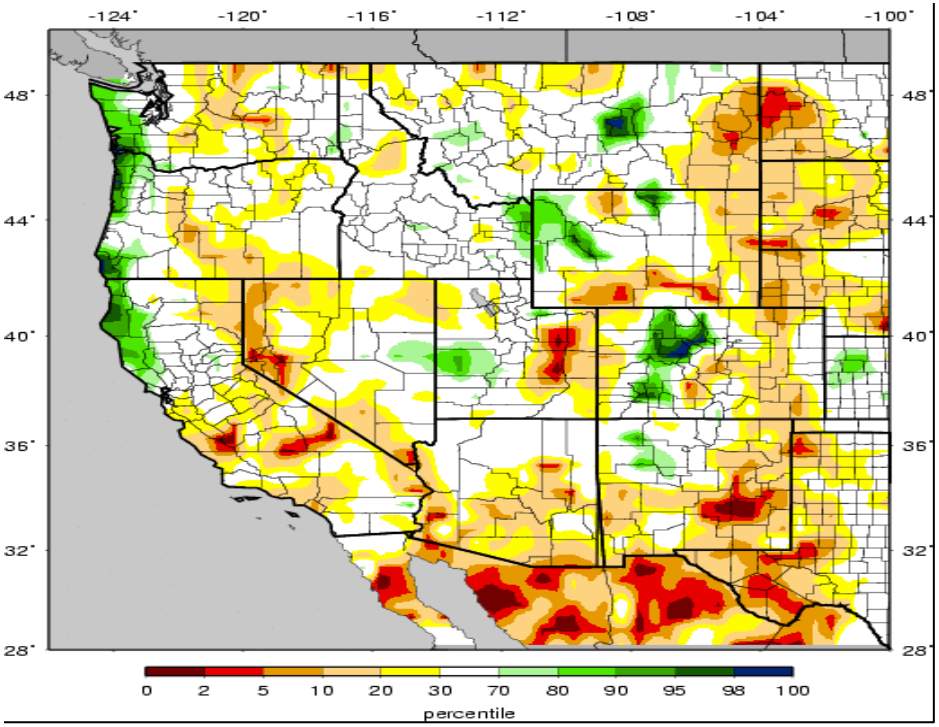


Fig. 7: VIC soil moisture percentiles as of April 8th, with total moisture storage (SWE and soil moisture) below.

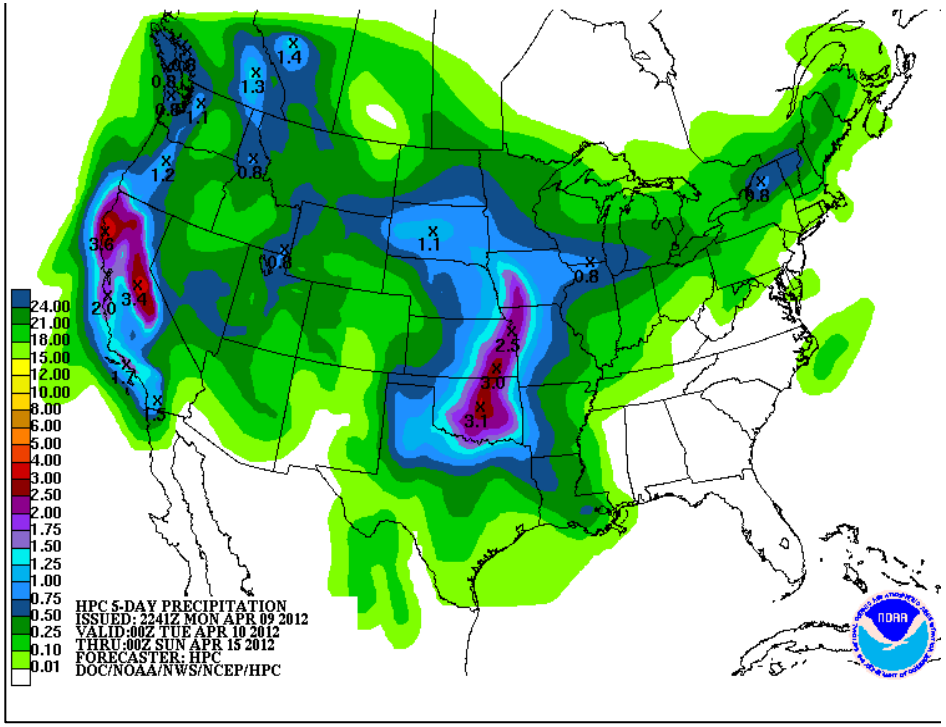
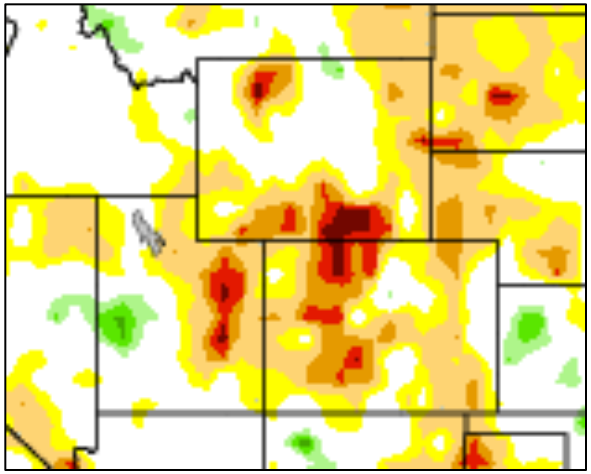
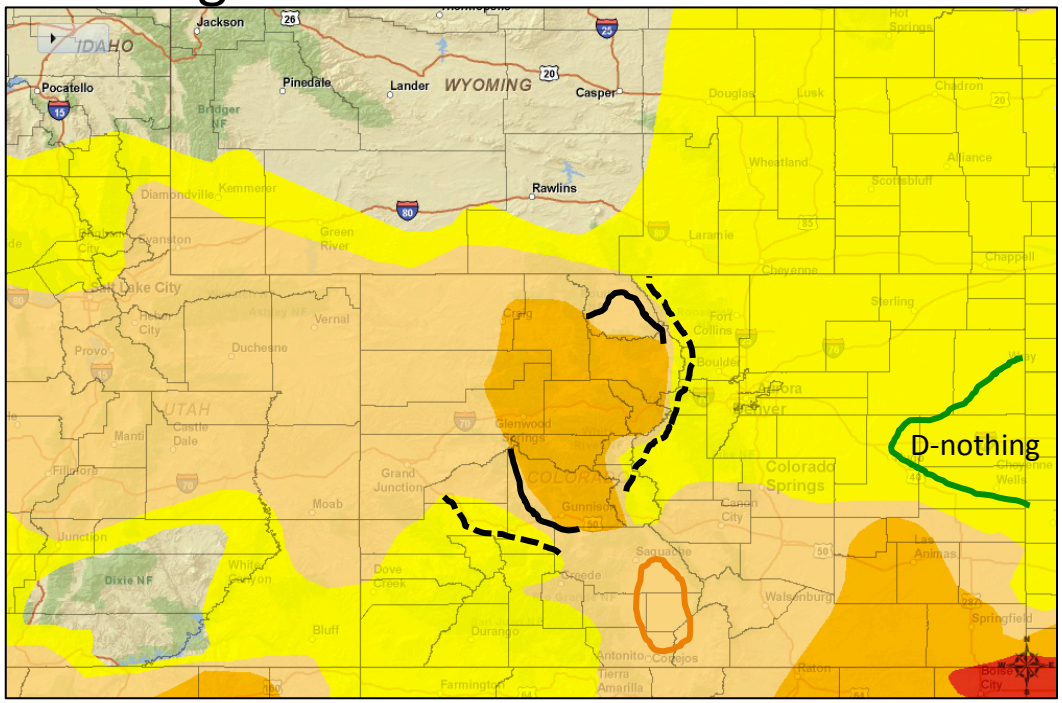


Fig. 8: Hydrologic Prediction Center's Quantitative Precipitation Forecast (QPF) through 00UTC Sunday.



Drought and Water Discussion



Drought – Exceptional	0 to 2 (D4)
Drought – Extreme	2 to 5 (D3)
Drought – Severe	5 to 10 (D2)
Drought – Moderate	10 to 20 (D1)
Abnormally Dry	20 to 30 (D0)

Drought categories and their associated percentiles

Fig. 9: April 3rd release of U.S. Drought Monitor for the UCRB.

In the first draft of the U.S. Drought Monitor (USDM) map, the current USDM author removed the D3 in Baca County, CO and has decreased the D2 in Las Animas, Otero, Crowley, Kiowa and Bent counties. In addition to these improvements, it is also recommended that the D0 be removed from some of eastern CO where short-term dryness has been relieved by recent storms (Fig. 9, green line). In the San Luis Valley, an introduction of D2 is recommended on the valley floor where short-term and long-term dryness exist (Fig. 9, orange line).

D1 expansion is recommended in Montrose and Gunnison counties, and also recommended to be expanded through Lake and northern Chaffee counties and then northward, across the Continental Divide (Fig. 9, dashed lines). D2 can be expanded more westward in Gunnison County and also expanded into the North Park valley in Jackson County (Fig. 9, solid black line). It is also recommended that the D-nothing in southern UT be filled in and now become D0. More widespread degradations could be considered, but are being held off at the moment due to excellent water supplies in the region.