

# NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

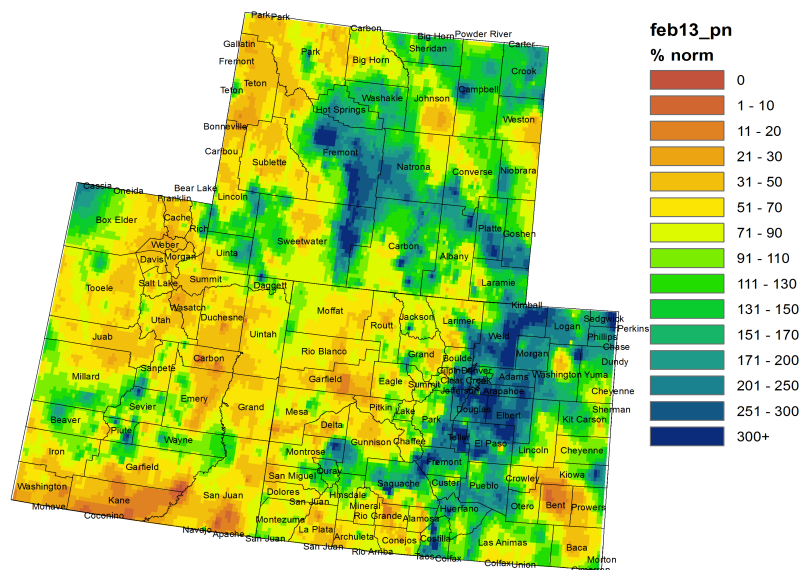
March 5, 2013

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Colorado, Utah and Wyoming February 2013 Precipitation as a Percentage of Normal



Colorado, Utah and Wyoming 7 Day Precipitation (in) 24 February - 2 March 2013

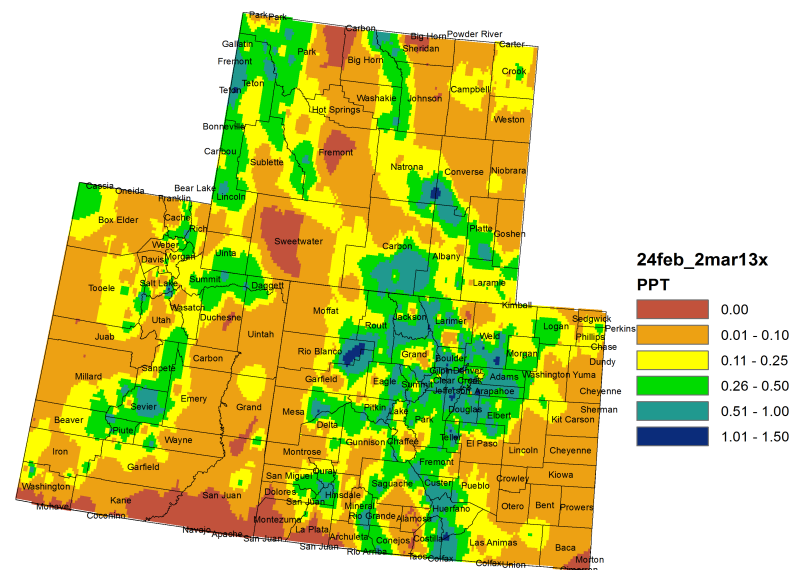


Fig. 1: February precipitation as a percent of average.

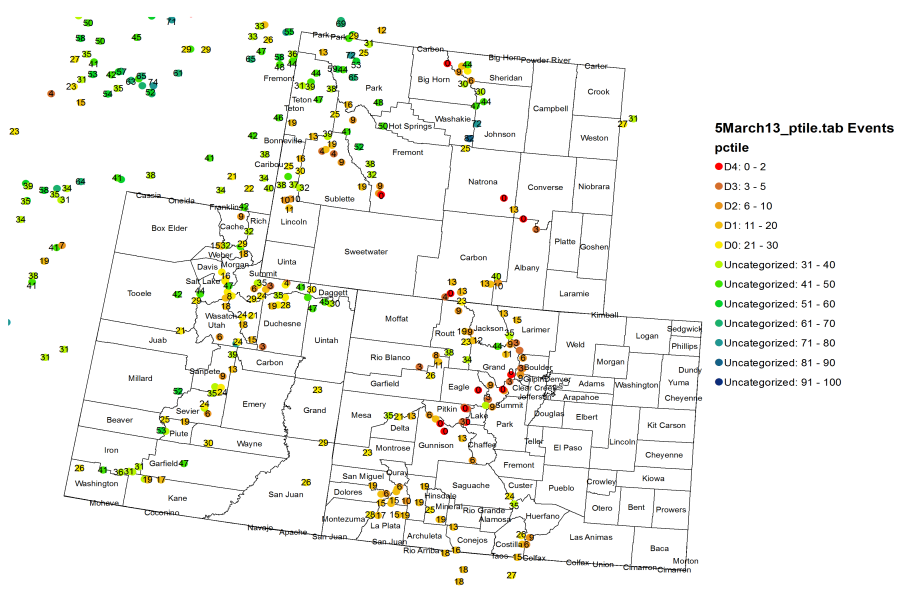
Fig. 2: February 24 – March 2 precipitation in inches.

## Precipitation

Last month, most of the Upper Colorado River Basin (UCRB) received less than average precipitation (Fig. 1). Though the higher elevation precipitation amounts exceeded 1 inch in most areas, much of the UCRB received between 20% and 90% of average moisture for February. Parts of southwest Colorado (in the San Juans) and southwest WY received near to slightly above average precipitation for the month. Northern Utah was very dry (less than 50% of average) and the Colorado River valley just above Lake Powell was also very dry last month (mostly less than 30% of average). East of the basin, southeast CO remained drier than average, but northeast CO and the Front Range has seen some reprieve with much above average precipitation.

Last week, most of the higher elevations of the UCRB received between .10 to over 1 inch of moisture, while the lower elevations received less than .10 inches in most areas (Fig. 2). The CO Front Range again received beneficial moisture, with accumulations ranging from .25 to 1 inch of precipitation. Most of the eastern plains of CO were drier, receiving less than .10 inches of moisture for the week.

Snotel Water Year Precipitation Percentile Ranking for 5 March 2013 (Stations with 15+ years of data only)



Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Mar 04, 2013

Current Snow Water Equivalent (SWE) Basin-wide Percent of 1981-2010 Median

- unavailable \*
- <50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- >= 150%

\* Data unavailable at time of posting or measurement is not representative at this time of year

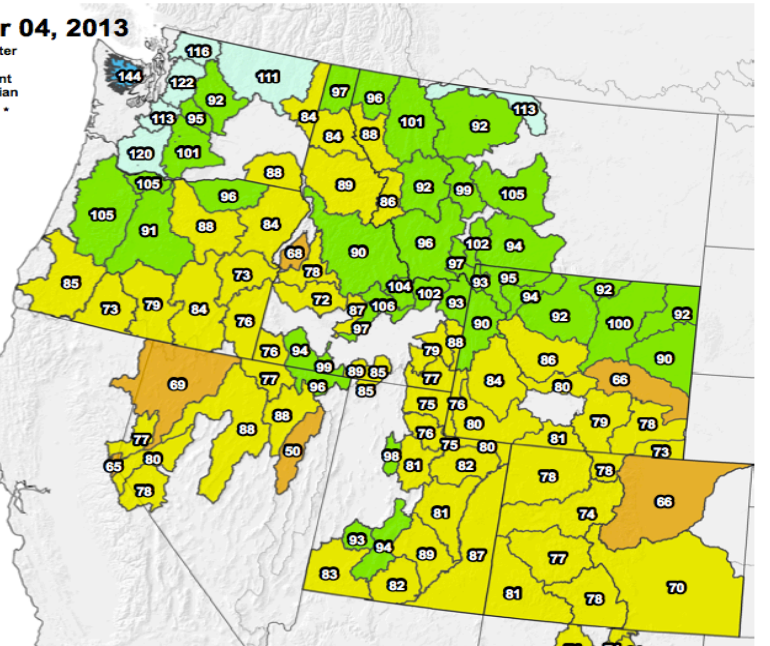


Fig. 3: WYTD SNOTEL precipitation percentiles (50<sup>th</sup> percentile is median, 30<sup>th</sup> percentile is D0 drought category) as of March 5<sup>th</sup>.

Fig. 4: Basin-averaged snow water equivalent as a percent of normal (median), as of March 4<sup>th</sup>.

## Snowpack

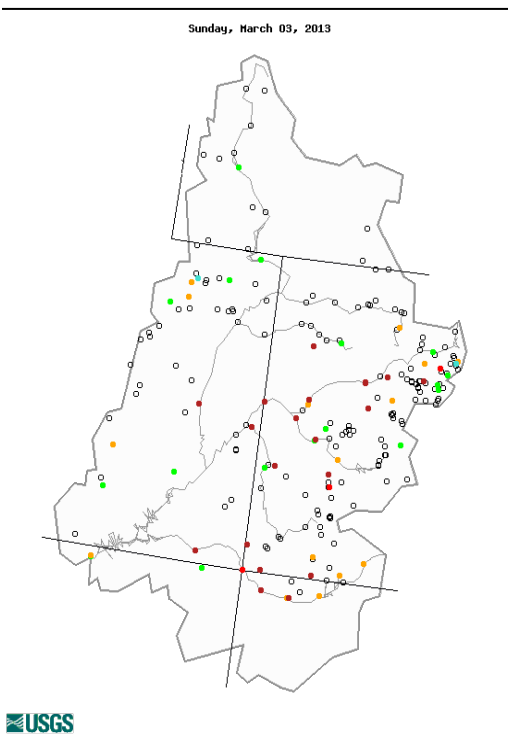
Water-year-to-date SNOTEL precipitation percentiles in the UCRB are below the median throughout the entire basin (Fig. 3). Along the Wasatch and Uintah ranges in UT and up to the Upper Green in WY, most percentiles range from the 20s to 40s, with a few that are now recording below the 10<sup>th</sup> percentile. The northern and central CO mountains are below the 20<sup>th</sup> percentile at most locations, with several sites recording below the 5<sup>th</sup> percentile. Percentile rankings in southwest CO in the San Juan mountains are mostly in the teens.

Accumulated snowpack is currently less than normal across the entire UCRB (Fig. 4). Sub-basins in western CO range between 74% to 81% of normal snowpack. The northeast UT and southwest WY basins, which had been closer to normal for most of the water year, are now a little lower, ranging from 75% of normal to 87% of normal for the season.

# Streamflow

As of March 3<sup>rd</sup>, about 34% of the USGS streamgages in the UCRB recorded normal (25<sup>th</sup> – 75<sup>th</sup> percentile) to above normal 7-day average streamflows (Fig. 5). About 40% percent of the gages in the basin are recording much below normal or low (i.e. lowest on record) streamflows, an increase from 29% two weeks ago. Many of the gages throughout the basin are under frozen conditions. However, the number of reporting stations (not ice-affected) has increased by 20 since one month ago.

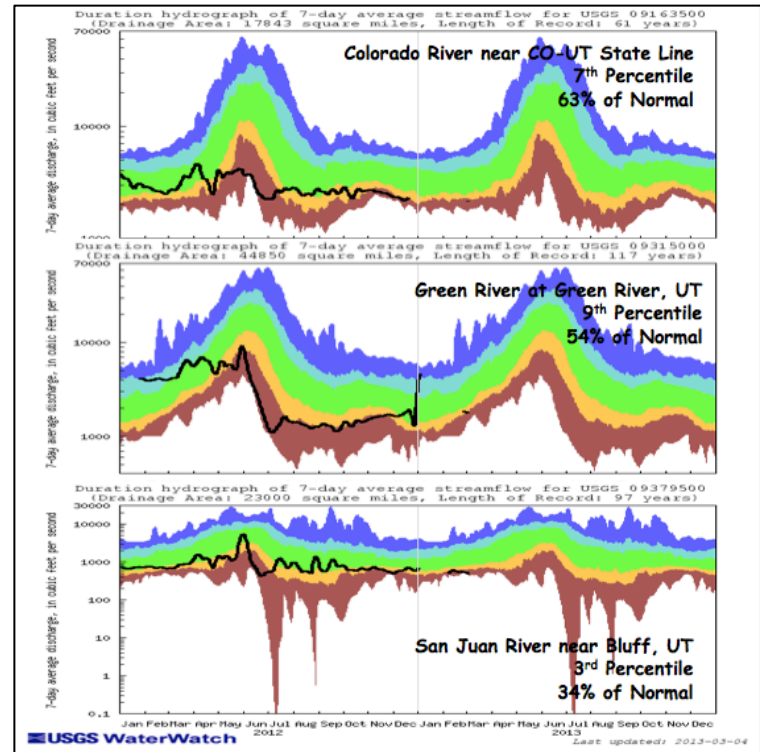
All three key gages in the basin have come out of frozen conditions and are all now reporting much below normal flows (Fig. 6). Flows on the Colorado River near the CO-UT state line have been ice affected since late December but just recently have begun reporting again at the 7<sup>th</sup> percentile. The Green River at Green River, UT site has been recording for about a week now and has decreased over the past week to the 9<sup>th</sup> percentile. The San Juan River near Bluff, UT is currently recording flows at the 3<sup>rd</sup> percentile and has seen very little change over the past couple of weeks.



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. 5: 7-day average discharge compared to historical discharge for March 3<sup>rd</sup>.

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 month, the entire UCRB saw below average temperatures ranging between 3 and 9 degrees colder than average. East of the basin, the rest of CO experienced slightly below average temperatures for February. Last week, the entire region saw temperatures ranging from 3 to 12 degrees colder than average. The VIC soil moisture model continues to show dry soils through most of WY with near normal soil moisture in far southwest WY (Fig. 7). Soil dryness is below the 20<sup>th</sup> percentile in northeast UT and most of western CO. Soil moisture in southwest CO is below normal, but shows near normal conditions when SWE is included (Fig. 7). Dry soils below the 10<sup>th</sup> percentile show up over most of southern and eastern CO.

Last month, most of the major reservoirs in the UCRB saw slight decreases in volume, which is normal for this time of year. Blue Mesa has stayed near steady for most of the calendar year though it usually decreases this time of year. McPhee decreased in volume, though it normally increases slightly in February. Lake Granby saw large volume decreases last month. Flaming Gorge is the only major reservoir near its March average. The rest of the major reservoirs range between 55% (Lake Granby) and 90% (Green Mountain) of average for the month of March.

## Precipitation Forecast

A ridge of high pressure currently over the UCRB will begin to slide eastward today as an approaching low pressure system nears the west coast. As this system begins to interact with the Pacific, then the Gulf of Mexico moisture, it's anticipated to rapidly strengthen throughout the day on Friday and reform somewhere over the Four Corners region. A deep subtropical moisture plume ahead of the storm will begin to impact the southern and southwestern portions of the basin on Friday morning and drive snow levels above 9000 feet. The exact track of this system is yet to be determined and will play a big role in where the greatest precipitation amounts occur, but anticipate widespread amounts of 0.50 inches of liquid over much of the basin with favored areas in the San Juans and southern mountains exceeding 1.00 inches by Sunday (Fig. 8). This upper level low is expected to linger over the region through the weekend with a major winter storm developing over areas east of the Continental Divide. As a result, unsettled conditions will persist over eastern and northern portions of the basin moving into early next week as the storm gradually begins to move off to the east.

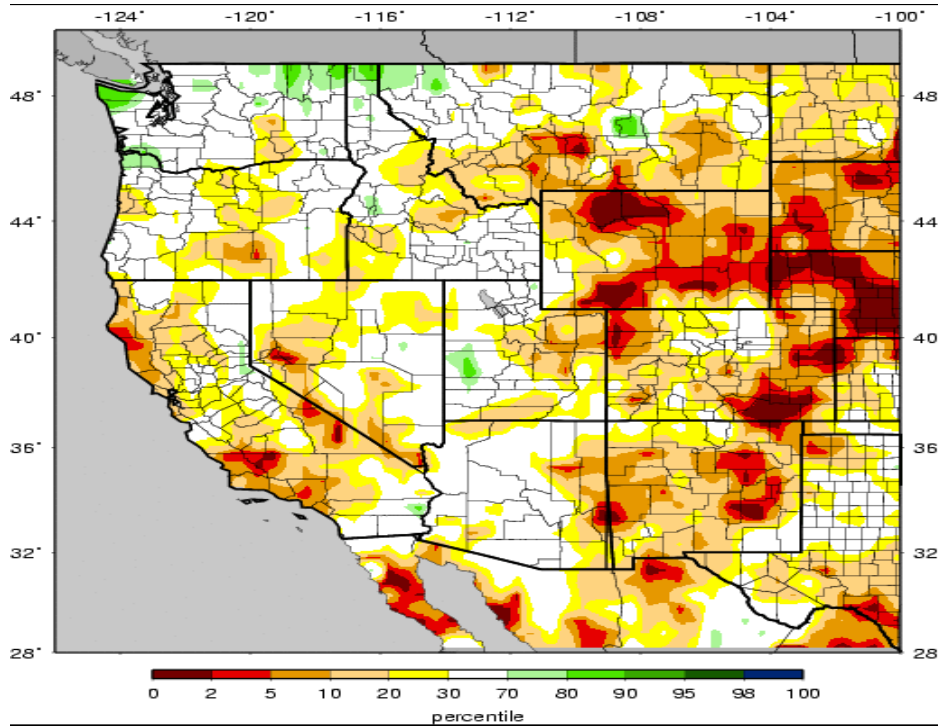


Fig. 7: VIC modeled soil moisture percentiles for the western U.S. as of March 3<sup>rd</sup>. The map below combines soil moisture and SWE.

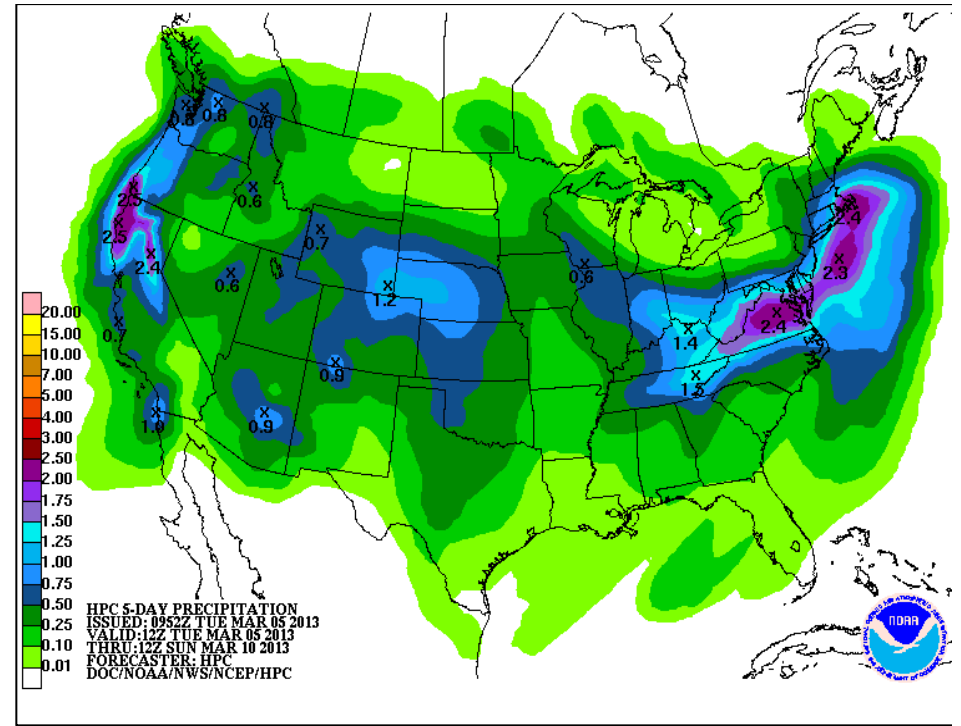
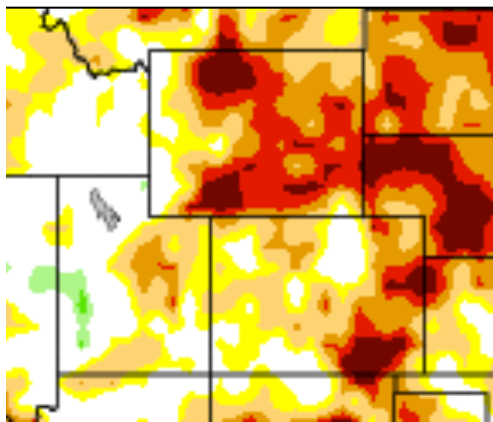


Fig. 8: Quantitative precipitation forecast (QPF) by the Hydrologic Prediction Center out to 12UTC Sunday.

## Drought and Water Discussion

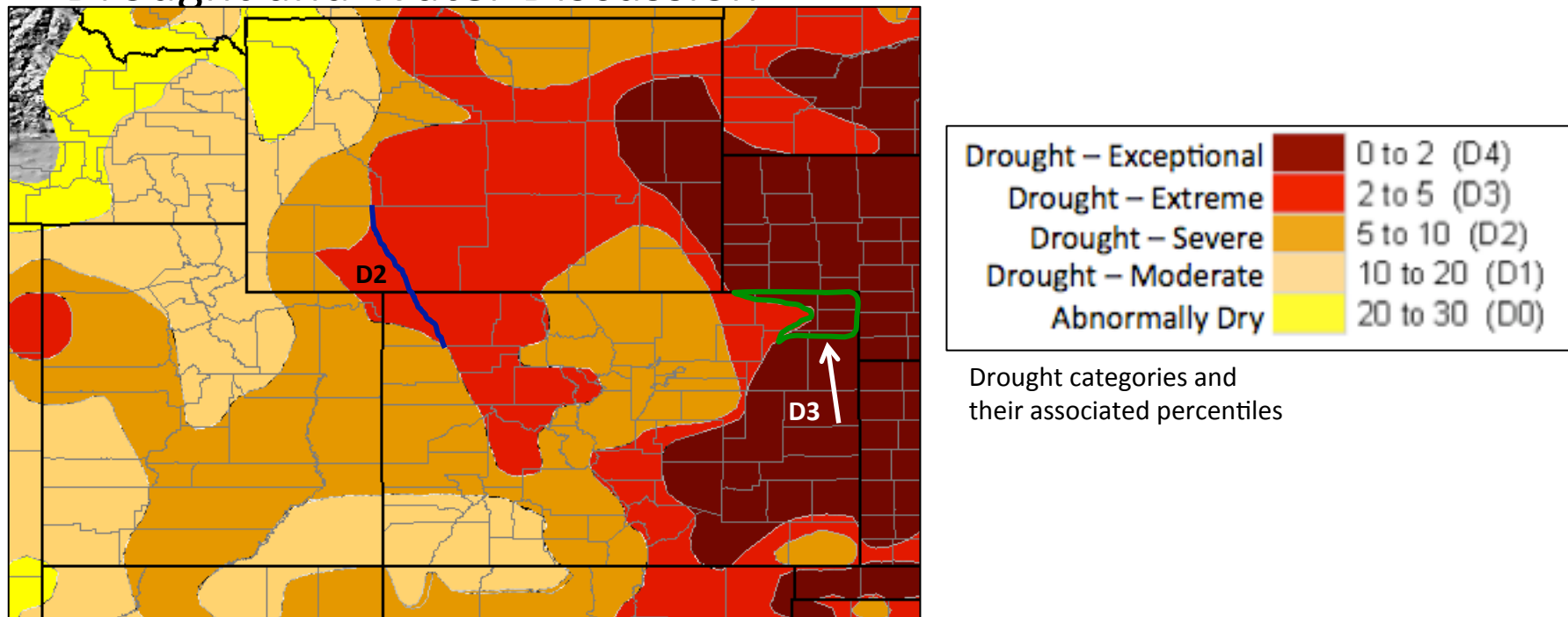


Fig. 9: February 26<sup>th</sup> release of U.S. Drought Monitor for the UCRB.

**UCRB:** A minor improvement from D3 to D2 is recommended in the northern part of the UCRB (Fig. 9, blue line). This improvement is based on standardized precipitation indices (SPIs) depicted using PRISM gridded data (since this is a very data sparse region). Short term SPIs show the area as being justified for a lower D-category. Status quo is recommended for the rest of the basin. D1 categories are justified in southwest CO where SNOTEL precipitation percentiles are in the teens, and in northern UT which is showing a slightly below average water year. D2 in the central portion of the basin matches with 6- and 9-month (SPIs), and the D3 in northwest CO shows areas where SNOTEL precipitation percentiles are primarily ranked below the 5<sup>th</sup> percentile.

**Eastern CO:** A slight trimming of the D4 is recommended for northeast CO after much greater than average precipitation fell in February (Fig. 9, green shape). We defer to the author on how to handle this improvement across state lines. Further improvements may be warranted next week after additional precipitation accumulates.