

Spring 2013



March 26th,
2013

UPPER COLORADO RIVER REGIONAL DROUGHT
EARLY WARNING SYSTEM

Weekly Climate, Water & Drought Assessment

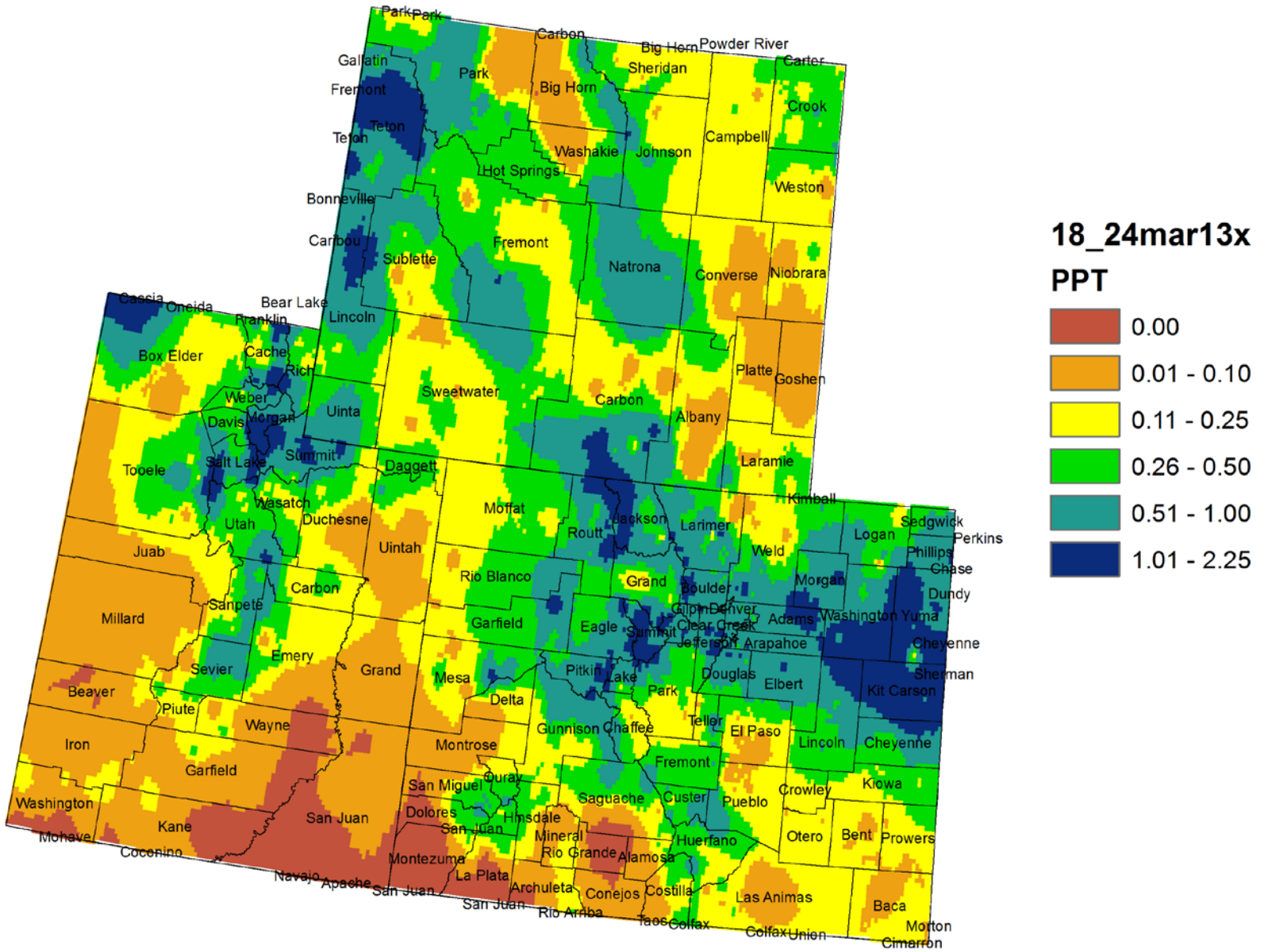
Today's Agenda

- Assessment of current water conditions
- Precipitation Forecast
- Recommendations for Drought Monitor

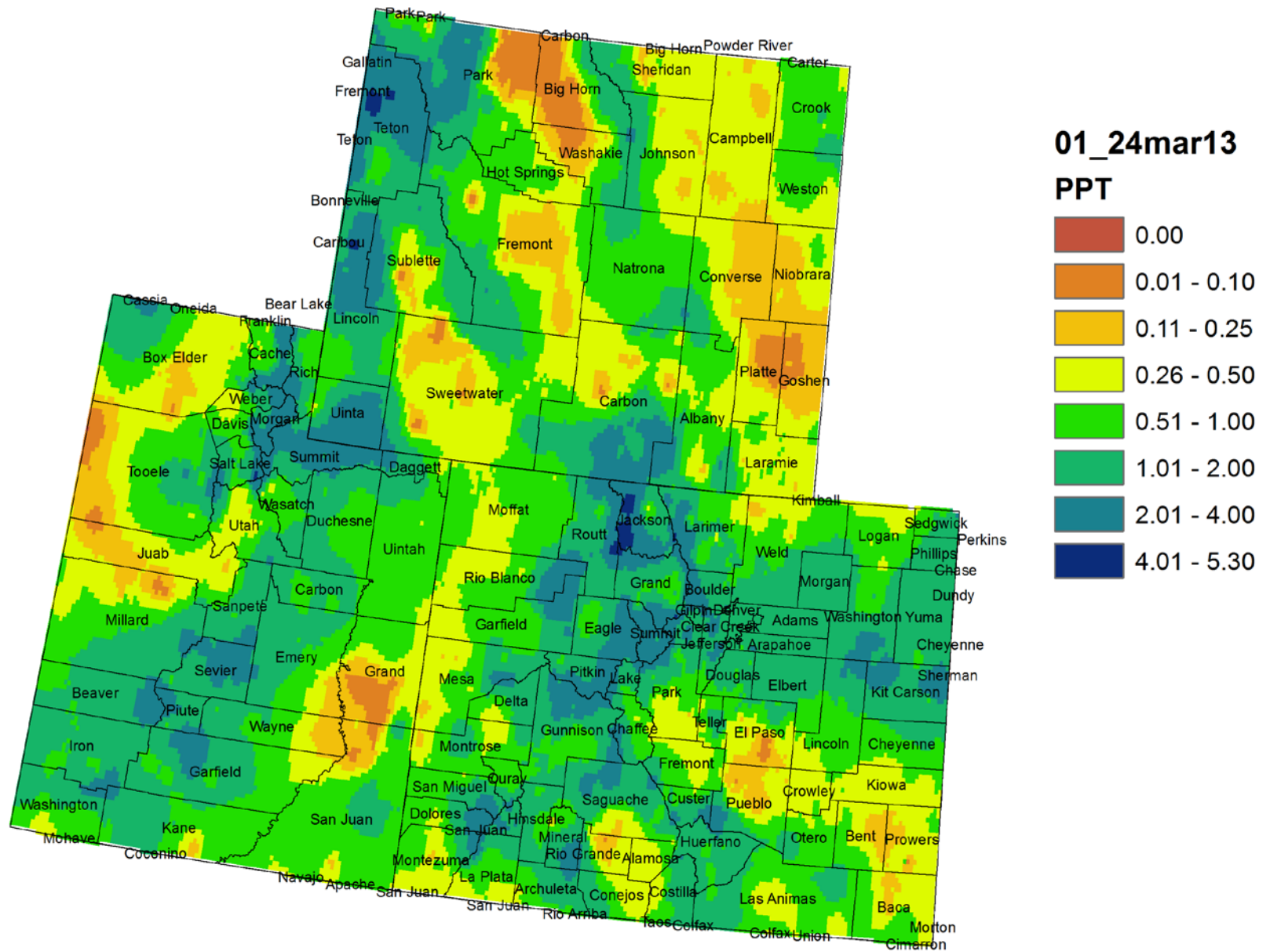
Precipitation/Snowpack Update



Colorado, Utah and Wyoming 7 Day Precipitation (in) 18 - 24 March 2013

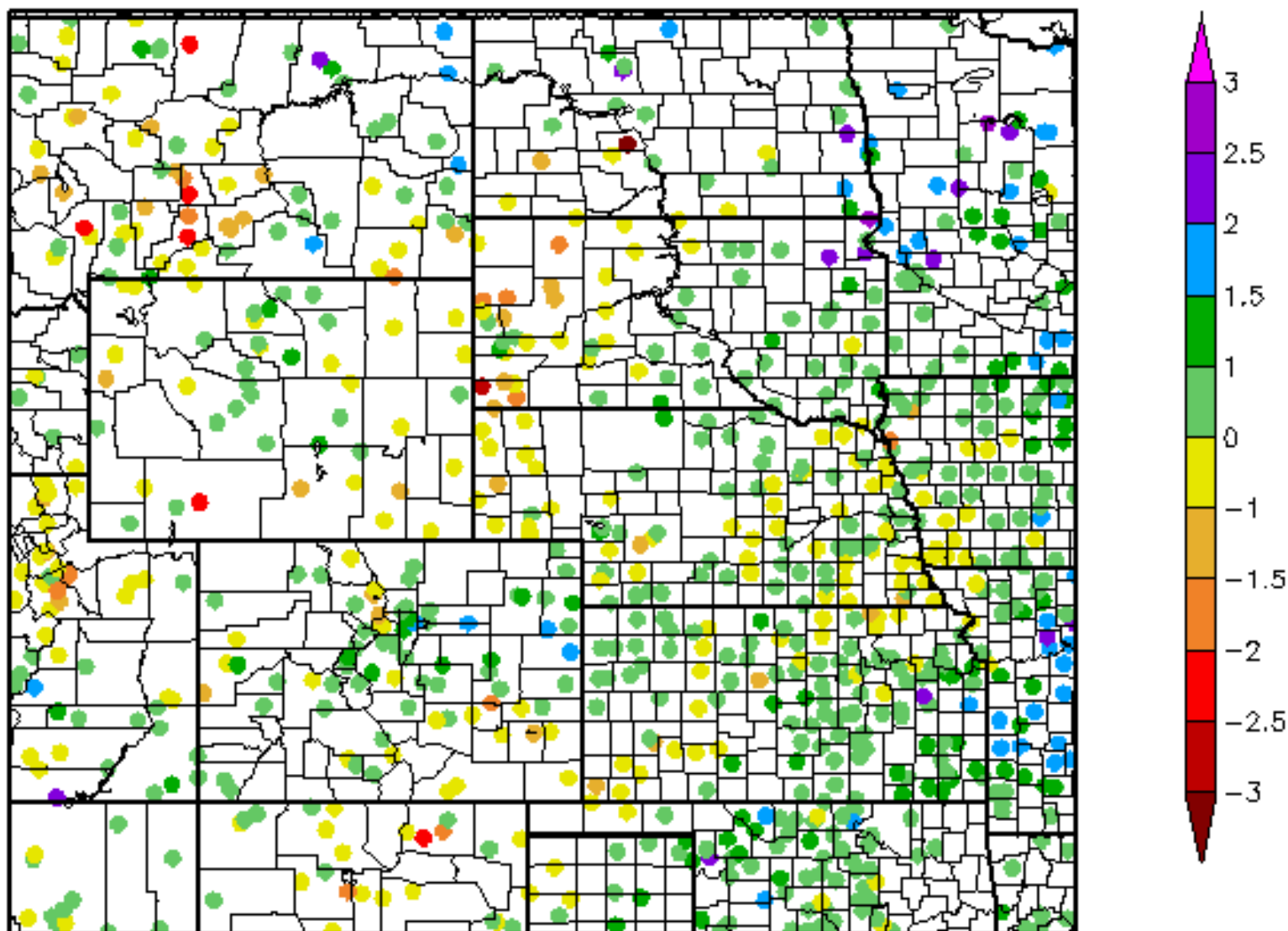


Colorado, Utah and Wyoming Month to Date Precipitation (in) 1 - 24 March 2013



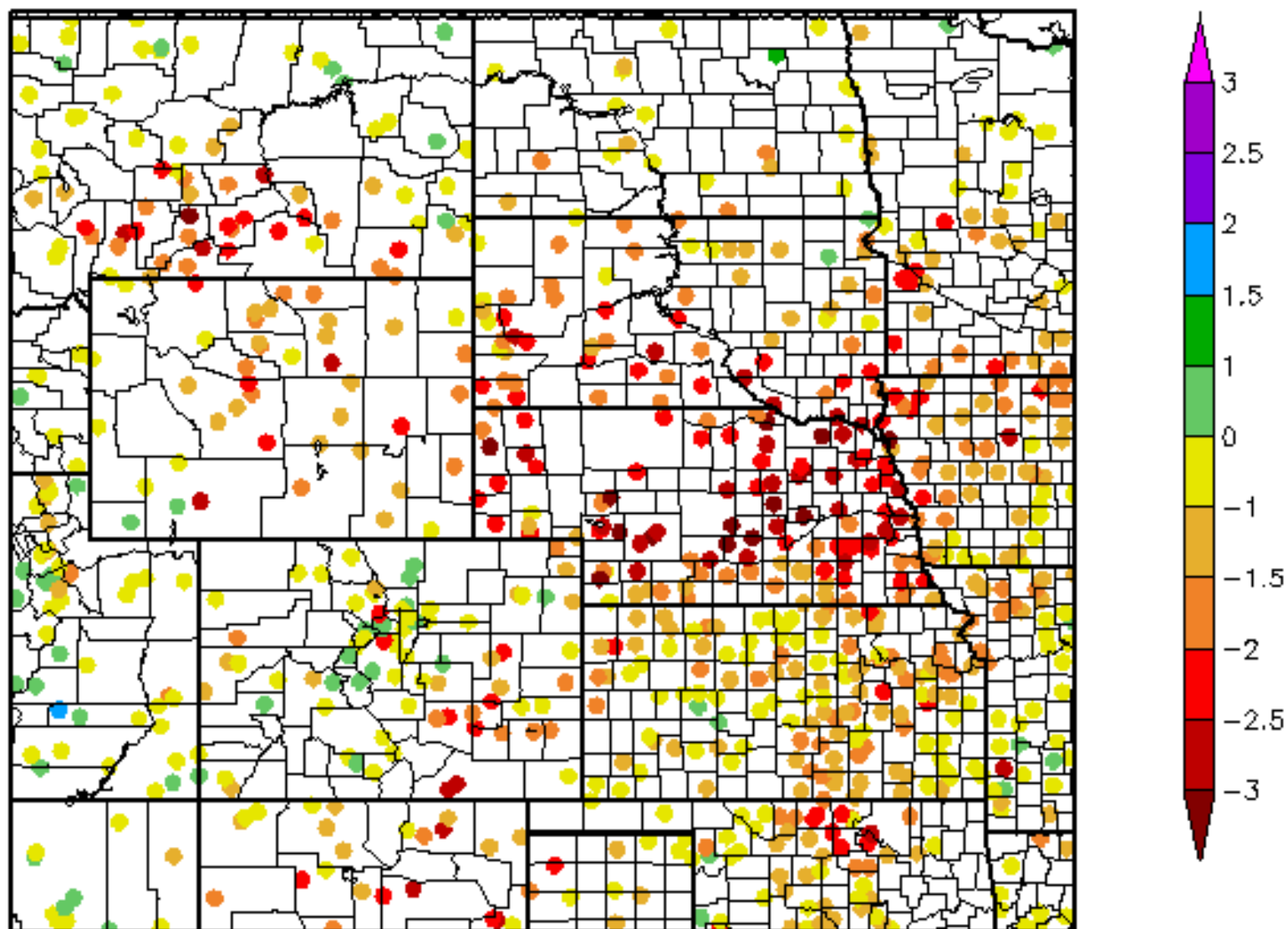
60 Day SPI

1/25/2013 – 3/25/2013

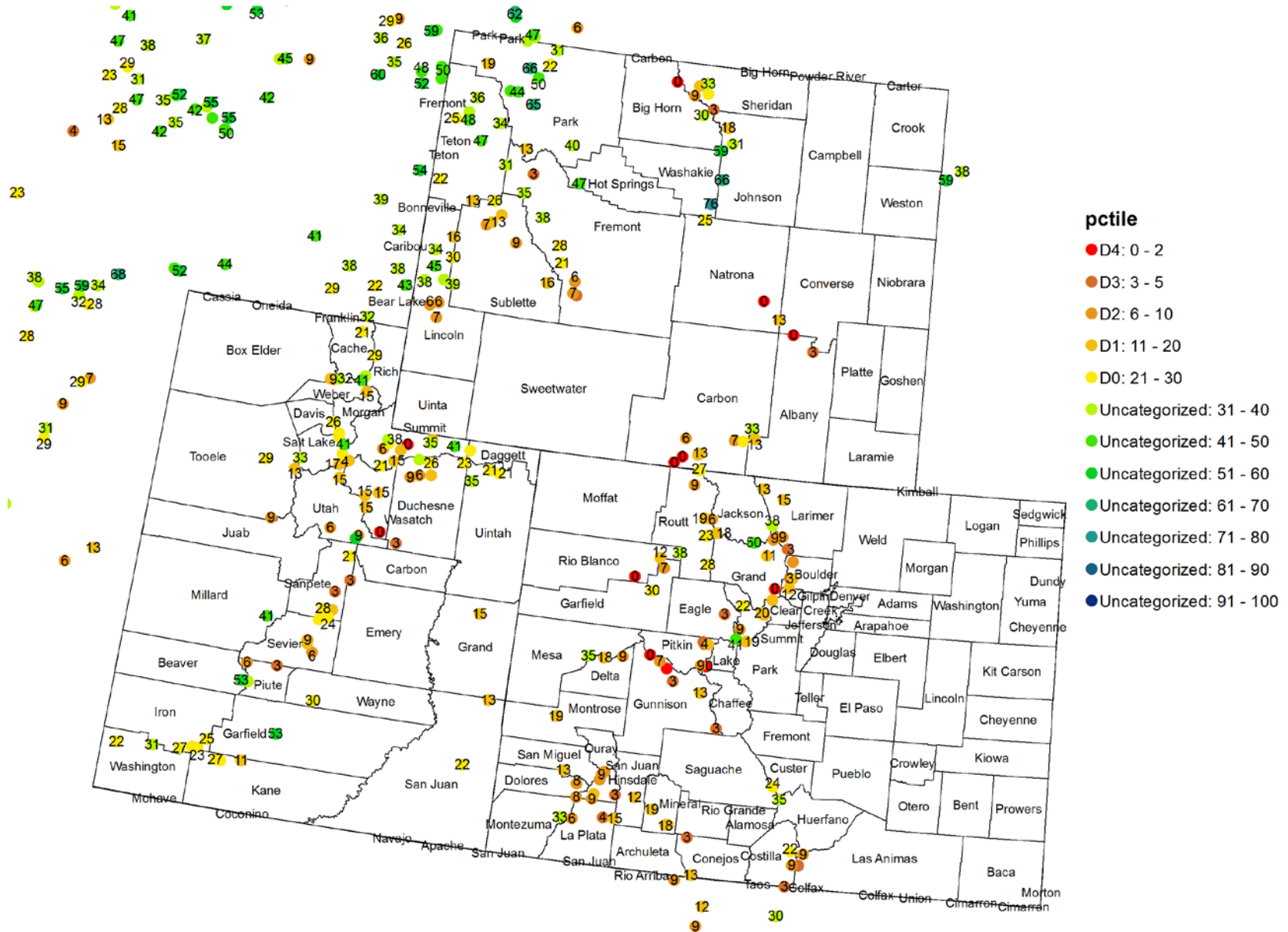


9 Month SPI

6/26/2012 - 3/25/2013



Snotel Water Year Precipitation Percentile Ranking for 26 March 2013 (Stations with 15+ years of data only)



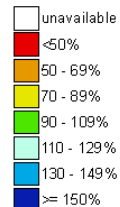
Snowpack



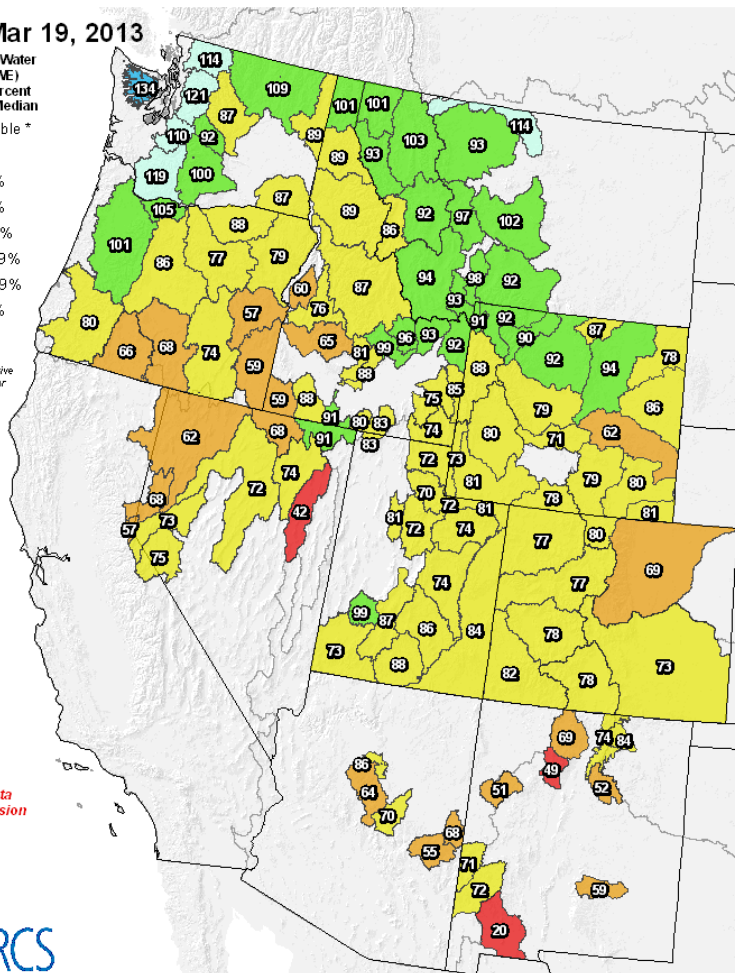
Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Mar 19, 2013

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



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



Provisional data subject to revision



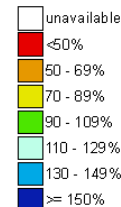
The snowwater equivalent percent of normal represents the current snowwater equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by the USDA/NRCS National Water and Climate Center Portland, Oregon <http://www.wcc.nrcs.usda.gov/gis/>
Based on data from <http://www.wcc.nrcs.usda.gov/reports/>
Science contact: Jim Marron@por.usda.gov 503 414 3047

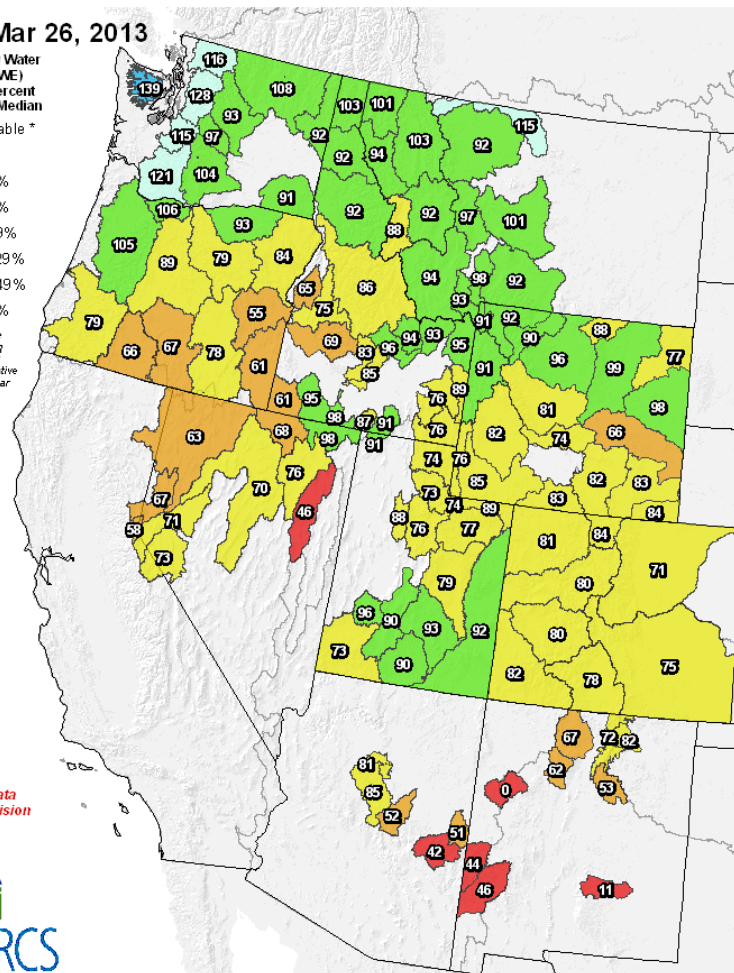
Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Mar 26, 2013

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



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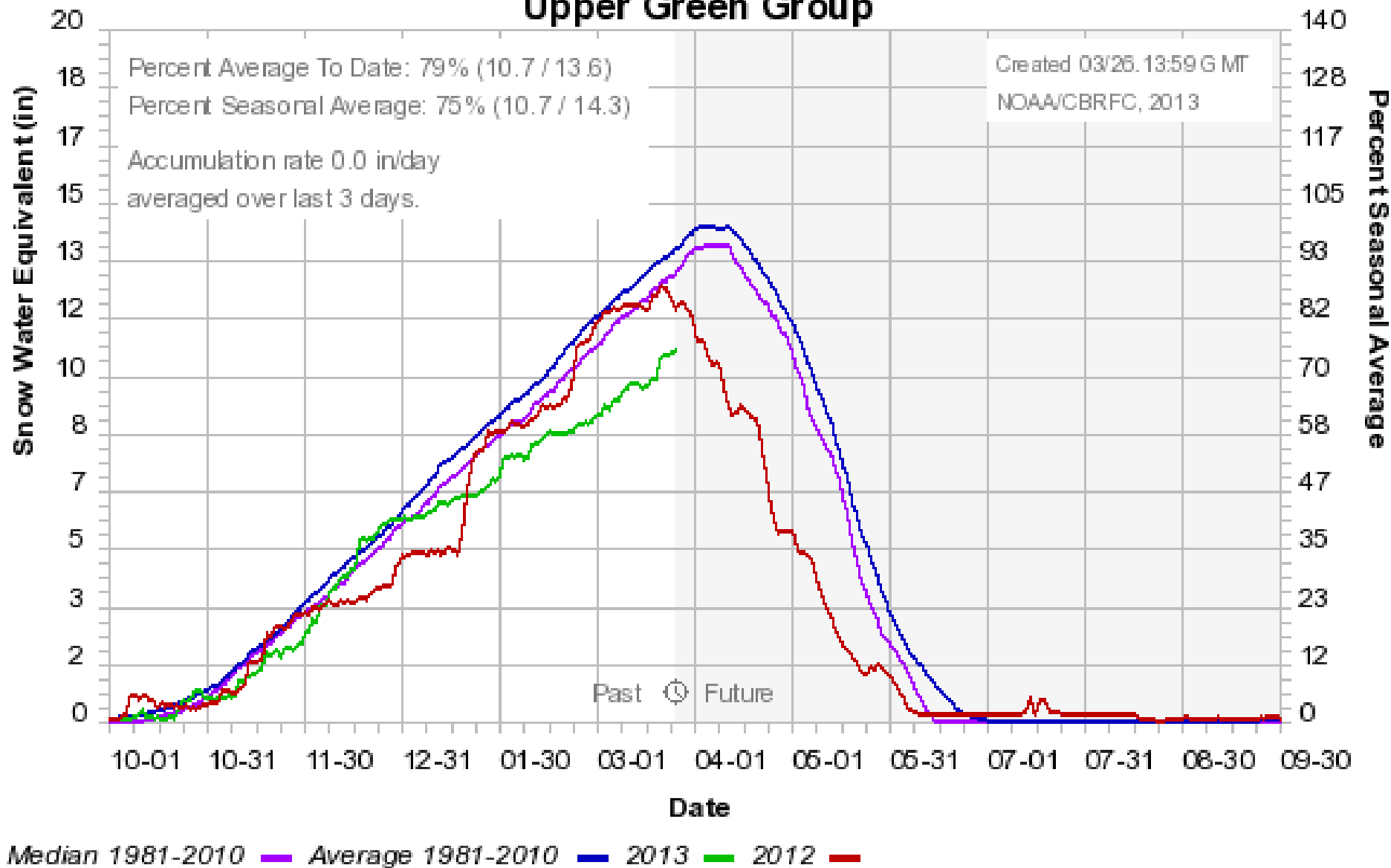
Provisional data subject to revision



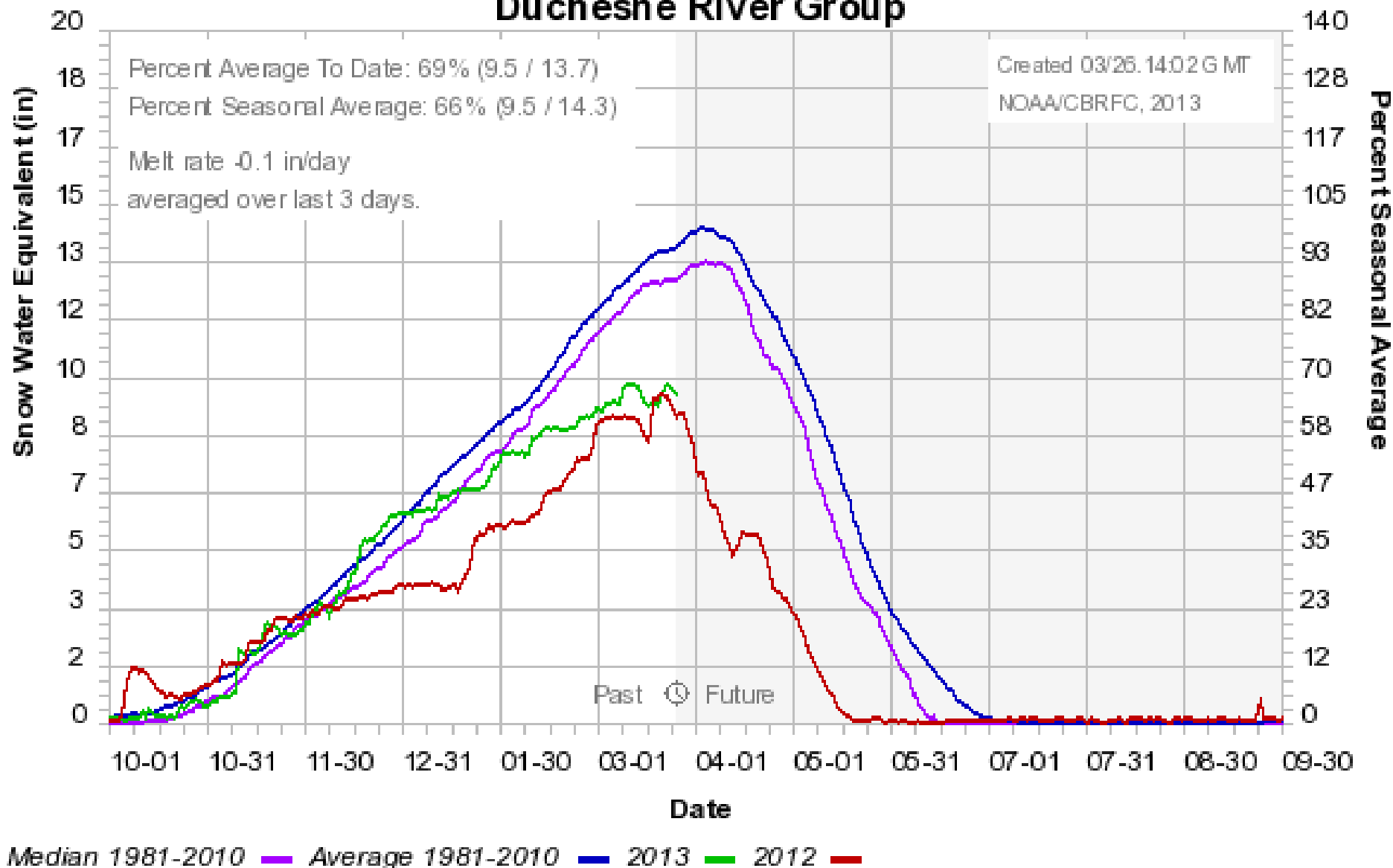
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Based on data from <http://www.wcc.nrcs.usda.gov/reports/>
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Colorado Basin River Forecast Center Upper Green Group

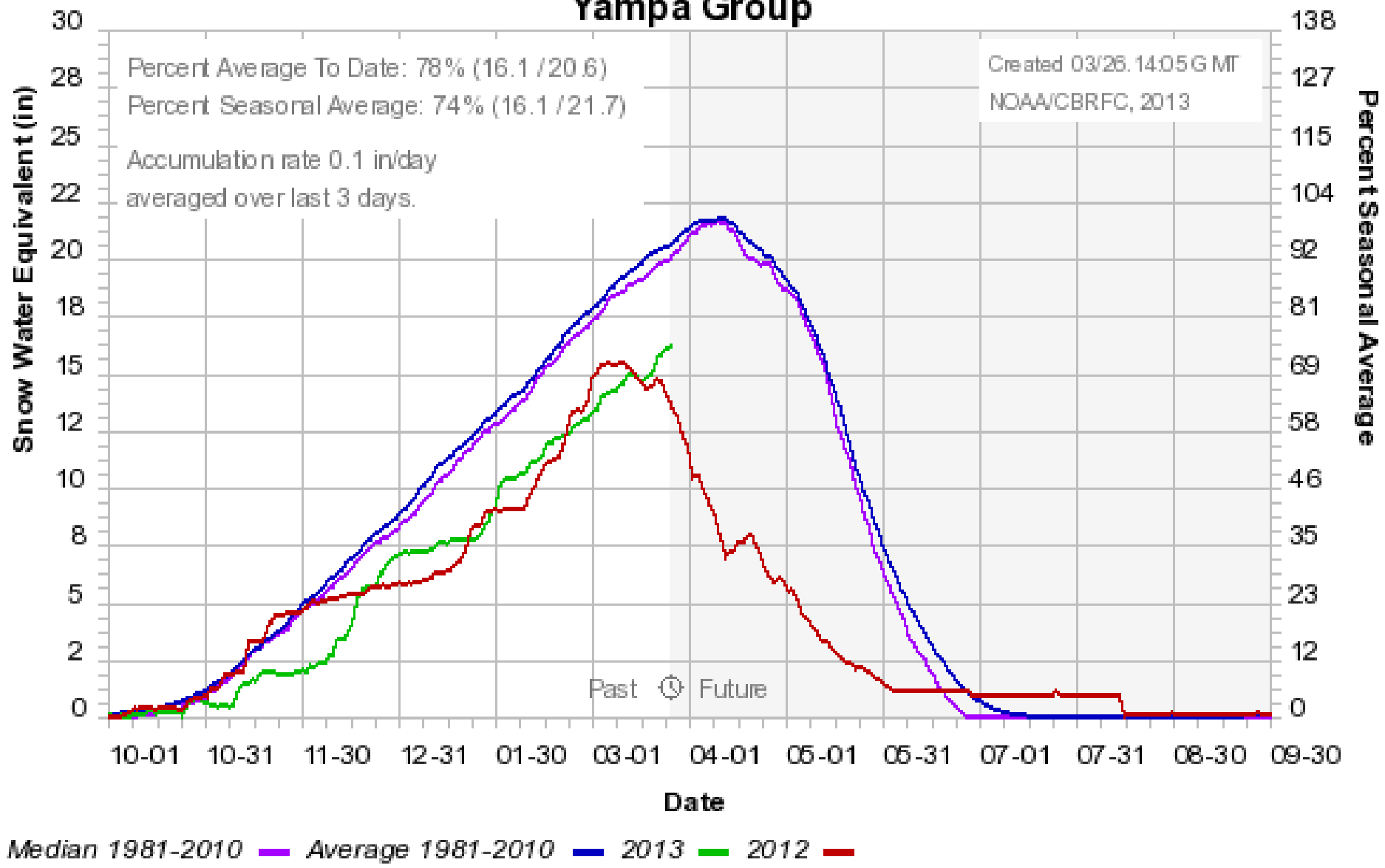


Colorado Basin River Forecast Center Duchesne River Group

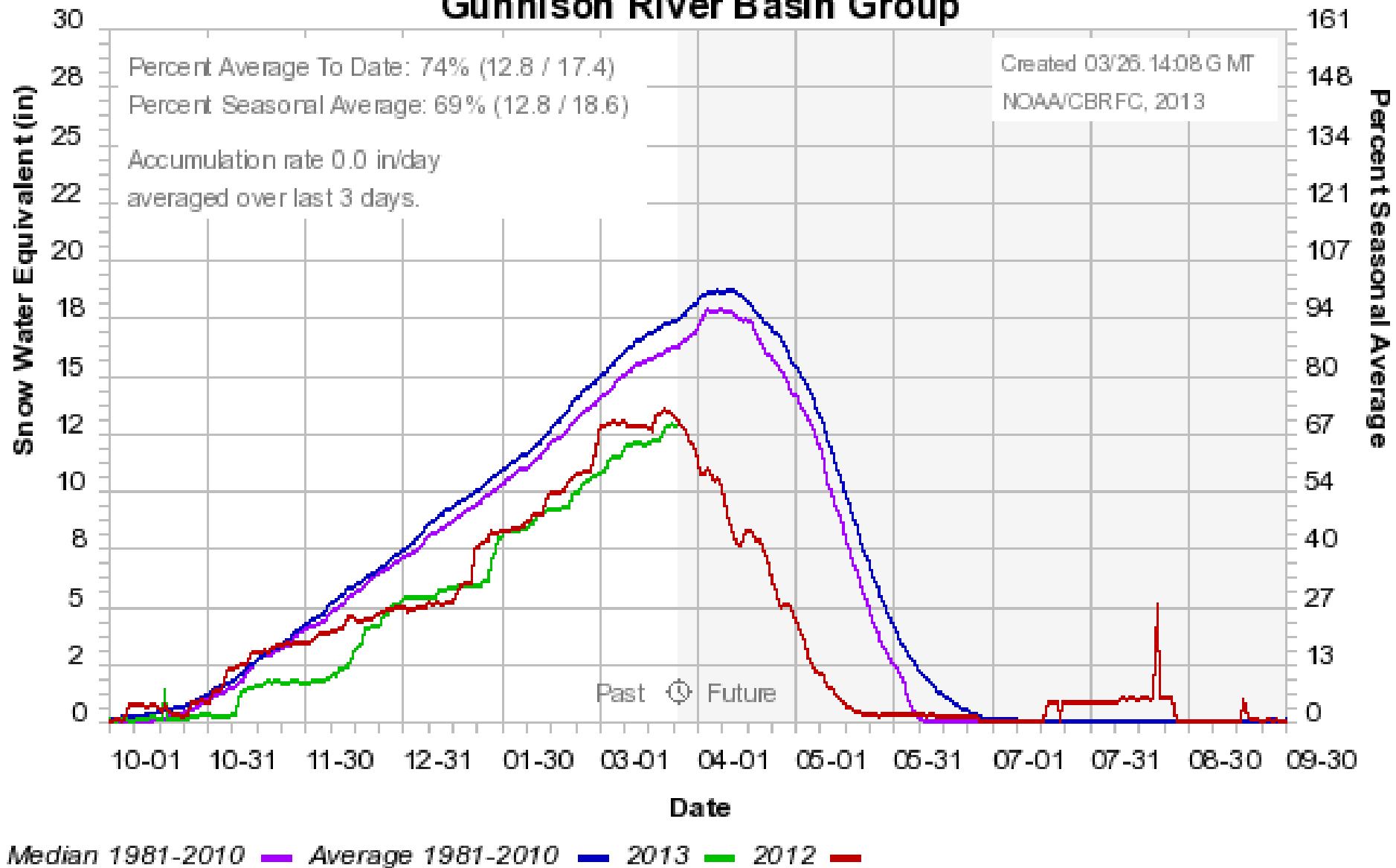


Colorado Basin River Forecast Center

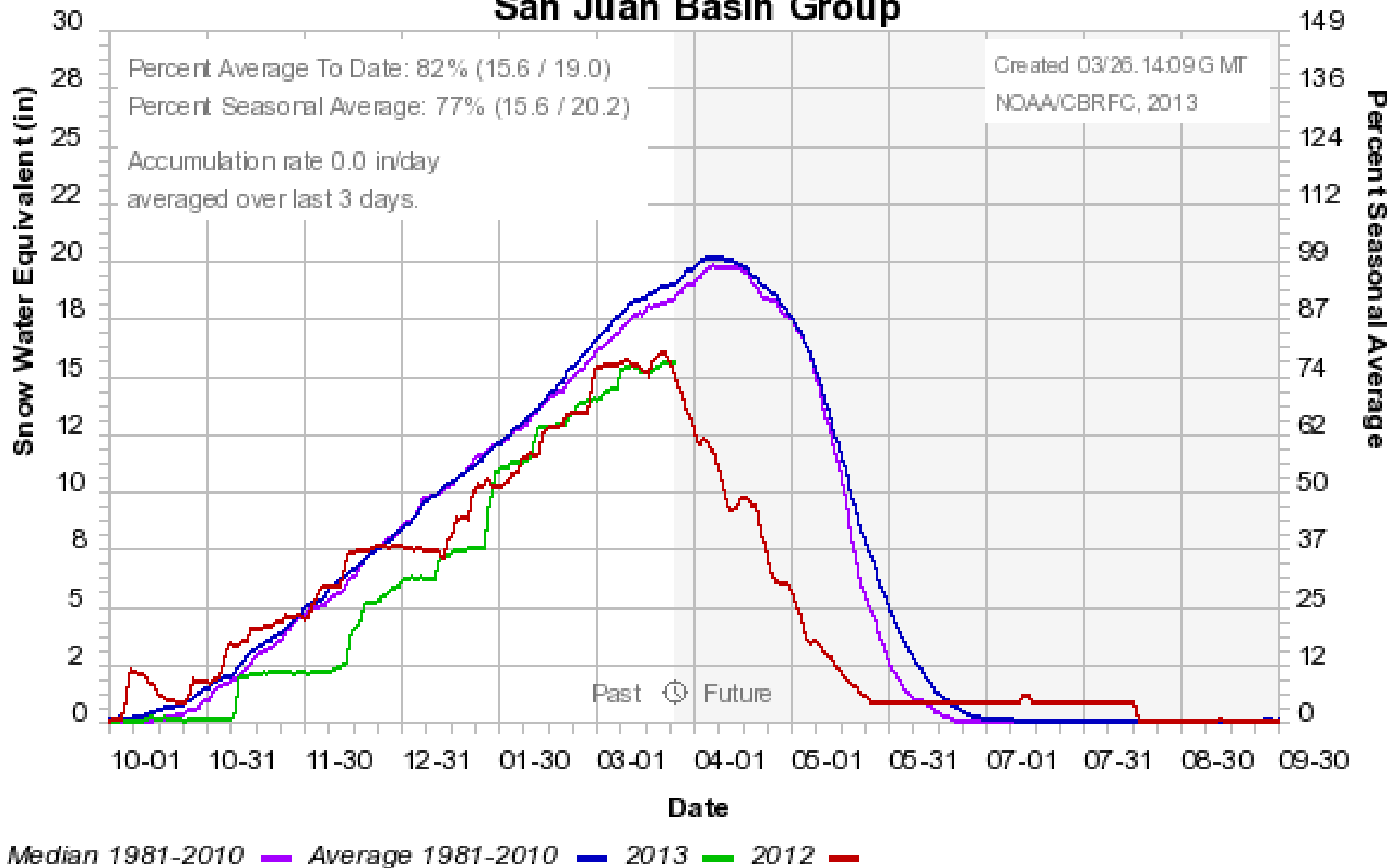
Yampa Group



Colorado Basin River Forecast Center Gunnison River Basin Group



Colorado Basin River Forecast Center San Juan Basin Group

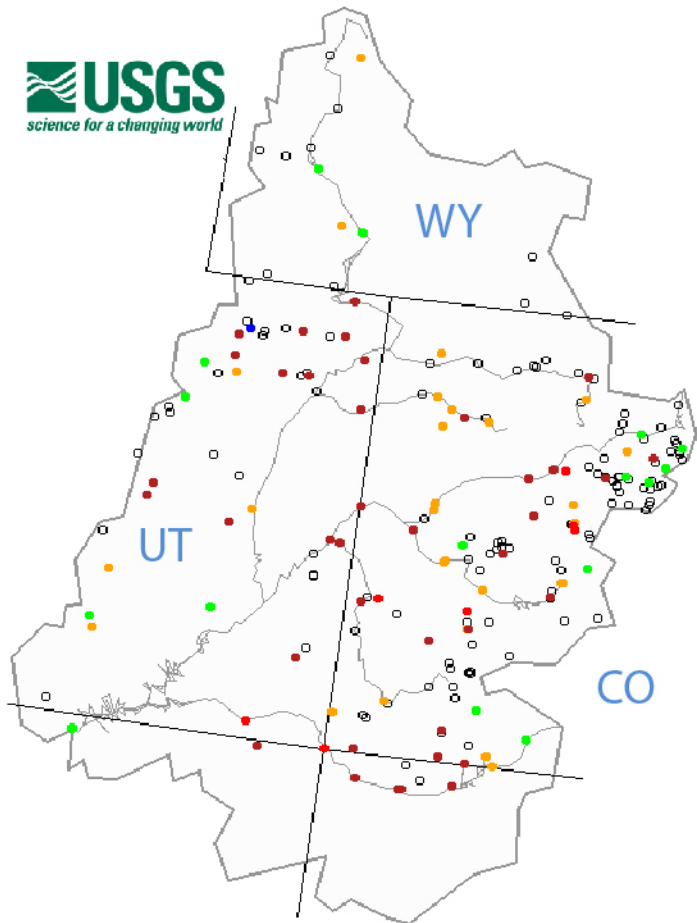


Streamflow Update

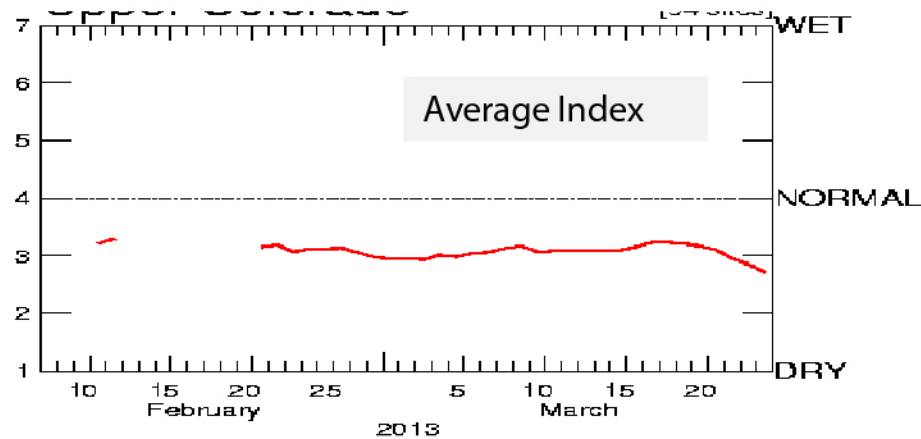
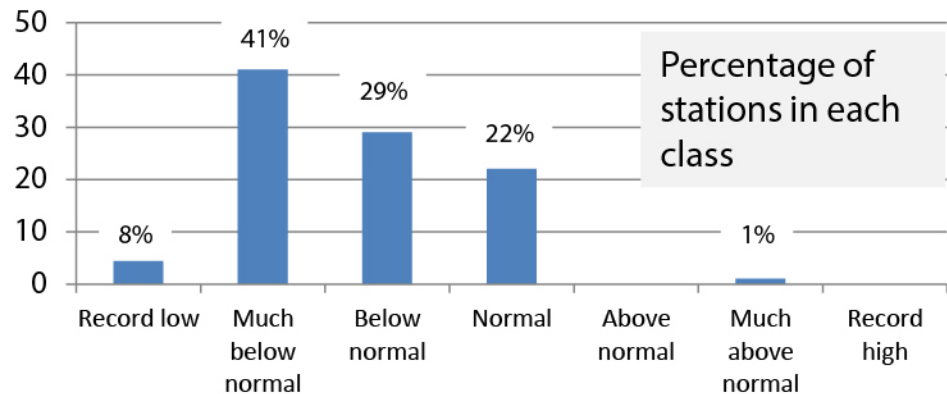
Bob Kimbrough | U.S. Geological Survey



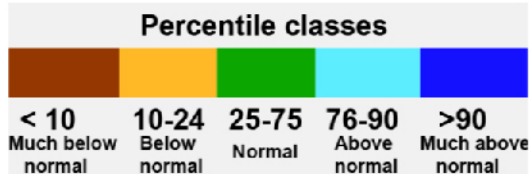
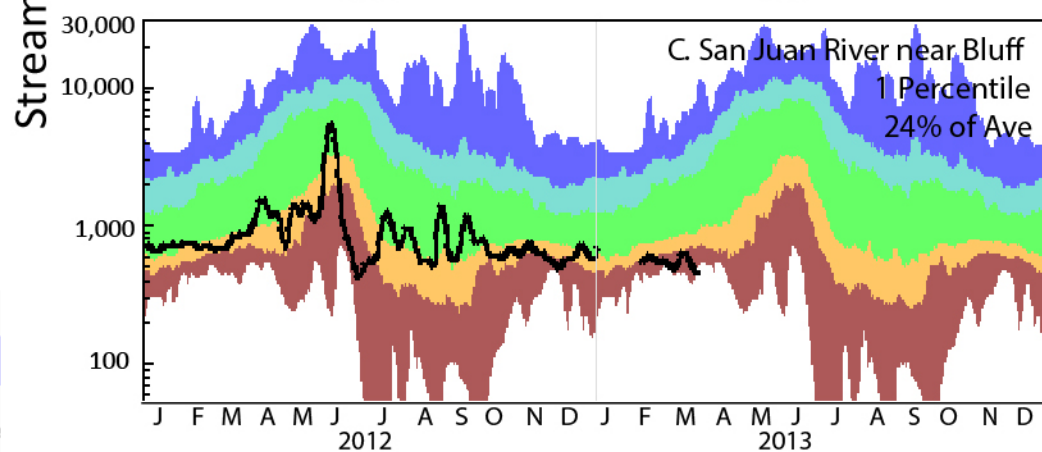
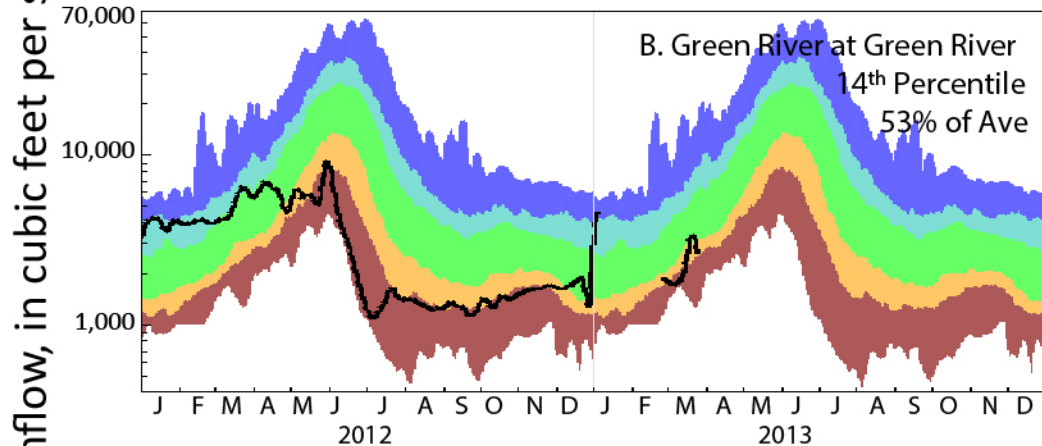
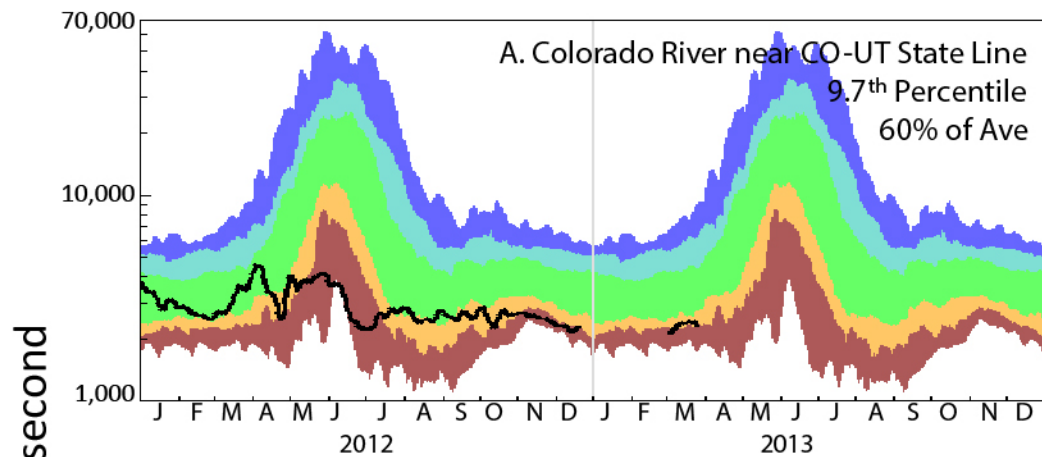
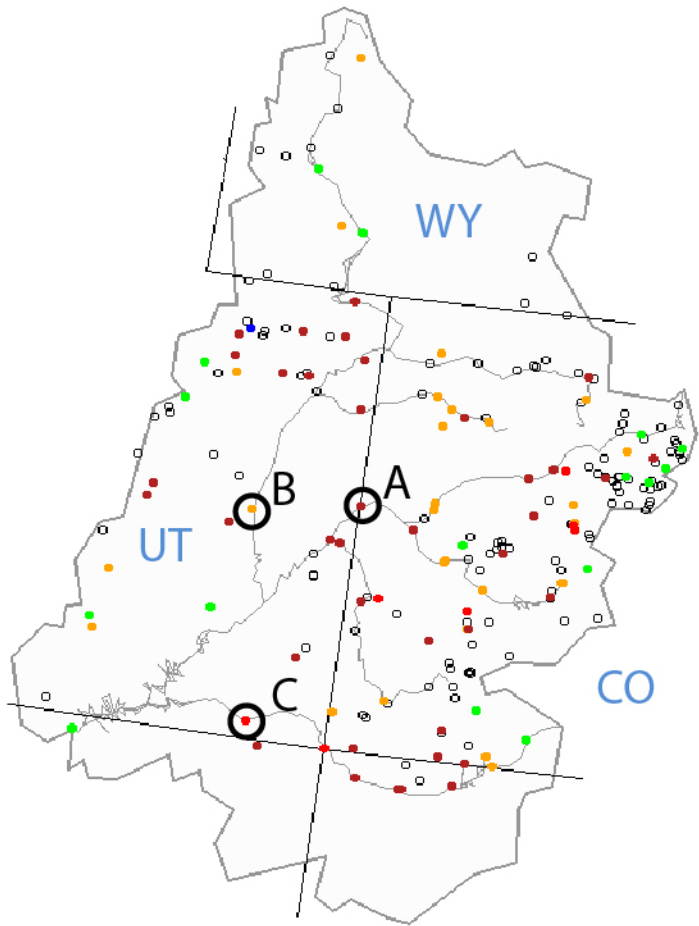
7 Day Average Streamflow Upper Colorado Basin March 25, 2013



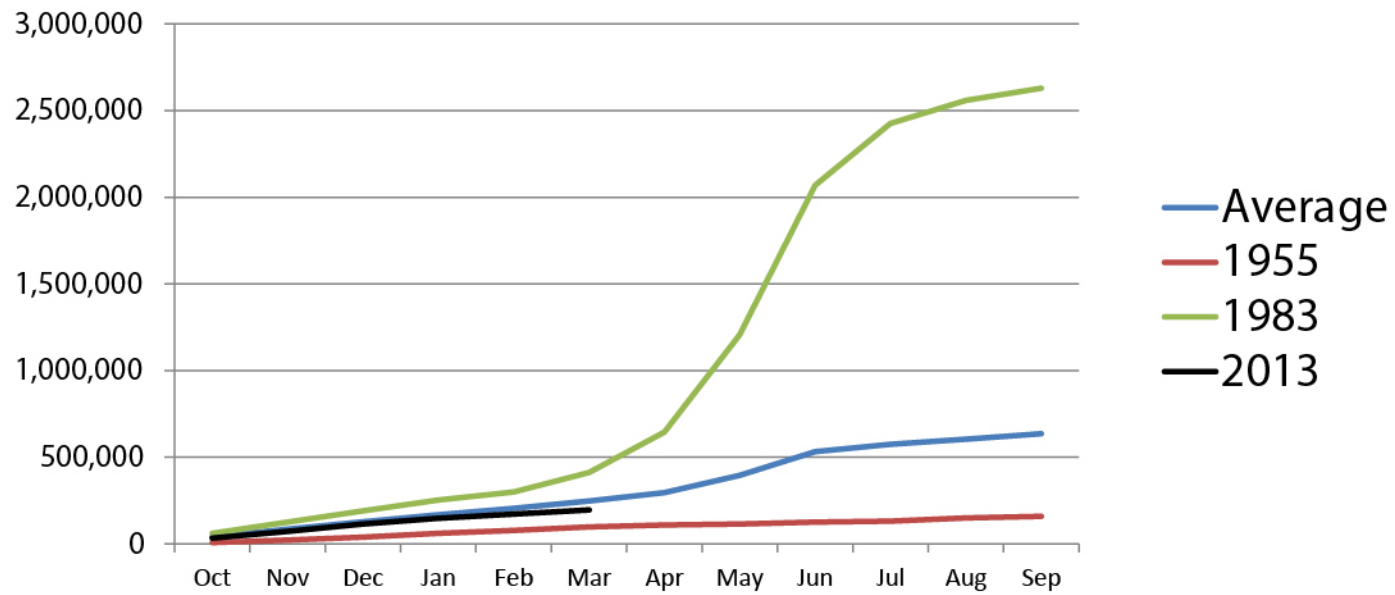
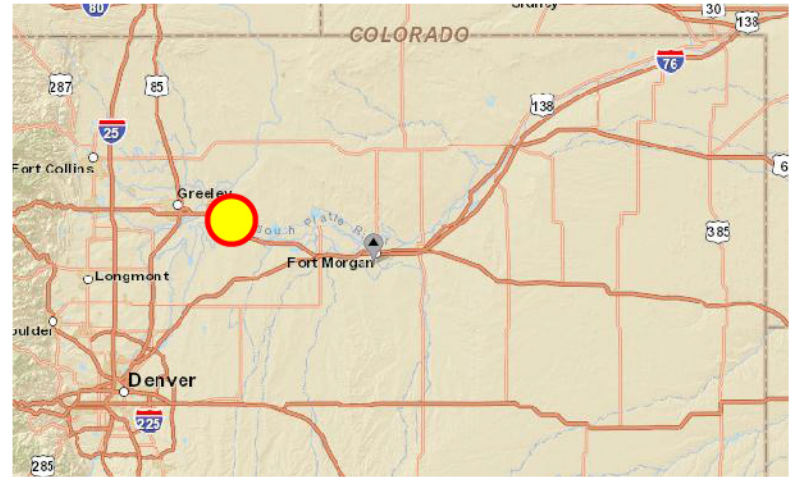
Percentile classes						
1	2	3	4	5	6	7
Record Low	< 10 Much below normal	10-24 Below normal	25-75 Normal	76-90 Above normal	>90 Much above normal	Record High



7 Day Average Streamflow Upper Colorado Basin March 25, 2013

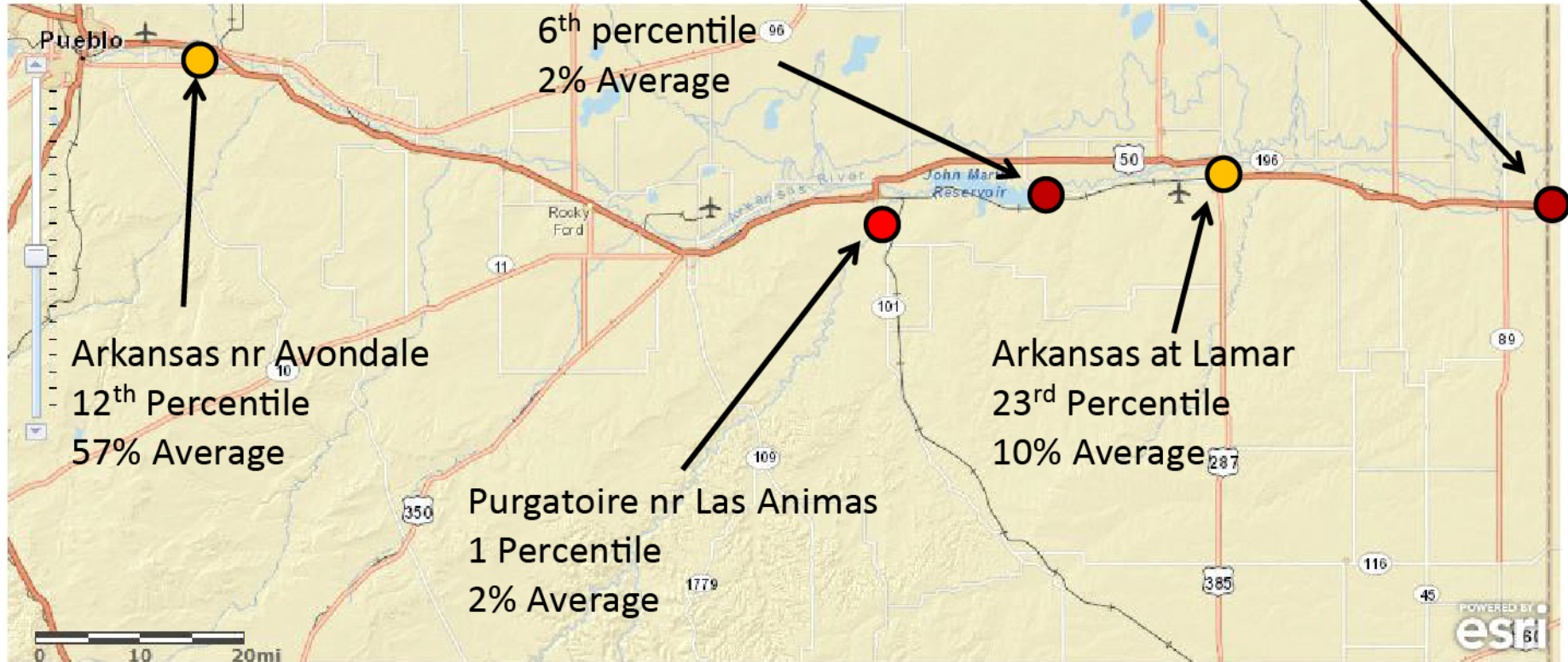


Cumulative Streamflow, South Platte near Kersey, in Ac-ft

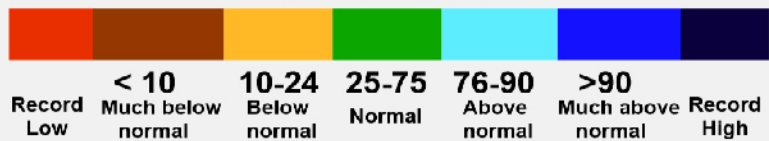


7 Day Average Streamflow Lower Arkansas River March 25, 2013

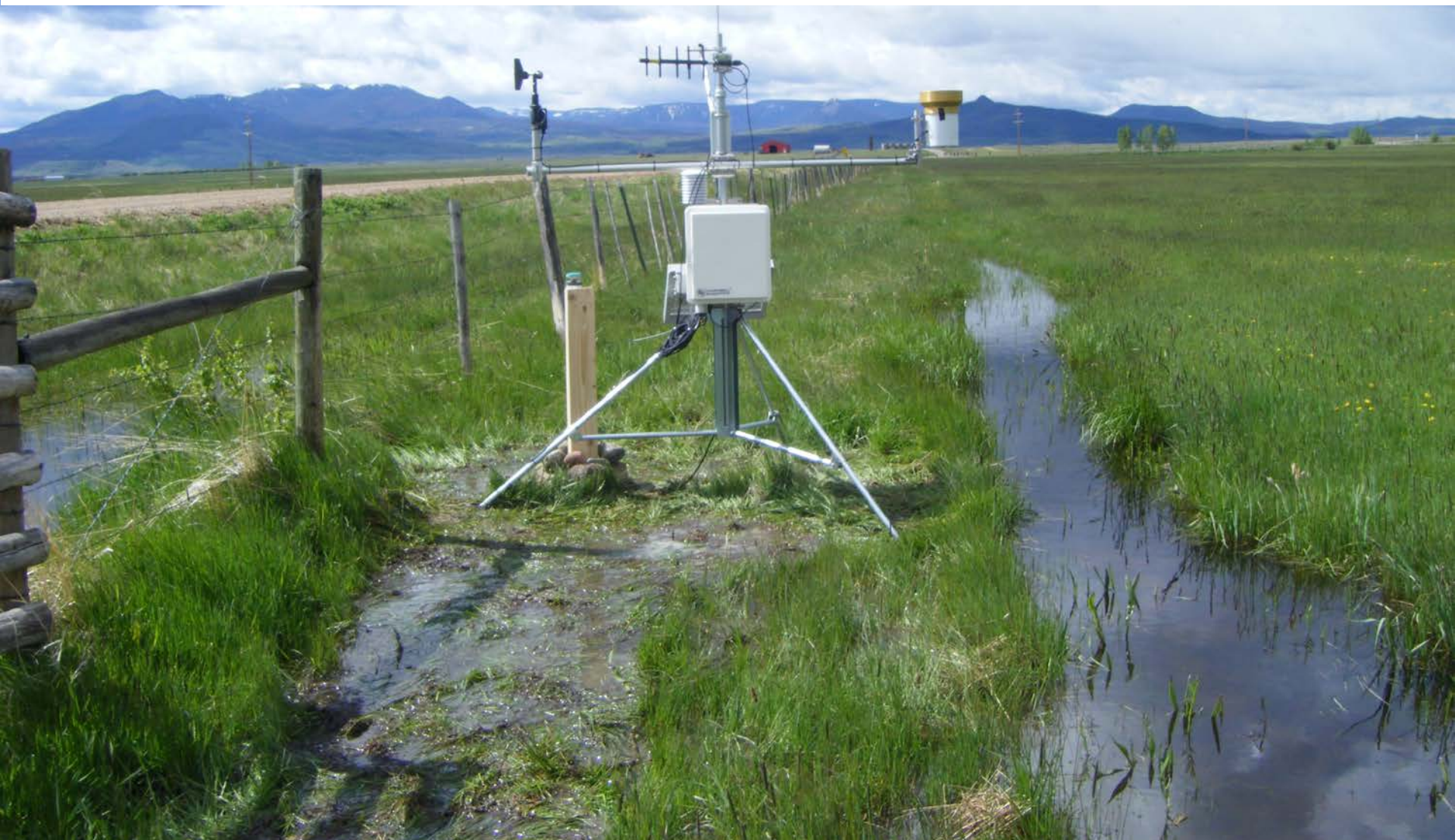
Arkansas nr Coolidge, KS
6th Percentile
14% Average



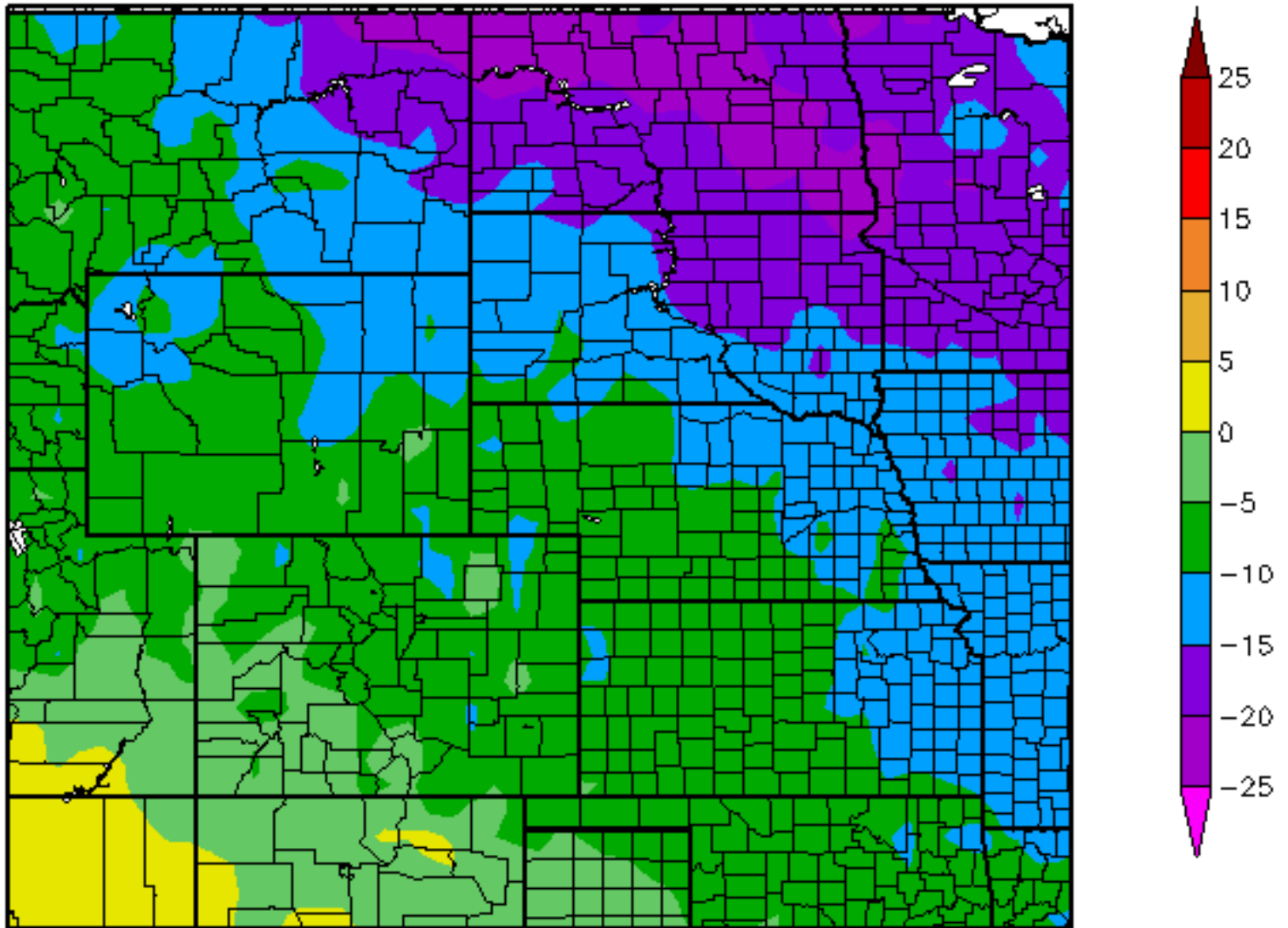
Percentile classes



Water Demand

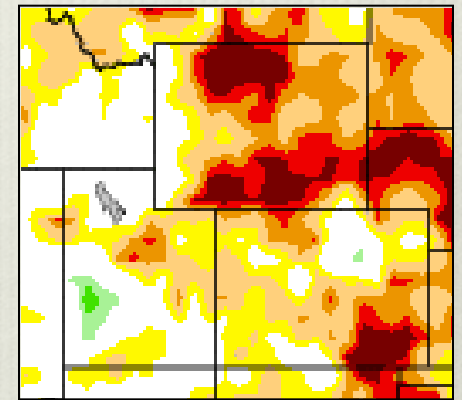
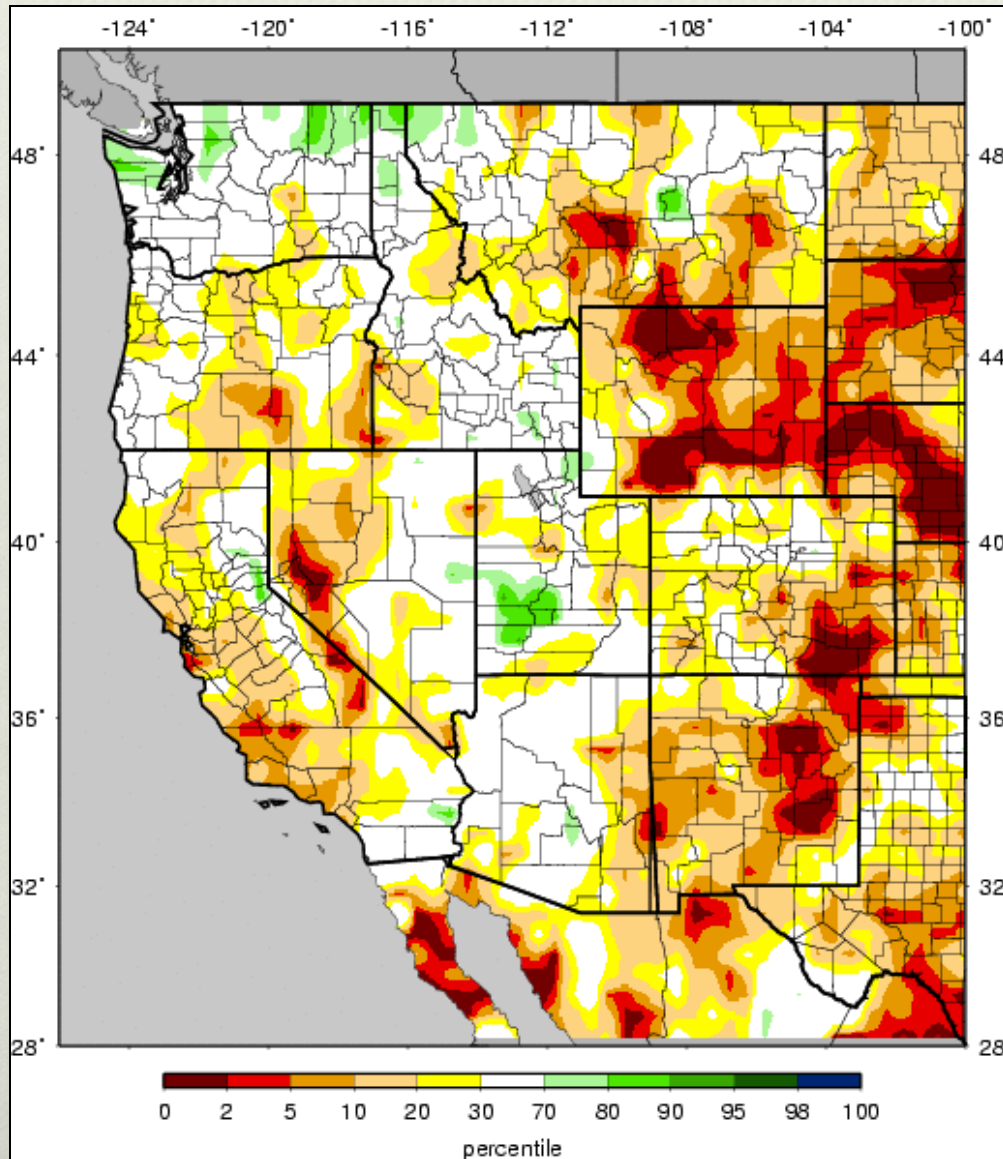


Temperature Departure from Normal 03/18/2013 – 03/24/2013



VIC Soil Moisture

24 March 2013

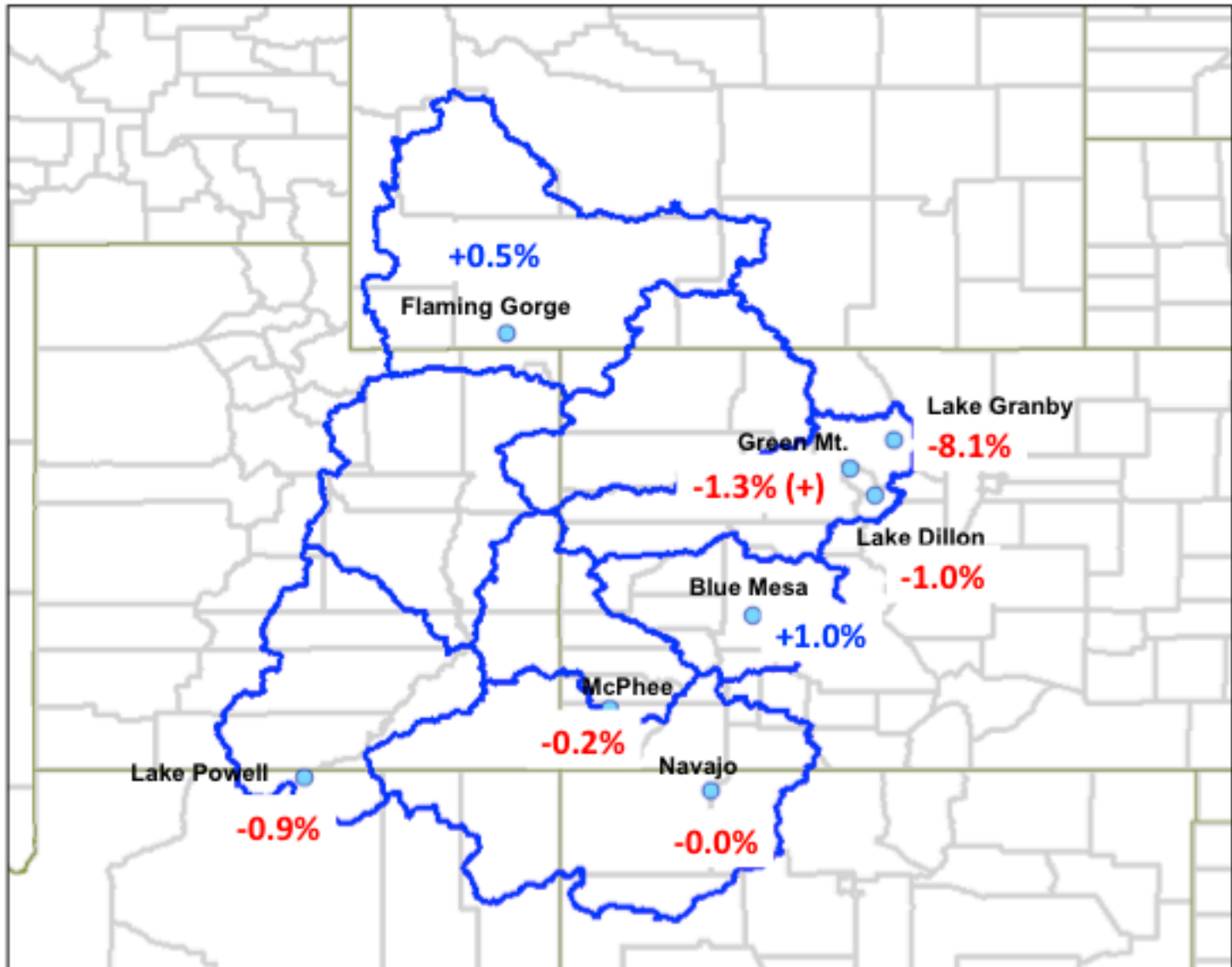


VIC + SWE

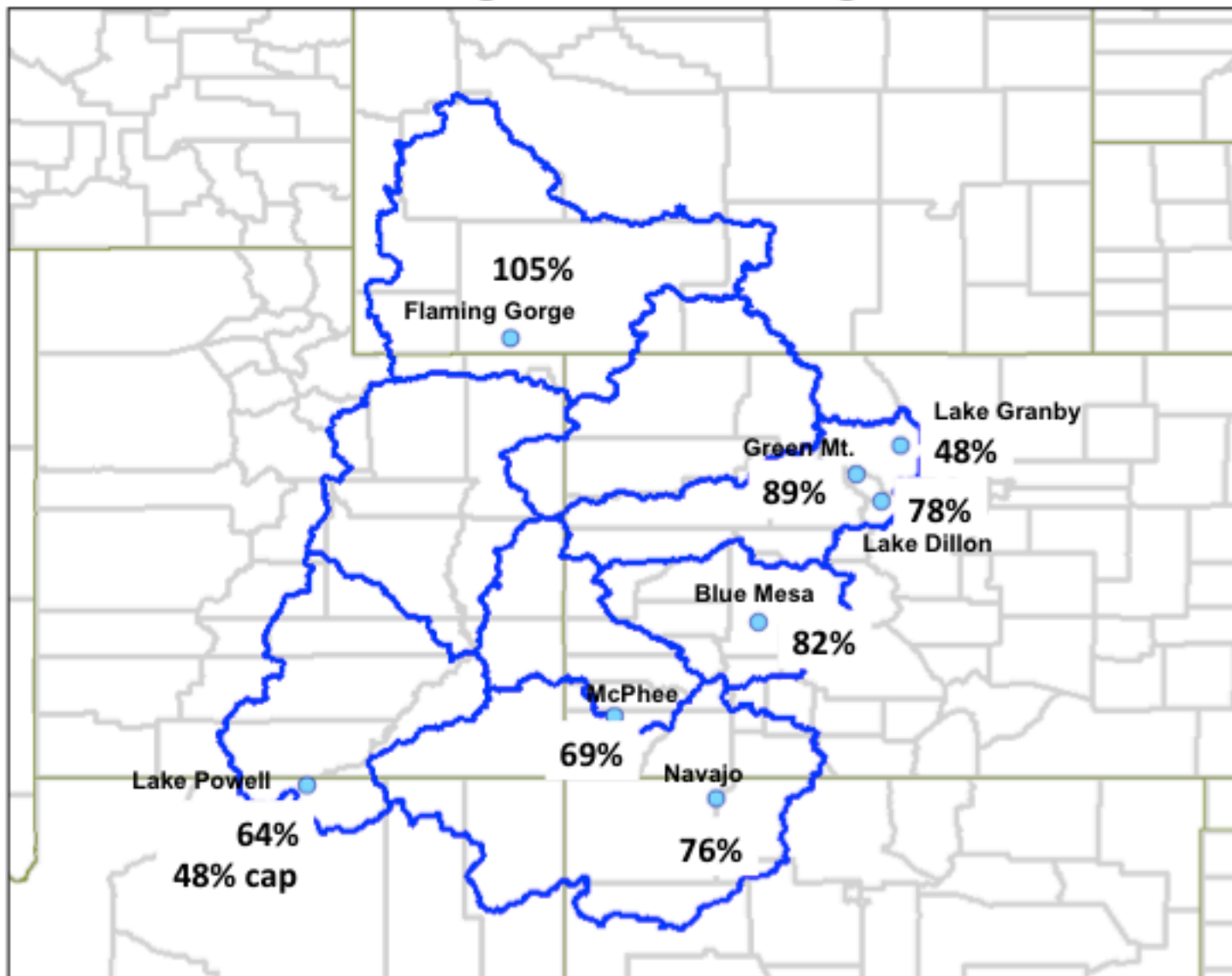
Reservoir Update



March Reservoir Storage Volume Change

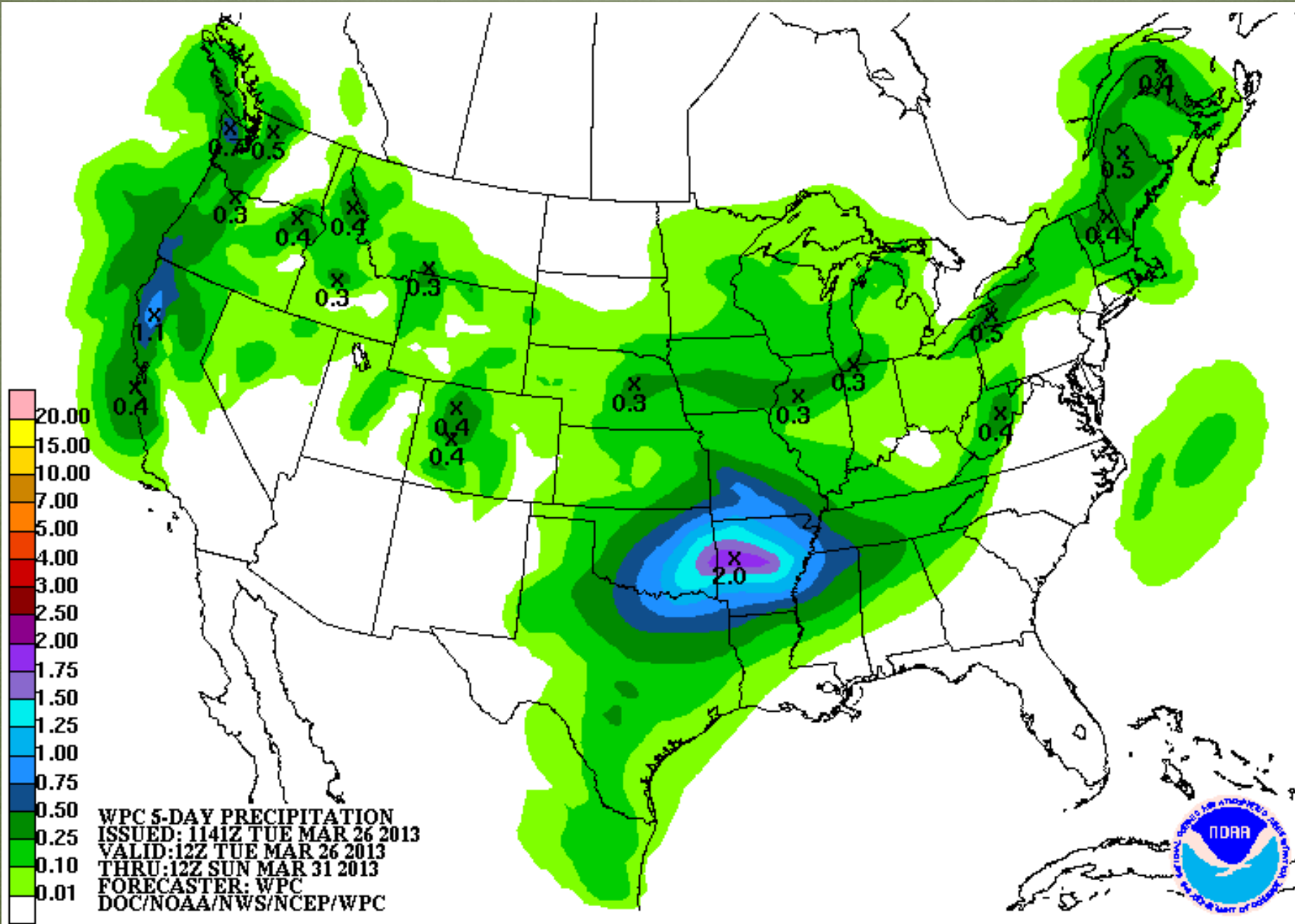


March Average Reservoir Storage Volume



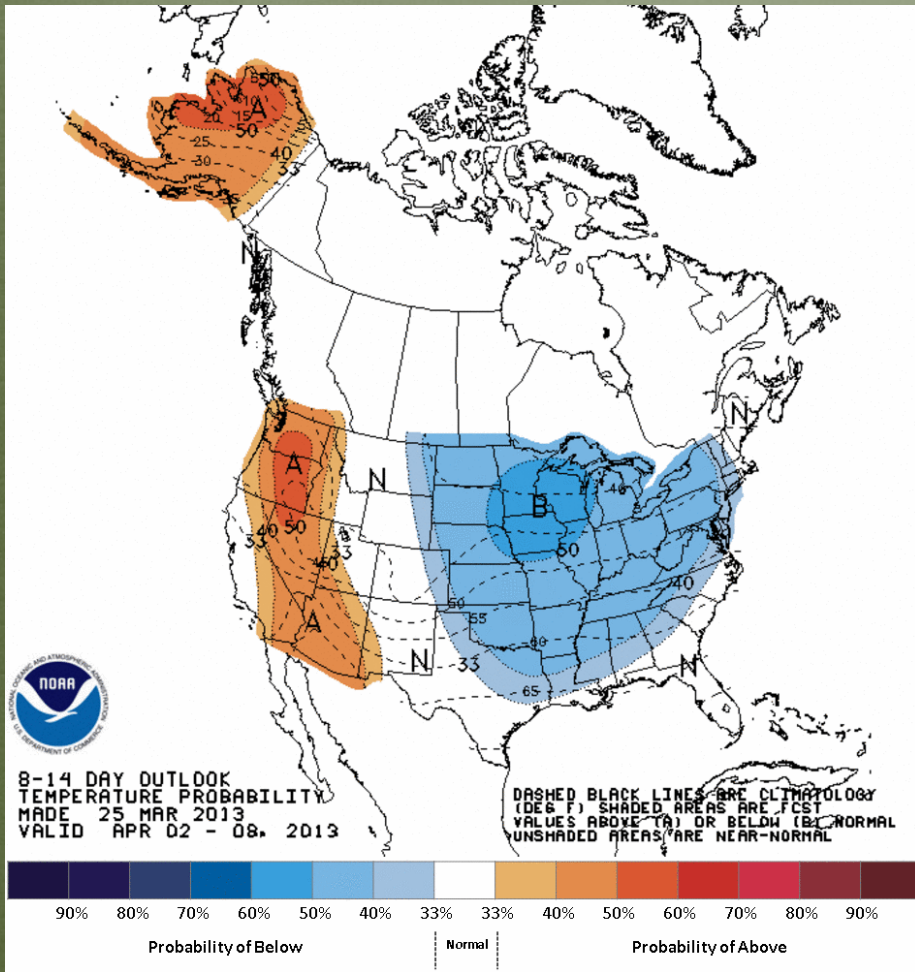
Precipitation Forecast



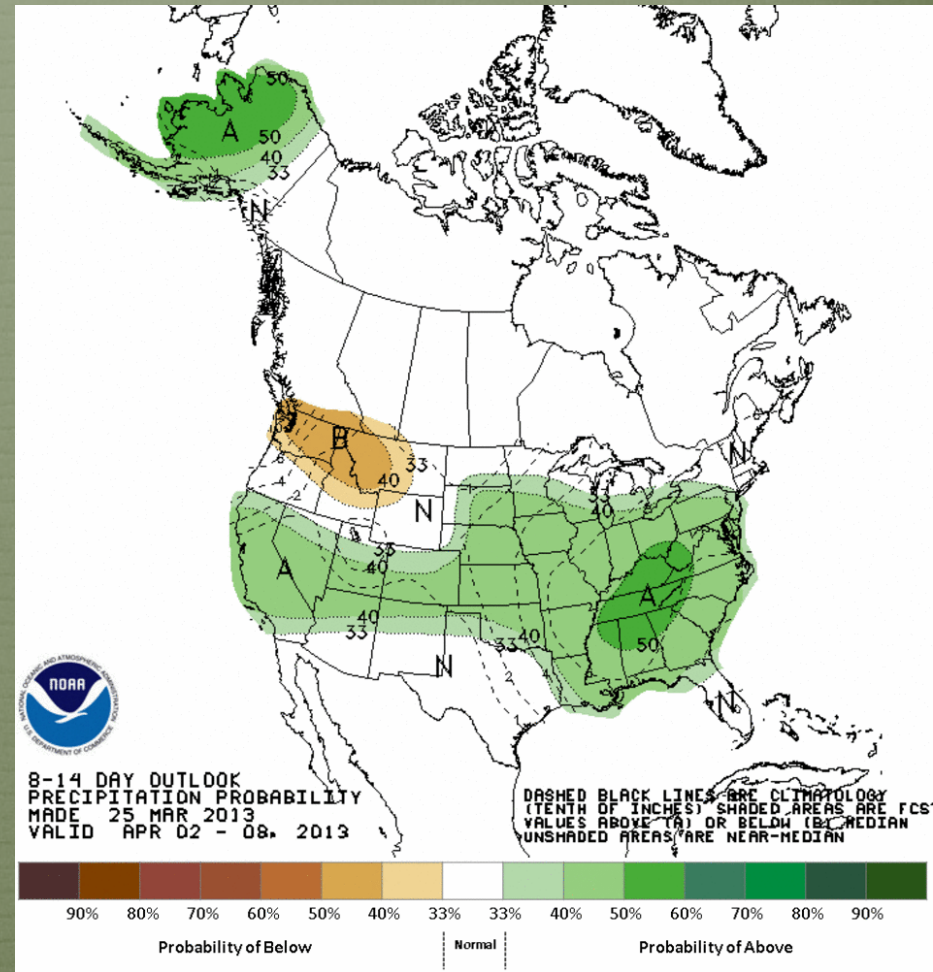


5-Day Quantitative Precipitation Forecast

8-14 Day Outlook

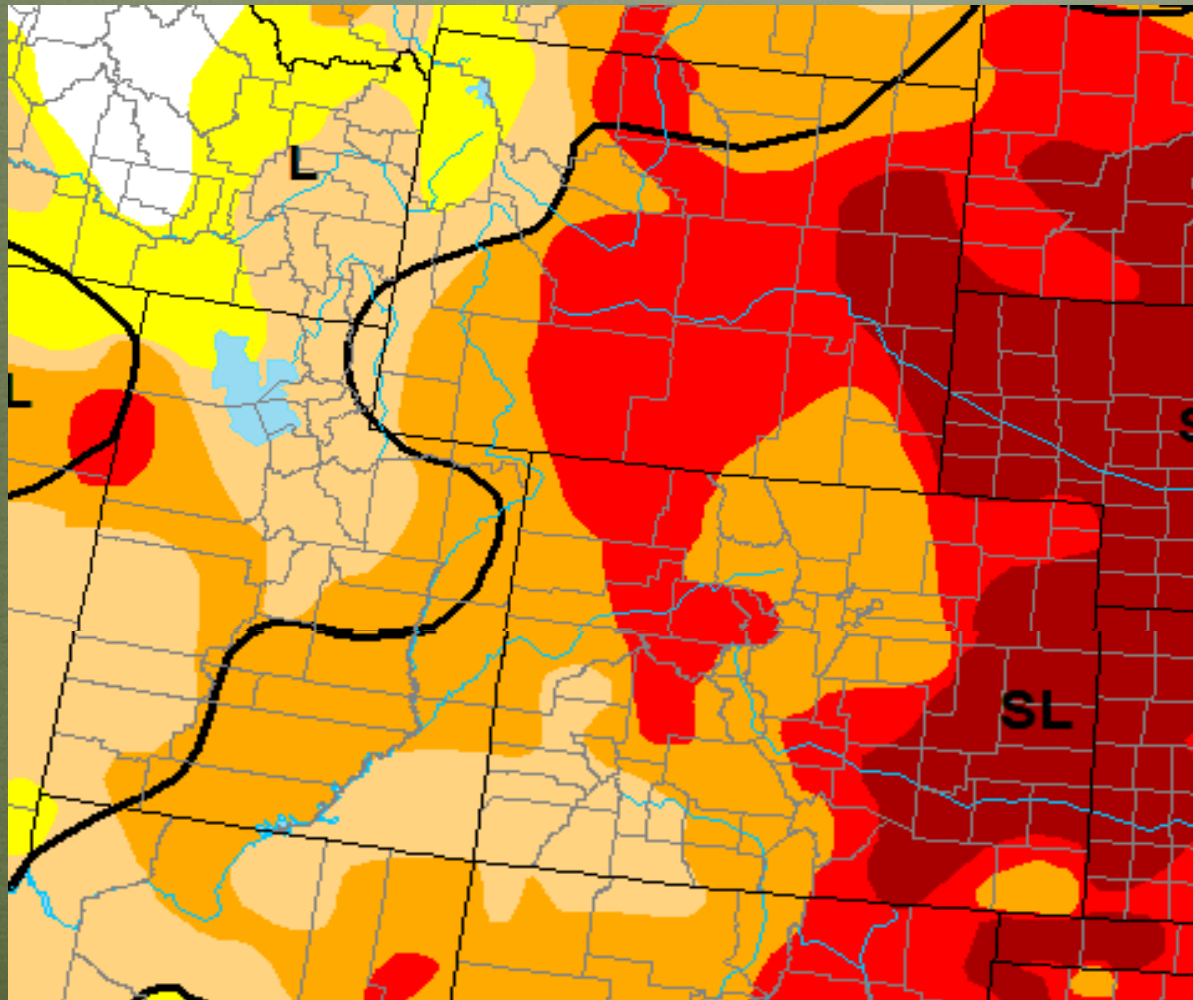


Temperature








Precipitation

Recommendations



Intensity:

-  D0 Abnormally Dry
-  D1 Drought - Moderate
-  D2 Drought - Severe
-  D3 Drought - Extreme
-  D4 Drought - Exceptional

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CONTACT:

COLORADO CLIMATE CENTER

COLORADO STATE UNIVERSITY

FORT COLLINS, CO 80523

970 - 491 - 8545

NIDIS - UPPER COLORADO BASIN PILOT PROJECT

F o r m o r e i n f o r m a t i o n

NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

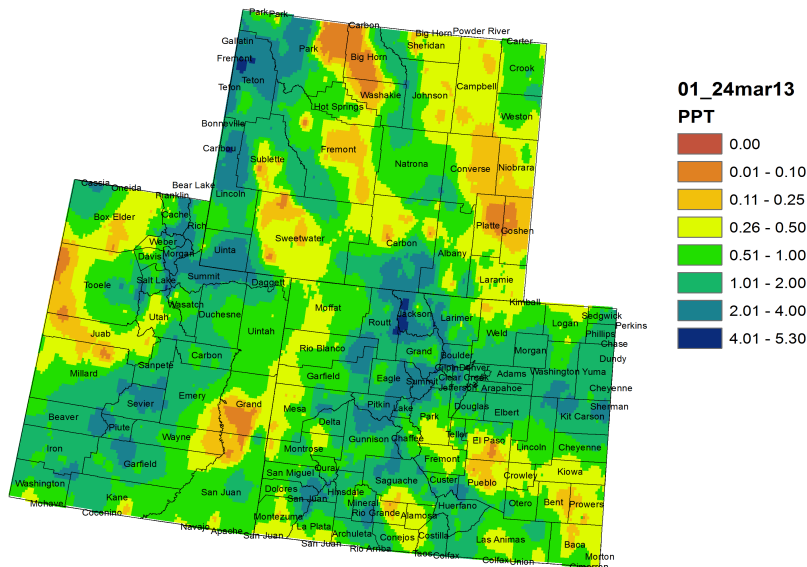
March 26, 2013

To be added to the mailing list, email: hreges@atmos.colostate.edu

View previous briefings: http://ccc.atmos.colostate.edu/drought_webinar.php

Register for the webinar: http://ccc.atmos.colostate.edu/drought_webinar_registration.php

Colorado, Utah and Wyoming Month to Date Precipitation (in)
1 - 24 March 2013



Colorado, Utah and Wyoming 7 Day Precipitation (in)
18 - 24 March 2013

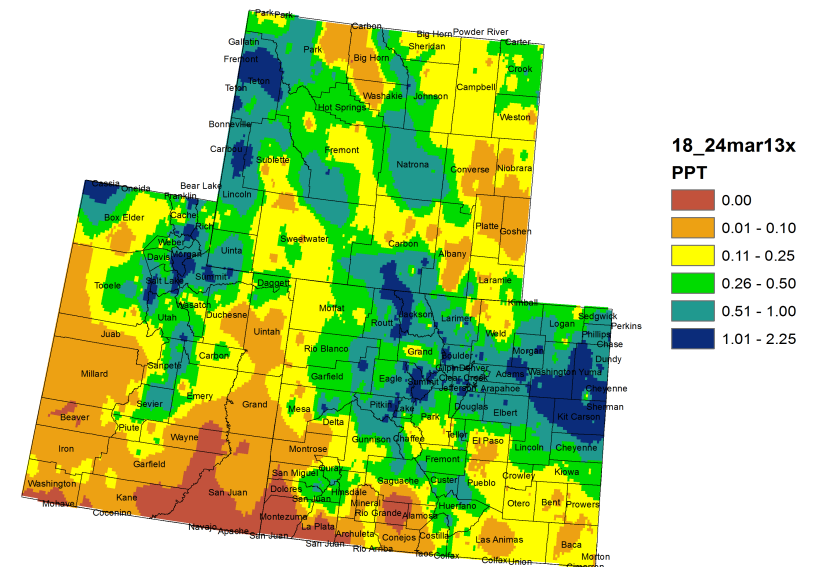


Fig. 1: March month-to-date precipitation in inches.

Fig. 2: March 18 – 24 precipitation in inches.

Precipitation

Since the beginning of the month, most of the higher elevations in the Upper Colorado River Basin (UCRB) have received more than 2 inches of moisture (Fig. 1). Many of the lower elevation locations have received between .5 and 2 inches month-to-date. A few locations, such as Sweetwater County, WY, northwest CO and parts of the Colorado River valley in eastern UT, have been a little drier, receiving less than .50 inches of precipitation. East of the basin, the wet mountains and Sangre de Cristos in southern CO have received over 1 inch of moisture. The Front Range urban corridor, extending east into the plains, have also received over 1 inch. The Arkansas valley region and far northeast CO have been drier, receiving less than 1 inch in most locations.

Last week, the northern and central mountains of CO and the higher elevations of northern UT and western WY received over .5 inches of precipitation (Fig. 2). The lower elevations in the northern UCRB and most of the southern UCRB were drier, receiving less than .25 inches for the week. East of the basin, the Front Range and parts of northeast CO received over .5 inches of moisture, while southeast CO was much drier.

Snotel Water Year Precipitation Percentile Ranking for 26 March 2013 (Stations with 15+ years of data only)

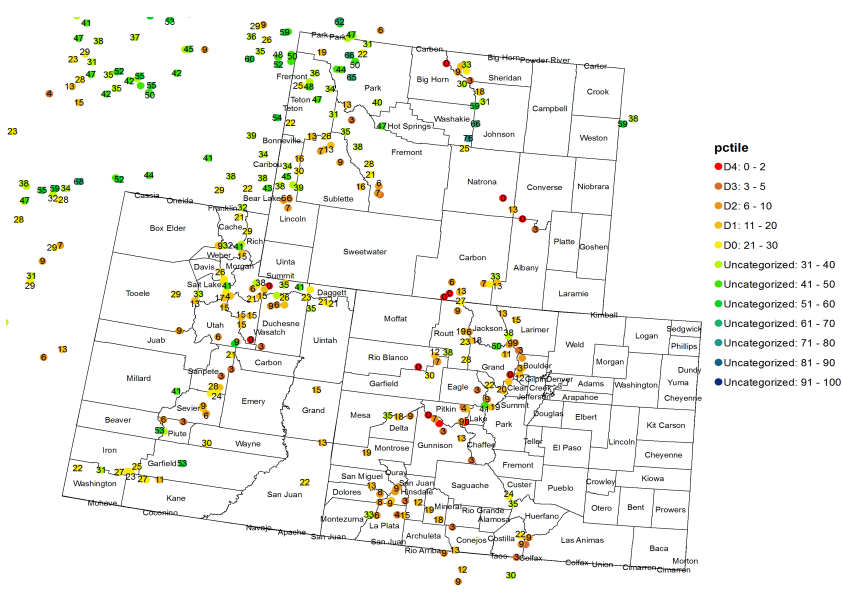


Fig. 3: WYTD SNOTEL precipitation percentiles (50th percentile is median, 30th percentile is D0 drought category) as of March 26th.

Snowpack

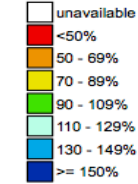
Water-year-to-date SNOTEL precipitation percentiles in the UCRB are below the median throughout the entire basin (Fig. 3). Along the Wasatch and Uintah ranges in UT and up to the Upper Green in WY, most percentiles range from the teens to 30s, with a few that are now recording below the 10th percentile. The northern and central CO mountains are below the 30th percentile at most locations, with several sites recording below the 5th percentile. Percentile rankings in southwest CO in the San Juan mountains are mostly in the teens and single digits.

Accumulated snowpack is currently less than normal across the entire UCRB (Fig. 4), although most of the sub-basins saw a slight increase in percent of normal from last week. Sub-basins in western CO range are all above 80% of normal snowpack. Southern UT basins are over 90% of normal while snowpack in the sub-basins of northern UT and southwest WY range between 70% and 90% of normal.

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

Mar 25, 2013

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



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

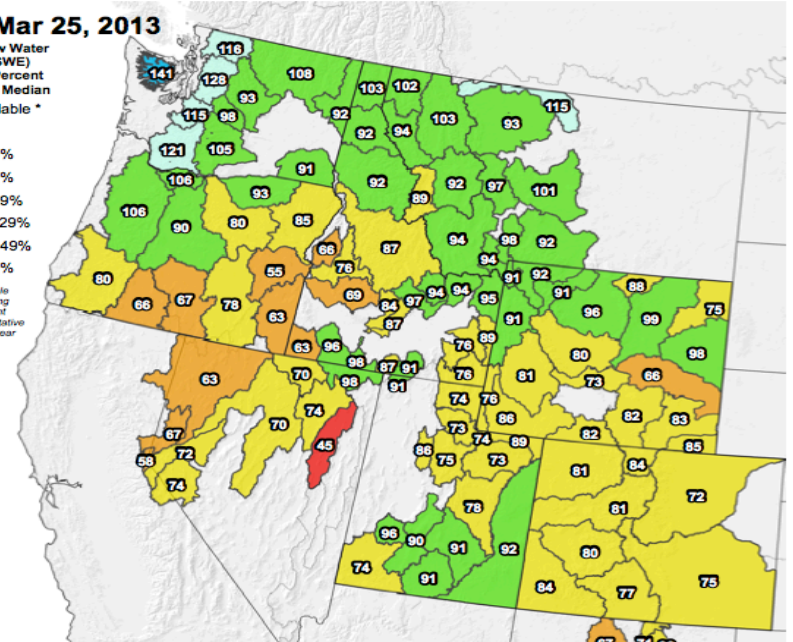
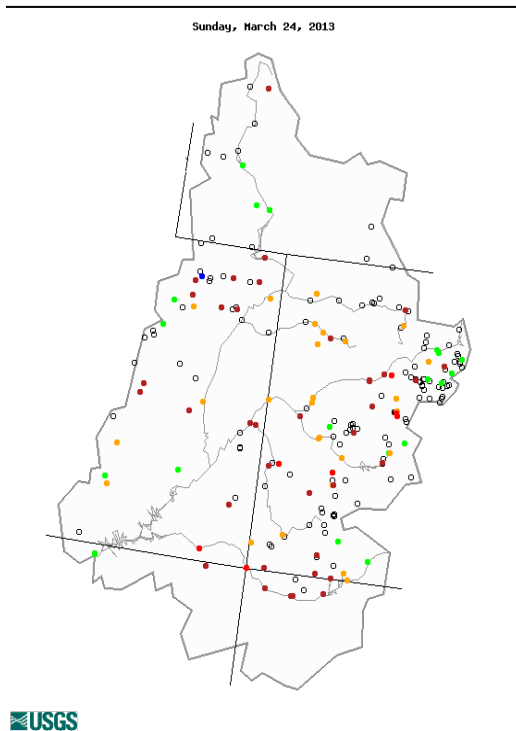


Fig. 4: Basin-averaged snow water equivalent as a percent of normal (median), as of March 25th.

Streamflow

As of March 24th, about 23% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) to above normal 7-day average streamflows (Fig. 5), a decrease from 49% last week. This decrease is likely due to much cooler temperatures. About 51% percent of the gages in the basin are recording much below normal or low (i.e. lowest on record) streamflows, and only 1 gage is reporting much above normal flows (and that is solely due to reservoir releases above that gage). 93 gages are now reporting again (out of frozen conditions), an increase from 55 gages one month ago.

Flows on the three key gages around the basin have all seen decreases in flow over the past week (Fig. 6), due to the colder temperatures. Flows on the Colorado River near the CO-UT state line and on the Green River at Green River, UT are in the much below normal range, at the 12th and 22nd percentiles, respectively. The San Juan River near Bluff, UT has dropped to the 1st percentile, and is recording a new record low for the latest 7-day period for that site.



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 24th.

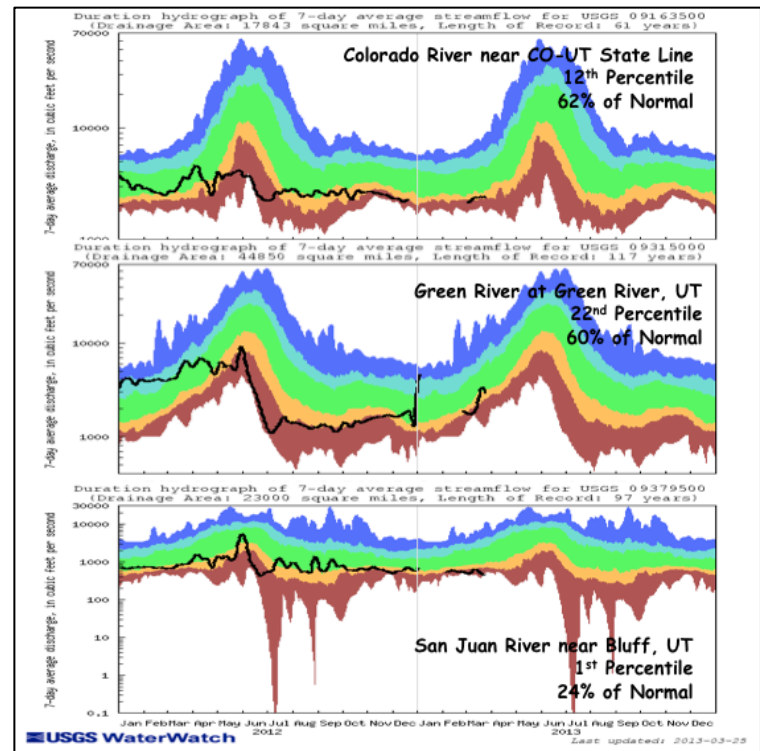


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Last week, the UCRB experienced cooler than average temperatures. The northern part of the basin saw temperatures 5 to 10 degrees colder than average, while the southern part of the basin saw temperatures 0 to 5 degrees below average. East of the basin, the rest of CO also saw temperatures 5 to 10 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). The VIC model is being largely controlled by temperature changes for much of the basin and showed a decline in soil moisture from last week (due to colder temperatures). When SWE is combined with soil moisture, lower percentiles show up for western CO and northeast UT (Fig. 7). Dry soils below the 10th percentile show up over most of southern, with some improvement showing up over eastern CO.

Most of the major reservoirs in the UCRB continue to see volume decreases. Flaming Gorge and Blue Mesa have seen slight volume increases since the beginning of the month. Green Mountain has begun to see volume increases in the past week. Lake Granby continues to decrease by a large percentage. For the month of March, Flaming Gorge is just above average while the remaining reservoirs are all below average, ranging from 48% of average (Lake Granby) to 89% of average (Green Mountain).

Precipitation Forecast

The UCRB is currently in between a broad low pressure trough over the mid-west and a developing ridge of high pressure over the west coast. A weak disturbance will traverse the CO/WY border through Wednesday morning and bring a chance for light snow showers to the northern border of the basin. A warming trend will then take hold for the rest of the work week as the upper level ridge intensifies and shifts east. Temperatures should warm to above freezing for most locations below 10,000 ft. before the next weak disturbance spreads a chance of showers back into the area on late day Friday. Accumulations through Friday will generally remain below 0.10 inches of liquid, possibly reaching 0.25 inches in favored locals of the central CO mountains (Fig. 8). Attention then turns to a large low pressure system expected to form off the California coast late this week. This feature is anticipated to make landfall sometime this weekend, with a return to unsettled conditions for the basin moving into early next week.

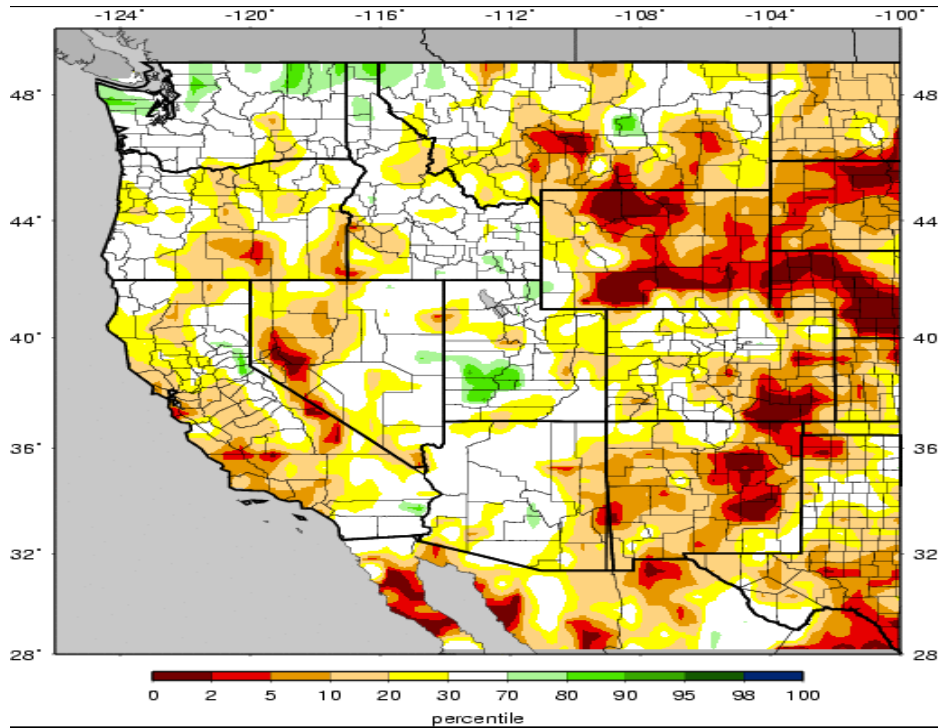


Fig. 7: VIC modeled soil moisture percentiles for the western U.S. as of March 17th. The map below combines soil moisture and SWE.

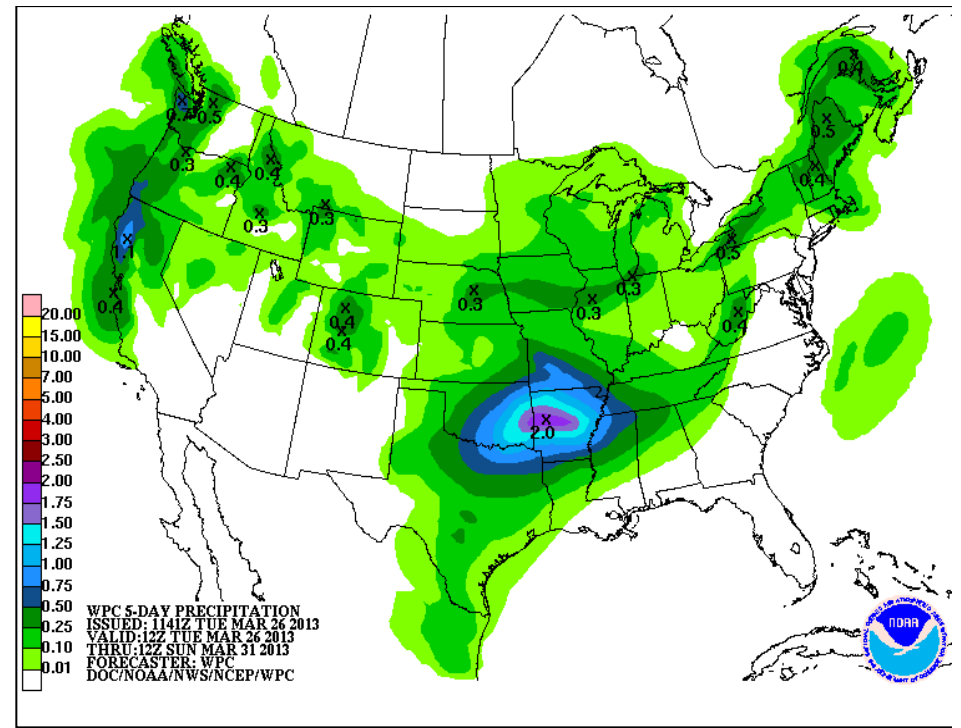
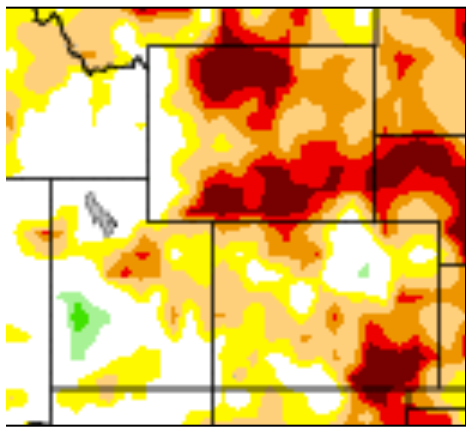


Fig. 8: Quantitative precipitation forecast (QPF) by the Hydrologic Prediction Center out to 12UTC Sunday.

Drought and Water Discussion

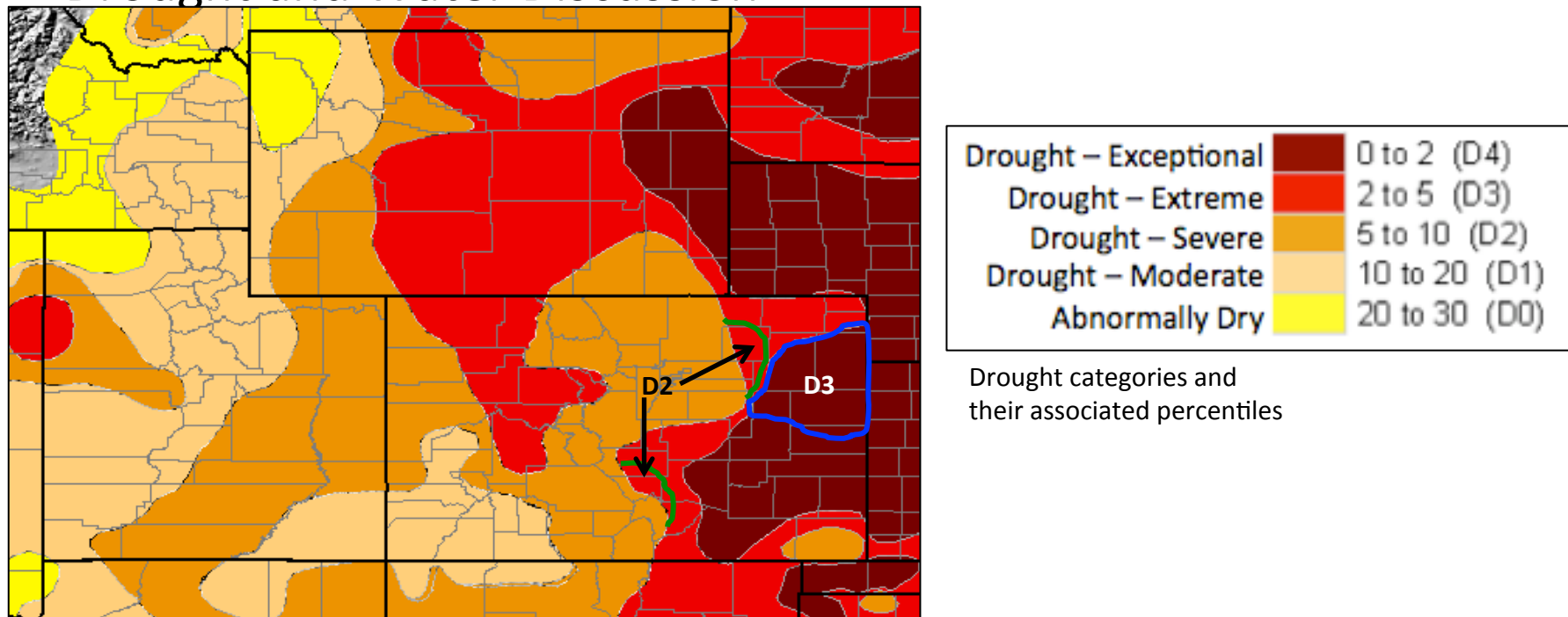


Fig. 9: March 19th release of U.S. Drought Monitor for the UCRB.

UCRB: Status quo is recommended for the UCRB in the current depiction of the U.S. Drought Monitor (USDM) map (Fig. 9). Much of the basin will be closely monitored over the next couple of weeks, as this is a critical time for snowpack—low accumulations and warm temperatures could lead to quickly deteriorating drought conditions, but colder temperatures and continued accumulations could help minimize the impacts. Status quo will be recommended until the timing of peak snowpack and melting is more clear.

Eastern CO: Some improvements are recommended for eastern CO (Fig. 9, blue shape and green lines). Month-to-date, portions of eastern CO have seen above average precipitation and some improvement in the winter wheat conditions. Further south, though much of the Arkansas valley has been very dry, the wet mountains and Sangre de Cristos have seen good moisture for March. Although the urban corridor has received generous amounts of moisture, no improvements are recommended as the water supply situation is still poor.