

Spring
2011

March 29th, 2011

NIDIS - UPPER COLORADO BASIN PILOT PROJECT

Weekly Climate, Water & Drought Assessment

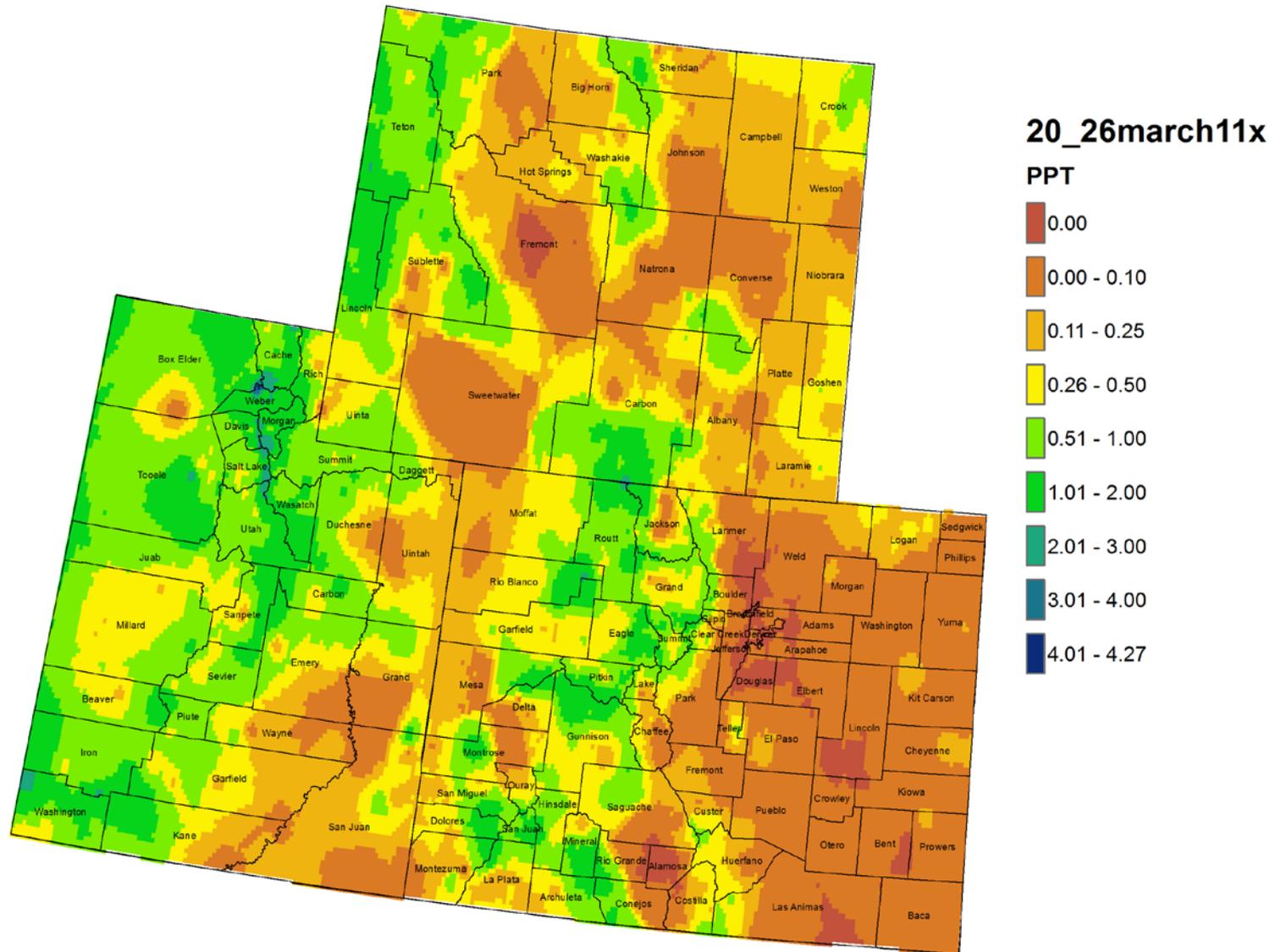
Today's Agenda

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

Precipitation/Snowpack Update

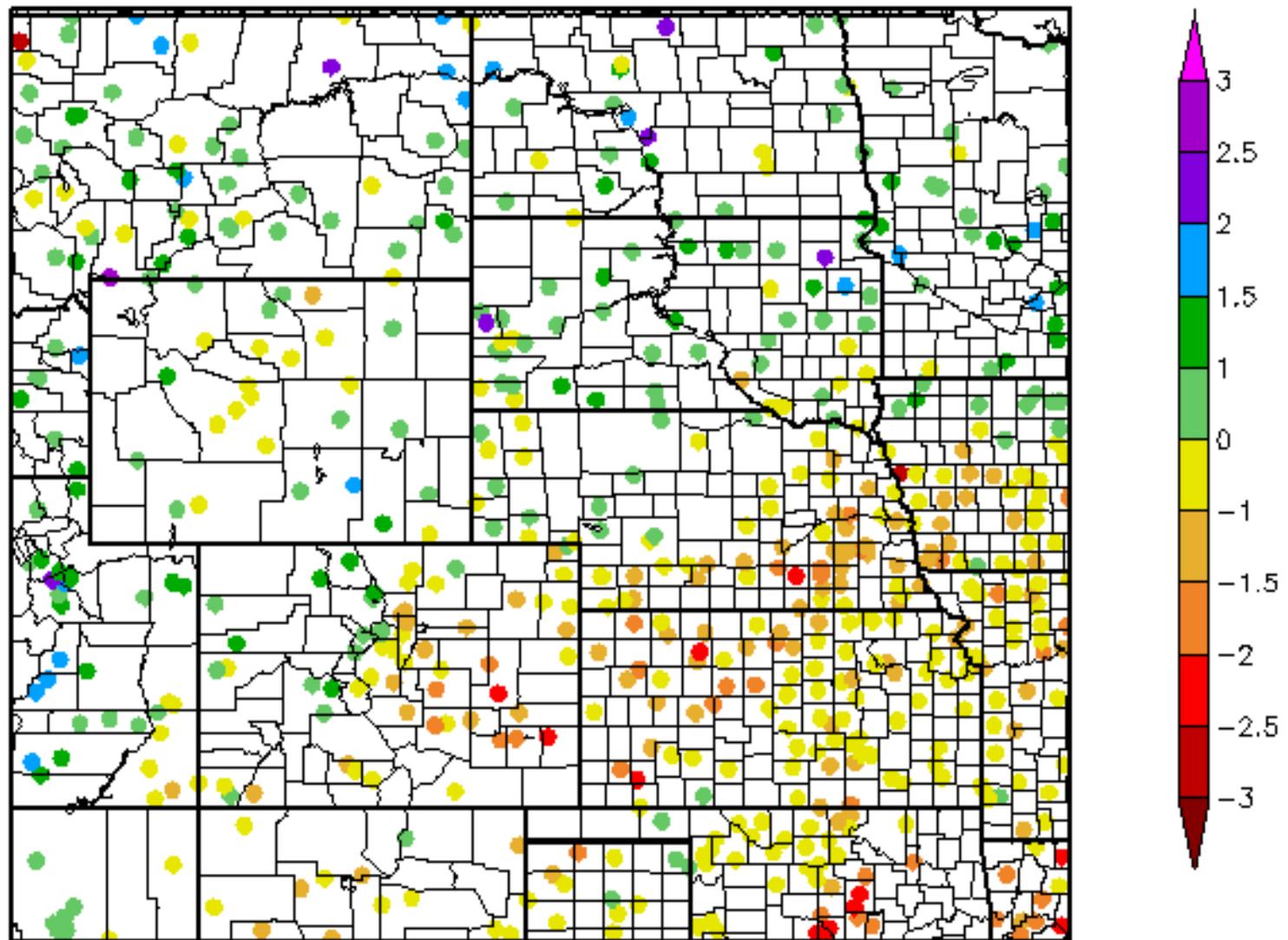


Colorado, Utah and Wyoming 7 Day Precipitation (in) 20 - 26 March 2011

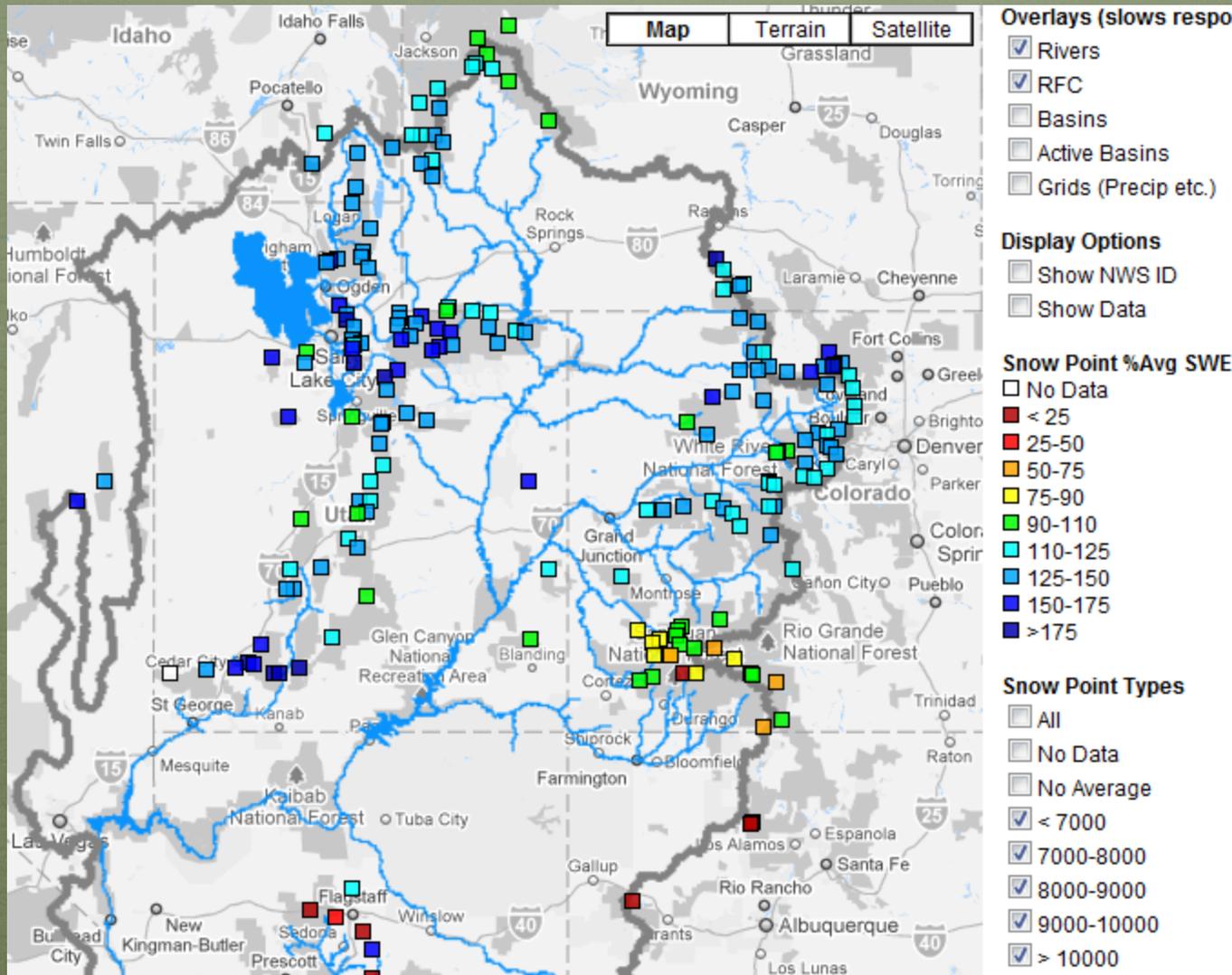


6 Month SPI

9/28/2010 - 3/27/2011

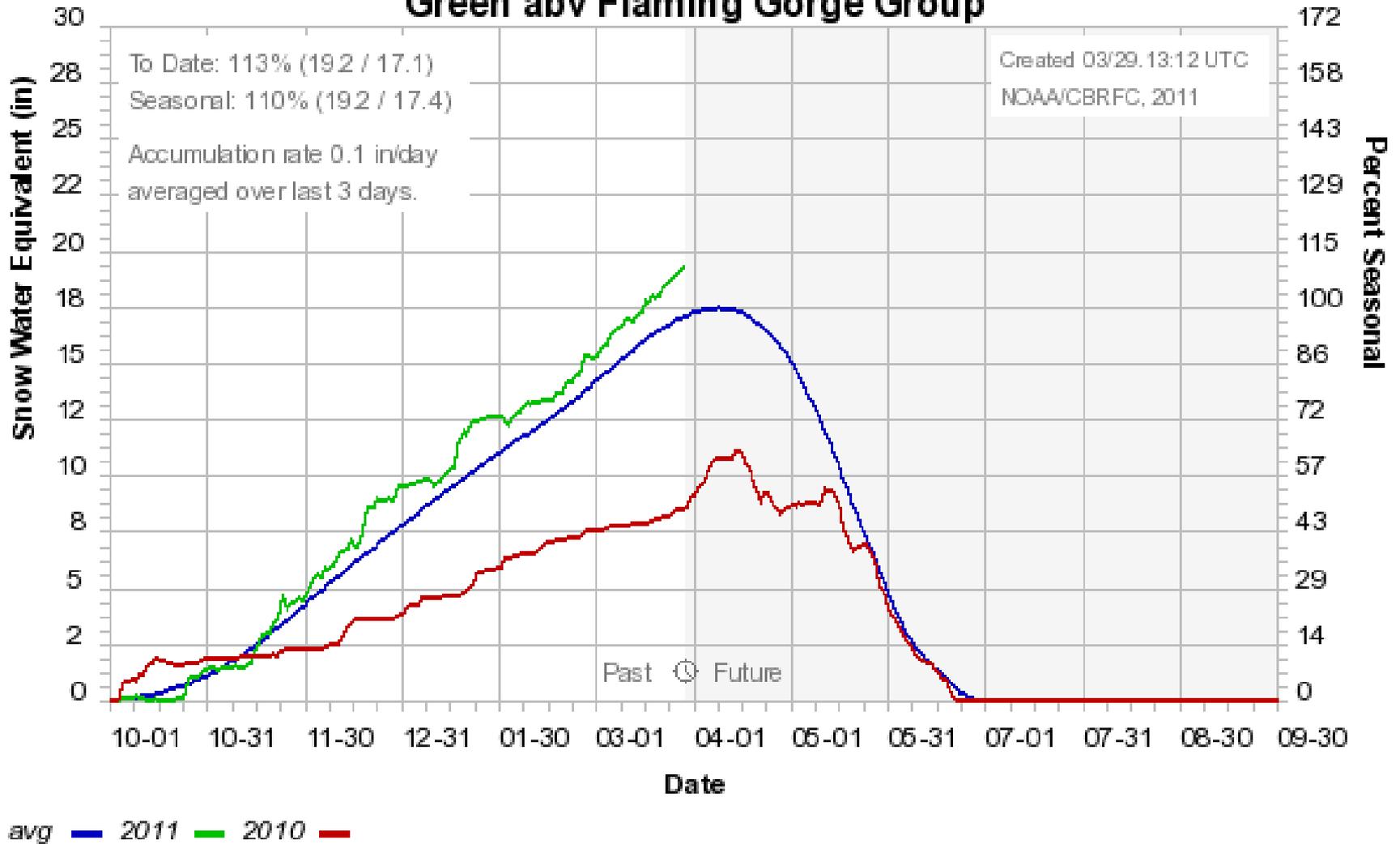


Upper Colorado River Basin Snow



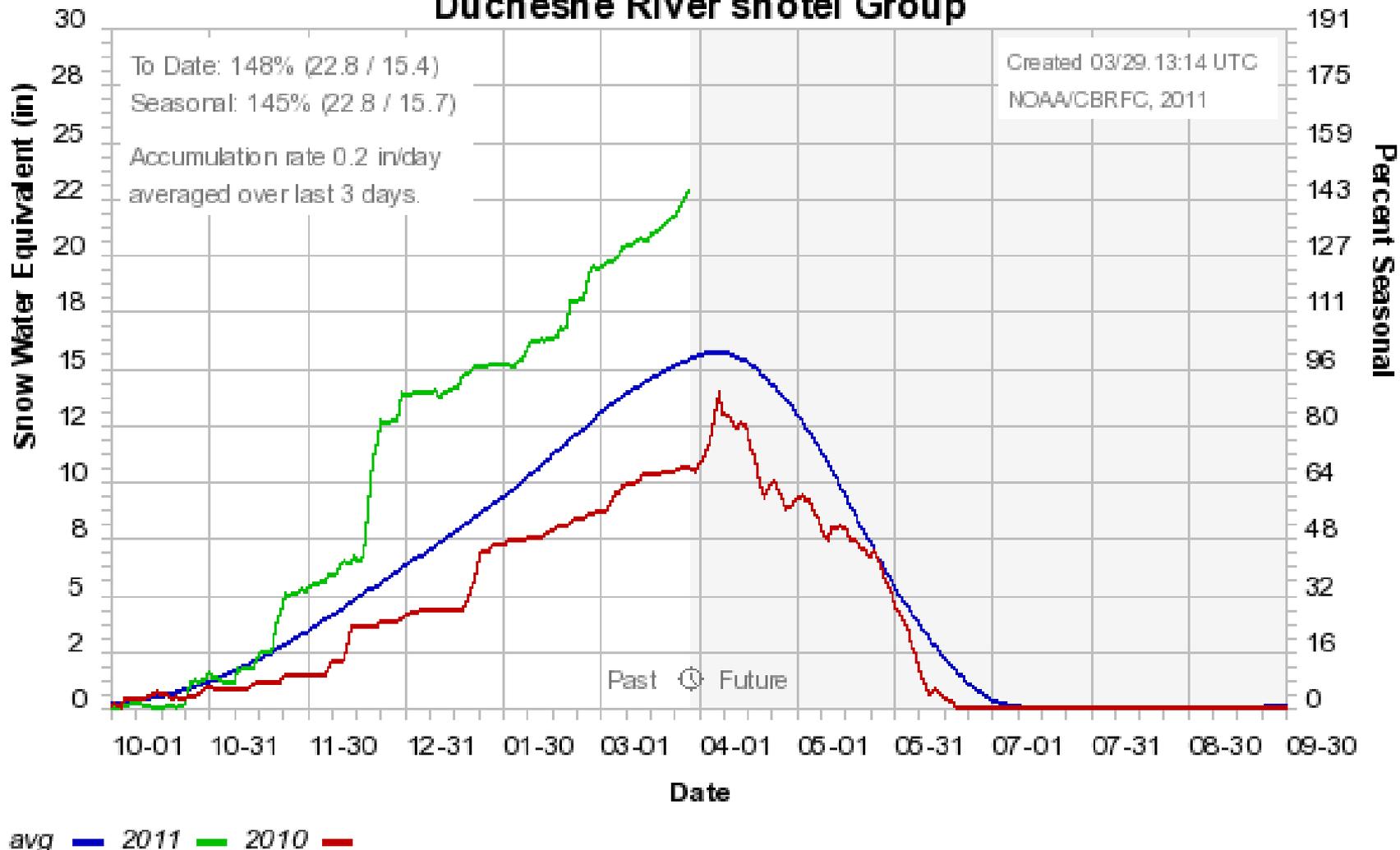
Colorado Basin River Forecast Center

Green abv Flaming Gorge Group



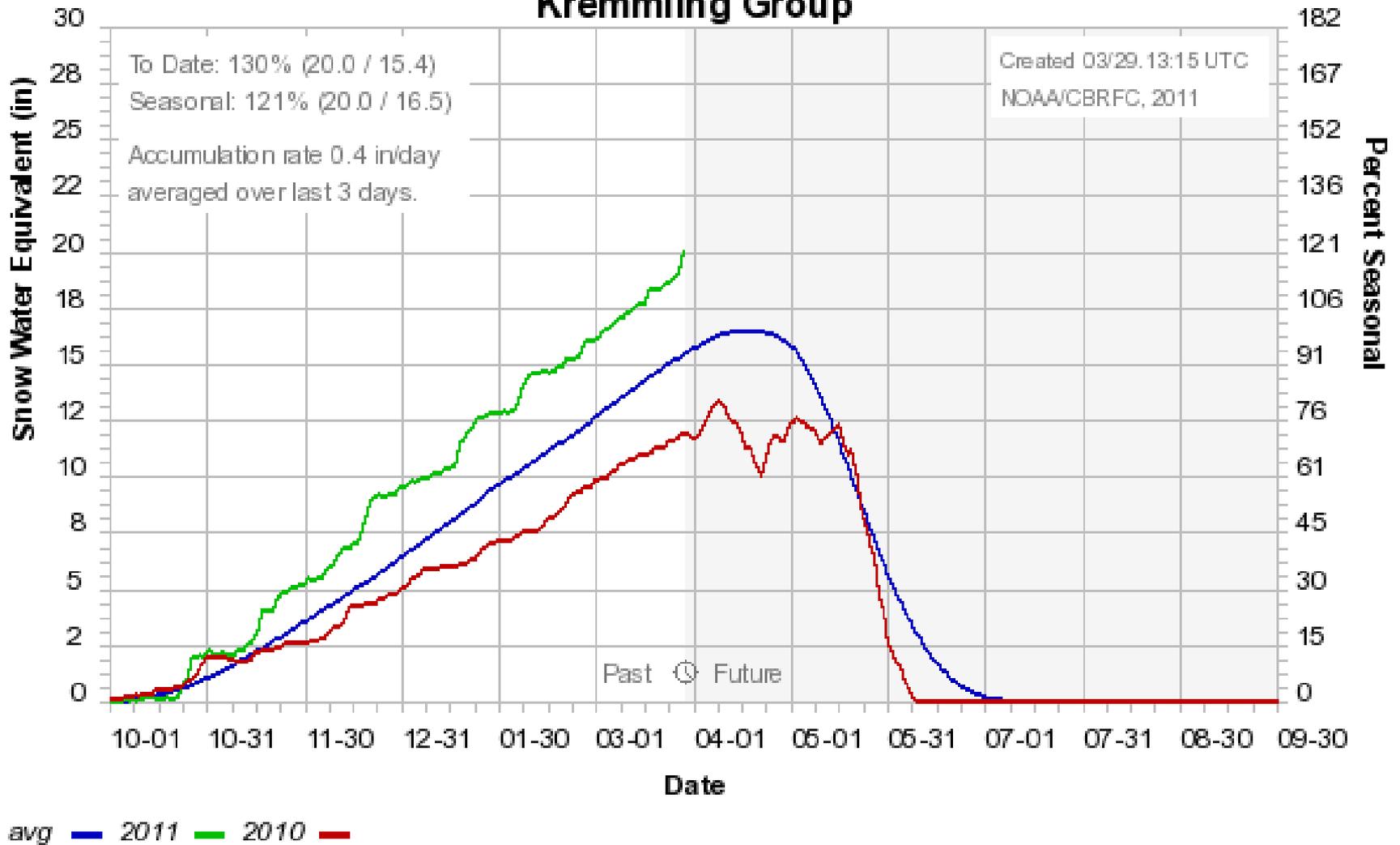
Snowpack % of average to date: 113%
Percent of average peak: 110%

Colorado Basin River Forecast Center Duchesne River snotel Group



Snowpack % of average to date: 148%
Percent of average peak: 145%

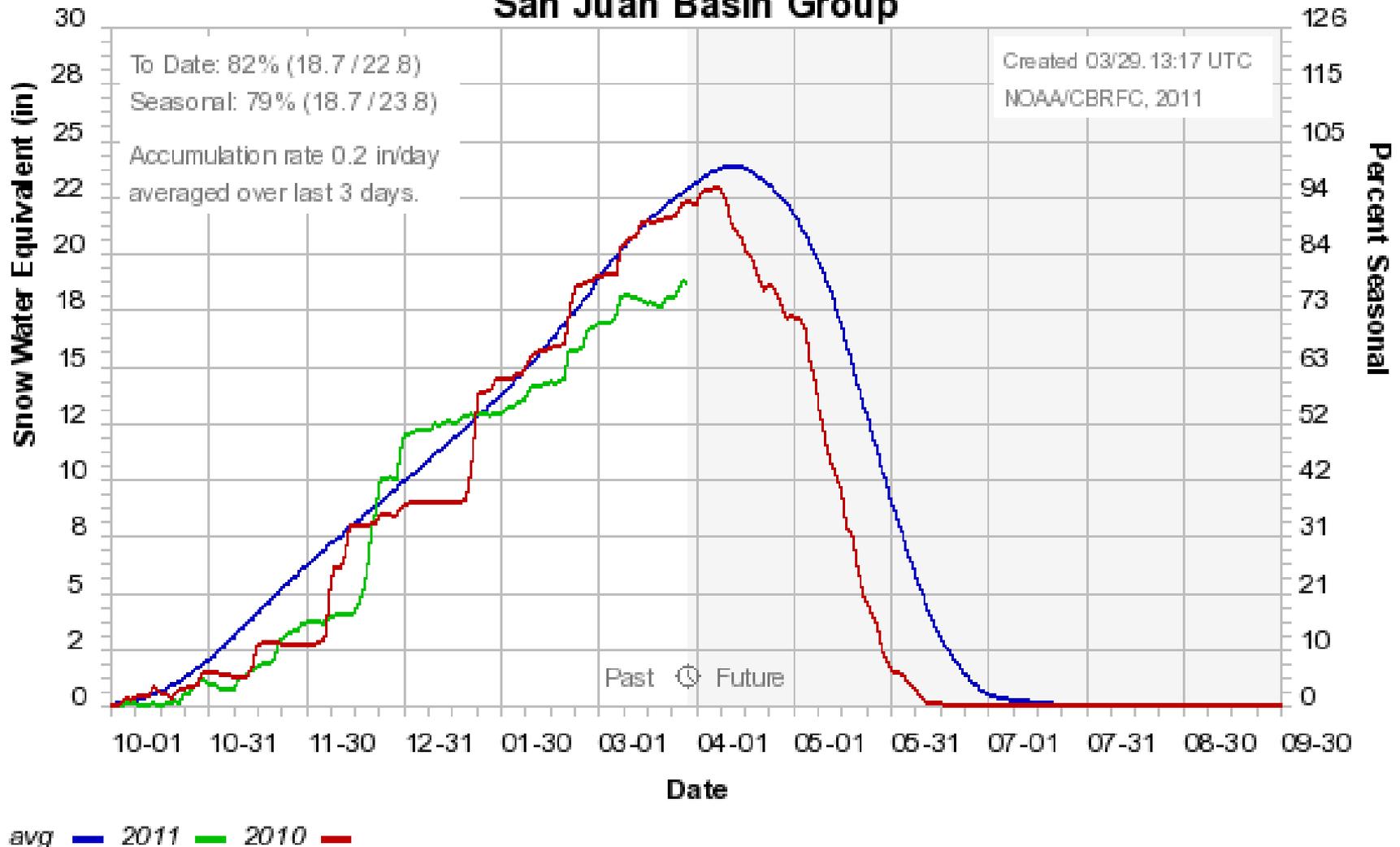
Colorado Basin River Forecast Center Kremmling Group



Snowpack % of average to date: 130%
Percent of average peak: 121%

Colorado Basin River Forecast Center

San Juan Basin Group

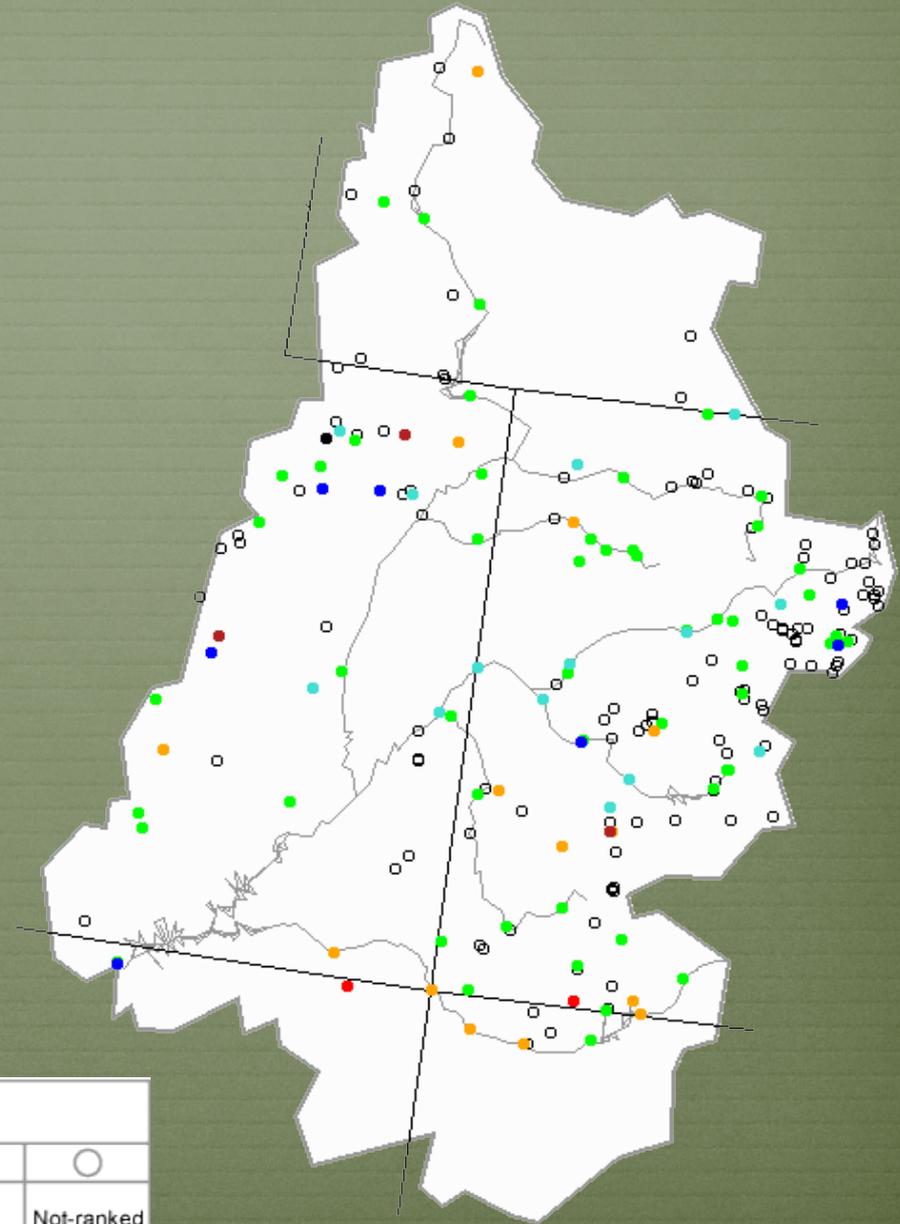


Snowpack % of average to date: 82%
Percent of average peak: 79%

Streamflow Update

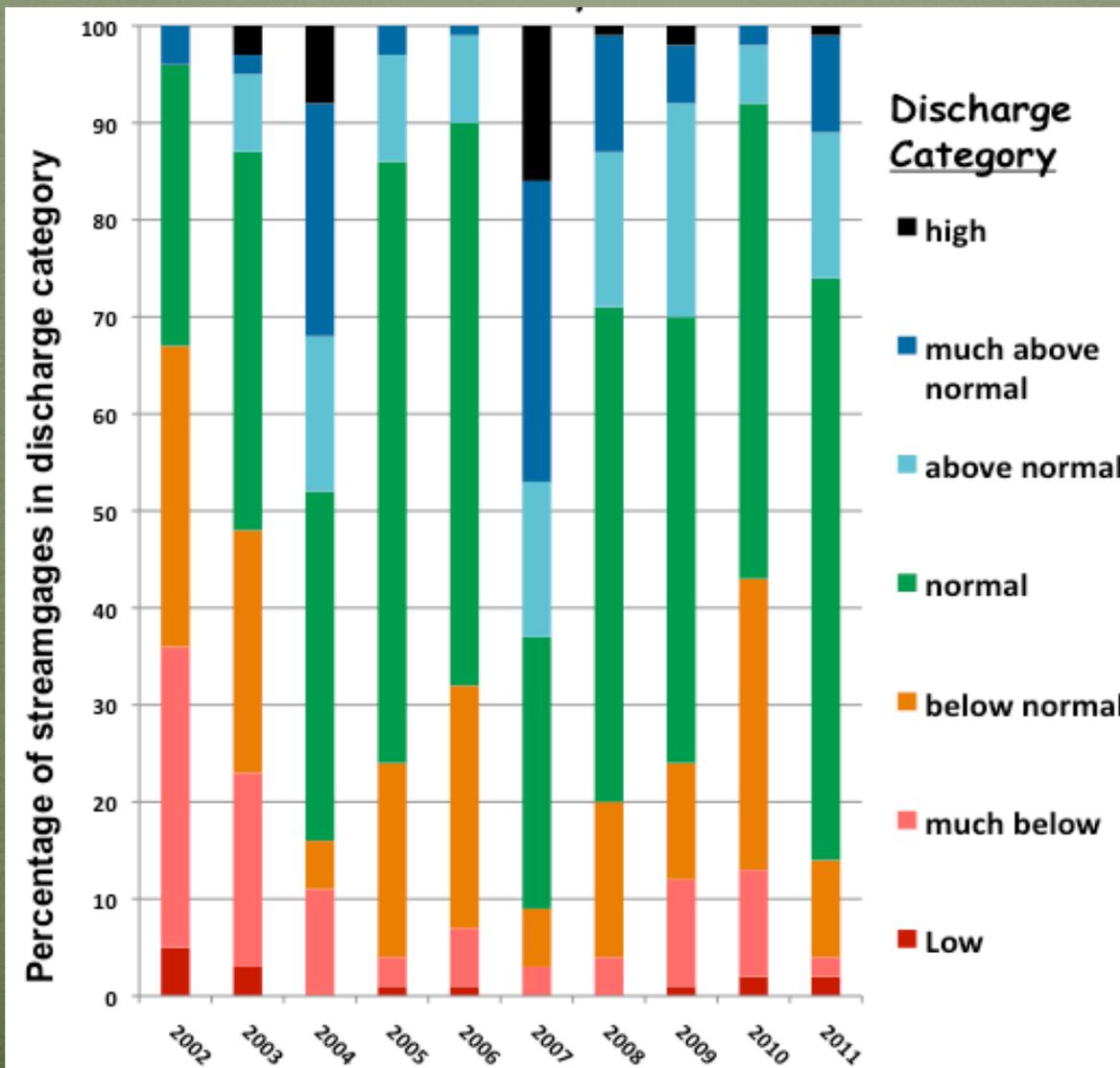


7-day average discharge compared to historical discharge for the day of the year (March 27th)

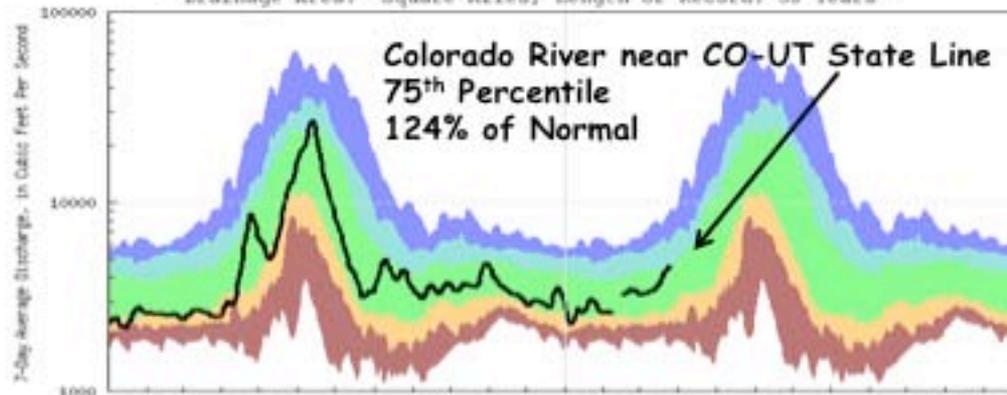


Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

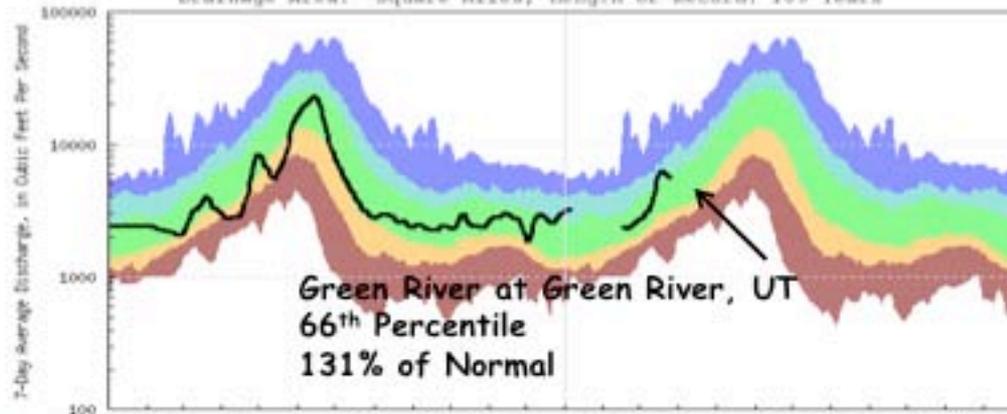
Upper Colorado River Basin- Comparison of 7-day Average Discharge March 26, 2002-2011



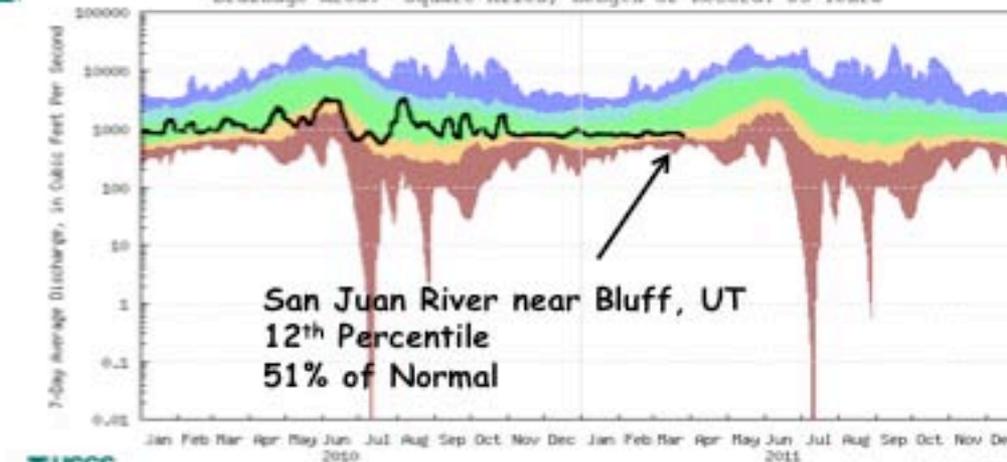
USGS 09163500 COLORADO RIVER NEAR COLORADO-UTAH STATE LINE
Drainage Area: Square Miles, Length of Record: 58 Years



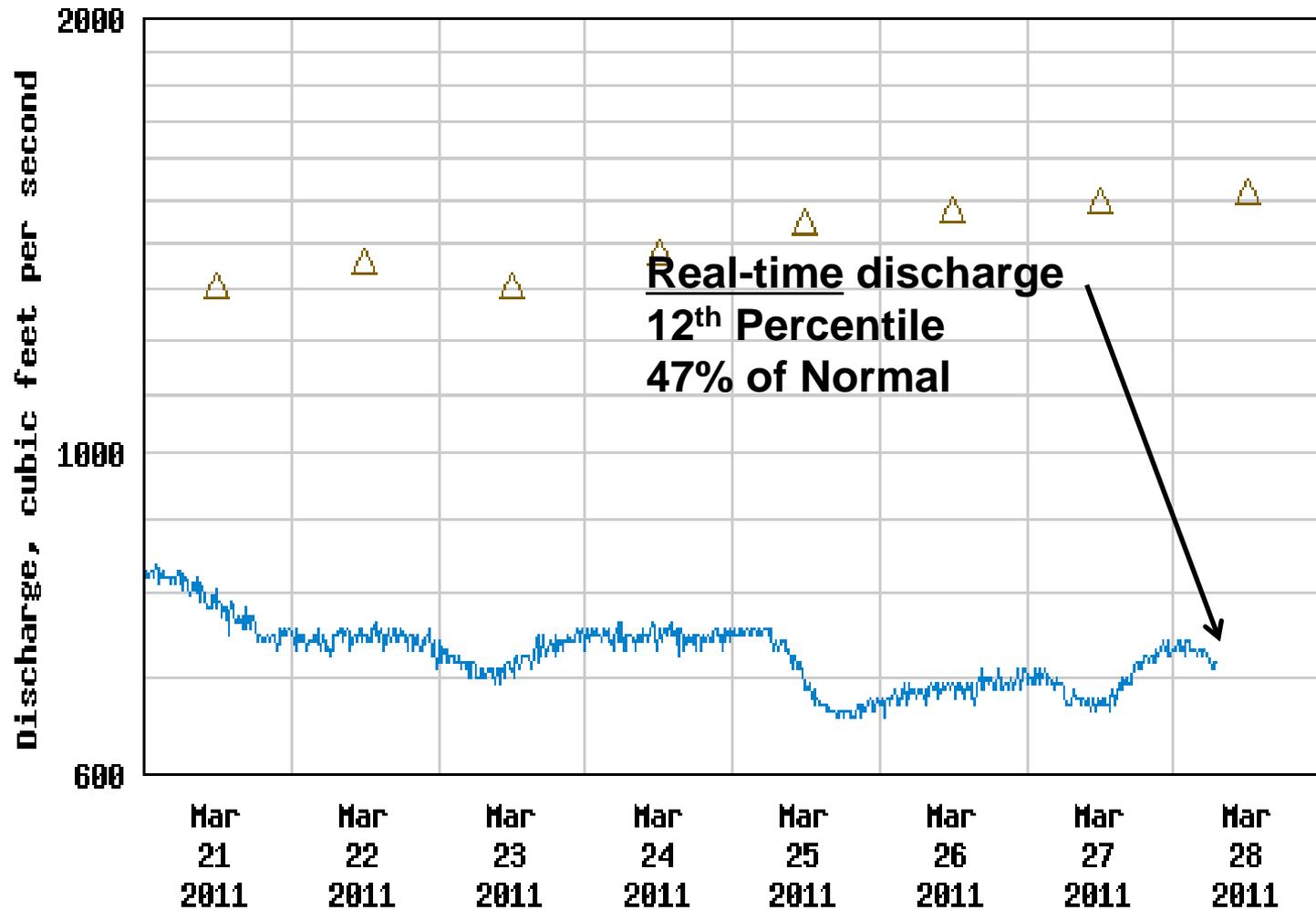
USGS 09315000 GREEN RIVER AT GREEN RIVER, UT
Drainage Area: Square Miles, Length of Record: 109 Years



USGS 09379500 SAN JUAN RIVER NEAR BLUFF, UT
Drainage Area: Square Miles, Length of Record: 85 Years



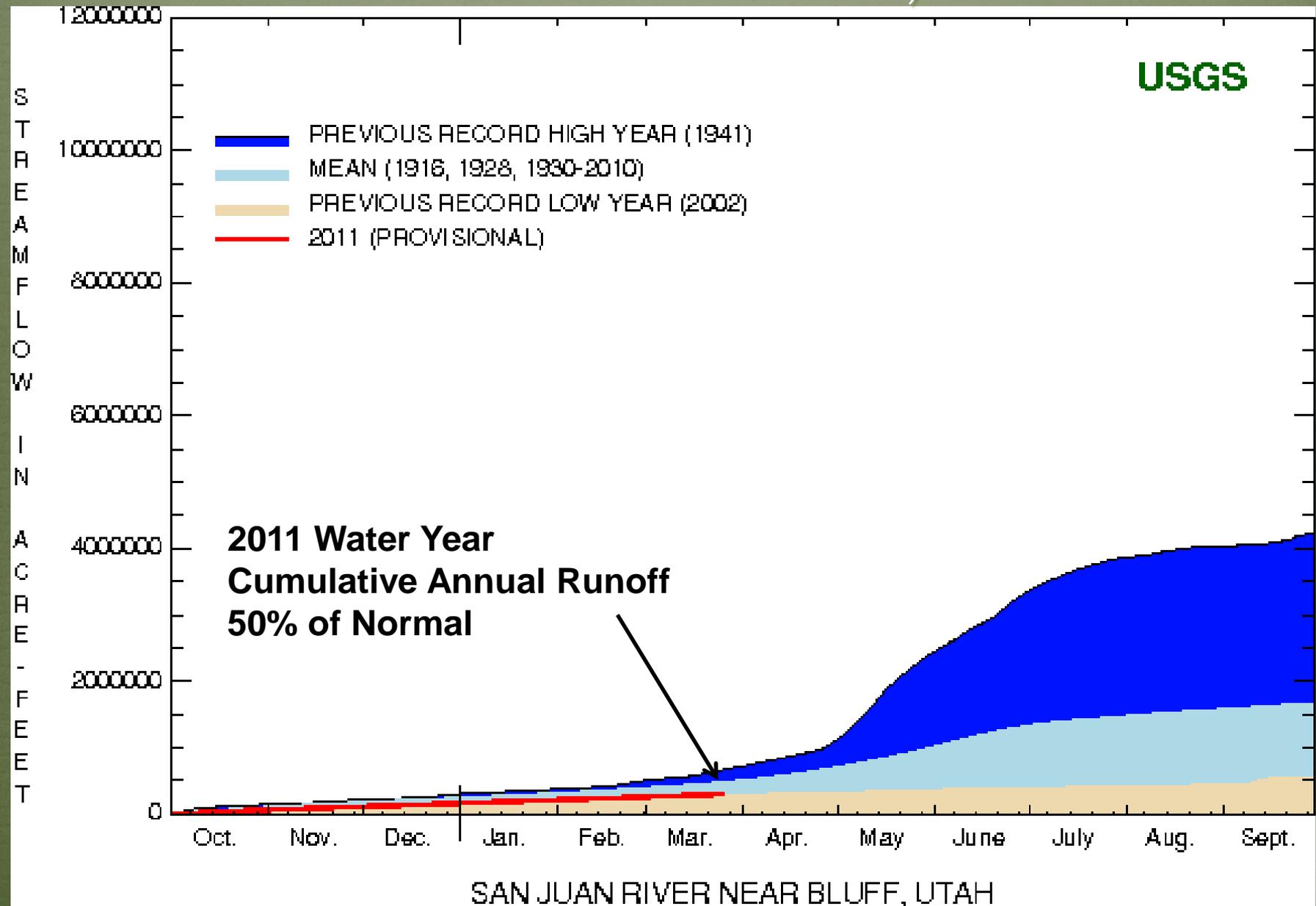
USGS 09379500 SAN JUAN RIVER NEAR BLUFF, UT



----- Provisional Data Subject to Revision -----

△ Median daily statistic (87 years) — Discharge

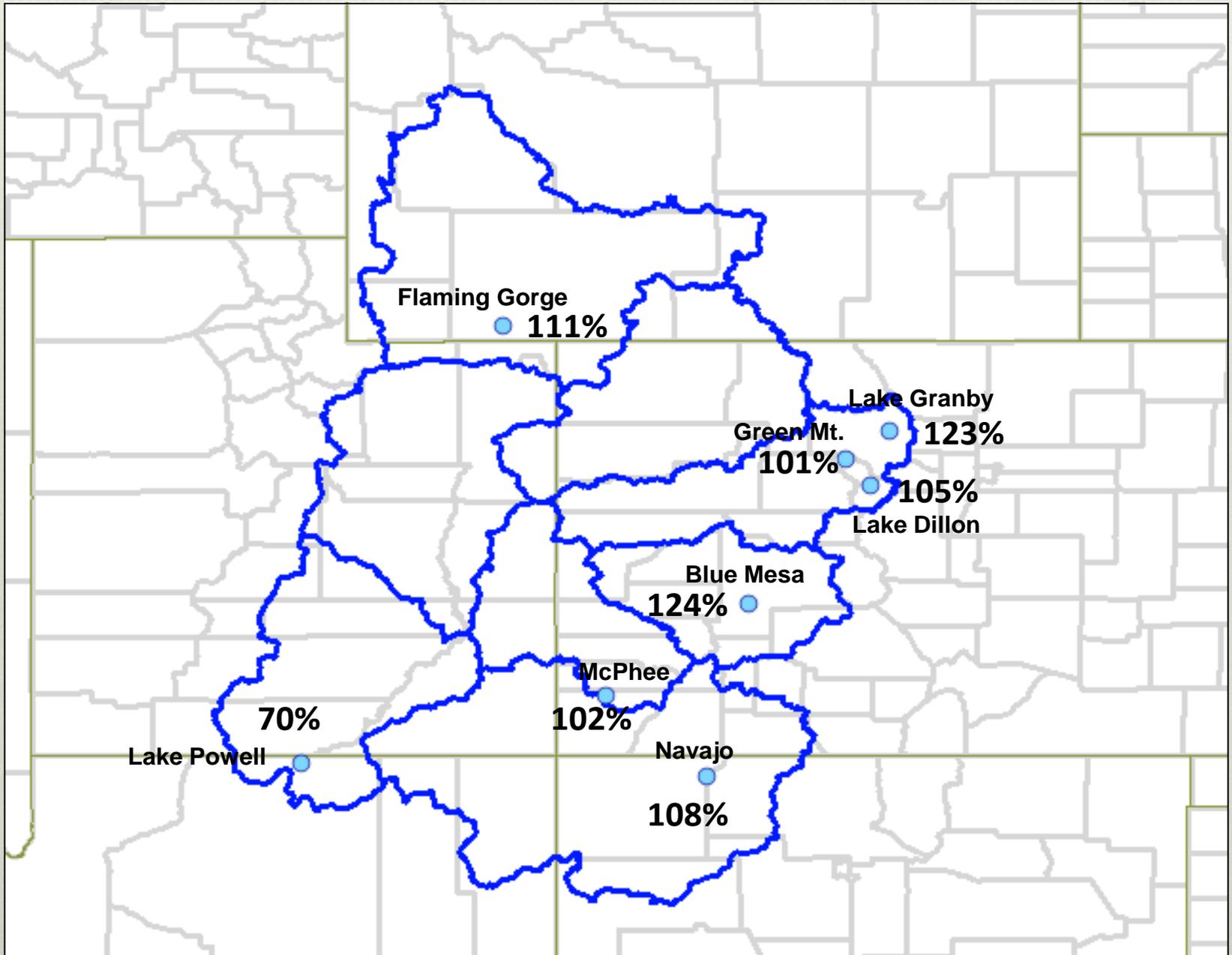
Cumulative Annual Runoff 2011 Water Year San Juan River Near Bluff, Utah



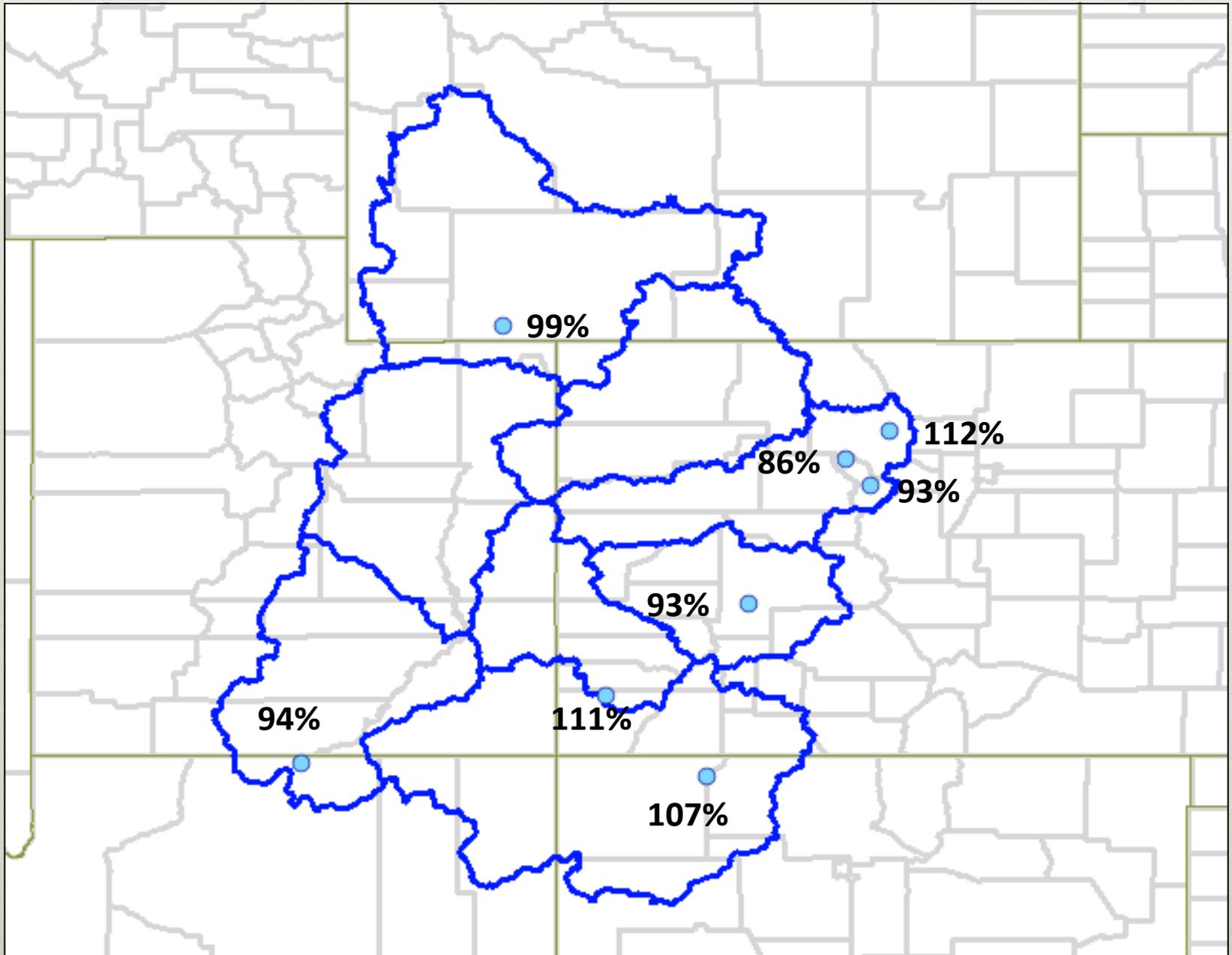
Reservoir Update



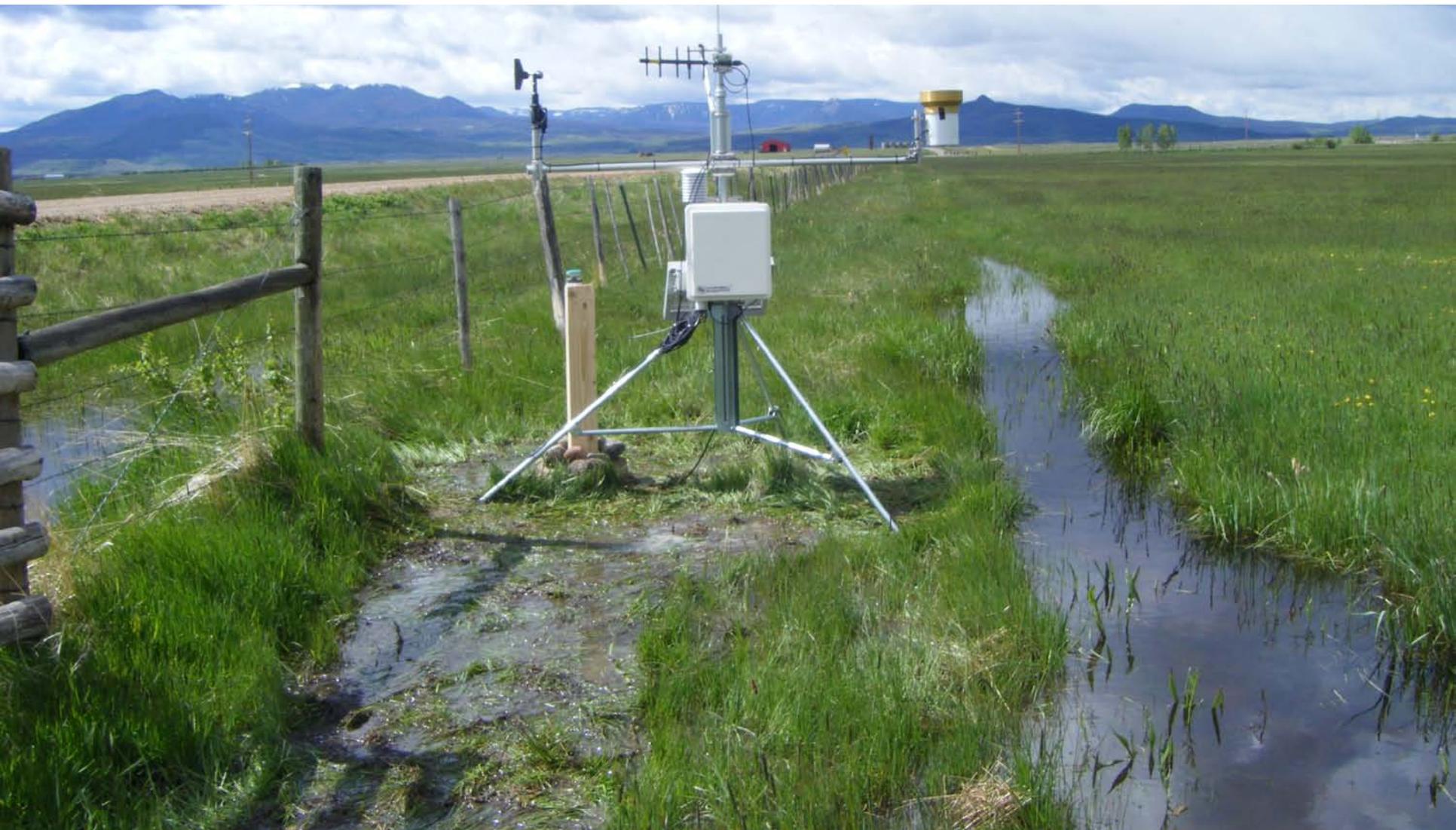
Reservoir Level Percents of Average – 3/27/2011



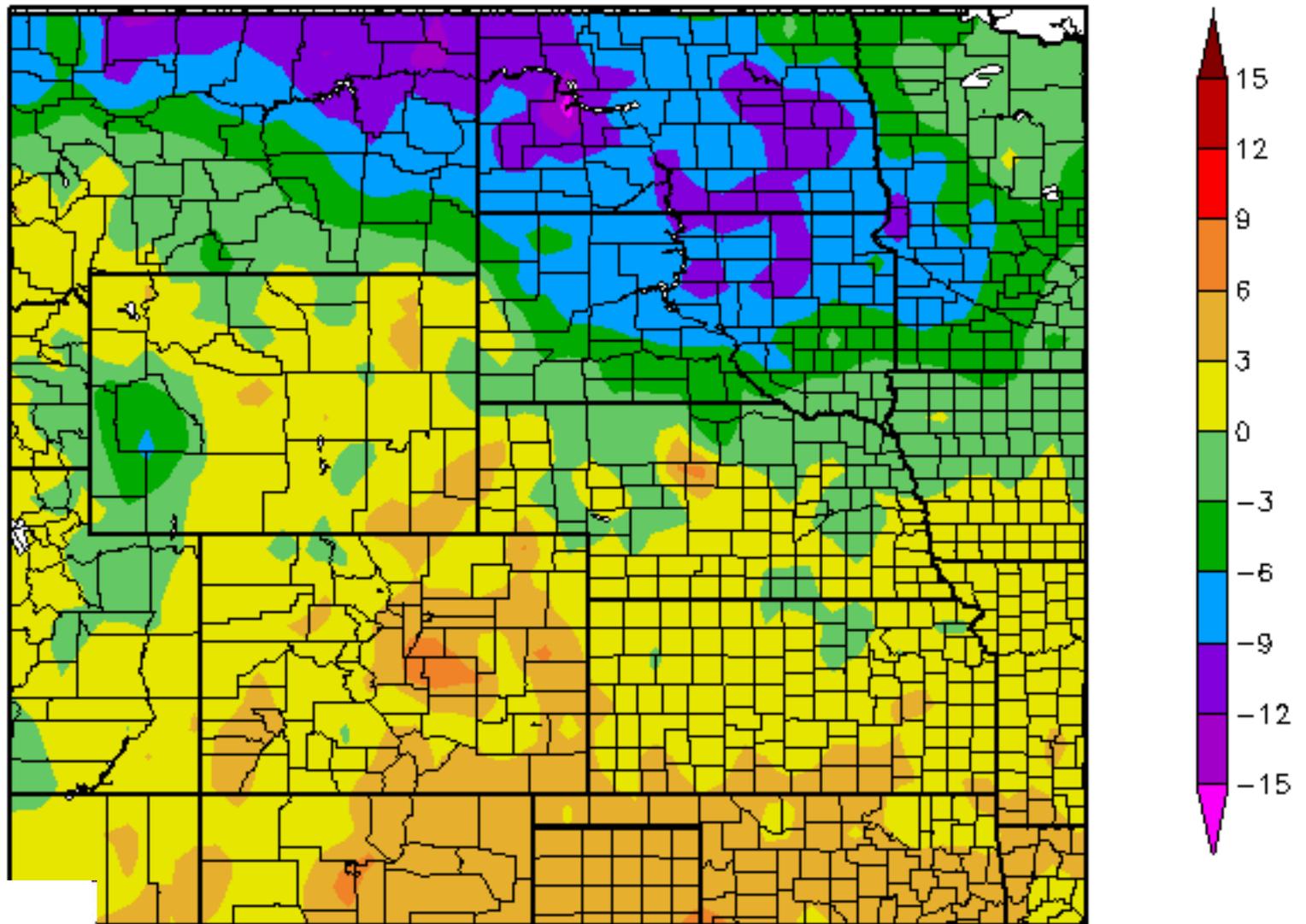
Reservoir Level Percents of Last Year – 3/27/2011



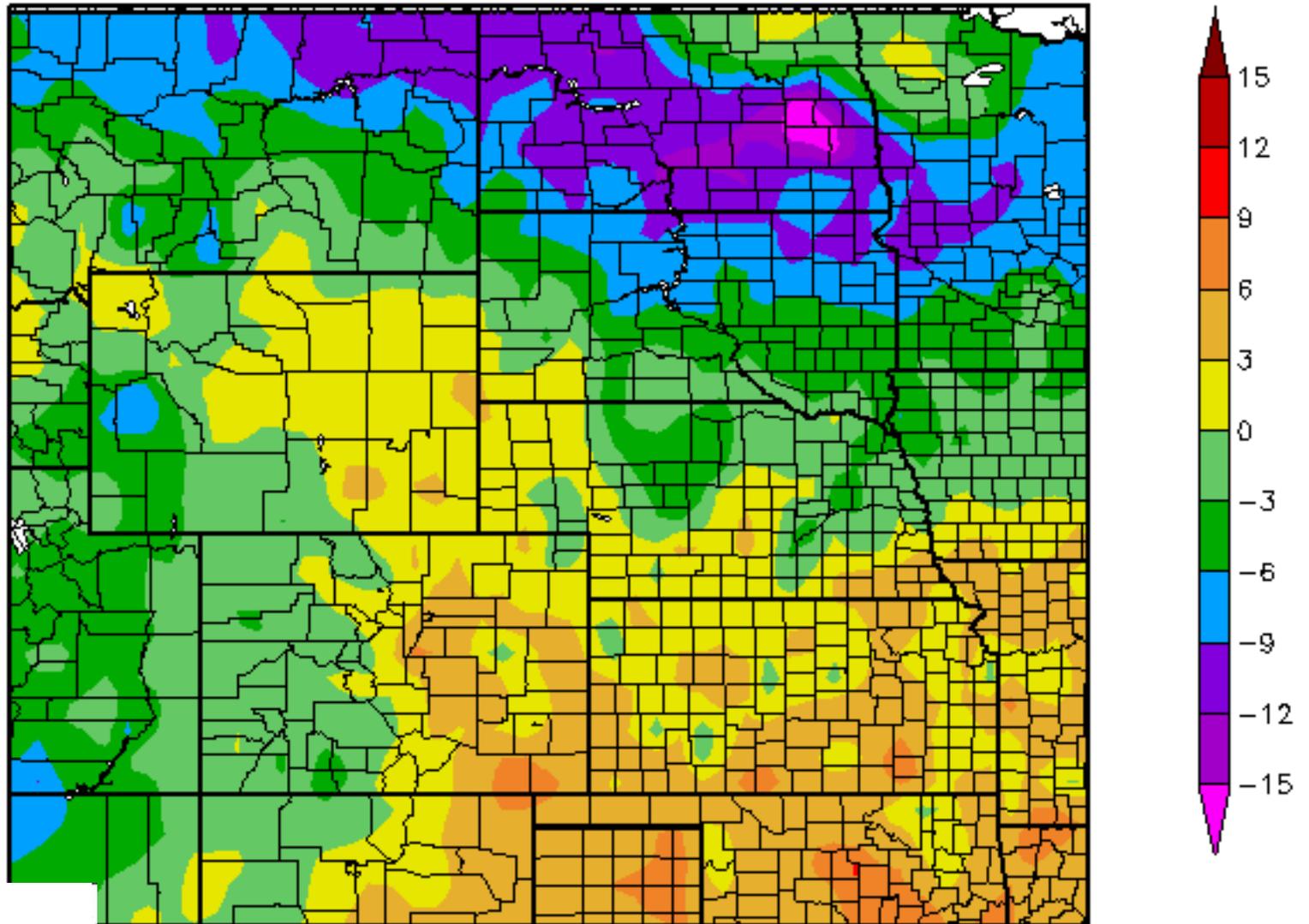
Water Demand



Temperature Departure from Normal 03/1/2011 – 03/27/2011

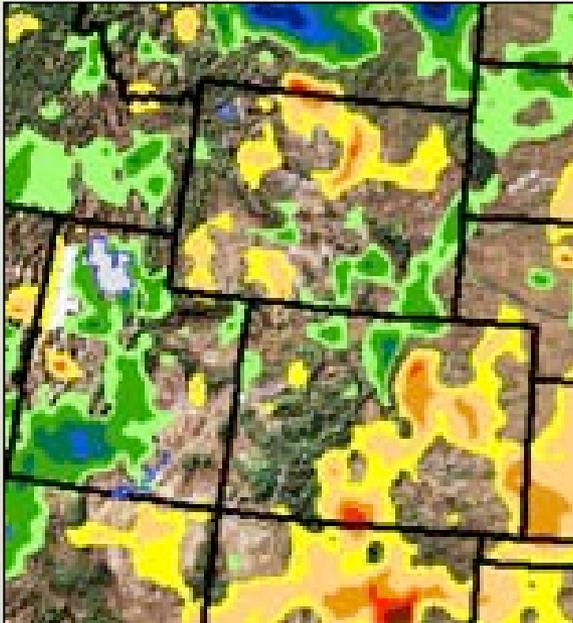


Temperature Departure from Normal 03/21/2011 – 03/27/2011

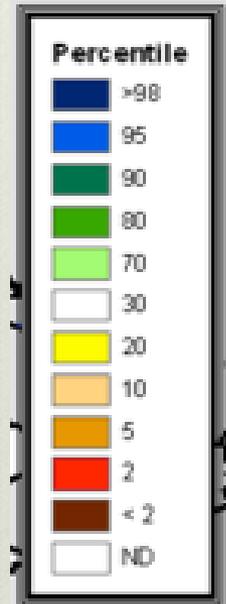
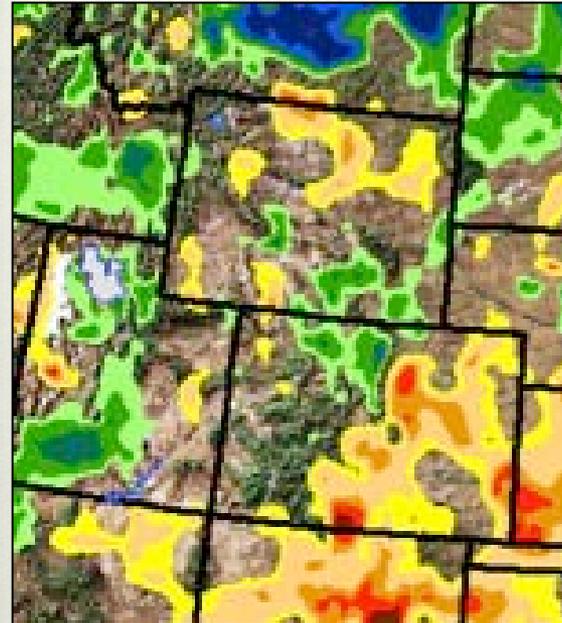


NLDAS Total Column Soil Moisture Change

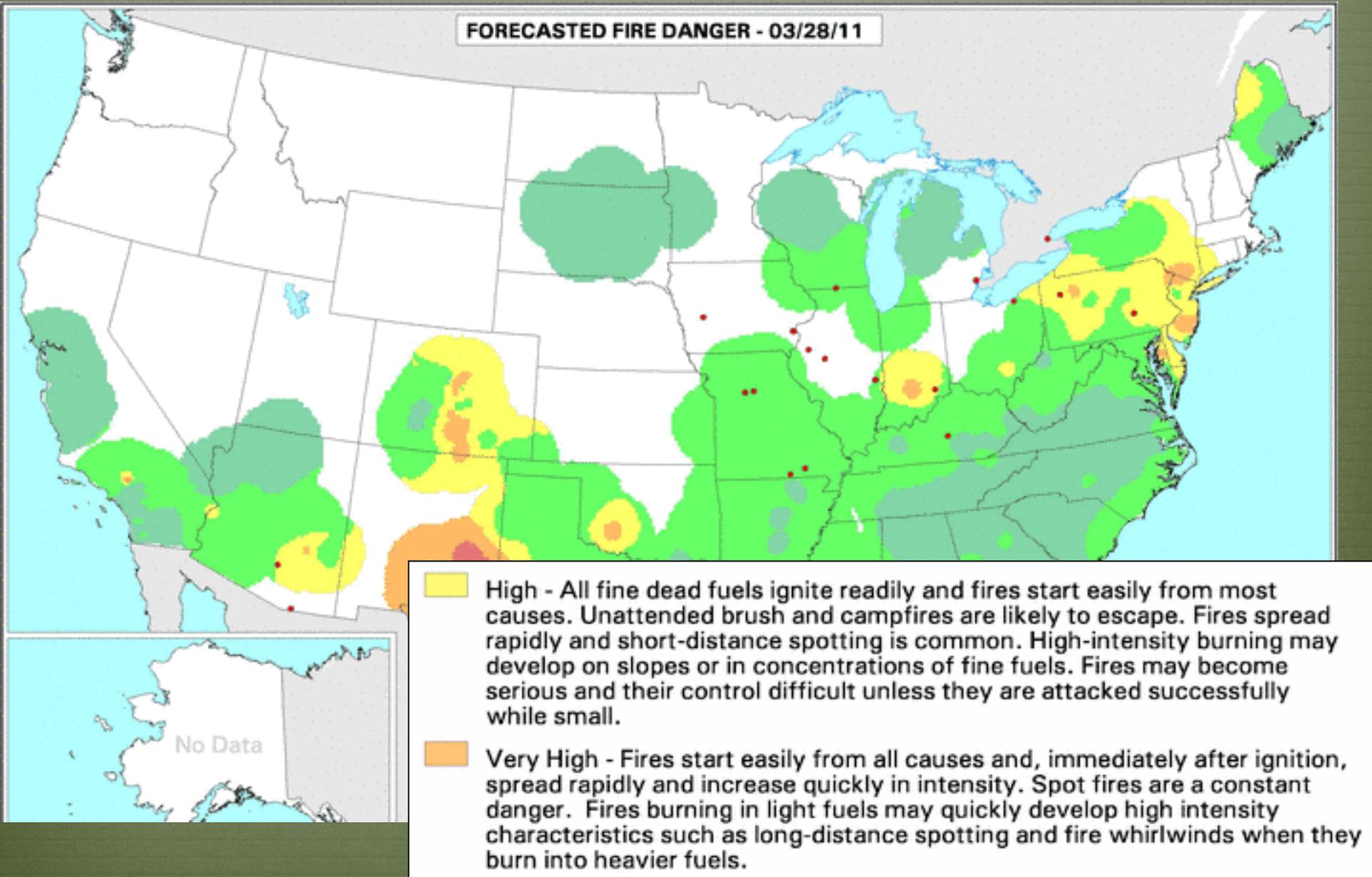
March 15, 2011



March 27, 2011



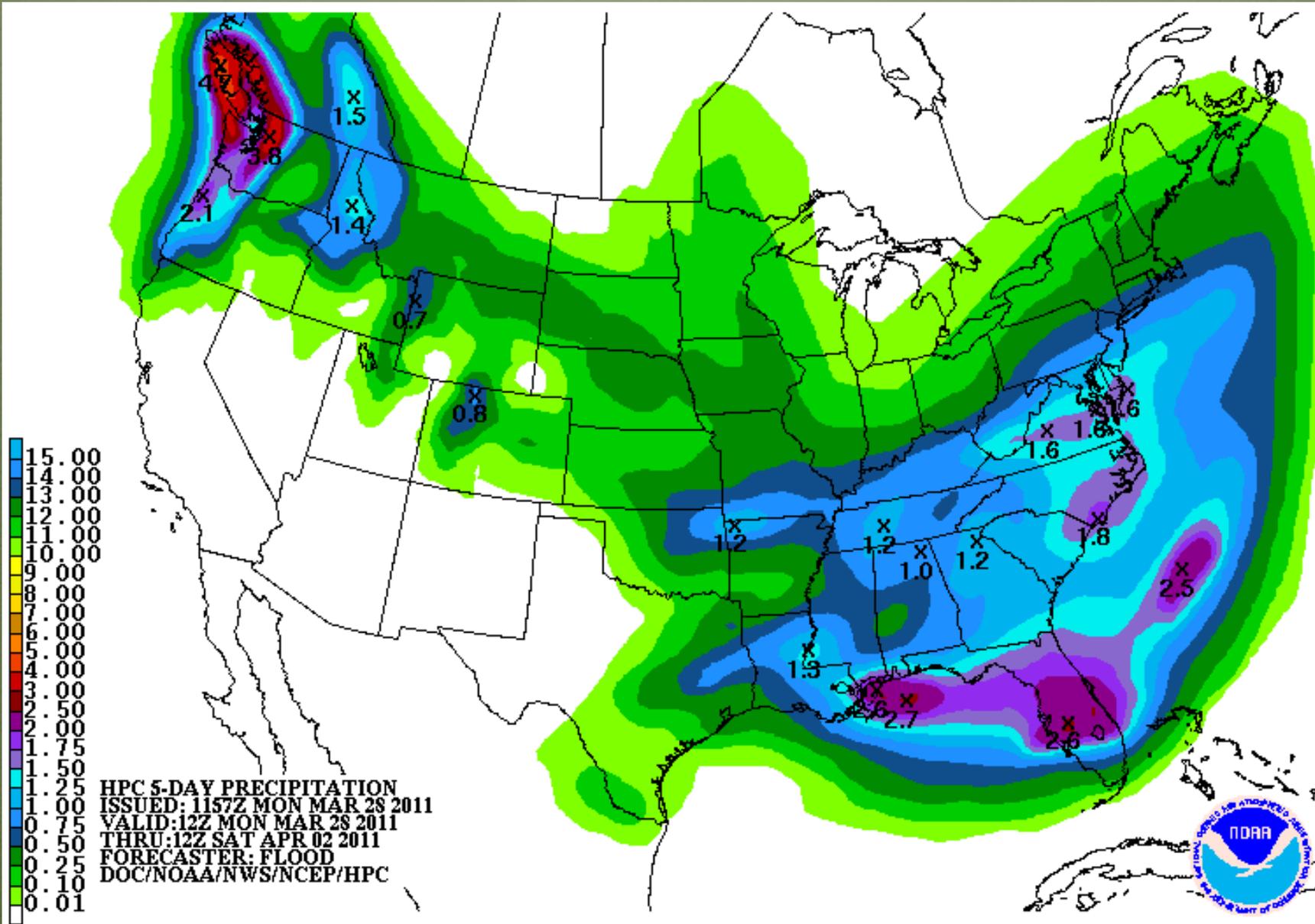
USFS Forecasted Fire Danger as of March 28, 2011



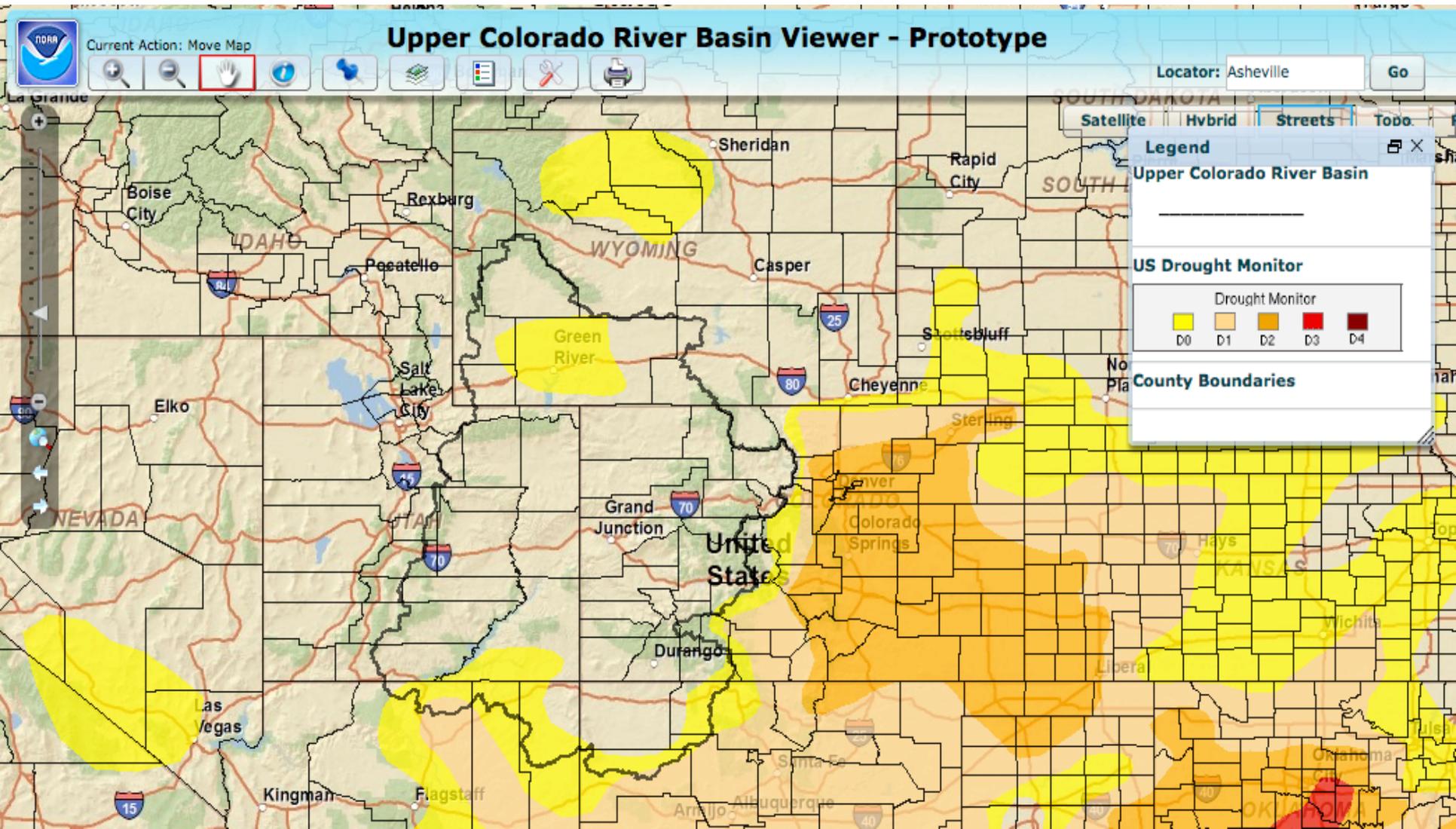
Precipitation Forecast



5 Day QPF 28 Mar – 2 Apr 2011



Recommendations



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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 29, 2011

Precipitation and Snowpack

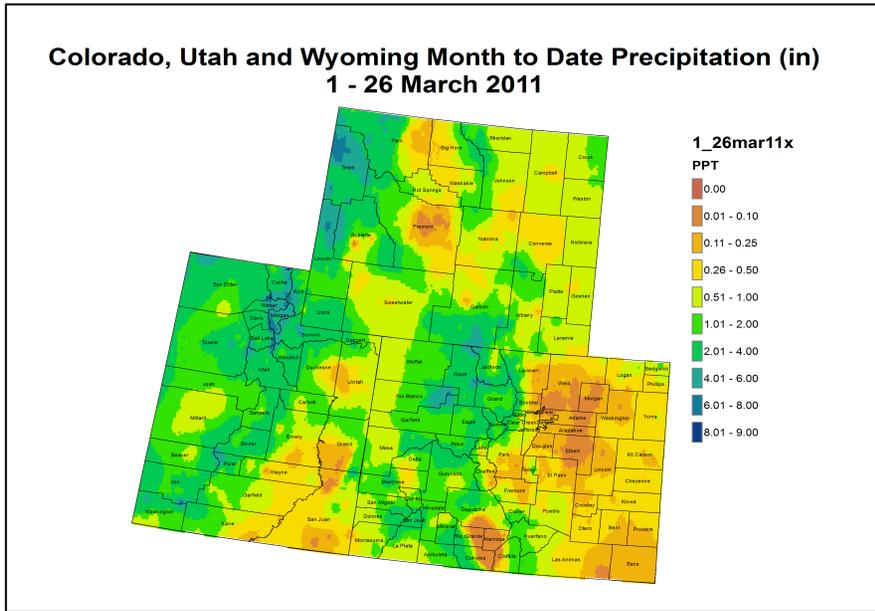


Fig. 1: March month-to-date precipitation in inches.

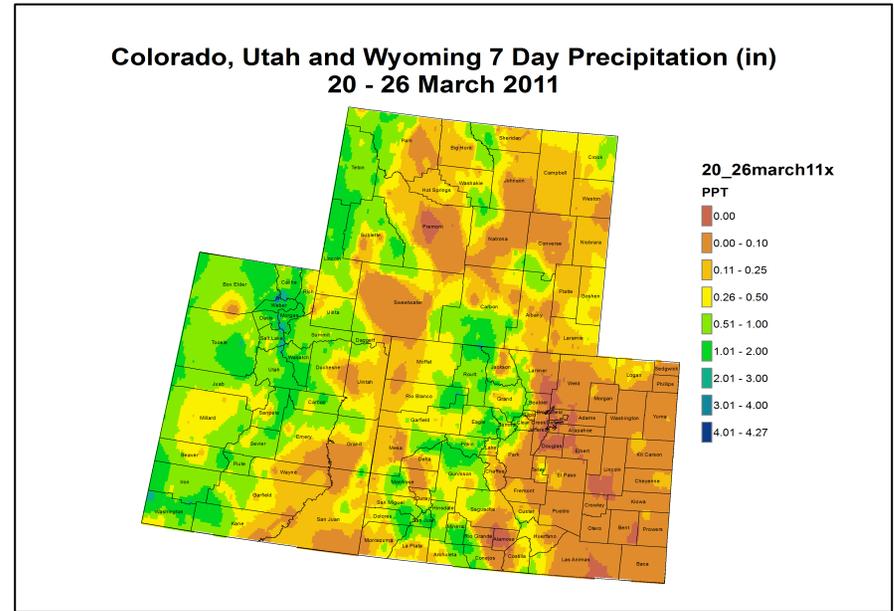


Fig. 2: March 20 – 26 precipitation in inches.

For the month of March, most of the precipitation has been concentrated over the Colorado mountains and the Wasatch range in Utah, which have seen around 2 to 4 inches of moisture (Fig. 1). The valleys of western Colorado and eastern Utah and some parts of the Upper Green basin in Wyoming have been slightly drier and seen less than an inch of precipitation. The Four Corners region, the eastern plains of Colorado and the Upper Rio Grande basin have been very dry, seeing less than a quarter inch of moisture during a normally snowy month.

Last week, the highest amounts of precipitation continued to favor the higher elevations of the Upper Colorado River Basin (UCRB, Fig. 2). The valleys around the Four Corners region, around the Sangre de Cristos in southern CO, and also in the Upper Green basin have remained fairly dry over the past week. Sunday and Monday precipitation amounts are not included in Figure 2, so cannot show the beneficial moisture that has recently accumulated in northeastern Colorado. The Arkansas basin has remained fairly dry.

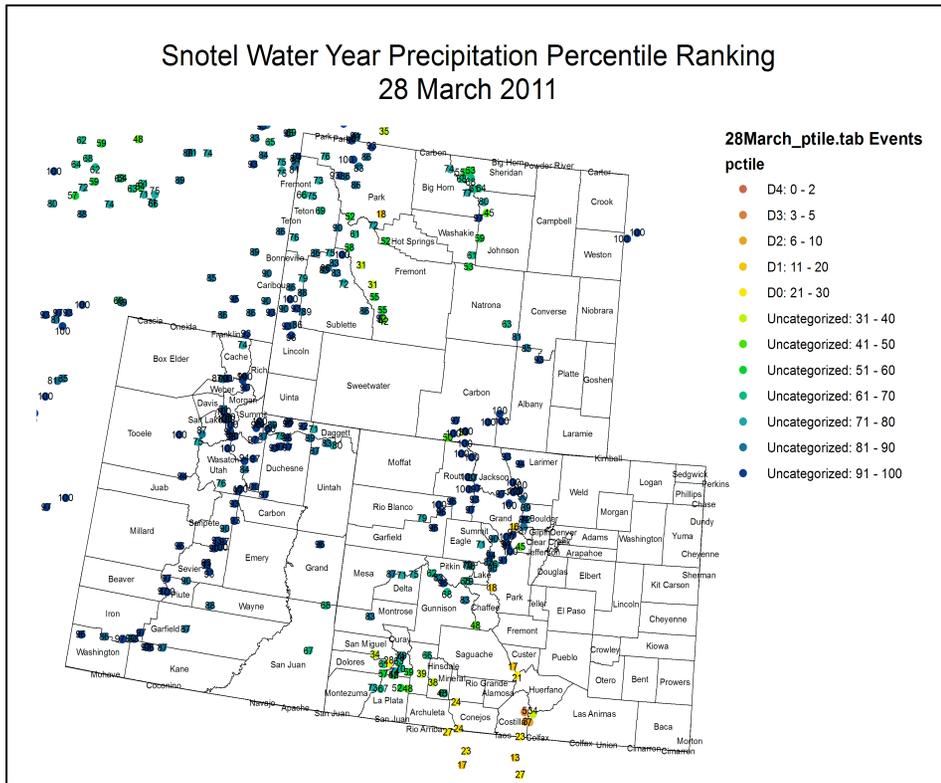


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21-30% is Drought Monitor’s D0 category).

The majority of the SNOTEL sites in the UCRB are showing 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, showing precipitation percentile rankings below 50%. Some of the sites in the Rio Grande basin are showing percentiles below 30% (meaning that 70% of the years have been wetter).

Snowpack around most of the UCRB is in good condition—currently snowpack for the entire basin above Lake Powell is 115% of average (Fig. 4). The Upper Green basin in Wyoming, the Duchesne basin in Utah and the Upper Colorado above Kremmling have already surpassed their average seasonal snowpack peaks with about two weeks before their average snowmelt timing begins. The San Juan basin in southern CO is currently at 82% of its average snowpack and 79% of its average annual peak. After some initial melting, the San Juan basin has recently seen some new accumulation and improvement in snowpack.

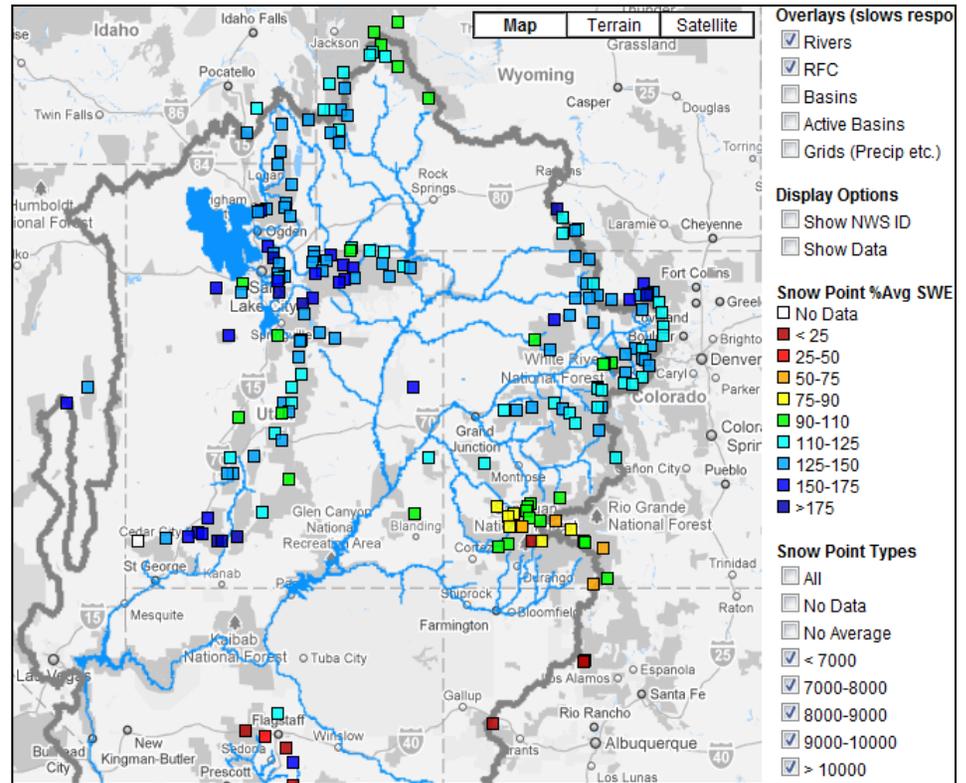
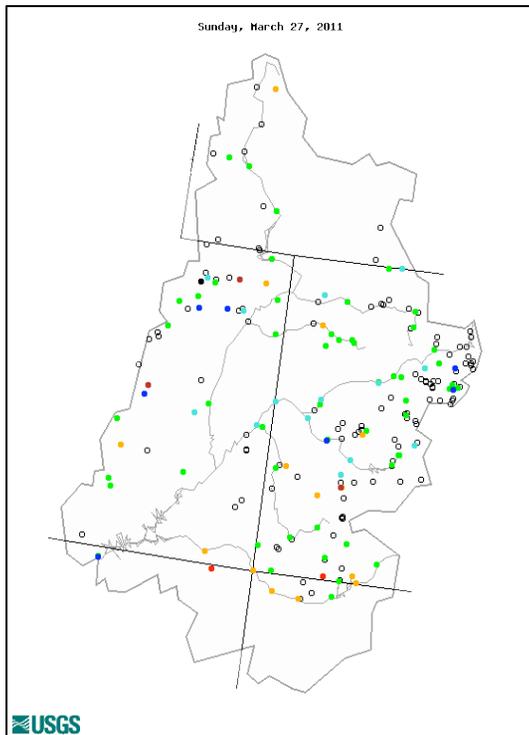


Fig. 4: SNOTEL WYTD accumulated snow water equivalent as a percent of average.

Streamflow

As of March 27th, about 86% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows (Fig. 5). There are about 93 gages in the basin currently reporting, and new gages are coming out of icy conditions on a daily basis. A cluster of below normal streamflow gages is currently showing up in the Four Corners region.

The gages on the Colorado River near the CO-UT state line and the Green River at Green River, UT are both currently recording above normal discharge and are in the 75th and 66th percentiles, respectively (Fig. 6). The San Juan River near Bluff, UT is currently recording below normal flows (10th – 24th percentile). For the current water year, this gage is reporting only 50% of its normal cumulative runoff. With lower snowpack in the region, it is likely that this river will not recover this accumulation. This could have some impact on the UCRB as the San Juan contributes about 15% to the total runoff for the basin.



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: USGS 7-day average streamflow compared to historical streamflow for March 27th in the UCRB.

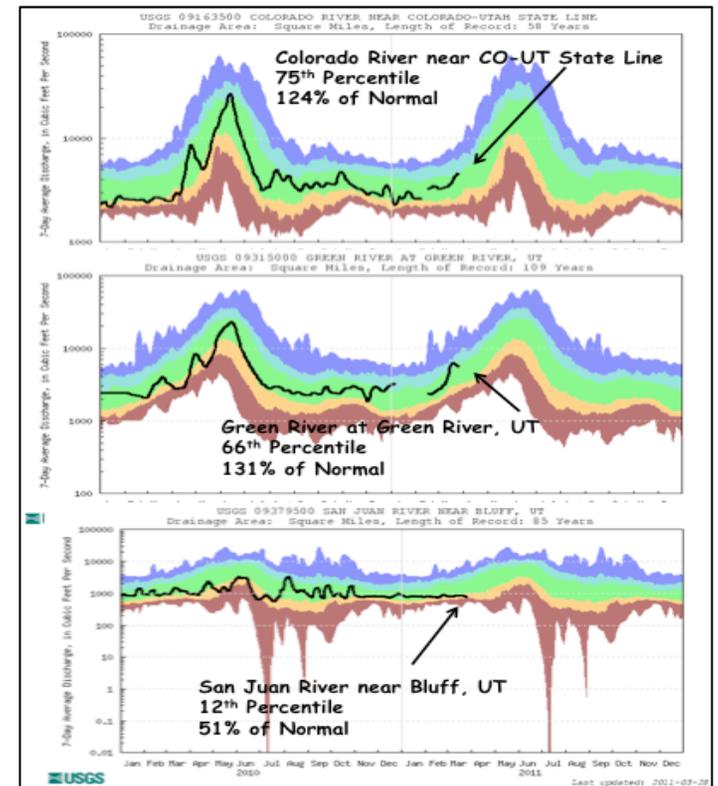


Fig. 6: USGS 7-day average discharge over time at the CO-UT state line (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

For most of March, temperatures have been near average for most of the basin, with warmer than average temperatures over the eastern plains. Last week, the western part of the UCRB experienced below average temperatures while the Front Range and eastern plains continued to experience warmer than average temperatures. Soil moisture through most of the UCRB is in good condition, with deteriorating soil moisture conditions around the Four Corners region (Fig. 7). The driest soils continue to dominate throughout eastern Colorado and in the Upper Rio Grande basin.

Above Lake Powell, all of the major reservoirs in the UCRB are currently above their average March levels (Fig. 8). Though above average, Flaming Gorge, Lake Dillon, Green Mountain, and Blue Mesa are slightly below last year's levels. However, with higher than average snowpack, this could change once the snowmelt season begins. Flaming Gorge and Blue Mesa have both seen rises in their levels since the beginning of the month. Lake Powell is currently at 70% of average and 53% of capacity. This is also expected to increase significantly during the snowmelt season.

Precipitation Forecast

The region will continue to be dominated by a northwesterly flow regime with several disturbances bringing scattered showers to the UCRB and eastern plains. Snow will continue over the higher elevations into Wednesday, mainly over the southern CO mountains. Thursday, the northern CO mountains could see more snow as the disturbance exits the region. Friday, a ridge of high pressure builds over the area, bringing warmer temperatures with it. The next system to affect the region could arrive late Sunday, though there is model disagreement about the timing. As this system enters, the Four Corners region could see some beneficial pre-frontal moisture. This system will not only bring moisture to the high elevations of the UCRB, but could also bring some much-needed relief to the eastern plains.

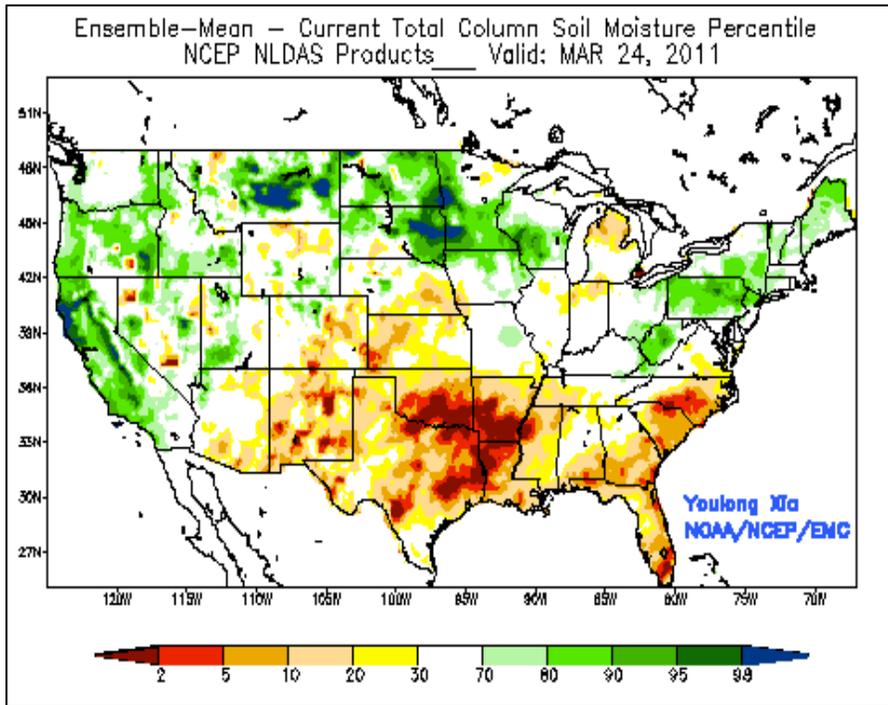


Fig. 7: NLDAS Ensemble Mean Total Column Soil Moisture as of March 24th.

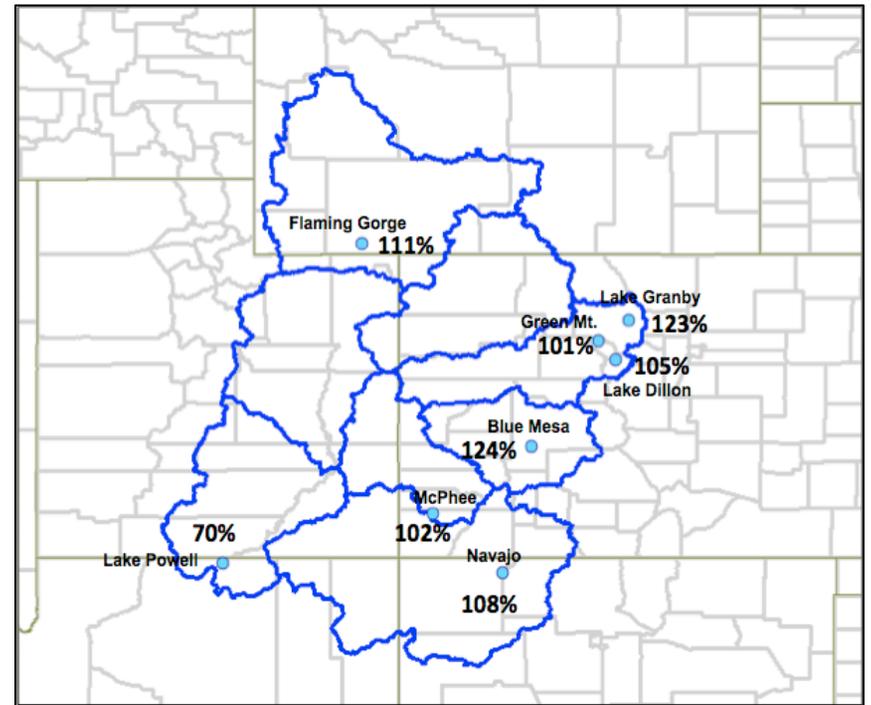


Fig. 8: March 27th reservoir levels as a percent of the 1971 – 2000 average March levels.

Drought and Water Discussion

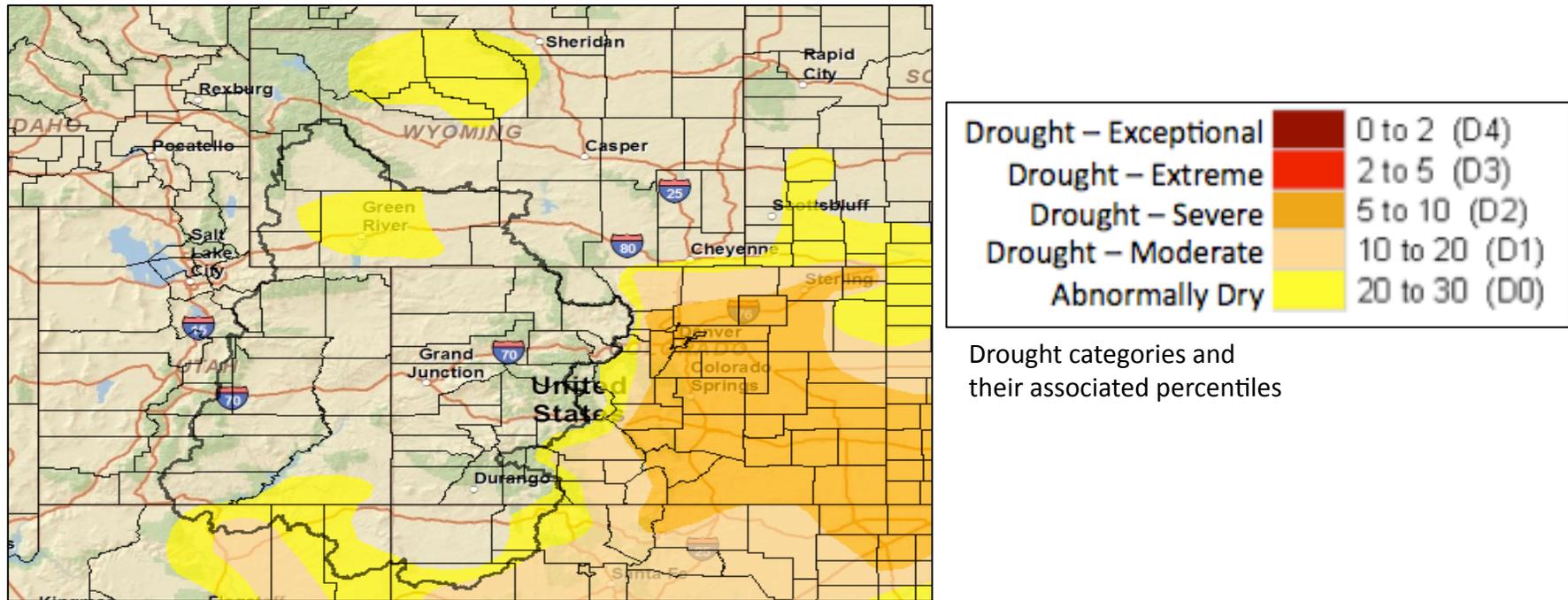


Fig. 10: March 22nd release of U.S. Drought Monitor for the UCRB

Status quo has been recommended for the UCRB and eastern plains for the current U.S. Drought Monitor map (Fig. 10). The USDM author mentioned the possibility of adjustments in the Four Corners region. Currently, the only adjustment that would be justified is a slight eastward expansion of the D0 toward the actual four corners borders.

The situation over the eastern plains is still being closely monitored. Though several wildfires have impacted the area, so far no additional agricultural impacts have been reported. The area is currently seeing some lingering snow showers and could receive more moisture early next week. This is not enough to improve categories, and if the next major storm doesn't pan out, further degradation will soon need to be considered.