Winter 2011

March 1st, 2011

Weekly Climate, Water & Drought Assessment

Today's Agenda

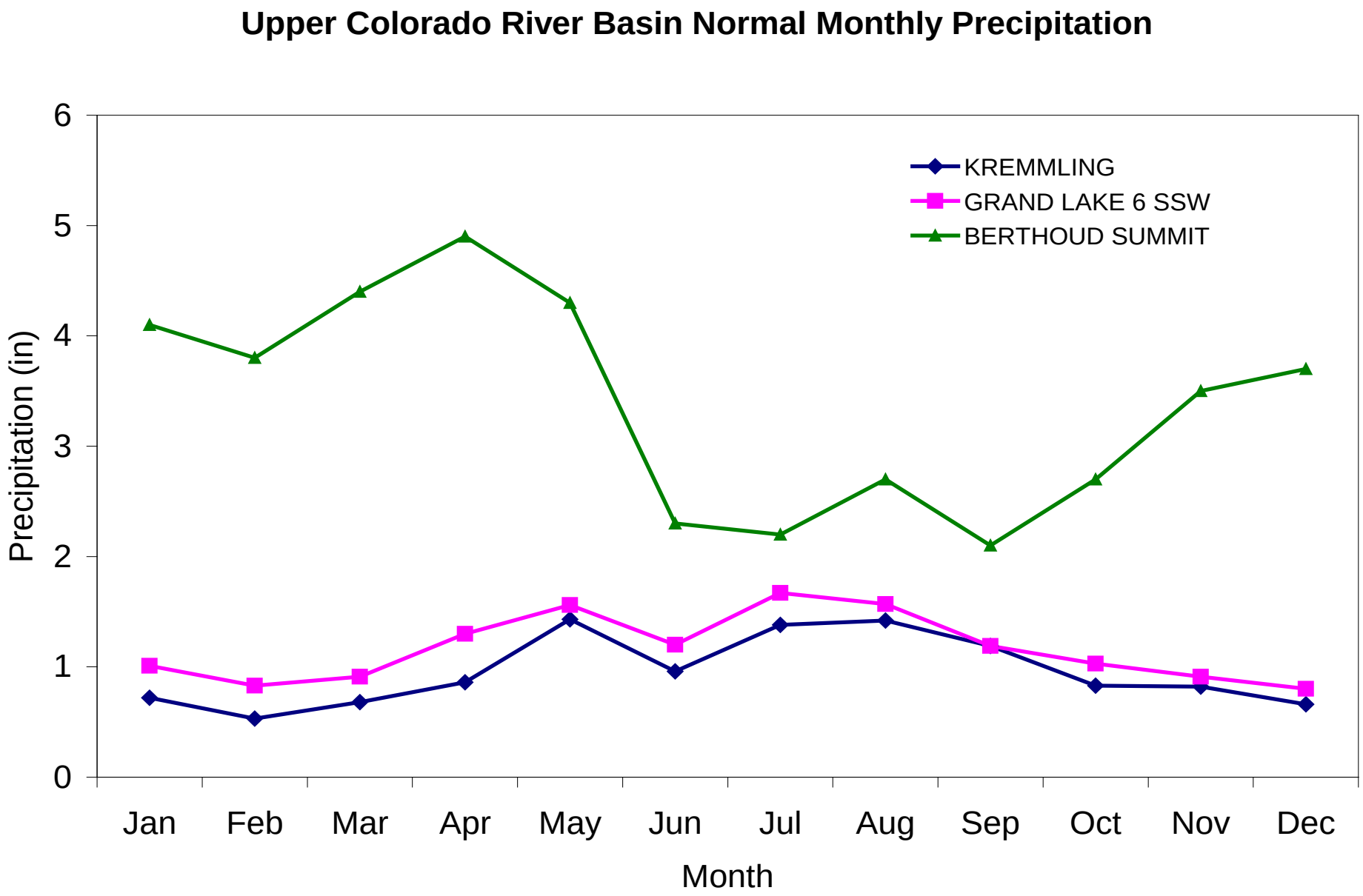
-Assessment of current water conditions

- Precipitation Forecast

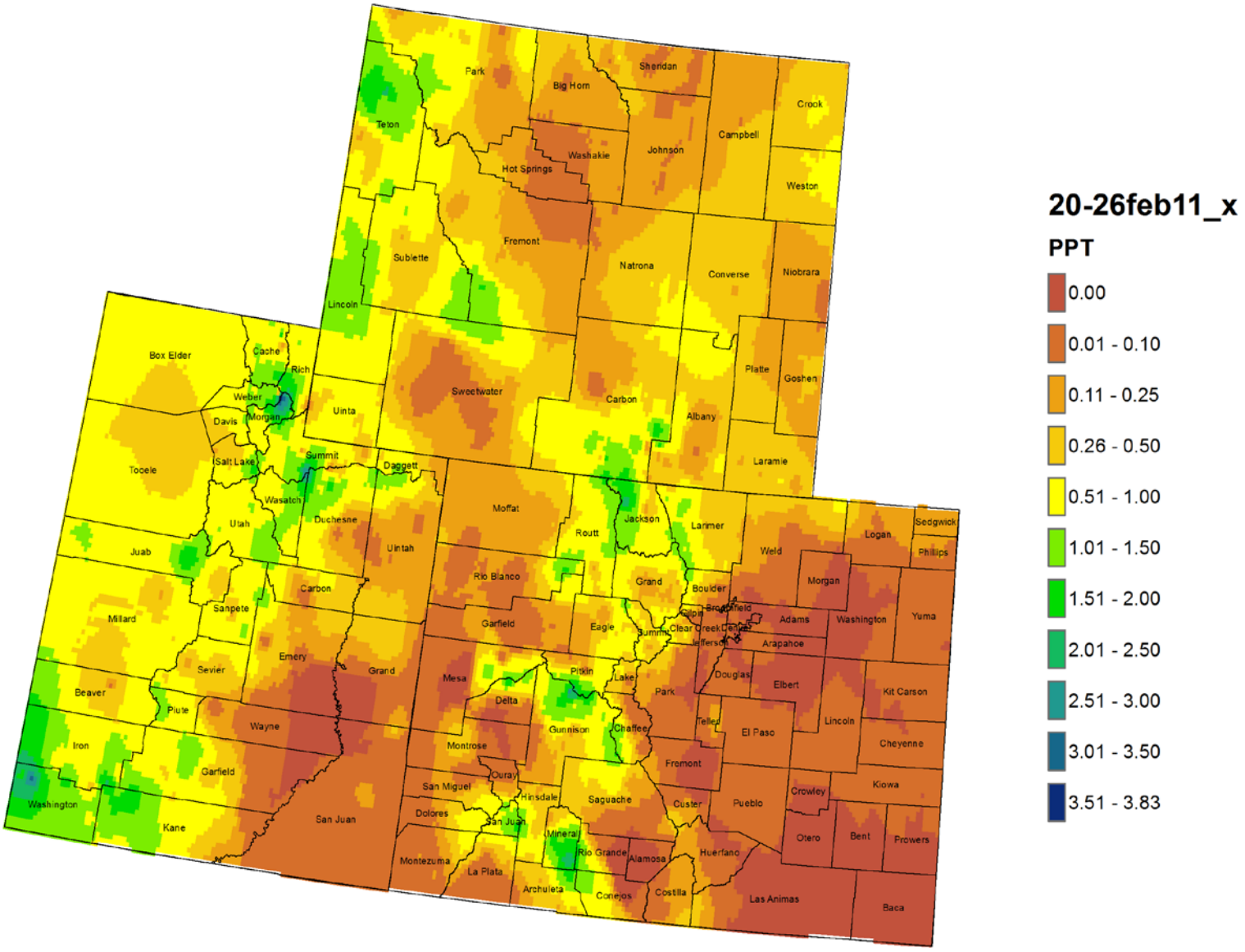
- Recommendations for Drought Monitor

Precipitation/Snowpack Update

Upper Colorado Normal Precipitation



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

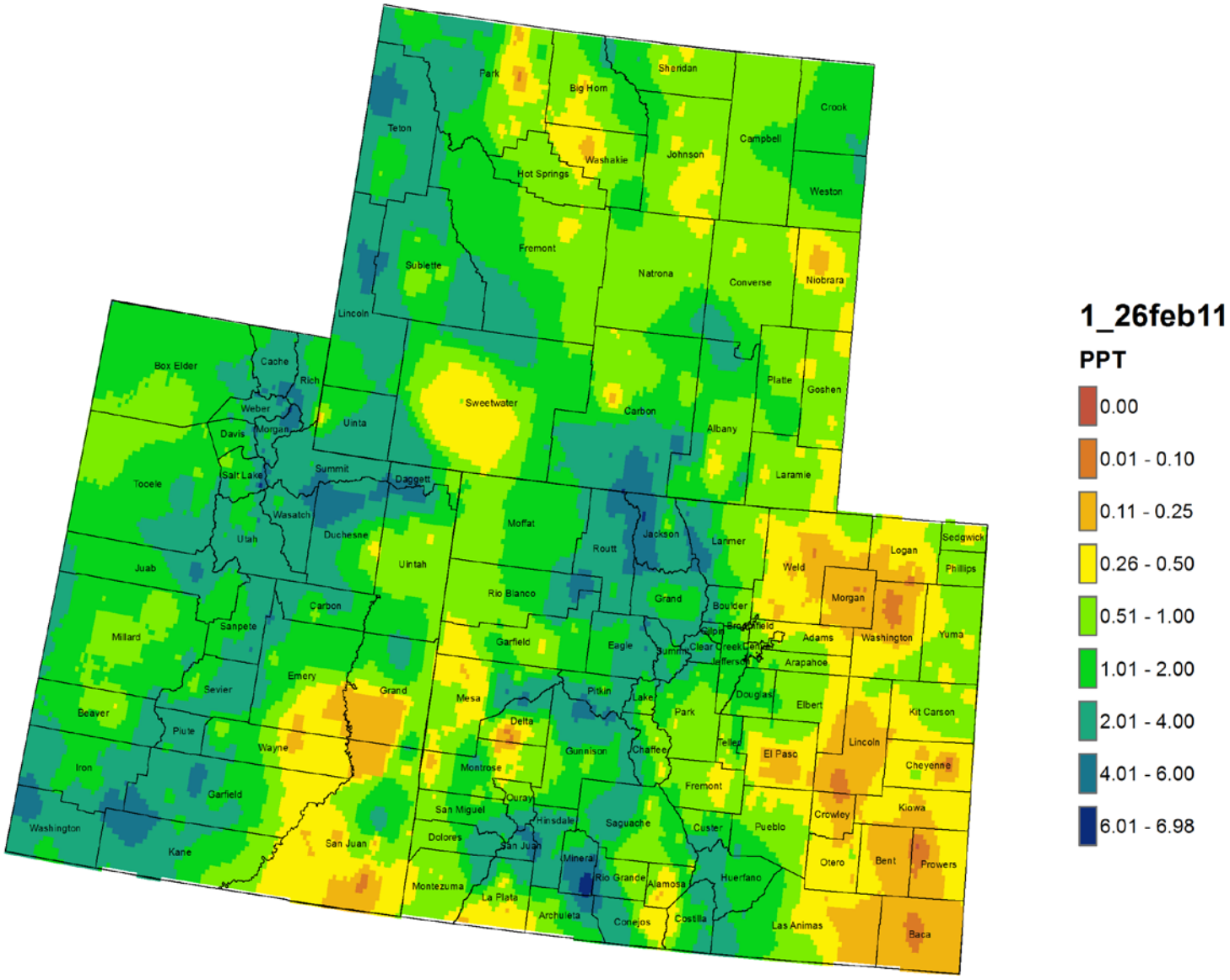


20-26feb11_x

PPT

- 0.00
- 0.01 - 0.10
- 0.11 - 0.25
- 0.26 - 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50
- 2.51 - 3.00
- 3.01 - 3.50
- 3.51 - 3.83

Colorado, Utah and Wyoming February to Date Precipitation (in)
1 - 26 February 2011

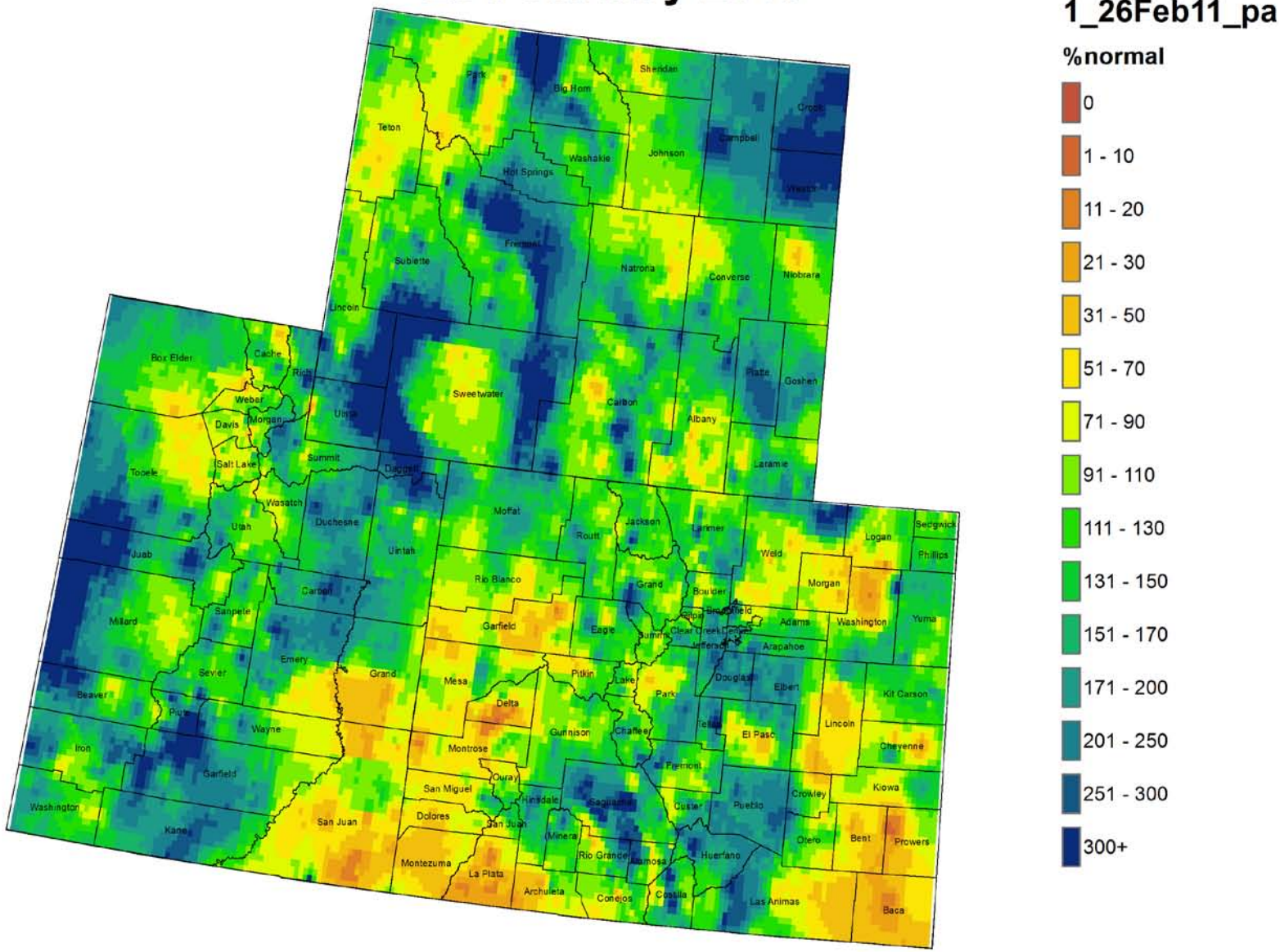


1_26feb11

PPT

- 0.00
- 0.01 - 0.10
- 0.11 - 0.25
- 0.26 - 0.50
- 0.51 - 1.00
- 1.01 - 2.00
- 2.01 - 4.00
- 4.01 - 6.00
- 6.01 - 6.98

Colorado, Utah and Wyoming February to Date Precipitation as Percentage of Average (Preliminary)
1 - 26 February 2011

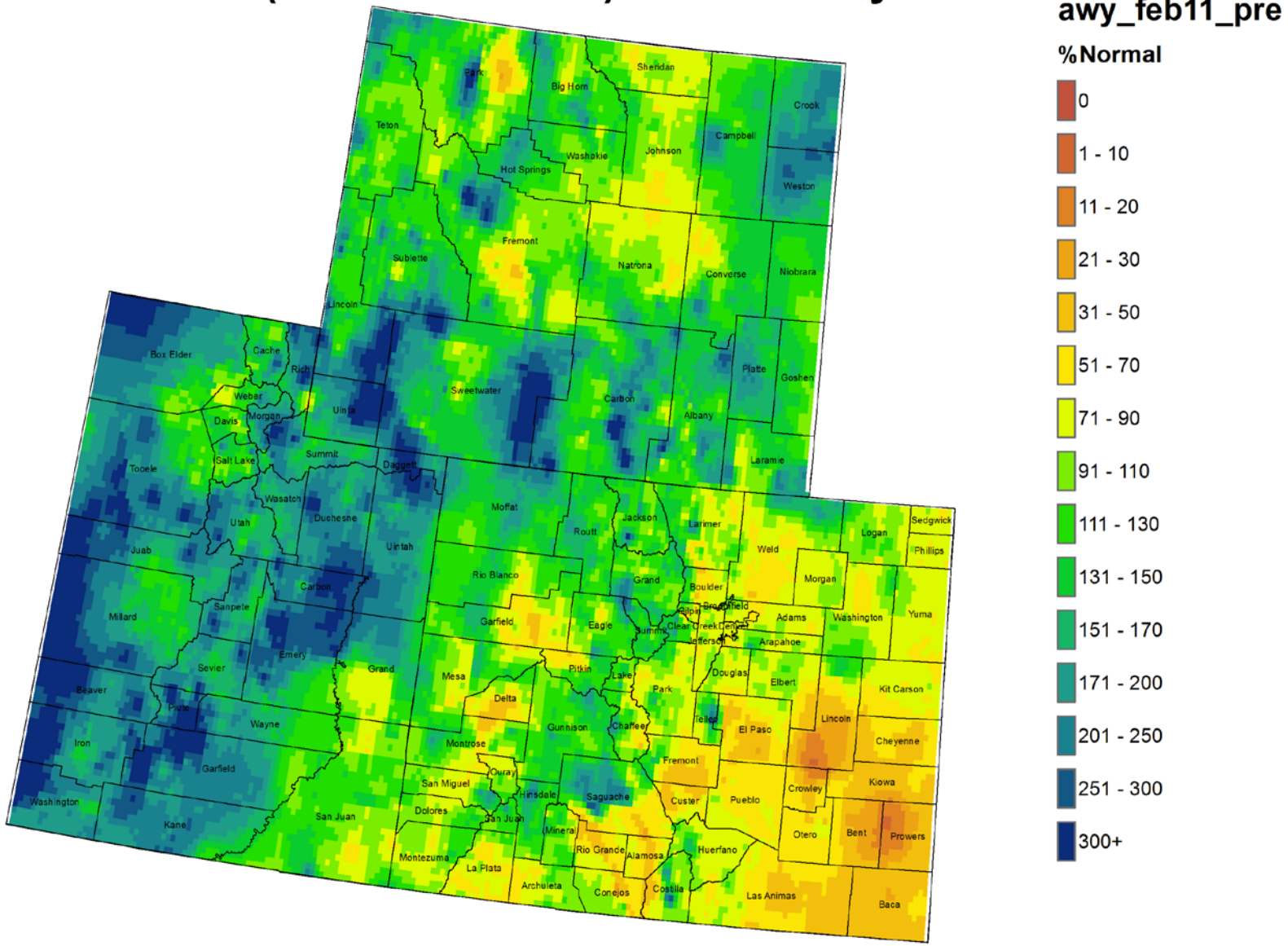


1_26Feb11_pa

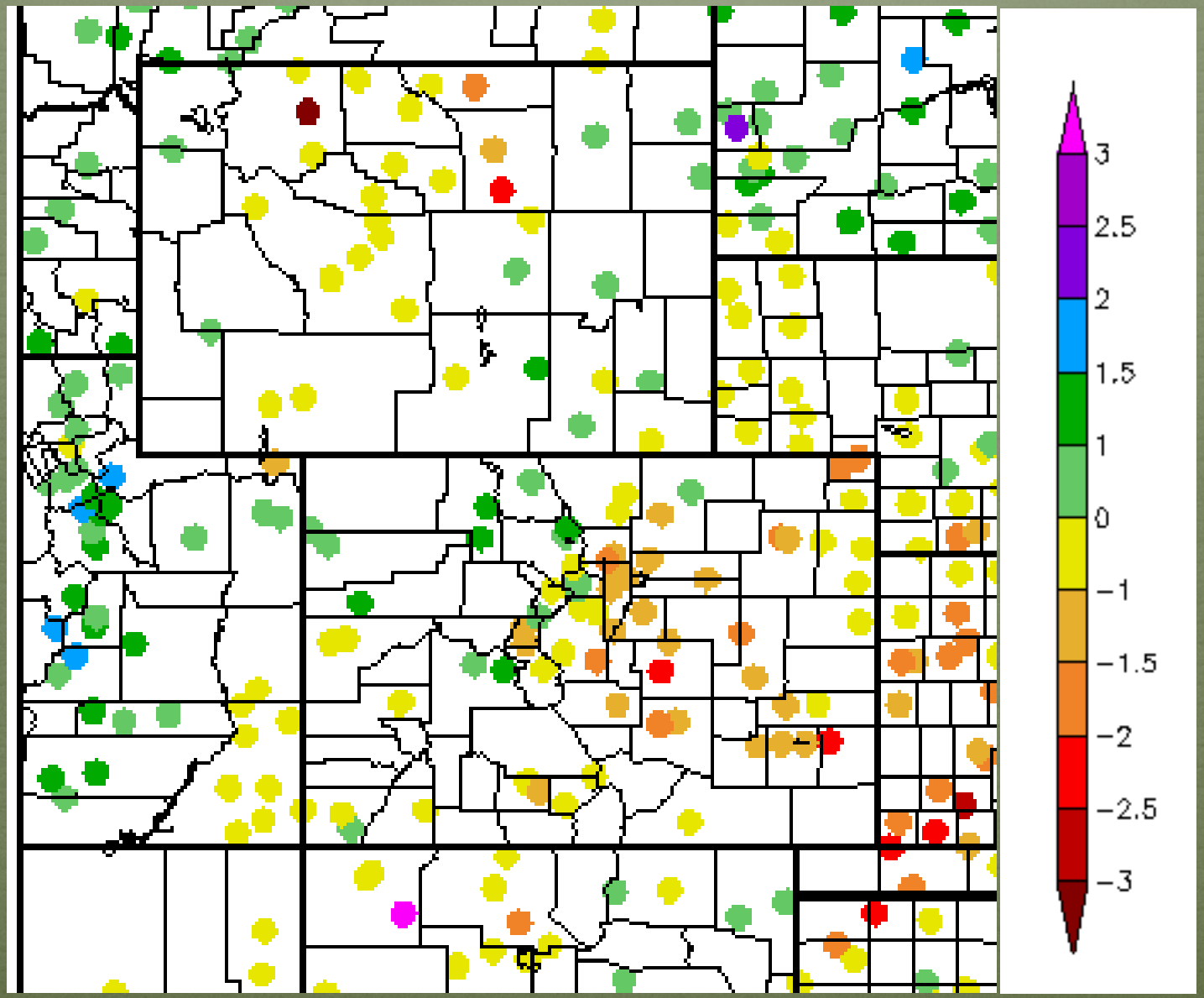
%normal

- 0
- 1 - 10
- 11 - 20
- 21 - 30
- 31 - 50
- 51 - 70
- 71 - 90
- 91 - 110
- 111 - 130
- 131 - 150
- 151 - 170
- 171 - 200
- 201 - 250
- 251 - 300
- 300+

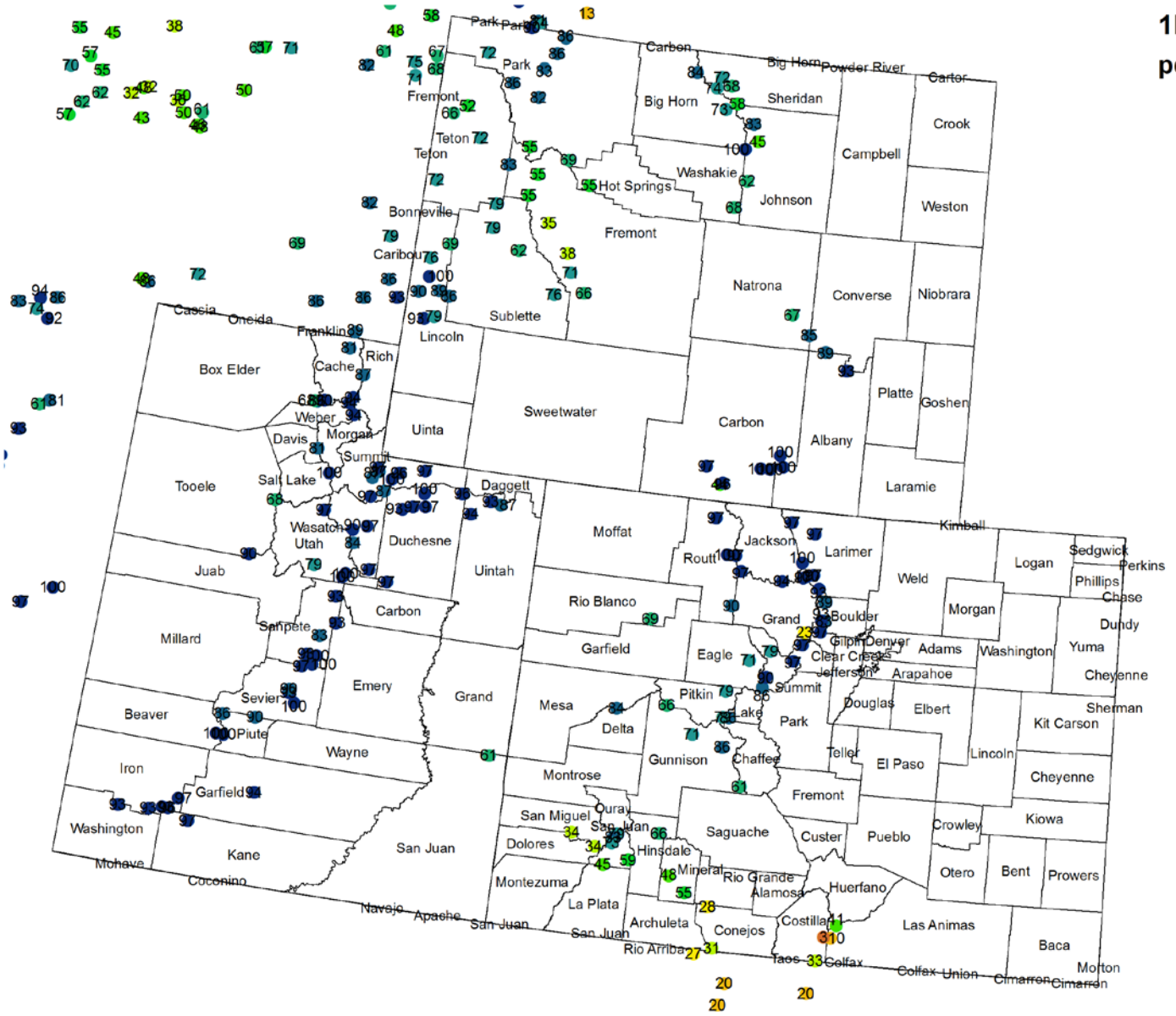
Colorado, Utah and Wyoming Water Year to Date Precipitation as Percentage of Average (Oct 10 - Feb 11) Preliminary



6 Month SPI 9/1/10 – 2/28/11



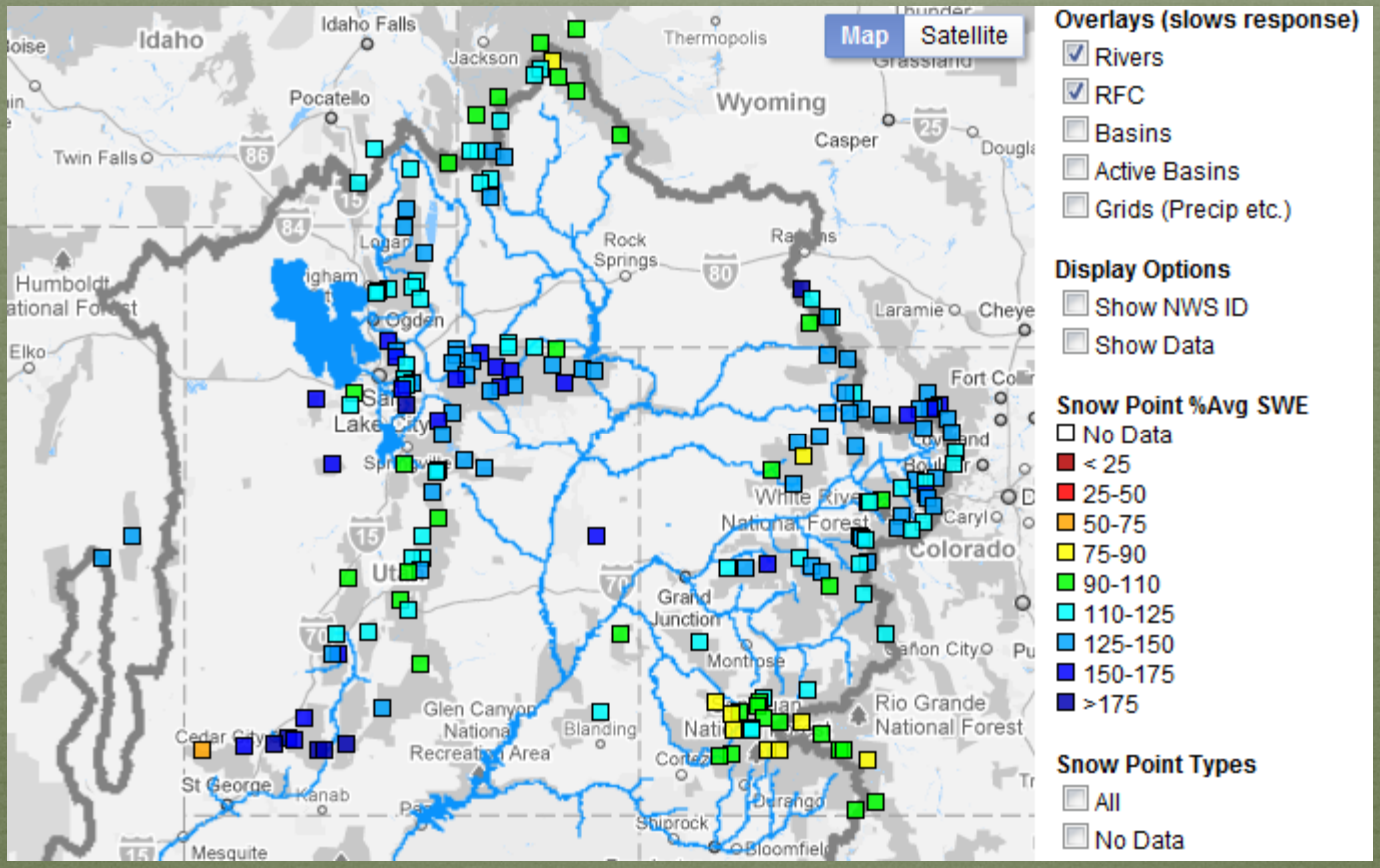
Snotel Water Year Precipitation Percentile Ranking
1 March 2011



1Mar11_ptile.tab Events
pctile

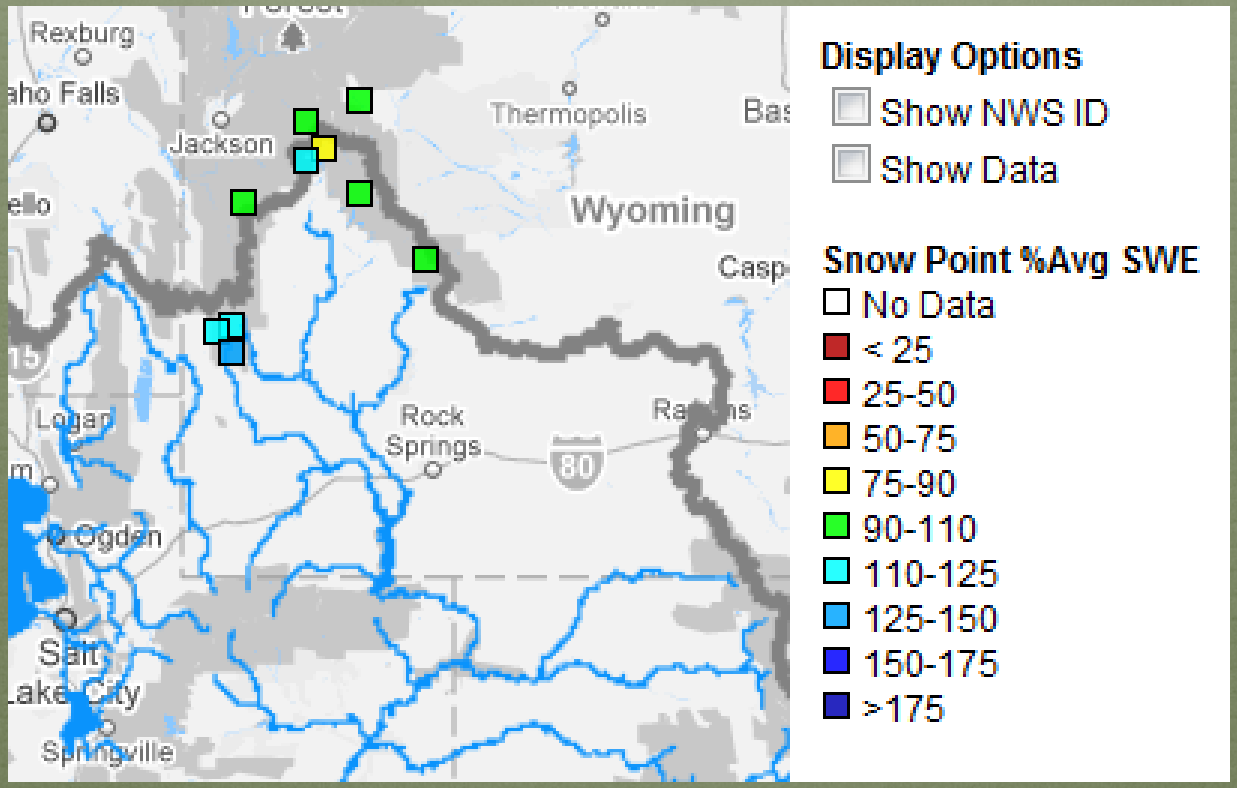
- D4: 0 - 2
- D3: 3 - 5
- D2: 6 - 10
- D1: 11 - 20
- D0: 21 - 30
- Uncategorized: 31 - 40
- Uncategorized: 41 - 50
- Uncategorized: 51 - 60
- Uncategorized: 61 - 70
- Uncategorized: 71 - 80
- Uncategorized: 81 - 90
- Uncategorized: 91 - 100

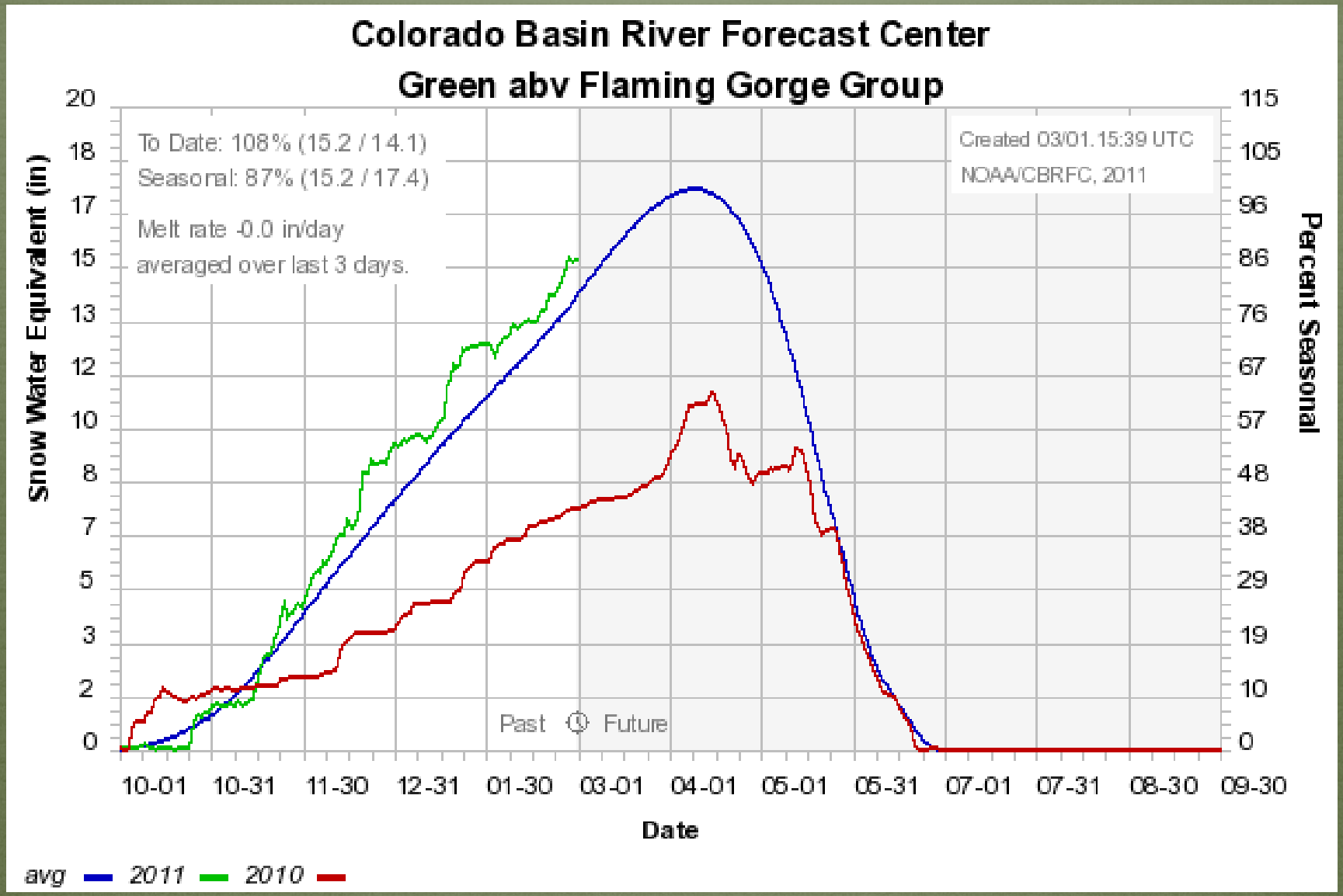
Upper Colorado River Basin Snow



NATIONAL WEATHER SERVICE
Colorado Basin River Forecast Center

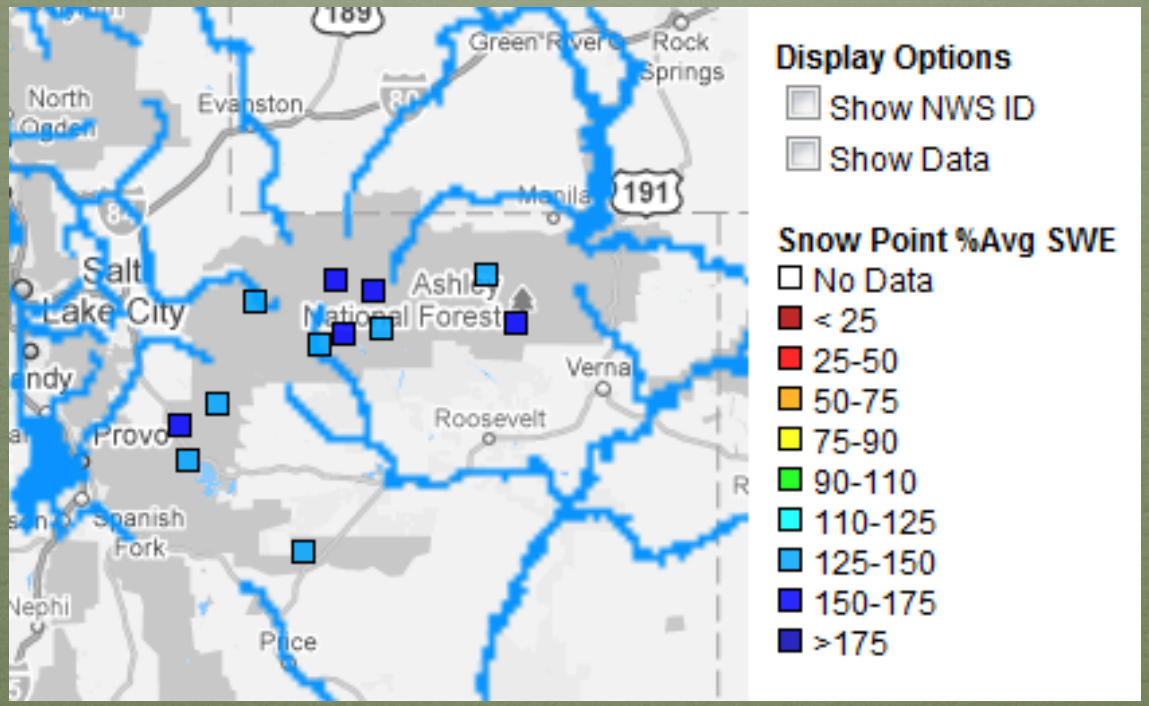
Green River Basin above Flaming Gorge



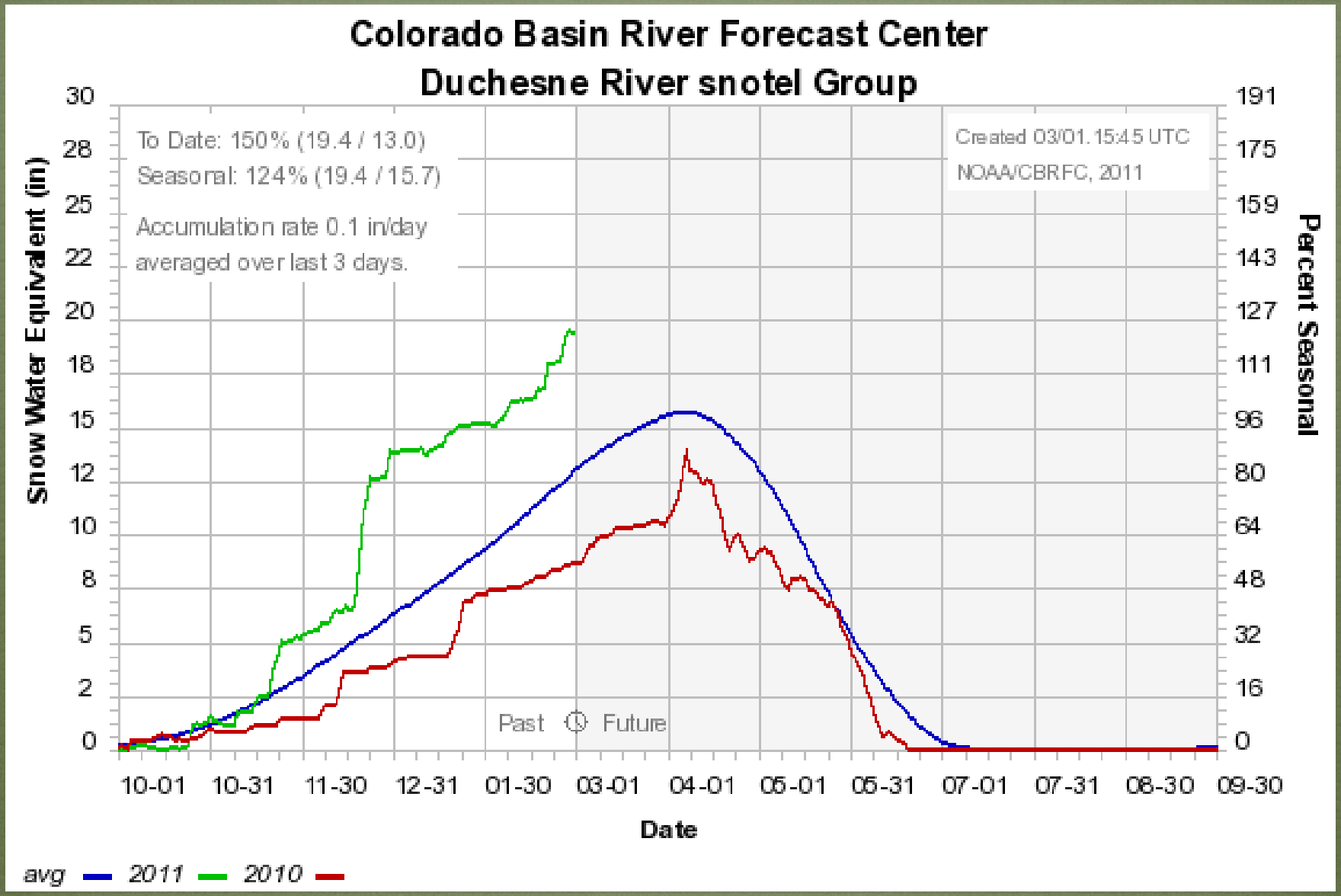


Snowpack % of average to date: 108%
Percent of average peak: 87%

Duchesne River Basin

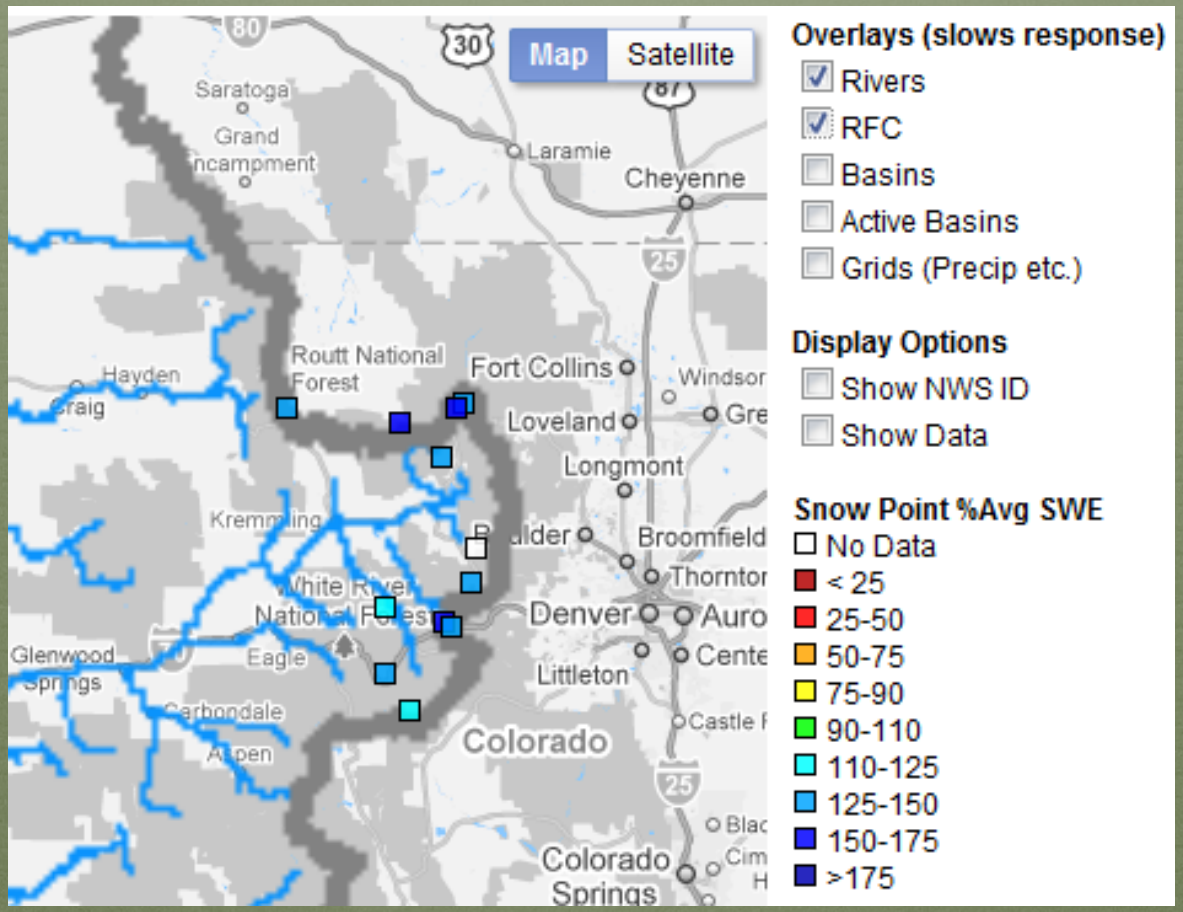


NATIONAL WEATHER SERVICE
Colorado Basin River Forecast Center

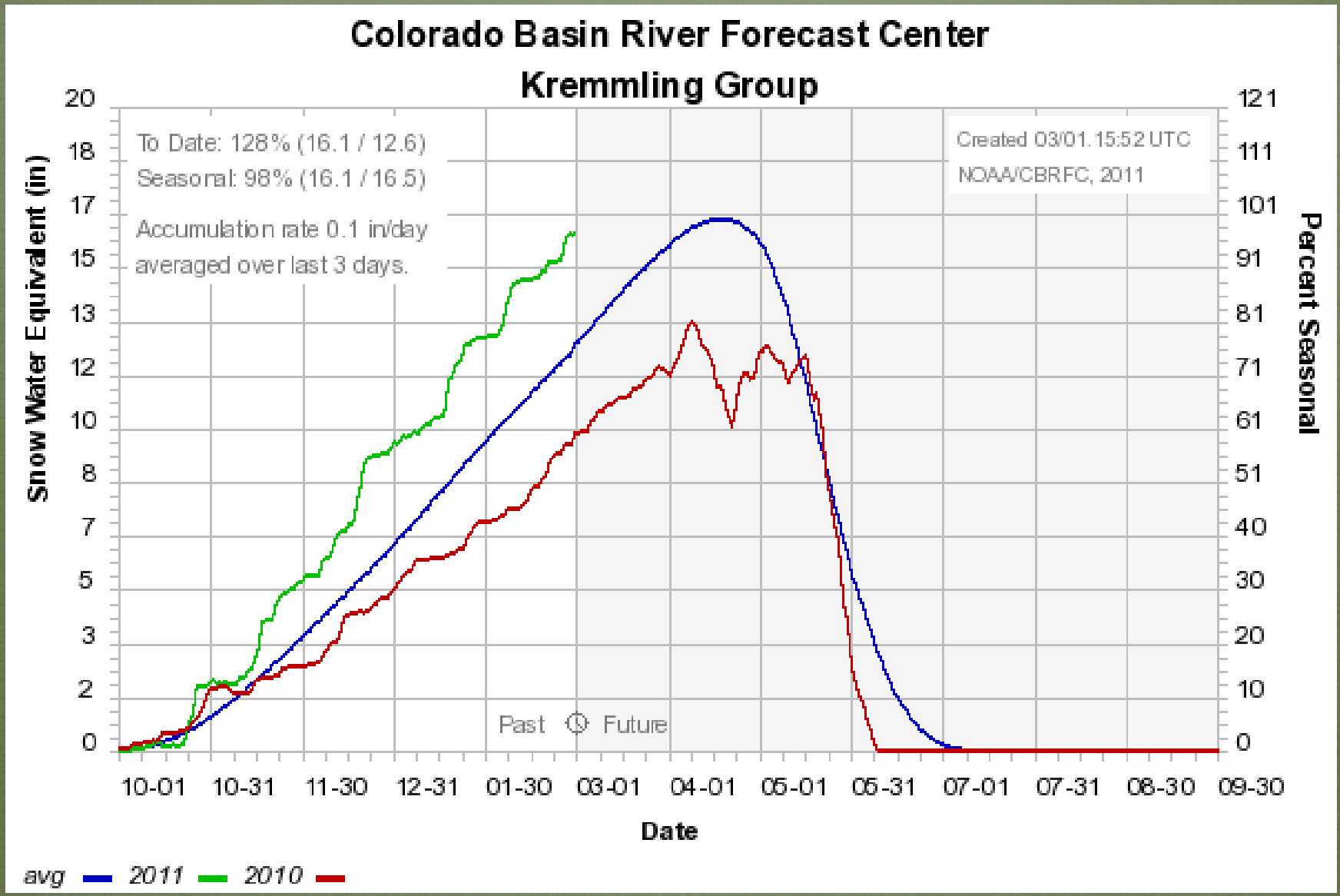


Snowpack % of average to date: 150%
Percent of average peak: 124%

Upper Colorado above Kremmling

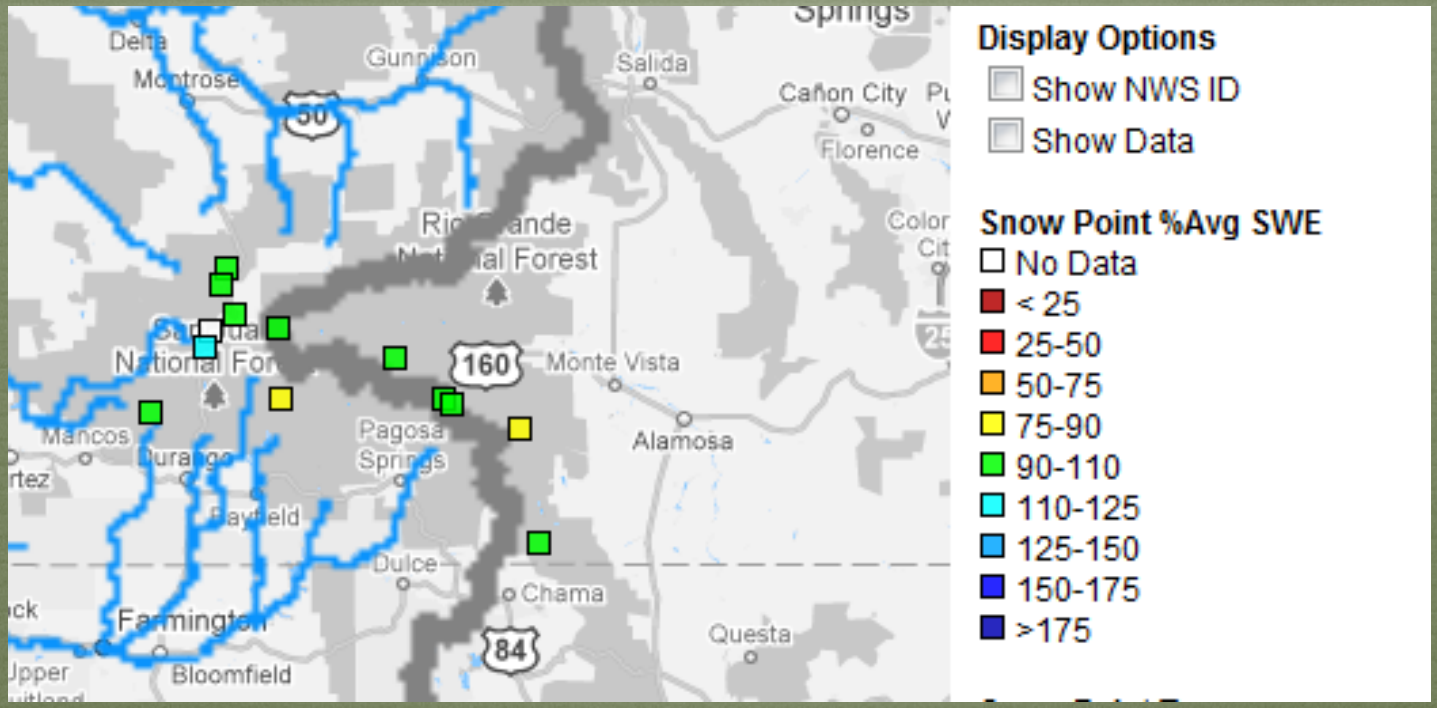


NATIONAL WEATHER SERVICE
Colorado Basin River Forecast Center

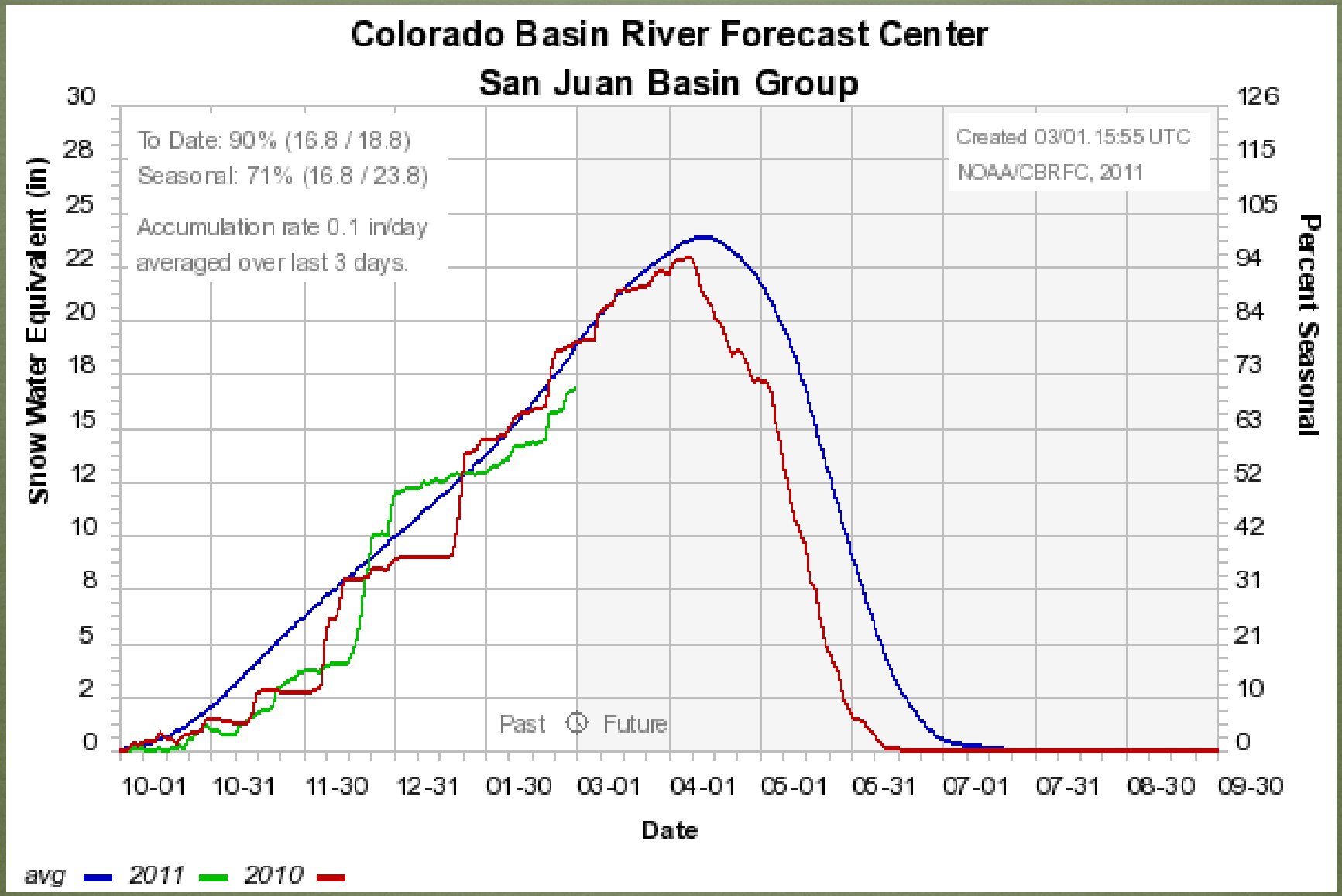


Snowpack % of average to date: 128%
Percent of average peak: 98%

San Juan Basin



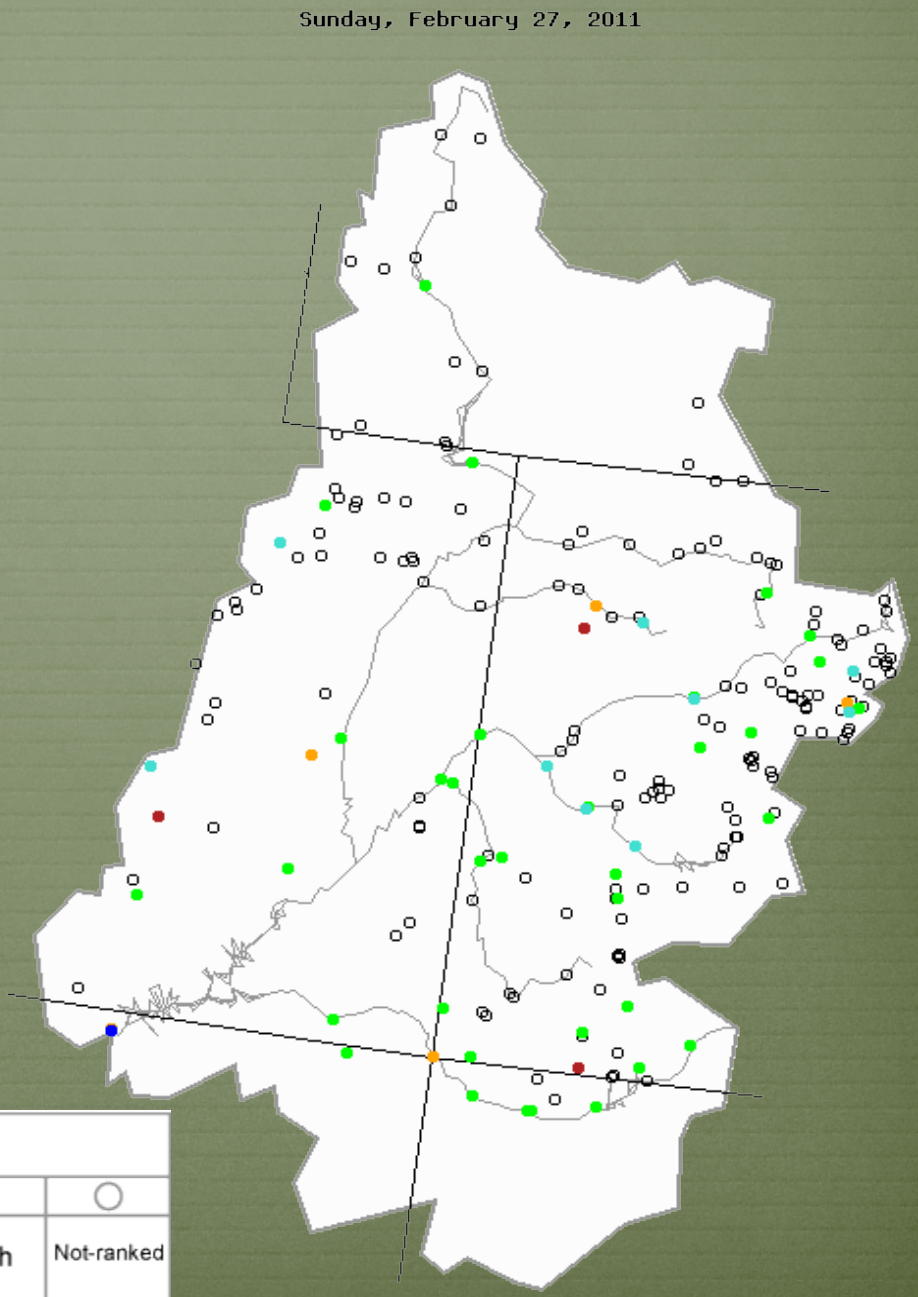
NATIONAL WEATHER SERVICE
Colorado Basin River Forecast Center



Snowpack % of average to date: 90%
Percent of average peak: 71%

Streamflow Update

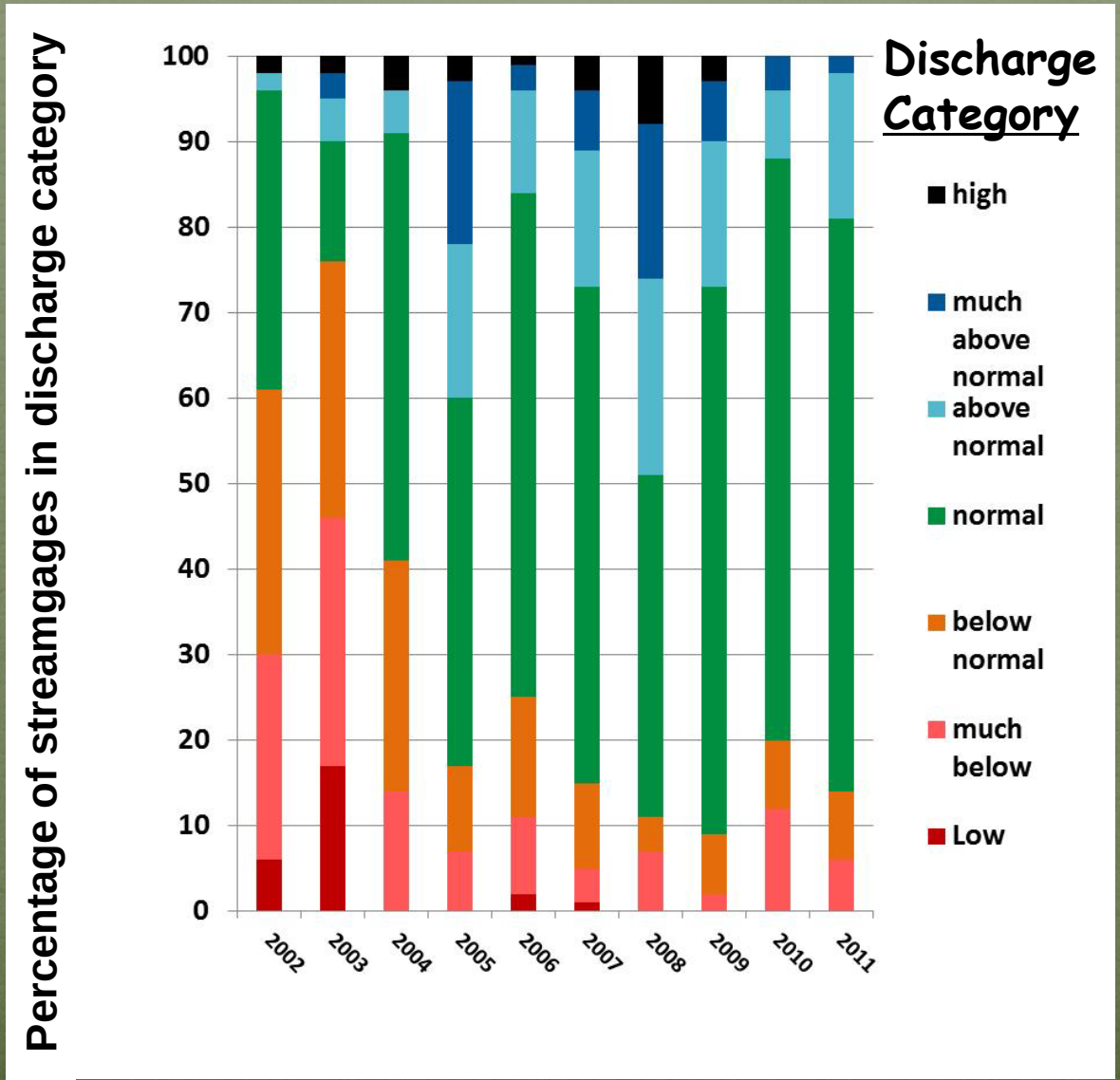
7-day average discharge compared to historical discharge for the day of the year (February 27th)



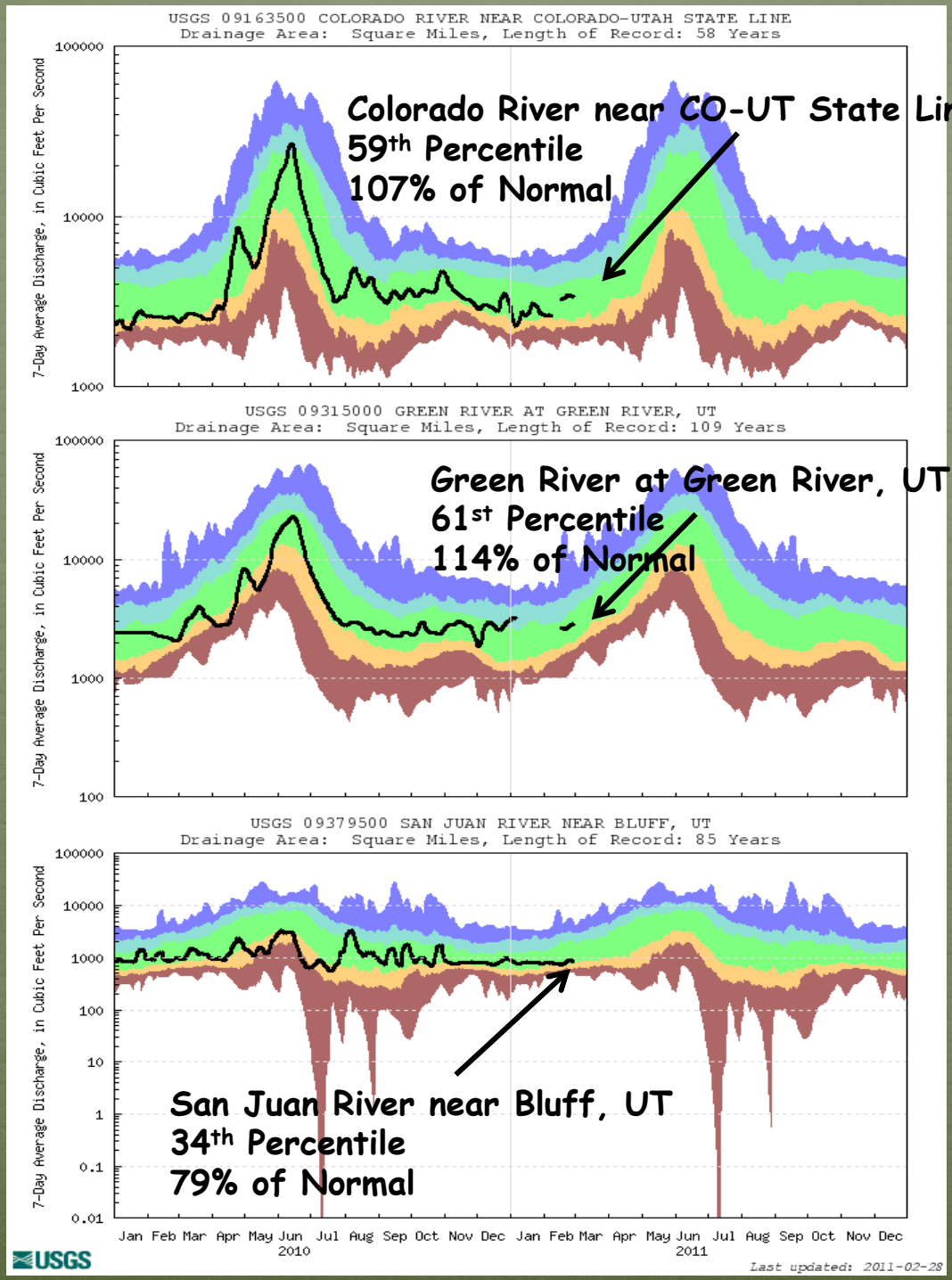
Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

USGS

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

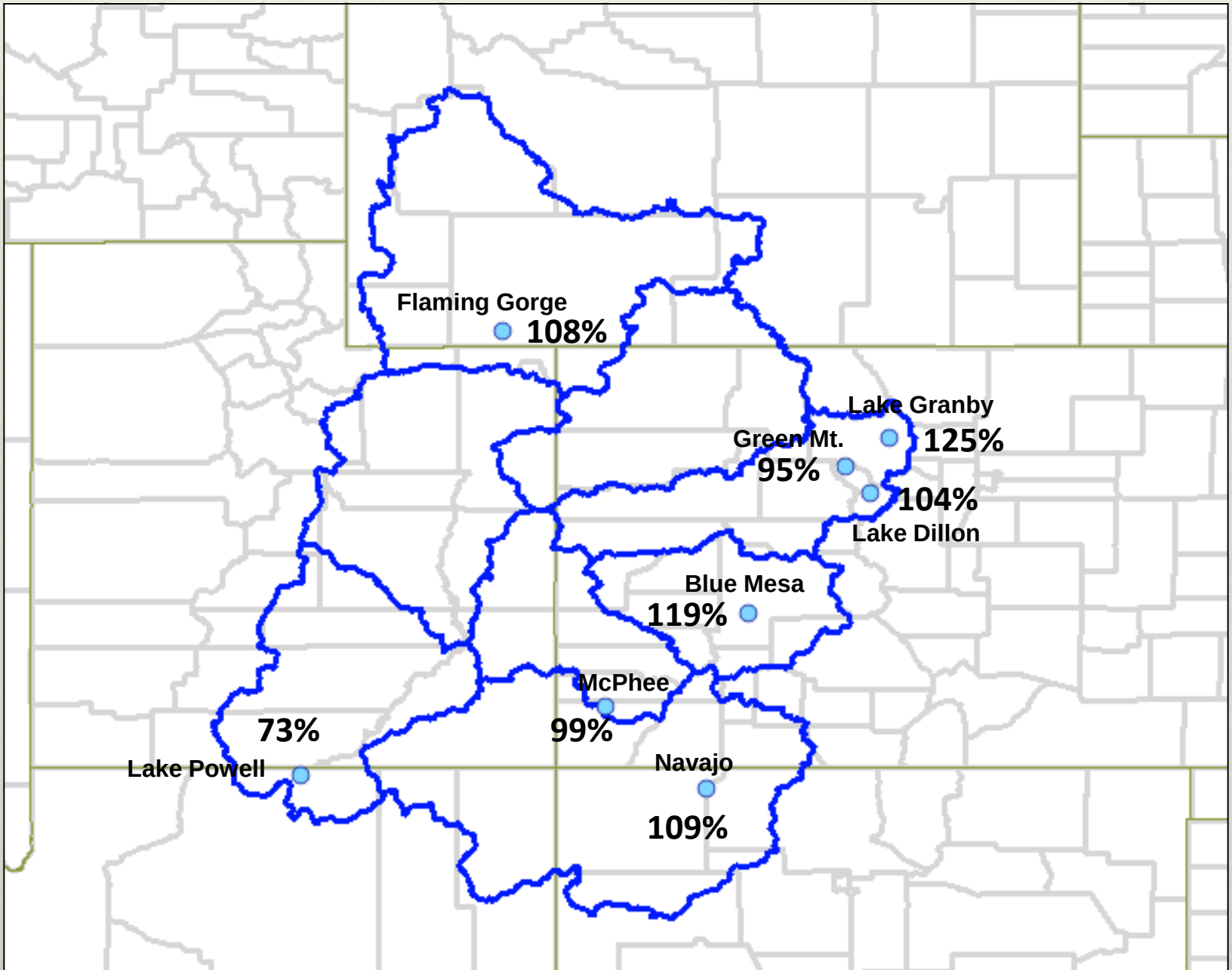


USGS

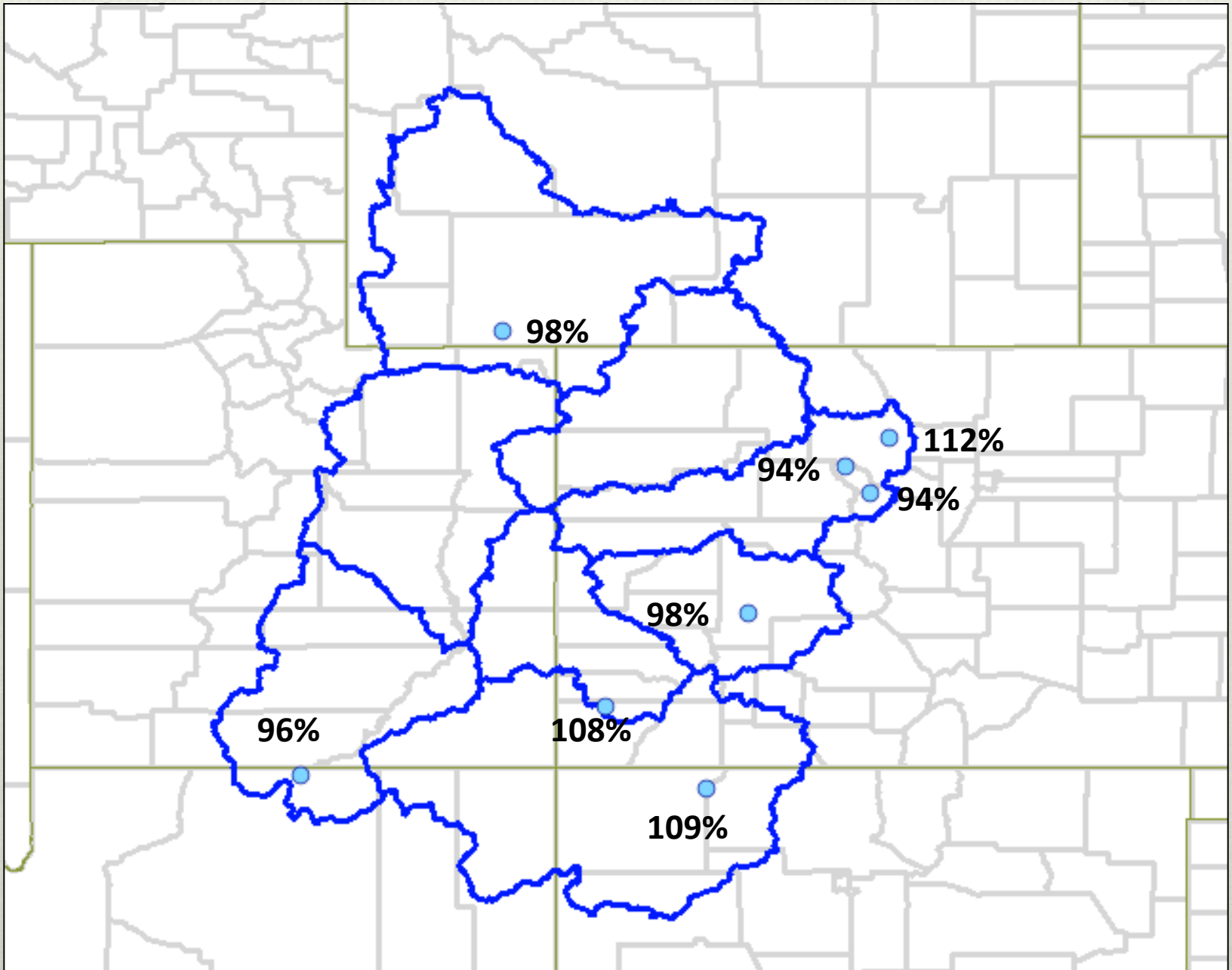

USGS 09163500 COLORADO RIVER NEAR COLORADO-UTAH STATE LINE
Drainage Area: Square Miles, Length of Record: 58 Years
7-Day Average Discharge, in Cubic Feet Per Second
100000
10000
1000
Colorado River near CO-UT State Line
59th Percentile
107% of Normal
USGS 09315000 GREEN RIVER AT GREEN RIVER, UT
Drainage Area: Square Miles, Length of Record: 109 Years
7-Day Average Discharge, in Cubic Feet Per Second
100000
10000
1000
100
Green River at Green River, UT
61st Percentile
114% of Normal
USGS 09379500 SAN JUAN RIVER NEAR BLUFF, UT
Drainage Area: Square Miles, Length of Record: 85 Years
7-Day Average Discharge, in Cubic Feet Per Second
100000
10000
1000
100
10
1
0.1
0.01
San Juan River near Bluff, UT
34th Percentile
79% of Normal
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
2010
2011
USGS
Last updated: 2011-02-28

Reservoir Update

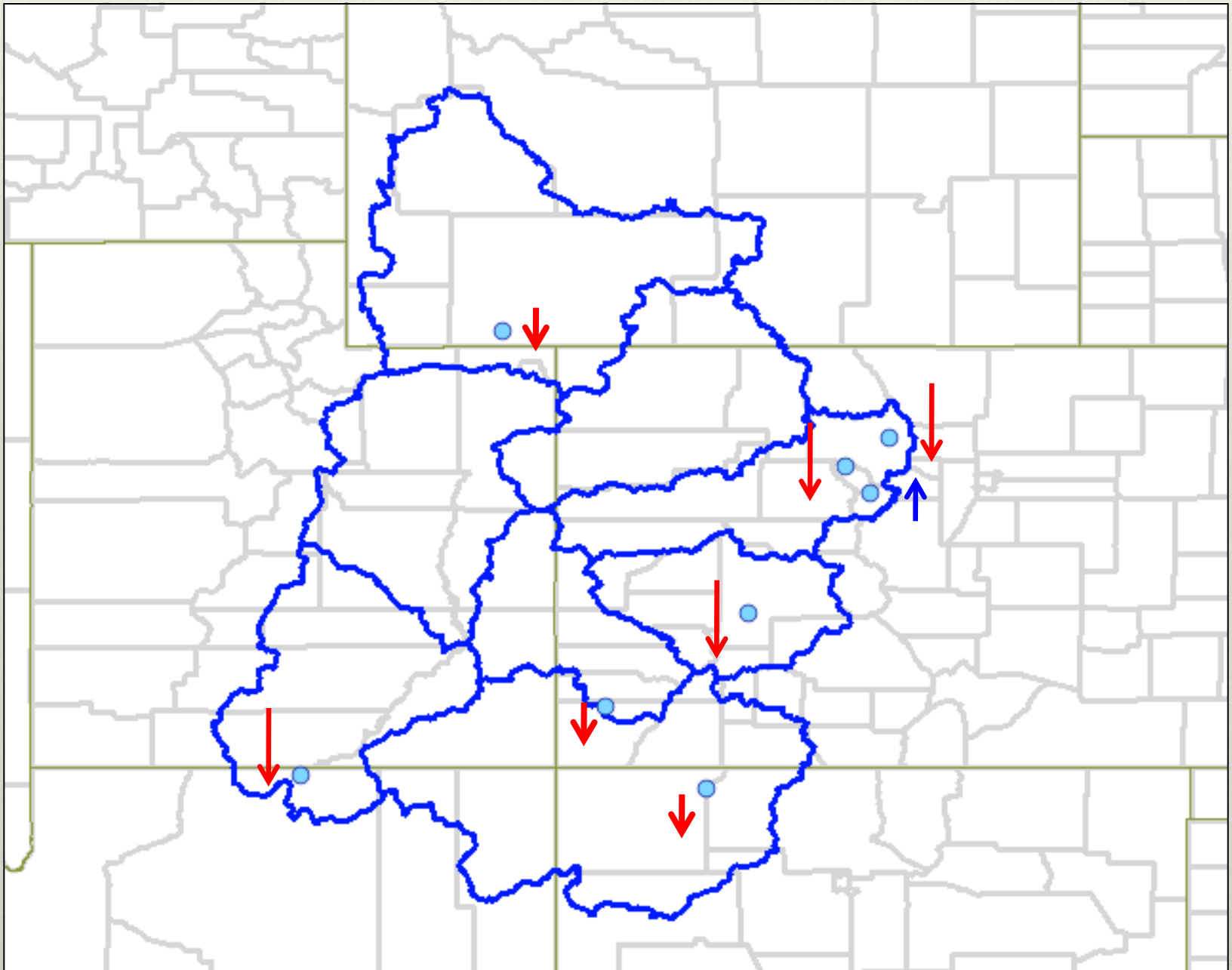
Reservoir Level Percents of Average – 2/27/2011

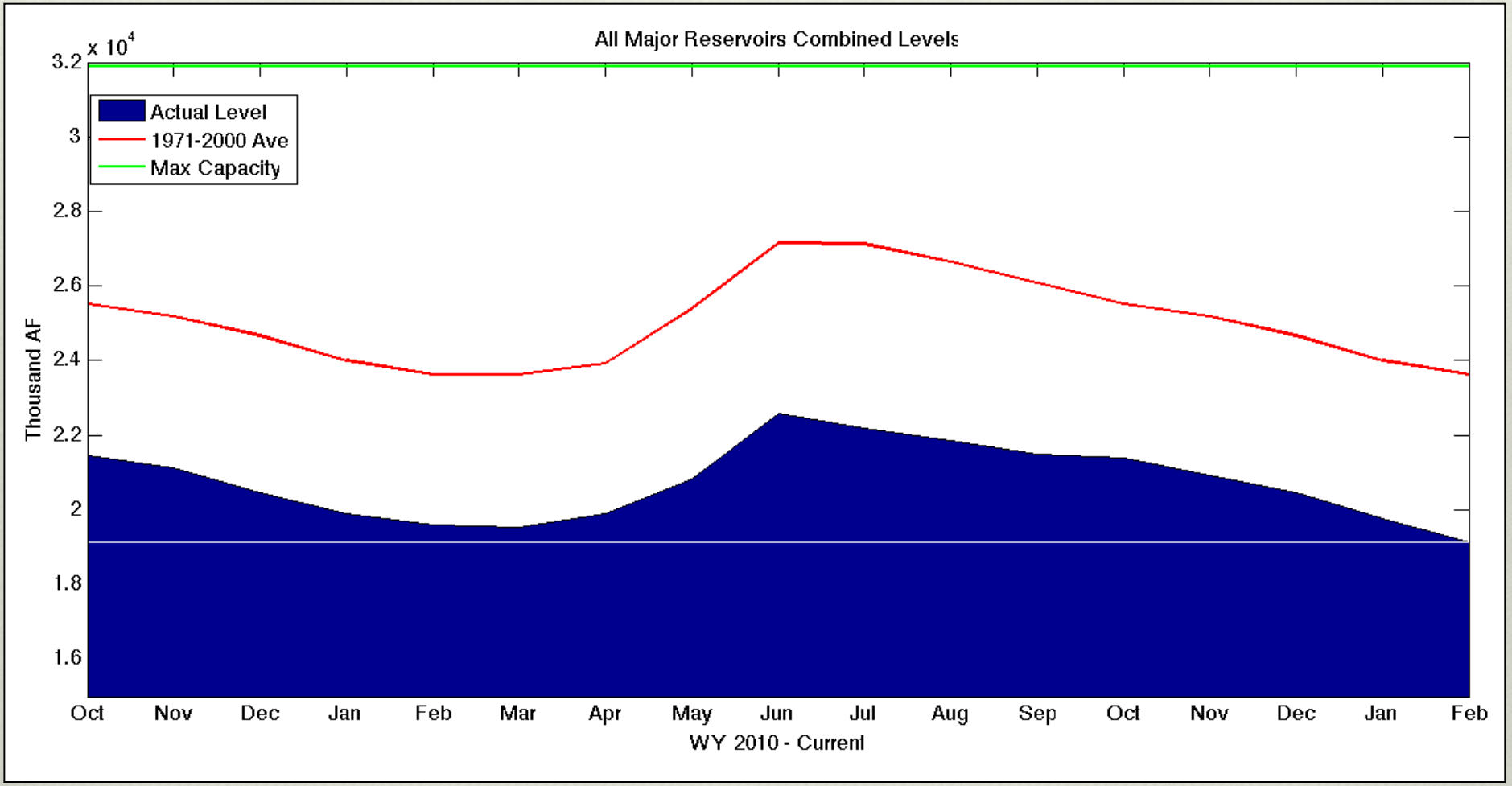


Reservoir Level Percents of Last Year – 2/27/2011

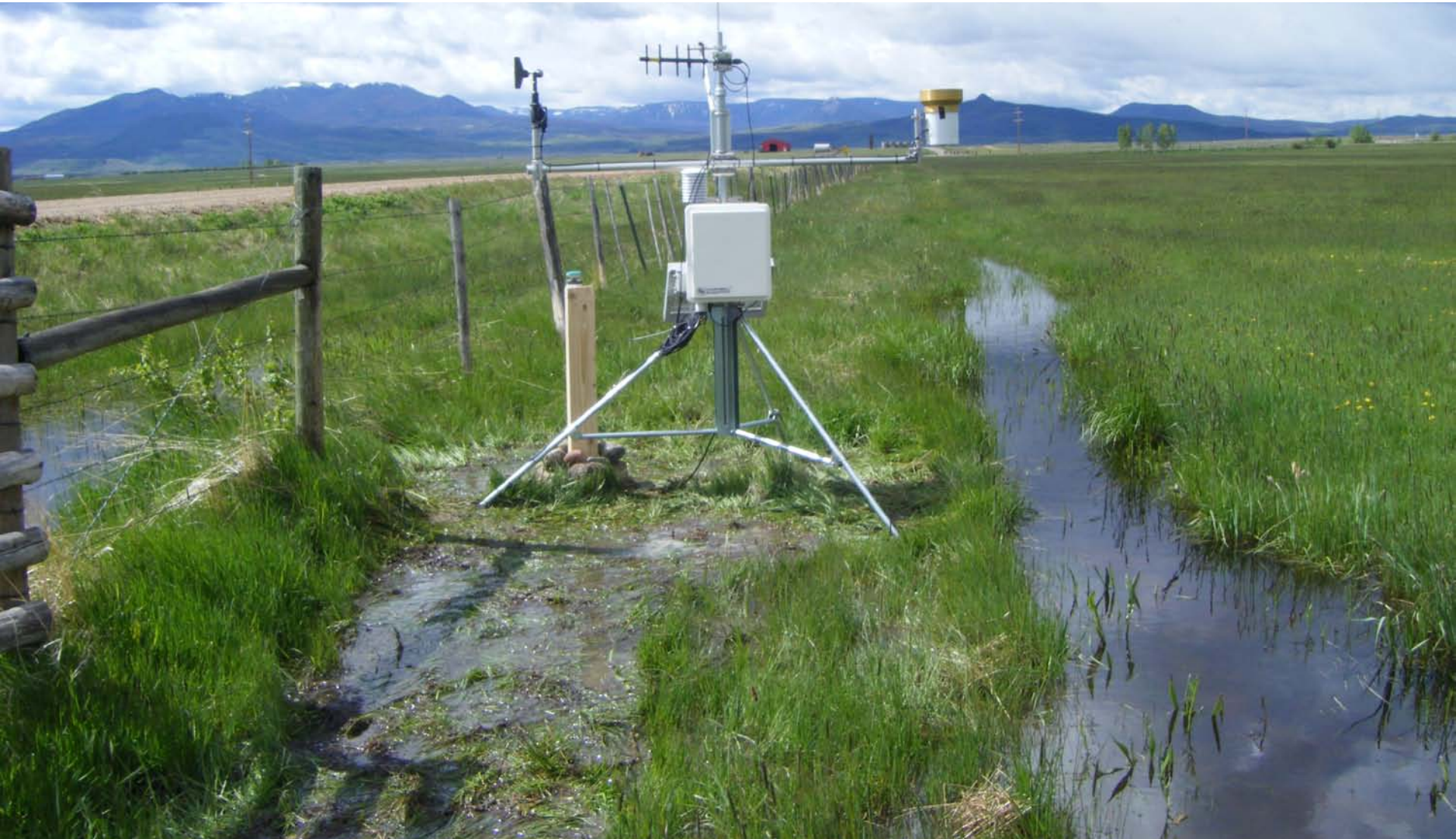


Reservoir Level Changes Month-to-Date – 2/27/2011

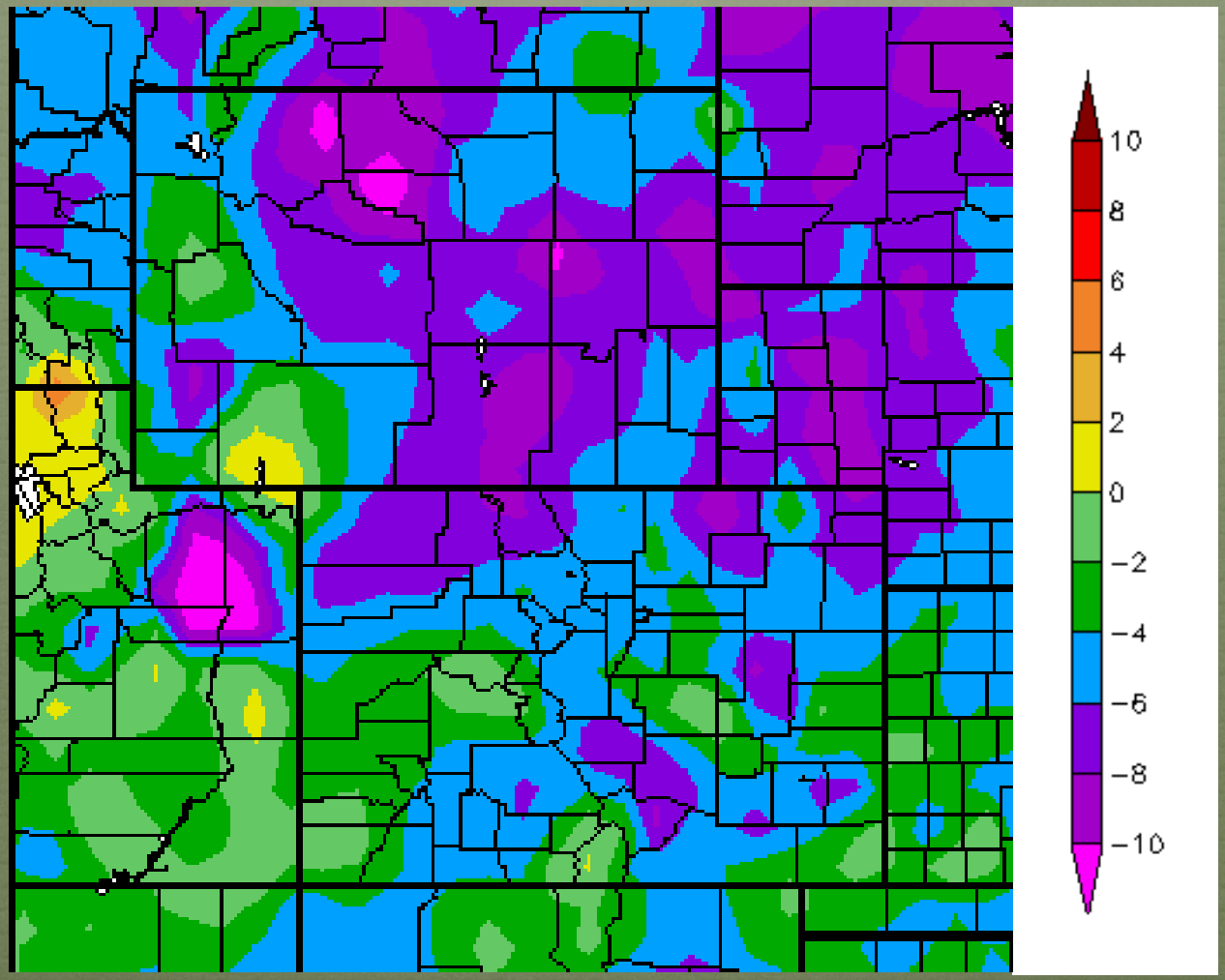



All Major Reservoirs Combined Levels
x 10^4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
Thousand AF
Actual Level
1971-2000 Ave
Max Capacity
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
WY 2010 - Current

Water Demand

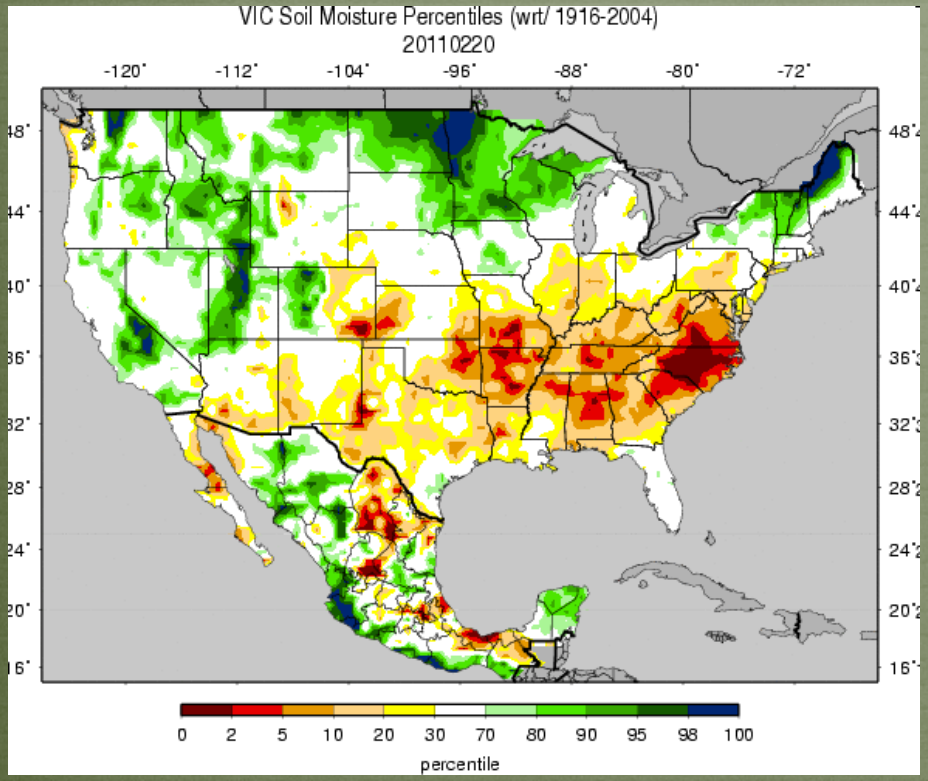


Temperature Departure from Normal
02/01/2011 – 02/28/2011

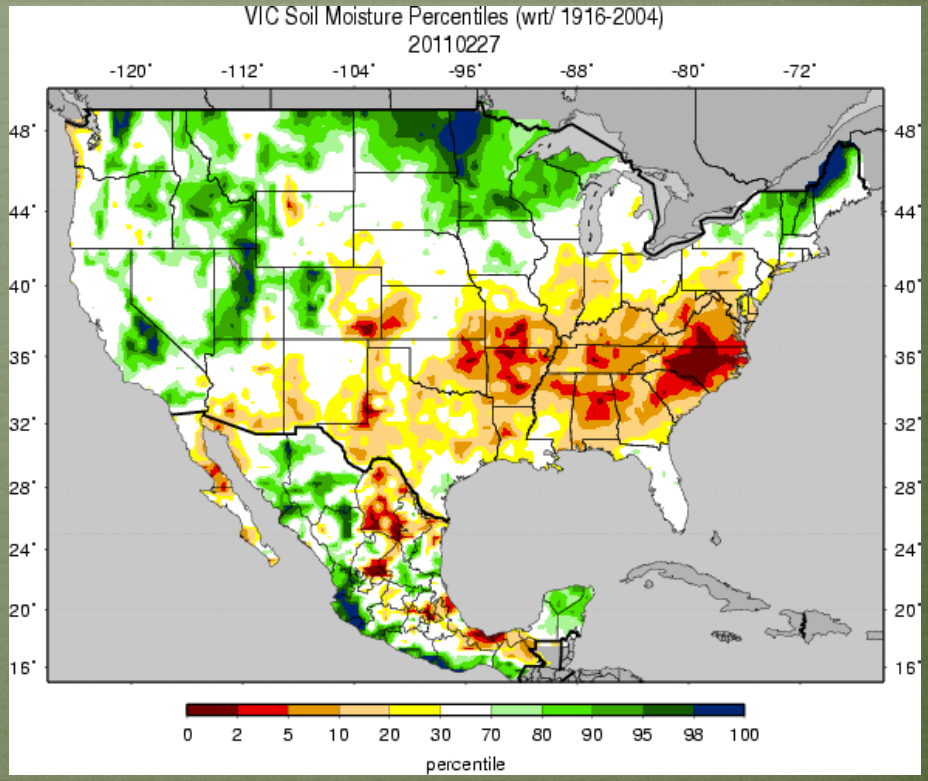


High Plains Regional Climate Center

Soil Moisture Change from Feb 20th, 2011



20 February 2011

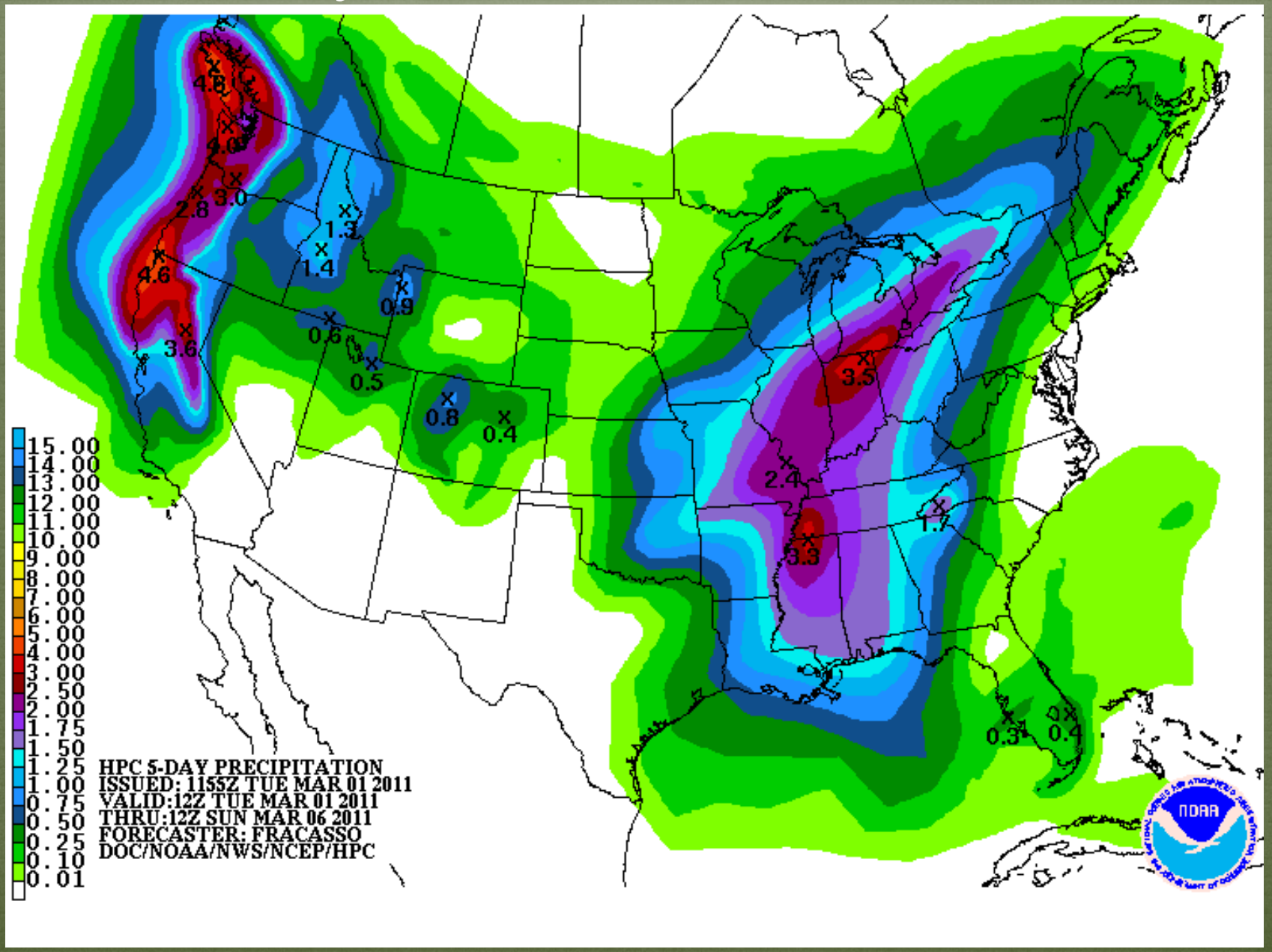


27 February 2011

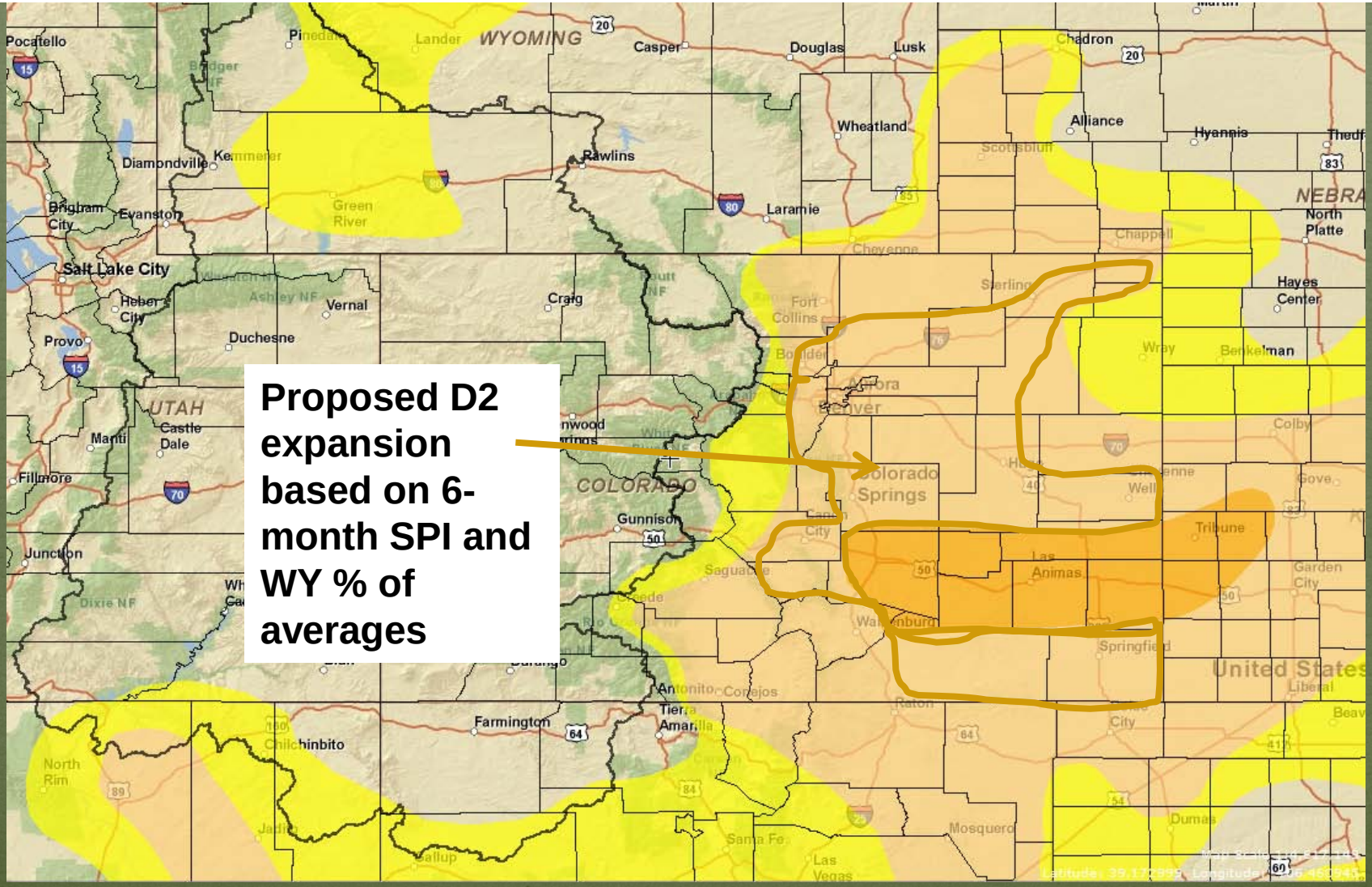
University of Washington

Precipitation Forecast

5 Day QPF 1-6 March 2011



Recommendations



INFO

For more information

NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

March 1, 2011

Precipitation and Snowpack

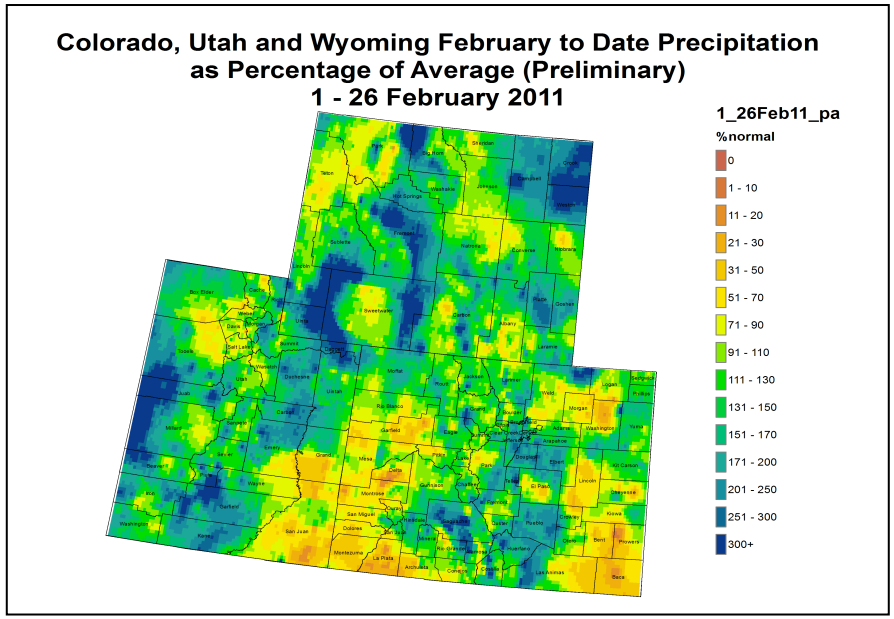


Fig. 1: February month-to-date precipitation as percent of average.

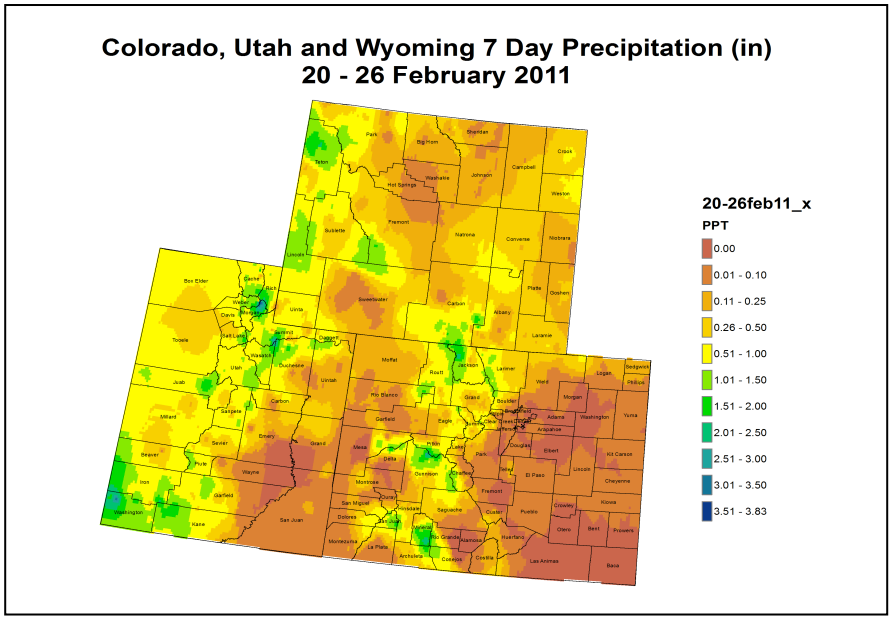


Fig. 2: February 20 – 26 precipitation in inches.

For the month of February to date the Wasatch and Uintas in Utah, areas of southwestern Wyoming, the Sangre de Cristos in southern Colorado and the northern mountains of Colorado received above average moisture (Fig. 1). Many counties along the Front Range also saw above average precipitation month-to-date, though because February is not typically a wet month, their water-year-to-date numbers are still at a deficit. The valleys of western CO and eastern UT, the Four Corners region and the southeastern plains remained dry for the month.

Last week, the highest amounts of precipitation fell in the Lower and Upper Green River basins, in the northern and central mountains of Colorado, and in the Rio Grande basin to the south (Fig. 2). These areas saw around half an inch to nearly two inches of moisture in the past week. The eastern plains, valley regions, and Four Corners area mostly received less than a tenth of an inch of precipitation.

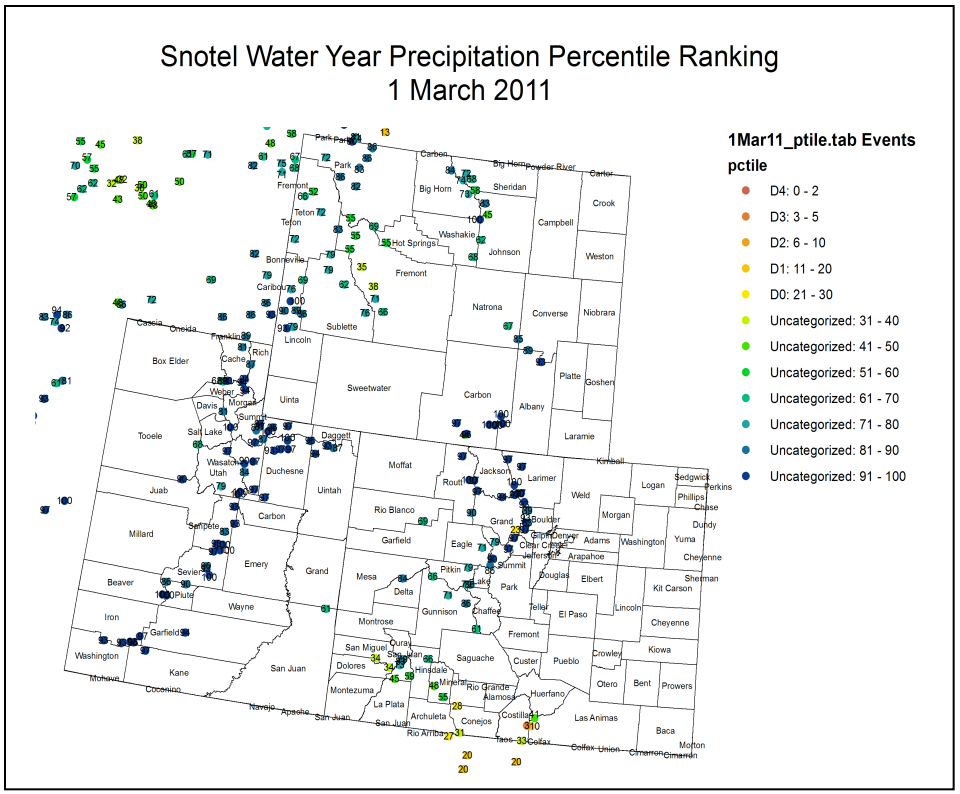


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21-30% is Drought Monitor's D0 category).

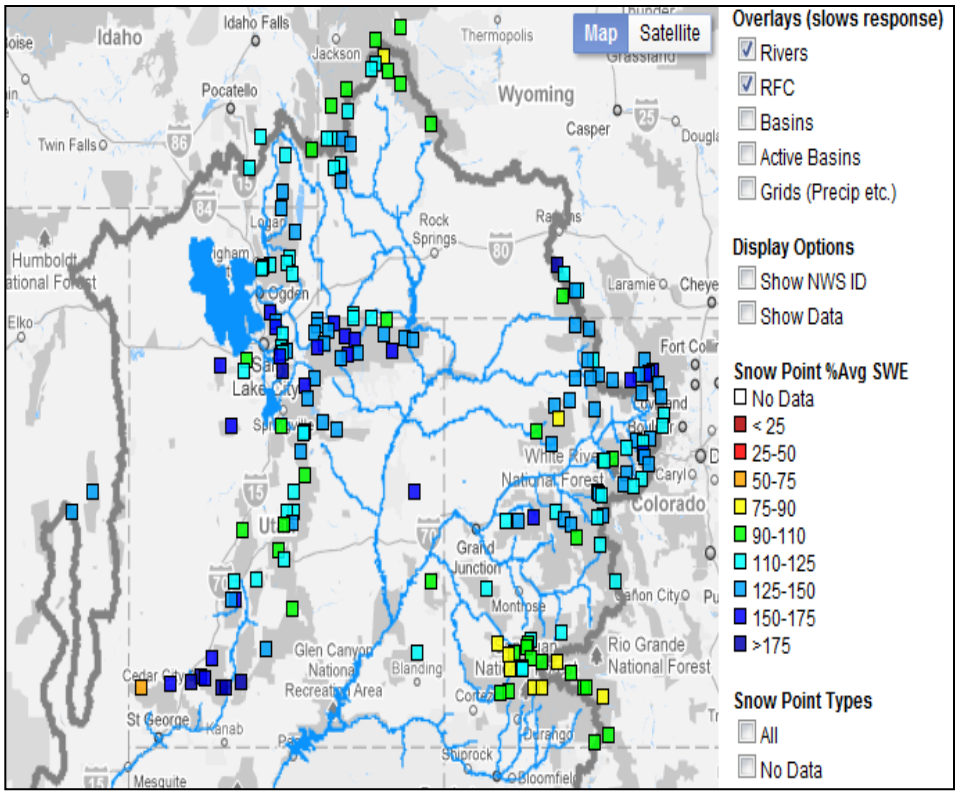


Fig. 4: San Juan basin averaged accumulations of snow water equivalent, WYTD.

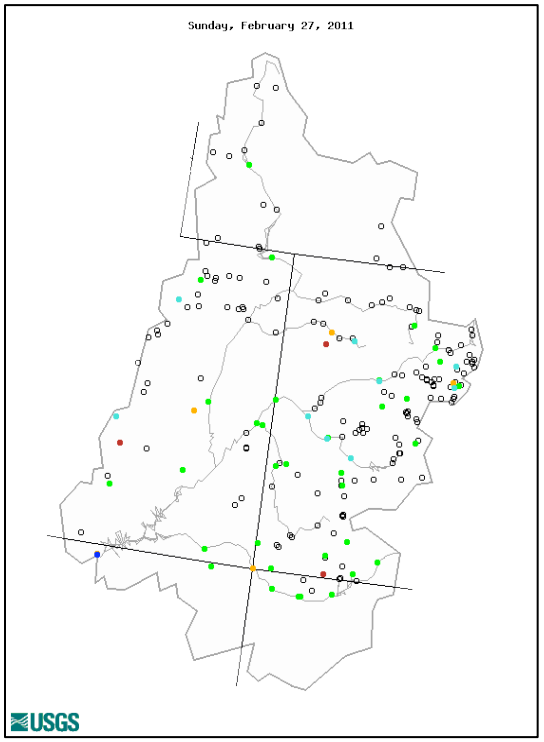
The majority of the SNOTEL sites in the Upper Colorado River Basin (UCRB) are showing high percentile rankings for water-year-to-date (WYTD) precipitation (Fig. 3). The Rio Grande and San Juan basins in southern CO are the driest, showing percentile rankings below 50%. Some of the sites in the Rio Grande basin are showing percentiles below 30% (meaning that 70% of the years have been wetter).

Snowpack around most of the UCRB is above average for this time of year (Fig. 4). The northern boundary of the Upper Green River basin shows accumulated snowpack levels slightly below average. The San Juan basin in southern Colorado shows the lowest percents of average for snowpack in the UCRB, with many sites recording less than 90% of average snowpack to date.

Streamflow

As of February 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 52 gages in the basin currently reporting, but new gages are coming out of icy conditions on a daily basis. By the end of the month, up to 100 gages could be reporting again.

At key gages around the basin, normal flows are being recorded (Fig. 6). Both the Colorado River at the CO-UT state line and the Green River at Green River, UT are recording above average flows. The San Juan River near Bluff, UT is currently showing normal flows, though it is only at the 34th percentile. We are arriving at a time period when many of the sites could start showing some short-term peaks in flow before the big seasonal peaks, depending on the pattern of seasonal snowmelt.



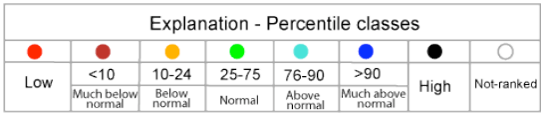


Fig. 5: USGS 7-day average streamflow compared to historical streamflow for February 27th in the UCRB.

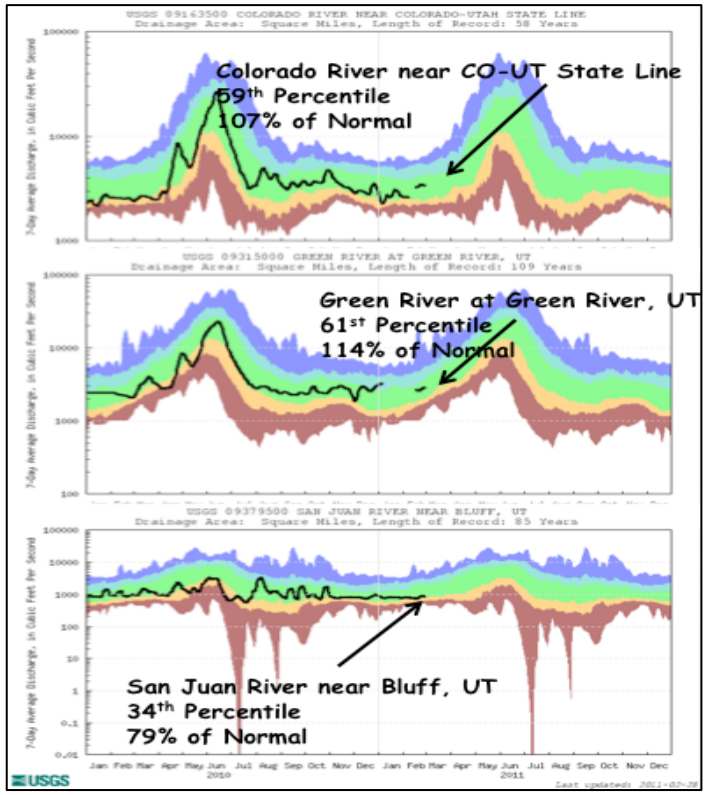


Fig. 6: USGS 7-day average discharge over time at the CO-UT state line (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

For the month of February, temperatures have been below average for most of the UCRB and the eastern plains of Colorado. Temperature departures have ranged from 2°F below average to more than 10°F below average for the month in northeast UT. Soil moisture in the UCRB is in good condition, with dry soils still showing up in eastern Colorado (Fig. 7). The driest soils are located in southeastern Colorado.

For the month of February, most of the reservoirs have seen their levels drop, with the exception of Lake Dillon, which saw a slight increase in its levels. Lake Powell volume has decreased by over half a million acre feet since the beginning of the month, with inflows into the lake slightly below what had been projected. Lake Granby has also seen a larger decrease in volume, likely to prevent spilling from occurring this summer as its levels are currently very high. Most of the reservoirs are near or above average levels for this time of year. Lake Powell is currently at 73% of average, but it is expected for levels to start rising again as snowmelt starts in March and April.

Precipitation Forecast

High pressure and mainly dry conditions will soon move out of the region as the next system moves into the area on Thursday. Light to moderate precipitation will be seen along the Colorado and Utah border. By Friday, around half an inch of moisture will accumulate in the Uintas and northern mountain ranges of Colorado. The very dry eastern plains could also receive some beneficial moisture from this system, late Thursday and into Friday. Saturday will see a return to dry conditions before the next system arrives on Sunday. There is the potential for this next storm to be significant, though there is some uncertainty in the long-range forecasts.

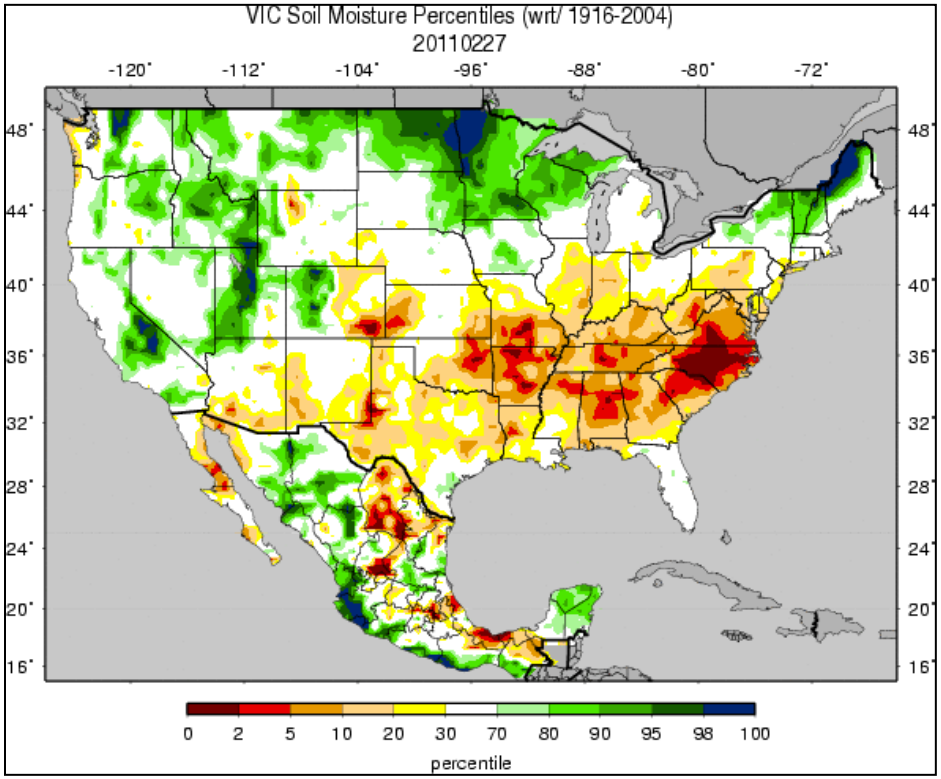


Fig. 7: VIC soil moisture as of February 27th.

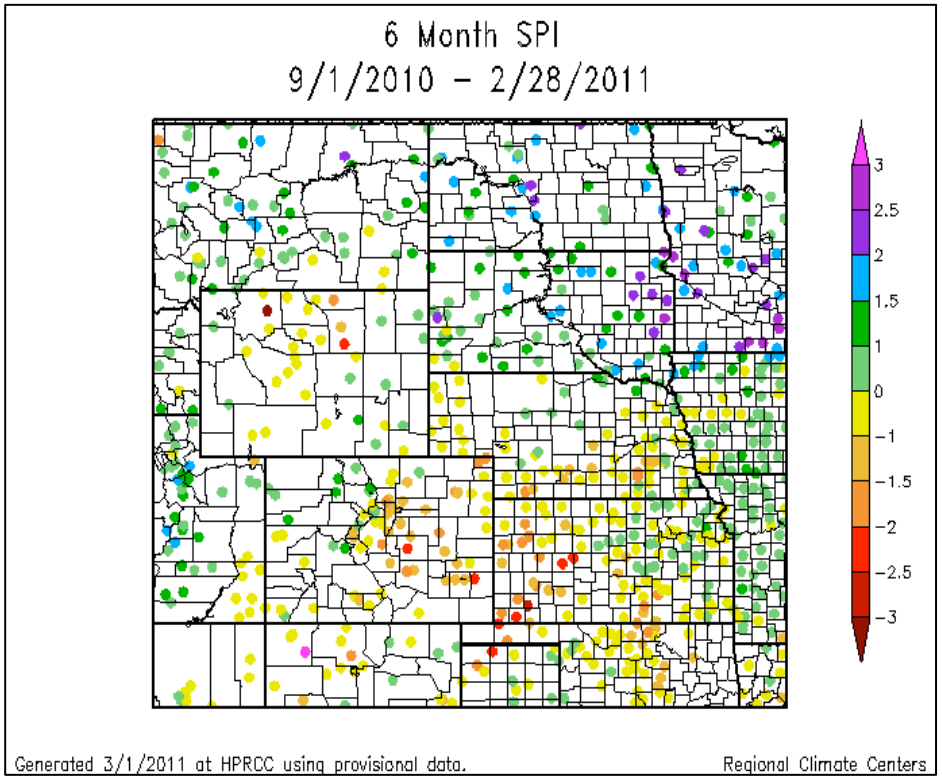


Fig. 8: 6 month standardized precipitation index (SPI) as of February 28th.

Drought and Water Discussion

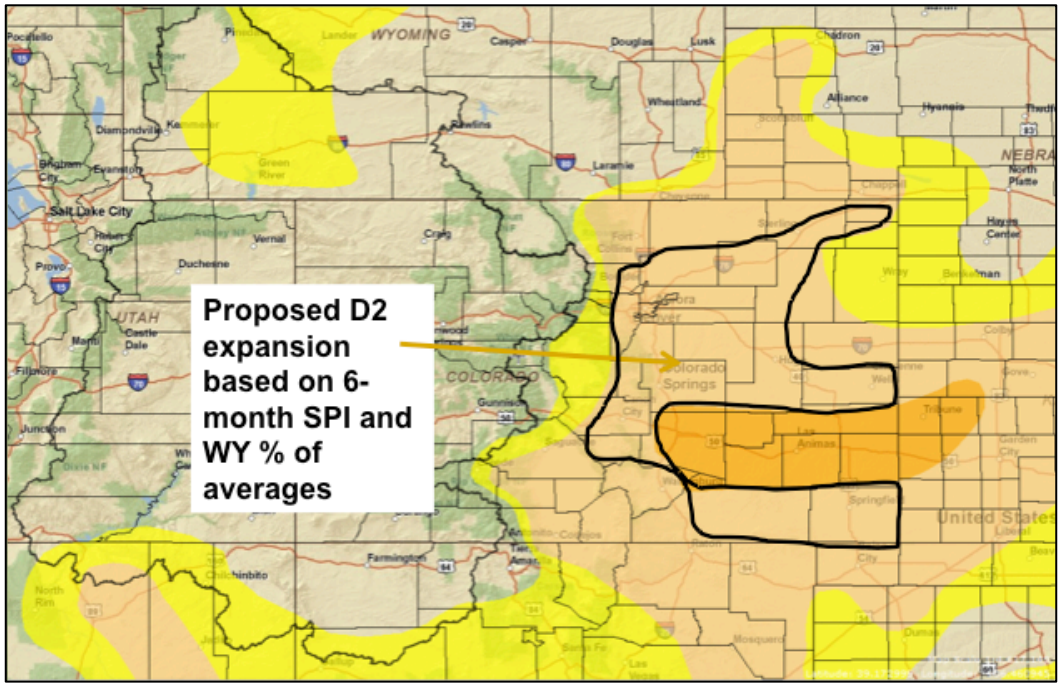


Fig. 9: February 22nd release of U.S. Drought Monitor for the UCRB

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

Six month SPIs show the driest conditions over the eastern plains of Colorado (Fig. 8). Values in eastern Colorado mainly range from -1 to -3. Based on the concentration of negative SPI values (at time periods ranging from 120 days to 12 months at some stations), poor soil moisture conditions, and the increased threat of wildfires in the region, a D2 expansion is recommended in eastern Colorado (Fig. 9).

The D0 in northeastern Colorado shows SPI values between 0 and -1 (Fig. 8), and soil moisture in that area is in good condition (Fig. 7). A couple of streamgages in Yuma County are recording below normal flows though. Mostly, it appears that the D0 does not need to be degraded in that area at this time. However, we defer to the current U.S. Drought Monitor (USDM) author, as the redrawing of the D2 line would mean that D0 would border D2 in this area.