Spring 2012

Weekly Climate, Water & Drought Assessment

Today's Agenda

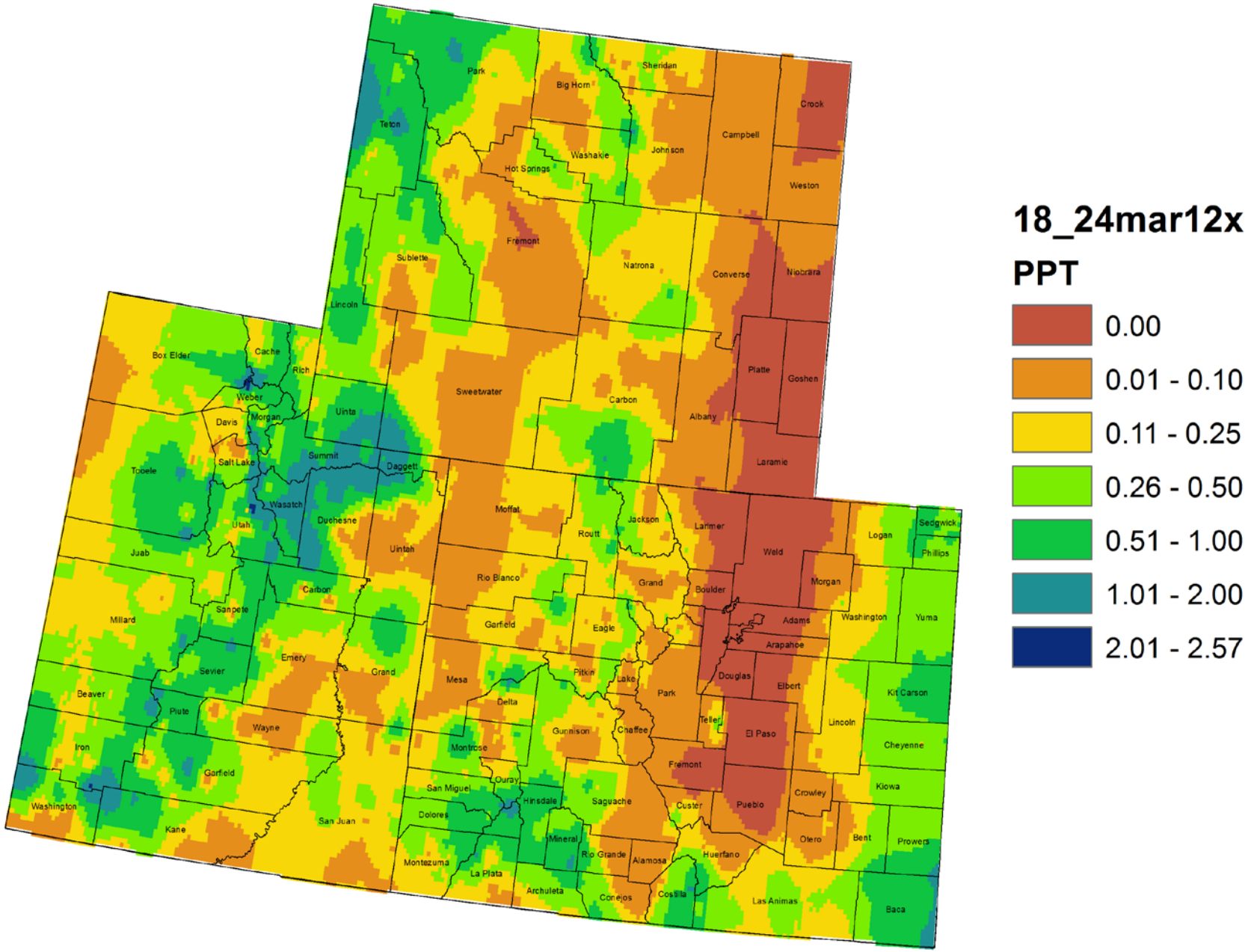
-Assessment of current water conditions

- Precipitation Forecast

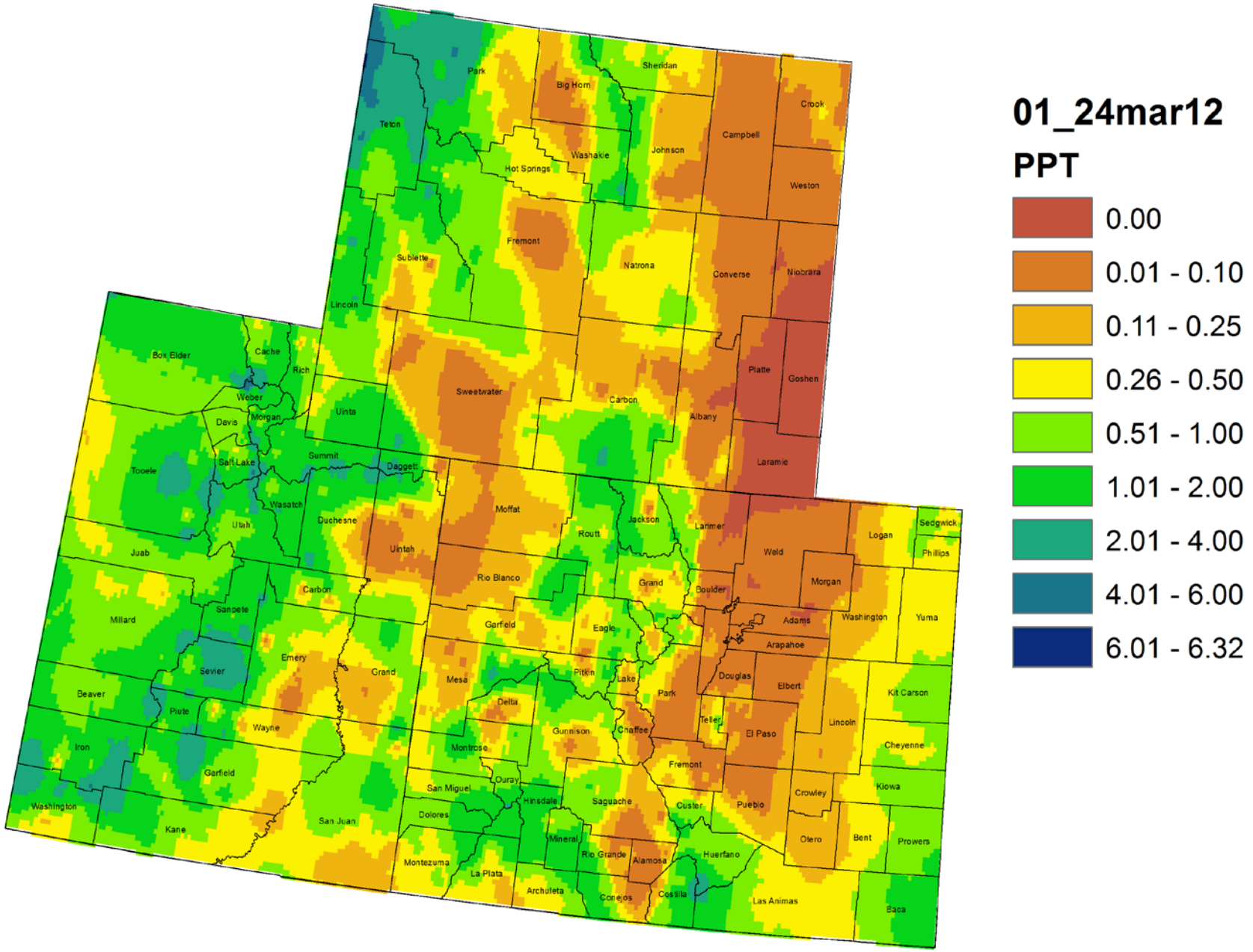
- Recommendations for Drought Monitor

Precipitation/Snowpack Update

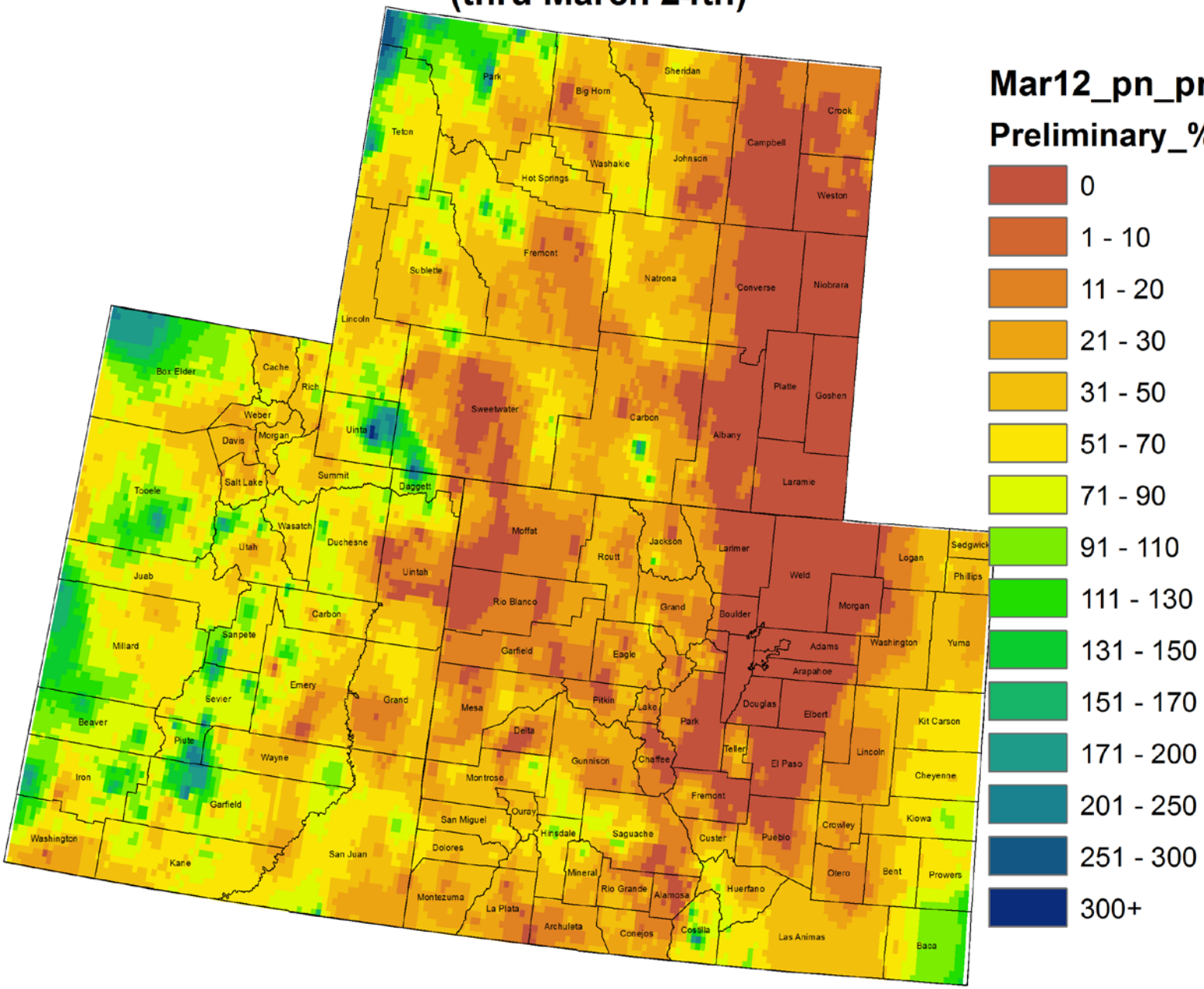
Colorado, Utah and Wyoming 7 Day Precipitation (in)
18 - 24 March 2012



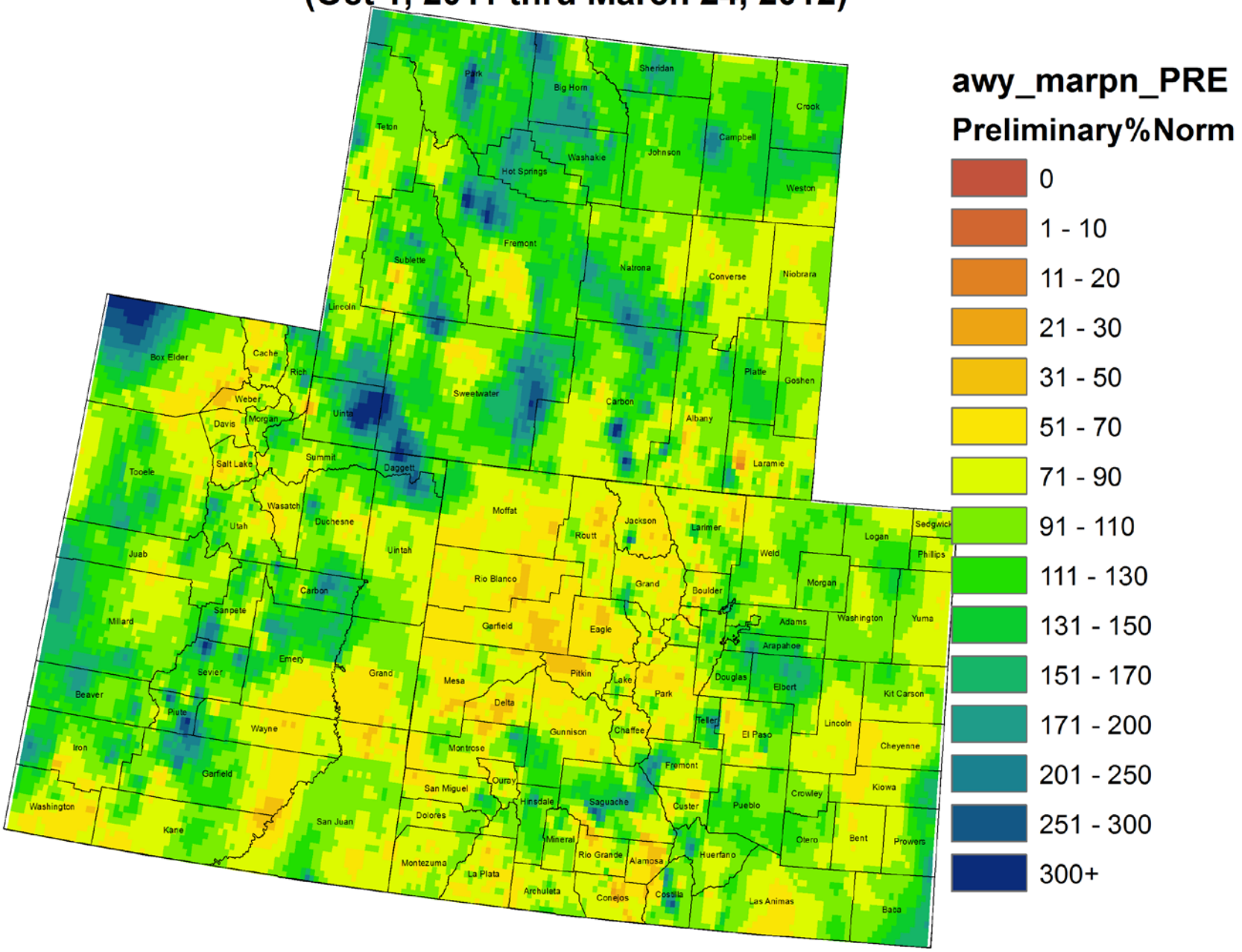
Colorado, Utah and Wyoming Month to Date Precipitation (in)
1 - 24 March 2012



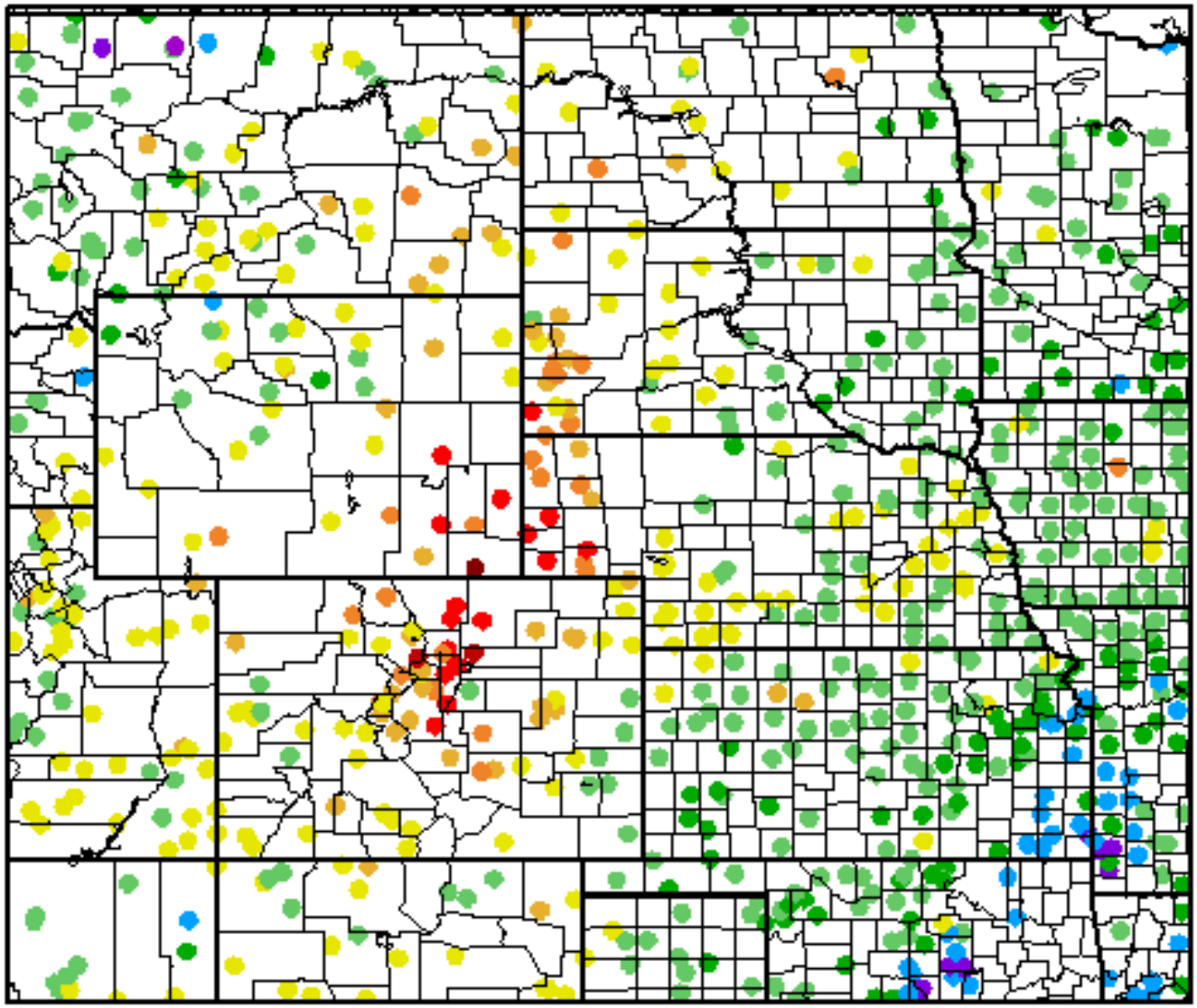
Colorado, Utah and Wyoming Preliminary March Precipitation as Percentage of Normal (thru March 24th)



Colorado, Utah and Wyoming Preliminary Water Year 2012 Precipitation as Percentage of Normal (Oct 1, 2011 thru March 24, 2012)



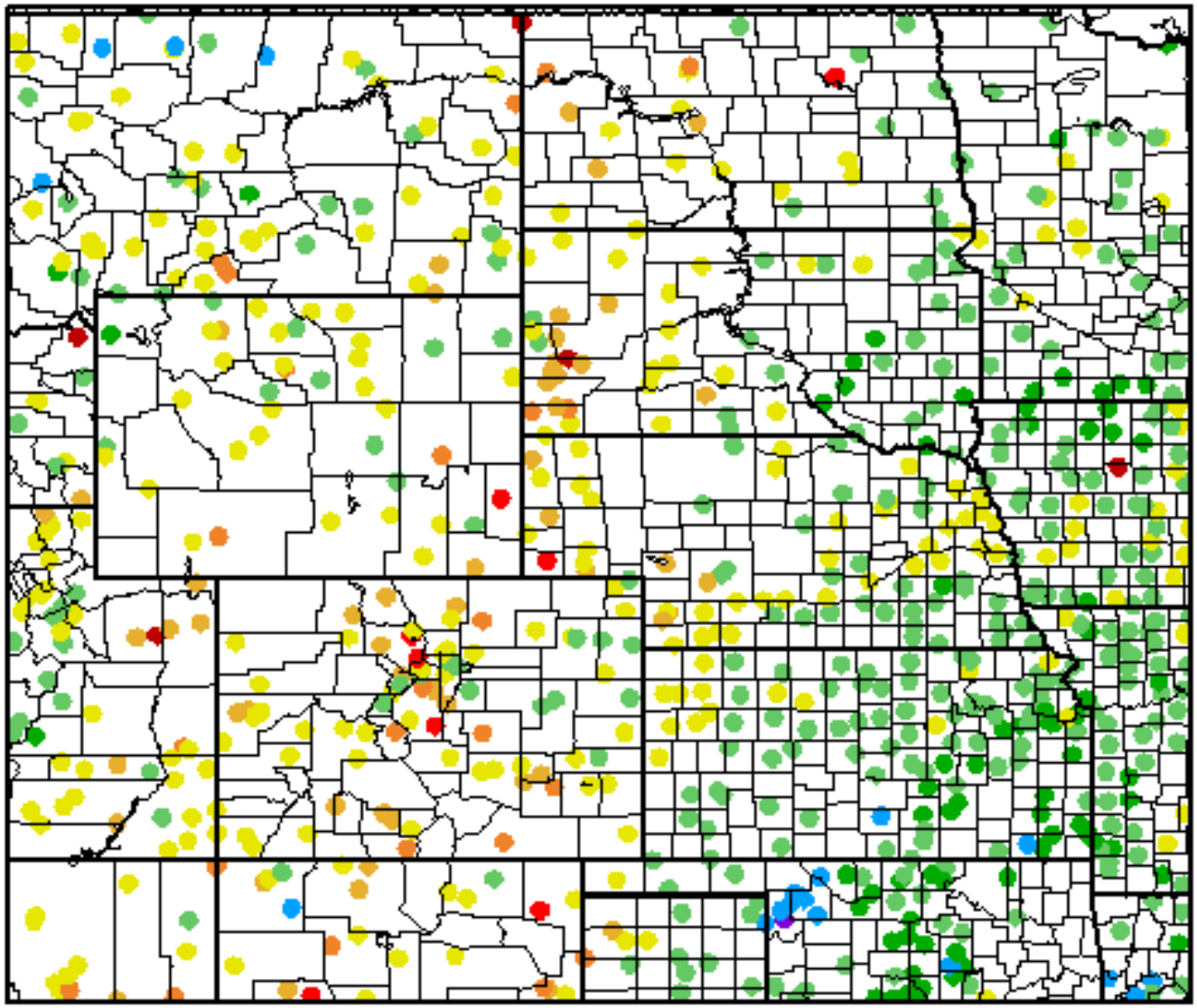
30 Day SPI
2/26/2012 – 3/26/2012



Generated 3/27/2012 at HPRCC using provisional data.

Regional Climate Centers

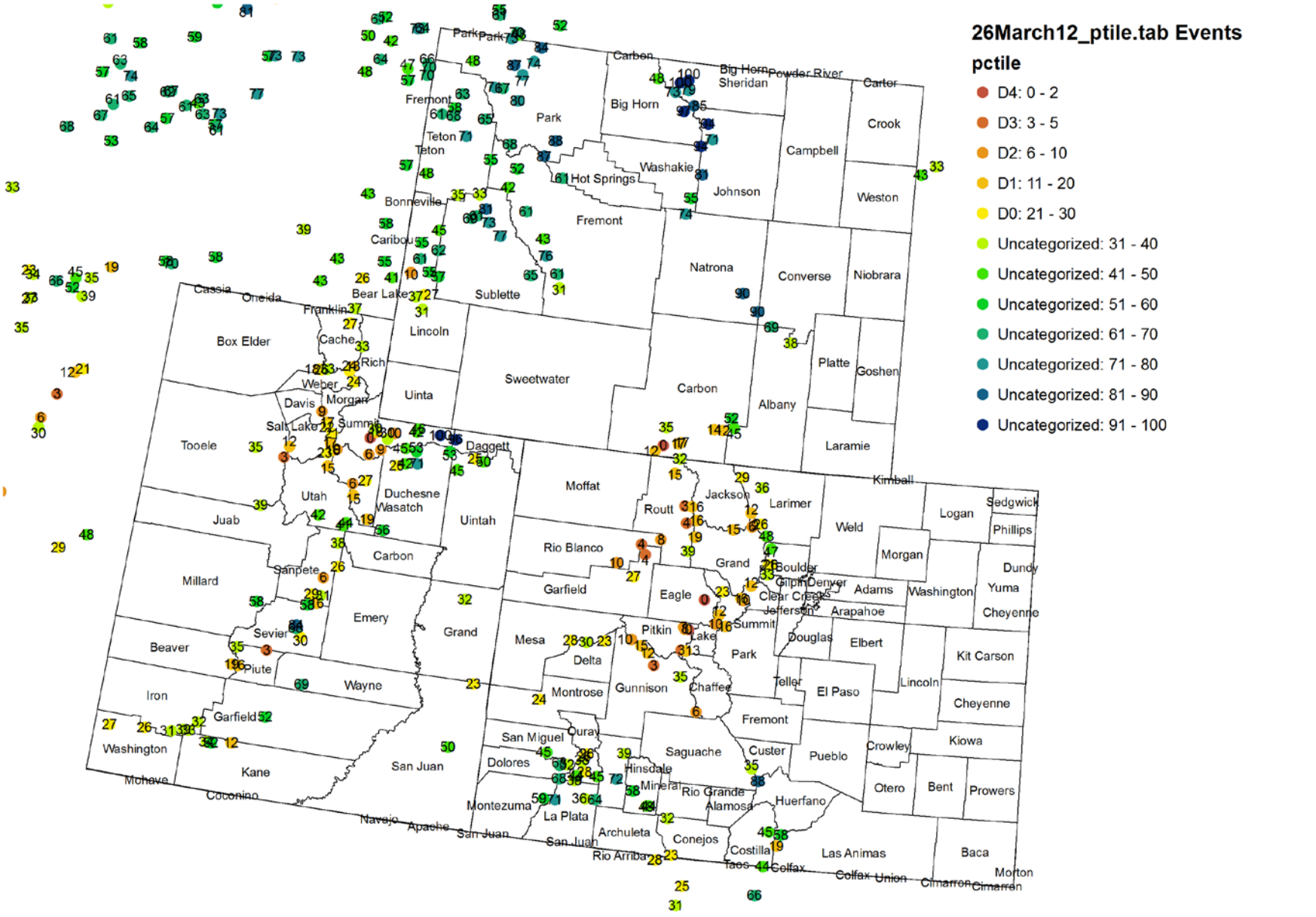
90 Day SPI
12/28/2011 – 3/26/2012



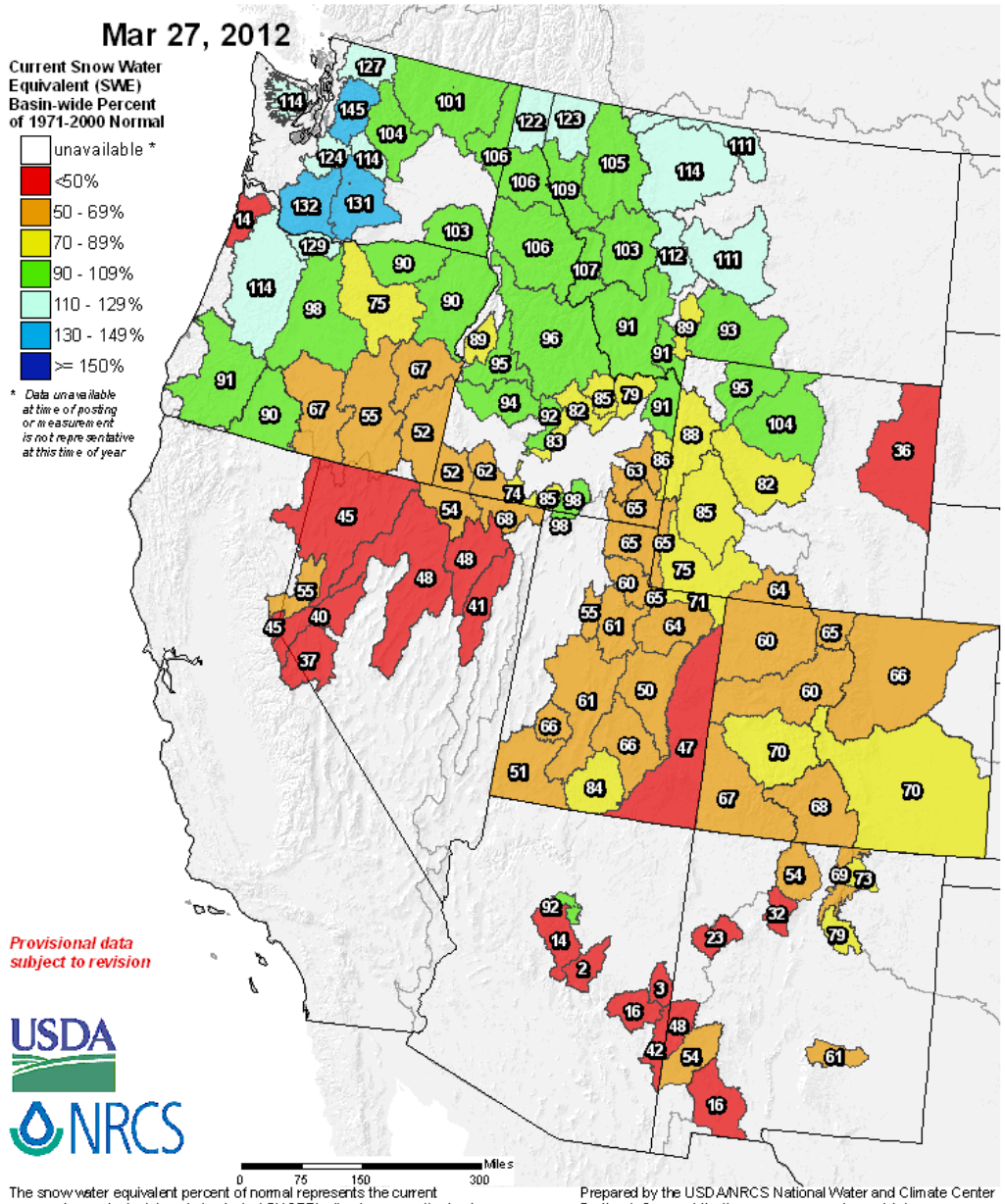
Generated 3/27/2012 at HPRCC using provisional data.

Regional Climate Centers

Snotel Water Year Precipitation Percentile Ranking for 26 March 2012 (Stations with 15+ years of data only)

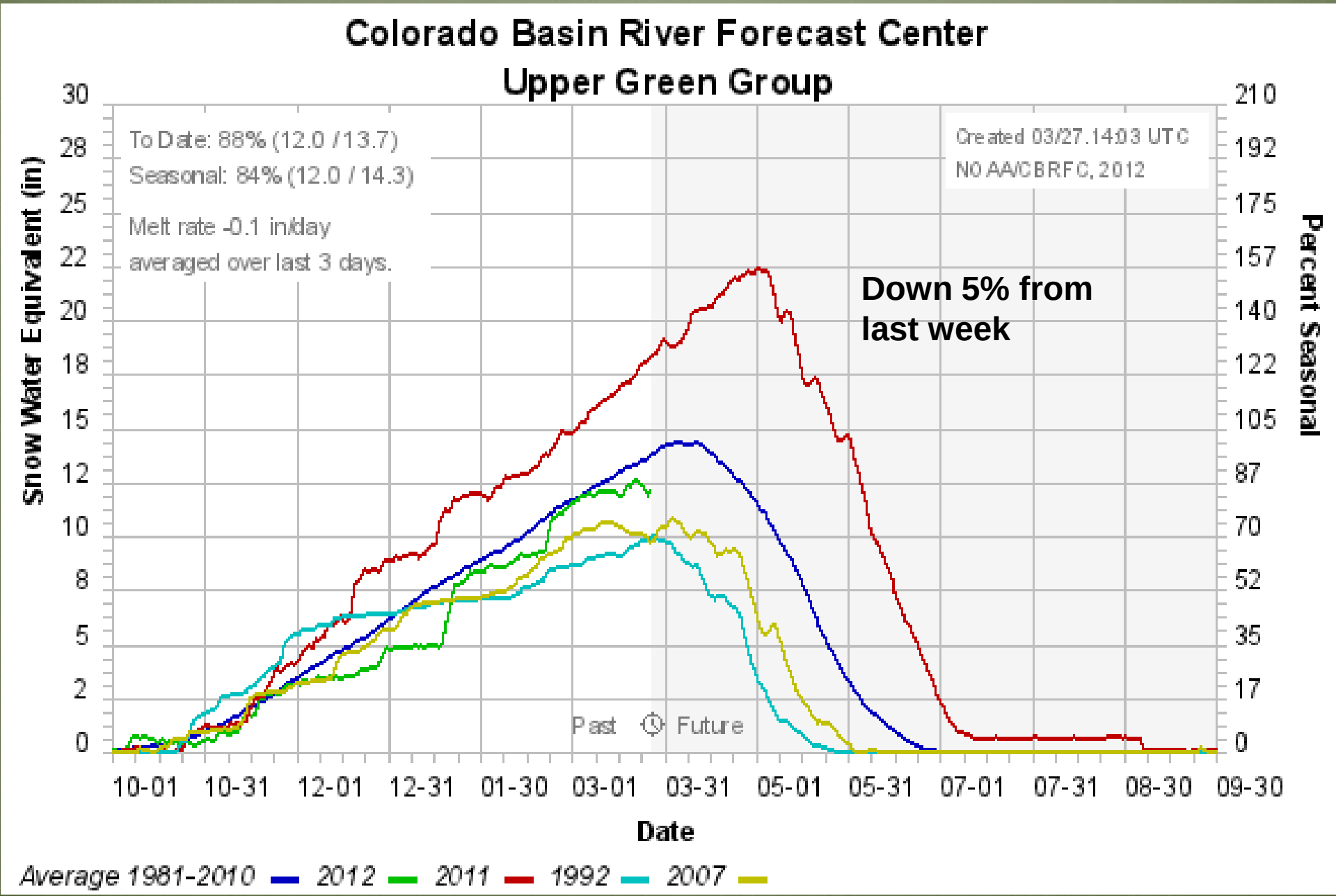


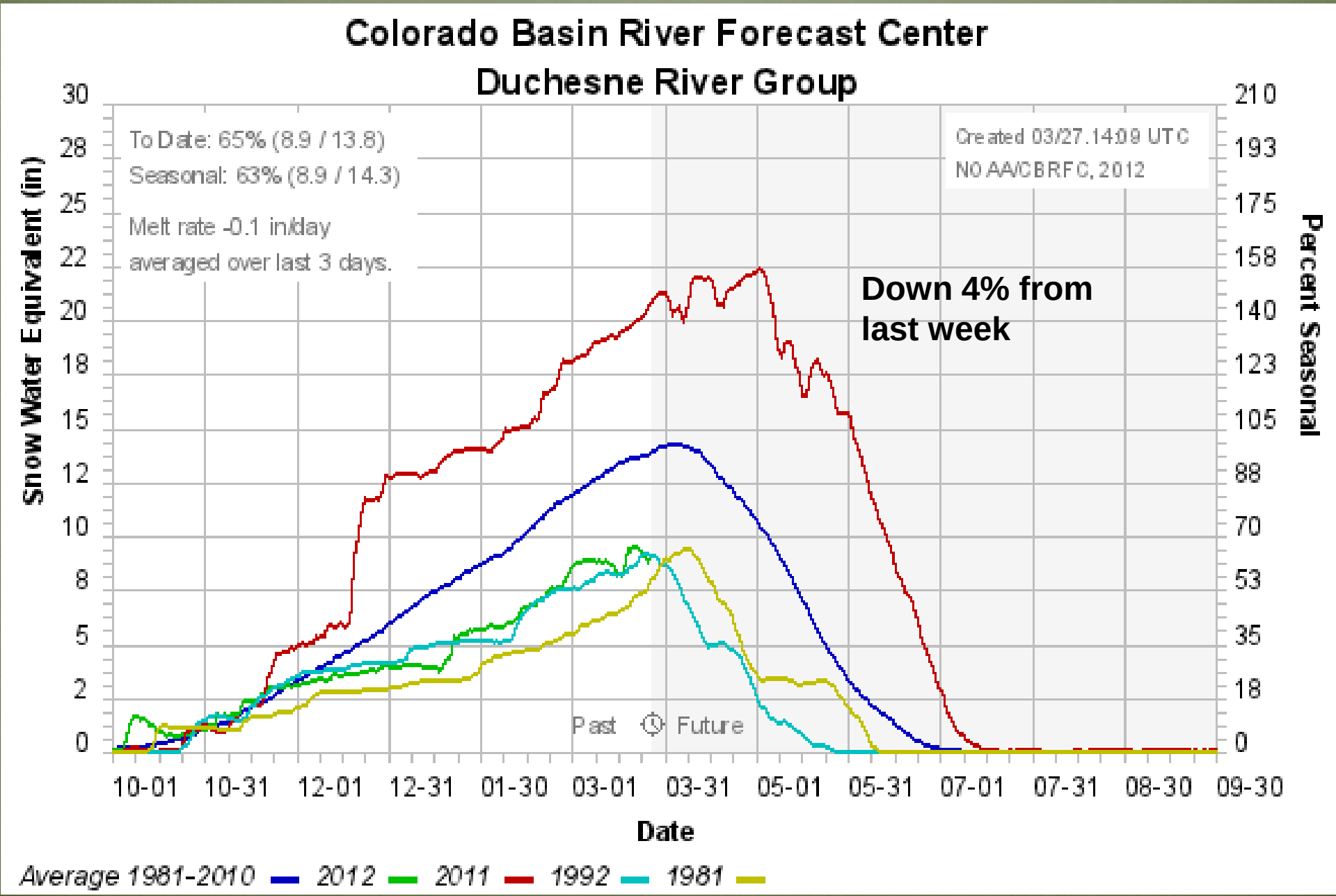
Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

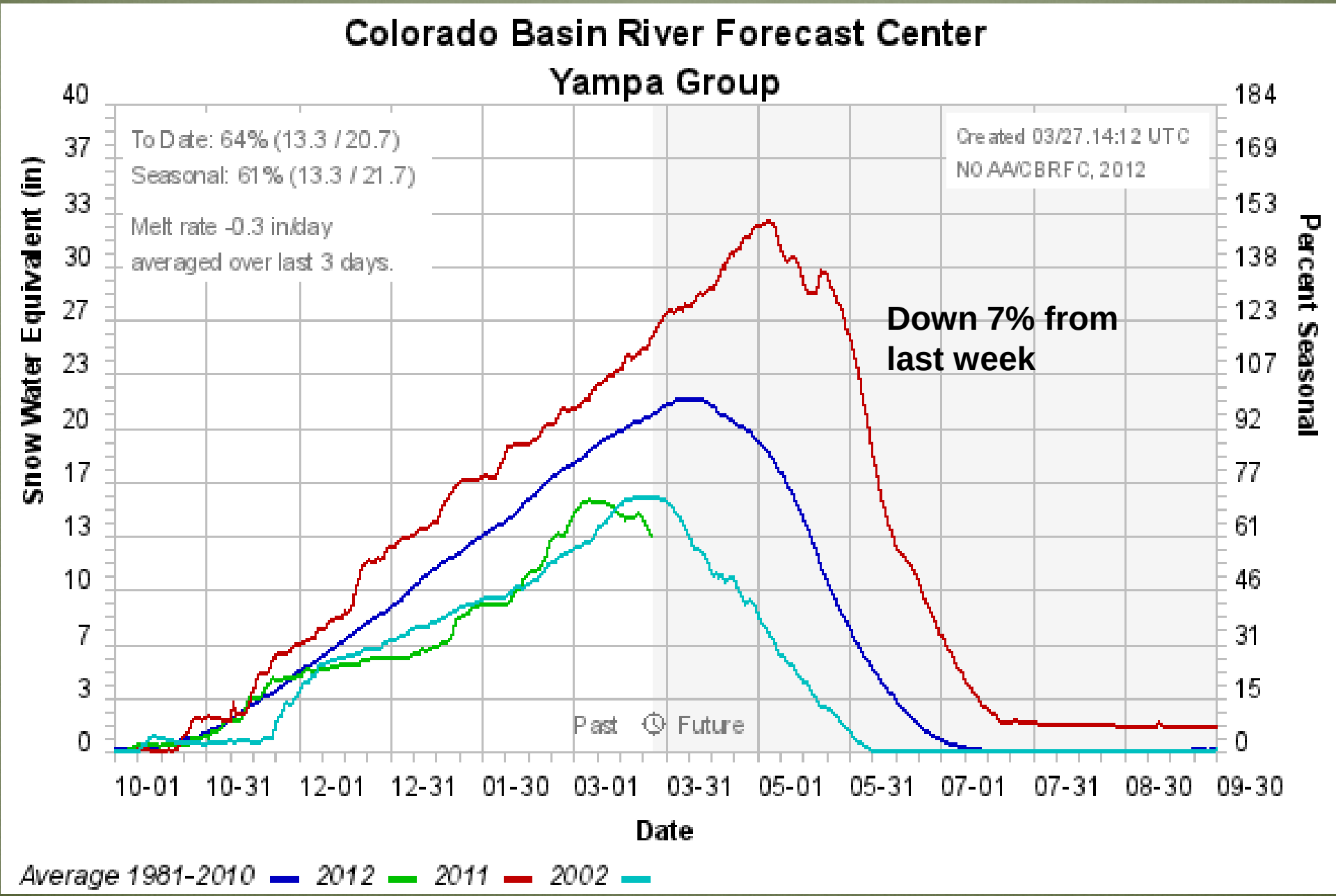


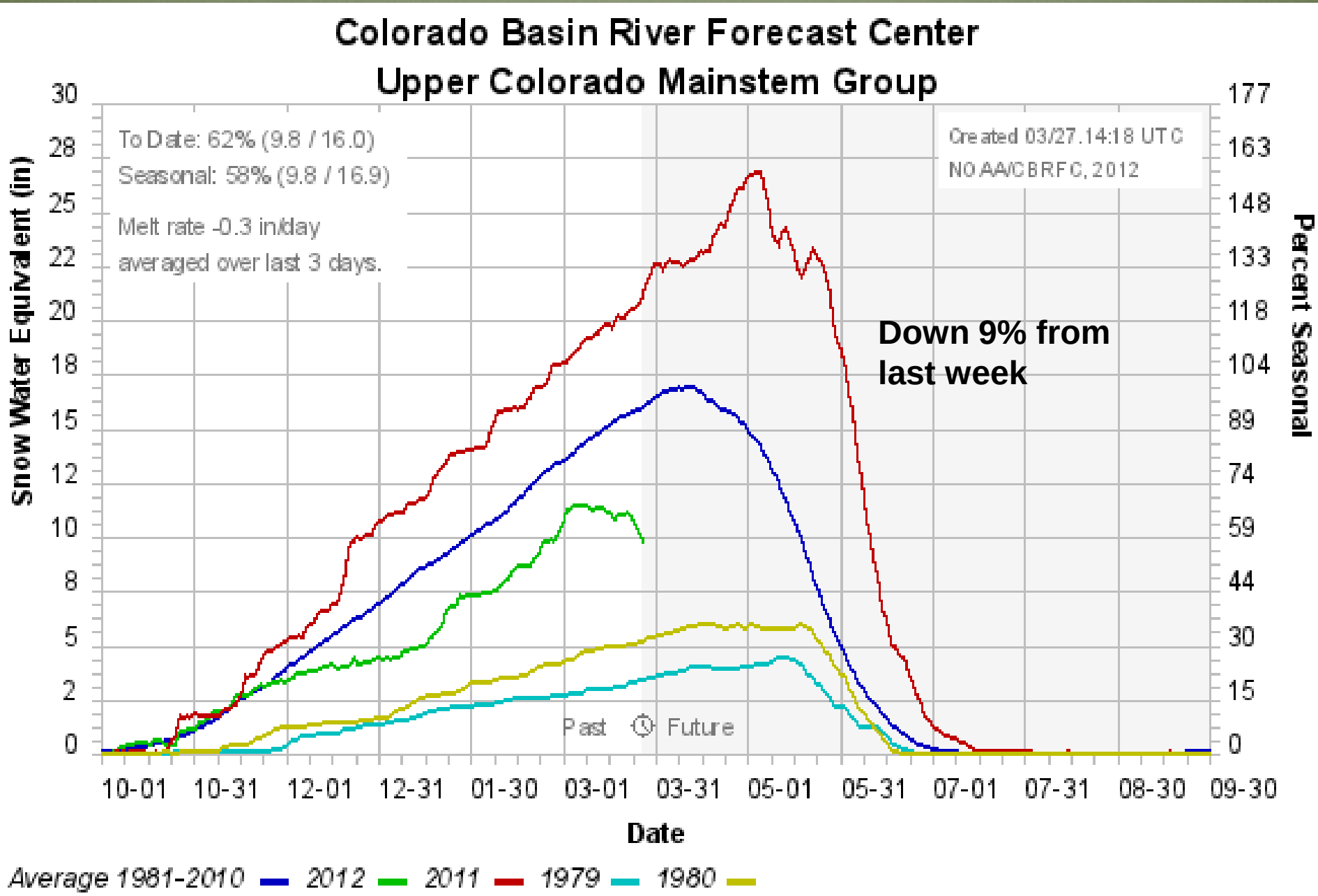
The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

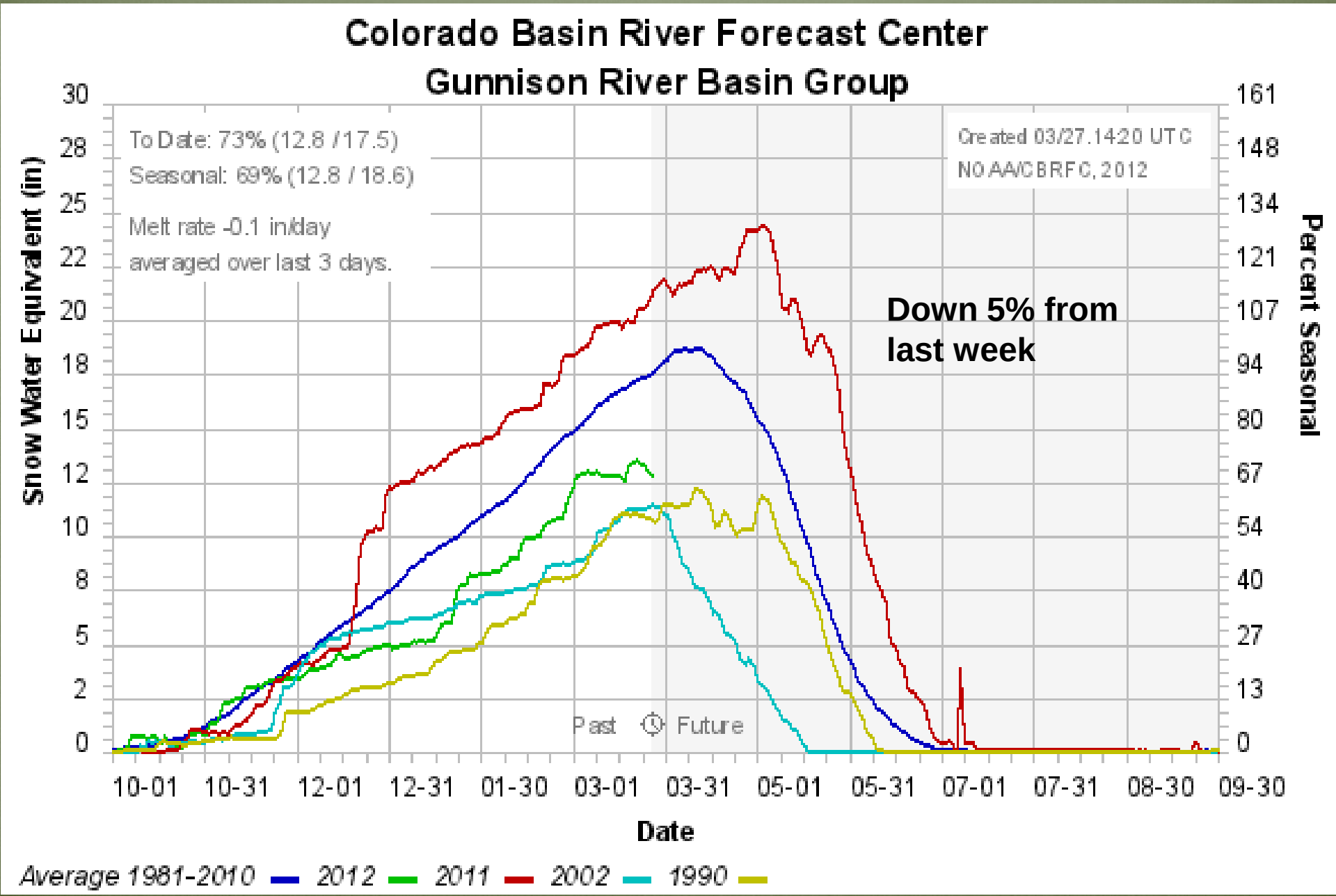
Prepared by the USDA/NRCS National Water and Climate Center
Portland, Oregon http://www.wcc.nrcs.usda.gov/gis/
Based on data from http://www.wcc.nrcs.usda.gov/reports/
Science contact: Jim.Marron@por.usda.gov 503 414 3047

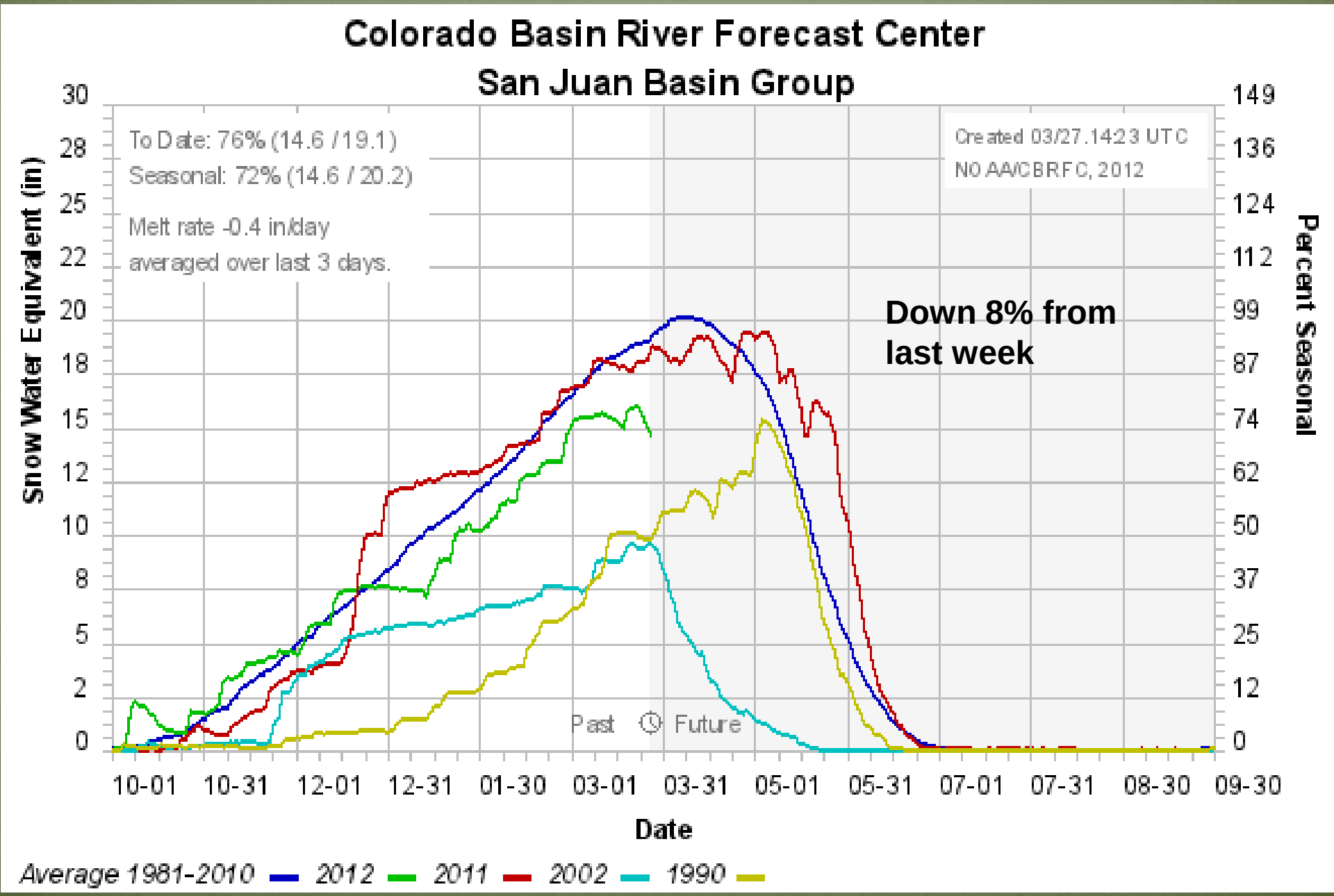

Colorado Basin River Forecast Center
Upper Green Group
To Date: 88% (12.0 / 13.7)
Seasonal: 84% (12.0 / 14.3)
Melt rate -0.1 in/day
averaged over last 3 days.
Created 03/27.1403 UTC
NOAA/CBRFC, 2012
Down 5% from last week
Past
Future
Snow Water Equivalent (in)
Percent Seasonal
Date
10-01
10-31
12-01
12-31
01-30
03-01
03-31
05-01
05-31
07-01
07-31
08-30
09-30
Average 1981-2010
2012
2011
1992
2007


Colorado Basin River Forecast Center
Duchesne River Group
To Date: 65% (8.9 / 13.8)
Seasonal: 63% (8.9 / 14.3)
Melt rate -0.1 in/day
averaged over last 3 days.
Created 03/27.1409 UTC
NOAA/CBRFC, 2012
Down 4% from last week
Past
Future
Snow Water Equivalent (in)
Percent Seasonal
Date
10-01
10-31
12-01
12-31
01-30
03-01
03-31
05-01
05-31
07-01
07-31
08-30
09-30
Average 1981-2010
2012
2011
1992
1981


Colorado Basin River Forecast Center
Yampa Group
To Date: 64% (13.3 / 20.7)
Seasonal: 61% (13.3 / 21.7)
Melt rate -0.3 in/day
averaged over last 3 days.
Created 03/27.14:12 UTC
NOAA/CBRFC, 2012
Down 7% from last week
Past
Future
Snow Water Equivalent (in)
Percent Seasonal
Date
40
37
33
30
27
23
20
17
13
10
7
3
0
184
169
153
138
123
107
92
77
61
46
31
15
0
10-01
10-31
12-01
12-31
01-30
03-01
03-31
05-01
05-31
07-01
07-31
08-30
09-30
Average 1981-2010
2012
2011
2002

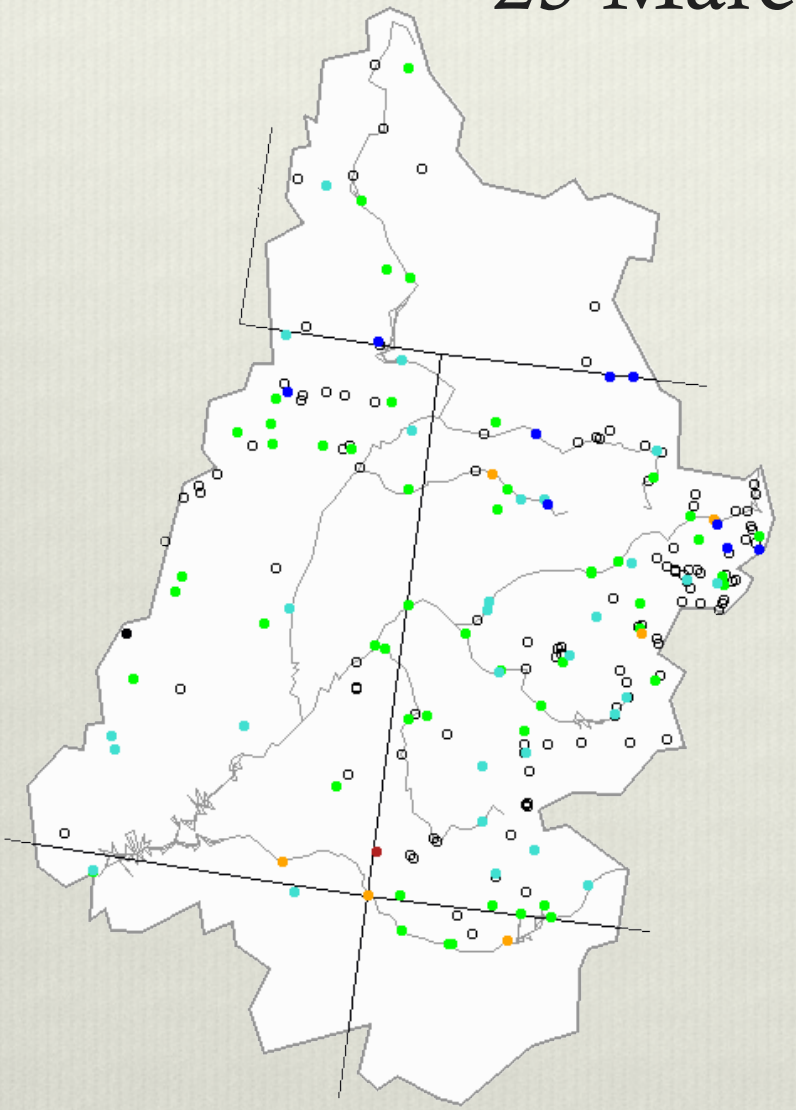

Colorado Basin River Forecast Center
Upper Colorado Mainstem Group
To Date: 62% (9.8 / 16.0)
Seasonal: 58% (9.8 / 16.9)
Melt rate -0.3 in/day
averaged over last 3 days.
Created 03/27.14:18 UTC
NOAA/CBRFC, 2012
Down 9% from last week
Past
Future
Snow Water Equivalent (in)
Percent Seasonal
Date
10-01
10-31
12-01
12-31
01-30
03-01
03-31
05-01
05-31
07-01
07-31
08-30
09-30
Average 1981-2010
2012
2011
1979
1980


Colorado Basin River Forecast Center
Gunnison River Basin Group
To Date: 73% (12.8 / 17.5)
Seasonal: 69% (12.8 / 18.6)
Melt rate -0.1 in/day
averaged over last 3 days.
Created 03/27.1420 UTC
NOAA/CBRFC, 2012
Down 5% from last week
Past
Future
Snow Water Equivalent (in)
Percent Seasonal
Date
10-01
10-31
12-01
12-31
01-30
03-01
03-31
05-01
05-31
07-01
07-31
08-30
09-30
Average 1981-2010
2012
2011
2002
1990


Colorado Basin River Forecast Center
San Juan Basin Group
To Date: 76% (14.6 / 19.1)
Seasonal: 72% (14.6 / 20.2)
Melt rate -0.4 in/day
averaged over last 3 days.
Created 03/27.1423 UTC
NOAA/CBRFC, 2012
Down 8% from last week
Past
Future
Snow Water Equivalent (in)
Percent Seasonal
Date
10-01
10-31
12-01
12-31
01-30
03-01
03-31
05-01
05-31
07-01
07-31
08-30
09-30
Average 1981-2010
2012
2011
2002
1990

Streamflow Update

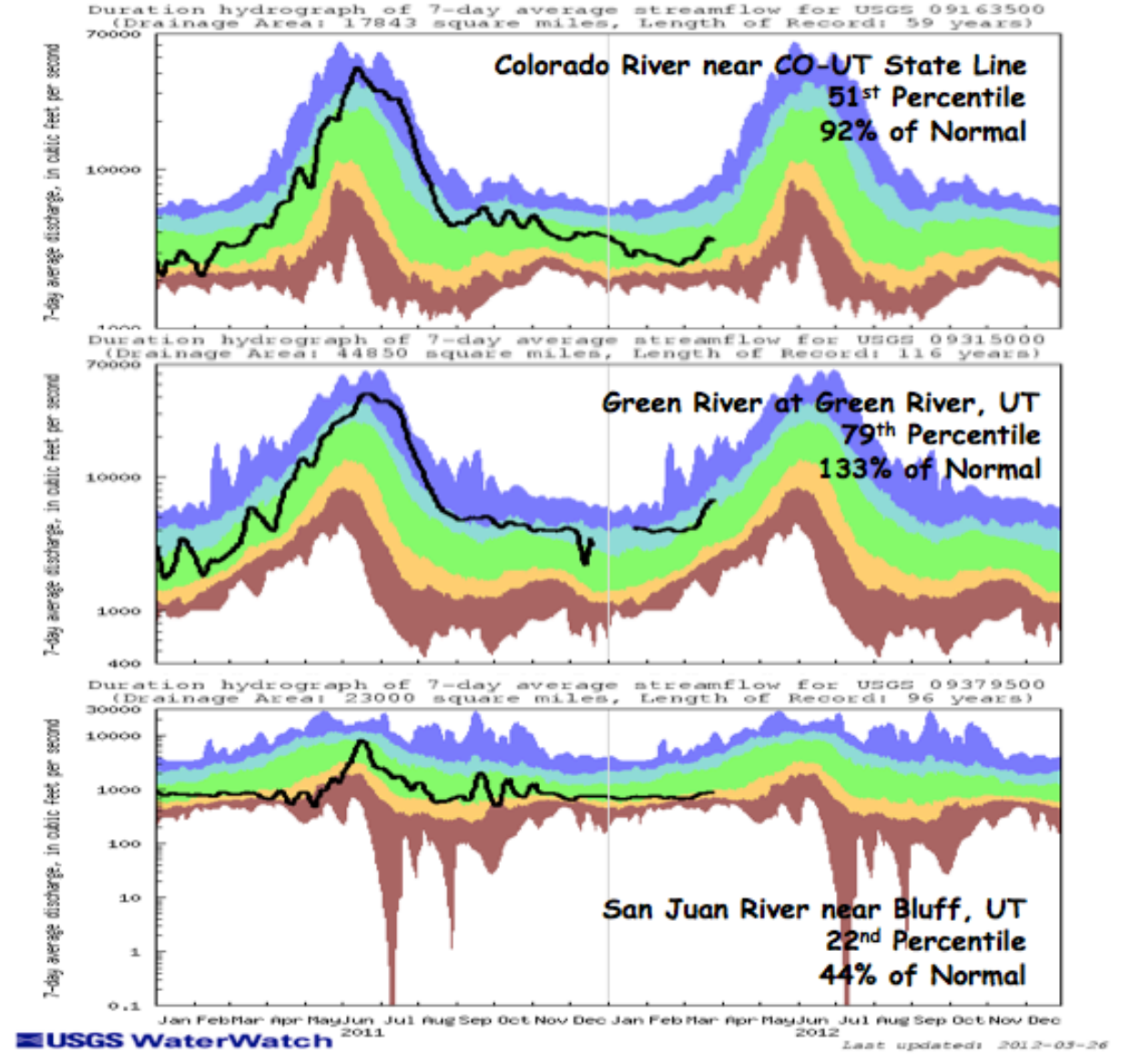
7-Day Average Streamflow
25 March 2012



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		

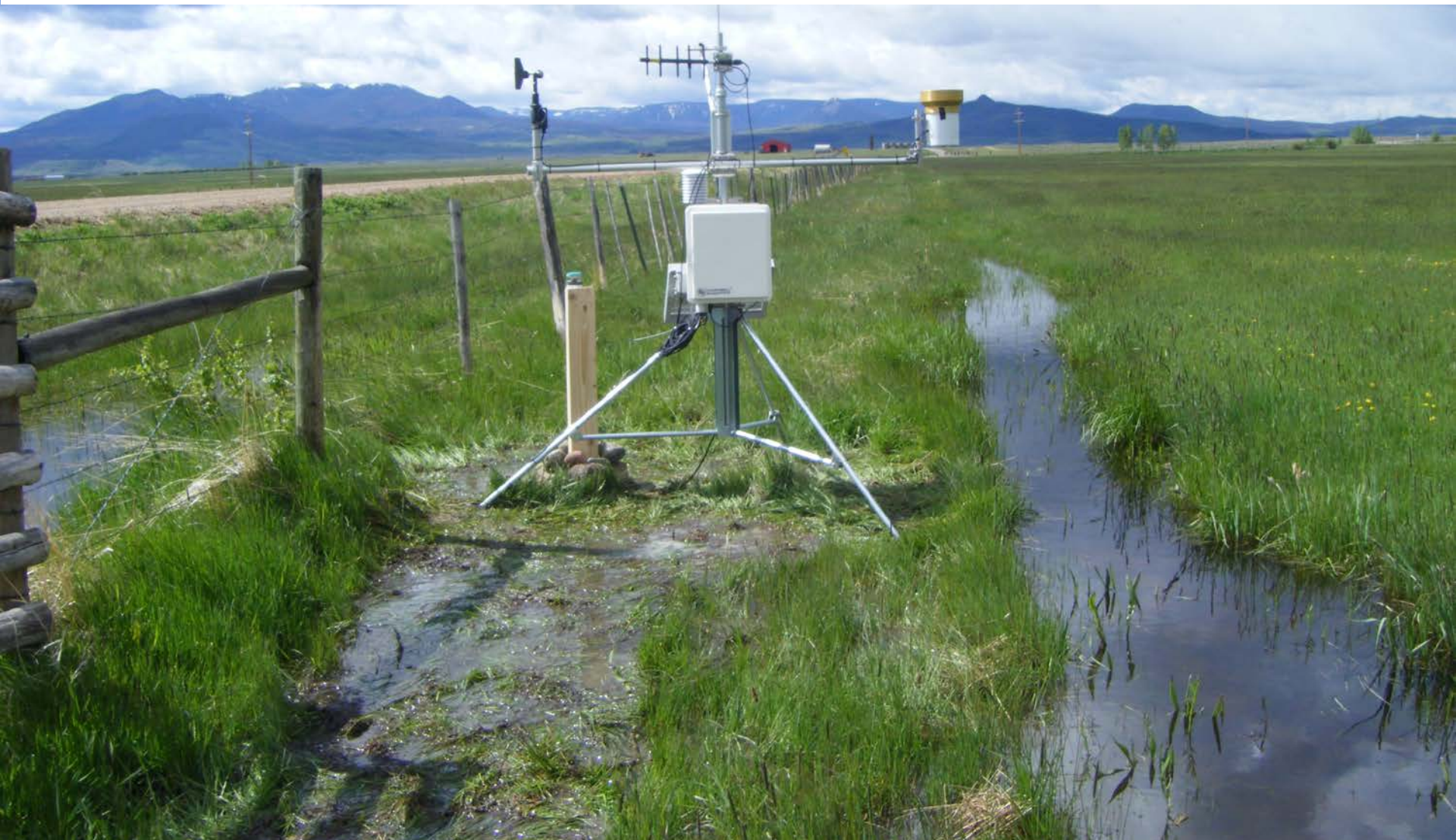
USGS

7-Day Average Hydrographs
25 March 2012

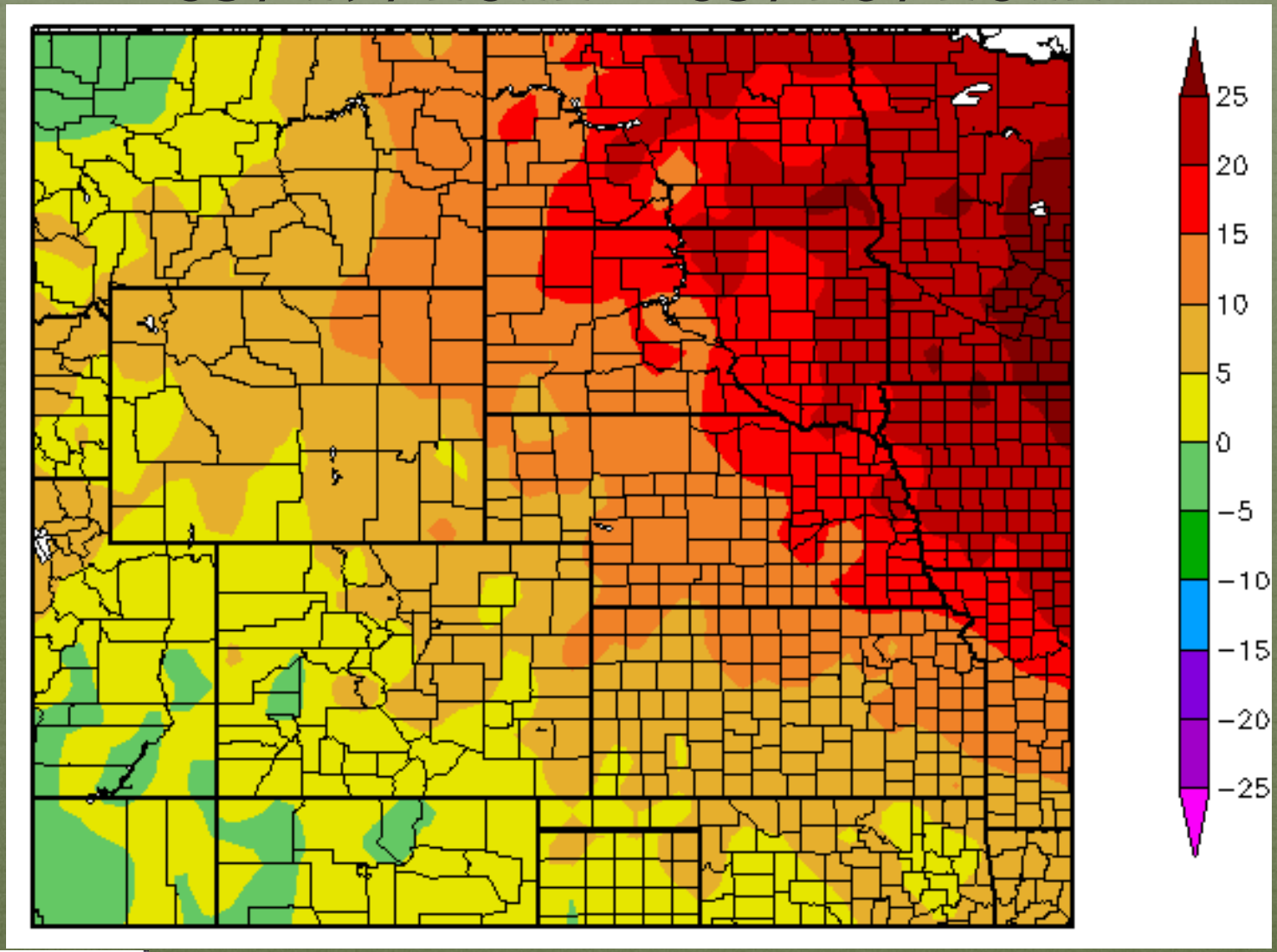


Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

Water Demand

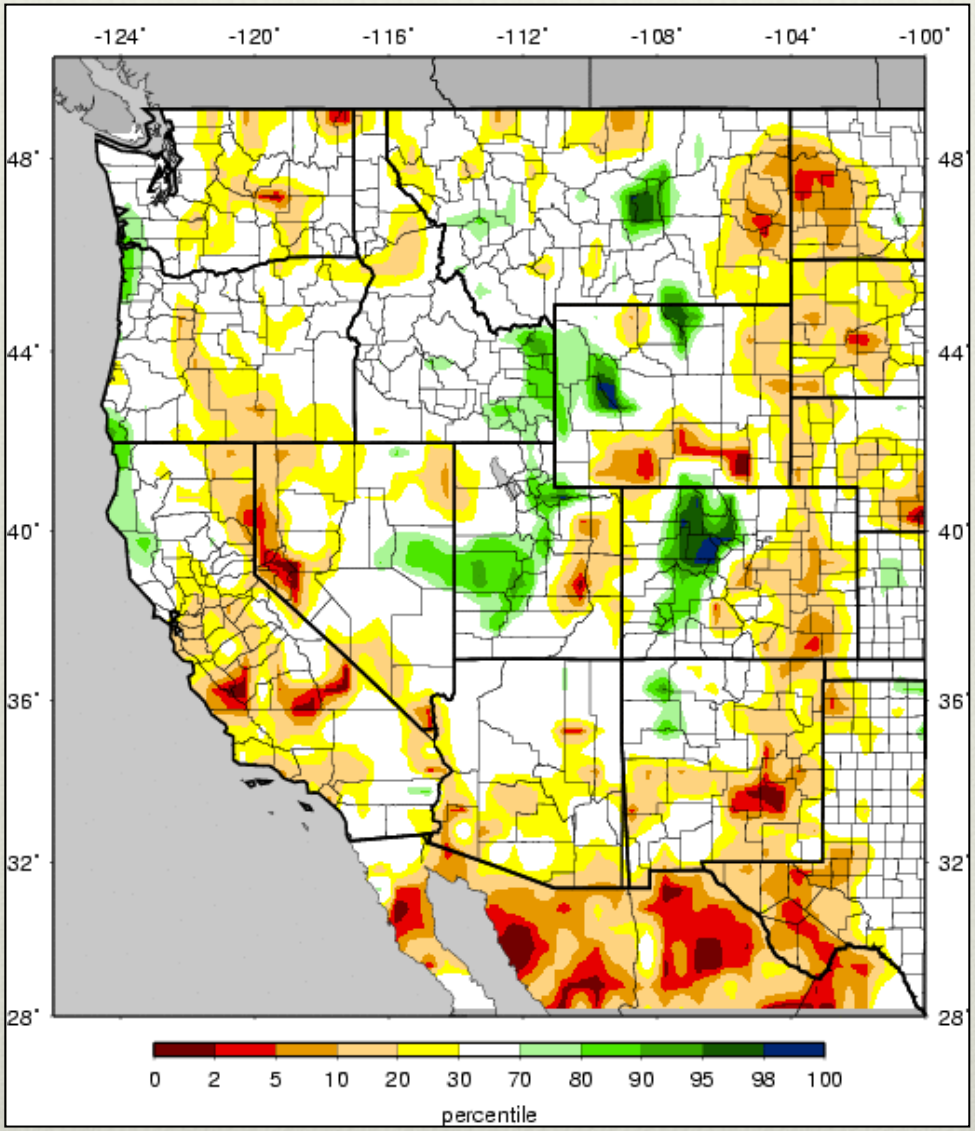


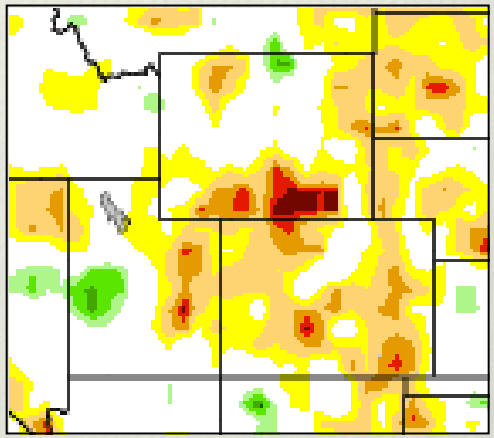
Temperature Departure from Normal
03/19/2012 – 03/25/2012



High Plains Regional Climate Center

VIC Soil Moisture
25 March 2012

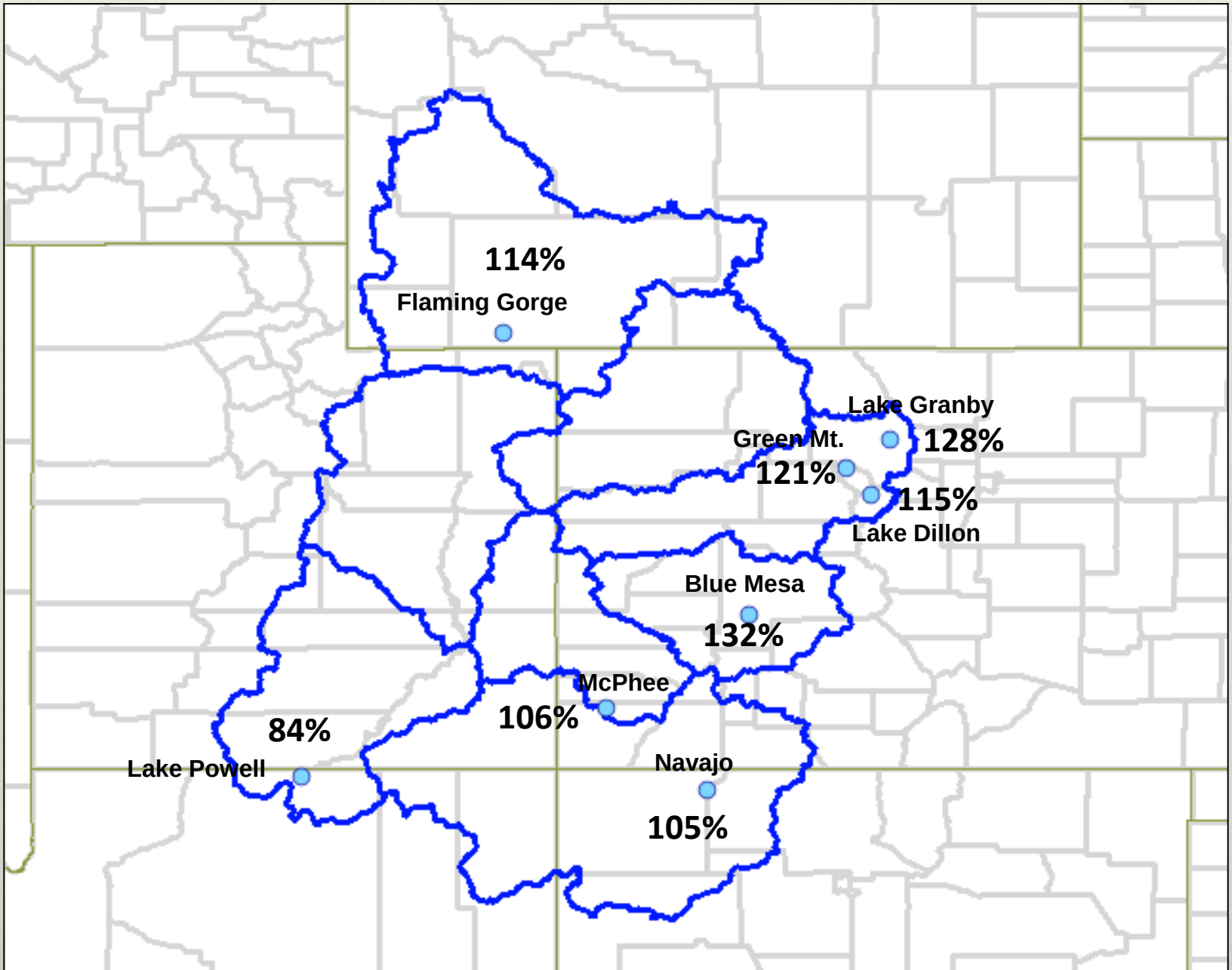




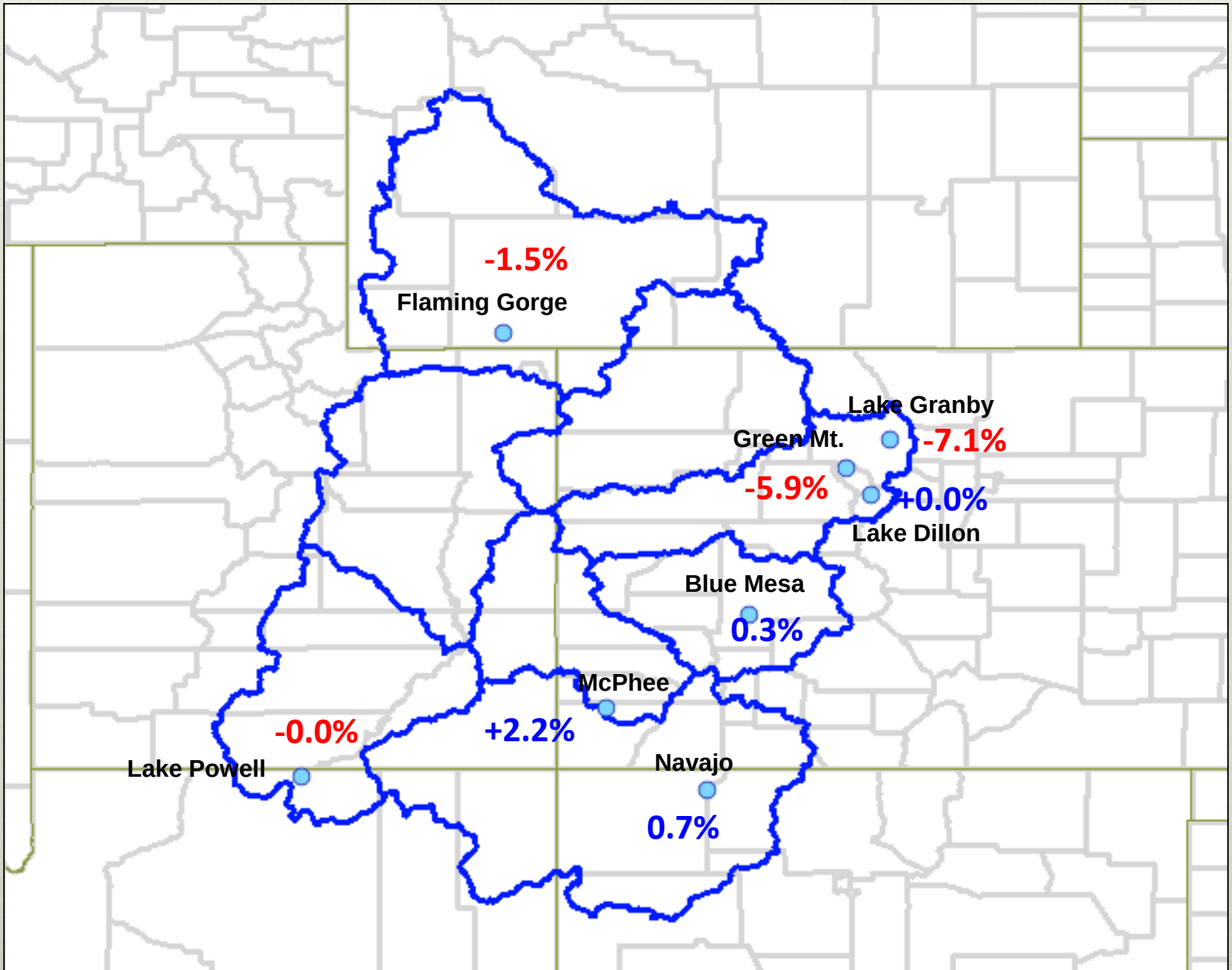
SWE + SOIL MOISTURE = TOTAL MOISTURE STORAGE

Reservoir Update

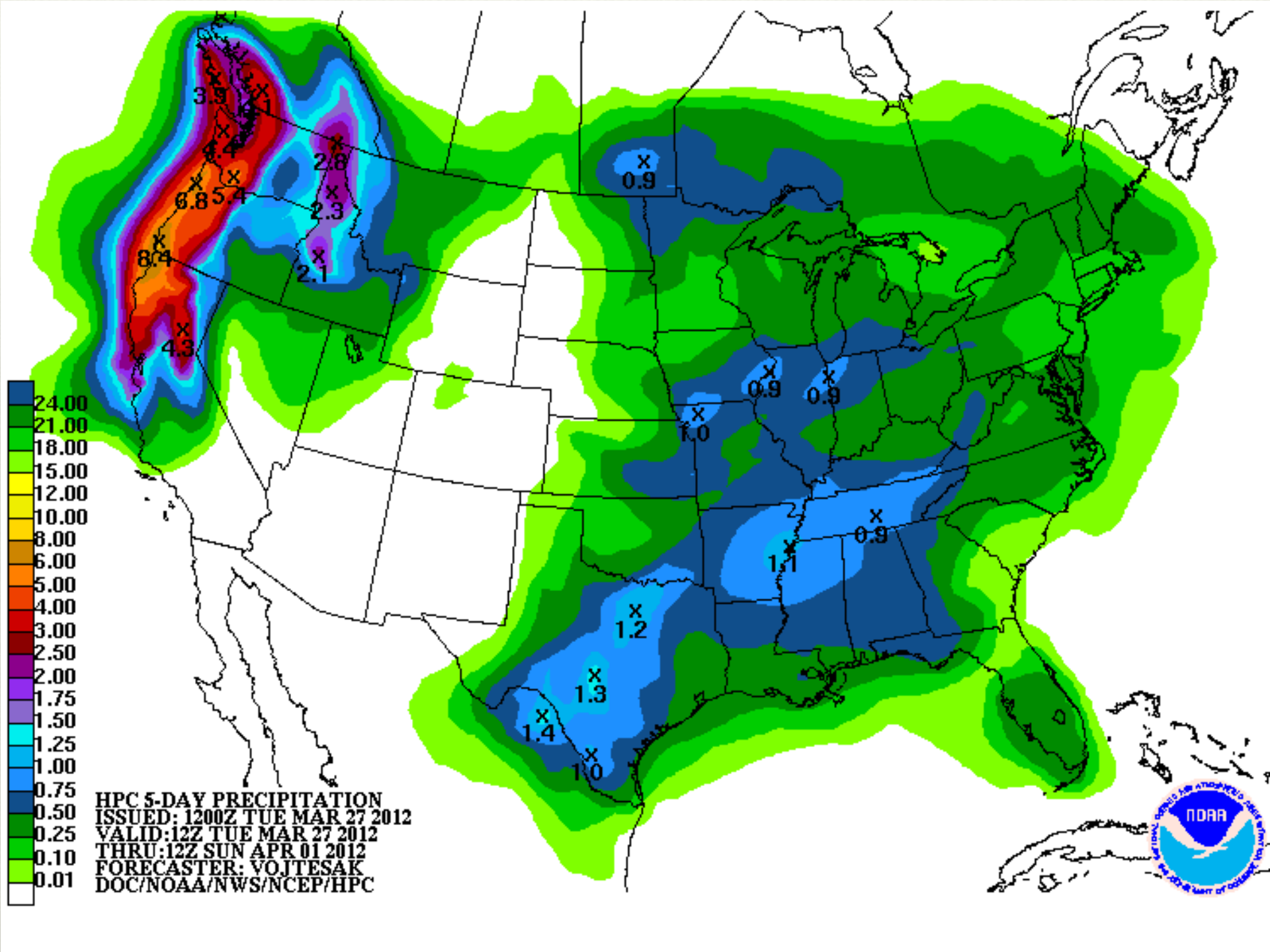
March Average Reservoir Storage Volume



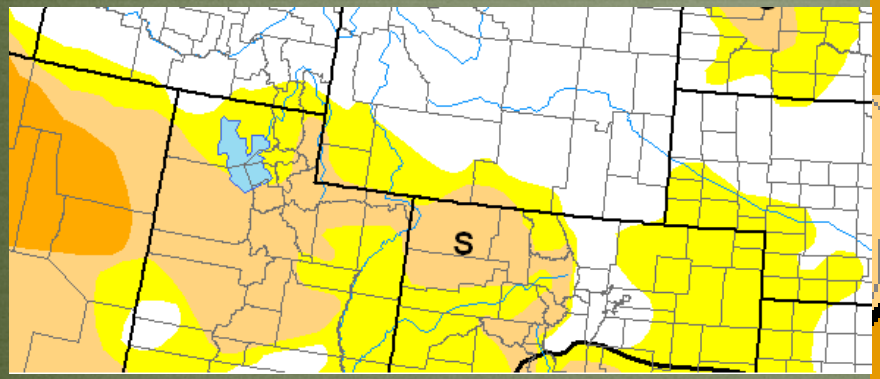
March Reservoir Storage Volume Change

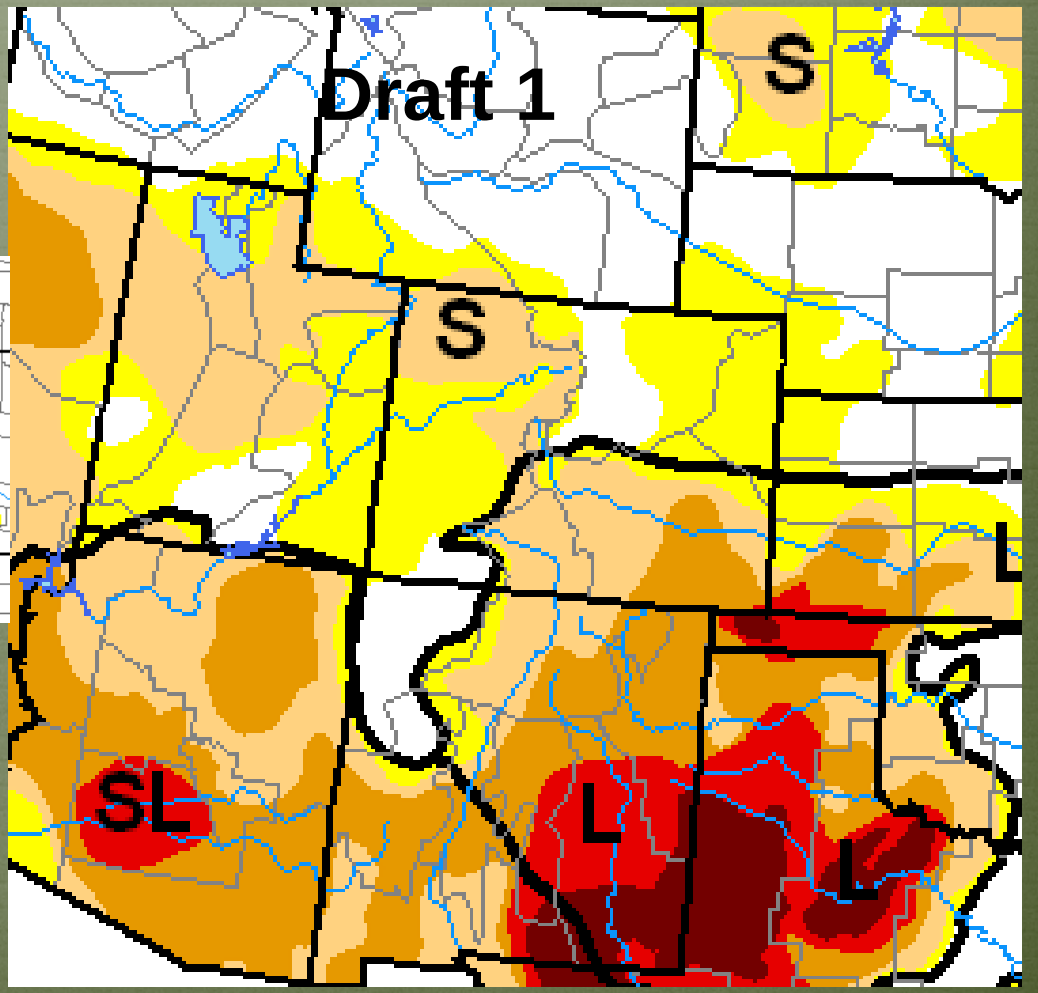


Precipitation Forecast


24.00
21.00
18.00
15.00
12.00
10.00
8.00
6.00
5.00
4.00
3.00
2.50
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.10
0.01
HPC 5-DAY PRECIPITATION
ISSUED: 1200Z TUE MAR 27 2012
VALID:12Z TUE MAR 27 2012
THRU:12Z SUN APR 01 2012
FORECASTER: VOJTESAK
DOC/NOAA/NWS/NCEP/HPC
3.9
4.4
6.8
5.4
2.8
2.3
2.1
8.4
4.3
0.9
0.9
0.9
1.0
0.9
1.1
1.2
1.3
1.4
1.0
NOAA

Recommendations





INFO

For more information

NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

March 27, 2012

Precipitation and Snowpack

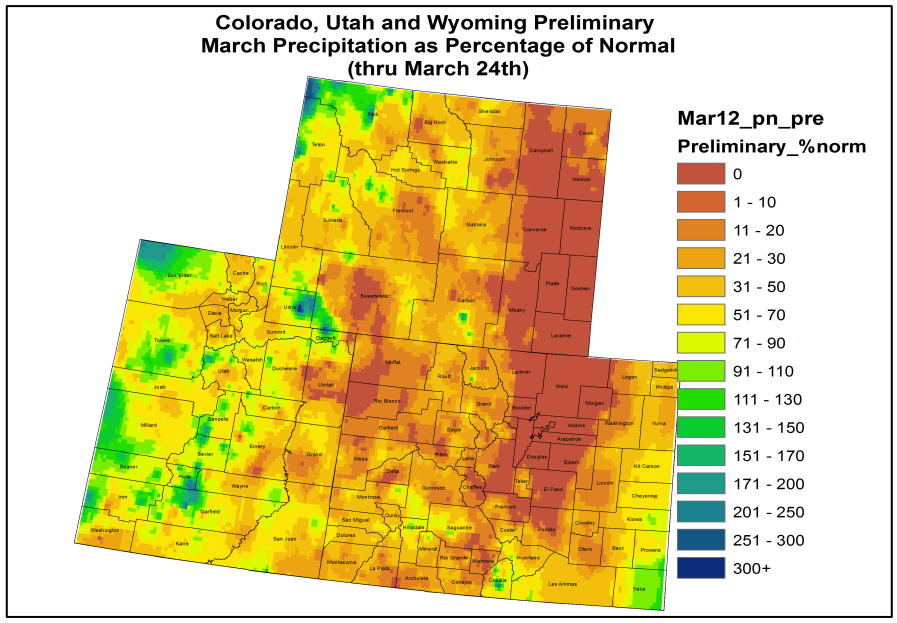


Fig. 1: March month-to-date precipitation as a percent of average.

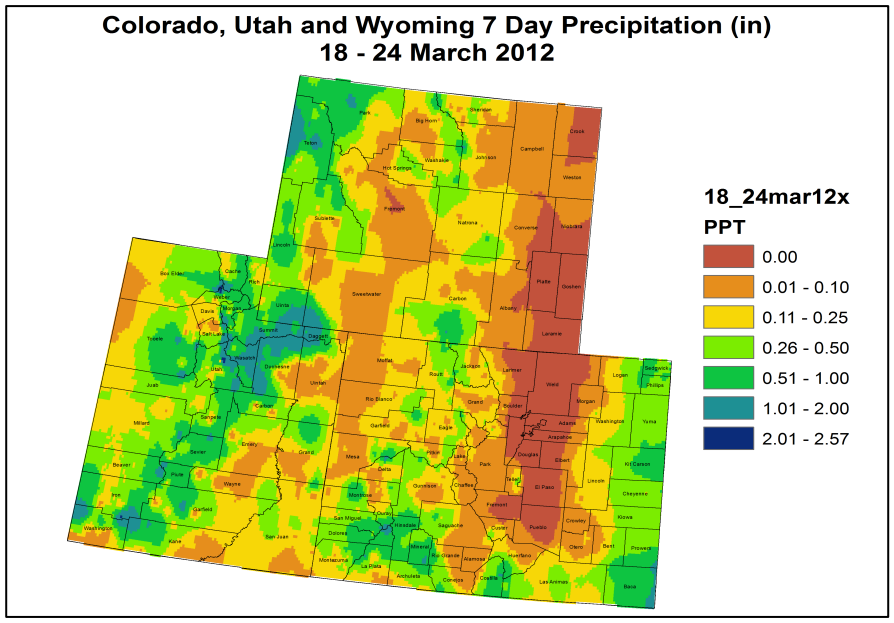


Fig. 2: March 18 – 24 precipitation in inches.

For the month of March so far, most of the Upper Colorado River Basin (UCRB) has been drier than average (Fig. 1). Some spotty higher elevation locations in southwest Wyoming and northeast Utah have received near to above average precipitation since the beginning of 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. East of the basin, most of the CO Front Range has experienced an extremely dry March with the far eastern plains faring slightly better and receiving between 50% and 100% of average precipitation.

Last week, the heaviest precipitation was concentrated over northeast UT, with the Uintahs and Wasatch mountains seeing accumulations ranging from half an inch to over 2 inches (Fig. 2). The San Juans and eastern CO also received between a quarter inch to an inch last week. The rest of the UCRB was drier, mostly seeing between .01 to .25 inches, and the CO Front Range received no precipitation for the week.

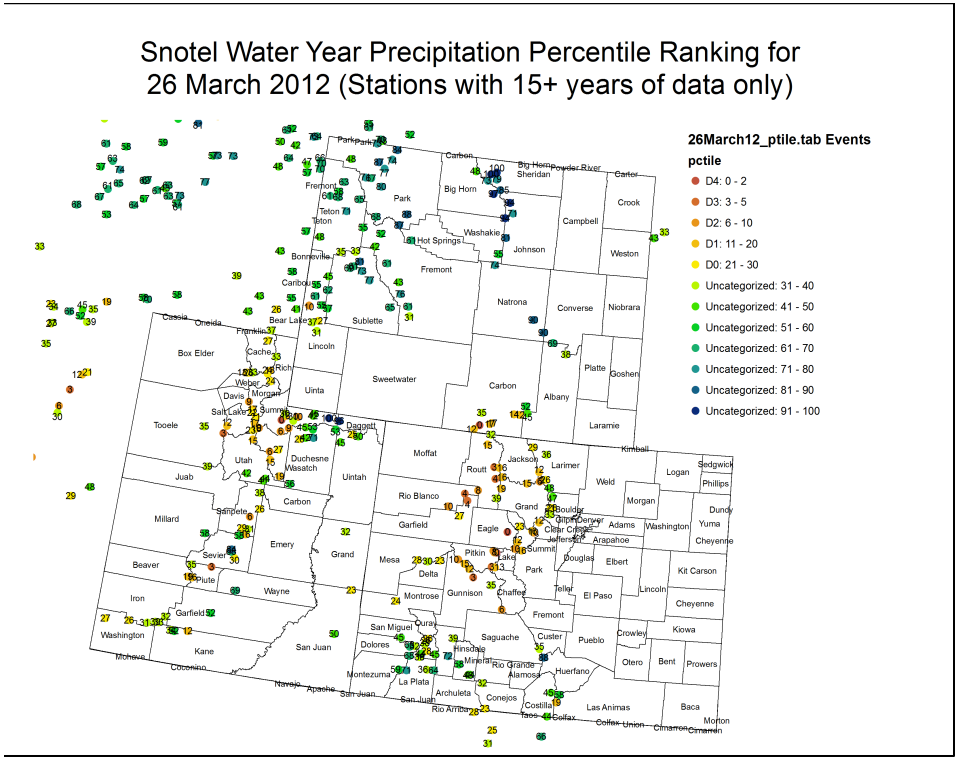


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21 – 30% is Drought Monitor D0 category).

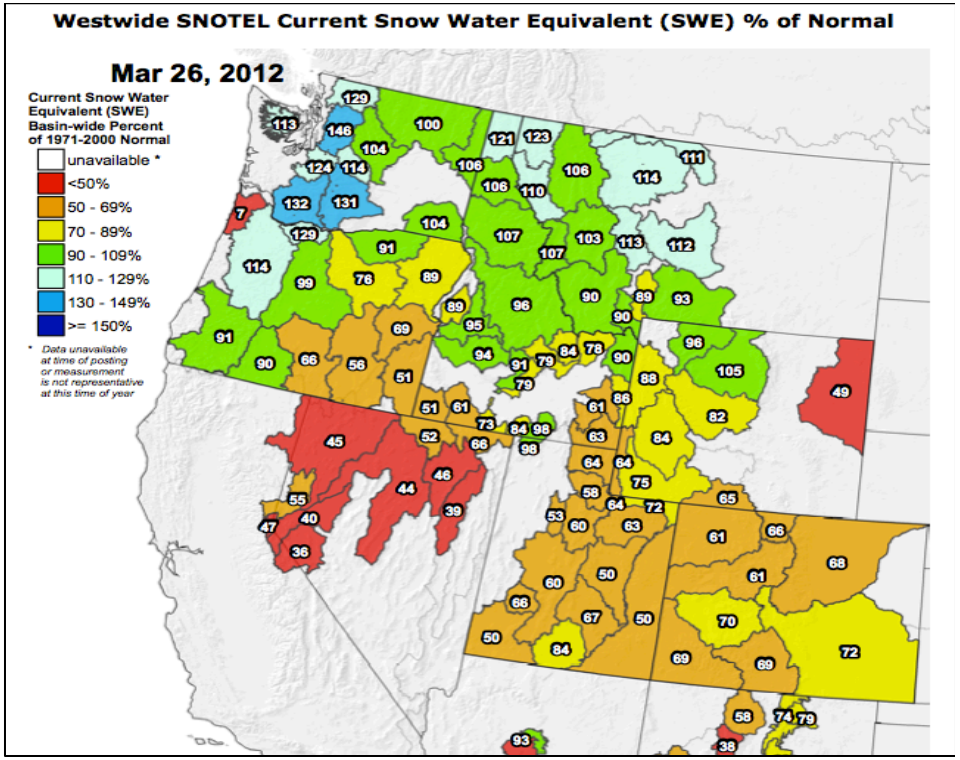


Fig. 4: Basin snow water equivalent (SWE) as a percent of average.

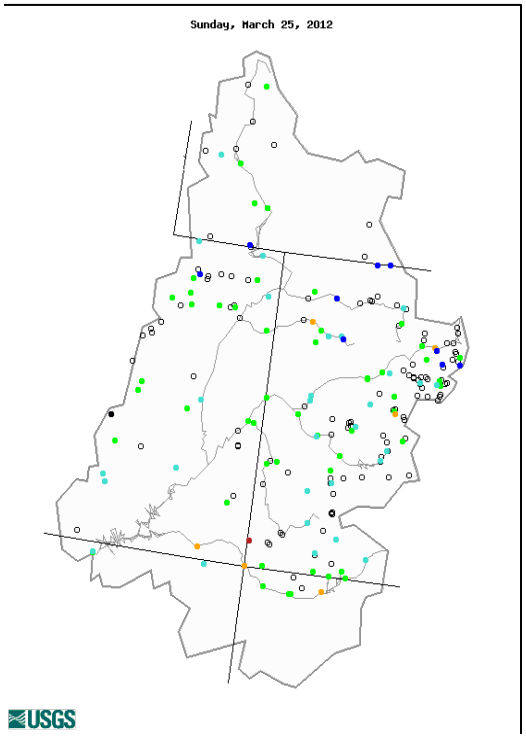
Water-year-to-date (WYTD), SNOTEL precipitation percentiles are lowest for the Yampa basin in northwest CO, with percentiles ranging from single digits to around the 20th percentile (Fig. 3). The Colorado and Gunnison basins in CO and the Wasatch range in UT are also fairly dry, with many SNOTEL sites showing percentiles in the teens. SNOTEL percentiles in the Upper Green basin in WY are generally above the 50th percentile, and most in the San Juan basin in southern CO are also near or above the 50th percentile.

Snowpack conditions around the UCRB are all well below normal as a combined result of lower snowpack accumulations than normal and earlier melting than normal (Fig. 4). Most of the sub-basins in eastern UT and western CO are less than 70% of average, with the most eastern part of UT (following the Colorado River Valley and leading to Lake Powell) showing around 50% of average. The northern-most part of the UCRB in southwest WY is still currently showing sub-basin averages between 75% and 85%.

Streamflow

As of March 25th, 93% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows (Fig. 5). About 40% of the gages in the basin are recording above normal flows, while about 7% of the gages in the basin are recording below normal flows. The number of reporting gages in the basin has increased by 30 since the beginning of the month, indicating warmer temperatures causing some early season melting. There are currently 6 gages recording below normal flows, and most of those are located in the San Juan basin.

Key gages throughout the basin have all shown an increase in streamflow over the past couple of weeks (Fig. 6). Flows on the Colorado River near the CO-UT state line are currently recording in the near normal range at the 51st percentile. The San Juan River near Bluff, UT is recording below normal flows at the 22nd percentile. The Green River near Green River, UT is again recording flows in the above normal range, at the 79th percentile.



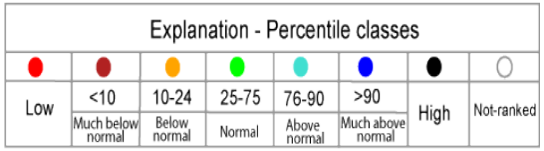


Fig. 5: 7-day average discharge compared to historical discharge for March 25th.

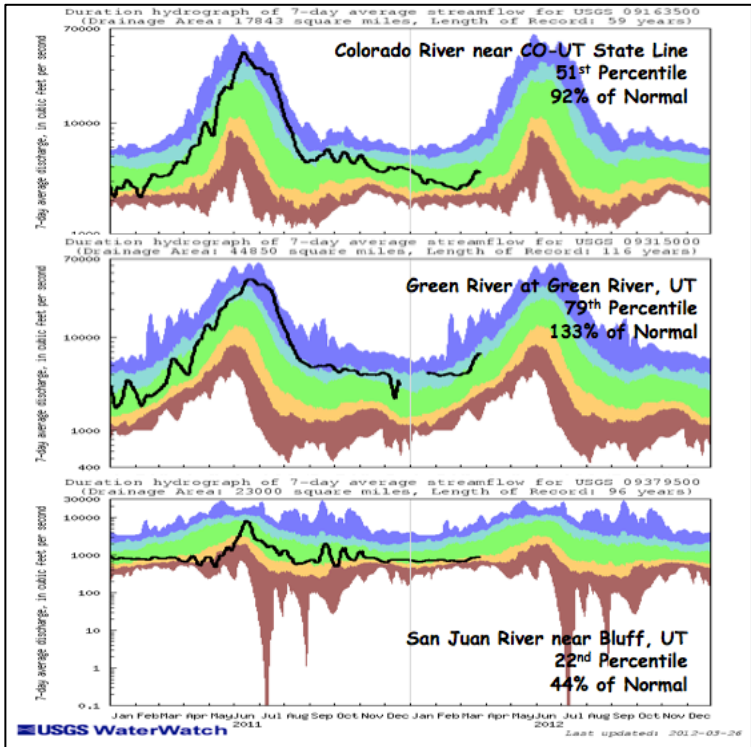


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

All of the UCRB and the rest of CO continued to experience warmer than average temperatures last week, with most of the basin seeing temperatures slightly above to 5 degrees above average and eastern CO experiencing temperatures 5 to 10 degrees above average. 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). 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 March storage averages. Dillon, Blue Mesa, McPhee, and Navajo have all begun to slightly increase in levels. Granby, Green Mountain, and Flaming Gorge continue to show storage decreases, which is normal for this time of year. Lake Powell shows about steady volumes since the beginning of the month and is currently at 84% of average and 63% of capacity (compared to 53% one year ago).

Precipitation Forecast

A high pressure system will again dominate for most of the week over the UCRB. A small disturbance is expected to move across the region on Thursday, however it is weak and has little moisture associated with it, so expect scattered shower accumulations to be light. Otherwise, above average temperatures and little to no precipitation are expected for most of the region up to the weekend. A Pacific storm is forecast to pass over the basin on Sunday and into Monday, and this system could have more moisture. However, the models are in disagreement regarding the timing, placement, and intensity of this storm. So, it is a possibility that some beneficial precipitation will fall with the passage of this system, but there is still uncertainty about what regions of the basin will benefit from it and how much.

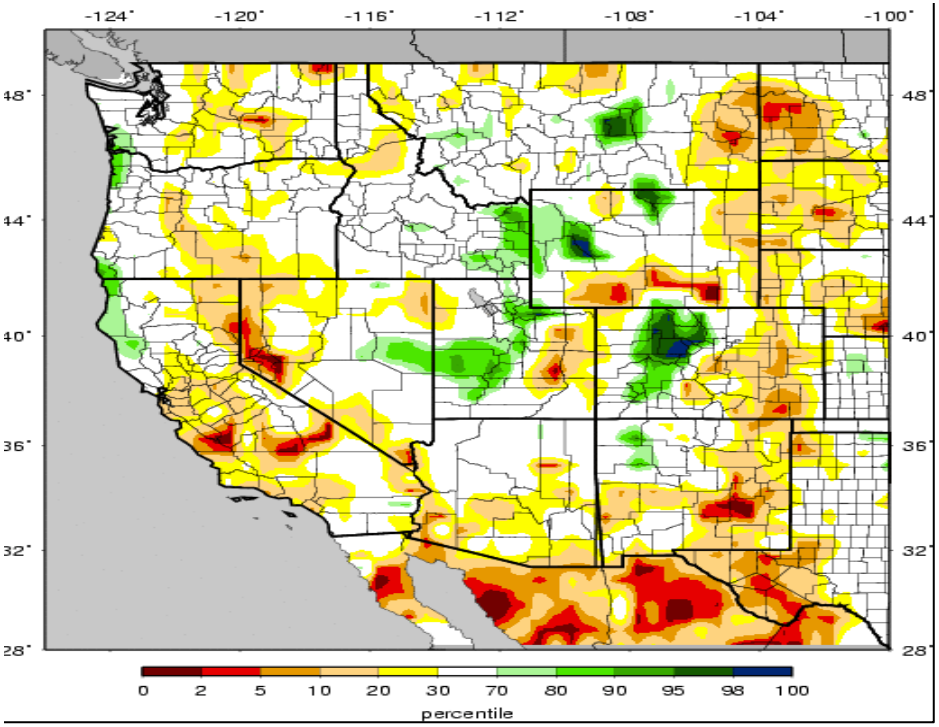


Fig. 7: VIC soil moisture percentiles as of March 25th, with total moisture storage (SWE and soil moisture) below.

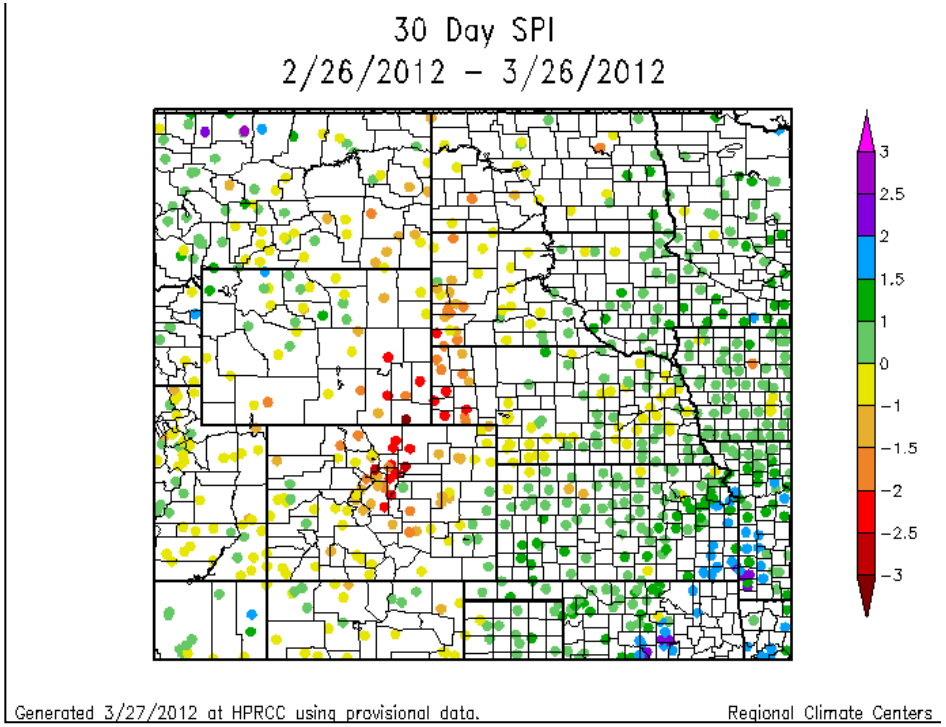
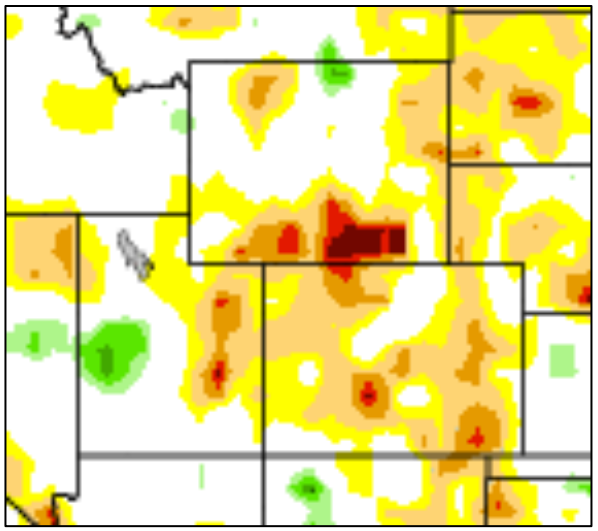
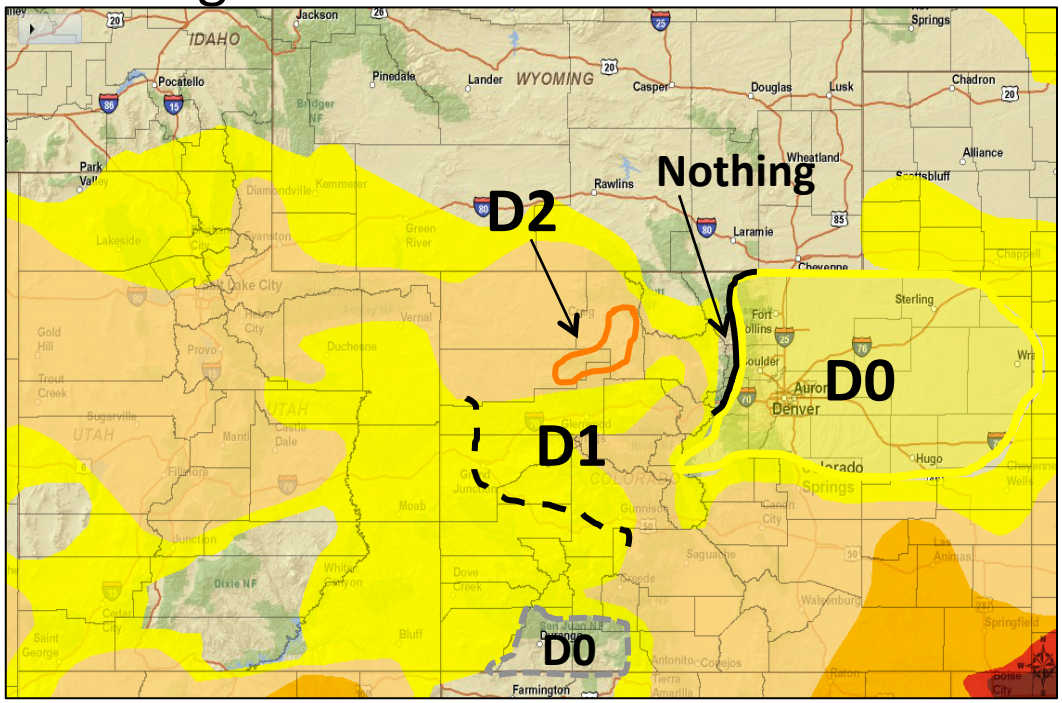
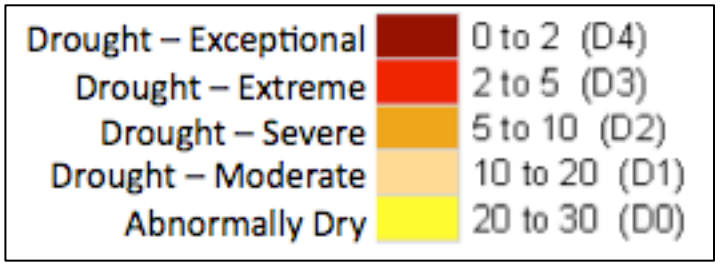


Fig. 8: 30-day standardized precipitation index (SPI) where a -1.0 SPI is equivalent to the 16th percentile (D1).



Drought and Water Discussion





Drought categories and their associated percentiles

Fig. 9: March 20th release of U.S. Drought Monitor for the UCRB.

The current U.S. Drought Monitor (USDM) author has already updated the current map depiction to include the changes recommended from last week. Further D0 expansion to cover more of the CO Front Range is recommended (Fig. 9, solid black line). This area has experienced above average temperatures, high winds, and elevated fire dangers; also 30-day SPIs in Larimer, Boulder, and Jefferson counties are currently less than -2 (Fig. 8). Status quo is recommended for southeast CO.

In the UCRB, a D1 expansion is recommended for the Colorado River valley and for much of the Gunnison basin (Fig. 9, dashed black line) to better represent the very dry conditions (including recent dust events) observed on the ground there. Also, a D2 introduction is recommended around Routt County, where SNOTEL precipitation percentiles are less than 10 (Fig. 9, orange shape outline). In the southern part of the basin, the San Juans have received more, but are still relatively dry, so a "filling in" of the D0 around there is recommended (Fig. 9, dashed grey line).