Spring 2012

Weekly Climate, Water & Drought Assessment

Today's Agenda

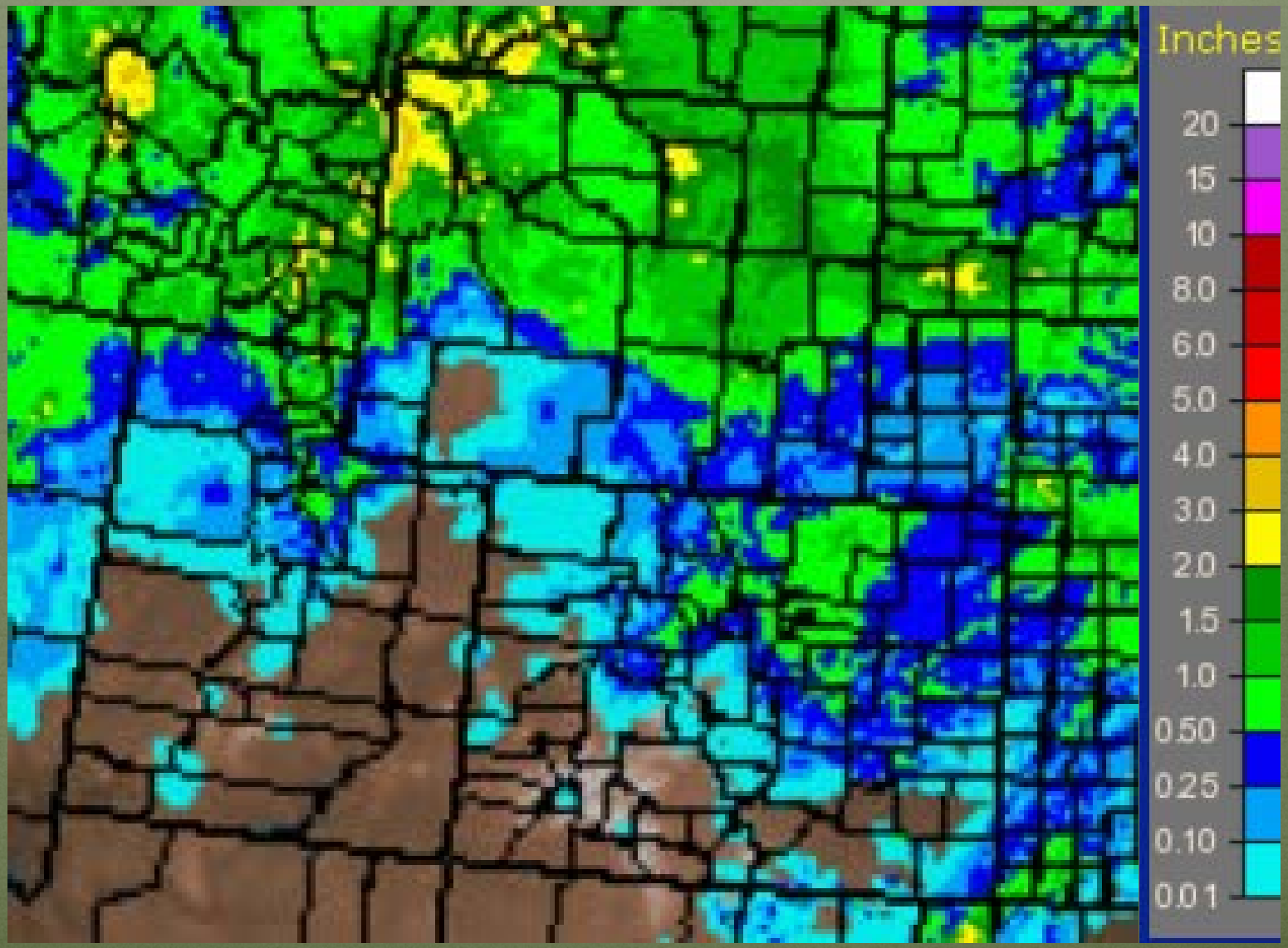
-Assessment of current water conditions

- Precipitation Forecast

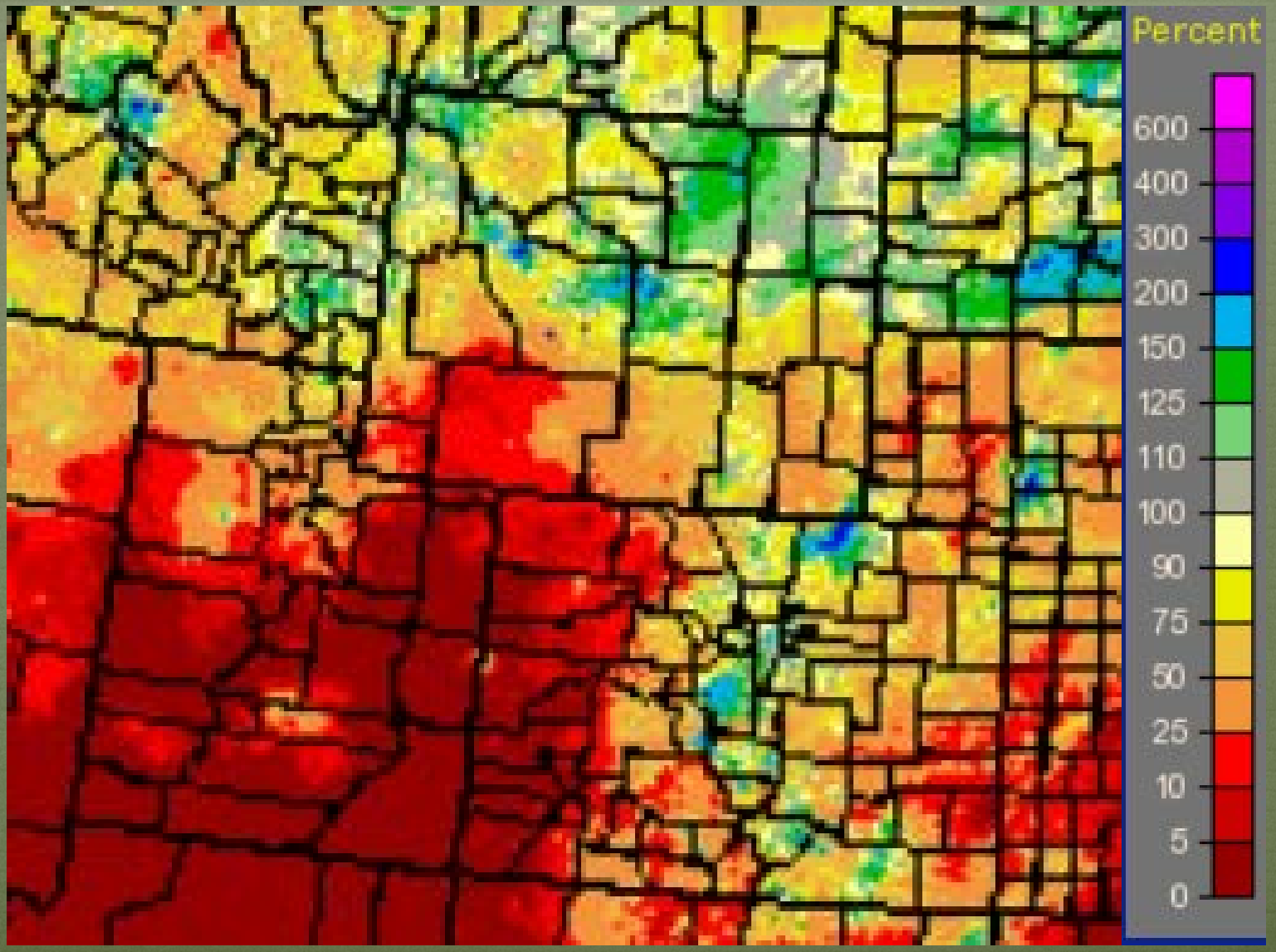
- Recommendations for Drought Monitor

Precipitation/Snowpack Update

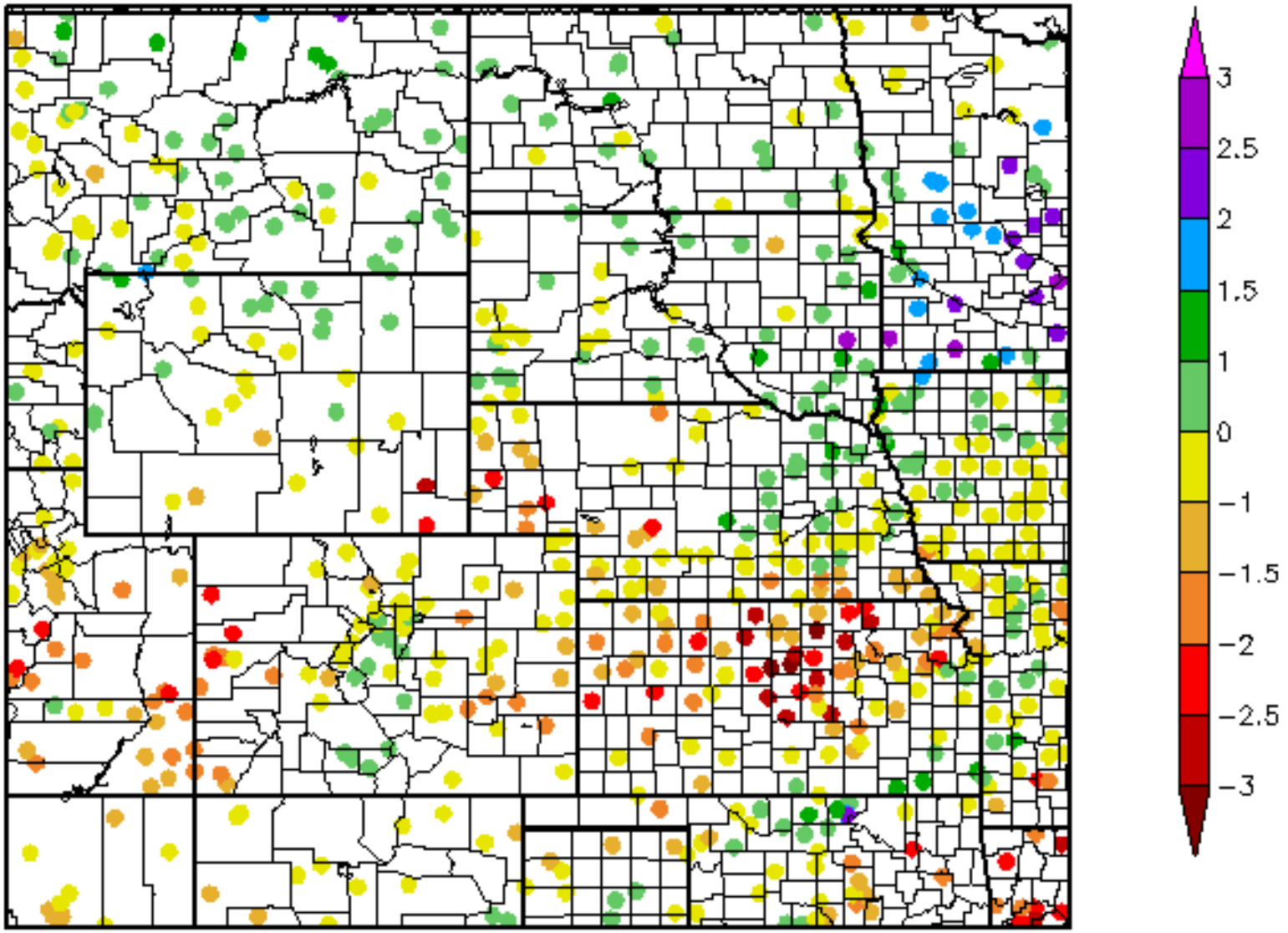
AHPS 7 Day Precipitation: 5/22-5/28



AHPS May to Date Percent of Normal



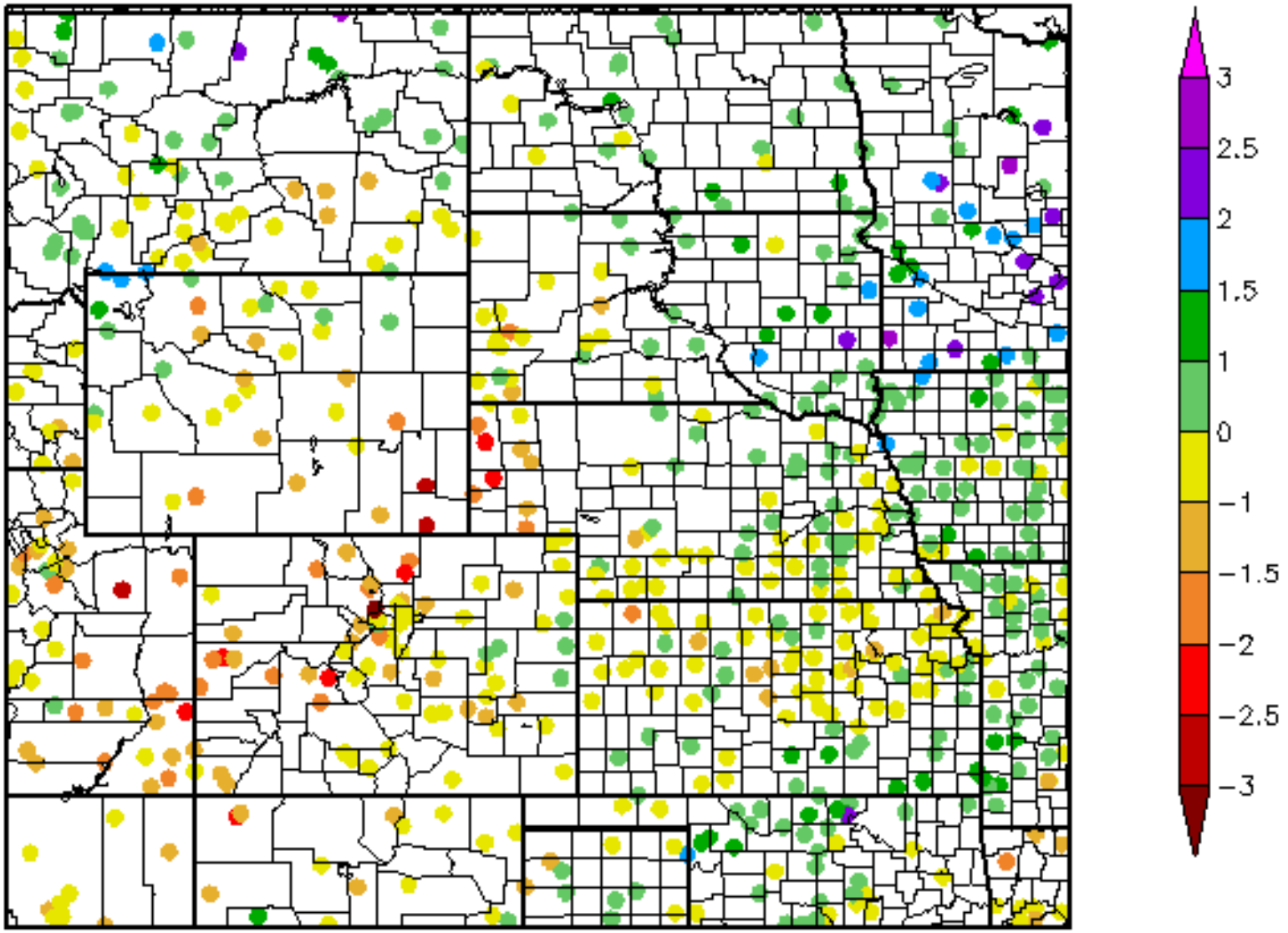
30 Day SPI
4/29/2012 – 5/28/2012



Generated 5/29/2012 at HPRCC using provisional data.

Regional Climate Centers

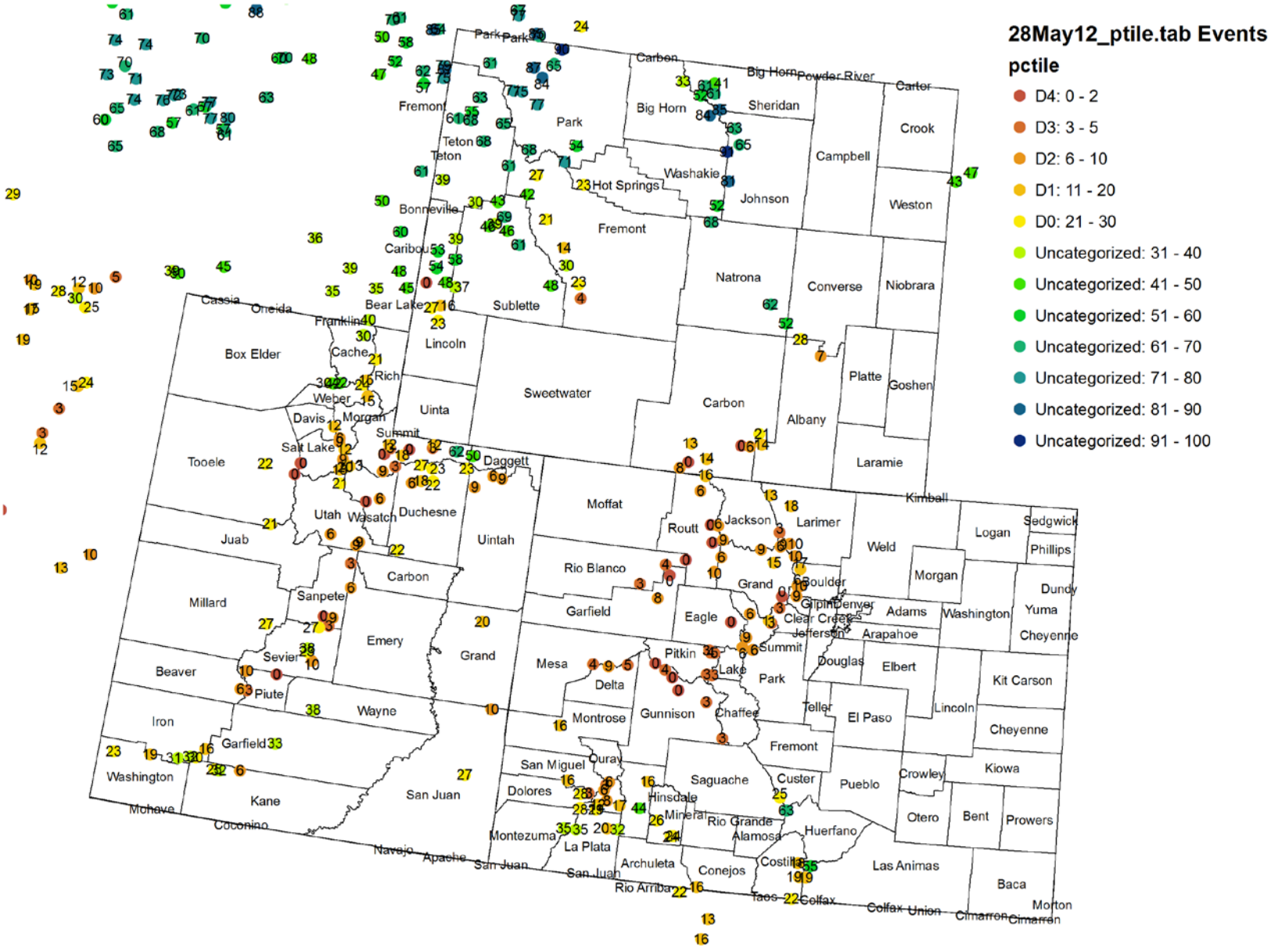
120 Day SPI
1/30/2012 – 5/28/2012



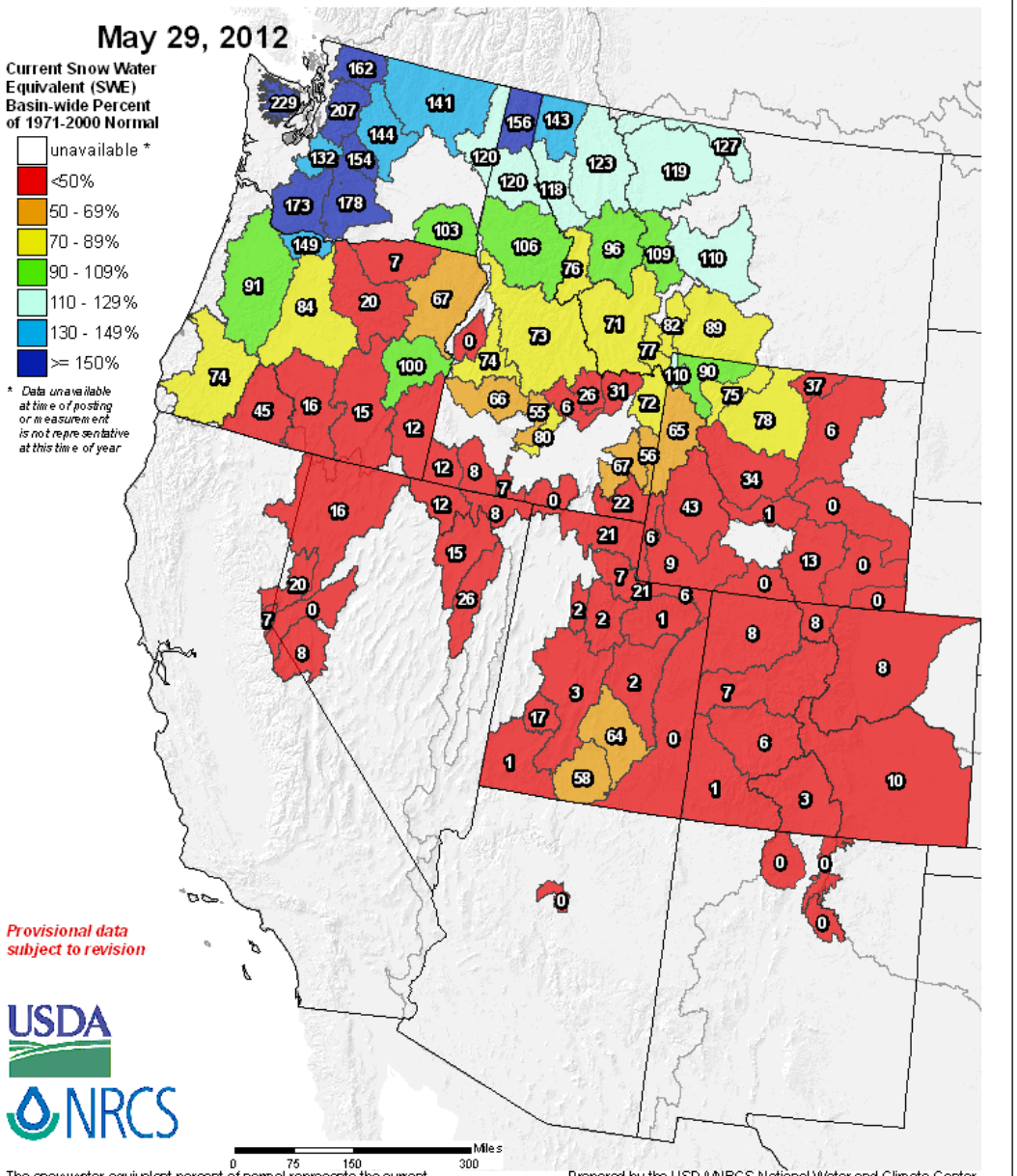
Generated 5/29/2012 at HPRCC using provisional data.

Regional Climate Centers

Snotel Water Year Precipitation Percentile Ranking for 28 May 2012 (Stations with 15+ years of data only)

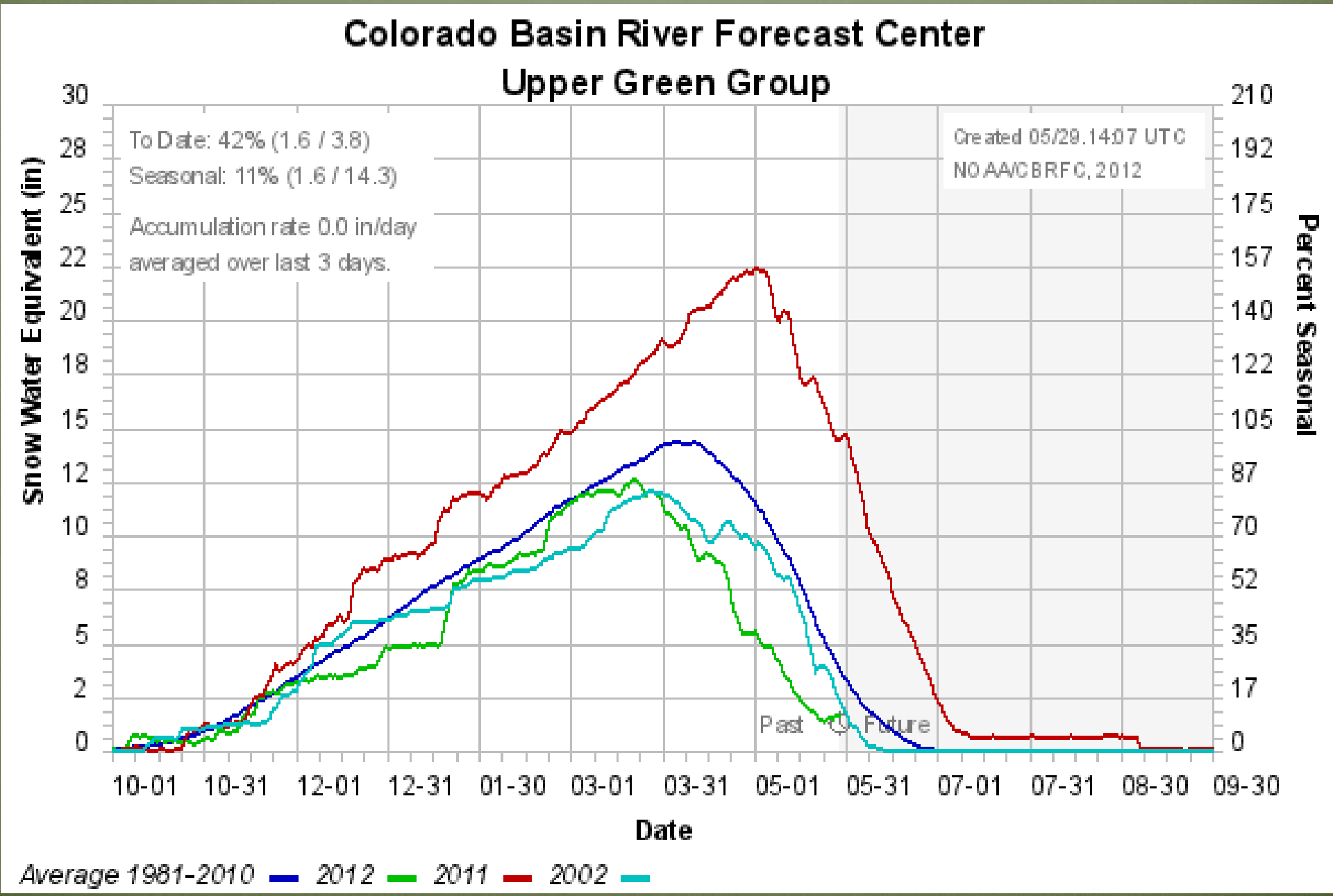


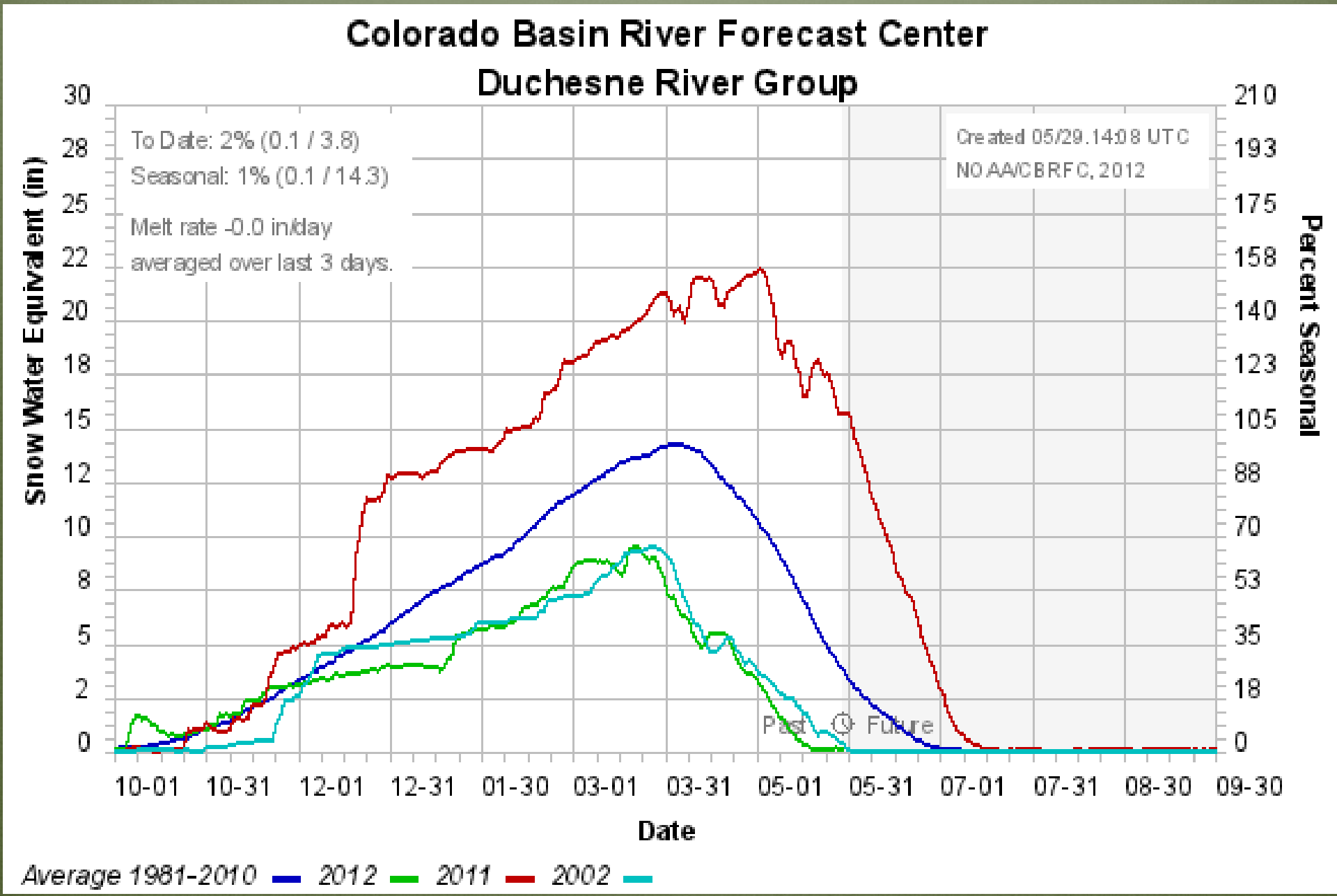
Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

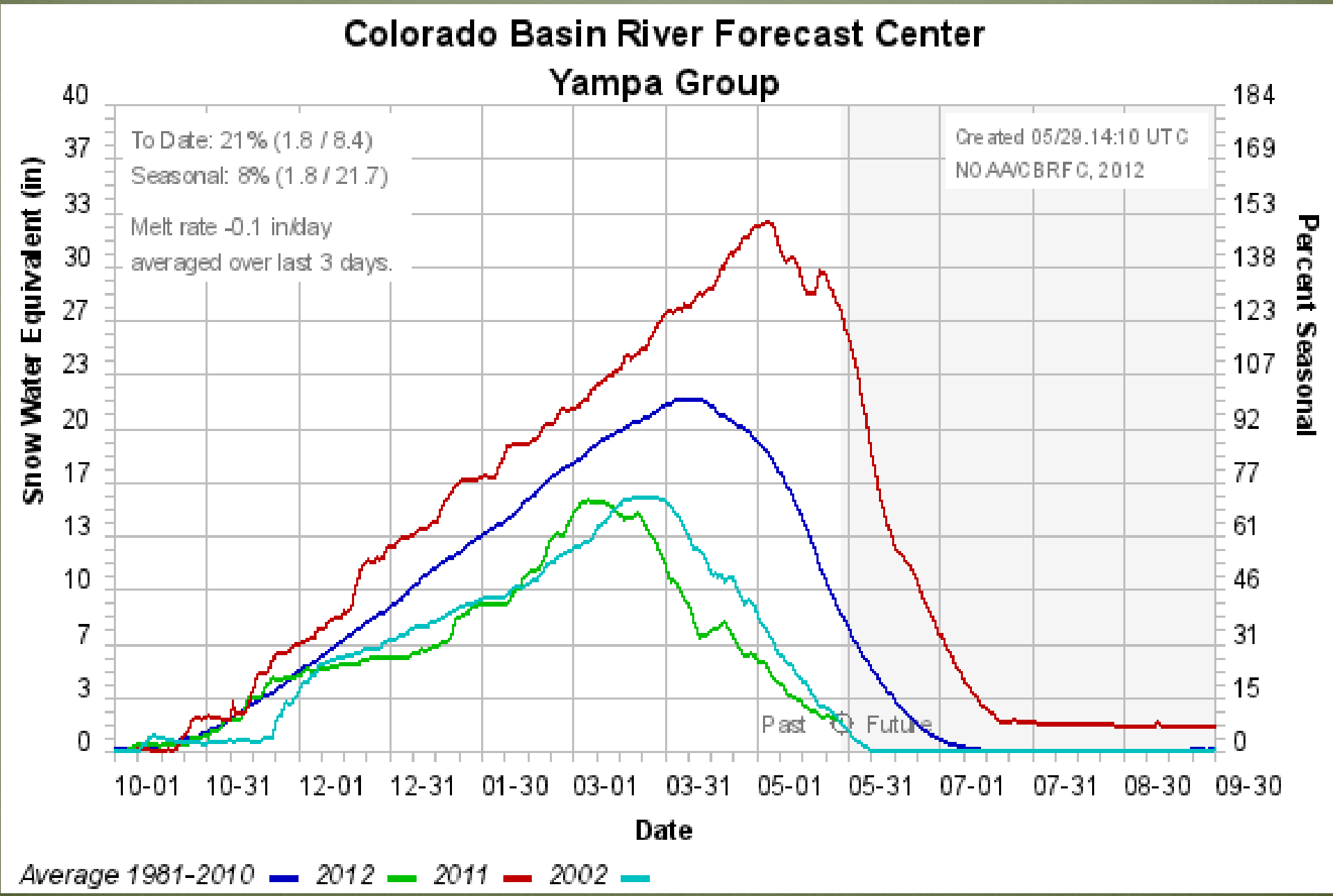


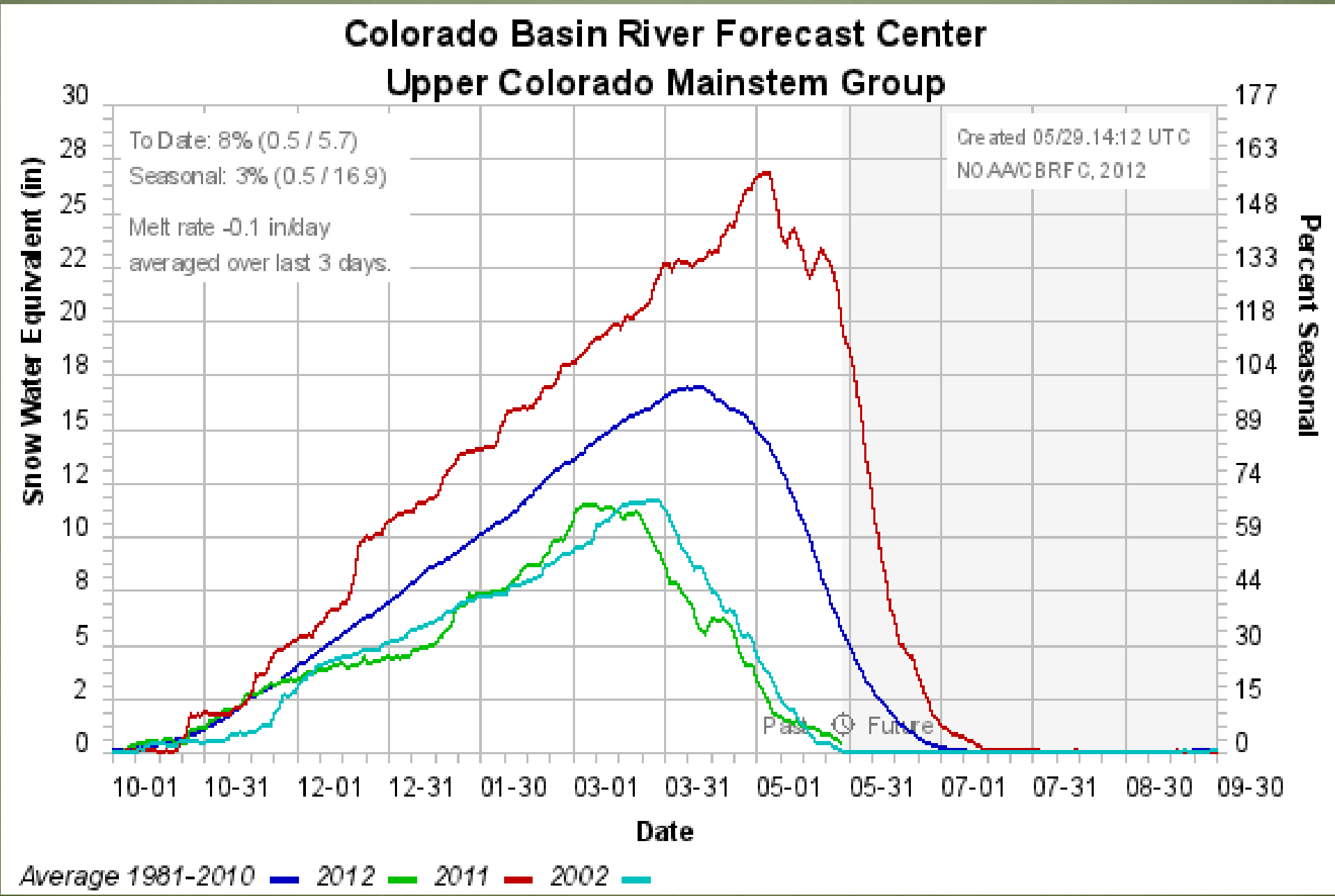
The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

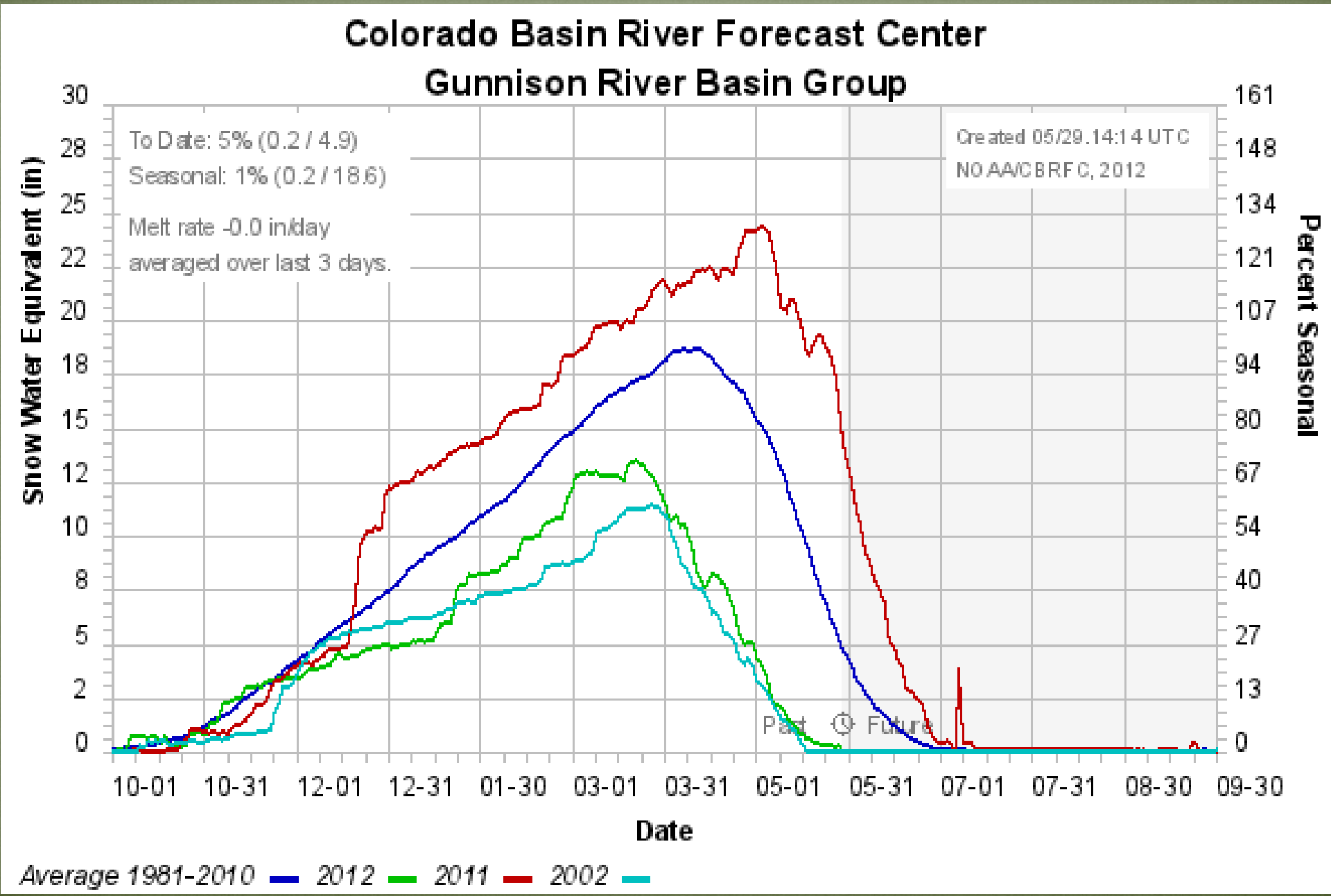
Prepared by the USDA/NRCS National Water and Climate Center
Portland, Oregon http://www.wcc.nrcs.usda.gov/gis/
Based on data from http://www.wcc.nrcs.usda.gov/reports/
Science contact: Jim.Marron@por.usda.gov 503 414 3047

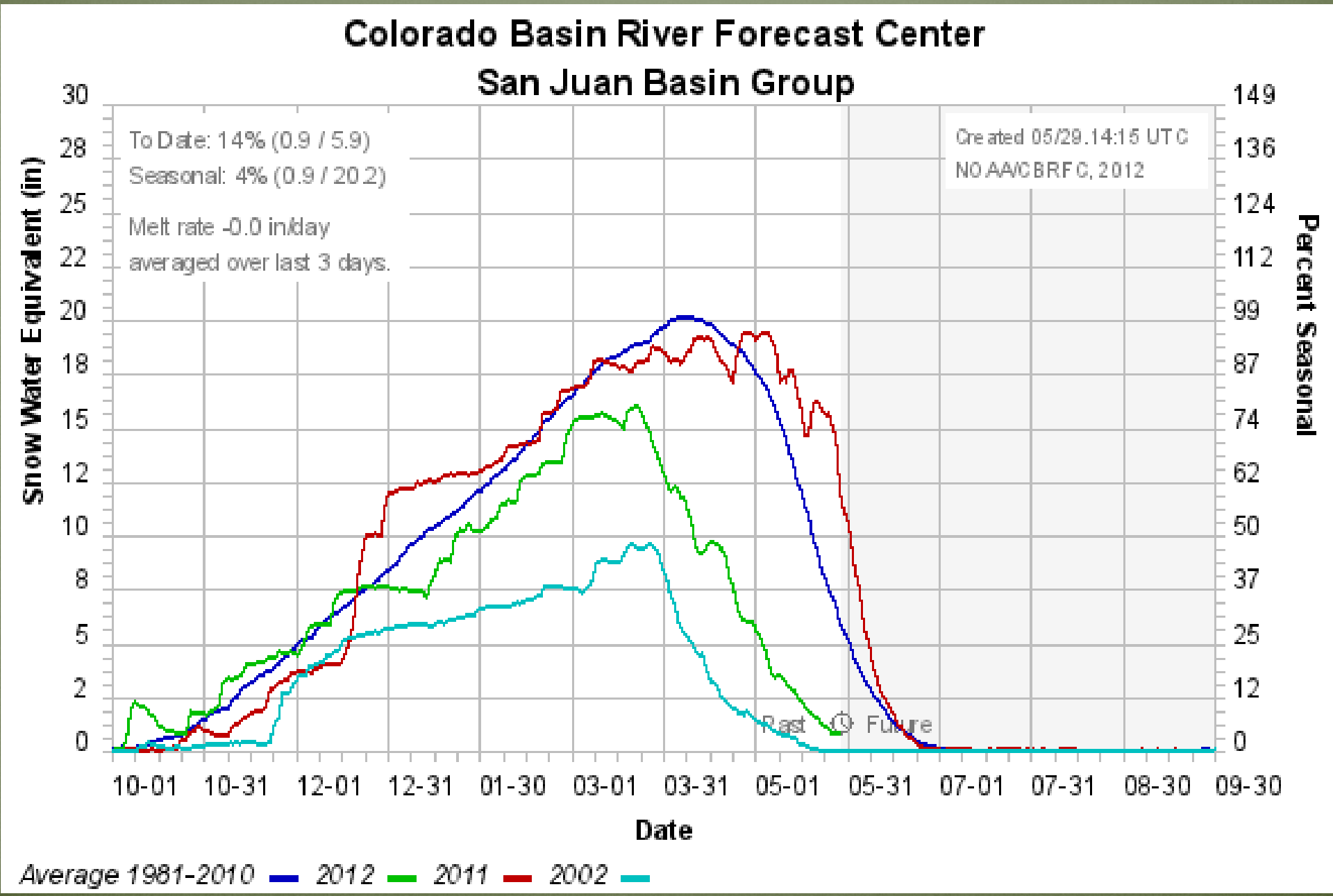

Colorado Basin River Forecast Center
Upper Green Group
To Date: 42% (1.6 / 3.8)
Seasonal: 11% (1.6 / 14.3)
Accumulation rate 0.0 in/day
averaged over last 3 days.
Created 05/29.1407 UTC
NOAA/CBRFC, 2012
Snow Water Equivalent (in)
Percent Seasonal
30
28
25
22
20
18
15
12
10
8
5
2
0
210
192
175
157
140
122
105
87
70
52
35
17
0
Past
Future
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
Date
Average 1981-2010
2012
2011
2002


Colorado Basin River Forecast Center
Duchesne River Group
To Date: 2% (0.1 / 3.8)
Seasonal: 1% (0.1 / 14.3)
Melt rate -0.0 in/day
averaged over last 3 days.
Created 05/29.1408 UTC
NOAA/CBRFC, 2012
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


Colorado Basin River Forecast Center
Yampa Group
To Date: 21% (1.8 / 8.4)
Seasonal: 8% (1.8 / 21.7)
Melt rate -0.1 in/day
averaged over last 3 days.
Created 05/29.14:10 UTC
NOAA/CBRFC, 2012
Snow Water Equivalent (in)
Percent Seasonal
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
Past
Future
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
Date
Average 1981-2010
2012
2011
2002


Colorado Basin River Forecast Center
Upper Colorado Mainstem Group
To Date: 8% (0.5 / 5.7)
Seasonal: 3% (0.5 / 16.9)
Melt rate -0.1 in/day
averaged over last 3 days.
Created 05/29.14:12 UTC
NOAA/CBRFC, 2012
Snow Water Equivalent (in)
Percent Seasonal
30
28
25
22
20
18
15
12
10
8
5
2
0
177
163
148
133
118
104
89
74
59
44
30
15
0
Past
Future
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
Date
Average 1981-2010
2012
2011
2002

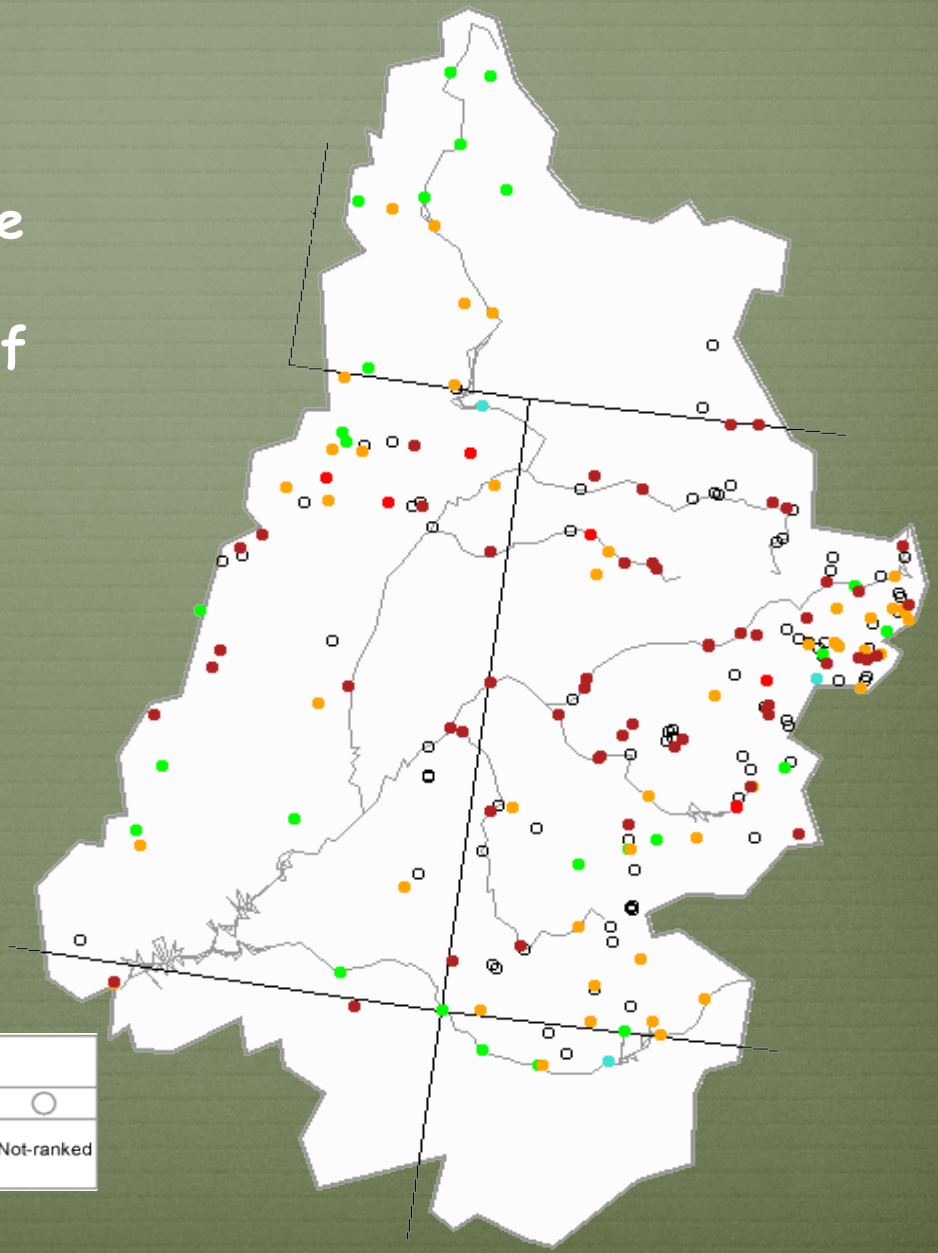

Colorado Basin River Forecast Center
Gunnison River Basin Group
To Date: 5% (0.2 / 4.9)
Seasonal: 1% (0.2 / 18.6)
Melt rate -0.0 in/day
averaged over last 3 days.
Created 05/29.14:14 UTC
NOAA/CBRFC, 2012
Past
Future
Snow Water Equivalent (in)
Percent Seasonal
Date
30
28
25
22
20
18
15
12
10
8
5
2
0
161
148
134
121
107
94
80
67
54
40
27
13
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
San Juan Basin Group
To Date: 14% (0.9 / 5.9)
Seasonal: 4% (0.9 / 20.2)
Melt rate -0.0 in/day
averaged over last 3 days.
Created 05/29.14:15 UTC
NOAA/CBRFC, 2012
Snow Water Equivalent (in)
Percent Seasonal
30
28
25
22
20
18
15
12
10
8
5
2
0
149
136
124
112
99
87
74
62
50
37
25
12
0
Past
Future
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
Date
Average 1981-2010
2012
2011
2002

Streamflow Update

Sunday, May 27, 2012

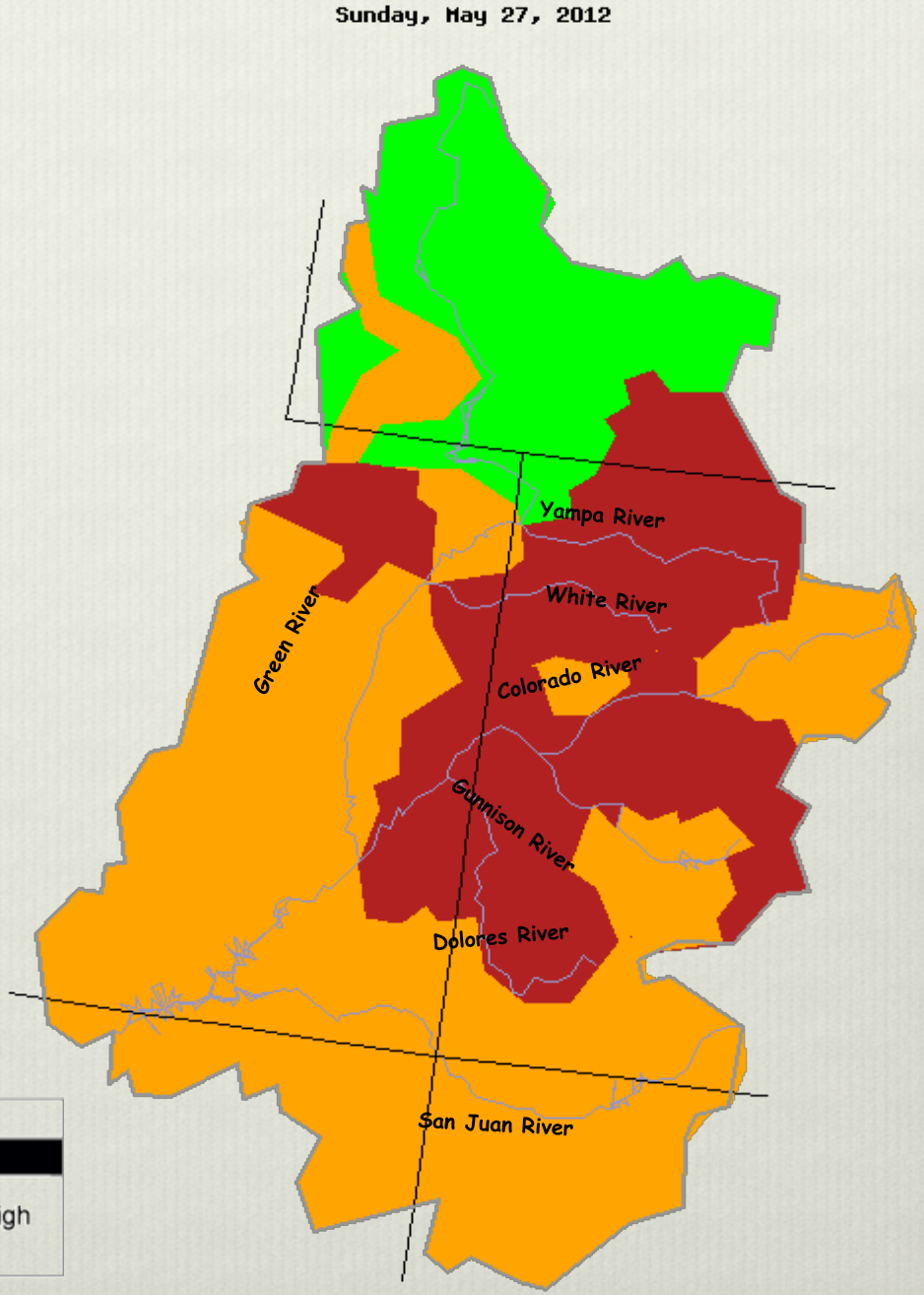
7-day average discharge compared to historical discharge for the day of the year (May 27)



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

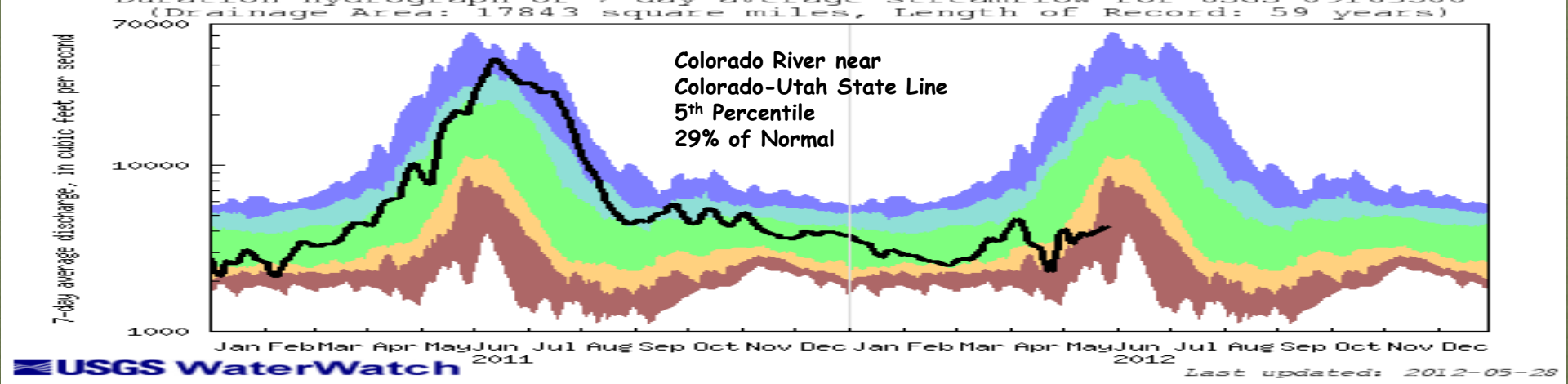
USGS

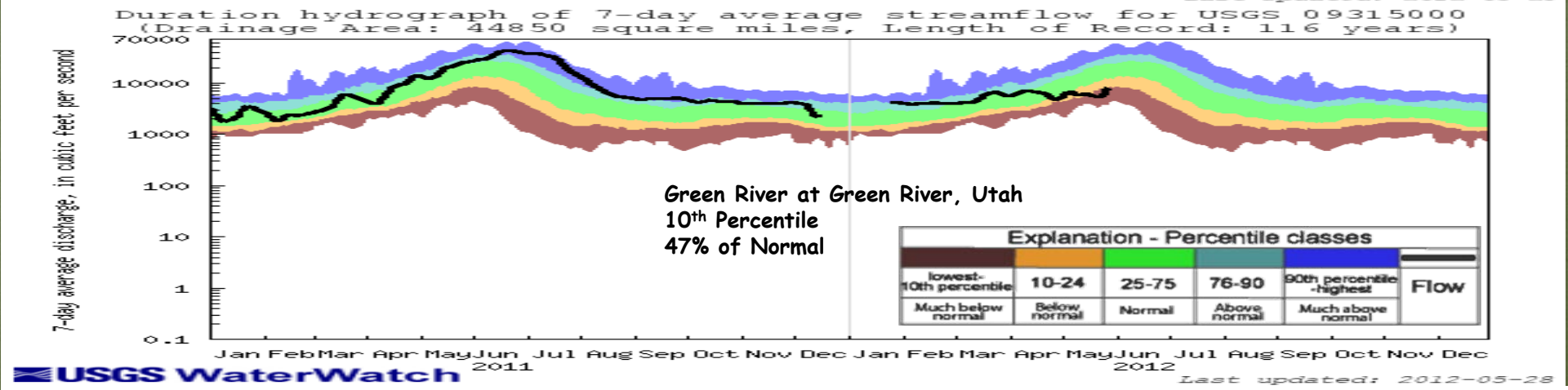
7-day average discharge compared to historical discharge for the day of the year (May 27)

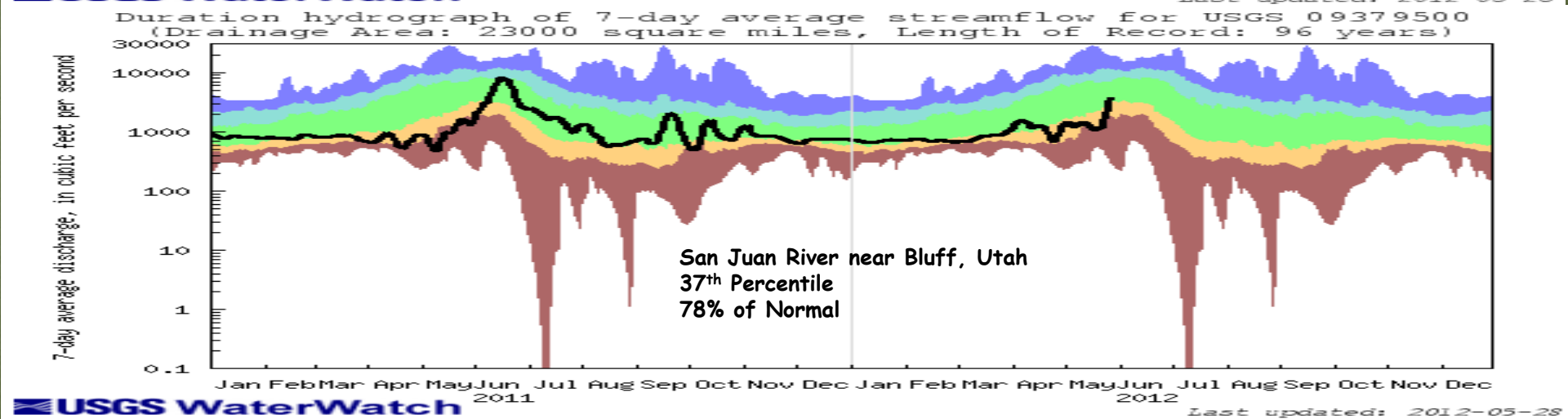


Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

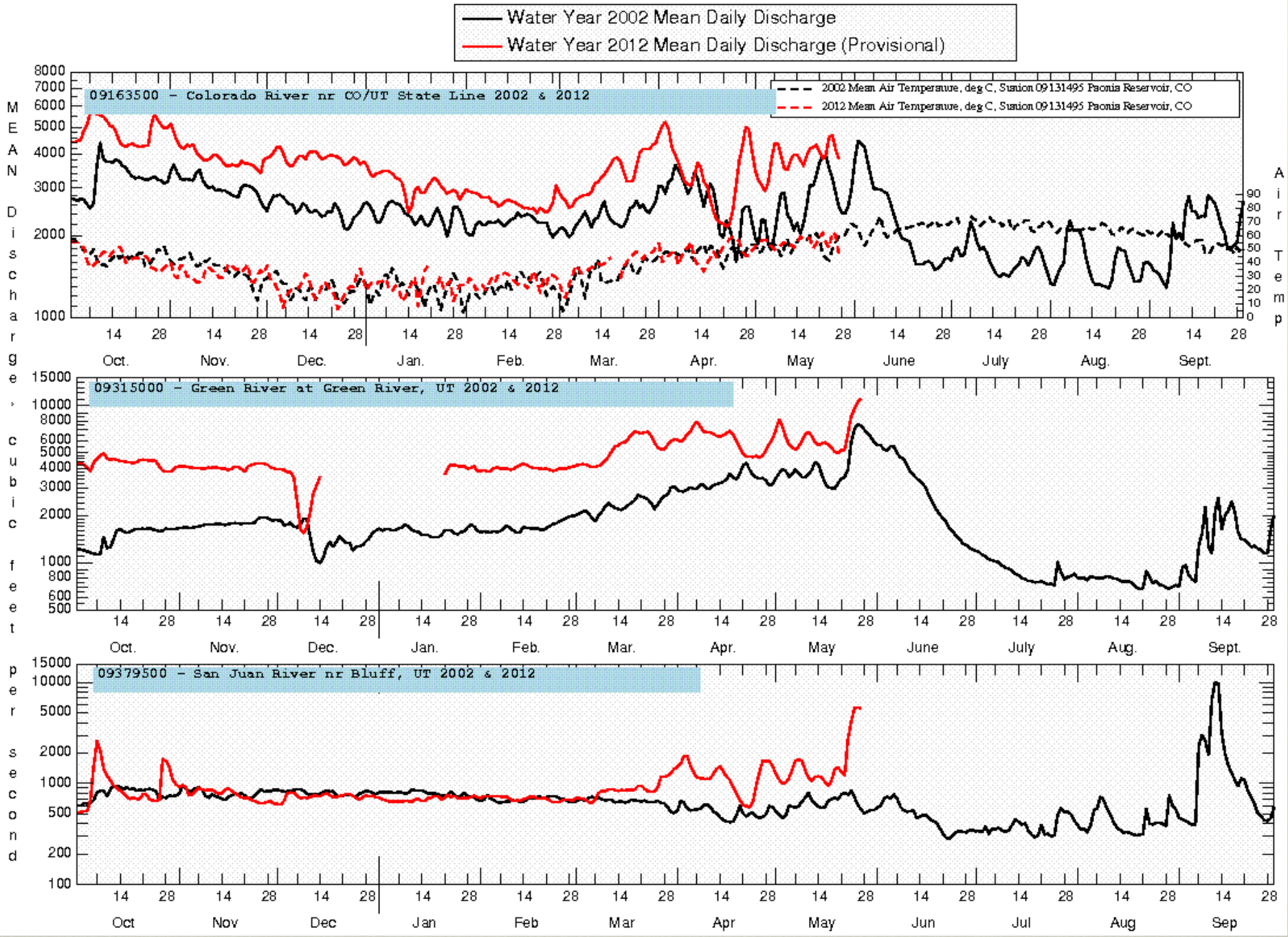
USGS


(Drainage Area: 17843 square miles, Length of Record: 59 years)
70000
10000
1000
7-day average discharge, in cubic feet per second
Colorado River near
Colorado-Utah State Line
5th Percentile
29% 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
2011
2012
USGS WaterWatch
Last updated: 2012-05-28

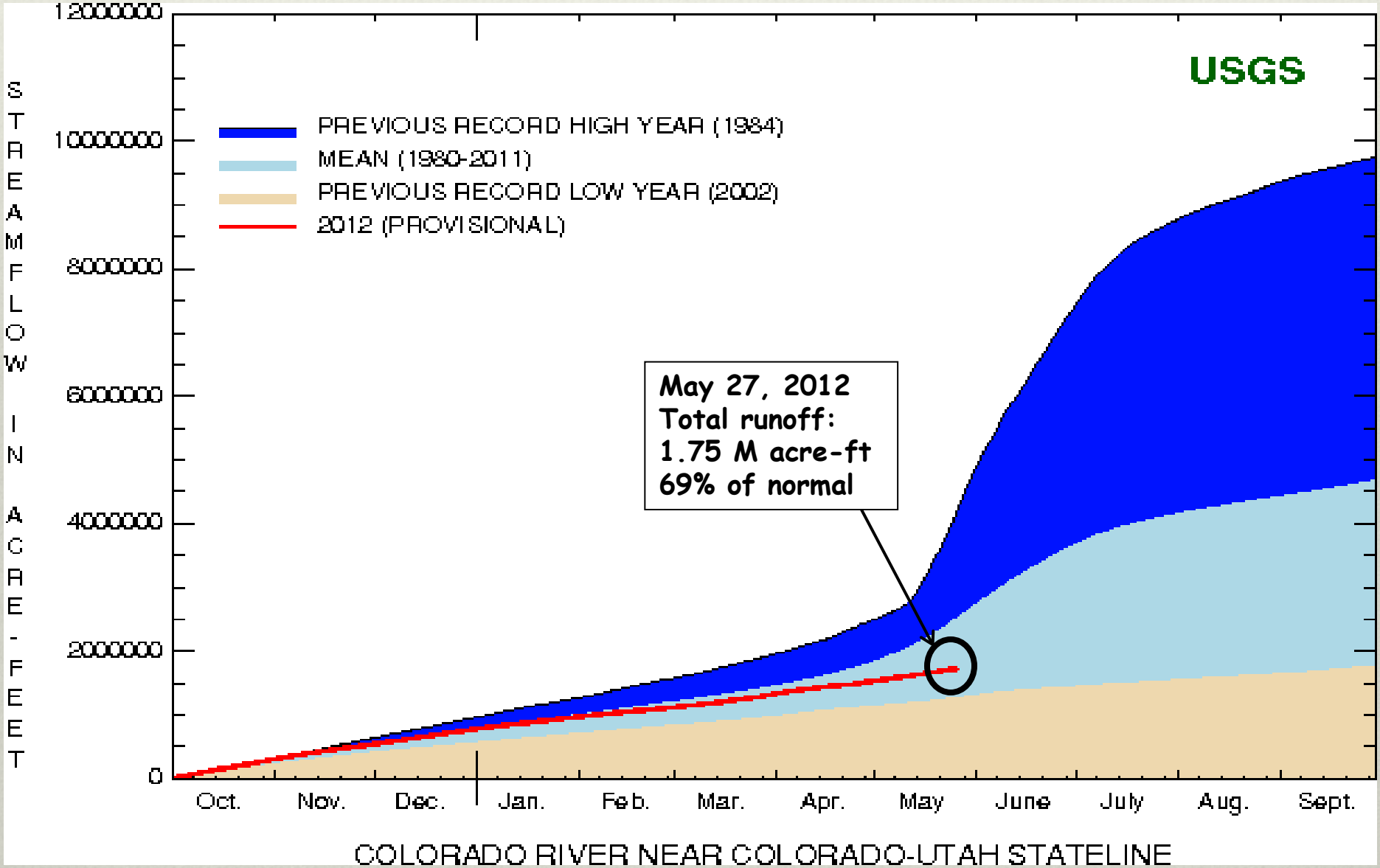

Duration hydrograph of 7-day average streamflow for USGS 09315000
(Drainage Area: 44850 square miles, Length of Record: 116 years)
70000
10000
1000
100
10
1
0.1
7-day average discharge, in cubic feet per second
Green River at Green River, Utah
10th Percentile
47% of Normal
Explanation - Percentile classes
lowest-10th percentile
10-24
25-75
76-90
90th percentile -highest
Flow
Much below normal
Below normal
Normal
Above normal
Much above 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
2011
2012
USGS WaterWatch
Last updated: 2012-05-28


Duration hydrograph of 7-day average streamflow for USGS 09379500
(Drainage Area: 23000 square miles, Length of Record: 96 years)
30000
10000
1000
100
10
1
0.1
7-day average discharge, in cubic feet per second
San Juan River near Bluff, Utah
37th Percentile
78% 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
2011
2012
USGS WaterWatch
Last updated: 2012-05-28

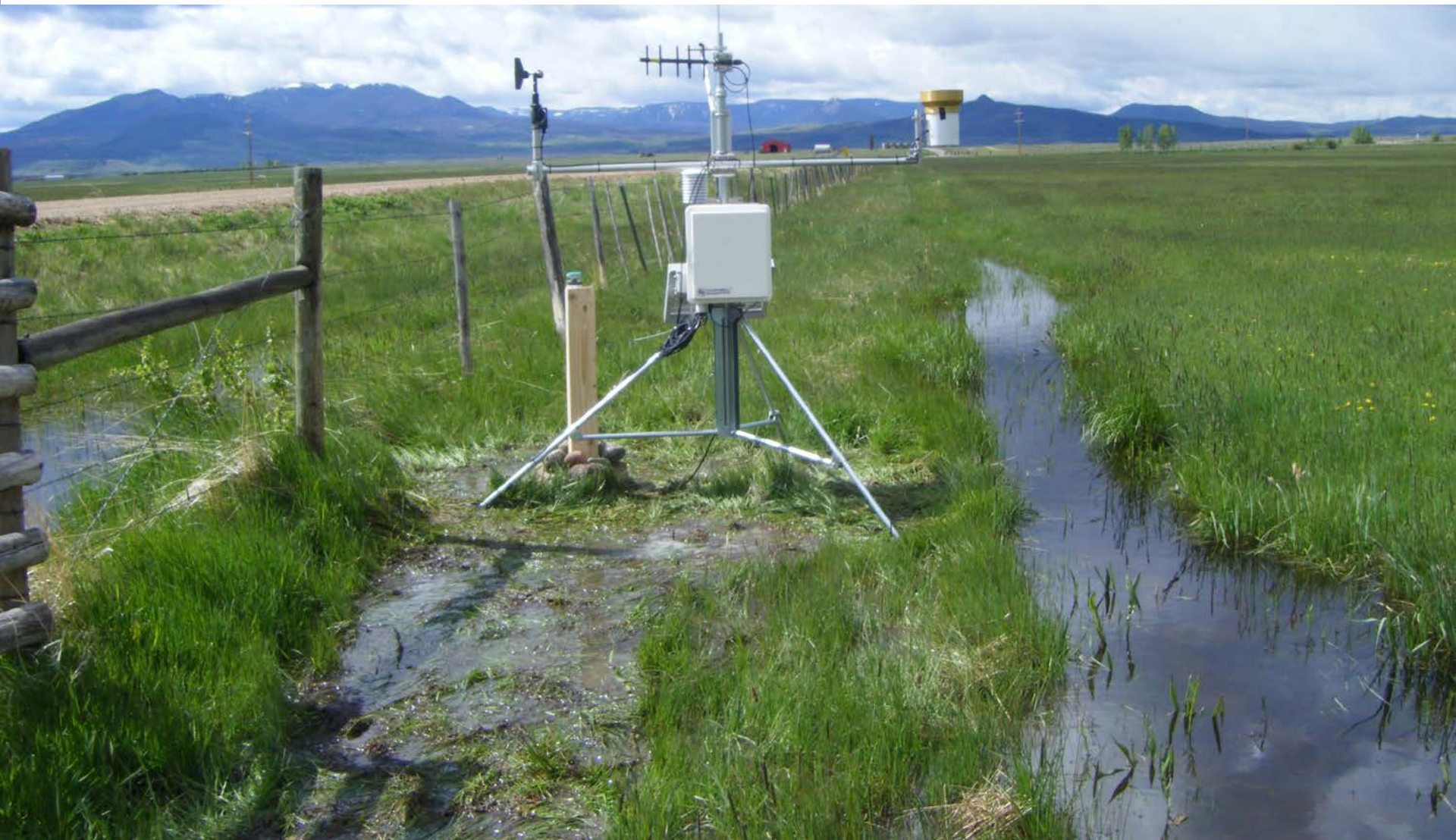
Colorado River Basin 2002 vs. 2012 Mean Daily Discharge Comparison at Select Stations



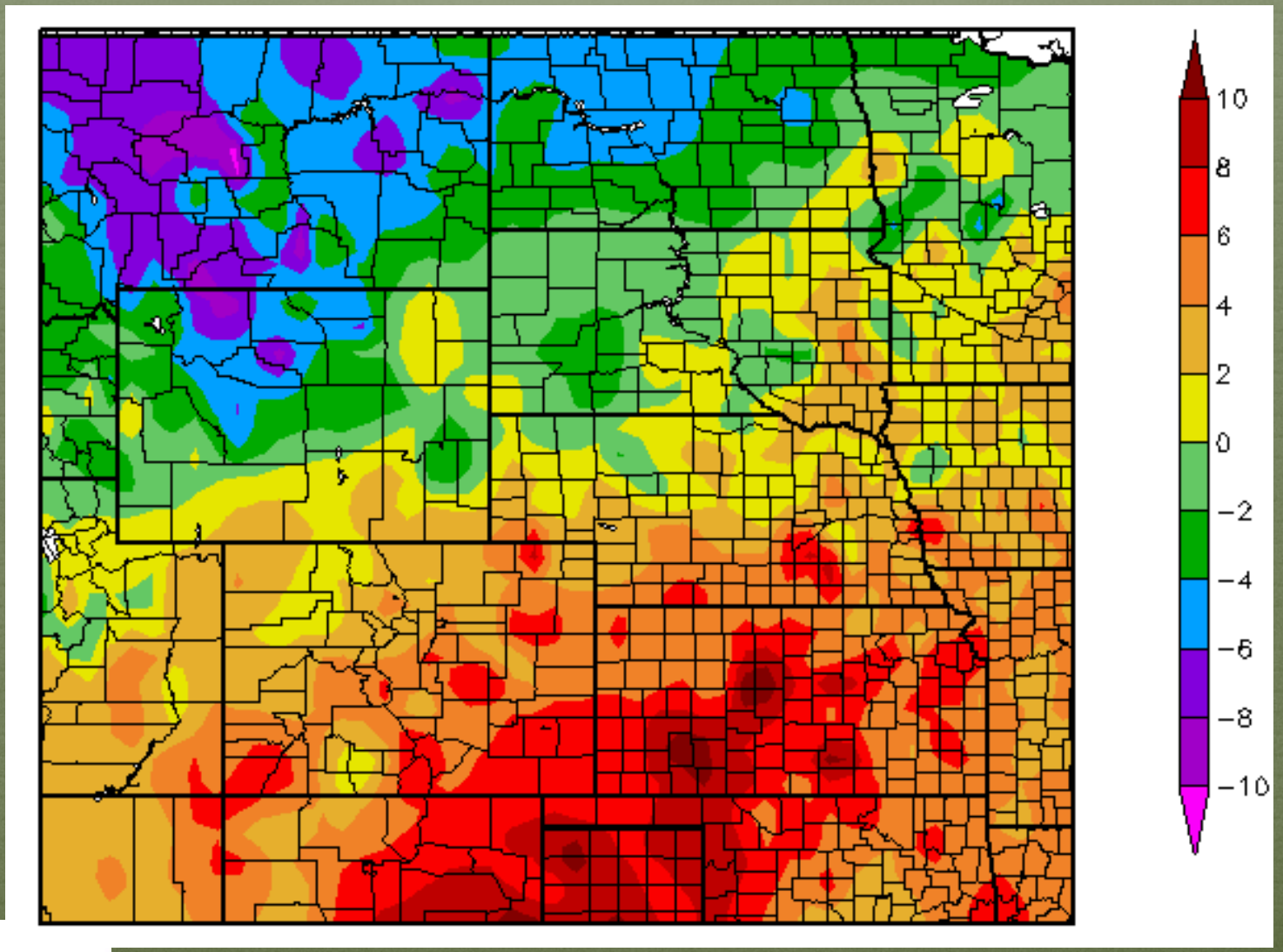
Total Streamflow Volume
Colorado River nr CO/UT State Line
Oct 1, 2011 to May 28, 2012



Water Demand

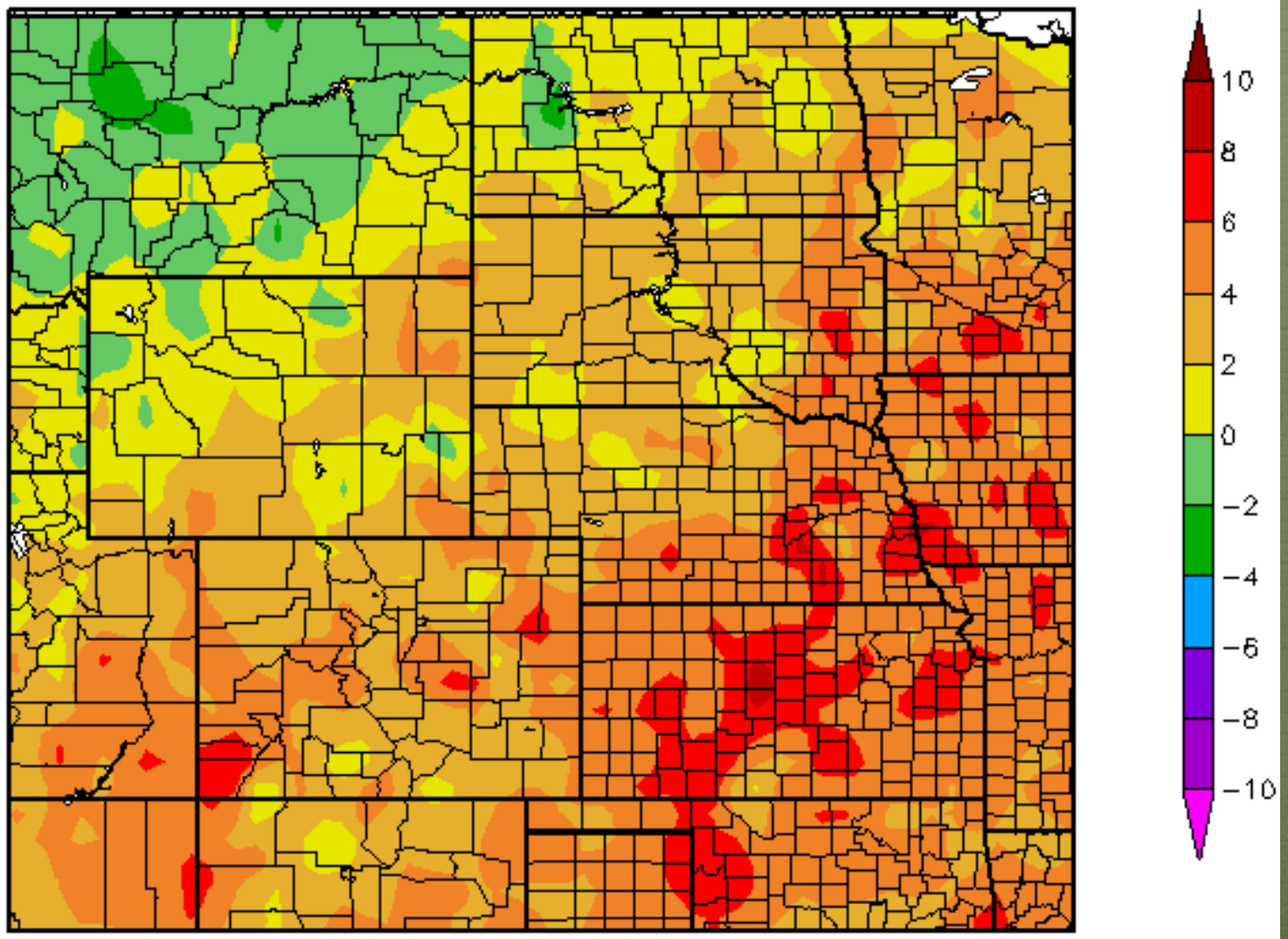


Temperature Departure from Normal
05/21/2012 – 05/27/2012



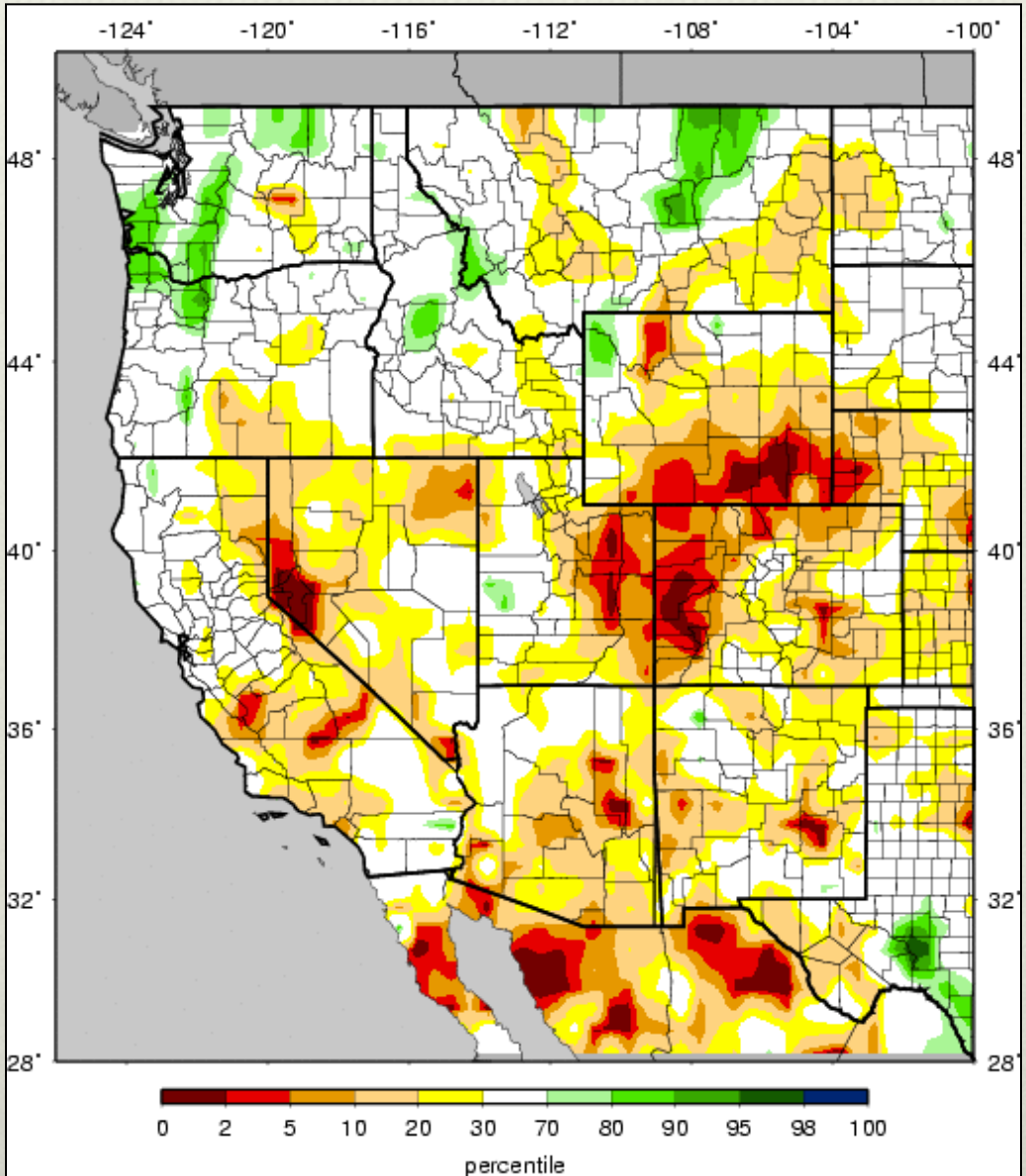
High Plains Regional Climate Center

Temperature Departure from Normal
05/01/2012 – 05/27/2012

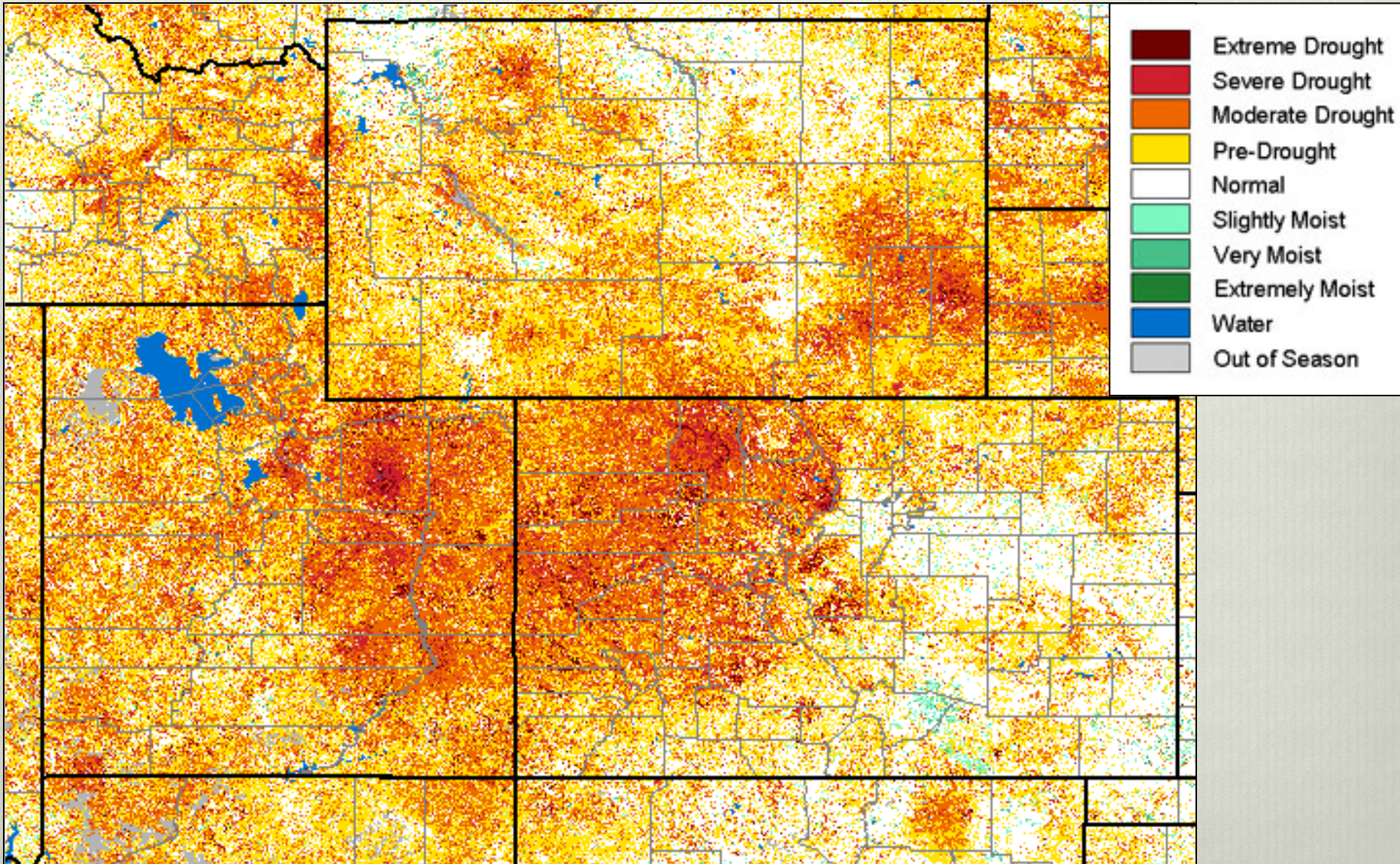


High Plains Regional Climate Center

VIC Soil Moisture
27 May 2012

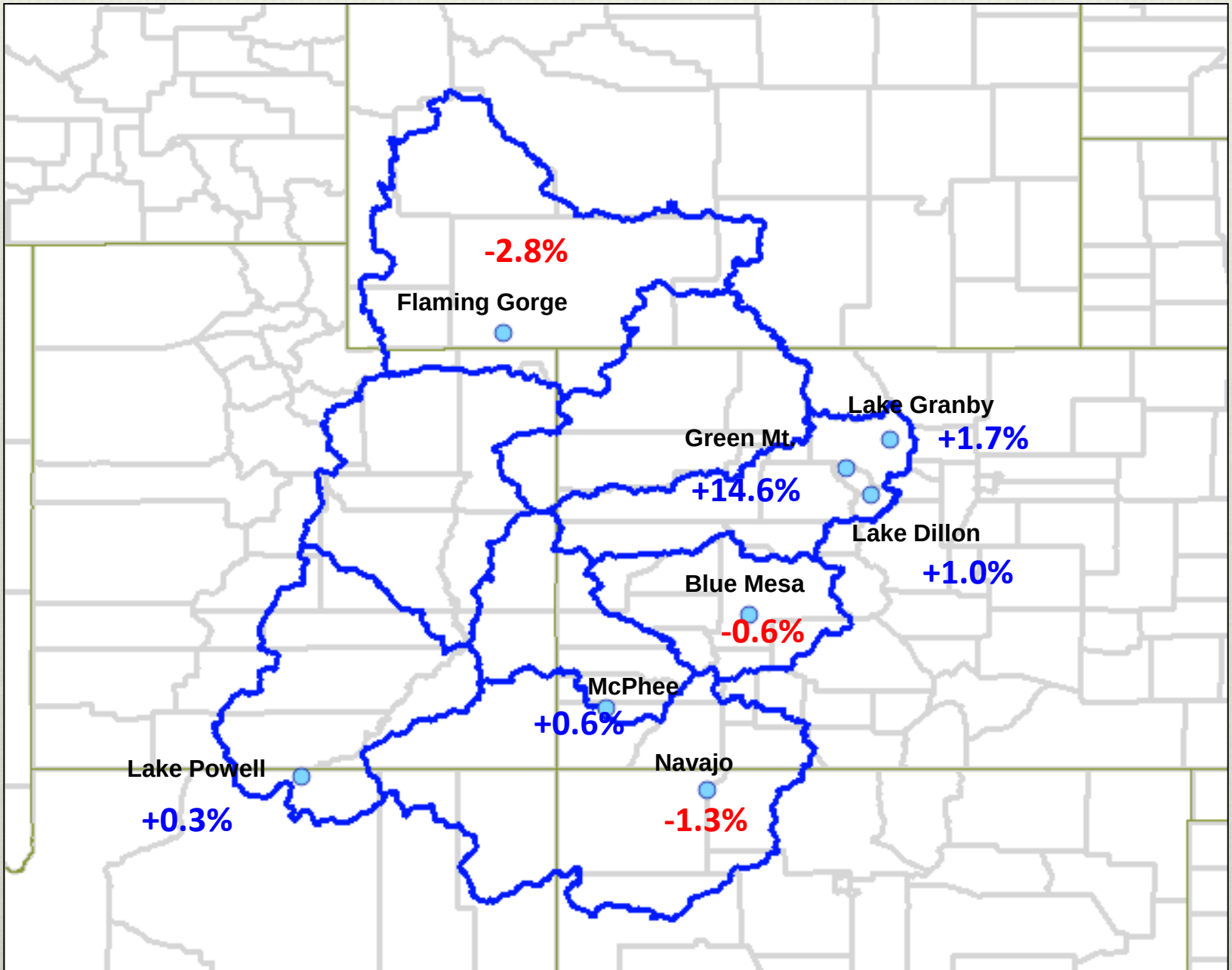


eMODIS VegDRI Vegetation
27 May 2012

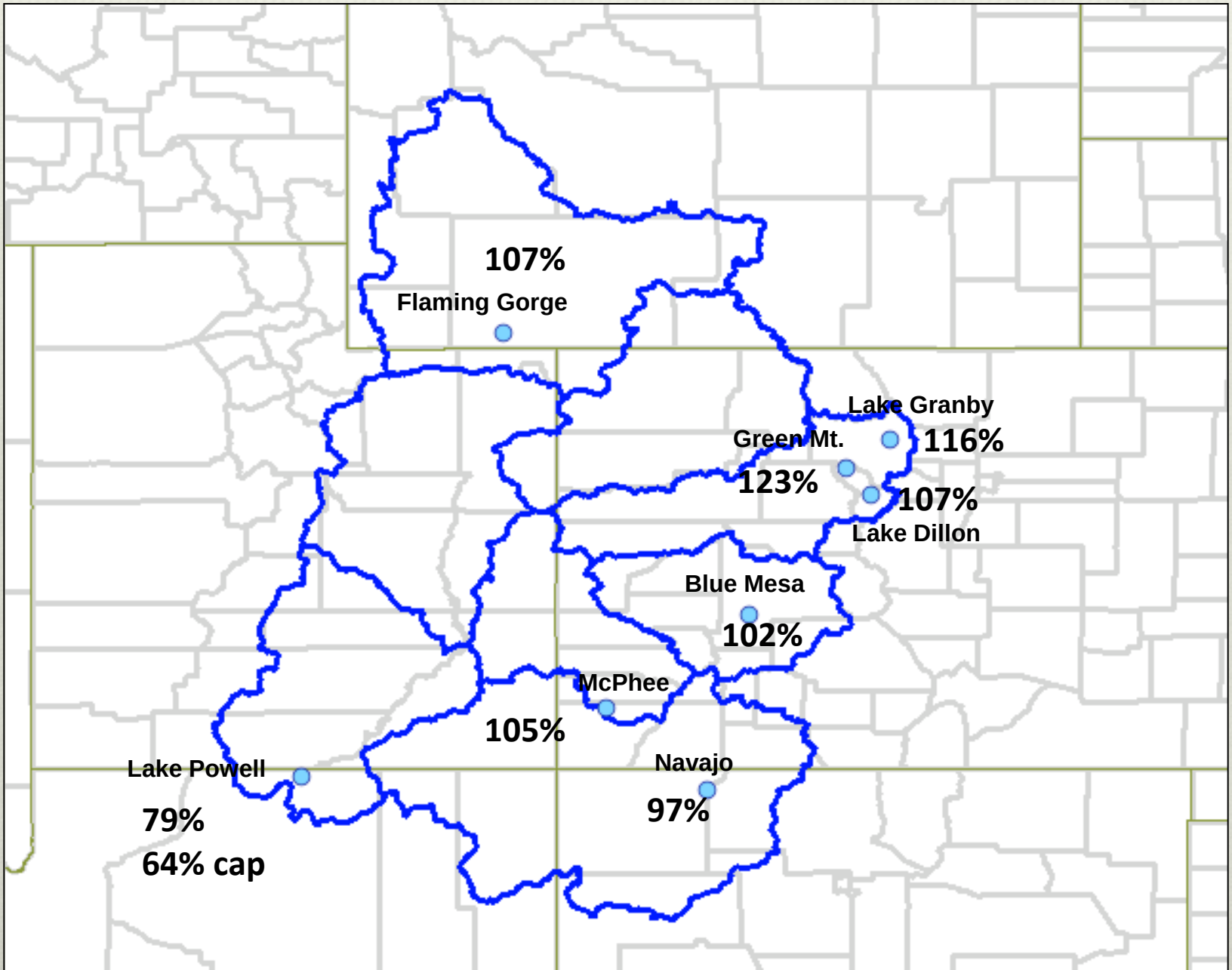


Reservoir Update

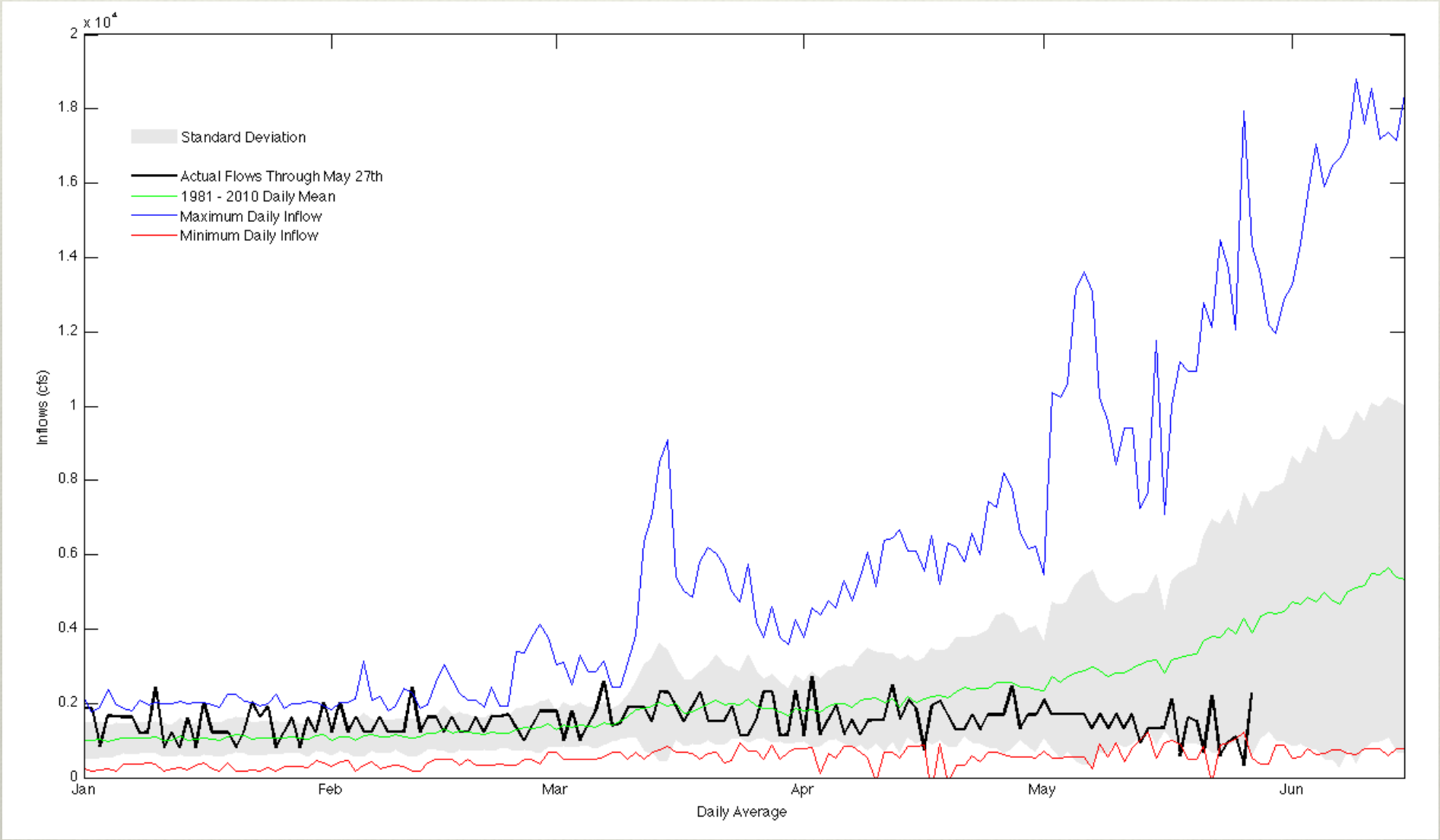
May Reservoir Storage Volume Change



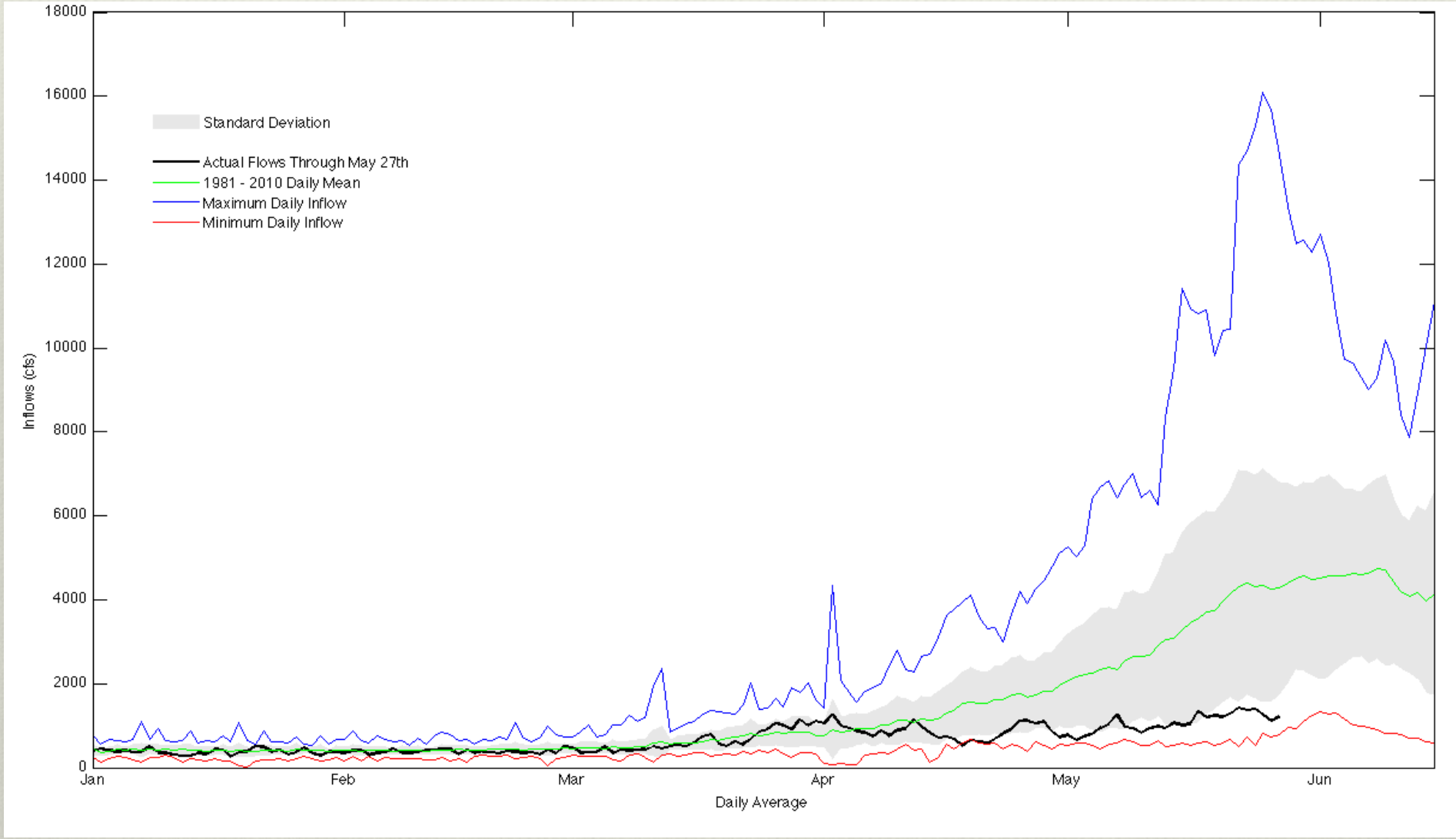
May Average Reservoir Storage Volume



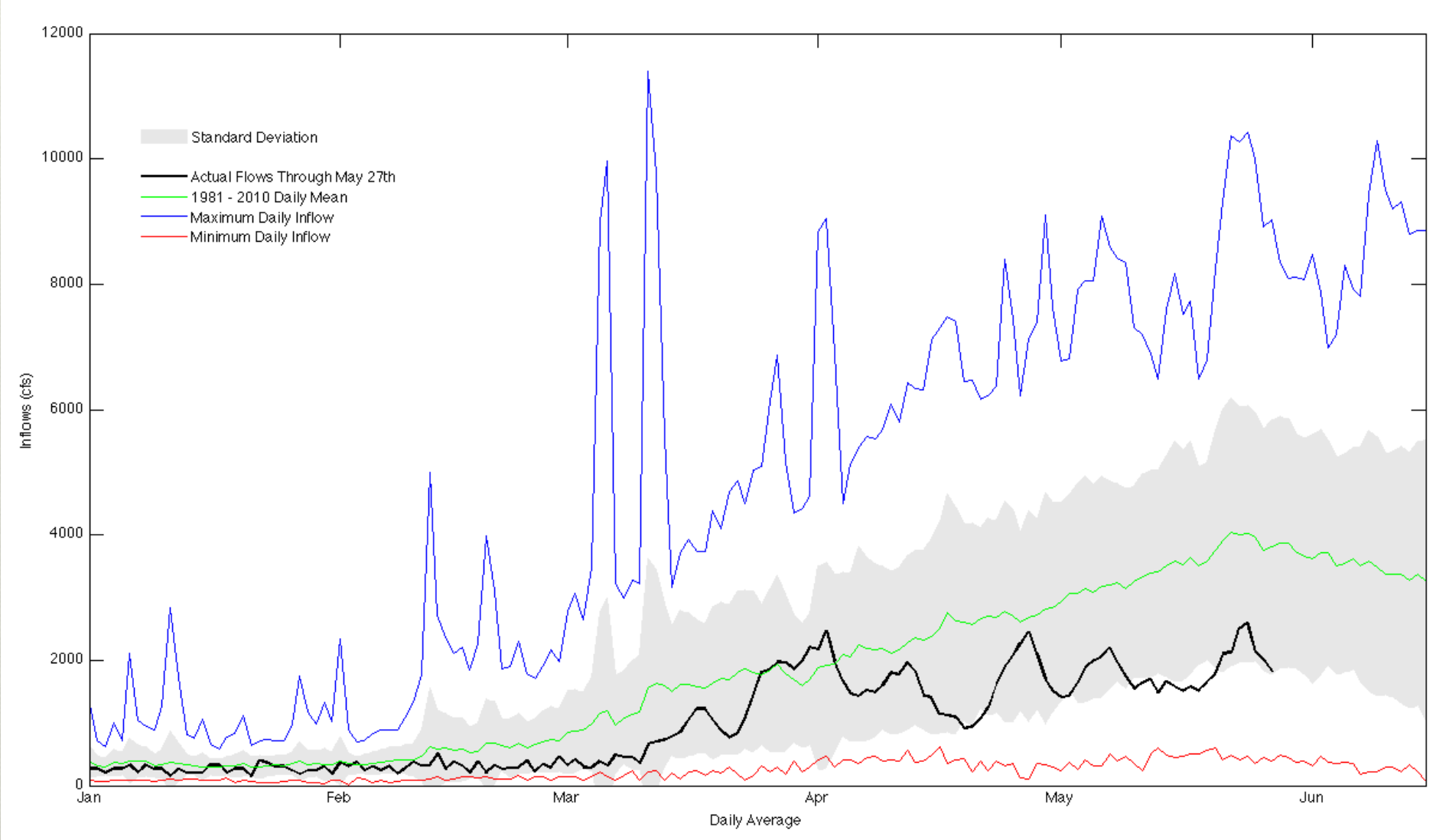
Daily Inflows into Flaming Gorge



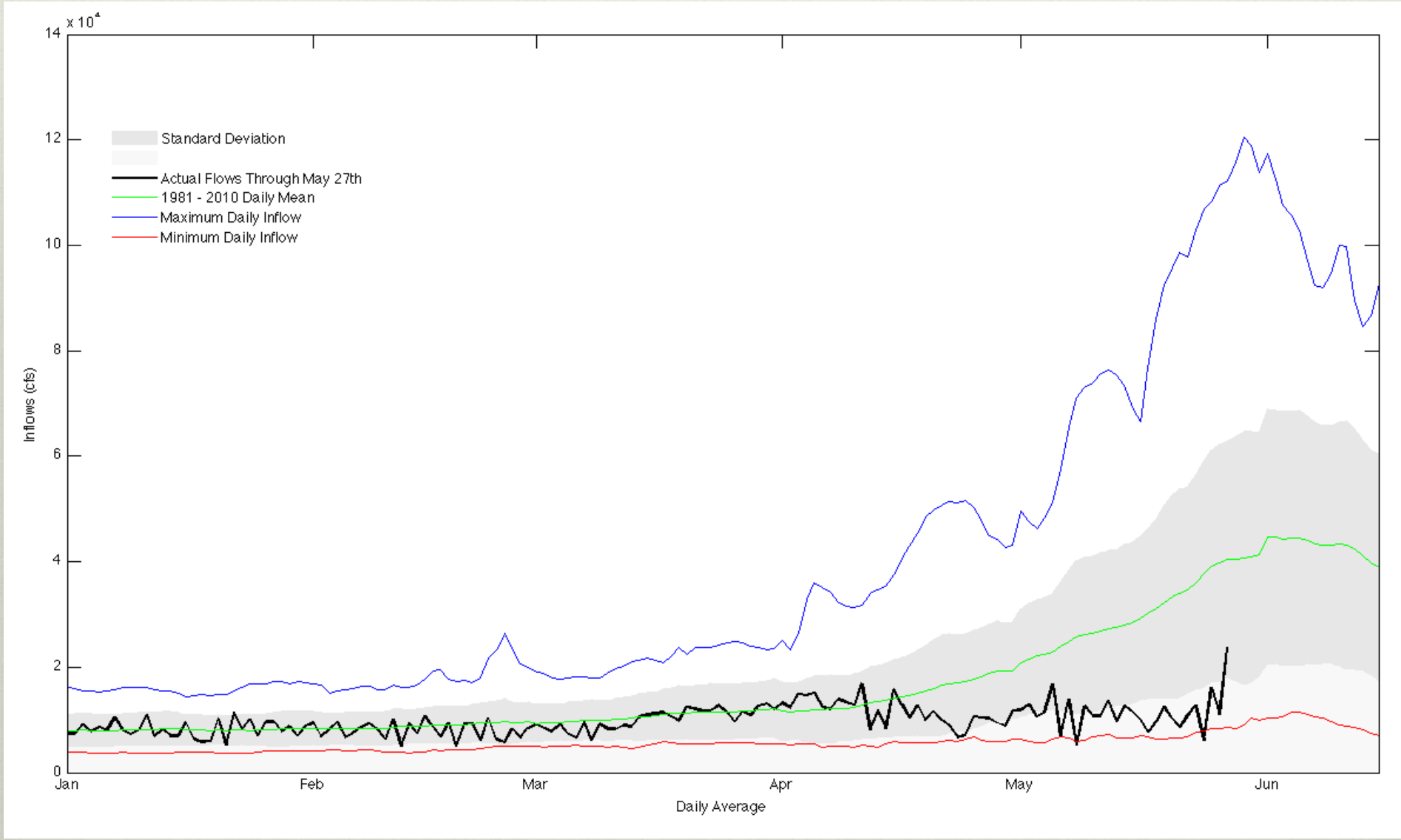
Daily Inflows into Blue Mesa



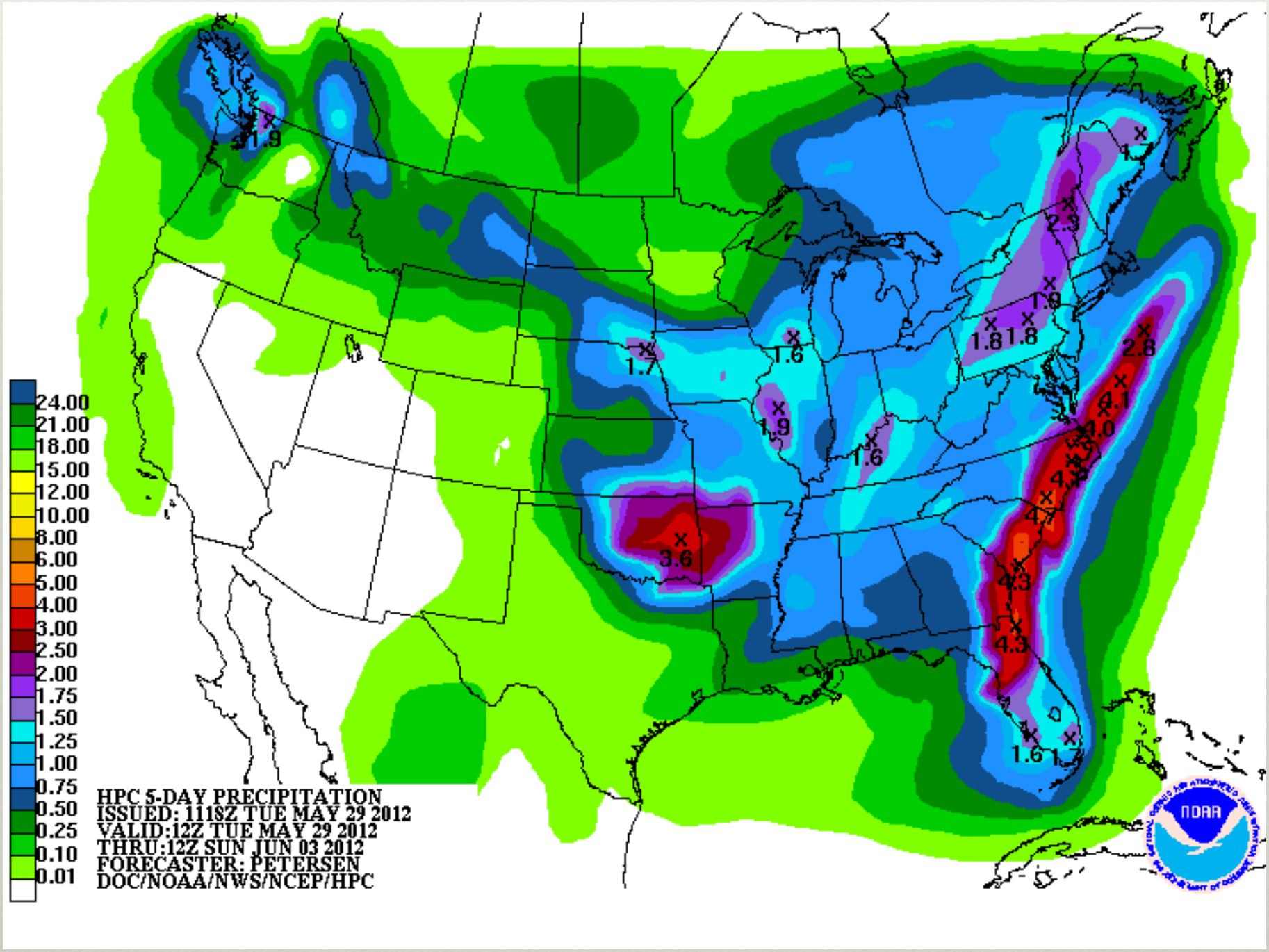
Daily Inflows into Navajo



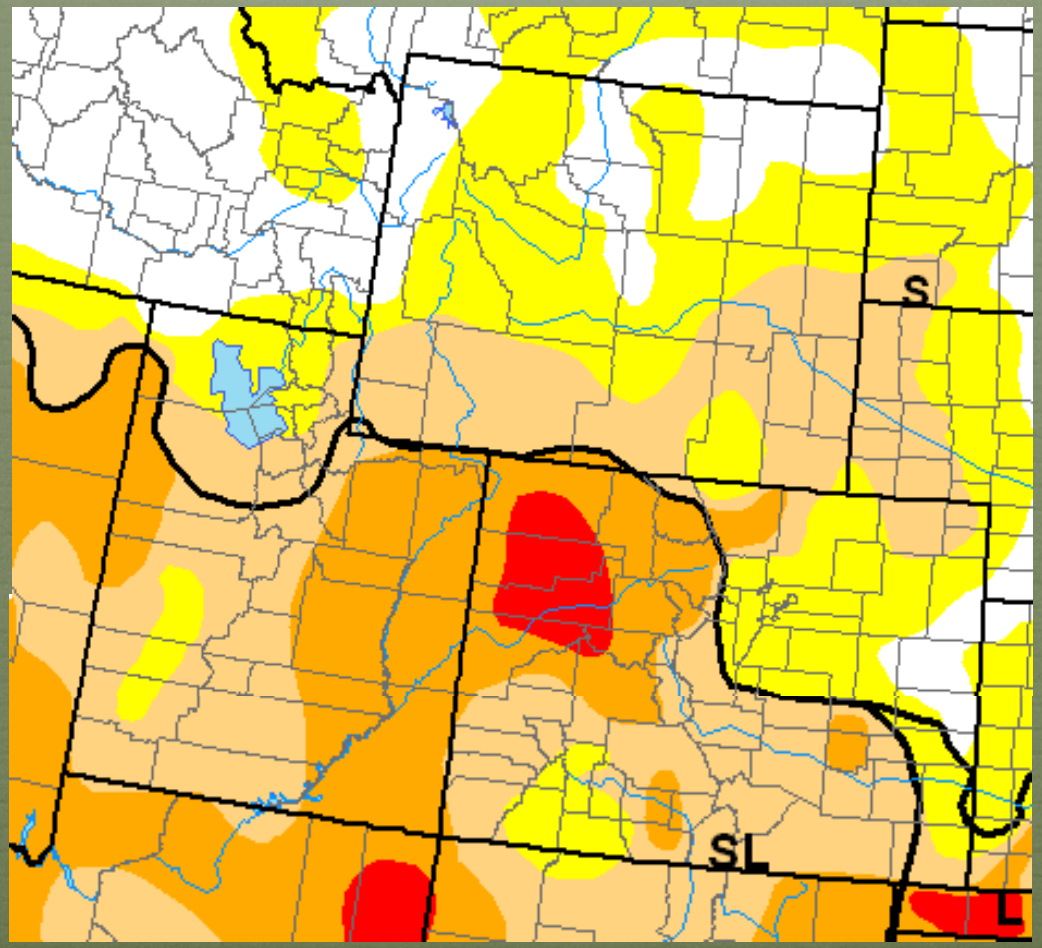
Daily Inflows into Lake Powell



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: 1118Z TUE MAY 29 2012
VALID:12Z TUE MAY 29 2012
THRU:12Z SUN JUN 03 2012
FORECASTER: PETERSEN
DOC/NOAA/NWS/NCEP/HPC
NOAA

Recommendations



INFO

For more information

NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

May 29, 2012

Precipitation and Snowpack

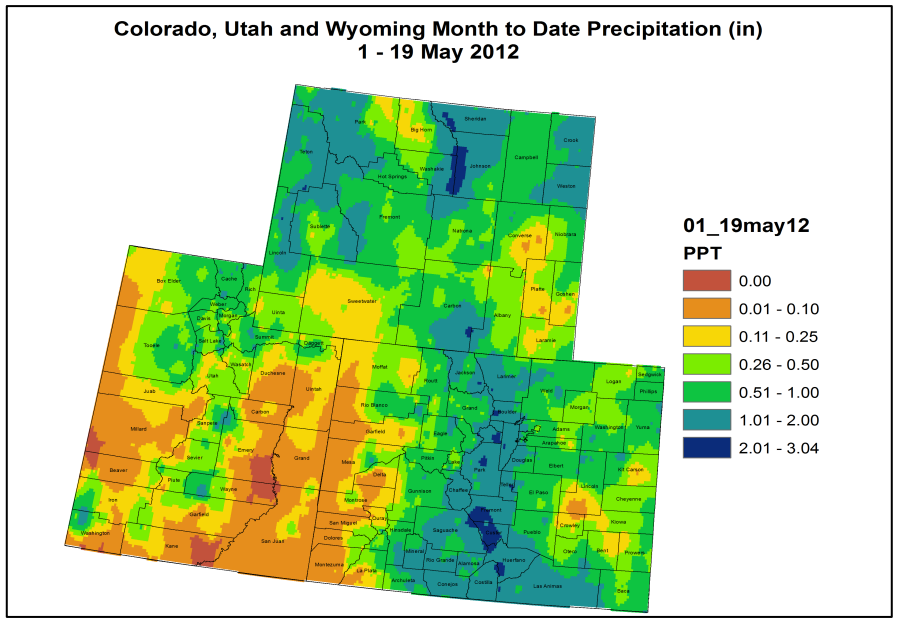


Fig. 1: May 1 – 19 precipitation in inches.

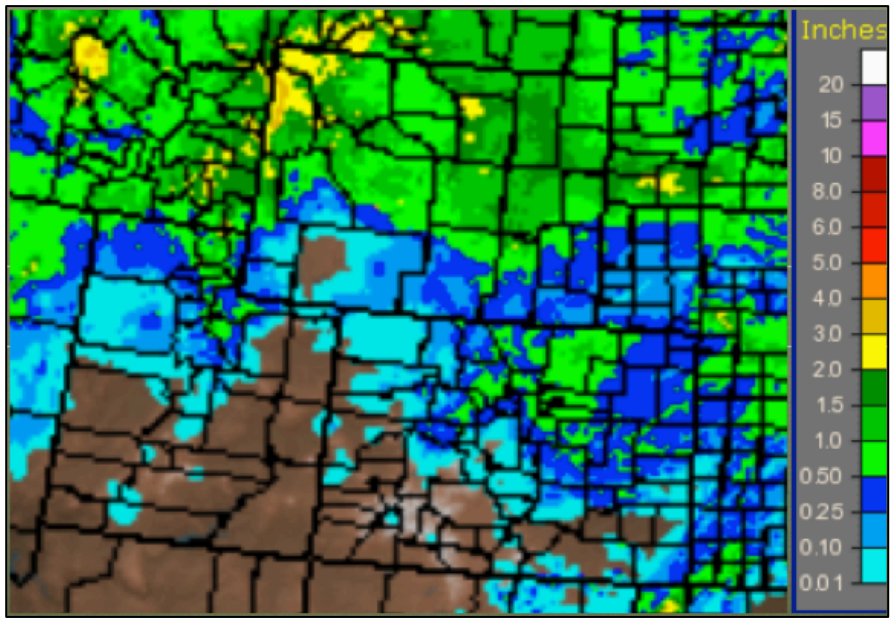


Fig. 2: May 20 – 27 precipitation in inches.

For the month of May so far, the heaviest precipitation has been concentrated along the Front Range of Colorado, just east of the Continental Divide and southern CO, with many of those areas, including the San Luis Valley, receiving between 1 and 2 inches of moisture (Fig. 1). Higher elevations in the UCRB have received between half an inch and 2 inches for the month, but most of the lower elevations have seen less than a qaurter of an inch. Most of eastern CO has received between a quarter inch and an inch of precipitation since the beginning of the month.

Last week, precipitation in the UCRB was mainly confined to the north, with some areas of northeast Utah receiving between a quarter inch to an inch of precipitation (Fig. 2). Some areas of southwest Wyoming and northwest CO received around a tenth of an inch of moisture for the week. Eastern UT, southwest CO, and the Four Corners area were dry for the week. Northern CO (east of the UCRB) received between a quarter inch to an inch, and southeast CO also received some spotty amounts of moisture for the week. The San Luis Valley did not see precipitation last week.

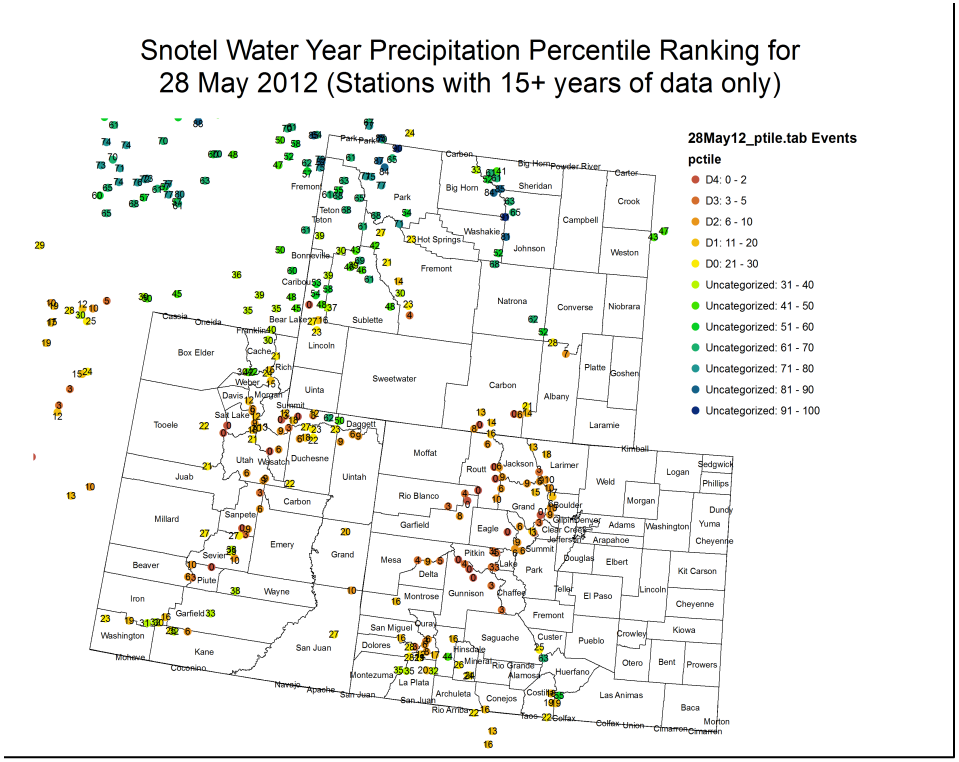


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21 – 30% is Drought Monitor D0 category).

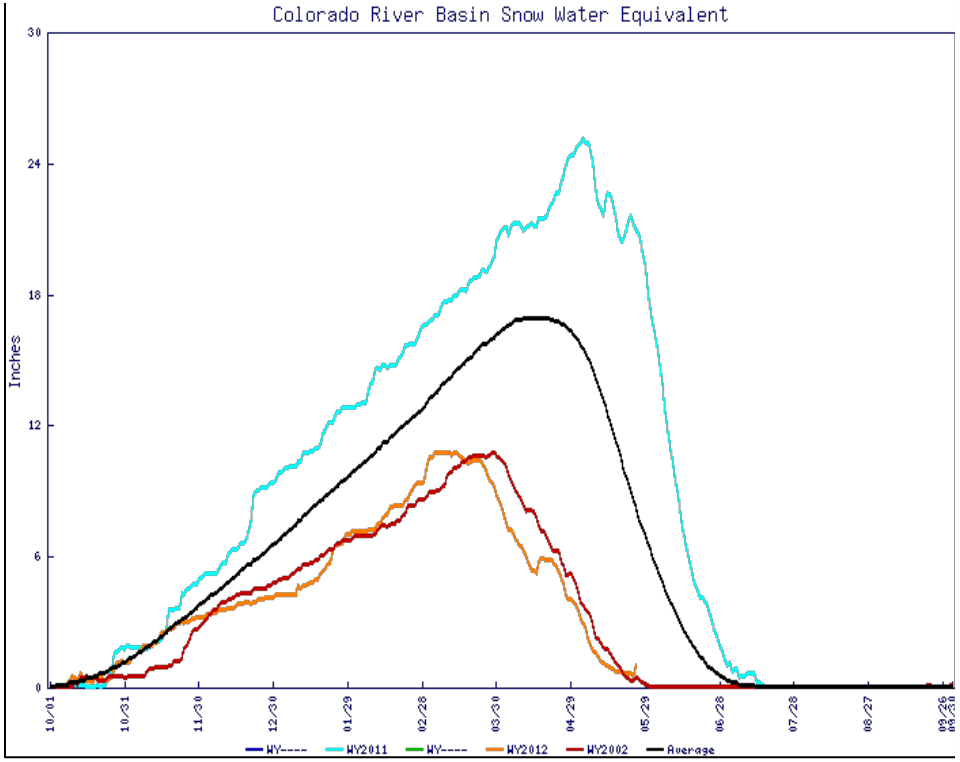


Fig. 4: SNOTEL WYTD SWE for the CO headwaters basin (orange line: current, black line: average, red line: 2002, blue line: 2011).

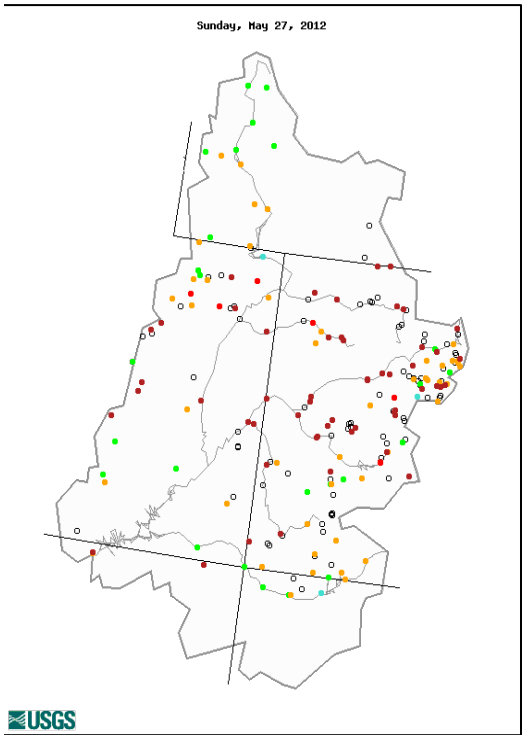
Water-year-to-date (WYTD), SNOTEL precipitation percentiles are lowest for the Yampa and Gunnison basins in CO, with many sites reporting in the lowest 5th percentile or below (Fig. 3). The Wasatch range in UT and the northern mountains of CO are also dry, with most precipitation percentiles in the teens. SNOTEL percentiles in the Upper Green basin in WY are generally above the 40th percentile. In the San Juan basin, a few SNOTEL percentiles remain above the 30th percentile, but there are many SNOTEL sites now reporting below the 30th percentile.

Snowpack conditions around the UCRB are all well below average and many sites have completely melted out. This is a combined result of less than average seasonal snowpack accumulations and much earlier melting. In Figure 4, accumulated snow water equivalent around the Colorado headwaters peaked over a month earlier than average. Accumulations were similar to 2002 accumulations and melting has occurred earlier than 2002. This is similar for many of the sub-basins in the UCRB.

Streamflow

As of May 27th, 21% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows (Fig. 5). Only 2% of the gages in the basin are recording above normal flows, while about 78% of the gages in the basin are recording below normal flows. The gages on the Upper Green River and the San Juan River are mixed between below normal and normal flows. Most gages on the Yampa, Colorado, Gunnison, and Dolores rivers are currently recording much below normal flows (below the 10th percentile). Higher flows are mostly located on smaller rivers, or in the northern part of the UCRB.

Flows on three key gages in the UCRB have increased over the past week (Fig. 6). Flows on the Colorado River near the CO-UT state line and on the Green River at Green River, UT increased slightly and are currently recording at the 5th and 10th percentiles, respectively. Flows on the San Juan River near Bluff, UT saw a large increase to the 37th percentile (from the 9th percentile last week). This increase in flows on the San Juan River is likely due to human regulations/releases from upstream Navajo Reservoir.



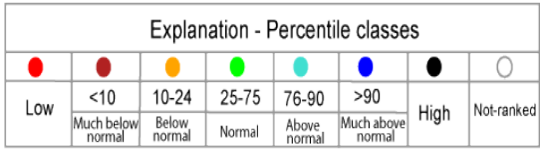


Fig. 5: 7-day average discharge compared to historical discharge for May 27th.

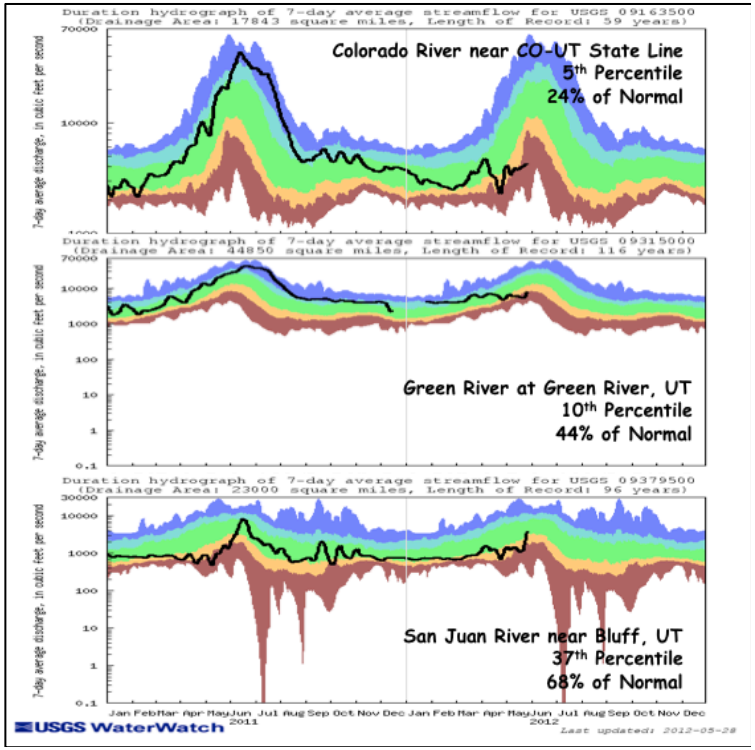


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Most of the UCRB experienced warmer than average temperatures last week, with the northern portion of the basin seeing near to slightly cooler than average temperatures and the Four Corners region seeing temperatures 4 to 8 degrees above average. The rest of CO was also warmer than average. The VIC model shows extremely dry soil moisture conditions for almost all of the UCRB. Very dry soils in the lowest 5th percentile are modeled in western CO, eastern UT, and much of southern WY. Dry soils are also evident through much of northeast and southeast CO. Satellite vegetation conditions show the driest vegetation over northwest CO and eastern UT, with slightly better (but still dry) conditions over southwest WY, the Four Corners region, and northeast CO (Fig. 7)

All of the reservoirs above Lake Powell are currently near or above their May storage averages. Flaming Gorge, Blue Mesa, and Navajo have seen volume decreases since the beginning of the month. The other reservoirs have seen slight increases, though they are observing volume increases much less than what is normally expected for this time of year. Lake Powell is currently at 79% of average and 64% of capacity. Daily inflows into the major reservoirs in the basin are much below average for this time of year.

Precipitation Forecast

An expansive area of high pressure over the western U.S. will again be the main feature of the UCRB forecast. Despite a few weak disturbances moving underneath the ridge, the very dry air associated with this high pressure center will severely limit the potential for any measurable precipitation. Current forecast models indicate that convection will be confined to the highest peaks of the CO mountains, especially around the San Juan mountains where a passing disturbance on Saturday will provide the best chance of any precipitation reaching the ground (Fig. 8). Elsewhere expect mostly sunny skies to prevail, with above average temperatures and dry conditions through the weekend. The next Pacific trough will begin to approach the west coast on Sunday, with the possibility of more significant moisture returning to far western sections of the basin by sometime early next week.

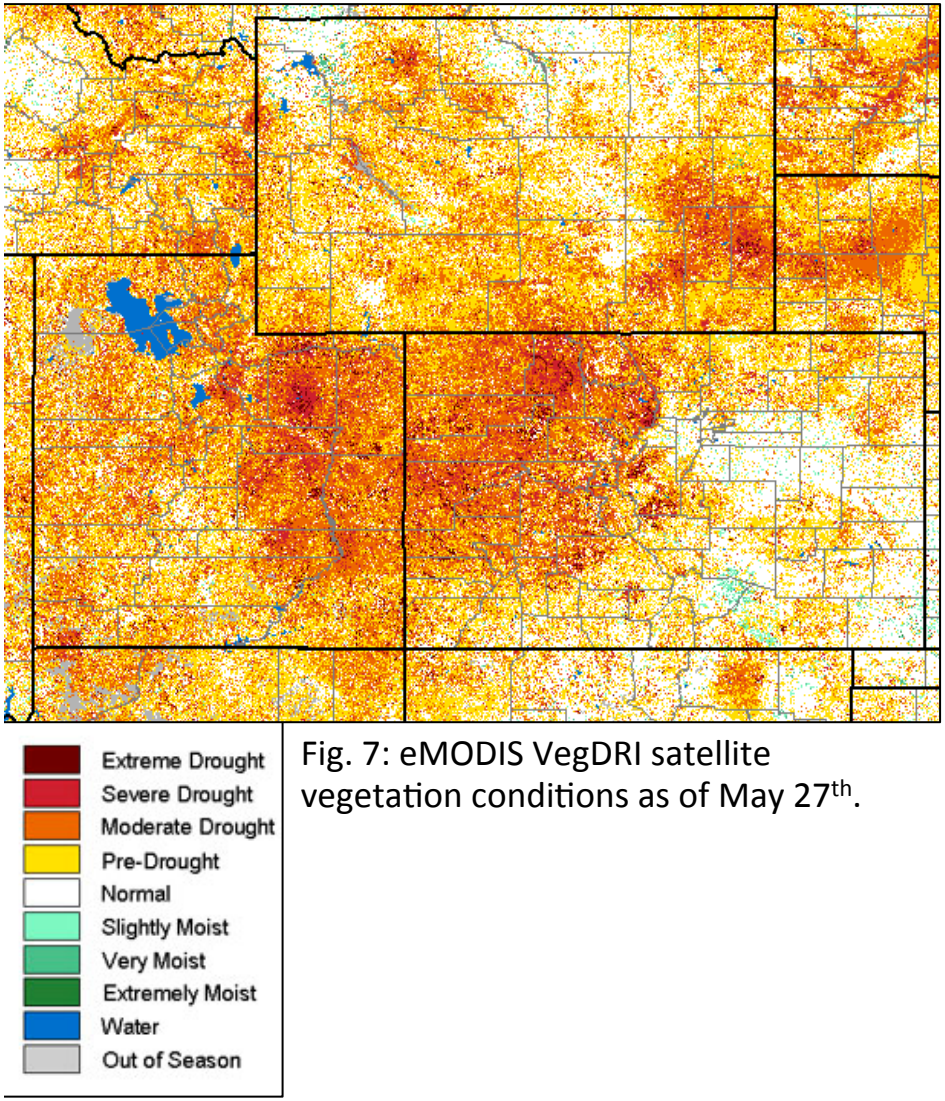


Fig. 7: eMODIS VegDRI satellite vegetation conditions as of May 27th.

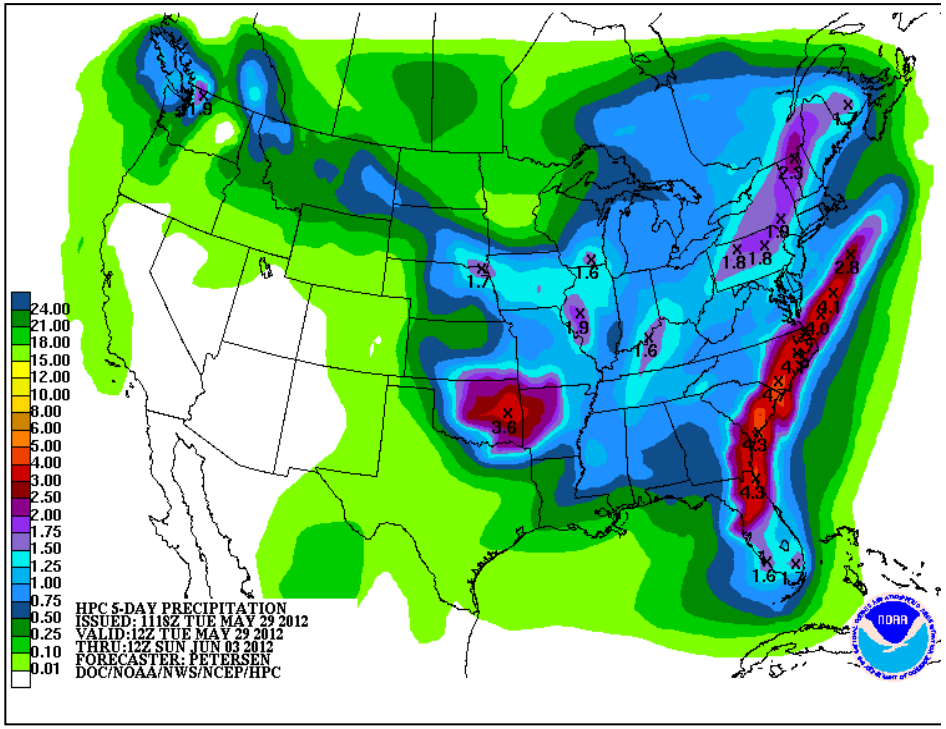
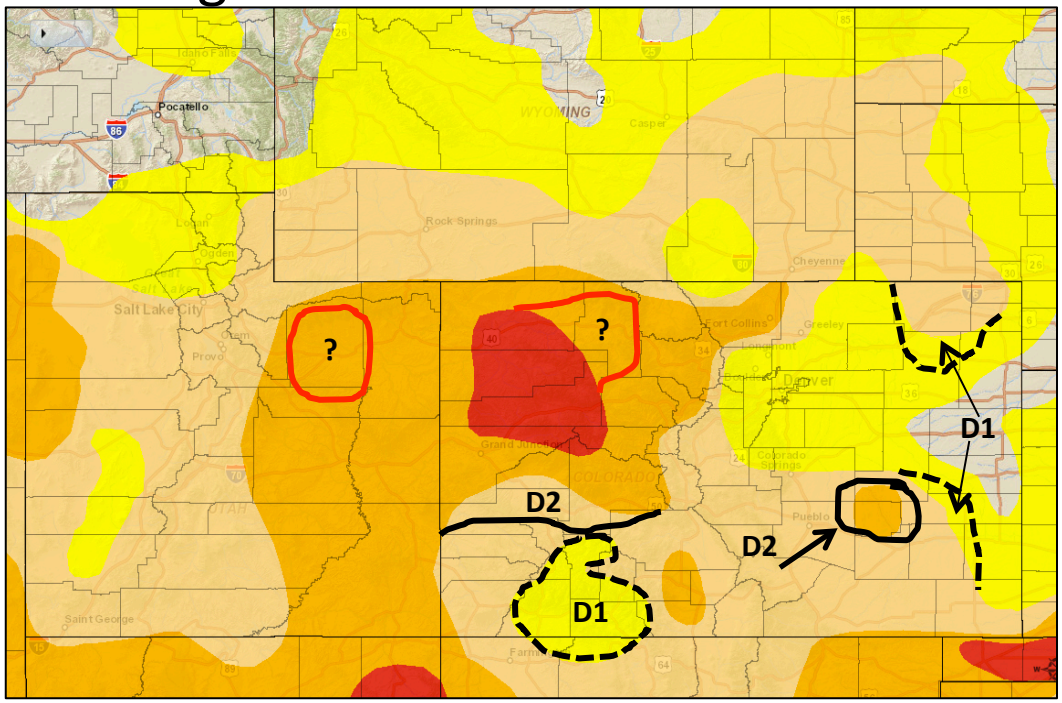
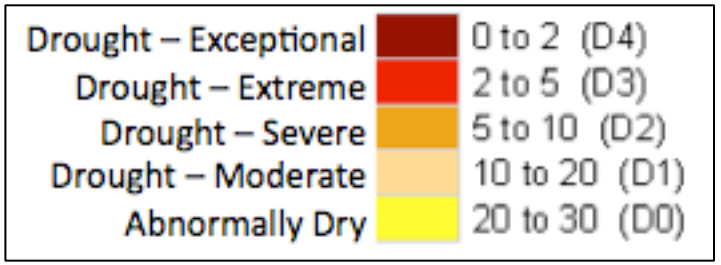


Fig. 8: Hydrologic Prediction Center's Quantitative Precipitation Forecast (QPF) through 12UTC Sunday.

Drought and Water Discussion





Drought categories and their associated percentiles

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

Several changes are recommended for the current U.S. Drought Monitor (USDM) map depiction (Fig. 9). In the UCRB, it is recommended that the remaining D0 around the San Juan Mountains be filled in with D1 (Fig. 9, dashed line), and that the D2 be expanded to cover the remainder of Gunnison County and much of Montrose County (Fig. 9, solid black line). There are reports of wildfires, very dry and dusty conditions, and large precipitation deficits throughout that area. Also, expanding the D3 in northwest CO to cover more of Routt County should be considered (Fig. 9, red line). Many Routt County SNOTEL precipitation percentiles are below the 5th percentile and the VegDRI depicts this area as having extremely dry vegetation. Additionally, the USDM author may want to consider a D3 introduction in Duchesne County, UT where SPIs on several timescales are less than -2.0 and VegDRI also shows extremely dry vegetation (Fig. 9, red line). East of the UCRB, a D1 expansion into Washington County is recommended based on on-the-ground reports (Fig. 9, dashed line). A D1 and D2 expansion are recommended around Kiowa and Lincoln counties where very poor crop conditions are being reported (Fig. 9, dashed and solid black lines).