Spring 2012

Weekly Climate, Water & Drought Assessment

Today's Agenda

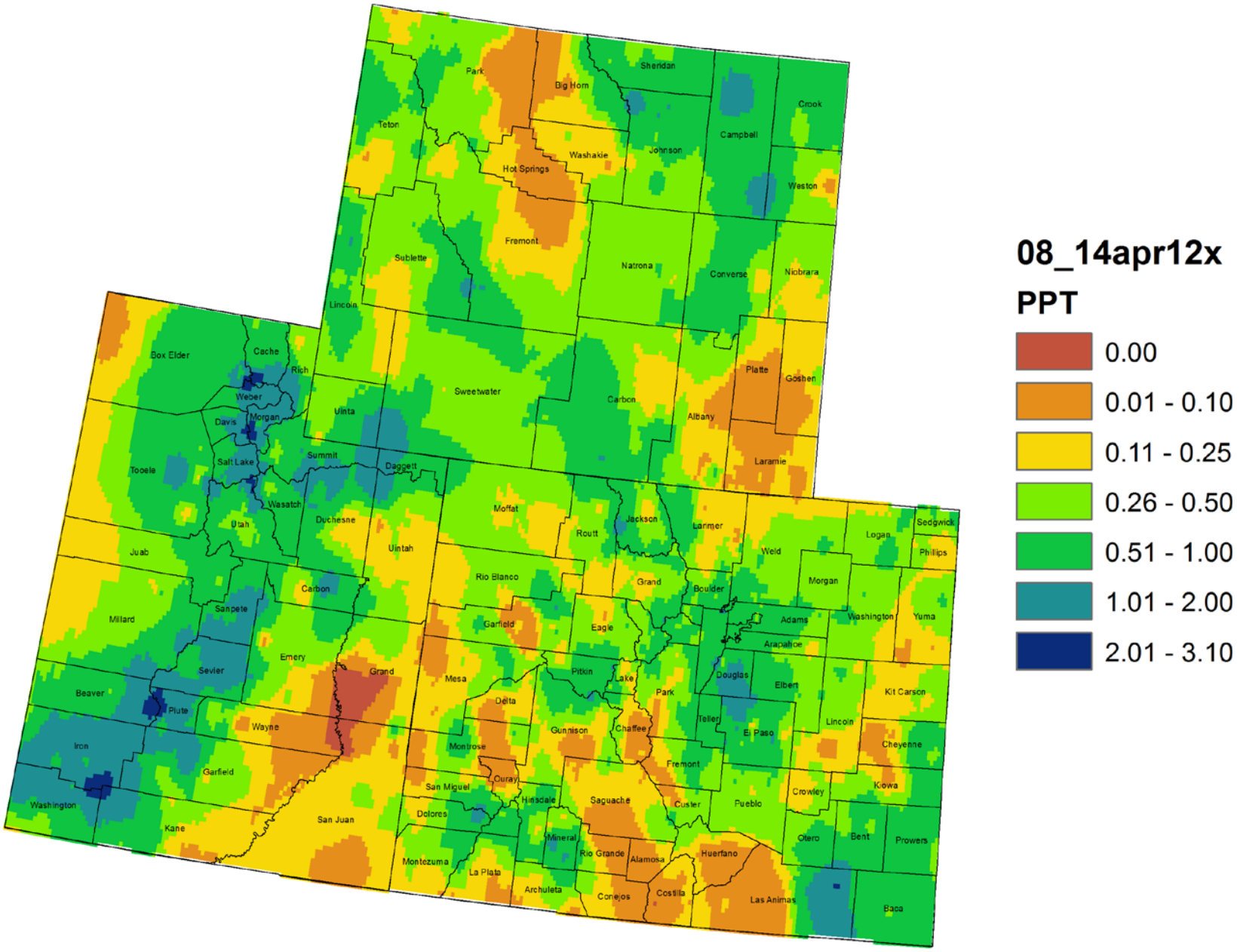
-Assessment of current water conditions

- Precipitation Forecast

- Recommendations for Drought Monitor

Precipitation/Snowpack Update

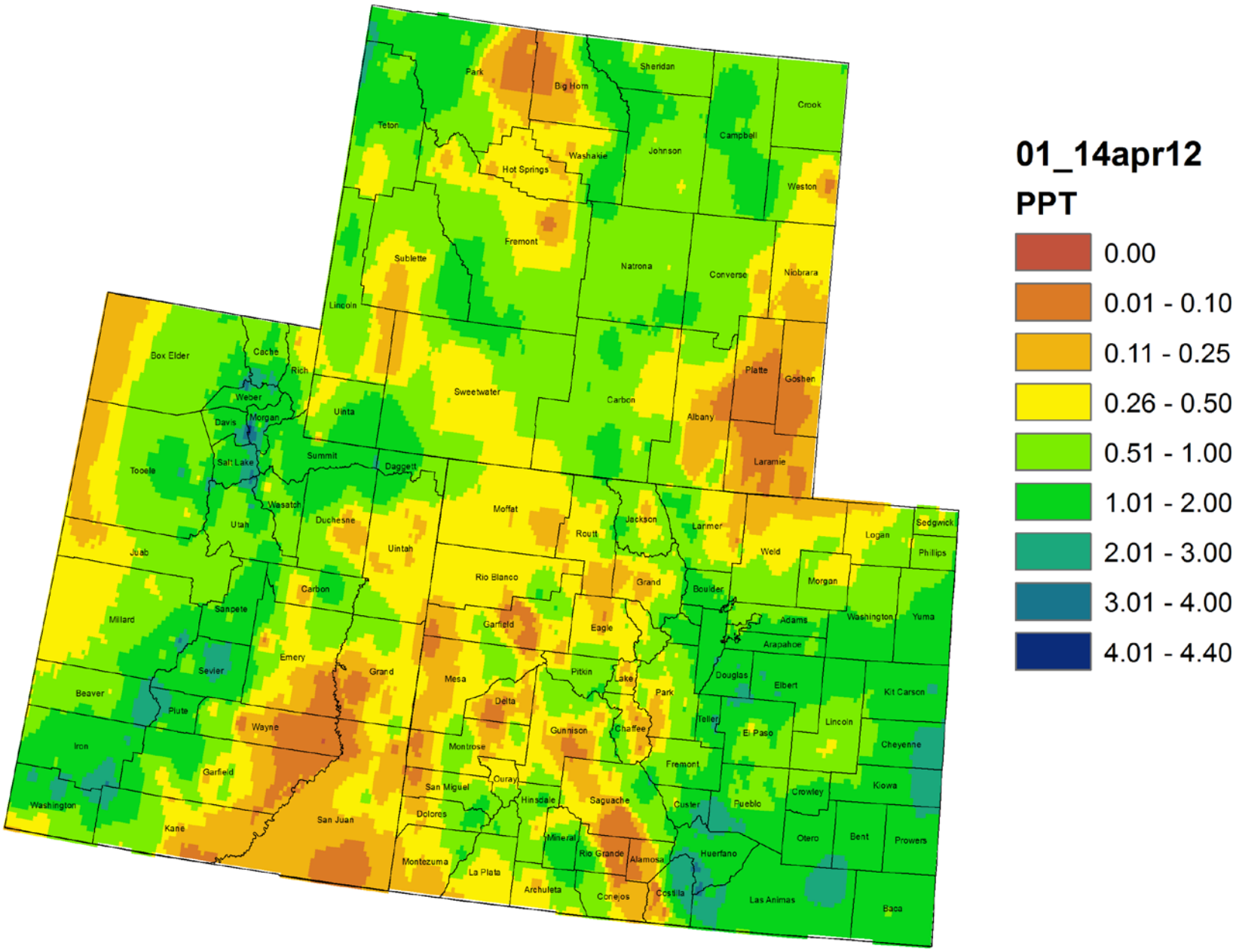
Colorado, Utah and Wyoming 7 Day Precipitation (inches)
8 - 14 April 2012



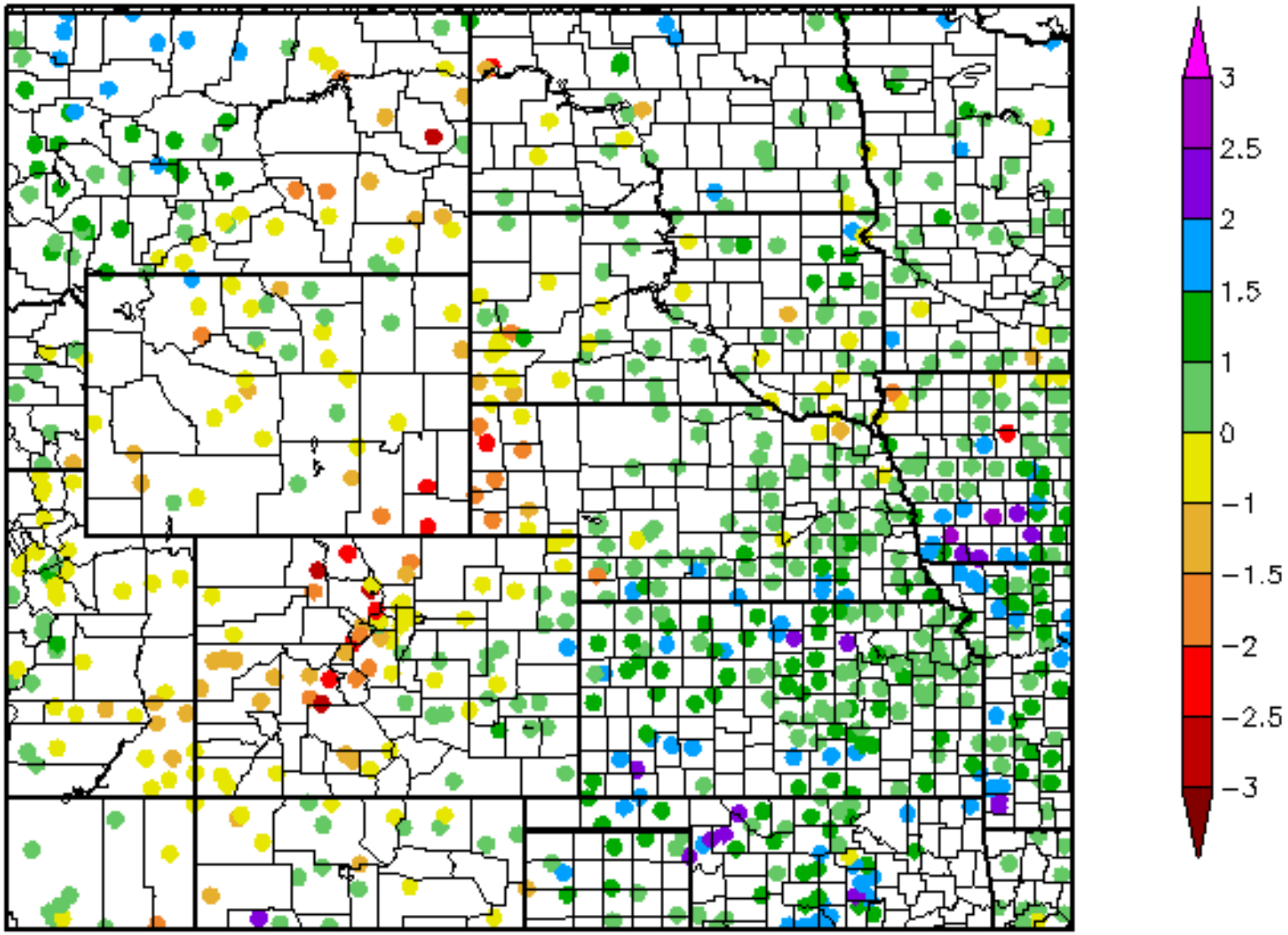
08_14apr12x
PPT

- 0.00
- 0.01 - 0.10
- 0.11 - 0.25
- 0.26 - 0.50
- 0.51 - 1.00
- 1.01 - 2.00
- 2.01 - 3.10

Colorado, Utah and Wyoming Month to Date Precipitation (inches)
1 - 14 April 2012



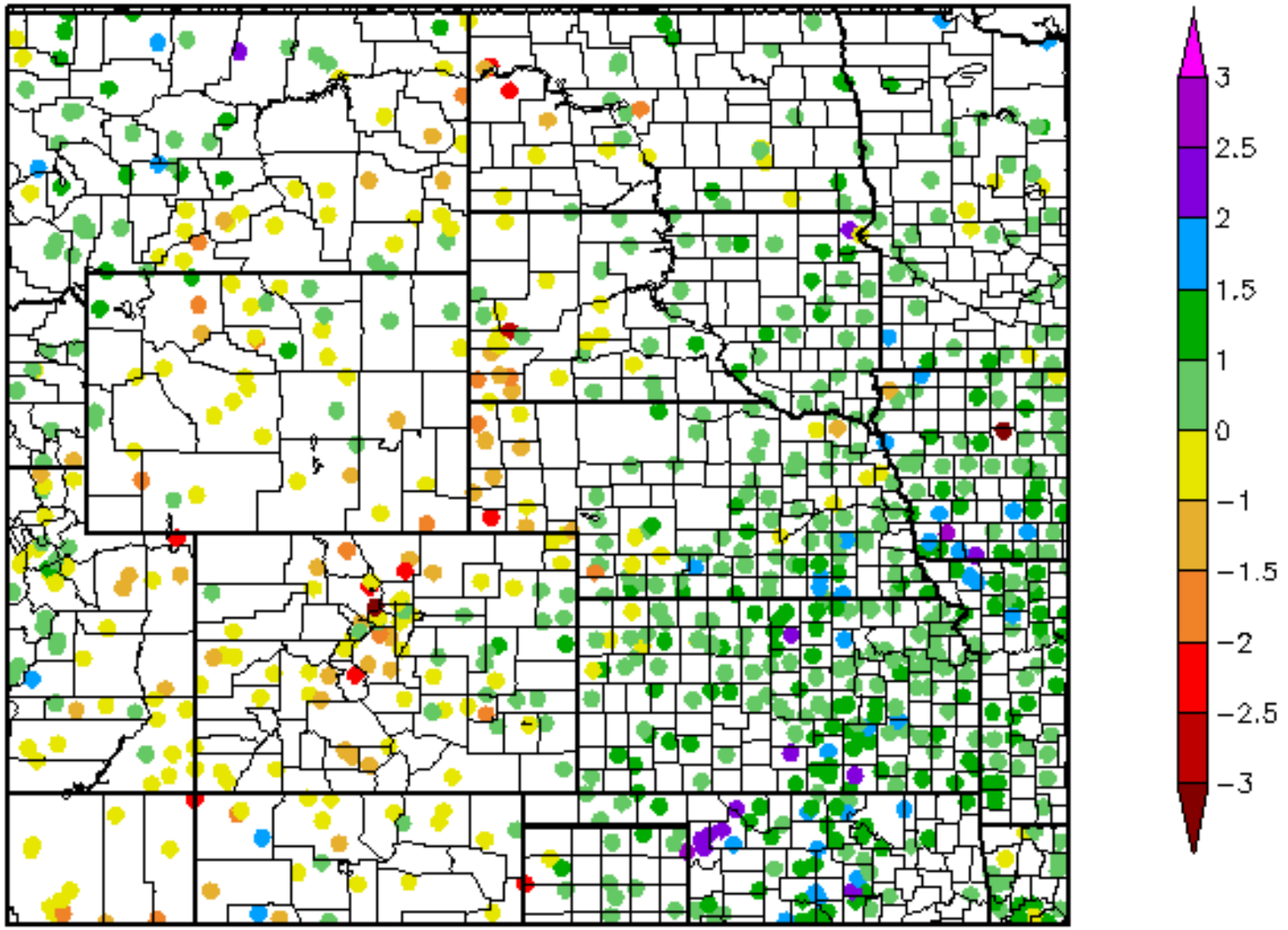
30 Day SPI
3/18/2012 – 4/16/2012



Generated 4/17/2012 at HPRCC using provisional data.

Regional Climate Centers

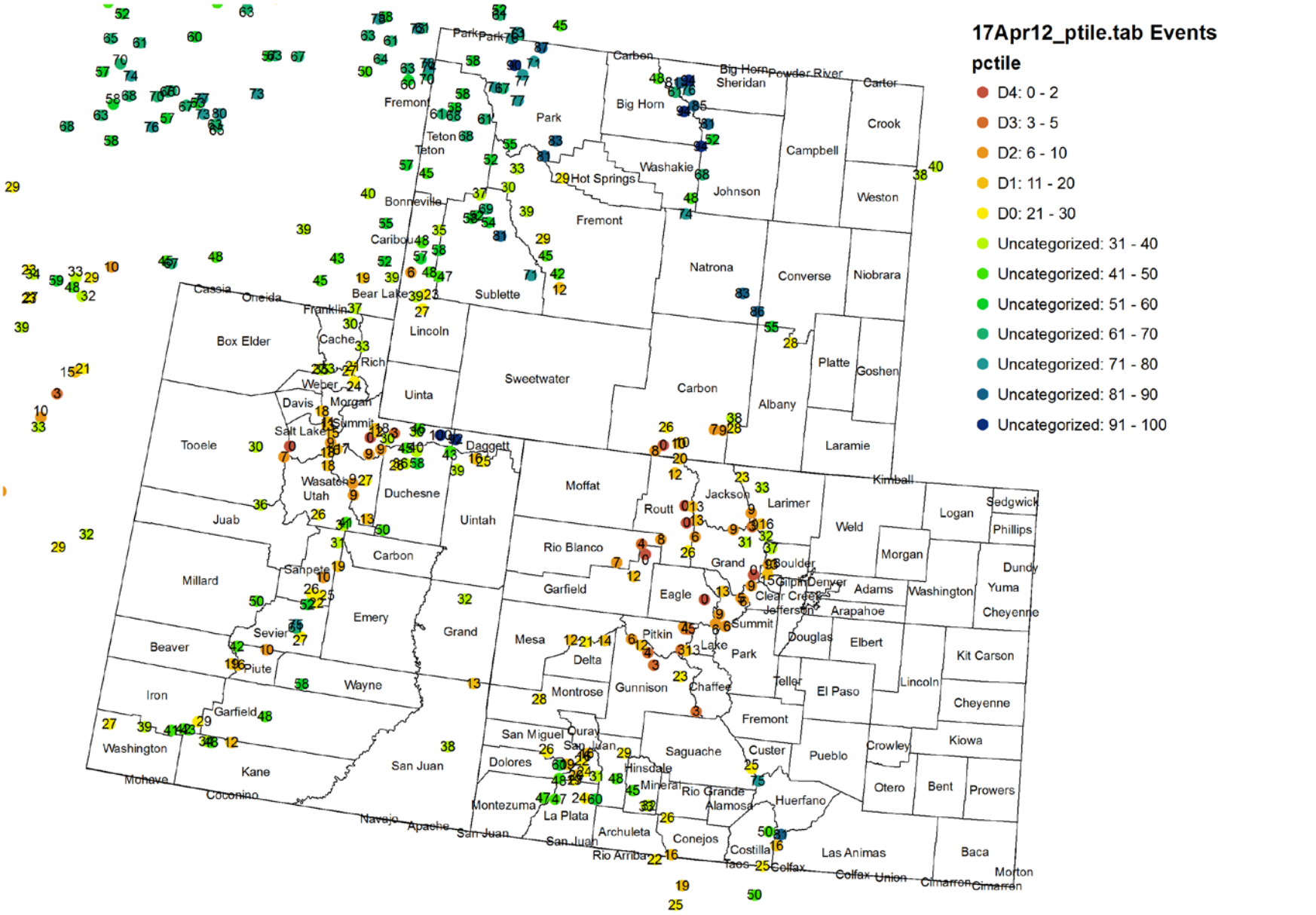
90 Day SPI
1/18/2012 – 4/16/2012



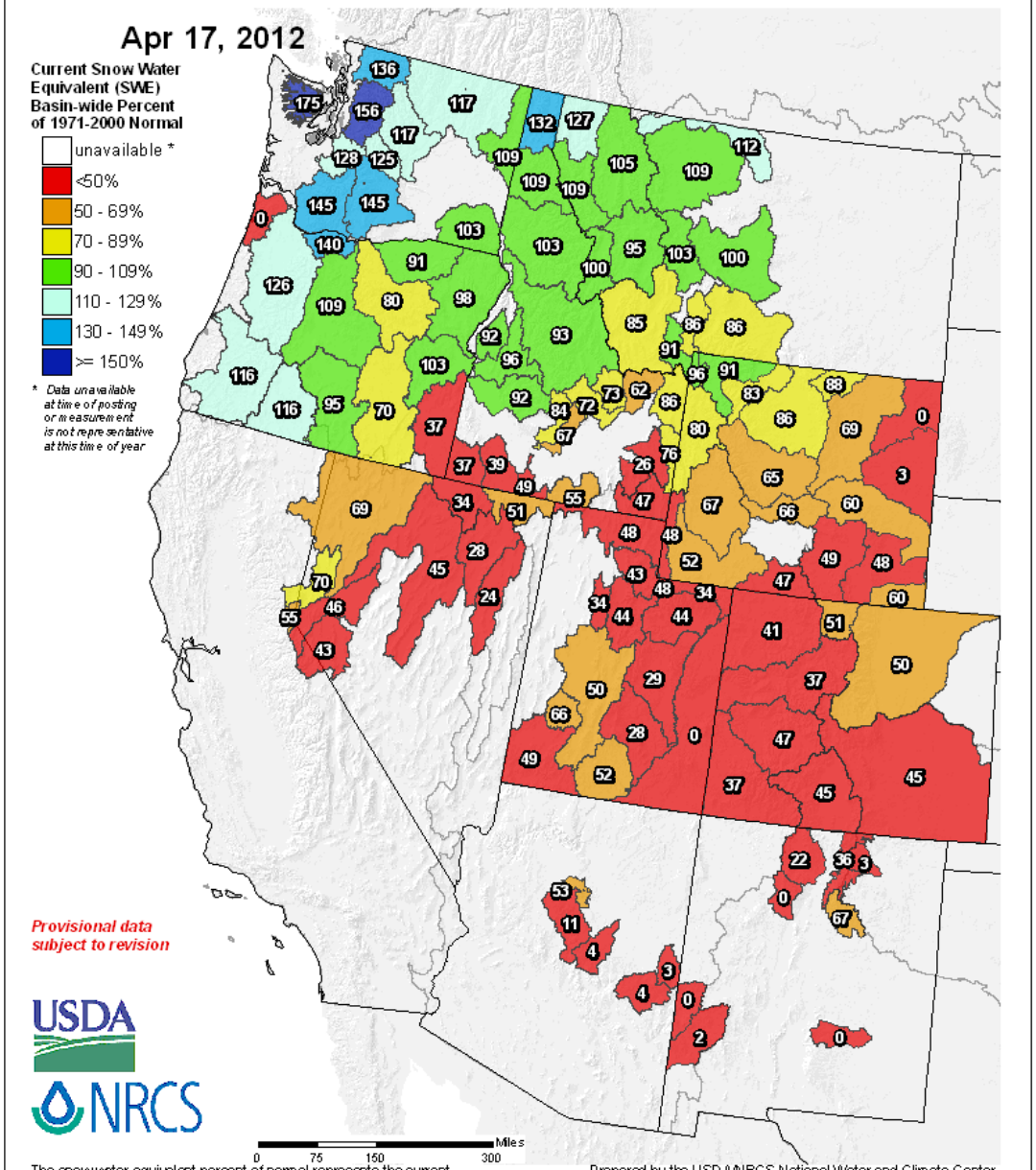
Generated 4/17/2012 at HPRCC using provisional data.

Regional Climate Centers

Snotel Water Year Precipitation Percentile Ranking for 16 April 2012 (Stations with 15+ years of data only)

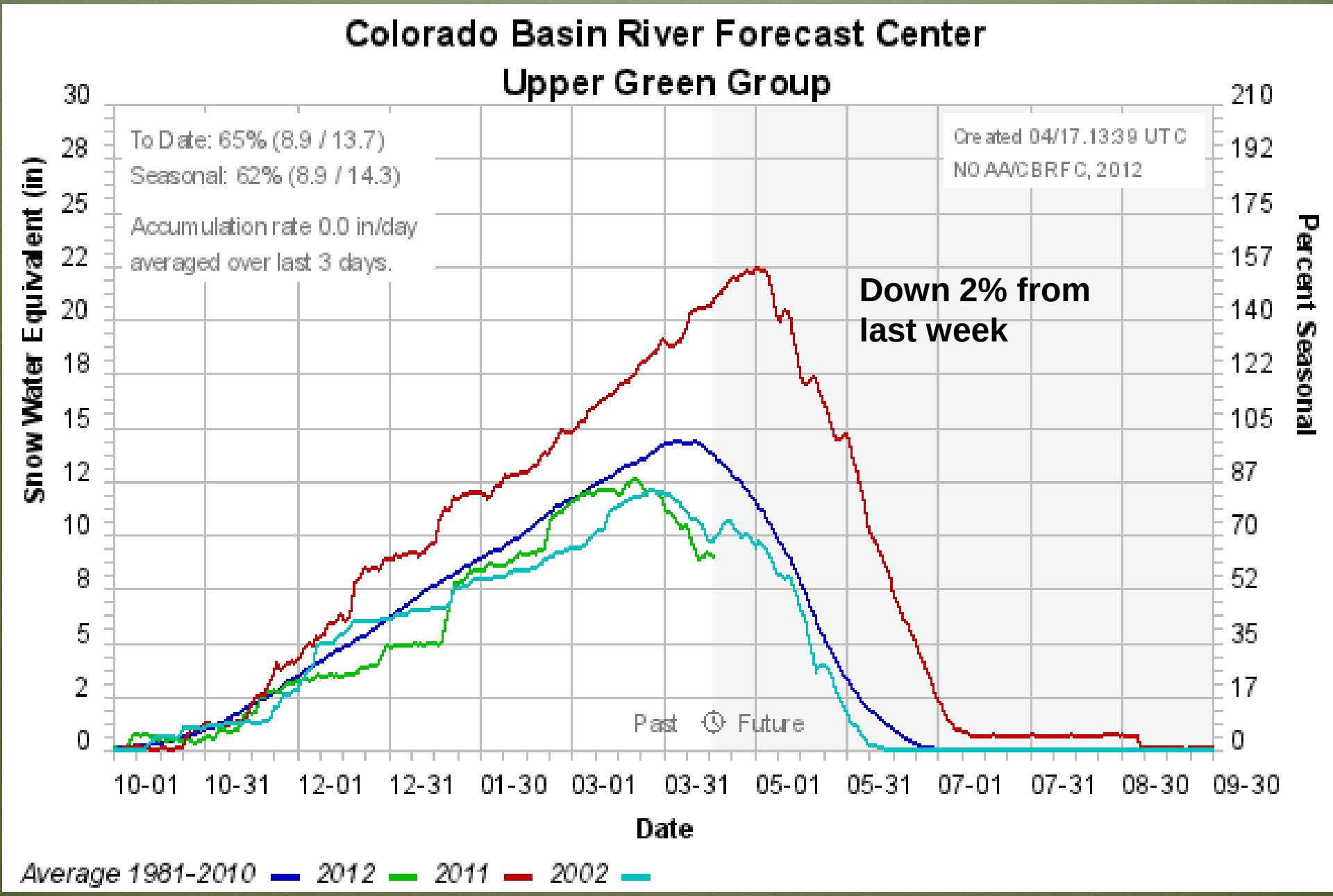


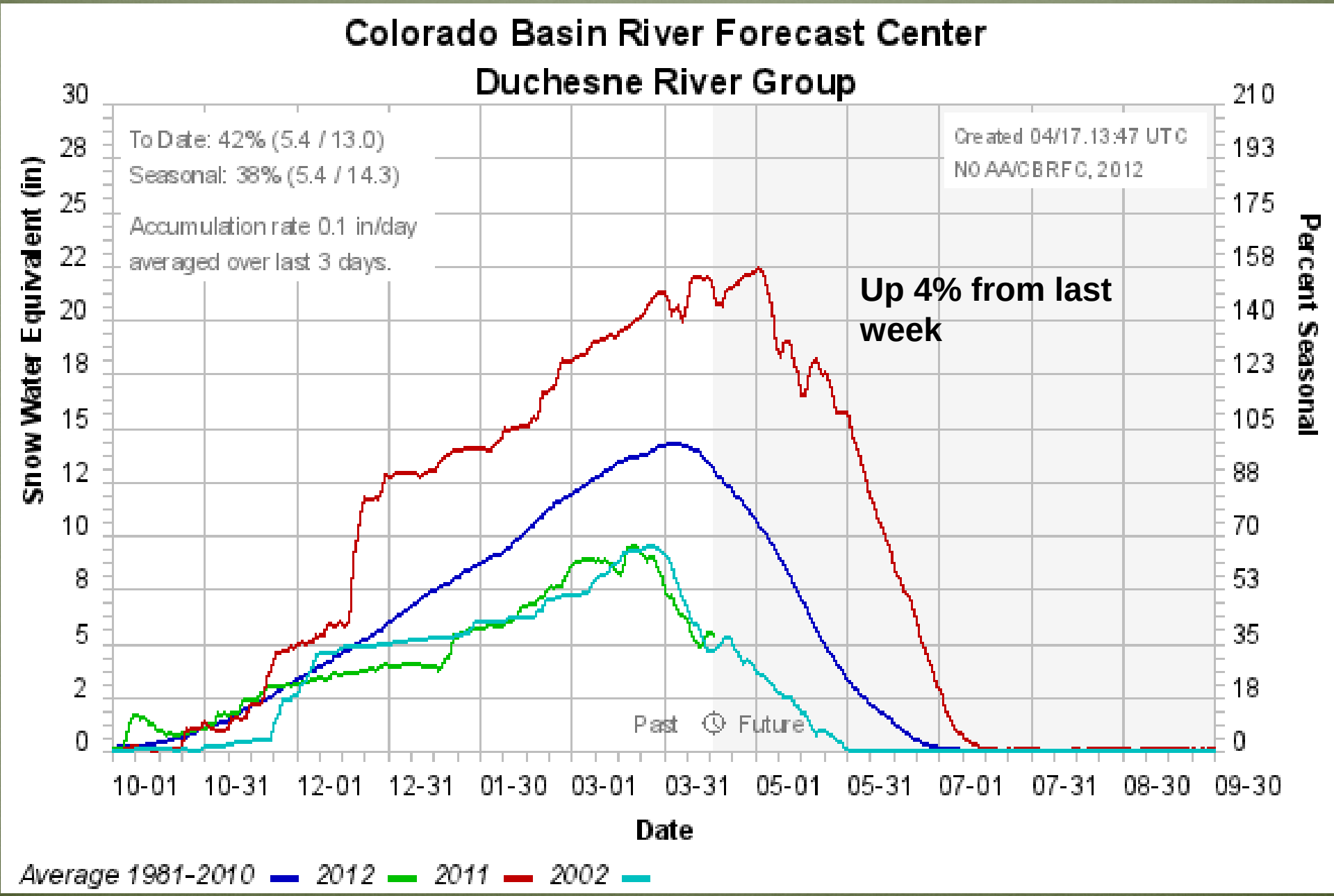
Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

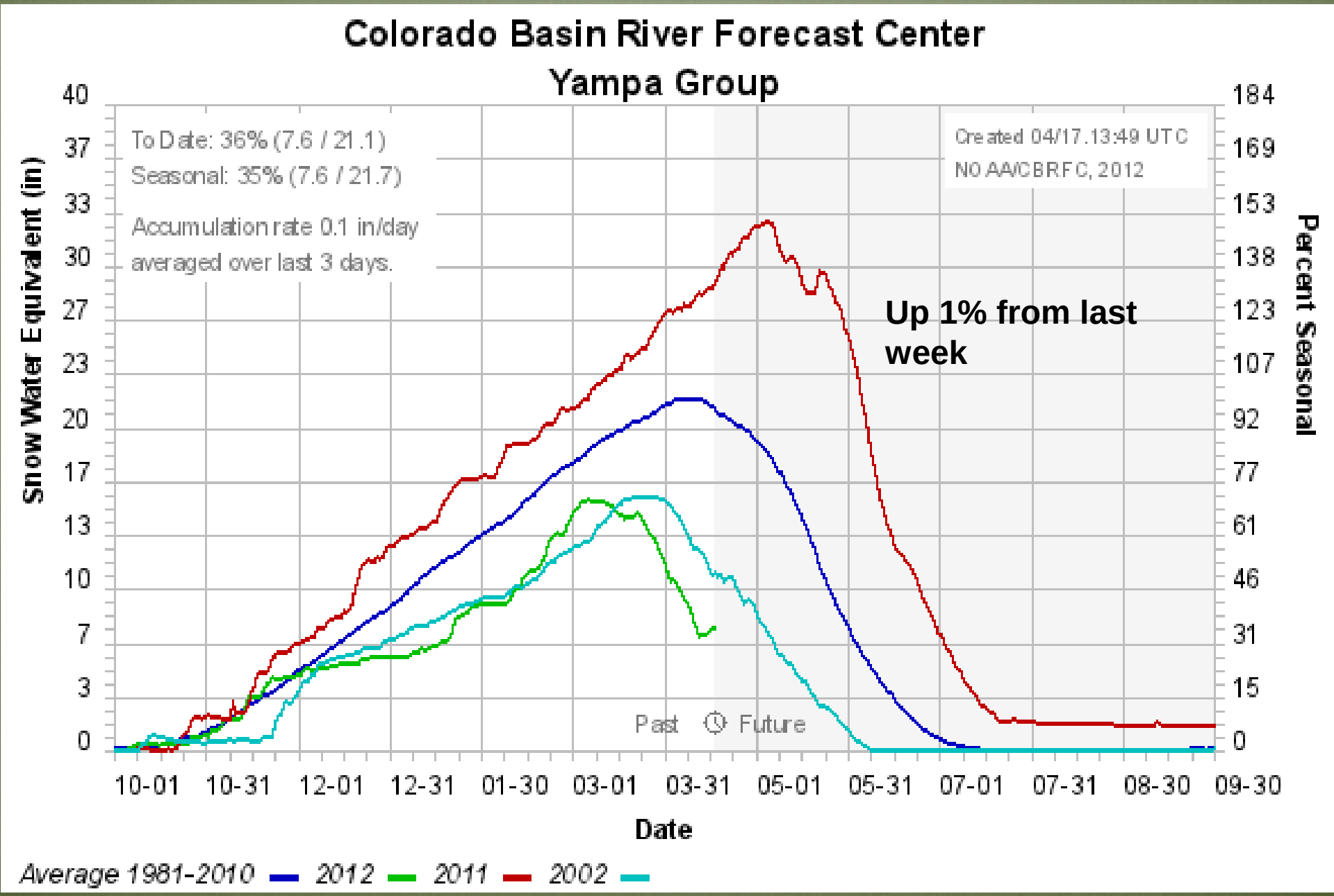


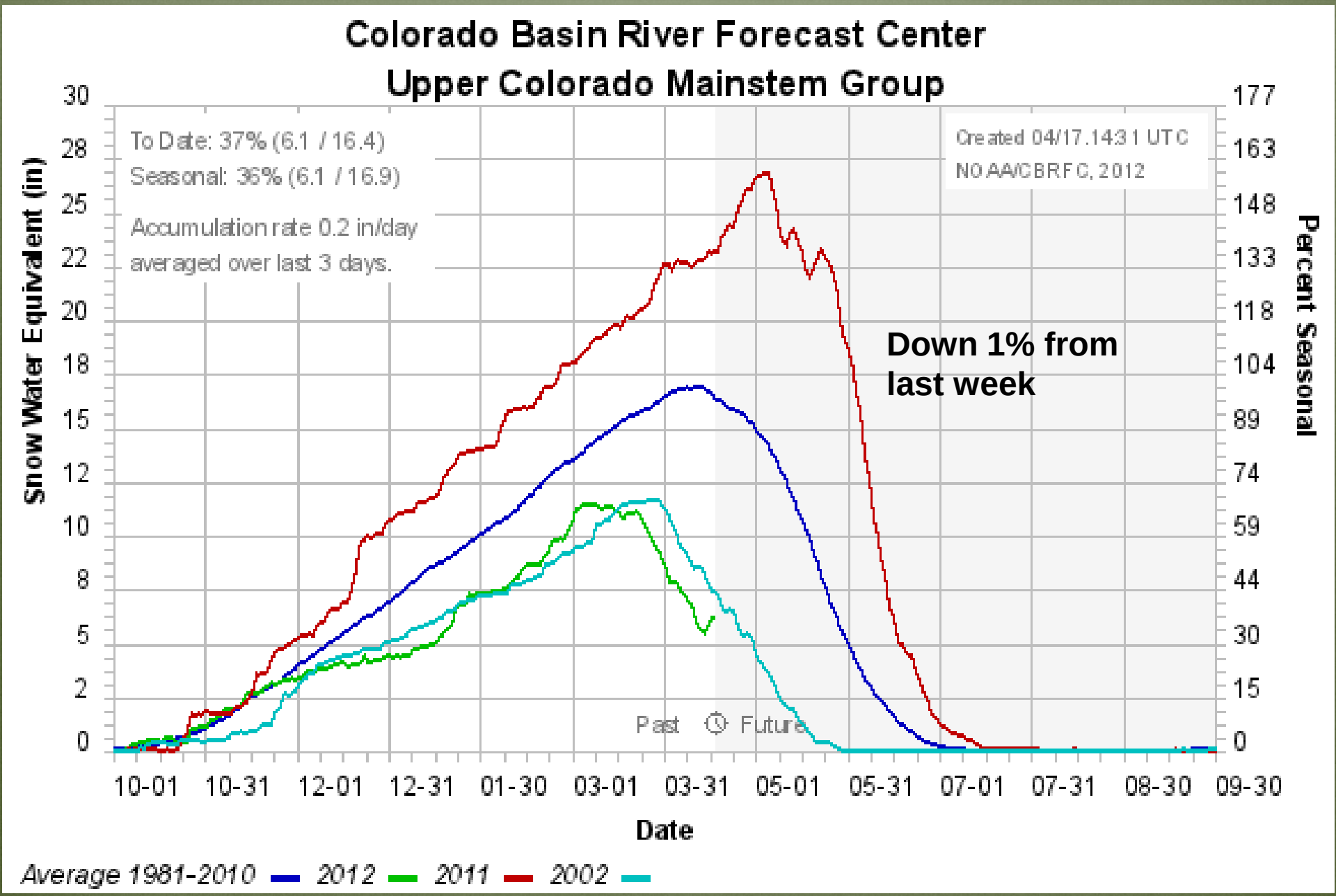
The snow water equivalent percent of normal represents the current snowwater equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

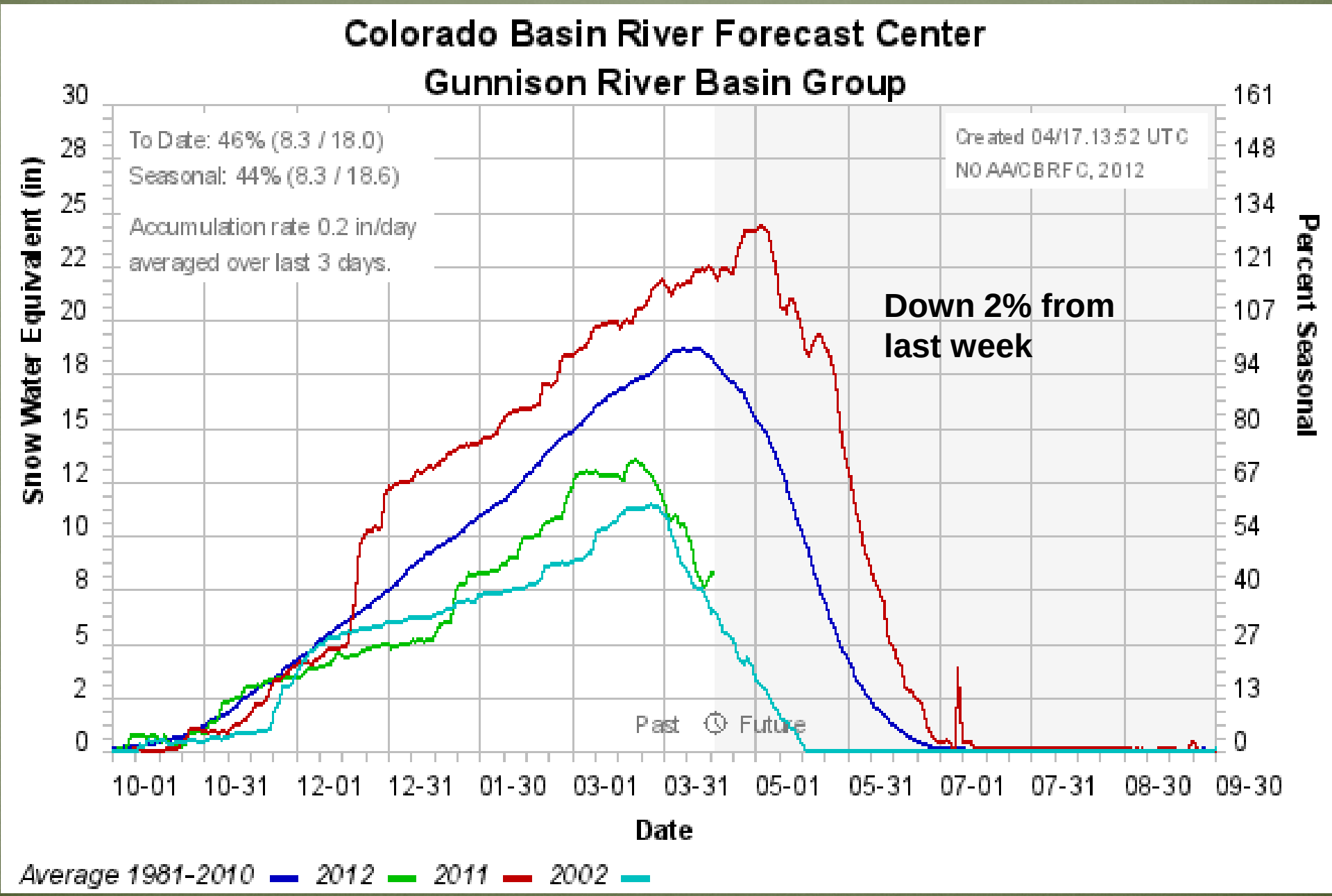
Prepared by the USDA/NRCS National Water and Climate Center
Portland, Oregon http://www.wcc.nrcs.usda.gov/gis/
Based on data from http://www.wcc.nrcs.usda.gov/reports/
Science contact: Jim.Marron@por.usda.gov 503 414 3047

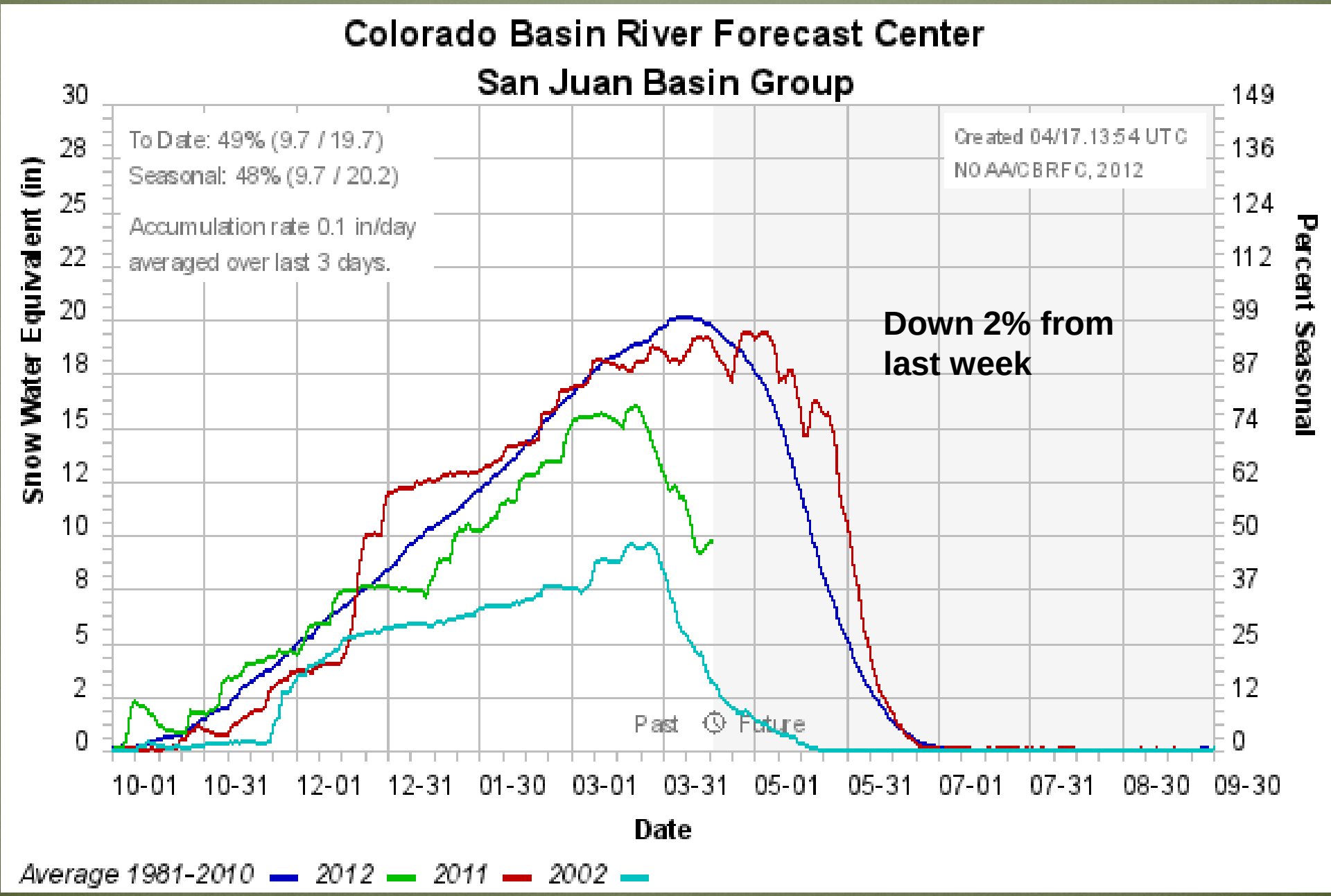

Colorado Basin River Forecast Center
Upper Green Group
To Date: 65% (8.9 / 13.7)
Seasonal: 62% (8.9 / 14.3)
Accumulation rate 0.0 in/day averaged over last 3 days.
Created 04/17.1339 UTC
NOAA/CBRFC, 2012
Down 2% from last week
Past
Future
Snow Water Equivalent (in)
Percent Seasonal
Date
10-01
10-31
12-01
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


Colorado Basin River Forecast Center
Duchesne River Group
To Date: 42% (5.4 / 13.0)
Seasonal: 38% (5.4 / 14.3)
Accumulation rate 0.1 in/day averaged over last 3 days.
Created 04/17.13:47 UTC
NOAA/CBRFC, 2012
Up 4% from last week
Past
Future
Snow Water Equivalent (in)
Percent Seasonal
Date
30
28
25
22
20
18
15
12
10
8
5
2
0
210
193
175
158
140
123
105
88
70
53
35
18
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
Yampa Group
To Date: 36% (7.6 / 21.1)
Seasonal: 35% (7.6 / 21.7)
Accumulation rate 0.1 in/day averaged over last 3 days.
Created 04/17.13:49 UTC
NOAA/CBRFC, 2012
Up 1% 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

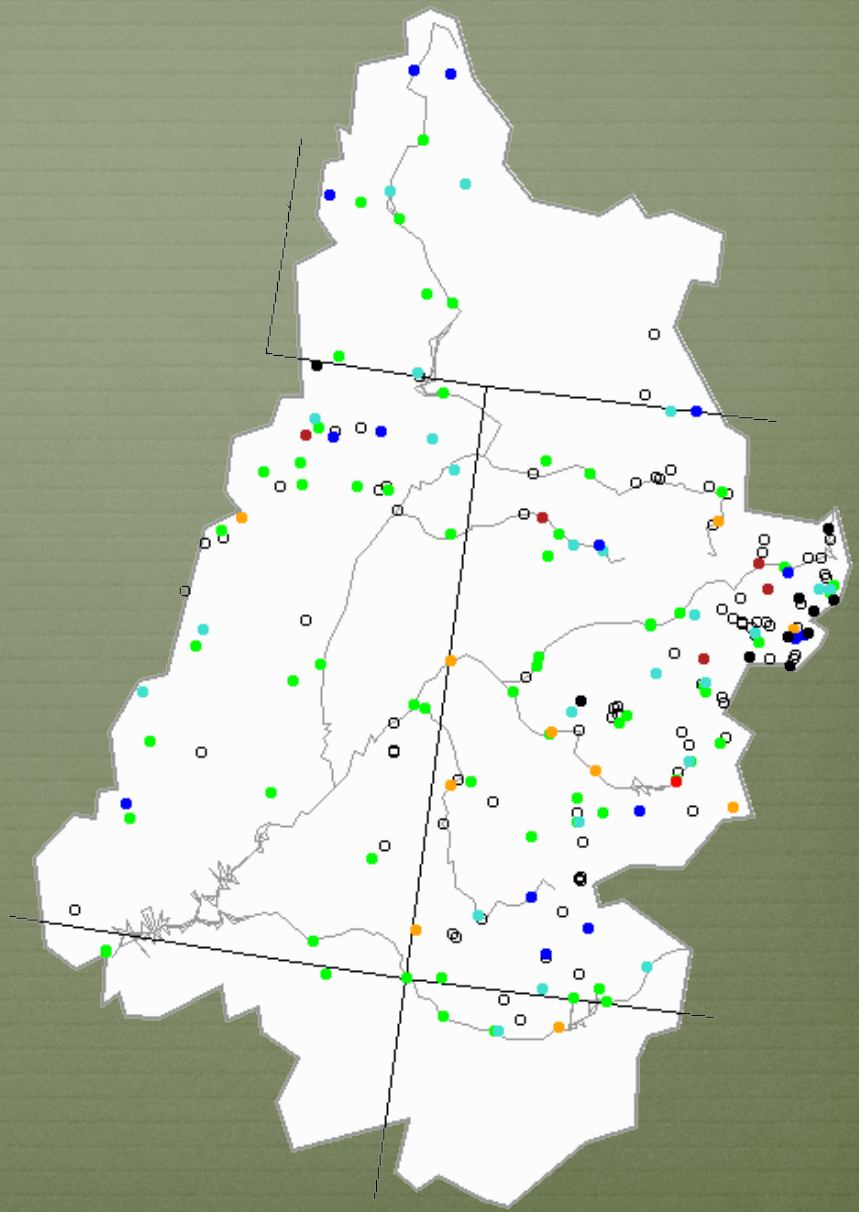

Colorado Basin River Forecast Center
Upper Colorado Mainstem Group
To Date: 37% (6.1 / 16.4)
Seasonal: 36% (6.1 / 16.9)
Accumulation rate 0.2 in/day
averaged over last 3 days.
Created 04/17.1431 UTC
NOAA/CBRFC, 2012
Down 1% from
last week
Past
Future
Snow Water Equivalent (in)
Percent Seasonal
Date
10-01
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


Colorado Basin River Forecast Center
Gunnison River Basin Group
To Date: 46% (8.3 / 18.0)
Seasonal: 44% (8.3 / 18.6)
Accumulation rate 0.2 in/day
averaged over last 3 days.
Created 04/17.1352 UTC
NOAA/CBRFC, 2012
Down 2% from
last week
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: 49% (9.7 / 19.7)
Seasonal: 48% (9.7 / 20.2)
Accumulation rate 0.1 in/day
averaged over last 3 days.
Created 04/17.1354 UTC
NOAA/CBRFC, 2012
Down 2% from
last week
Past
Future
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
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

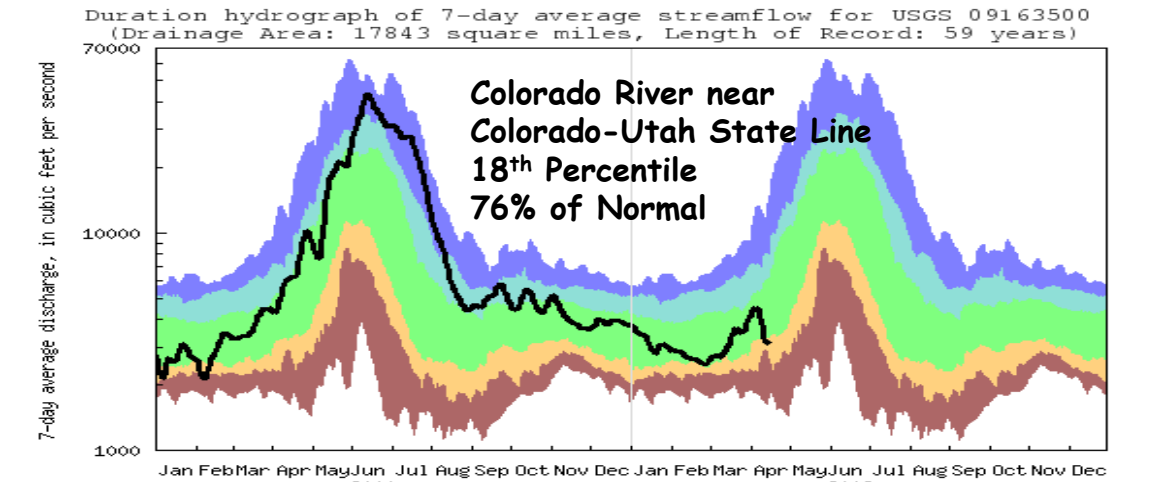
Streamflow Update

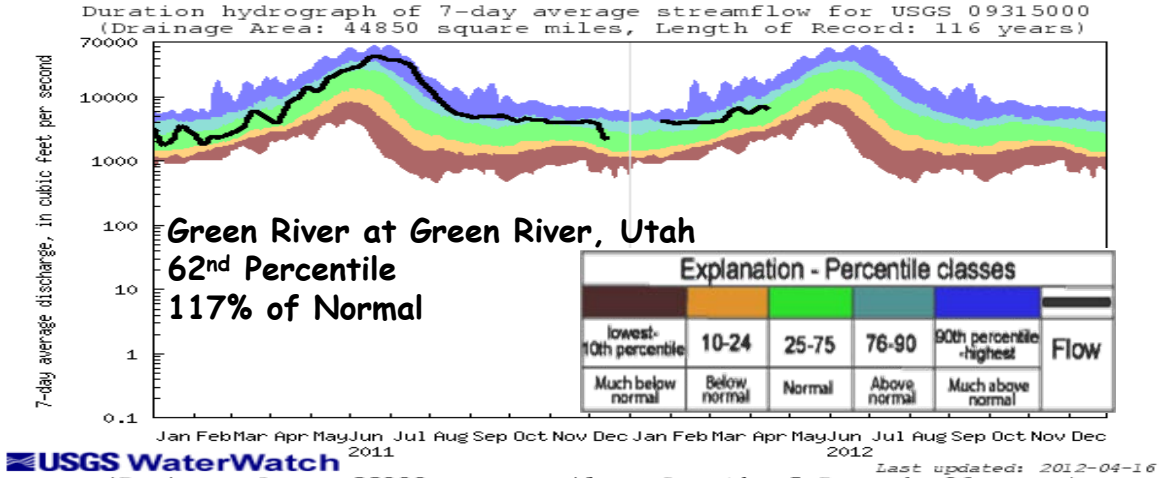
7-day average discharge compared to historical discharge for the day of the year (April 15)



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		

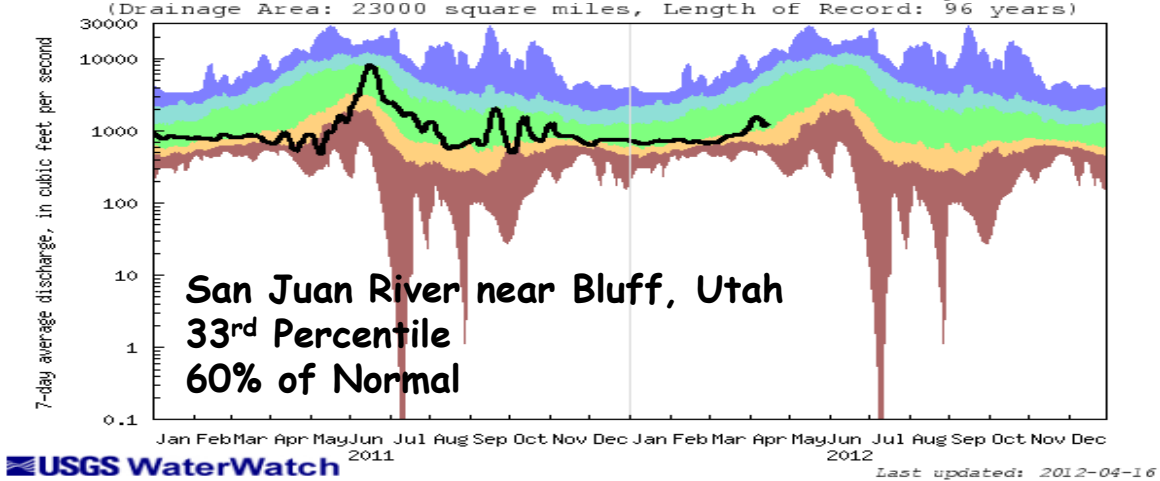
USGS





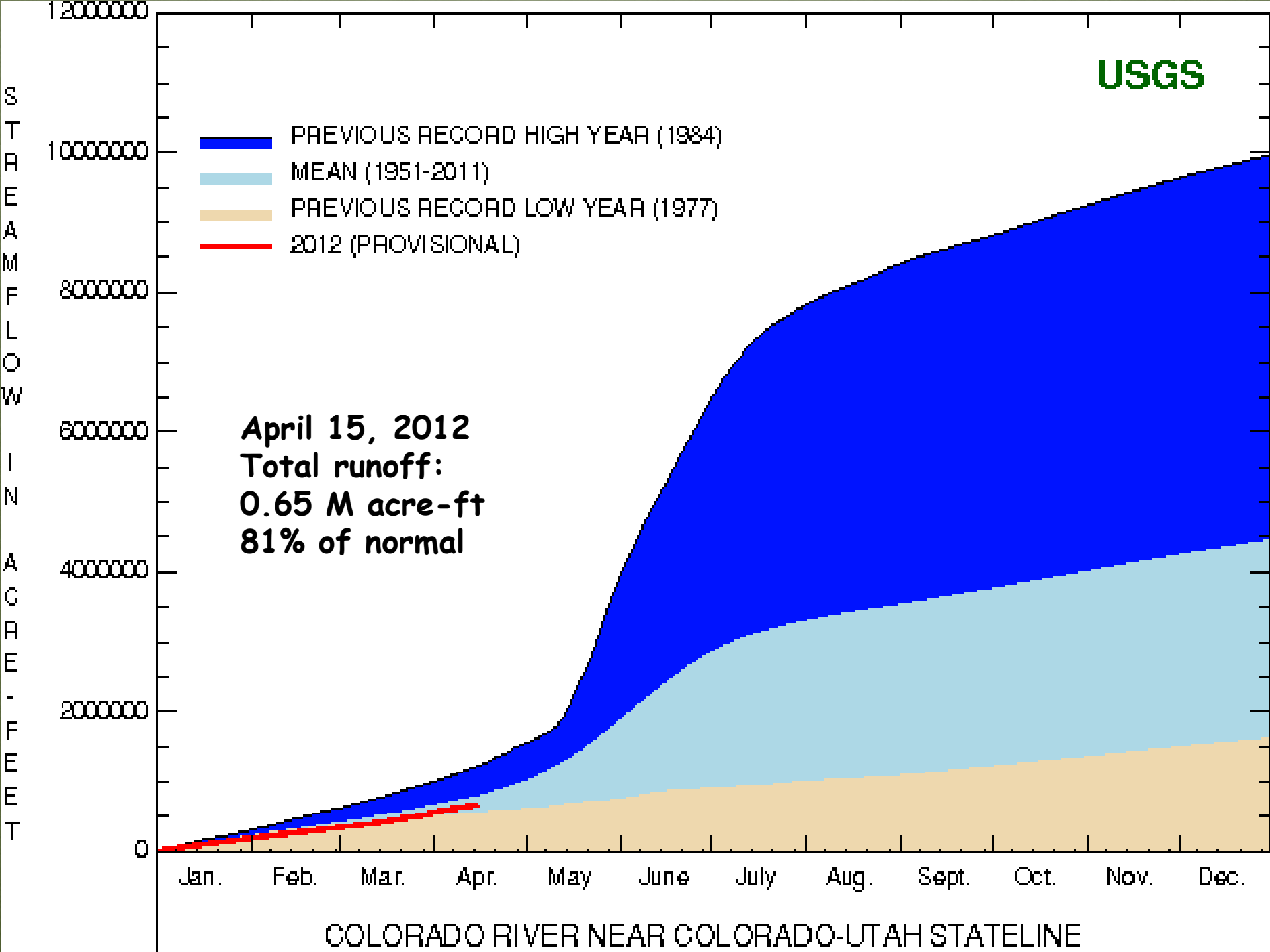
USGS WaterWatch

Last updated: 2012-04-16

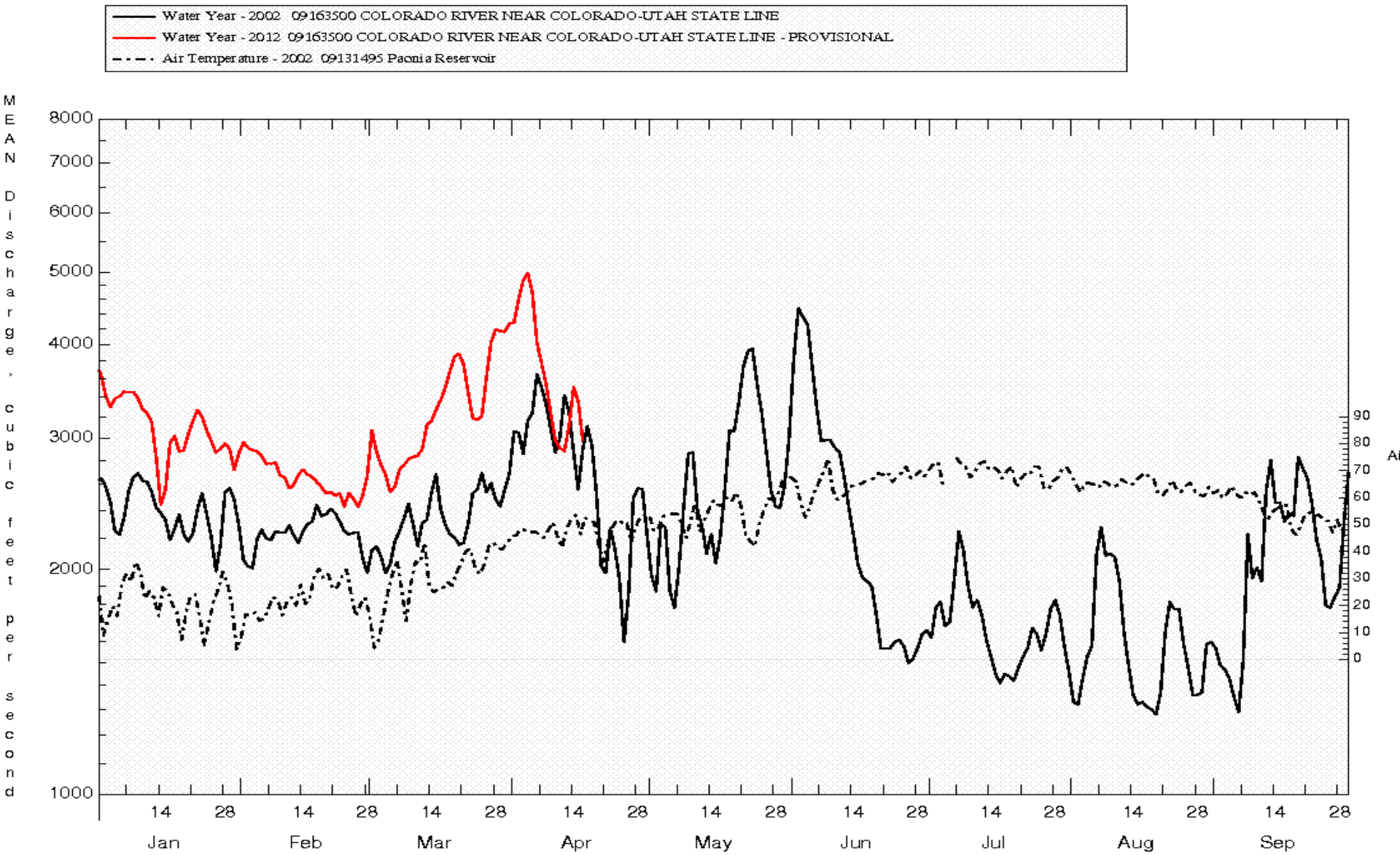


USGS WaterWatch

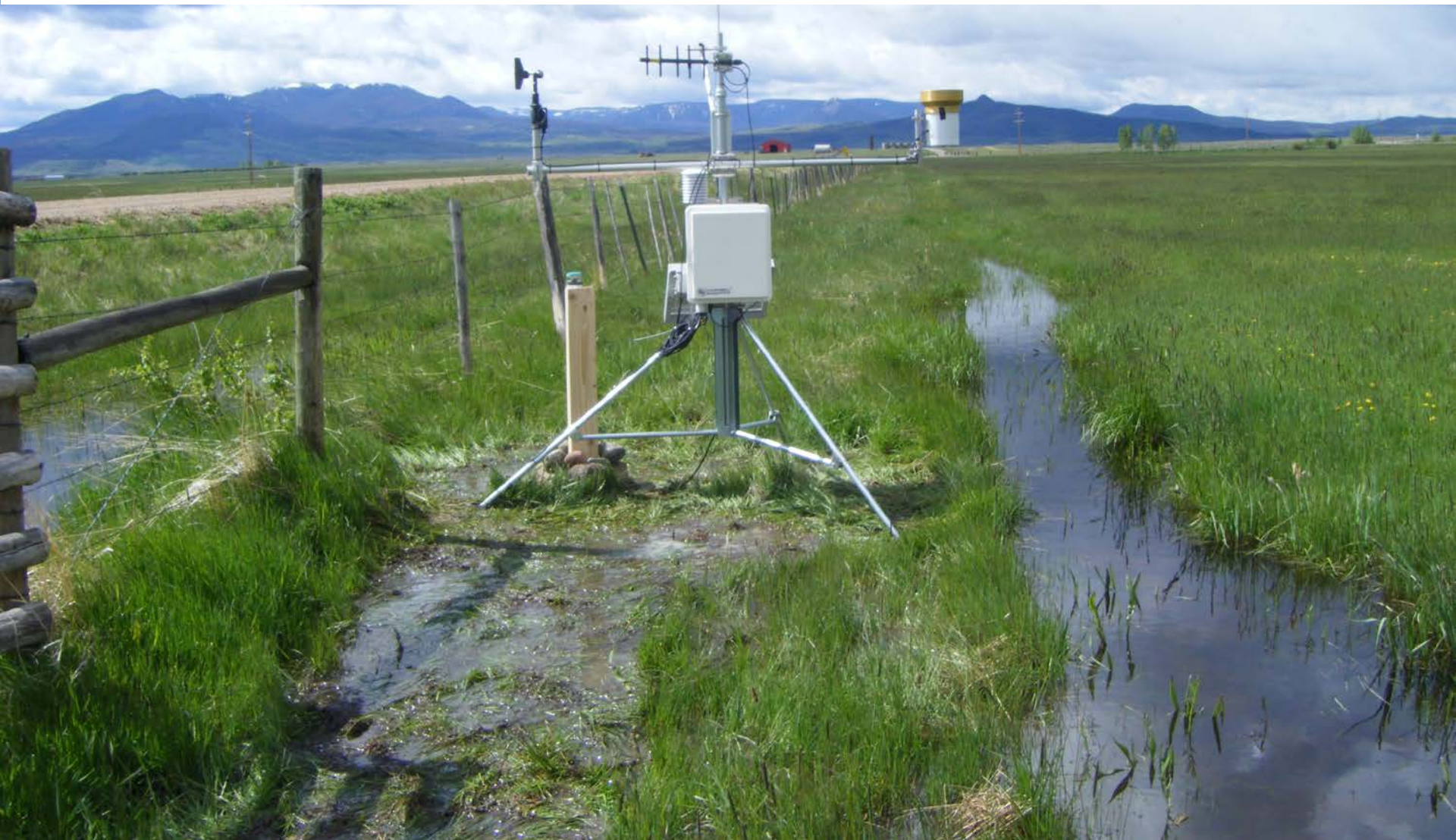
Last updated: 2012-04-16


USGS
PREVIOUS RECORD HIGH YEAR (1984)
MEAN (1951-2011)
PREVIOUS RECORD LOW YEAR (1977)
2012 (PROVISIONAL)
April 15, 2012
Total runoff:
0.65 M acre-ft
81% of normal
STREAMFLOW IN ACRE-FEET
12000000
10000000
8000000
6000000
4000000
2000000
0
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
COLORADO RIVER NEAR COLORADO-UTAH STATELINE

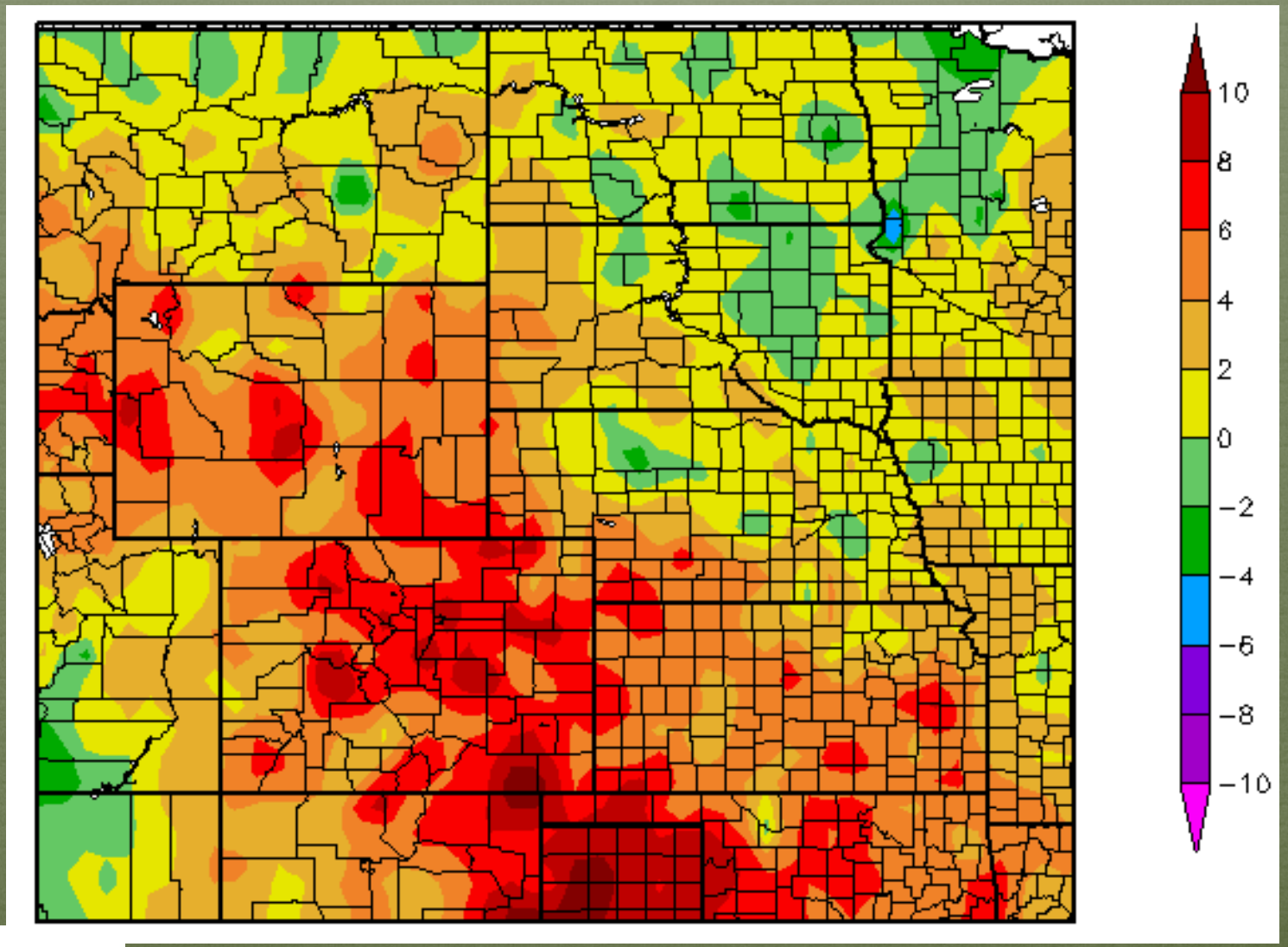
Colorado River nr CO/UT State Line
2002 & 2012



Water Demand

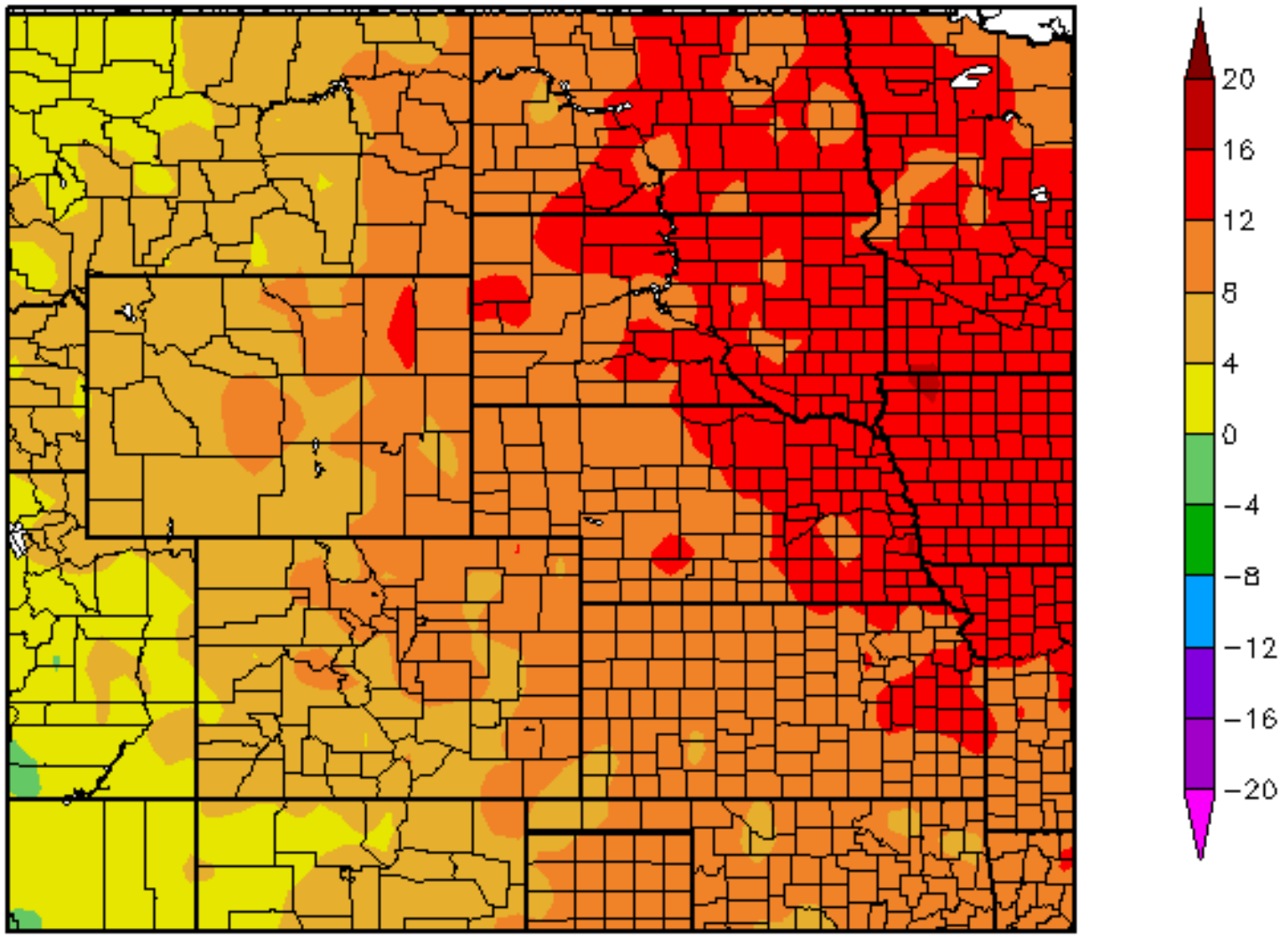


Temperature Departure from Normal
04/09/2012 – 04/15/2012



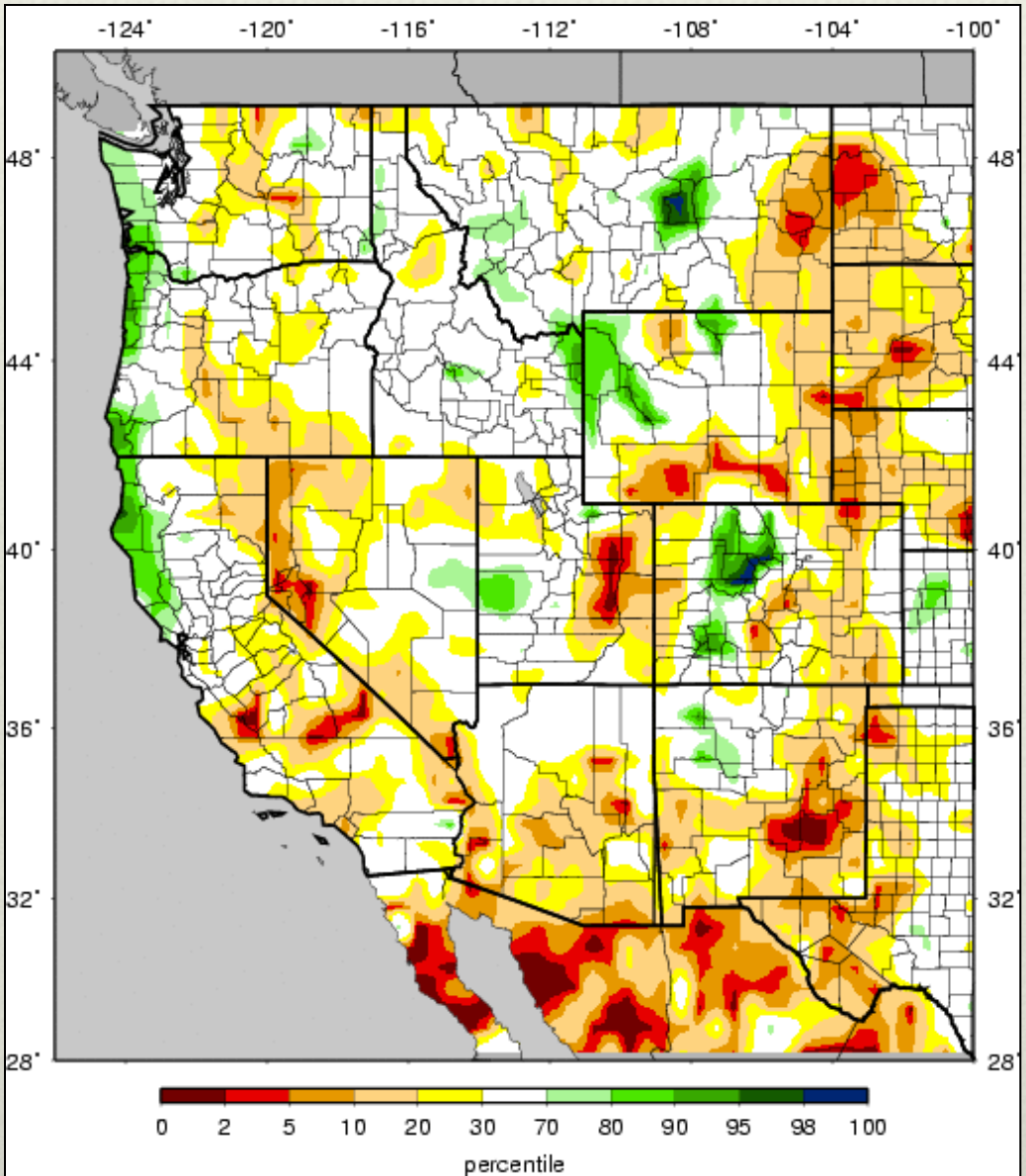
High Plains Regional Climate Center

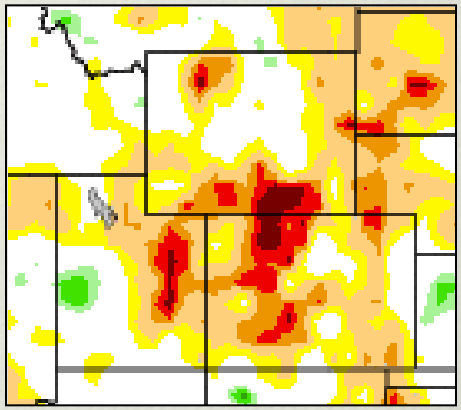
Temperature Departure from Normal
03/17/2012 – 04/15/2012



High Plains Regional Climate Center

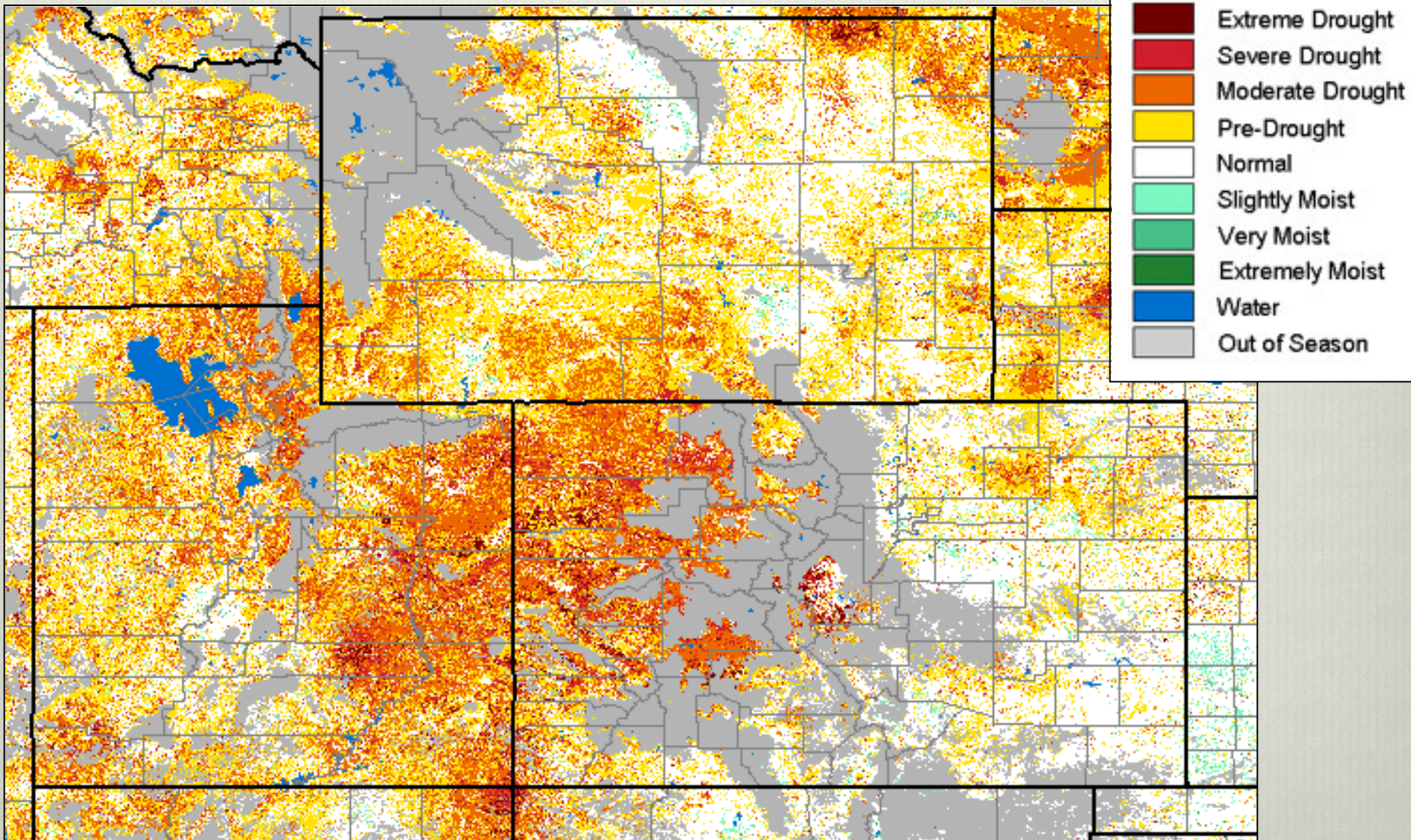
VIC Soil Moisture
15 April 2012





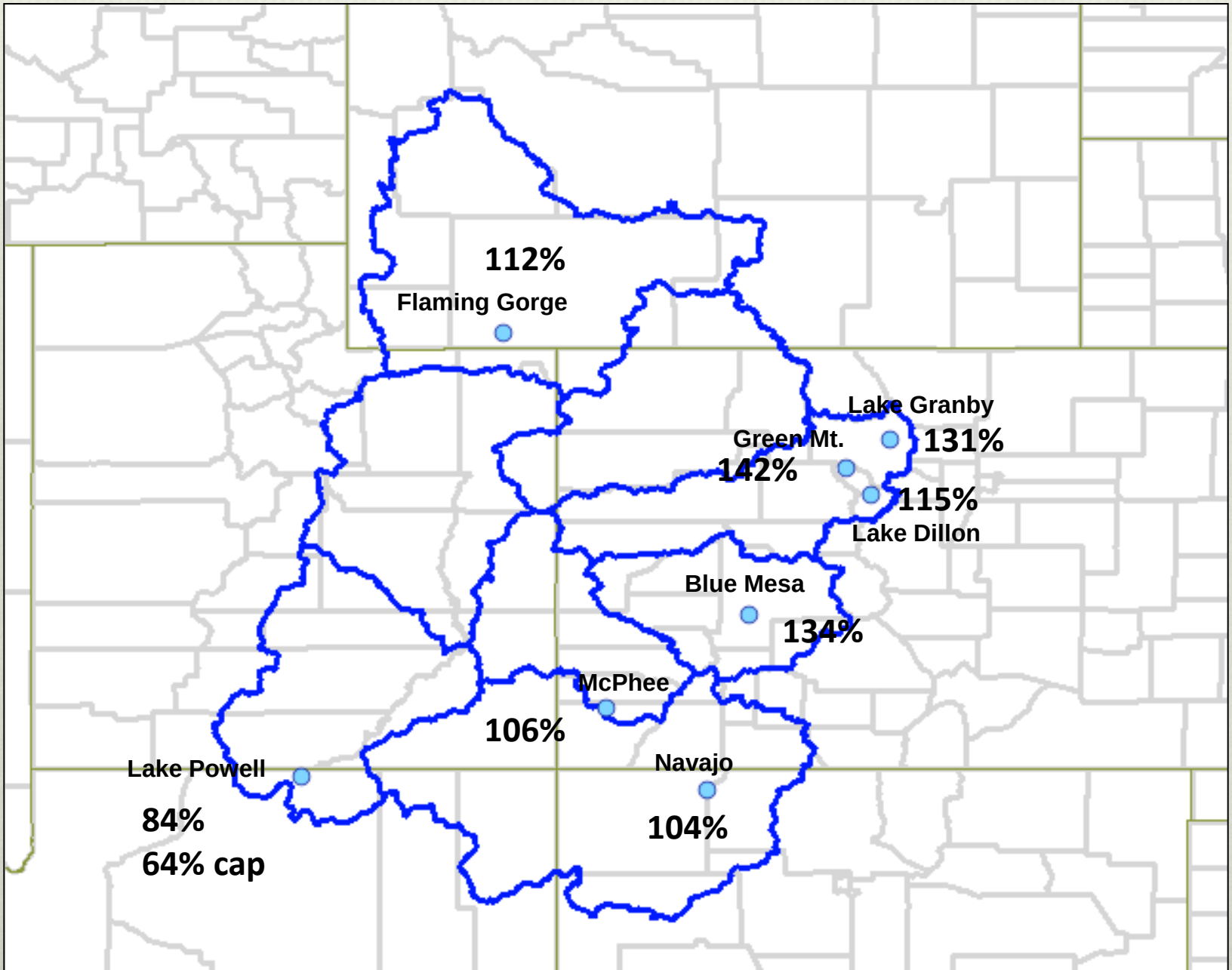
SWE + SOIL MOISTURE = TOTAL MOISTURE STORAGE

eMODIS VegDRI Vegetation
15 April 2012

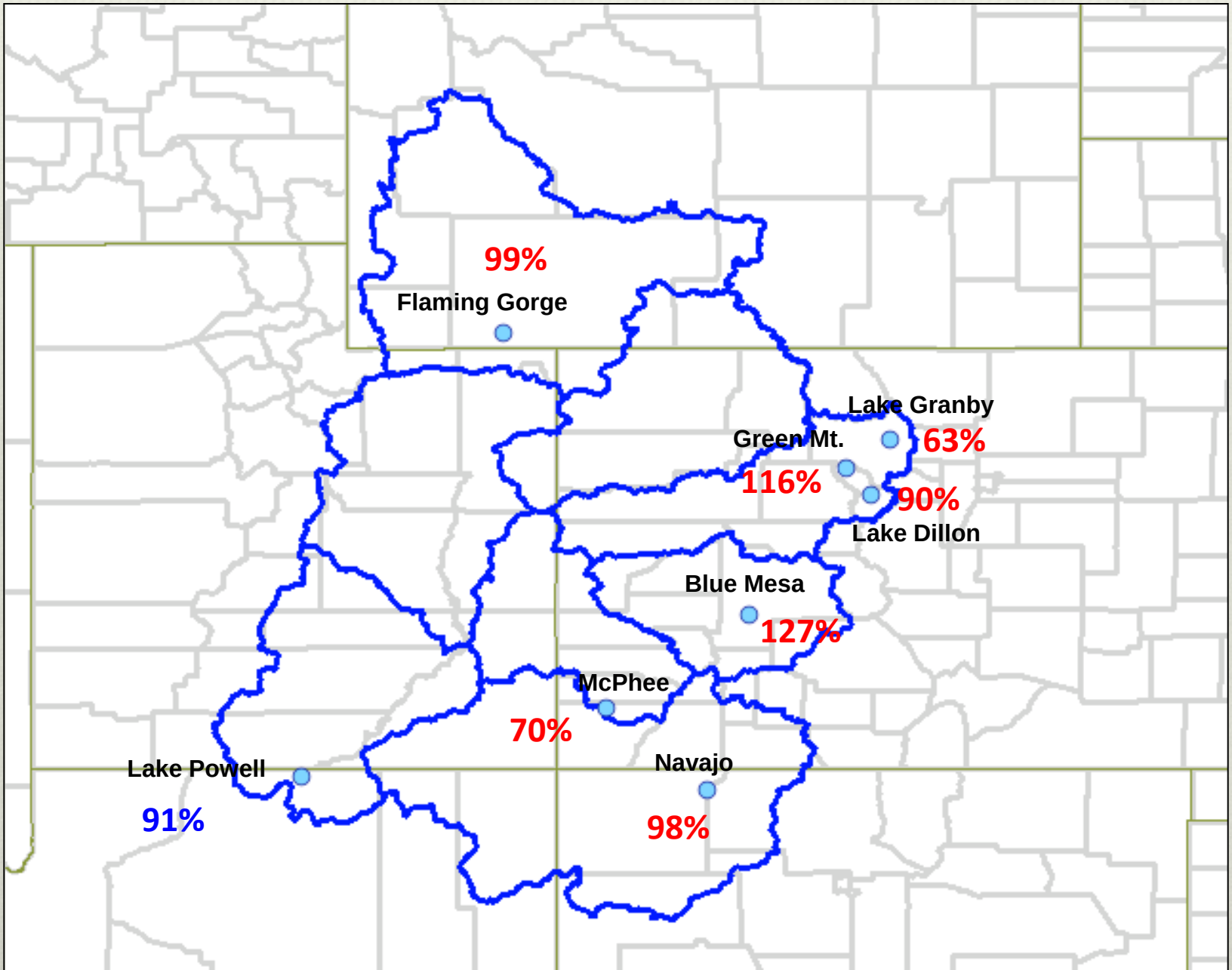


Reservoir Update

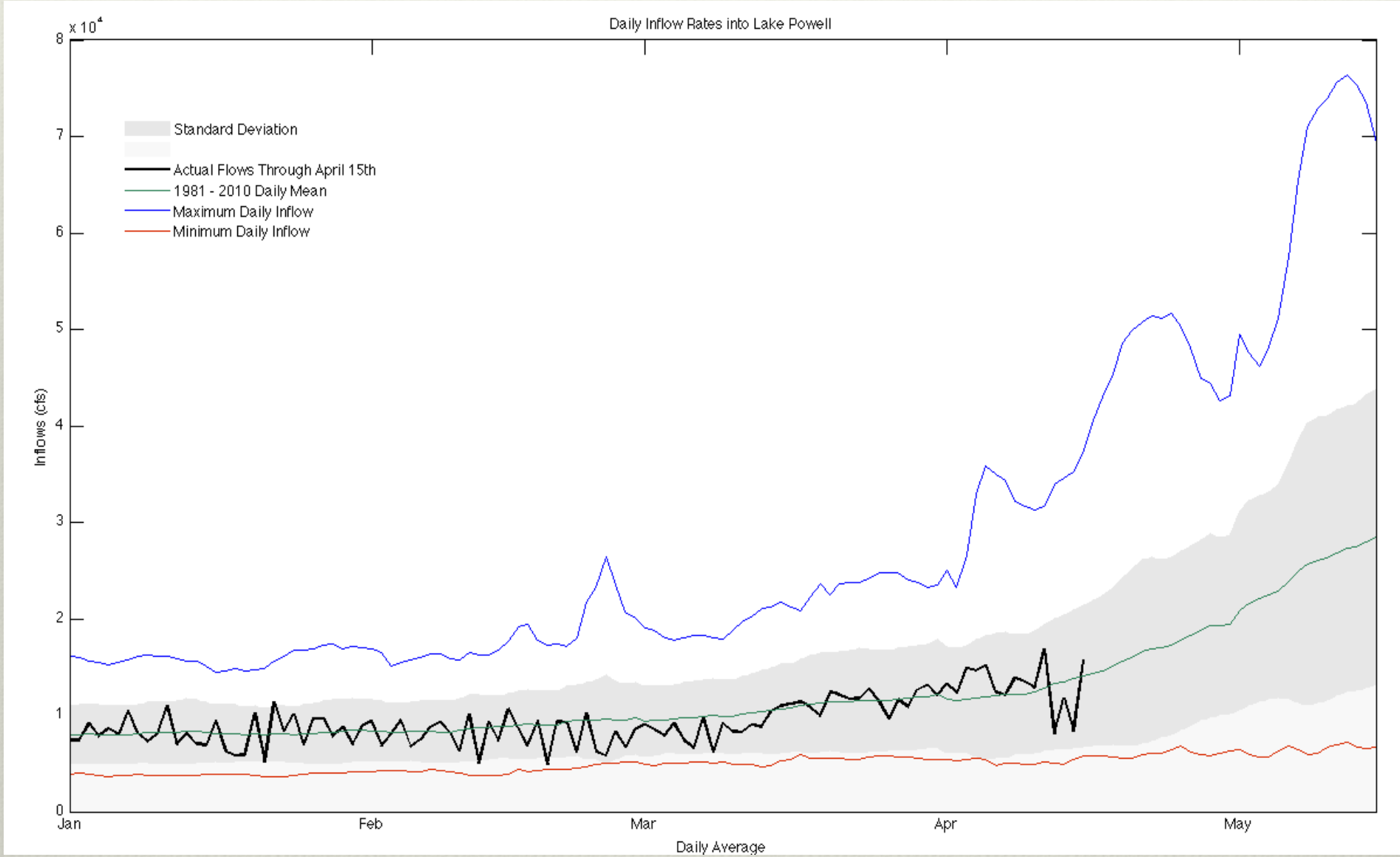
April Average Reservoir Storage Volume



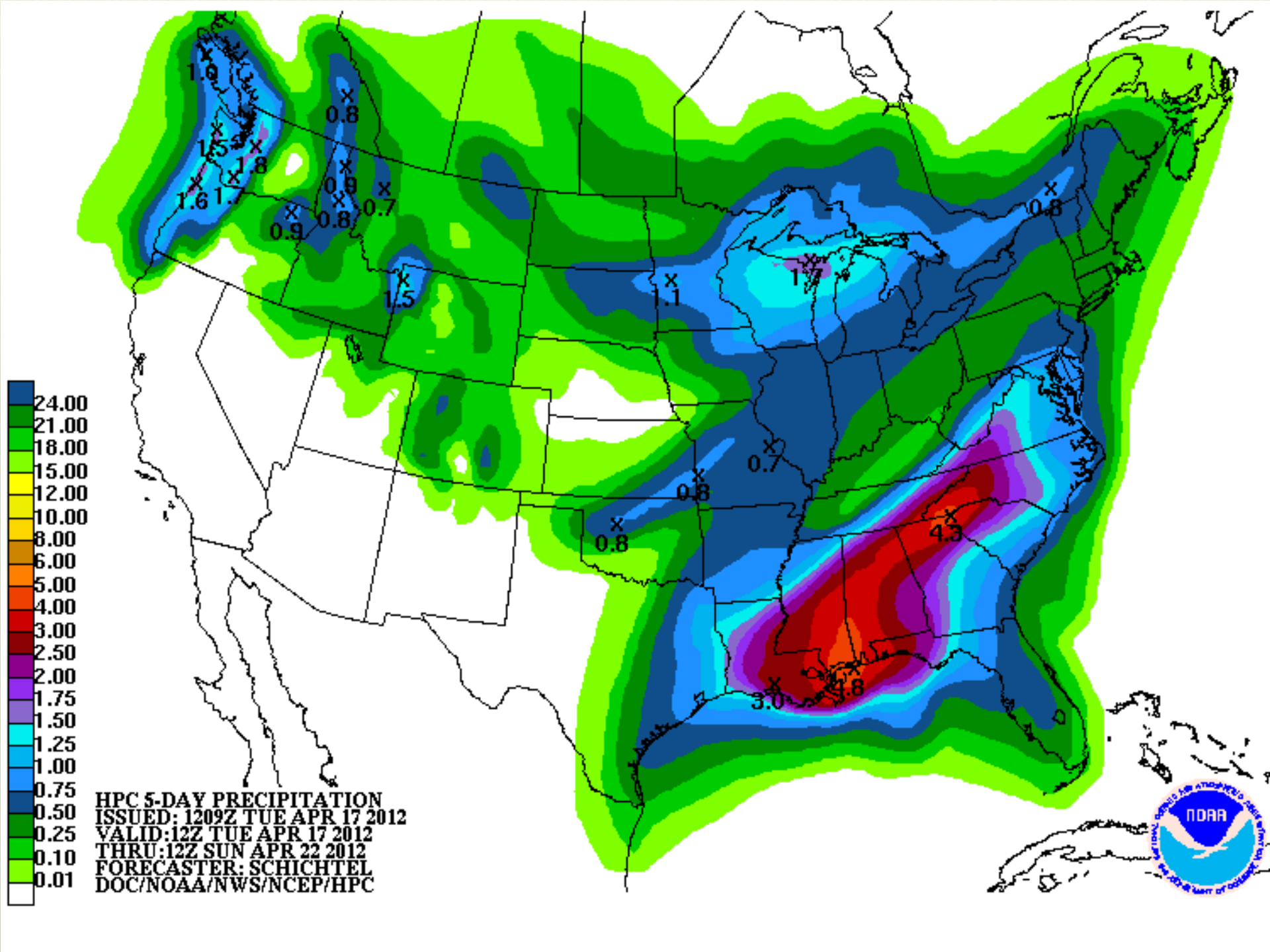
April Average Reservoir Storage Volume 2002



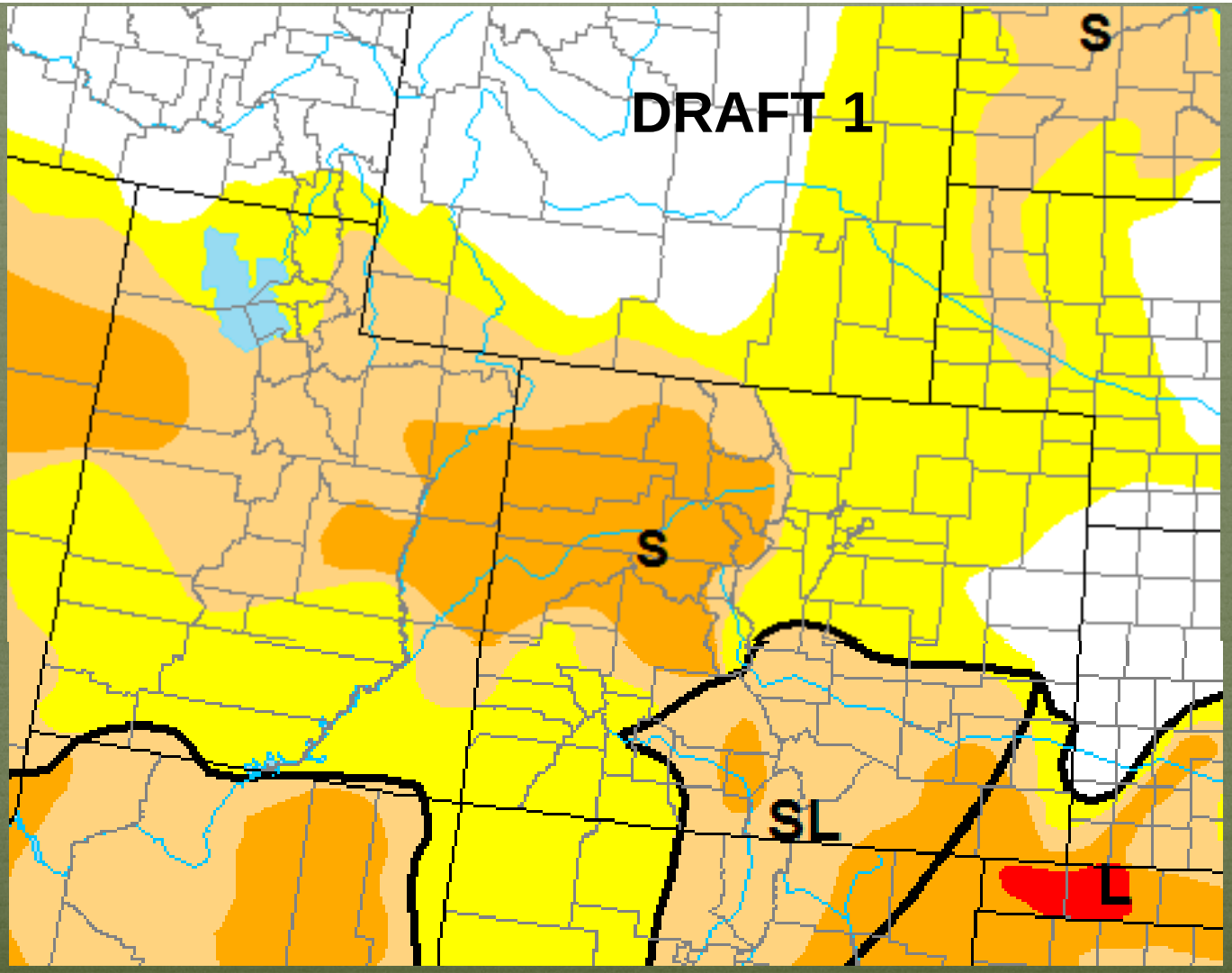
Lake Powell Daily Inflows



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: 1209Z TUE APR 17 2012
VALID:12Z TUE APR 17 2012
THRU:12Z SUN APR 22 2012
FORECASTER: SCHICHTEL
DOC/NOAA/NWS/NCEP/HPC
NOAA

Recommendations



INFO

For more information

NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

April 17, 2012

Precipitation and Snowpack

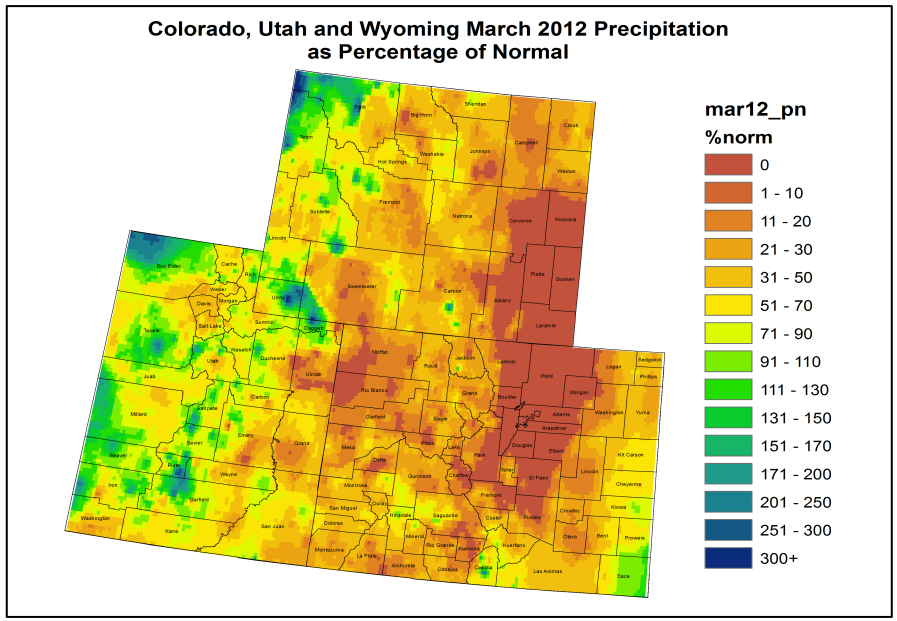


Fig. 1: March precipitation as a percent of average.

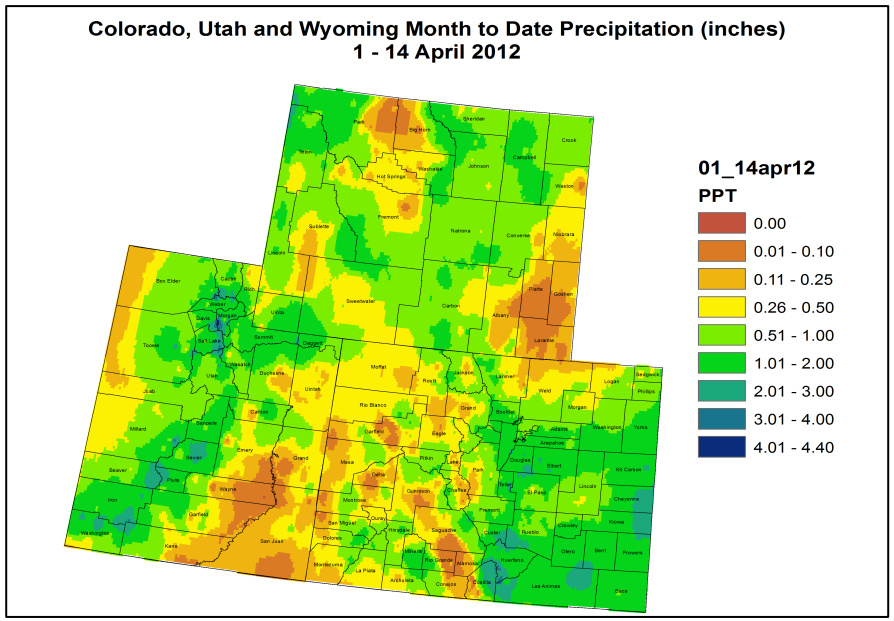


Fig. 2: April month-to-date precipitation in inches.

For the month of March, most of the Upper Colorado River Basin (UCRB) was drier than average (Fig. 1). Some spotty higher elevation locations in southwest Wyoming and northeast Utah received near to above average precipitation for 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. Most of the CO Front Range experienced an extremely dry March with the far eastern plains receiving between 50% and 100% of average precipitation.

In April so far, the heaviest precipitation has fallen over the Wasatch and Uintah ranges in UT (Fig. 2), with amounts ranging between 1 and 2 inches. The northern and central mountains of CO have received some beneficial moisture, ranging between a half inch and 1 inch. The lower elevations of the UCRB have been somewhat drier, though more recent amounts in western CO (not shown on the map) have helped stave off deteriorations for now. Southeastern CO has also received beneficial moisture for the month so far.

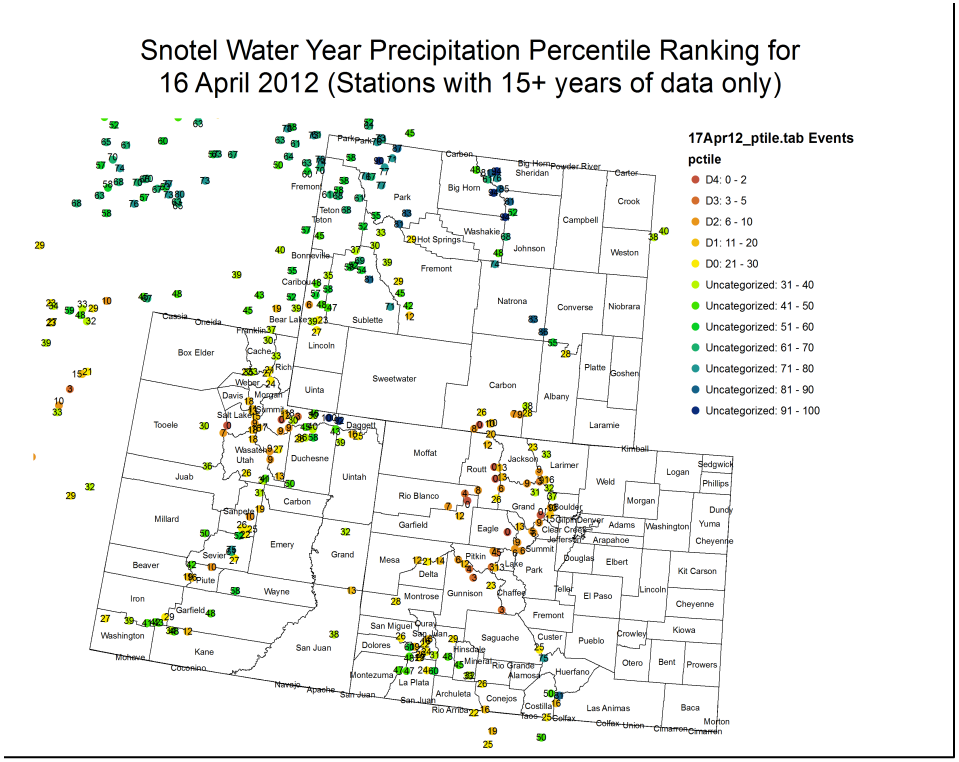


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21 – 30% is Drought Monitor D0 category).

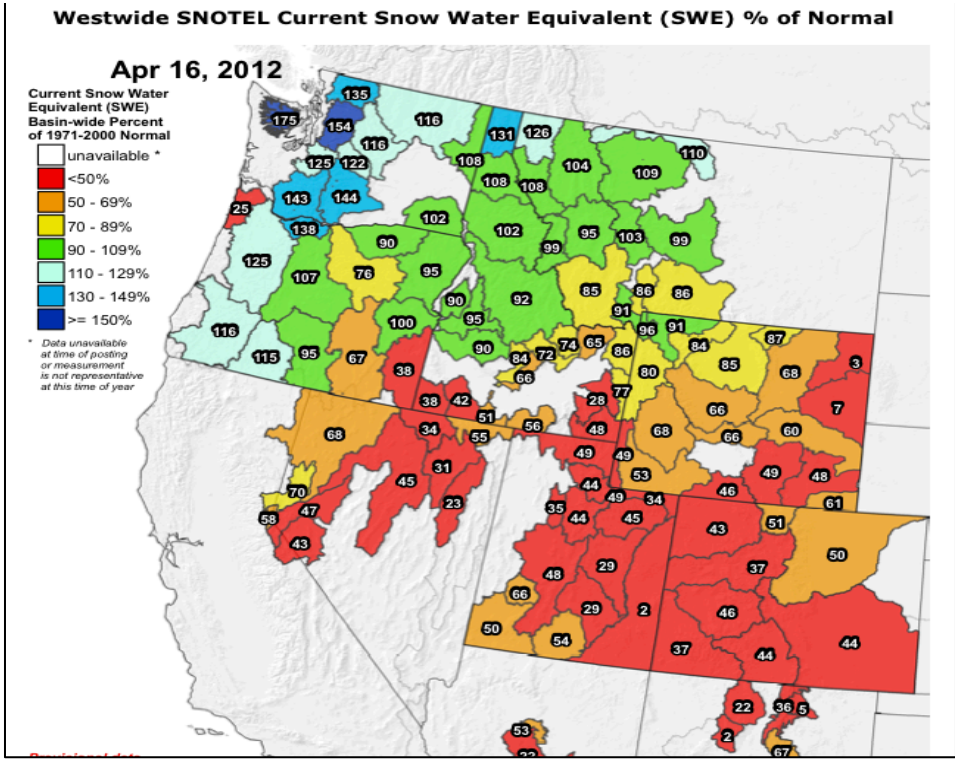


Fig. 4: Basin snow water equivalent (SWE) as a percent of average.

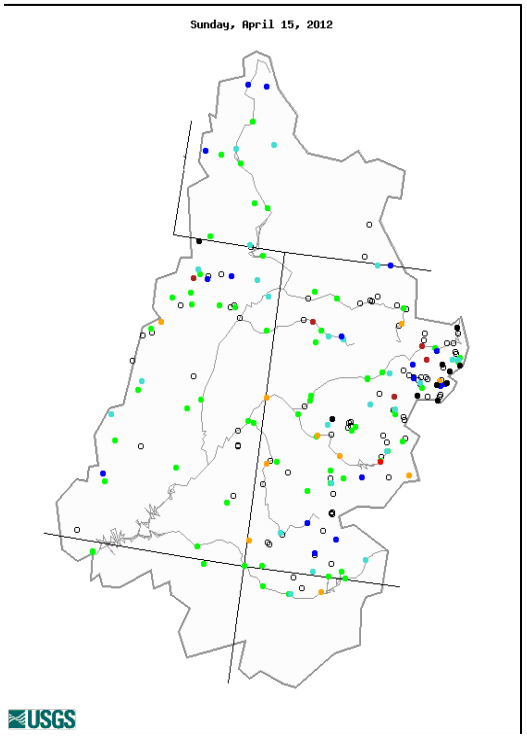
Water-year-to-date (WYTD), SNOTEL precipitation percentiles are lowest for the northern and central mountains of CO, with percentiles ranging from single digits to around the 20th percentile (Fig. 3). The Wasatch range in UT is also fairly dry, with many SNOTEL sites showing percentiles in the teens. SNOTEL percentiles in the Upper Green basin in WY are generally above the 50th percentile. In the San Juan basin, many SNOTEL percentiles are above the 30th percentile, but there are an increasing number of SNOTELs now recording below the 30th percentile.

Snowpack conditions around the UCRB are all well below normal as a combined result of less than average seasonal snowpack accumulations and earlier melting than normal (Fig. 4). All of the sub-basins in eastern UT and western CO are showing SWE values below 50% of average. Most of the snowpack in far eastern UT is entirely gone, as the basin snowpack there is at 2% of average. The sub-basins in southwest WY are still showing SWE values above 50% of average, but there is also rapid melting there too.

Streamflow

As of April 15th, 86% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows (Fig. 5). About 38% of the gages in the basin are recording above normal flows, while about 13% of the gages in the basin are recording below normal flows. 20% of the gages are recording much above normal flows or higher, and 10 gages are recording high flows (with most of those near the Colorado headwaters region). These higher flows are likely due to early melt-off from unseasonably warm temperatures for the past month, and could mean lower peak flows later in the season.

The three key gages in the UCRB all show decreasing flows over the past week (Fig. 6). Flows on the Green River at Green River, UT and the San Juan River near Bluff, UT are in the near normal range, at the 62nd and 33rd percentiles, respectively. Flows on the Colorado River near the CO-UT state line have rapidly dropped from the 57th percentile last week to the 18th percentile this week. This drop off is likely a combination of cooler temperatures over the weekend and the recent opening of canals in the Grand valley.



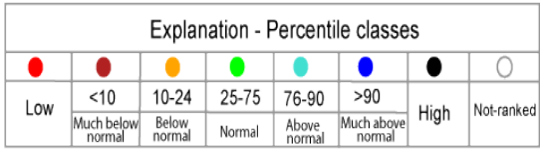


Fig. 5: 7-day average discharge compared to historical discharge for April 15th.

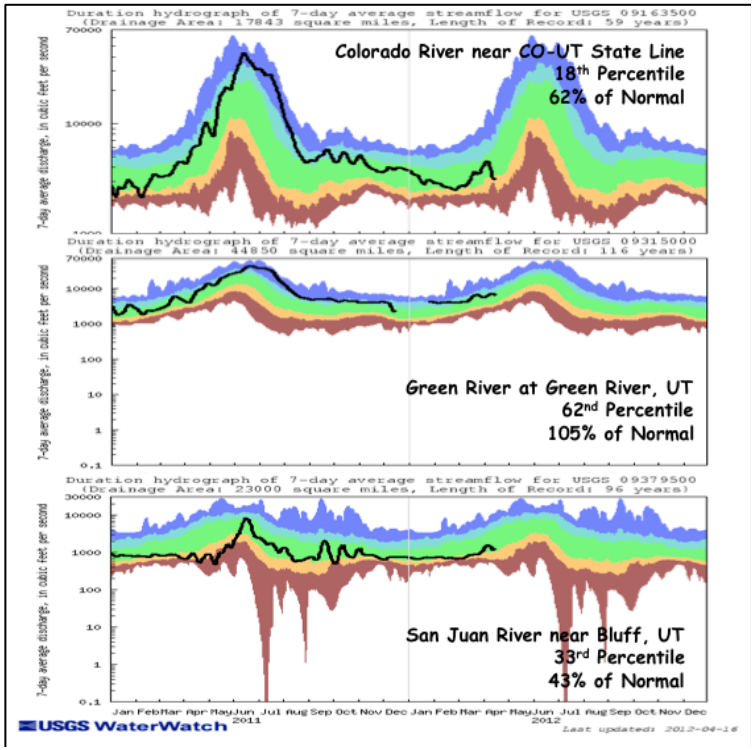


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Most of the UCRB experienced above average temperatures for the week, with areas in the northern and central mountains of CO seeing temperatures 6 to 8 degrees above average and closer to average temperatures in eastern UT. The VIC model shows dry soil moisture conditions in eastern CO, in UT around the Colorado River and Green River valleys, and in southern WY (Fig. 7). All of these dry regions have been expanding in size and intensity. The VIC shows very wet soils around the Colorado headwaters region (likely due to early melting of snowpack infiltrating the soils). However, when VIC SWE and soil moisture are combined, this UCRB shows a moisture storage deficit (Fig. 7).

All of the reservoirs above Lake Powell are currently above their April storage averages. Lake Dillon and Flaming Gorge have seen storage volume decreases since the beginning of the month, while the rest of the major reservoirs have been increasing in volume. Lake Powell is currently at 84% of average and 64% of capacity (compared to 53% one year ago). Currently, the most probable unregulated inflow forecast into Lake Powell through July is at 63% of average.

Precipitation Forecast

The UCRB will be underneath moderate westerly flow through the middle of the week with a series of weak disturbances quickly moving over the area. These minor features will keep the weather pattern slightly unsettled, with the best chance of precipitation occurring sometime late Wednesday through Thursday. Expect to see light shower activity result in liquid accumulations of 0.10 to 0.25 inches across the mountain ranges of western Colorado and northern Utah, with localized amounts of 0.5 inches possible over the highest peaks (Fig. 8). By Friday a substantial ridge will begin to build over the western US, which is then forecast to persist across the UCRB well into next week. Limited moisture underneath this ridge will lead to a slight chance of isolated shower activity through the weekend while temperatures again climb well above normal.

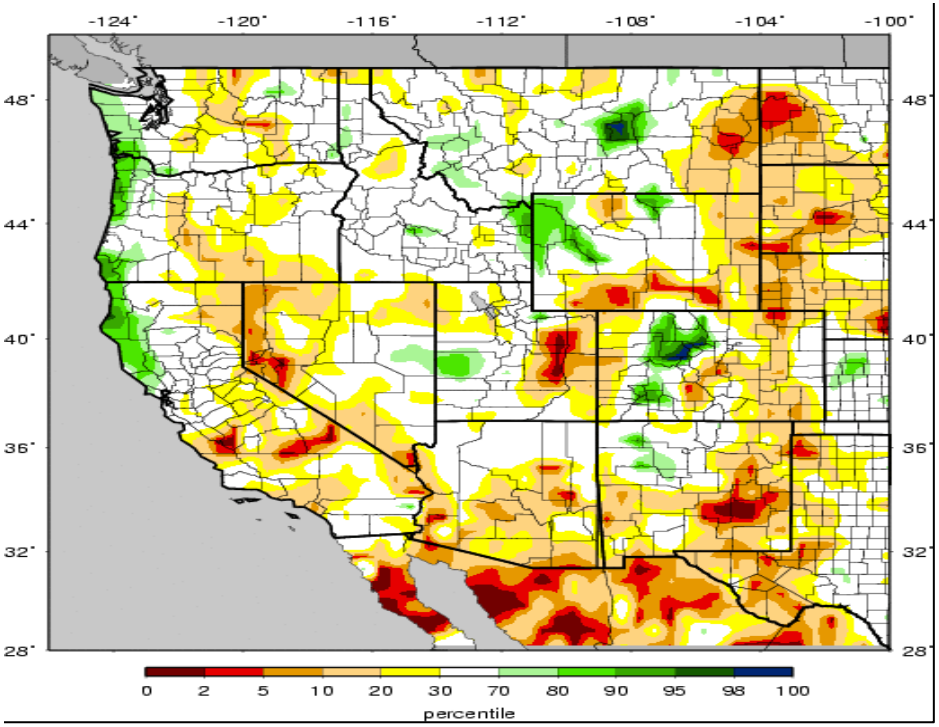


Fig. 7: VIC soil moisture percentiles as of April 15th, with total moisture storage (SWE and soil moisture) below.

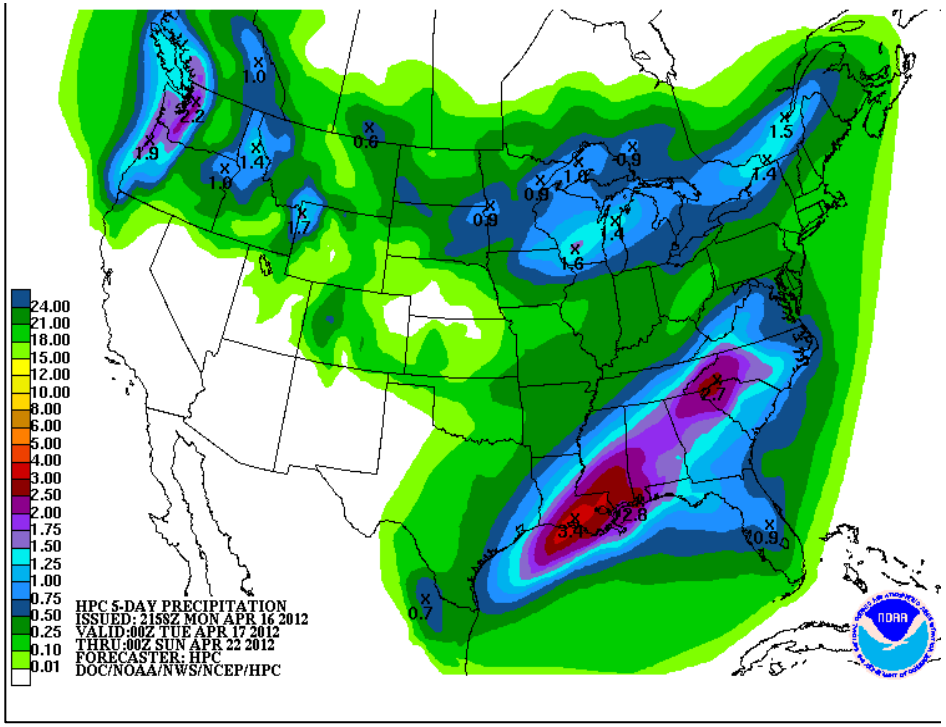
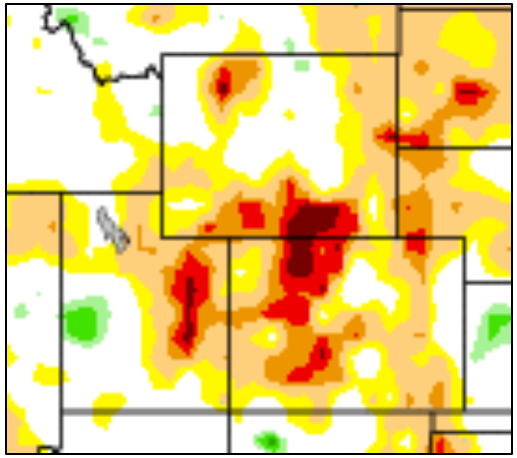
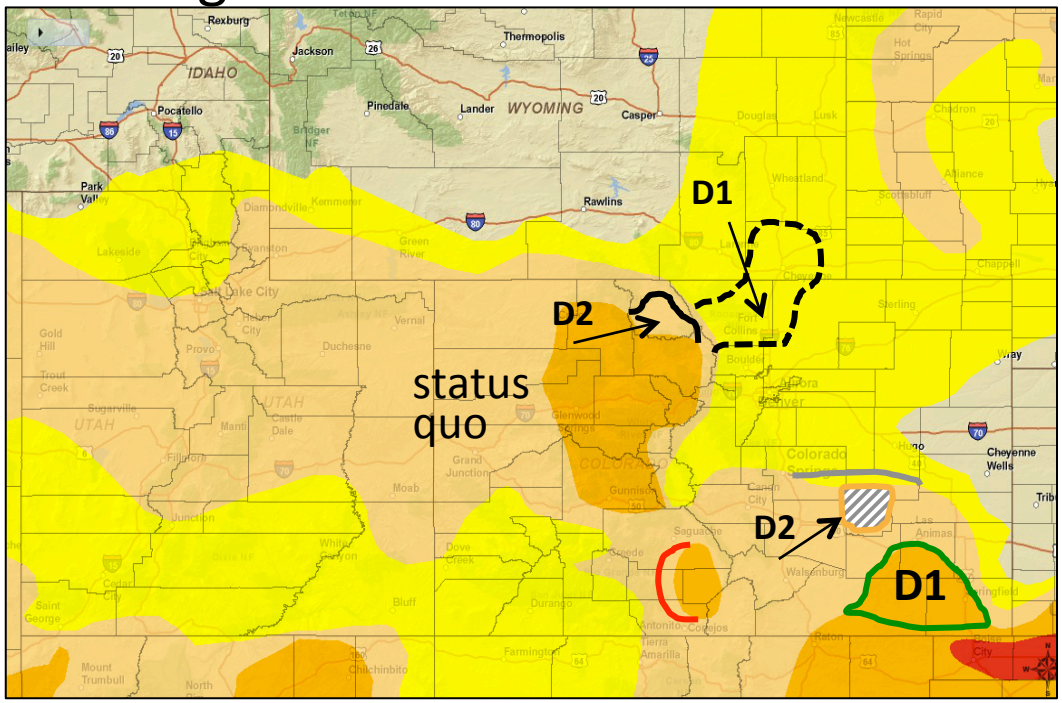
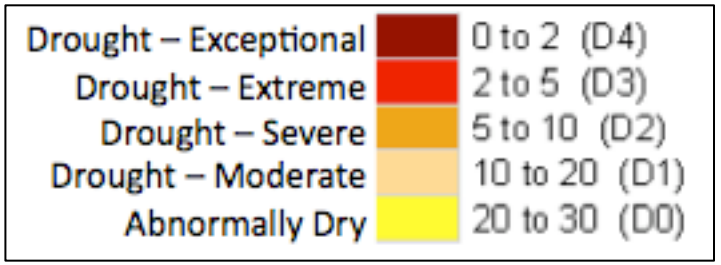


Fig. 8: Hydrologic Prediction Center's Quantitative Precipitation Forecast (QPF) through 00UTC Sunday.



Drought and Water Discussion



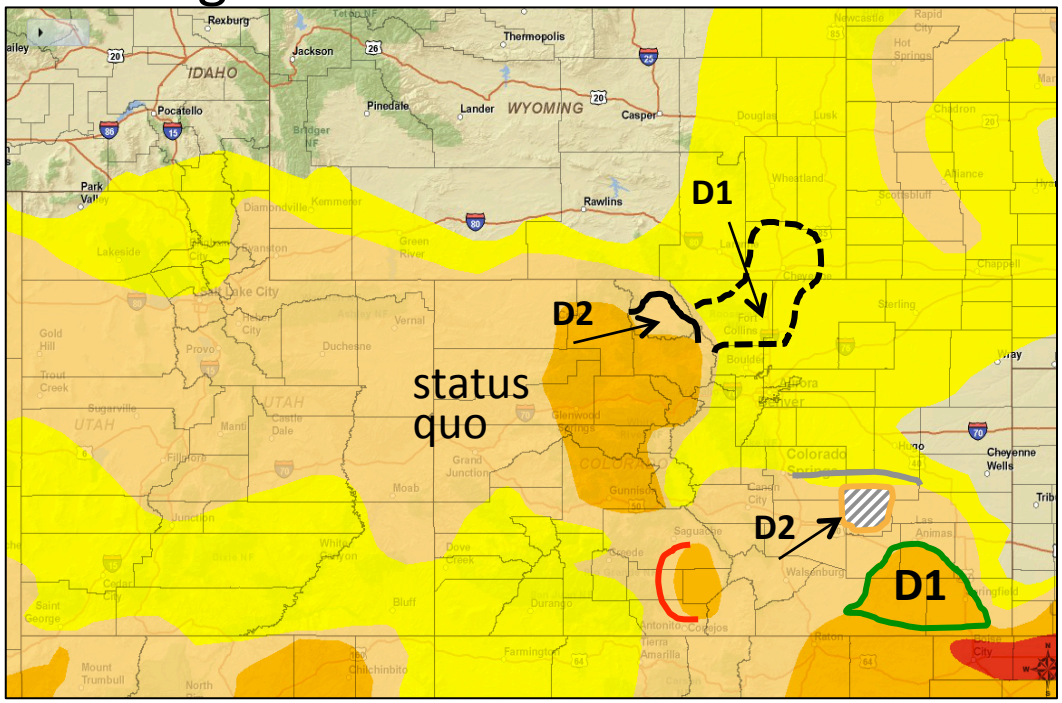


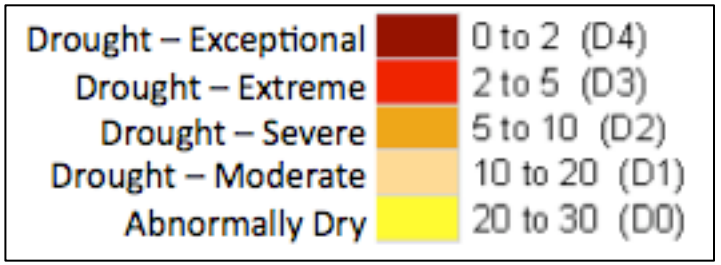
Drought categories and their associated percentiles

Fig. 9: April 10th release of U.S. Drought Monitor for the UCRB.

In the first draft of the U.S. Drought Monitor (USDM) map, the current USDM author expanded D2 through northwest CO and into eastern UT. Based on recent precipitation accumulations of nearly an inch along the CO western slope (combined with SNOTEL precipitation percentiles in the teens around Delta County and borderline D1/D2 SPIs in Mesa and Garfield counties), status quo is recommended for western CO, and a request to hold off on deteriorations in eastern UT for one week until there is a consensus on the ideal placement of D2. As requested last week, the North Park valley in Jackson County, CO is very dry and a D2 expansion is recommended there (Fig. 9, black line). Also, due to recent dryness and 120-day SPIs below -1, it is recommended that the D1 in northern CO be expanded through more of Larimer County and into Weld County (Fig. 9, black dashed lines). This D1 can be expanded into southeast WY around Cheyenne, and has been agreed upon with the WY state climatologist.

Drought and Water Discussion





Drought categories and
their associated percentiles

Fig. 9: April 10th release of U.S. Drought Monitor for the UCRB.

In southeast CO, beneficial moisture has helped alleviate many of the long-term effects from last year's drought there. In Otero, Bent, Las Animas, and Baca counties, SPIs are positive or only slightly negative on short- and long- term scales. Reports are that wheat crops in Baca County are greening up nicely. Therefore, it is recommended that D2 be trimmed down in those counties (Fig. 9, green line). However, reports from local experts suggest that the conditions have not been as improved around Crowley and southern Lincoln counties. Crowley has not seen the beneficial moisture that its neighbor Otero received. Lincoln County has recently received a disaster declaration of drought for aide. SPIs around Crowley County are around -1.5 on the 6-month time scale. Therefore, it is recommended that D2 be re-introduced in that area, and that the D1 be pushed slightly further north in Lincoln County (Fig. 9, grey hatched shape with orange outline, and grey line for D1).

It is also recommended that the D2 in the San Luis Valley be adjusted to cover Del Norte (Fig. 9, red line).