Spring 2012

Weekly Climate, Water & Drought Assessment

Today's Agenda

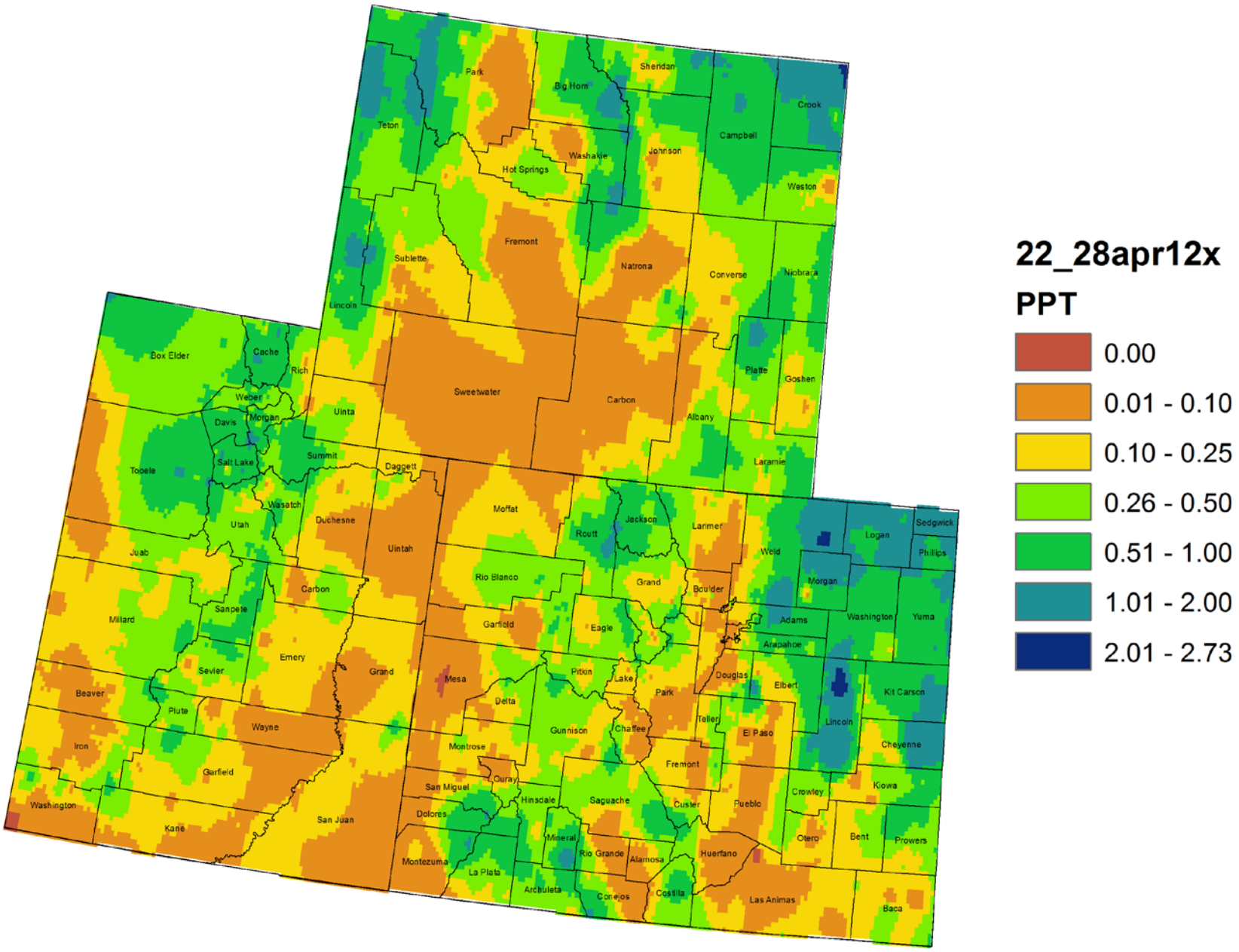
-Assessment of current water conditions

- Precipitation Forecast

- Recommendations for Drought Monitor

Precipitation/Snowpack Update

Colorado, Utah and Wyoming 7 Day Precipitation (inches)
22 - 28 April 2012

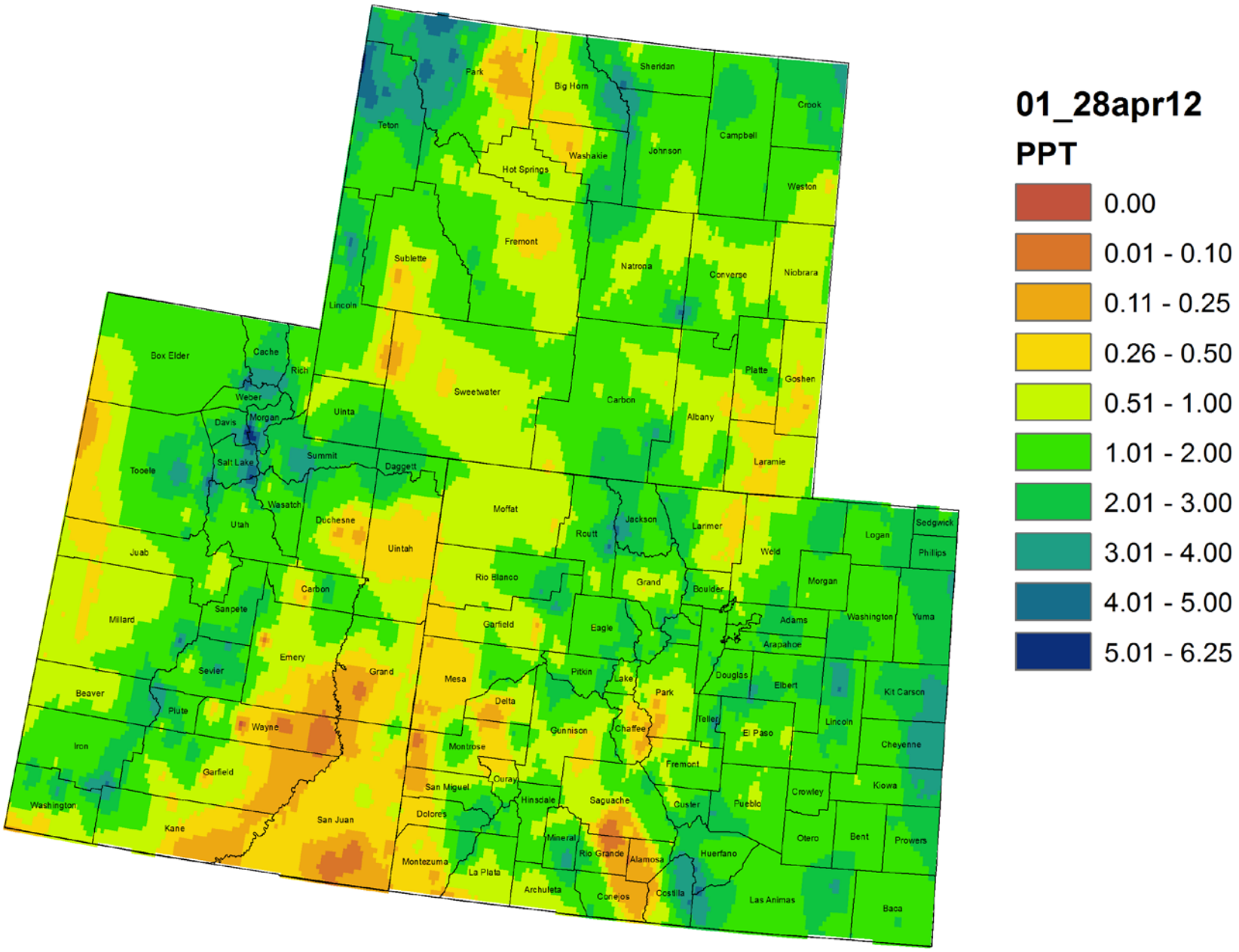


22_28apr12x

PPT

- 0.00
- 0.01 - 0.10
- 0.10 - 0.25
- 0.26 - 0.50
- 0.51 - 1.00
- 1.01 - 2.00
- 2.01 - 2.73

Colorado, Utah and Wyoming Month to Date Precipitation (inches)
1 - 28 April 2012

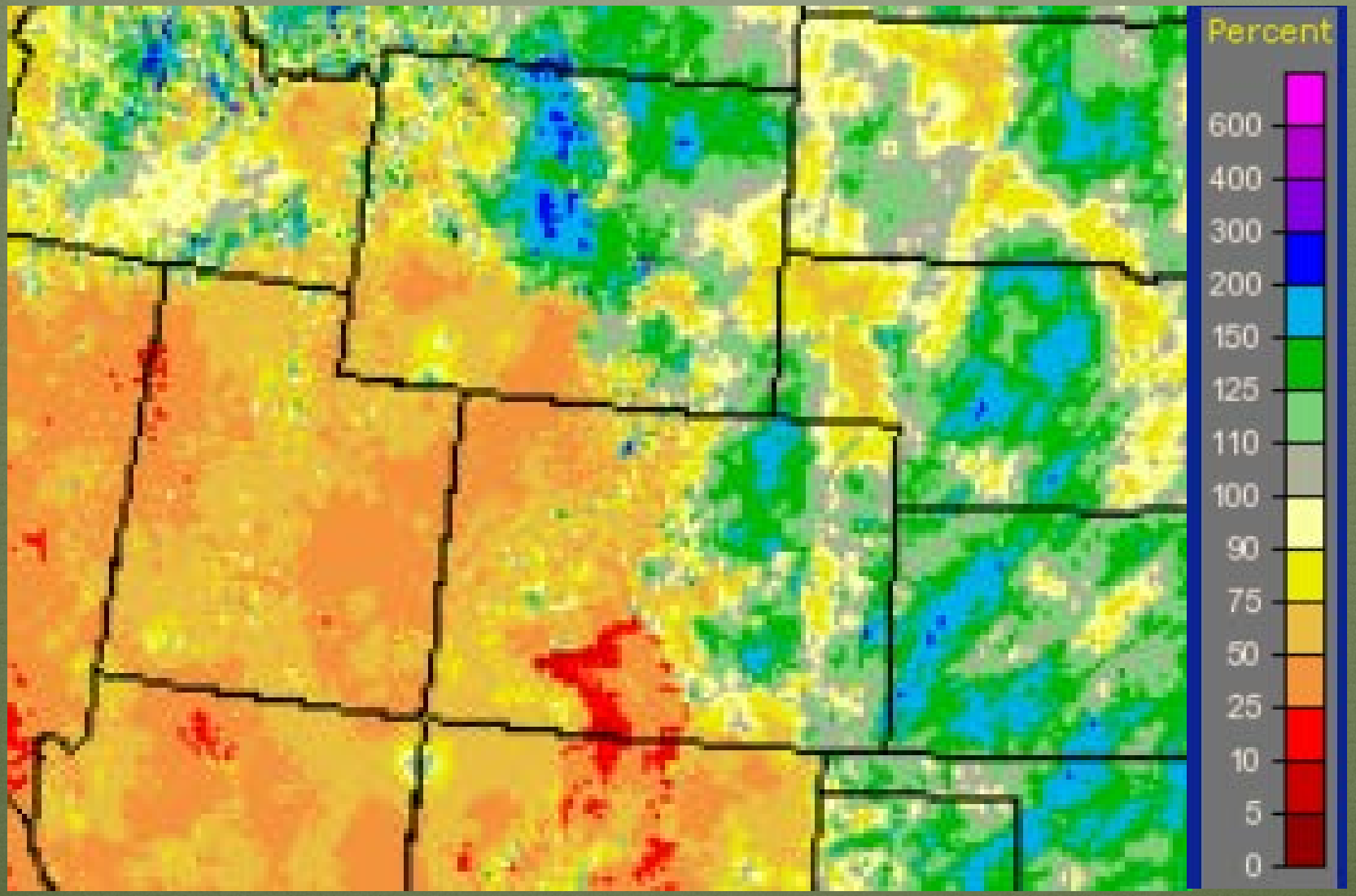


01_28apr12

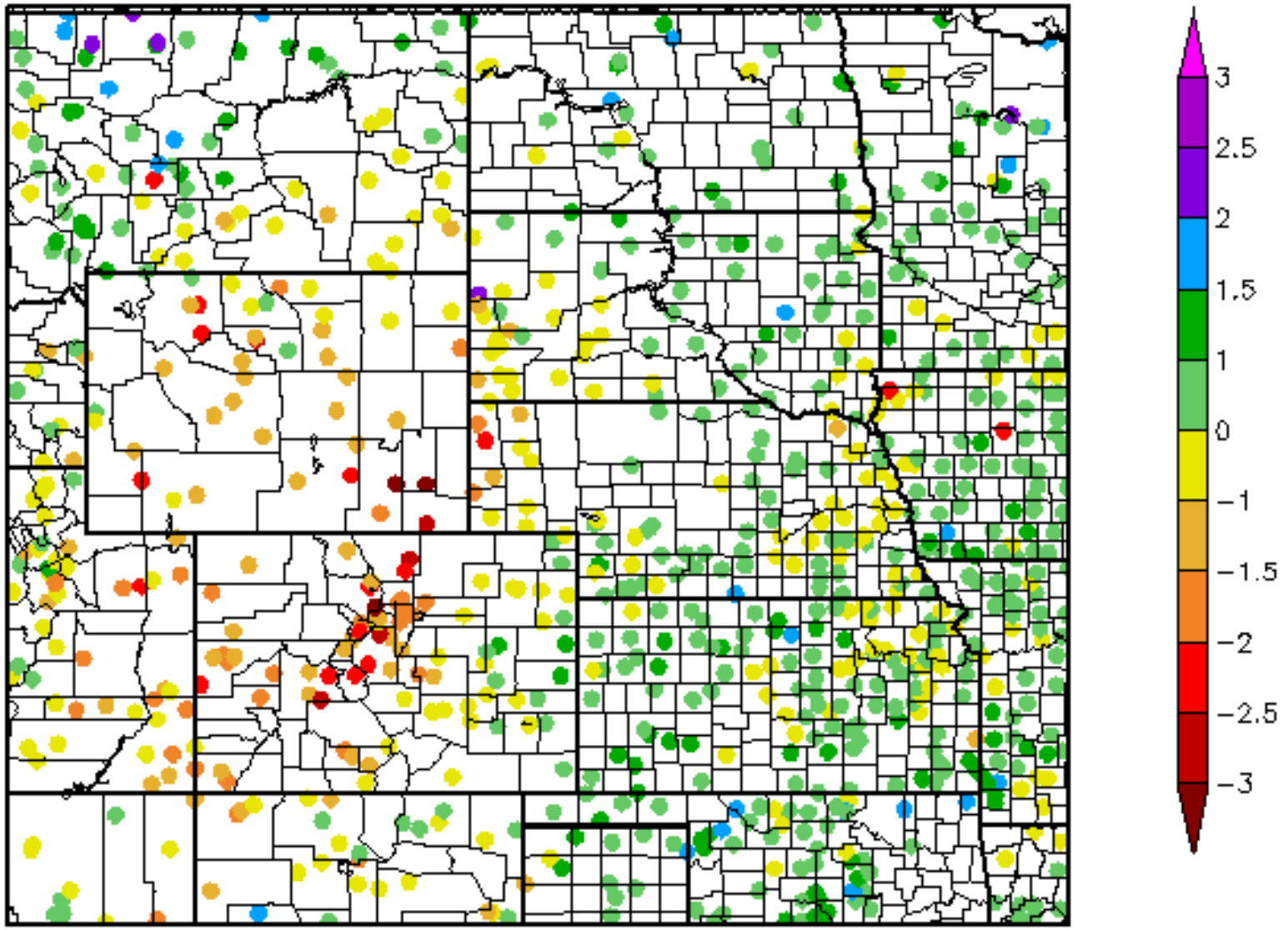
PPT

- 0.00
- 0.01 - 0.10
- 0.11 - 0.25
- 0.26 - 0.50
- 0.51 - 1.00
- 1.01 - 2.00
- 2.01 - 3.00
- 3.01 - 4.00
- 4.01 - 5.00
- 5.01 - 6.25

AHPS Water Year Precipitation as Percentage of Normal



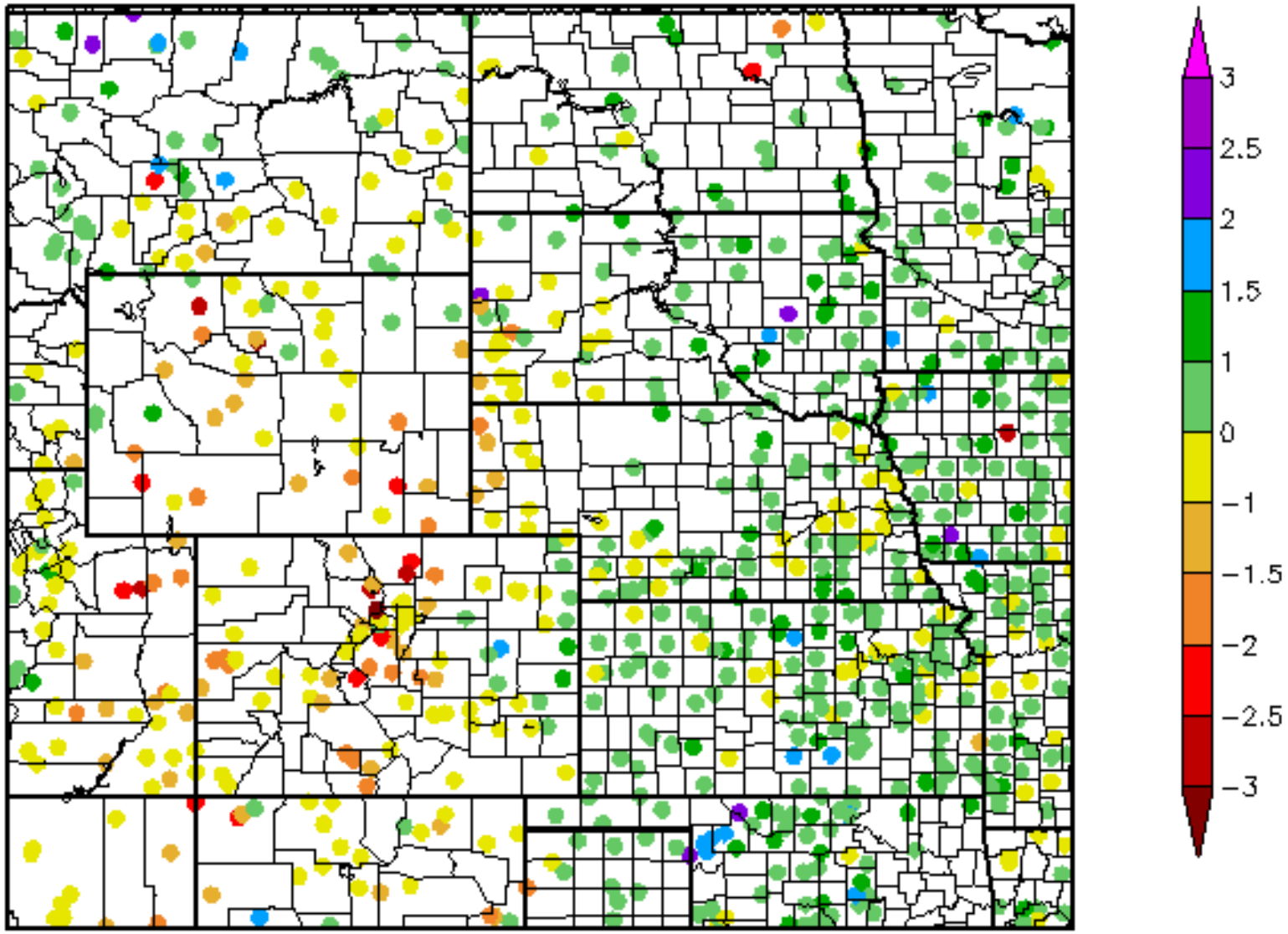
60 Day SPI
3/2/2012 – 4/30/2012



Generated 5/1/2012 at HPRCC using provisional data.

Regional Climate Centers

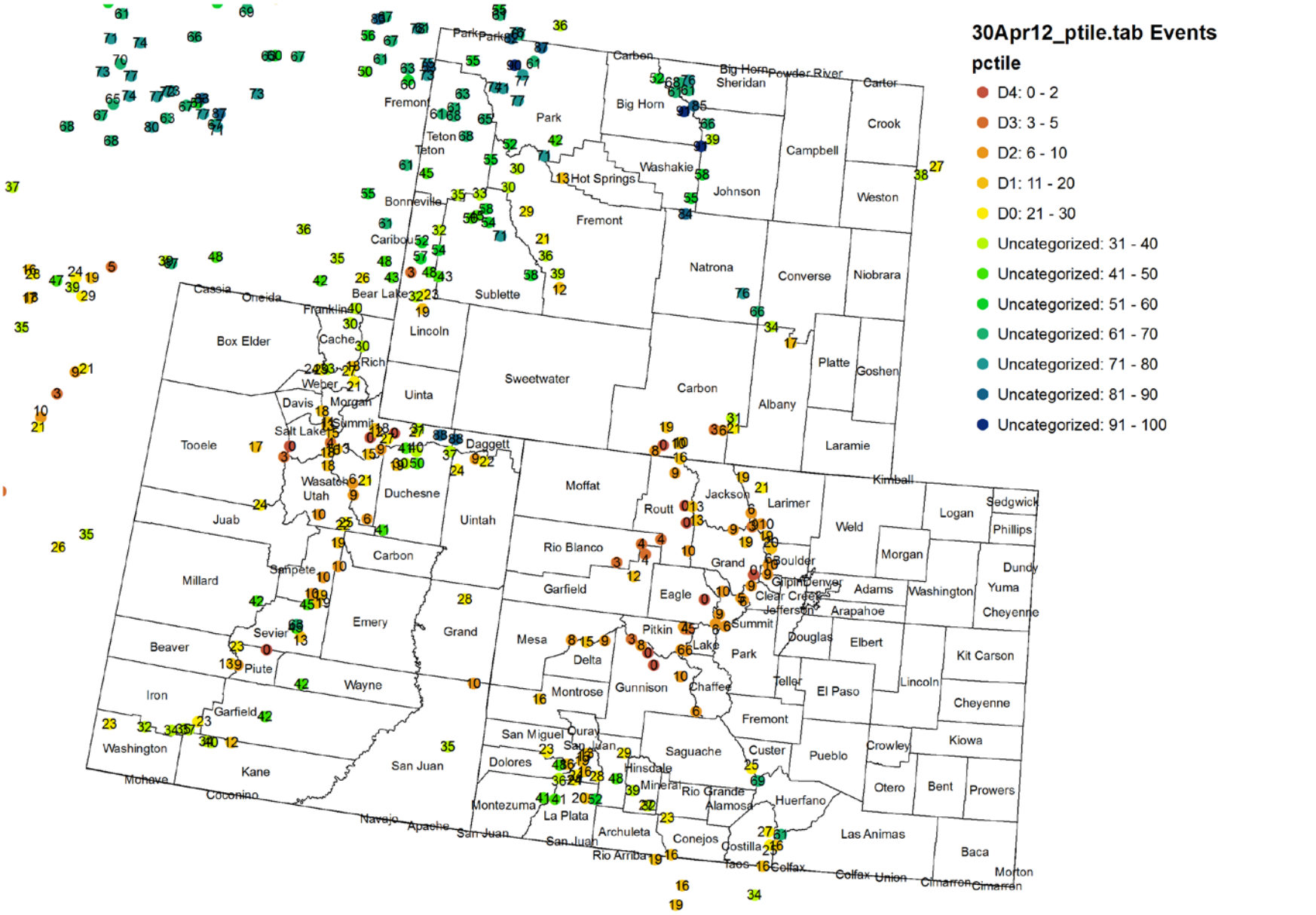
120 Day SPI
1/2/2012 – 4/30/2012



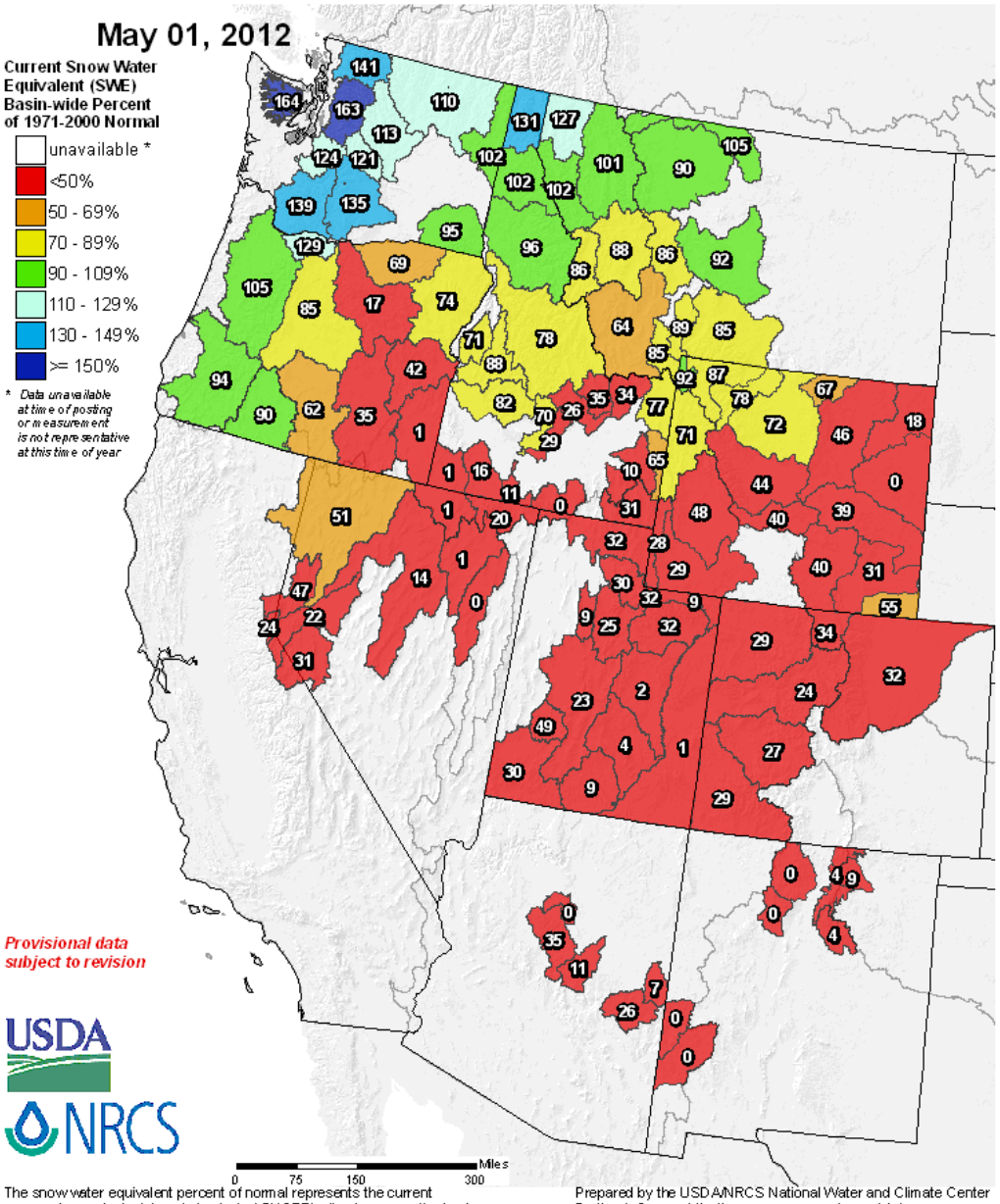
Generated 5/1/2012 at HPRCC using provisional data.

Regional Climate Centers

Snotel Water Year Precipitation Percentile Ranking for 30 April 2012 (Stations with 15+ years of data only)

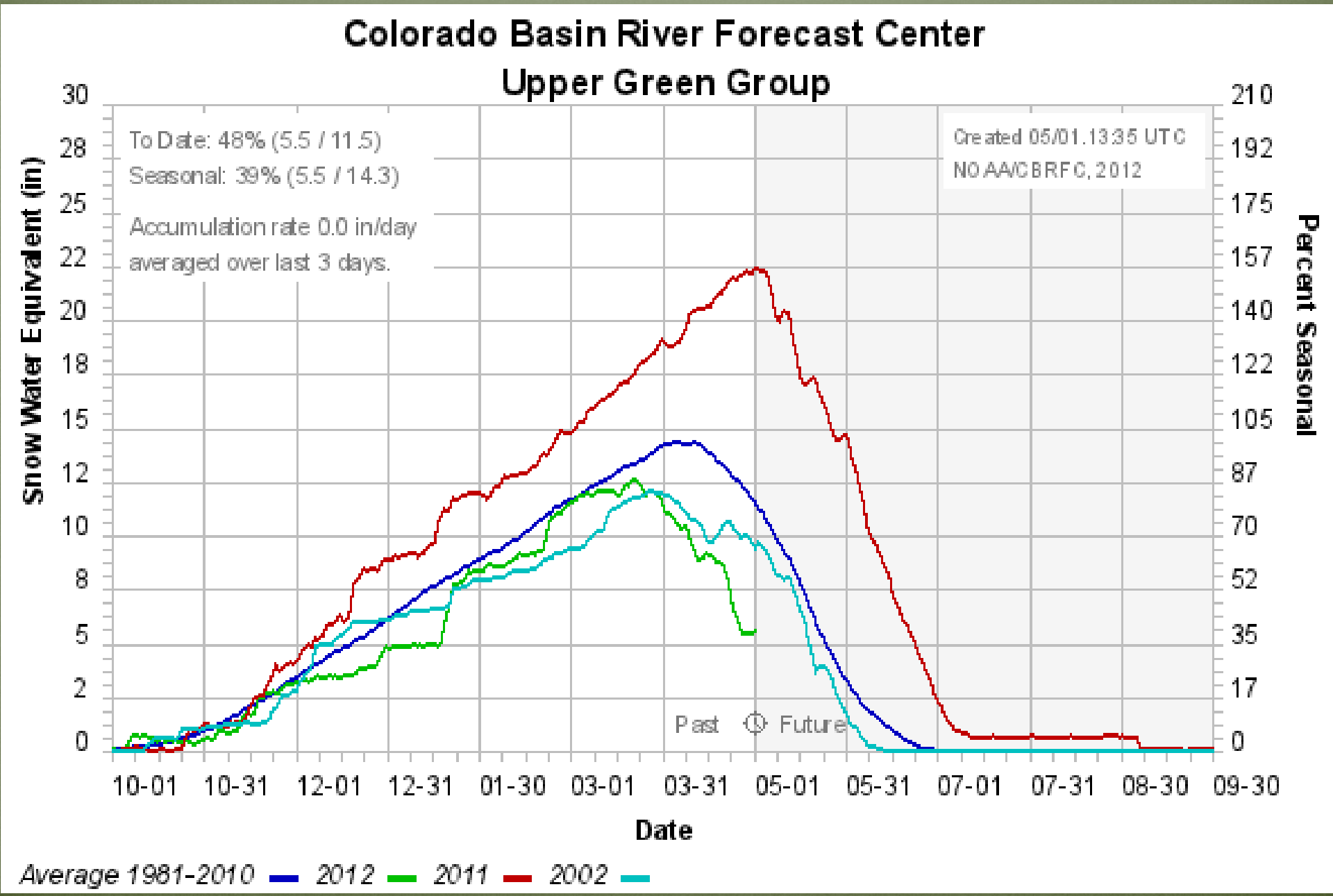


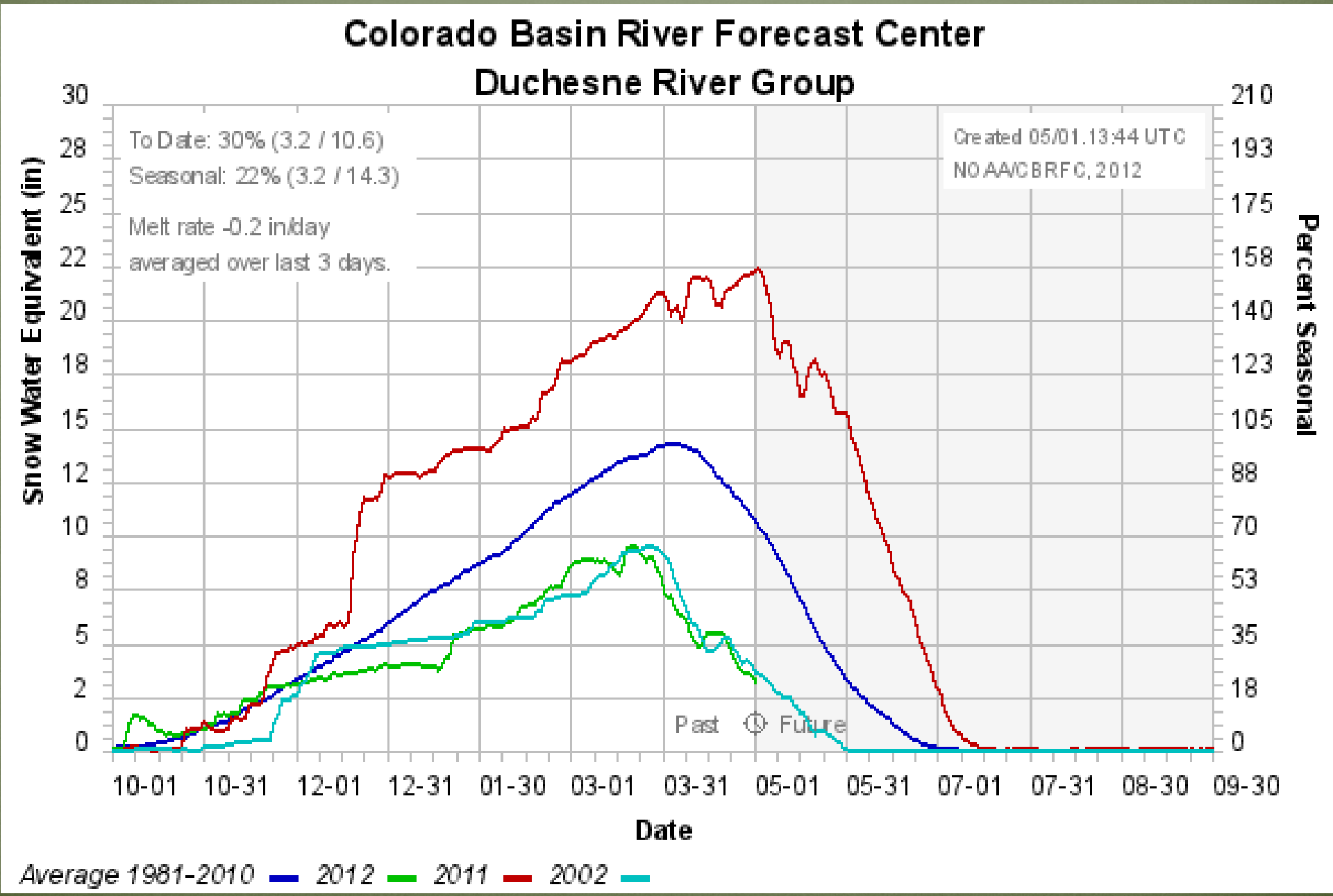
Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

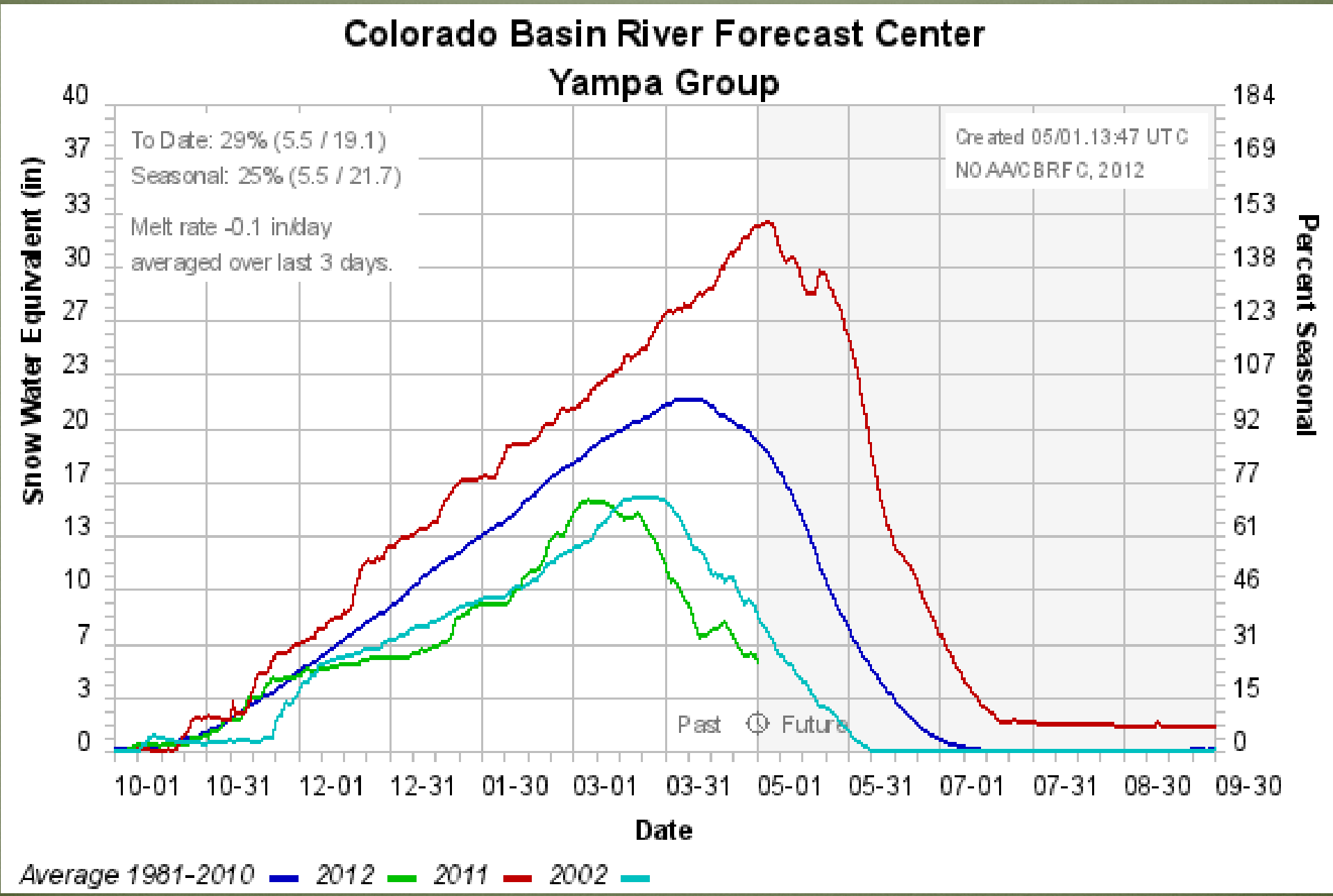


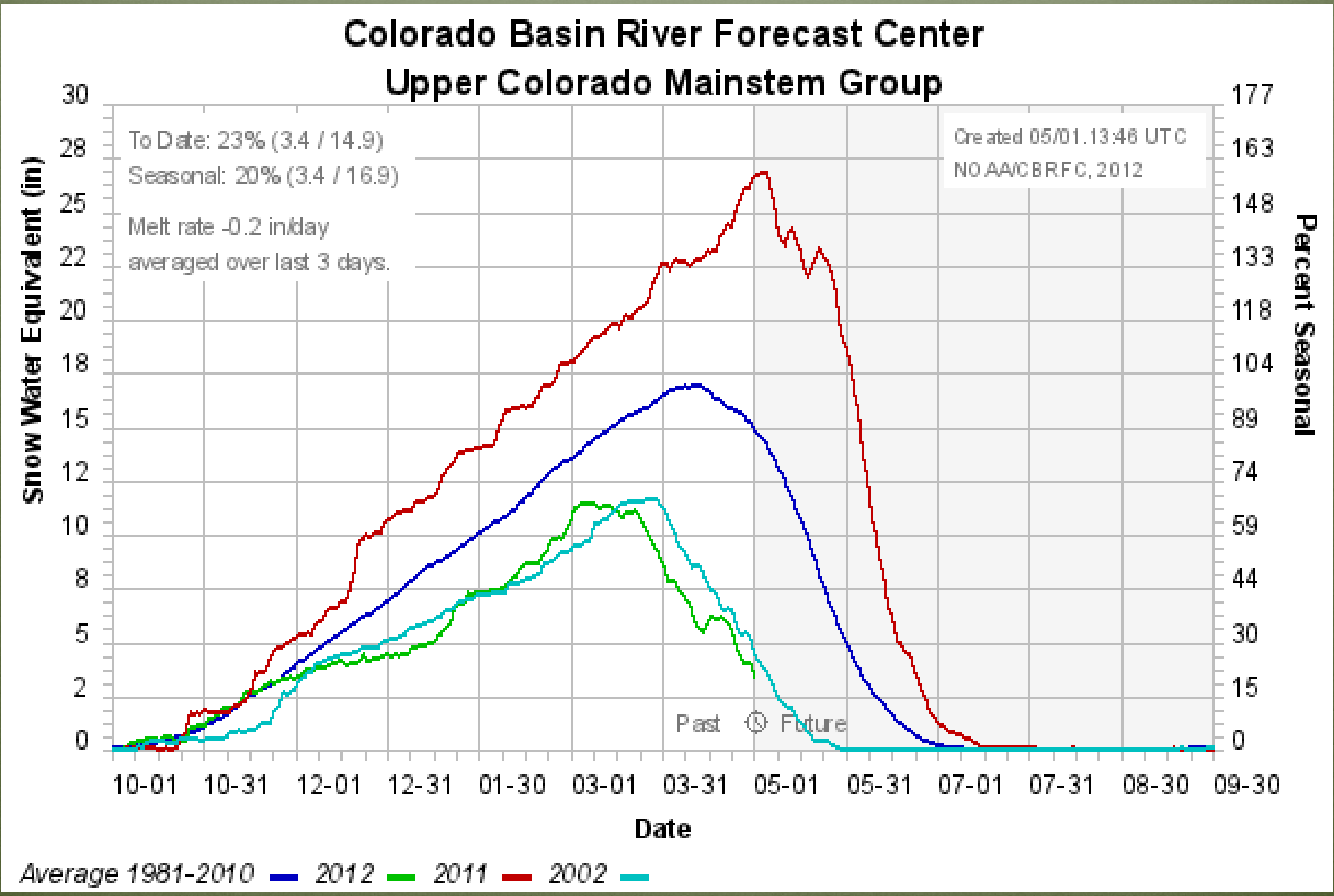
The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

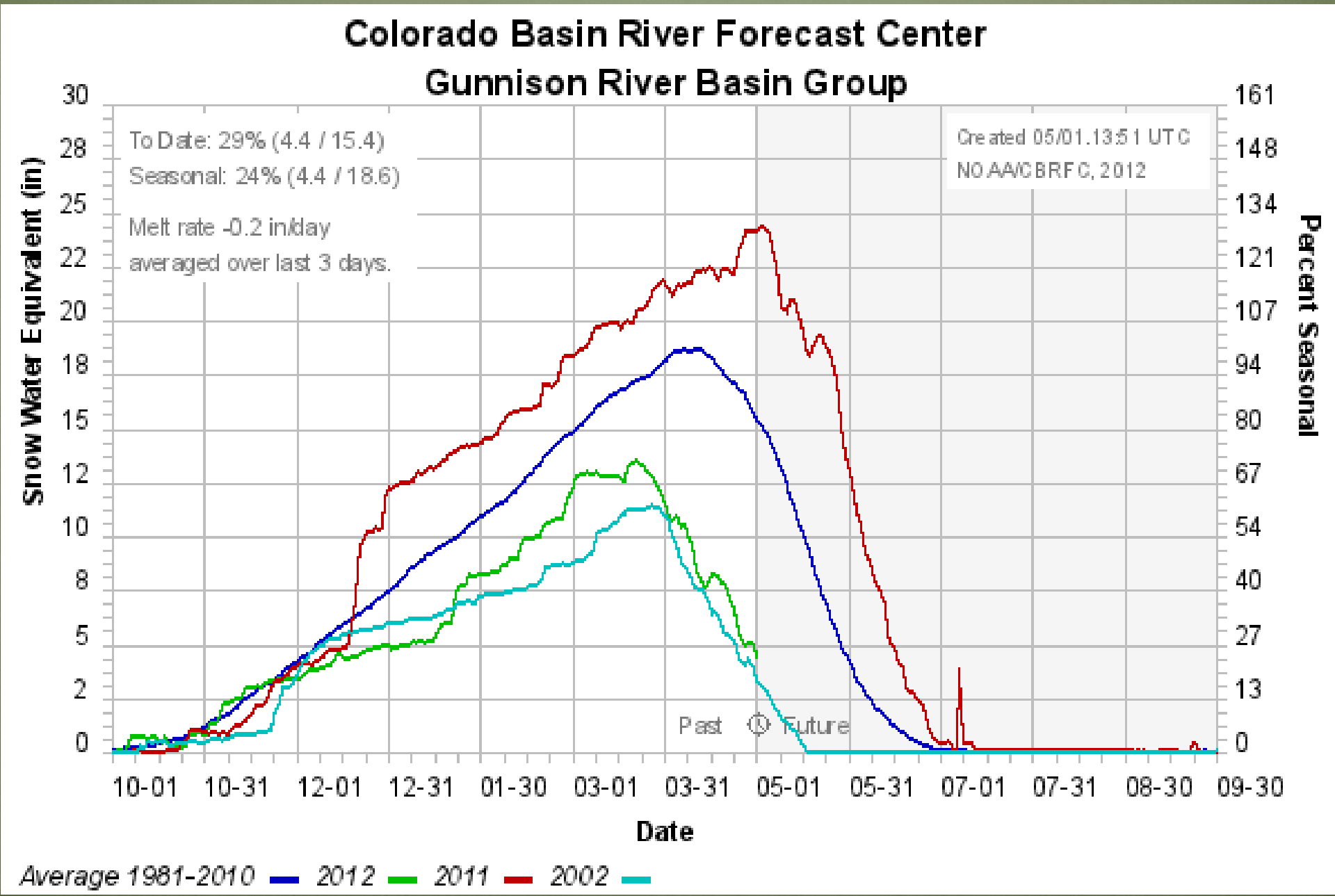
Prepared by the USDA/NRCS National Water and Climate Center
Portland, Oregon http://www.wcc.nrcs.usda.gov/gis/
Based on data from http://www.wcc.nrcs.usda.gov/reports/
Science contact: Jim.Marron@por.usda.gov 503 414 3047

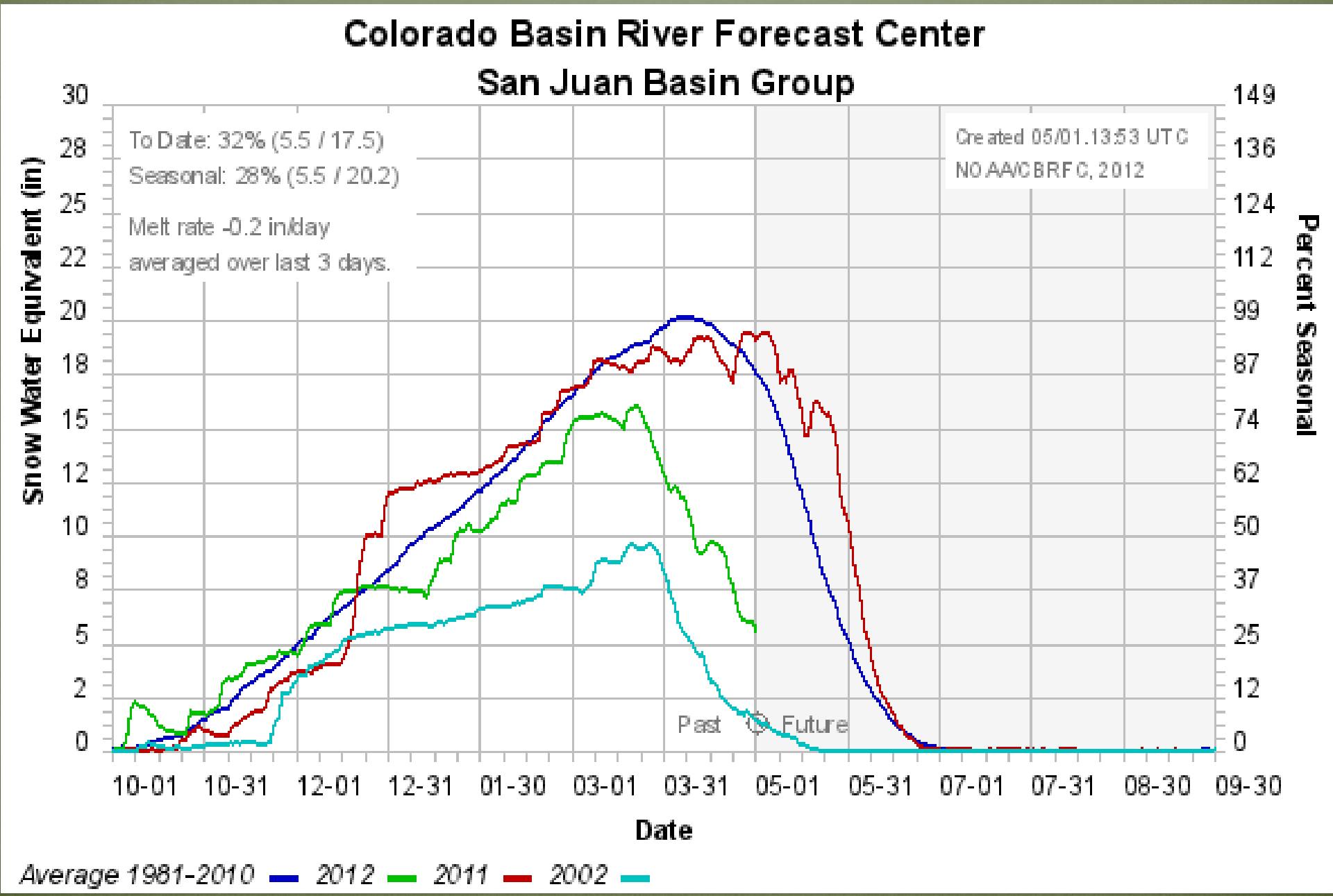

Colorado Basin River Forecast Center
Upper Green Group
To Date: 48% (5.5 / 11.5)
Seasonal: 39% (5.5 / 14.3)
Accumulation rate 0.0 in/day
averaged over last 3 days.
Created 05/01.13:35 UTC
NOAA/CBRFC, 2012
Past
Future
Snow Water Equivalent (in)
Percent Seasonal
Date
30
28
25
22
20
18
15
12
10
8
5
2
0
210
192
175
157
140
122
105
87
70
52
35
17
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
Duchesne River Group
To Date: 30% (3.2 / 10.6)
Seasonal: 22% (3.2 / 14.3)
Melt rate -0.2 in/day
averaged over last 3 days.
Created 05/01 13:44 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
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: 29% (5.5 / 19.1)
Seasonal: 25% (5.5 / 21.7)
Melt rate -0.1 in/day
averaged over last 3 days.
Created 05/01 13:47 UTC
NOAA/CBRFC, 2012
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

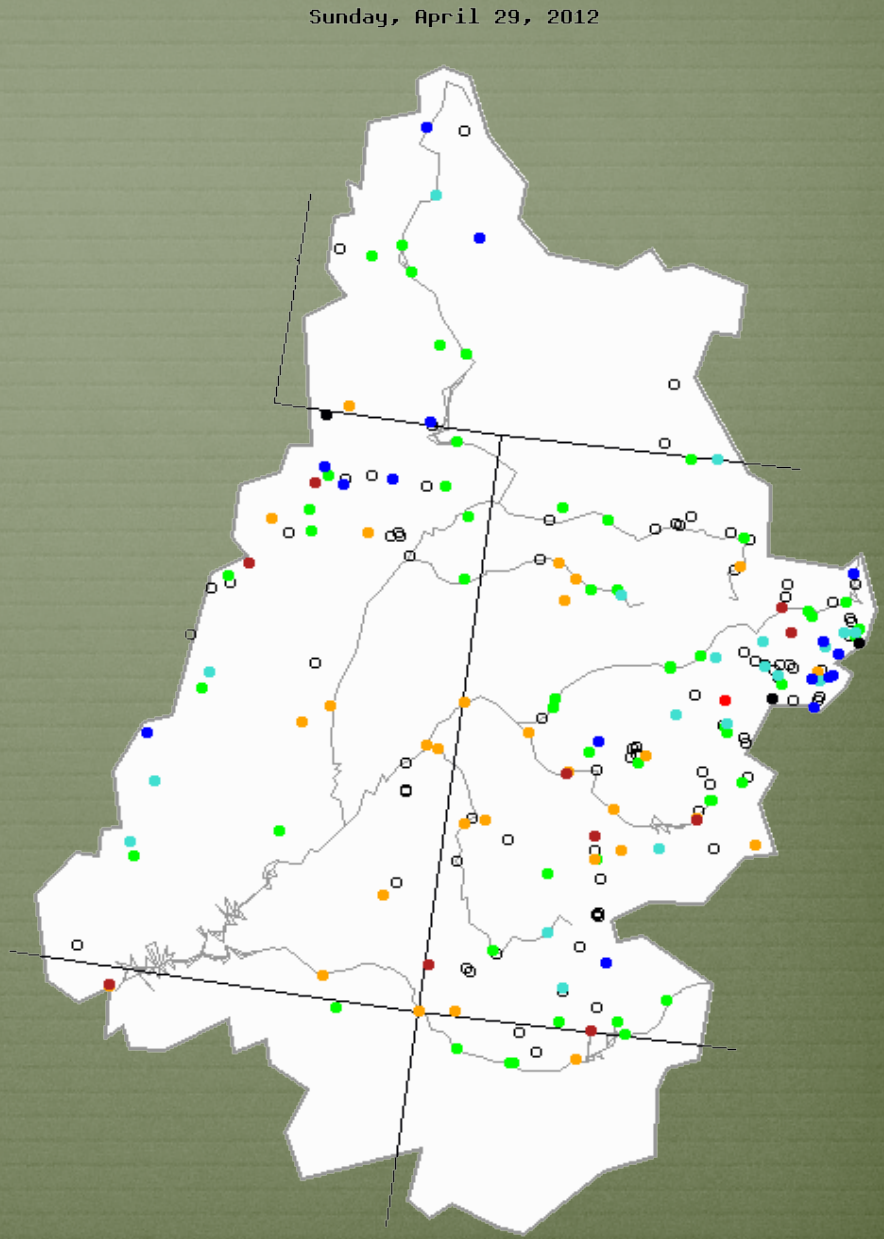

Colorado Basin River Forecast Center
Upper Colorado Mainstem Group
To Date: 23% (3.4 / 14.9)
Seasonal: 20% (3.4 / 16.9)
Melt rate -0.2 in/day
averaged over last 3 days.
Created 05/01 13:46 UTC
NOAA/CBRFC, 2012
Past
Future
Snow Water Equivalent (in)
Percent Seasonal
Date
30
28
25
22
20
18
15
12
10
8
5
2
0
177
163
148
133
118
104
89
74
59
44
30
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
Gunnison River Basin Group
To Date: 29% (4.4 / 15.4)
Seasonal: 24% (4.4 / 18.6)
Melt rate -0.2 in/day
averaged over last 3 days.
Created 05/01.1351 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: 32% (5.5 / 17.5)
Seasonal: 28% (5.5 / 20.2)
Melt rate -0.2 in/day
averaged over last 3 days.
Created 05/01.1353 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
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
Average 1981-2010
2012
2011
2002

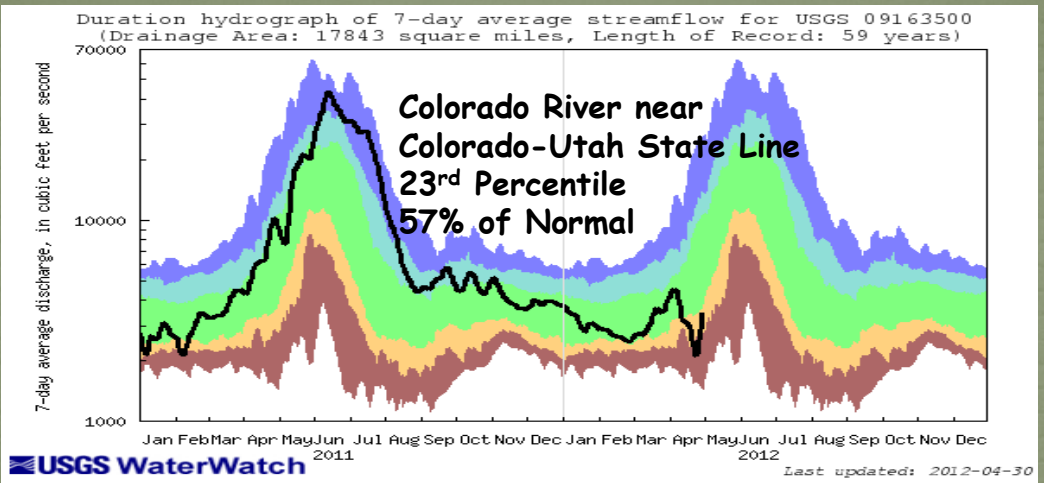
Streamflow Update

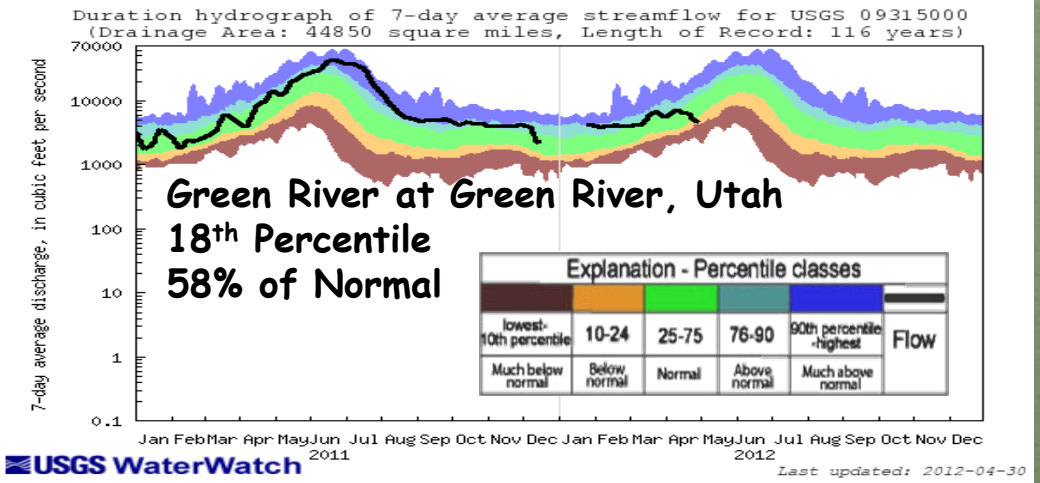
7-day average discharge compared to historical discharge for the day of the year (April 29)

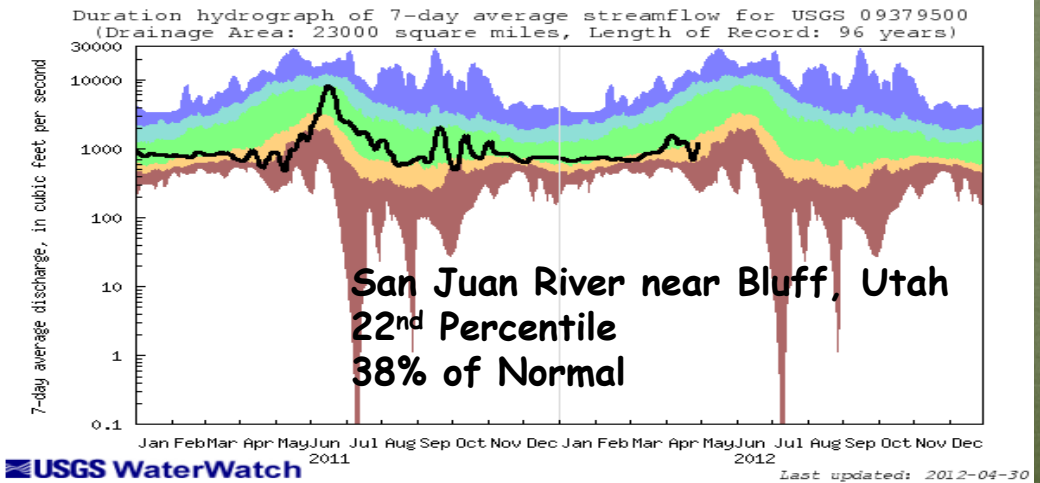


Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

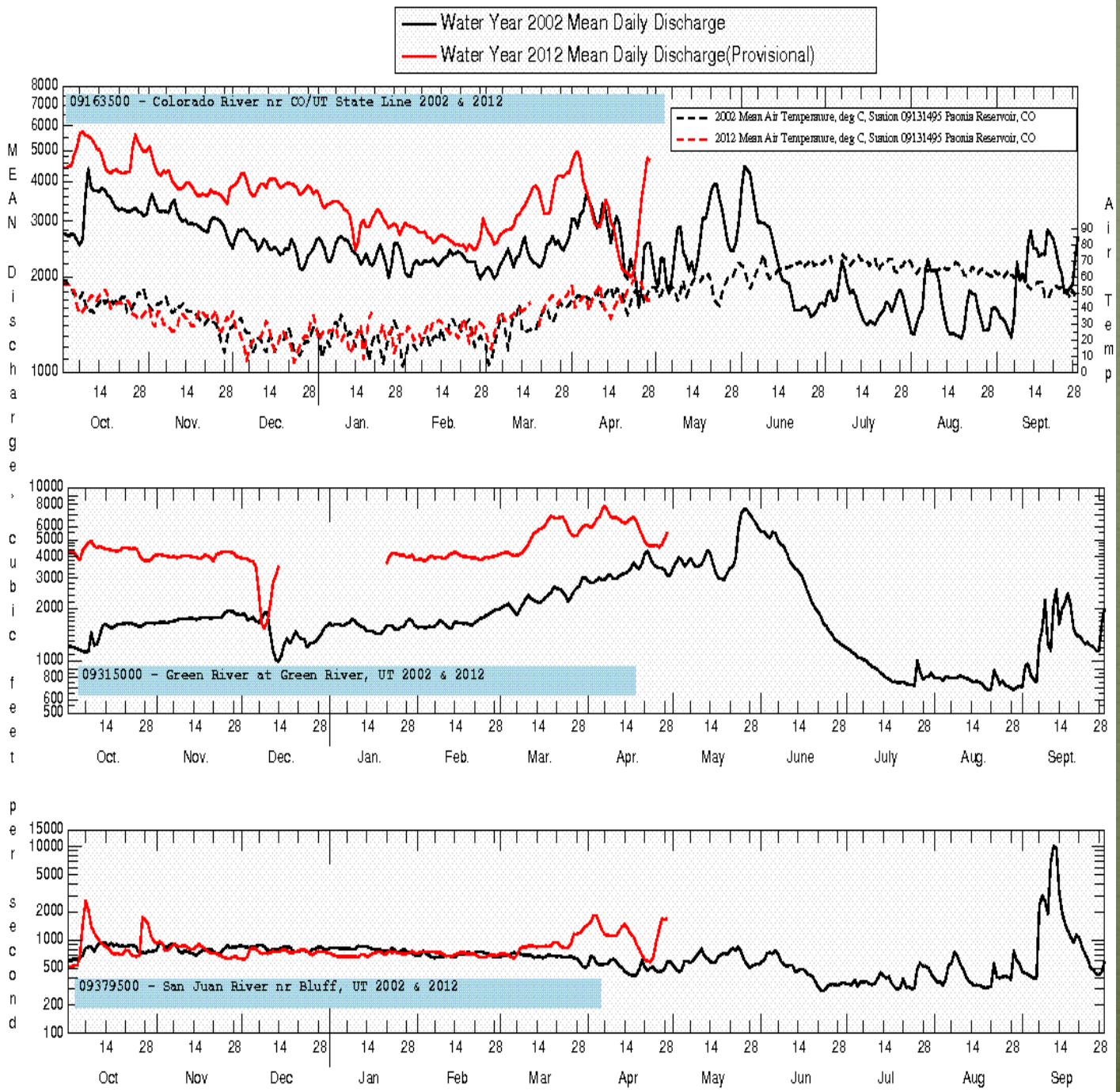
USGS

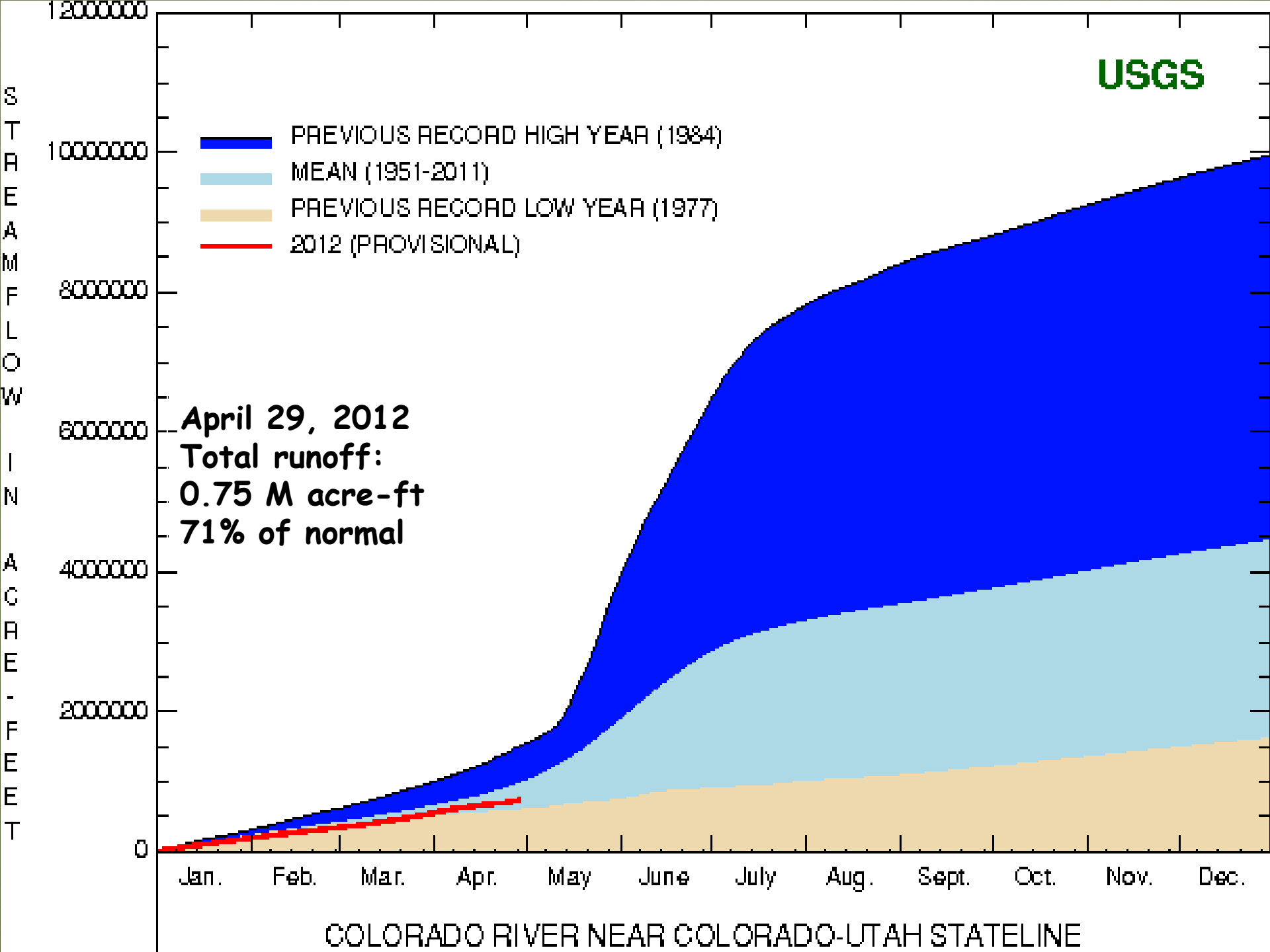

Duration hydrograph of 7-day average streamflow for USGS 09163500
(Drainage Area: 17843 square miles, Length of Record: 59 years)
7-day average discharge, in cubic feet per second
70000
10000
1000
Colorado River near
Colorado-Utah State Line
23rd Percentile
57% of Normal
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
2011
2012
USGS WaterWatch
Last updated: 2012-04-30


Duration hydrograph of 7-day average streamflow for USGS 09315000
(Drainage Area: 44850 square miles, Length of Record: 116 years)
7-day average discharge, in cubic feet per second
70000
10000
1000
100
10
1
0.1
Green River at Green River, Utah
18th Percentile
58% 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: 2012-04-30

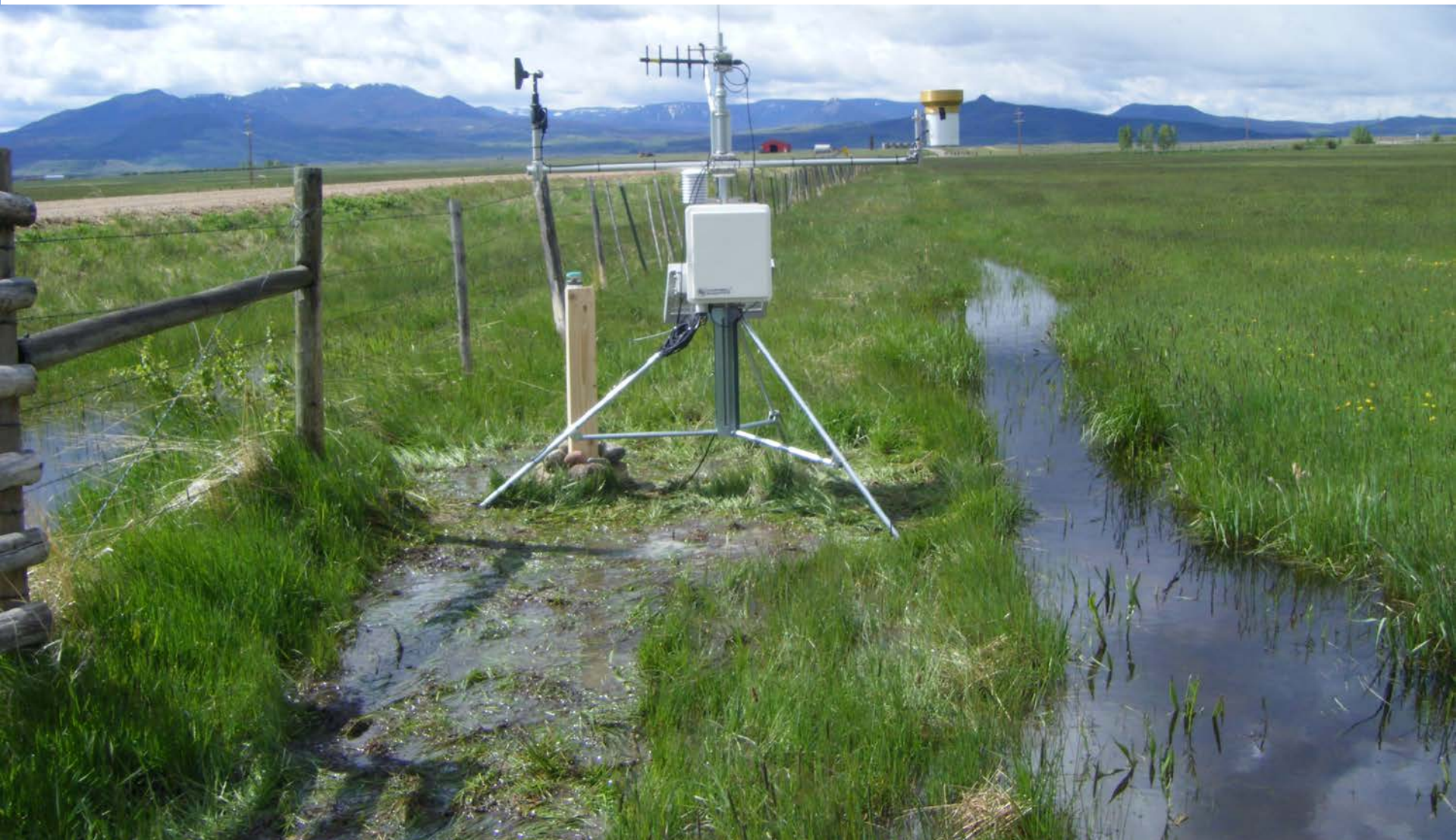

Duration hydrograph of 7-day average streamflow for USGS 09379500
(Drainage Area: 23000 square miles, Length of Record: 96 years)
7-day average discharge, in cubic feet per second
30000
10000
1000
100
10
1
0.1
San Juan River near Bluff, Utah
22nd Percentile
38% of Normal
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
2011
2012
USGS WaterWatch
Last updated: 2012-04-30

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

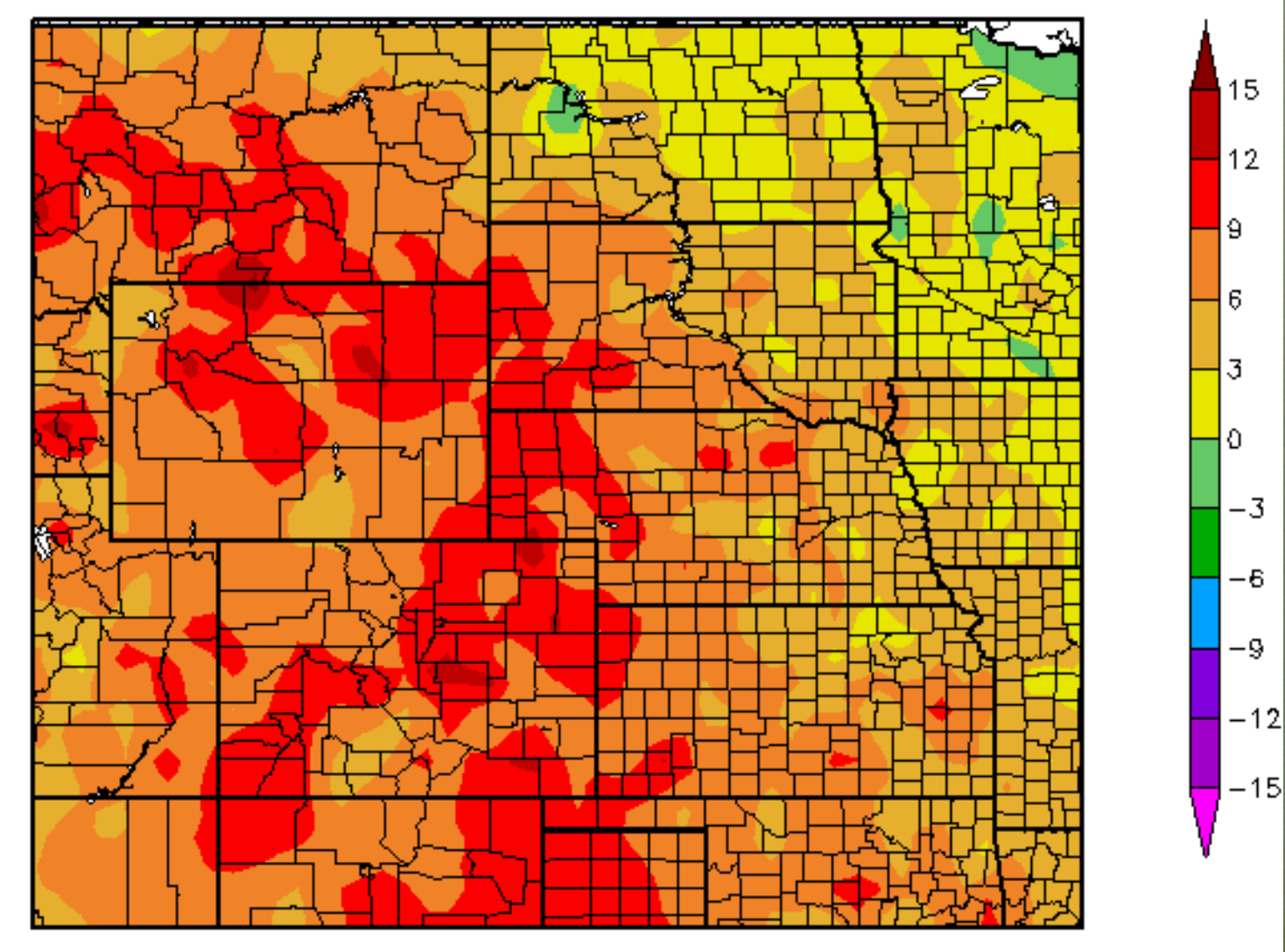



USGS
PREVIOUS RECORD HIGH YEAR (1984)
MEAN (1951-2011)
PREVIOUS RECORD LOW YEAR (1977)
2012 (PROVISIONAL)
April 29, 2012
Total runoff:
0.75 M acre-ft
71% of normal
STREAMFLOW IN ACRE-FEET
12000000
10000000
8000000
6000000
4000000
2000000
0
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
COLORADO RIVER NEAR COLORADO-UTAH STATELINE

Water Demand

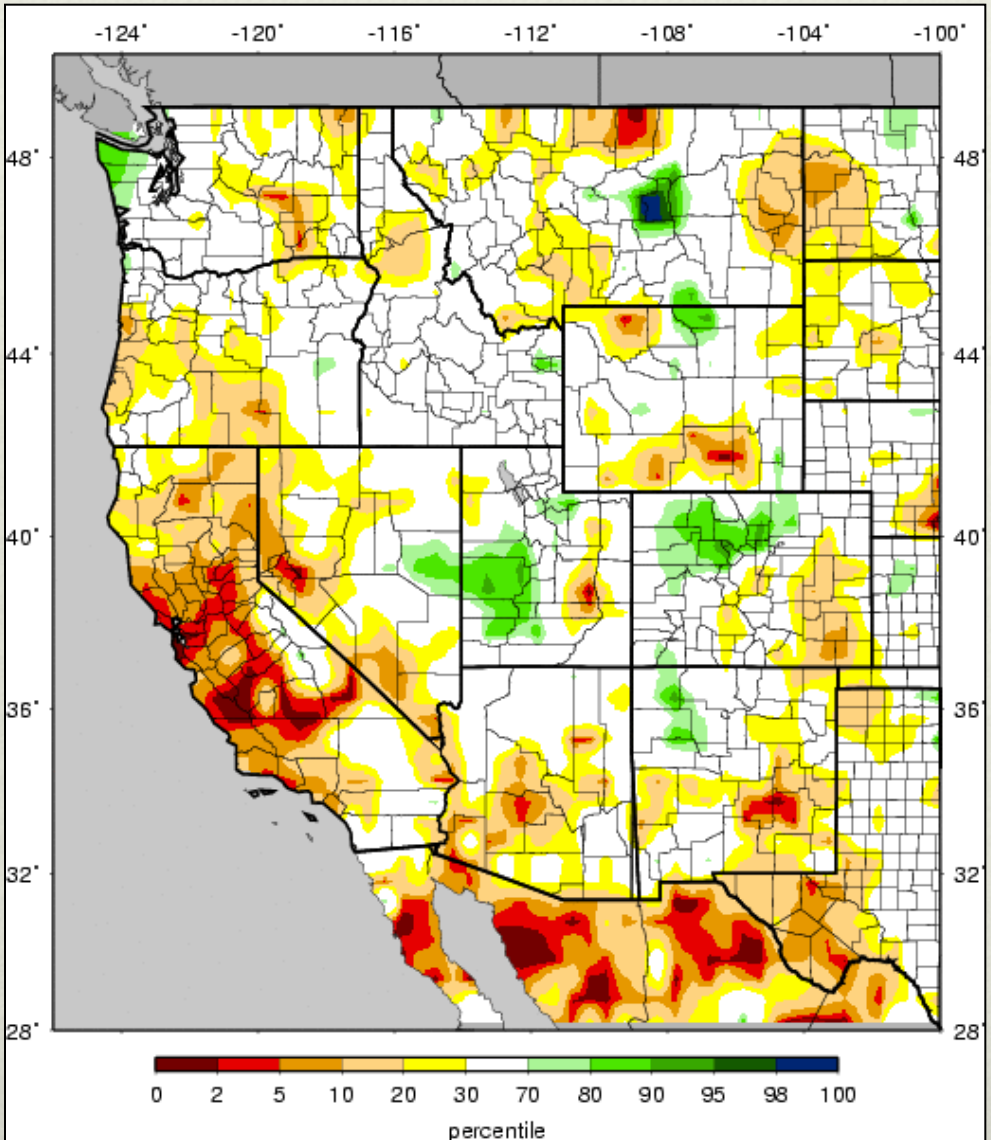


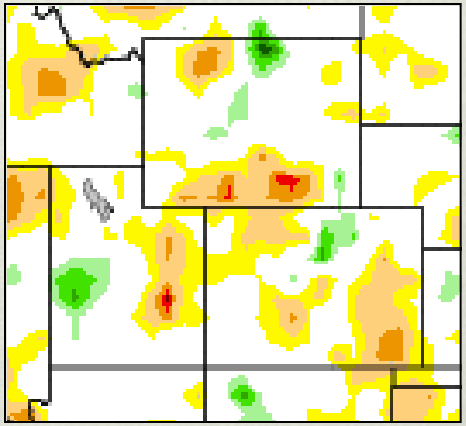
Temperature Departure from Normal
04/23/2012 – 04/29/2012



High Plains Regional Climate Center

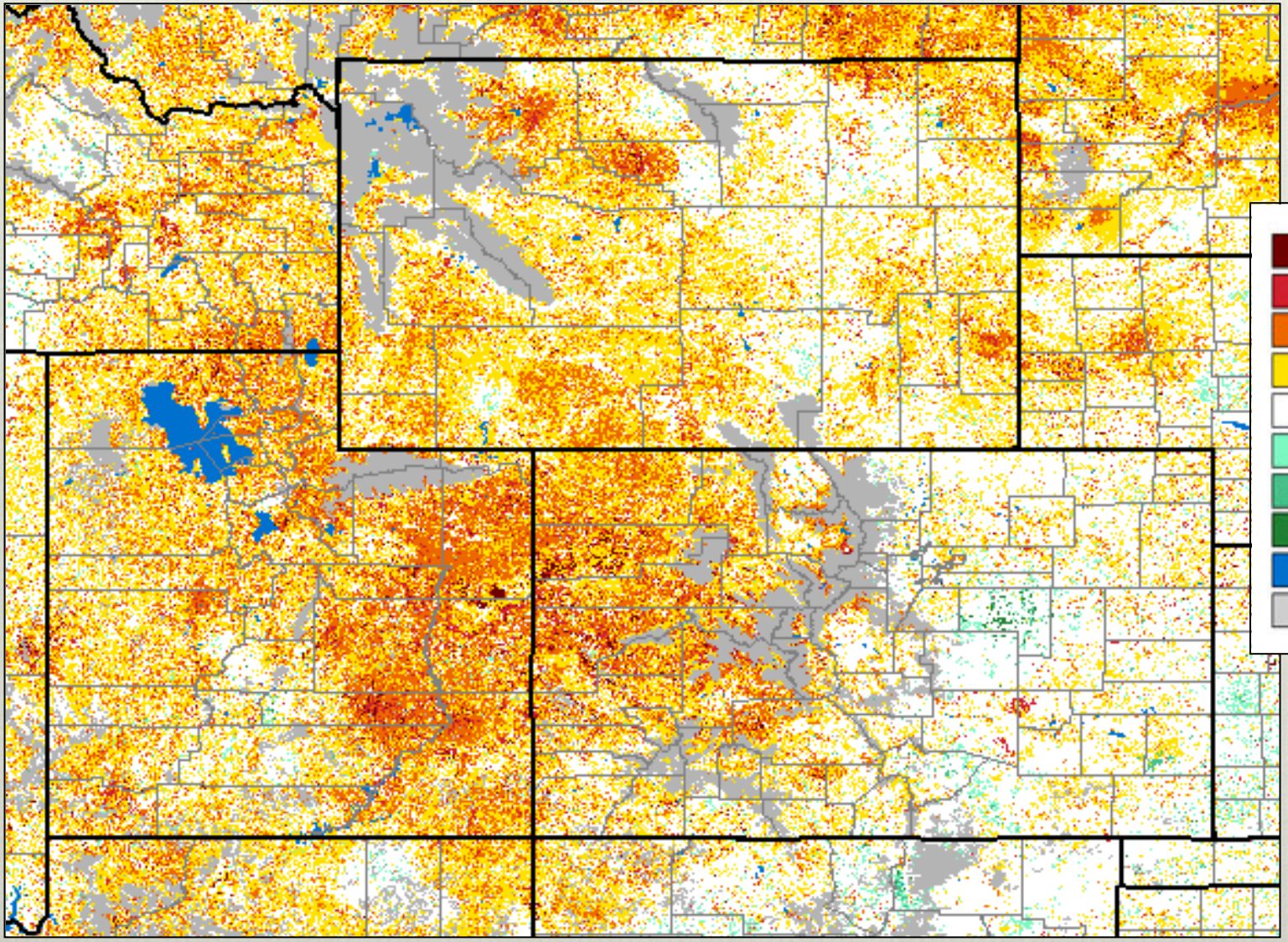
VIC Soil Moisture
29 April 2012





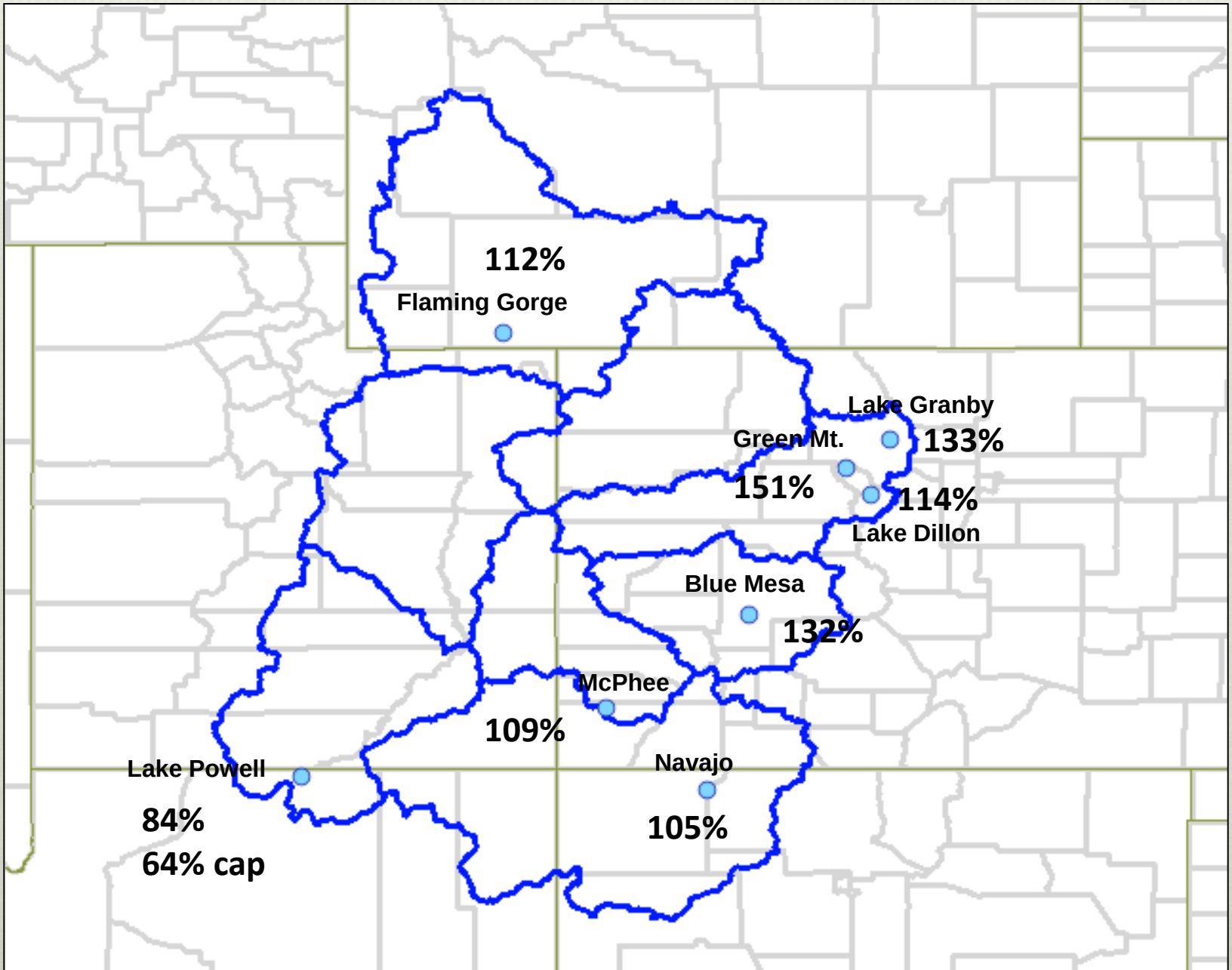
SWE + SOIL MOISTURE = TOTAL MOISTURE STORAGE

eMODIS VegDRI Vegetation
29 April 2012

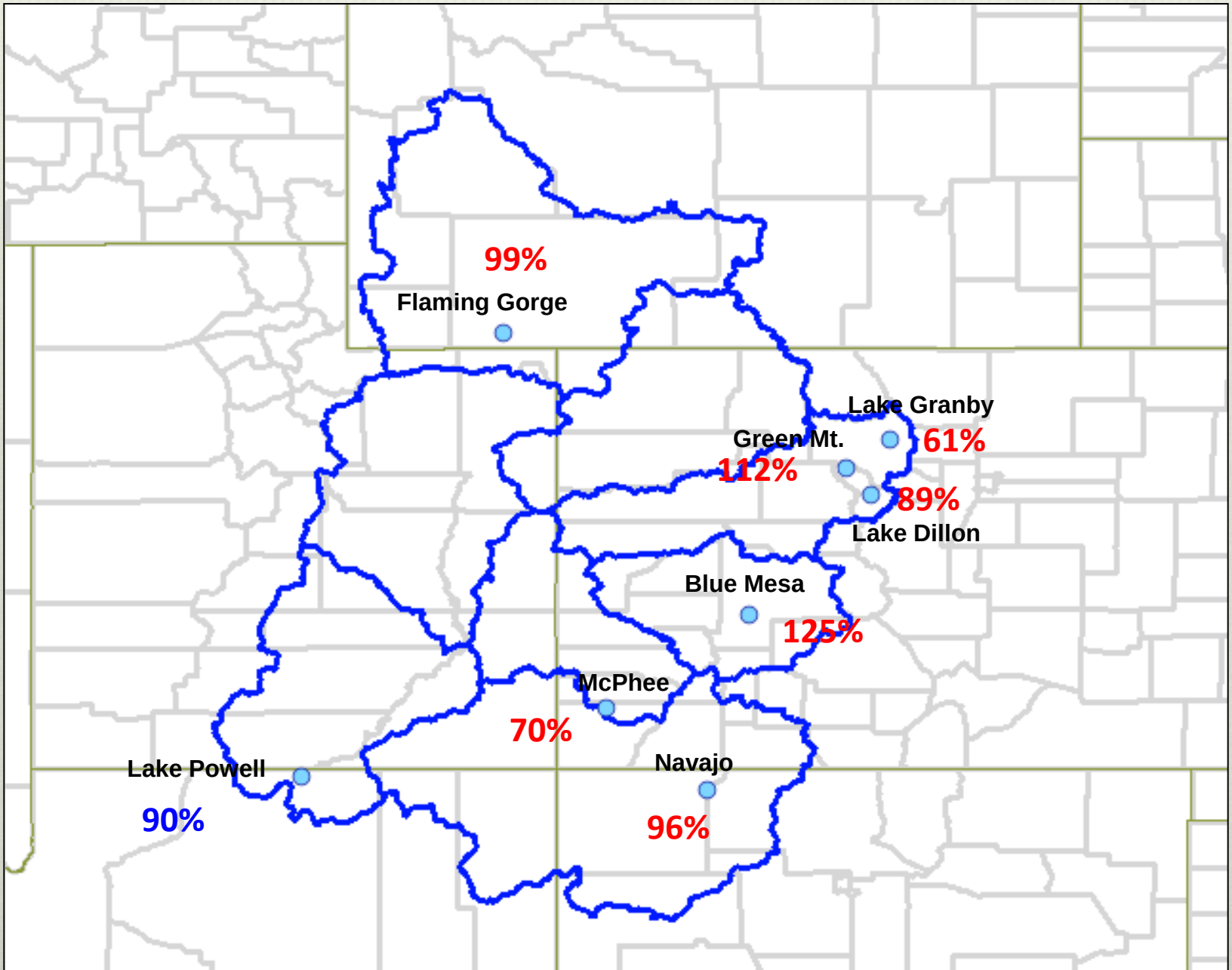


Reservoir Update

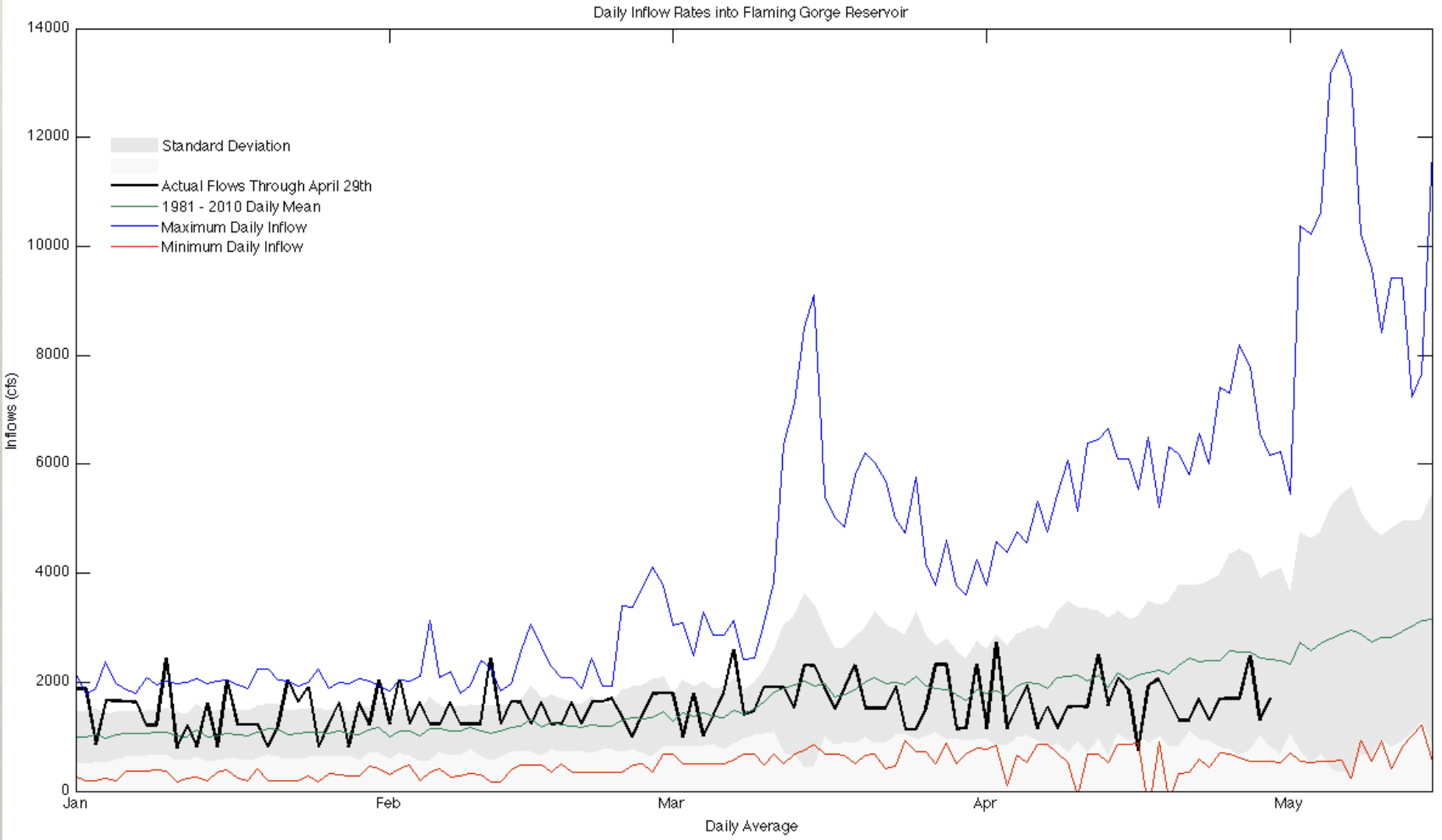
April Average Reservoir Storage Volume



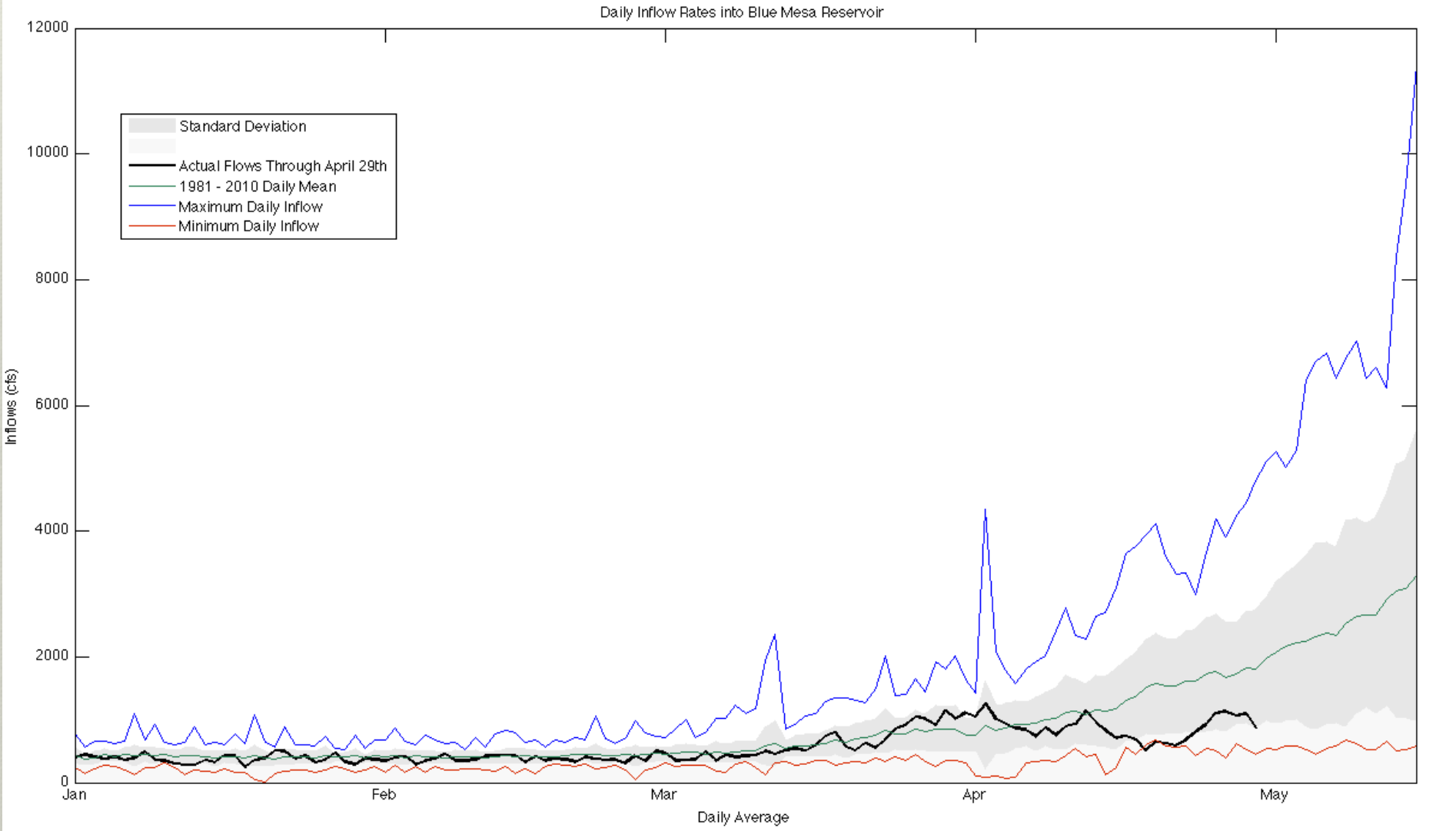
April Average Reservoir Storage Volume 2002



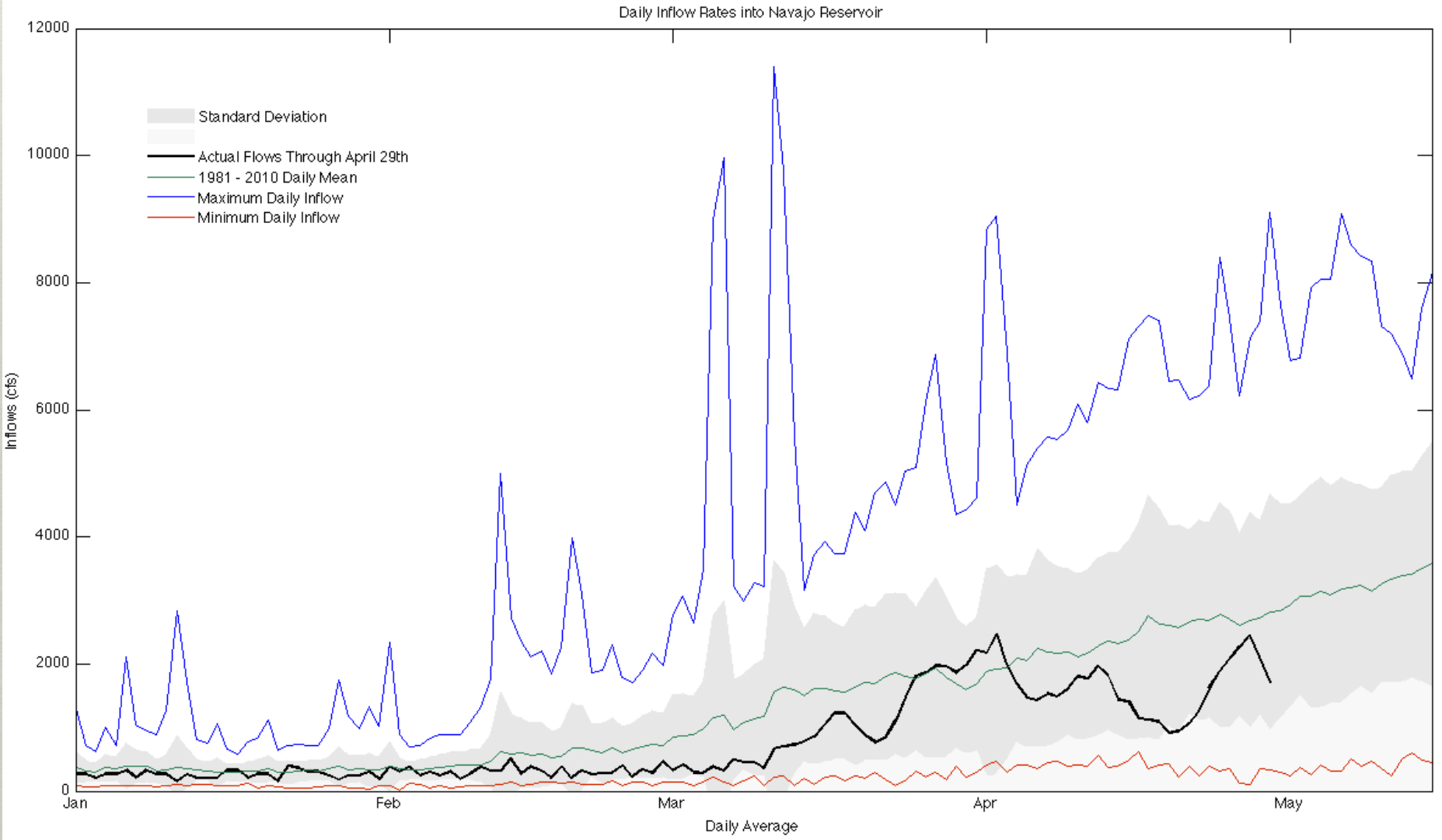
Daily Inflows into Flaming Gorge



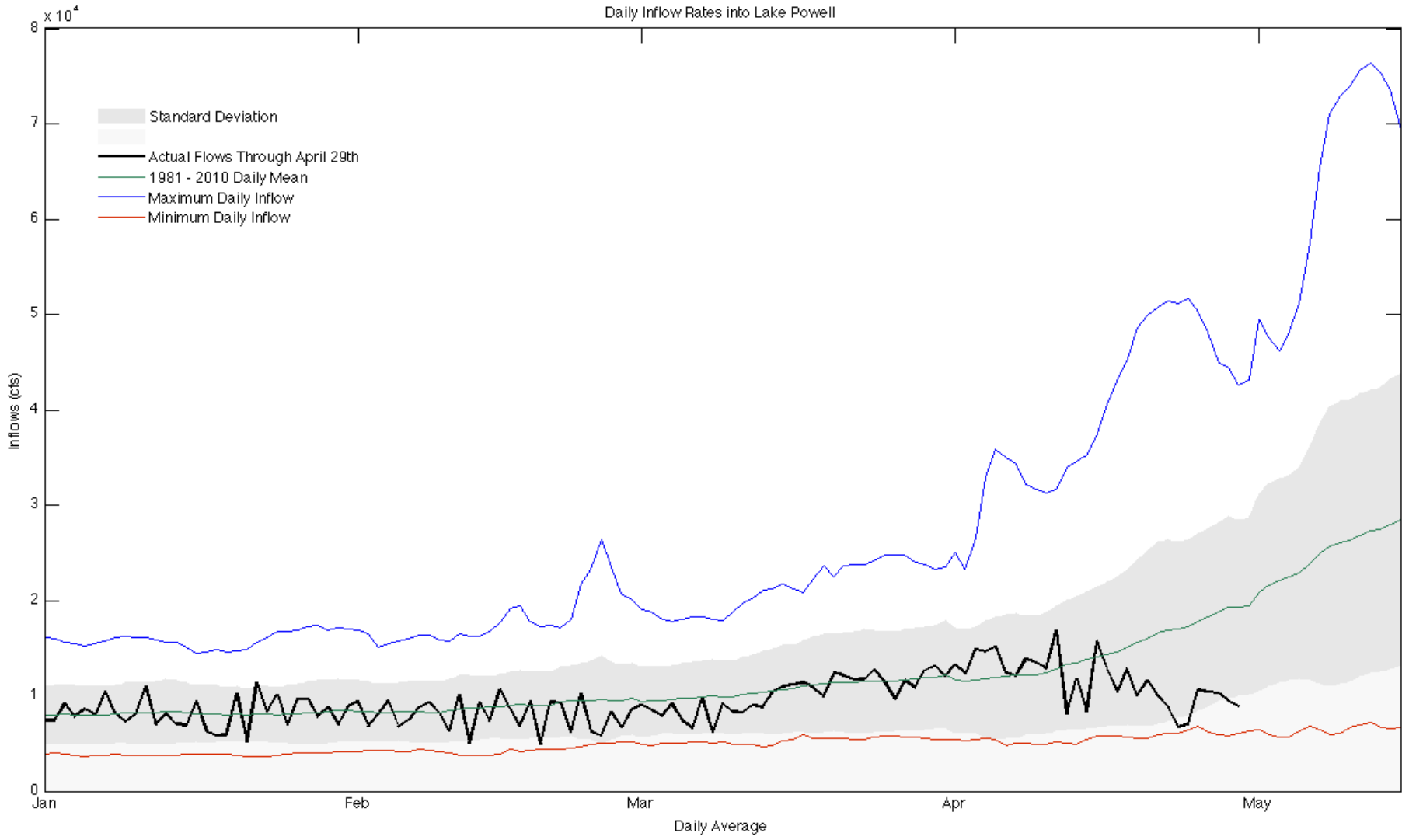
Daily Inflows into Blue Mesa



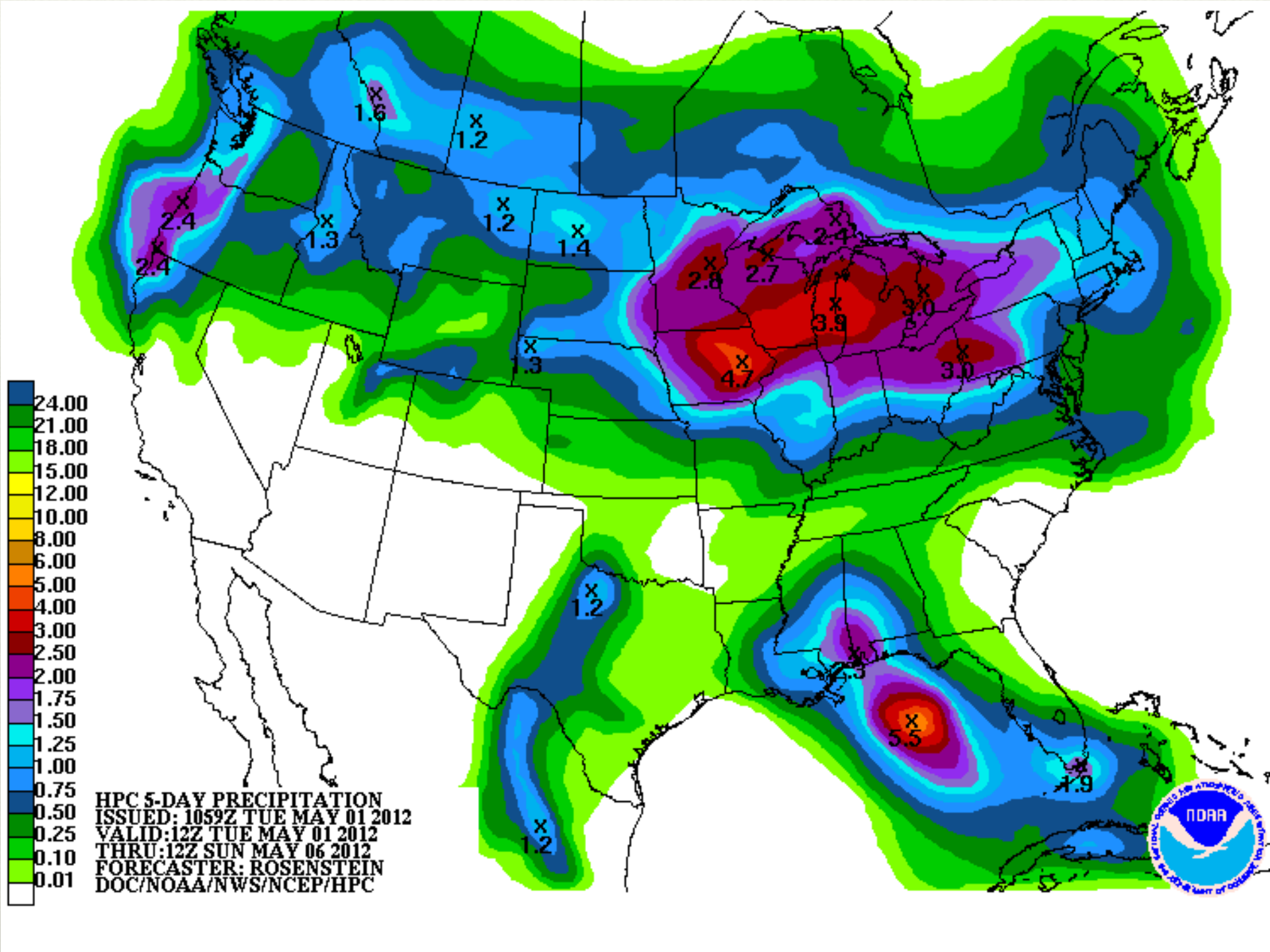
Daily Inflows into Navajo Lake



Daily Inflows into Lake Powell

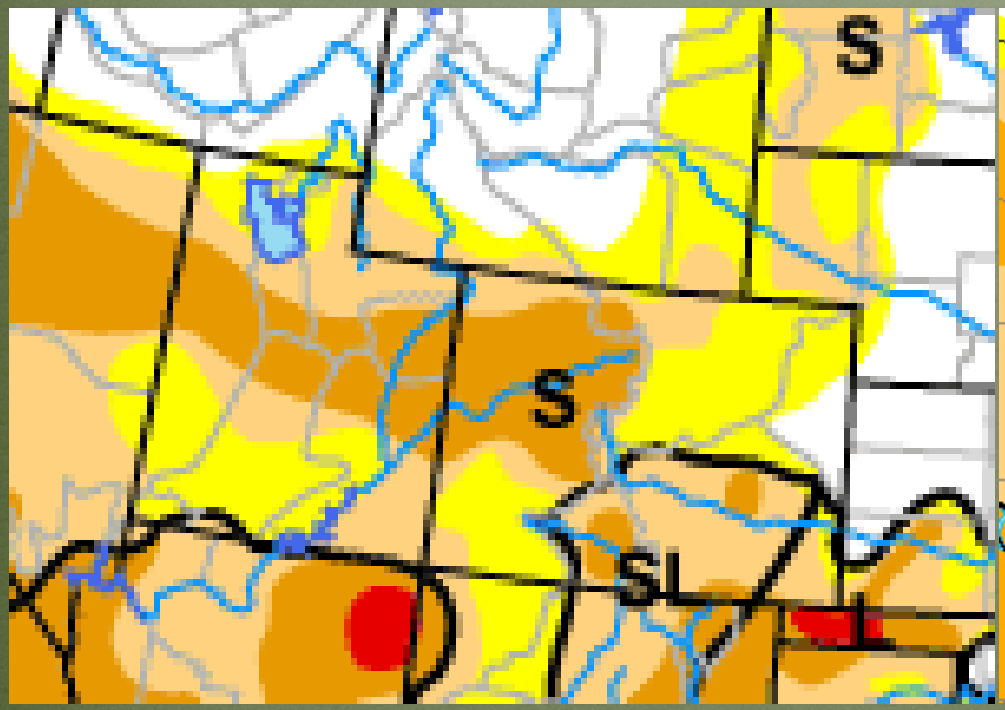


Precipitation Forecast

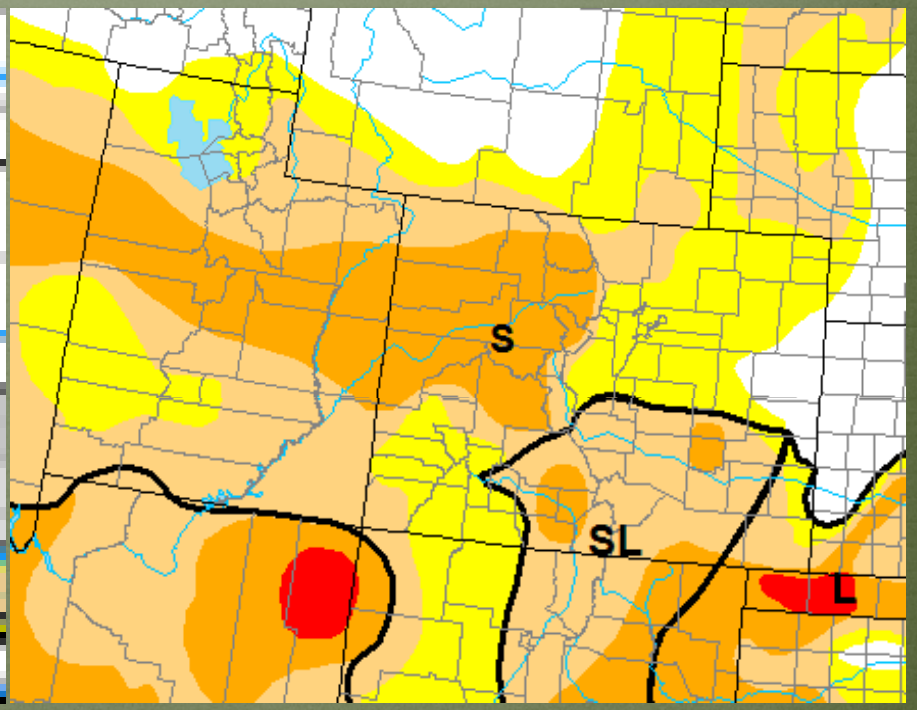

24.00
21.00
18.00
15.00
12.00
10.00
8.00
6.00
5.00
4.00
3.00
2.50
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.10
0.01
HPC 5-DAY PRECIPITATION
ISSUED: 1059Z TUE MAY 01 2012
VALID:12Z TUE MAY 01 2012
THRU:12Z SUN MAY 06 2012
FORECASTER: ROSENSTEIN
DOC/NOAA/NWS/NCEP/HPC
1.6
1.2
2.4
2.4
1.3
1.2
1.4
2.4
2.8
2.7
3.9
3.0
3.0
4.7
1.3
1.2
5.5
1.9
1.2
NOAA

Recommendations

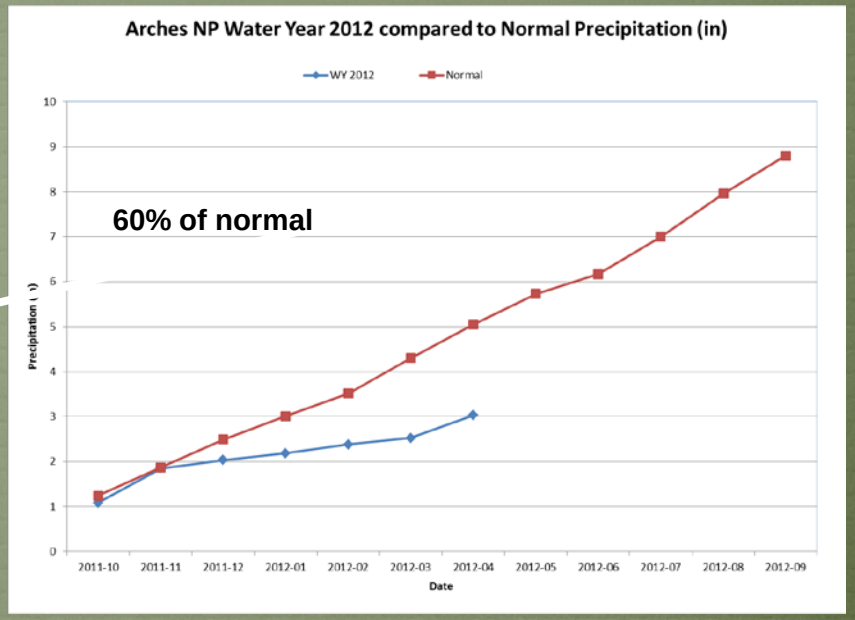
April 24 USDM

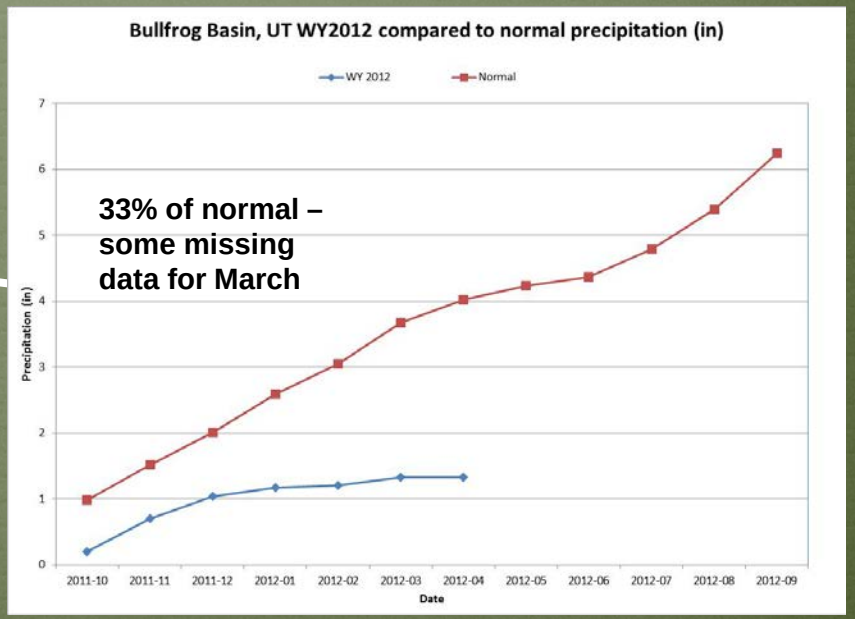


Draft 1




Satellite
Fruita
Clifton
Redlands
Palisade
Grand Junction
Ferron
Green River
Arches National Park
Orchard City
Delta
Moab
Spanish Valley
Hanksville
La Sal
Canyonlands National Park
Nucla
Naturita
Uncompahgre National Fores
Capitol Reef National Park
Boulder
Monticello
Dove Creek
Blanding
Lewis
Dolores
Cortez
Mancos
Montezuma Creek
Bluff
Towaoc
Aneth
Halchita
Glen Canyon National Recreation Area
50 km
Expand Search Area
Google


Arches NP Water Year 2012 compared to Normal Precipitation (in)
WY 2012
Normal
60% of normal
Precipitation (in)
Date
2011-10
2011-11
2011-12
2012-01
2012-02
2012-03
2012-04
2012-05
2012-06
2012-07
2012-08
2012-09


Bullfrog Basin, UT WY2012 compared to normal precipitation (in)
WY 2012
Normal
33% of normal – some missing data for March
Precipitation (in)
Date
2011-10
2011-11
2011-12
2012-01
2012-02
2012-03
2012-04
2012-05
2012-06
2012-07
2012-08
2012-09

INFO

For more information

NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

May 1, 2012

Precipitation and Snowpack

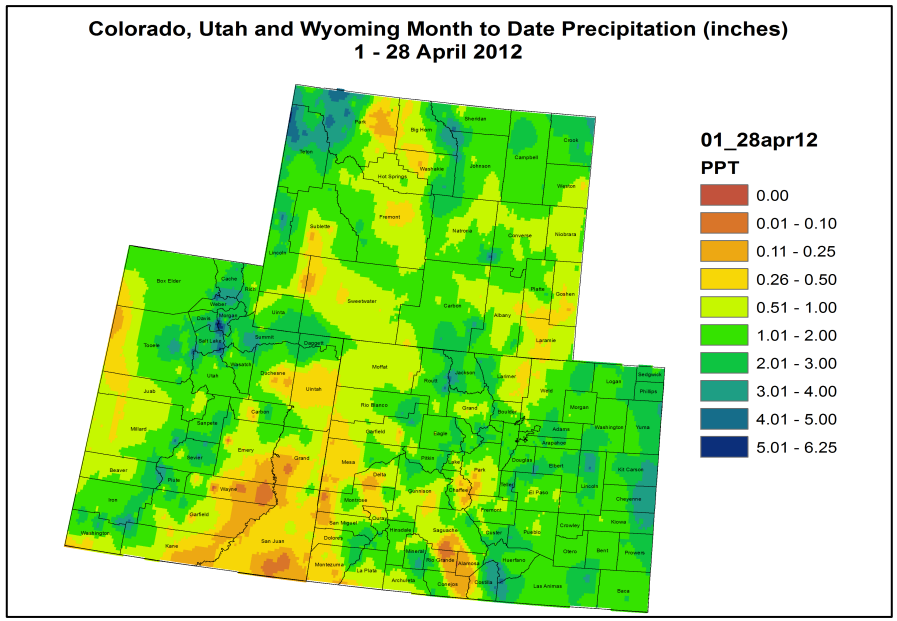


Fig. 1: April month-to-date precipitation in inches.

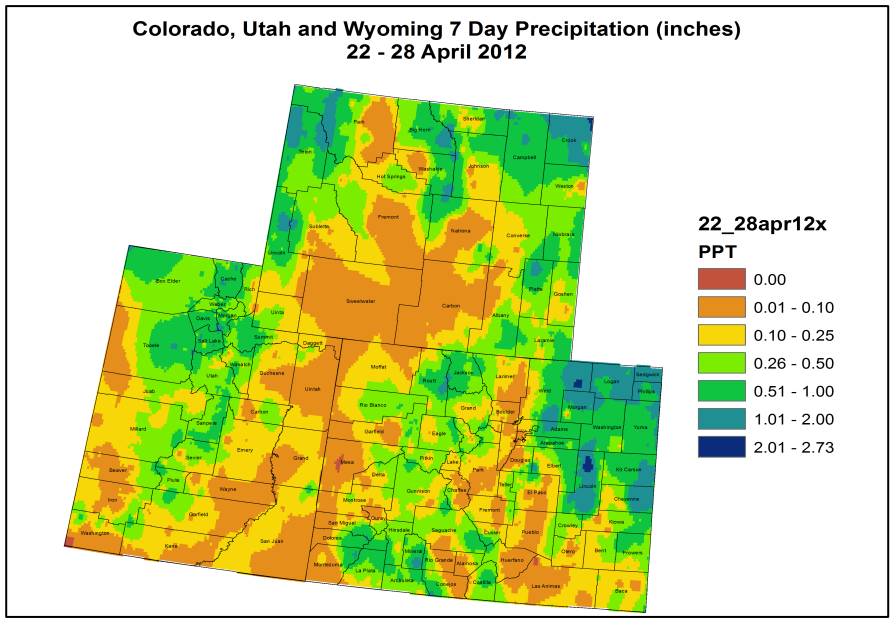


Fig. 2: April 22 – 28 precipitation in inches.

Since the beginning of the month, the Upper Colorado River Basin (UCRB) higher elevations have seen precipitation amounts ranging between 1 and 3 inches, with spotty amounts of over 3 inches in the Wasatch mountains in Utah (Fig. 1). The lower elevations of western Colorado and eastern UT have received amounts ranging between a quarter inch and 1 inch, with the Colorado River valley just above Lake Powell receiving less than a quarter inch since the beginning of the month. Most of CO, east of the UCRB, has received between 1 and 2 inches of precipitation, though short-term dryness shows up in northern CO and in the South Park valley. The San Luis Valley has also been drier, seeing less than a quarter of an inch for the month.

Last week, the heaviest precipitation fell in the higher elevations of the UCRB, with accumulations ranging from a quarter inch to an inch (Fig. 2). The lower elevations of the UCRB received less than a quarter of an inch for the week. East of the basin, northeast CO received over half an inch for the week, with some locations seeing more than an inch of moisture. Southeast CO was a bit drier for the week, though they did receive additional precipitation of around half an inch on Sunday (not shown on map).

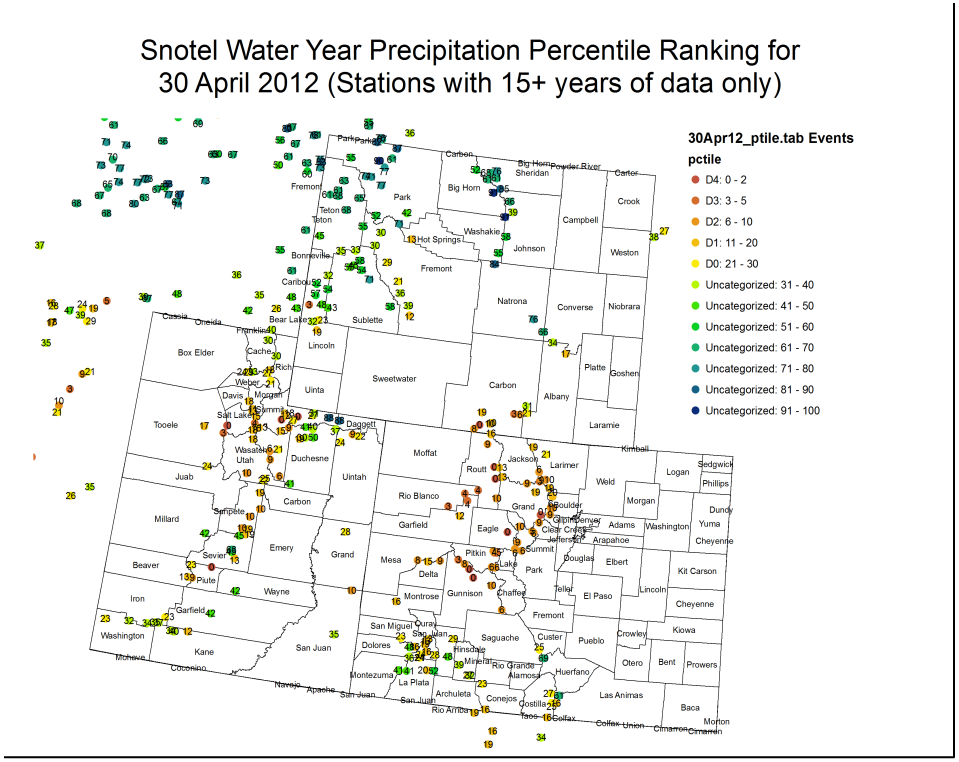


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21 – 30% is Drought Monitor D0 category).

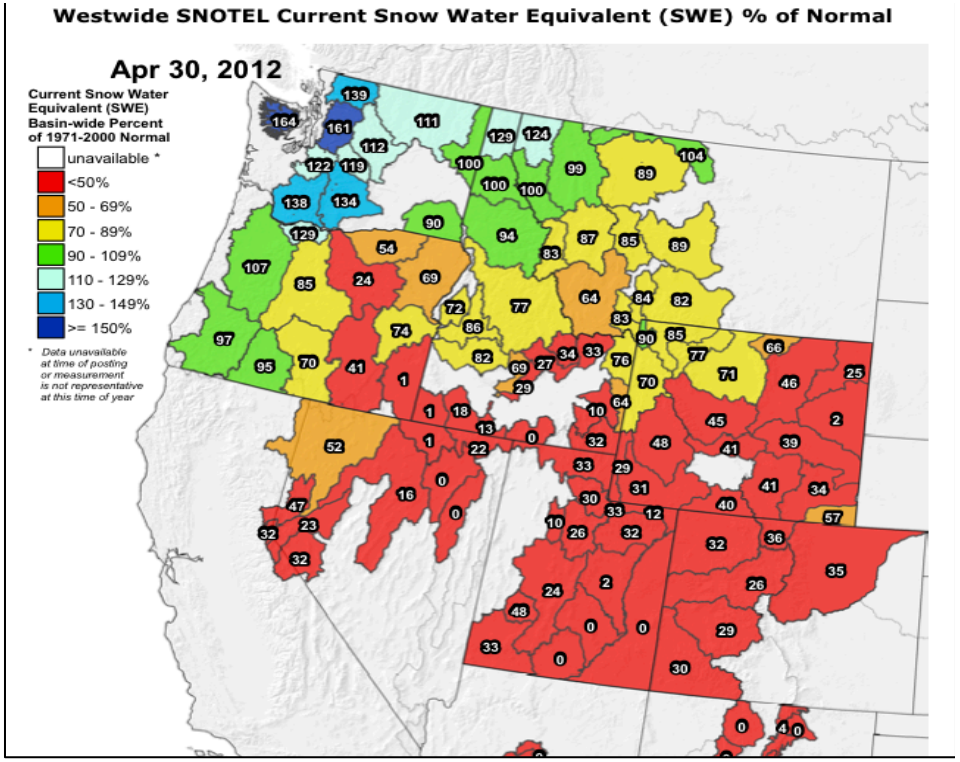


Fig. 4: Basin snow water equivalent (SWE) as a percent of average.

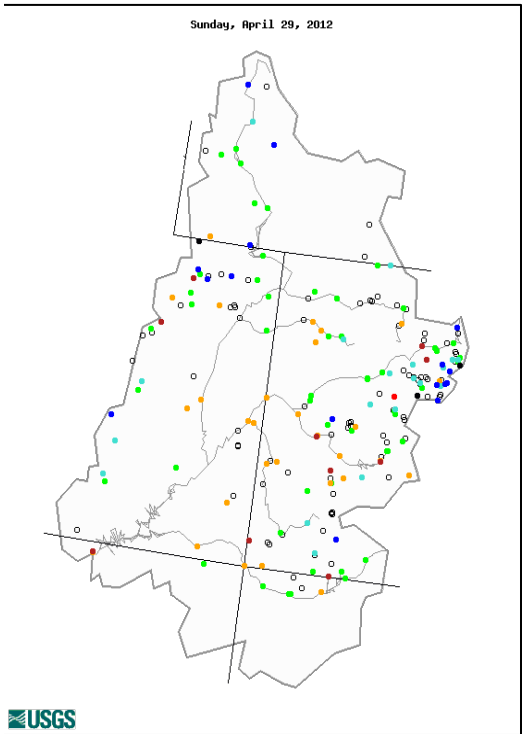
Water-year-to-date (WYTD), SNOTEL precipitation percentiles are lowest for the Yampa and Gunnison basins in CO, with many sites reporting in the lowest 5th percentile or below (Fig. 3). The Wasatch range in UT and the northern mountains of CO are also dry, with most precipitation percentiles in the teens. SNOTEL percentiles in the Upper Green basin in WY are generally above the 40th percentile. In the San Juan basin, 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 average and many sites have completely melted out (Fig. 4). This is a combined result of less than average seasonal snowpack accumulations and much earlier melting (seasonal peaks one month earlier than normal). Nearly all of the sub-basins are near or below 30% of average. The lowest averages are in eastern UT. In the northern-most part of the UCRB in WY, one sub-basin is still recording 48% of average snowpack.

Streamflow

As of April 29th, 69% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows (Fig. 5). About 30% of the gages in the basin are recording above normal flows, while about 31% of the gages in the basin are recording below normal flows. Most of the gages on the Green River in WY are showing near normal flows, while streamflow on the Gunnison River is below normal. Flows on the Colorado and San Juan rivers are variable. Higher flows are concentrated near the Colorado headwaters region.

Flows on two key gages in the UCRB showed increases last week, while one continued to show decreasing flows (Fig. 6). Flows on the Green River at Green River, UT dropped into the below normal range at the 18th percentile (down from the 42nd percentile last week). Flows on the Colorado River near the CO-UT state line and the San Juan River near Bluff, UT both increased last week, but are still in the below normal range, at the 23rd and 22nd percentiles, respectively.



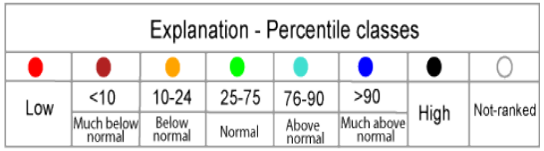


Fig. 5: 7-day average discharge compared to historical discharge for April 29th.

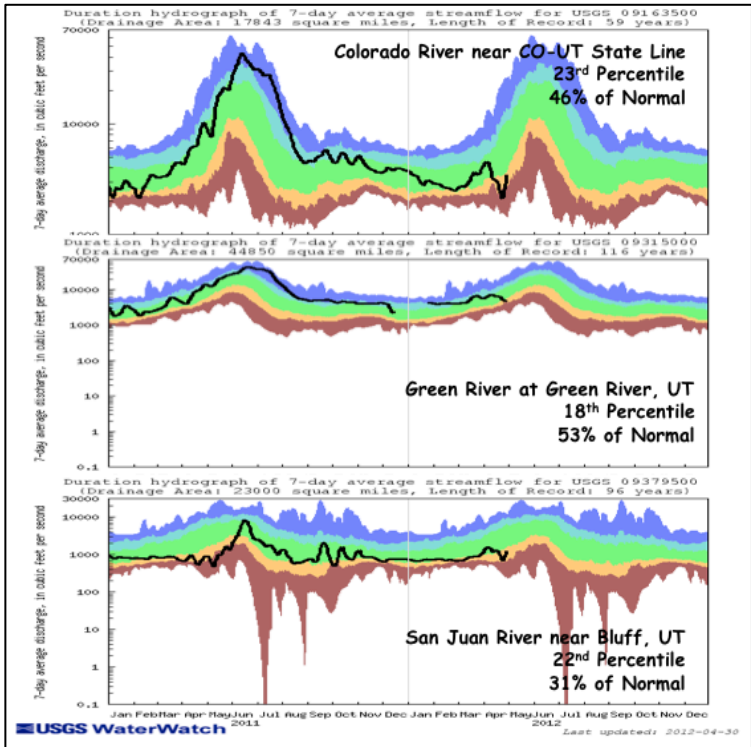


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

All of the UCRB experienced above average temperatures for the week, parts of the Gunnison and San Juan basins experiencing temperatures 9 to 12 degrees above average. All of eastern CO also experienced much warmer than average temperatures last week as well. 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). The VIC shows very wet soils around the Colorado headwaters region (likely due to early melting of snowpack infiltrating the soils), however this area of wet soils is decreasing in size and intensity. When VIC SWE and soil moisture are combined, the 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. The rest of the major reservoirs have been increasing in volume since the beginning of the month. Lake Powell is currently at 84% of average and 64% of capacity (compared to 52% one year ago). Compared to 2002 (the UCRB's most severe drought in recent history), water supply is in better condition with all of the major reservoirs above Lake Powell at higher levels than in April of 2002.

Precipitation Forecast

UCRB will be in between a dry ridge of high pressure located over the western high plains and a deepening trough of low pressure over the Pacific Northwest. This trough will remain anchored over western Oregon through most of the week, and bring a persistent chance of light showers to the extreme northwest parts of the basin. Where precipitation does fall expect liquid accumulations to be around 0.25 inches, with localized areas of 0.50 inches possible through Friday. The Pacific Northwest trough begins to move southeast through the weekend with large differences in forecast path. Best chance of showers and isolated thunderstorms with this feature will likely remain over the northern-most fringes of the UCRB, while the majority of the region remains dry well into next week.

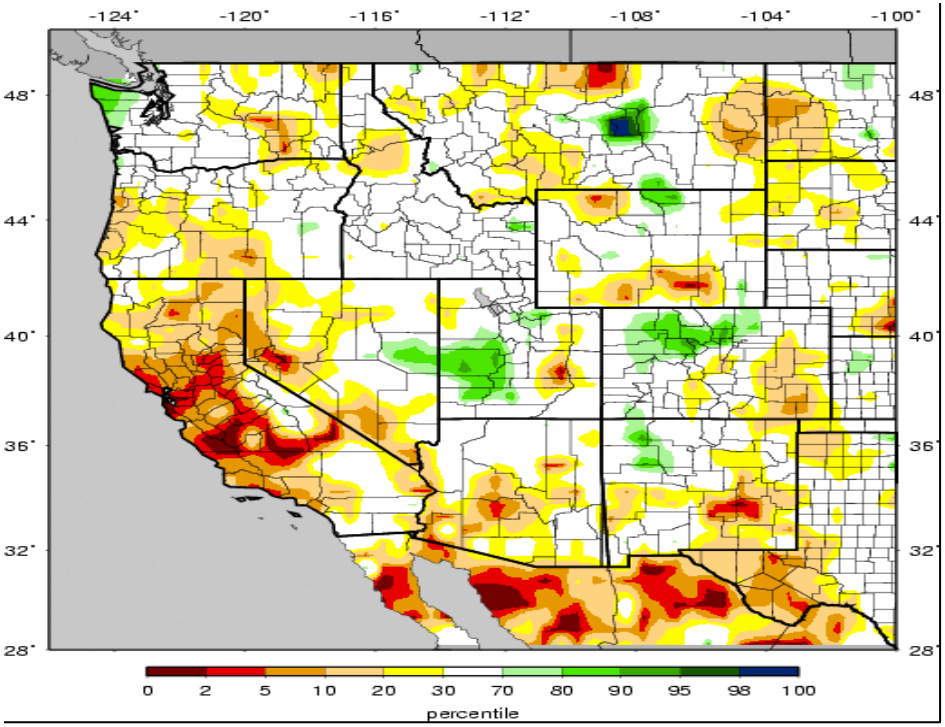
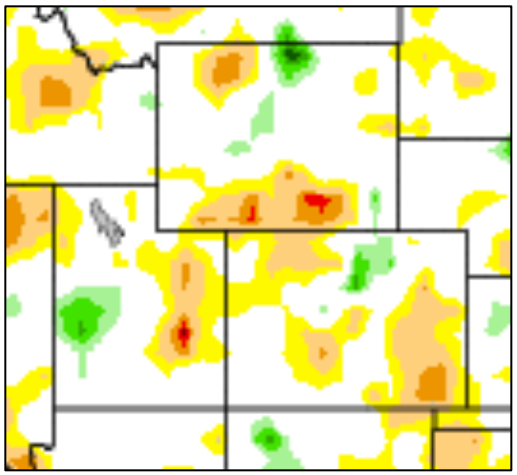


Fig. 7: VIC soil moisture percentiles as of April 29th, with total moisture storage (SWE and soil moisture) below.



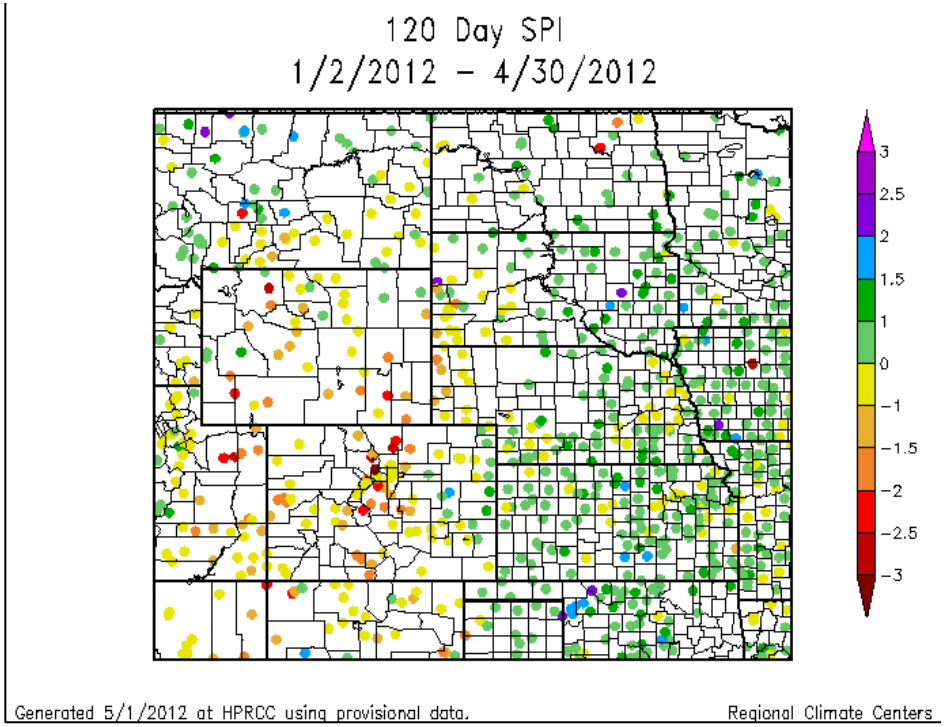
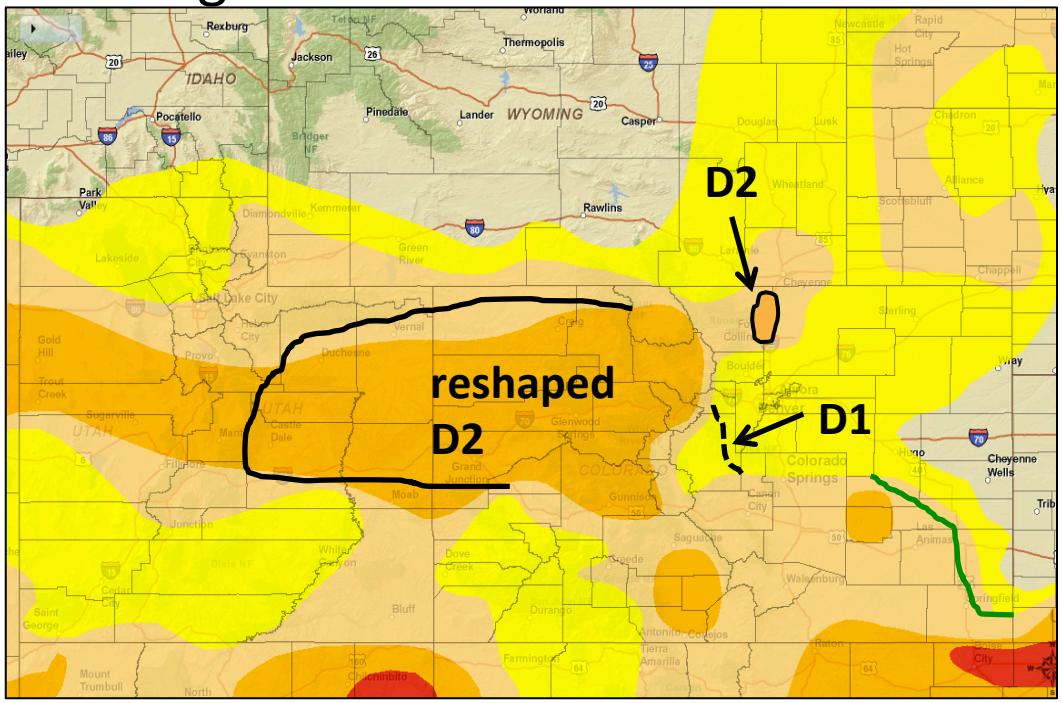


Fig. 8: Standardized precipitation indices (SPIs) for the 120-day time scale as of April 30th.

Drought and Water Discussion



Drought categories and their associated percentiles

Fig. 9: April 24th release of U.S. Drought Monitor for the UCRB.

Looking at the current depiction of the U.S. Drought Monitor (USDM) map, it is recommended that the D2 in eastern UT and western CO be slightly adjusted (Fig. 9, black line). Based on several different time scales of SPIs (Fig. 8), it doesn't appear that the southern parts of Mesa County, CO and Grand County, UT are as dry as the northern parts. Also, the SPIs and SNOTEL precipitation percentiles west of Emery County, UT don't warrant D2 at this time. SPIs do support a slight northward expansion of the D2 in northeast UT and northwest CO though. As for the exact D2 delineation in western UT, we defer to the USDM author and local experts.

Also recommended is a D2 introduction around Fort Collins, CO (Fig. 9, black outlined orange shape) where short-term SPIs out to 120-days are all less than -2. An expansion of D1 to cover the South Park valley is also recommended (Fig. 9, dashed line). Based on excellent precipitation over the past month, a slight improvement of the D1 in southeast CO is recommended (Fig. 9, green line).