Spring 2011

Weekly Climate, Water & Drought Assessment

Today's Agenda

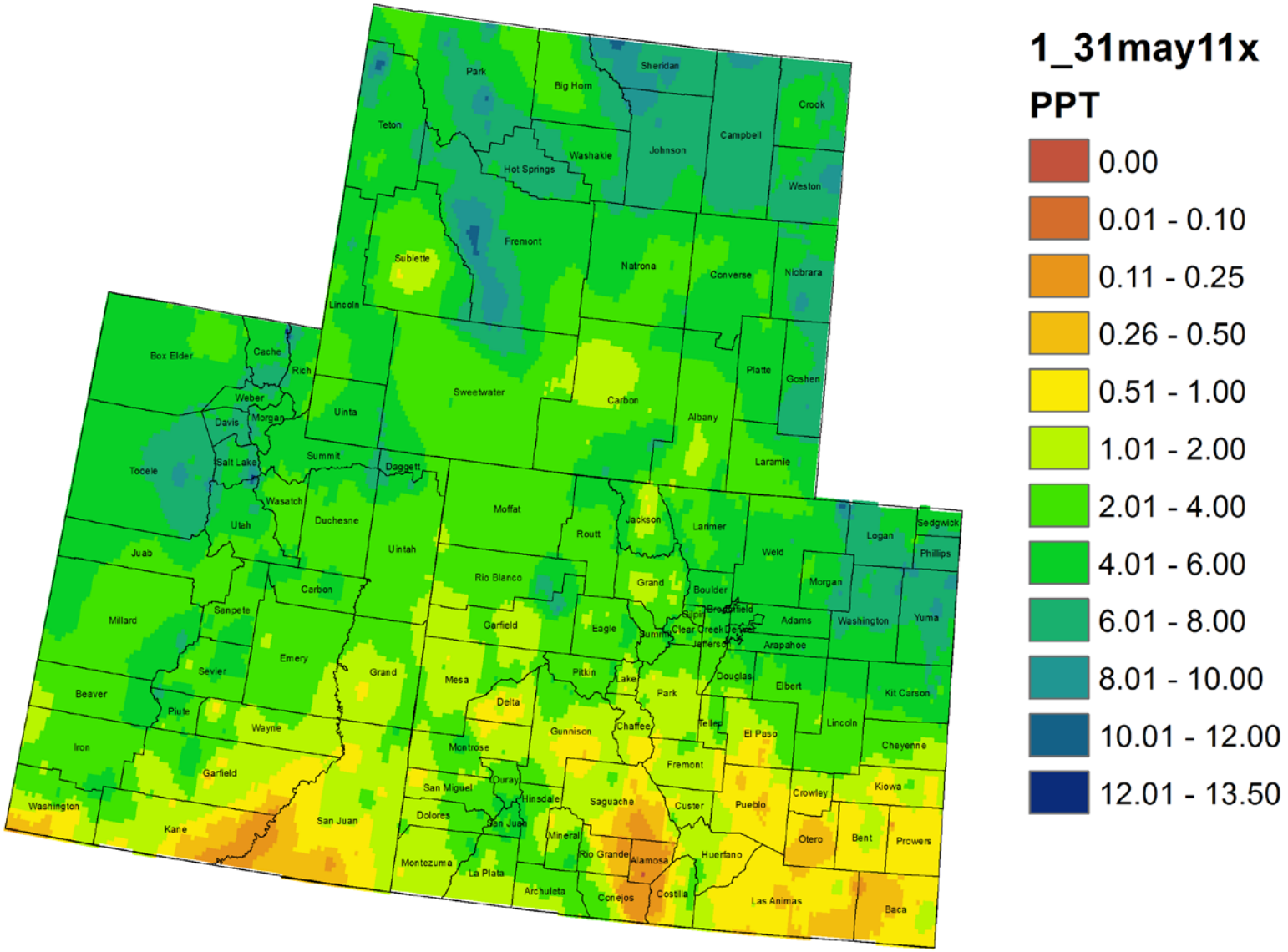
-Assessment of current water conditions

- Precipitation Forecast

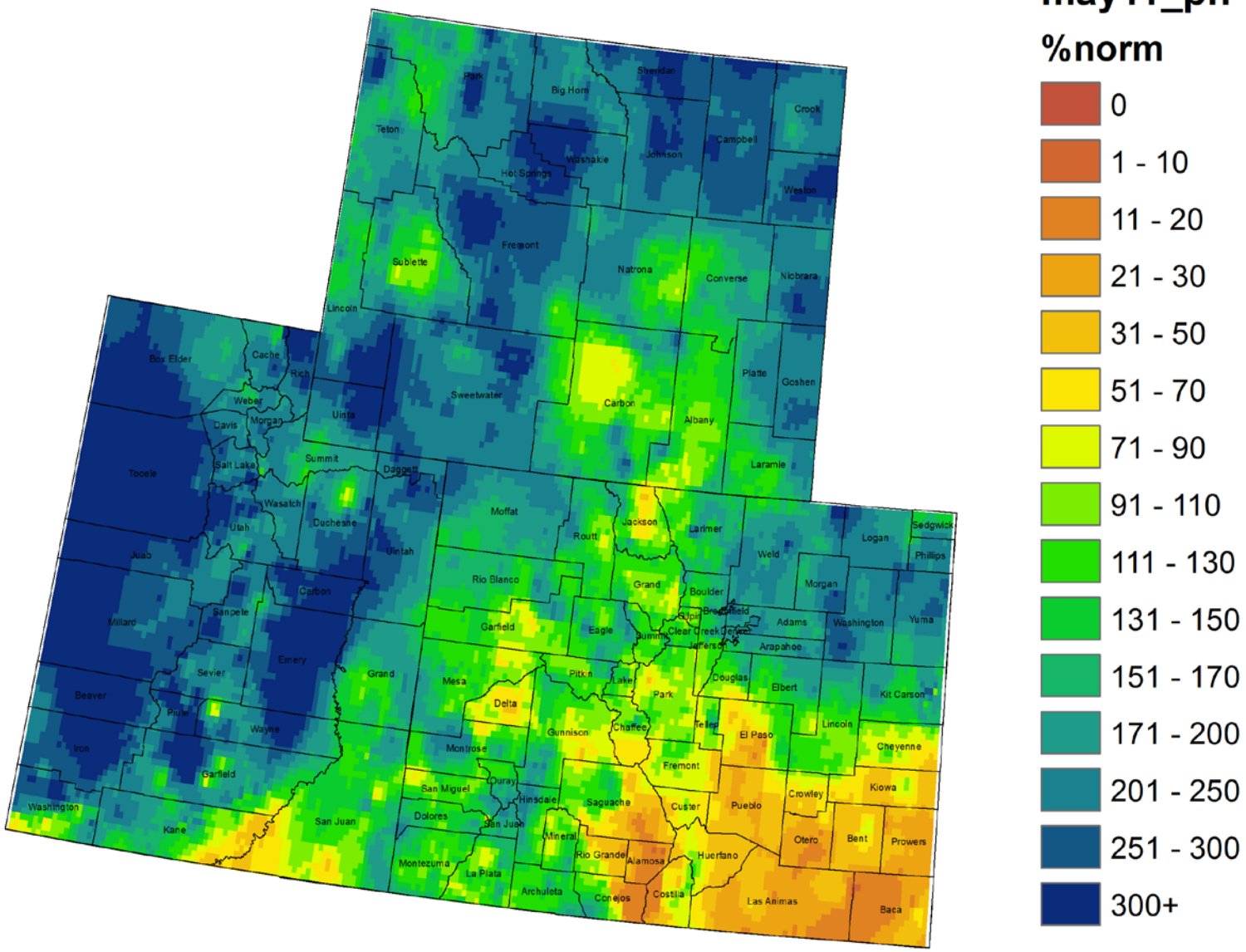
- Recommendations for Drought Monitor

Precipitation/Snowpack Update

Colorado, Utah and Wyoming May 2011 Precipitation (in)



Colorado, Utah and Wyoming May 2011 Precipitation as Percentage of Normal

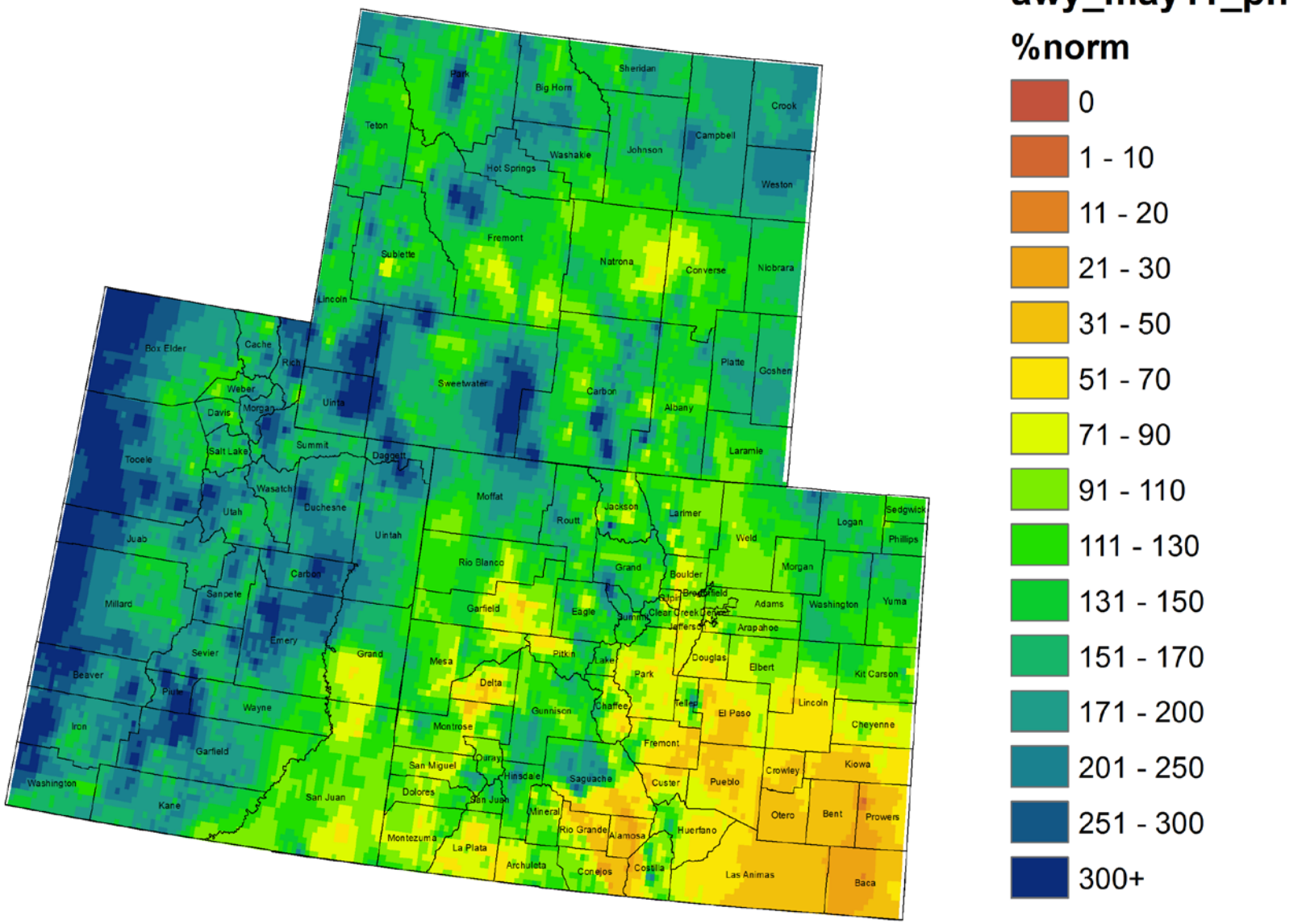


may11_pn

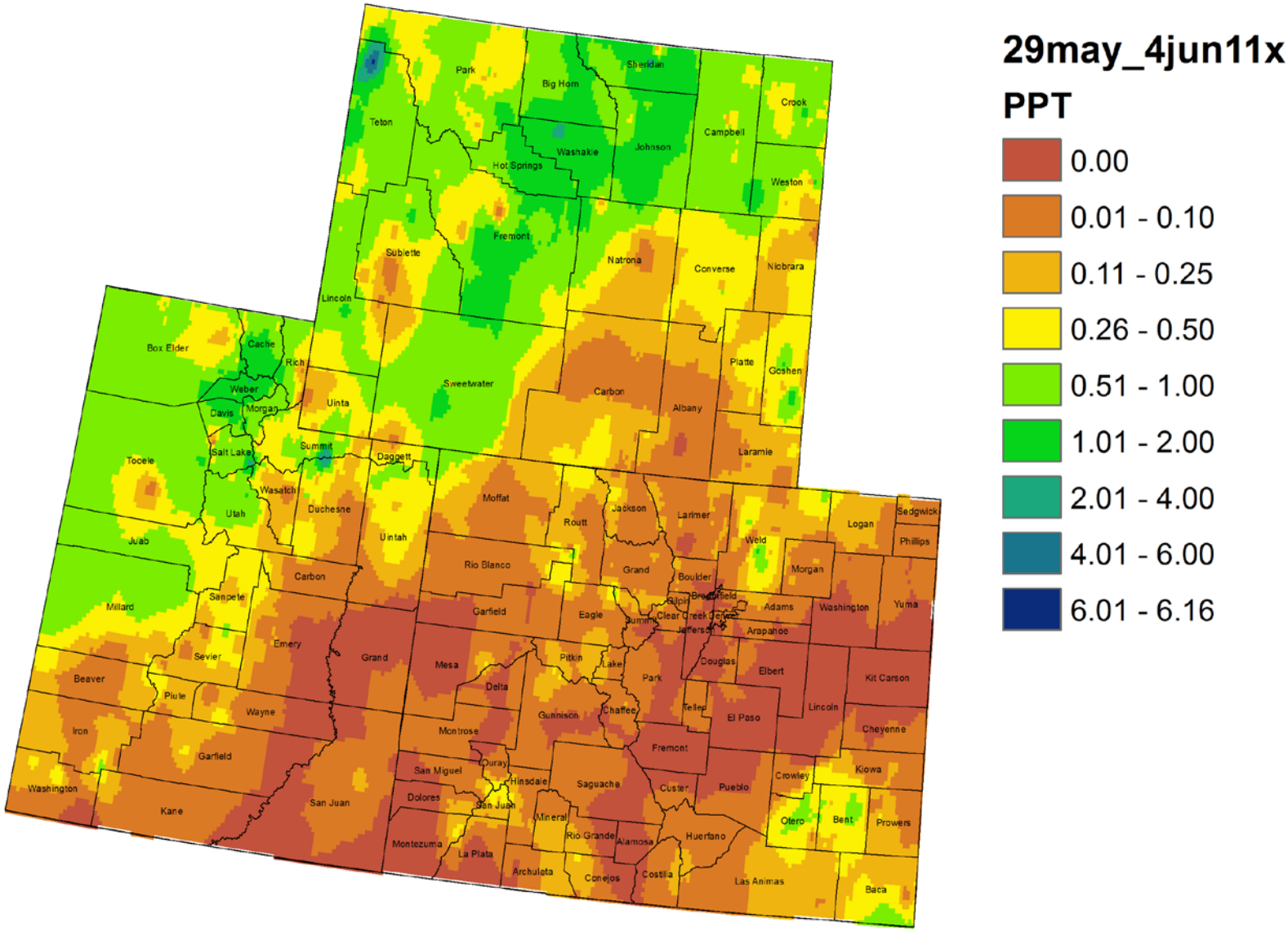
%norm

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

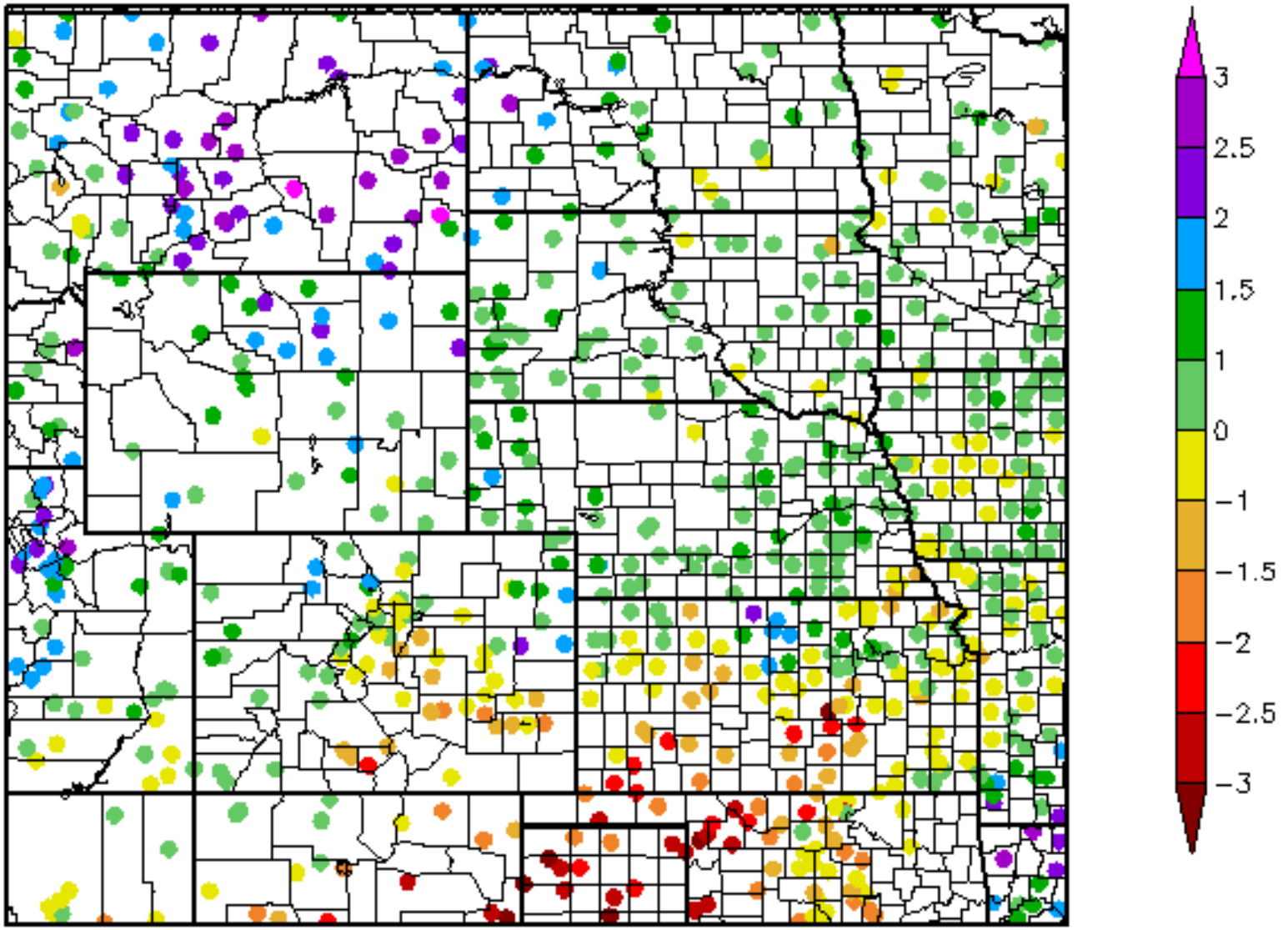
Water Year 2011 Precipitation as Percentage of Normal (Oct 10 - May 11)



Colorado, Utah and Wyoming 7 Day Precipitation (in)
29 May - 4 June 2011



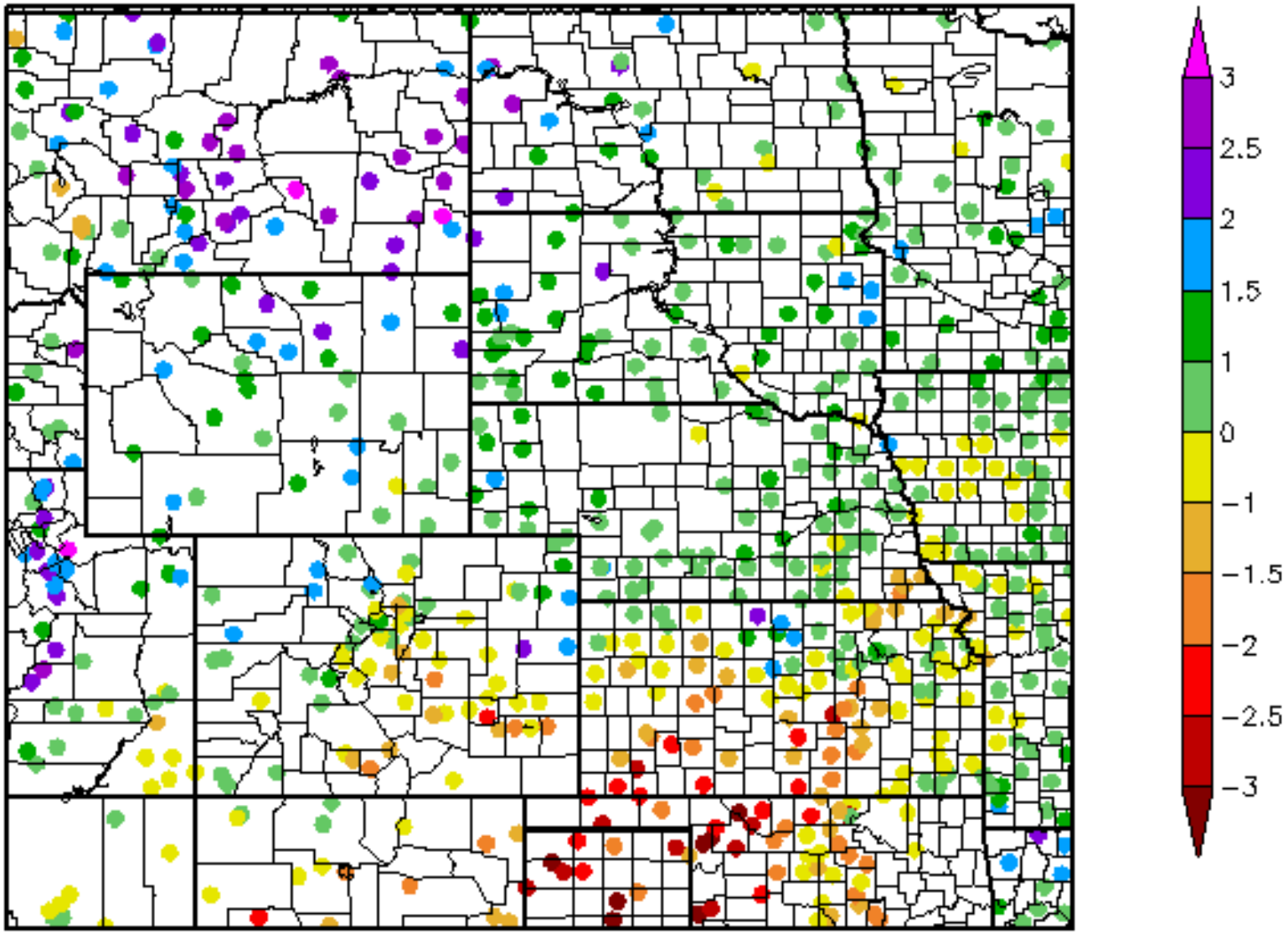
90 Day SPI
3/9/2011 – 6/6/2011



Generated 6/7/2011 at HPRCC using provisional data.

Regional Climate Centers

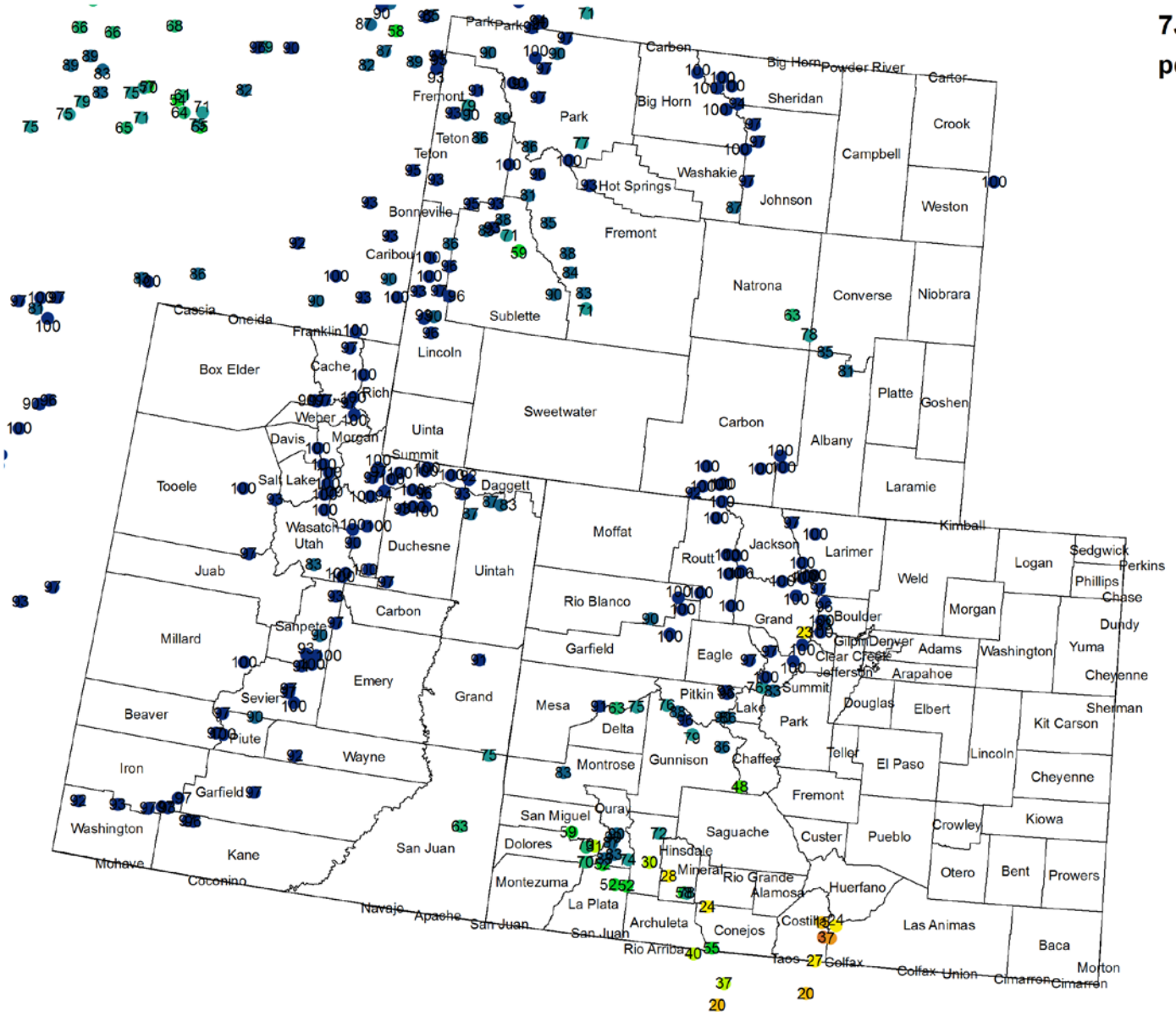
6 Month SPI
12/7/2010 – 6/6/2011



Generated 6/7/2011 at HPRCC using provisional data.

Regional Climate Centers

Snotel Water Year Precipitation Percentile Ranking for 7 June 11 (Stations with 20+ years of data only)

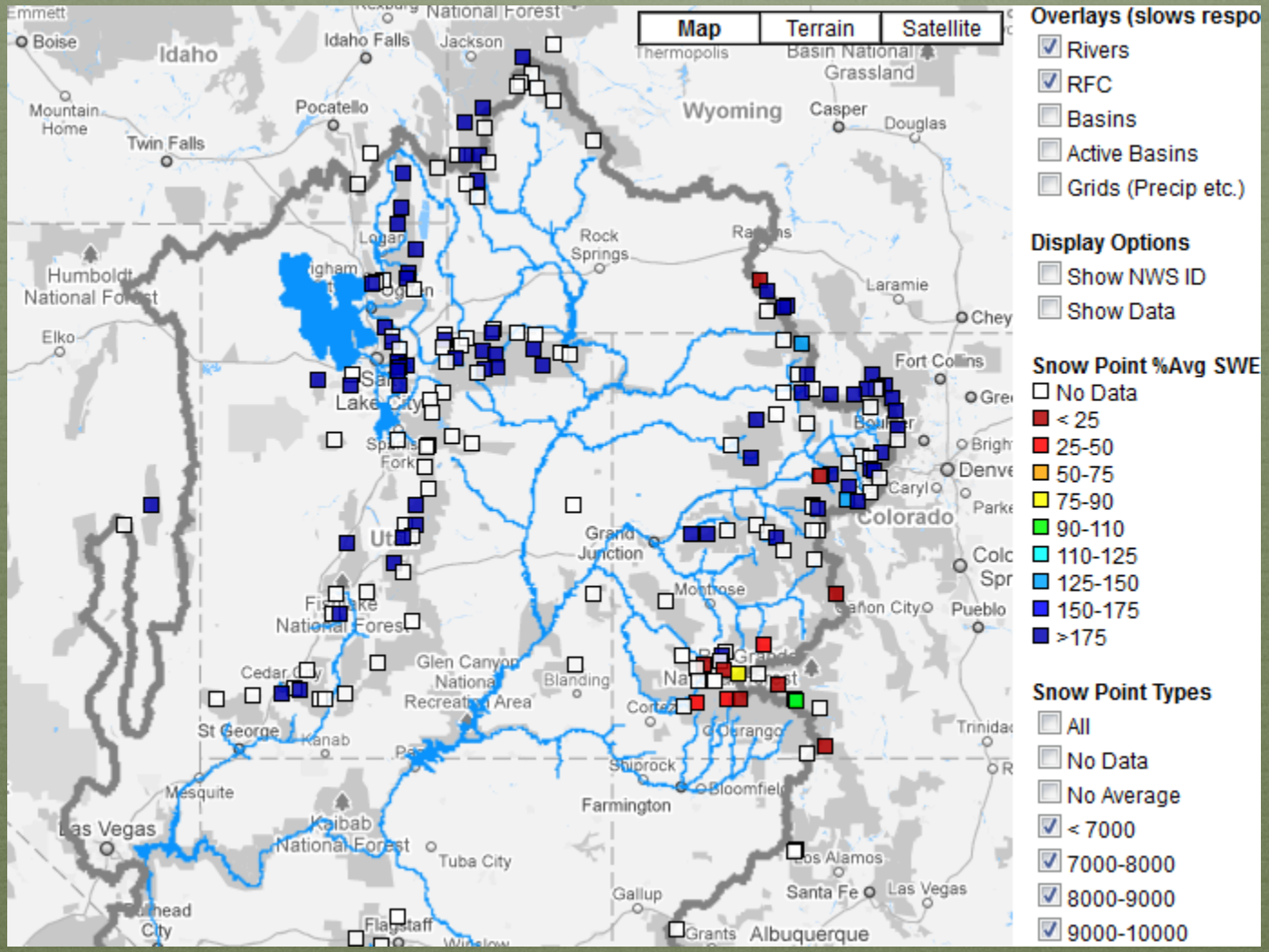


7Jun11_ptile.tab Events

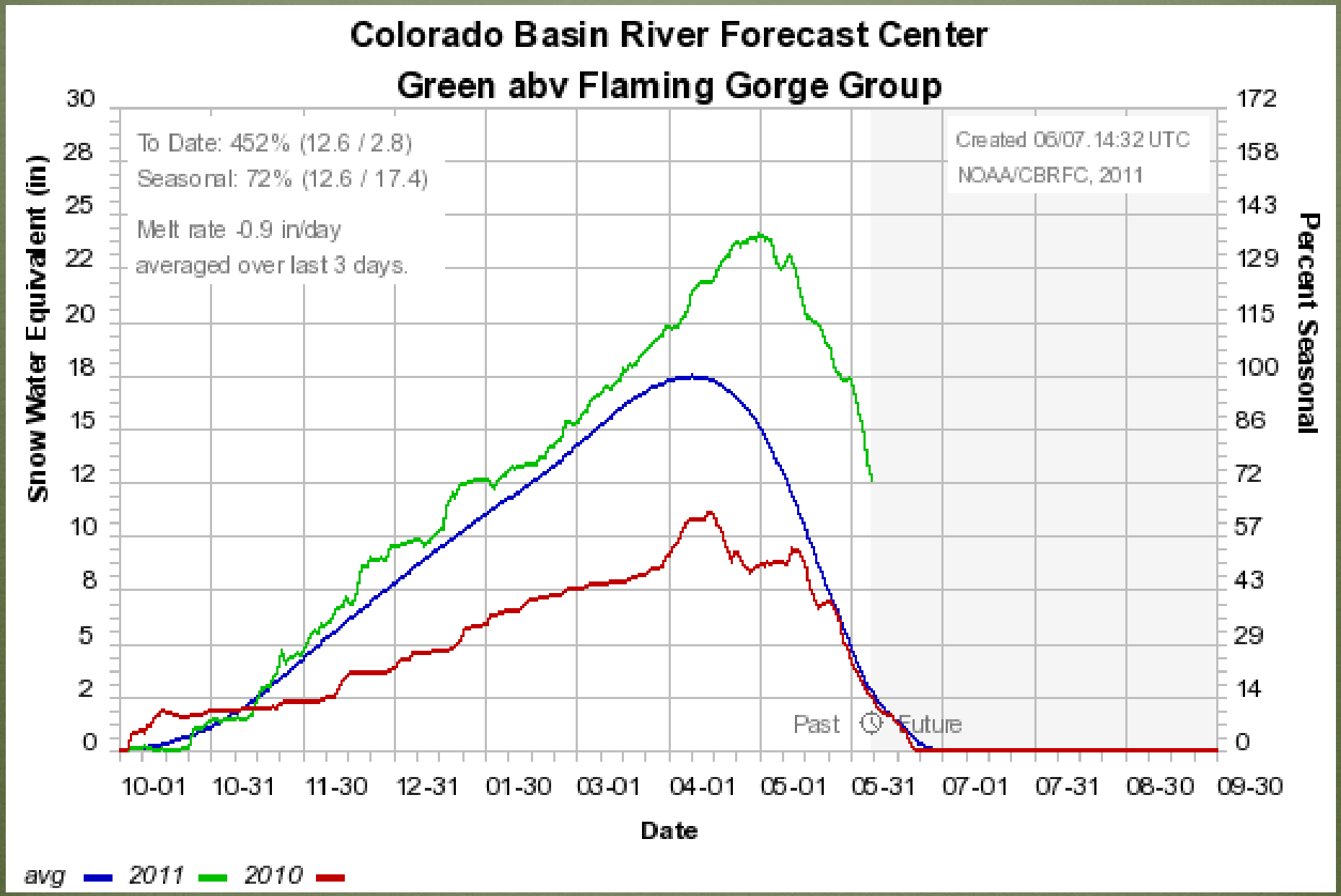
pctile

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

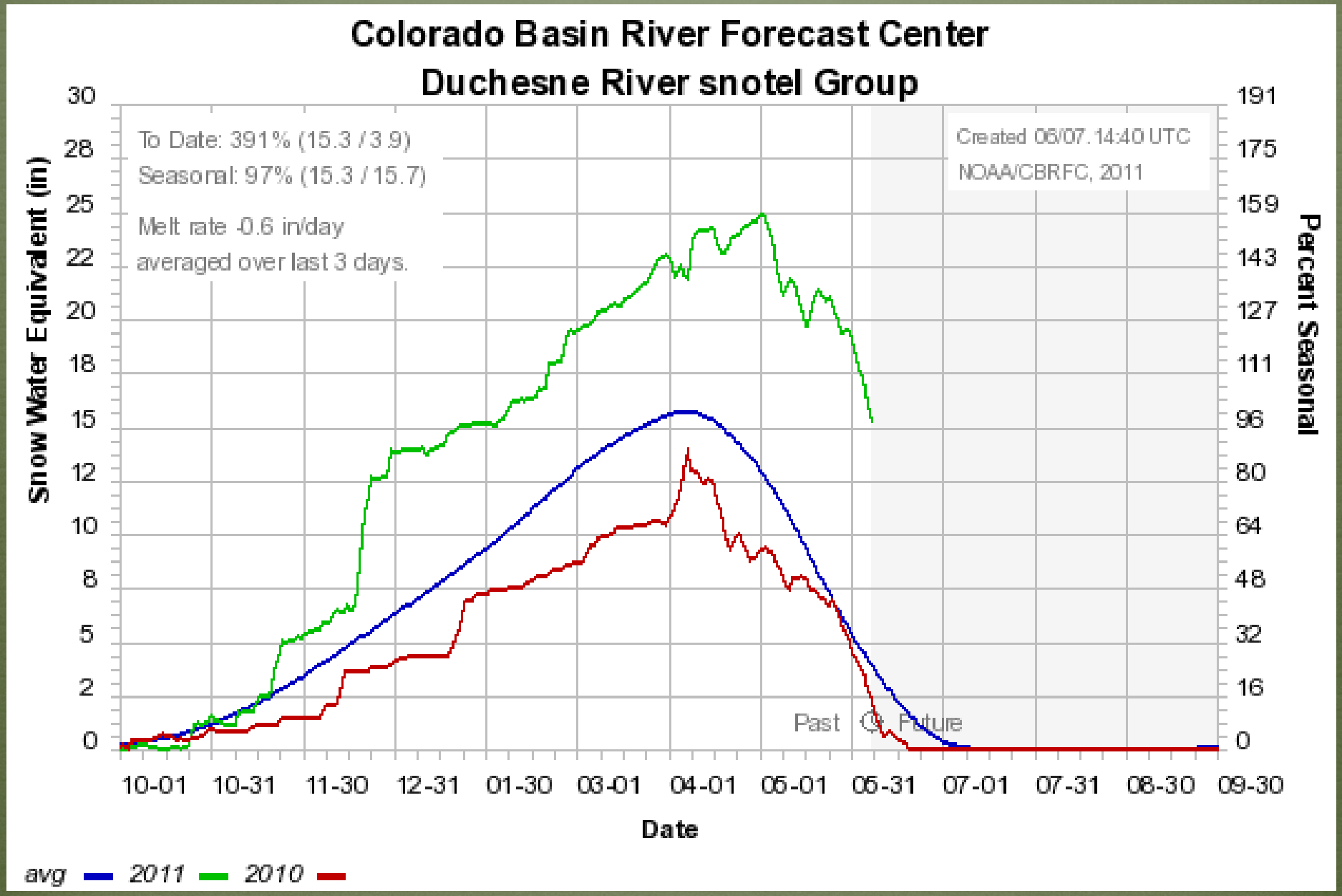
Upper Colorado River Basin Snowpack



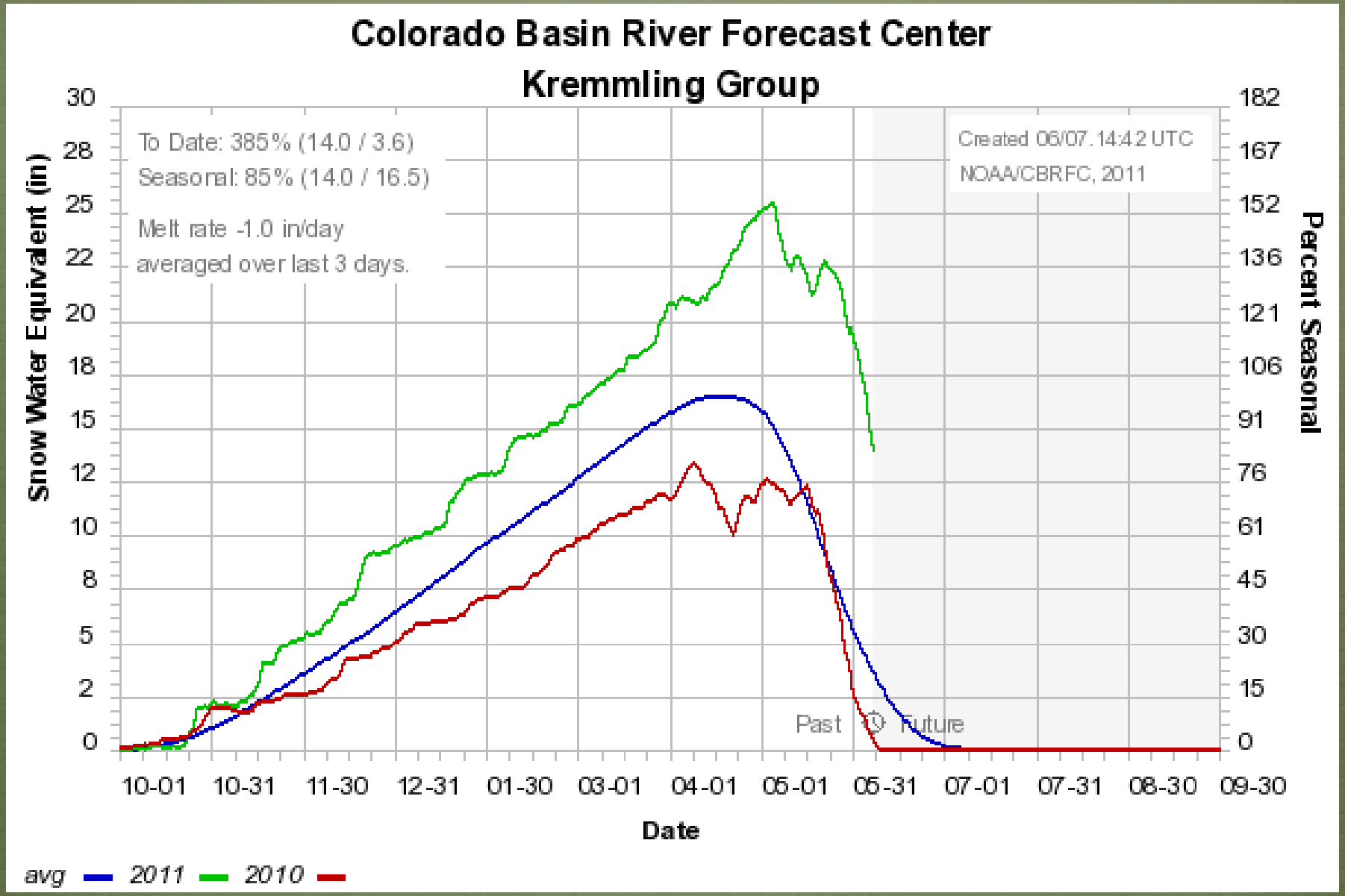
NATIONAL WEATHER SERVICE
Colorado Basin River Forecast Center



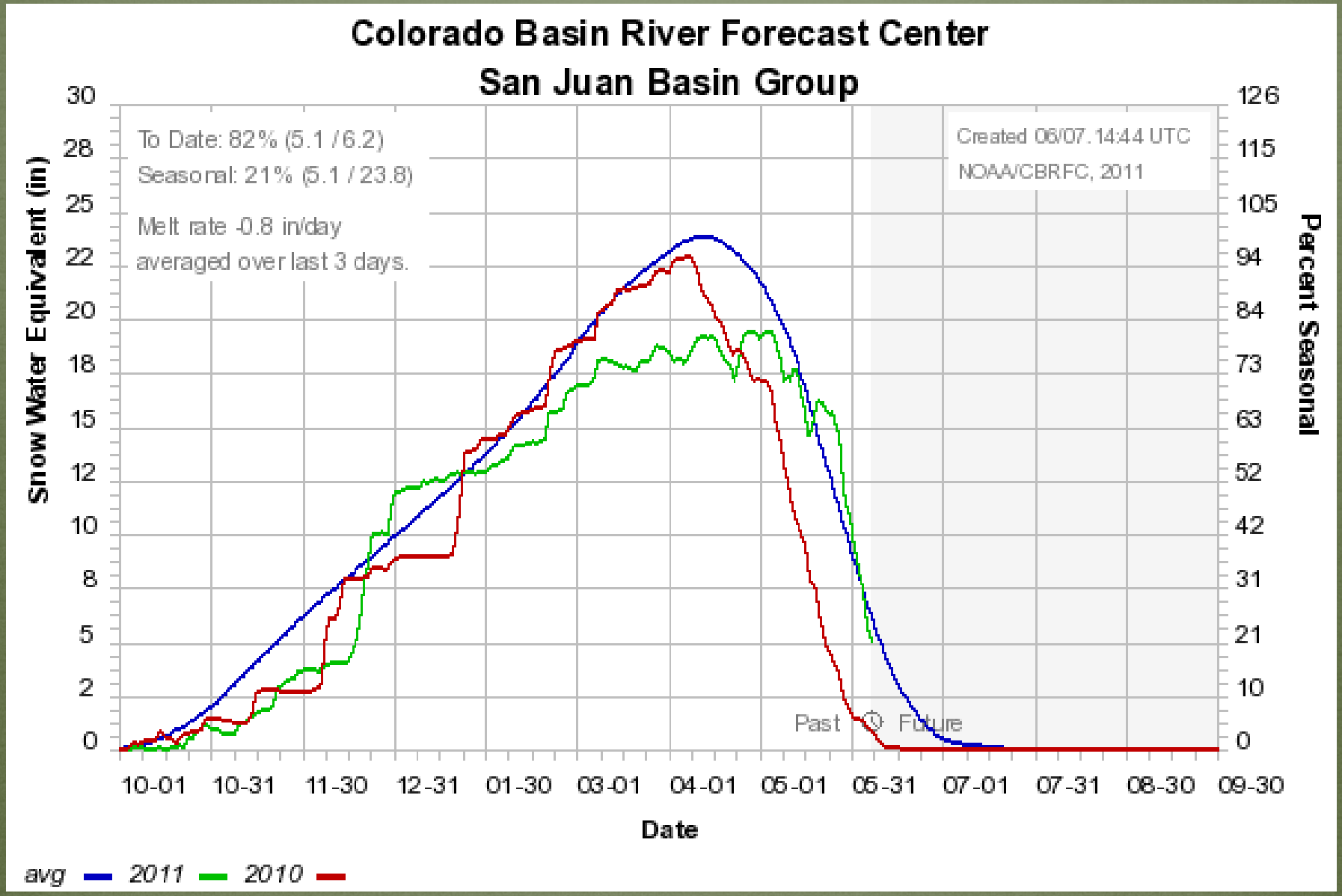
Snowpack % of average to date: 452%
Percent of average peak: 72%



Snowpack % of average to date: 391%
Percent of average peak: 97%



Snowpack % of average to date: 385%
Percent of average peak: 85%

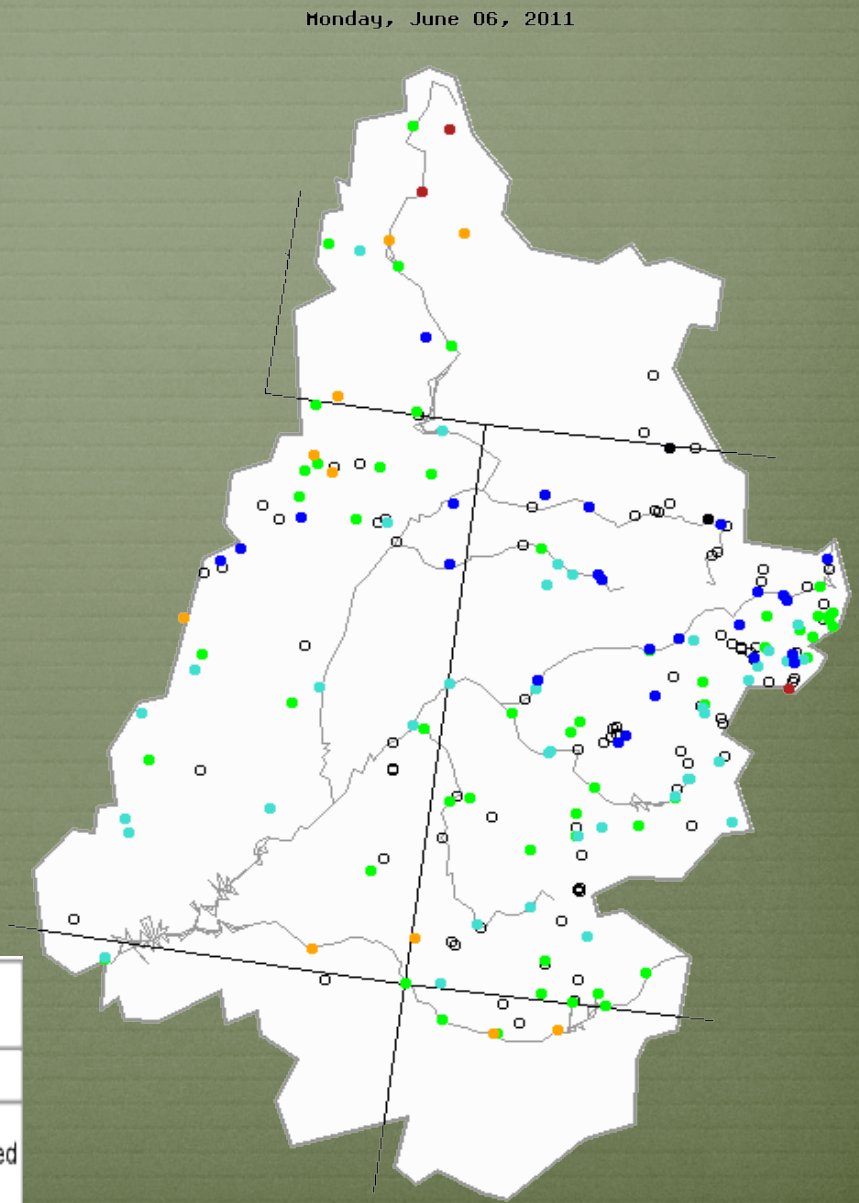


Snowpack % of average to date: 82%
Percent of average peak: 21%

Streamflow Update

Michael Lewis USGS

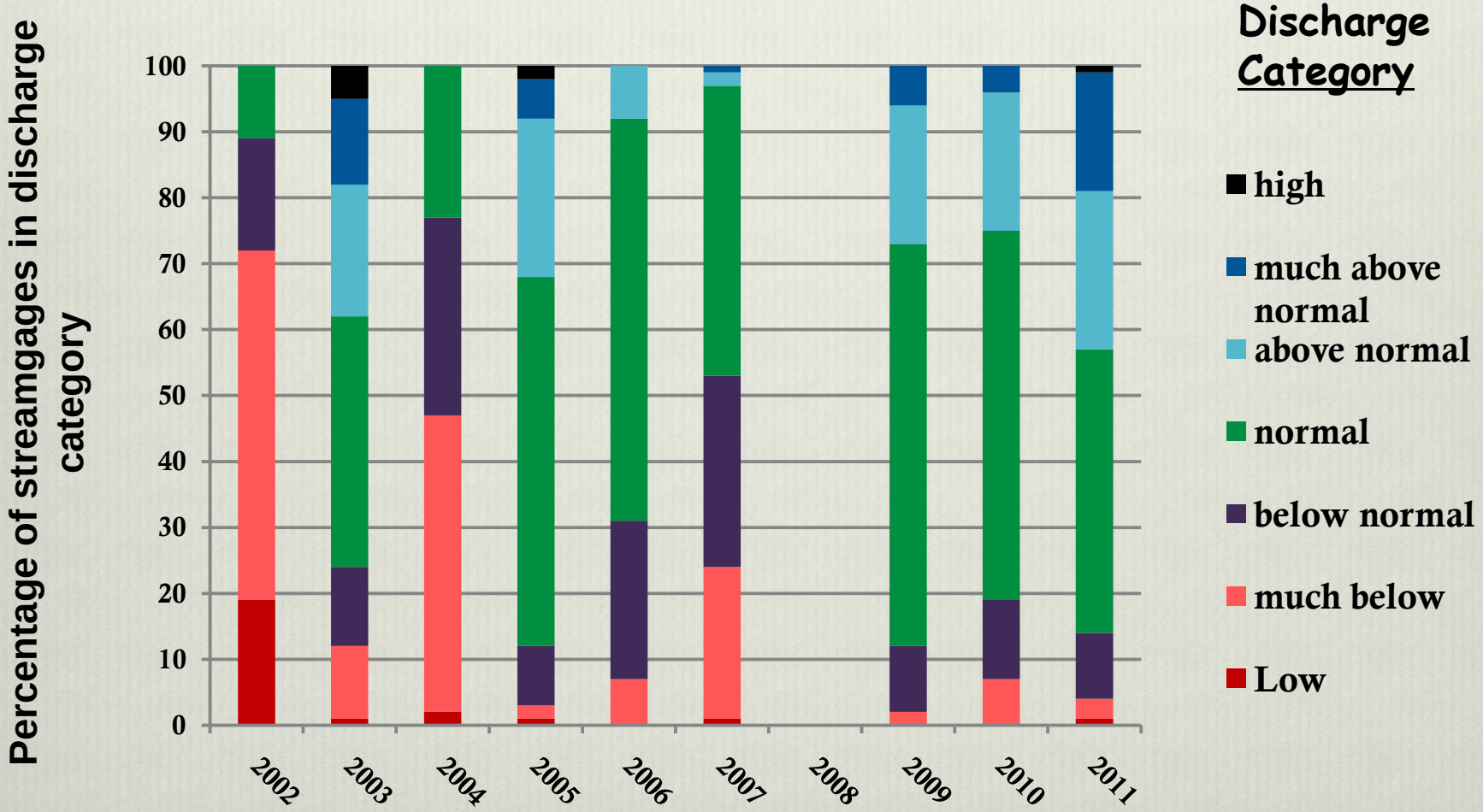
7-day average discharge compared to historical discharge for the day of the year (June 6th)



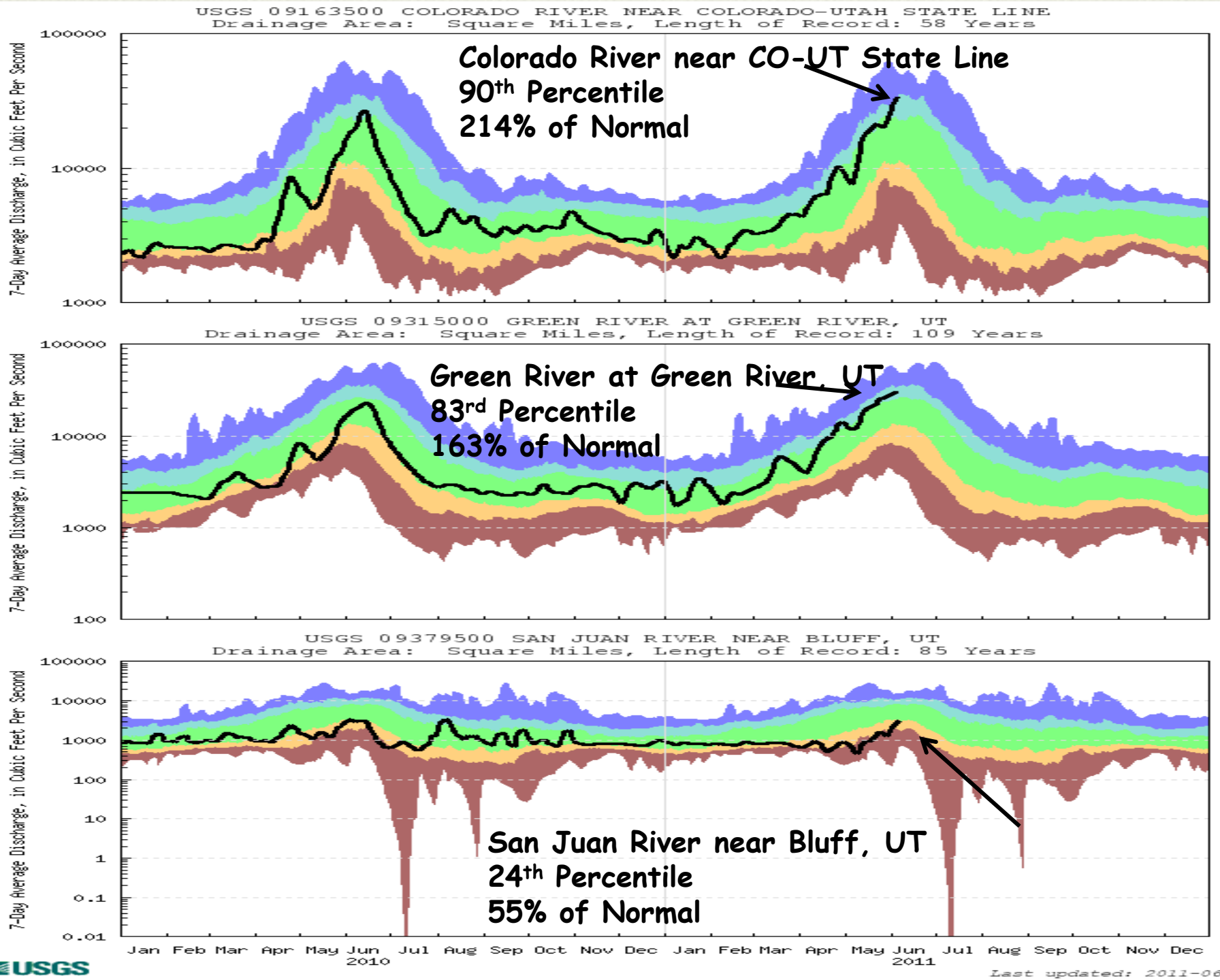
Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

USGS

-Upper Colorado River Basin- Comparison of 7-day Average Discharge For June 5, 2002-2011



USGS

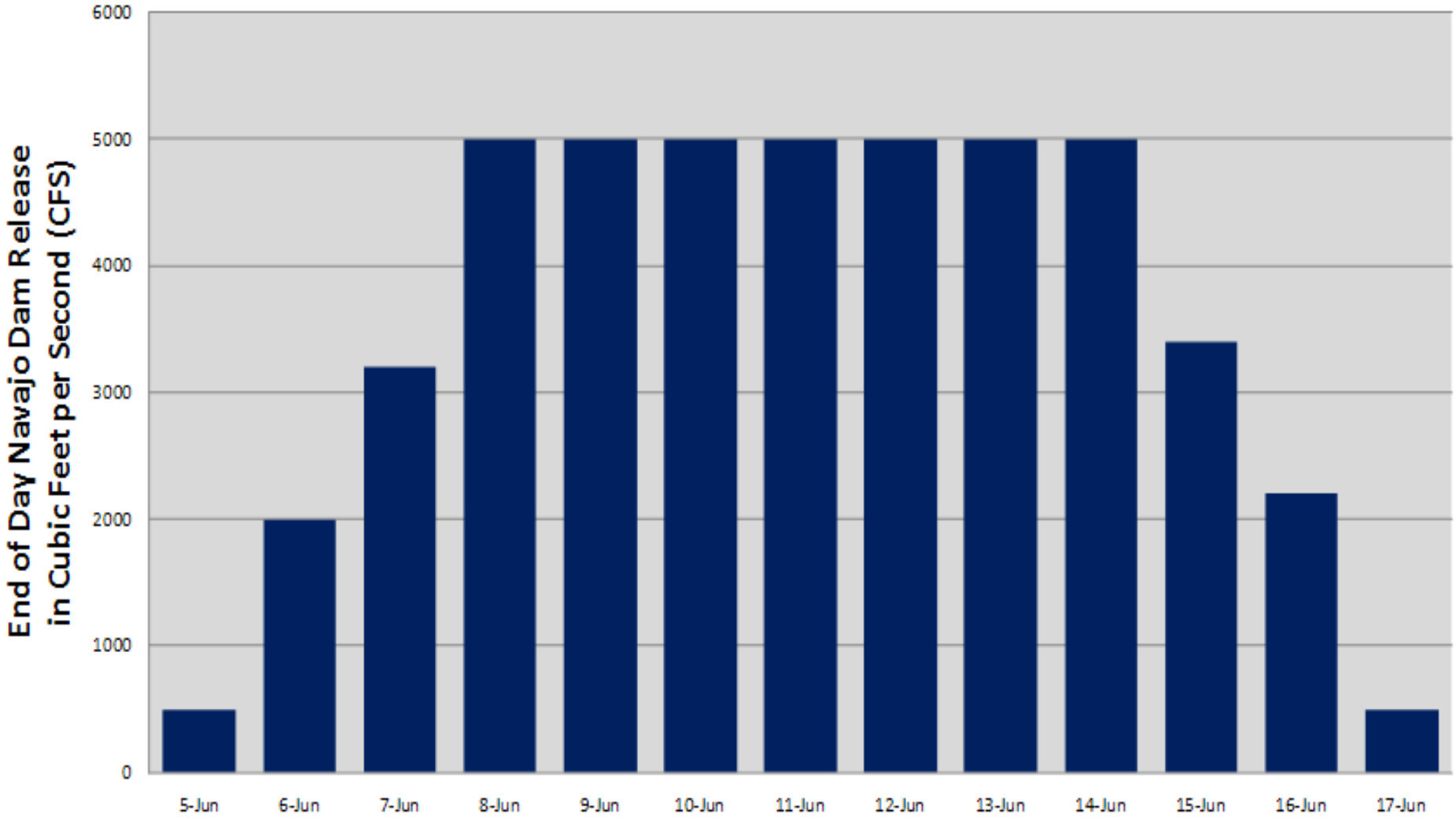


USGS

Last updated: 2011-06-07

Navajo Reservoir 2011 Spring Peak Release Schedule

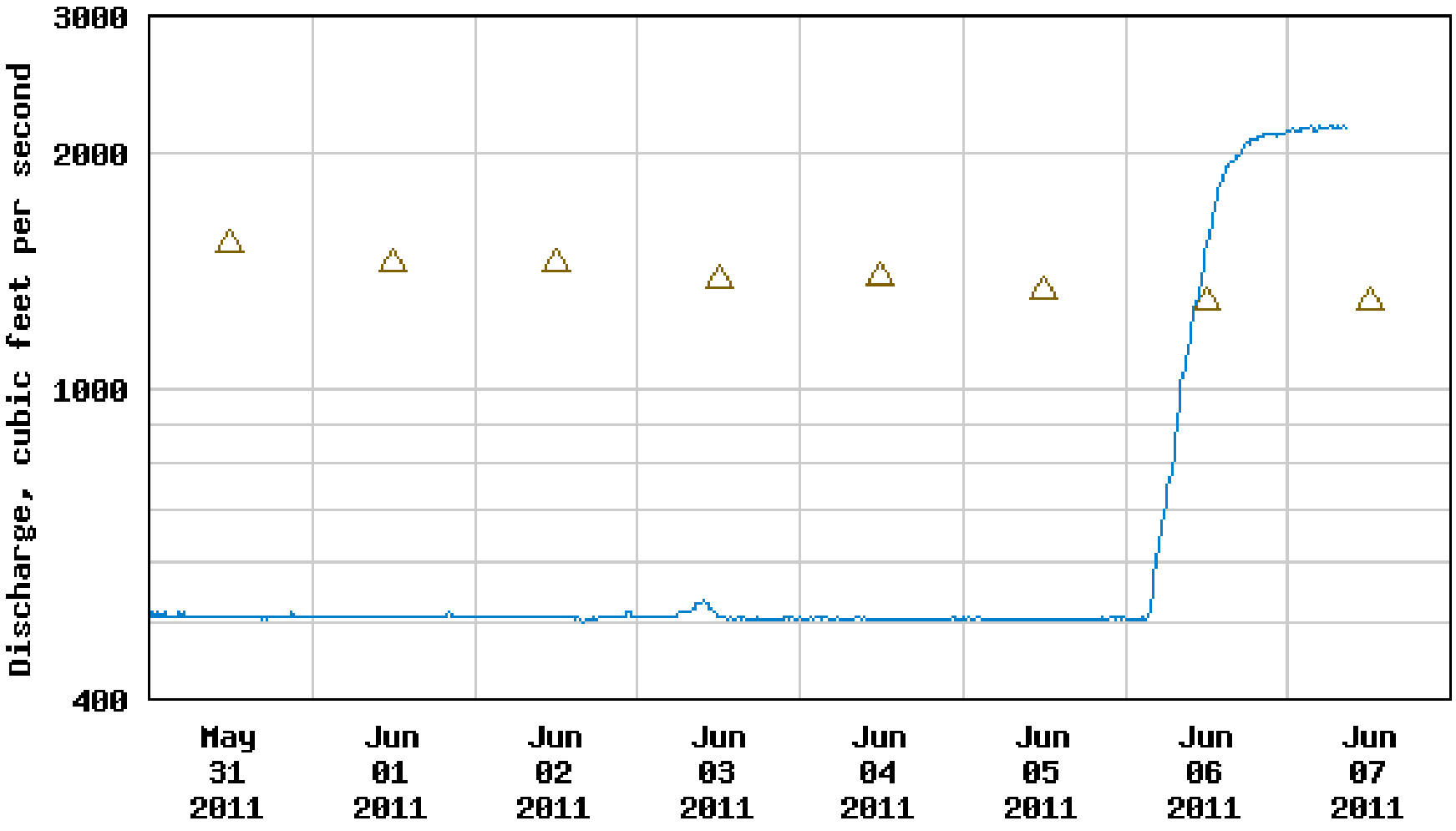
(Final)



	5-Jun	6-Jun	7-Jun	8-Jun	9-Jun	10-Jun	11-Jun	12-Jun	13-Jun	14-Jun	15-Jun	16-Jun	17-Jun
Release (CFS)	500	2000	3200	5000	5000	5000	5000	5000	5000	5000	3400	2200	500

USGS

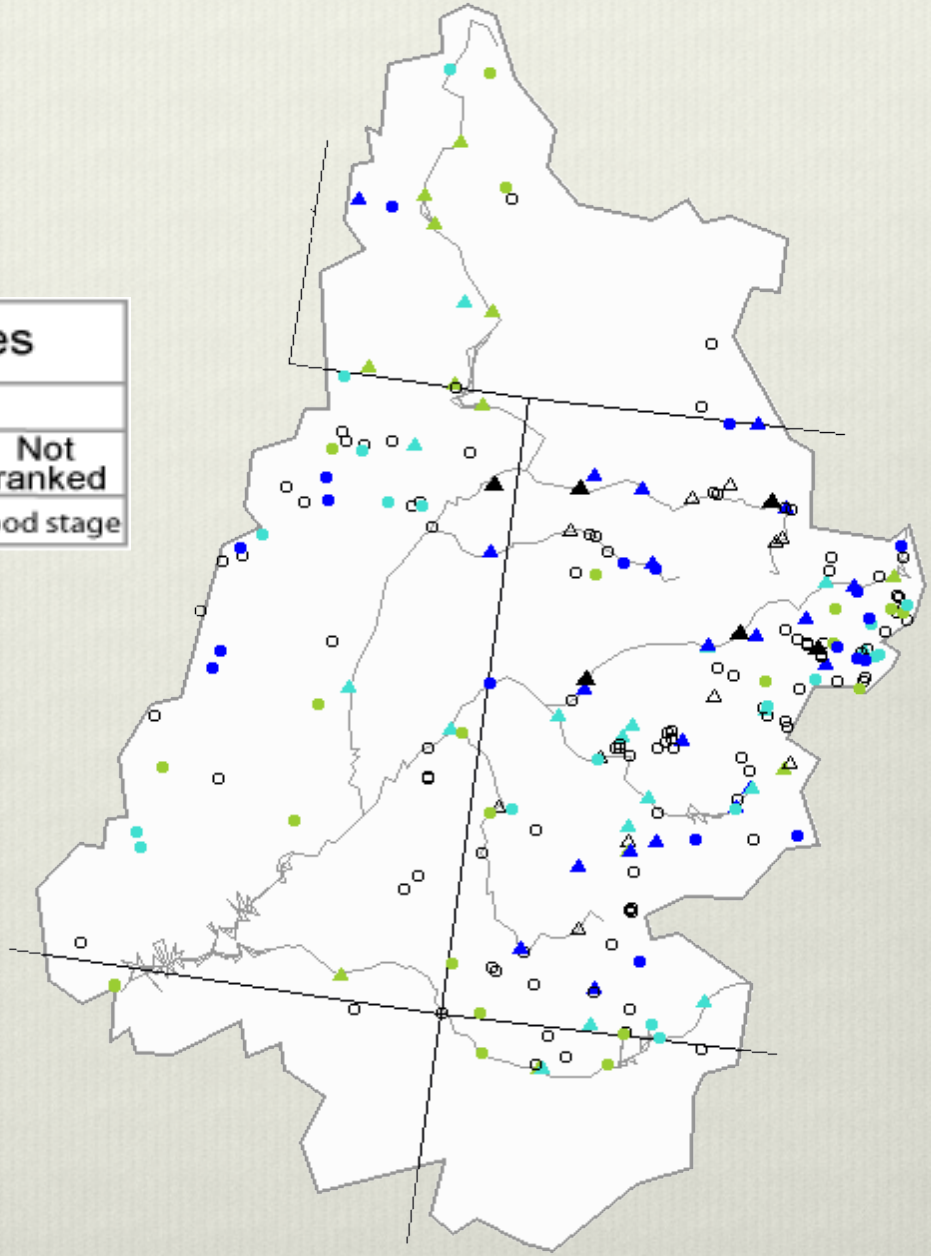
USGS 09355500 SAN JUAN RIVER NEAR ARCHULETA, NM



Real-time flood and high-flow conditions (June 7, 2011)

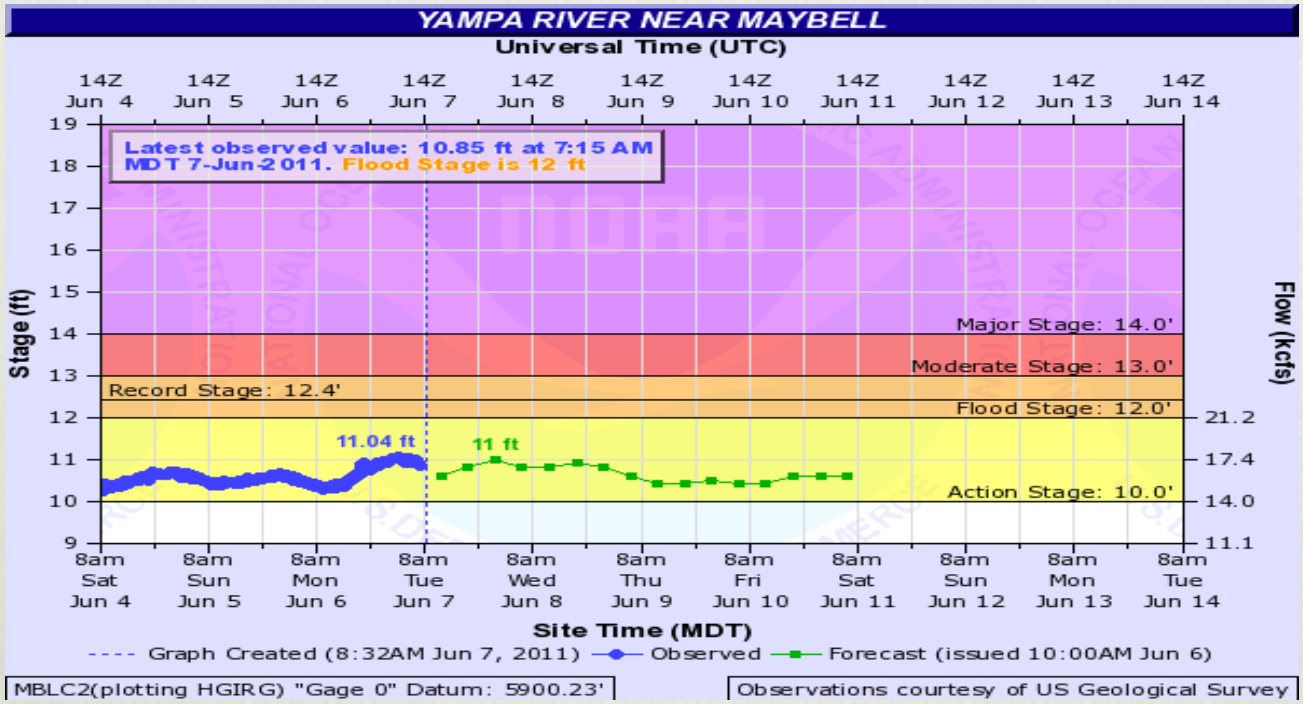
Tuesday, June 07, 2011 09:42ET

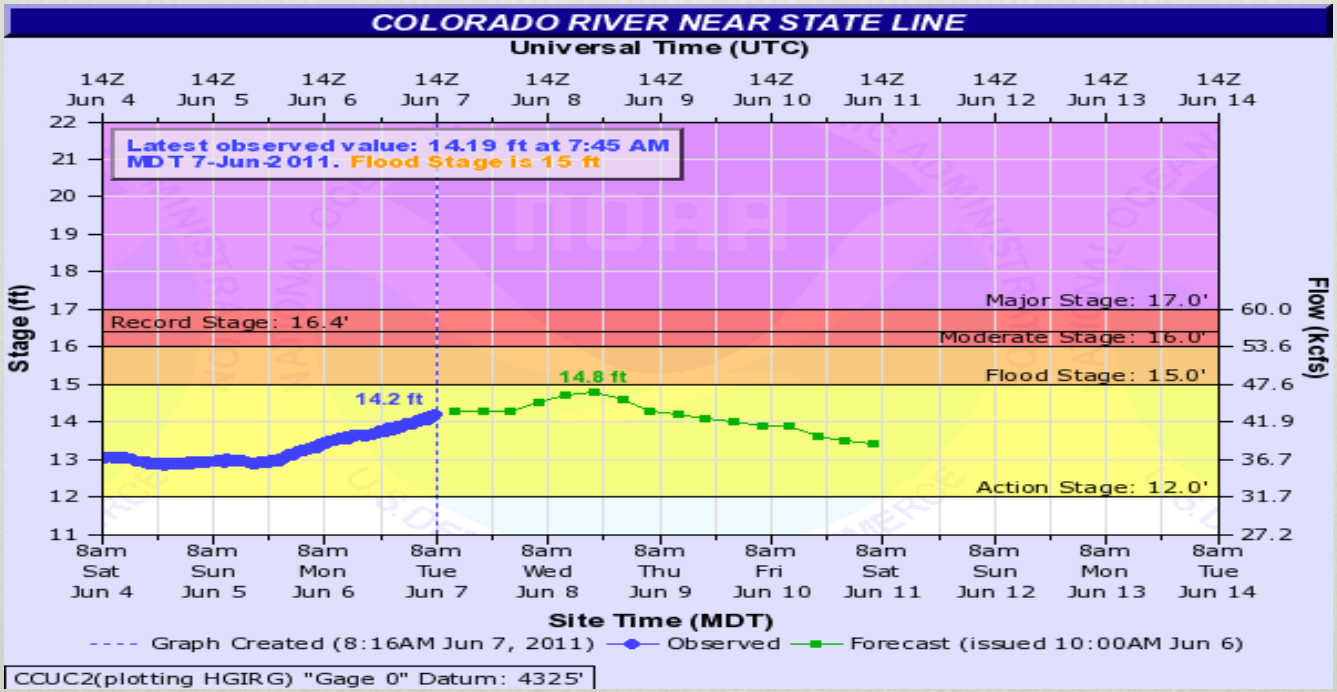
Explanation - Percentile classes				
<95	95-98	>= 99	River above flood stage	Not ranked
△ Streamgage with flood stage ○ Streamgage without flood stage				

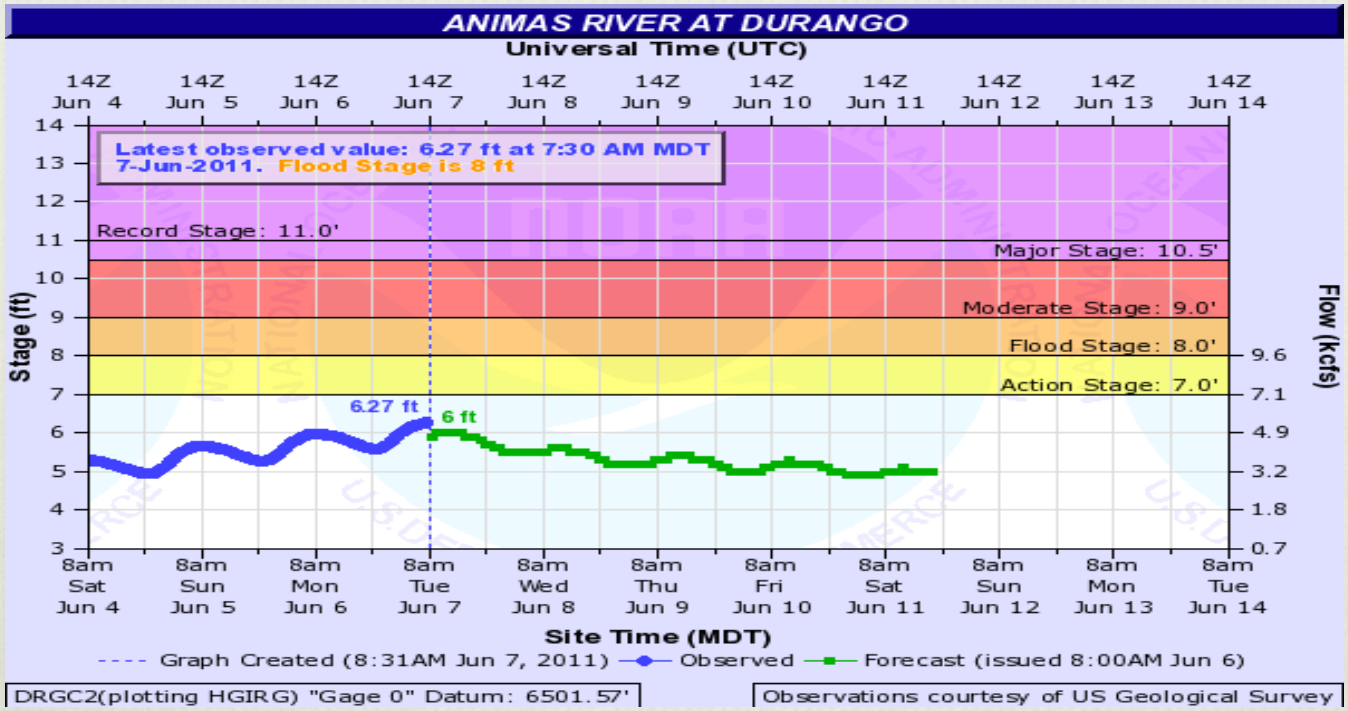


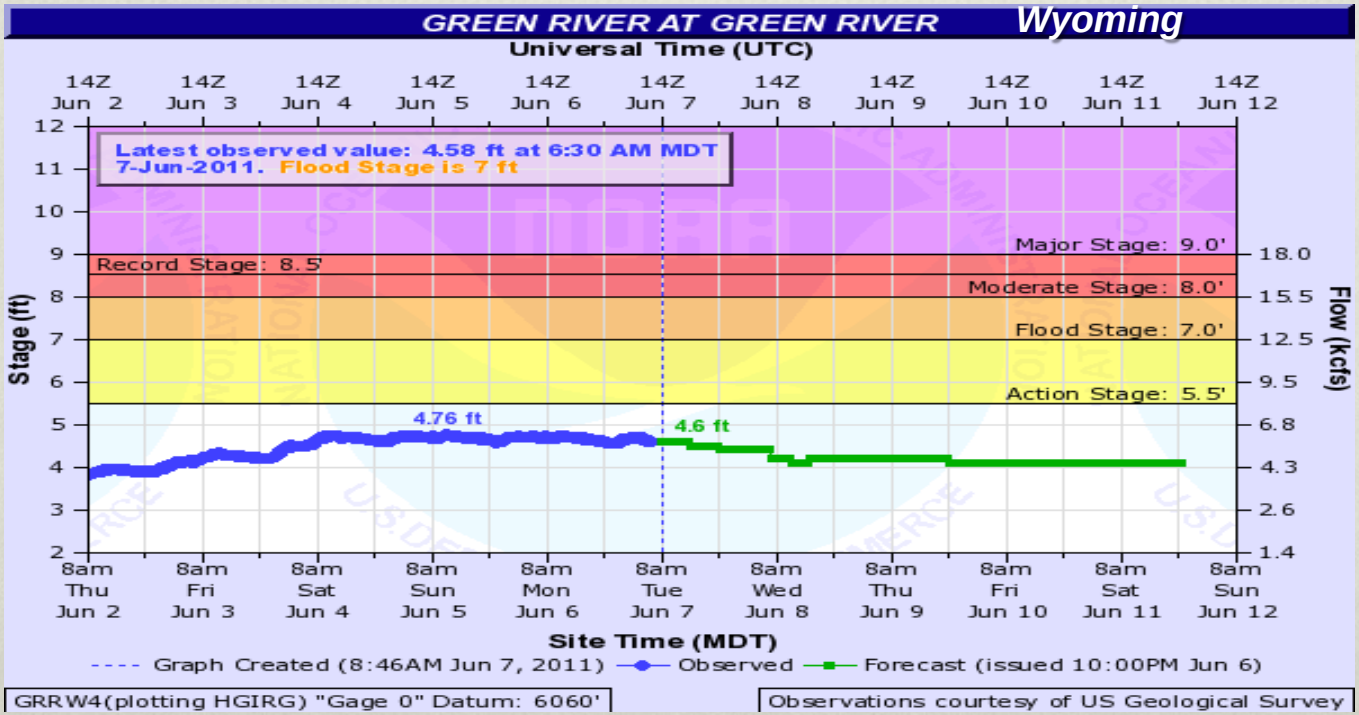
USGS

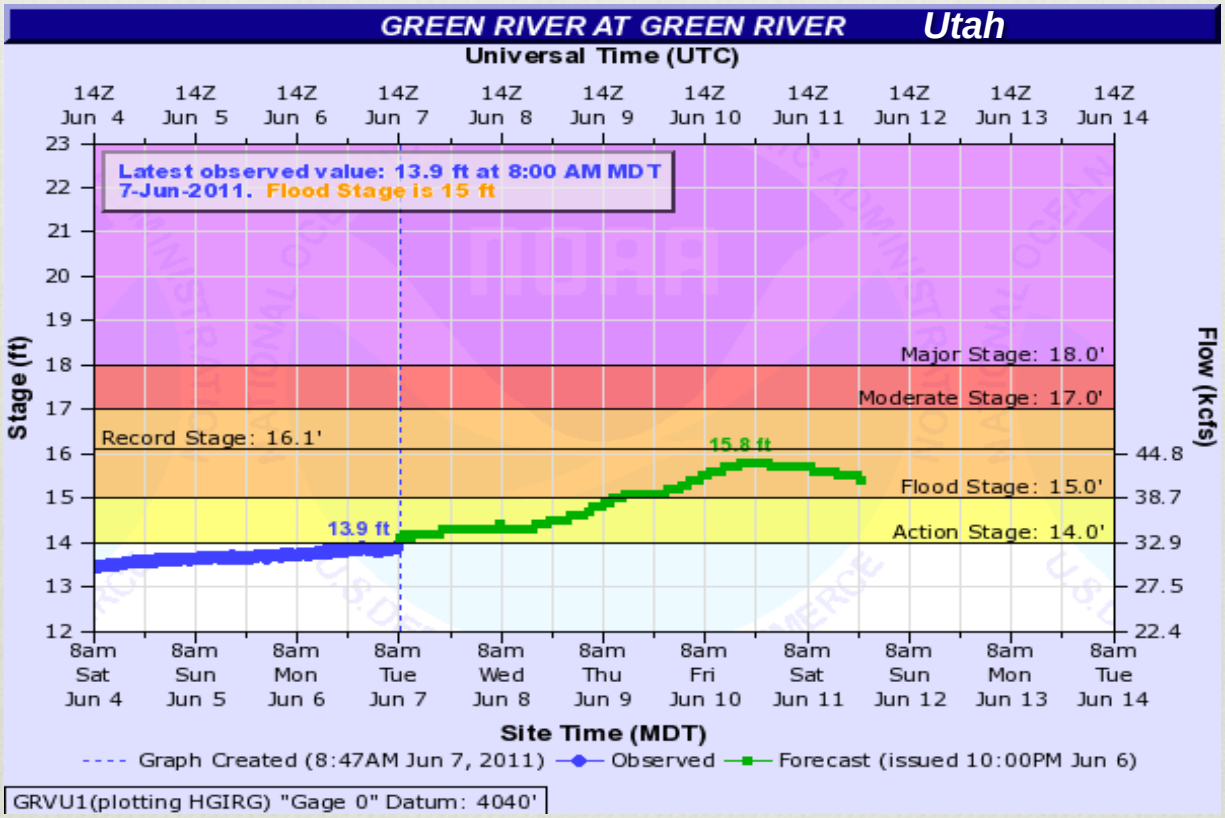
NOAA


YAMPA RIVER NEAR MAYBELL
Universal Time (UTC)
14Z Jun 4
14Z Jun 5
14Z Jun 6
14Z Jun 7
14Z Jun 8
14Z Jun 9
14Z Jun 10
14Z Jun 11
14Z Jun 12
14Z Jun 13
14Z Jun 14
Latest observed value: 10.85 ft at 7:15 AM MDT 7-Jun-2011. Flood Stage is 12 ft
Stage (ft)
Flow (kcfs)
Major Stage: 14.0'
Moderate Stage: 13.0'
Record Stage: 12.4'
Flood Stage: 12.0'
Action Stage: 10.0'
11.04 ft
11 ft
21.2
17.4
14.0
11.1
8am Sat Jun 4
8am Sun Jun 5
8am Mon Jun 6
8am Tue Jun 7
8am Wed Jun 8
8am Thu Jun 9
8am Fri Jun 10
8am Sat Jun 11
8am Sun Jun 12
8am Mon Jun 13
8am Tue Jun 14
Site Time (MDT)
Graph Created (8:32AM Jun 7, 2011)
Observed
Forecast (issued 10:00AM Jun 6)
MBLC2(plotting HGIRG) "Gage 0" Datum: 5900.23'
Observations courtesy of US Geological Survey

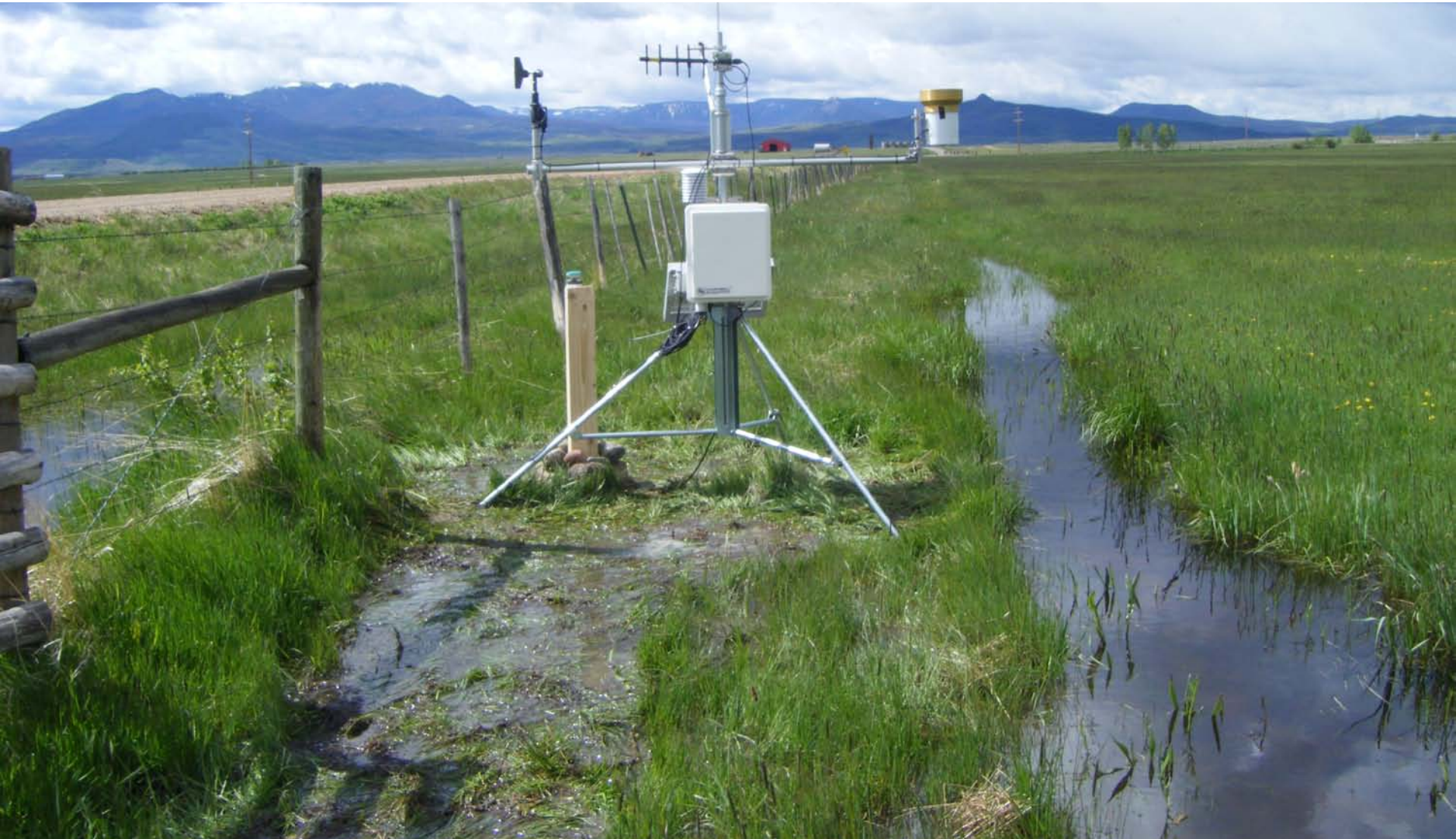

COLORADO RIVER NEAR STATE LINE
Universal Time (UTC)
14Z Jun 4
14Z Jun 5
14Z Jun 6
14Z Jun 7
14Z Jun 8
14Z Jun 9
14Z Jun 10
14Z Jun 11
14Z Jun 12
14Z Jun 13
14Z Jun 14
Latest observed value: 14.19 ft at 7:45 AM MDT 7-Jun-2011. Flood Stage is 15 ft
Stage (ft)
Flow (kcfs)
Major Stage: 17.0'
Record Stage: 16.4'
Moderate Stage: 16.0'
Flood Stage: 15.0'
Action Stage: 12.0'
14.2 ft
14.8 ft
60.0
53.6
47.6
41.9
36.7
31.7
27.2
8am Sat Jun 4
8am Sun Jun 5
8am Mon Jun 6
8am Tue Jun 7
8am Wed Jun 8
8am Thu Jun 9
8am Fri Jun 10
8am Sat Jun 11
8am Sun Jun 12
8am Mon Jun 13
8am Tue Jun 14
Site Time (MDT)
Graph Created (8:16AM Jun 7, 2011)
Observed
Forecast (issued 10:00AM Jun 6)
CCUC2(plotting HGIRG) "Gage 0" Datum: 4325'


ANIMAS RIVER AT DURANGO
Universal Time (UTC)
14Z Jun 4
14Z Jun 5
14Z Jun 6
14Z Jun 7
14Z Jun 8
14Z Jun 9
14Z Jun 10
14Z Jun 11
14Z Jun 12
14Z Jun 13
14Z Jun 14
Latest observed value: 6.27 ft at 7:30 AM MDT 7-Jun-2011. Flood Stage is 8 ft
Record Stage: 11.0'
Major Stage: 10.5'
Moderate Stage: 9.0'
Flood Stage: 8.0'
Action Stage: 7.0'
Stage (ft)
Flow (kcfs)
6.27 ft
6 ft
8am Sat Jun 4
8am Sun Jun 5
8am Mon Jun 6
8am Tue Jun 7
8am Wed Jun 8
8am Thu Jun 9
8am Fri Jun 10
8am Sat Jun 11
8am Sun Jun 12
8am Mon Jun 13
8am Tue Jun 14
Site Time (MDT)
Graph Created (8:31AM Jun 7, 2011)
Observed
Forecast (issued 8:00AM Jun 6)
DRGC2(plotting HGIRG) "Gage 0" Datum: 6501.57'
Observations courtesy of US Geological Survey

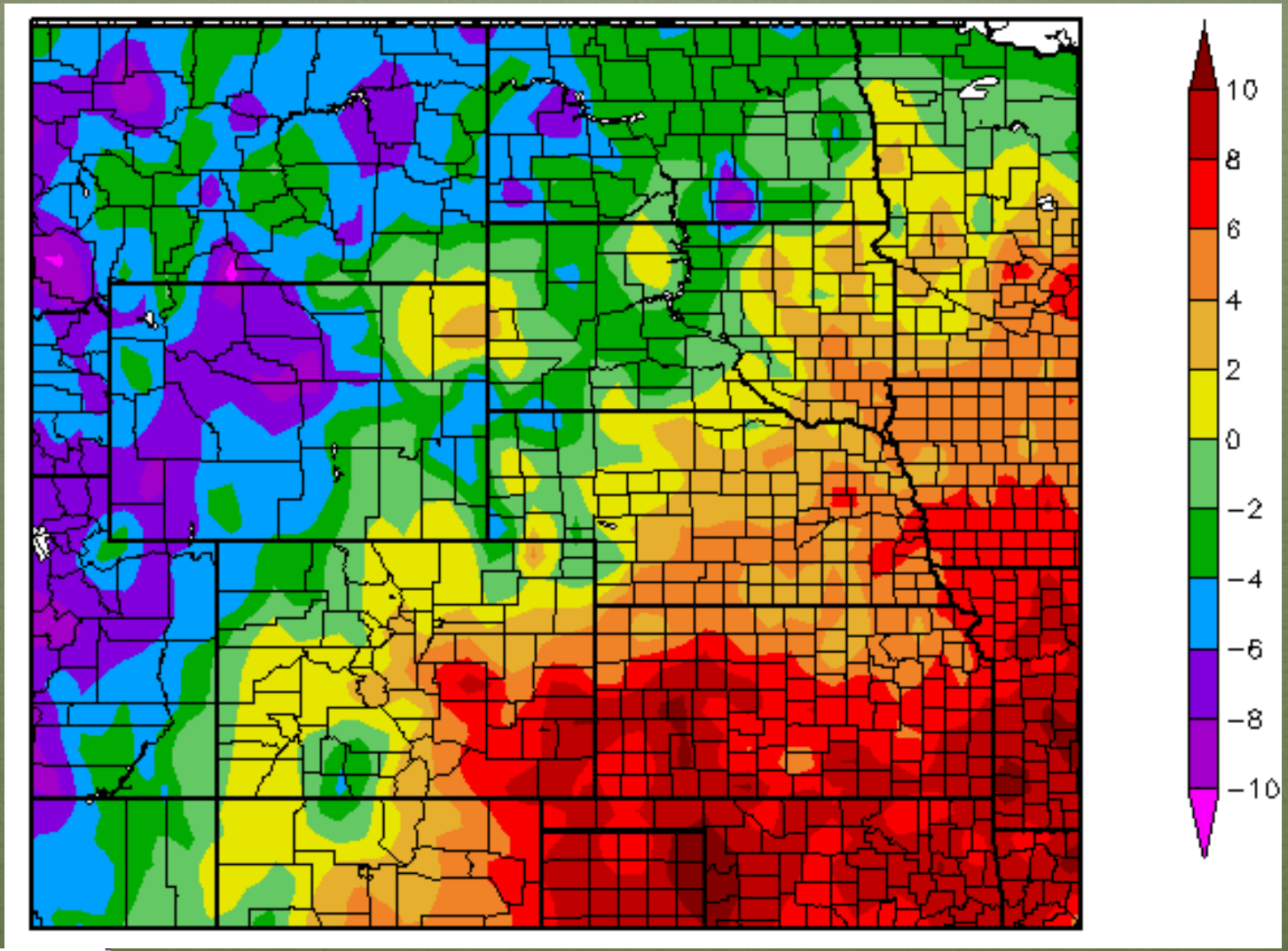

GREEN RIVER AT GREEN RIVER
Wyoming
Universal Time (UTC)
14Z Jun 2
14Z Jun 3
14Z Jun 4
14Z Jun 5
14Z Jun 6
14Z Jun 7
14Z Jun 8
14Z Jun 9
14Z Jun 10
14Z Jun 11
14Z Jun 12
Latest observed value: 4.58 ft at 6:30 AM MDT 7-Jun-2011. Flood Stage is 7 ft
Record Stage: 8.5'
Major Stage: 9.0'
Moderate Stage: 8.0'
Flood Stage: 7.0'
Action Stage: 5.5'
Stage (ft)
Flow (kcfs)
4.76 ft
4.6 ft
8am Thu Jun 2
8am Fri Jun 3
8am Sat Jun 4
8am Sun Jun 5
8am Mon Jun 6
8am Tue Jun 7
8am Wed Jun 8
8am Thu Jun 9
8am Fri Jun 10
8am Sat Jun 11
8am Sun Jun 12
Site Time (MDT)
Graph Created (8:46AM Jun 7, 2011)
Observed
Forecast (issued 10:00PM Jun 6)
GRRW4(plotting HGIRG) "Gage 0" Datum: 6060'
Observations courtesy of US Geological Survey


GREEN RIVER AT GREEN RIVER Utah
Universal Time (UTC)
14Z Jun 4
14Z Jun 5
14Z Jun 6
14Z Jun 7
14Z Jun 8
14Z Jun 9
14Z Jun 10
14Z Jun 11
14Z Jun 12
14Z Jun 13
14Z Jun 14
Latest observed value: 13.9 ft at 8:00 AM MDT 7-Jun-2011. Flood Stage is 15 ft
Stage (ft)
Flow (kcfs)
Major Stage: 18.0'
Moderate Stage: 17.0'
Record Stage: 16.1'
Flood Stage: 15.0'
Action Stage: 14.0'
15.8 ft
13.9 ft
23
22
21
20
19
18
17
16
15
14
13
12
44.8
38.7
32.9
27.5
22.4
8am Sat Jun 4
8am Sun Jun 5
8am Mon Jun 6
8am Tue Jun 7
8am Wed Jun 8
8am Thu Jun 9
8am Fri Jun 10
8am Sat Jun 11
8am Sun Jun 12
8am Mon Jun 13
8am Tue Jun 14
Site Time (MDT)
Graph Created (8:47AM Jun 7, 2011)
Observed
Forecast (issued 10:00PM Jun 6)
GRVU1(plotting HGIRG) "Gage 0" Datum: 4040'

Water Demand

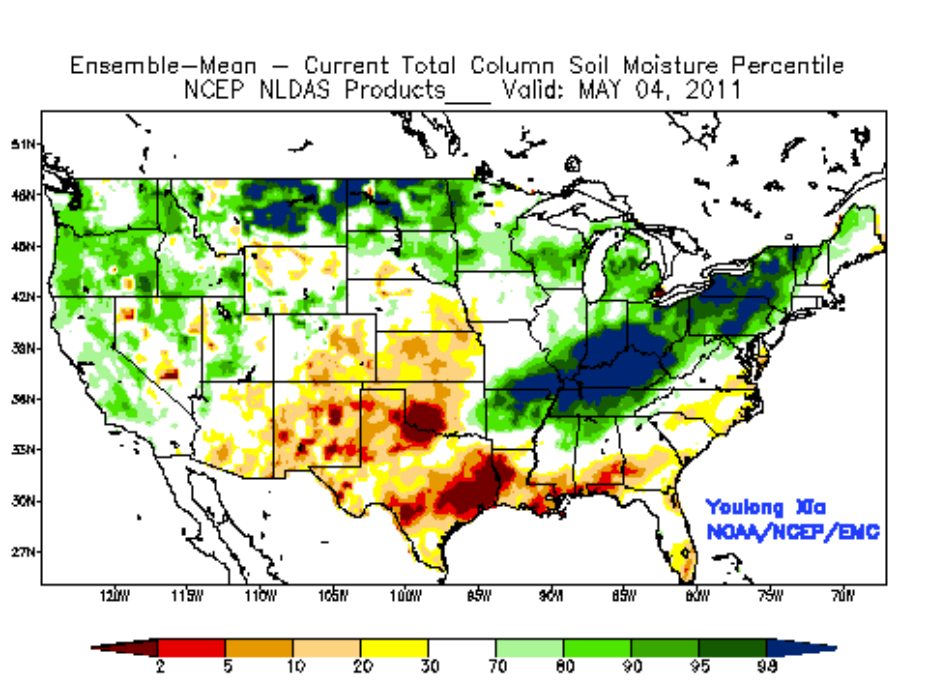


Temperature Departure from Normal
05/30/2011 – 06/05/2011

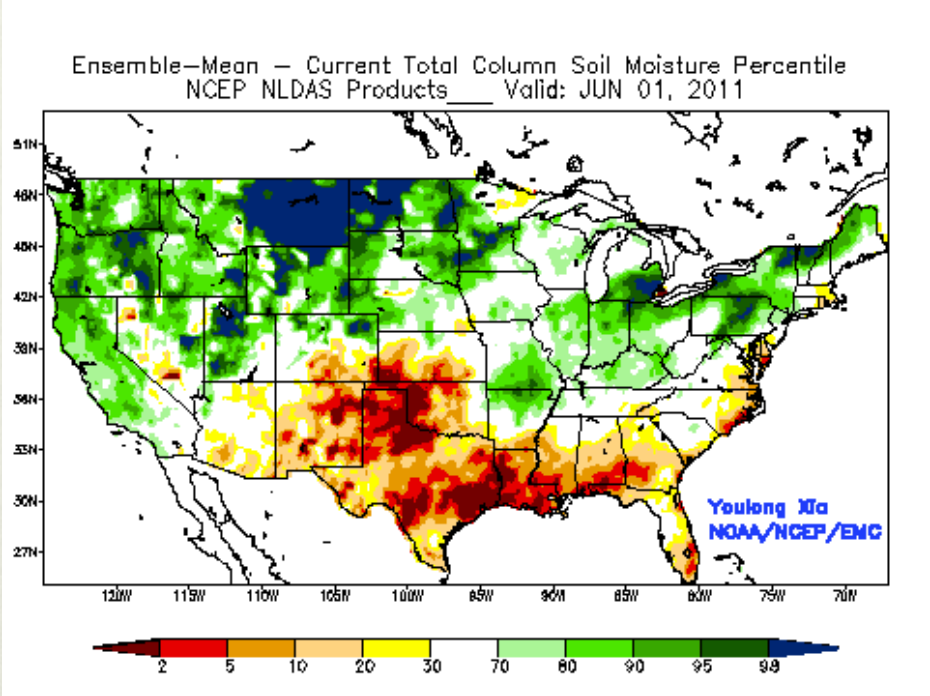


High Plains Regional Climate Center

NLDAS Soil Moisture

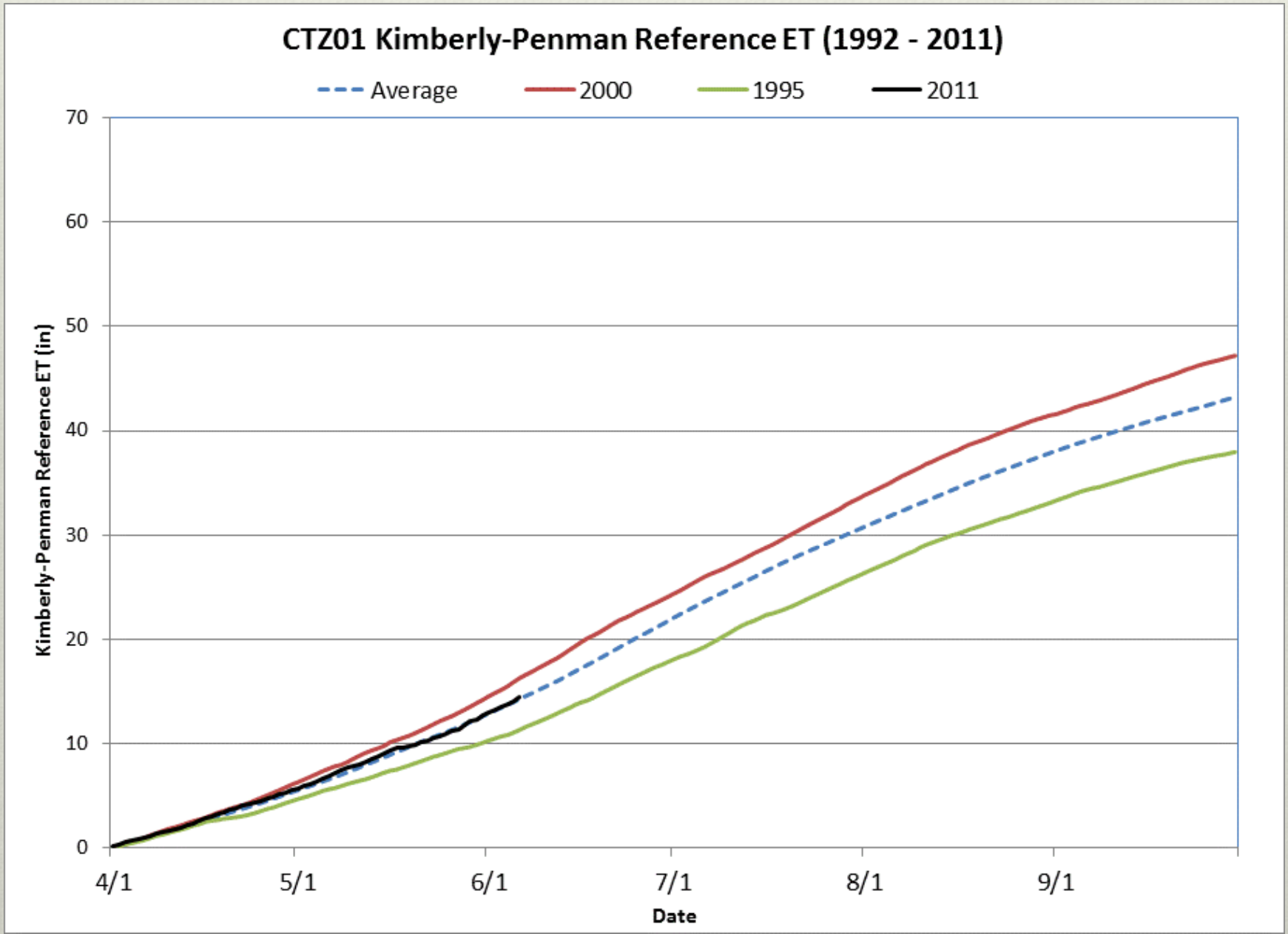


04 May 2011

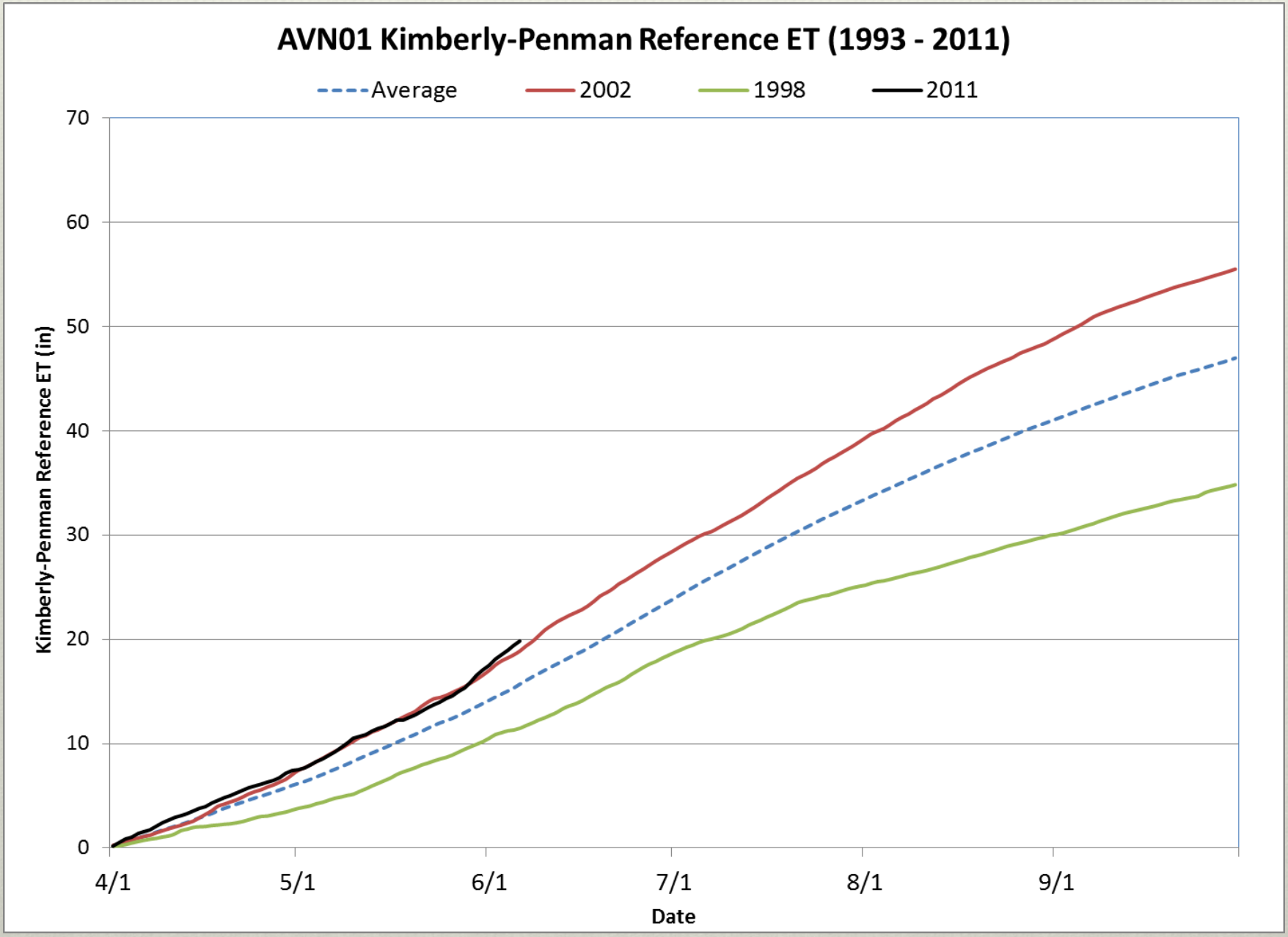


01 June 2011

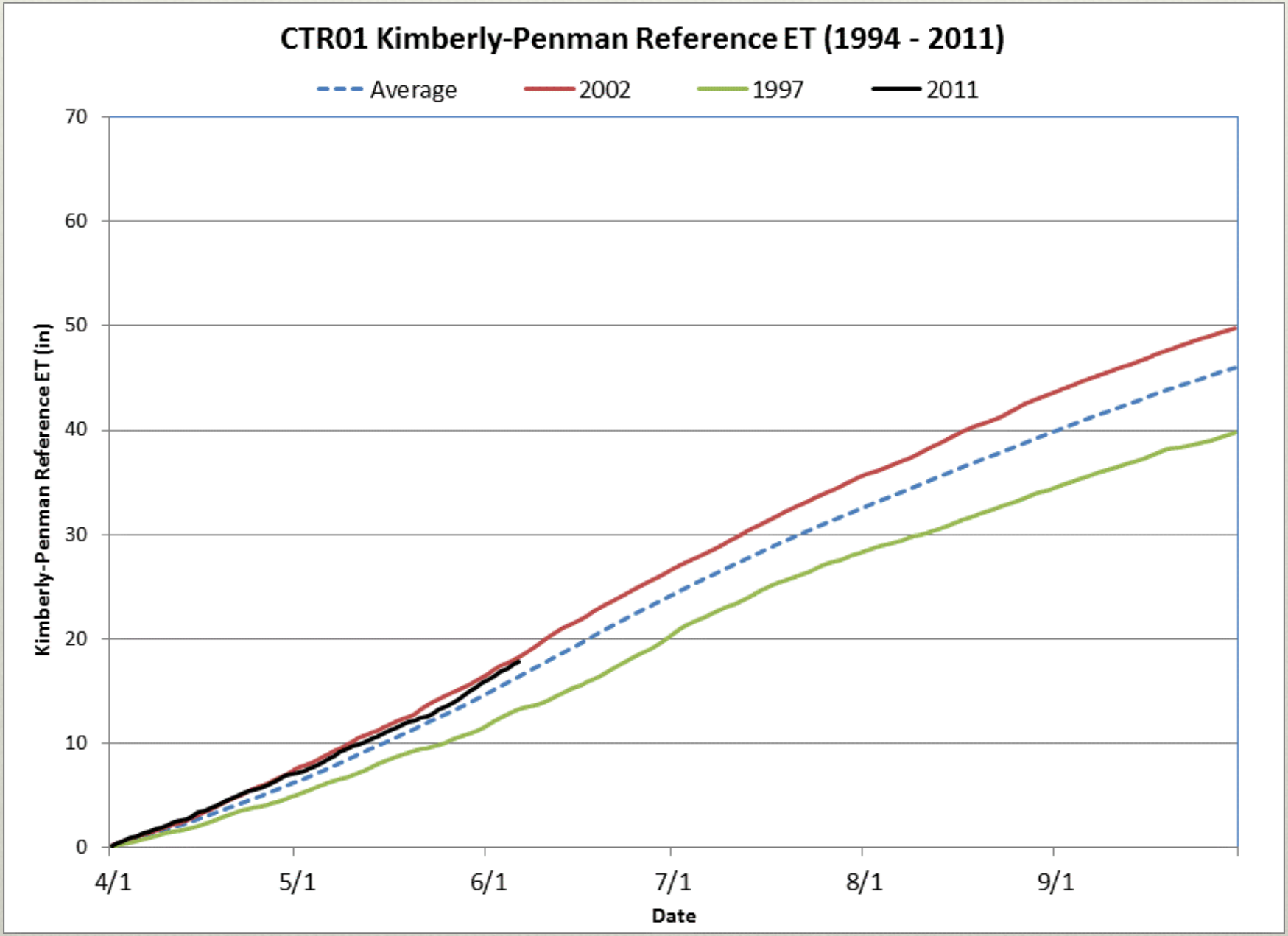
Cortez Reference ET – SW CO



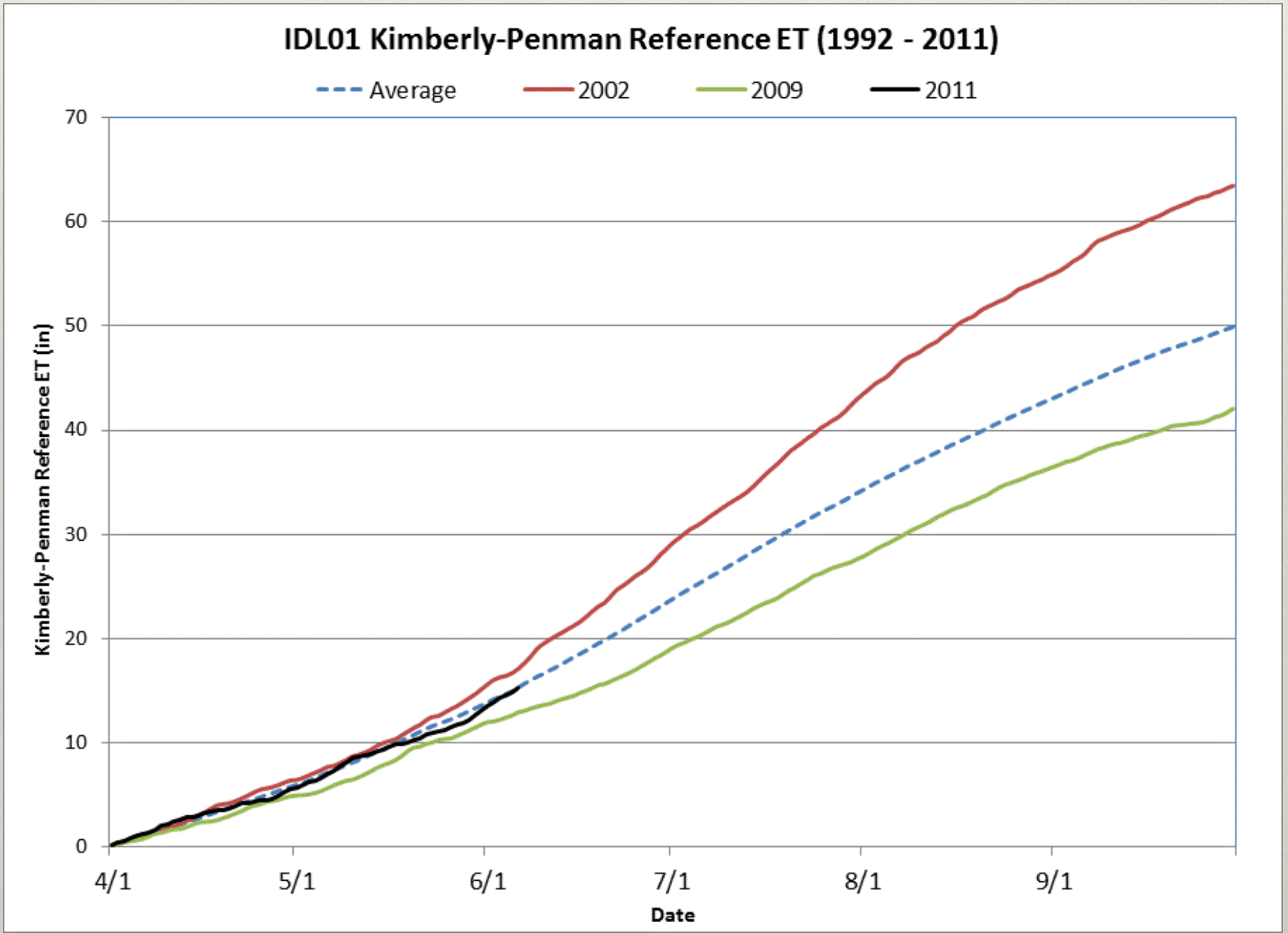
Avondale Reference ET – AK Basin



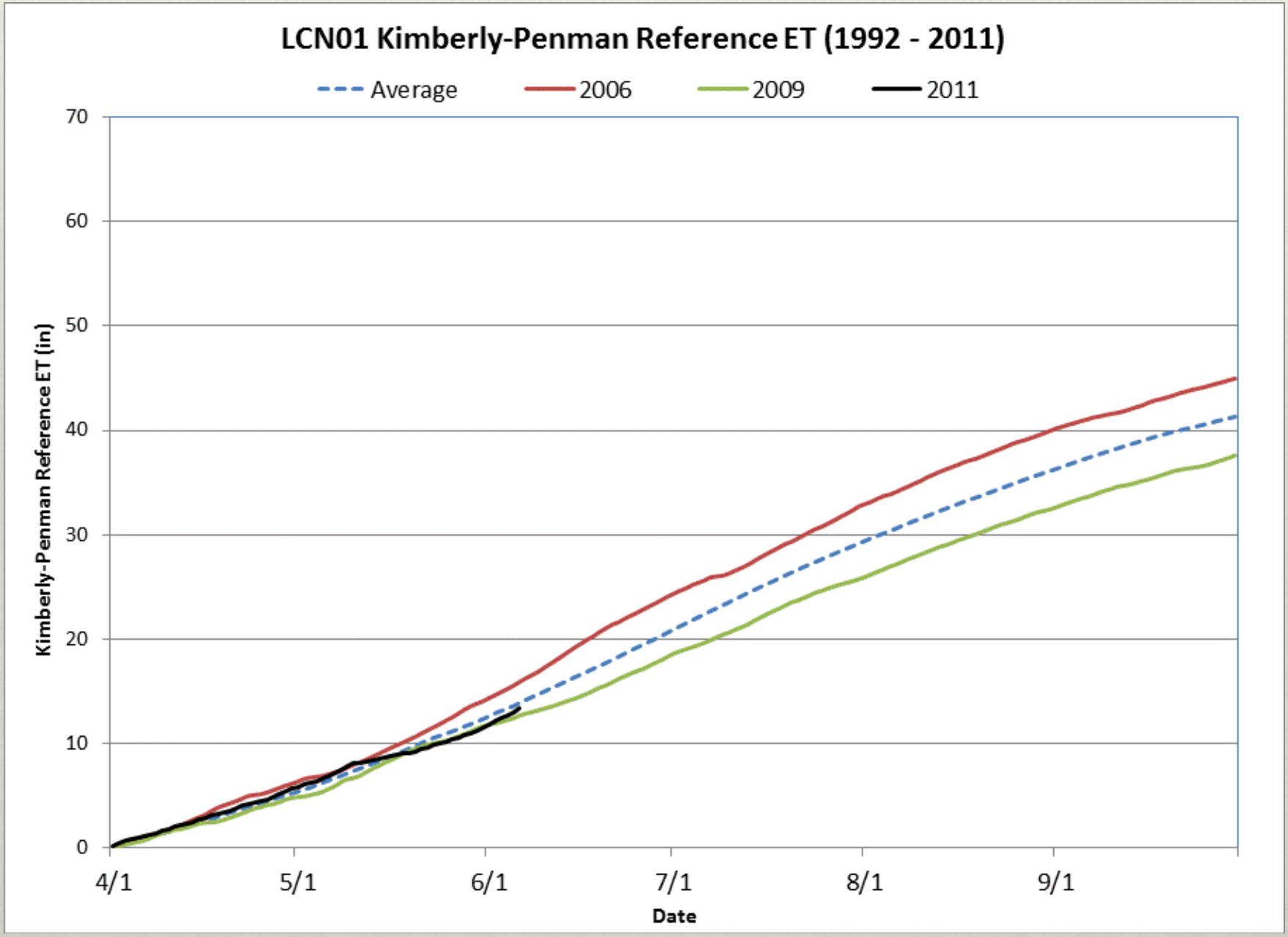
Center Reference ET - SLV



Idalia Reference ET – Eastern CO

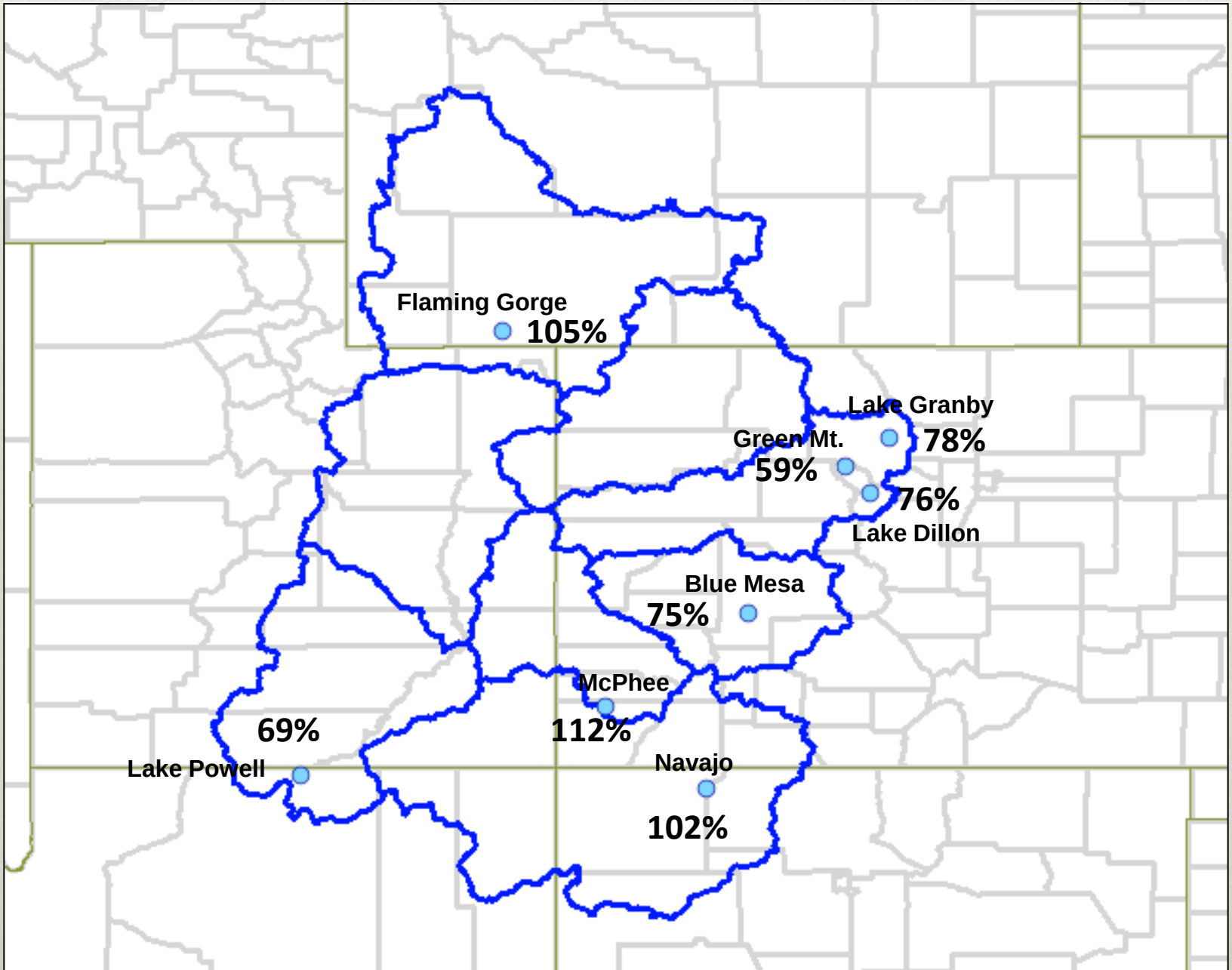


Lucerne Reference ET – N. Front Range

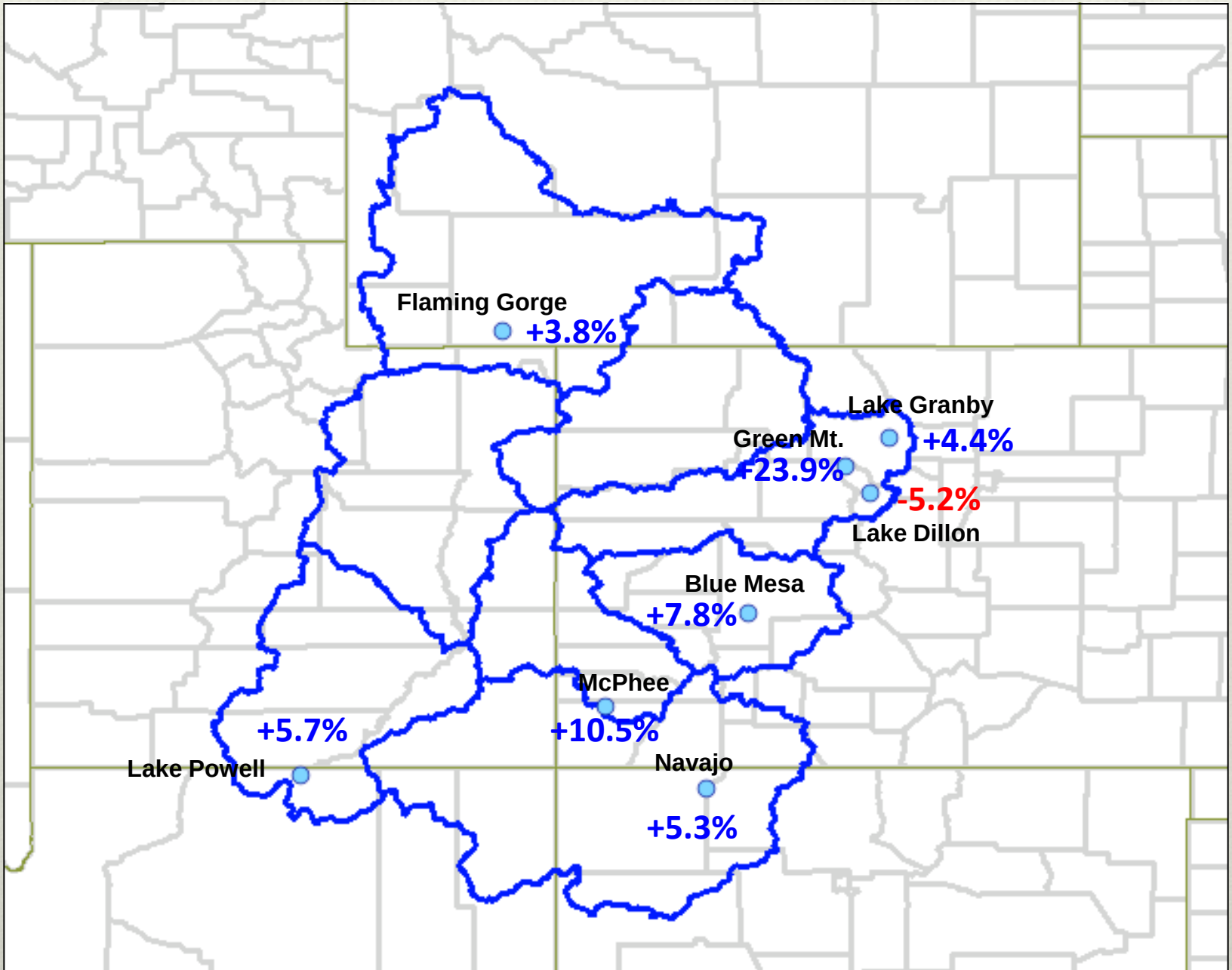


Reservoir Update

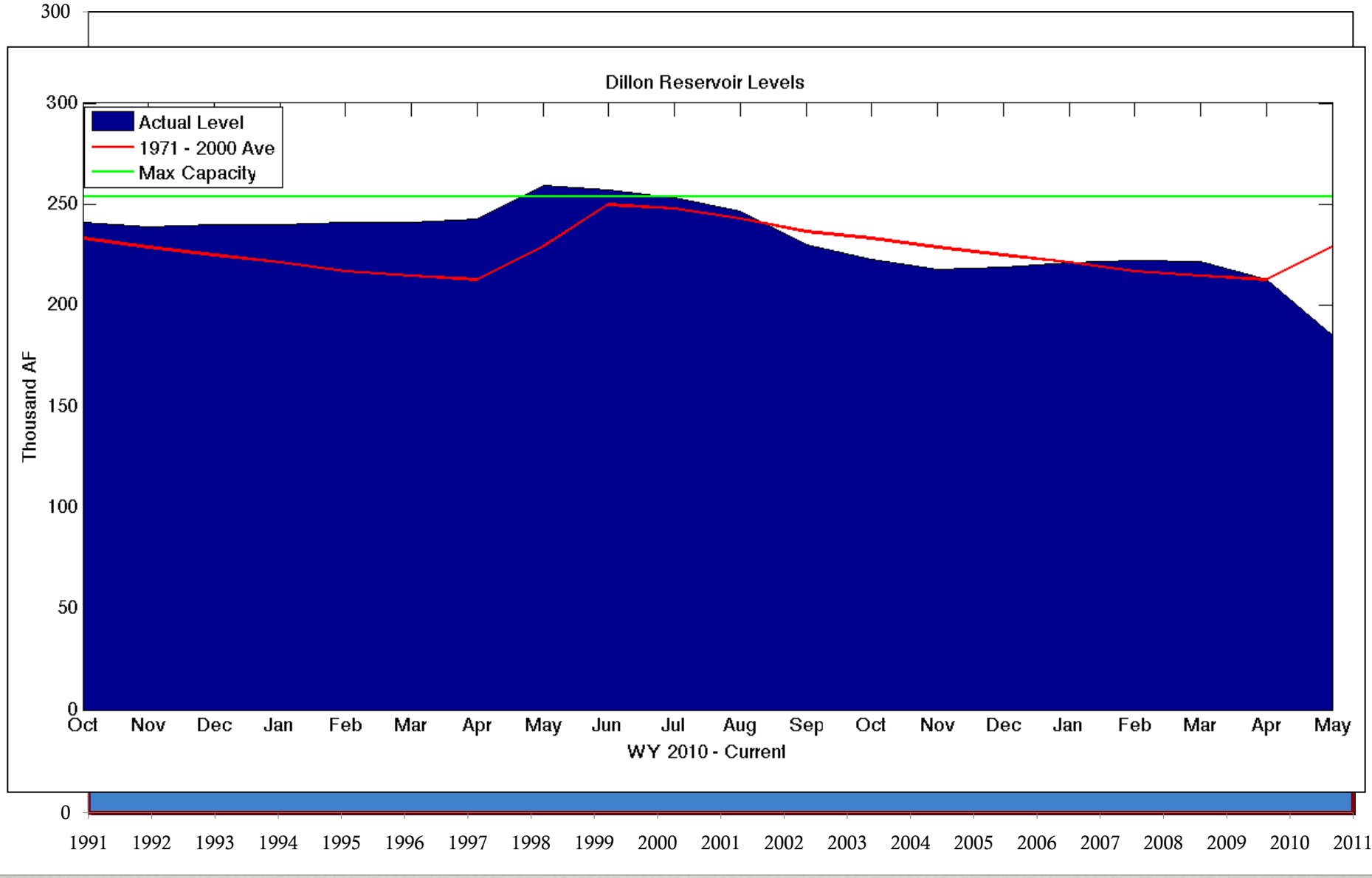
Reservoir Level as a Percent of Average – 6/5/2011



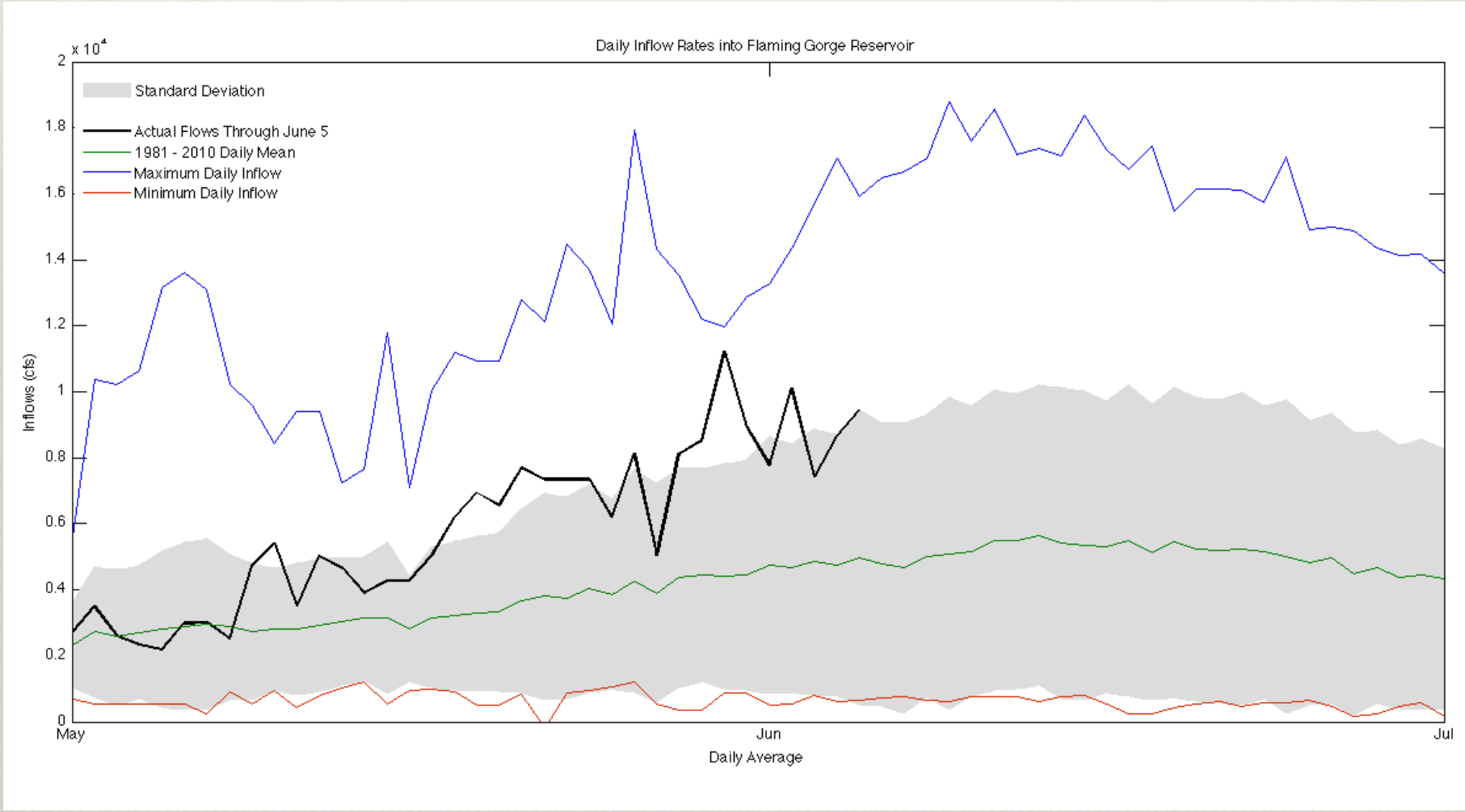
Reservoir Level Change Since 5/15/2011



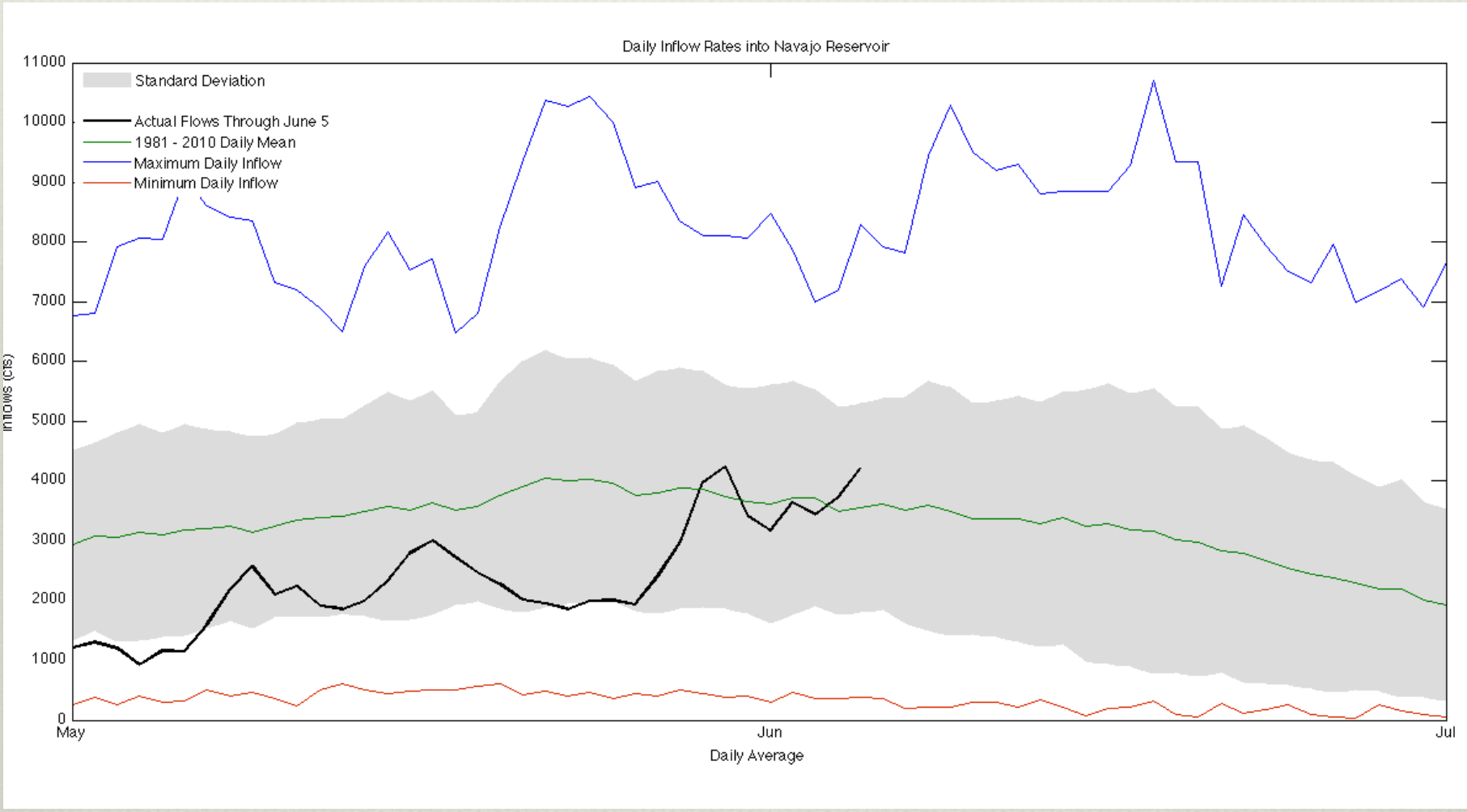
Lake Dillon May Reservoir Storage



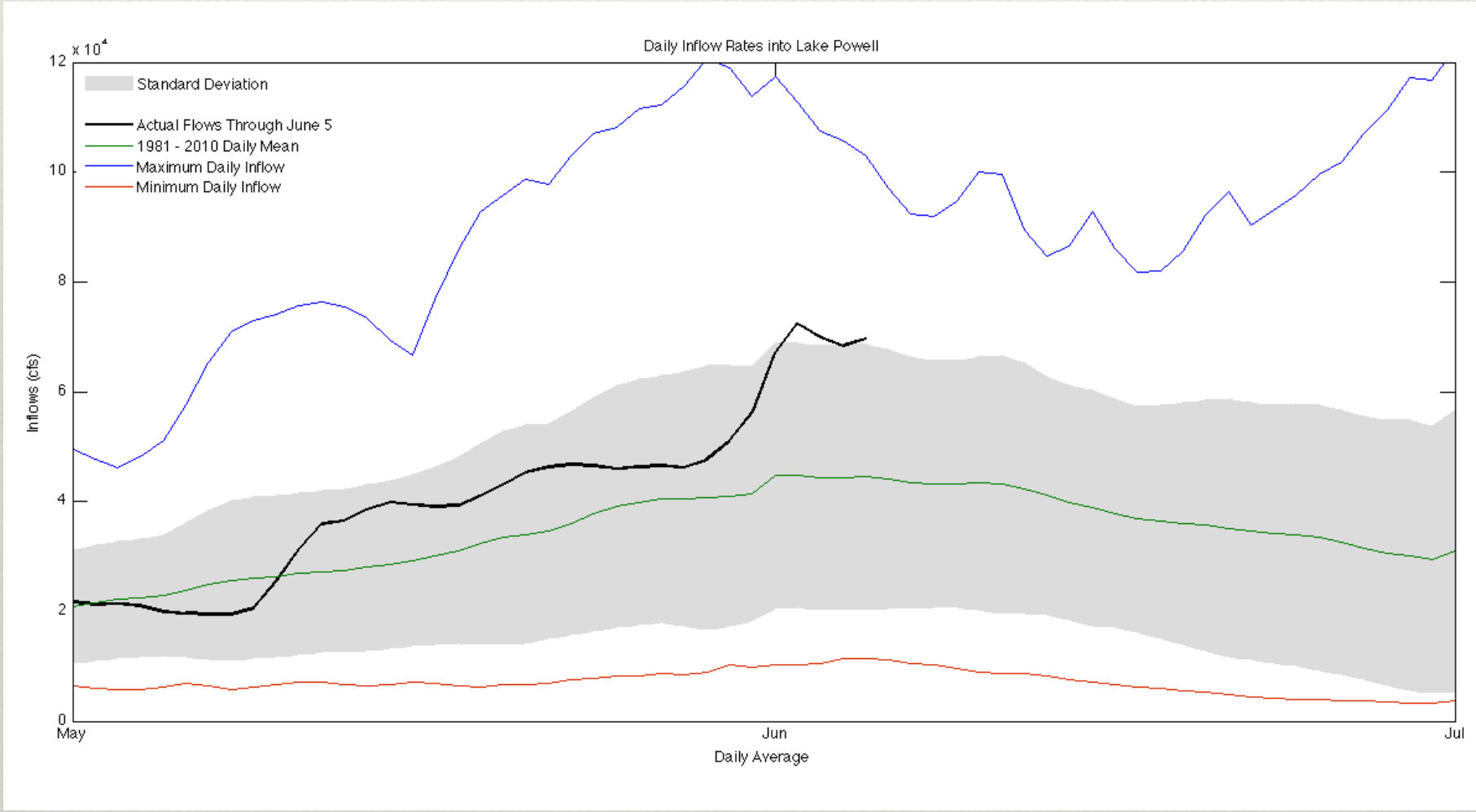
Flaming Gorge Reservoir Inflows as of 6/5/2011



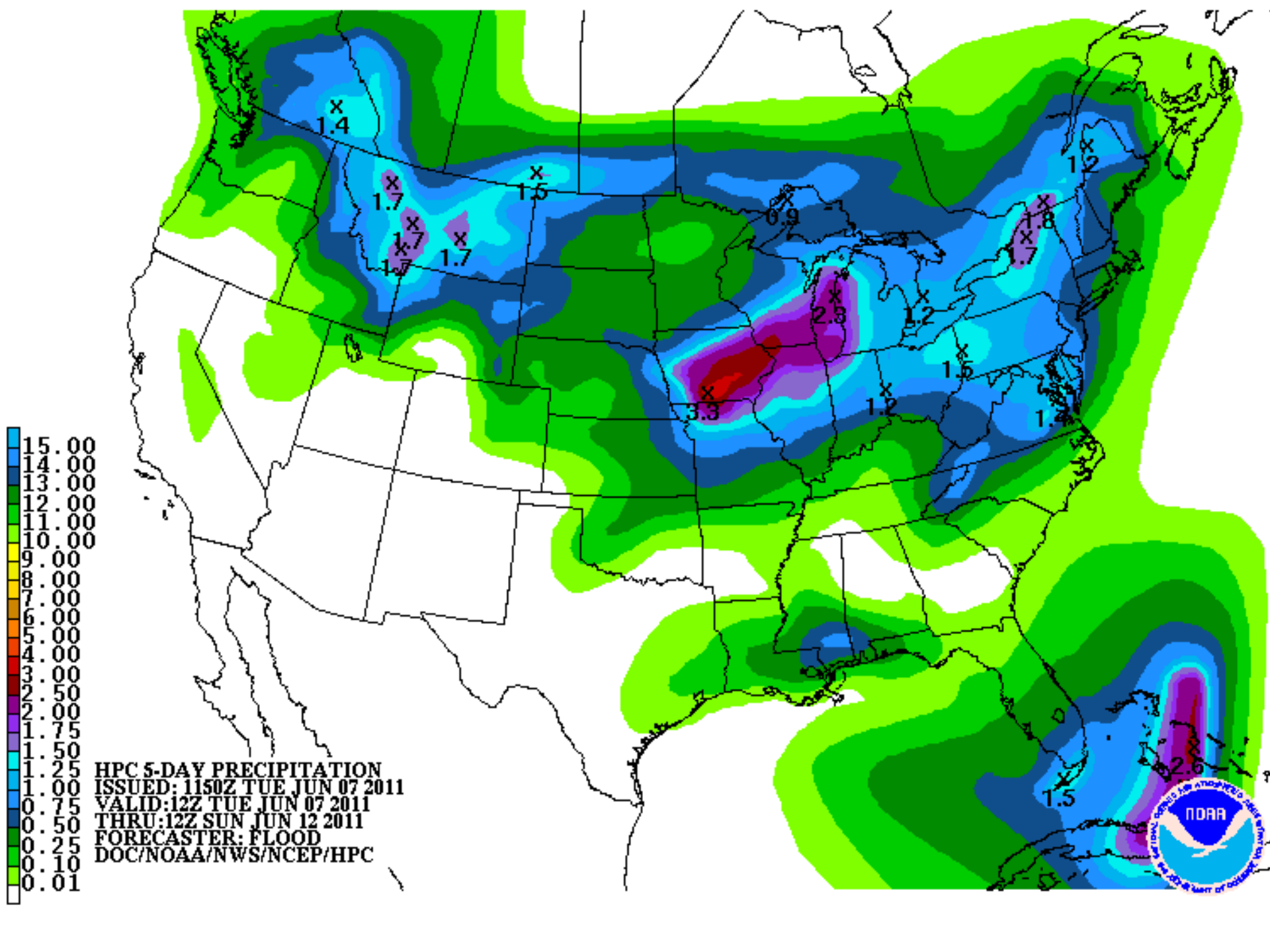
Navajo Reservoir Inflows as of 6/5/2011



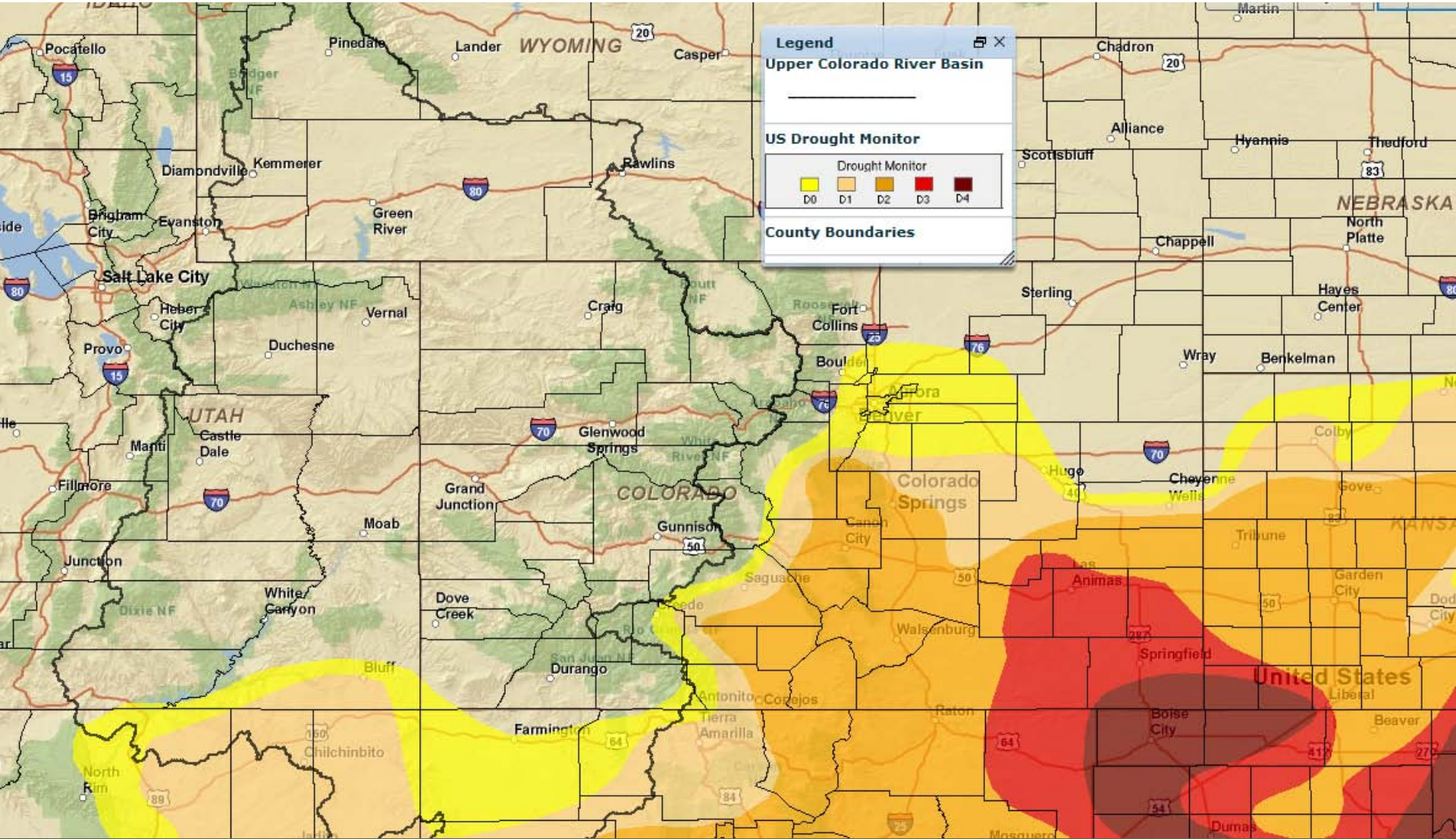
Lake Powell Inflows as of 6/5/2011



Precipitation Forecast


15.00
14.00
13.00
12.00
11.00
10.00
9.00
8.00
7.00
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: 1150Z TUE JUN 07 2011
VALID:12Z TUE JUN 07 2011
THRU:12Z SUN JUN 12 2011
FORECASTER: FLOOD
DOC/NOAA/NWS/NCEP/HPC
1.4
1.7
1.5
1.7
1.7
1.7
0.9
1.2
1.8
1.7
2.8
1.2
1.5
3.3
1.2
1.4
2.6
1.5
NOAA

Recommendations



INFO

For more information

NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

June 7, 2011

Precipitation and Snowpack

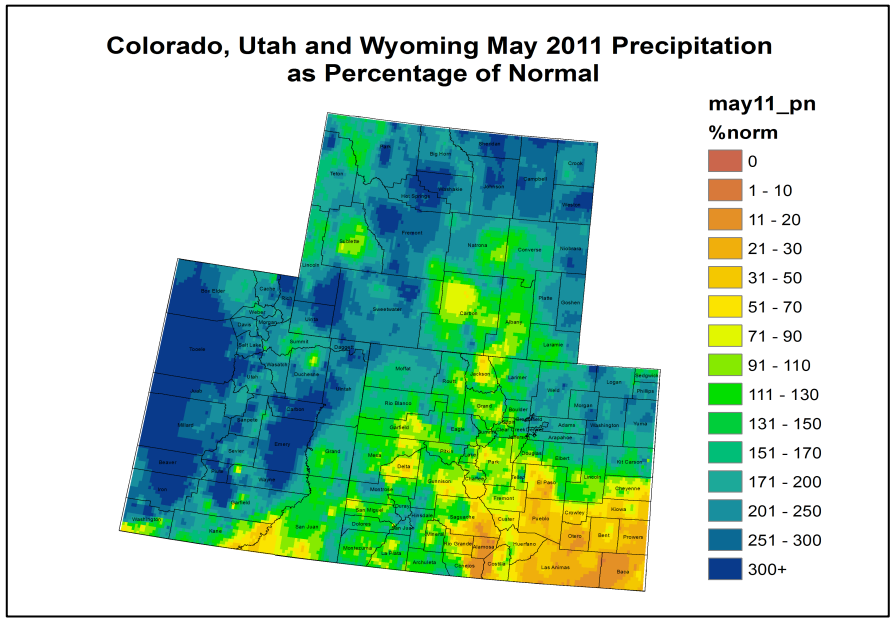


Fig. 1: May precipitation as a percent of average.

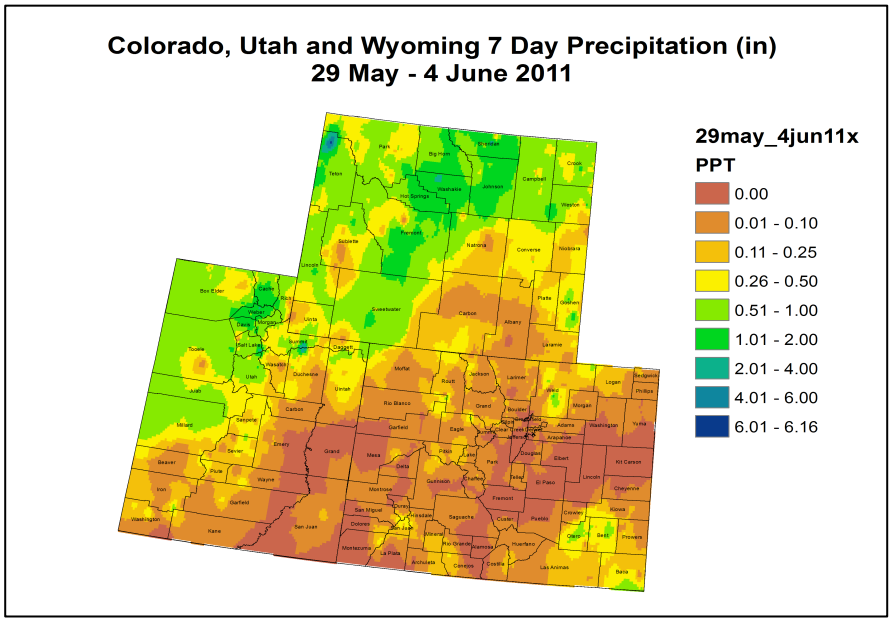


Fig. 2: May 29 – June 4 precipitation in inches.

For the month of May, most of the Upper Colorado River Basin (UCRB) received near or above average precipitation (Fig. 1). Some areas of eastern UT and southwestern WY saw over 300% of their average May precipitation. Some of the lower elevations in western CO and southern UT were a bit drier, receiving around 50 to 70% of their average precipitation for May. Precipitation was well above average for northeast CO, bringing their water year totals to near or above average. Southeast CO and the San Luis Valley saw less than 50% of their average moisture for the month.

Last week, much of the UCRB and surrounding areas were fairly dry (Fig. 2). The northern part of the basin (and into northwestern UT) received around a half inch to inch of precipitation. The far southeastern counties of CO also received between a quarter and half inch of moisture. The rest of the UCRB and plains of CO received less than a tenth of an inch of moisture for the week.

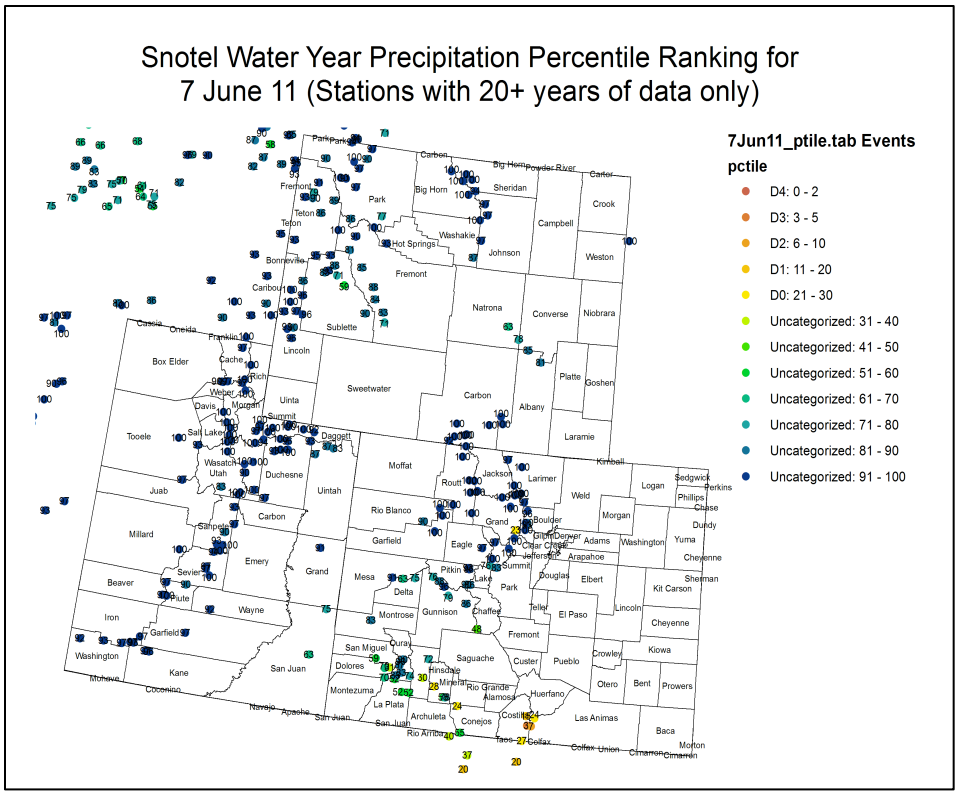


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21-30% is Drought Monitor's D0 category).

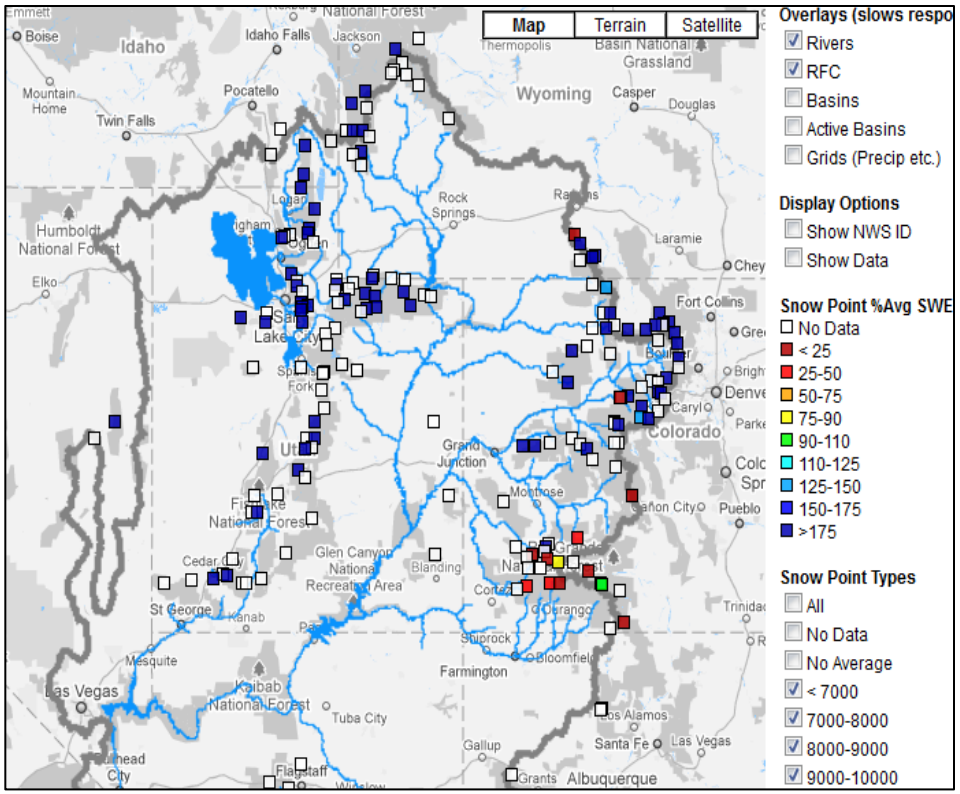


Fig. 4: SNOTEL WYTD accumulated snow water equivalent as a percent of average.

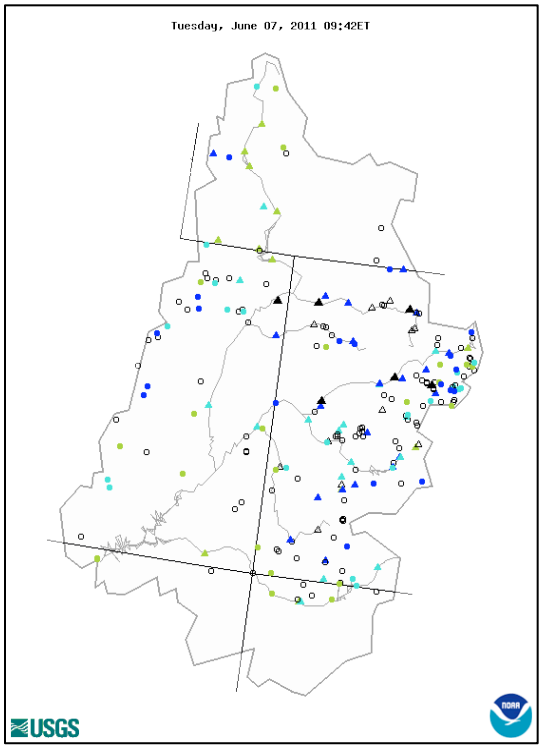
The majority of the SNOTEL sites in the UCRB are showing very high (and in many cases, record high) percentile rankings for water-year-to-date (WYTD) precipitation (Fig. 3). The Rio Grande and San Juan basins in southern CO are the driest, though the higher elevations of the San Juan basin have improved somewhat from the earlier part of the water year. Several sites in the Upper Rio Grande basin are below the 30th percentile.

Snowpack around most of the UCRB is much above average (Fig. 4). The latest Bureau of Reclamation update stated that May 26th snowpack for the entire basin above Lake Powell was at 223% of average, largely due to a later than average snowmelt season combined with higher than average seasonal snow accumulations. Many of the SNOTEL sites below 9000 feet have completely melted out over the past two weeks. Most of the higher elevation sites, while still well above average for this time of year, are rapidly melting down (between half an inch to over an inch per day).

Streamflow

As of June 6th, about 85% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows. Several mainstem and tributary sites in the Yampa River and Colorado River basins have exceeded flood stage (Fig. 5), with several other sites at the 99th percentile and very near flood stage.

Key gages on the Colorado River near the CO-UT state line and the Green River at Green River, UT have above normal 7-day average streamflow at the 90th and 83rd percentiles, respectively (Fig. 6). Although the current 7-day average streamflow for the San Juan River at Bluff, UT is below normal (24th percentile), real-time flows in the San Juan River are approaching or exceeding normal levels due to a substantial increase in releases from Navajo Reservoir, which began on June 6th. These releases are expected to continue until about June 16th at which time they are planned to be decreased to about 500 cfs.



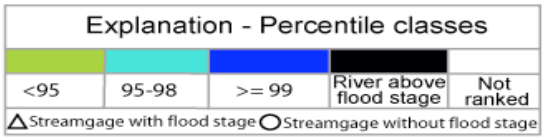


Fig. 5: Real-time flood and high-flows conditions at USGS streamgages as of June 7th.

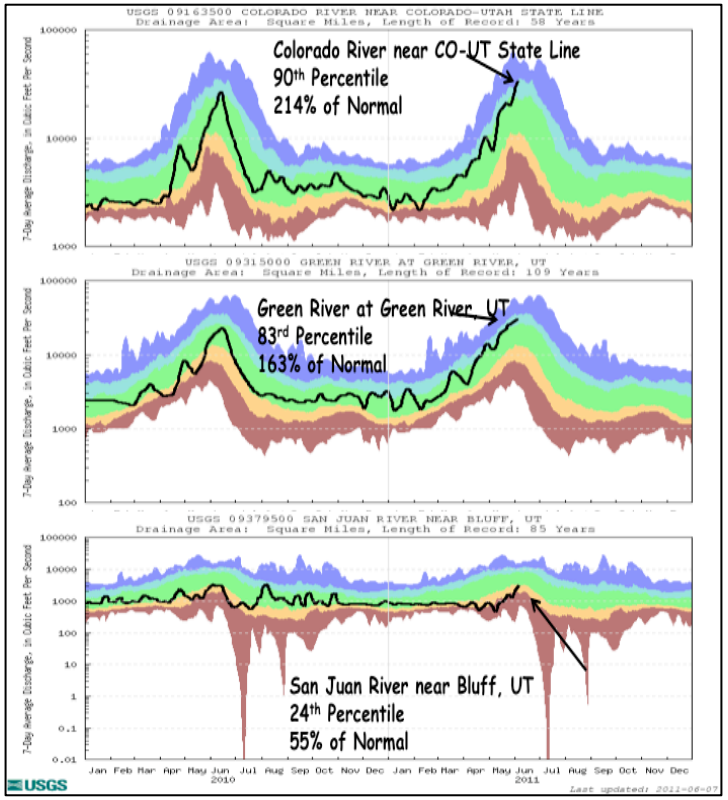


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Last week, cooler than average temperatures were prevalent over the UCRB, with much warmer than average temperatures seen over southeast CO. Soil moisture conditions remain poor for southeastern CO and the San Luis Valley. Soil moisture is above average along the Wasatch range in UT and has significantly improved over northeastern CO. At Avondale, CO (in the Arkansas basin) and at Center, CO (in the San Luis Valley, Fig. 7) reference evapotranspiration is currently tracking along with the year of highest recorded ET, which was during the drought of 2002.

Since May 15th, all of the major reservoirs in the UCRB (with the exception of Dillon) have been increasing in storage (Fig. 8). Daily inflows into Flaming Gorge, Blue Mesa, Navajo, and Lake Powell are all well above their averages for this time of year. Green Mountain Reservoir has experienced very large increases in the last week, as flows along the Blue River have rapidly increased over the past week. Storage volumes at Dillon have been adjusting over the last month to help mitigate the anticipated response of the Blue River flows to near record snowpack that has begun to melt in the region. With the recent warming and increased melting, Dillon's storage volume has begun increasing since June 1st.

Precipitation Forecast

The current pattern of passing troughs across WY, with prevailing southwesterly flow over the region, is likely to persist over the next week. Another system will pass over the area late Wednesday and into Friday. The bulk of this week's precipitation will likely fall with this disturbance, concentrating on the northeastern CO and WY plains with a chance of precipitation also in the northern CO and WY mountains. Another system looks to enter the UCRB early next week, but does not appear to have much moisture associated with it. The National Weather Service is forecasting that flows will decrease somewhat in the coming days due to slightly cooler air temperatures. An above average snowpack remains over much of the UCRB and is subject to rapid melt and increased runoff following a return to warmer temperatures.

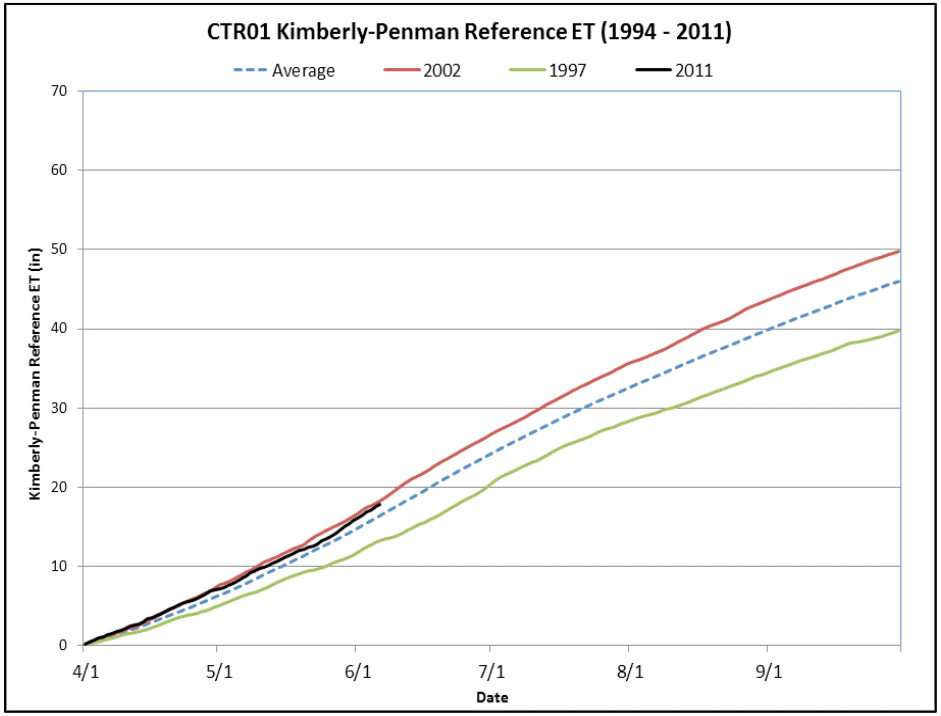


Fig. 7: Reference ET at Center, CO in the San Luis Valley since April 1st.

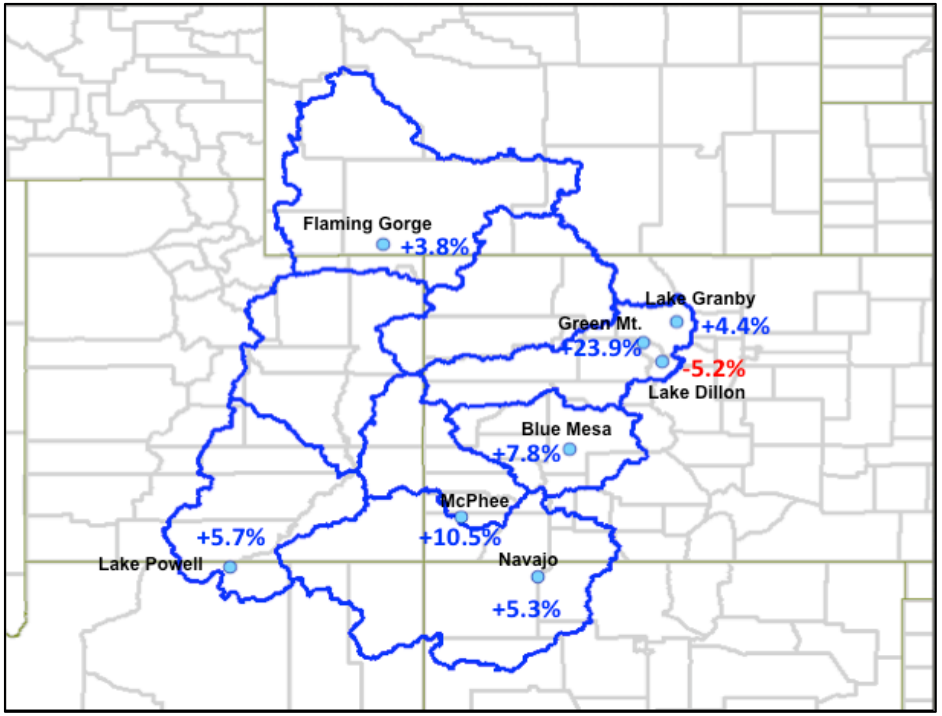
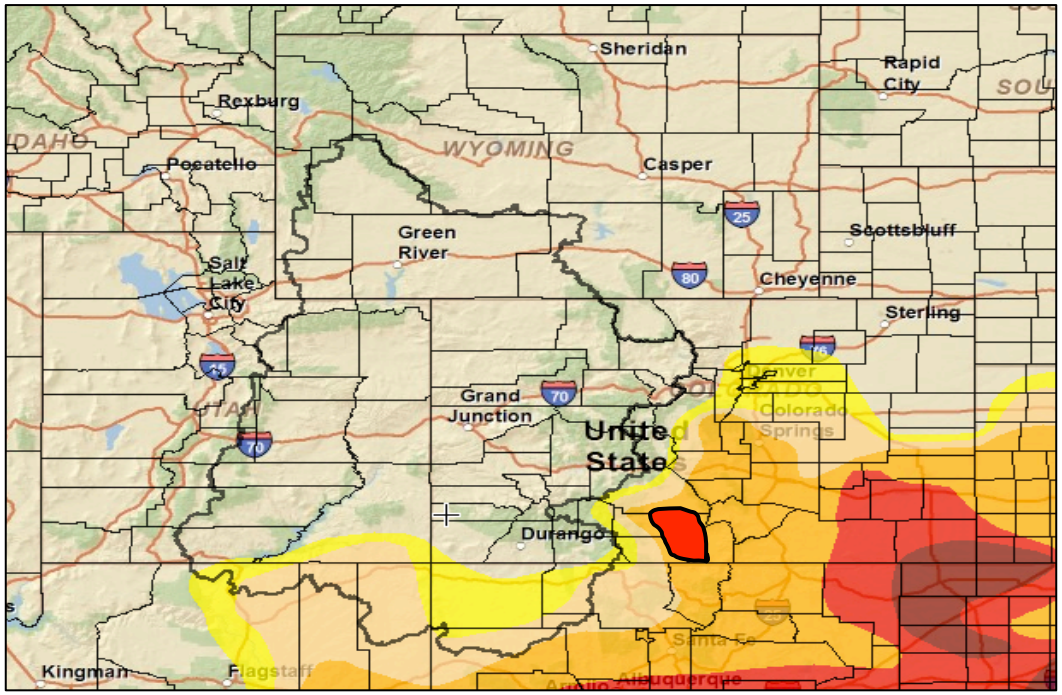
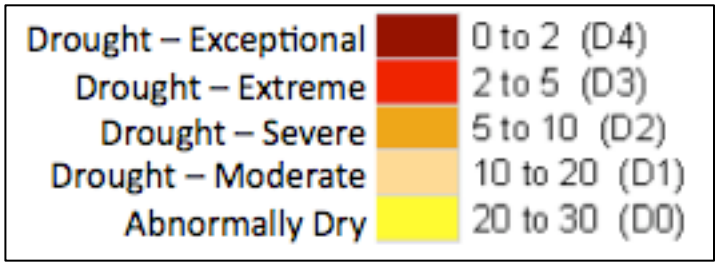


Fig. 8: Reservoir storage changes since 5/15/2011 as a percent of average June storages.

Drought and Water Discussion





Drought categories and their associated percentiles

Fig. 9: May 31st release of U.S. Drought Monitor for the UCRB

Status quo is being recommended for the UCRB in the current U.S. Drought Monitor (USDM) map (Fig. 9). East of the UCRB, a D3 introduction in the San Luis Valley is being recommended (Fig. 9, black contour, red shading). Standardized precipitation indices (SPIs) are less than -1 on several different timescales for the area. With the warmer temperatures, high potential ET and dry soil conditions, several indicators point to at least D3 in this area. This D3 should be limited to only the lower elevations as the surrounding Sangre de Cristos and Wet Mountains have seen closer to average precipitation for the water year and have experienced fewer impacts than the nearby lower elevations.