

Spring 2011

May 31st, 2011

NIDIS - UPPER COLORADO BASIN PILOT PROJECT

Weekly Climate, Water & Drought Assessment

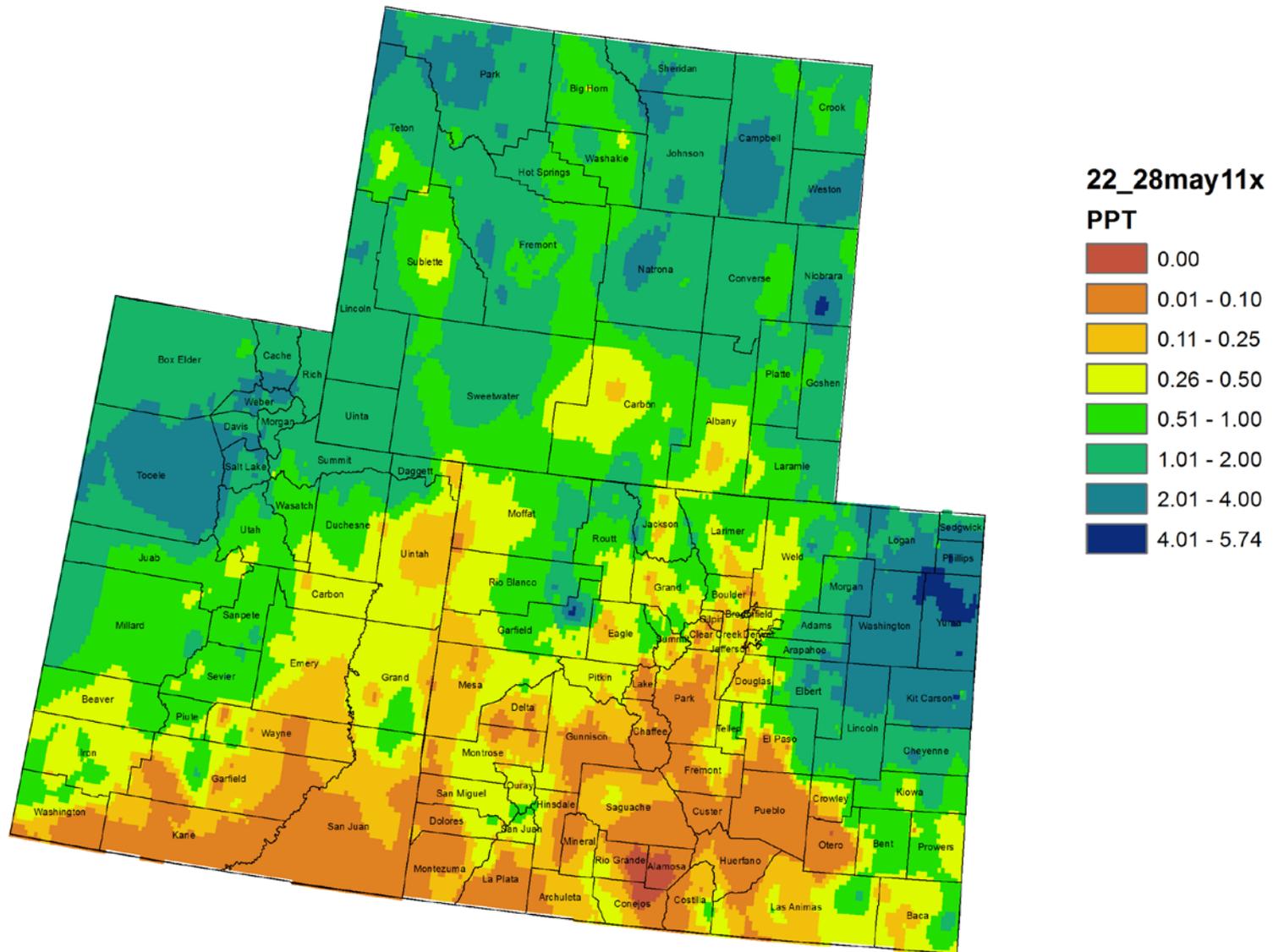
Today's Agenda

- Assessment of current water conditions
- Precipitation Forecast
- Recommendations for Drought Monitor

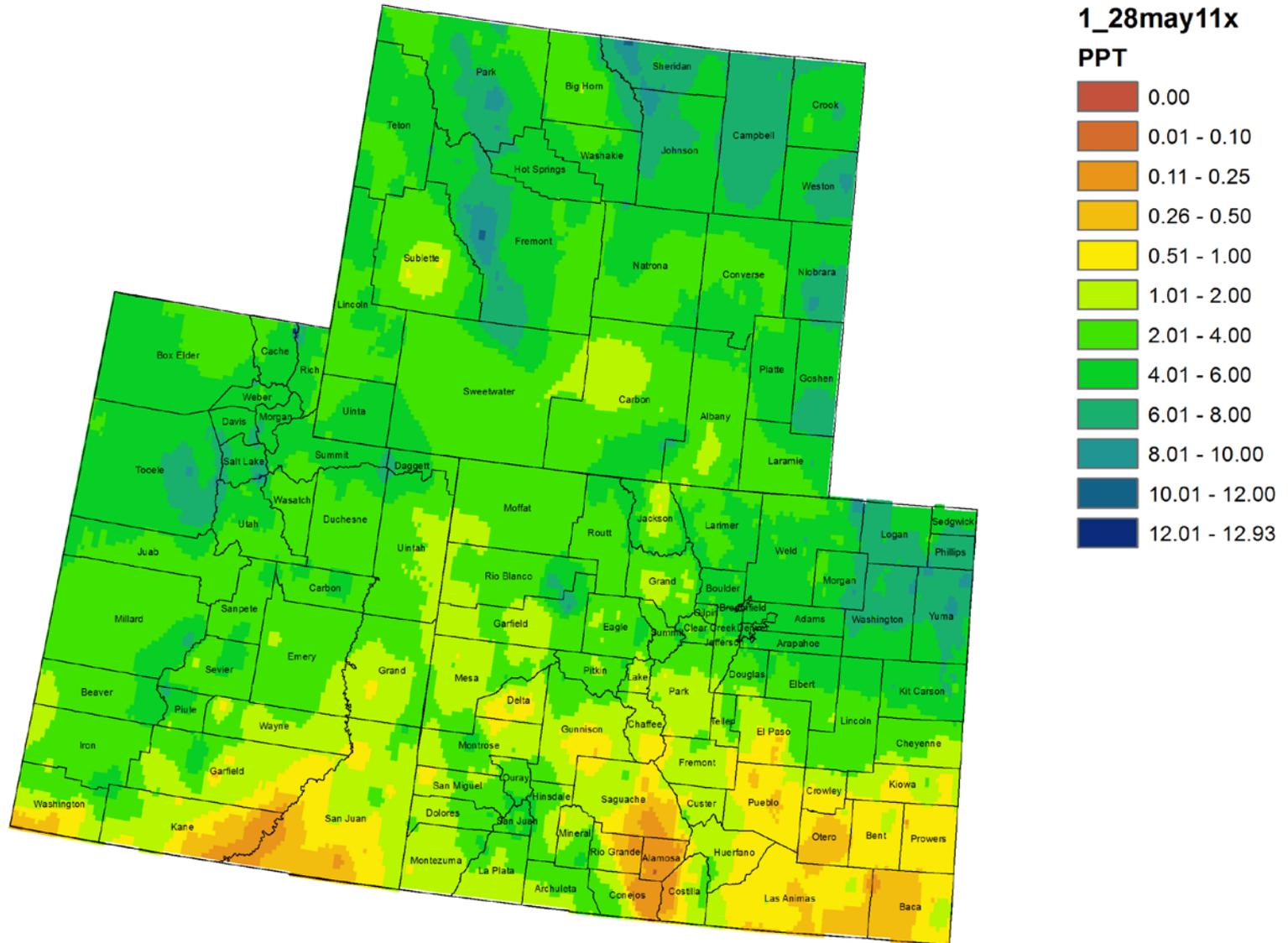
Precipitation/Snowpack Update



Colorado, Utah and Wyoming 7 Day Precipitation (in) 22 - 28 May 2011

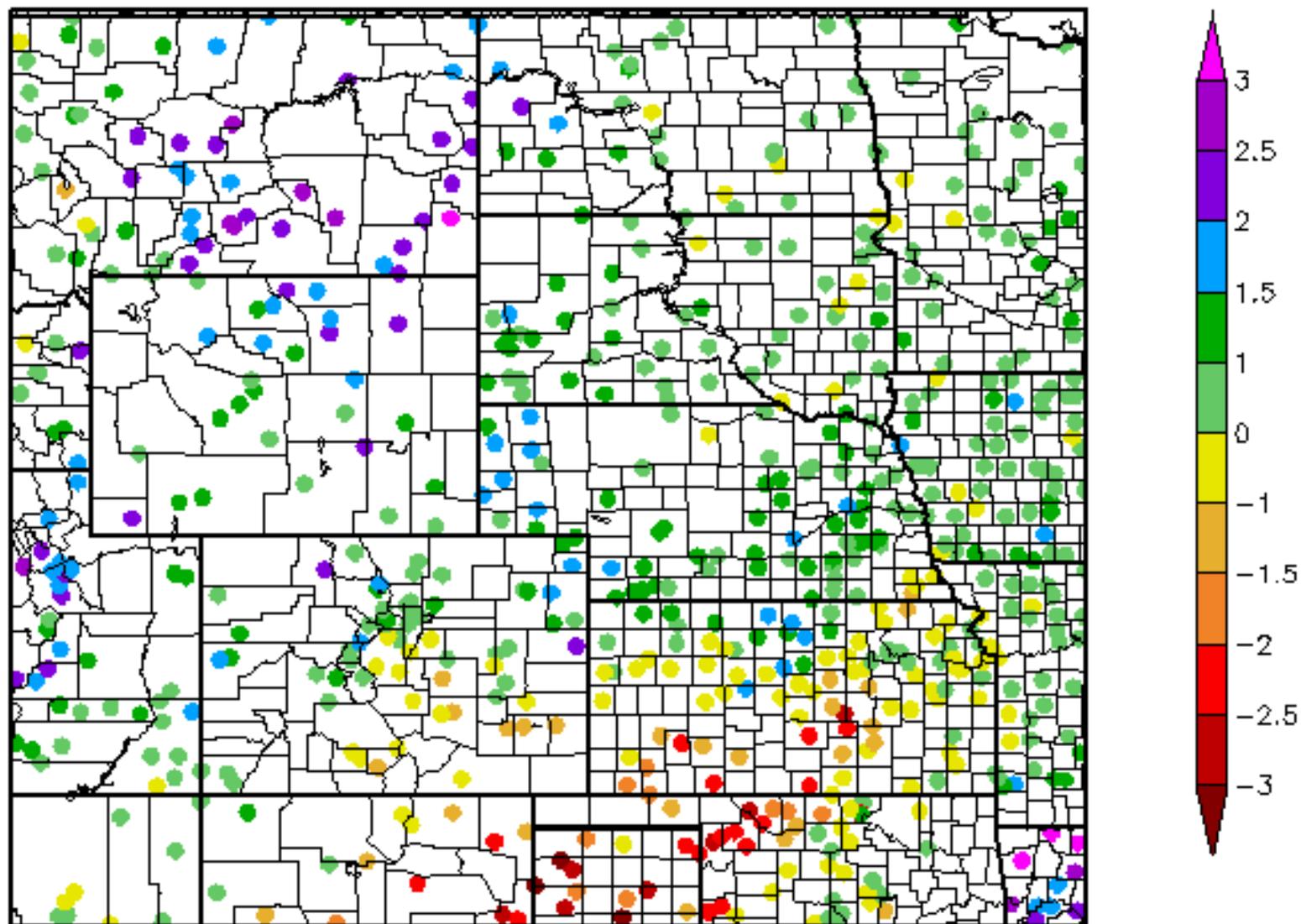


Colorado, Utah and Wyoming Month to Date Precipitation (in) 1 - 28 May 2011

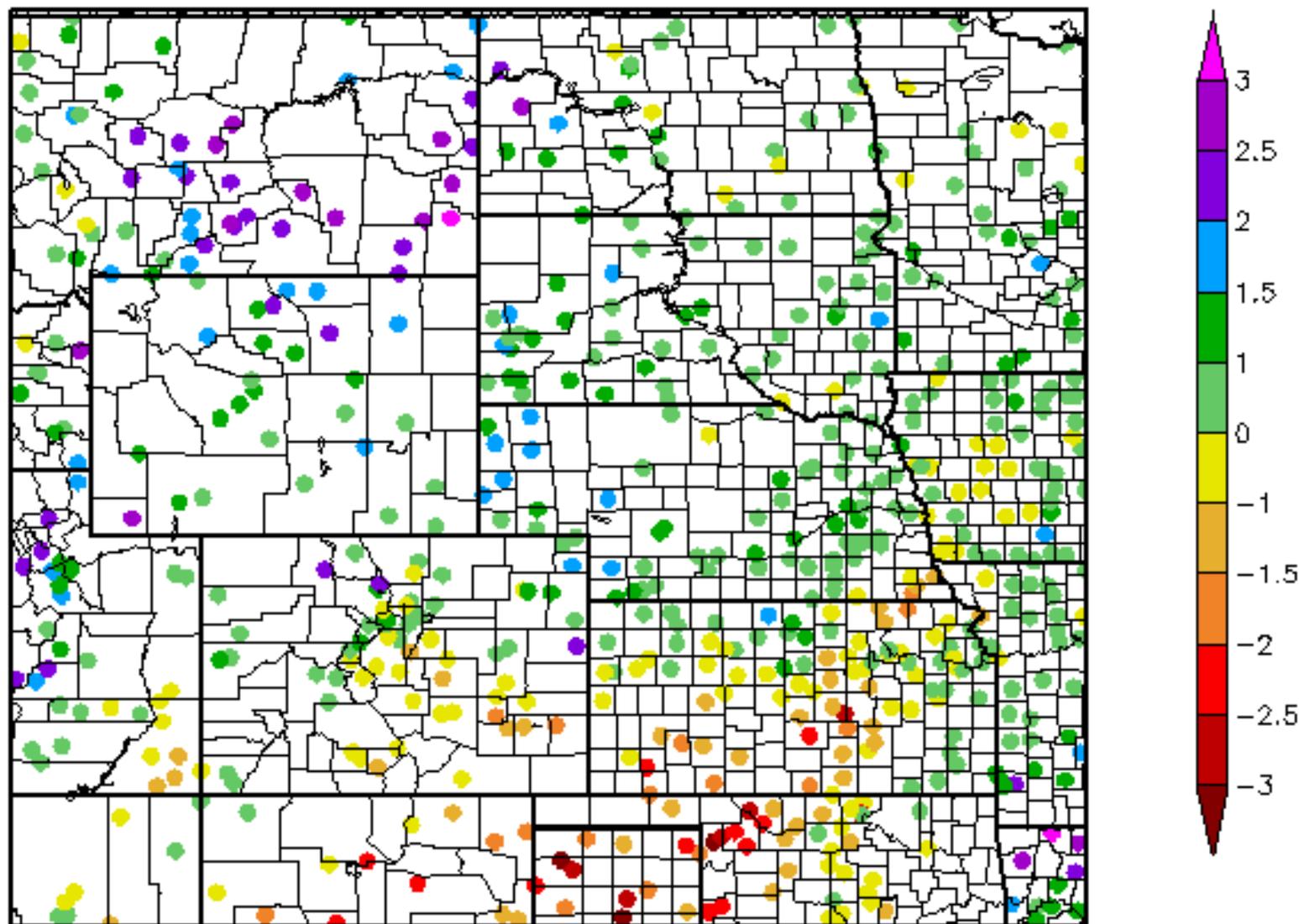


60 Day SPI

4/1/2011 - 5/30/2011

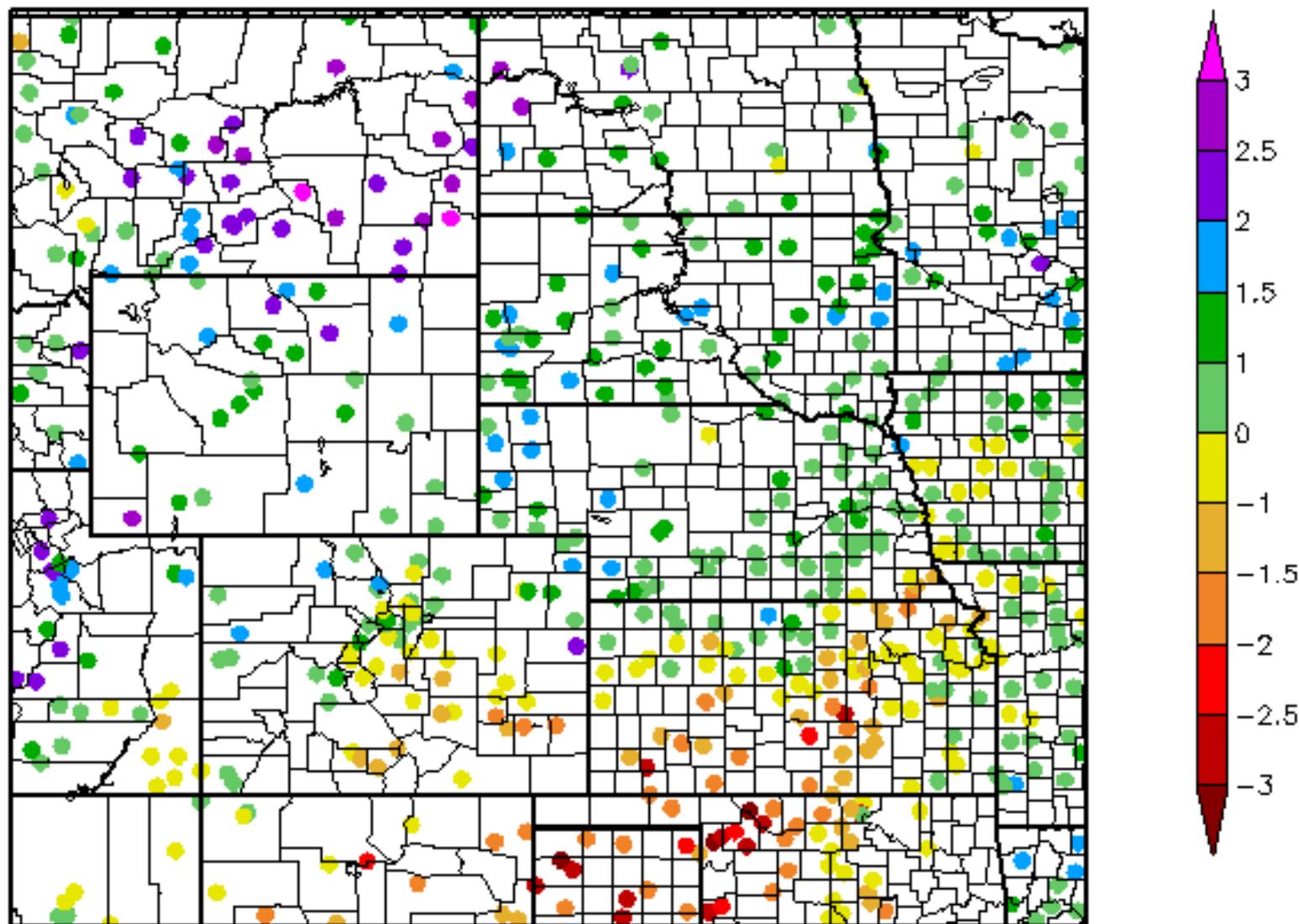


120 Day SPI 1/31/2011 – 5/30/2011



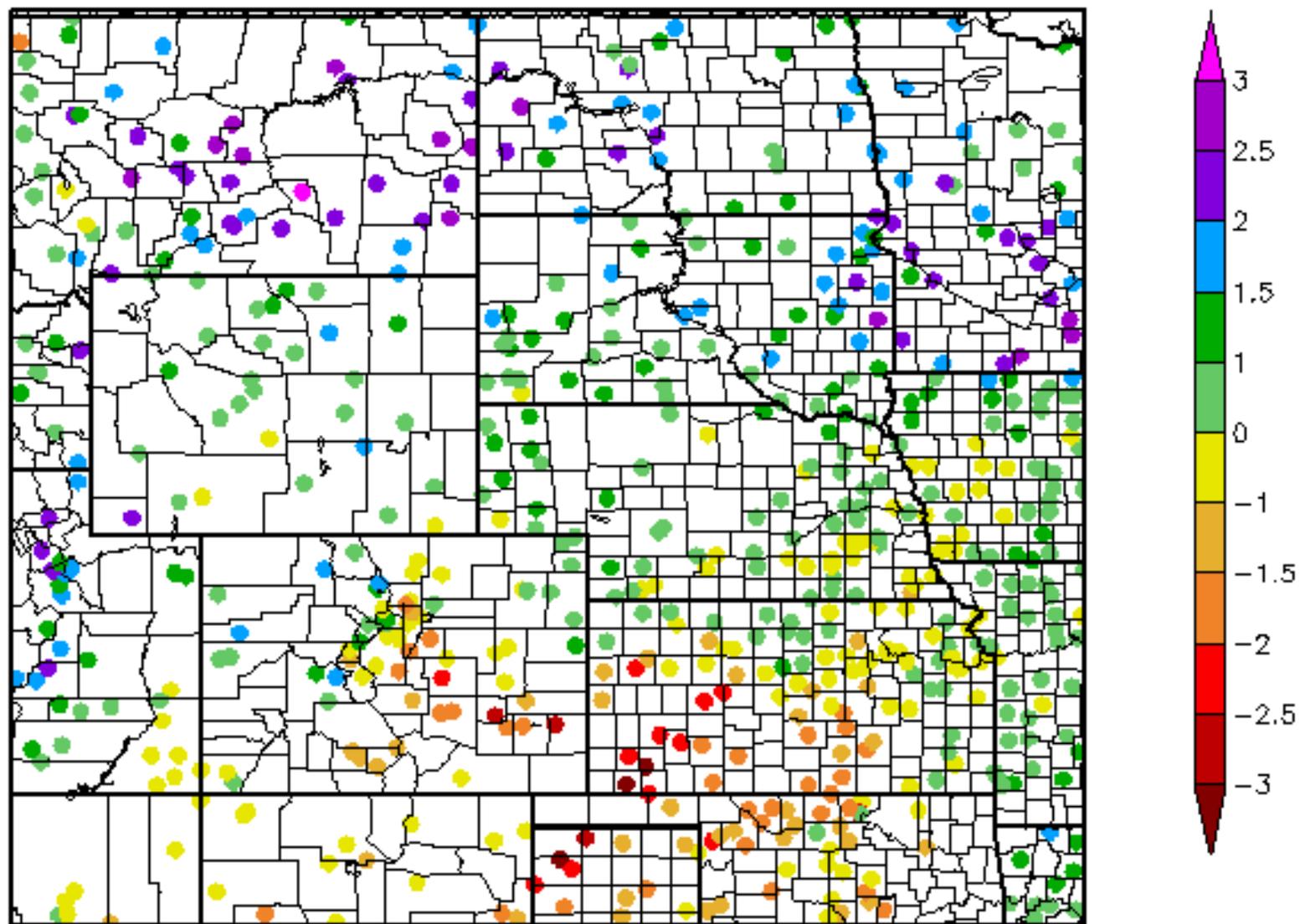
6 Month SPI

12/1/2010 – 5/30/2011

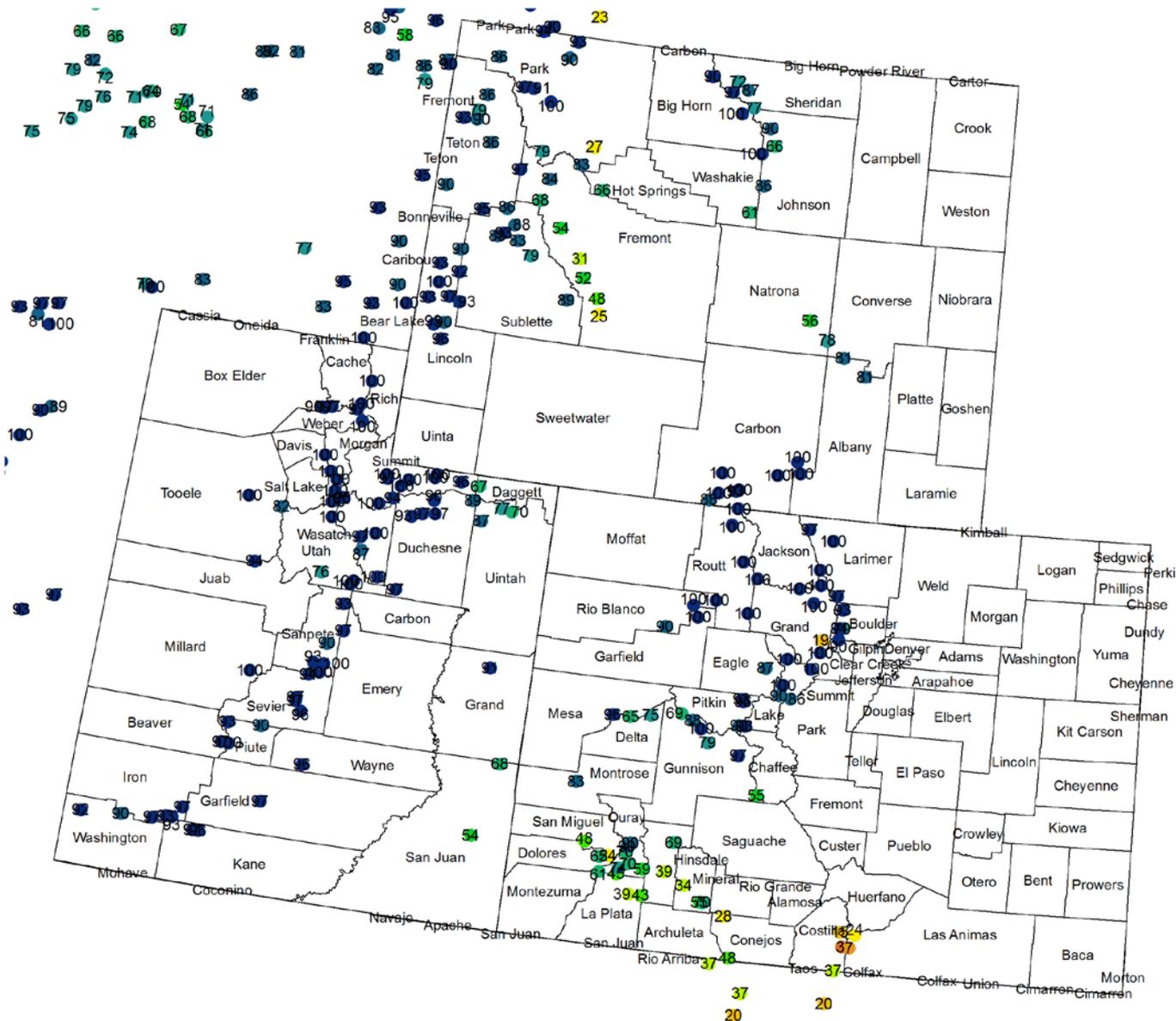


9 Month SPI

8/31/2010 - 5/30/2011



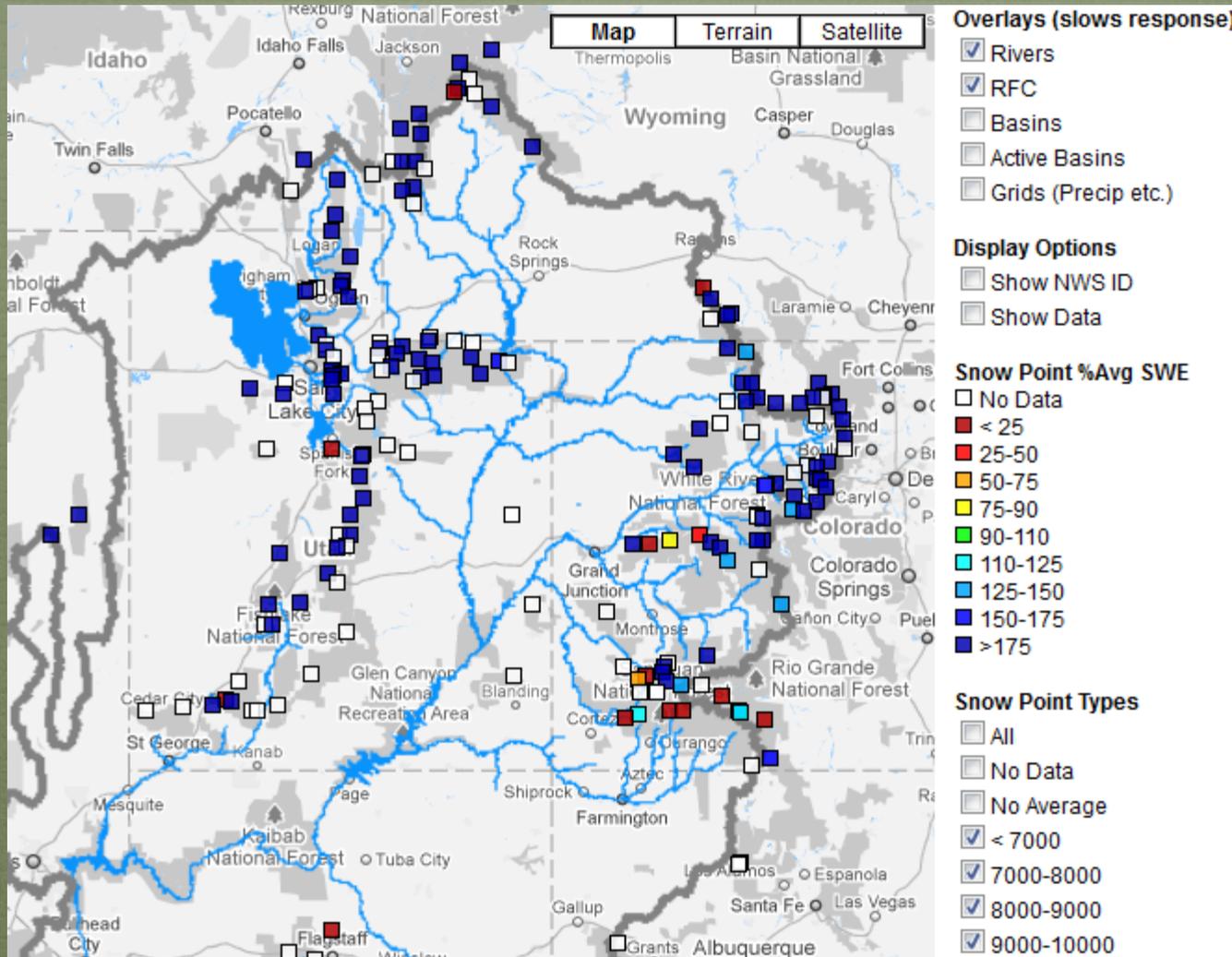
Snotel Water Year Precipitation Percentile Ranking 31 May 2011 (Stations with 20+ years of data only)



3May11_ptile.tab Events ptile

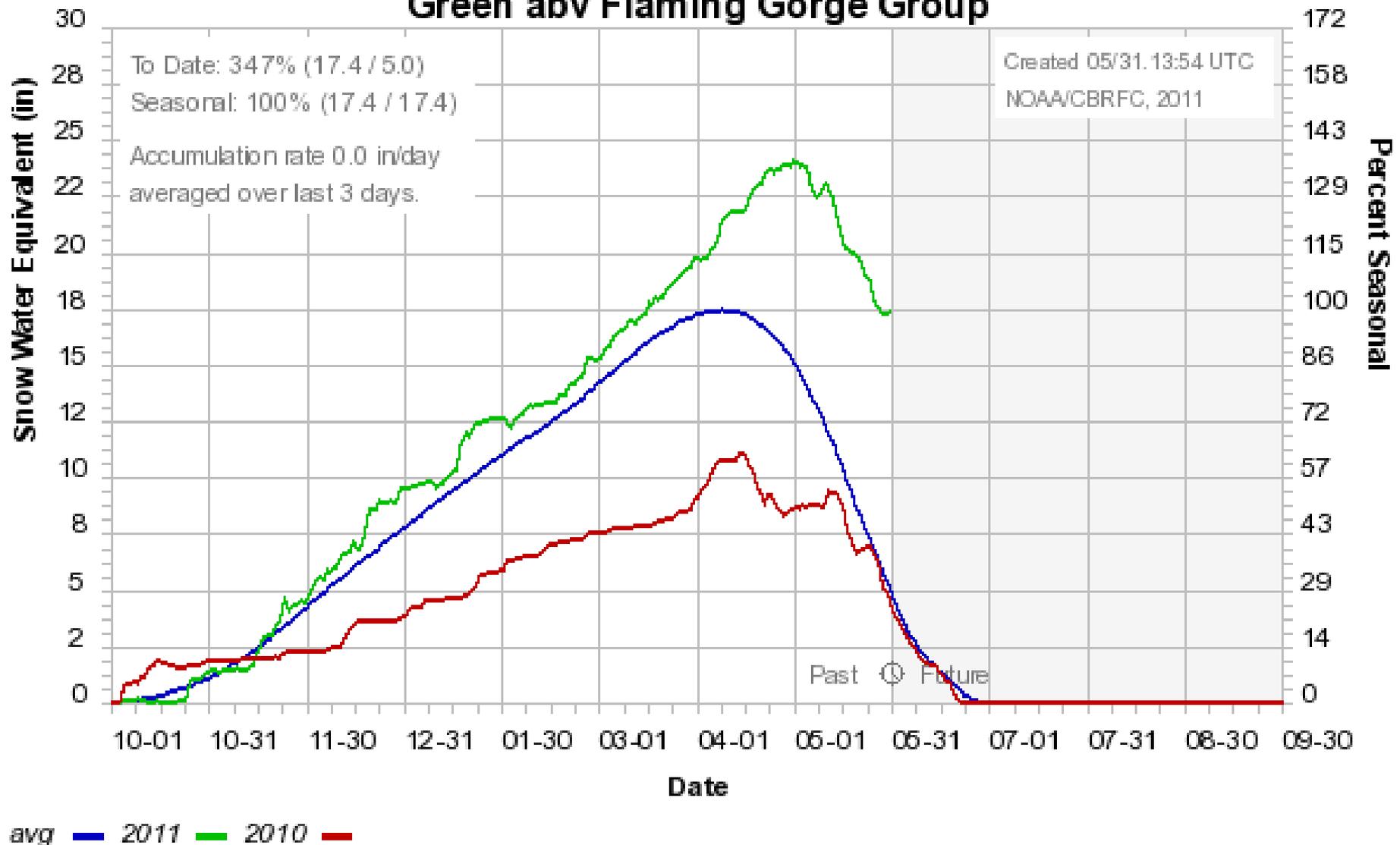
- D4: 0 - 2
- D3: 3 - 5
- D2: 6 - 10
- D1: 11 - 20
- D0: 21 - 30
- Uncategorized: 31 - 40
- Uncategorized: 41 - 50
- Uncategorized: 51 - 60
- Uncategorized: 61 - 70
- Uncategorized: 71 - 80
- Uncategorized: 81 - 90
- Uncategorized: 91 - 100

Upper Colorado River Basin Snow



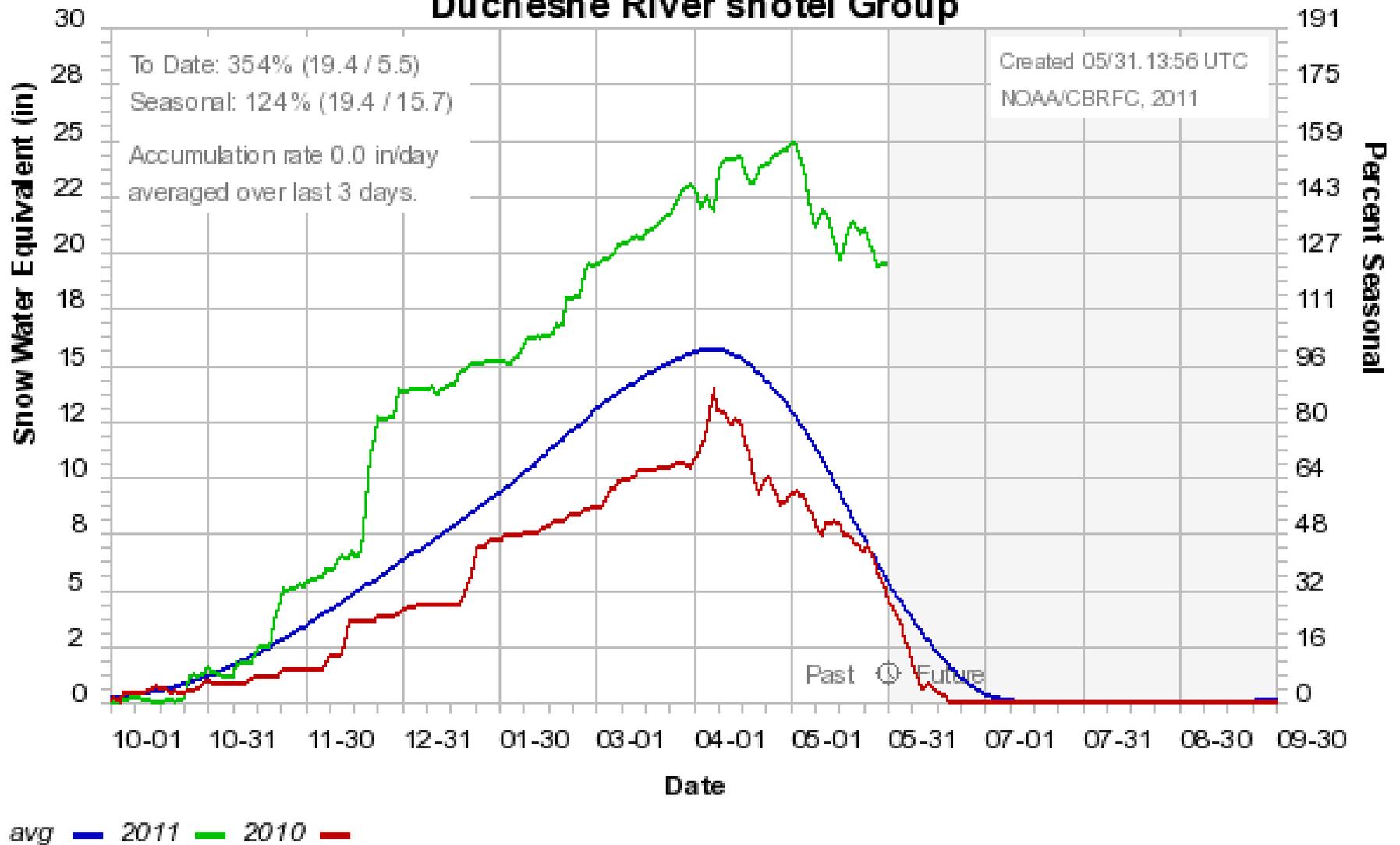
Colorado Basin River Forecast Center

Green abv Flaming Gorge Group



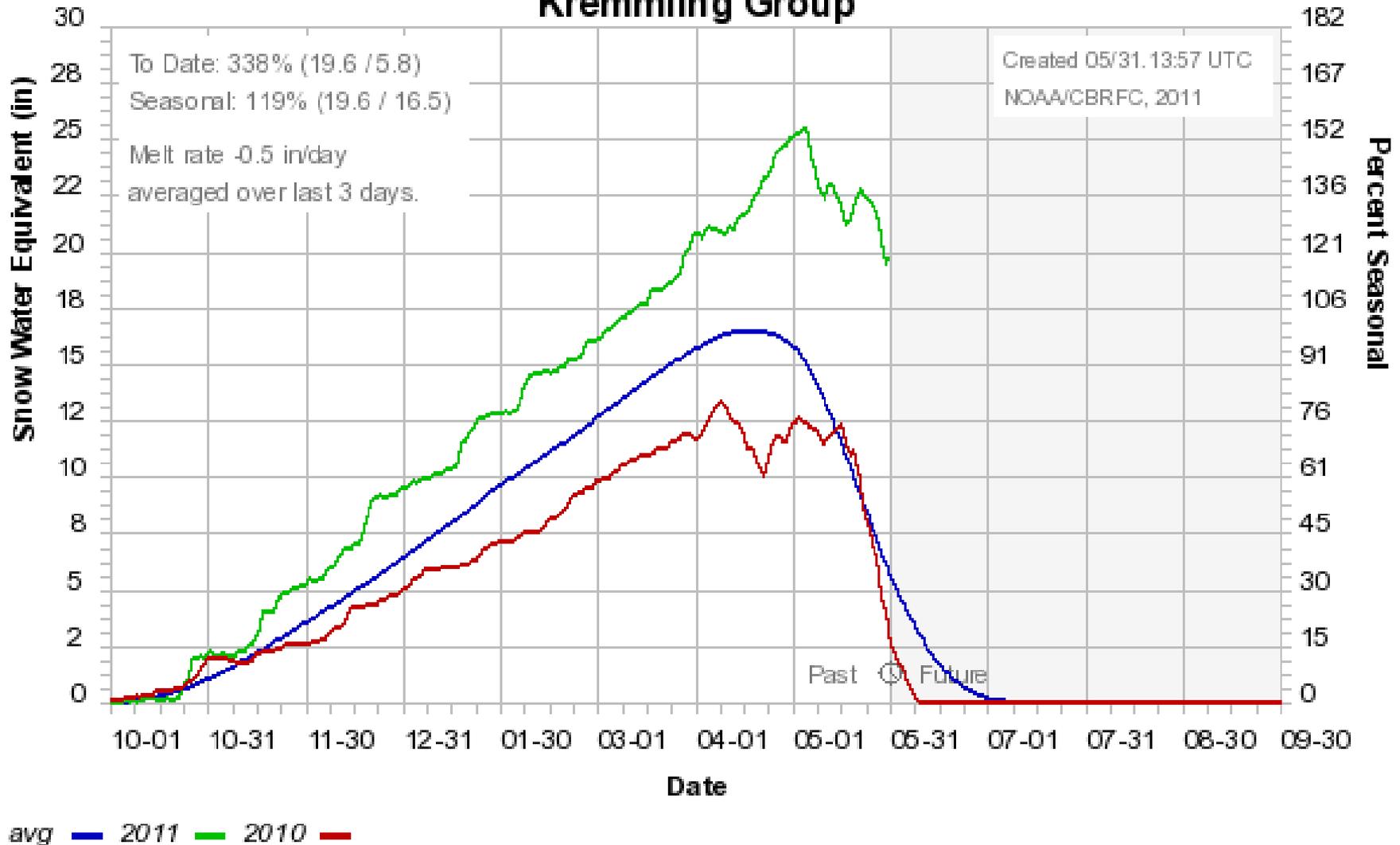
Snowpack % of average to date: 347%
Percent of average peak: 100%

Colorado Basin River Forecast Center Duchesne River snotel Group



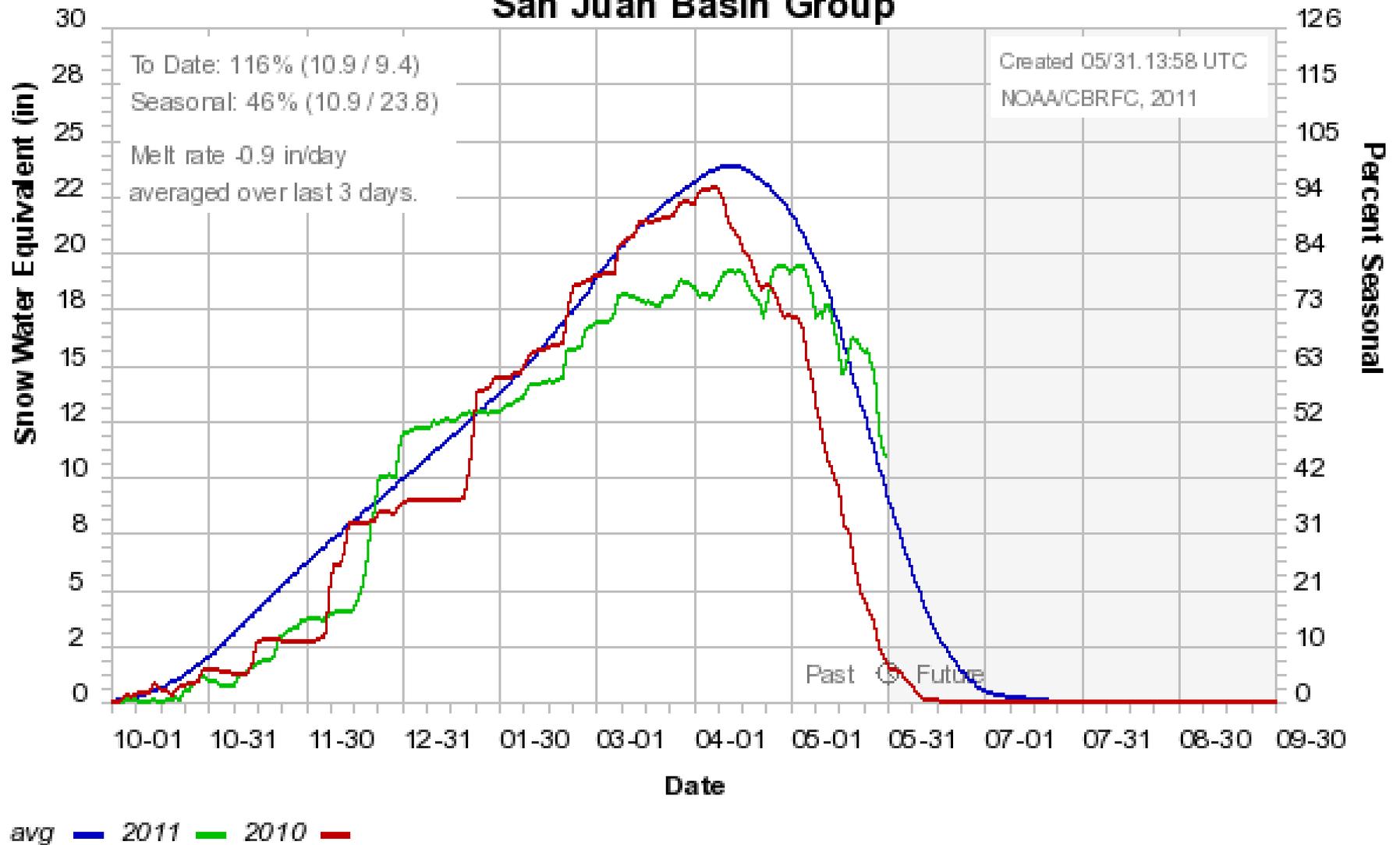
Snowpack % of average to date: 354%
Percent of average peak: 124%

Colorado Basin River Forecast Center Kremmling Group



Snowpack % of average to date: 338%
Percent of average peak: 119%

Colorado Basin River Forecast Center San Juan Basin Group



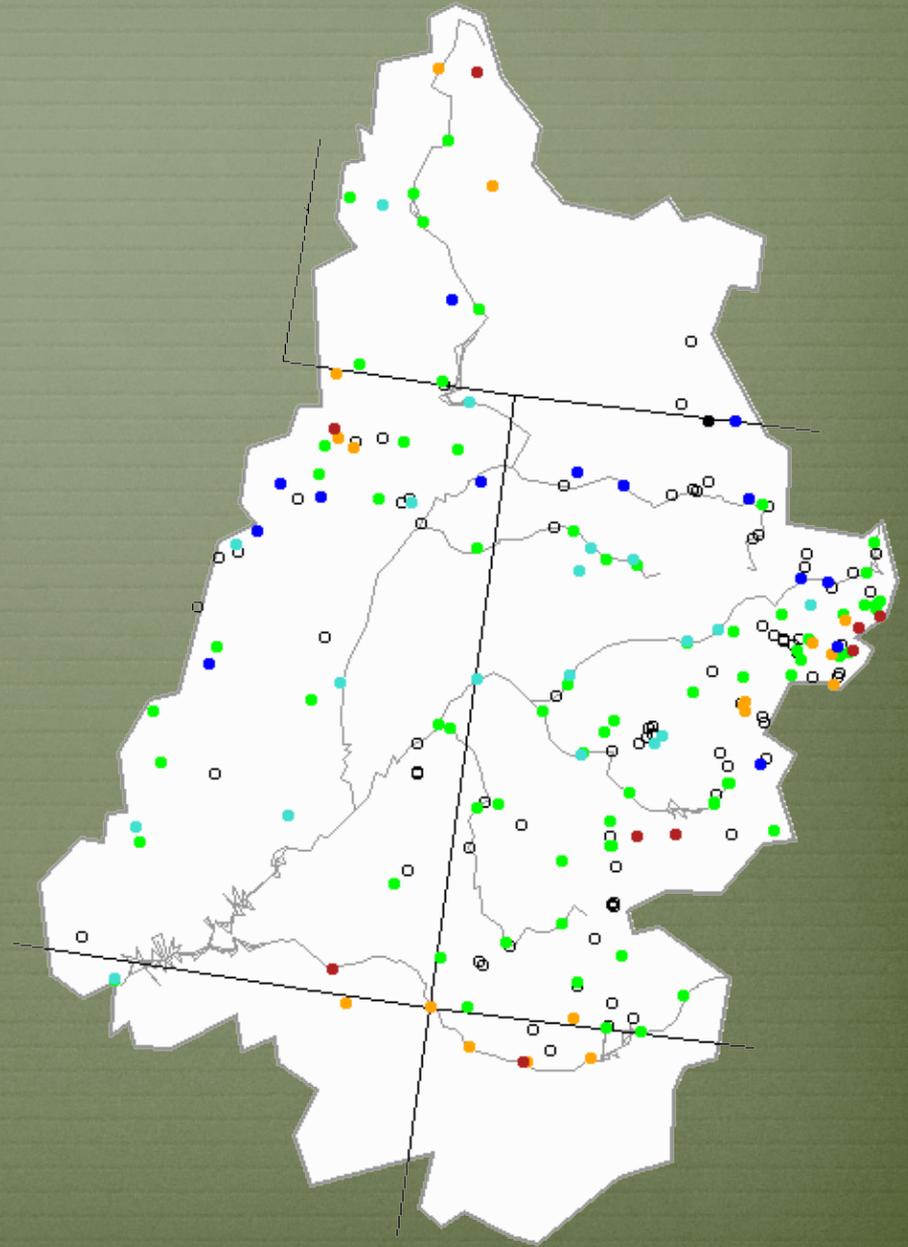
Snowpack % of average to date: 116%
Percent of average peak: 46%

Streamflow Update

Michael Lewis USGS



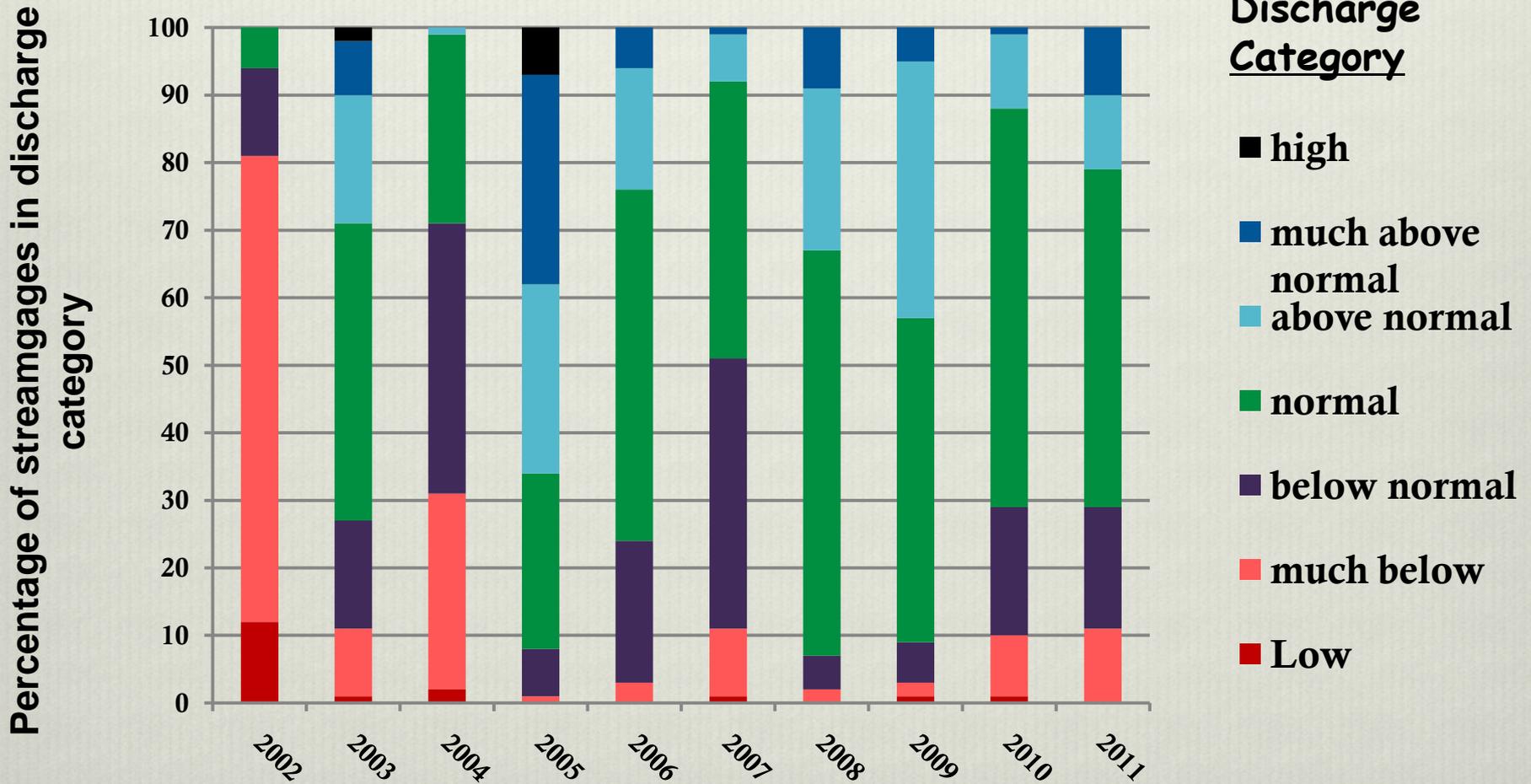
7-day average discharge compared to historical discharge for the day of the year (May 30th)

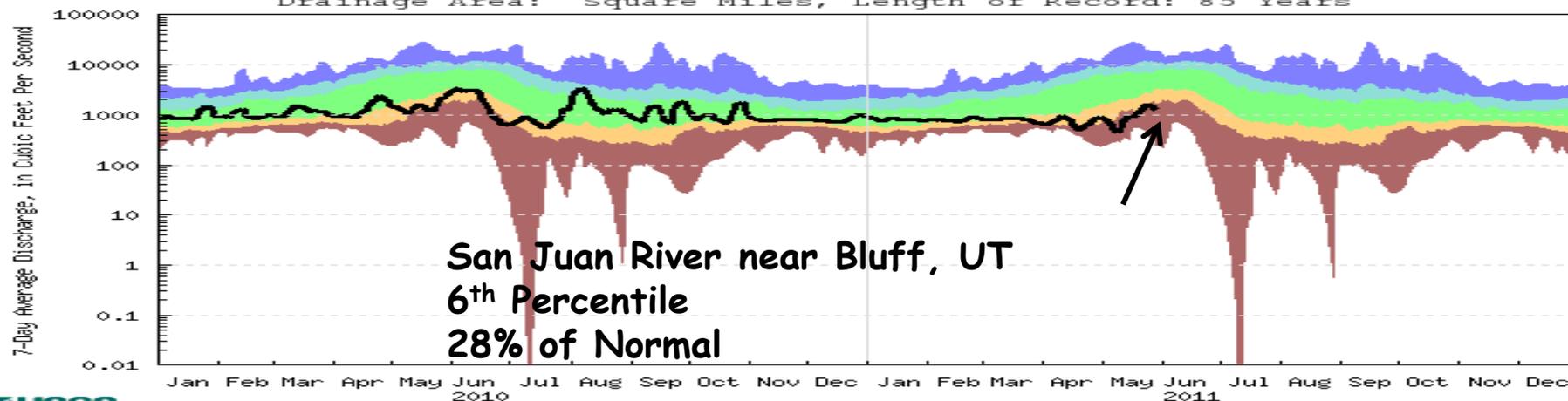
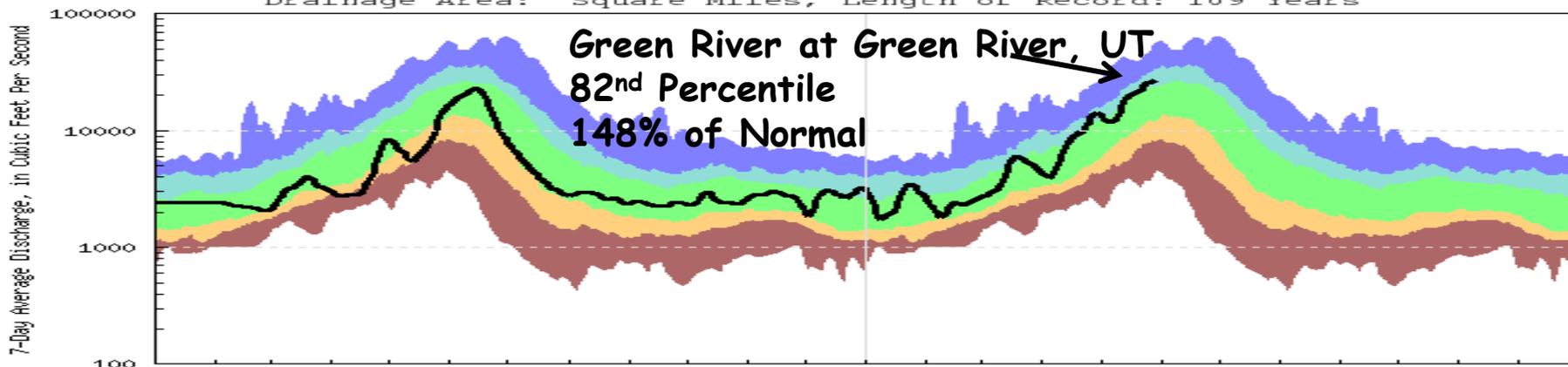
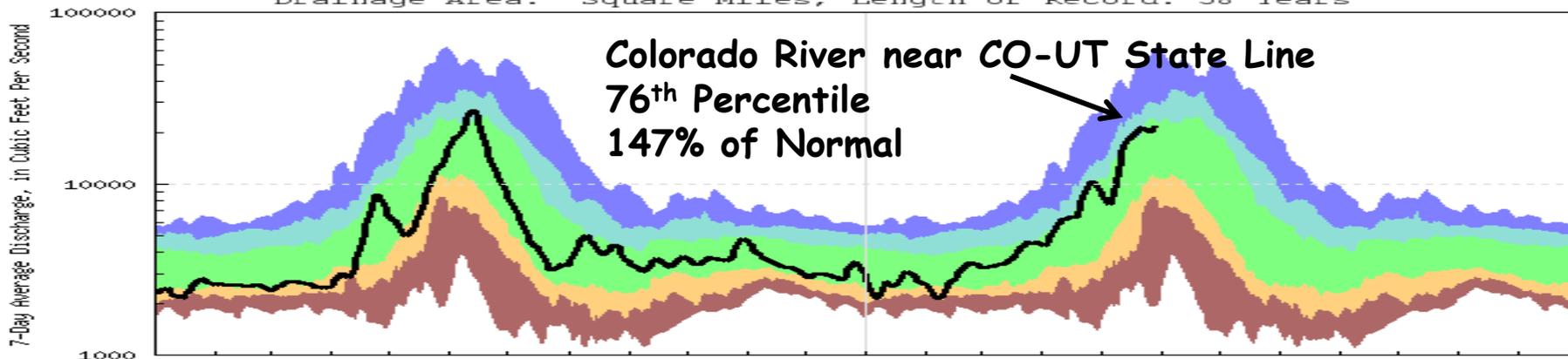


Explanation - Percentile classes

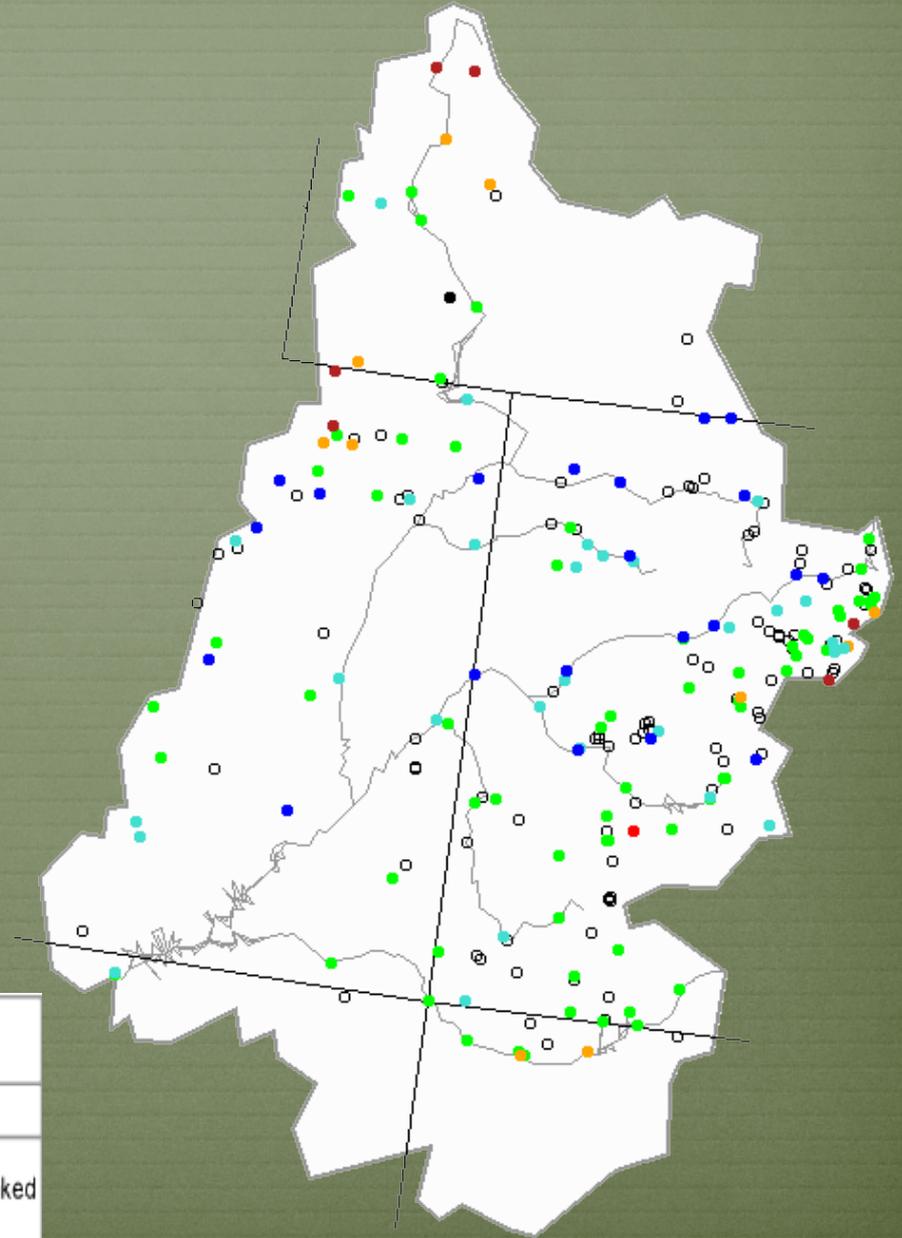
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

-Upper Colorado River Basin- Comparison of 7-day Average Discharge For May 29, 2002-2011





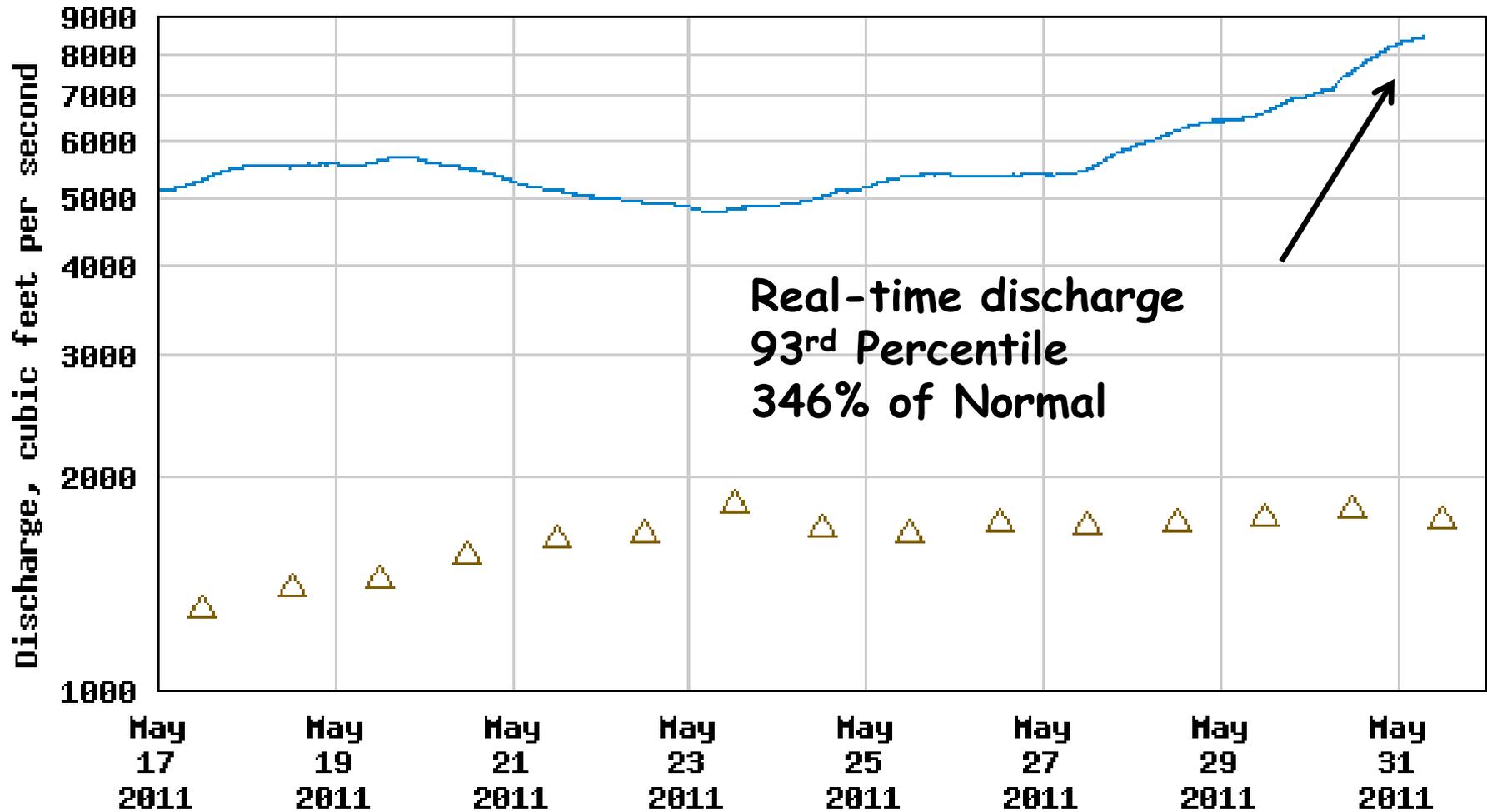
Real-time discharge compared to historical discharge for the day of the year (May 31)



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		

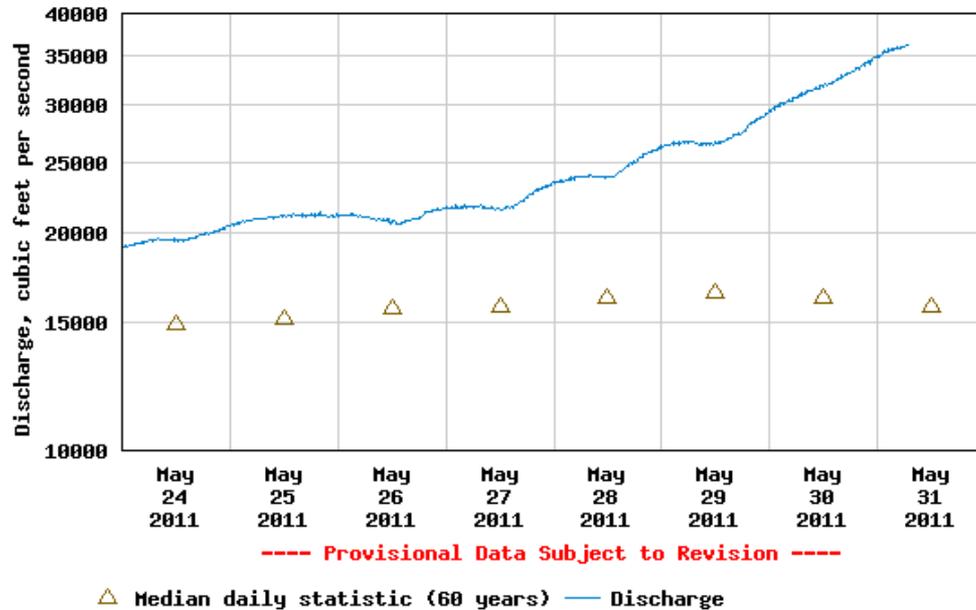
USGS 09058000 COLORADO RIVER NEAR KREMMLING, CO



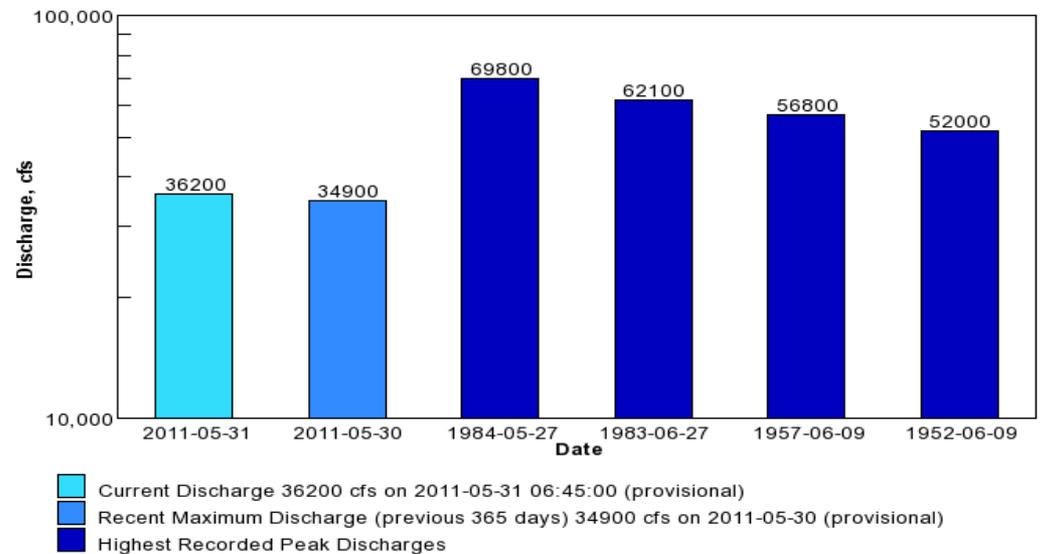
---- Provisional Data Subject to Revision ----

△ Median daily statistic (48 years) — Discharge

USGS 09163500 COLORADO RIVER NEAR COLORADO-UTAH STATE LINE



09163500 COLORADO RIVER NEAR COLORADO-UTAH STATE LINE



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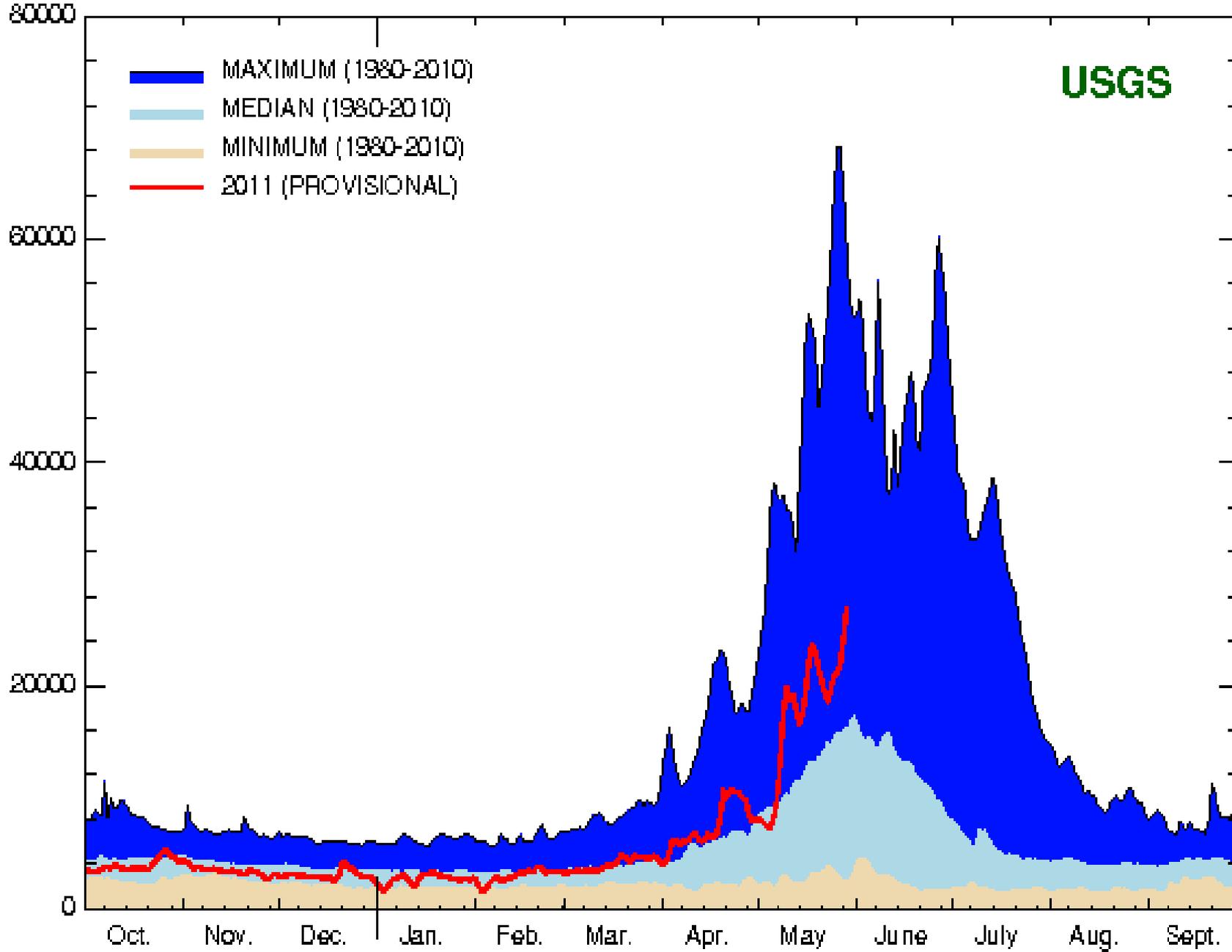
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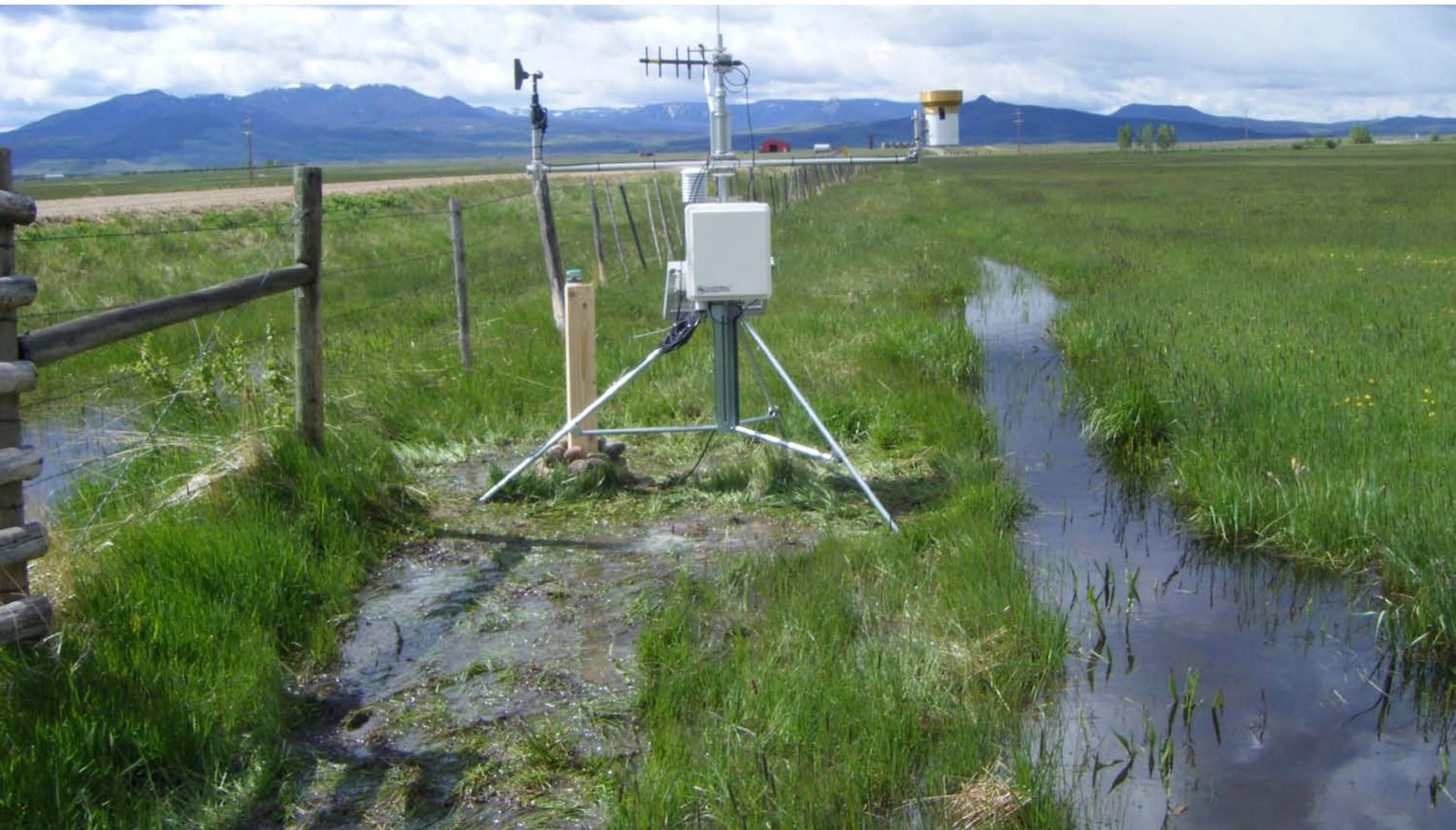
USGS

- MAXIMUM (1980-2010)
- MEDIAN (1980-2010)
- MINIMUM (1980-2010)
- 2011 (PROVISIONAL)

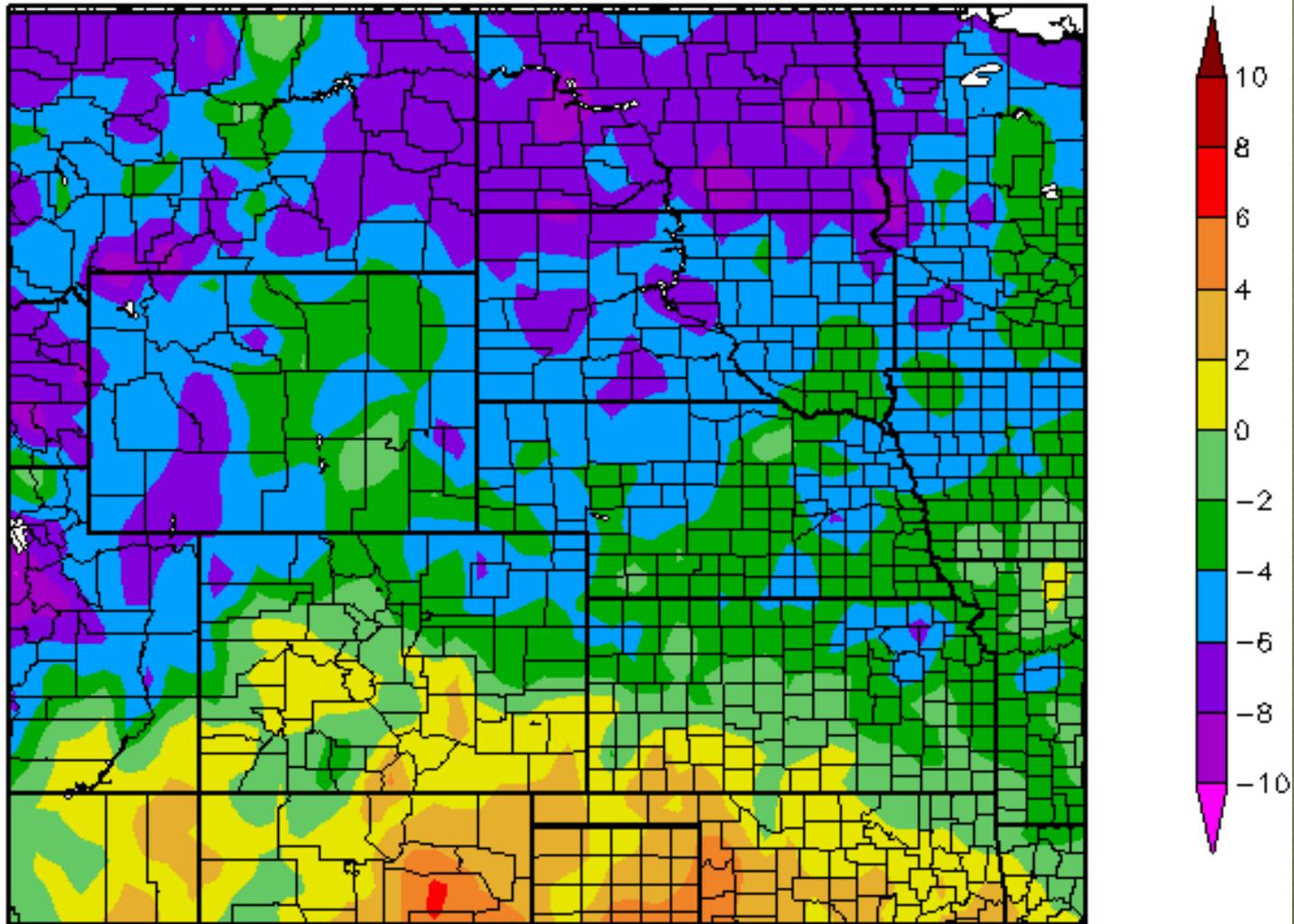


COLORADO RIVER NEAR COLORADO-UTAH STATELINE

Water Demand

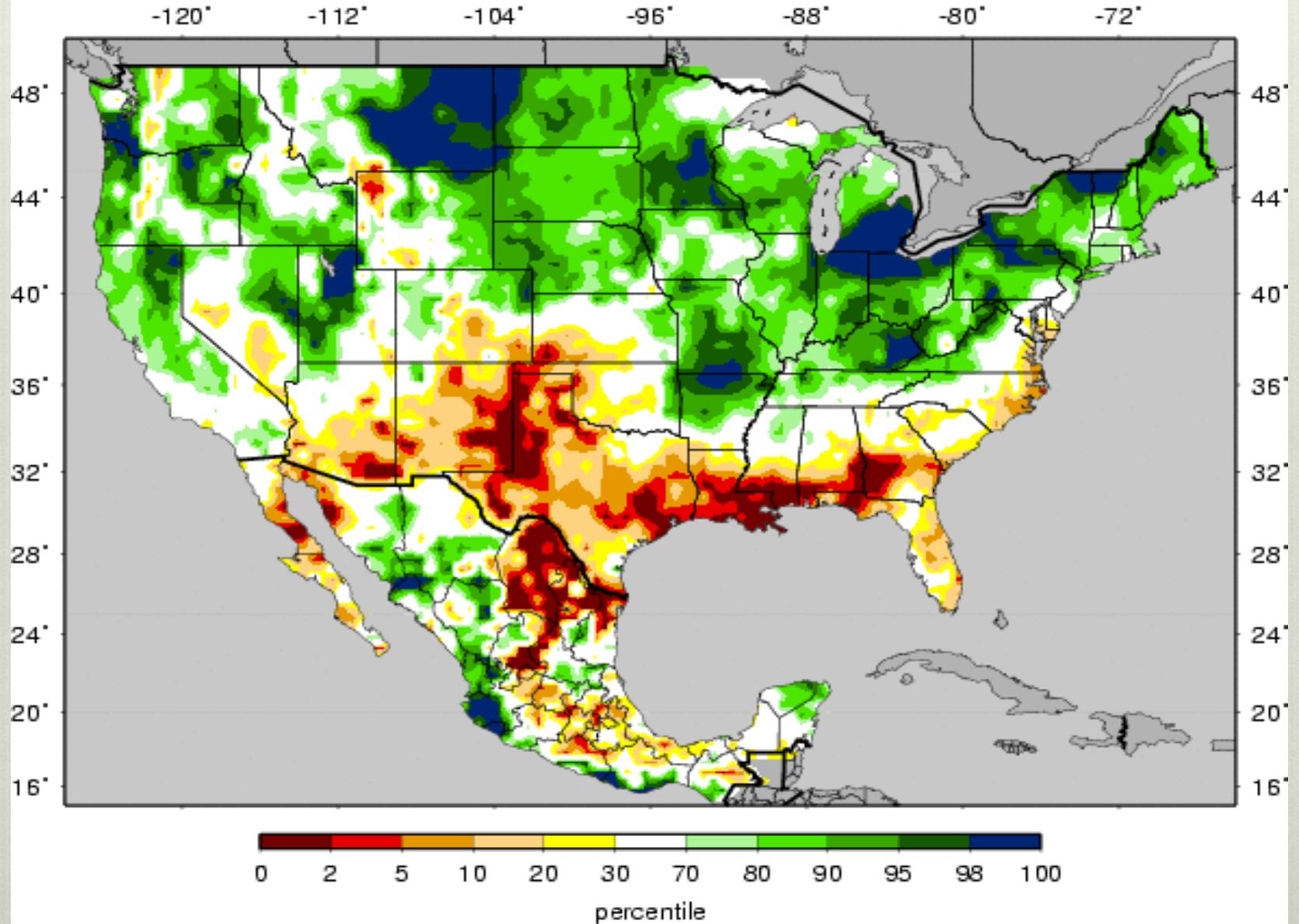


Temperature Departure from Normal 05/23/2011 – 05/29/2011



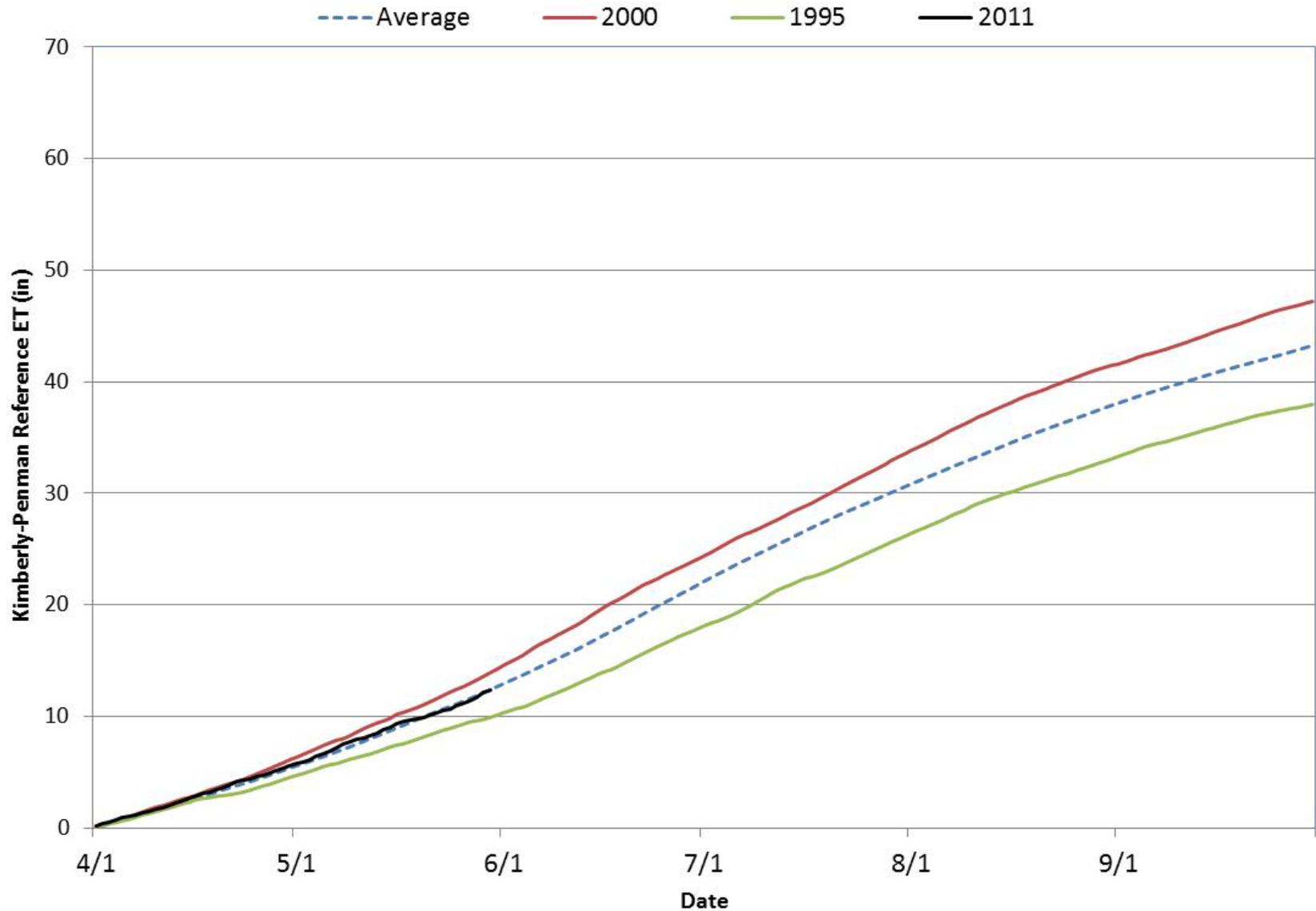
VIC Soil Moisture - 29 May 2011

VIC Soil Moisture Percentiles (wrt/ 1916-2004)
20110529



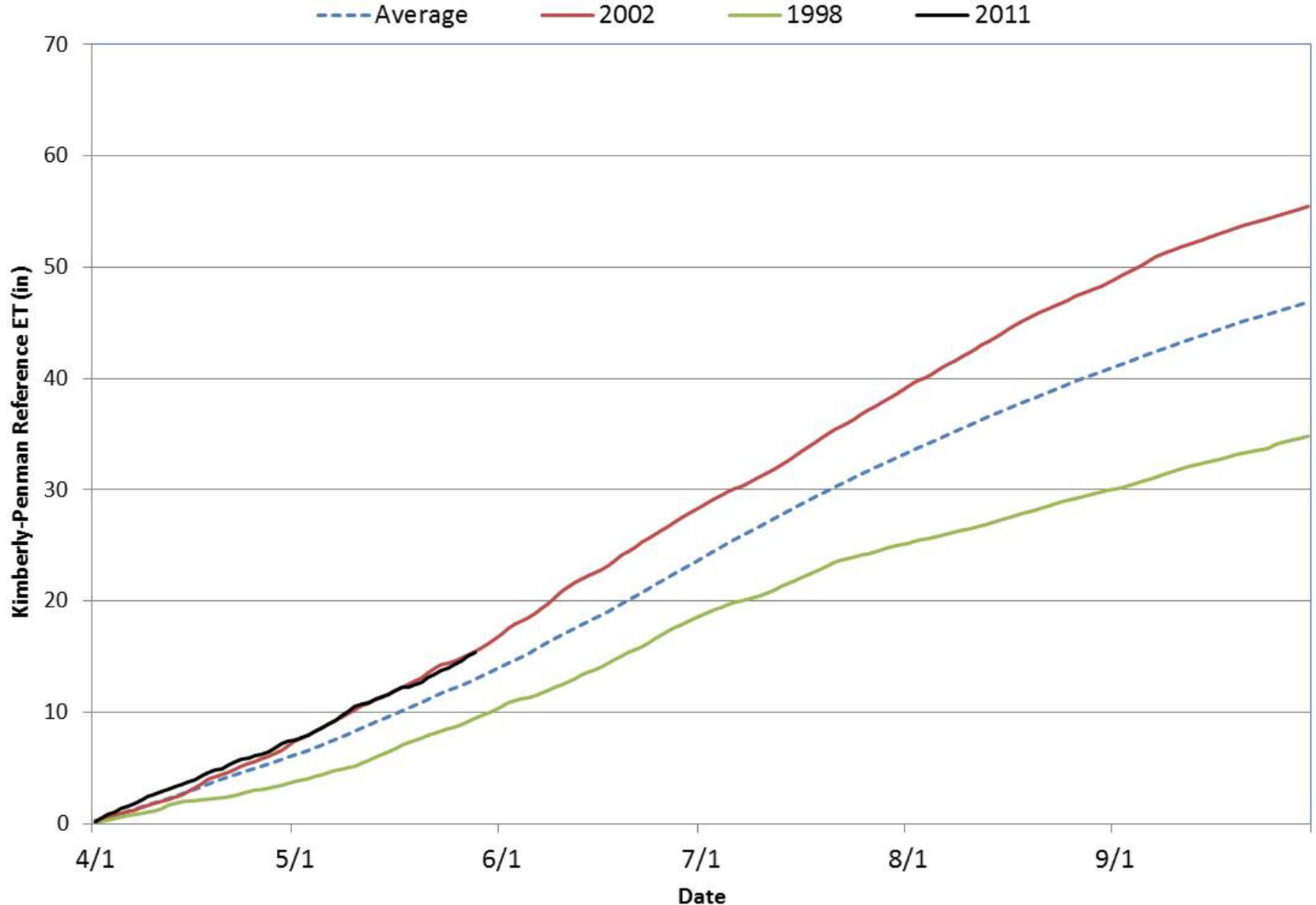
Cortez Reference ET

CTZ01 Kimberly-Penman Reference ET (1992 - 2011)



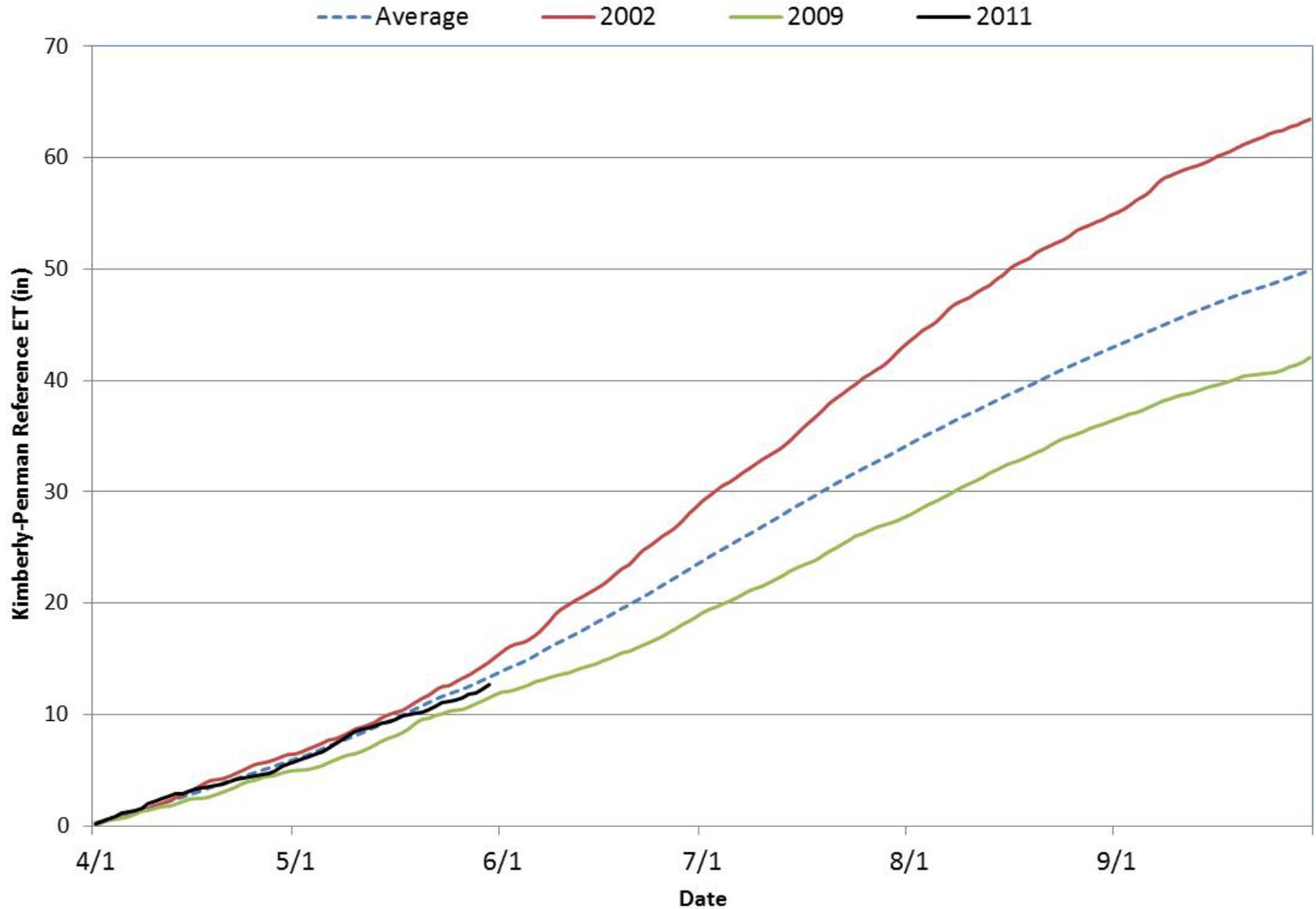
Avondale Reference ET

AVN01 Kimberly-Penman Reference ET (1993 - 2011)



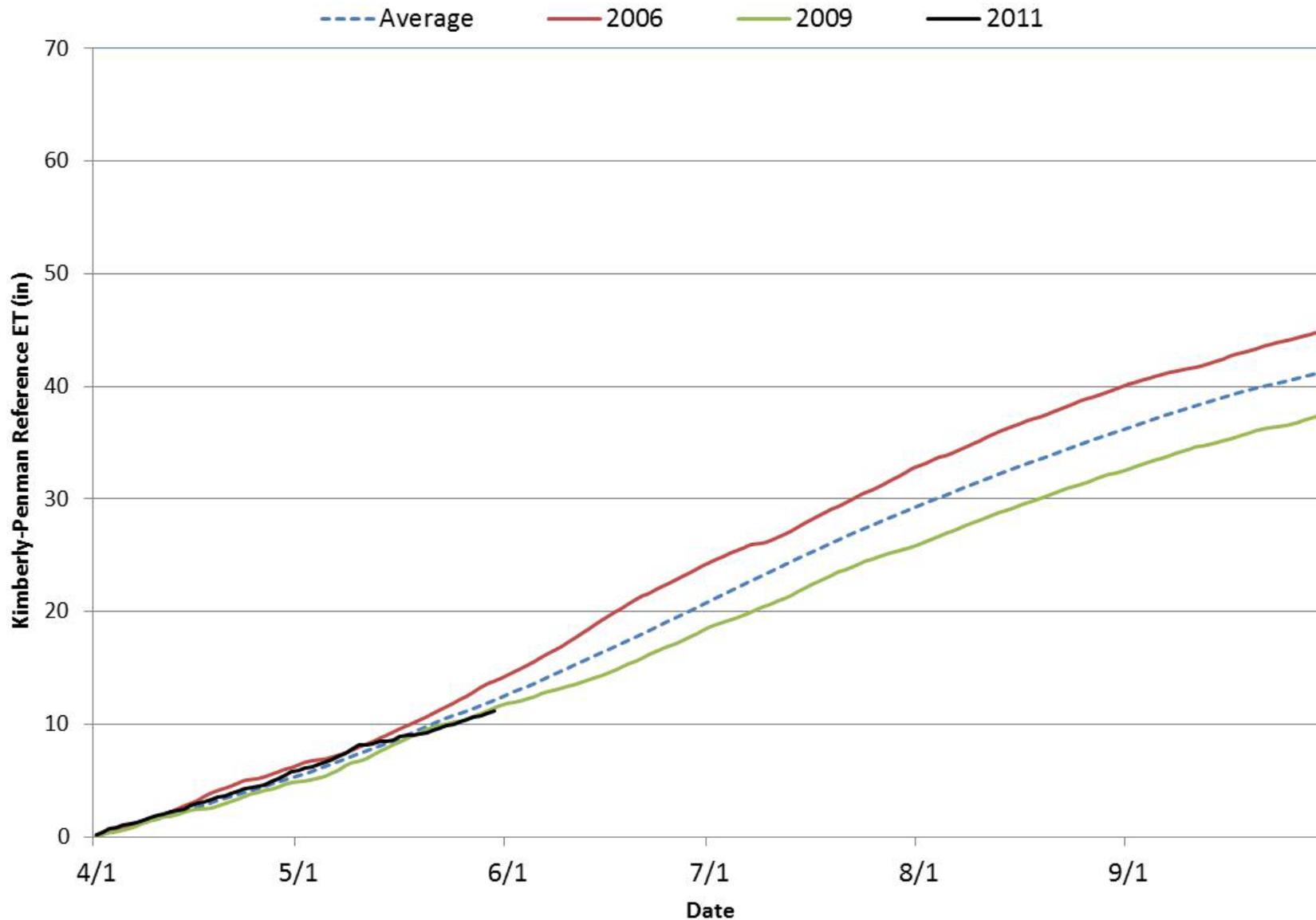
Idalia Reference ET

IDL01 Kimberly-Penman Reference ET (1992 - 2011)



Lucerne Reference ET

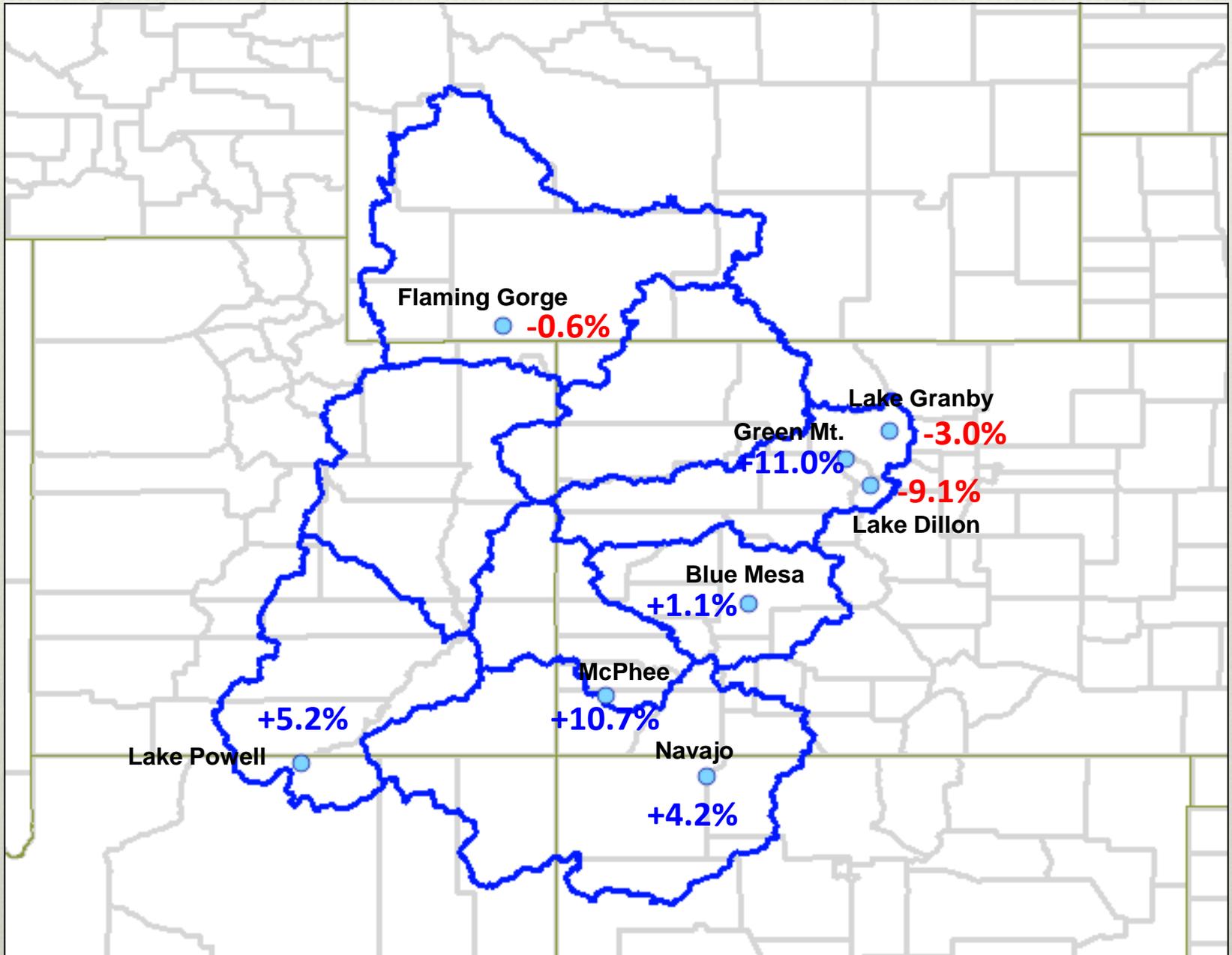
LCN01 Kimberly-Penman Reference ET (1992 - 2011)



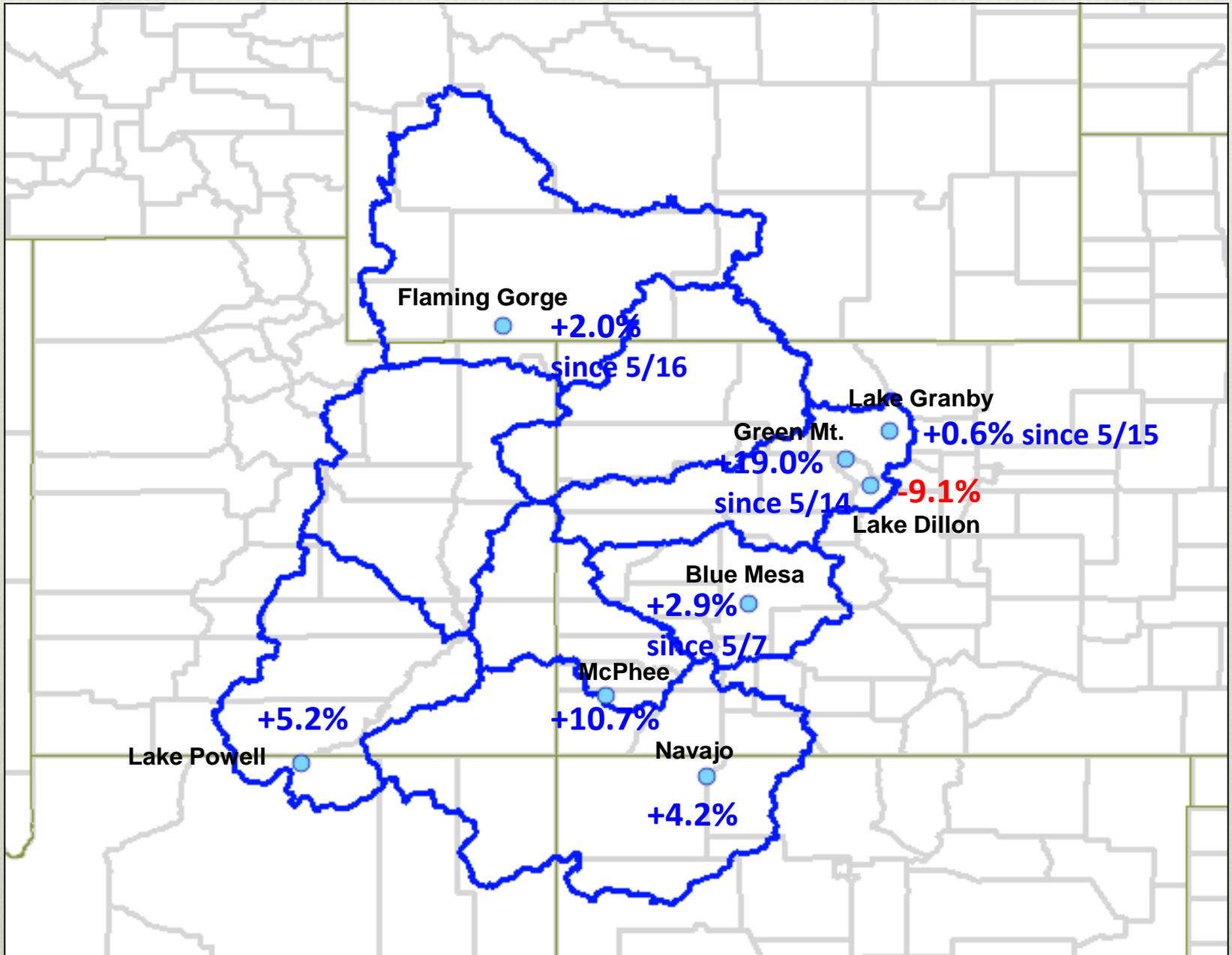
Reservoir Update



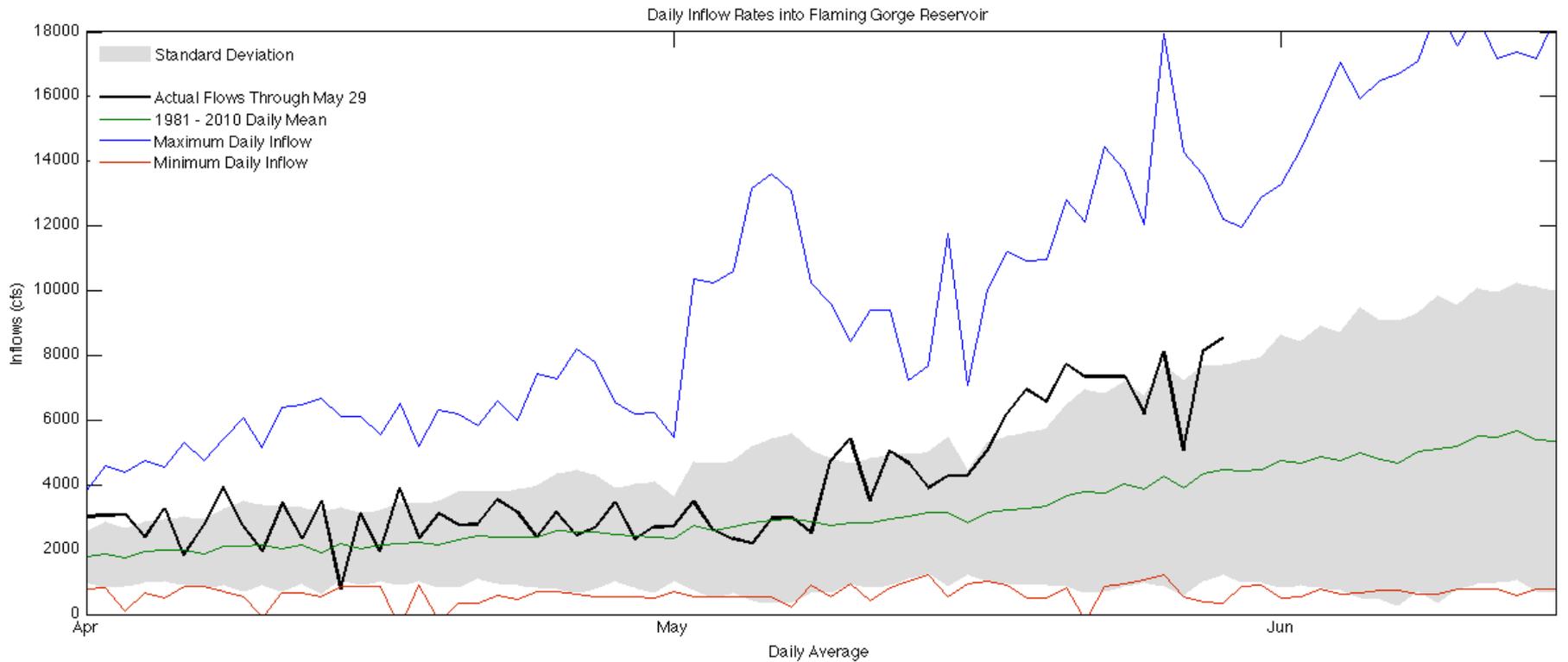
Reservoir Level Month-to-Date Change



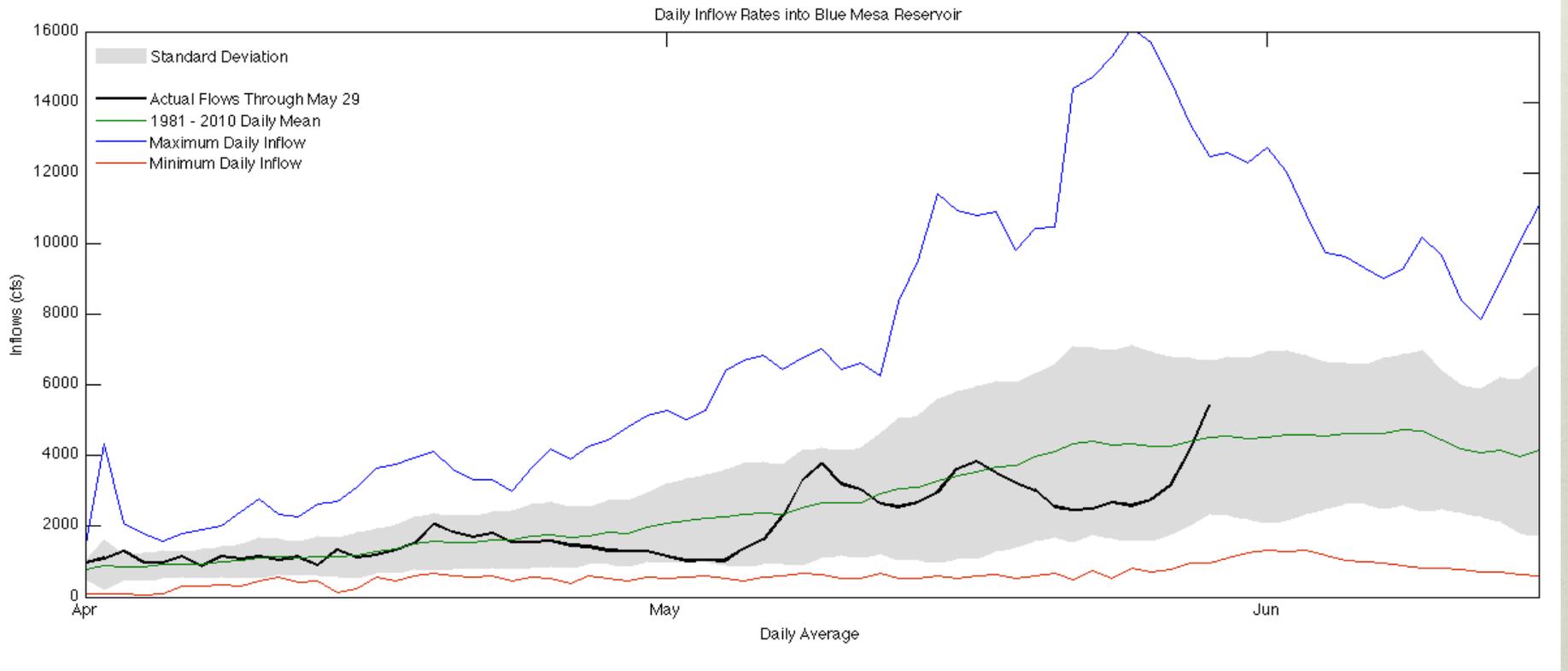
Reservoir Level Changes from May Minimum



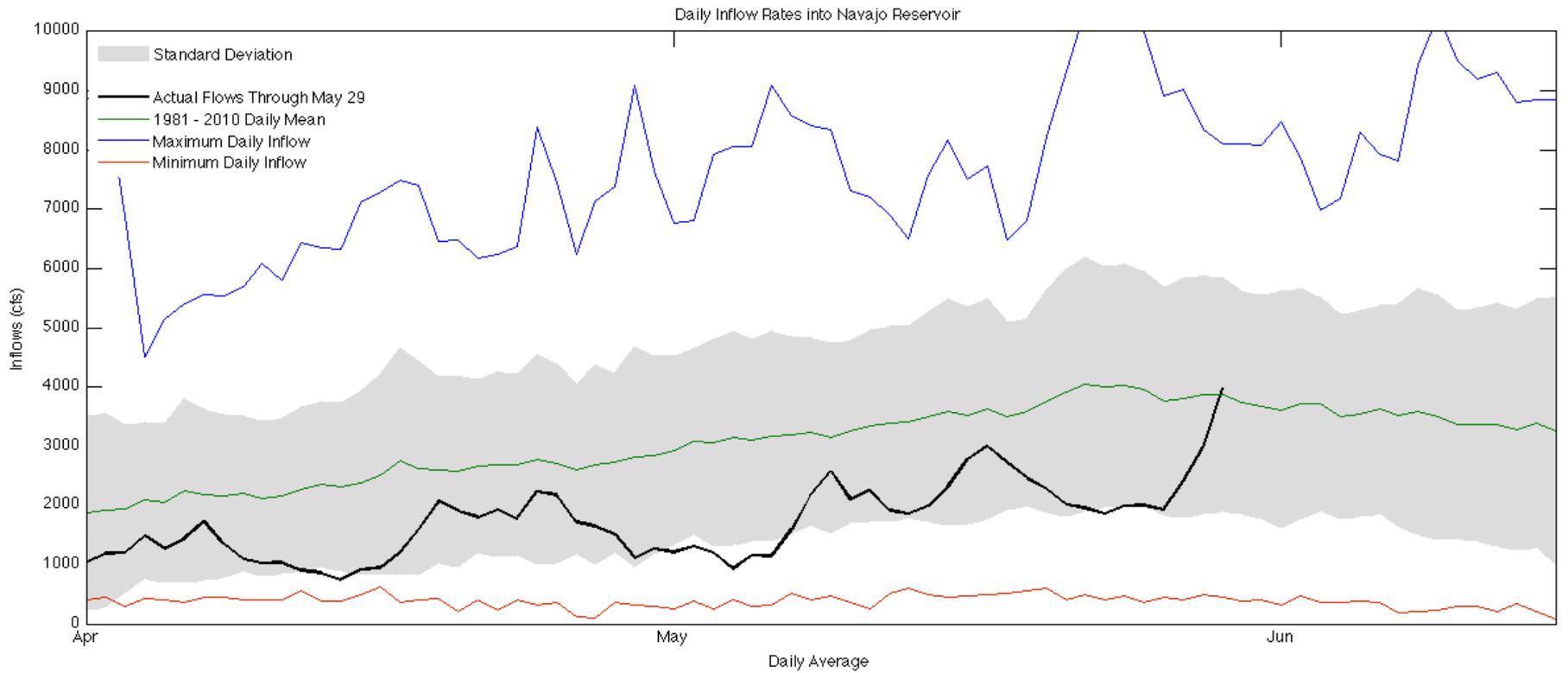
Flaming Gorge Reservoir Inflows as of 5/29/2011



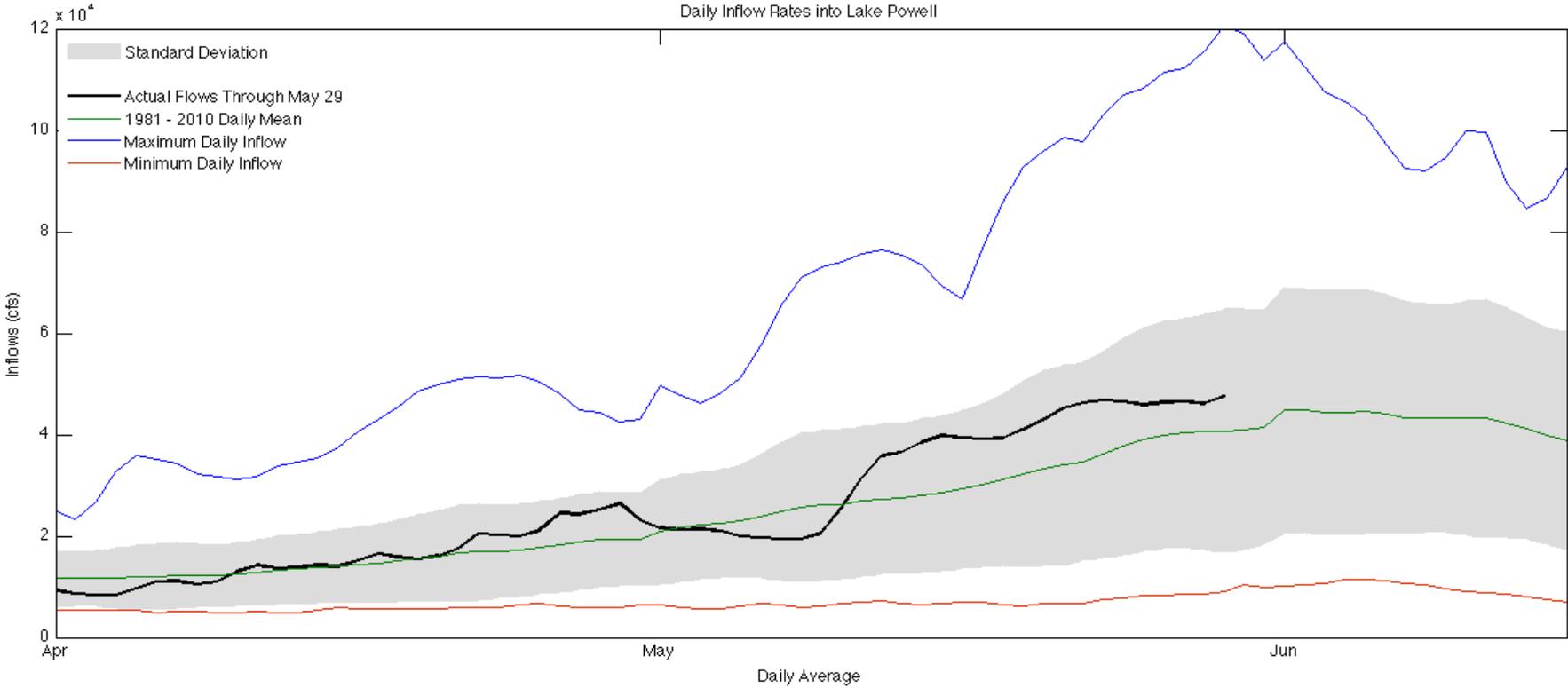
Blue Mesa Reservoir Inflows as of 5/29/2011



Navajo Reservoir Inflows as of 5/29/2011

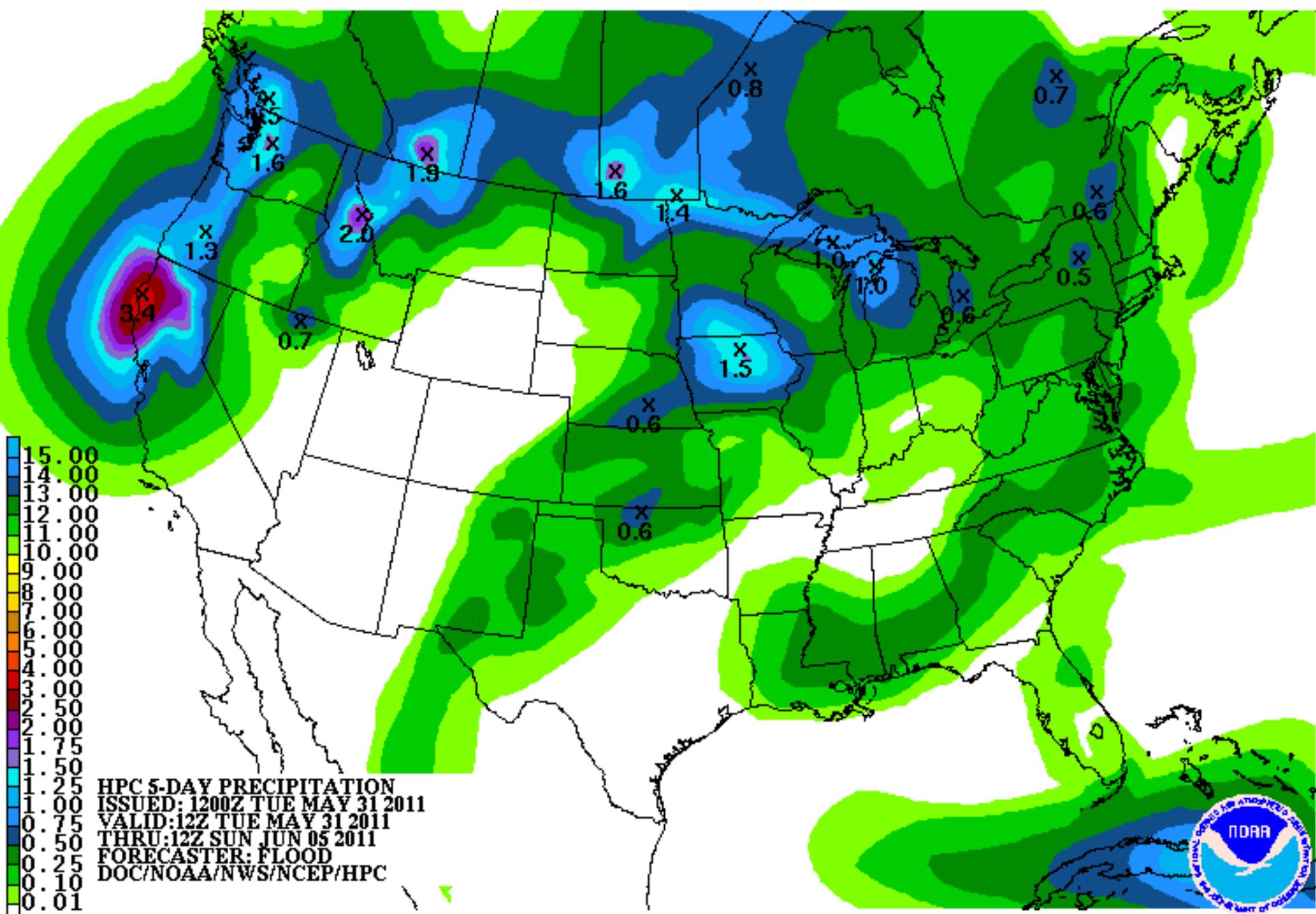


Lake Powell Inflows as of 5/29/2011

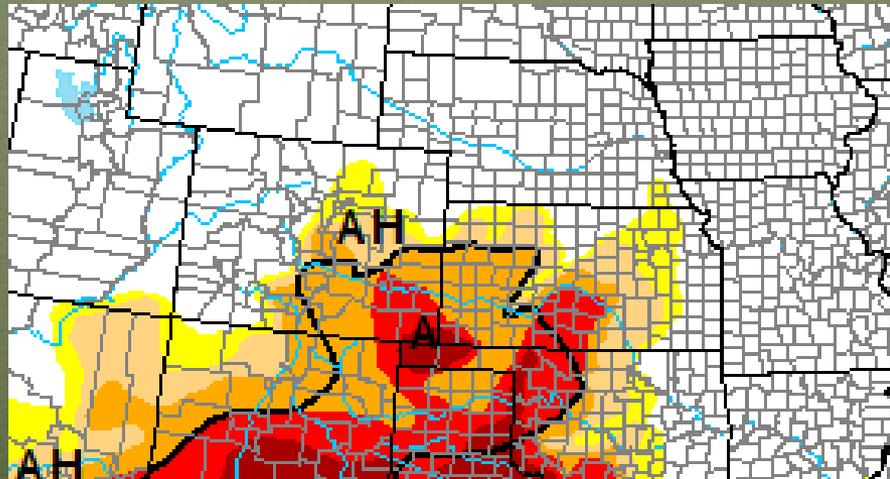
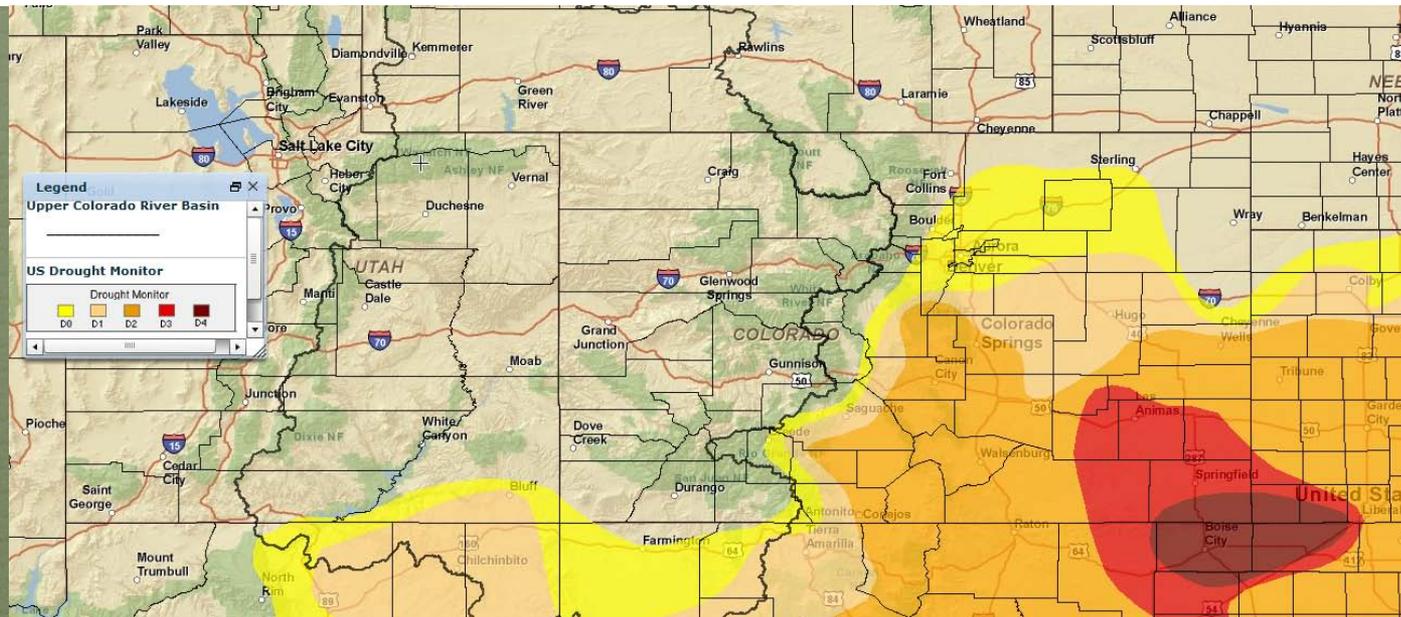


Precipitation Forecast





Recommendations



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NIDIS - UPPER COLORADO BASIN PILOT PROJECT

F o r m o r e i n f o r m a t i o n

NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

May 31, 2011

Precipitation and Snowpack

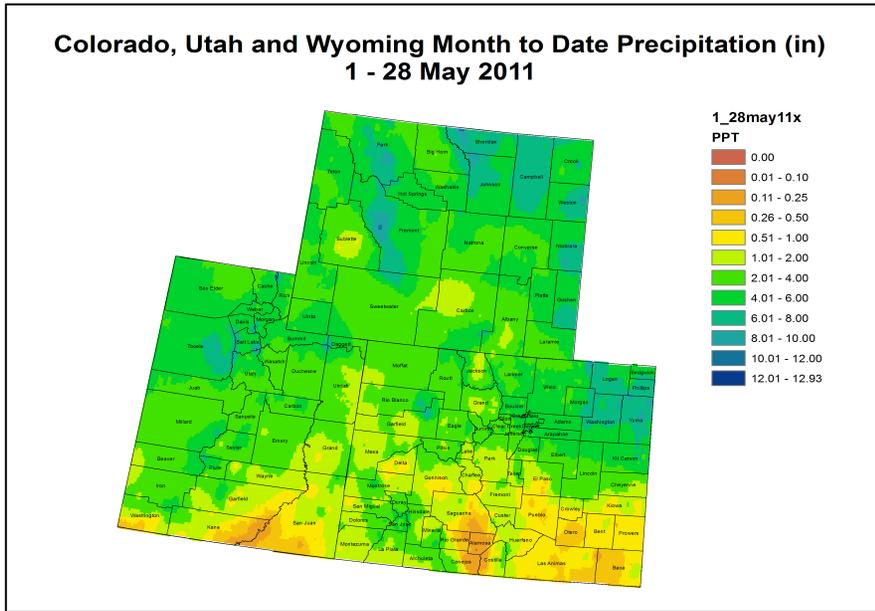


Fig. 1: May month-to-date precipitation in inches.

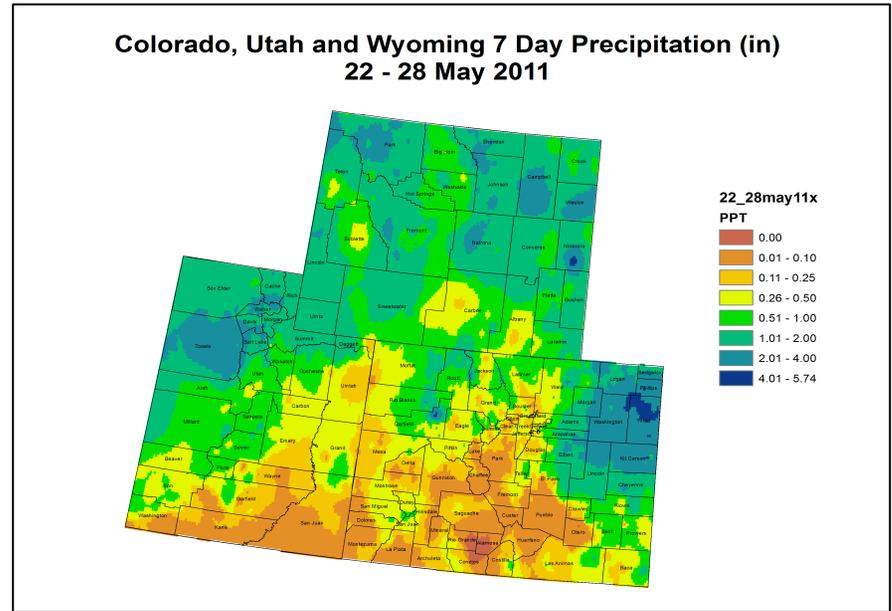


Fig. 2: May 22 – 28 precipitation in inches.

For the month of May, most of the Upper Colorado River Basin (UCRB) has received an inch or more of precipitation (Fig. 1). The higher elevations received around 2 to 6 inches of moisture while the valleys received lower amounts. Northeast CO has received between 4 and 8 inches of precipitation since the beginning of the month. Southern UT, southeastern CO and the San Luis Valley have been much drier, receiving less than an inch of moisture for the month.

Last week, the heaviest precipitation fell east of the UCRB (Fig. 2). Many counties in northeast CO saw about 1 to 4 inches of precipitation. Some of that beneficial moisture did extend further south into the drier regions of the Arkansas basin. The east side of the basin received over half an inch of precipitation while the west side of the basin remained drier, accumulating less than a tenth of an inch. The San Luis Valley and the southern portion of the UCRB were also drier, mostly receiving less than a quarter inch of moisture. The northern portion of the UCRB received around a half inch or more of precipitation for the week.

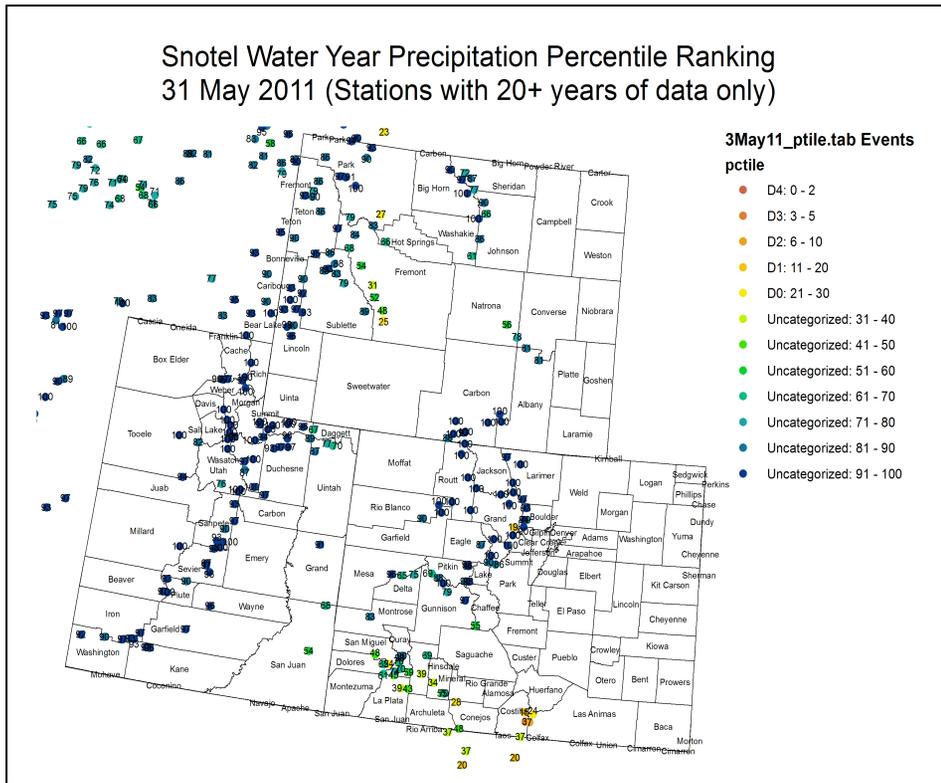


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21-30% is Drought Monitor's D0 category).

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. Some of the sites in the Upper Rio Grande basin are showing percentiles below 30% (meaning that 70% of the years have been wetter).

Snowpack around most of the UCRB is much above average (Fig. 4). Snowpack for the entire basin above Lake Powell was 223% of average as of May 26th, largely due to a later than average snowmelt season combined with higher than average seasonal snow accumulations. The Upper Green basin, the Upper Colorado above Kremmling, and the Duchesne basin surpassed their seasonal peak accumulations and peaked later than average, while the San Juan basin never reached its average seasonal peak.

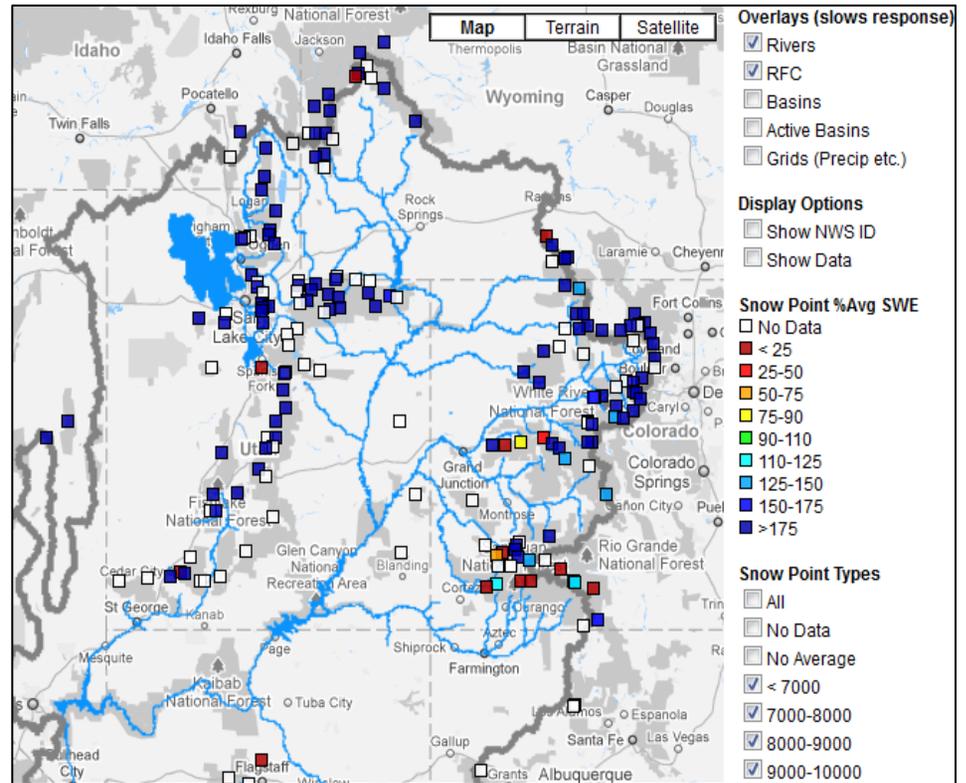
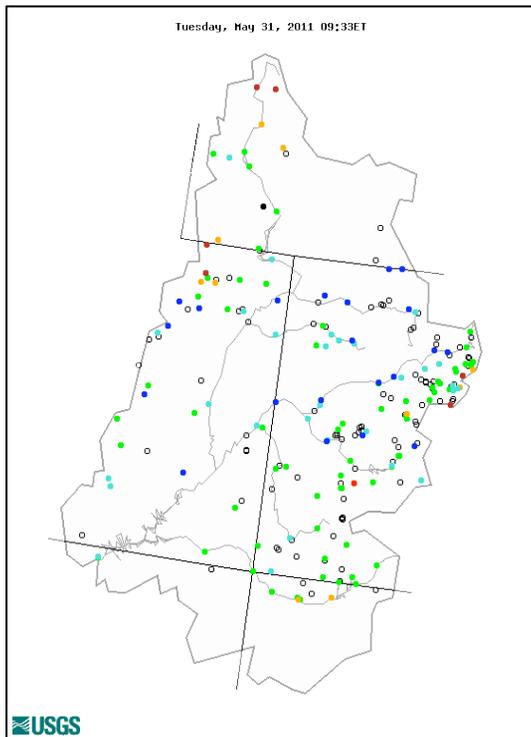


Fig. 4: SNOTEL WYTD accumulated snow water equivalent as a percent of average.

Streamflow

As of May 23rd, about 71% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows. The recent warming is evident when looking at real-time streamflow which shows many more sites near or above normal (Fig. 5). Many gages in the northern part of the UCRB, including the Colorado River near Kremmling, CO are very near flood-stage with a significant portion of their snowmelt still to come.

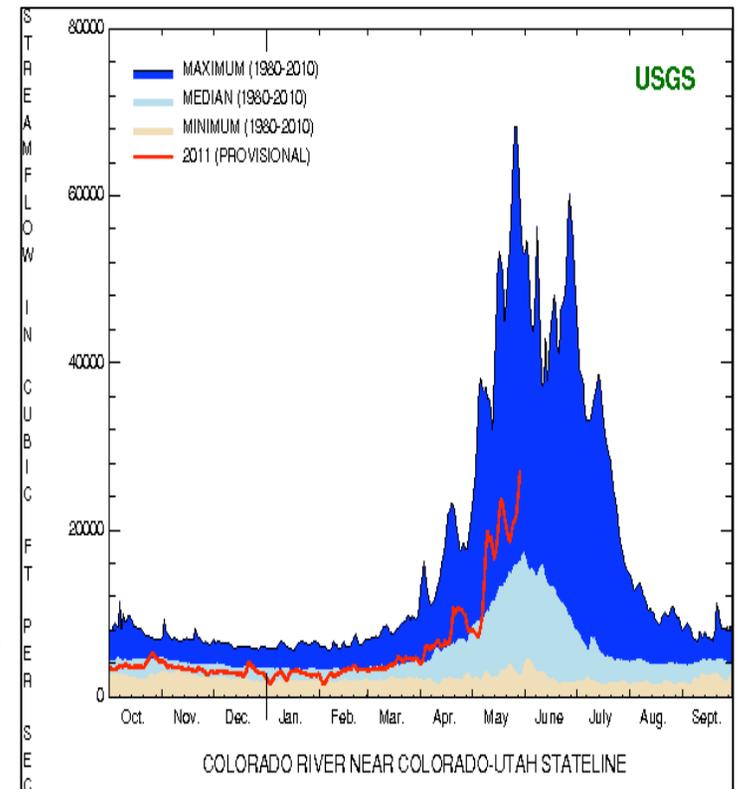
The San Juan River has been showing improved streamflow conditions. This is mostly due to local runoff in the Animas basin, since releases from Navajo Reservoir still have not begun. Cumulative runoff on the Colorado River near the CO-UT state line shows well above normal accumulations (Fig. 6). Though significant snowmelt has only recently begun there, accumulations are already well past the normal peak runoff for the season.



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		

Fig. 5: USGS real-time streamflow compared to historical streamflow for May 31st in the UCRB.

Fig. 6: USGS cumulative runoff for the water year on the Colorado River near the CO-UT state line.



Water Supply and Demand

Last week, the northern part of the UCRB and northeastern plains saw below average temperatures while the Four Corners area and southeastern CO saw close to average or slightly above average temperatures. Soil moisture conditions remain poor for southeastern CO. Soils are above average along the Wasatch range in UT and have significantly improved over northeastern CO. At Avondale, CO (in the Arkansas basin) reference evapotranspiration is currently tracking along with the year of highest recorded ET, which was during the drought of 2002 (Fig. 7). At Lucerne, CO (in the South Platte basin), a sharp decrease in reference ET over the past month shows the recent cool, wet period that has virtually eliminated the drought in northeast CO (Fig. 8).

Due to delayed snowmelt (and cooler than average temperatures) in the higher elevations, many of the reservoirs in the northern UCRB have seen a delay in increased inflows. Storage volumes at Lake Dillon continue to decrease. Storage volumes at Flaming Gorge, Green Mountain and Lake Granby only began increasing in mid-May. Lake Powell, McPhee, and Navajo Reservoir storages (all in the southern portion of the basin) have all been increasing since April.

Precipitation Forecast

A pattern shift is imminent for the UCRB and surrounding areas as warmer temperatures and dry, windy conditions are likely to prevail for the next week. Temperatures are expected to be much above average for the remainder of the week with a chance for some convective storms later in the week. As a Pacific trough pushes the ridge further south, expect slightly cooler temperatures this weekend. This system brings little chance for moisture to the area, though models do show a slight possibility for precipitation in southeastern CO. A return to warm and dry conditions is expected for the early part of next week.

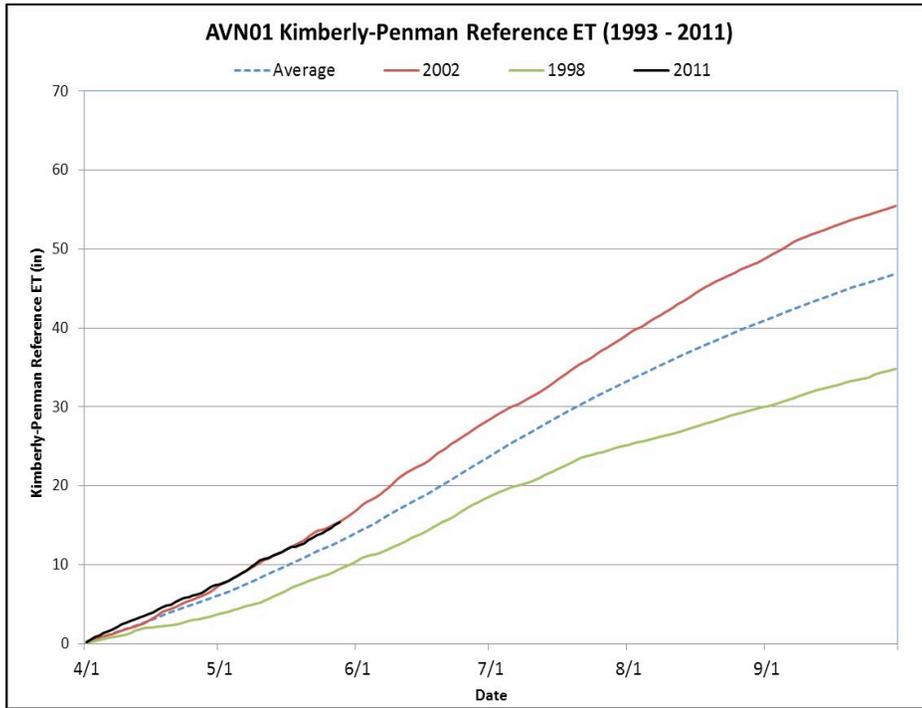


Fig. 7: Reference ET at Avondale, CO in the Arkansas basin since April 1st.

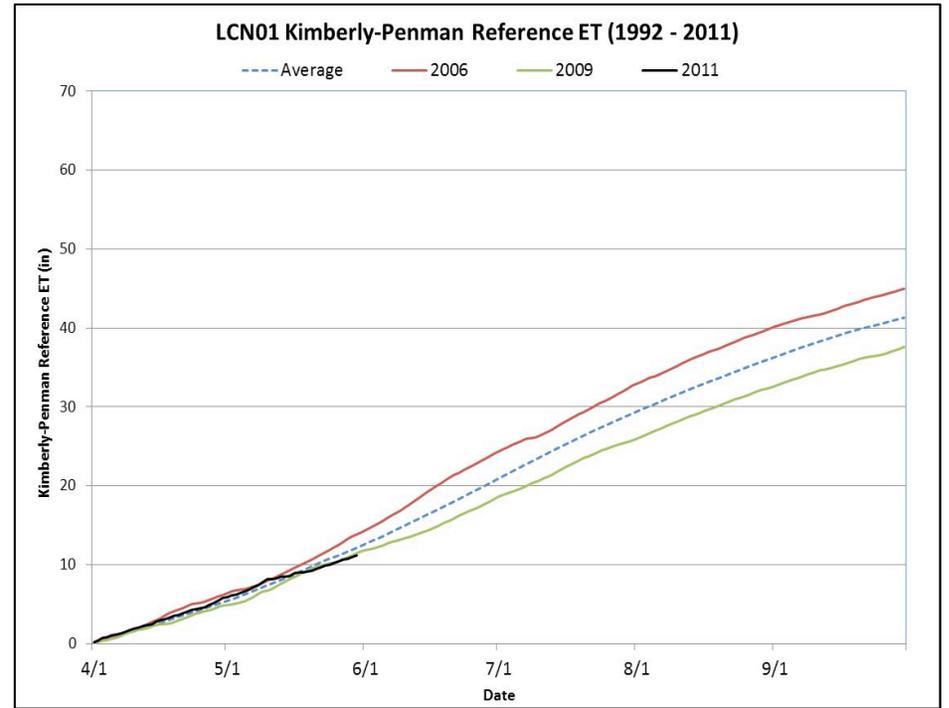


Fig. 8: Reference ET at Lucerne, CO in the South Platte basin since April 1st.

Drought and Water Discussion

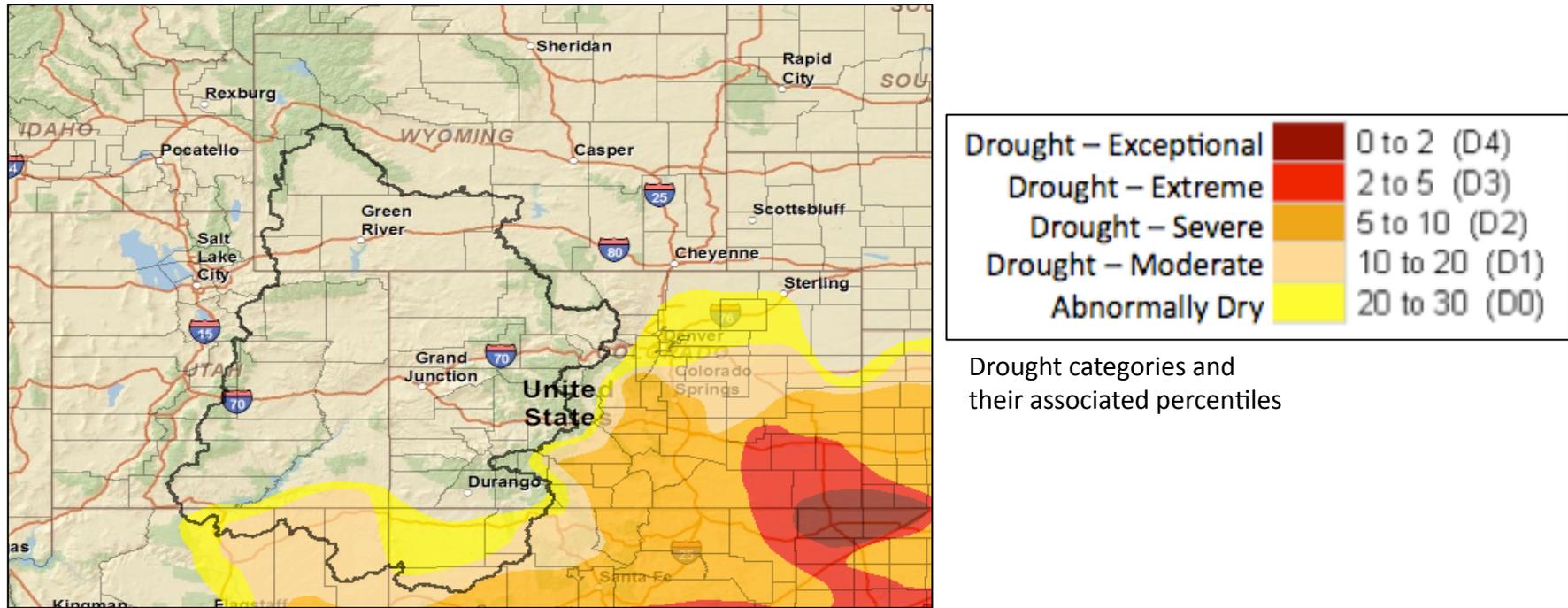


Fig. 9: May 24th release of U.S. Drought Monitor for the UCRB

No major changes are being recommended for the current U.S. Drought Monitor (USDM) map (Fig. 9). The current USDM author has further retreated the D0 line in northeastern CO, removing D0 from much of Washington, Logan and Morgan counties. It has been suggested that this line could be even further removed from all of Morgan and most of Weld counties. The D1 and D2 lines can be pushed slightly further south as well.

Some beneficial moisture did fall in southeastern CO, so no further degradations are currently needed for that region. Not enough precipitation accumulated to justify any improvements in the area though. Therefore, status quo is recommended for southeastern CO.

Status quo is also recommended for the UCRB this week.