

Spring 2011

May 24th, 2011

NIDIS - UPPER COLORADO BASIN PILOT PROJECT

Weekly Climate, Water & Drought Assessment

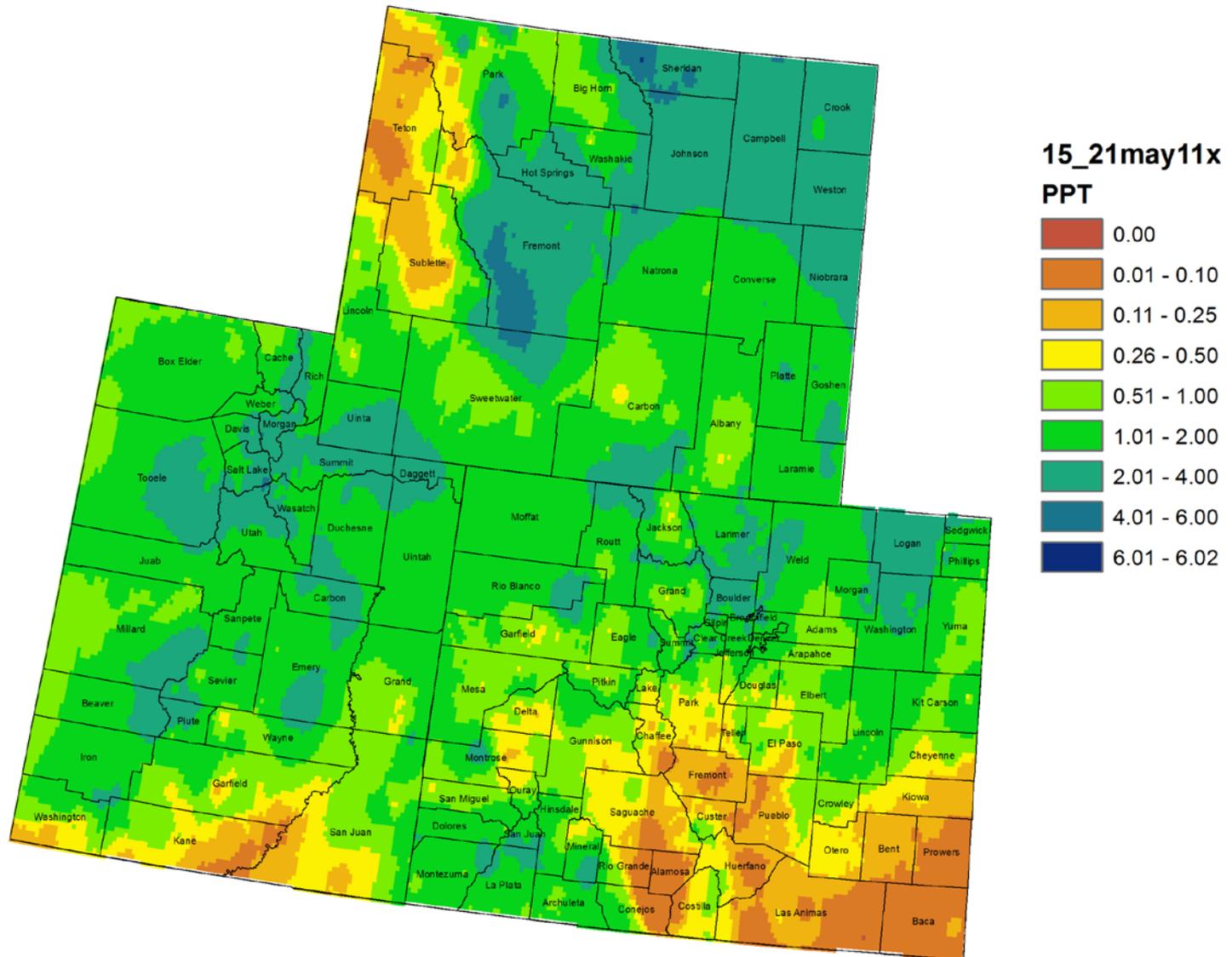
Today's Agenda

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

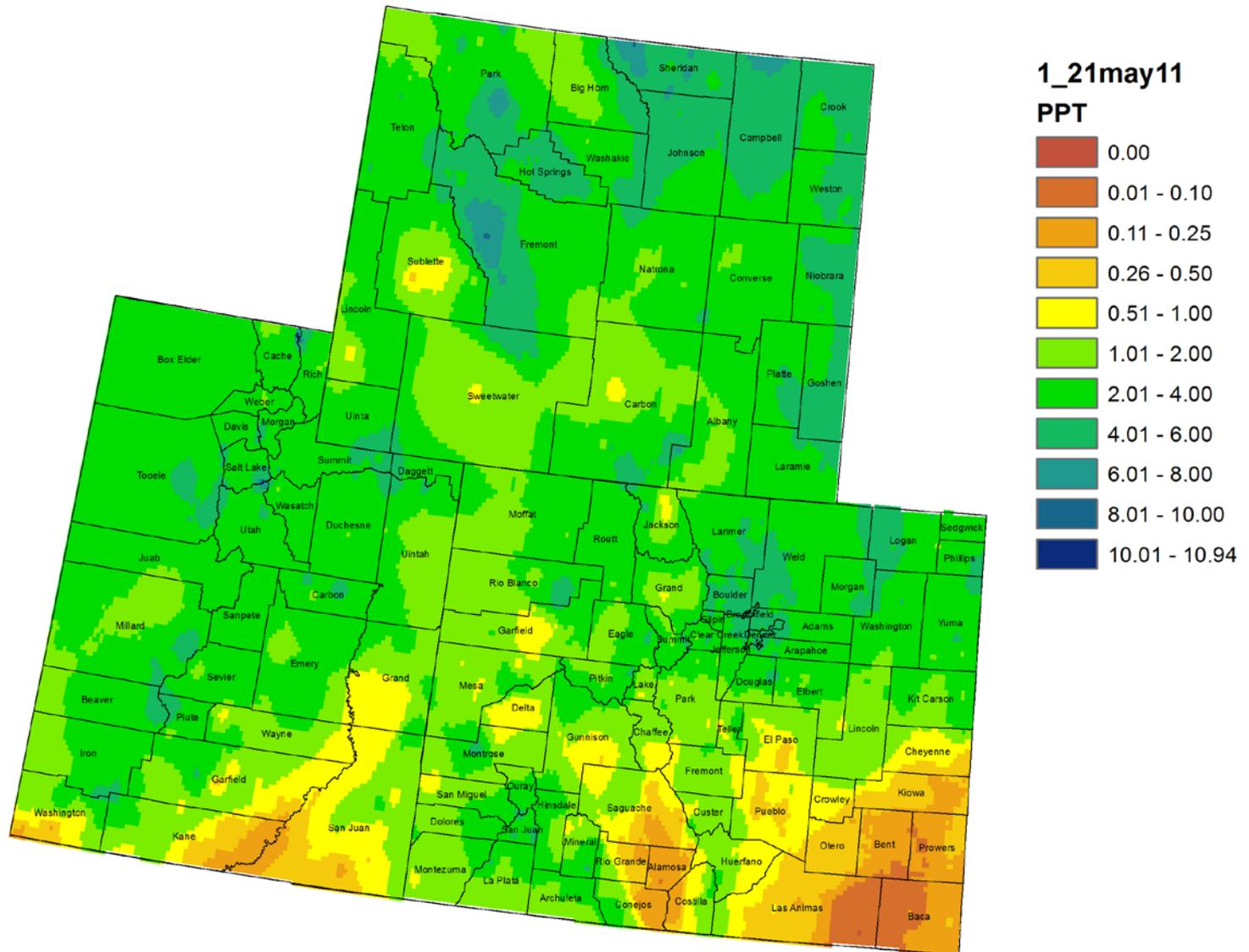
Precipitation/Snowpack Update



Colorado, Utah and Wyoming 7 Day Precipitation (in) 15 - 21 May 2011

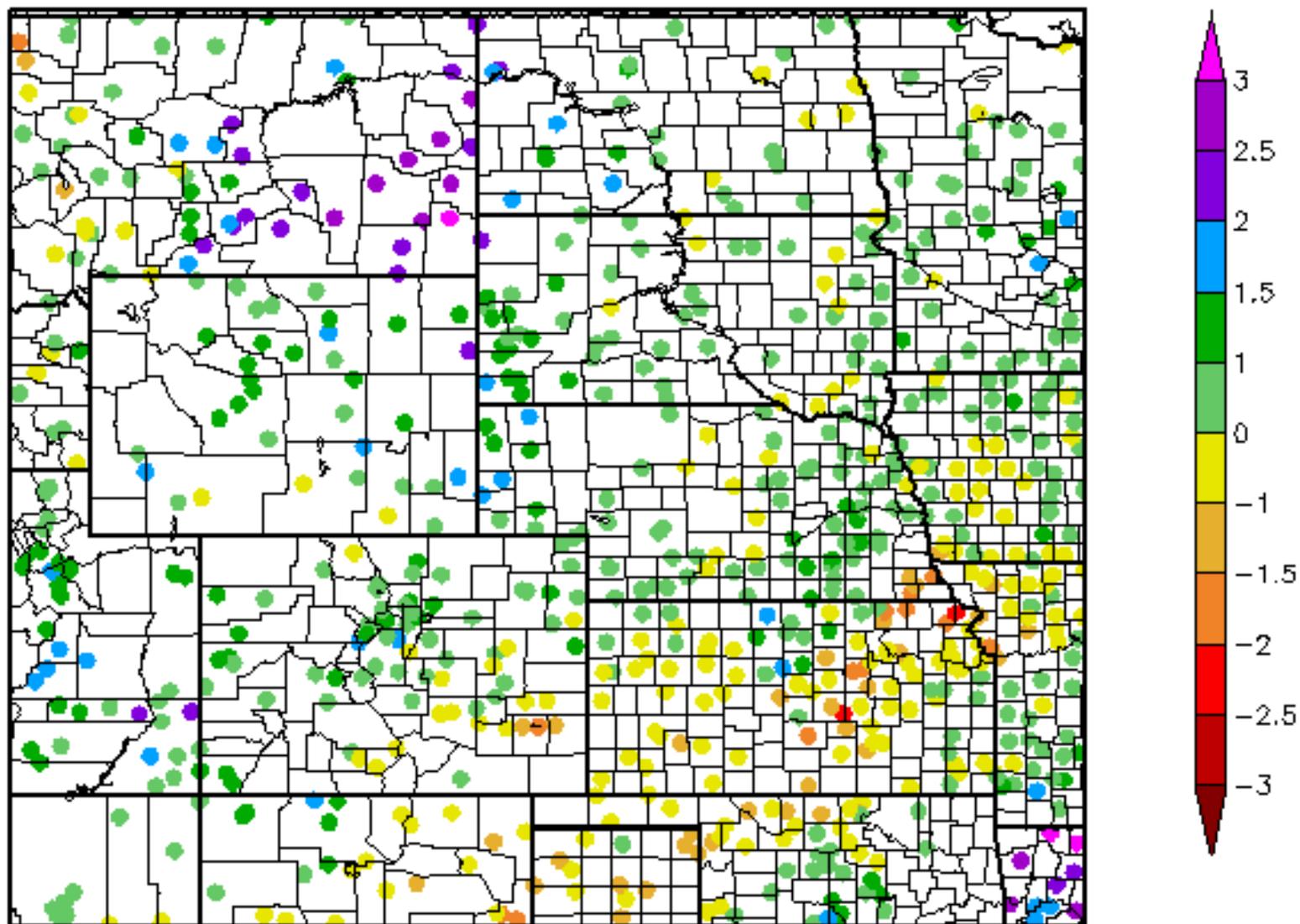


Colorado, Utah and Wyoming Month to Date Precipitation (in) 1 - 21May 2011



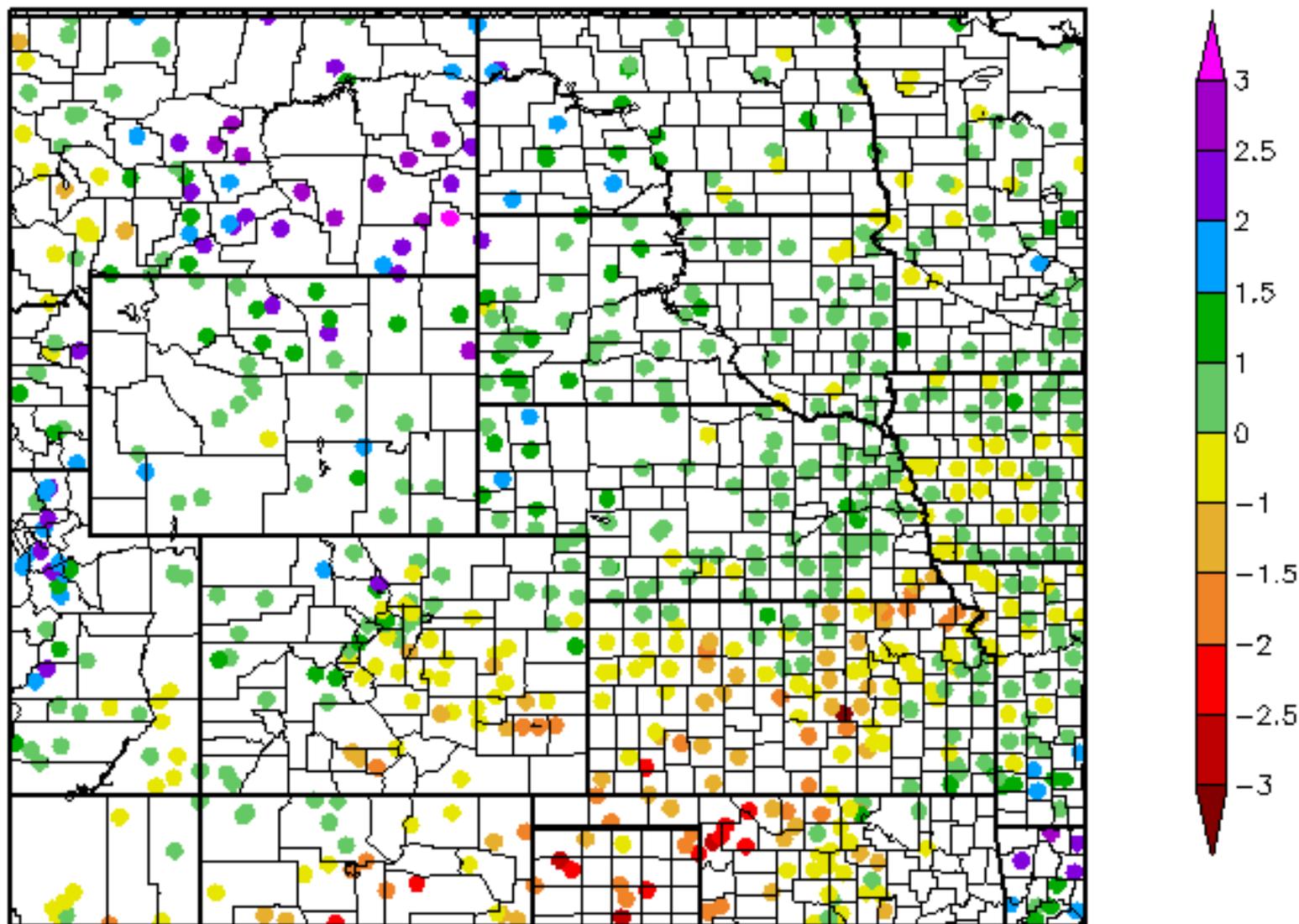
30 Day SPI

4/24/2011 – 5/23/2011



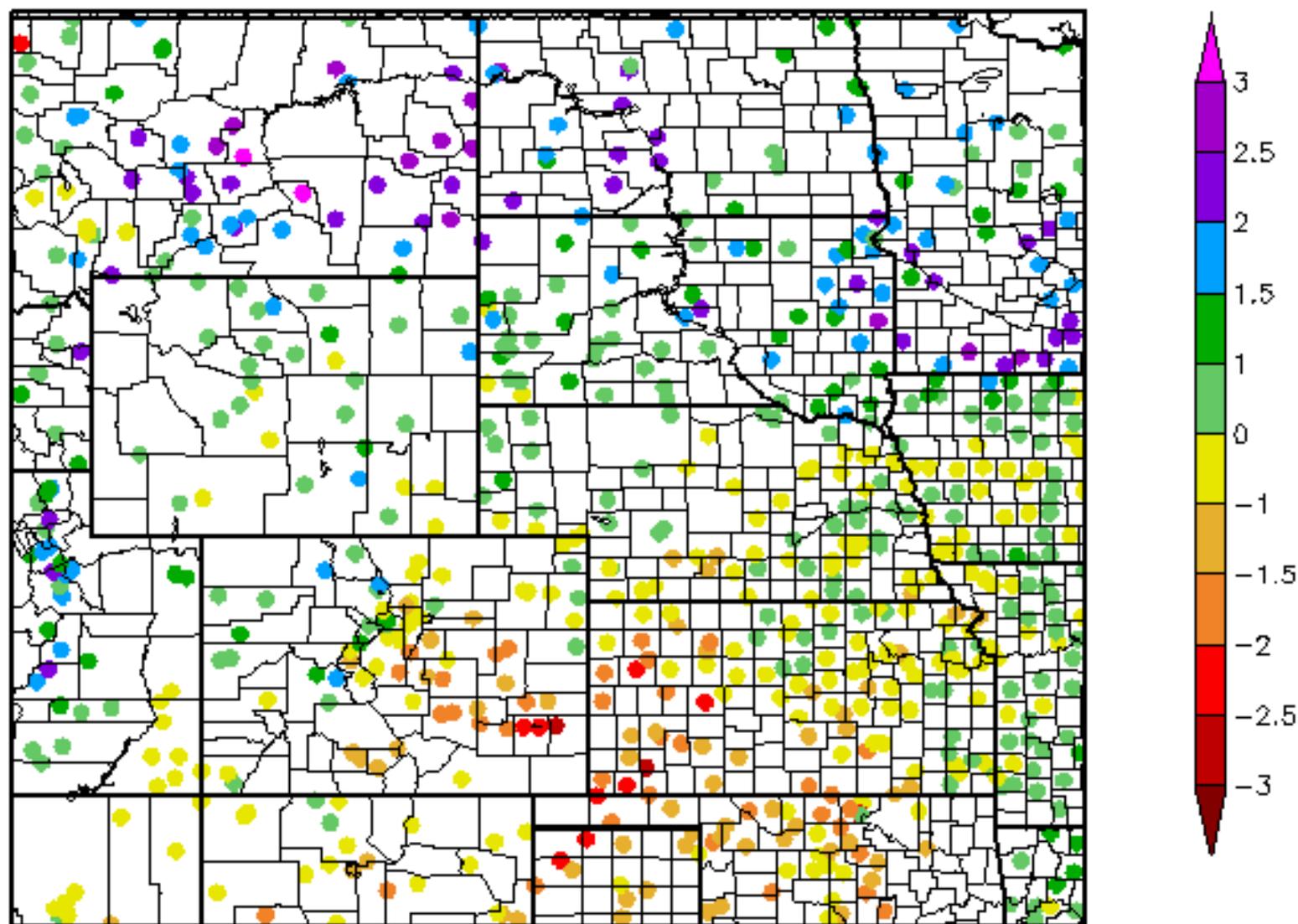
90 Day SPI

2/23/2011 – 5/23/2011

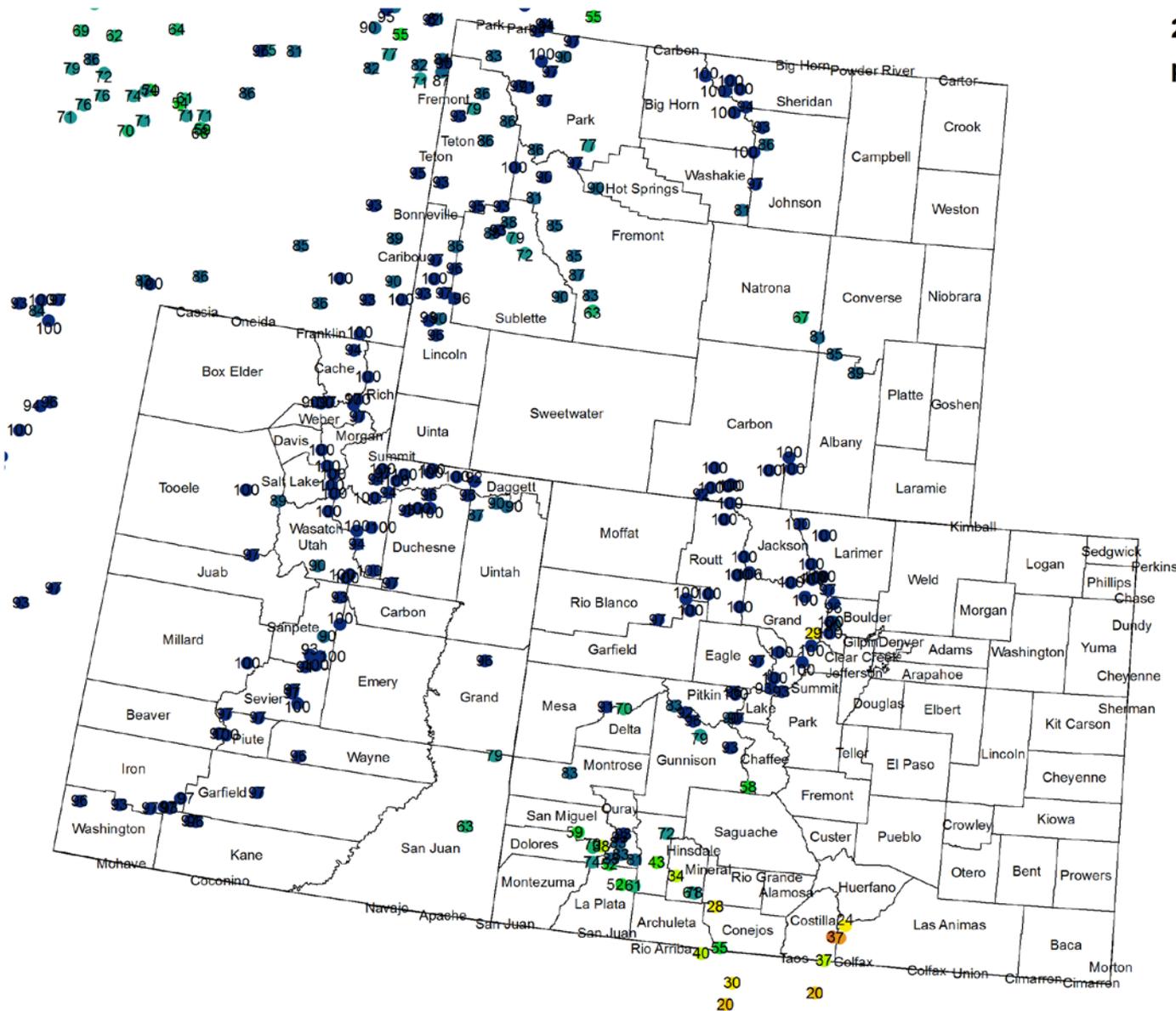


9 Month SPI

8/24/2010 - 5/23/2011



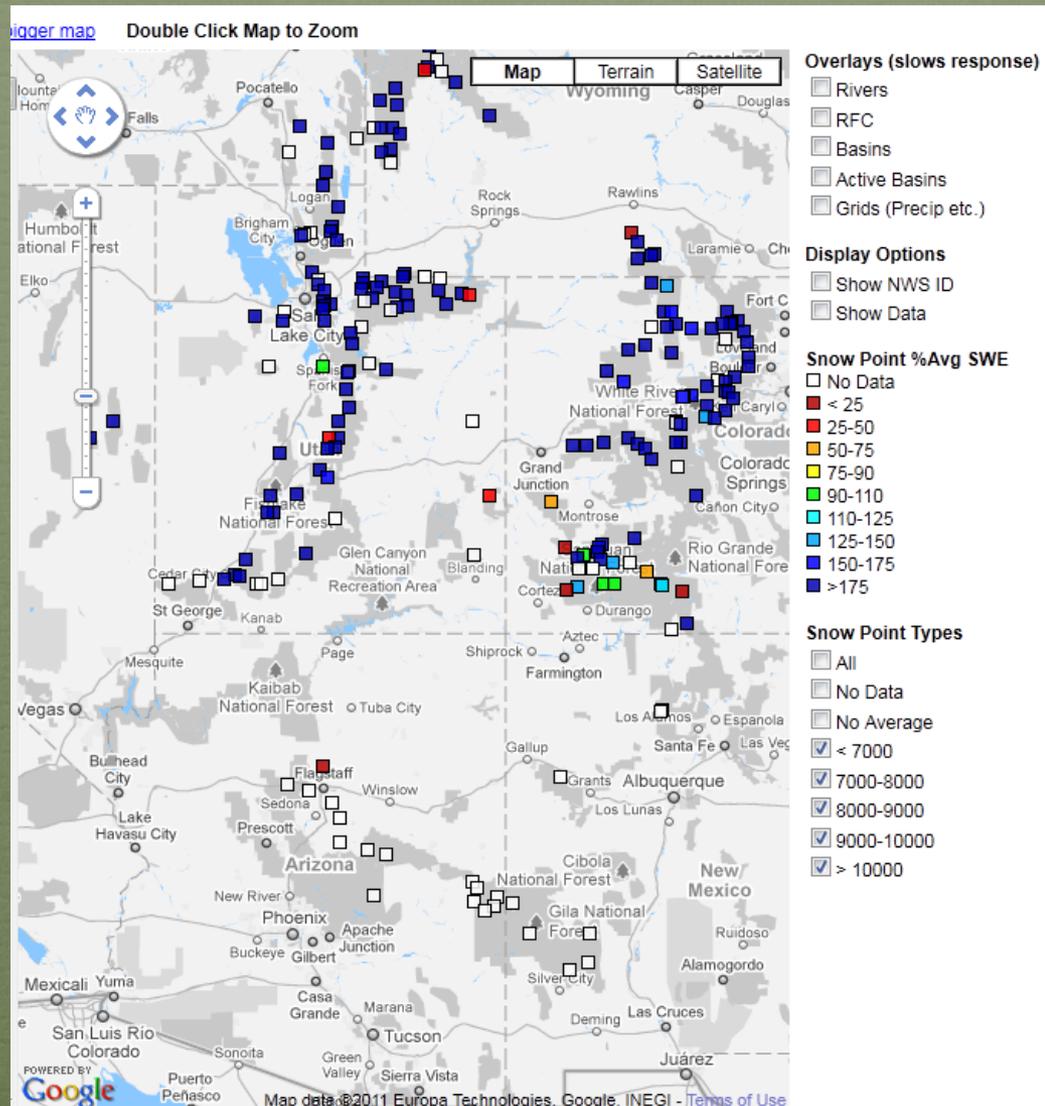
Snotel Water Year Precipitation Percentile Ranking 24 May 2011 (Stations with 20+ years of data only)



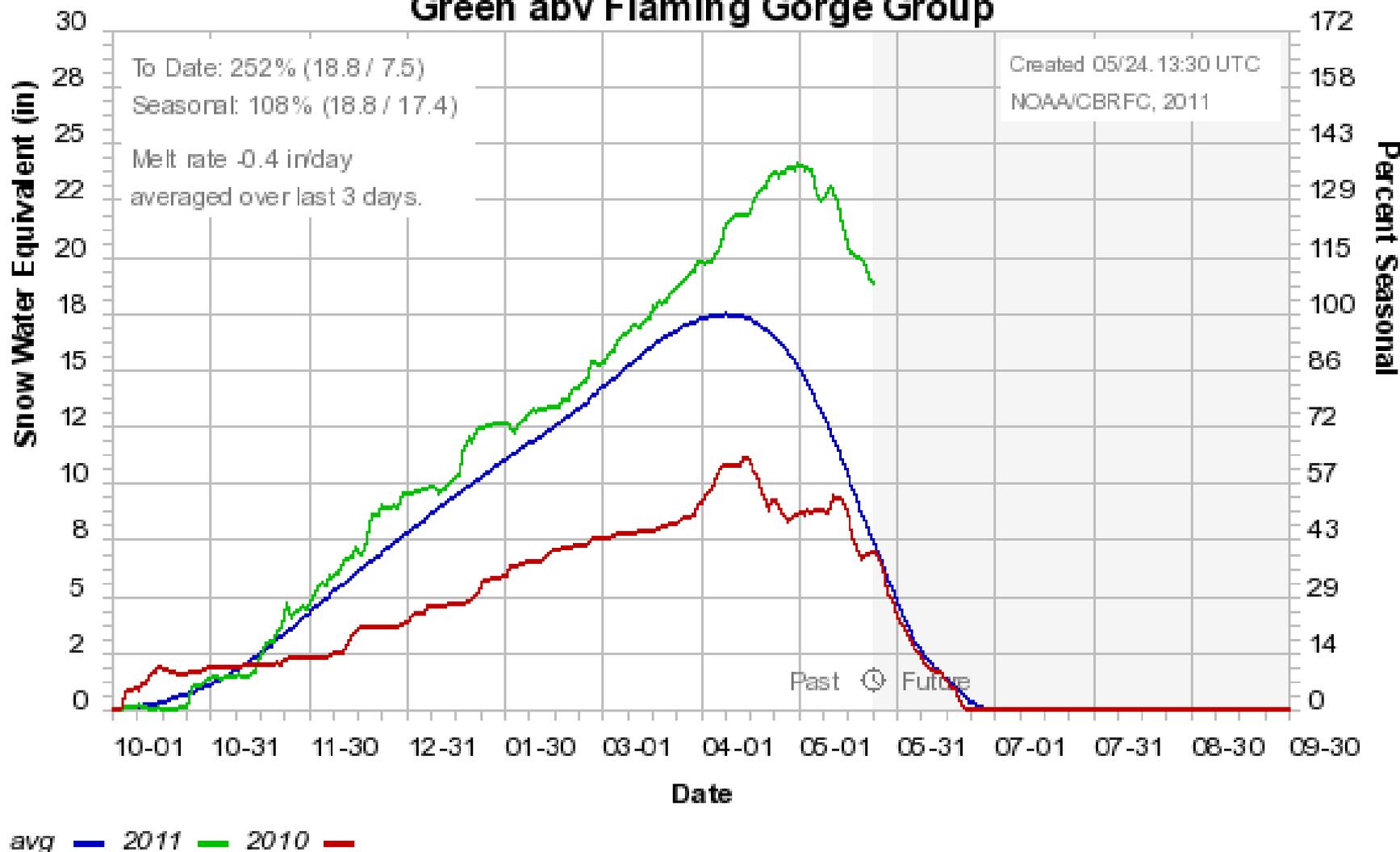
24May11_ptile.tab Events ptile

- 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

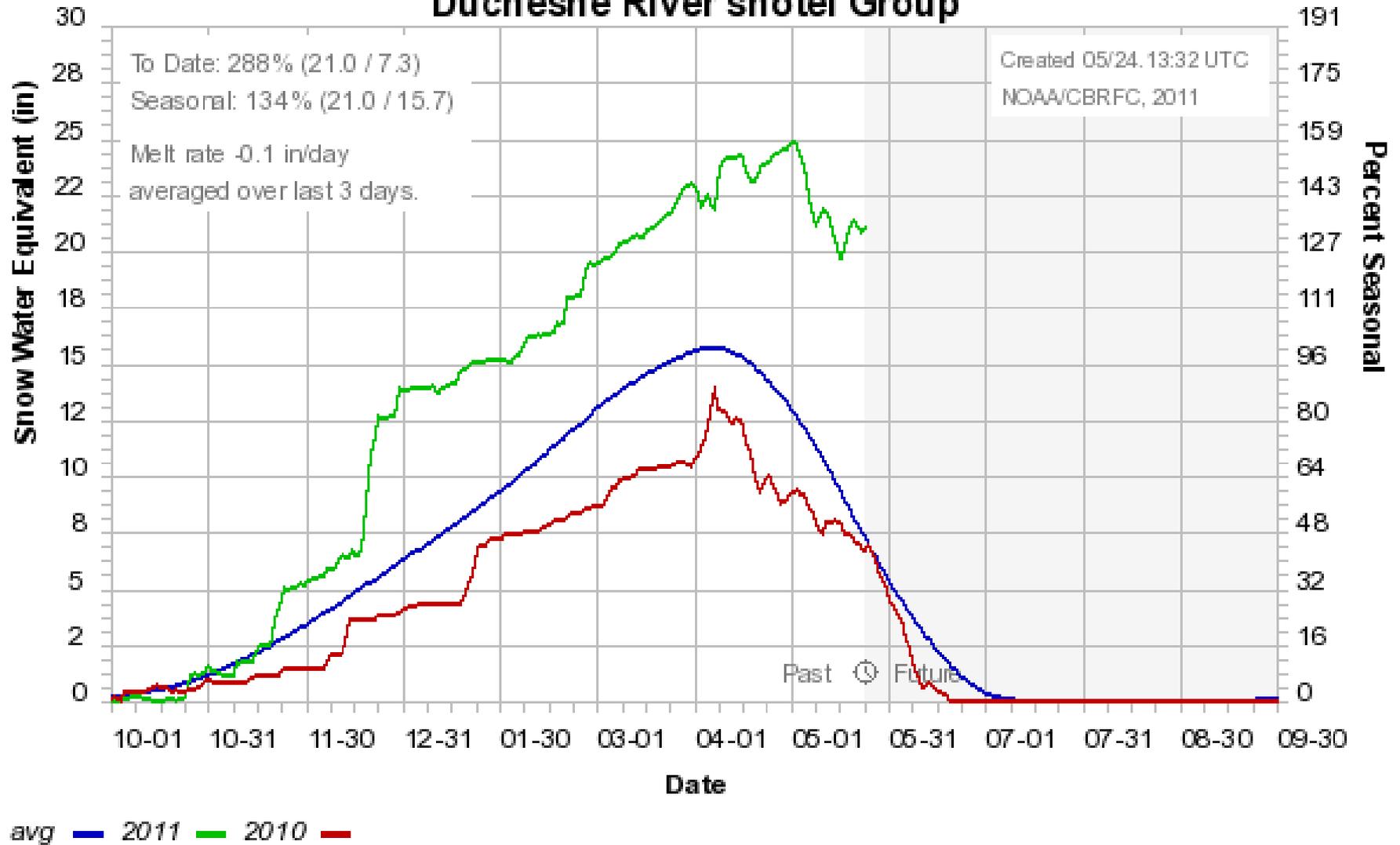


Colorado Basin River Forecast Center Green abv Flaming Gorge Group



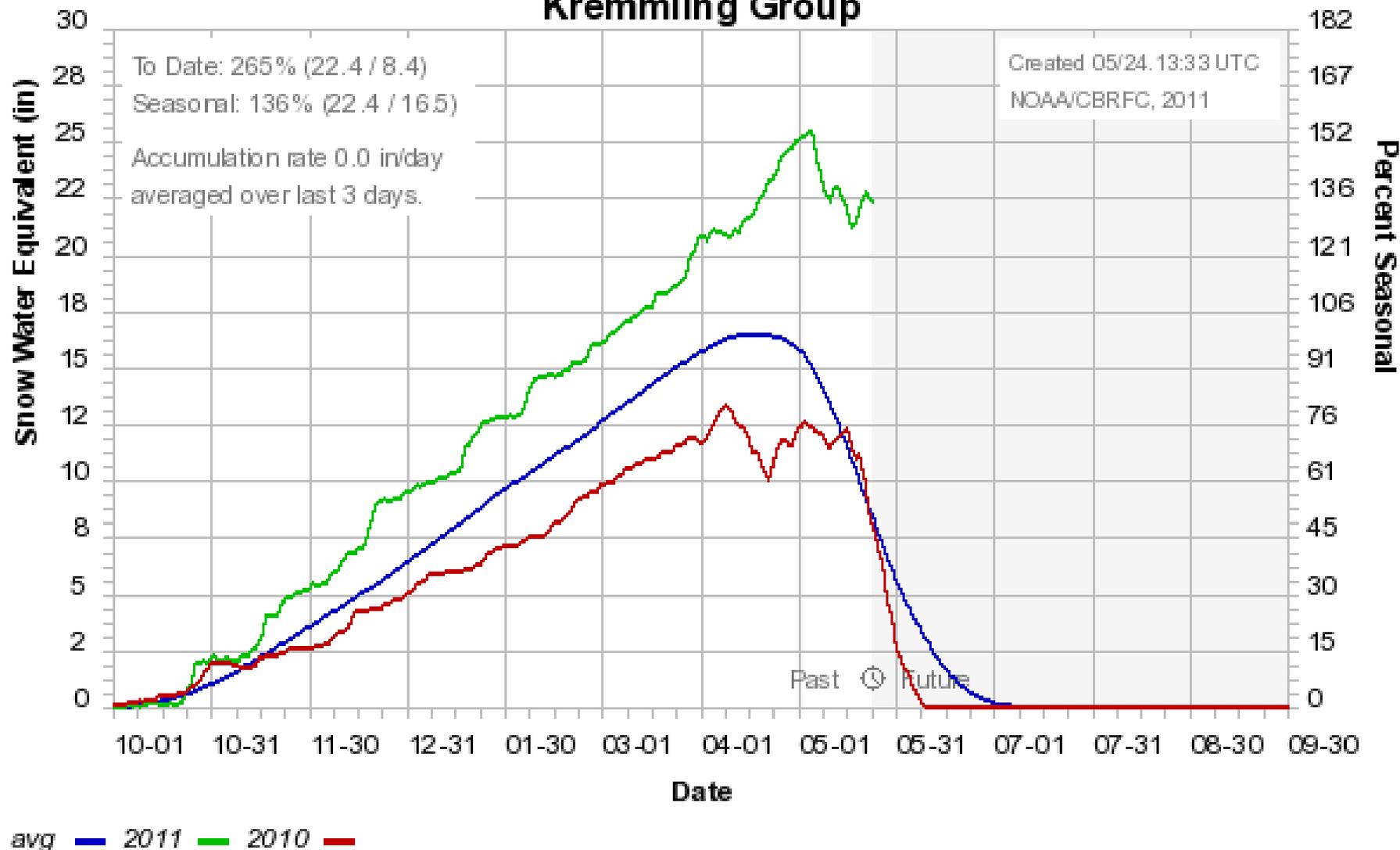
Snowpack % of average to date: 252%
Percent of average peak: 108%

Colorado Basin River Forecast Center Duchesne River snotel Group



Snowpack % of average to date: 288%
Percent of average peak: 134%

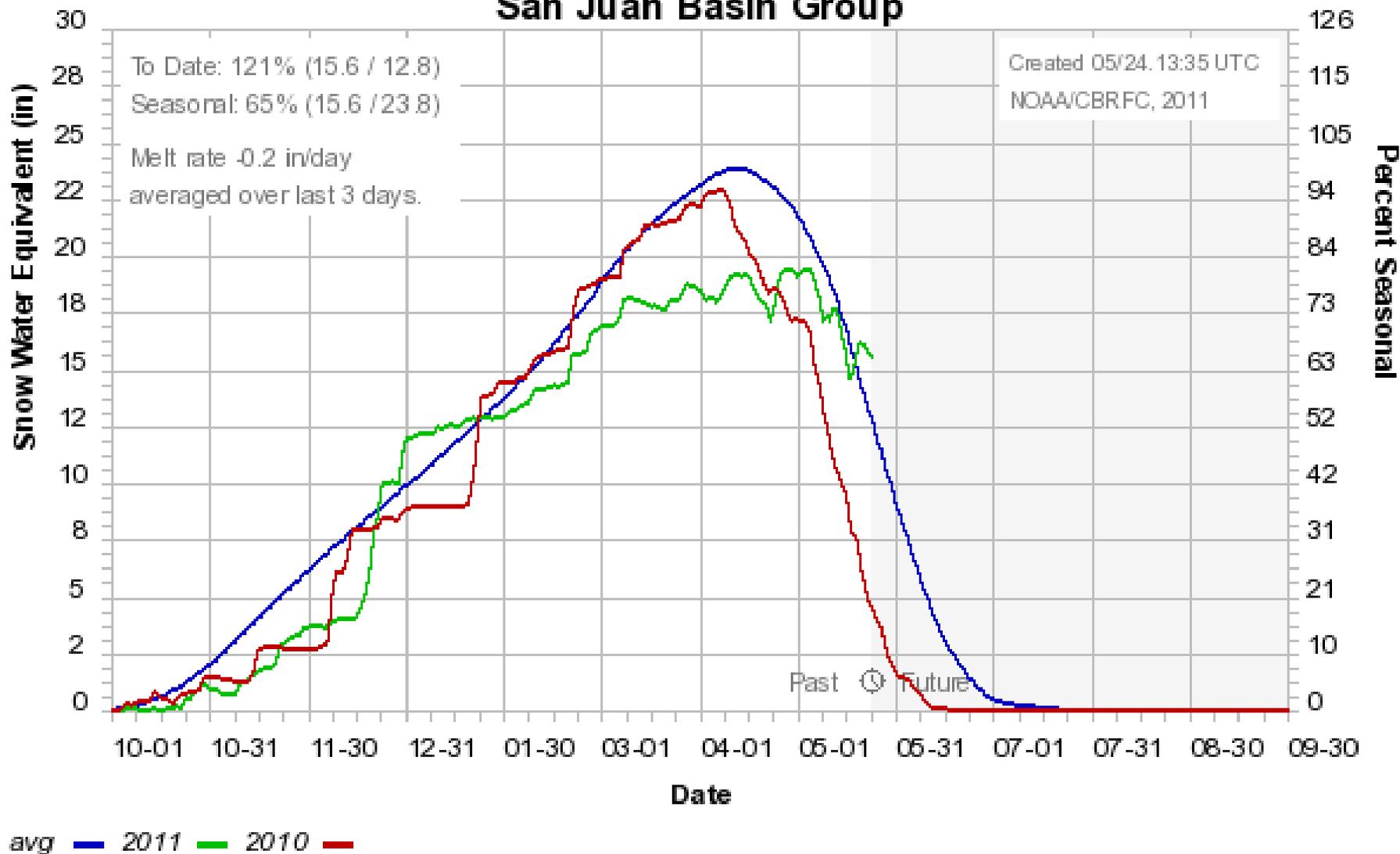
Colorado Basin River Forecast Center Kremmling Group



Snowpack % of average to date: 265%
Percent of average peak: 136%

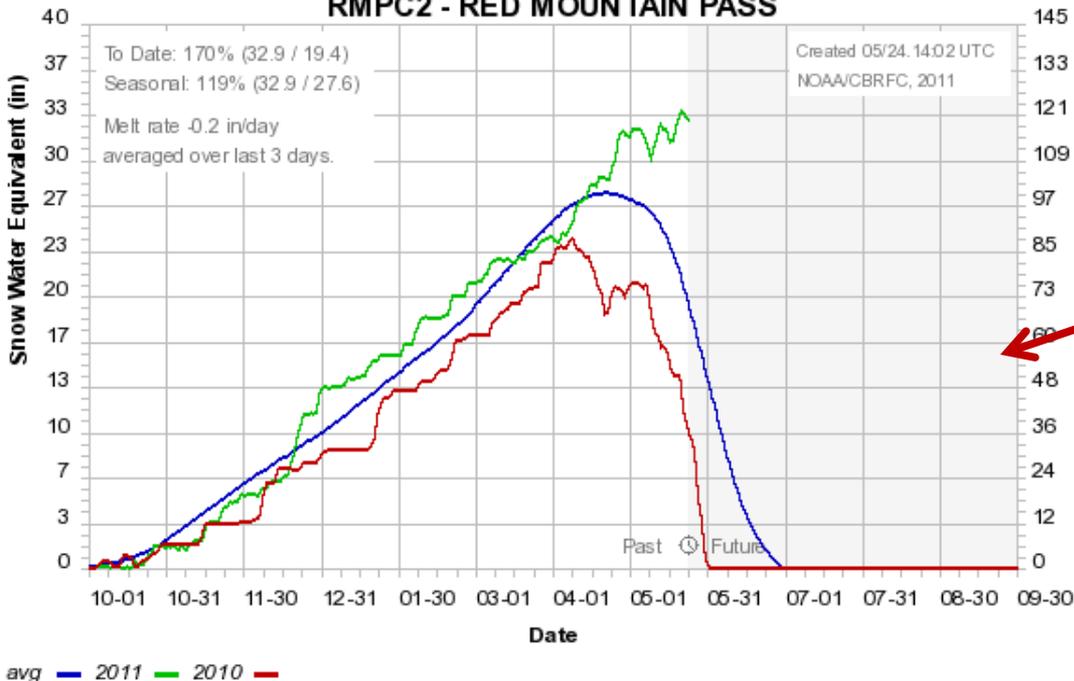
Colorado Basin River Forecast Center

San Juan Basin Group

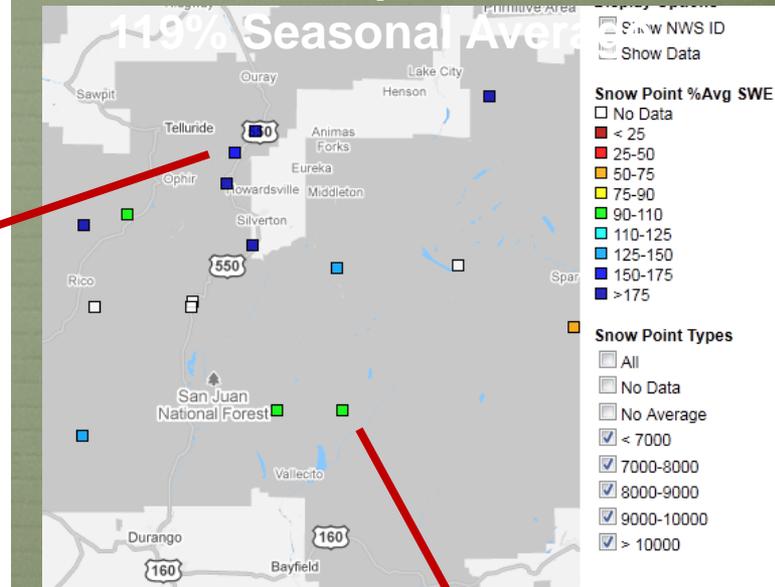


Snowpack % of average to date: 121%
Percent of average peak: 65%

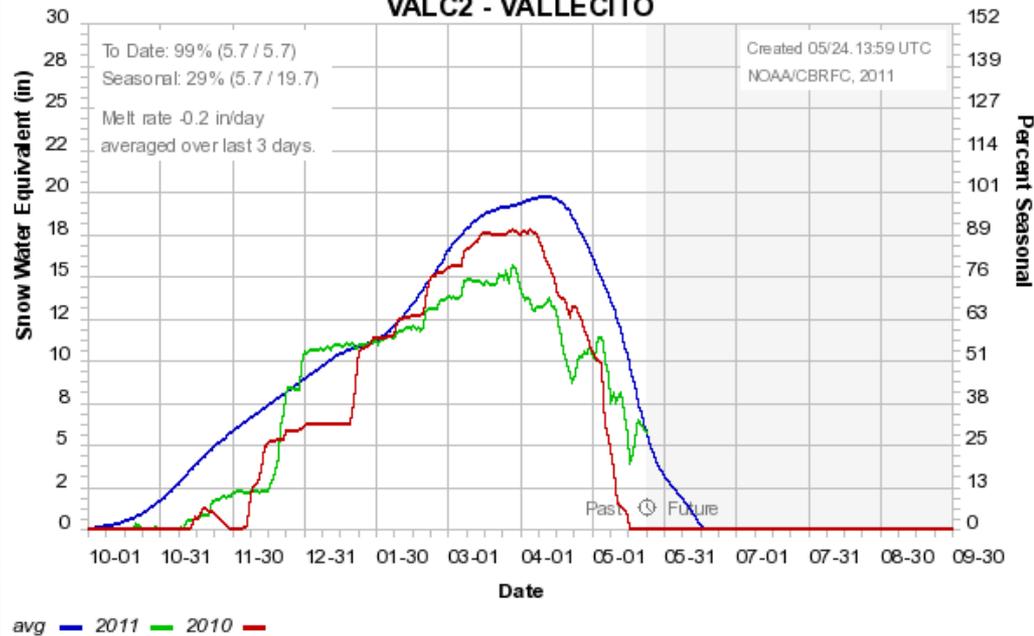
Colorado Basin River Forecast Center RMPC2 - RED MOUNTAIN PASS



Red Mountain Pass Snotel 170% Snowpack to date 119% Seasonal Average



Colorado Basin River Forecast Center VALC2 - VALLECITO



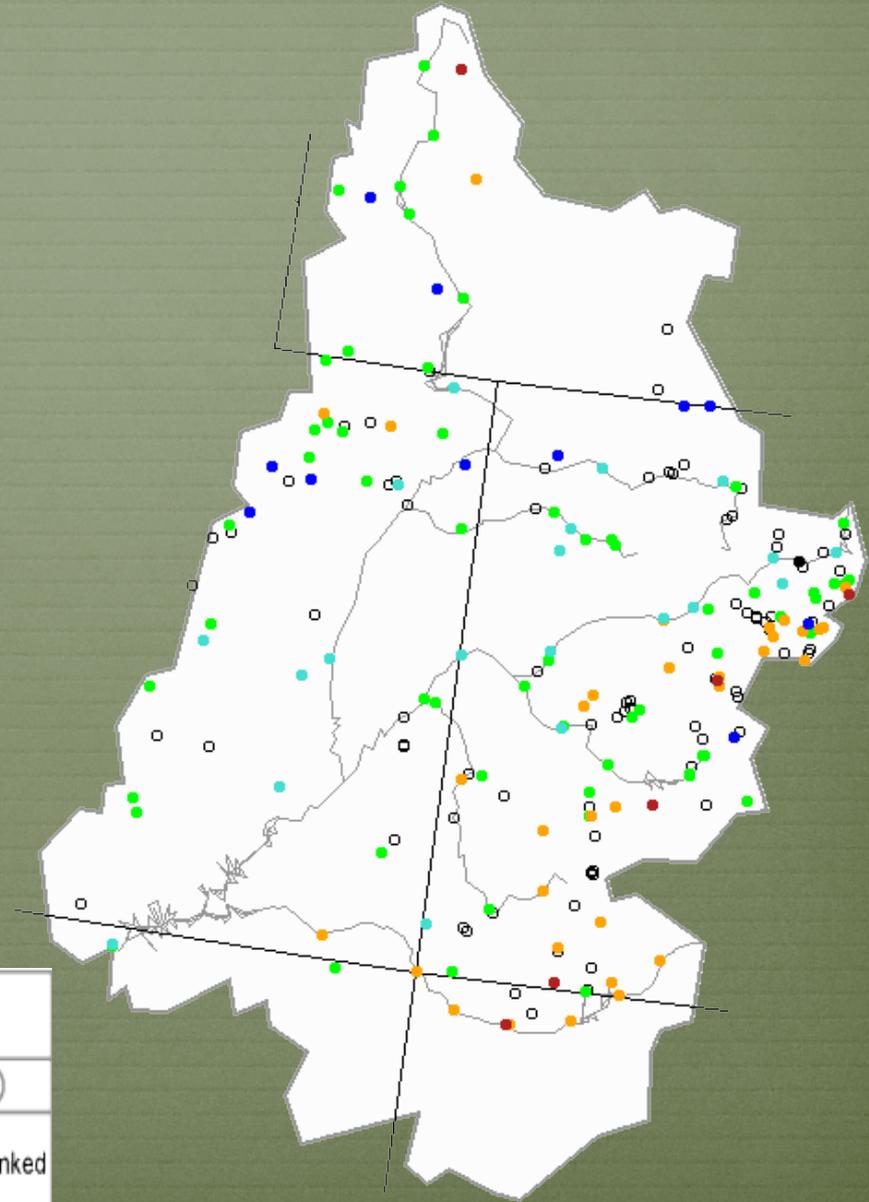
Vallecito Snotel
99% Snowpack to date
29% Average peak

Streamflow Update

Michael Lewis USGS



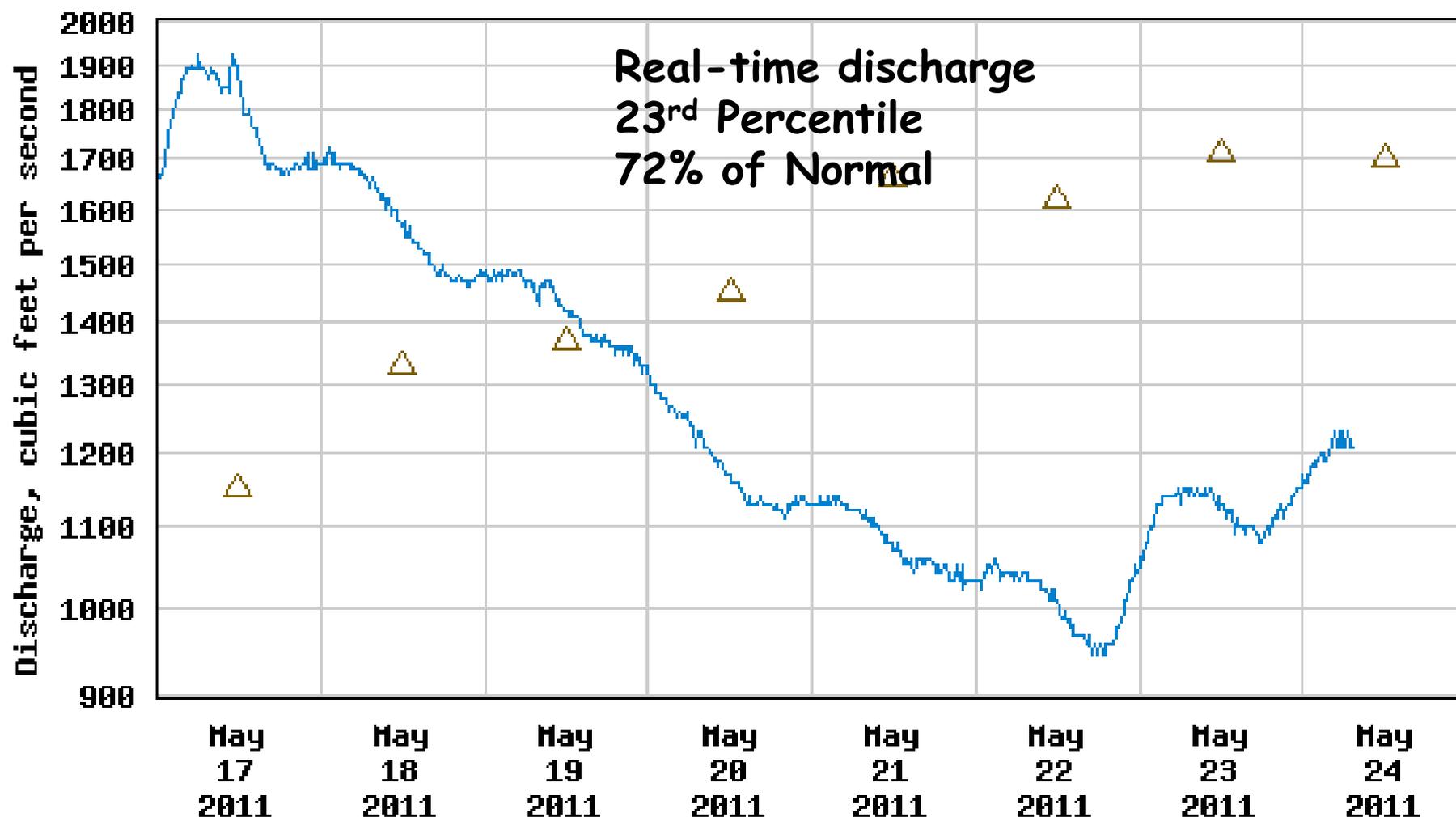
7-day average discharge compared to historical discharge for the day of the year (May 23rd)



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		

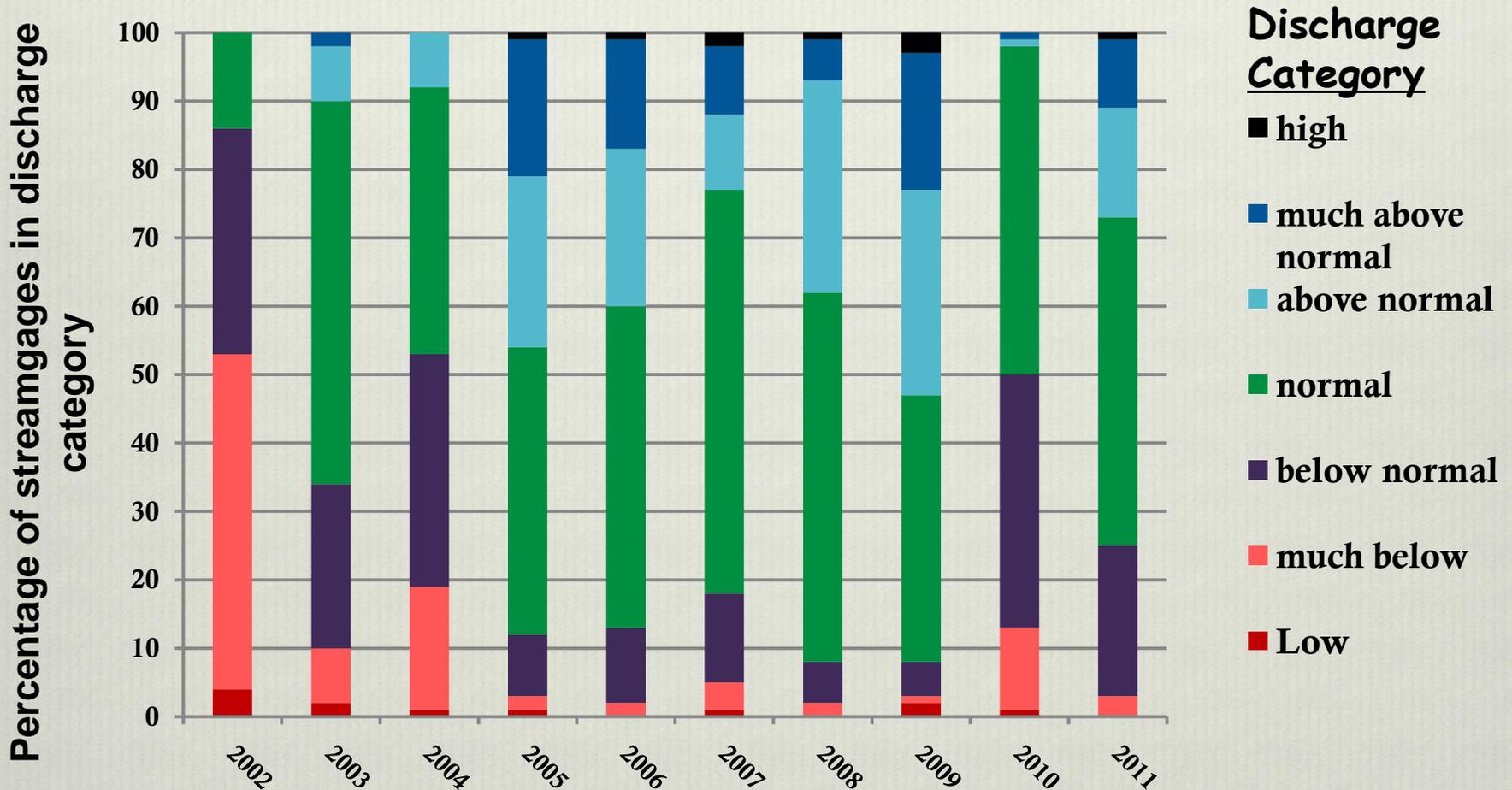
USGS 09070000 EAGLE RIVER BELOW GYPSUM, CO.

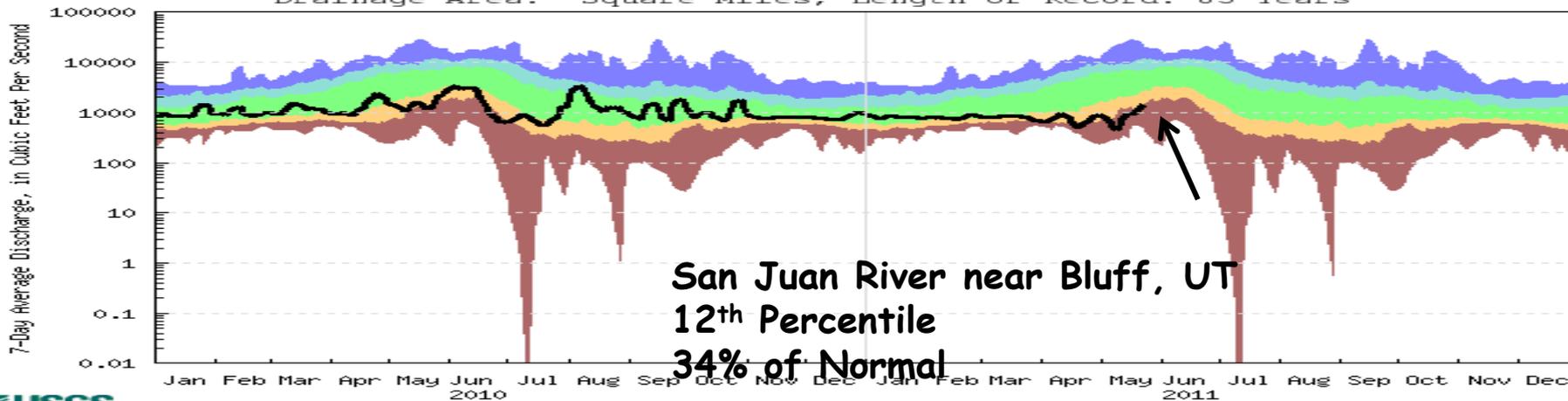
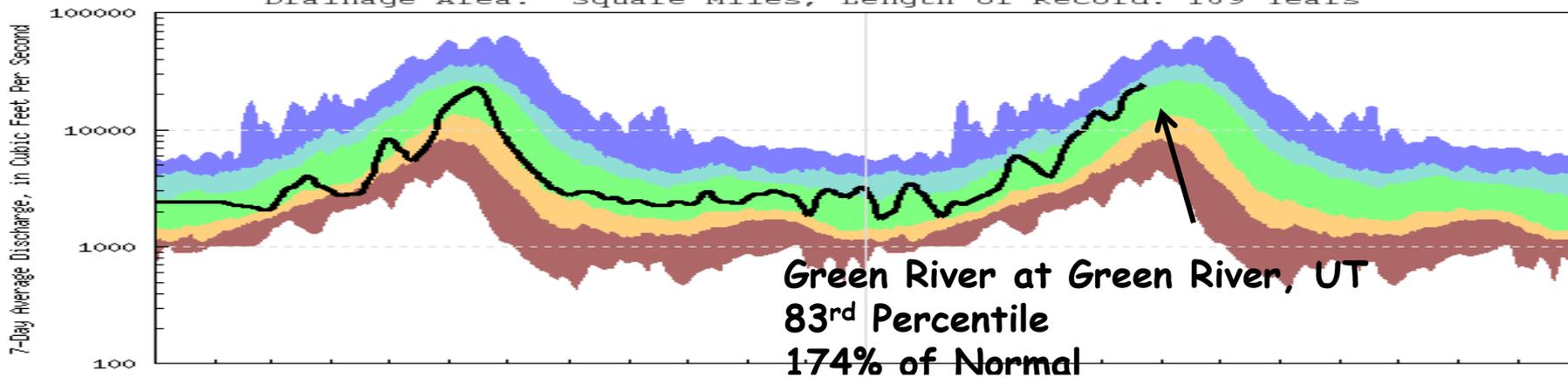
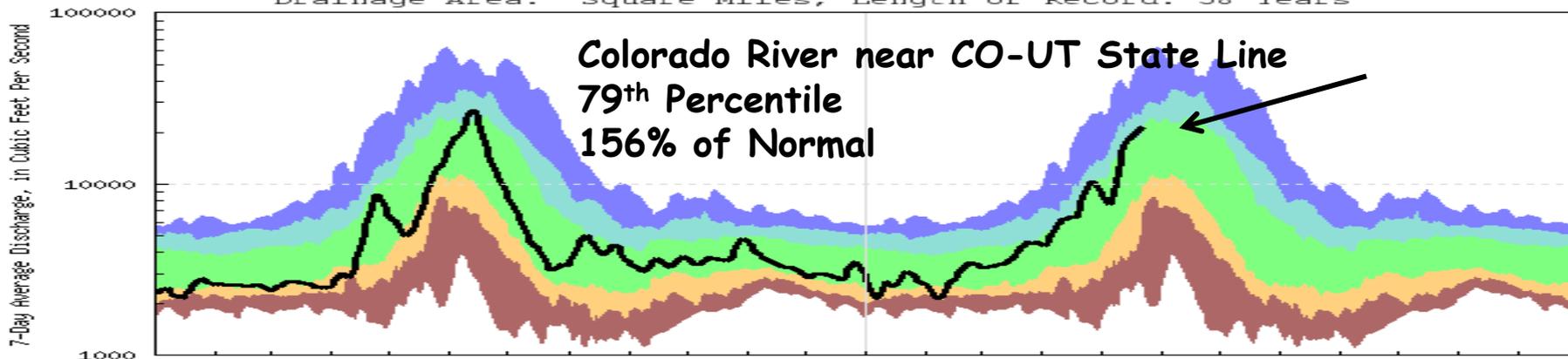


---- Provisional Data Subject to Revision ----

△ Median daily statistic (64 years) — Discharge

-Upper Colorado River Basin- Comparison of 7-day Average Discharge For May 22, 2002-2011

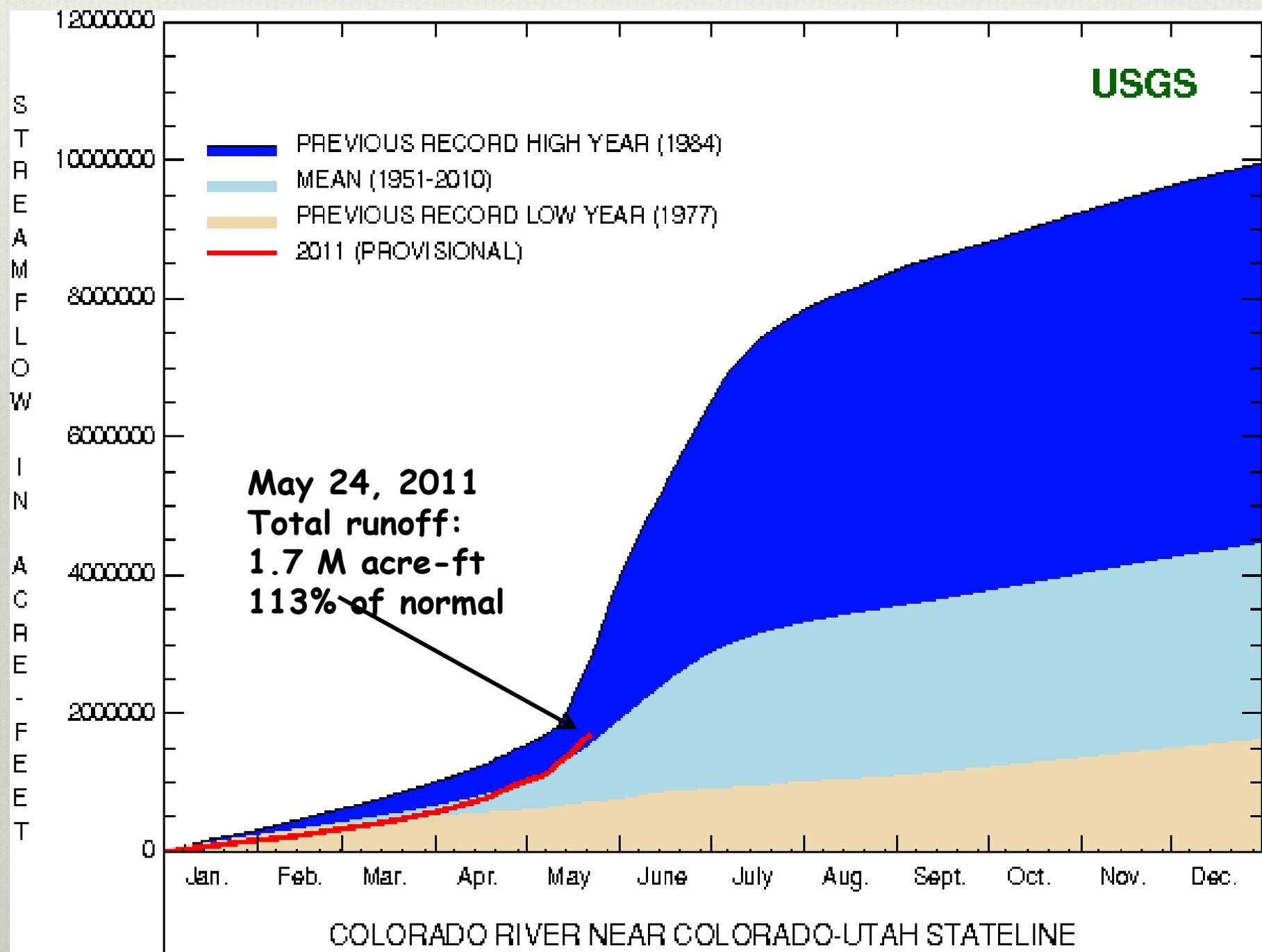




USGS

- PREVIOUS RECORD HIGH YEAR (1984)
- MEAN (1951-2010)
- PREVIOUS RECORD LOW YEAR (1977)
- 2011 (PROVISIONAL)

May 24, 2011
Total runoff:
1.7 M acre-ft
113% of normal

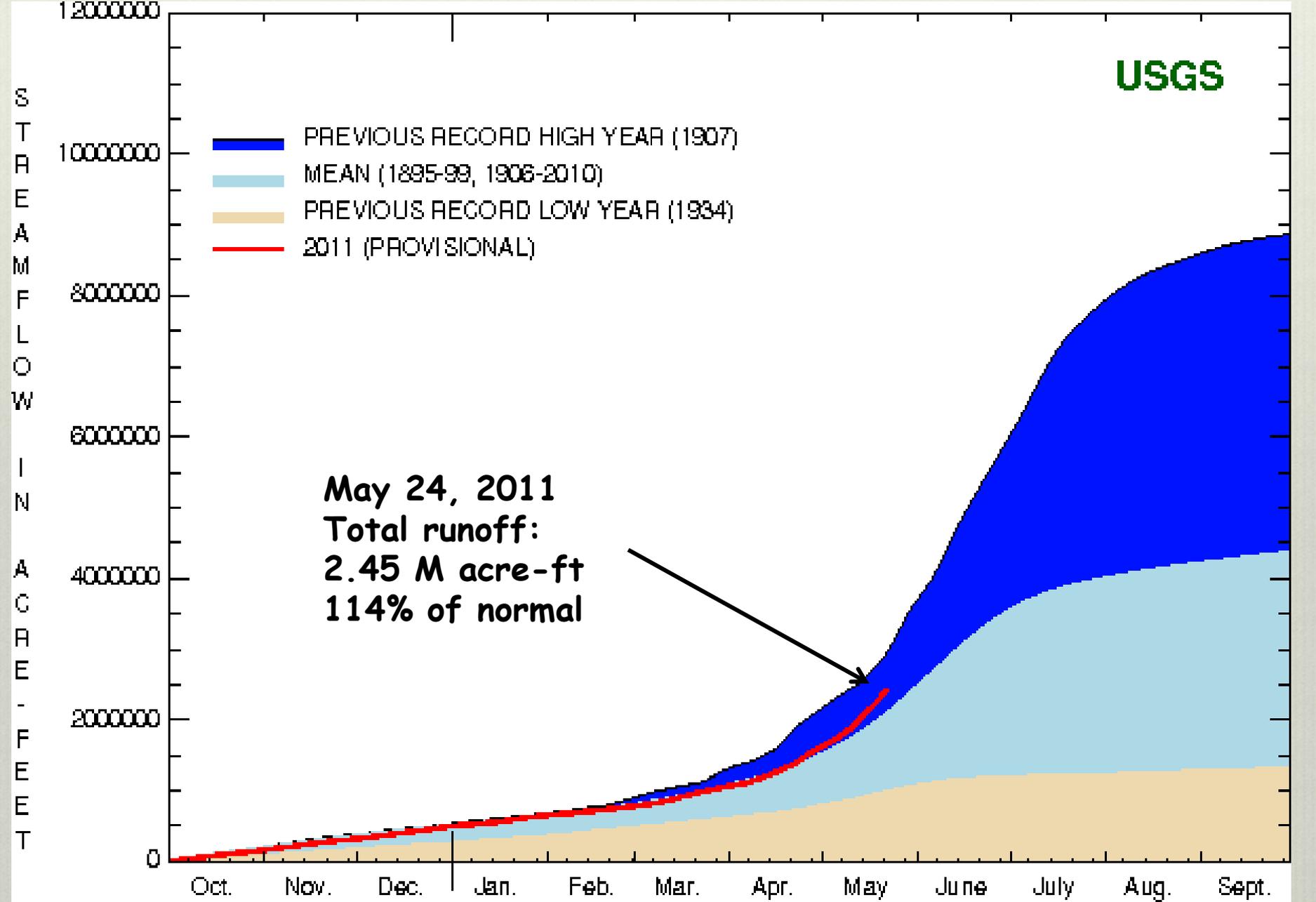


COLORADO RIVER NEAR COLORADO-UTAH STATELINE

USGS

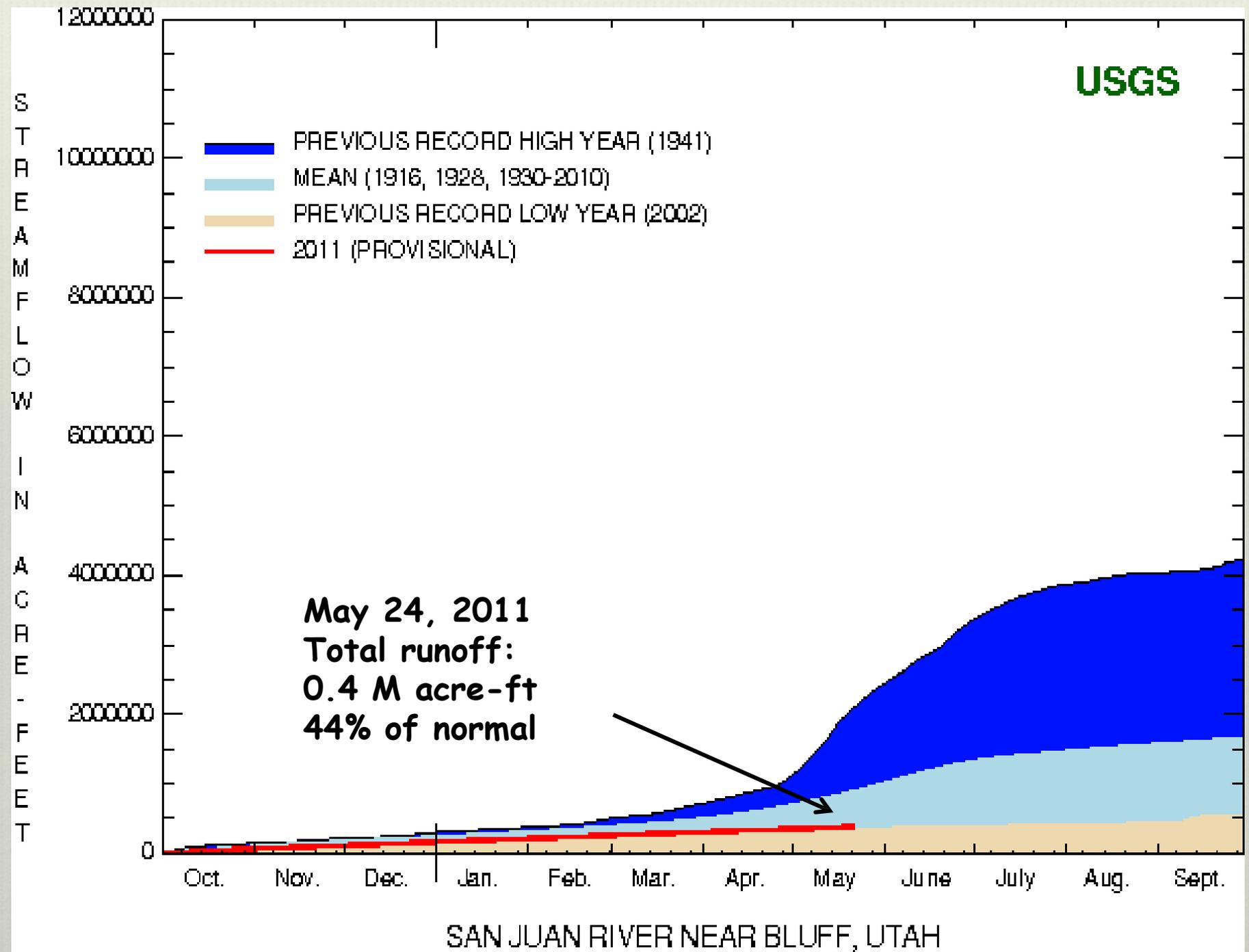
- PREVIOUS RECORD HIGH YEAR (1907)
- MEAN (1895-99, 1906-2010)
- PREVIOUS RECORD LOW YEAR (1934)
- 2011 (PROVISIONAL)

**May 24, 2011
Total runoff:
2.45 M acre-ft
114% of normal**

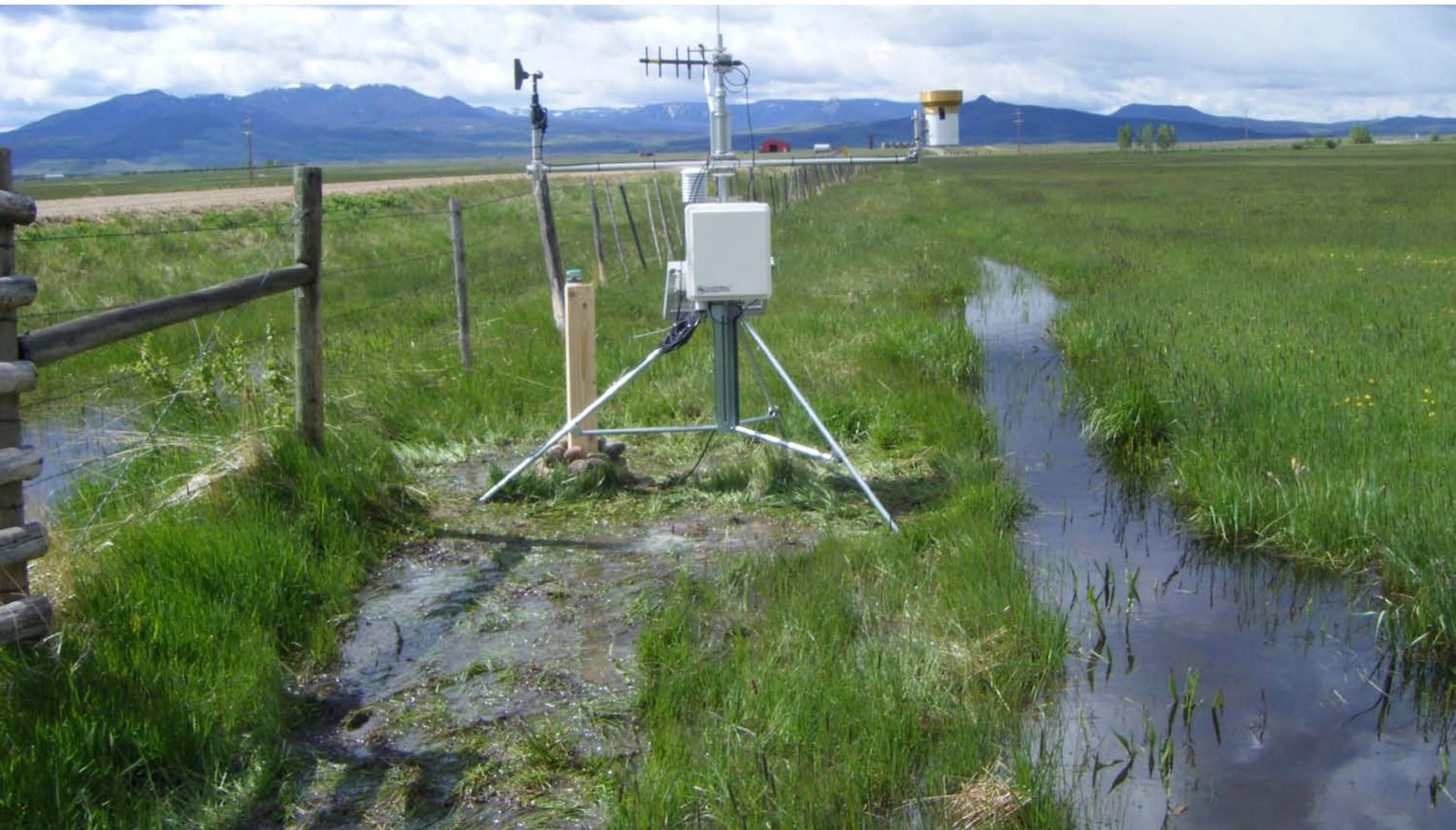


GREEN RIVER AT GREEN RIVER, UTAH

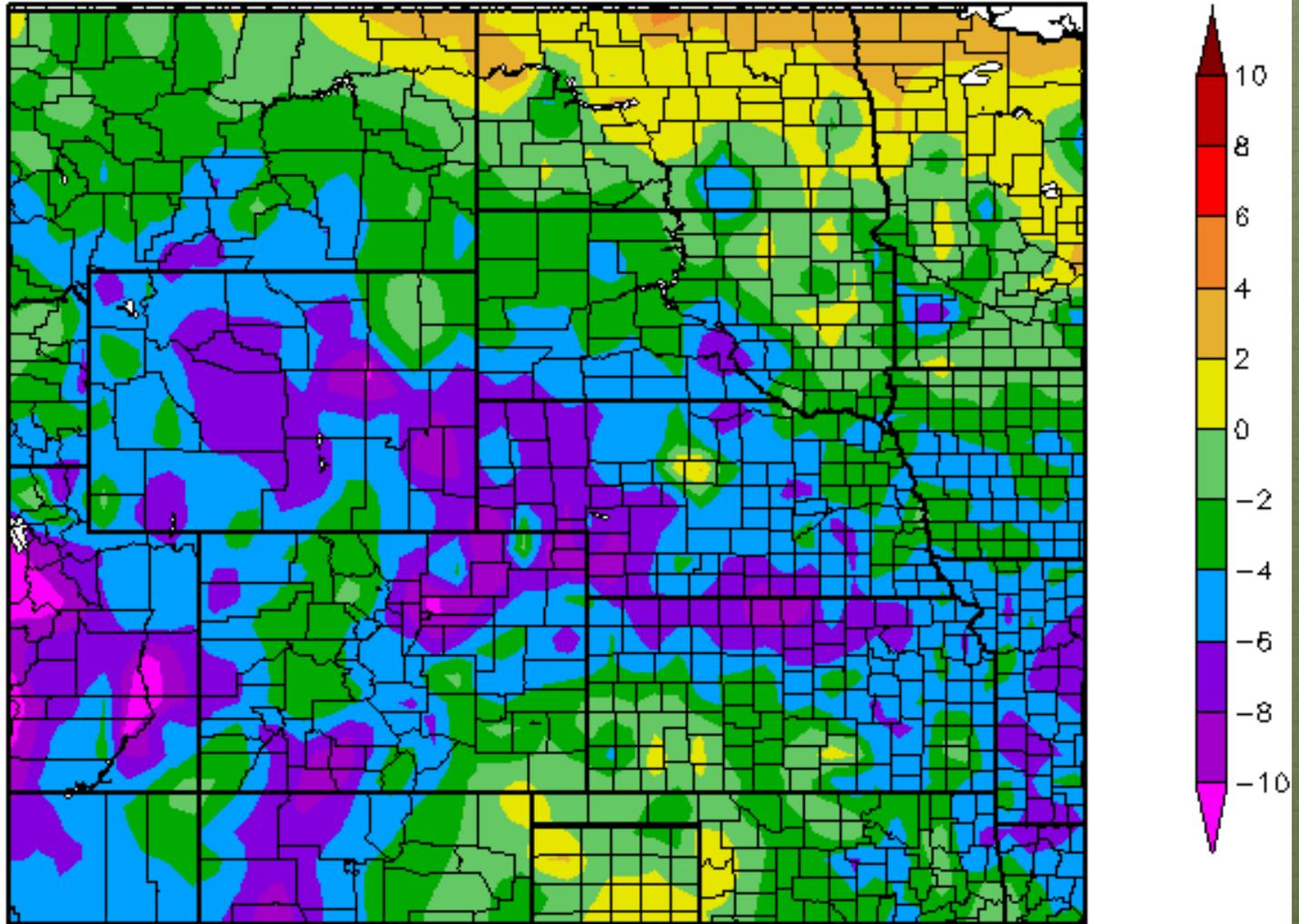
USGS



Water Demand

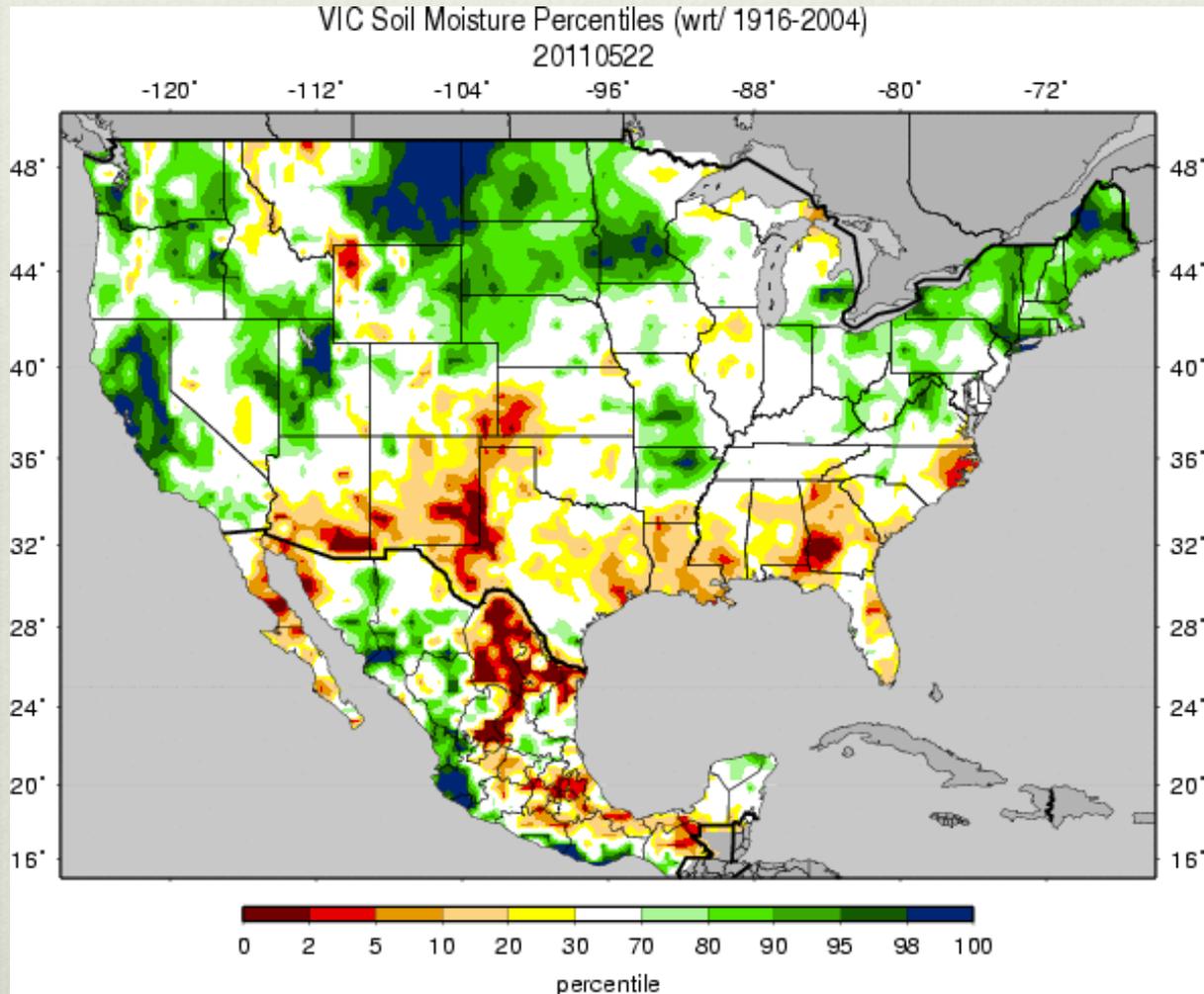


Temperature Departure from Normal 05/16/2011 – 05/22/2011



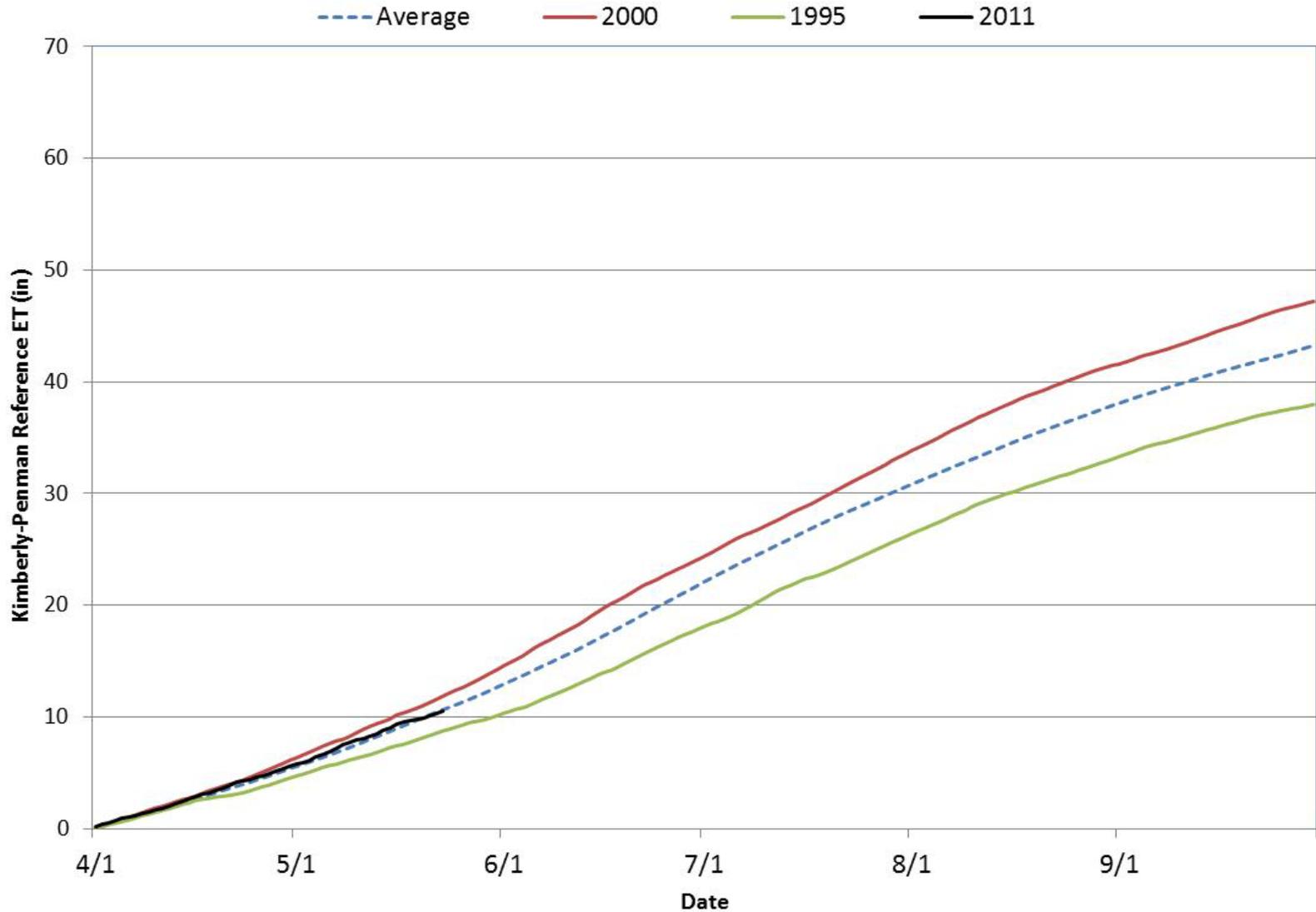
VIC Soil Moisture

22 May 2011



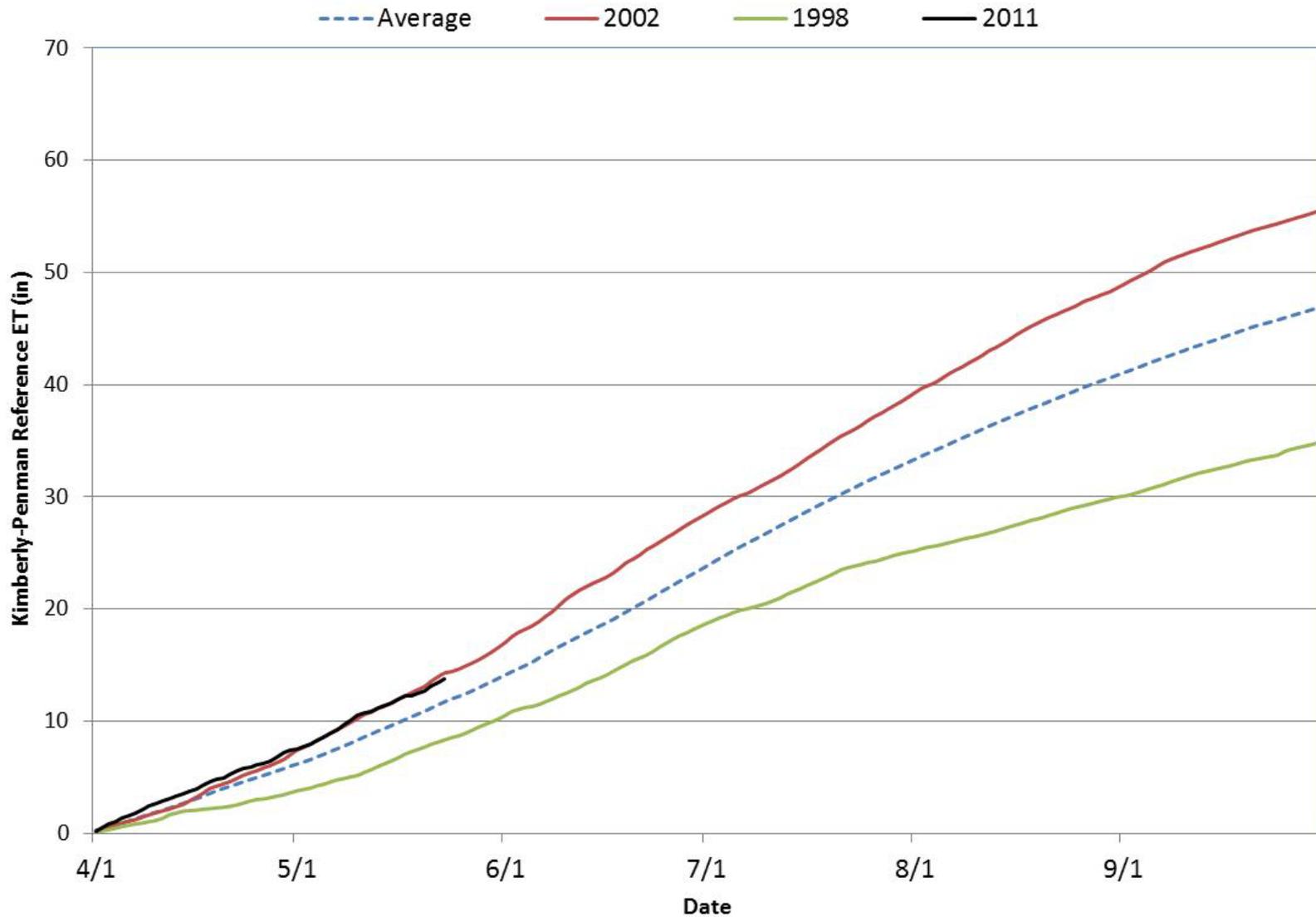
Cortez Reference ET

CTZ01 Kimberly-Penman Reference ET (1992 - 2011)



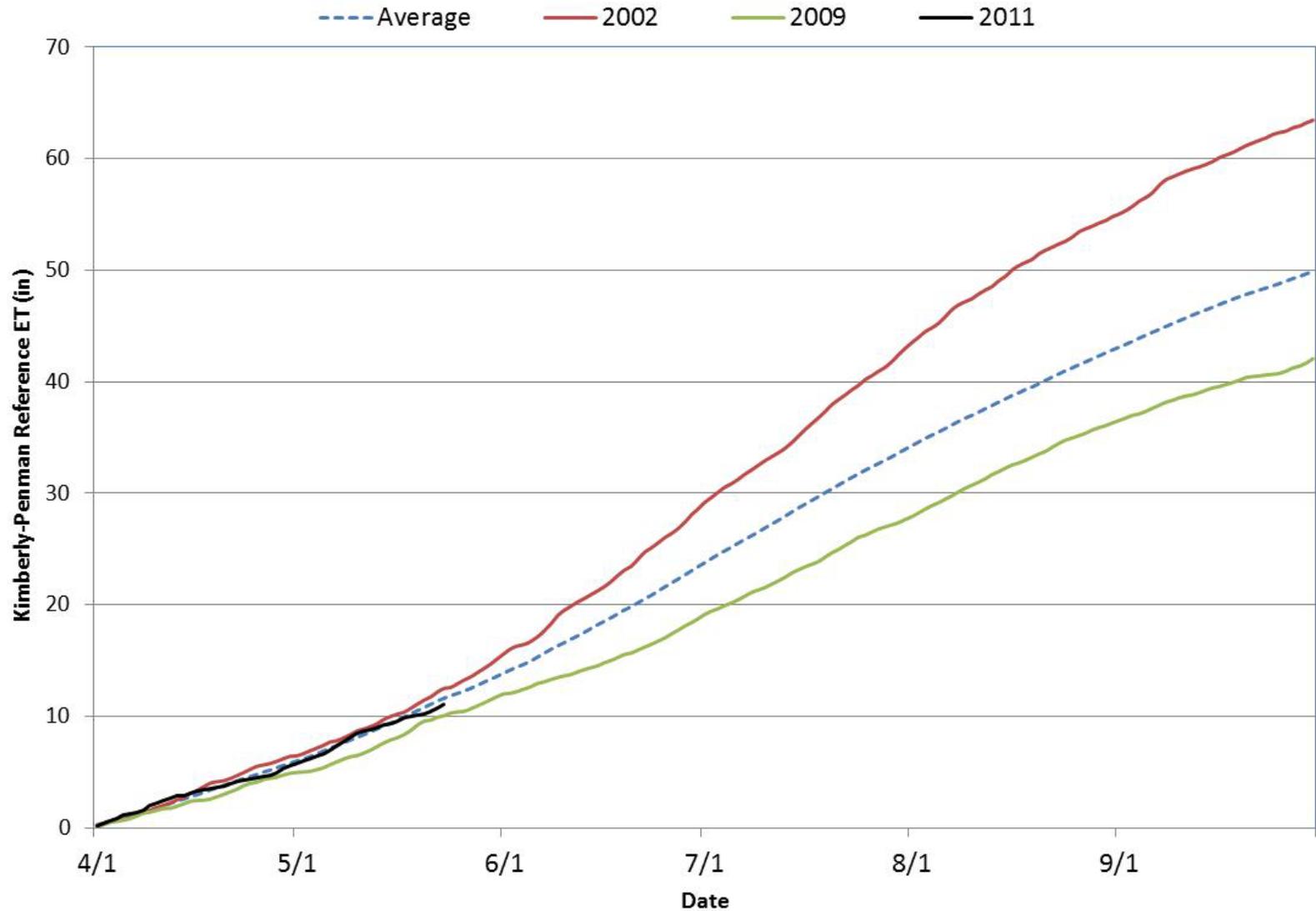
Avondale Reference ET

AVN01 Kimberly-Penman Reference ET (1993 - 2011)



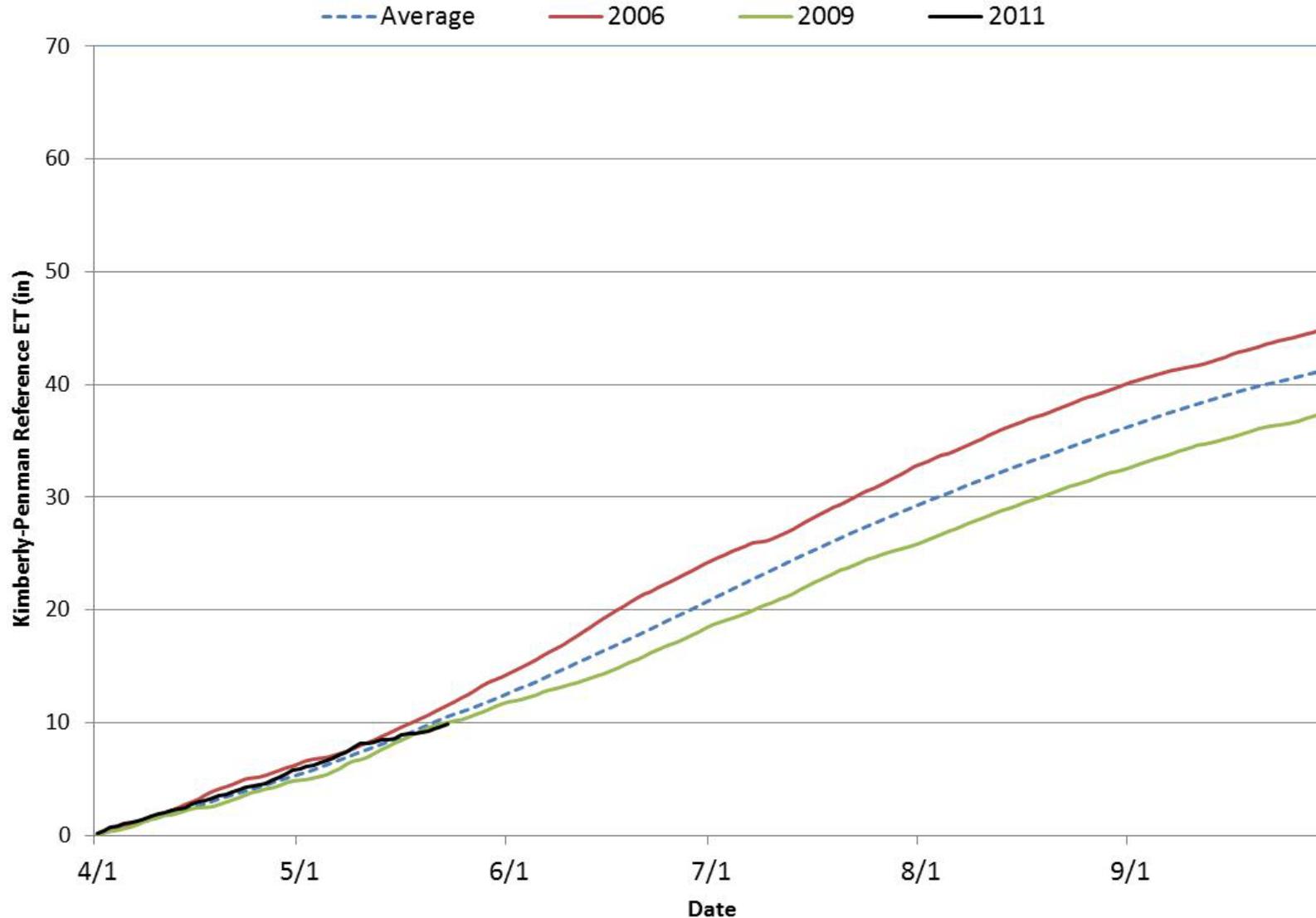
Idalia Reference ET

IDL01 Kimberly-Penman Reference ET (1992 - 2011)



Lucerne Reference ET

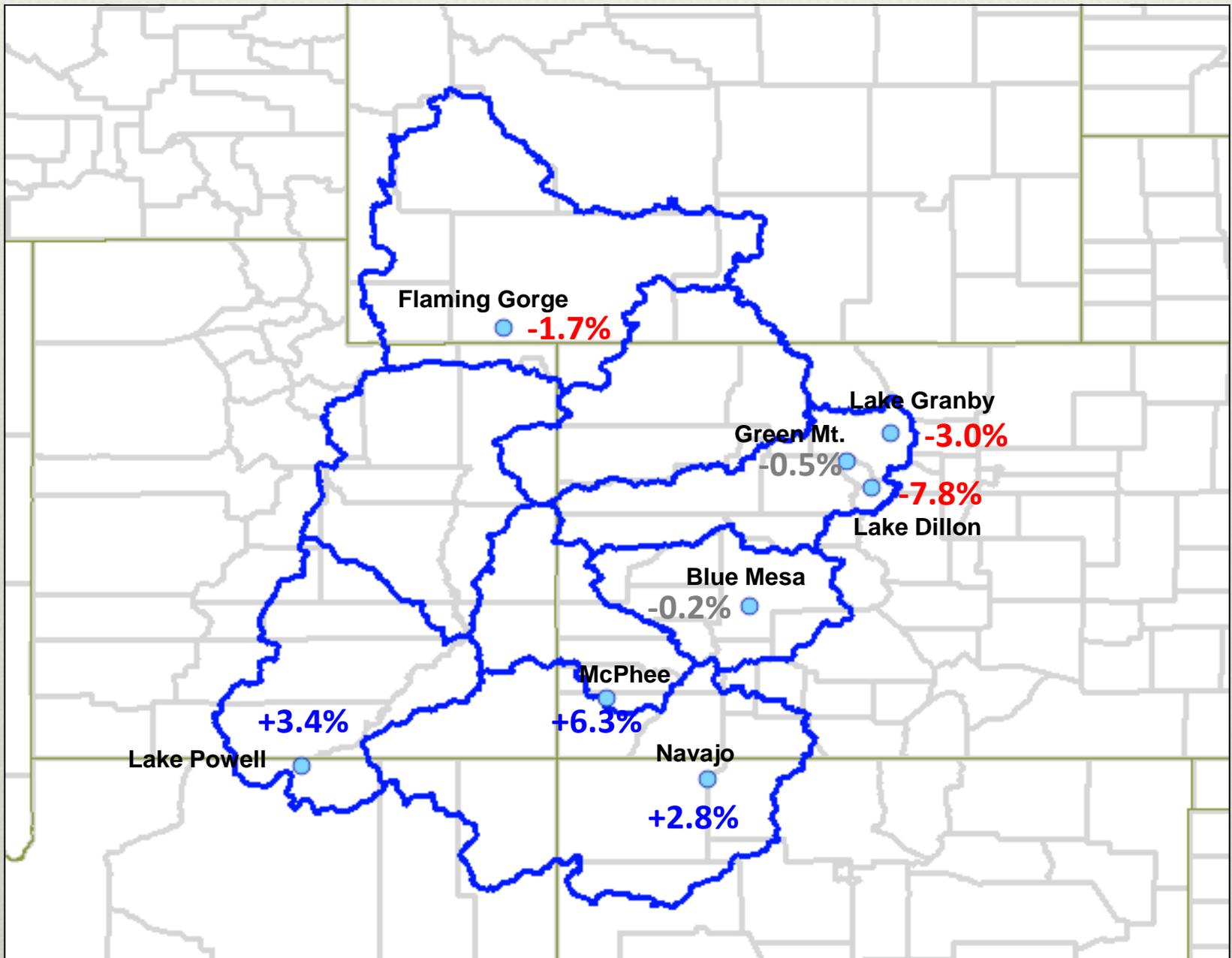
LCN01 Kimberly-Penman Reference ET (1992 - 2011)



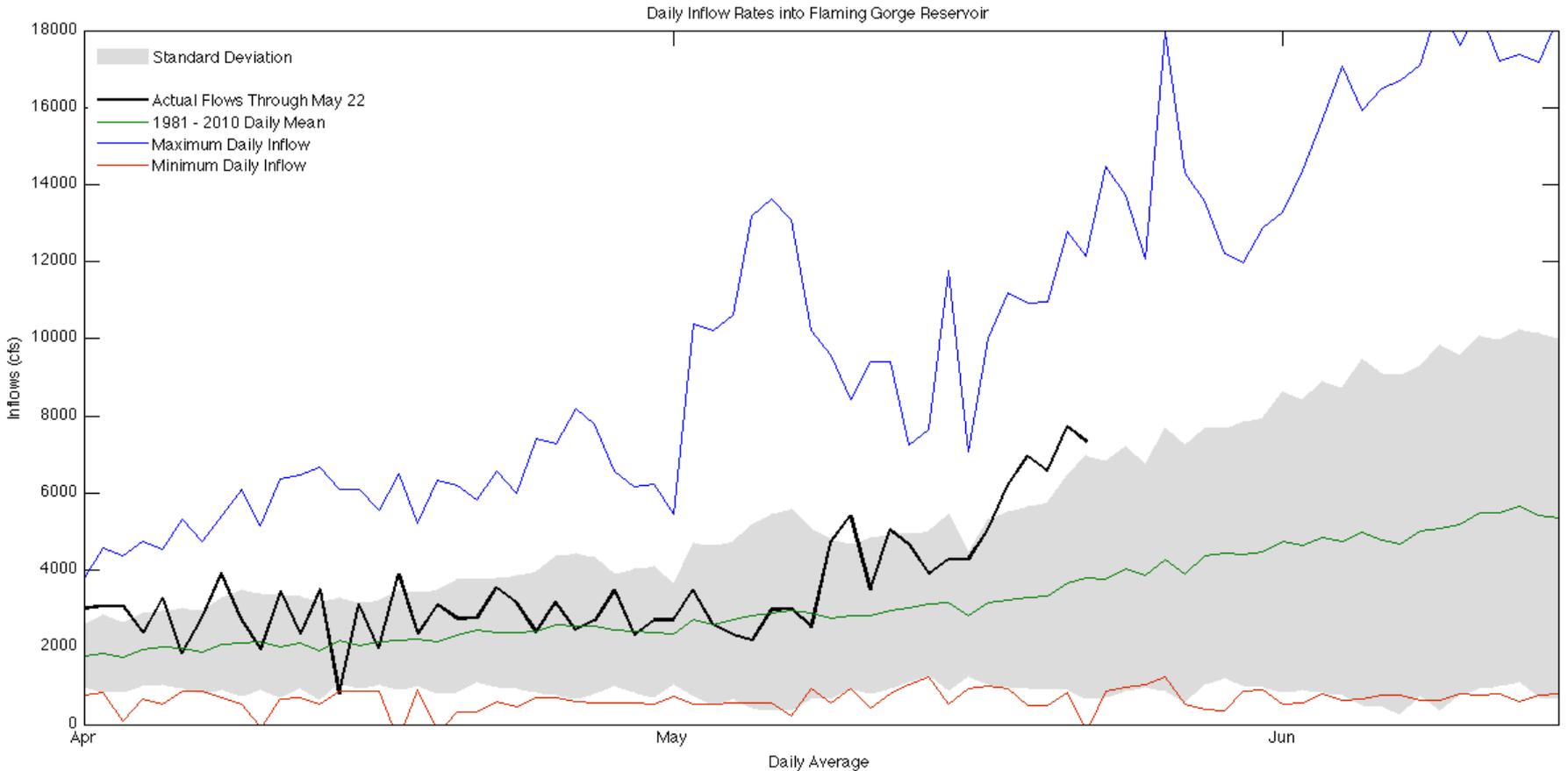
Reservoir Update



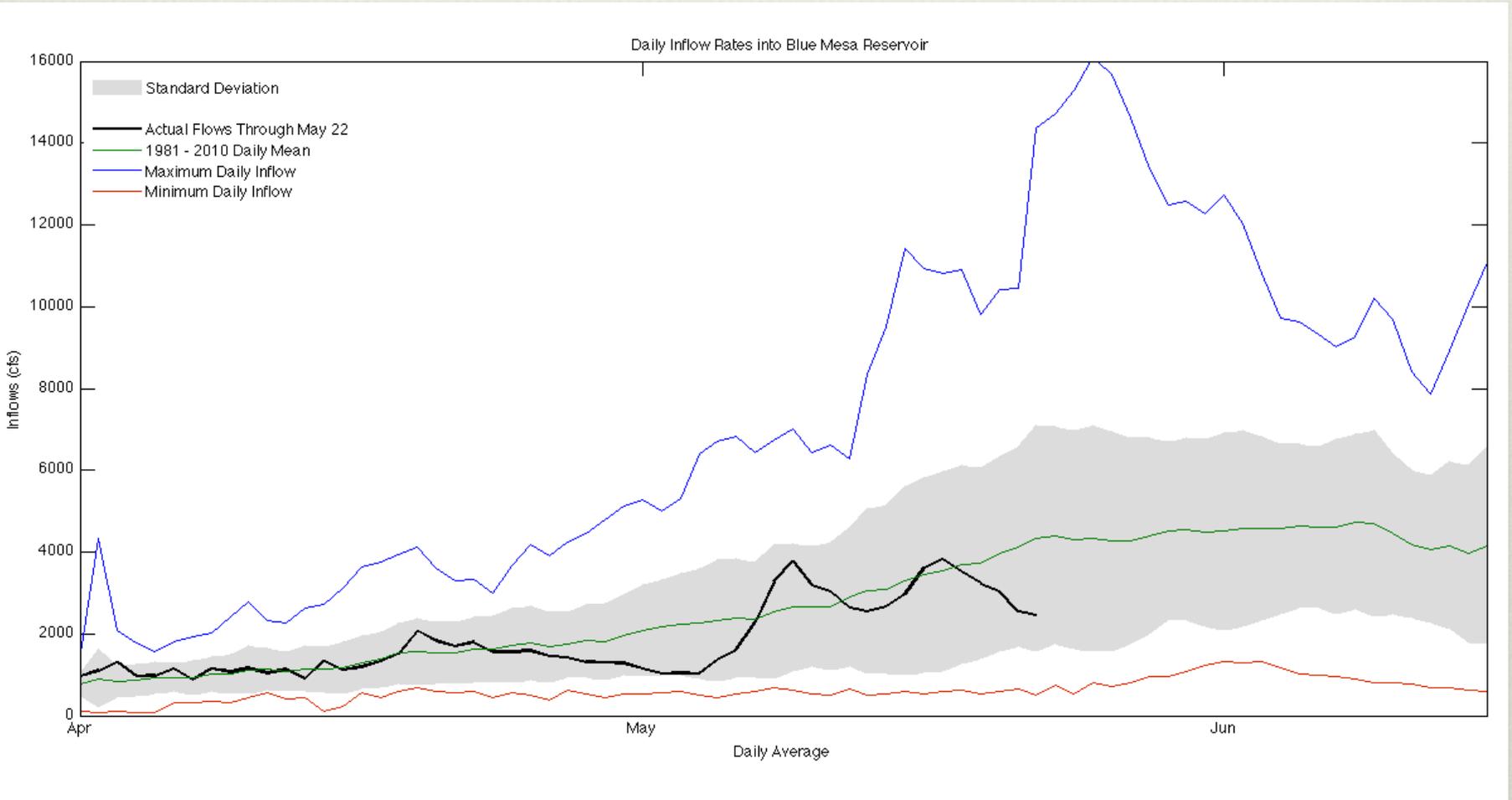
Reservoir Level Month-to-Date Change



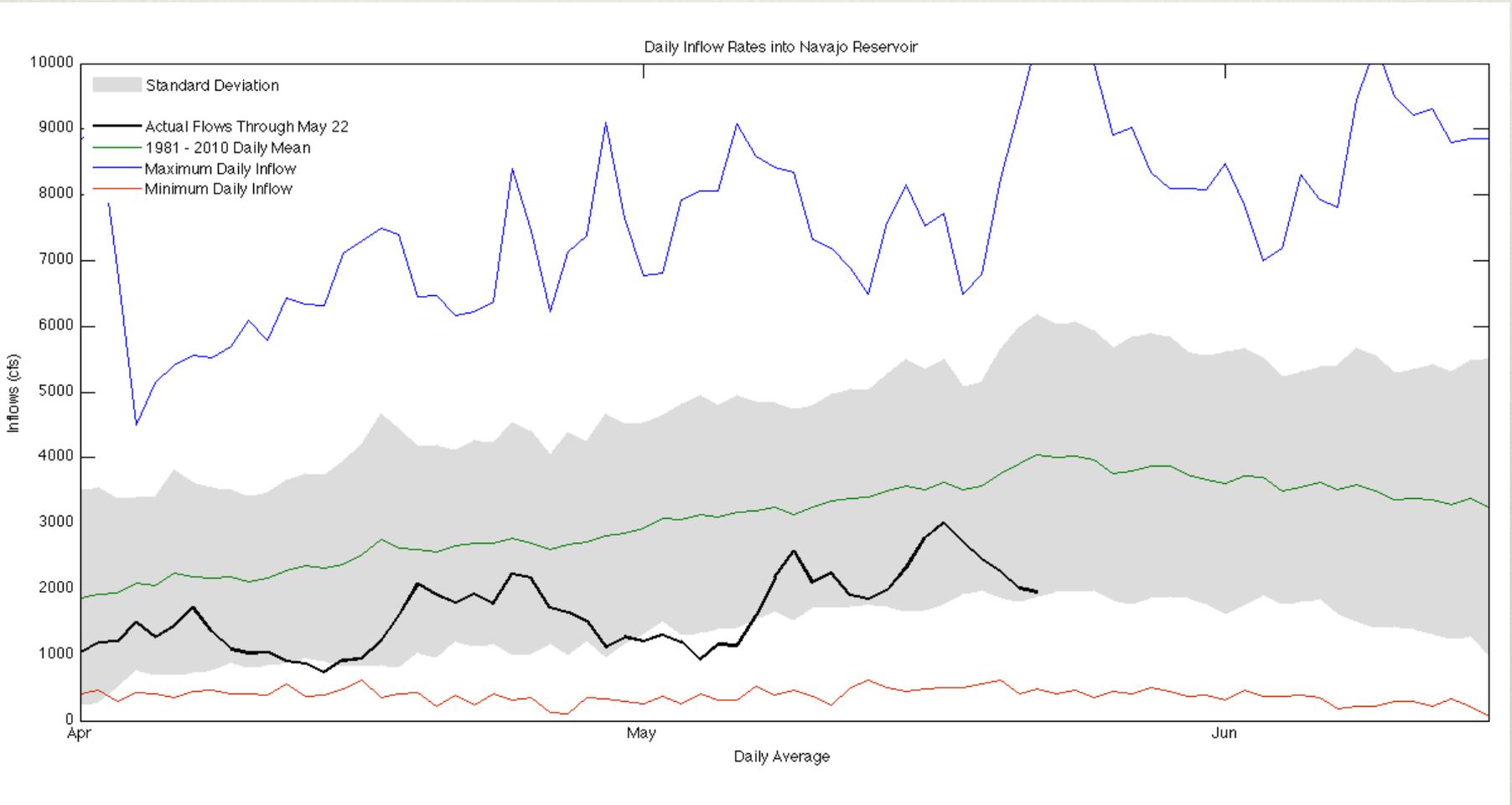
Flaming Gorge Reservoir Inflows as of 5/22/2011



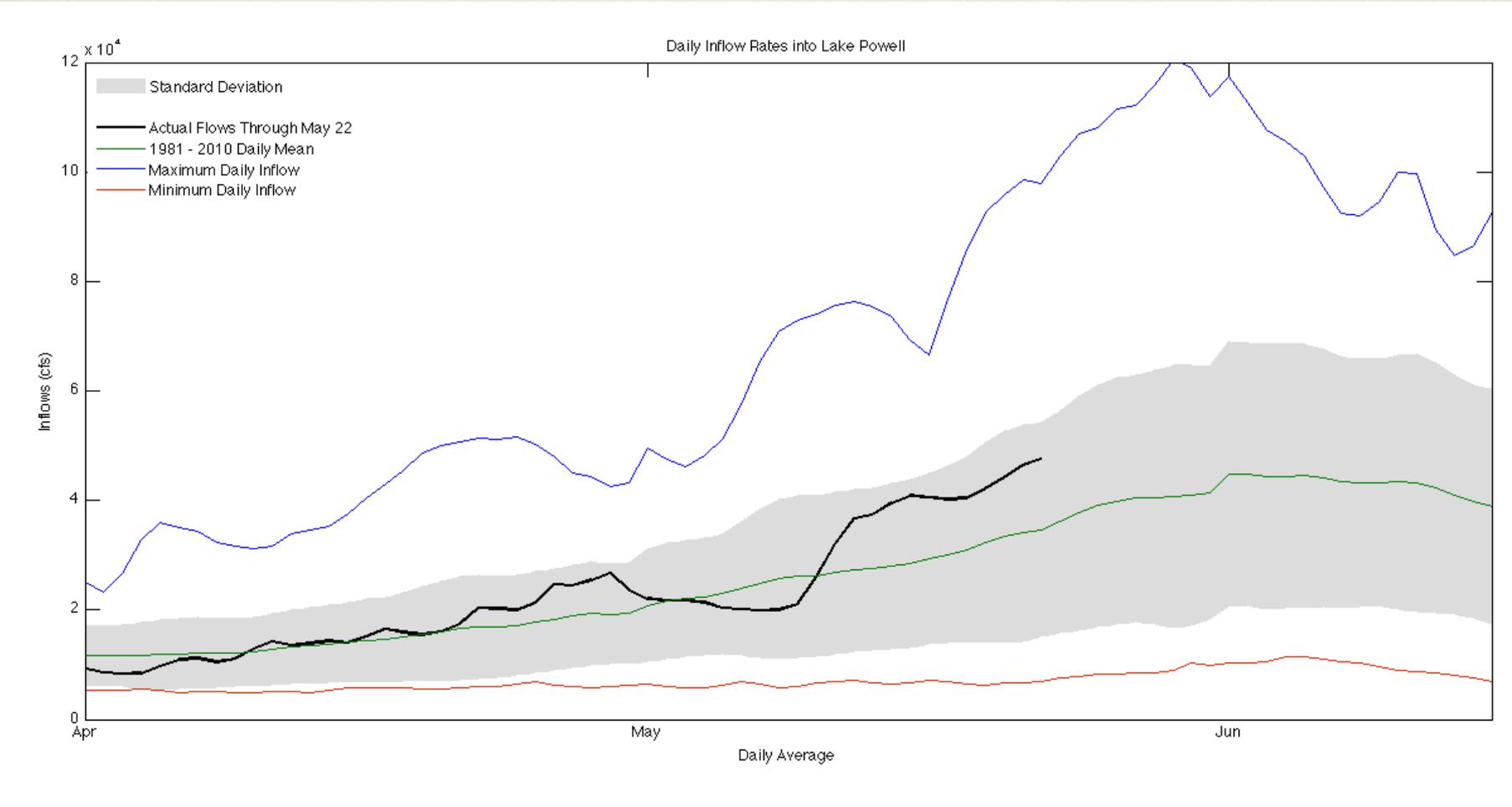
Blue Mesa Reservoir Inflows as of 5/22/2011



Navajo Reservoir Inflows as of 5/22/2011

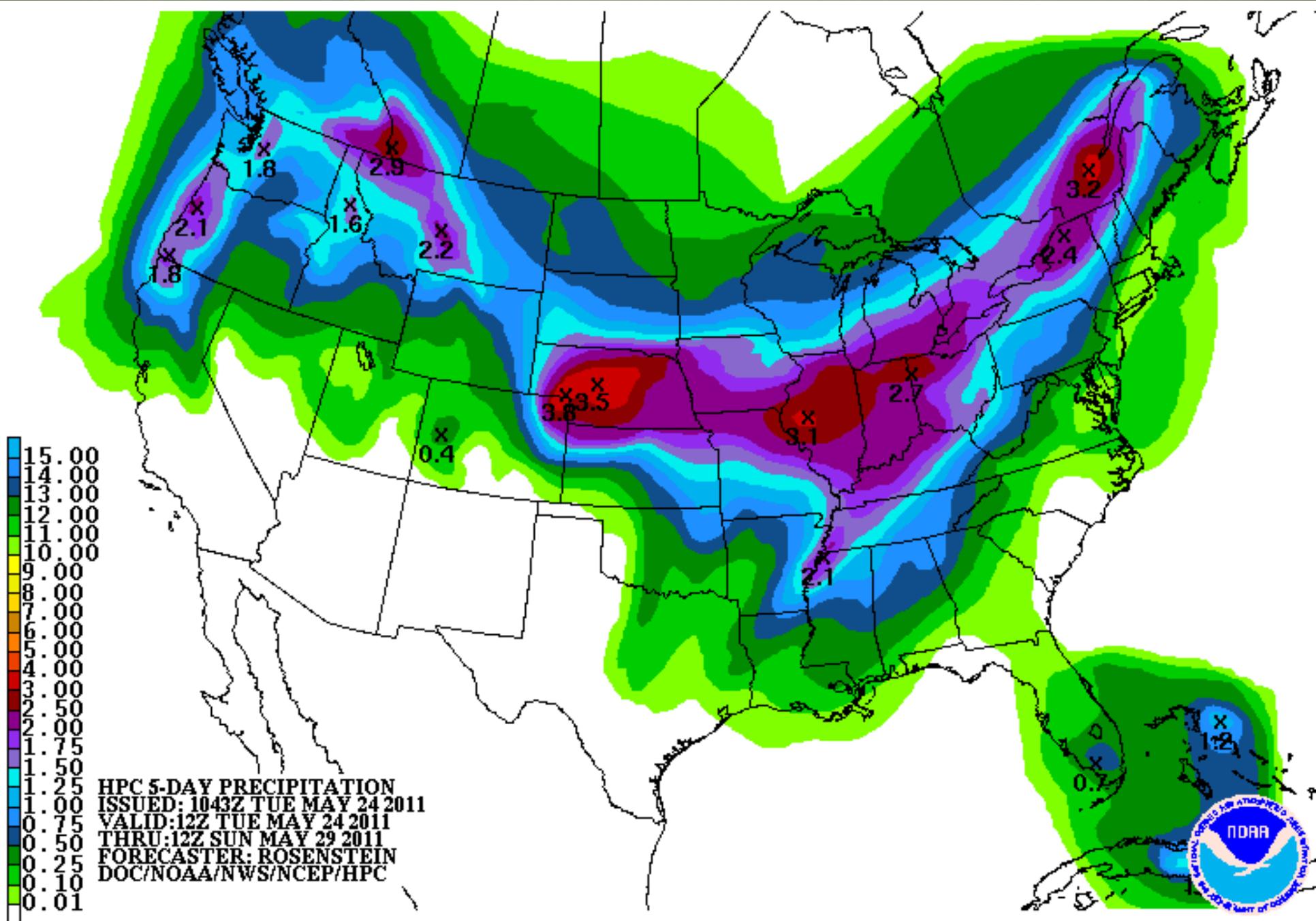


Lake Powell Inflows as of 5/22/2011

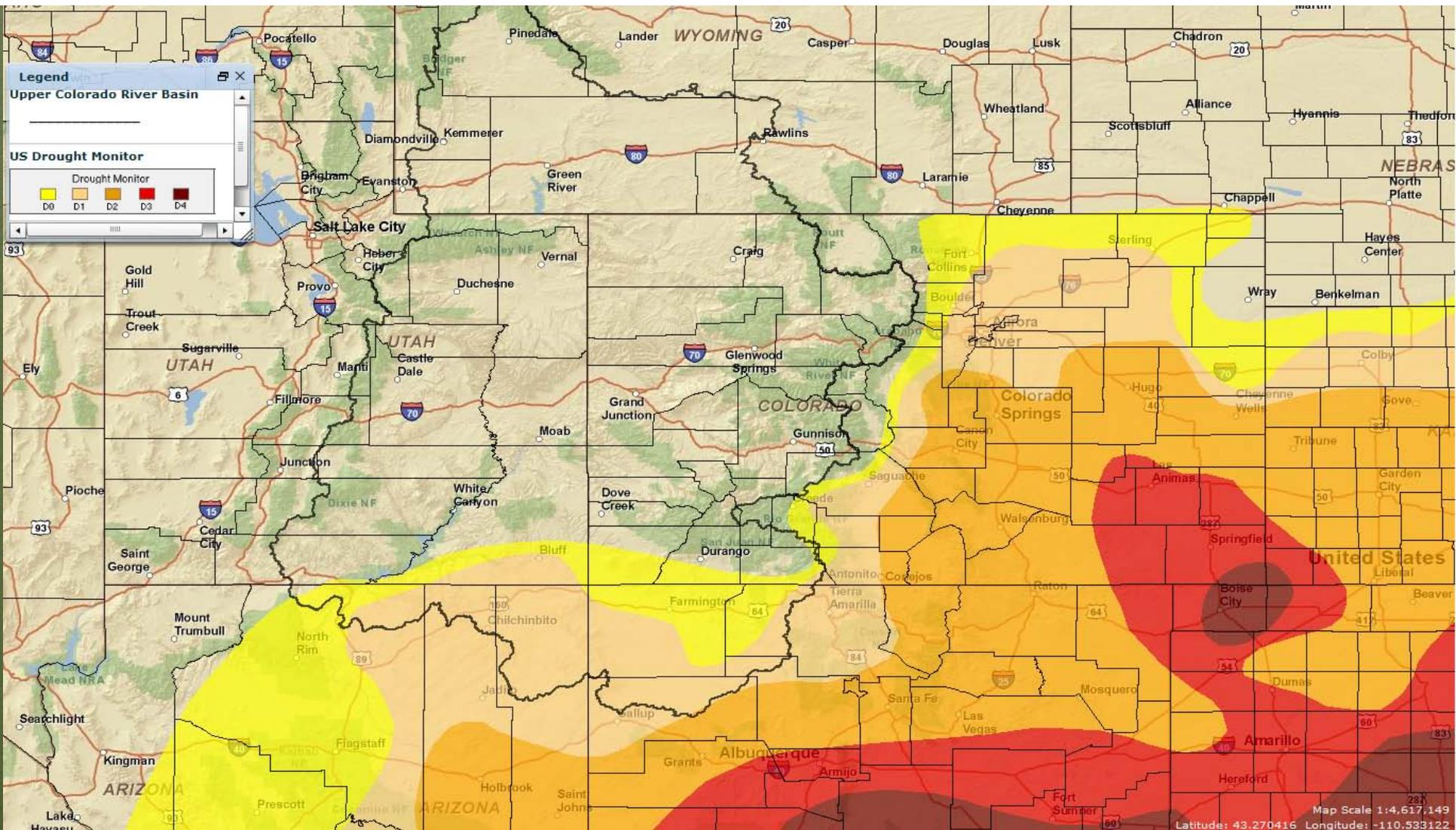


Precipitation Forecast

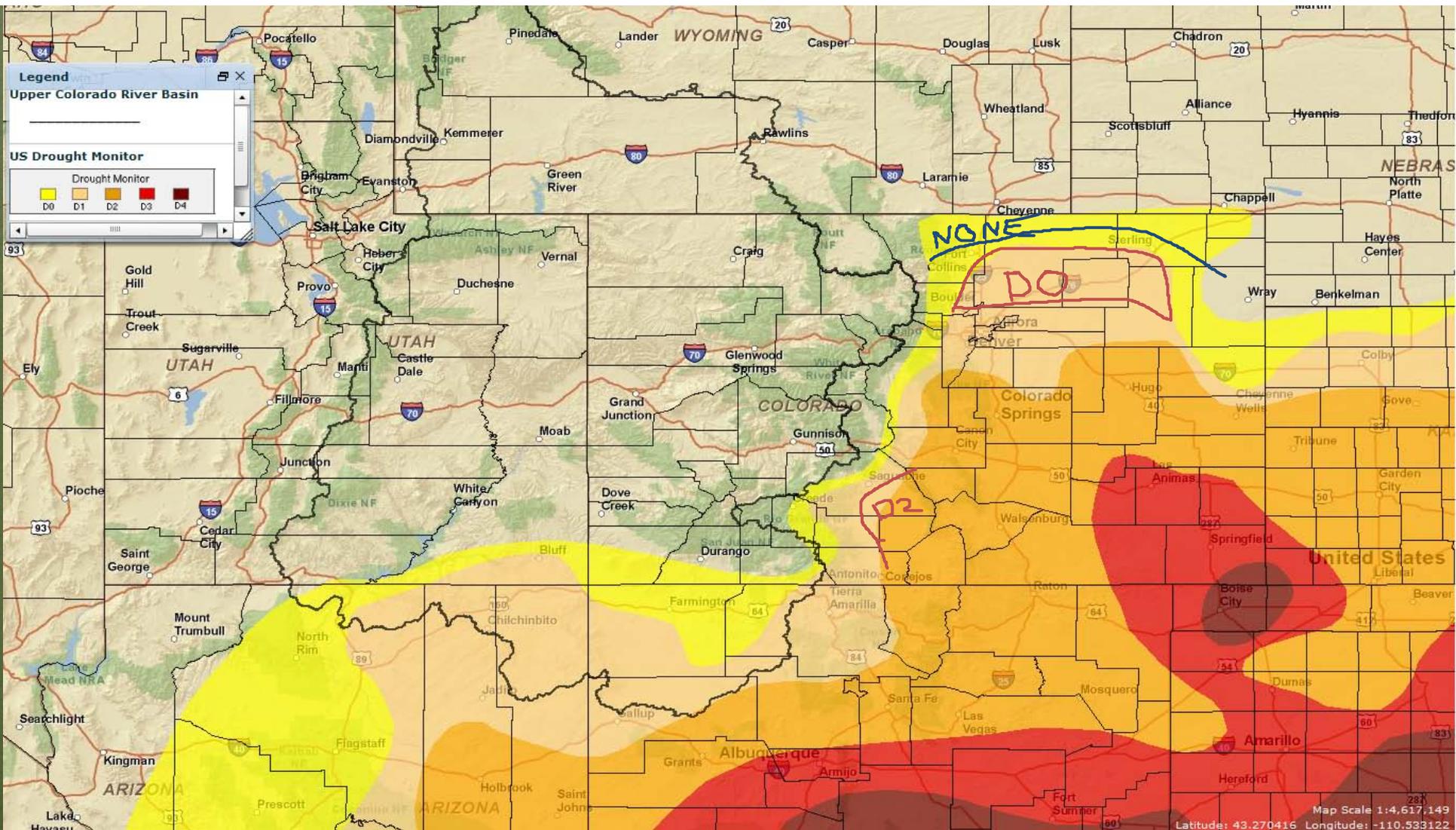




Recommendations



Recommendations



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COLORADO STATE UNIVERSITY

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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 24, 2011

Precipitation and Snowpack

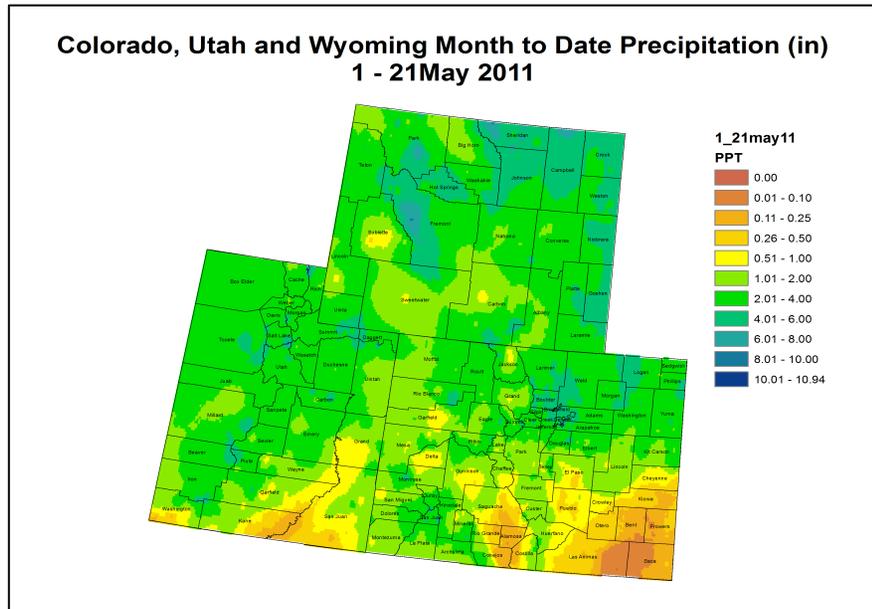


Fig. 1: May month-to-date precipitation in inches.

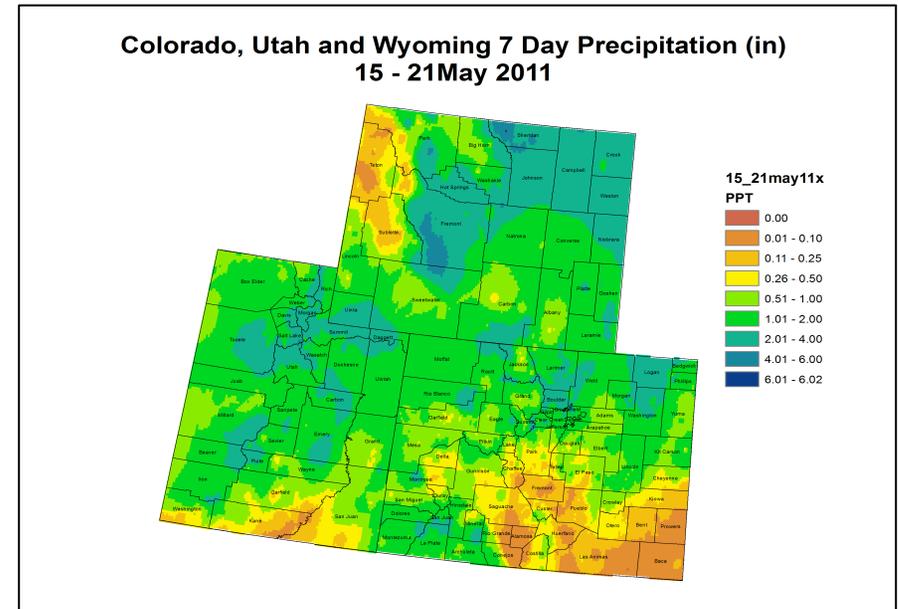


Fig. 2: May 15 – 21 precipitation in inches.

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 4 inches of moisture while the valleys received lower amounts. Northeast CO has also received between 2 and 6 inches of precipitation since the beginning of the month. Southern UT, southeastern CO and the San Luis Valley have been fairly dry for the month, receiving less than half an inch of moisture.

Last week, the heaviest precipitation fell east of the UCRB (Fig. 2). Many counties in northeast CO saw about 2 to 4 inches of precipitation. The Upper and Lower Green River basins also received over 2 inches of moisture for the week. Southwestern CO slightly rebounded from dry conditions with weekly accumulations of over an inch. The San Luis Valley and southeastern CO remained fairly dry with many areas only seeing less than a tenth of an inch of moisture for the week. Southern UT along the Colorado River was also fairly dry, receiving less than a quarter inch of precipitation.

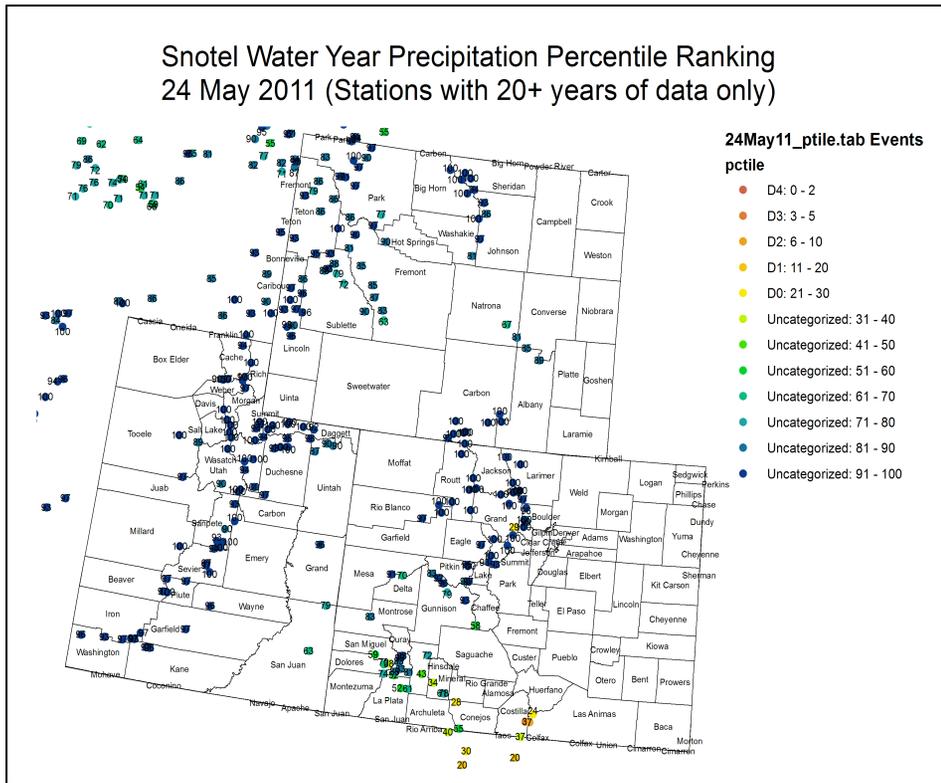


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21-30% is Drought Monitor's D0 category).

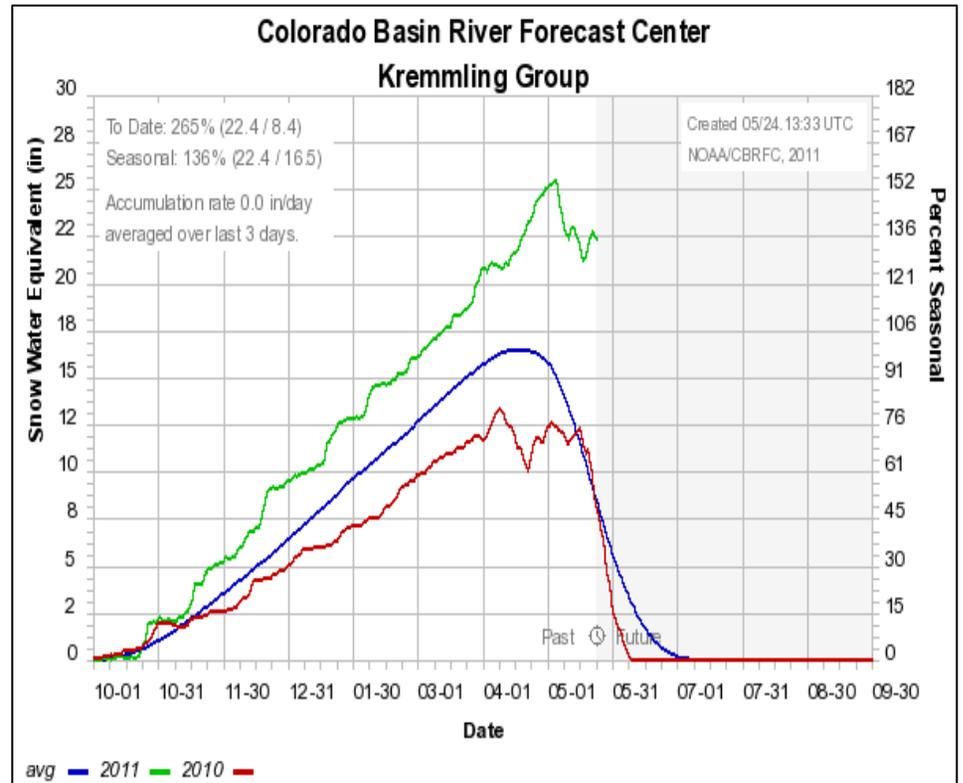


Fig. 4: Colorado Above Kremmling averaged accumulation of snow water equivalent, WYTD.

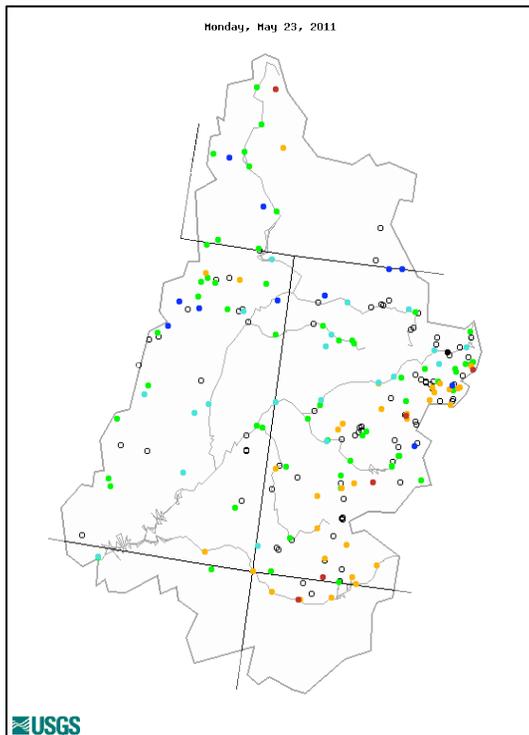
The majority of the SNOTEL sites in the UCRB are showing very high (and in many cases, record high) percentile rankings for water-year-to-date (WYTD) precipitation (Fig. 3). The Rio Grande and San Juan basins in southern CO are the driest, though the higher elevations of the San Juan basin have improved 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—snowpack for the entire basin above Lake Powell was 160% of average as of May 2nd. 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. The Colorado above Kremmling shows new accumulations for last week and a further delay of snowmelt due to colder than average temperatures (Fig. 4).

Streamflow

As of May 23rd, about 75% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows (Fig. 5). With the return to cooler temperatures, many of the higher elevation sites (especially prevalent in CO) saw a slow-down in runoff last week. As temperatures warm, many sites could approach flood stage, especially in the Yampa basin, due to the above average seasonal snowpack.

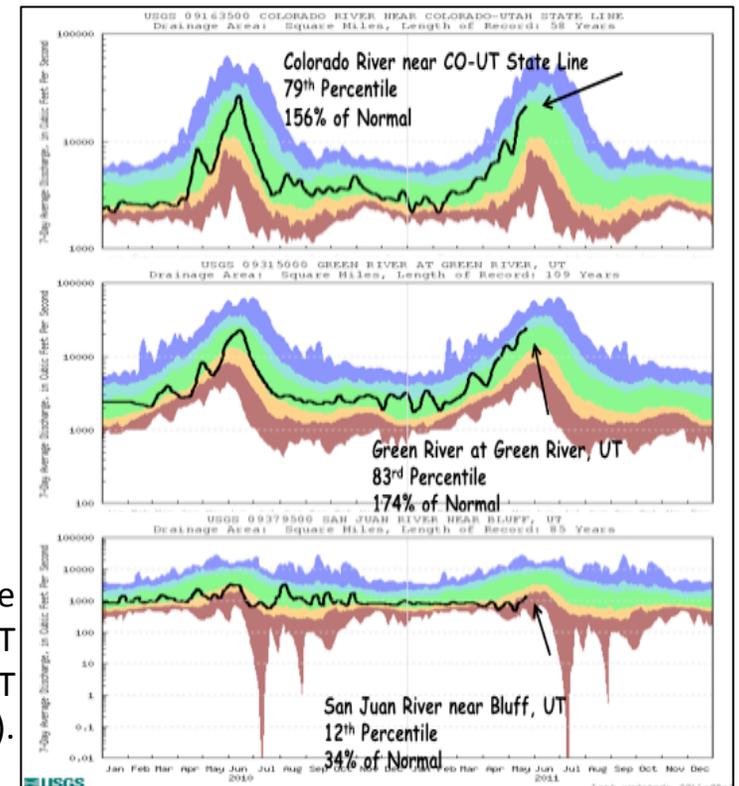
Key gages on the Colorado River near the CO-UT state line and the Green River at Green River, UT are both currently recording above normal discharge at the 79th and 83rd percentiles, respectively, while the San Juan River near Bluff, UT is currently recording below normal flows at the 12th percentile (Fig. 6). Low flows along the San Juan are likely due to limited releases out of Navajo Reservoir, which won't see larger increases until June.



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 7-day average streamflow compared to historical streamflow for May 23rd in the UCRB.

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, most of the UCRB and northeastern plains saw below average temperatures (-4 to -8°F) while the southeastern plains were only slightly cooler (0 to 2°F below average). 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 in southeastern CO) reference evapotranspiration is currently tracking along with the year of highest recorded ET, which was during the drought of 2002. At Lucerne, 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.

Due to delayed snowmelt (and cooler than average temperatures) in the higher elevations, most of the reservoir levels in the UCRB are below their average May levels. Storage volumes at Lake Dillon continue to decrease. Storage at Flaming Gorge, Green Mountain and Lake Granby have begun increasing since last week. Lake Powell, McPhee, and Navajo Reservoir storages (all in the southern portion of the basin) have all been increasing since April.

Precipitation Forecast

An upper level low, currently over the region, will produce widespread precipitation for much of the UCRB and the northeastern plains. The 5-day QPF accumulations will mostly fall over the region in the next 24 hours (Fig. 7) before this trough moves out to the east. Beyond today several more storm systems are predicted to move just north of the UCRB, keeping temperatures below average and bringing small amounts of precipitation to northern UT and northern CO and heavier amounts through much of WY. Southern UT and southern CO could see some additional snowmelt, though temperatures in the region will only reach near average. A similar storm track is possible for next week, with most of the systems moving just to the north. Chances for convective activity across the plains are greatest within the next 24 hours, with reduced chances for the remainder of the week.

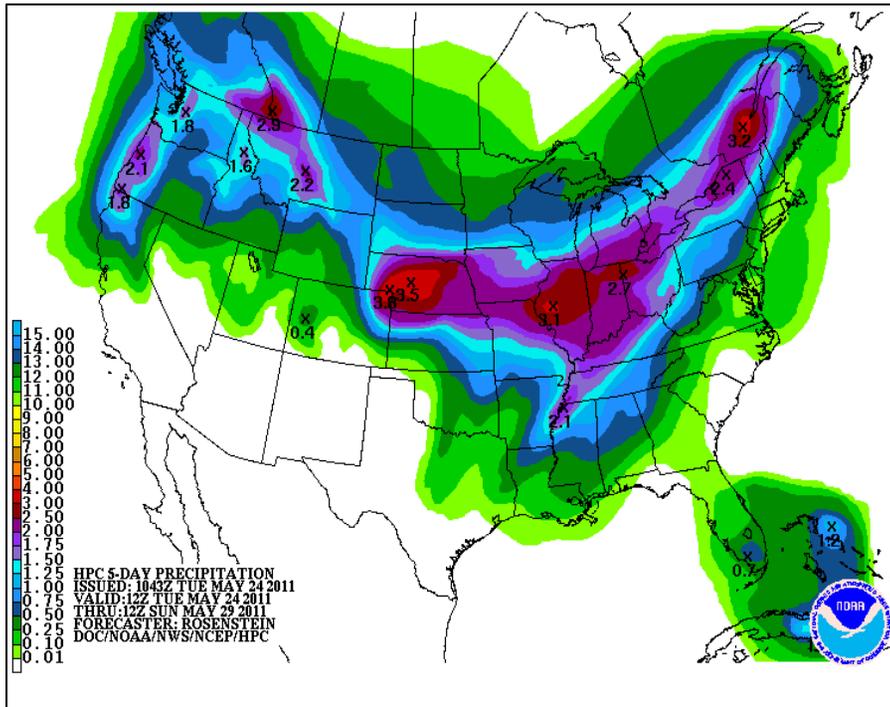


Fig. 7: HPC's 5-day quantitative precipitation forecast (QPF) as of 12UTC on May 24th.

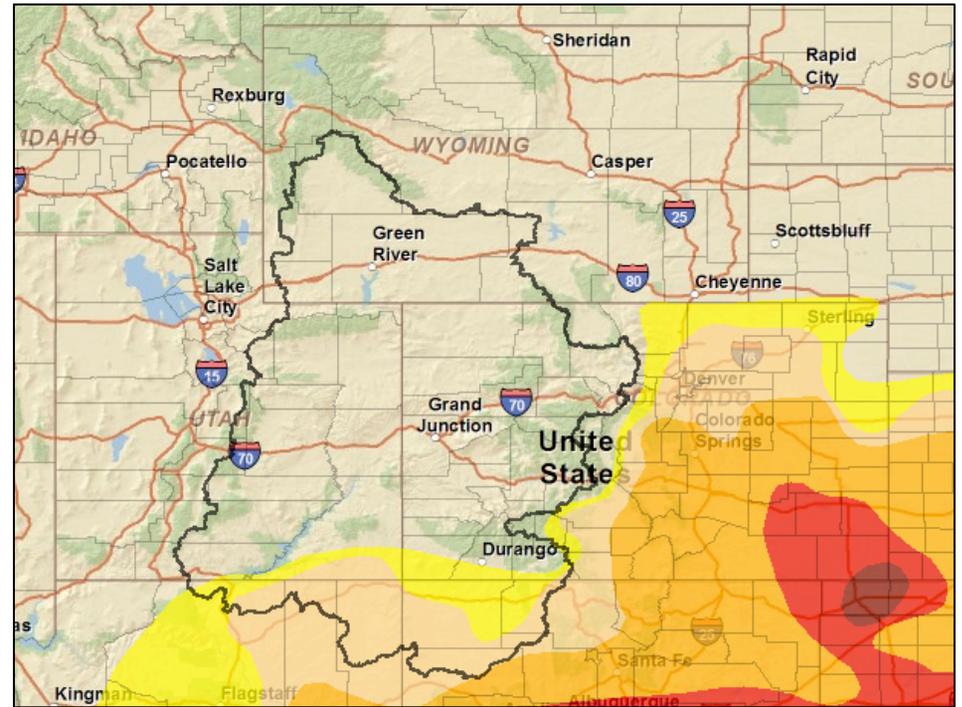


Fig. 8: May 17th release of U.S. Drought Monitor for the UCRB

Drought – Exceptional	0 to 2 (D4)
Drought – Extreme	2 to 5 (D3)
Drought – Severe	5 to 10 (D2)
Drought – Moderate	10 to 20 (D1)
Abnormally Dry	20 to 30 (D0)

Drought categories and their associated percentiles

Drought and Water Discussion

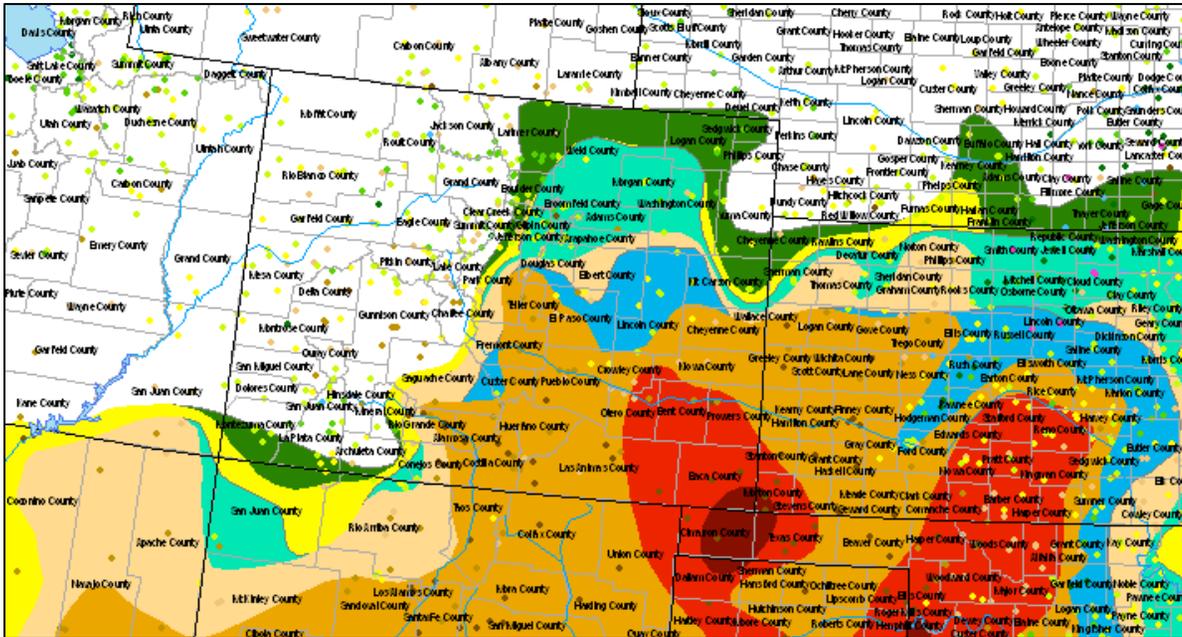


Fig. 9: Adjustments that the USDM author has made to the USDM map. Green is improvement from D0 to nothing; aqua is improvement from D1 to D0; and blue is improvement from D2 to D1.

Several changes are being recommended for the current U.S. Drought Monitor (USDM) map (Fig. 8). Due to continued above average precipitation that fell over northeastern CO last week, the current USDM author has scaled back the D0, D1, and D2 in those areas (Fig. 9).

Due to the beneficial moisture that fell in the Four Corners region last week, the USDM author has also scaled back some of the D0 and D1 in that area (Fig. 9). Local experts agreed that this was warranted.

Local experts have also requested a D2 to D1 improvement along the higher elevations of Fremont, Custer, and southwestern Pueblo counties. It is also being recommended that the D2 be pushed slightly further west into the dry regions of the San Luis Valley, covering more of Saguache County and extending into Rio Grande County.