

**Spring  
2011**

**April 19<sup>th</sup>, 2011**

**NIDIS - UPPER COLORADO BASIN PILOT PROJECT**

**Weekly Climate, Water & Drought Assessment**

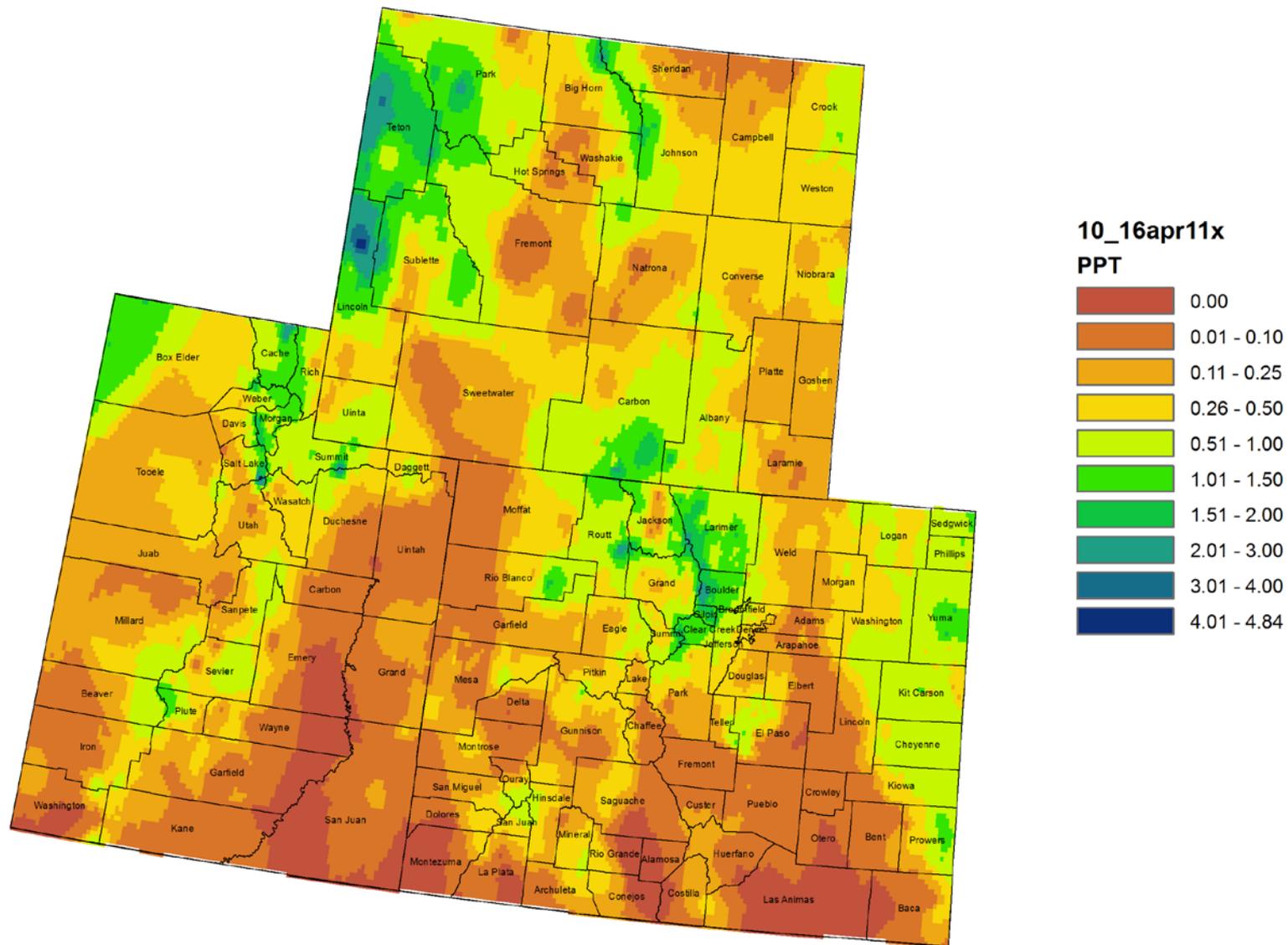
# Today's Agenda

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

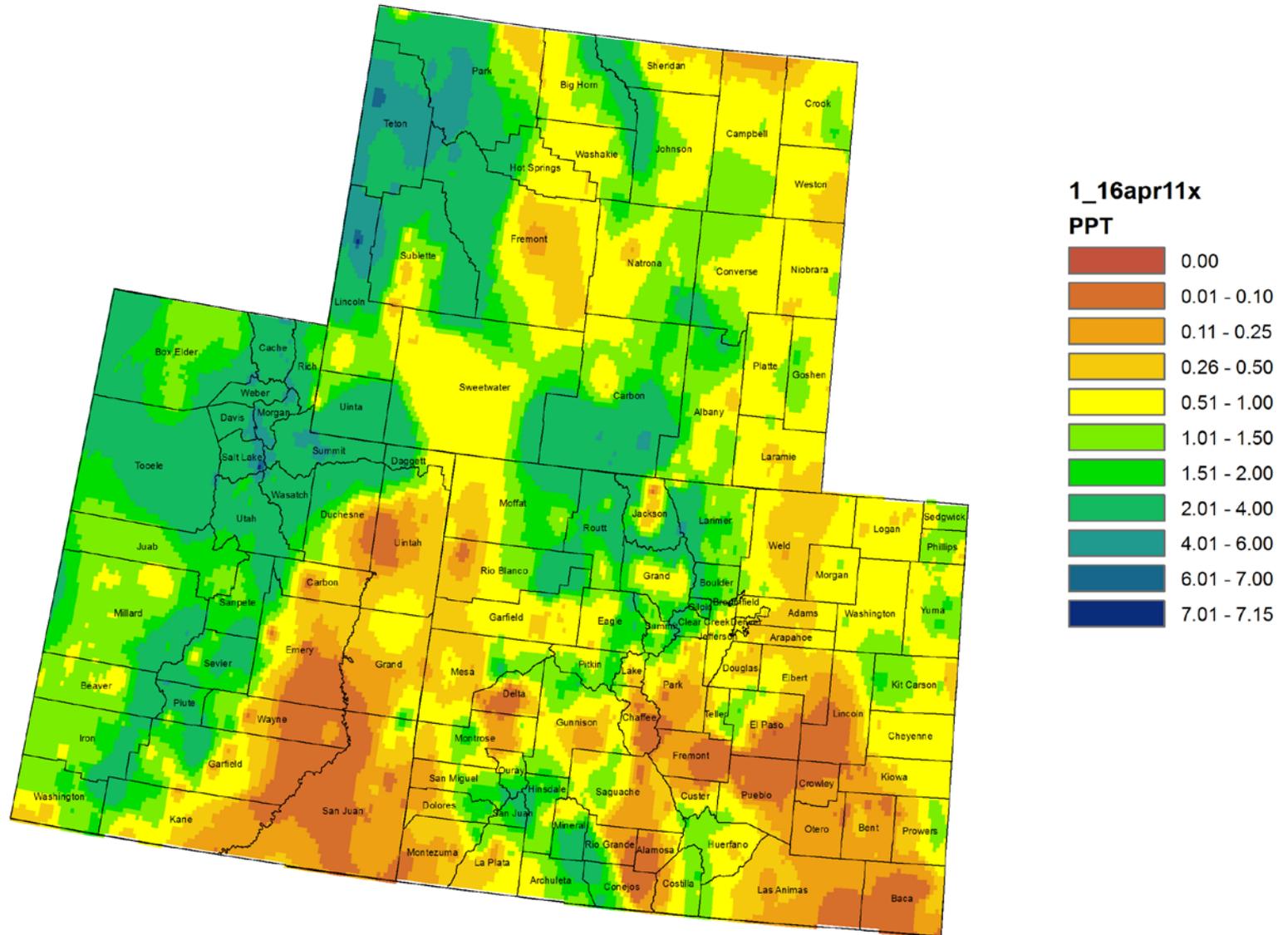
# Precipitation/Snowpack Update



# Colorado, Utah and Wyoming 7 Day Precipitation (in) 10 -16 April 2011

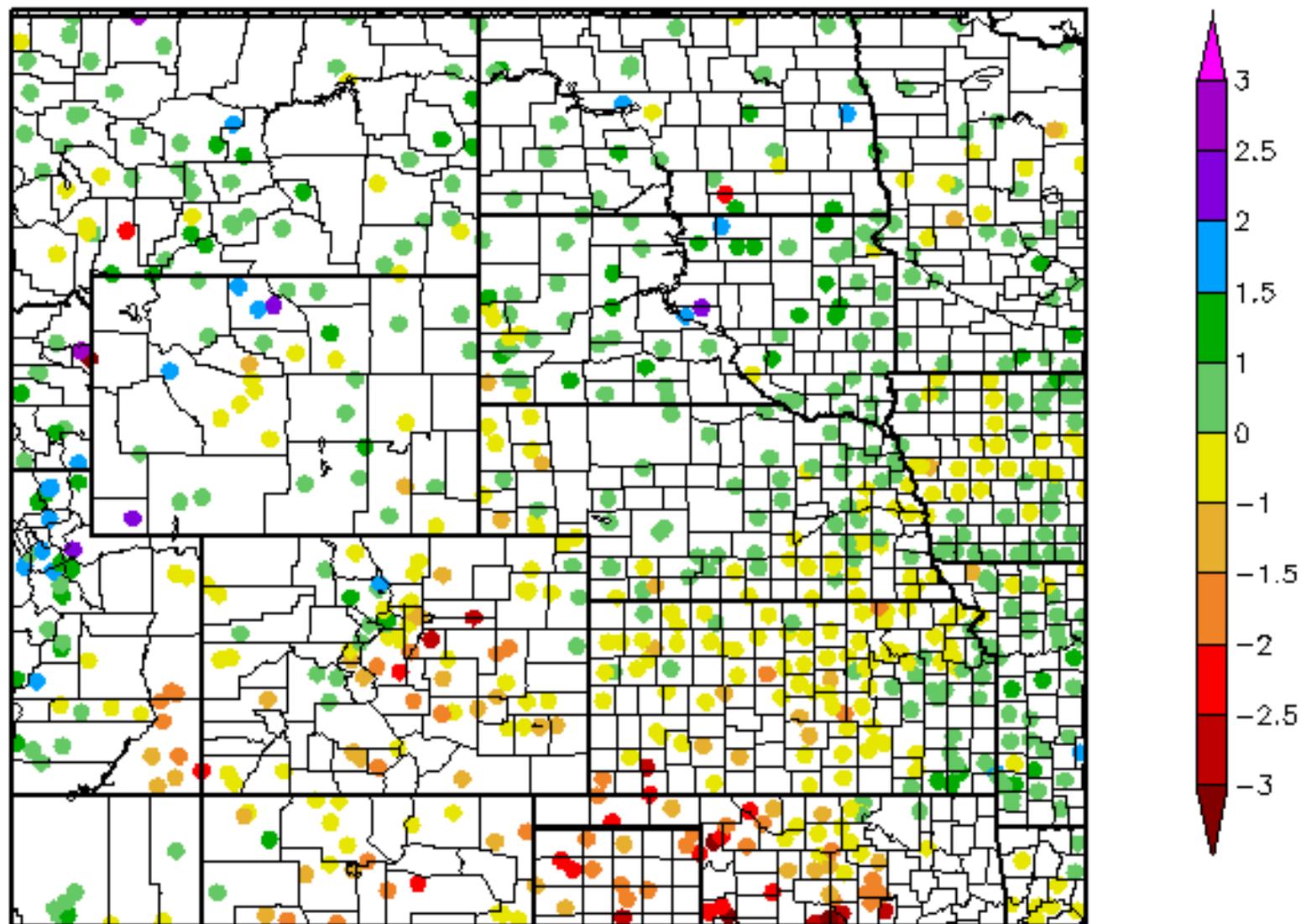


# Colorado, Utah and Wyoming Month to Date Precipitation (in) 1 -16 April 2011



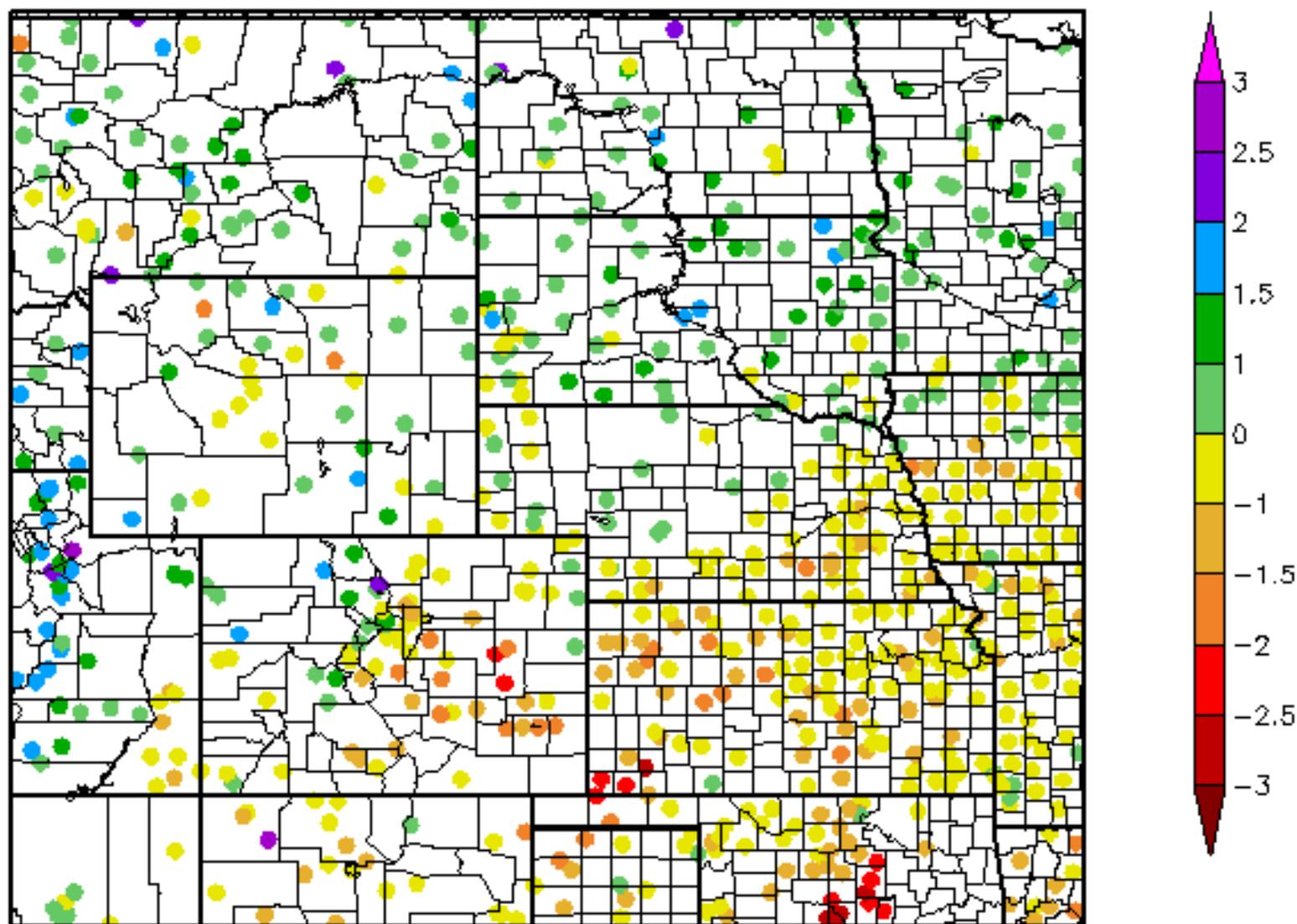
# 60 Day SPI

2/18/2011 - 4/18/2011



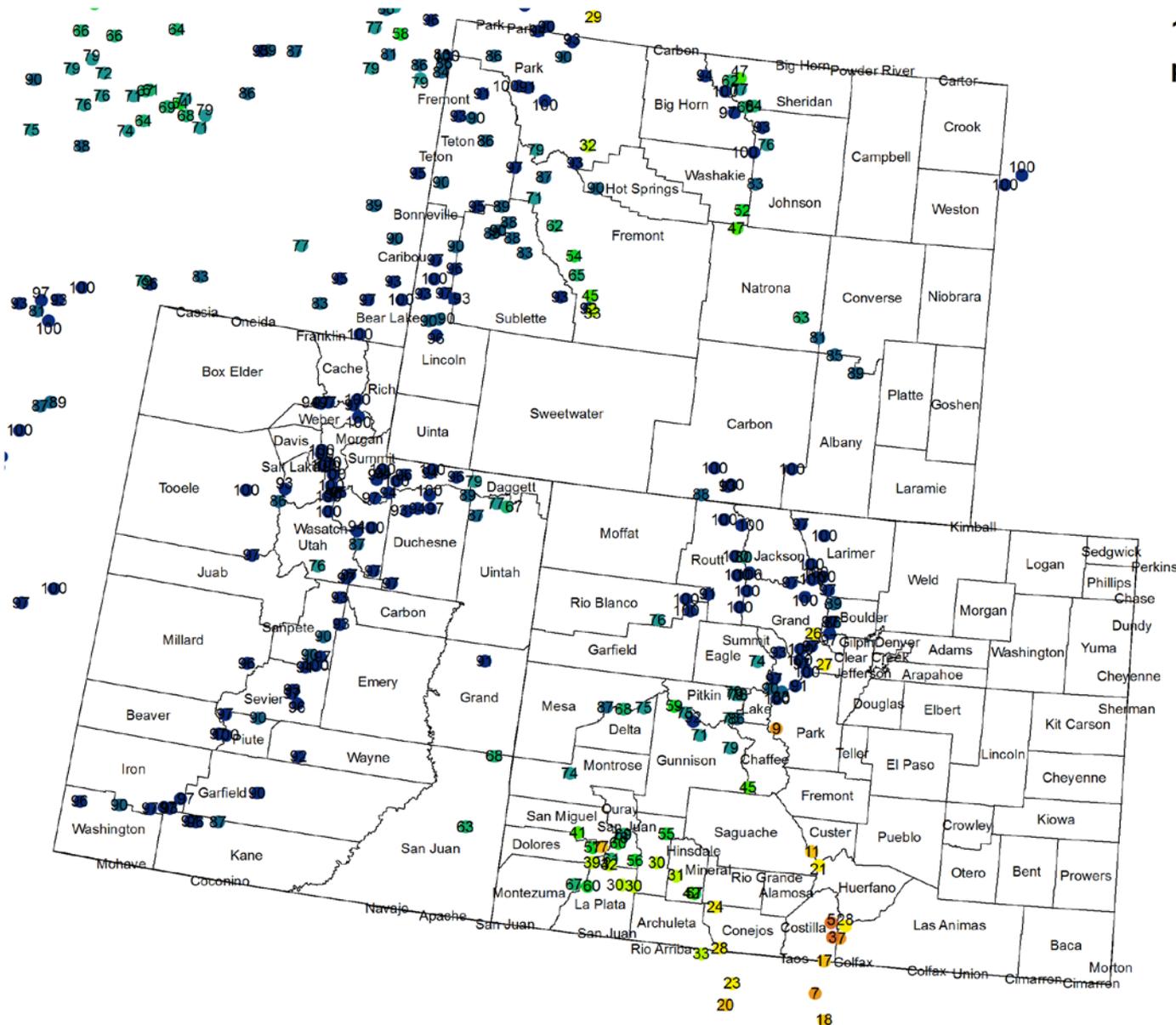
# Water Year SPI

10/1/2010 - 4/18/2011



# Snotel Water Year Precipitation Percentile Ranking

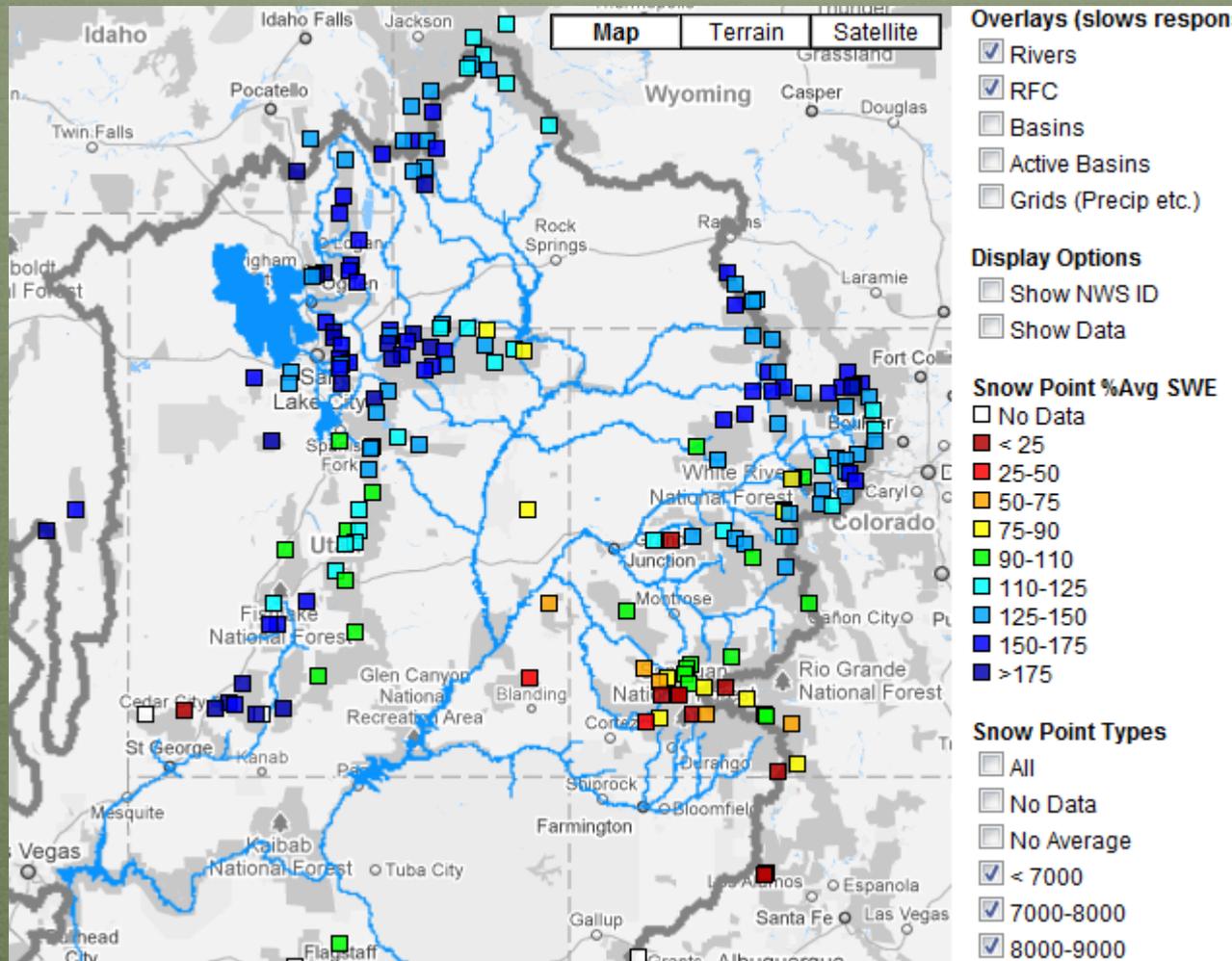
## 19 April 2011



### 19apr11\_ptile.tab Events ptile

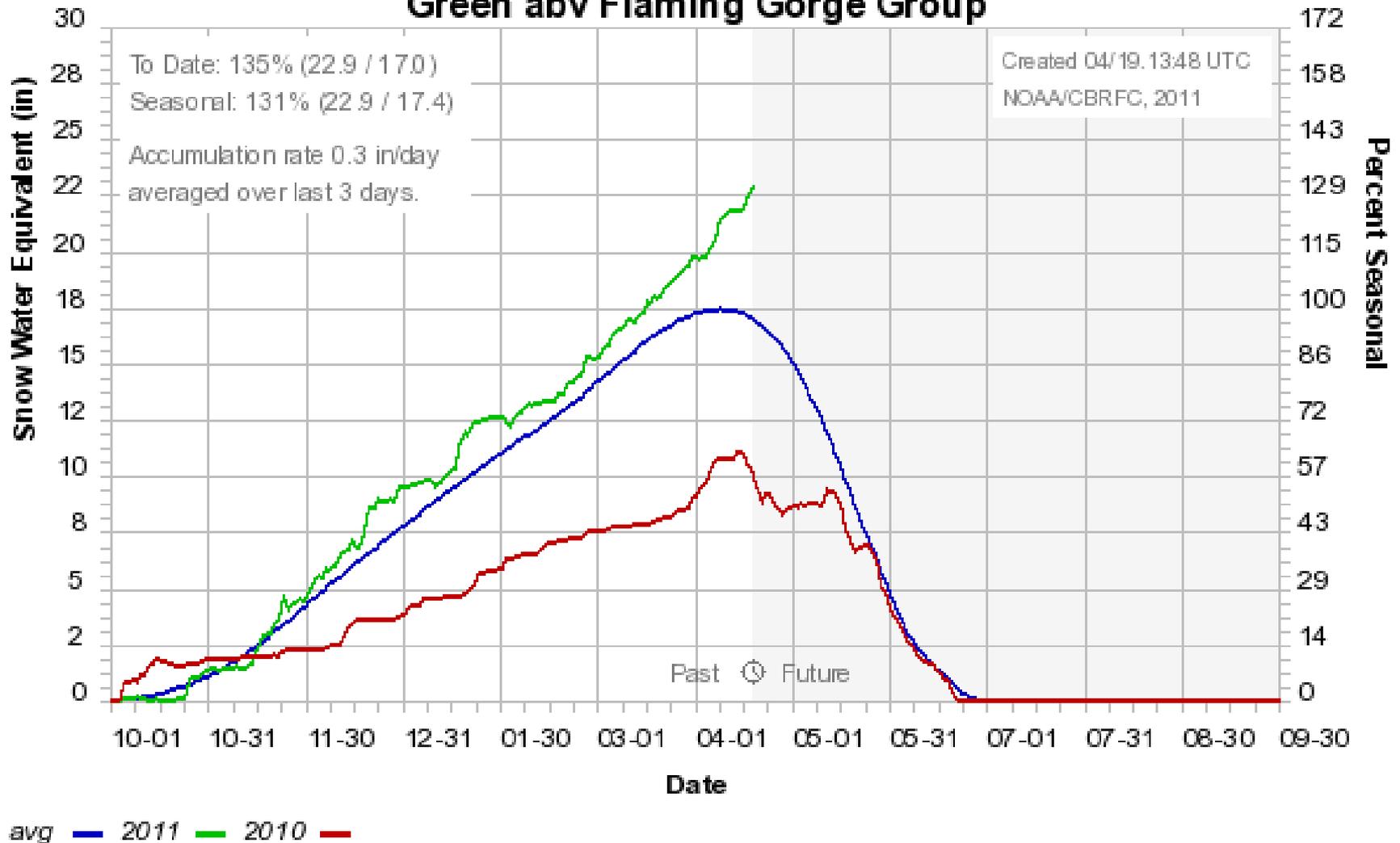
- D4: 0 - 2
- D3: 3 - 5
- D2: 6 - 10
- D1: 11 - 20
- D0: 21 - 30
- Uncategorized: 31 - 40
- Uncategorized: 41 - 50
- Uncategorized: 51 - 60
- Uncategorized: 61 - 70
- Uncategorized: 71 - 80
- Uncategorized: 81 - 90
- Uncategorized: 91 - 100

# Upper Colorado River Basin Snow



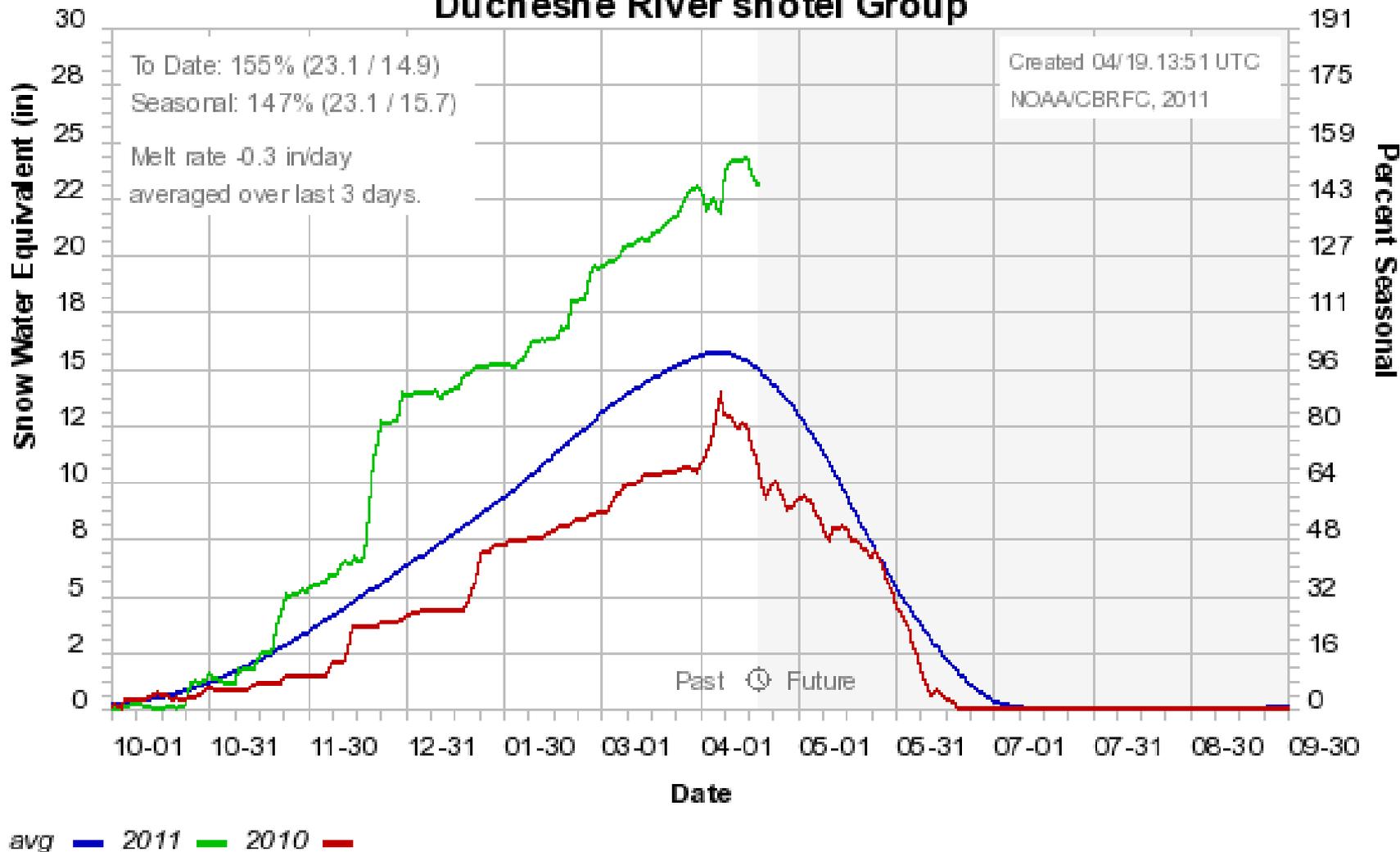
# Colorado Basin River Forecast Center

## Green abv Flaming Gorge Group



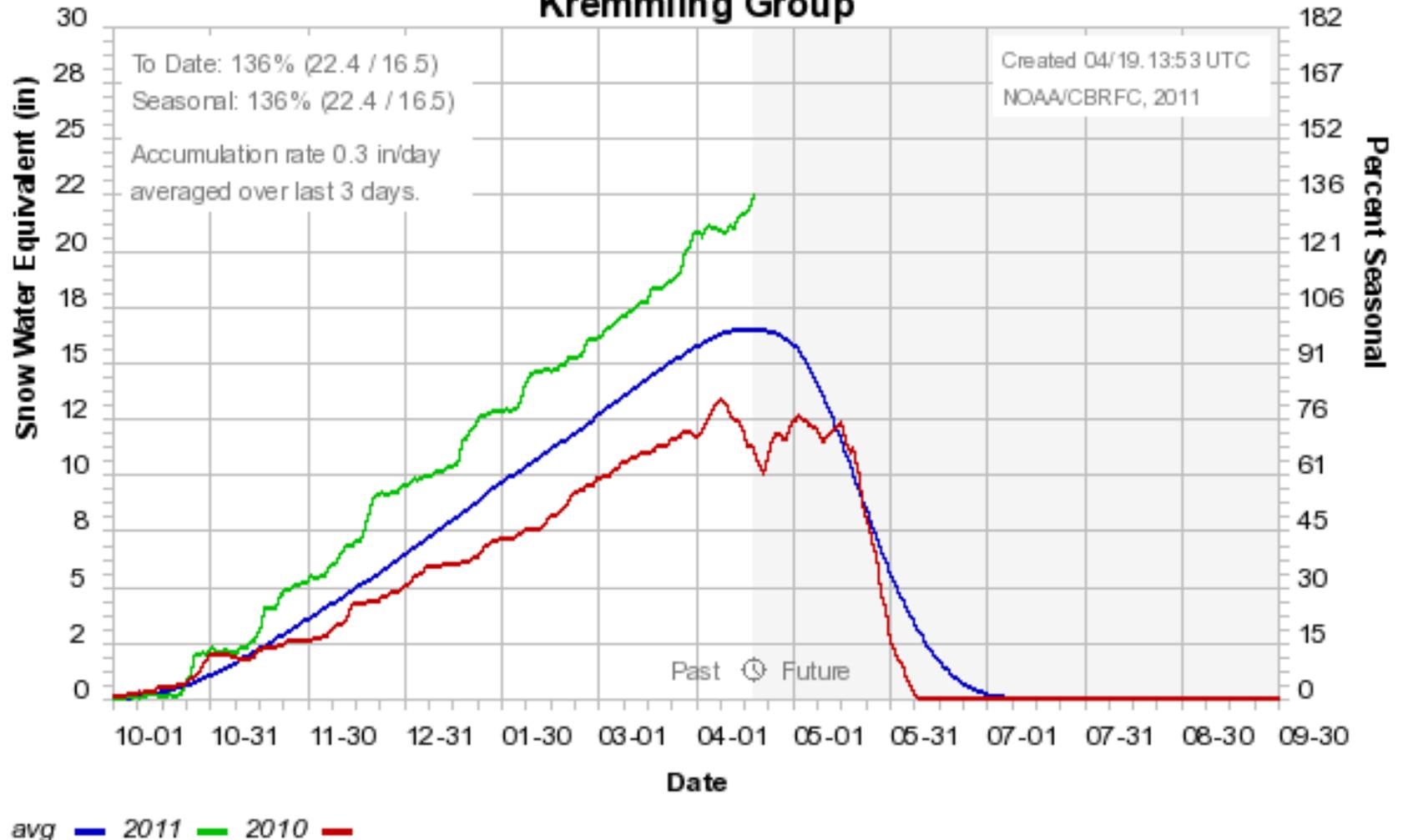
**Snowpack % of average to date: 135%**  
**Percent of average peak: 131%**

# Colorado Basin River Forecast Center Duchesne River snotel Group



**Snowpack % of average to date: 155%**  
**Percent of average peak: 147%**

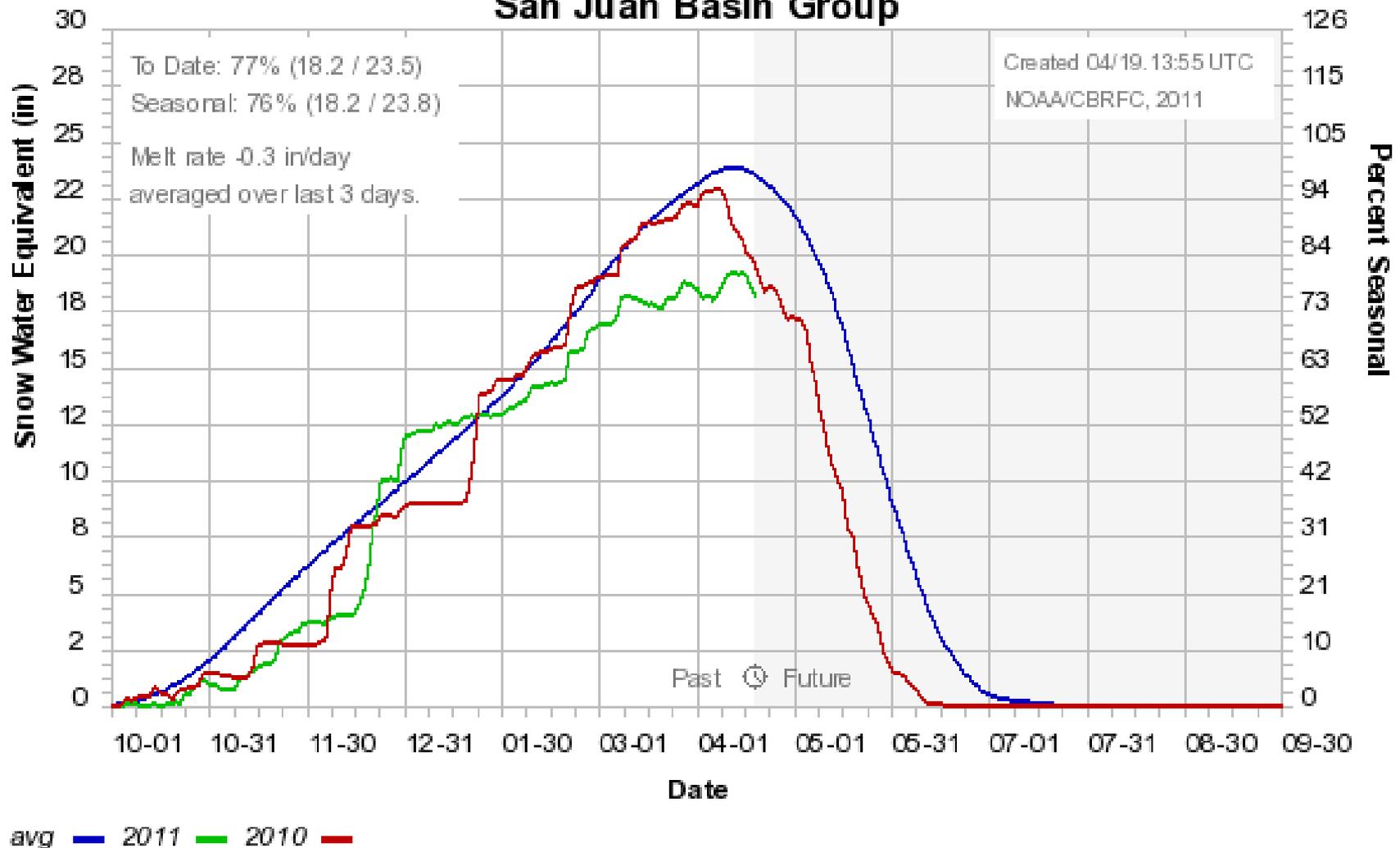
# Colorado Basin River Forecast Center Kremmling Group



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

# Colorado Basin River Forecast Center

## San Juan Basin Group



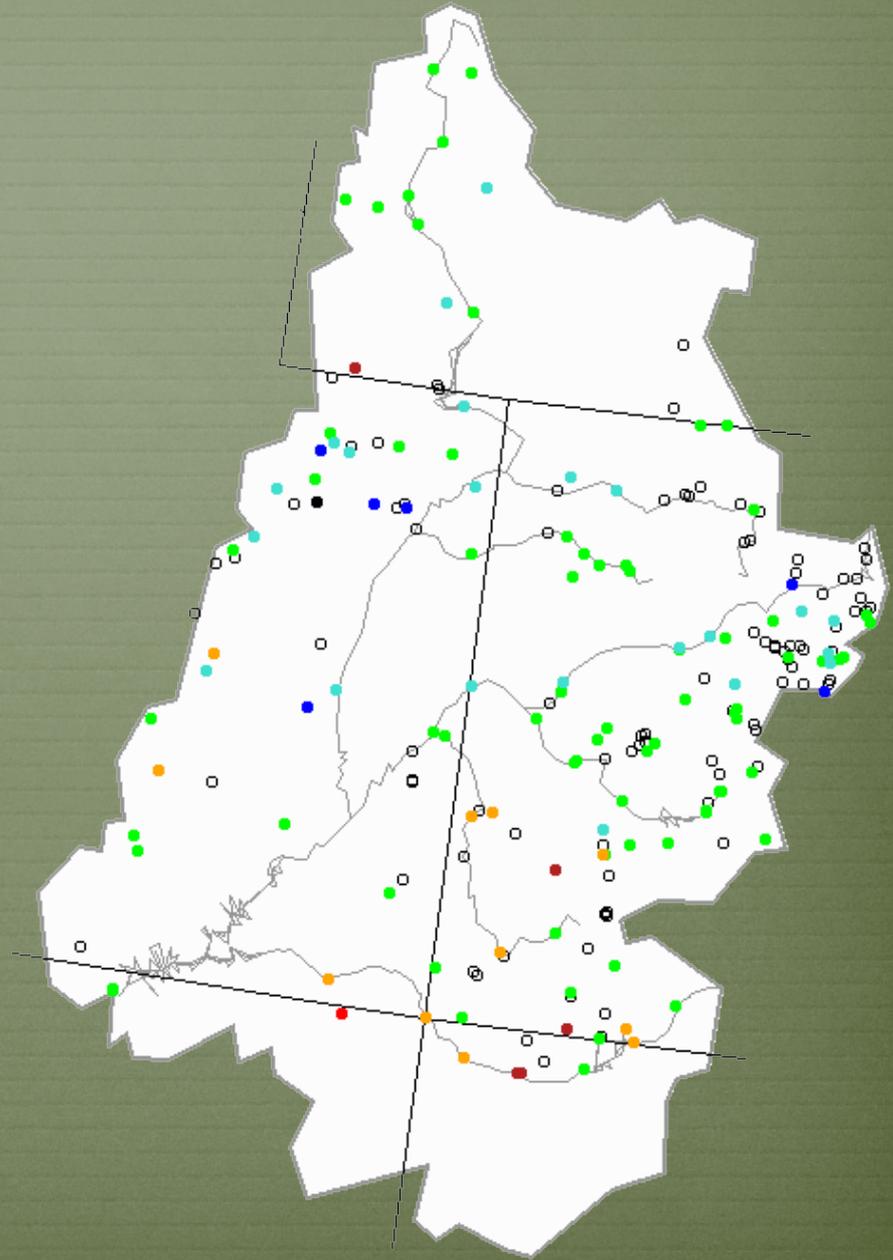
**Snowpack % of average to date: 77%**  
**Percent of average peak: 76%**

# Streamflow Update

Michael Lewis USGS



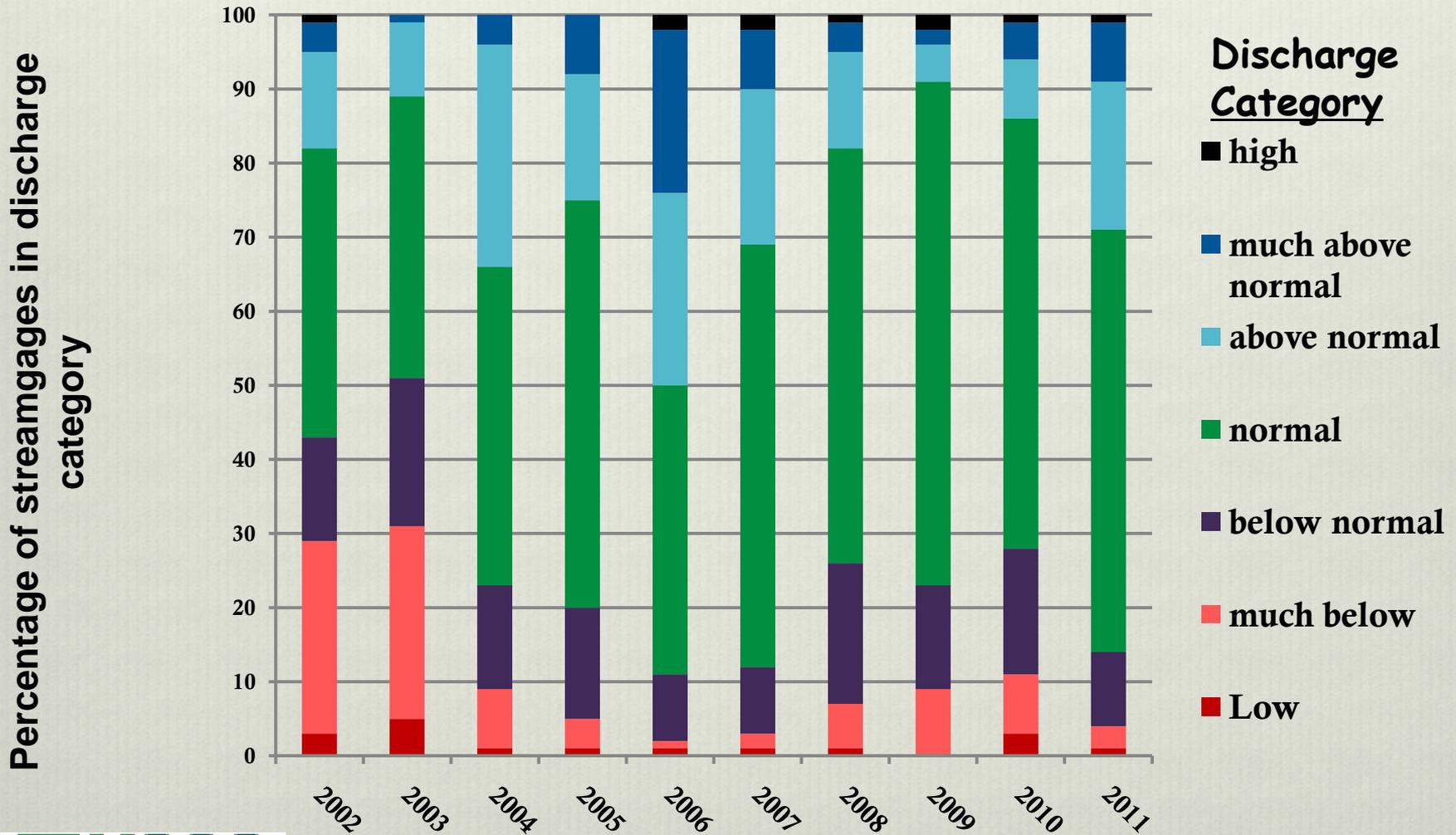
7-day average  
discharge  
compared to  
historical  
discharge for  
the day of  
the year  
(April 16)

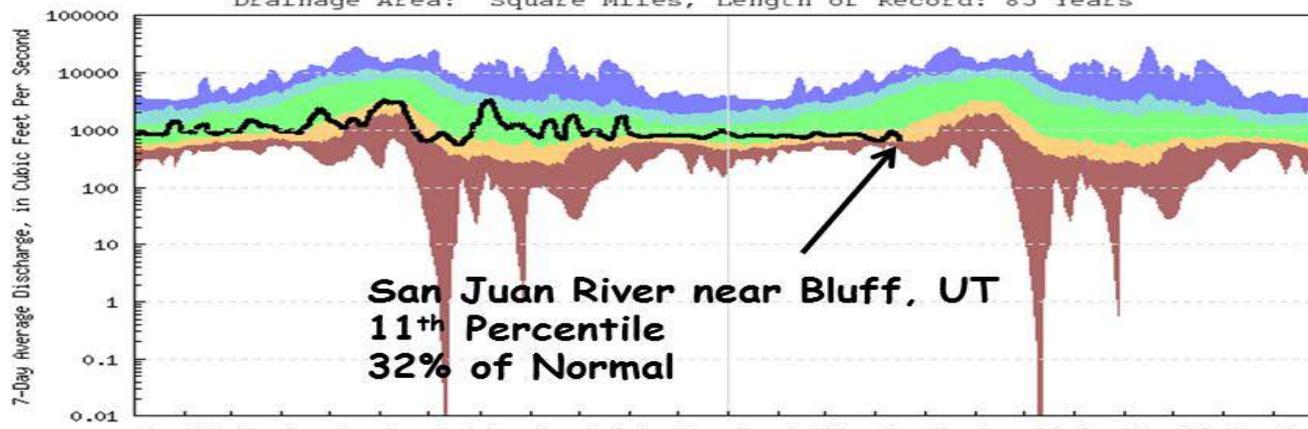
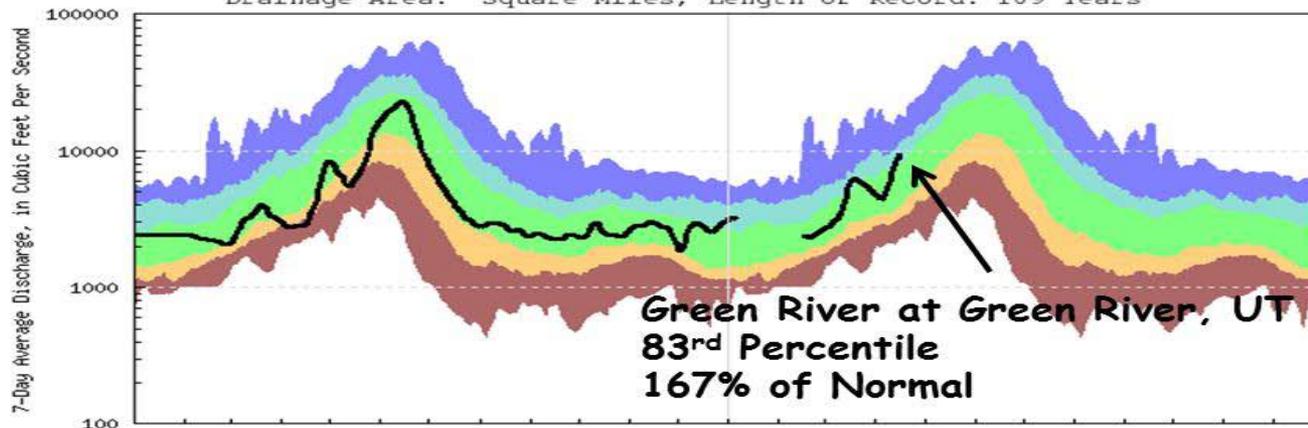
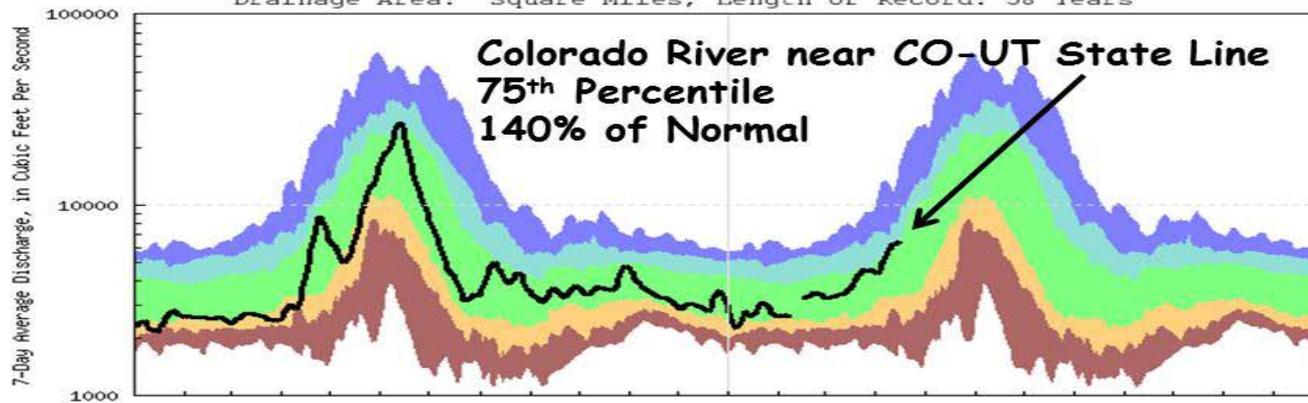


Explanation - Percentile classes

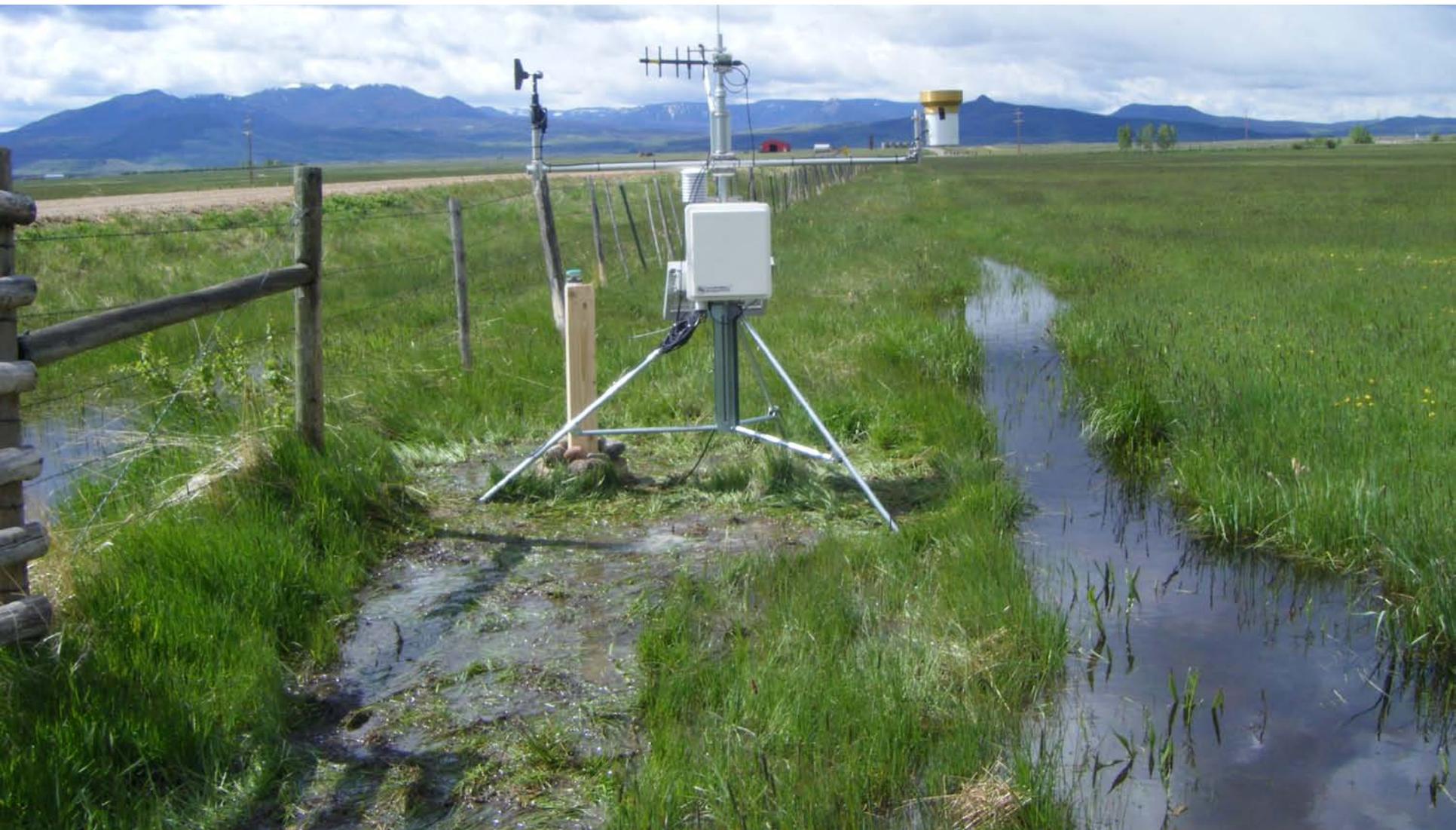
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

# -Upper Colorado River Basin- Comparison of 7-day Average Discharge For April 15, 2002-2011

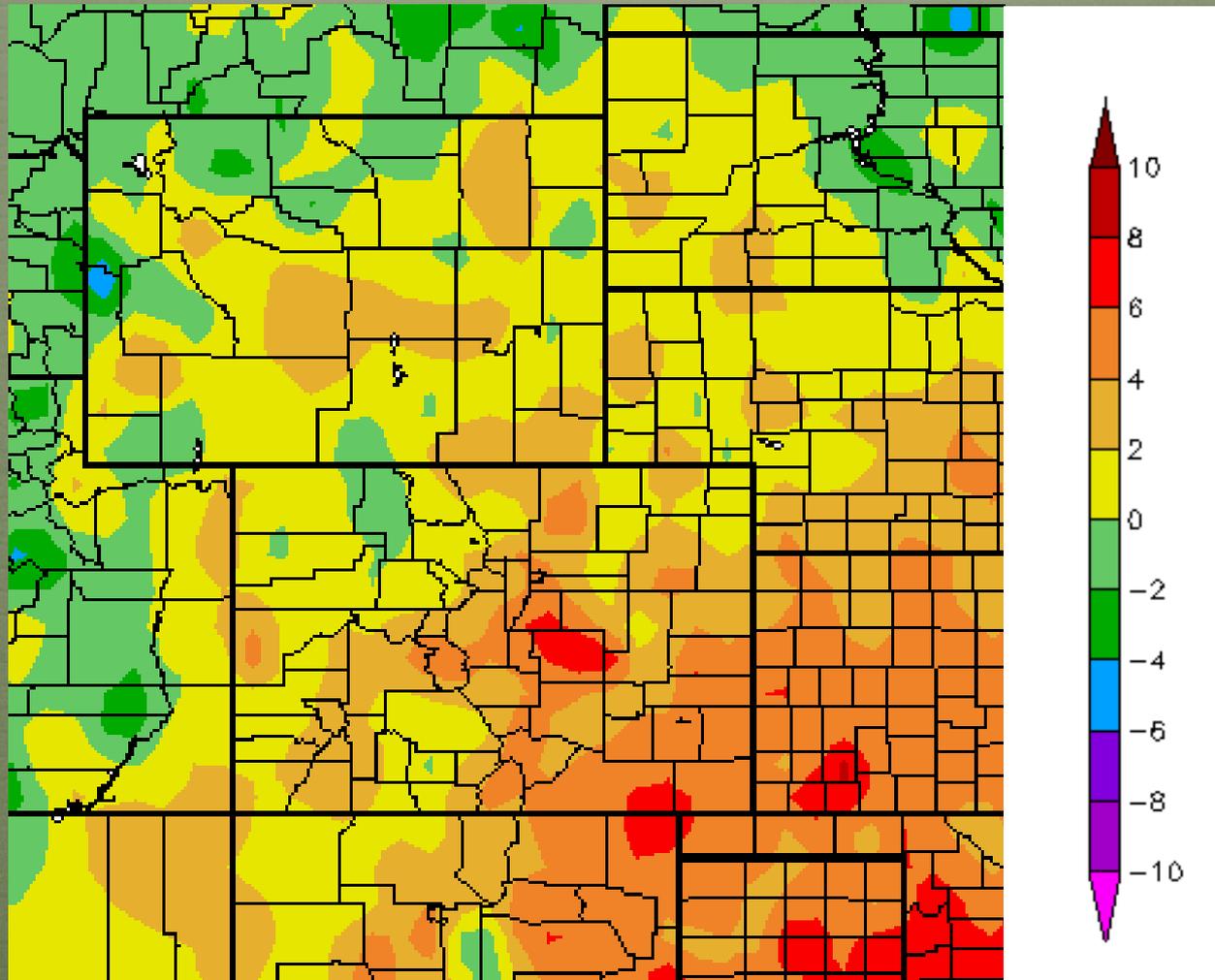




# Water Demand

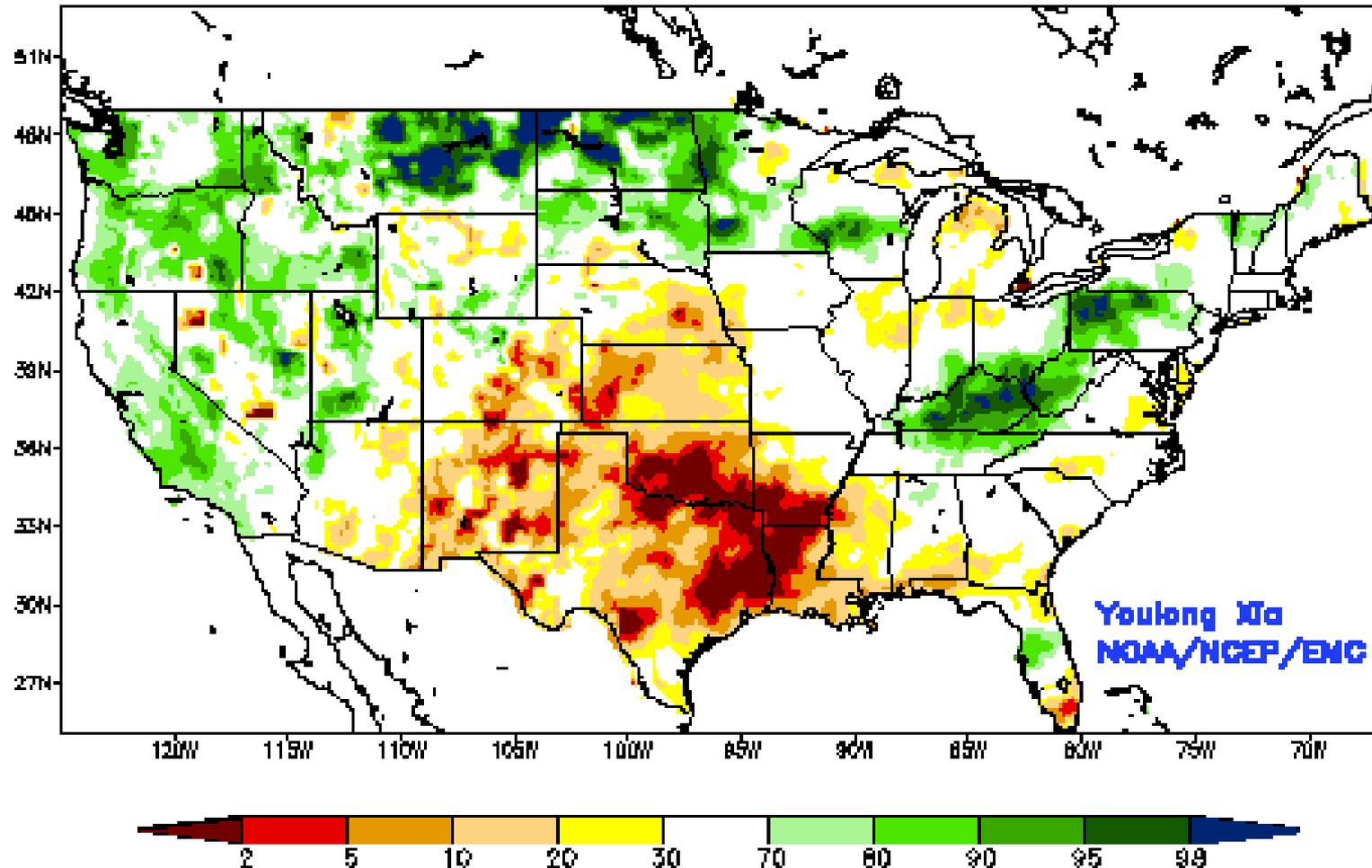


# Temperature Departure from Normal 04/01/2011 – 04/18/2011



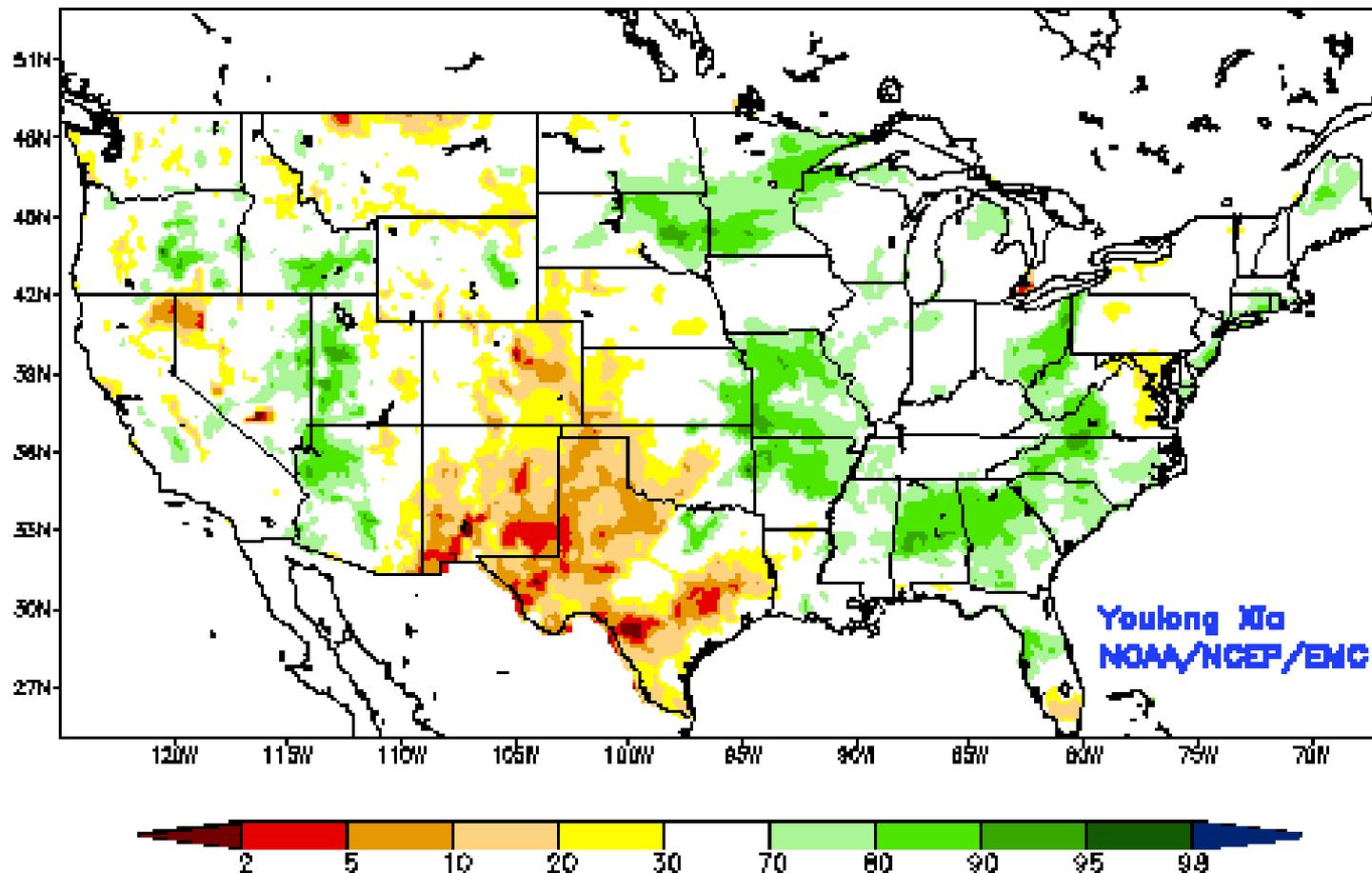
# NLDAS Ensemble Total Column Soil Moisture for 13 April, 2011

Ensemble—Mean — Current Total Column Soil Moisture Percentile  
NCEP NLDAS Products Valid: APR 13, 2011



# NLDAS Ensemble ET Percentiles for Week Ending 13 April, 2011

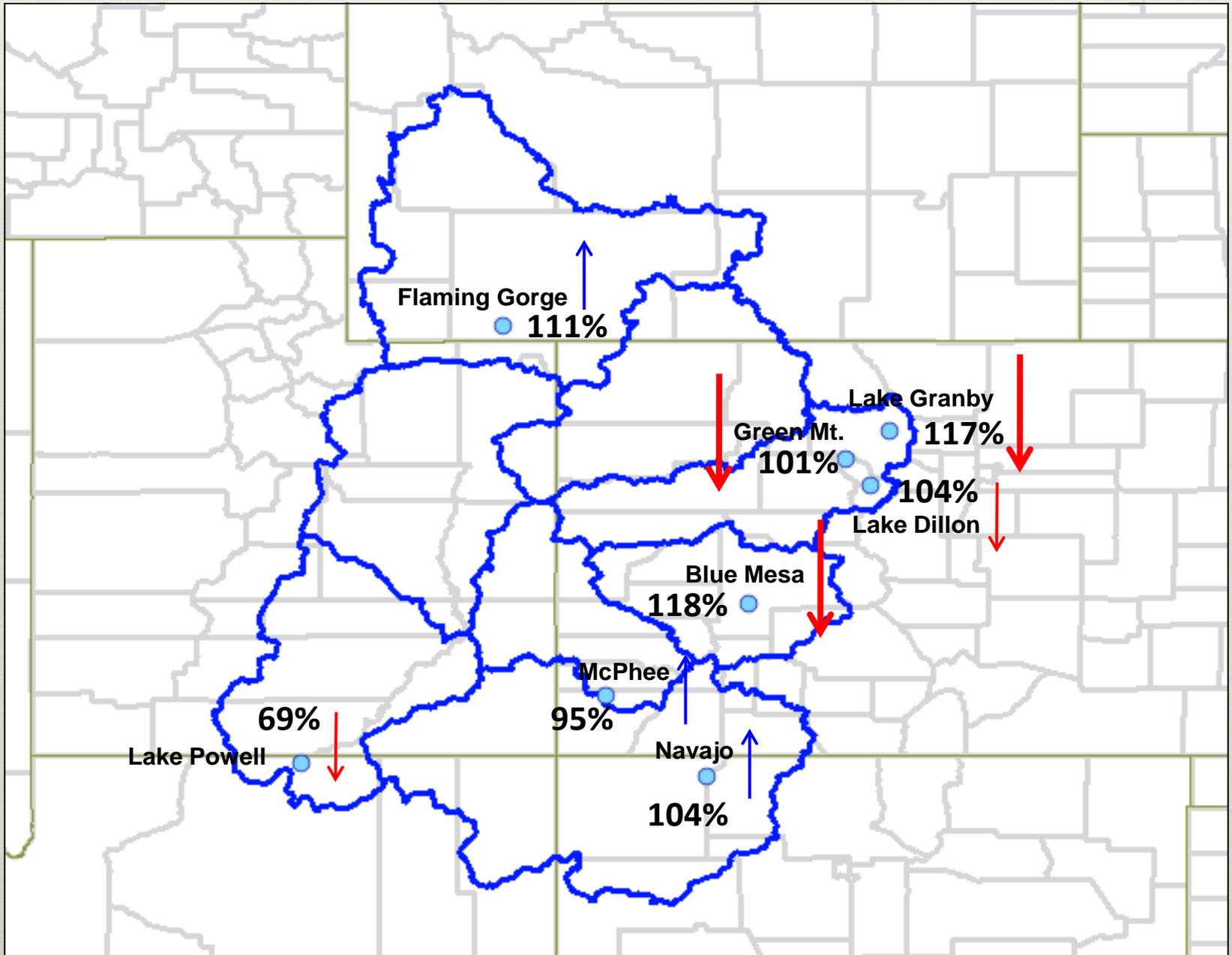
Ensemble-Mean: Current Evaporation Percentile  
NCEP NLDAS Products Valid: APR 13, 2011

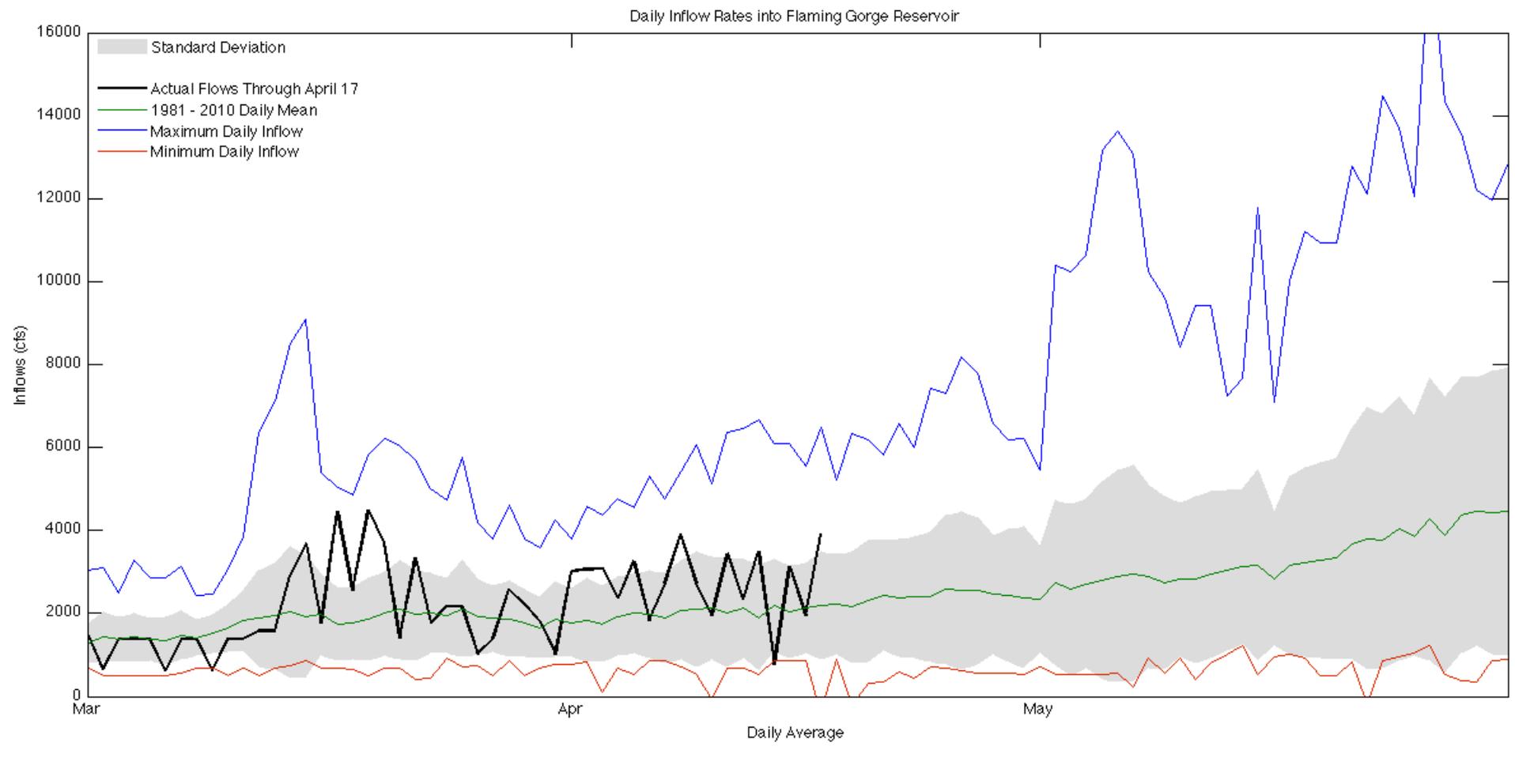
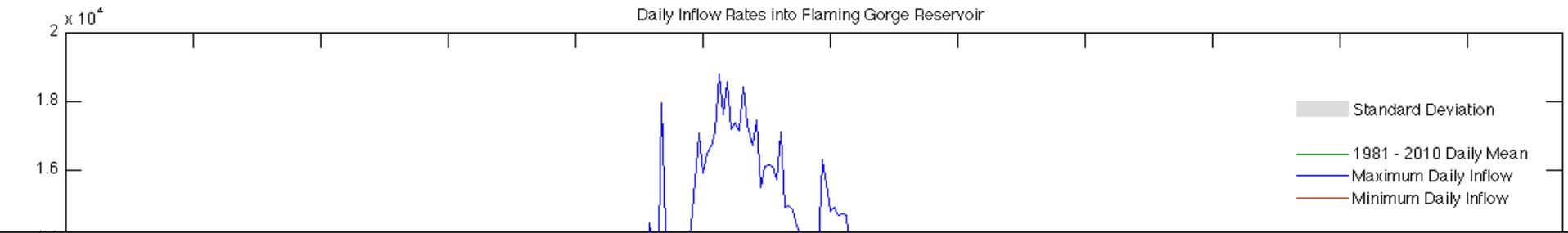


# Reservoir Update

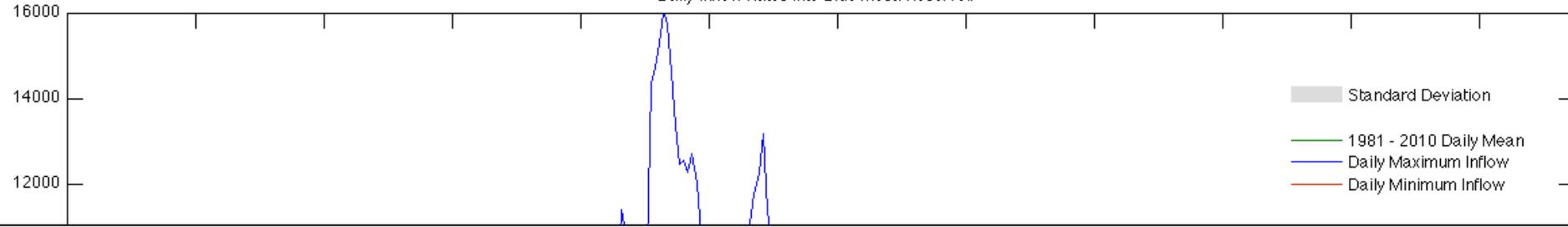


# Reservoir Level Percents of Average – 4/18/2011

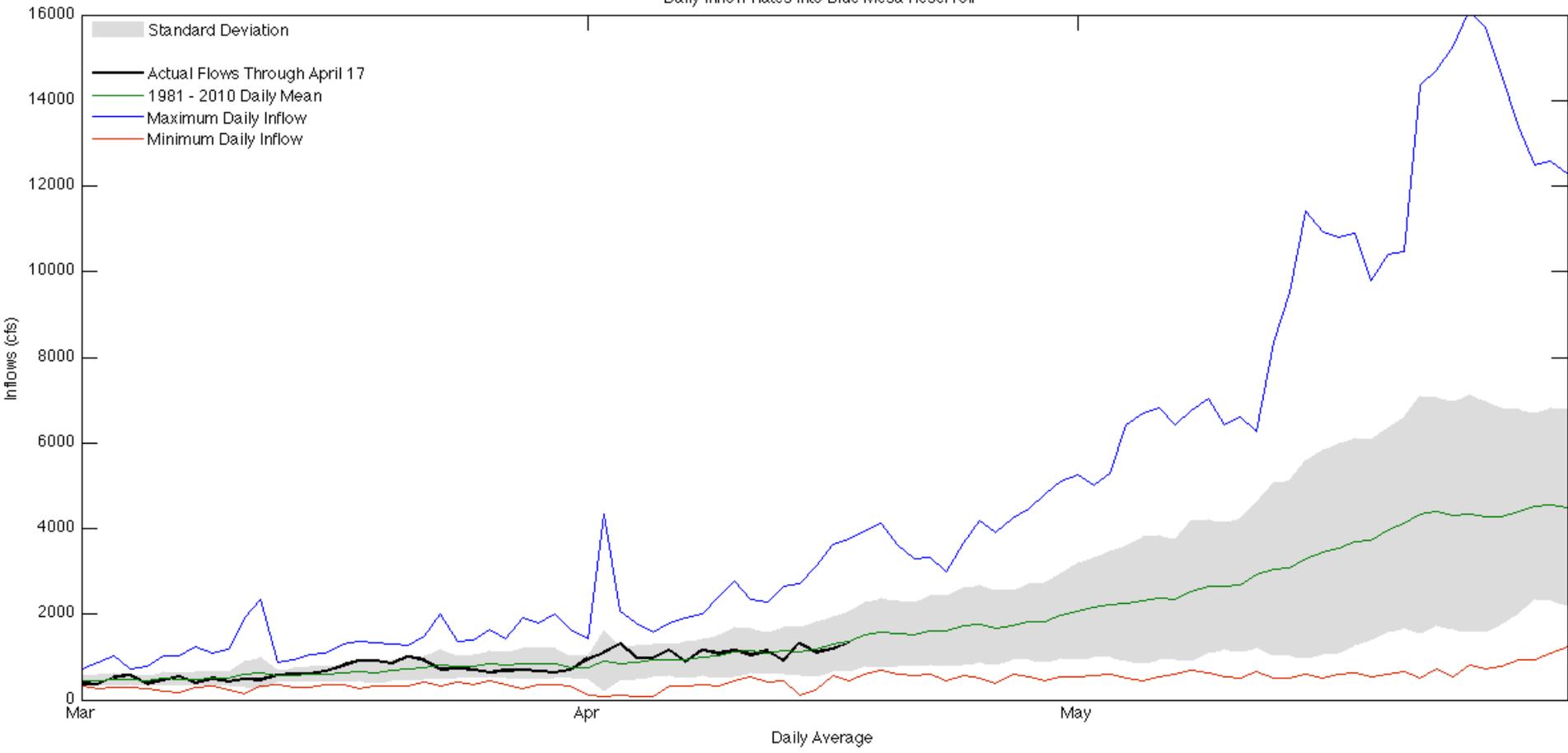




Daily Inflow Rates into Blue Mesa Reservoir



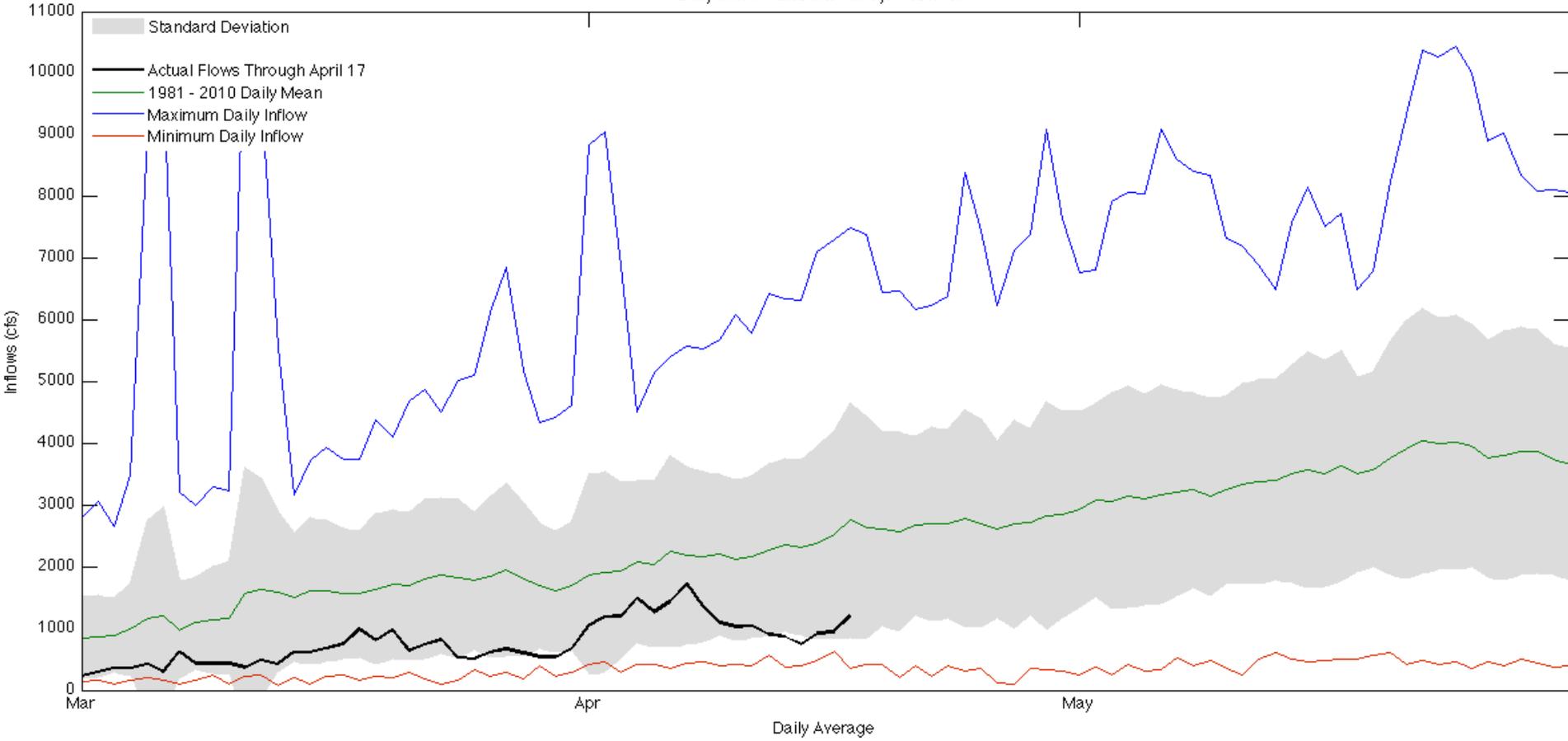
Daily Inflow Rates into Blue Mesa Reservoir

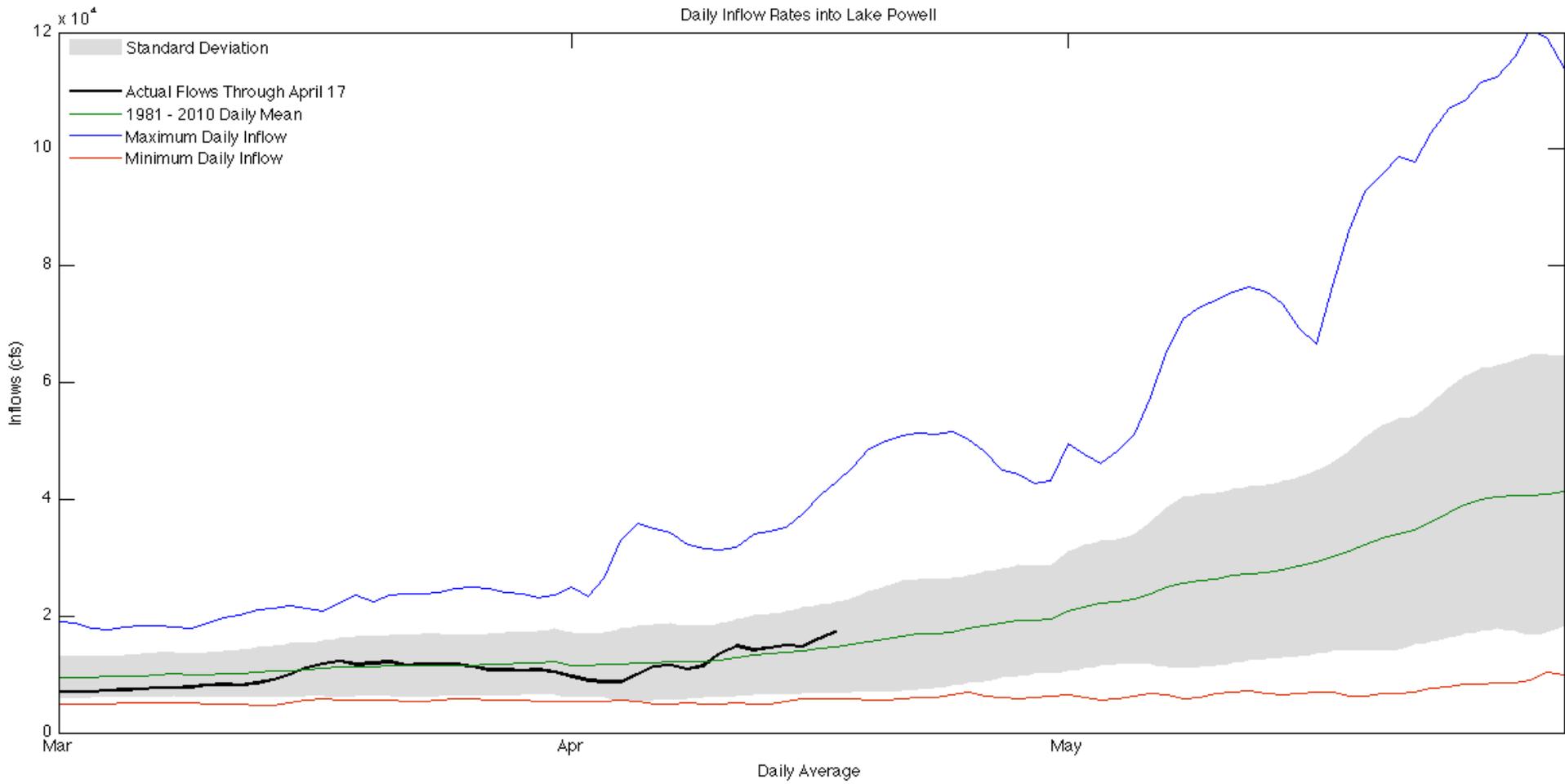
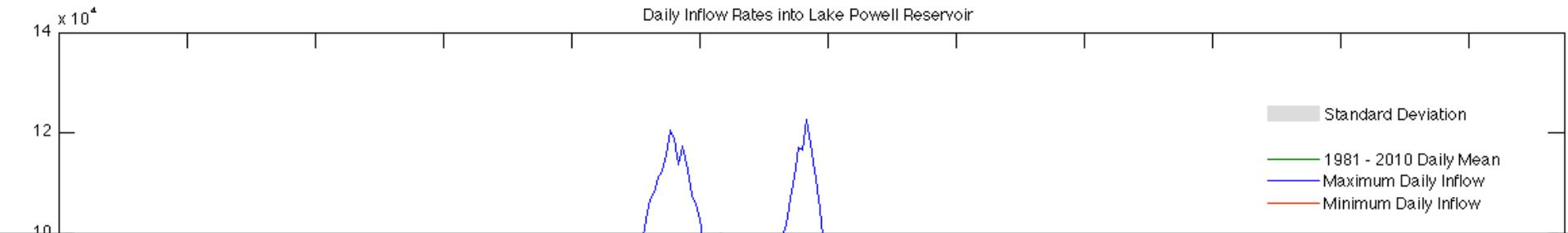


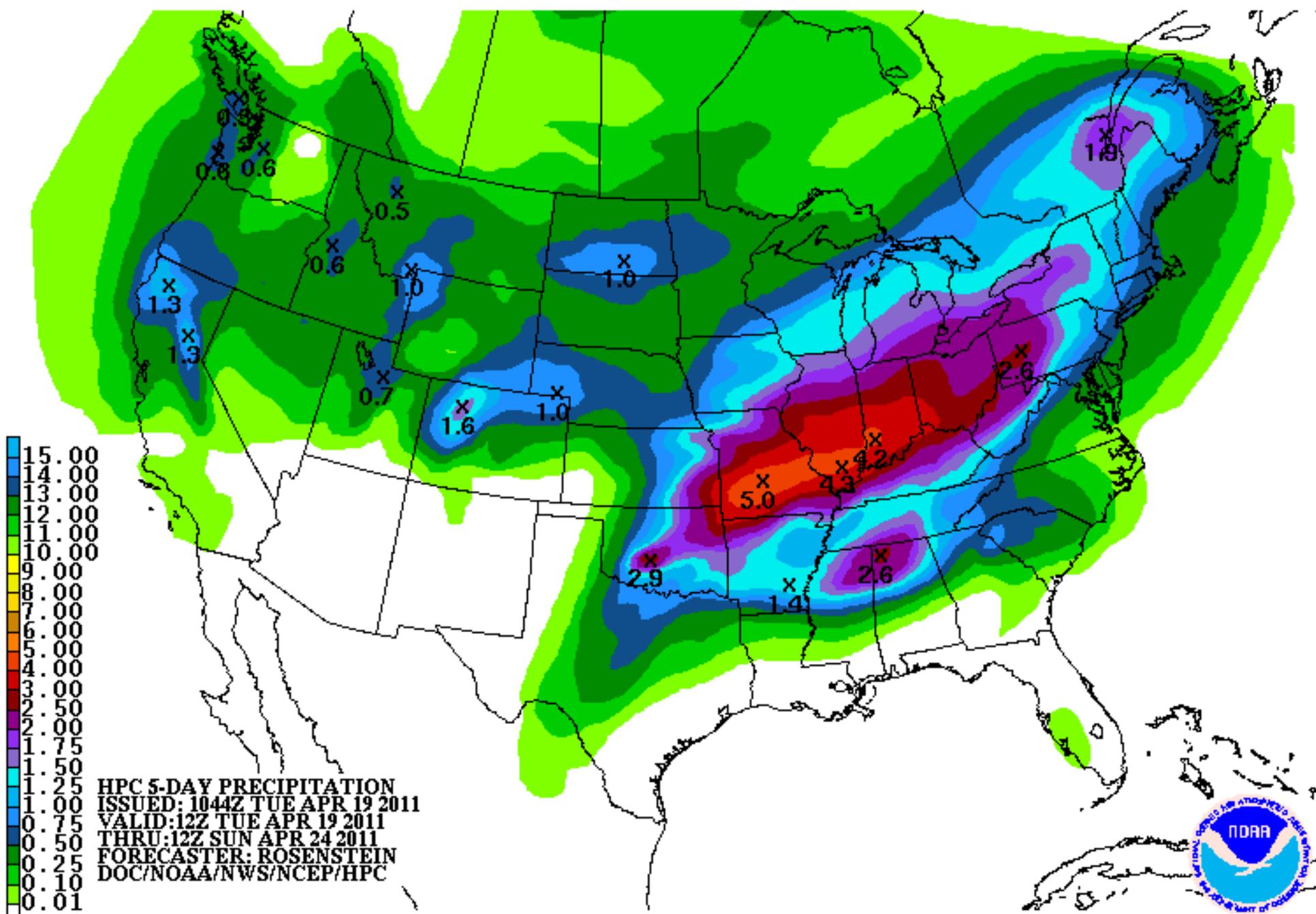
Daily Inflow Rates into Navajo Lake Reservoir



Daily Inflow Rates into Navajo Reservoir



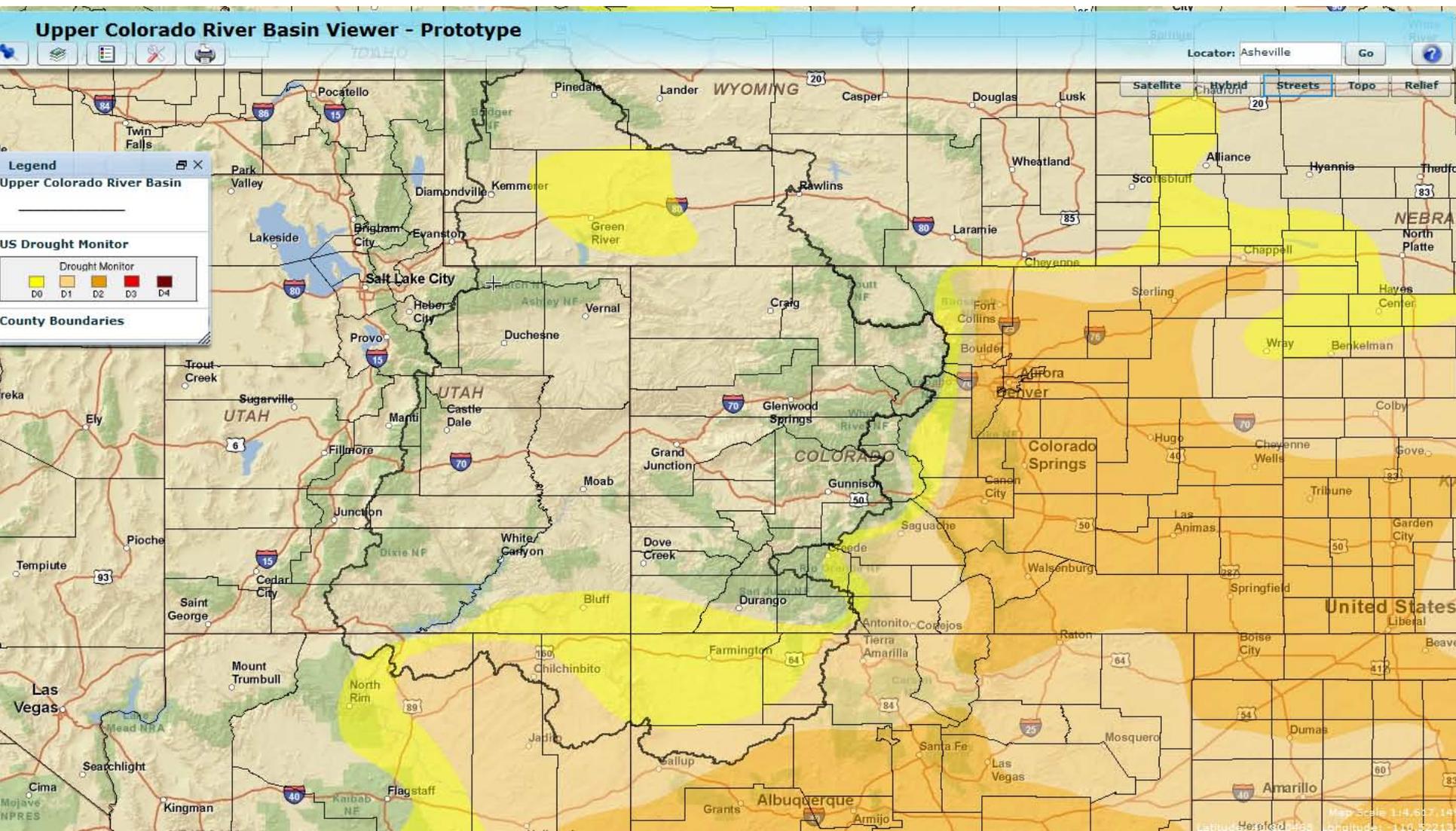




**HPC 5-DAY PRECIPITATION**  
 ISSUED: 1044Z TUE APR 19 2011  
 VALID: 12Z TUE APR 19 2011  
 THRU: 12Z SUN APR 24 2011  
 FORECASTER: ROSENSTEIN  
 DOC/NOAA/NWS/NCEP/HPC



# Recommendations



**O  
F  
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**CONTACT:**

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**COLORADO STATE UNIVERSITY**

**FORT COLLINS, CO 80523**

**970 - 491 - 8545**

**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

April 19, 2011

# Precipitation and Snowpack

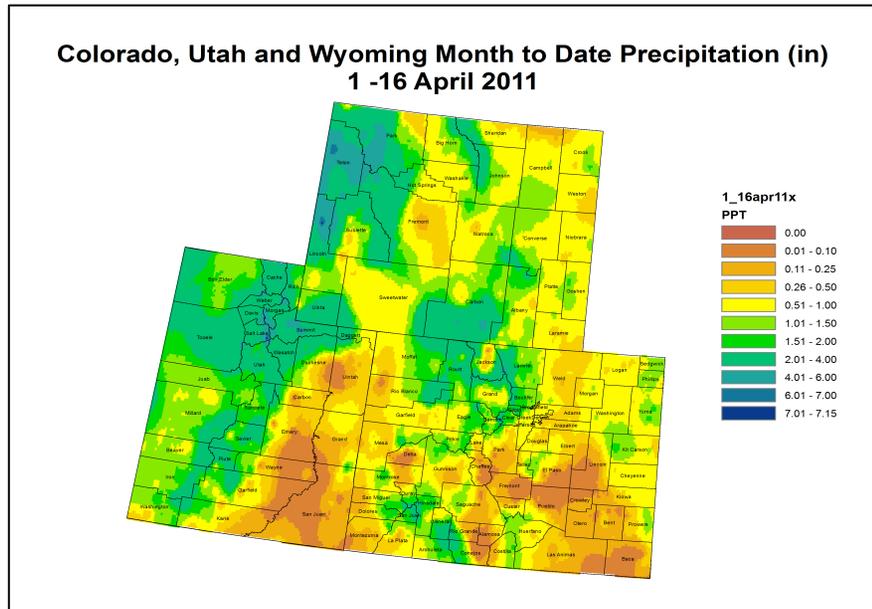


Fig. 1: April month-to-date precipitation in inches.

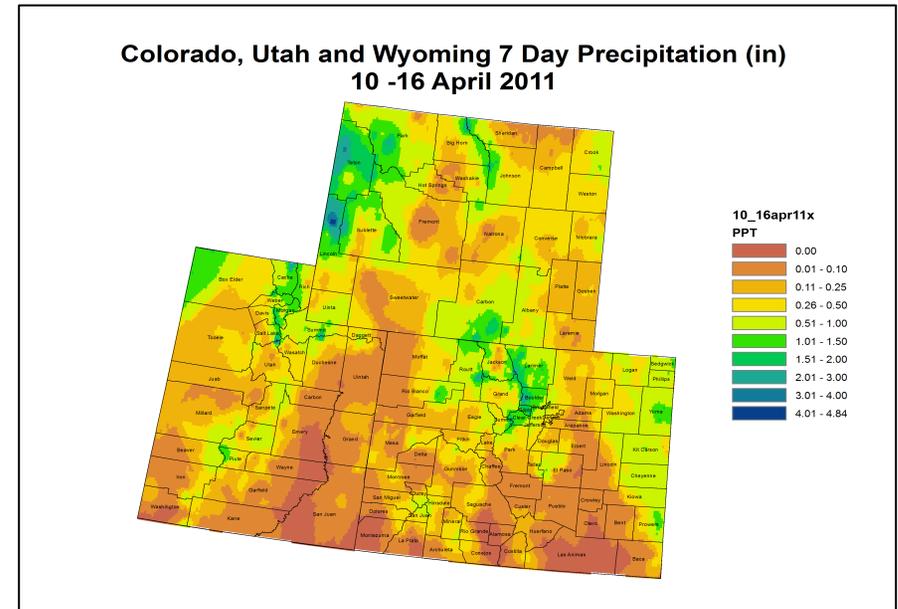


Fig. 2: April 10 – 16 precipitation in inches.

During March, the higher elevations of Colorado, northeastern Utah, and southwestern Wyoming saw above average moisture, while the valleys of western Colorado and eastern Utah and some parts of the Upper Green basin in Wyoming were drier. The Four Corners area, the eastern plains of Colorado, and the Upper Rio Grande in southern Colorado were very dry for the month. So far, this pattern has continued for the month of April with the higher elevations throughout the Upper Colorado River Basin (UCRB) receiving around two and up to six inches of moisture since the beginning of the month (Fig. 1). The Four Corners region, the Upper Rio Grande valleys and the southeastern plains have mostly seen less than a quarter of an inch month-to-date.

Last week, the highest amounts of precipitation fell just east of the Continental Divide and along the northern Front Range, with accumulations from half an inch at the lower elevations up to two inches in the mountains (Fig. 2). The eastern plains also received beneficial moisture of up to an inch, while the southern portion of the UCRB and the southeastern plains remained fairly dry for the week.

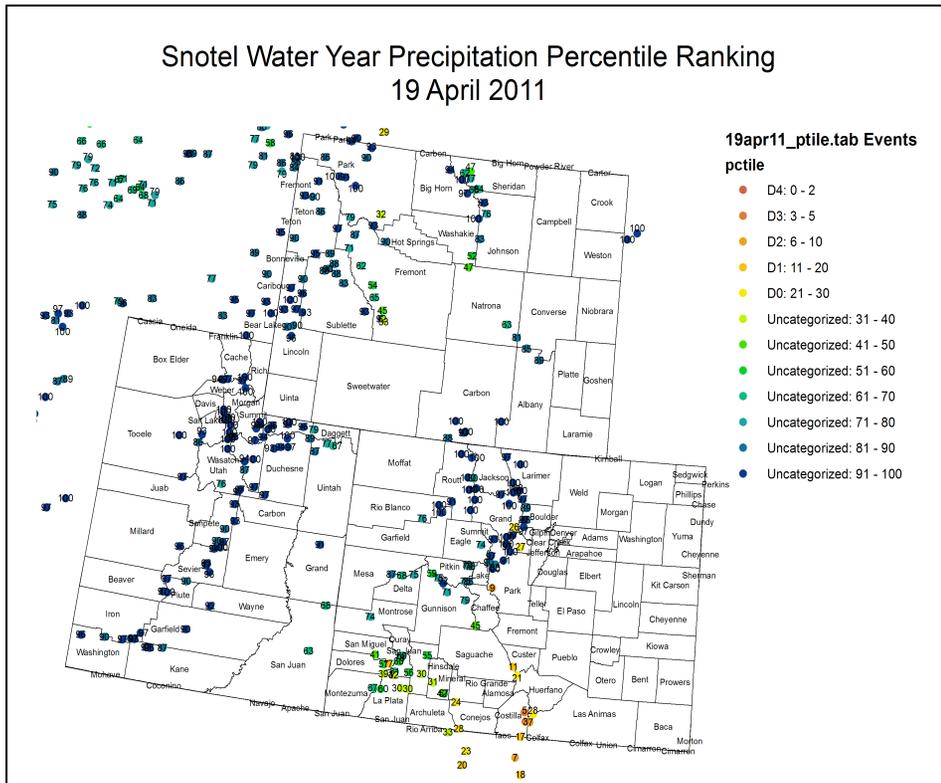


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21-30% is Drought Monitor’s D0 category).

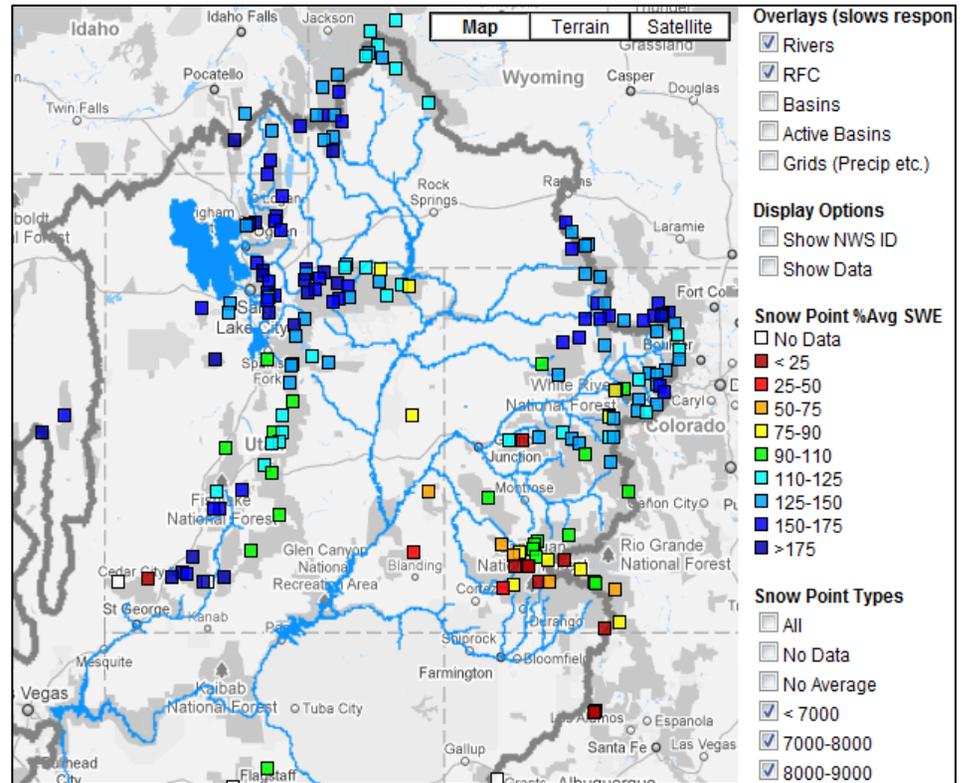


Fig. 4: SNOTEL WYTD accumulated snow water equivalent as a percent of average.

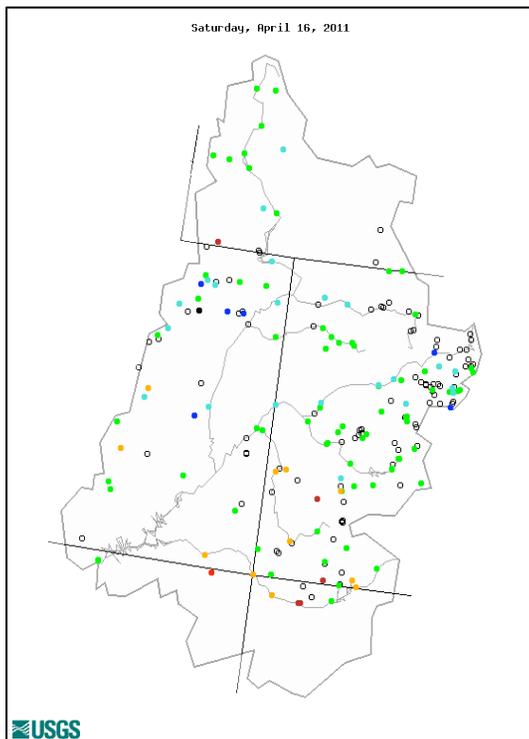
The majority of the SNOTEL sites in the UCRB are showing high percentile rankings for water-year-to-date (WYTD) precipitation (Fig. 3). The Rio Grande and San Juan basins in southern CO are the driest, showing percentile rankings below 50%. Many of the sites in the Rio Grande basin are showing percentiles well below 30% (meaning that 70% of the years have been wetter).

Snowpack around most of the UCRB is in good condition—snowpack for the entire basin above Lake Powell was 115% of average as of April 7<sup>th</sup> (Fig. 4). The Upper Green basin in WY and the Upper Colorado above Kremmling are still accumulating and are well above their average seasonal peaks. The San Juan basin in southwestern CO and the Duchesne basin in UT have begun their snowmelt, with the San Juan basin snowpack at only 77% of its average to date.

# Streamflow

As of April 16<sup>th</sup>, about 85% of the USGS streamgages in the UCRB recorded normal (25<sup>th</sup> – 75<sup>th</sup> percentile) or above normal 7-day average streamflows (Fig. 5). Most of the gage network is now fully operational with about 118 gages in the basin currently reporting. A cluster of gages recording high flows is evident in northeastern UT—mostly due to reservoir releases. At this point, flooding could possibly be a concern in the near future as the snowmelt season begins. Below normal flows in the San Juan basin have persisted, but this could change in the next week as the snowmelt season in that region has begun.

The 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 75<sup>th</sup> and 83<sup>rd</sup> percentiles, respectively (Fig. 6). The San Juan River near Bluff, UT is currently recording below normal flows (less than the 24<sup>th</sup> percentile), though this number is expected to rise in the next couple of weeks with the increased runoff from snowmelt.



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 April 16<sup>th</sup> in the UCRB.

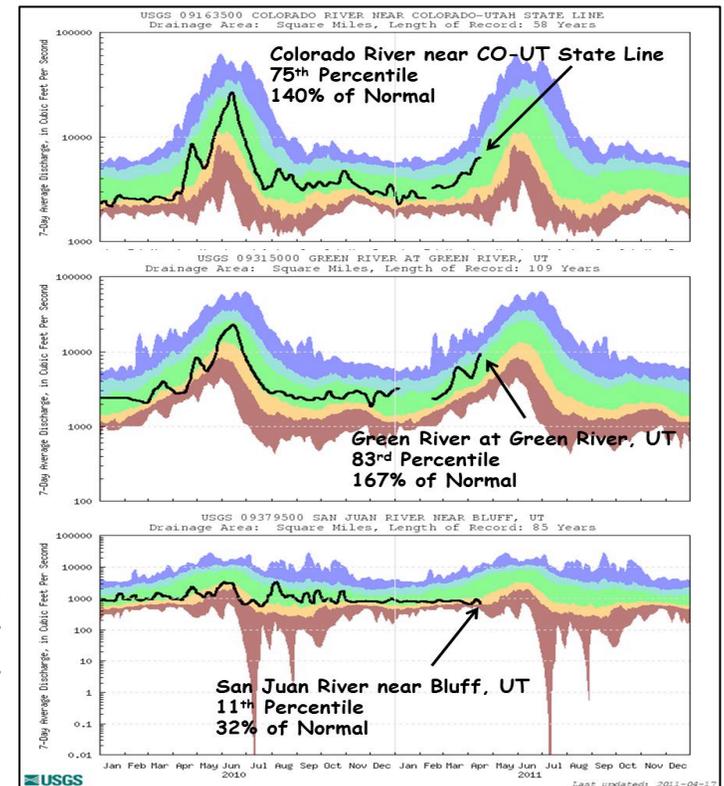


Fig. 6: USGS 7-day average discharge over time at the CO-UT state line (top), Green River, UT (middle) and Bluff, UT (bottom).

## Water Supply and Demand

Most of the Arkansas and Upper Rio Grande basins east of the UCRB have experienced above normal temperatures since the beginning of April. Temperatures around the UCRB have been mostly near average, with above average temperatures in the San Juan basin. Soil moisture conditions remain poor for eastern CO, the Upper Rio Grande and in the Four Corners region (Fig. 7). Though conditions in these regions have been warm and windy, little moisture has been available and evapotranspiration (ET) rates are very low.

Most of the major reservoirs in the UCRB are currently above their average levels for this time of year. Many of the reservoirs are below last year's levels, but are still in fairly good condition at the start of the snowmelt season. Flaming Gorge, McPhee, and Navajo Reservoirs storages have been increasing since the beginning of April. Daily inflows at many of the larger reservoirs have been near average since the beginning of the year with the exception of Navajo Reservoir in the San Juan basin. Navajo Reservoir has been recording below average daily inflows since January, and increases in inflows are much less than they should be at this time of year (Fig. 8).

## Precipitation Forecast

The region will continue to see a progressive flow with a number of systems passing through, with an emphasis on more moisture to the north. The next system will enter the region on Thursday afternoon, with QPF showing values around over half an inch for the mountains and lower amounts for the eastern plains, though these are conservative amounts according to some models. Another storm will impact the area on Sunday through Tuesday. That storm could bring generous amounts of precipitation as it's bringing in moisture from the tropics. Total accumulations for the week will be greatest for the northern mountains of CO and the northeastern plains, with slightly less accumulations over eastern UT and southwestern WY. Though QPF shows no precipitation accumulations over the Four Corners, the area could possibly receive around a quarter of an inch of moisture this next week.

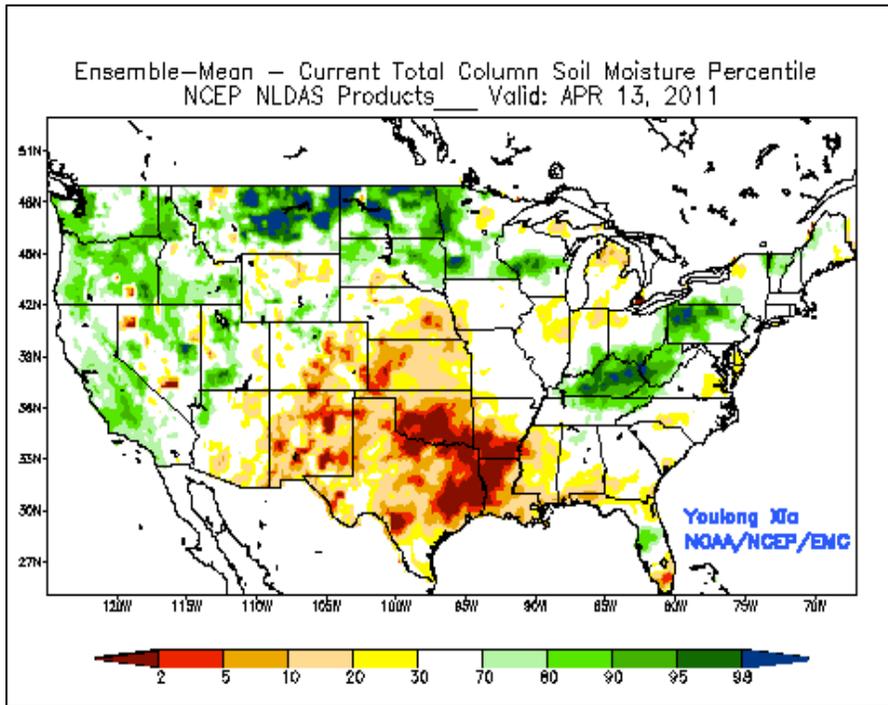


Fig. 7: NLDAS ensemble total column soil moisture percentiles as of April 13<sup>th</sup>.

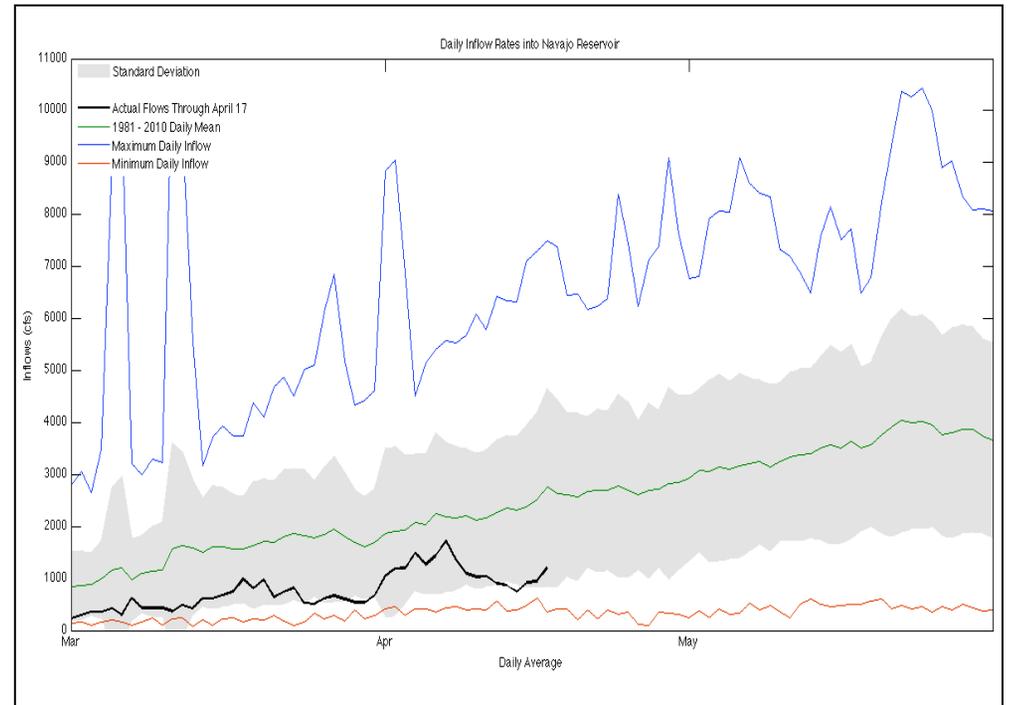


Fig. 8: Daily inflow rates into Navajo Reservoir as of April 17<sup>th</sup>.

# Drought and Water Discussion

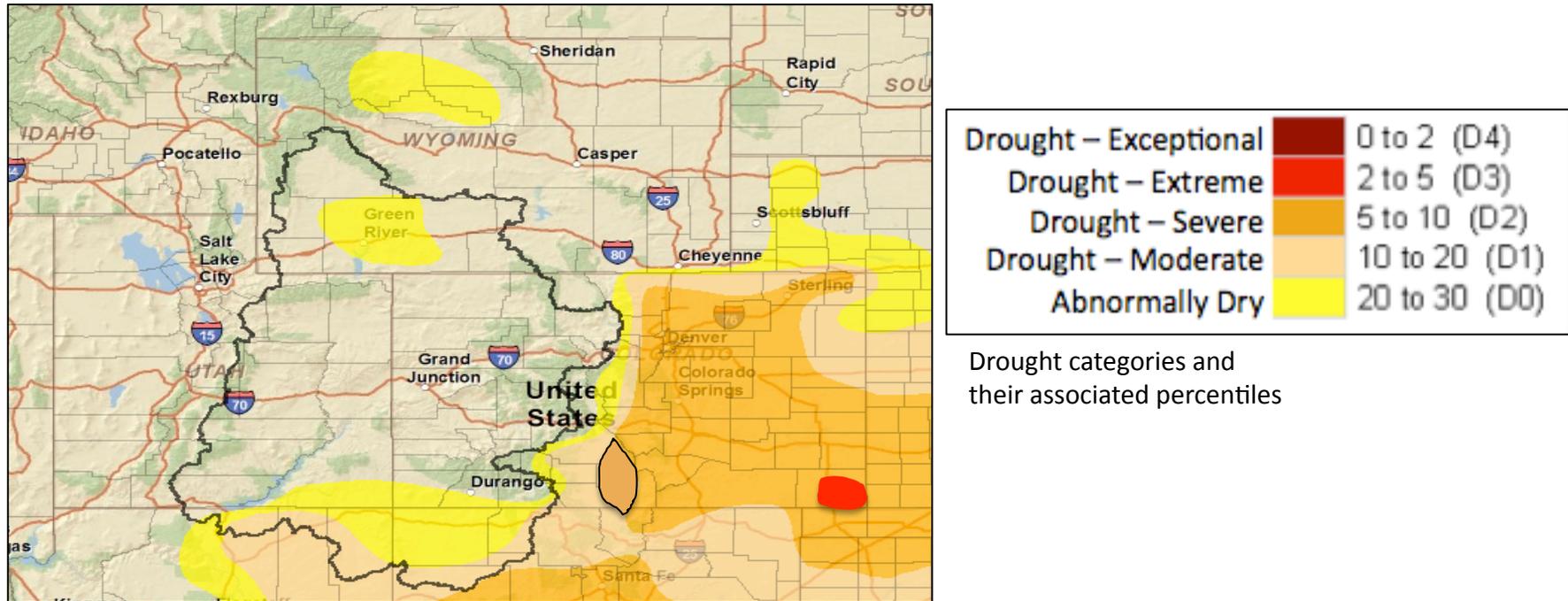


Fig. 10: April 12<sup>th</sup> release of U.S. Drought Monitor for the UCRB

The US Drought Monitor (USDM) author has slightly adjusted the D0 line in the Upper Green River basin per suggestions from Wyoming experts. Otherwise, no changes are being suggested for the UCRB in the current USDM map (Fig. 10).

It has been suggested that the D3 introduced in the Oklahoma panhandle be expanded to cover Baca County in southeastern CO westward through Campo and northward through Springfield (red shape, Fig. 10). Surrounding areas will be closely monitored for possible further expansion in the near future. A westward expansion of the D2 line to cover the eastern half of the San Luis Valley was also suggested due to the long-term dryness that has been occurring there (orange shape, Fig. 10).