

**Spring
2012**

May 15th, 2012

NIDIS - UPPER COLORADO BASIN PILOT PROJECT

Weekly Climate, Water & Drought Assessment

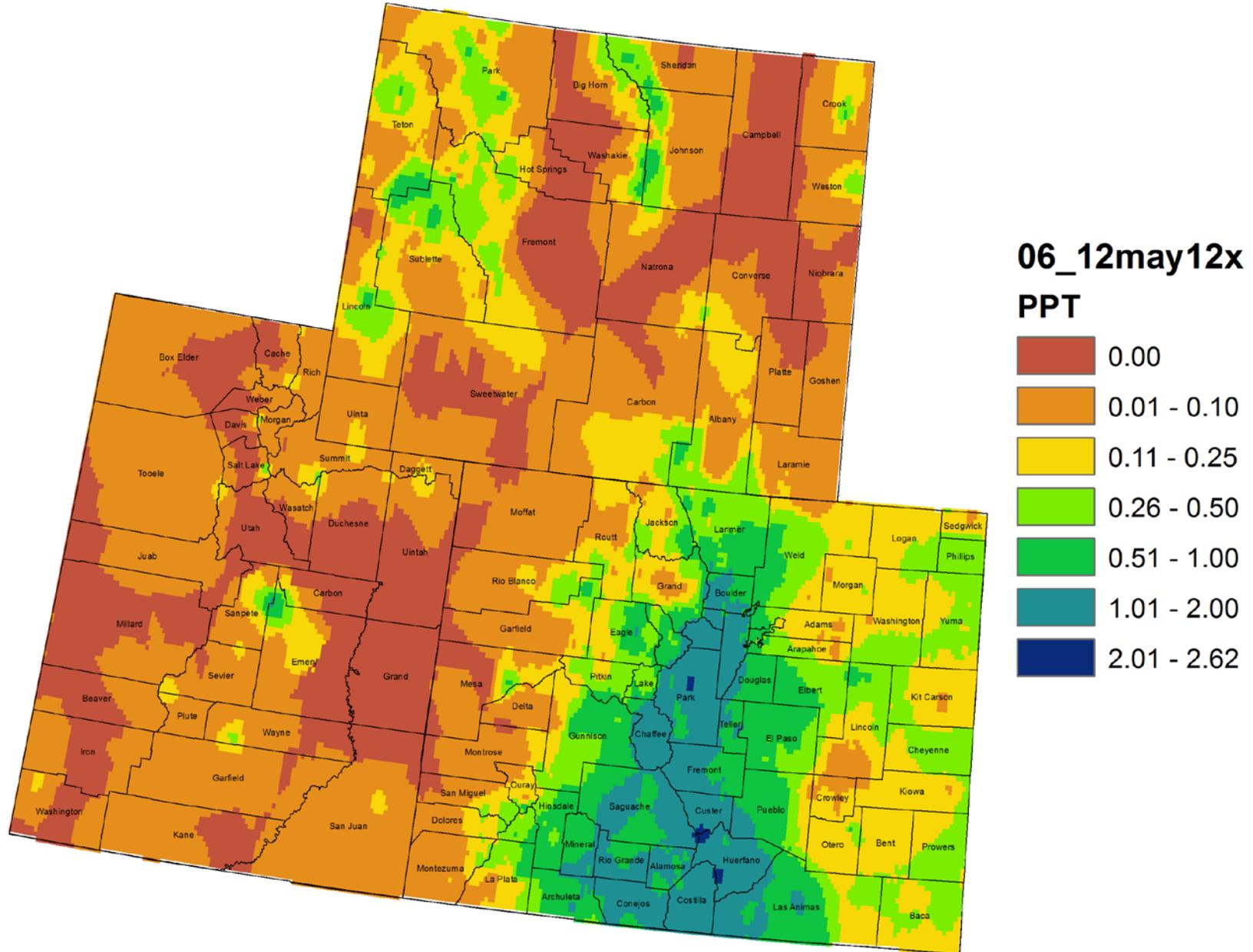
Today's Agenda

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

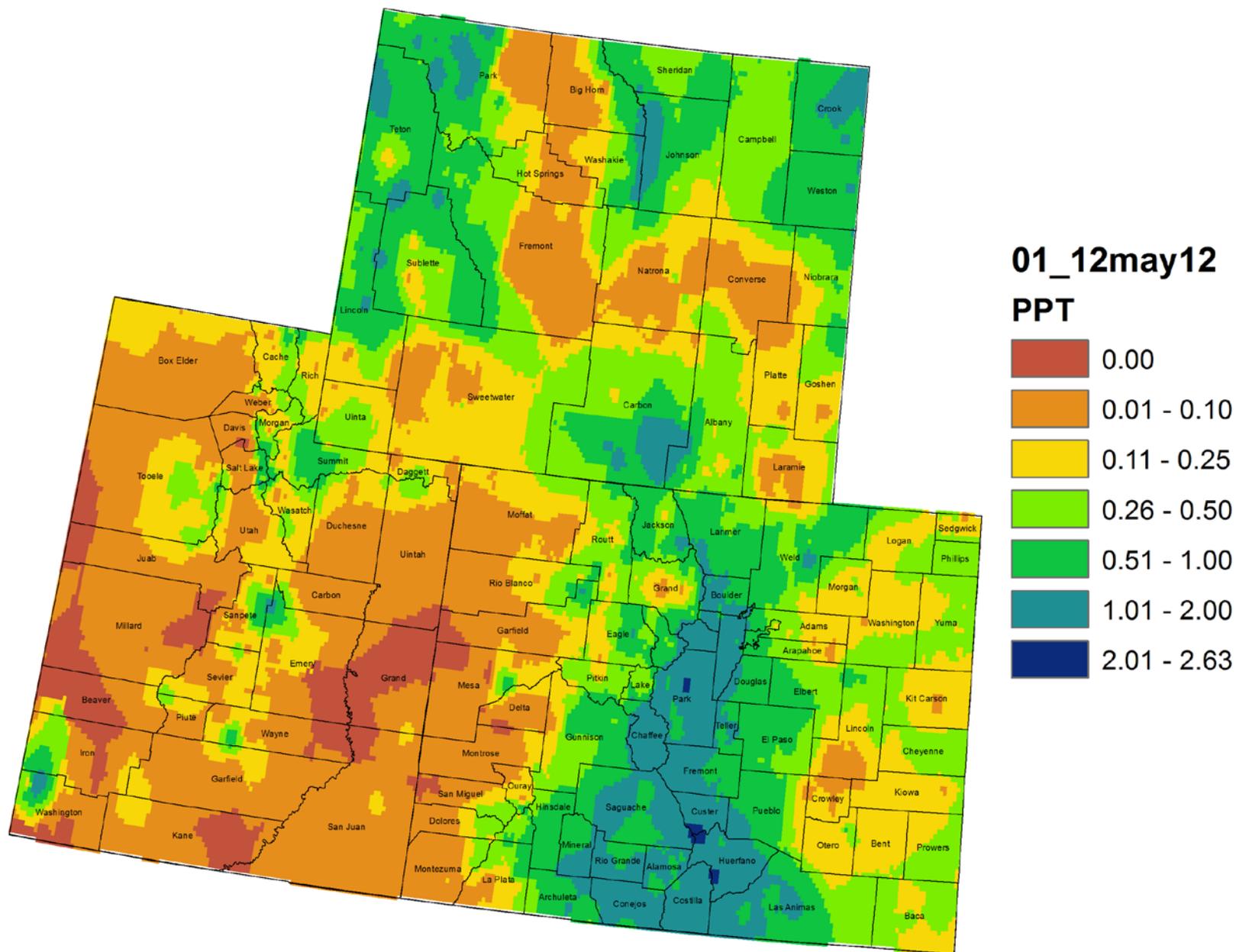
Precipitation/Snowpack Update



Colorado, Utah and Wyoming 7 Day Precipitation (in) 6 - 12 May 2012

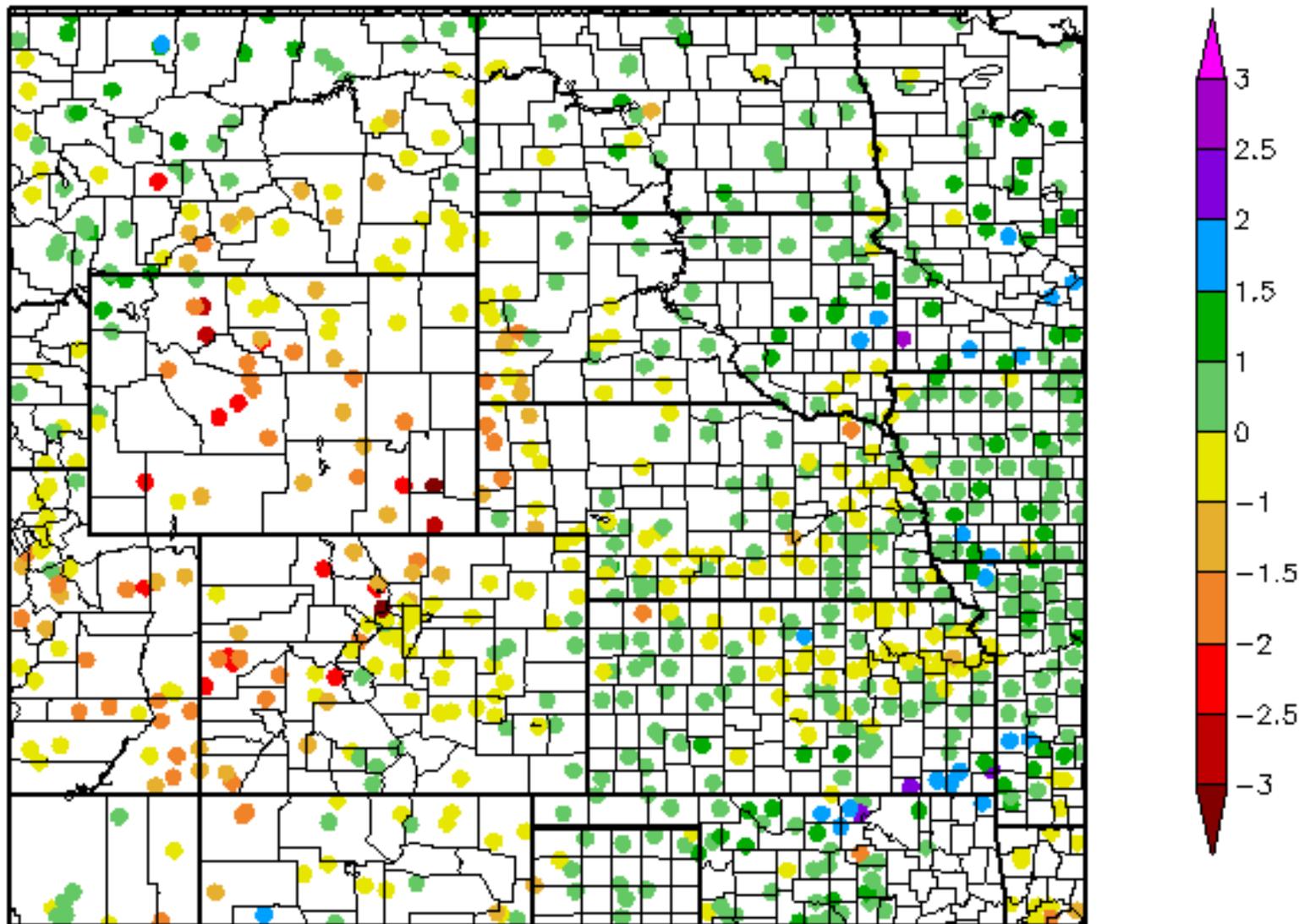


Colorado, Utah and Wyoming Month to Date Precipitation (in) 1 - 12 May 2012



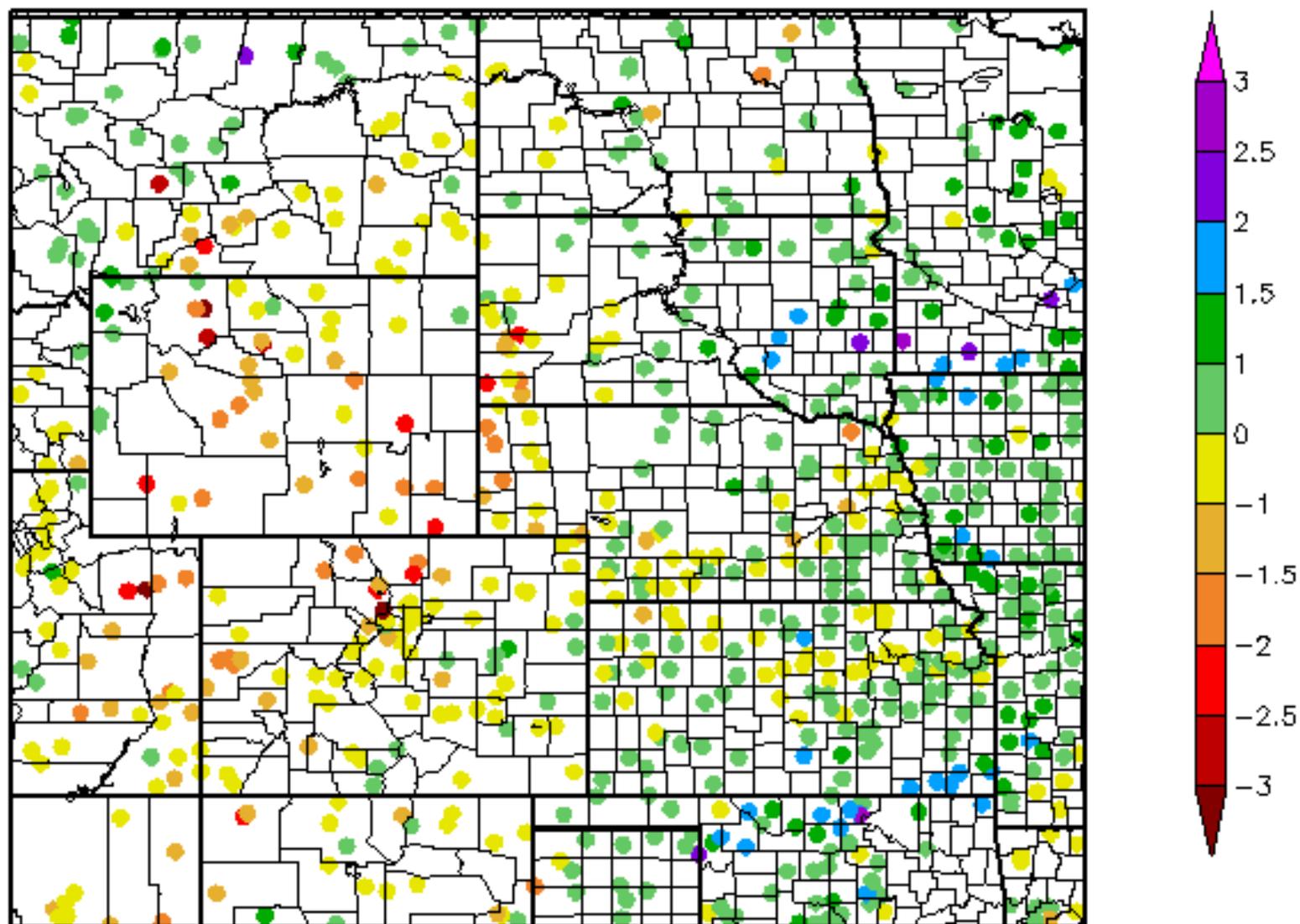
60 Day SPI

3/16/2012 - 5/14/2012

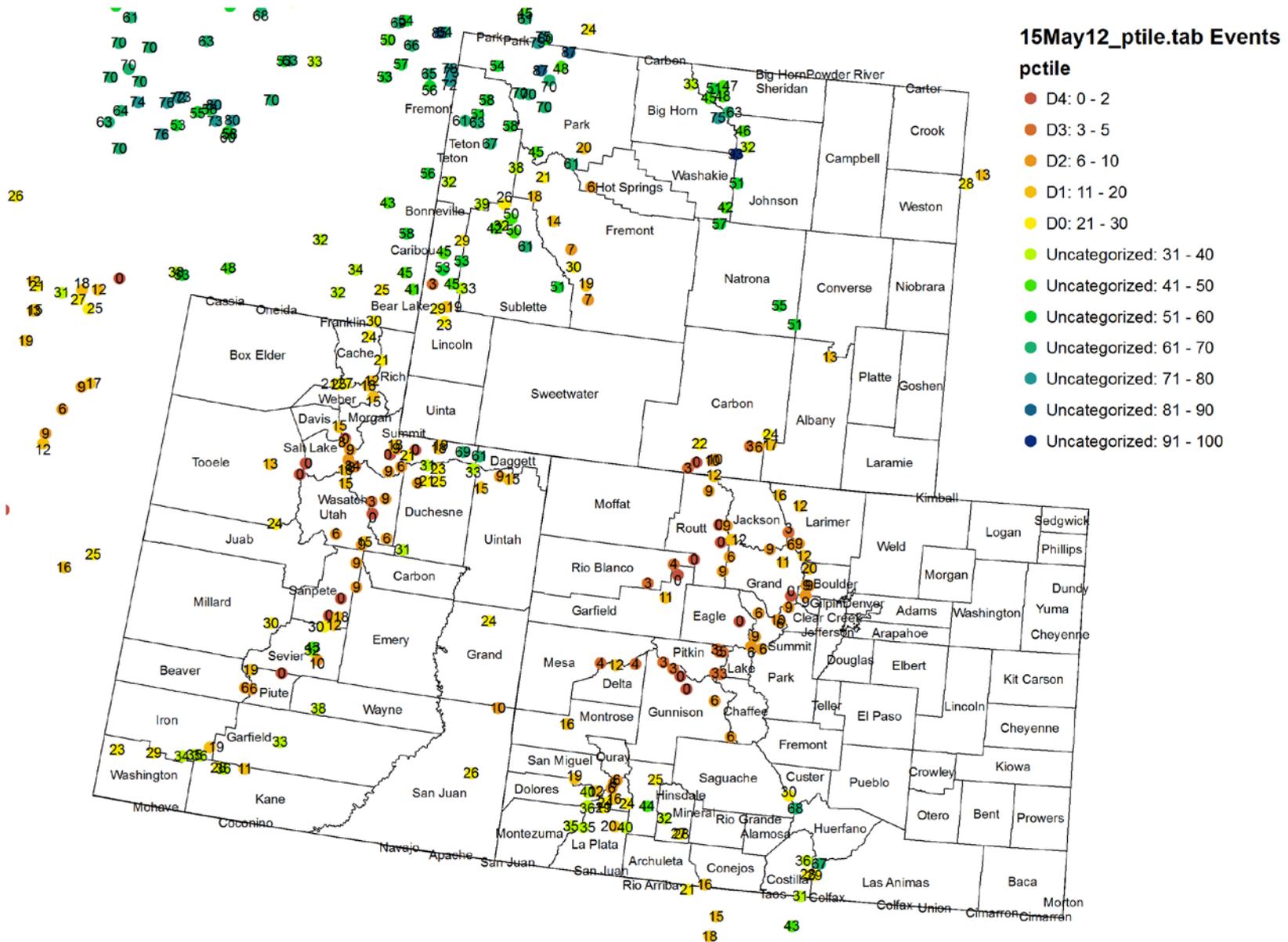


120 Day SPI

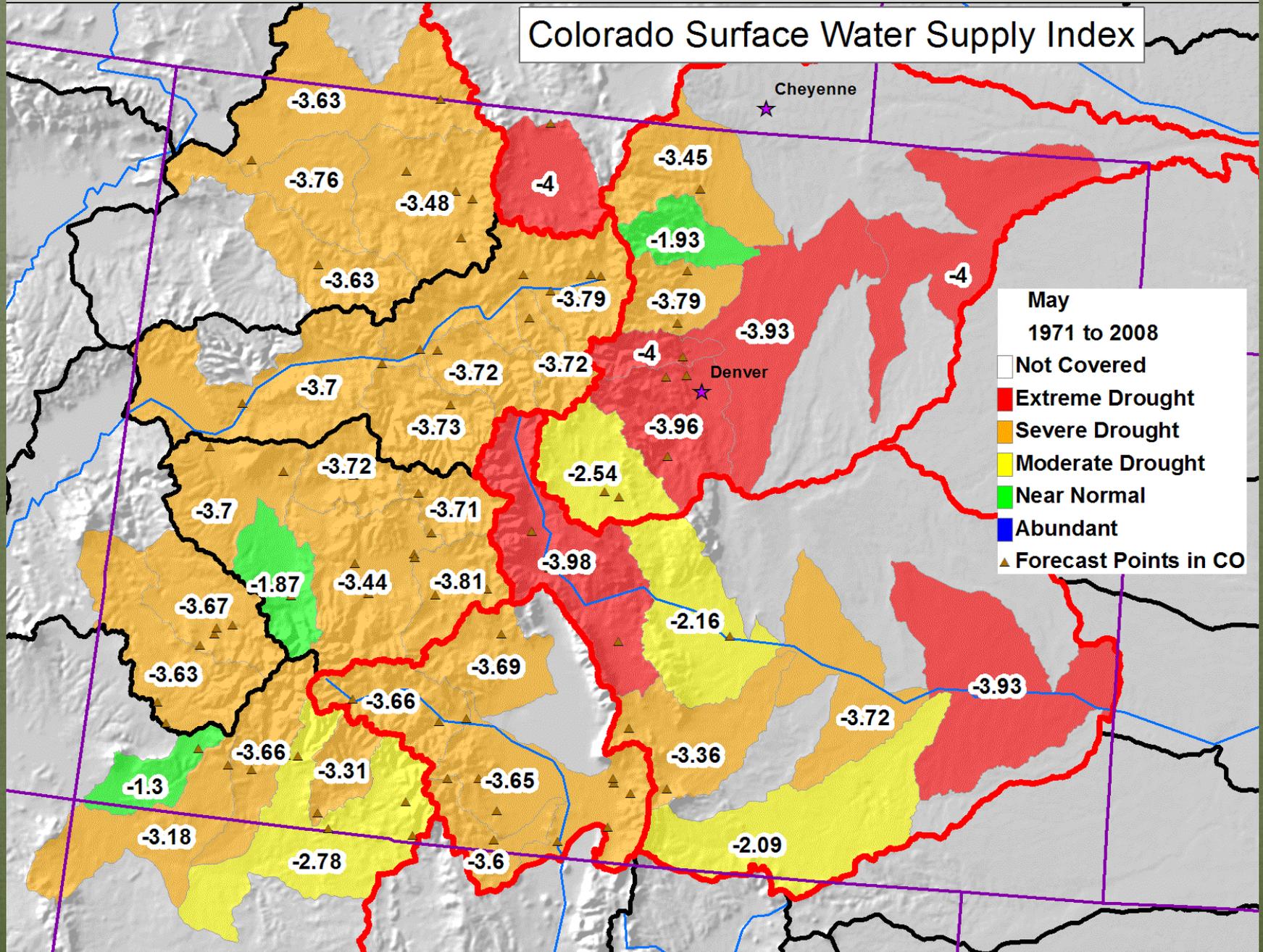
1/16/2012 - 5/14/2012



Snotel Water Year Precipitation Percentile Ranking for 14 May 2012 (Stations with 15+ years of data only)



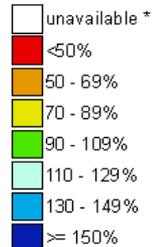
Colorado Surface Water Supply Index



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

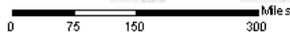
May 15, 2012

Current Snow Water Equivalent (SWE) Basin-wide Percent of 1971-2000 Normal



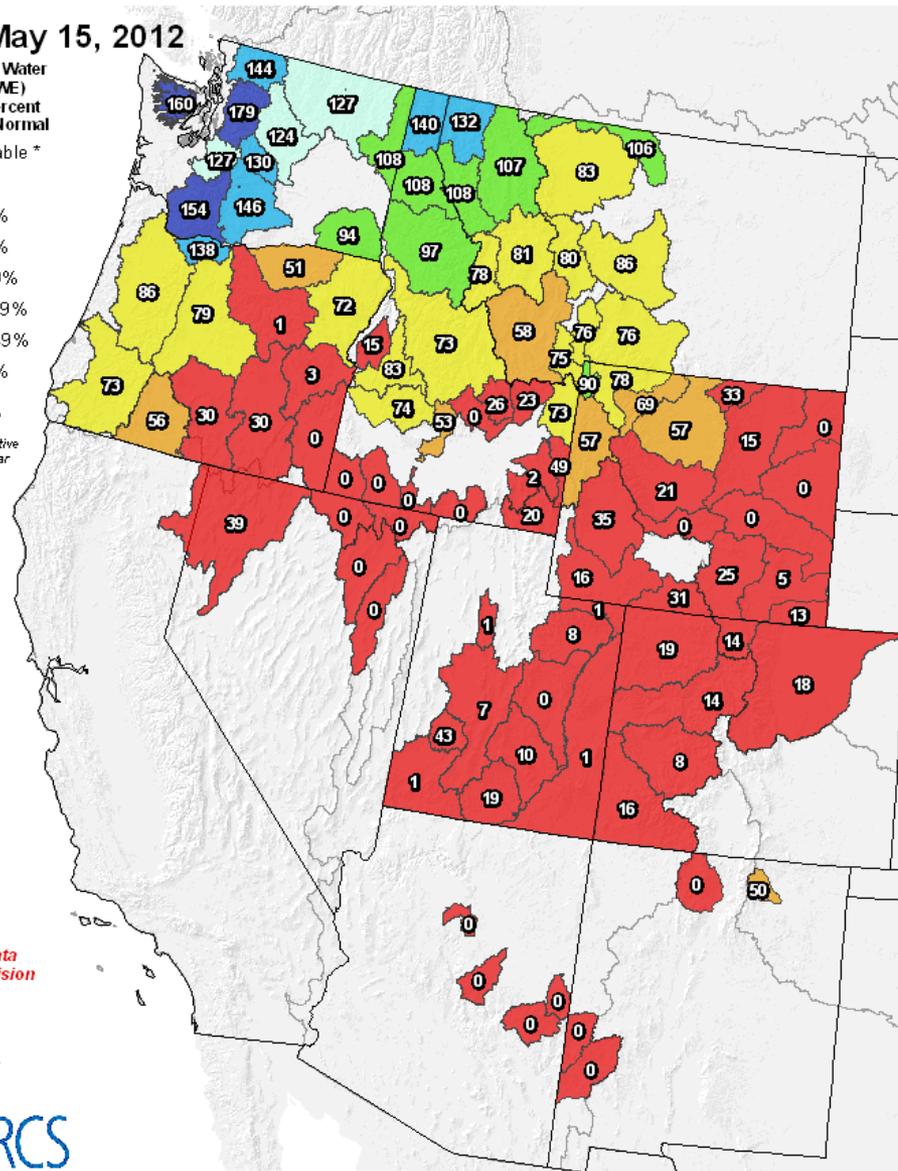
* Data unavailable at time of posting or measurement is not representative at this time of year

Provisional data subject to revision

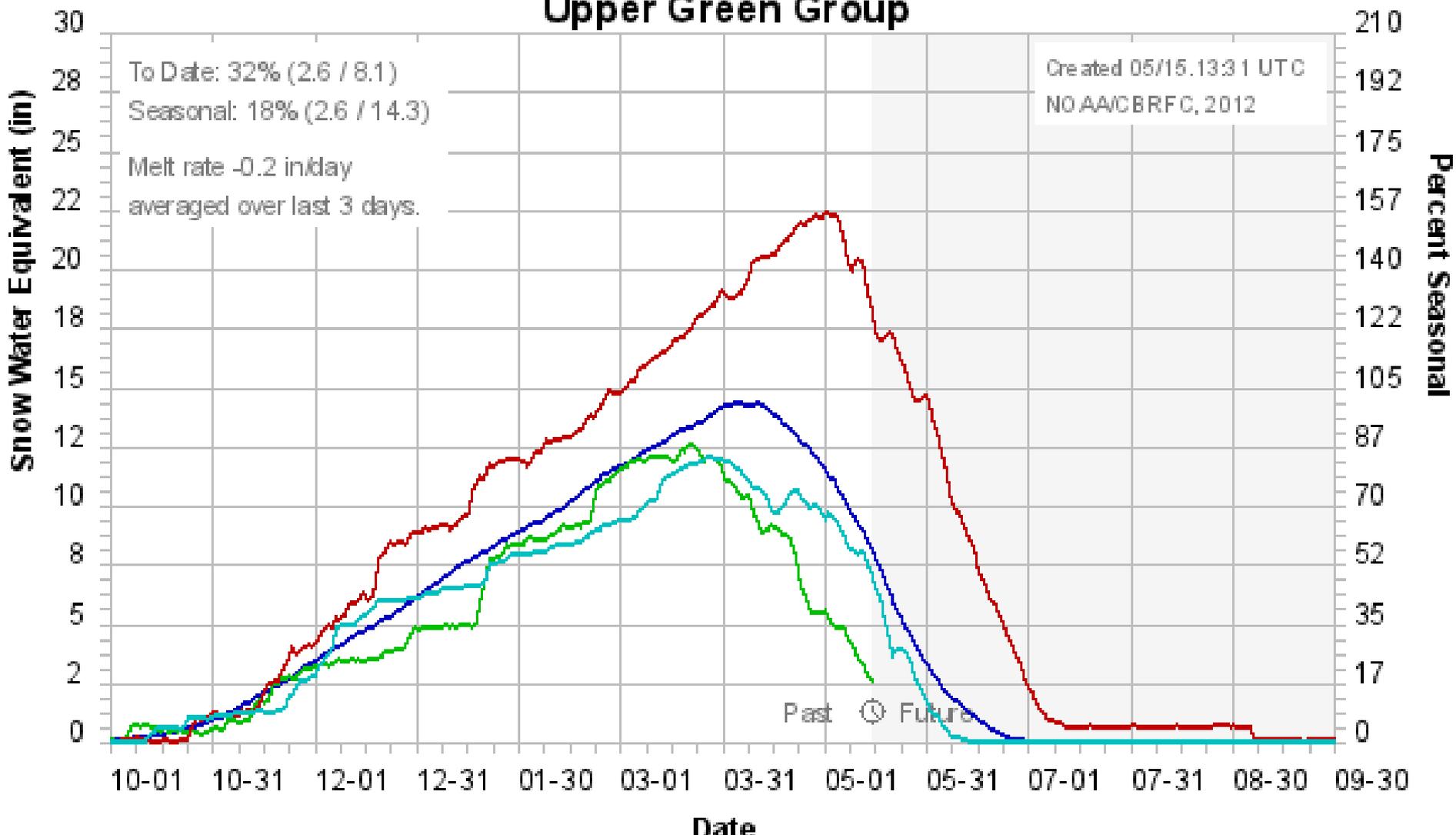


The snow water equivalent percent of normal represents the current snowwater equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

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

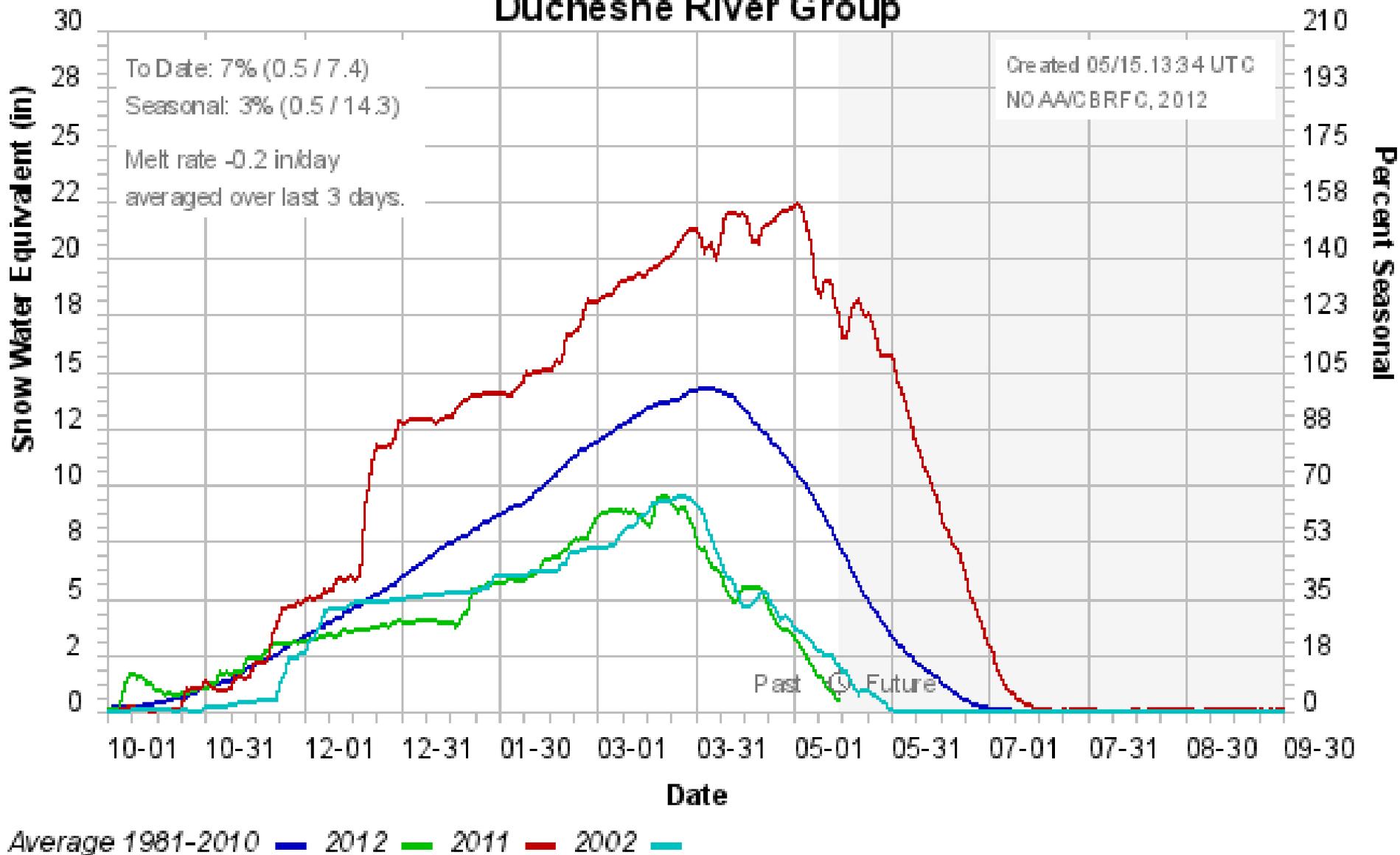


Colorado Basin River Forecast Center Upper Green Group

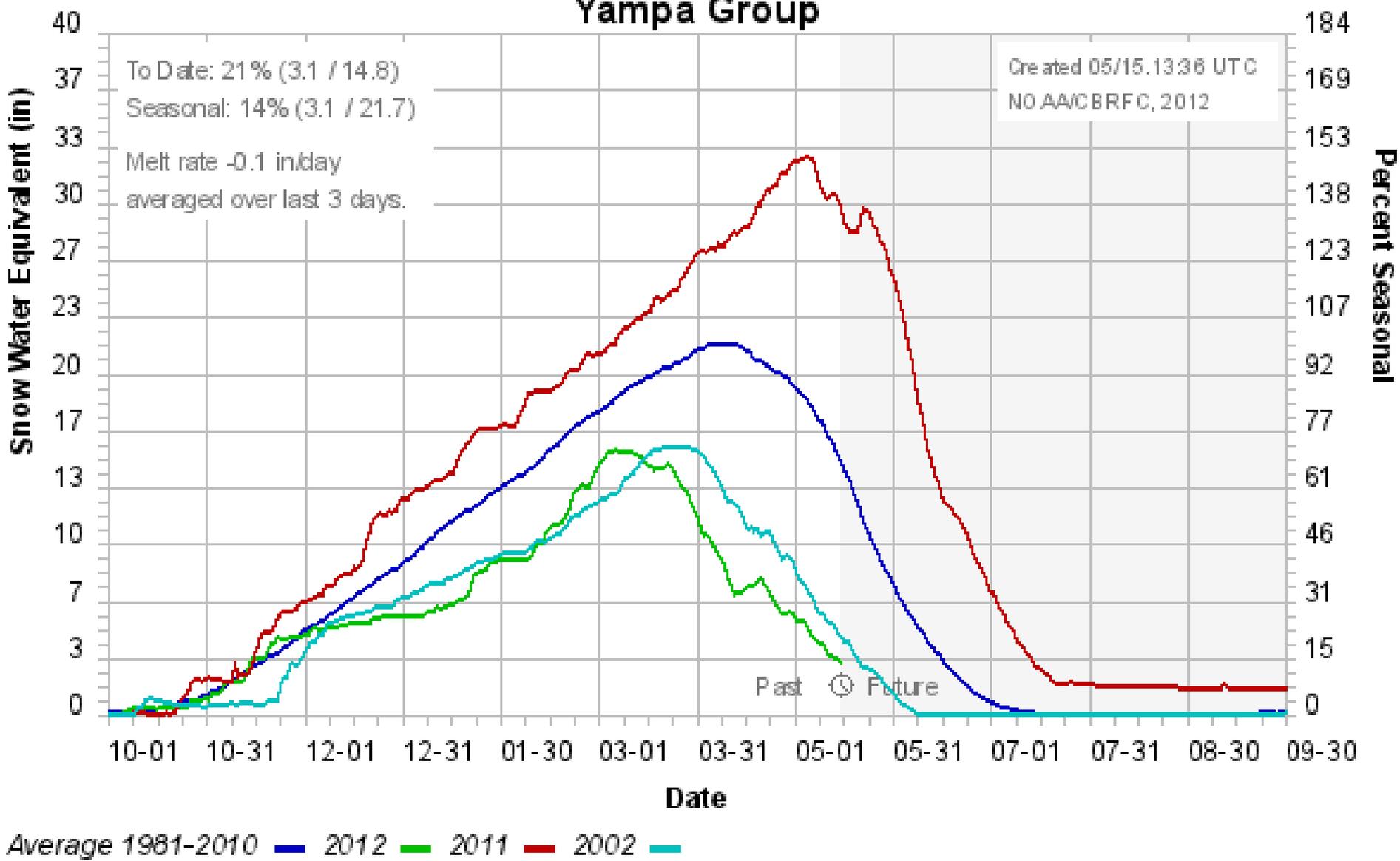


Average 1981-2010 2012 2011 2012 2012

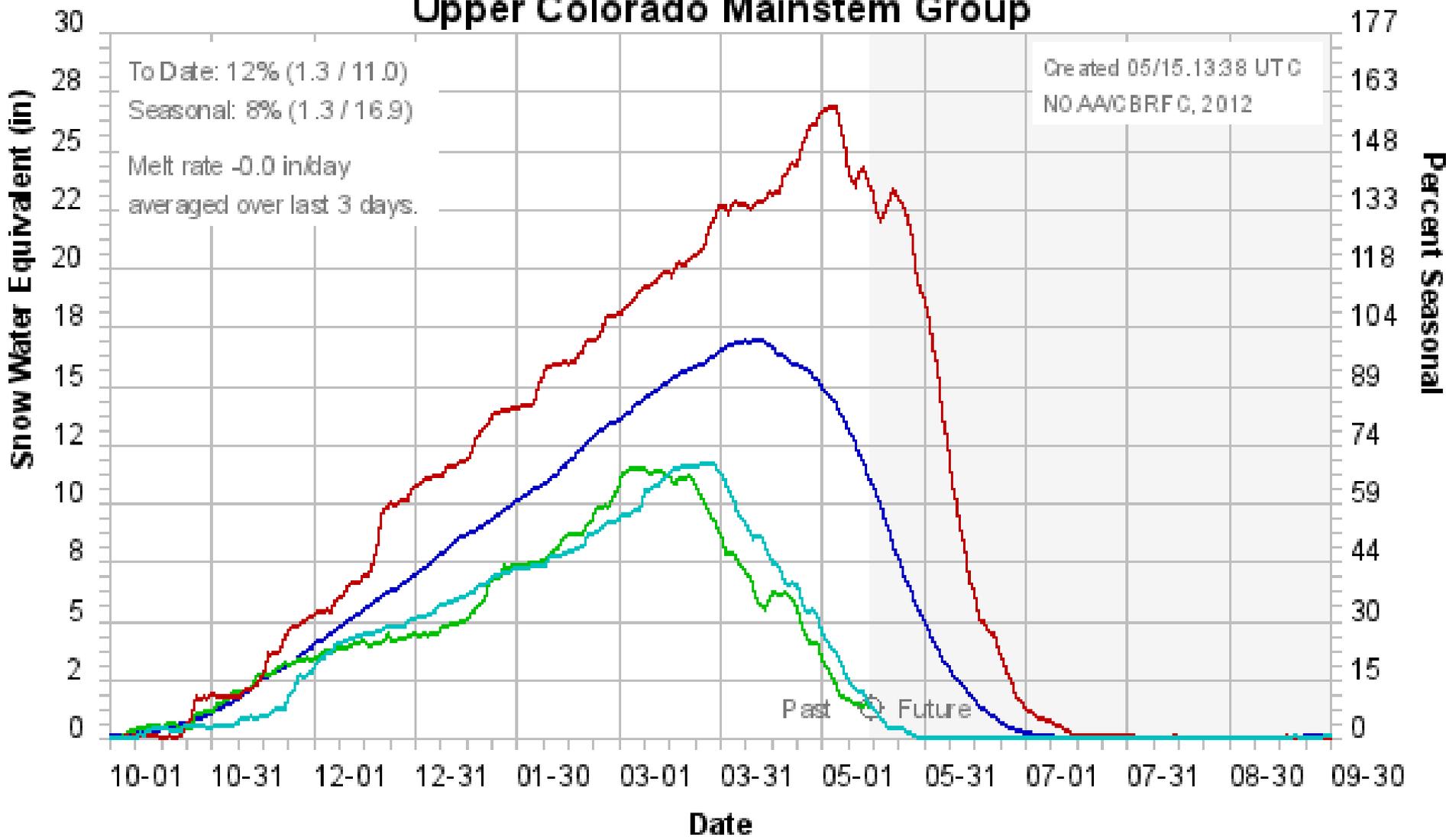
Colorado Basin River Forecast Center Duchesne River Group



Colorado Basin River Forecast Center Yampa Group

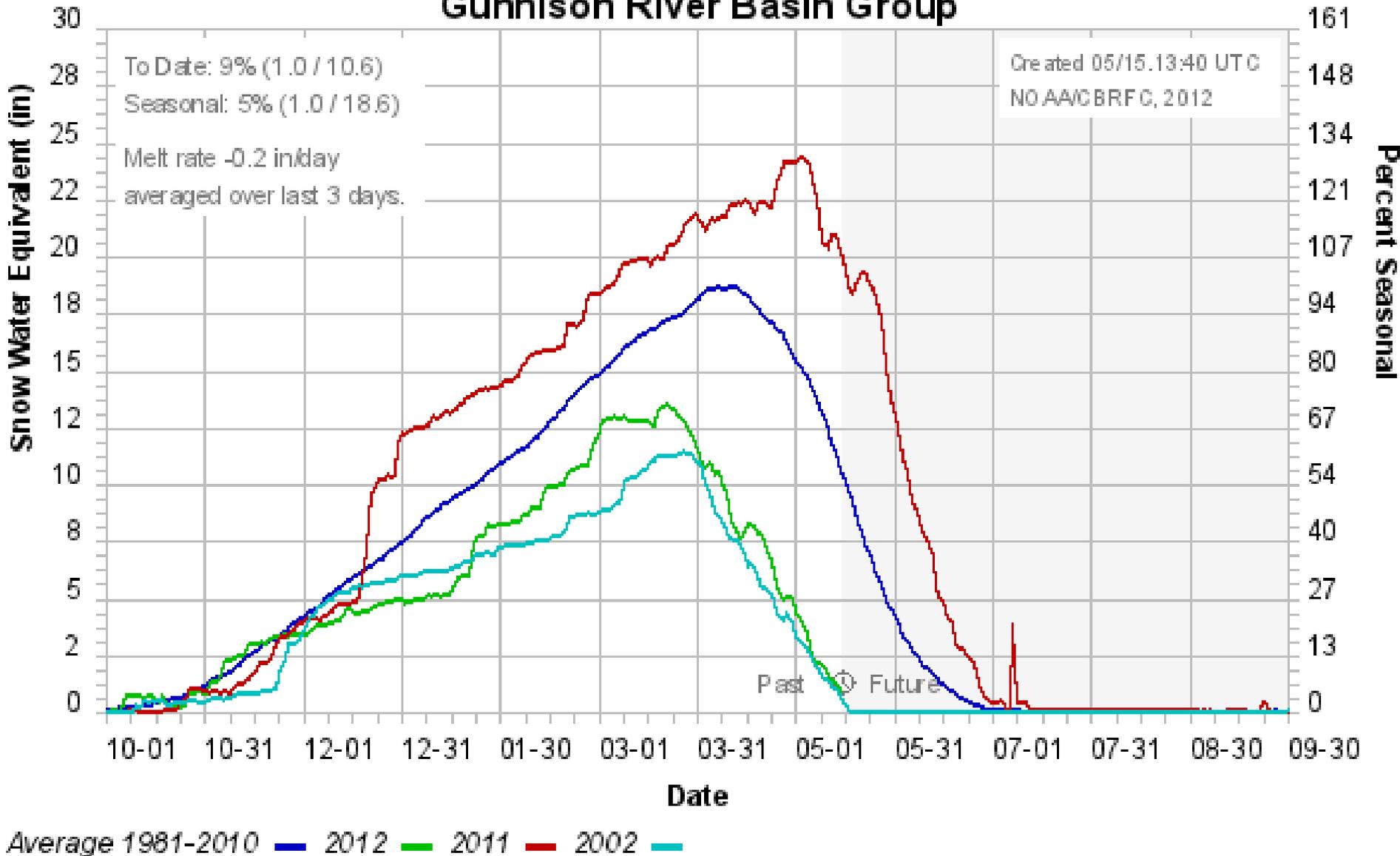


Colorado Basin River Forecast Center Upper Colorado Mainstem Group

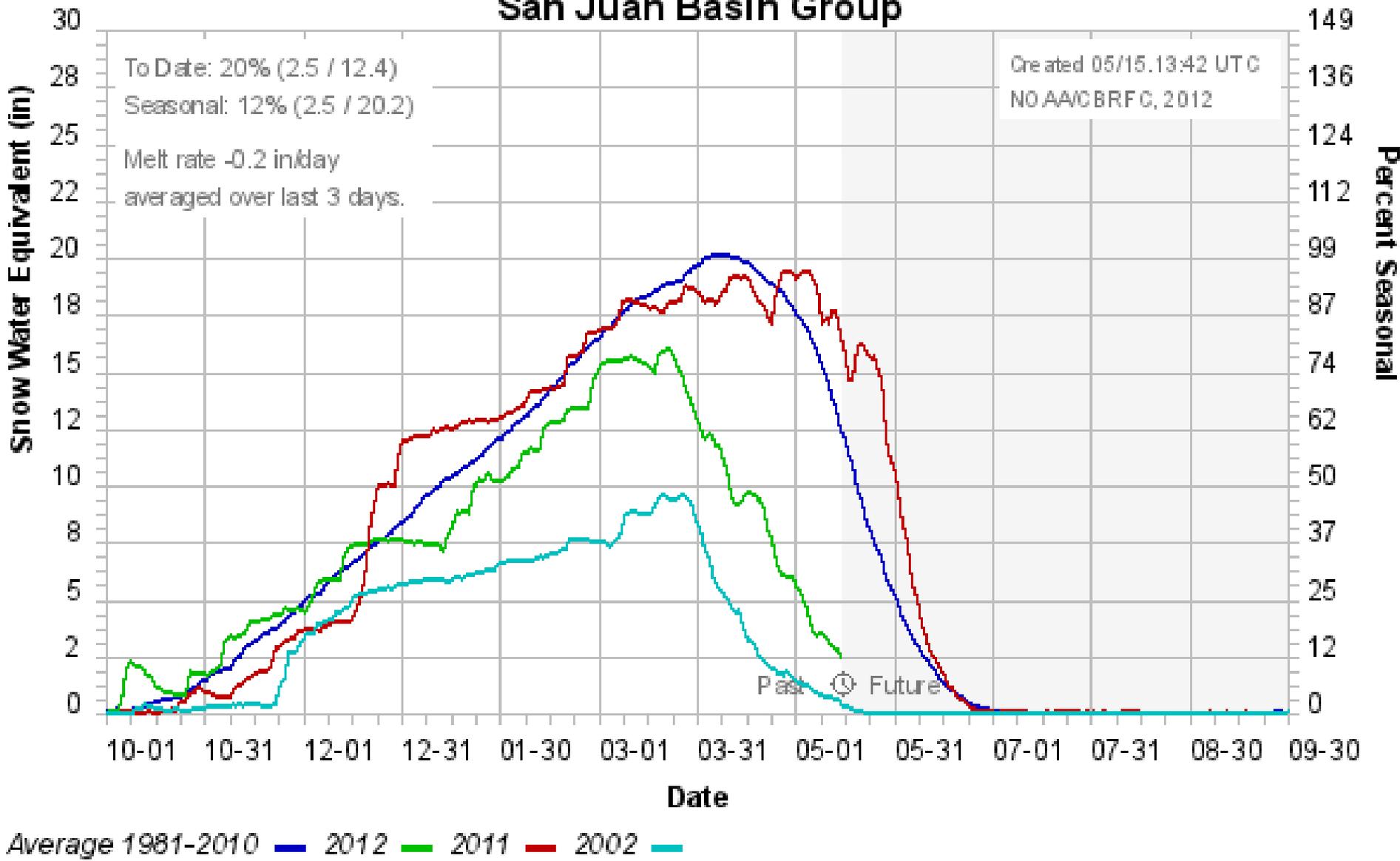


Average 1981-2010 2012 2011 2002

Colorado Basin River Forecast Center Gunnison River Basin Group



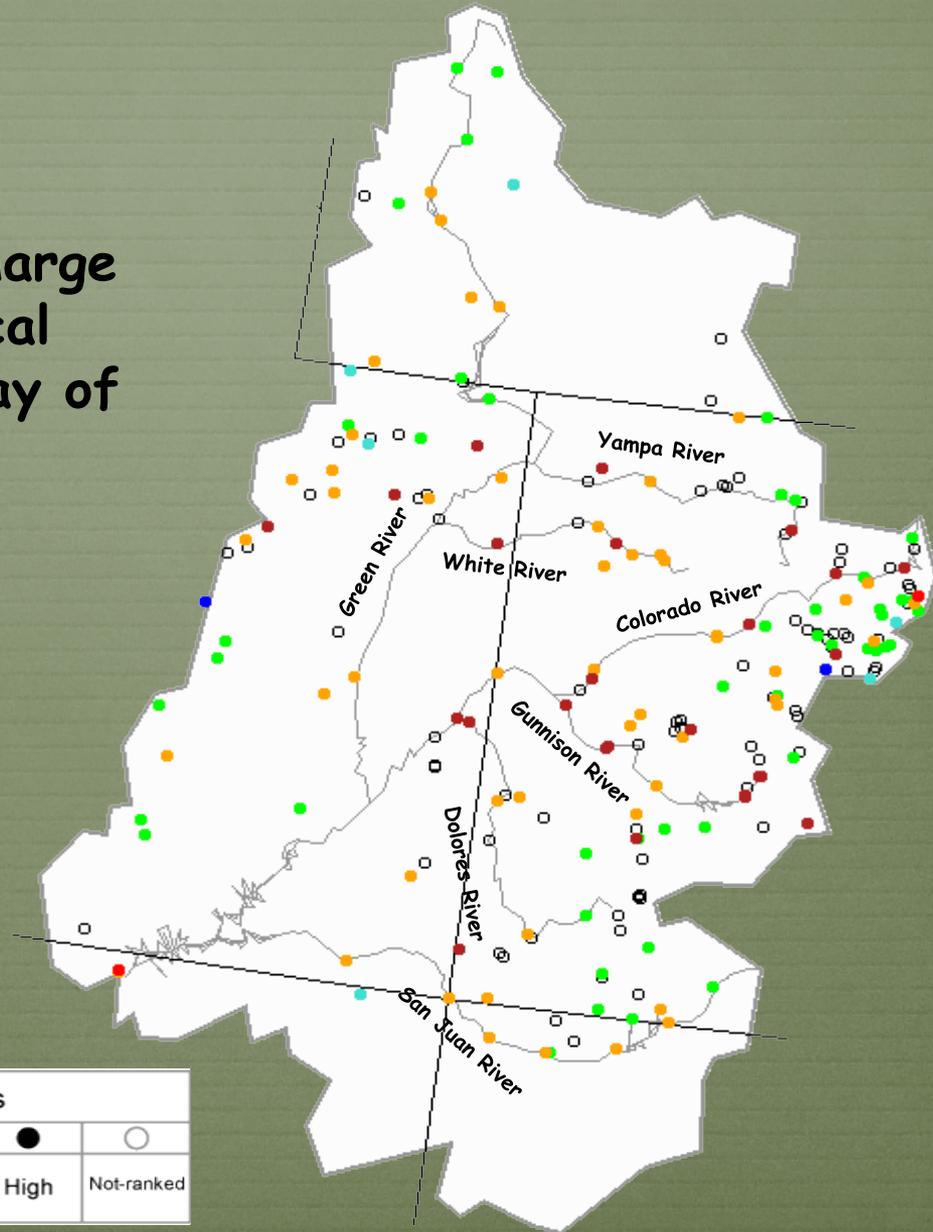
Colorado Basin River Forecast Center San Juan Basin Group



Streamflow Update

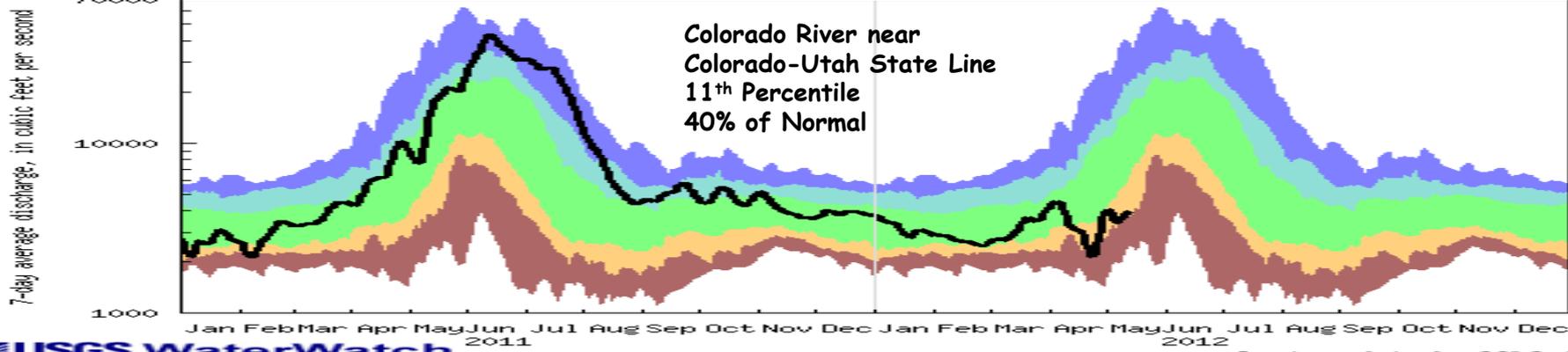


7-day average discharge compared to historical discharge for the day of the year (May 13)

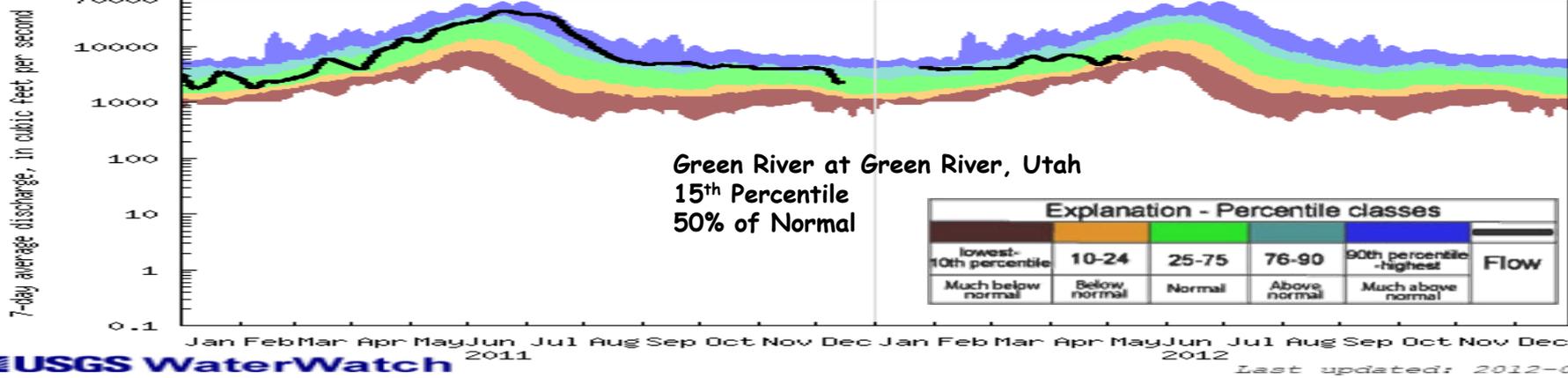


| Explanation - Percentile classes | | | | | | | |
|----------------------------------|-------------------|--------------|--------|--------------|-------------------|------|------------|
| ● | ● | ● | ● | ● | ● | ● | ○ |
| Low | <10 | 10-24 | 25-75 | 76-90 | >90 | High | Not-ranked |
| | Much below normal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

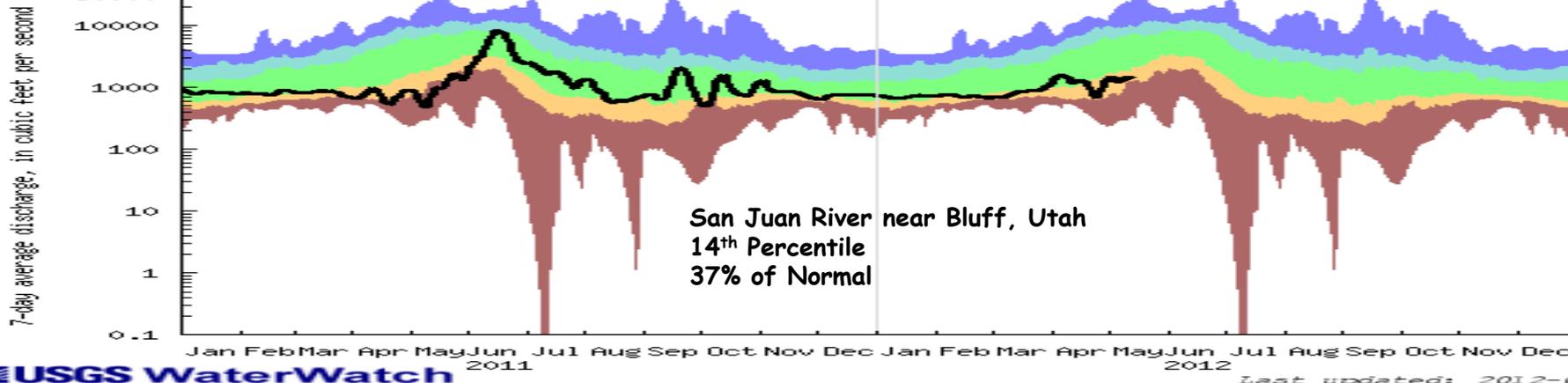
Duration hydrograph of 7-day average streamflow for USGS 09163500
 (Drainage Area: 17843 square miles, Length of Record: 59 years)



Duration hydrograph of 7-day average streamflow for USGS 09315000
 (Drainage Area: 44850 square miles, Length of Record: 116 years)

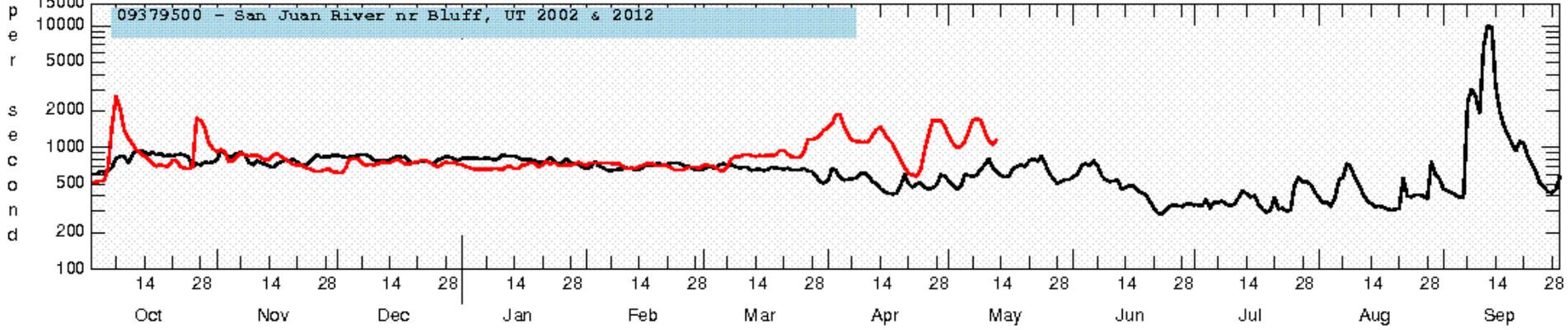
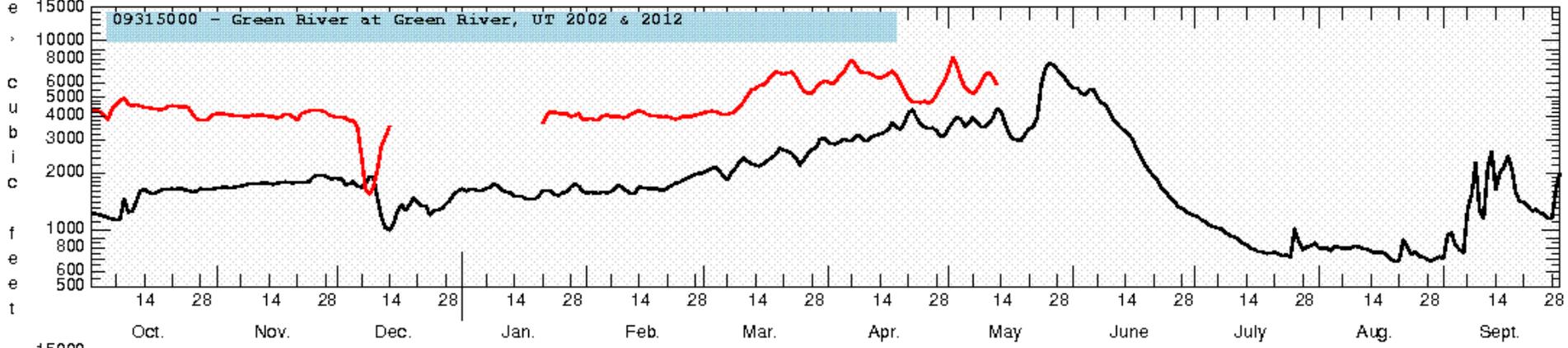
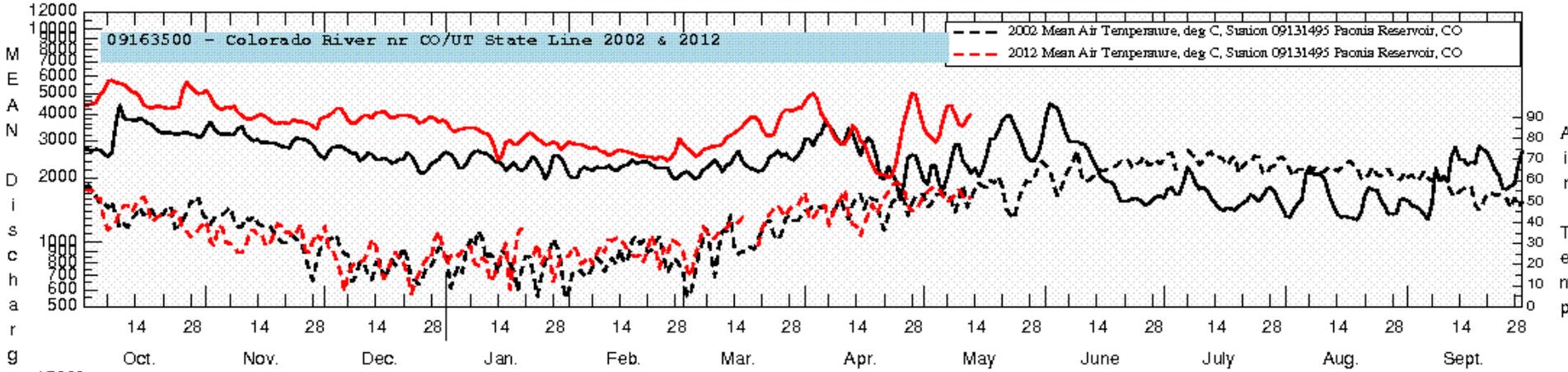


Duration hydrograph of 7-day average streamflow for USGS 09379500
 (Drainage Area: 23000 square miles, Length of Record: 96 years)



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

— Water Year 2002 Mean Daily Discharge
 — Water Year 2012 Mean Daily Discharge (Provisional)



USGS

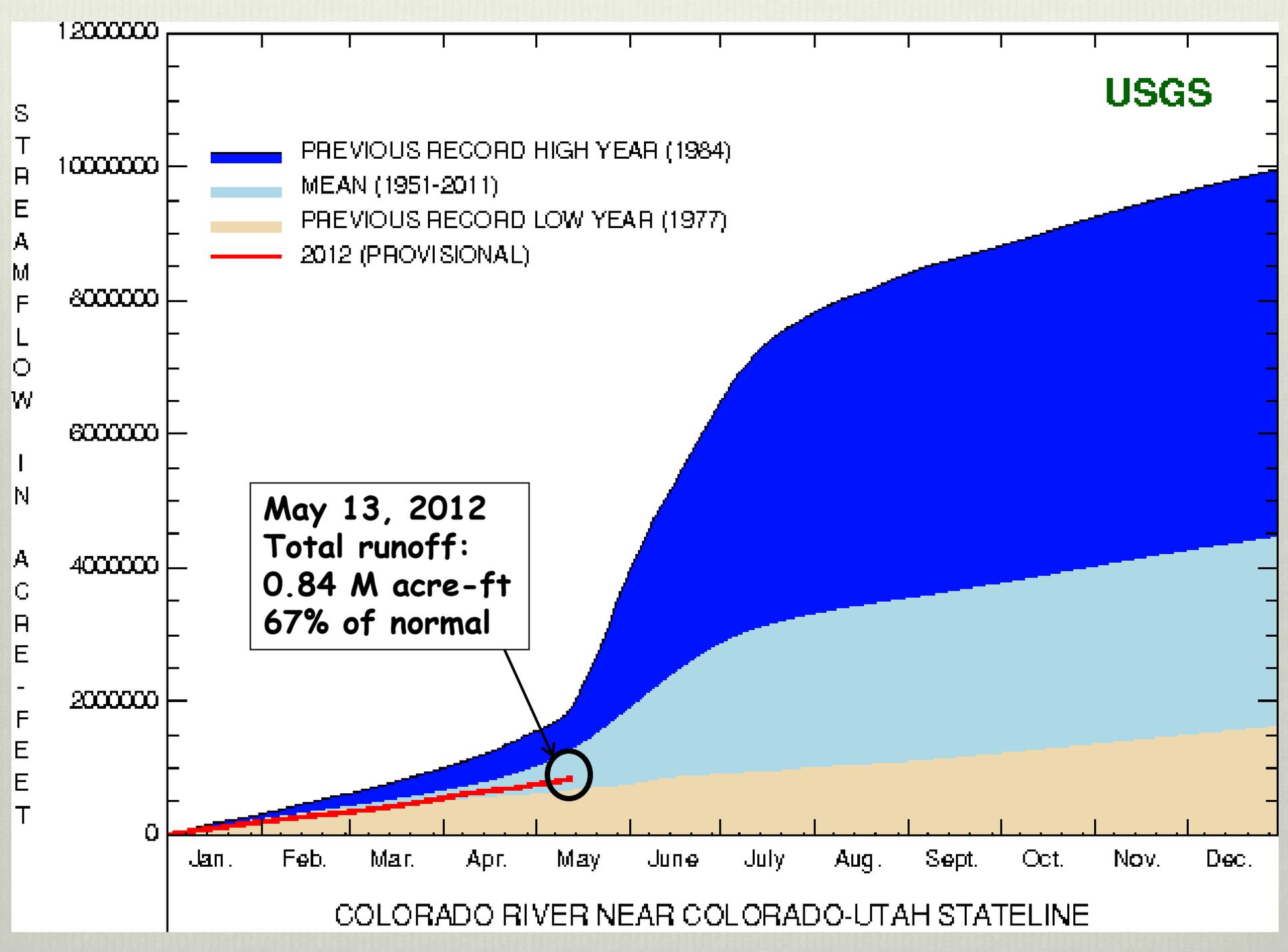
- PREVIOUS RECORD HIGH YEAR (1984)
- MEAN (1951-2011)
- PREVIOUS RECORD LOW YEAR (1977)
- 2012 (PROVISIONAL)

May 13, 2012
Total runoff:
0.84 M acre-ft
67% of normal

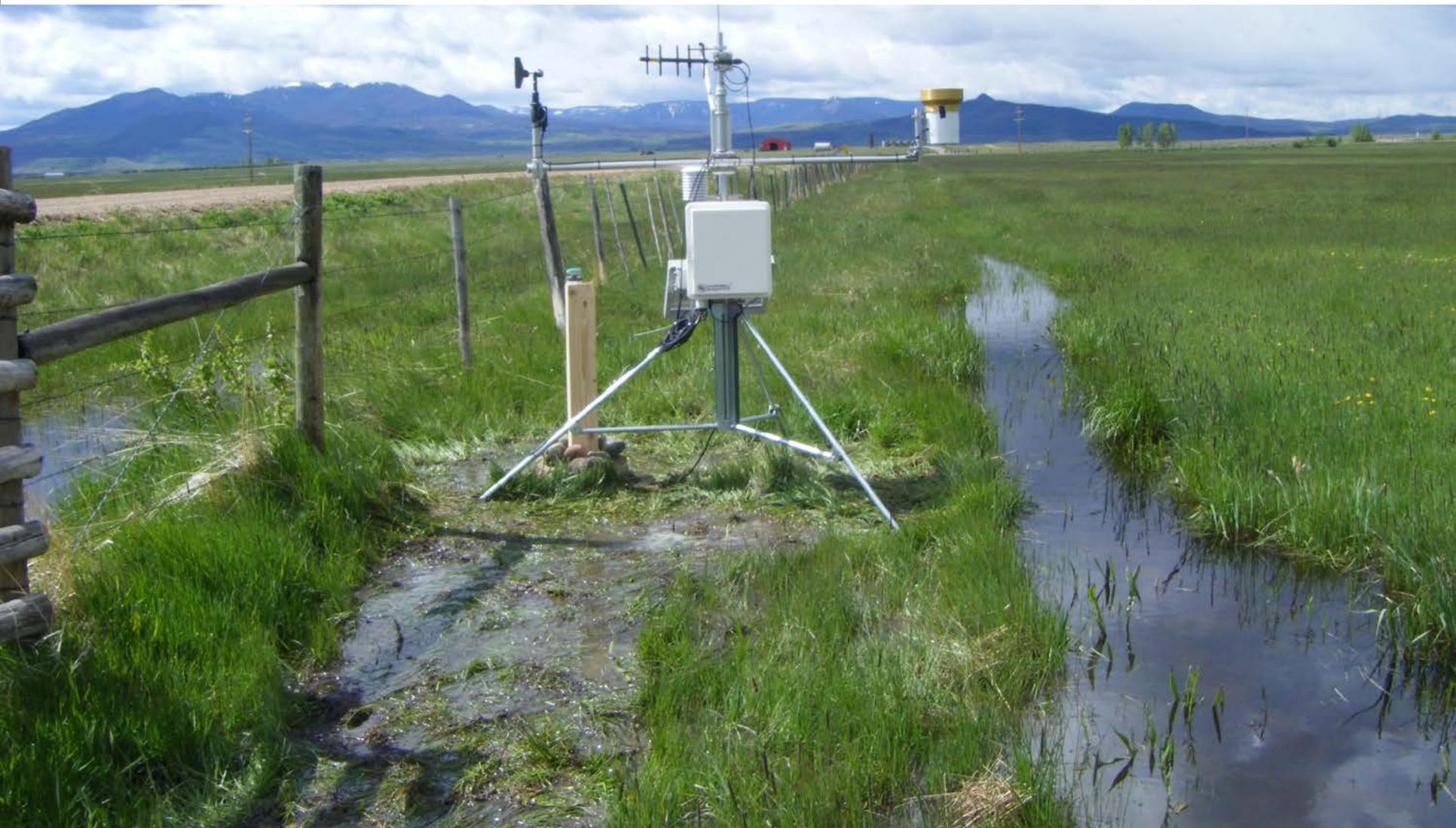
STREAM FLOW IN ACRES-FEET

Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

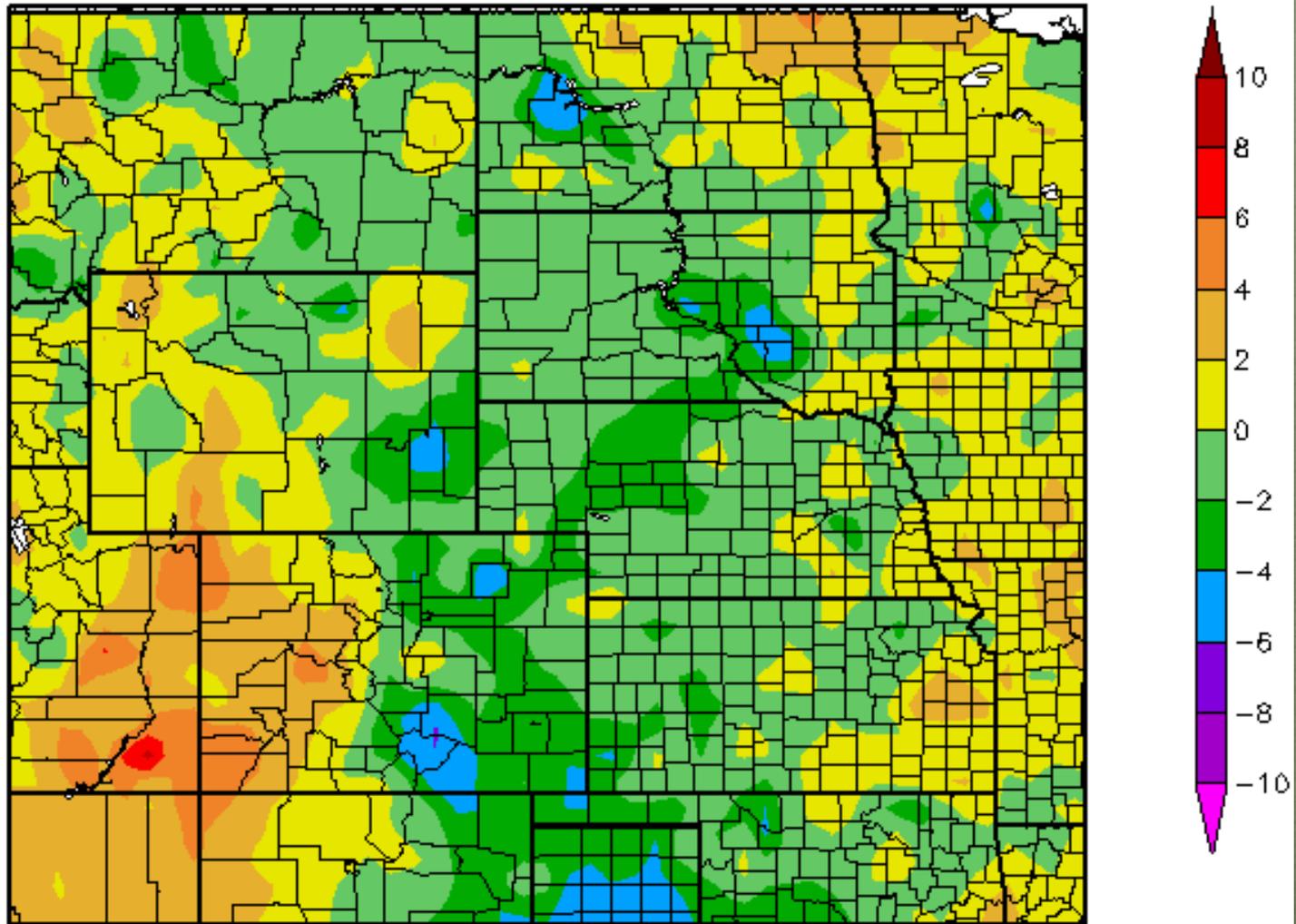
COLORADO RIVER NEAR COLORADO-UTAH STATELINE



Water Demand

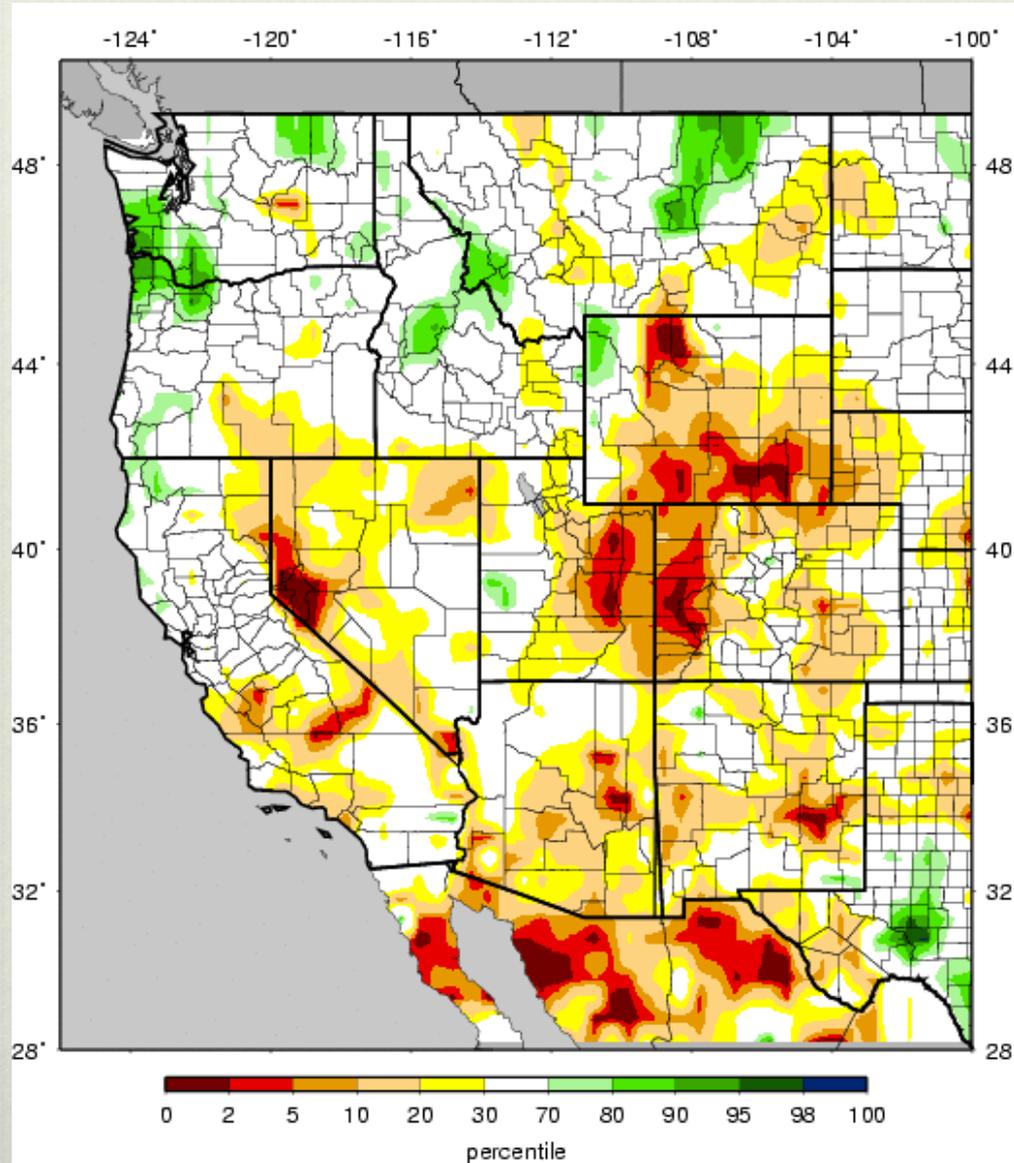


Temperature Departure from Normal 05/07/2012 – 05/13/2012



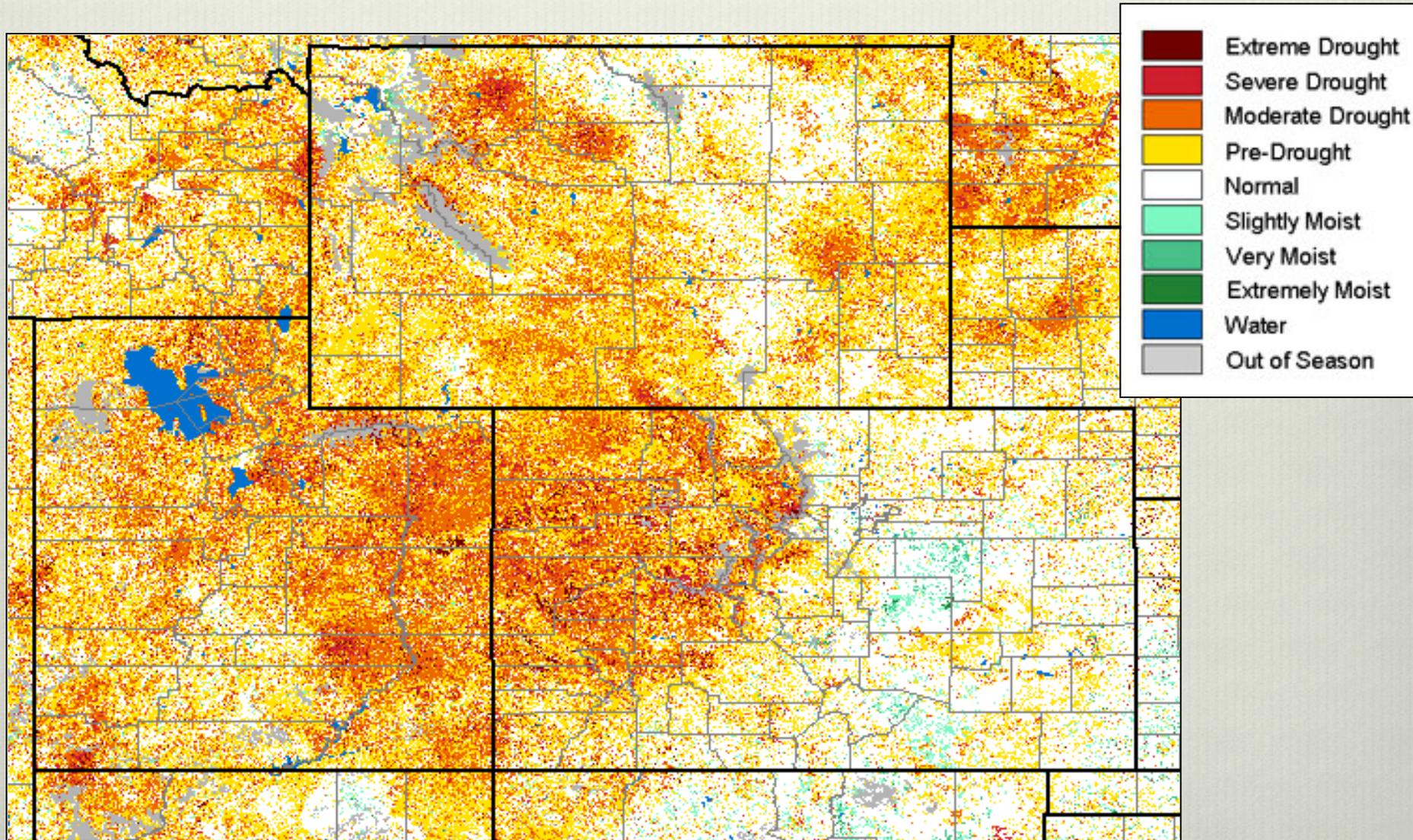
VIC Soil Moisture

13 May 2012



eMODIS VegDRI Vegetation

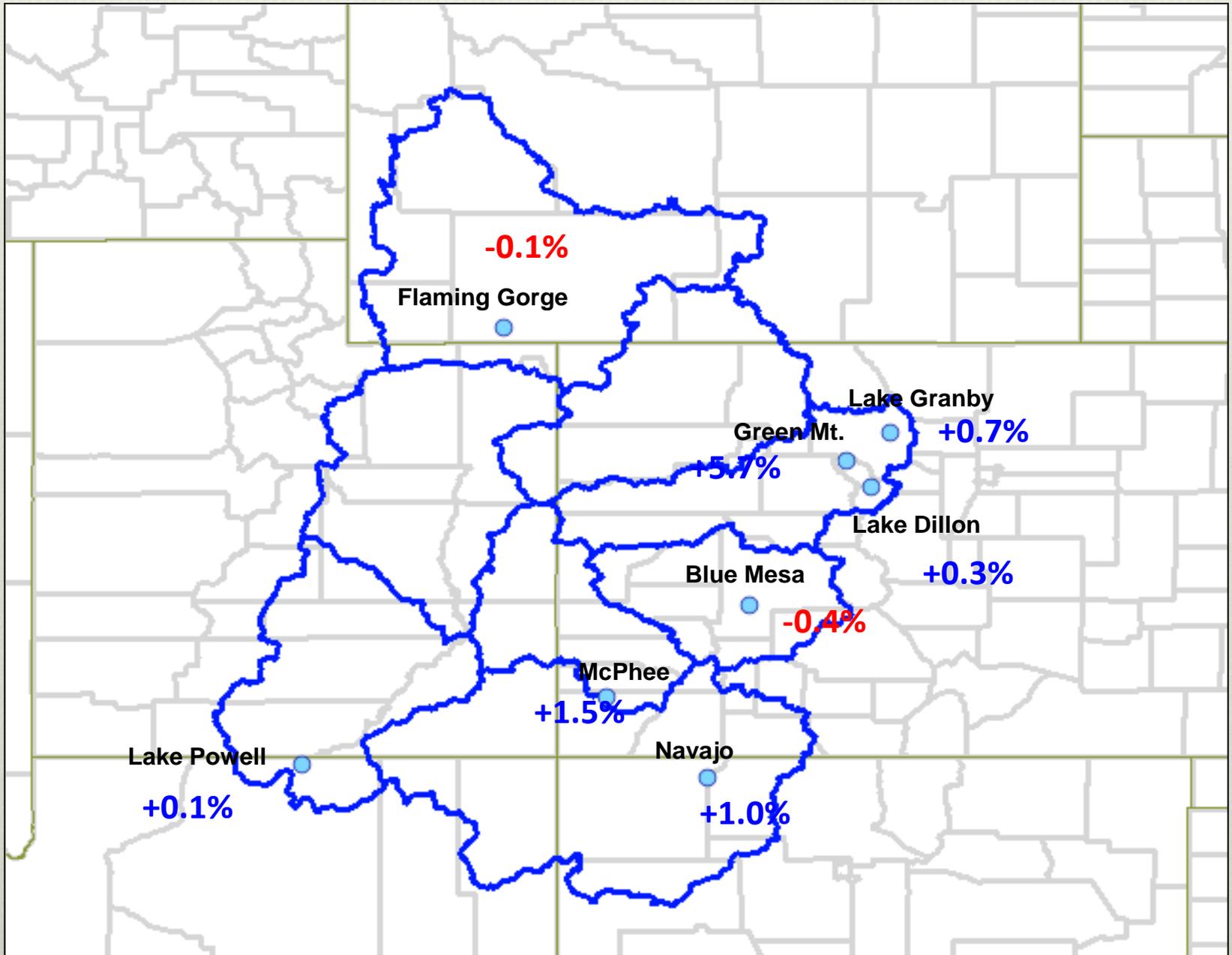
13 May 2012



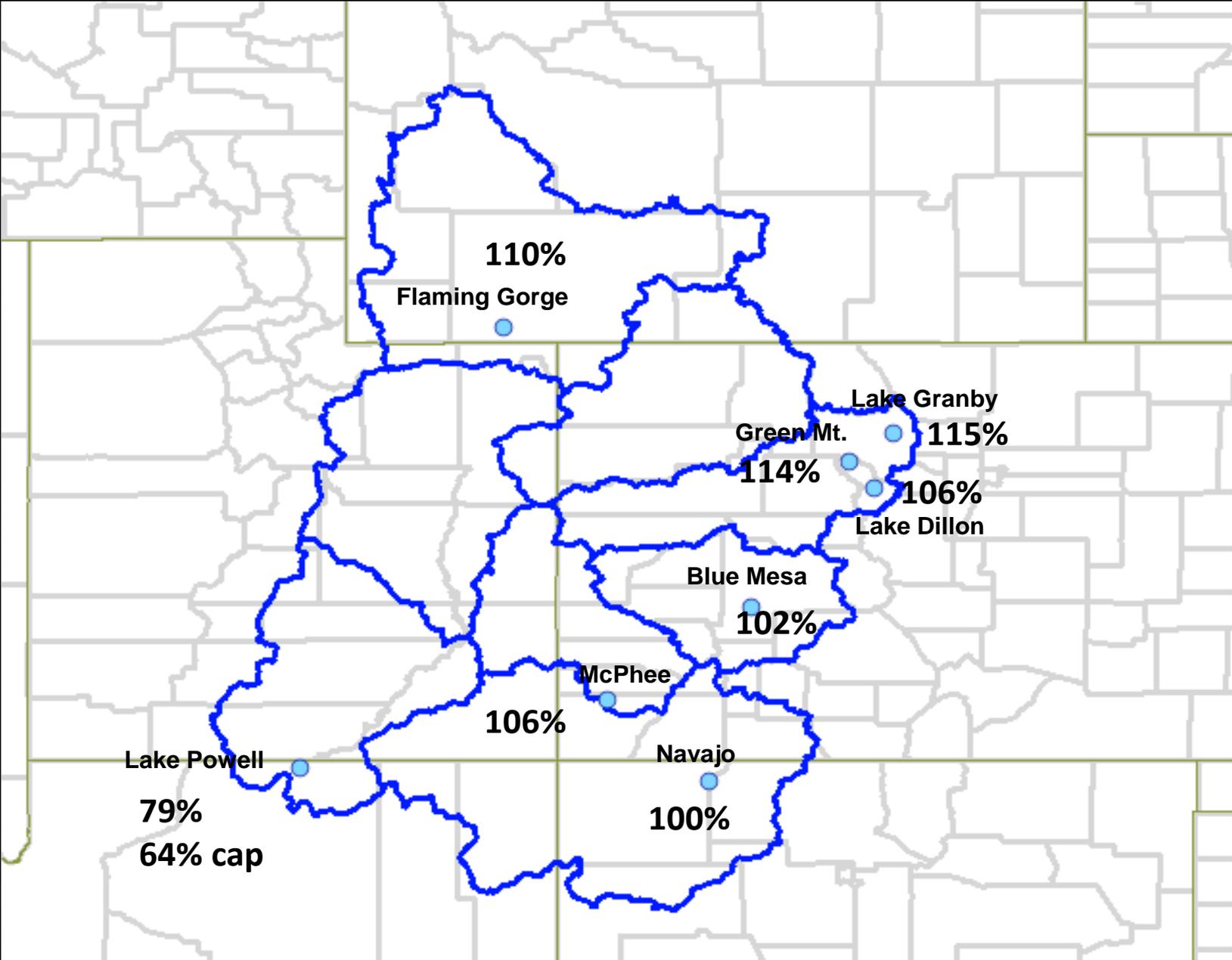
Reservoir Update



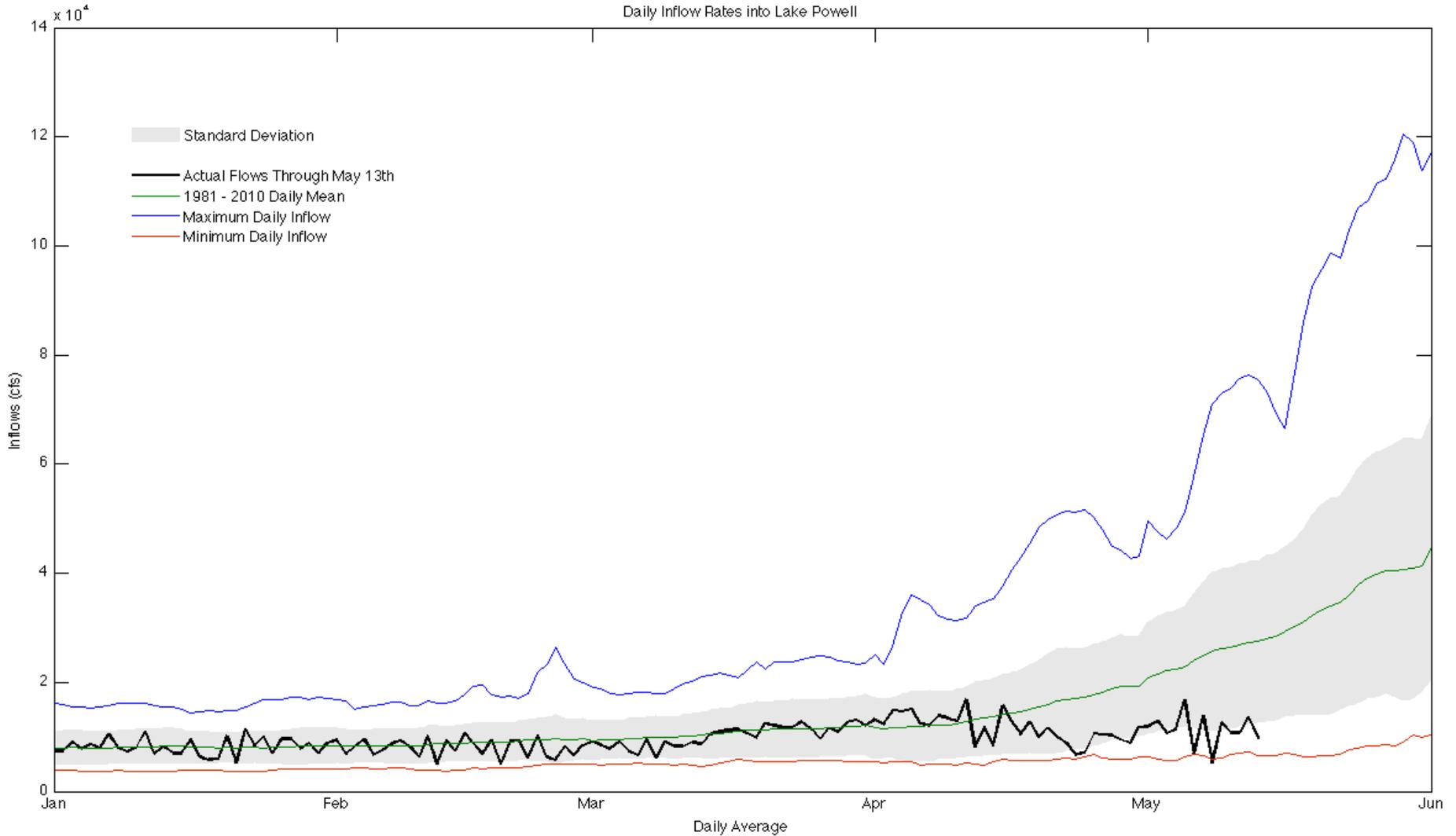
May Reservoir Storage Volume Change



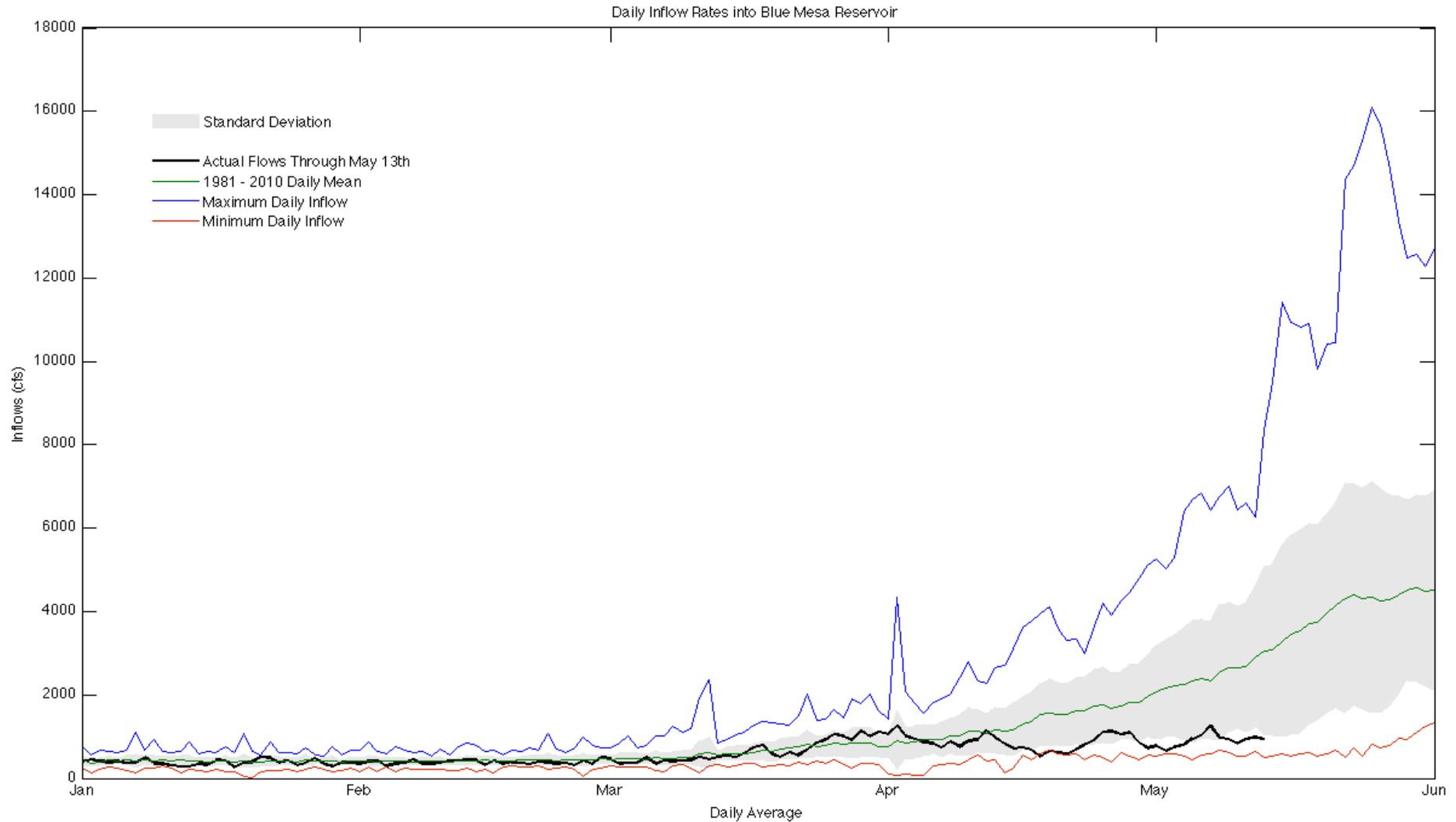
May Average Reservoir Storage Volume



Daily Inflows into Flaming Gorge

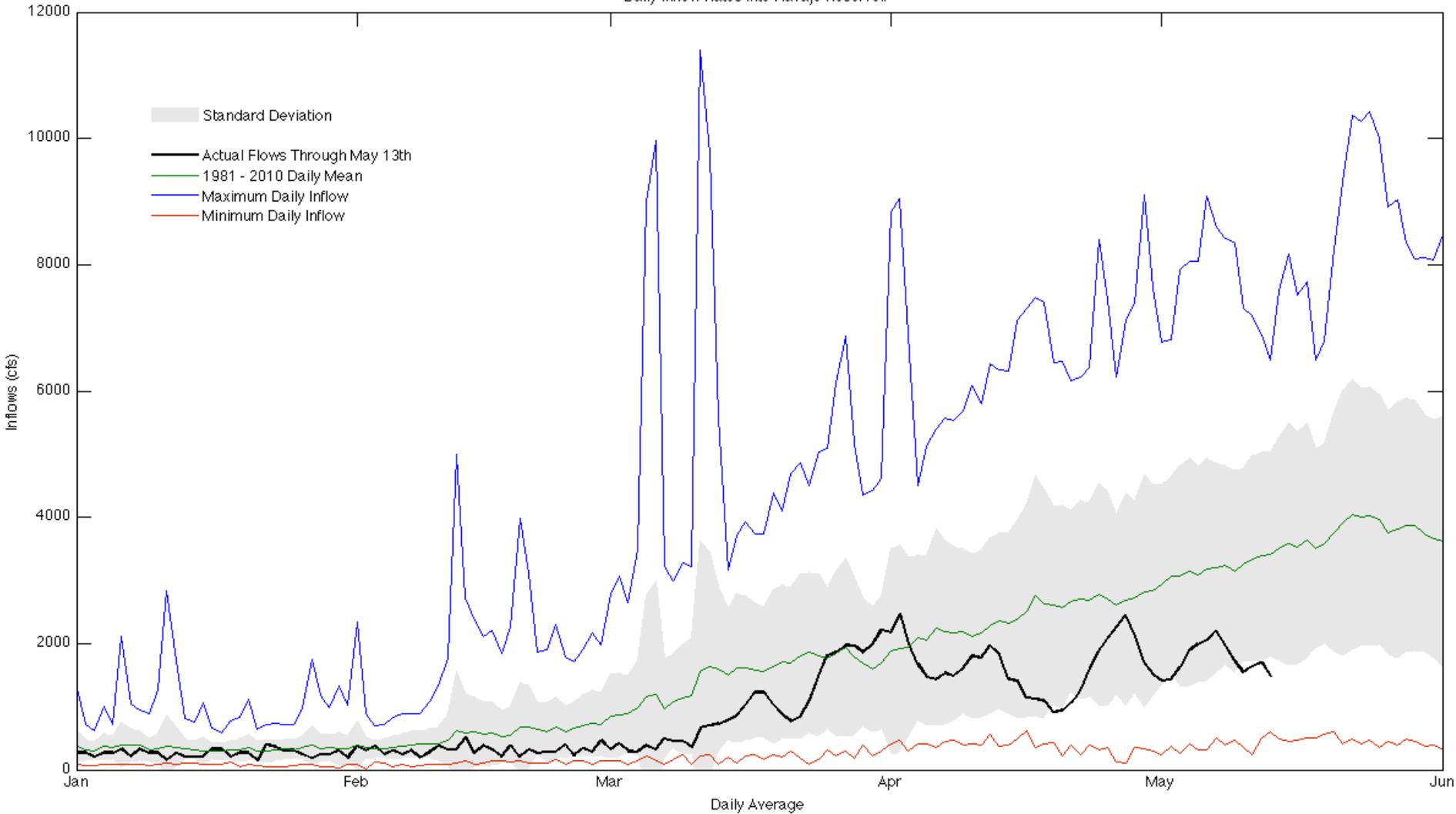


Daily Inflows into Blue Mesa

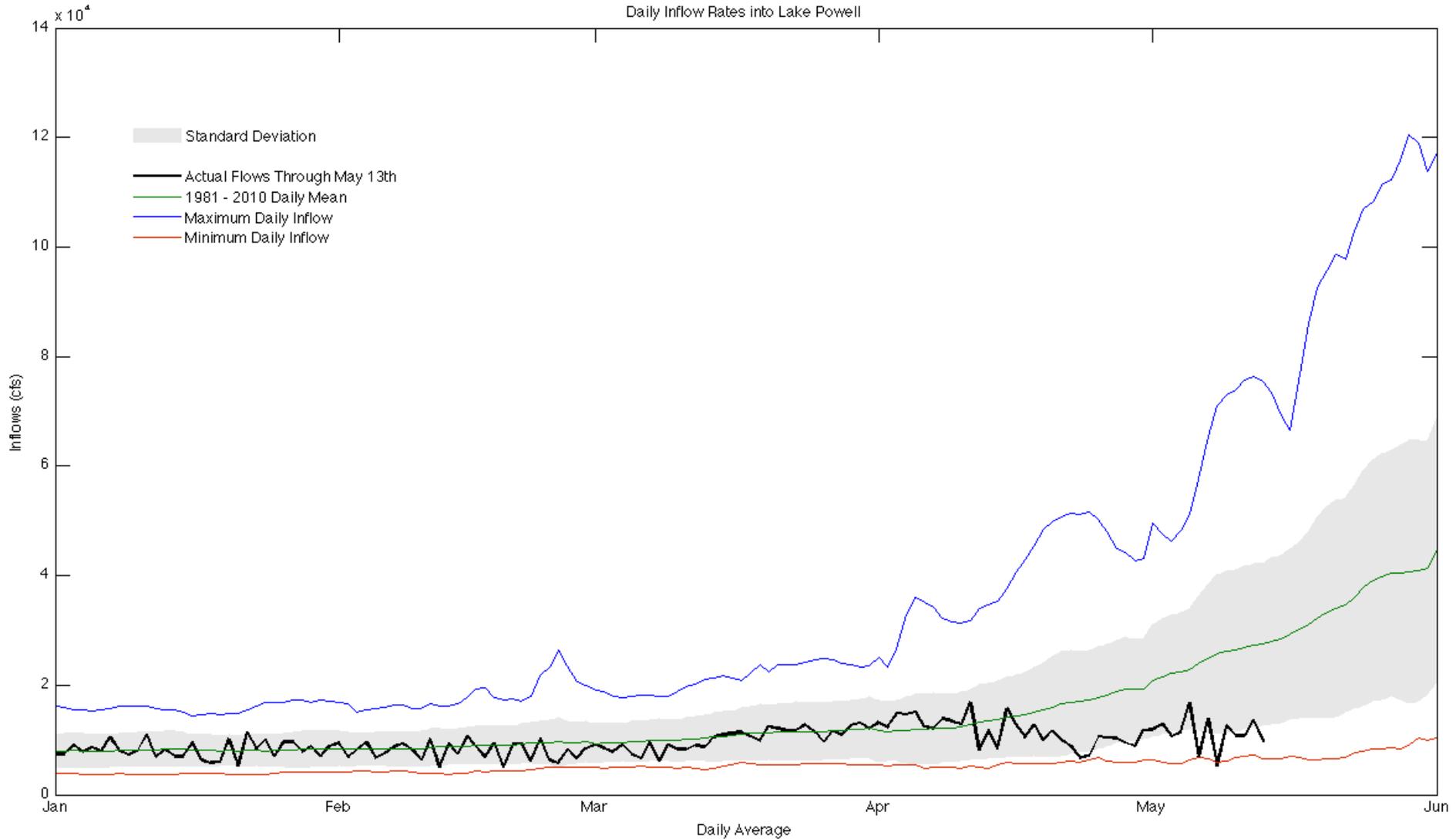


Daily Inflows into Navajo

Daily Inflow Rates into Navajo Reservoir

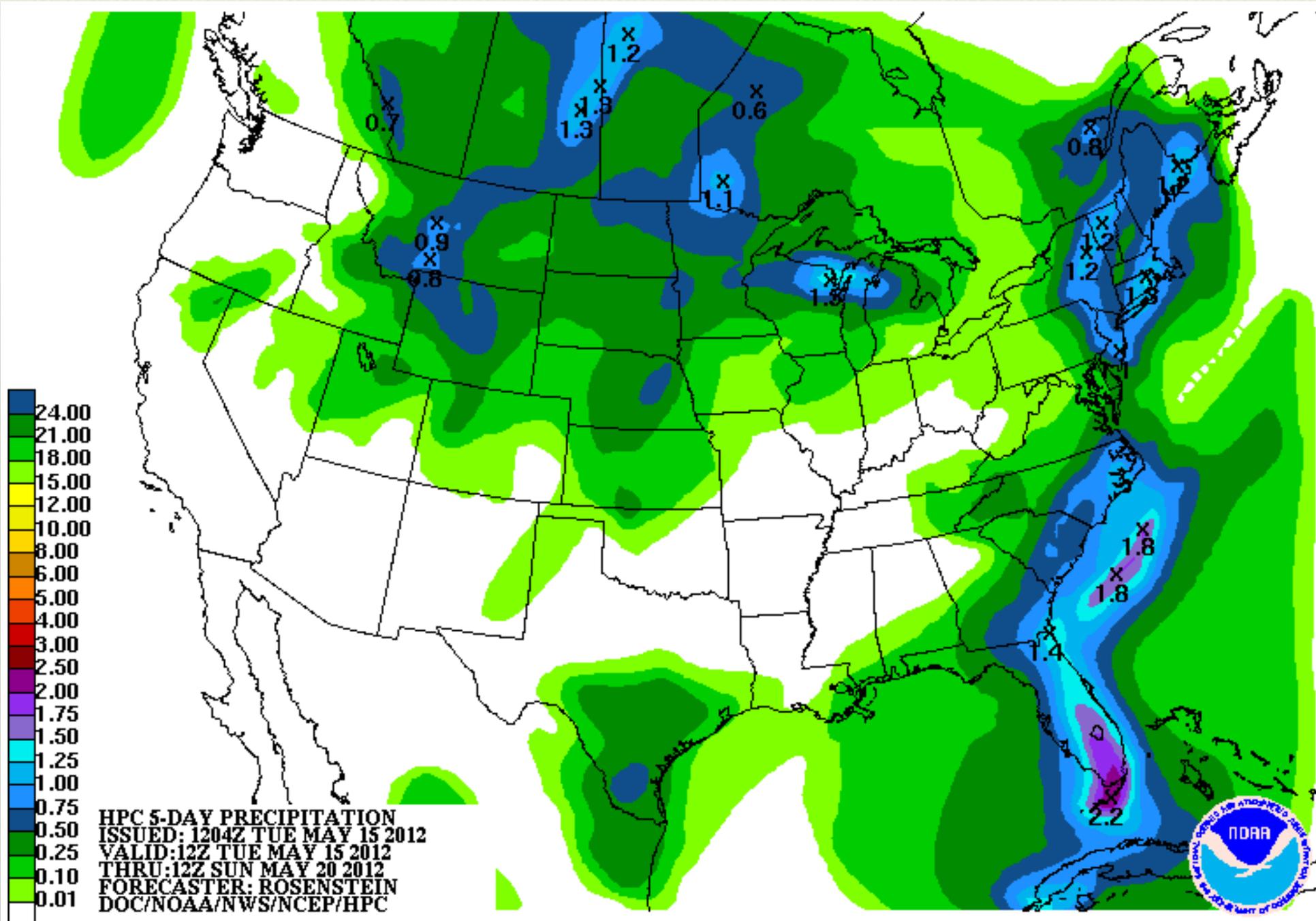


Daily Inflows into Lake Powell

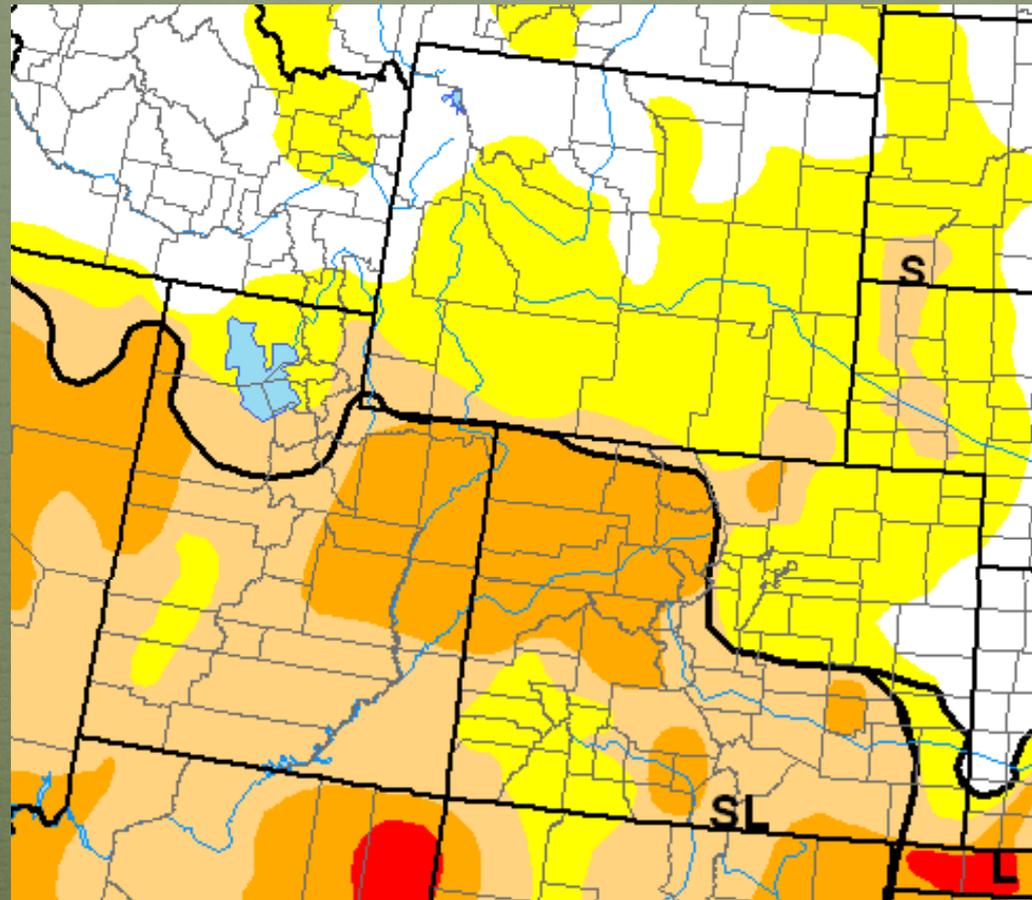


Precipitation Forecast





Recommendations



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NIDIS - UPPER COLORADO BASIN PILOT PROJECT

For more information

NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

May 15, 2012

Precipitation and Snowpack

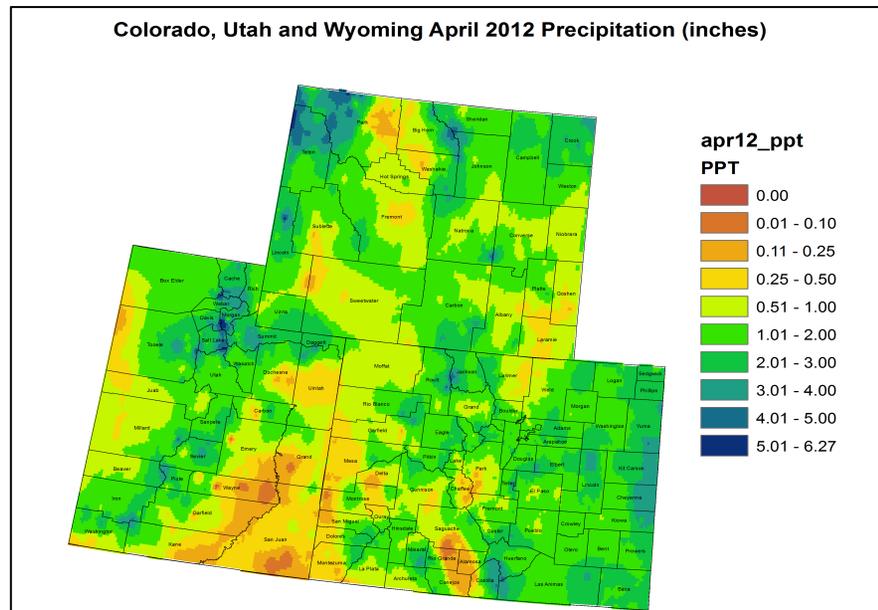


Fig. 1: April precipitation in inches.

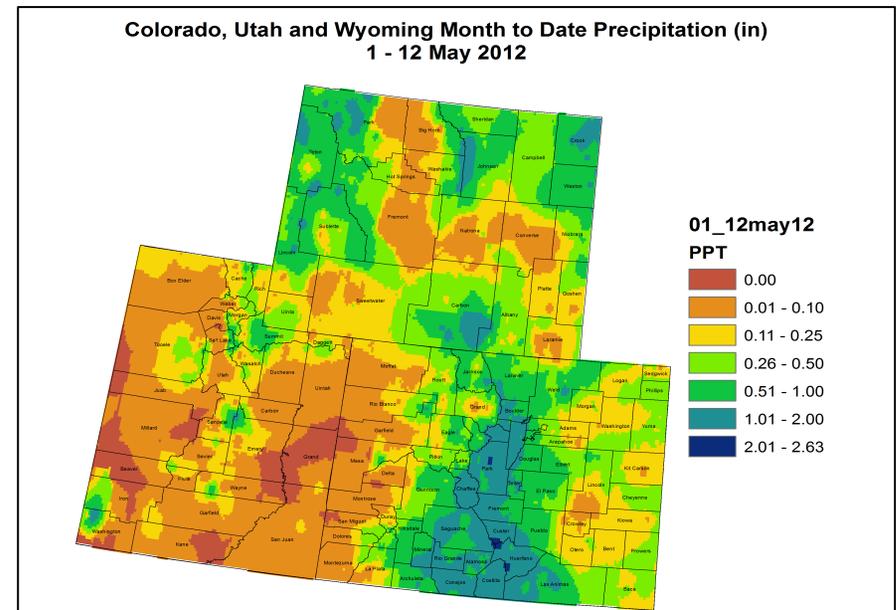


Fig. 2: May 1 – 12 precipitation in inches.

For the month of April, the Upper Colorado River Basin (UCRB) higher elevations saw 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 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 for the month. Most of CO, east of the UCRB, received between 1 and 2 inches of precipitation, though short-term dryness shows up in northern CO and in the South Park valley for the month. The San Luis Valley was also drier, seeing less than a quarter of an inch for the month.

For the month of May so far, the heaviest precipitation has been concentrated along the Front Range of CO and just east of the Continental Divide, with many of those areas, including the San Luis Valley, receiving between 1 and 2 inches of moisture (Fig. 2). Higher elevations in the UCRB have received between a quarter and half an inch for the month, but most of the lower elevations have seen less than a tenth of an inch. Eastern CO has received between a tenth and a half inch of precipitation since the beginning of the month.

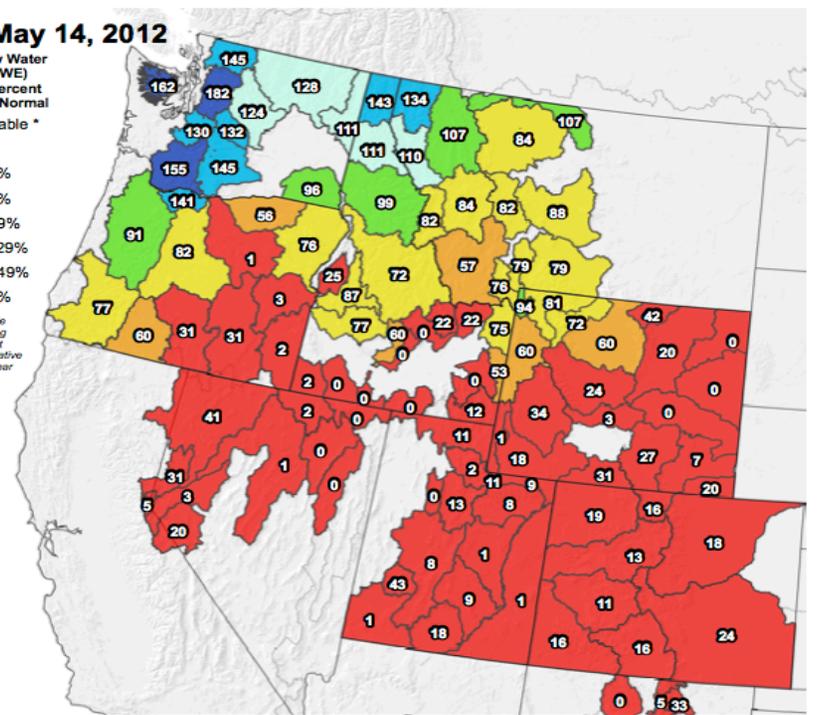
Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

May 14, 2012

Current Snow Water Equivalent (SWE) Basin-wide Percent of 1971-2000 Normal

- Unavailable *
- <50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- >= 150%

* Data unavailable at time of posting or measurement is not representative at this time of year



Snotel Water Year Precipitation Percentile Ranking for 14 May 2012 (Stations with 15+ years of data only)

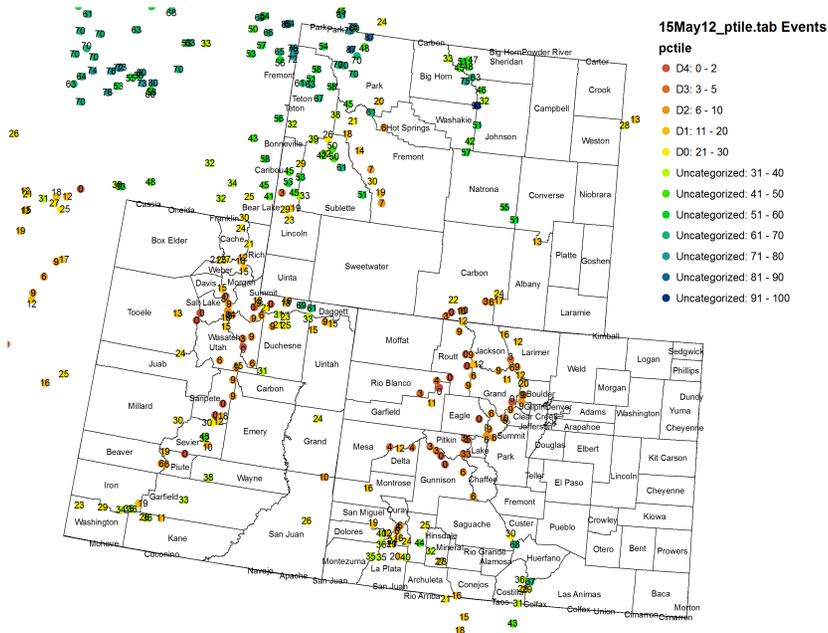


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21 – 30% is Drought Monitor D0 category).

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

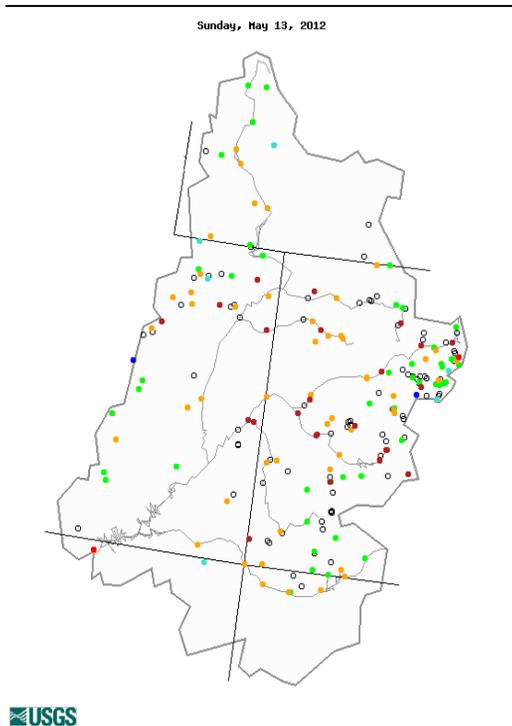
Water-year-to-date (WYTD), SNOTEL precipitation percentiles are lowest for the Yampa and Gunnison basins in CO, with many sites reporting in the lowest 5th percentile or below (Fig. 3). The Wasatch range in UT and the northern mountains of CO are also dry, with most precipitation percentiles in the teens. 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 also several SNOTEL sites reporting 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 below 20% of average. The lowest averages are in eastern UT where little to no snow remains. In the northern-most part of the UCRB in WY, one sub-basin is recording 34% of average snowpack.

Streamflow

As of May 13th, 41% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows (Fig. 5). Only 5% of the gages in the basin are recording above normal flows, while about 58% of the gages in the basin are recording below normal flows. The majority of the gages on all seven of the major rivers in the basin are now showing below normal flows, with many gages on the Colorado and Gunnison rivers showing much below normal flows. The streamgage just above Lake Powell is currently recording low flows. Many of the near normal flow recordings are at gages near the Colorado and Blue River headwaters.

Flows on two key gages in the UCRB have remained fairly steady for the past week, while one increased (Fig. 6). Flows on the Colorado River near the CO-UT state line increased slightly and is currently at the 11th percentile. Flows on the Green River near Green River, UT and the San Juan River near Bluff, UT are at the 15th and 14th percentiles, respectively. All three gages are currently recording in the below normal range.



| 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: 7-day average discharge compared to historical discharge for May 13th.

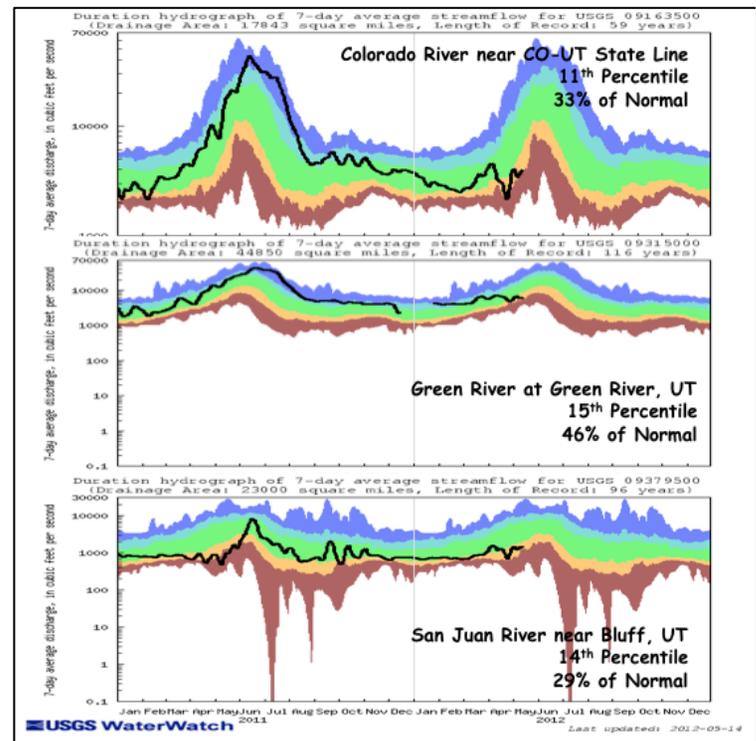


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Most of the UCRB experienced temperatures about 2 to 6 degrees above average for the week. All of eastern CO experienced cooler than average temperatures last week. The VIC model shows extremely dry soil moisture conditions for almost all of the UCRB (Fig. 7). Very dry soils in the lowest 5th percentile are modeled in western CO, eastern UT, and much of southern WY. Near normal soil moisture conditions are showing up over the Colorado River headwaters in the VIC model, though actual soils there are very dry. Dry soils are also evident through much of northeast and southeast CO.

All of the reservoirs above Lake Powell are currently near or above their May storage averages. Flaming Gorge and Blue Mesa have seen storage volume decreases since the beginning of the month. All other reservoirs have seen volume increases in May, though increases are generally less than the normal large increases that are observed this time of year. Lake Powell is currently at 79% of average and 64% of capacity (compared to 52% of capacity at the same time one year ago). Daily inflows in to the major reservoirs in the basin are much below average for this time of year.

Precipitation Forecast

A strong ridge of high pressure will remain anchored over the desert southwest through much of the week and lead to mostly dry conditions across the UCRB. Minor disturbances embedded in the flow will brush the northern section of the basin and bring a slight chance of convection to the highest peaks of northern CO. Expect any showers that do form to remain high based with gusty winds and little precipitation. A more significant trough (with near average temperatures) will approach the UCRB this weekend, however this system will also be moisture starved and will only result in light showers and thunderstorms, again favoring the north. Liquid accumulations may approach 0.25 inches over the northern CO and eastern UT mountains by Saturday while other areas receive little in the way of precipitation (Fig. 8). Strong ridging will then rebuild through the beginning of next week with a return to dry conditions and above average temperatures.

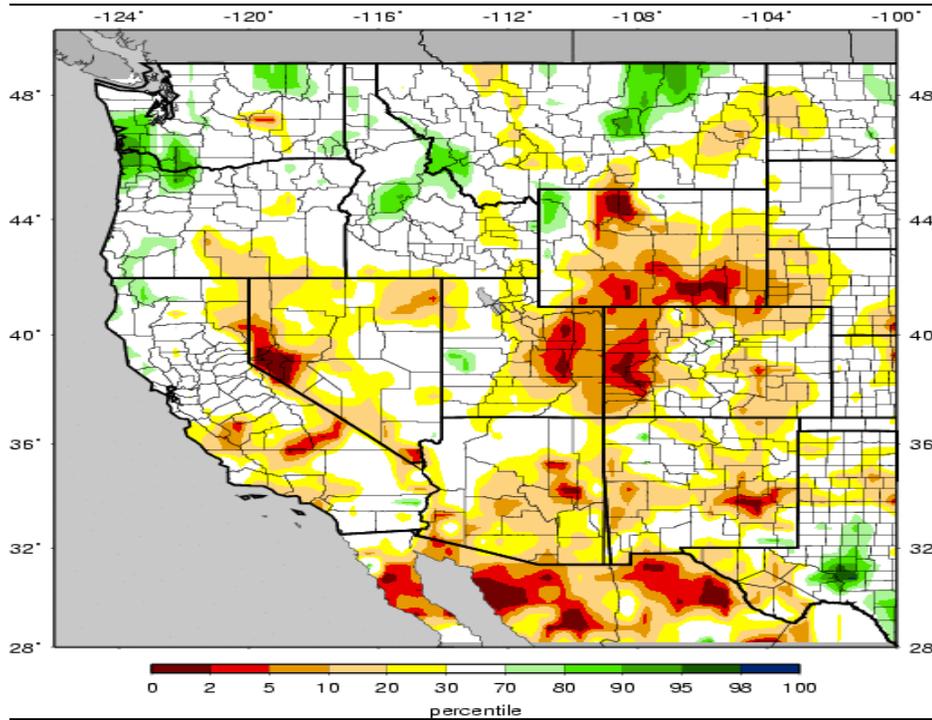


Fig. 7: VIC soil moisture percentiles as of May 13th, with total moisture storage (SWE and soil moisture) below.

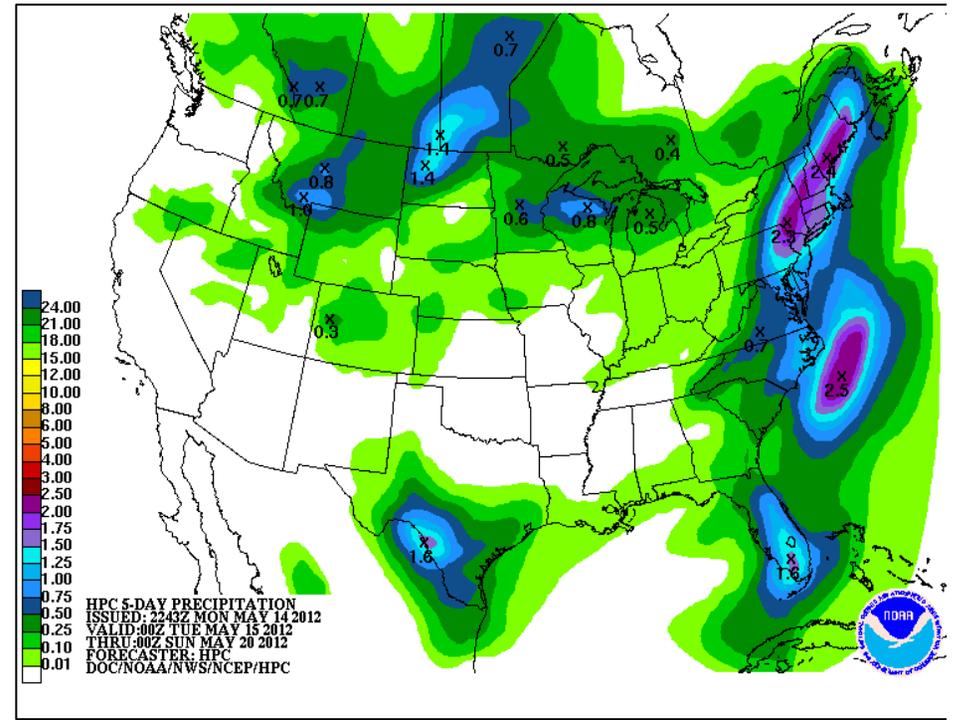


Fig. 8: Hydrologic Prediction Center's Quantitative Precipitation Forecast (QPF) through 00UTC Sunday.

Drought and Water Discussion

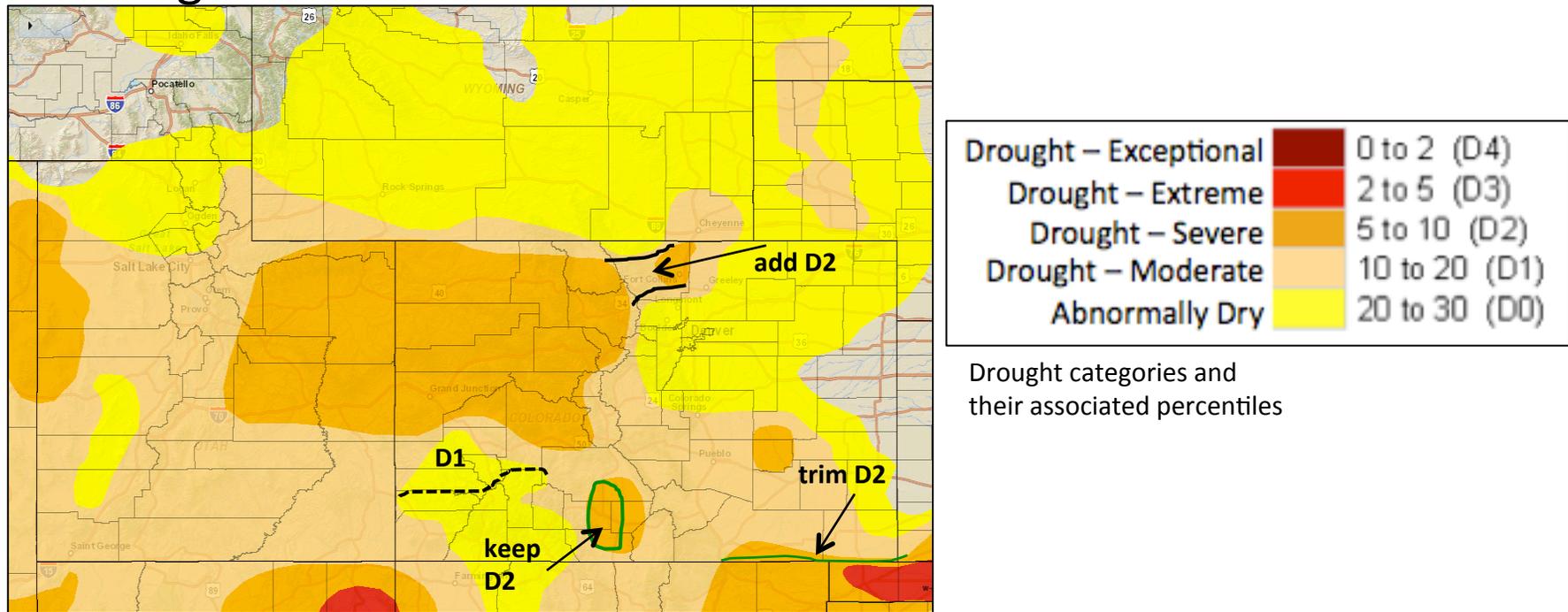


Fig. 9: May 8th release of U.S. Drought Monitor for the UCRB.

Several changes are recommended for the current U.S. Drought Monitor (USDM) map depiction (Fig. 9). In the UCRB, a D1 expansion to cover all of Montrose, San Miguel and Ouray counties is recommended based on SPIs and SNOTEL precipitation percentiles (Fig. 9, dashed black line). Status quo is recommended for the rest of the UCRB at this time.

In northern CO, a D2 expansion is recommended in Larimer County where recent rains have done little to help the extremely dry soils in the higher elevations (Fig. 9, solid black lines). In southern CO where recent beneficial rains have fallen, slight improvements to D2 are recommended (Fig. 9, green lines). In the San Luis Valley, conditions on the west side of the valley are considered drier, so D2 should remain, but the eastern portion of the D2 can be trimmed. Also, D2 can be trimmed out of Baca County and be limited to the extreme southern edge of Las Animas County.