

Spring
2012



June 12, 2012

NIDIS - UPPER COLORADO BASIN PILOT PROJECT

Weekly Climate, Water & Drought Assessment

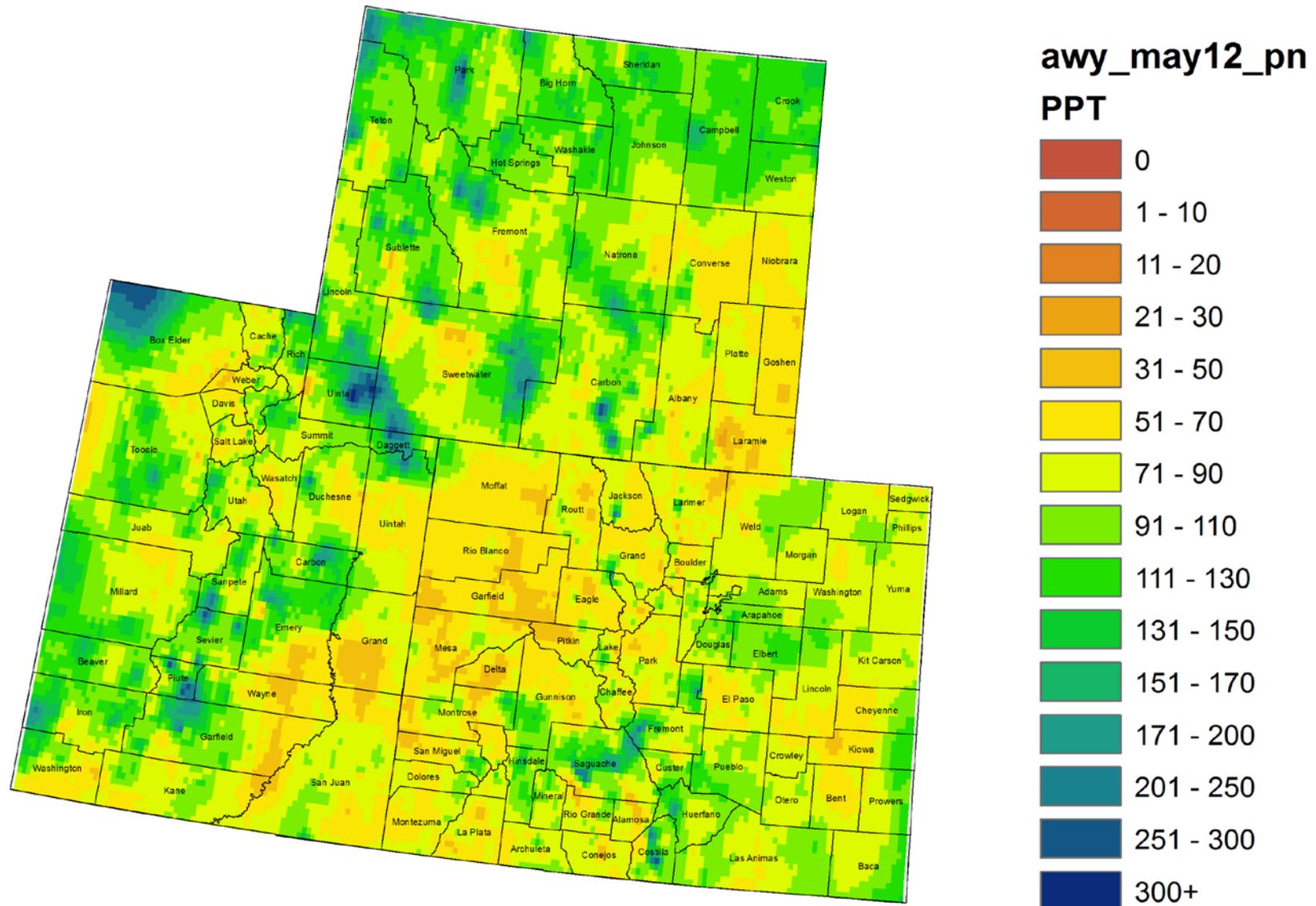
Today's Agenda

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

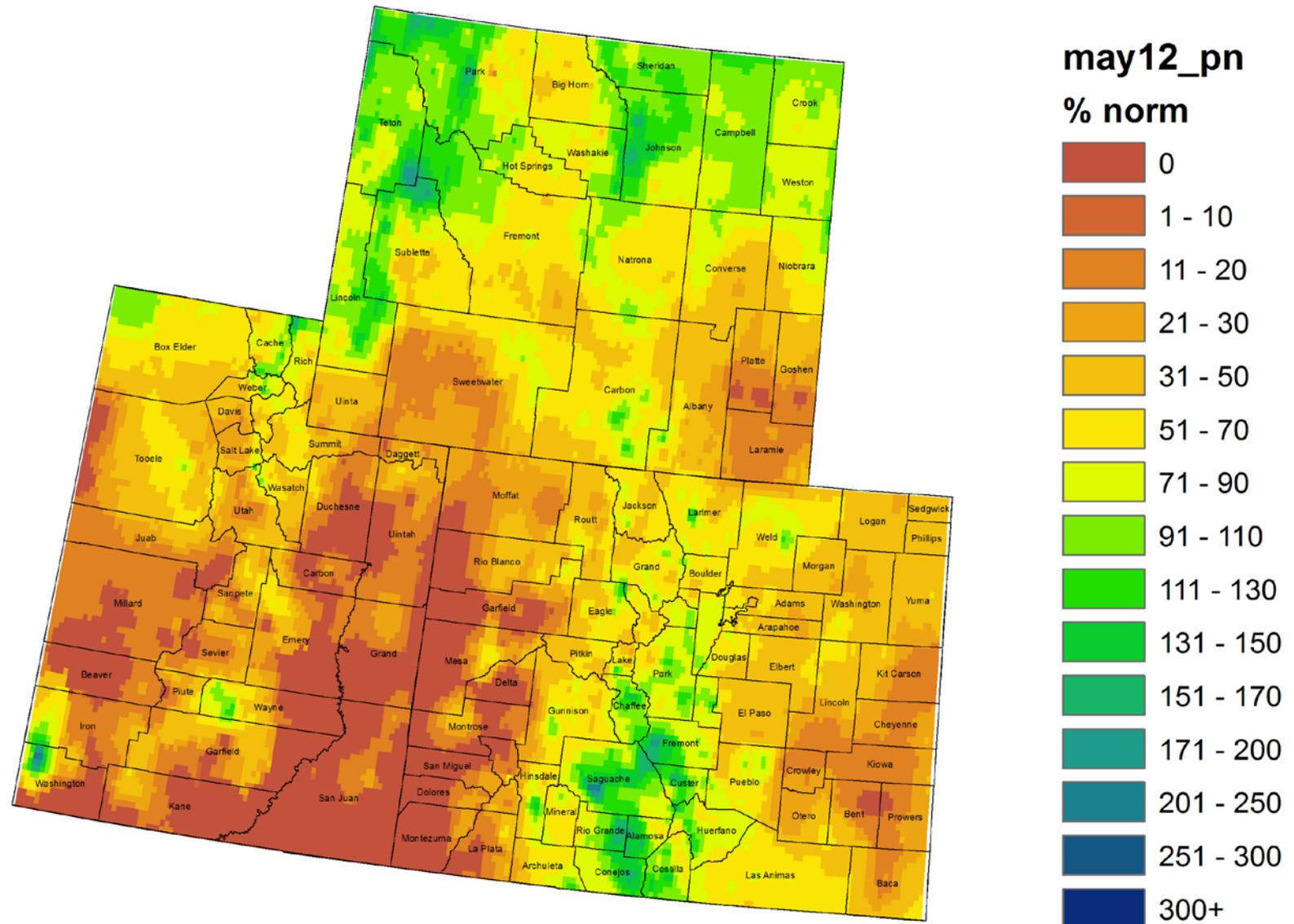
Precipitation/Snowpack Update



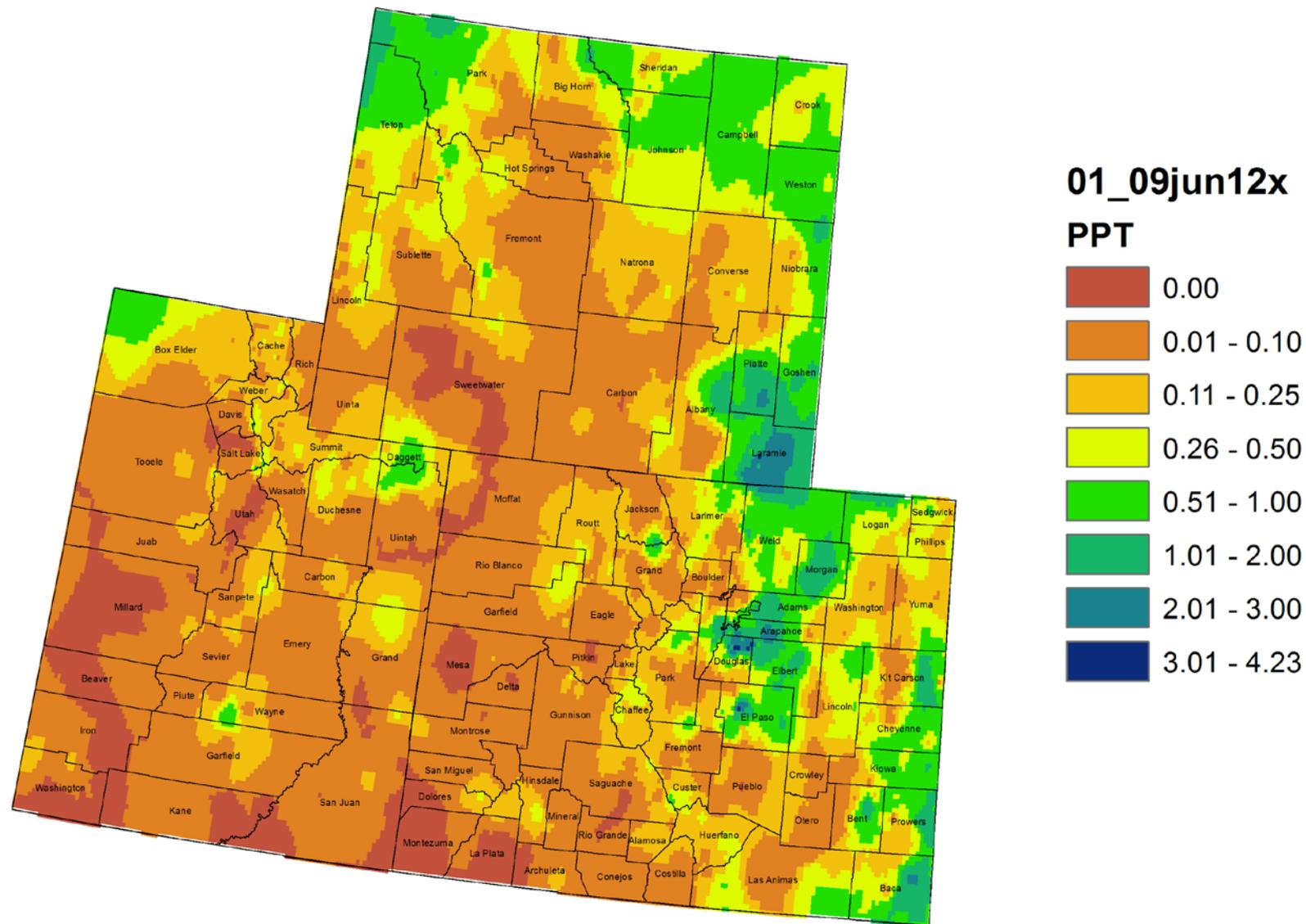
Colorado, Utah and Wyoming Water Year to Date Precipitation as Percentage of Normal (October 2012 - May 2012)



Colorado, Utah and Wyoming May 2012 Precipitation as Percentage of Normal

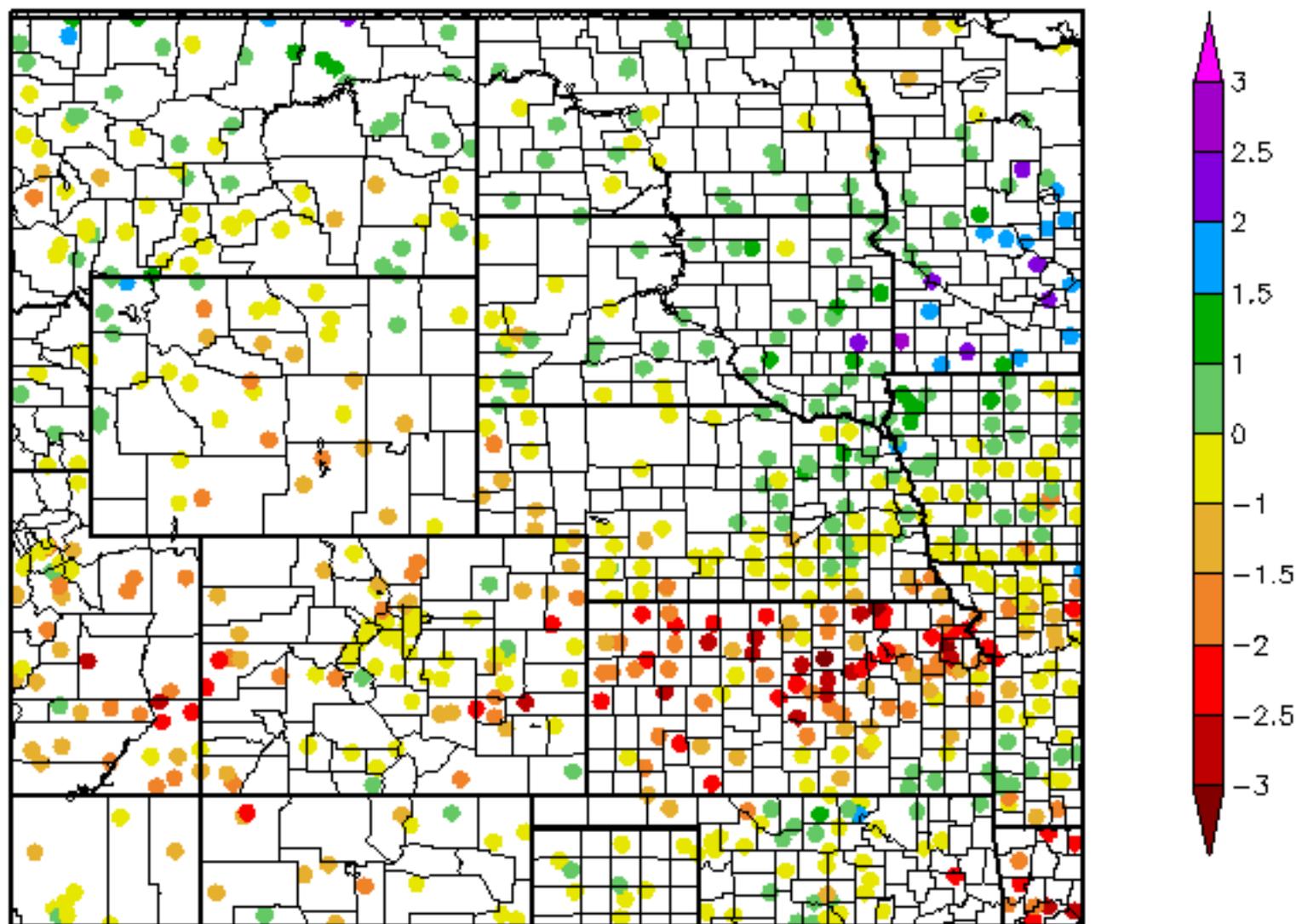


Colorado, Utah and Wyoming Month to Date Precipitation (inches) 1 - 9 June 2012



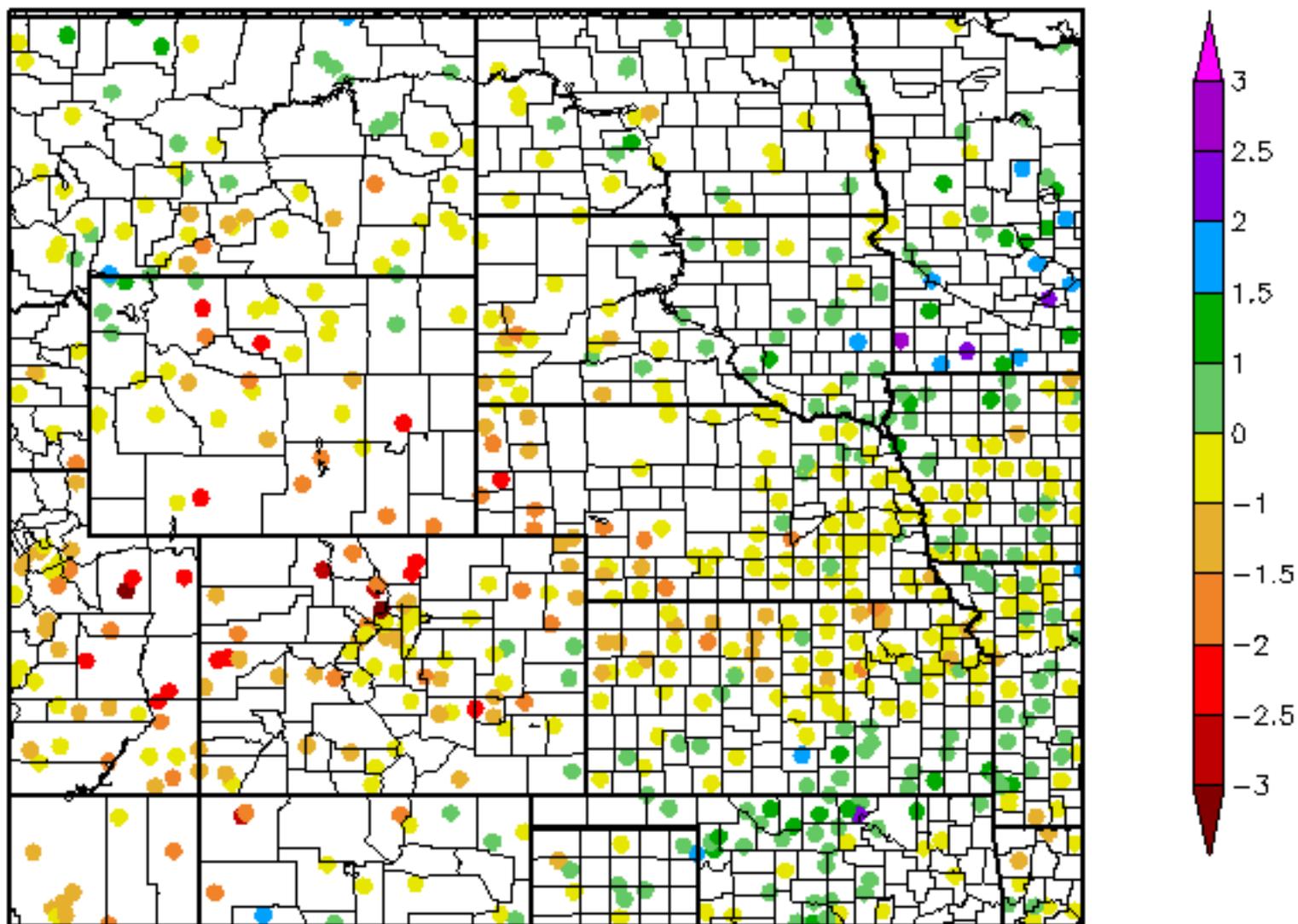
60 Day SPI

4/12/2012 - 6/10/2012

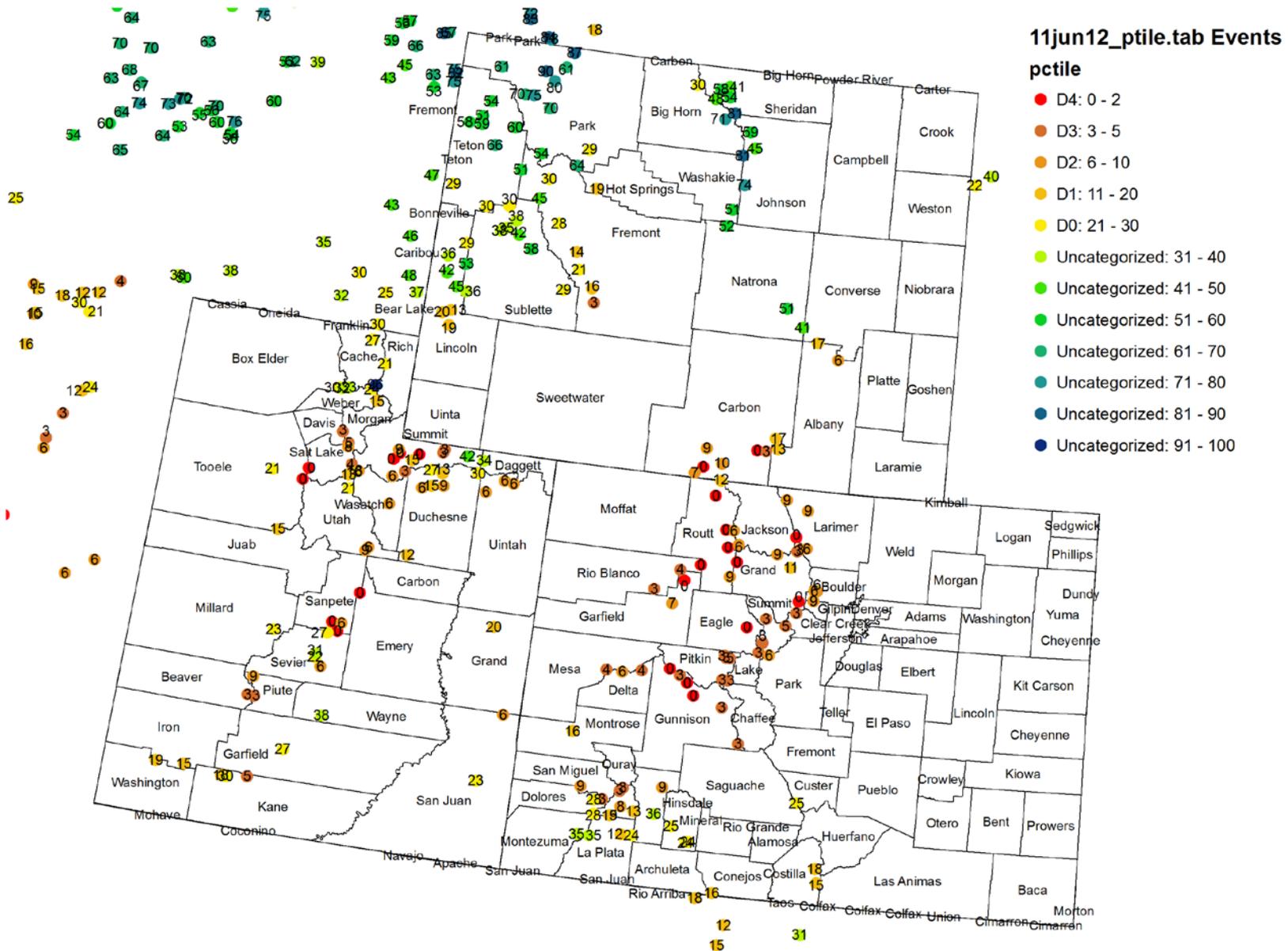


6 Month SPI

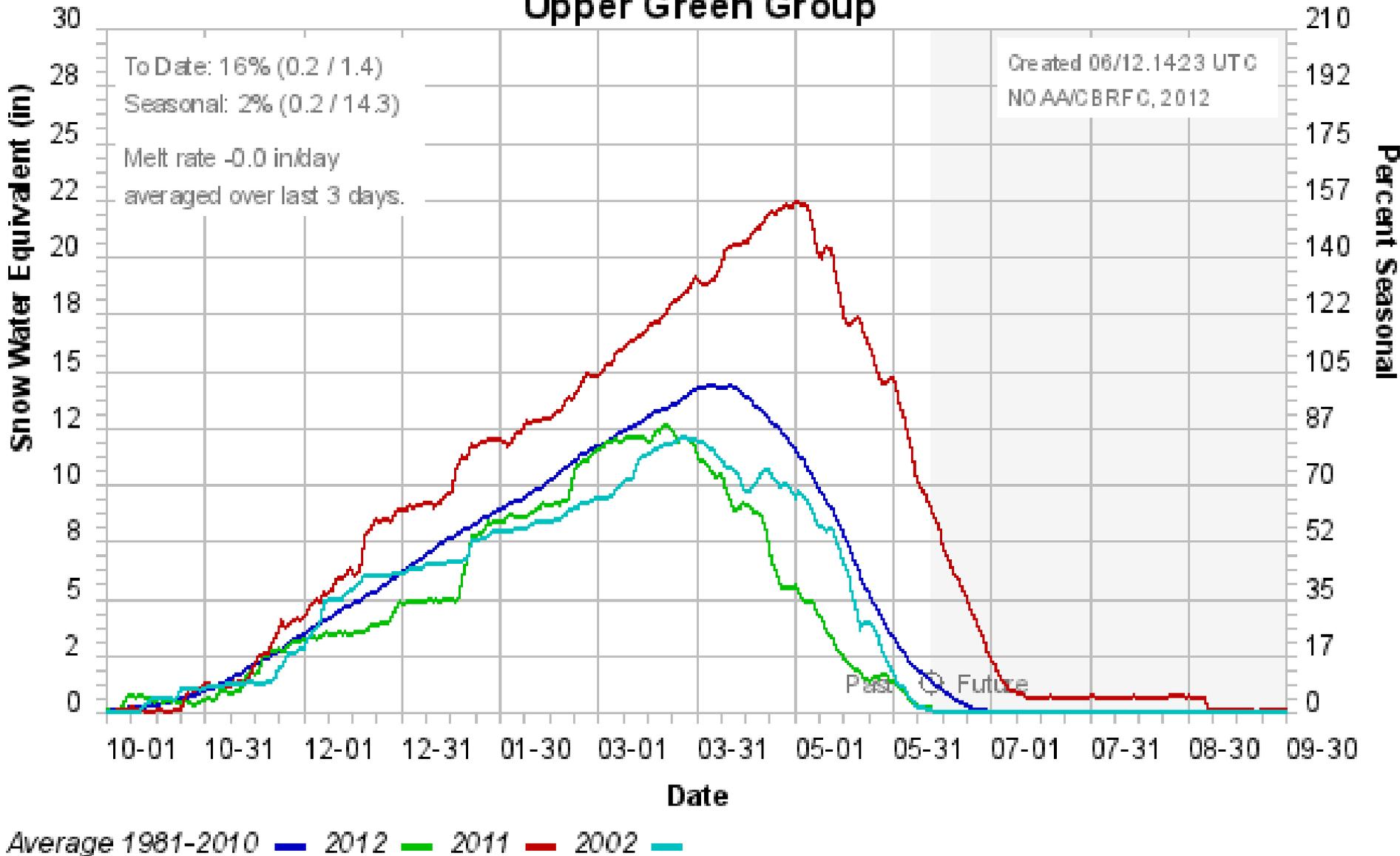
12/11/2011 - 6/10/2012



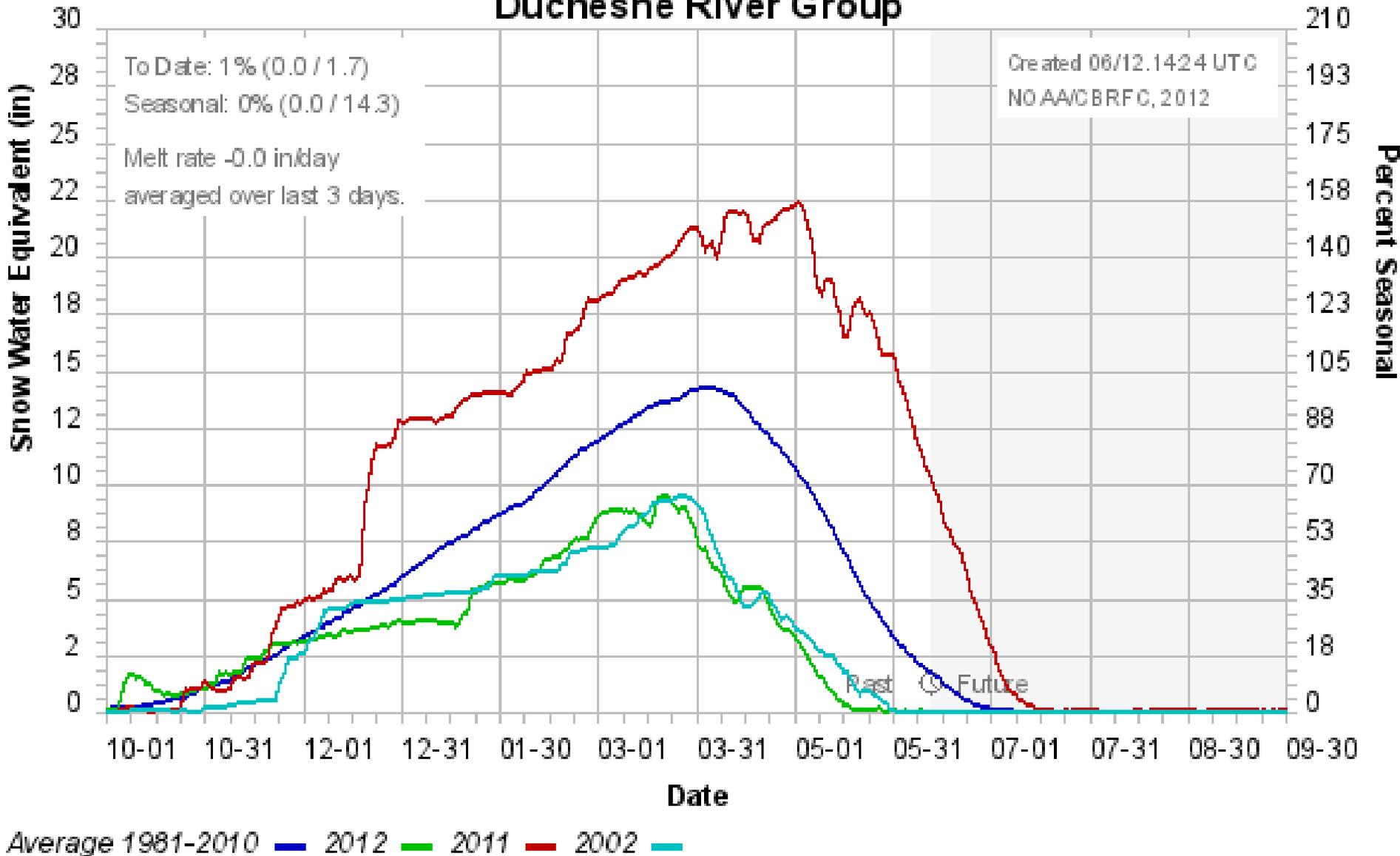
Snotel Water Year Precipitation Percentile Ranking for 11 June 2012 (Stations with 15+ years of data only)



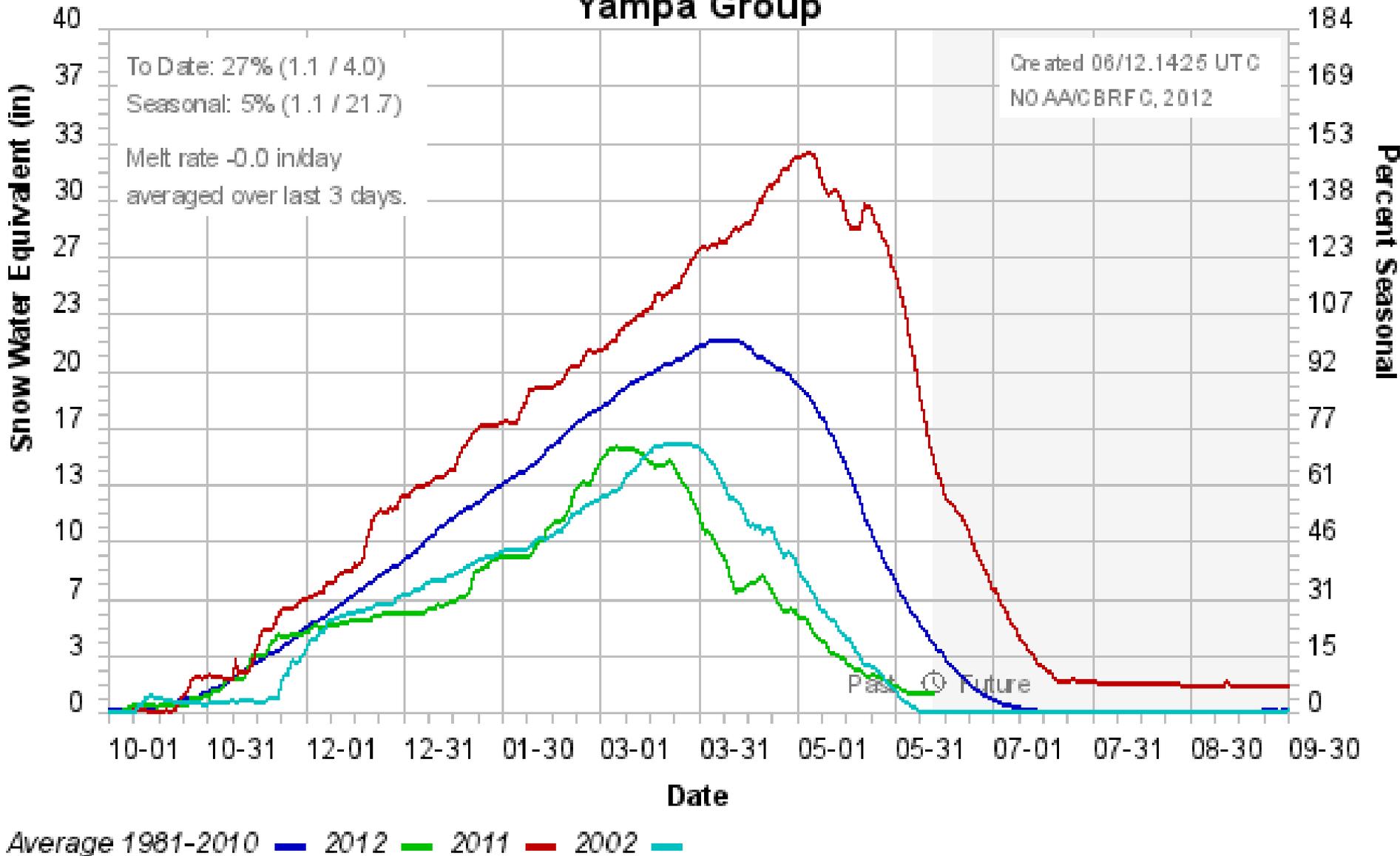
Colorado Basin River Forecast Center Upper Green Group



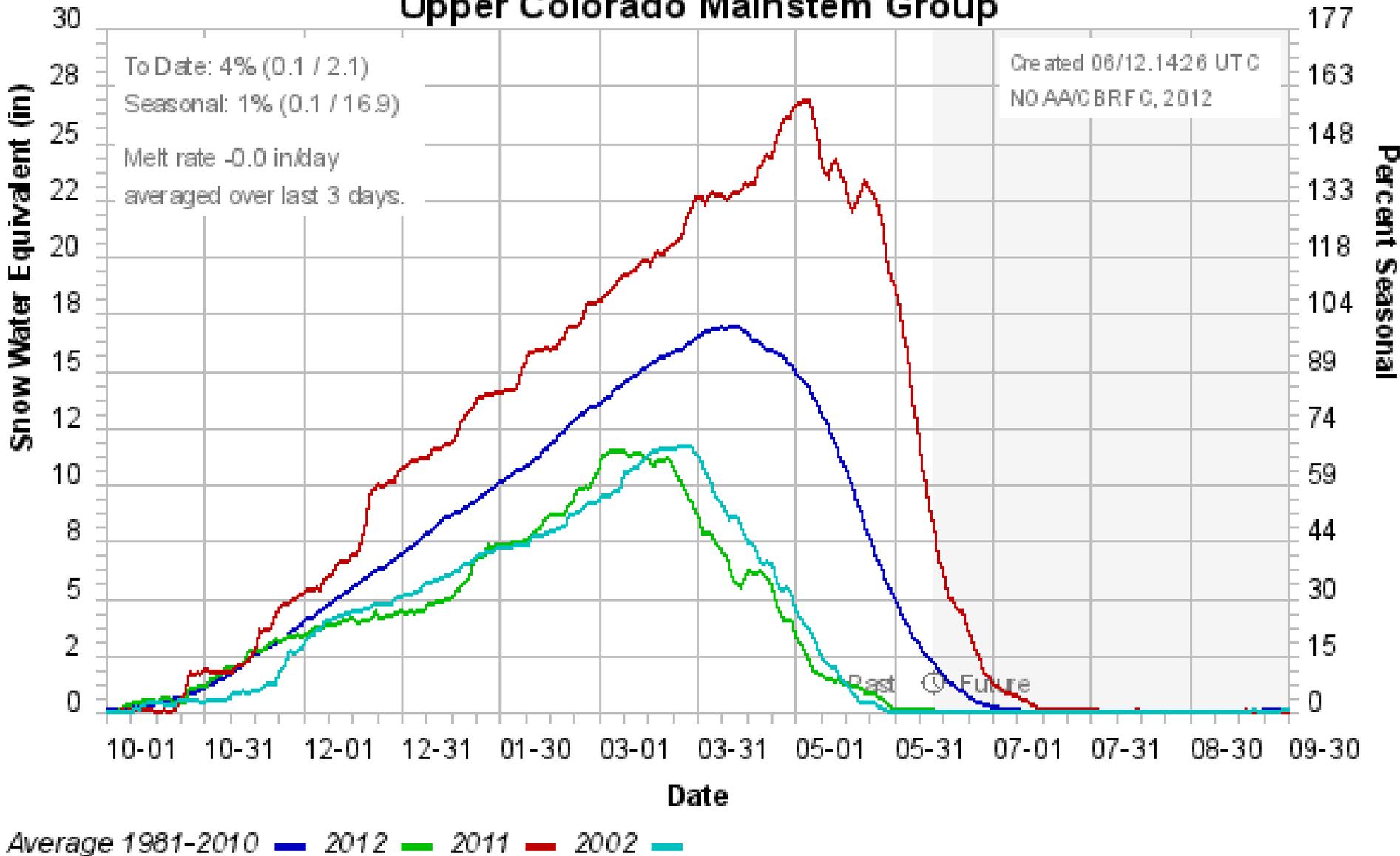
Colorado Basin River Forecast Center Duchesne River Group



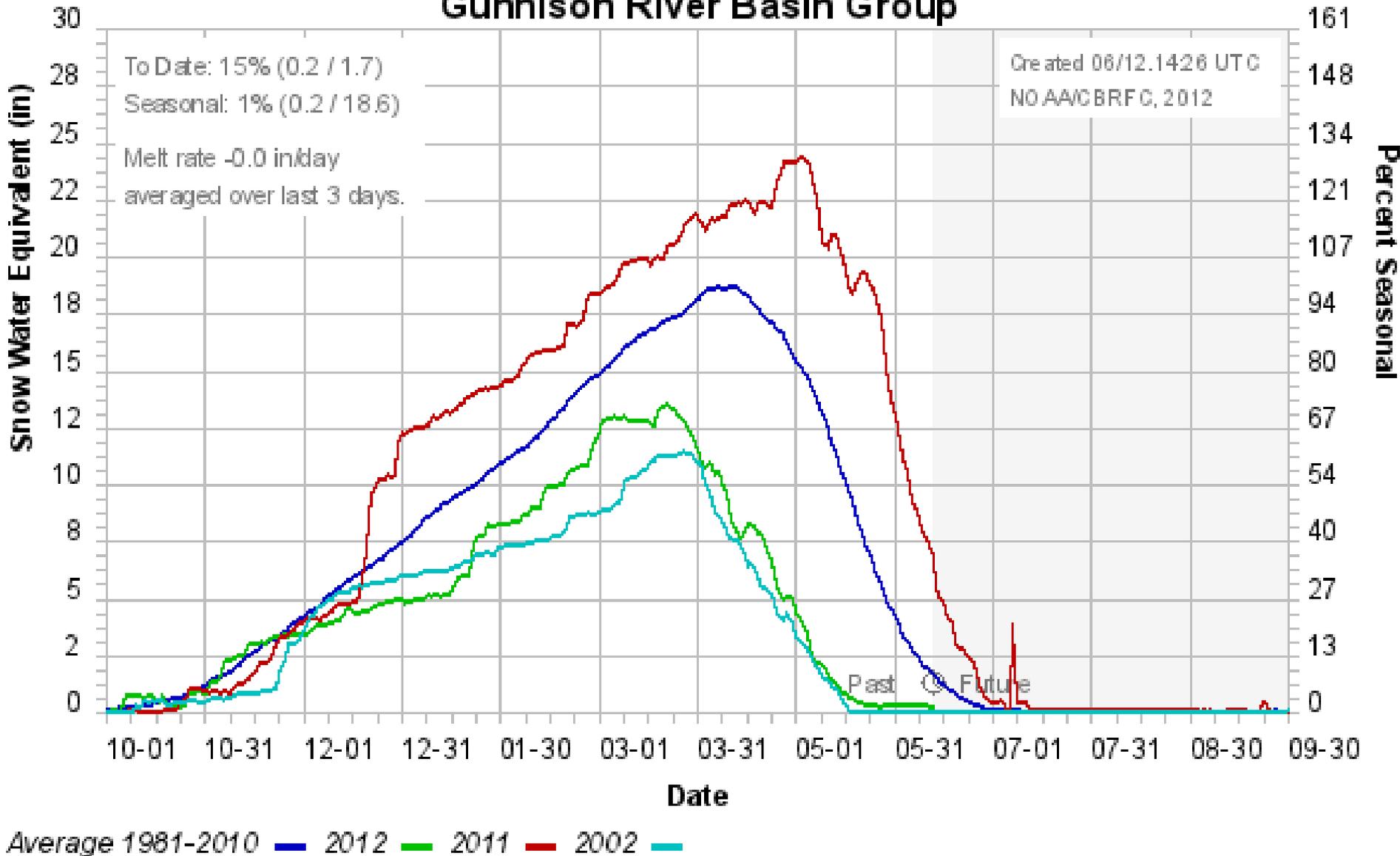
Colorado Basin River Forecast Center Yampa Group



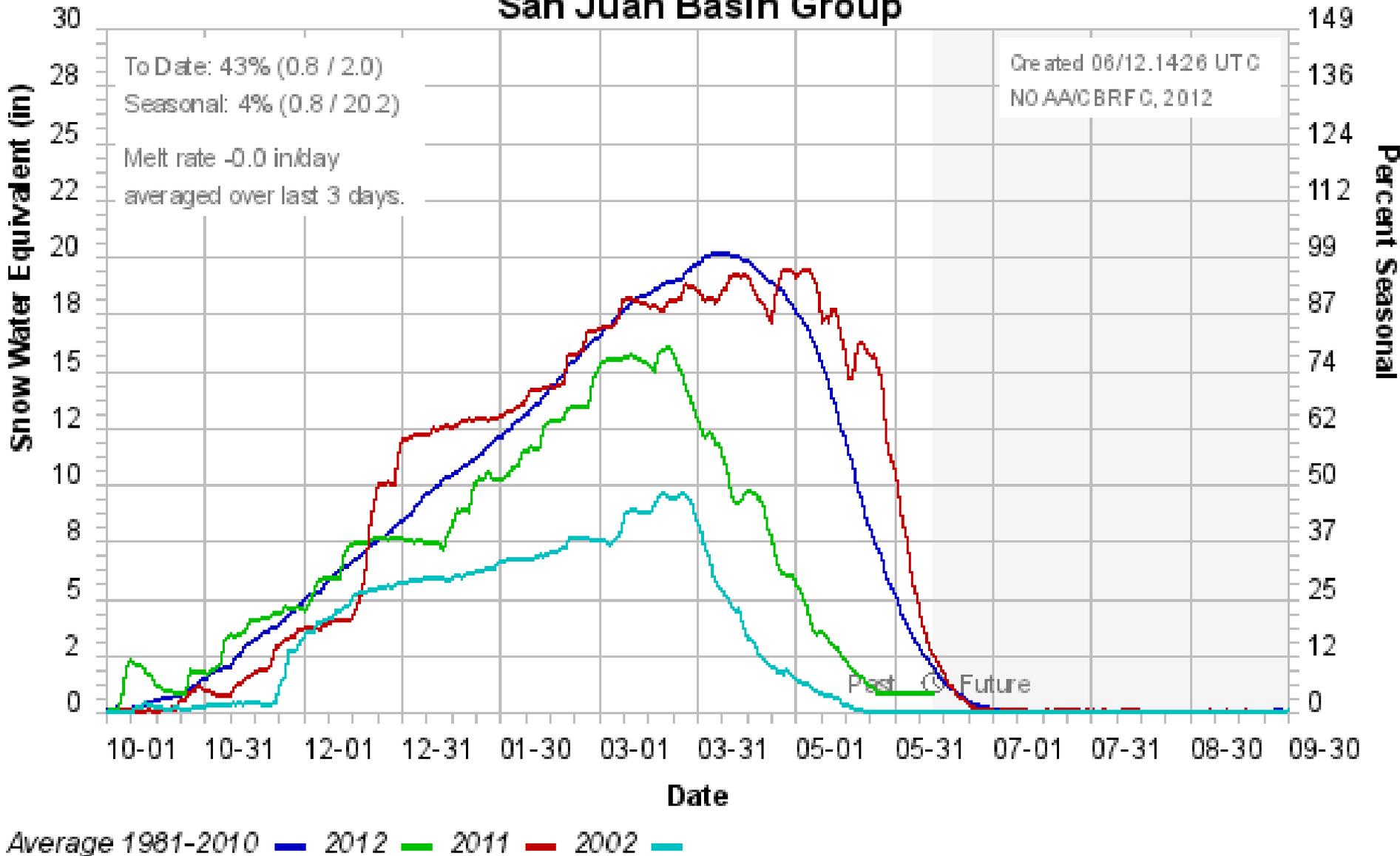
Colorado Basin River Forecast Center Upper Colorado Mainstem Group



Colorado Basin River Forecast Center Gunnison River Basin Group



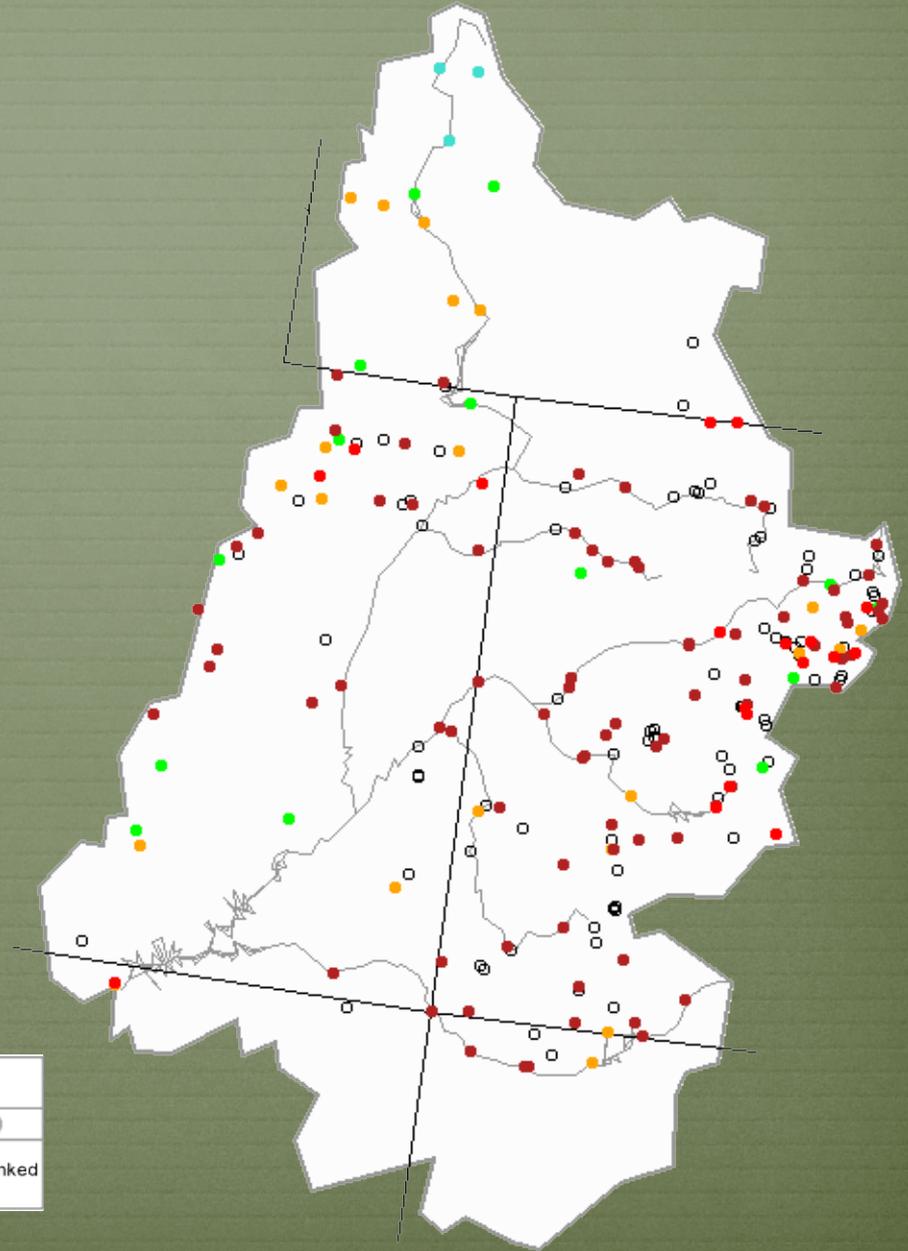
Colorado Basin River Forecast Center San Juan Basin Group



Streamflow Update



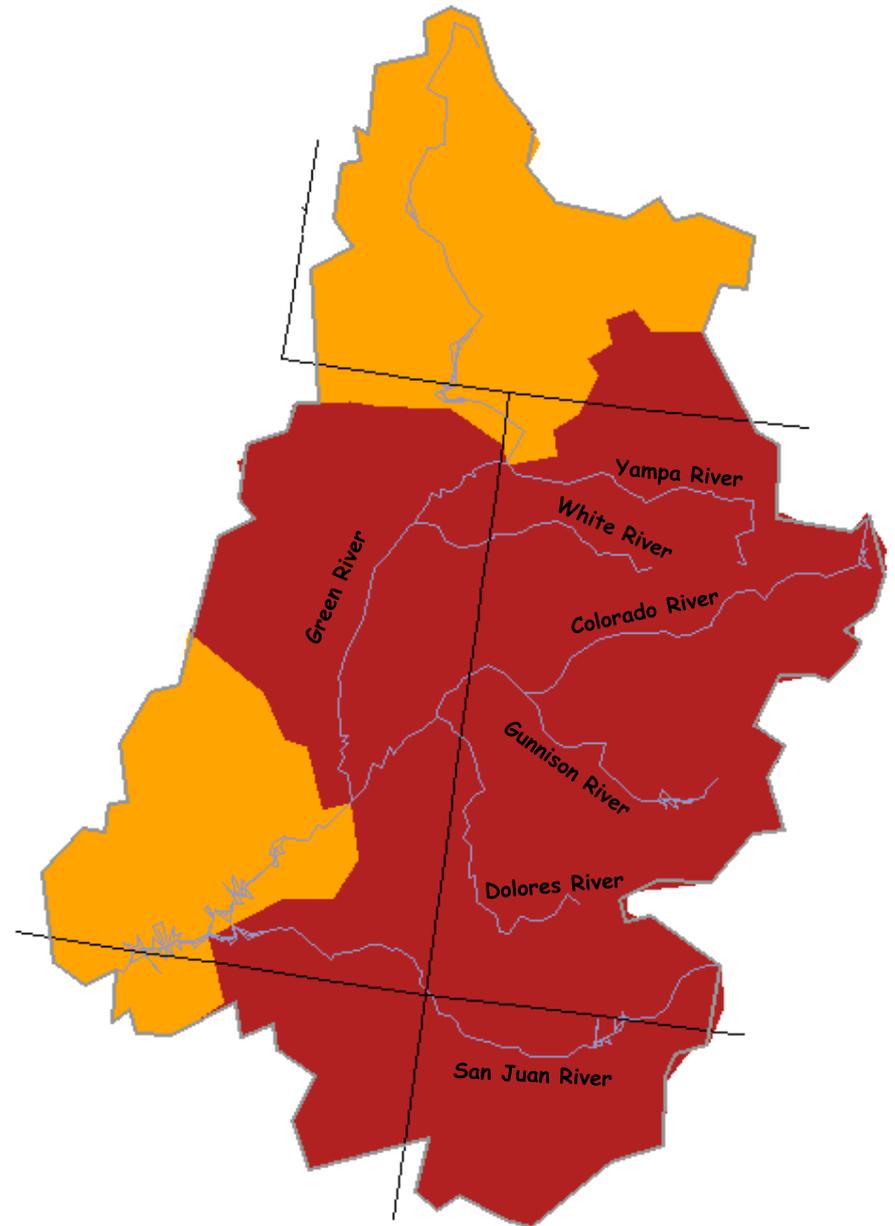
7-day average discharge compared to historical discharge for the day of the year (June 10th)



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			

Sunday, June 10, 2012

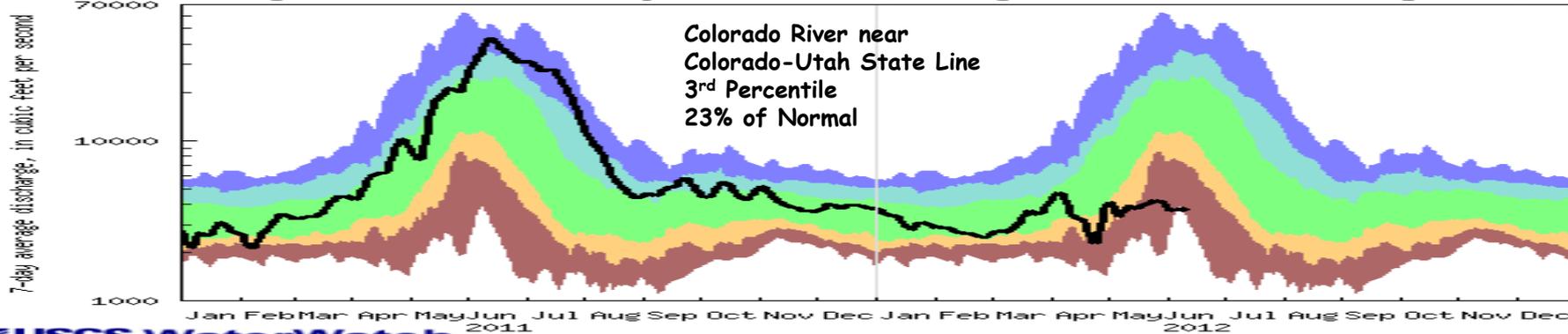
7-day average discharge compared to historical discharge for the day of the year (June 10th)



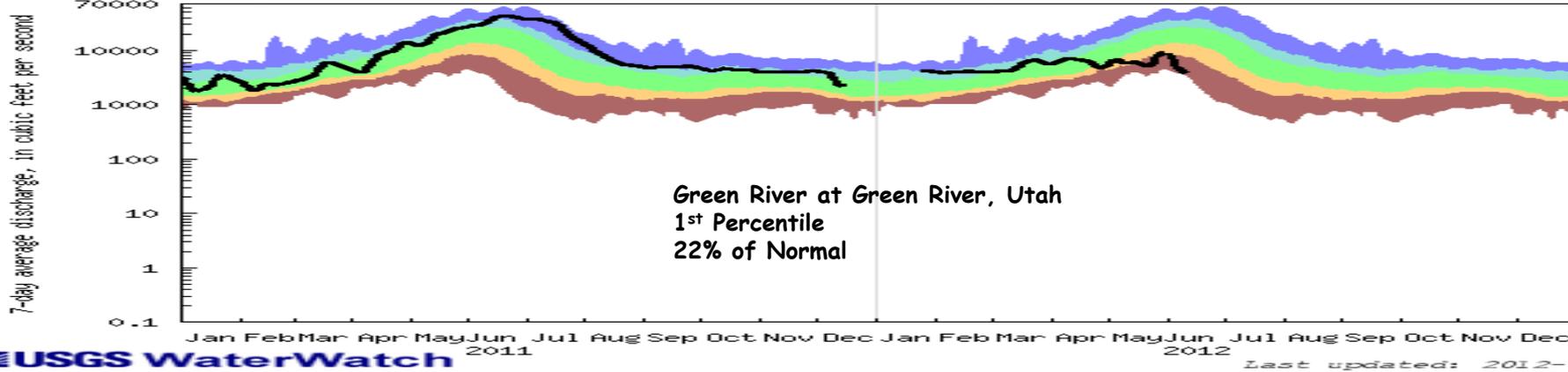
Explanation - Percentile classes

Low	<10	10-24	25-75	76-90	>90	High
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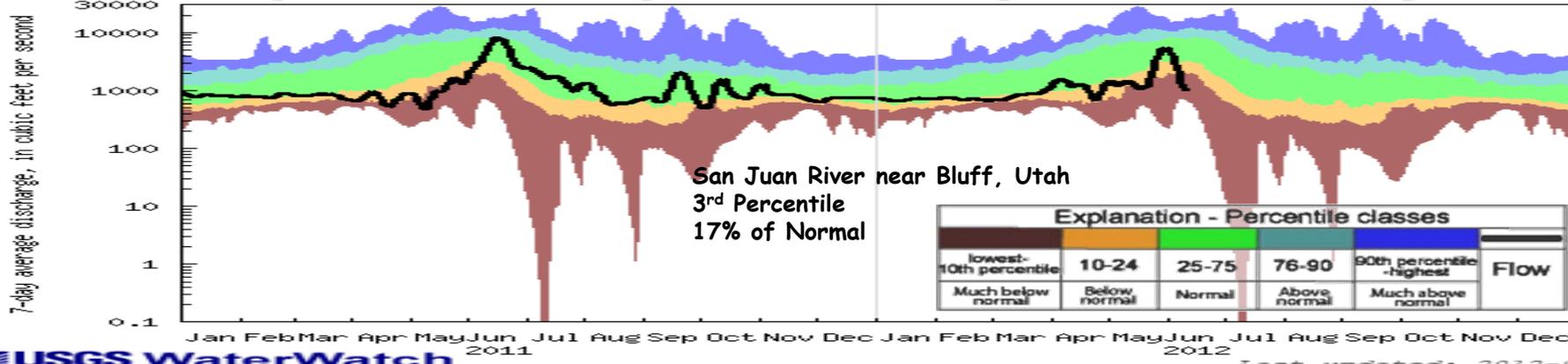
Duration hydrograph of 7-day average streamflow for USGS 09163500
 (Drainage Area: 17843 square miles, Length of Record: 61 years)



Duration hydrograph of 7-day average streamflow for USGS 09315000
 (Drainage Area: 44850 square miles, Length of Record: 117 years)

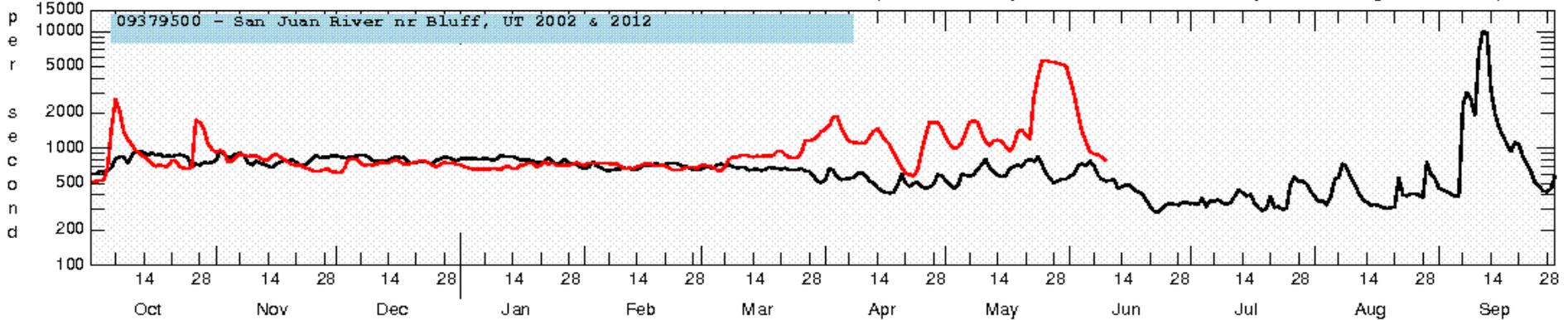
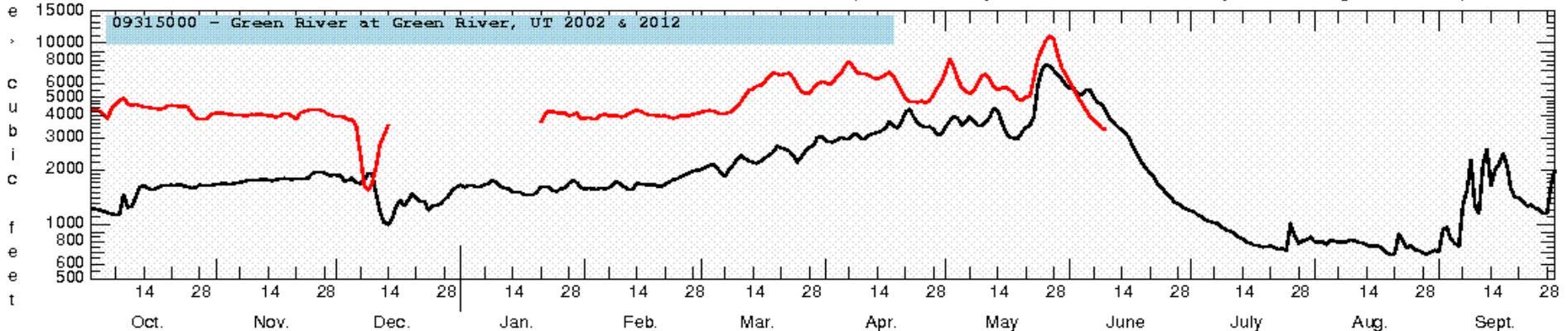
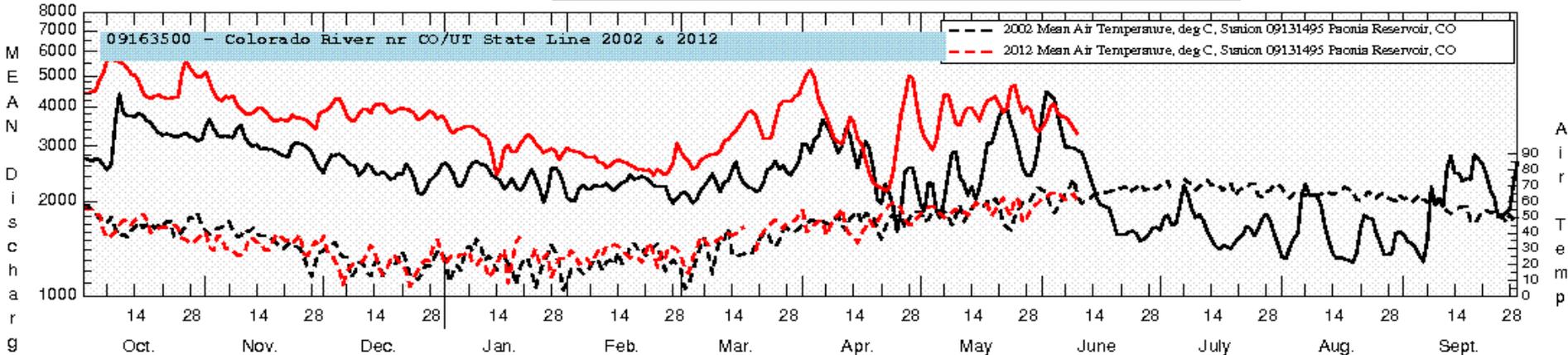


Duration hydrograph of 7-day average streamflow for USGS 09379500
 (Drainage Area: 23000 square miles, Length of Record: 97 years)



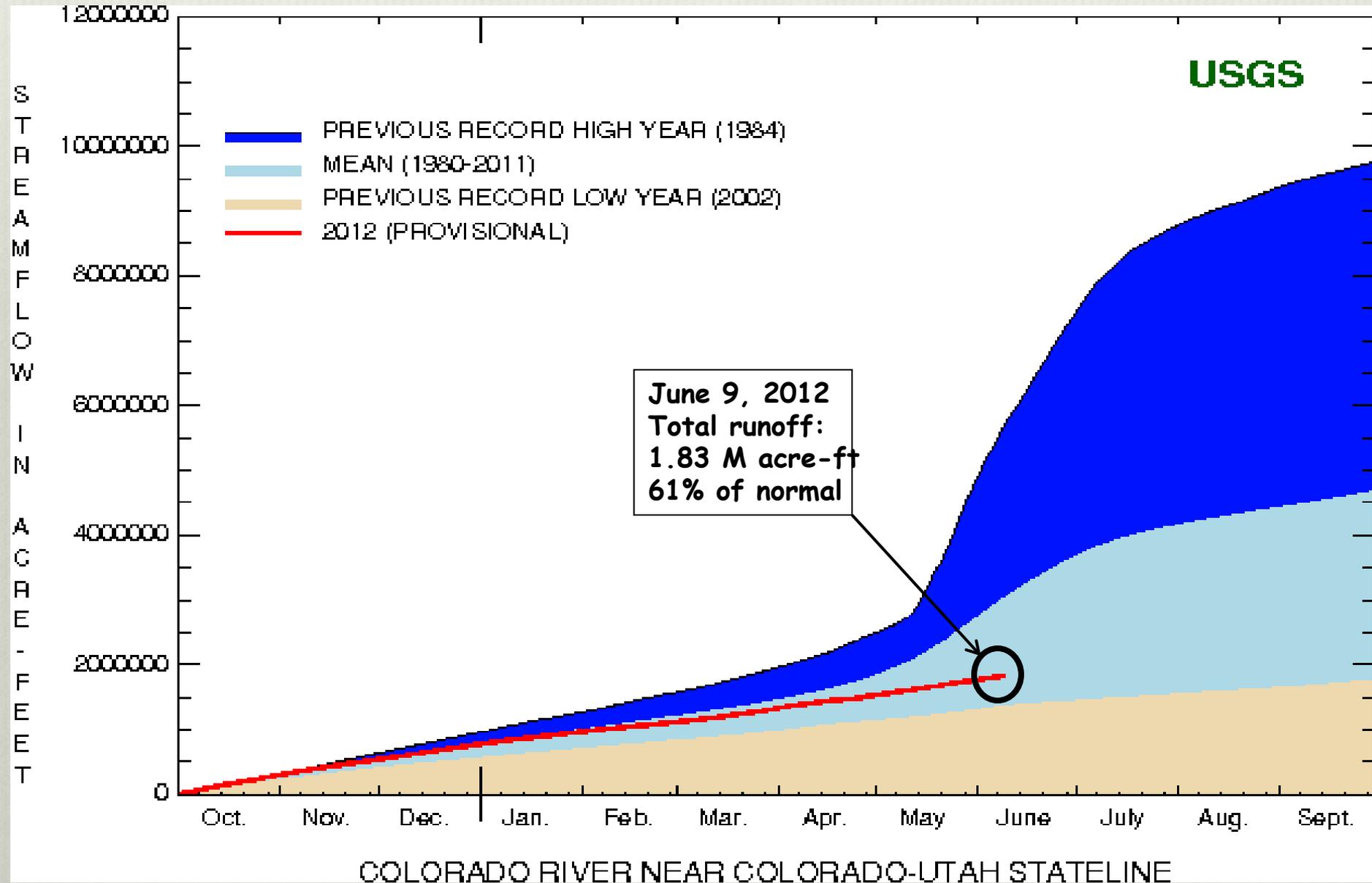
Colorado River Basin 2002 vs. 2012 Mean Daily Discharge Comparison at Select Stations

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

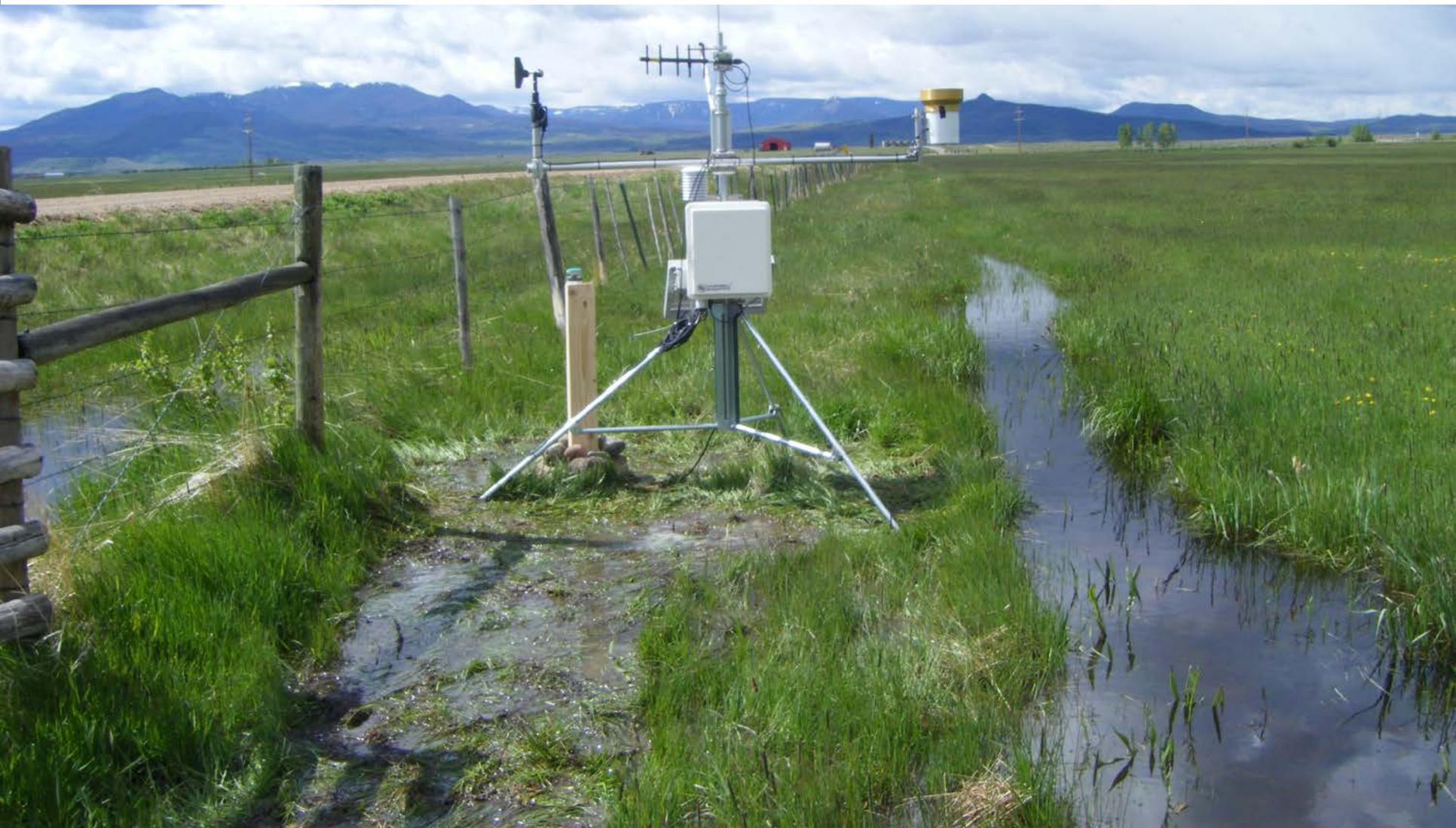


Total Streamflow Volume Colorado River nr CO/UT State Line Oct 1, 2011 to June 10, 2012

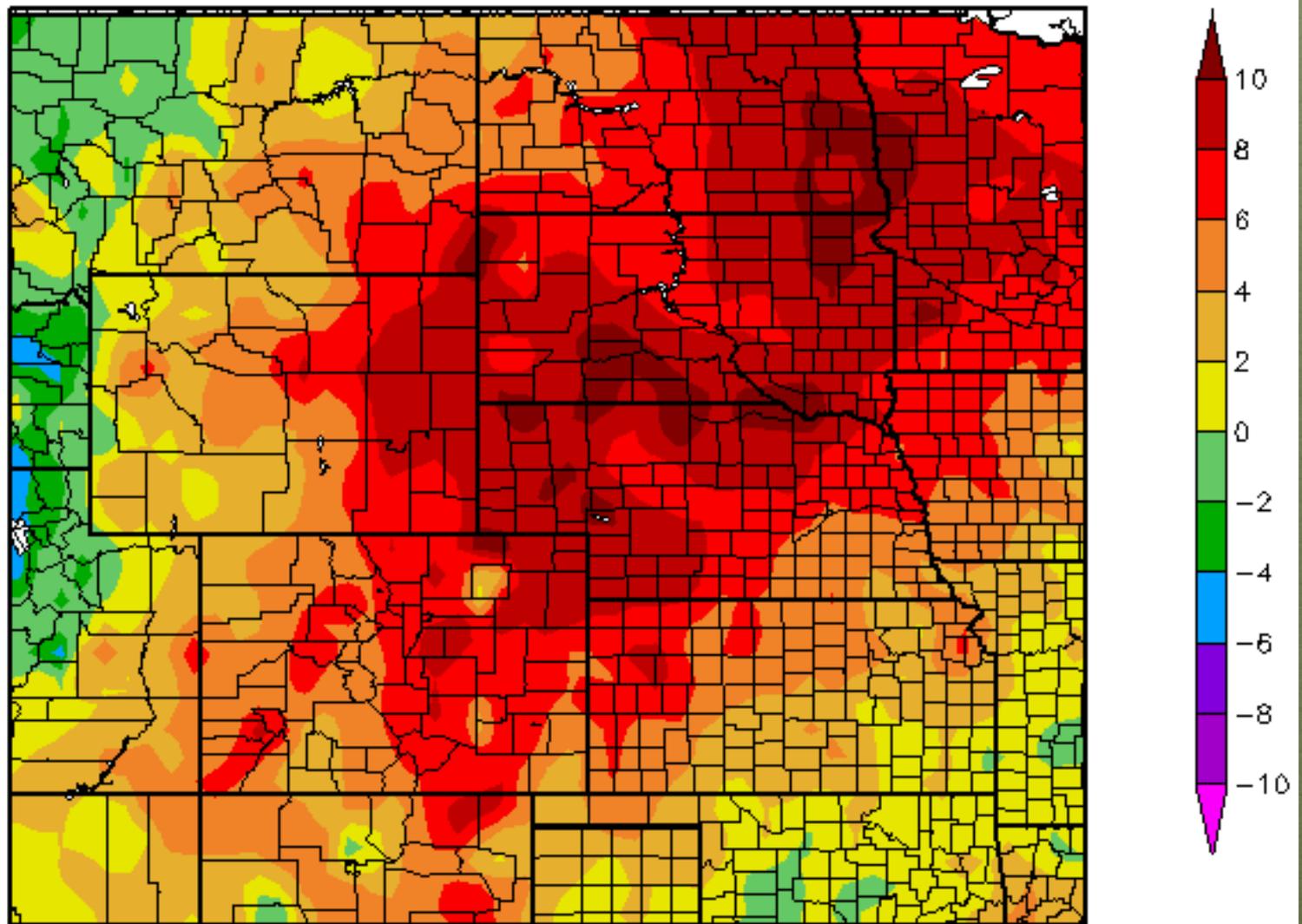
USGS



Water Demand

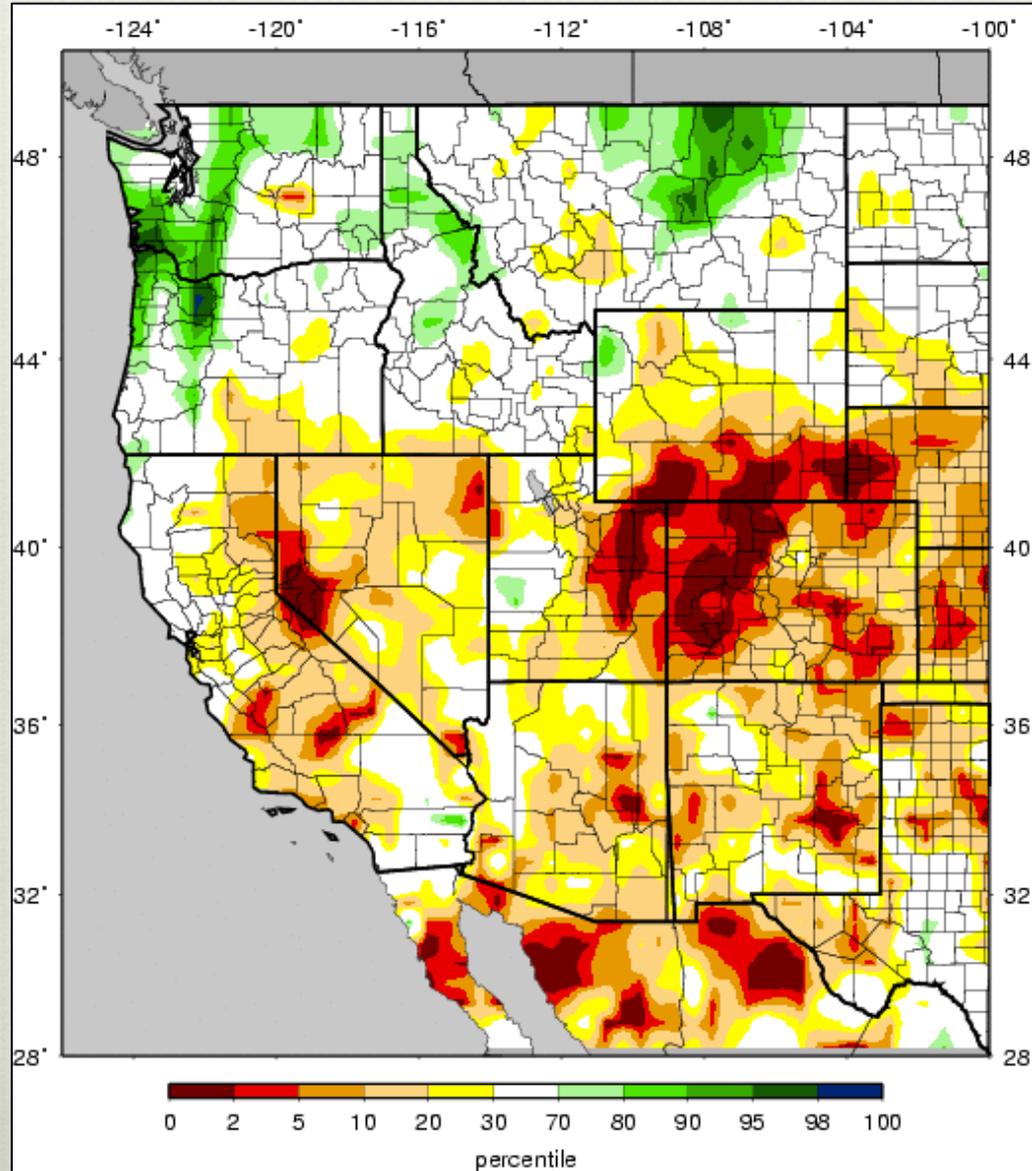


Temperature Departure from Normal 06/04/2012 – 06/10/2012



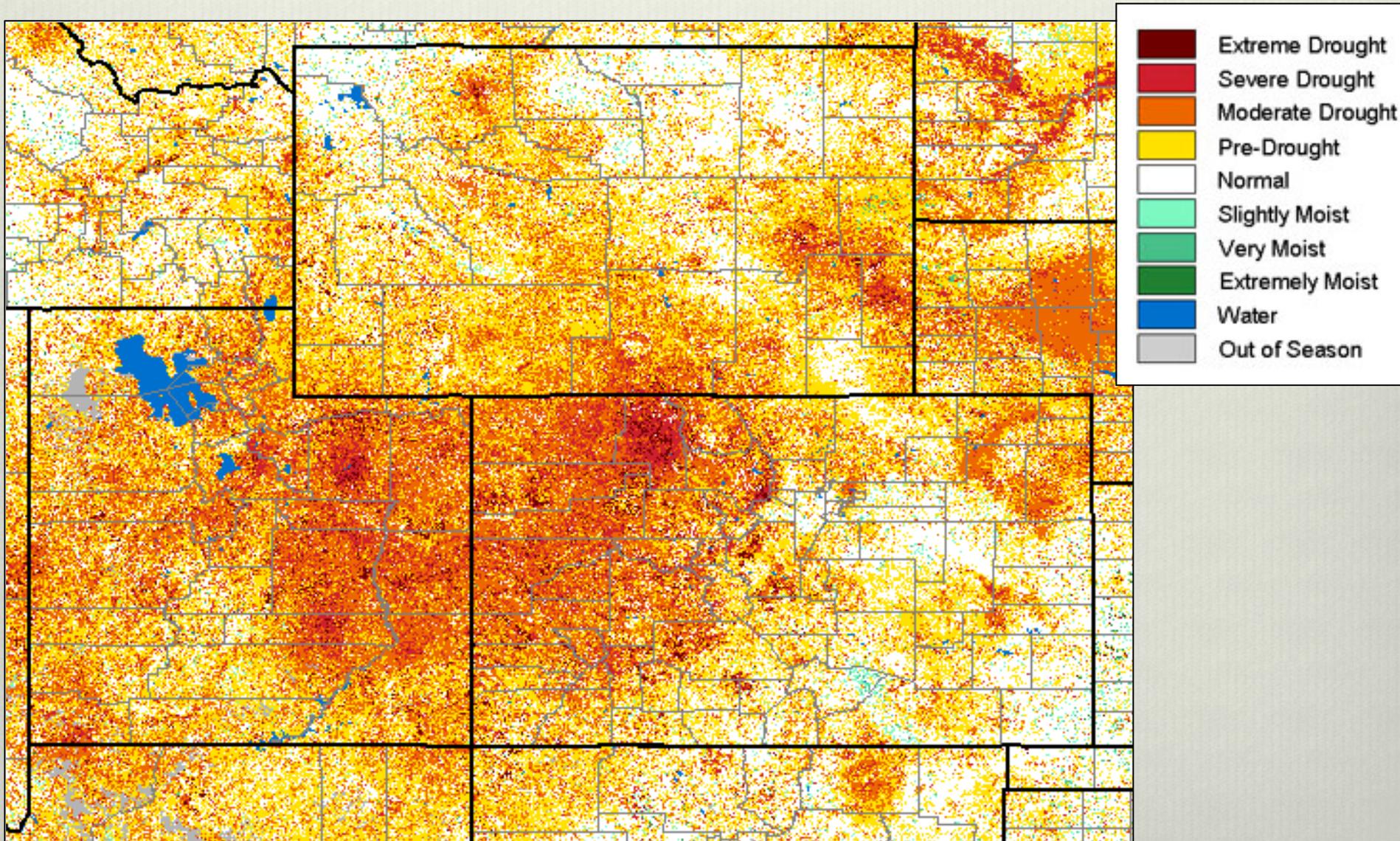
VIC Soil Moisture

10 June 2012



eMODIS VegDRI Vegetation

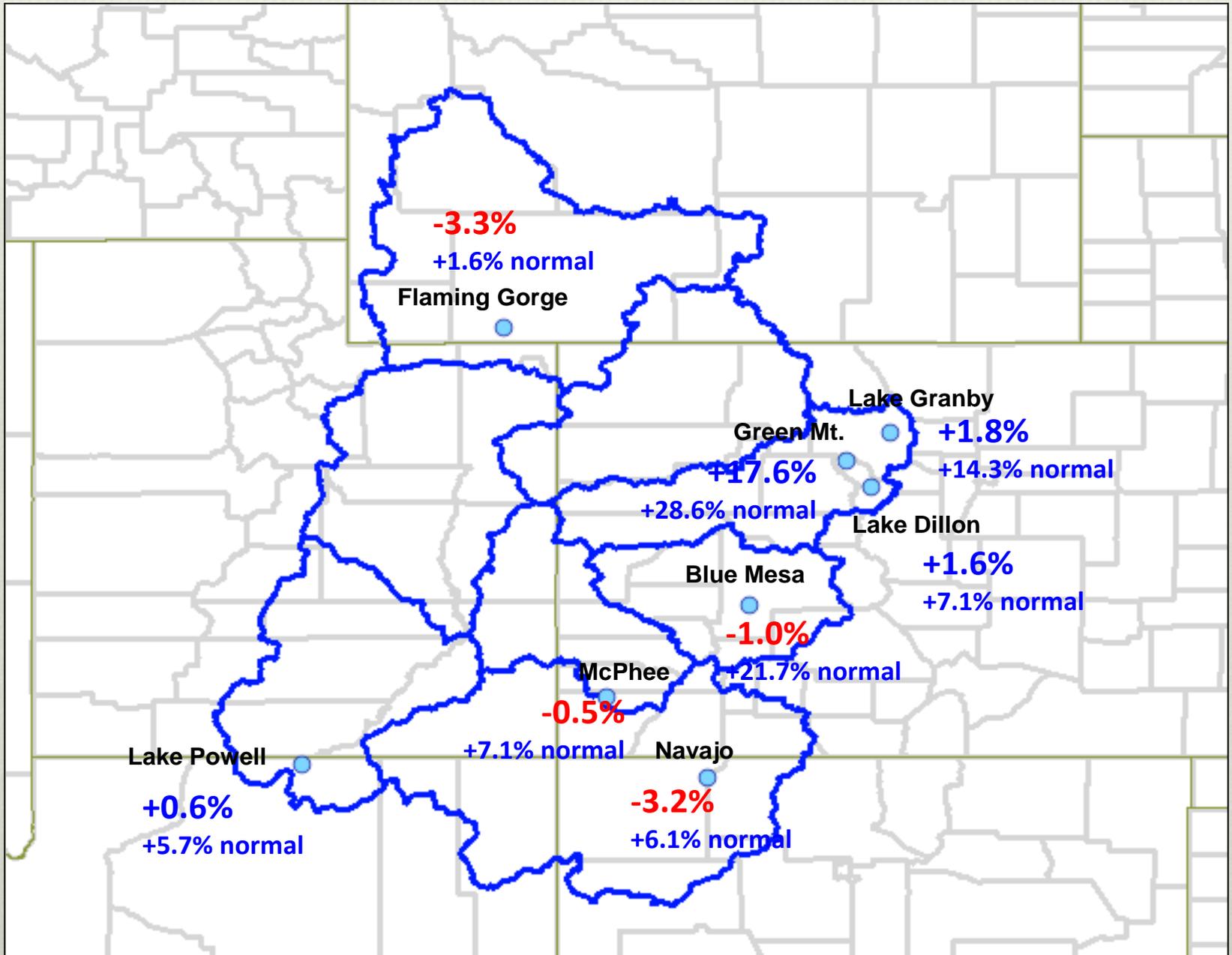
10 June 2012



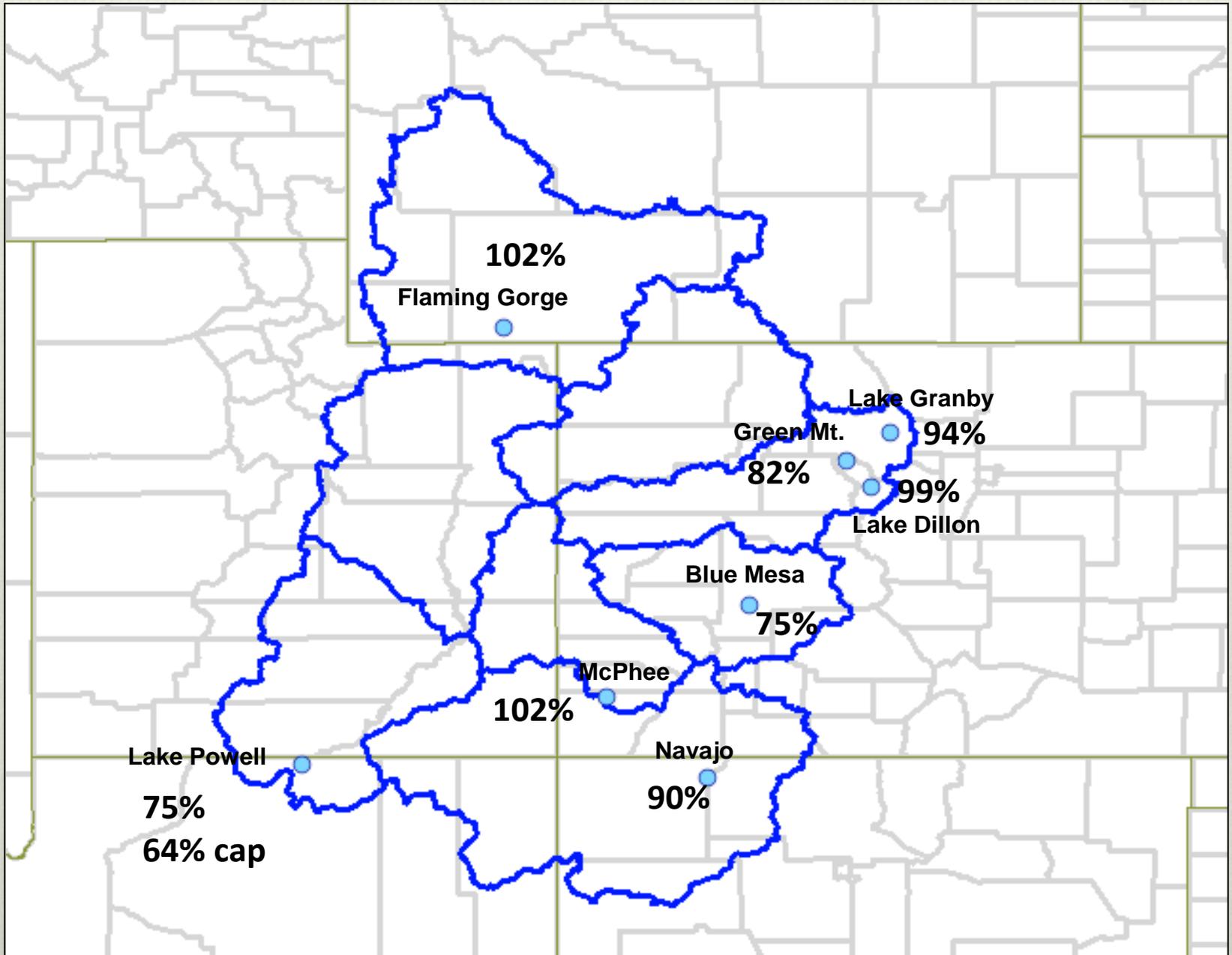
Reservoir Update



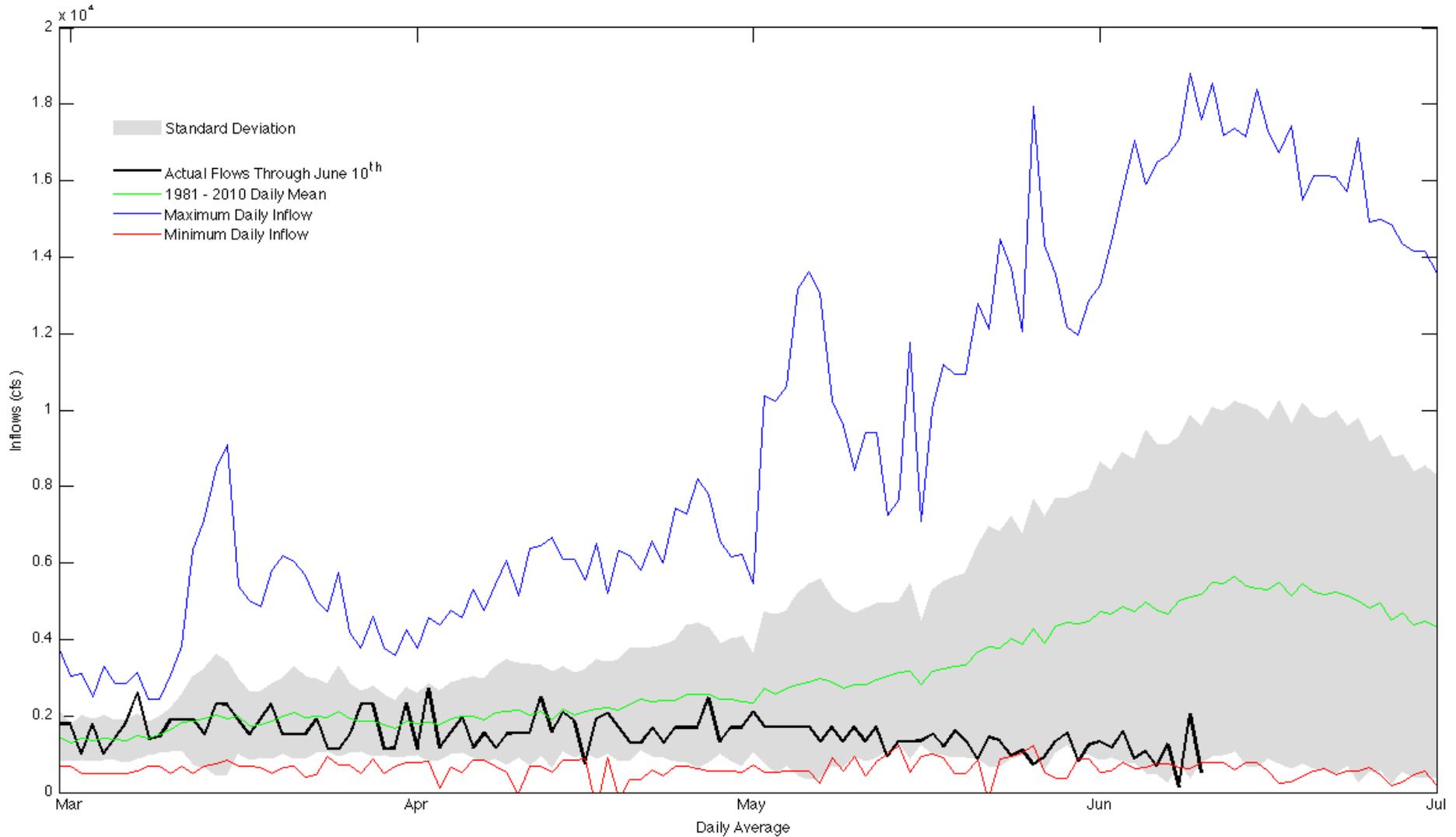
May Reservoir Storage Volume Change



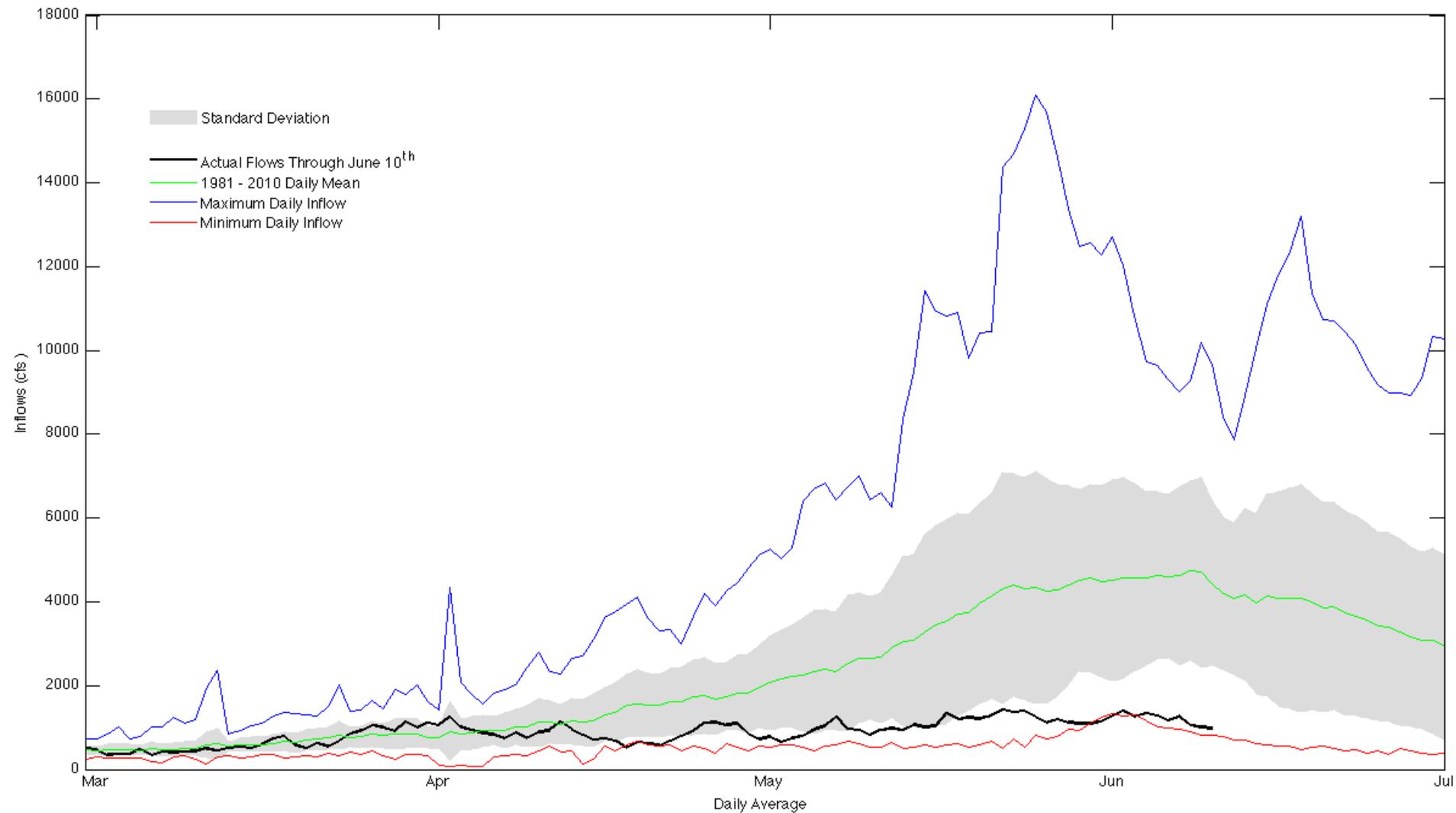
June Average Reservoir Storage Volume



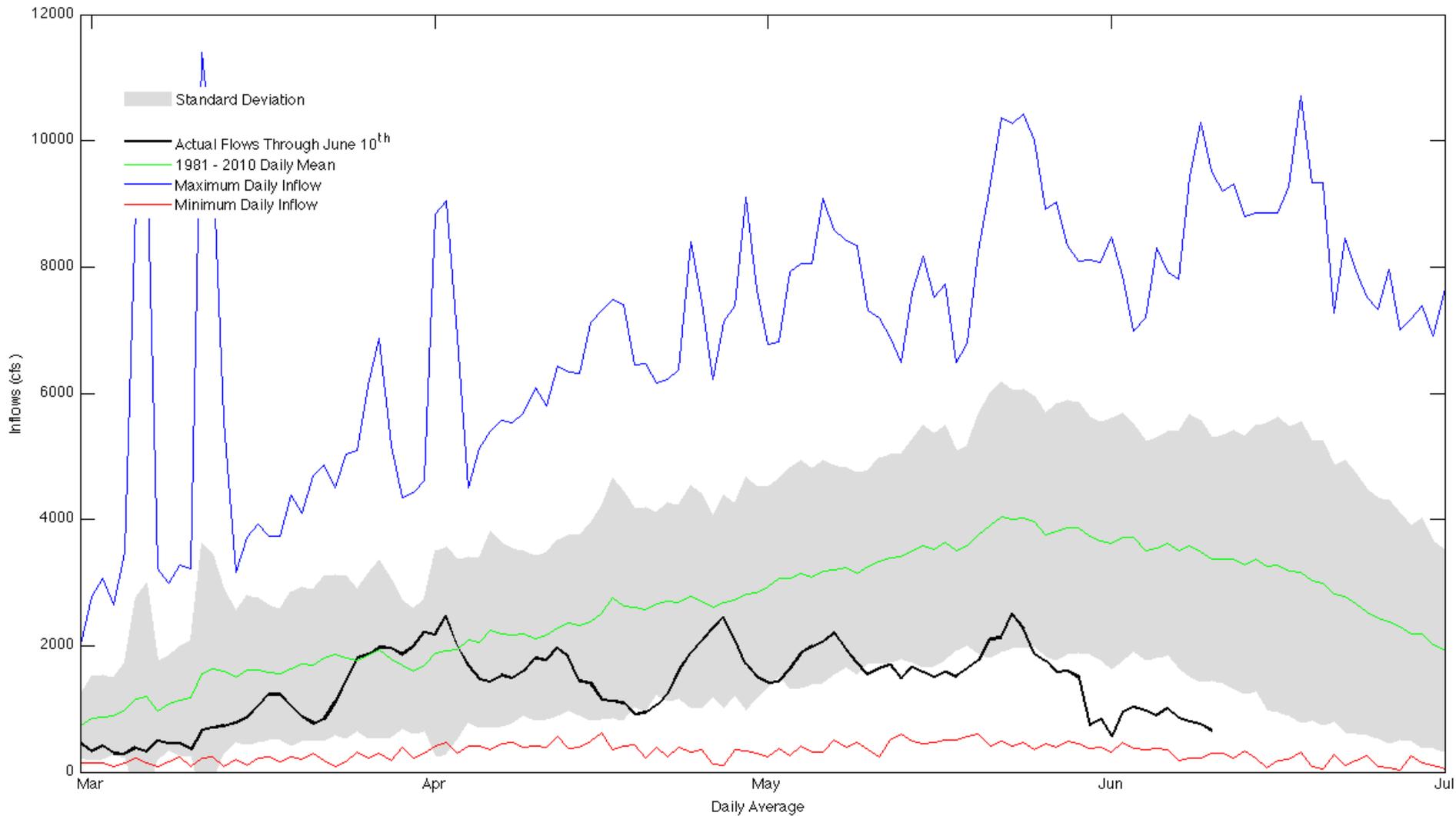
Daily Inflows into Flaming Gorge



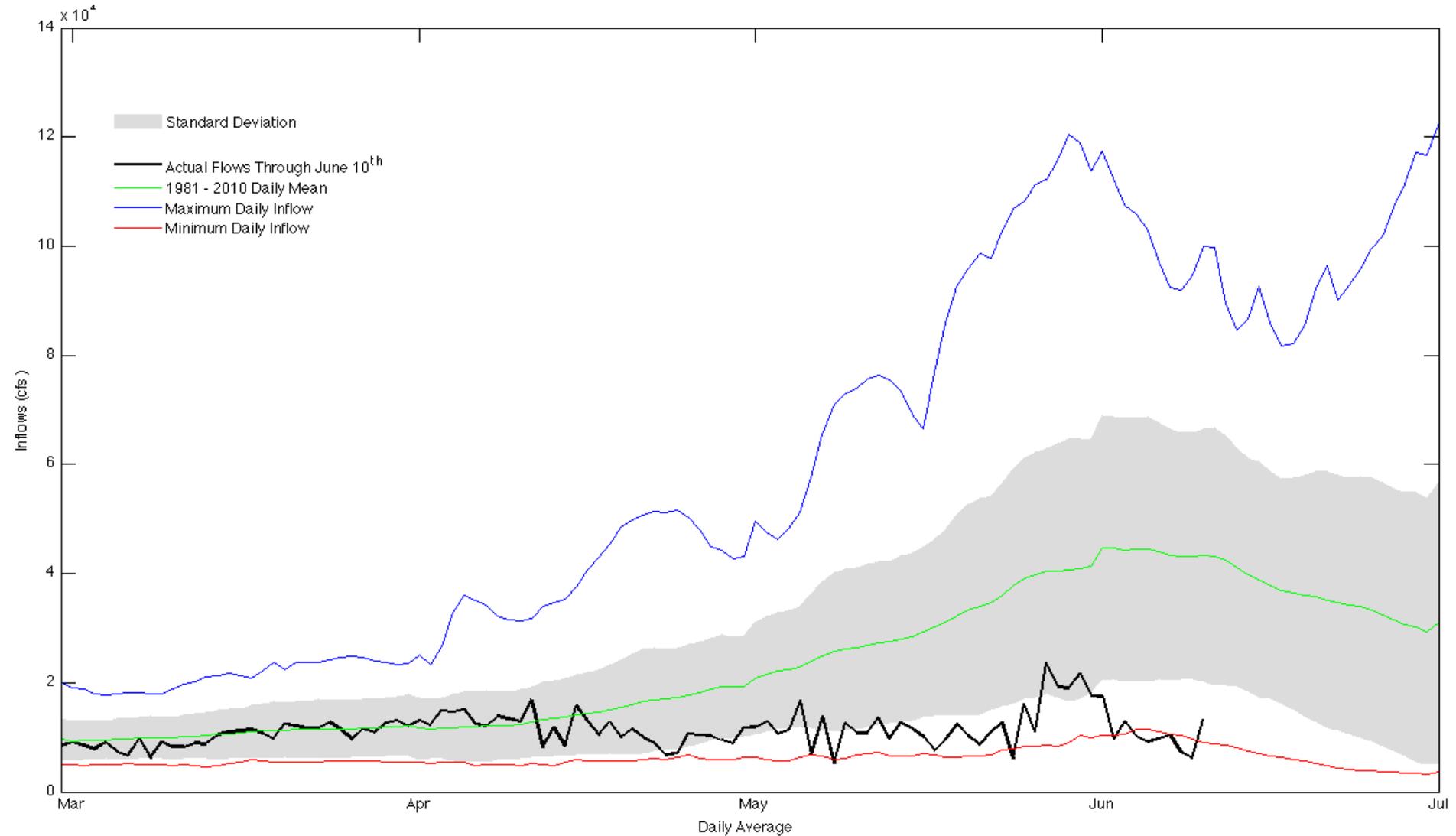
Daily Inflows into Blue Mesa



Daily Inflows into Navajo

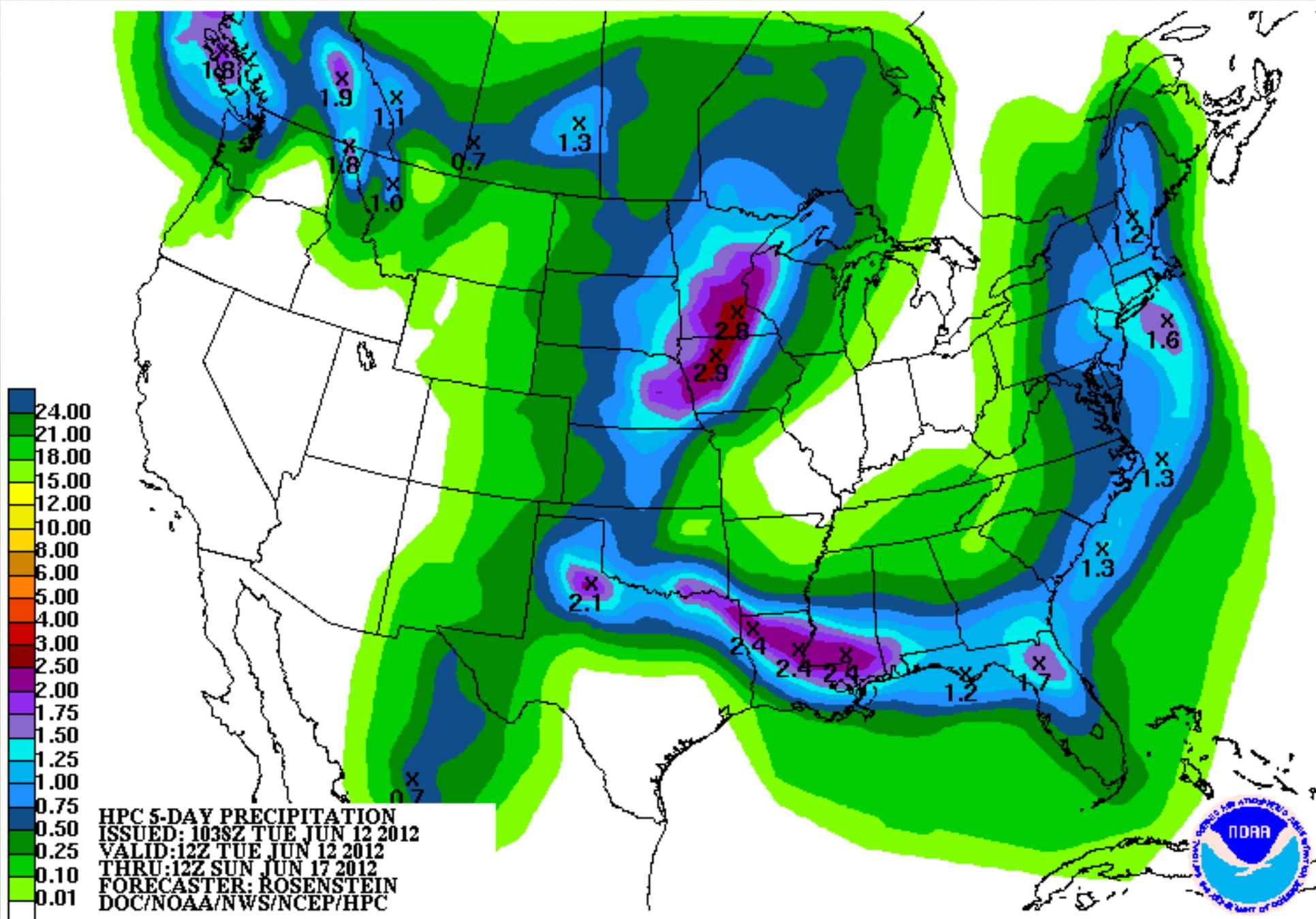


Daily Inflows into Lake Powell

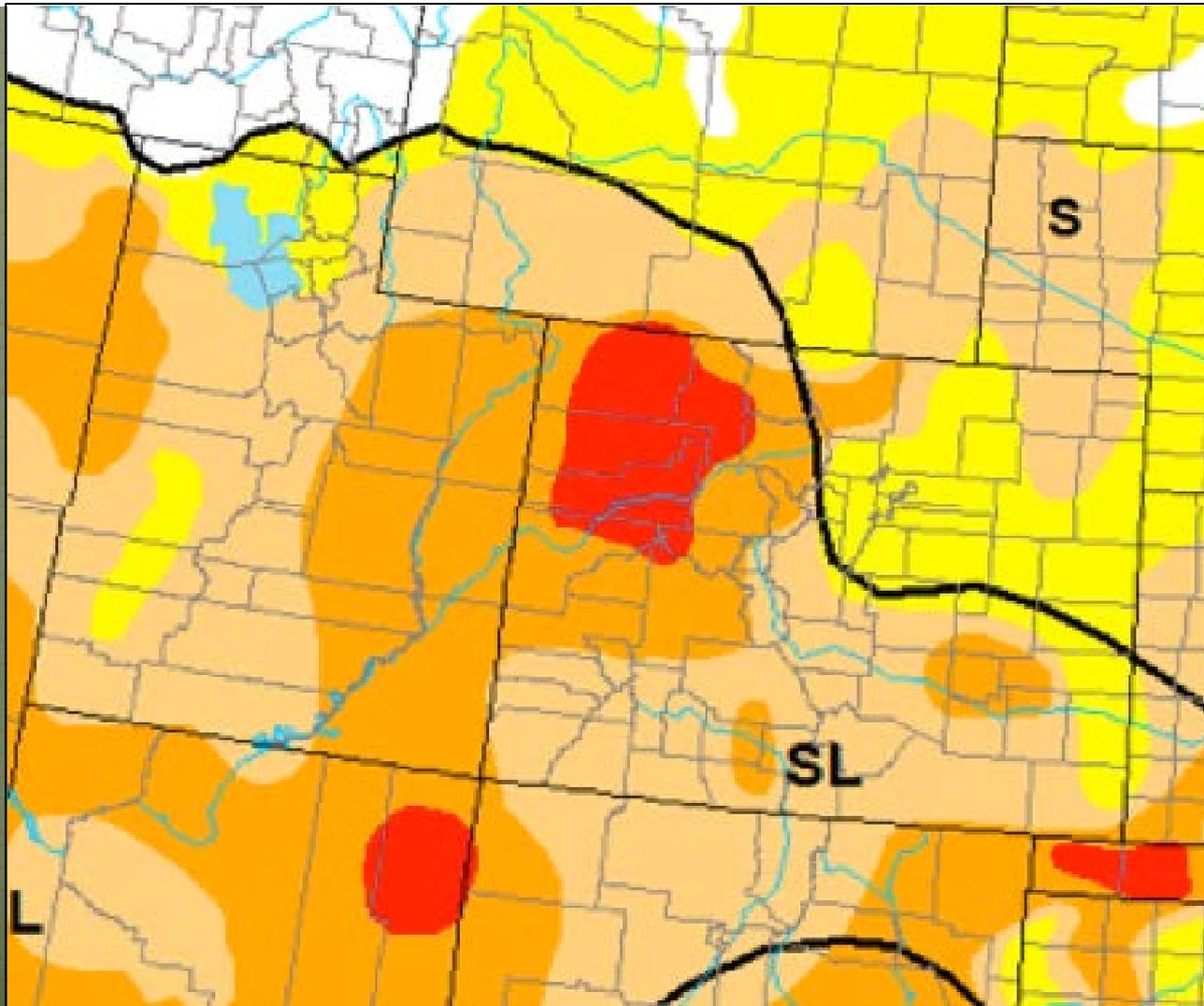


Precipitation Forecast





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

June 12, 2012

Precipitation and Snowpack

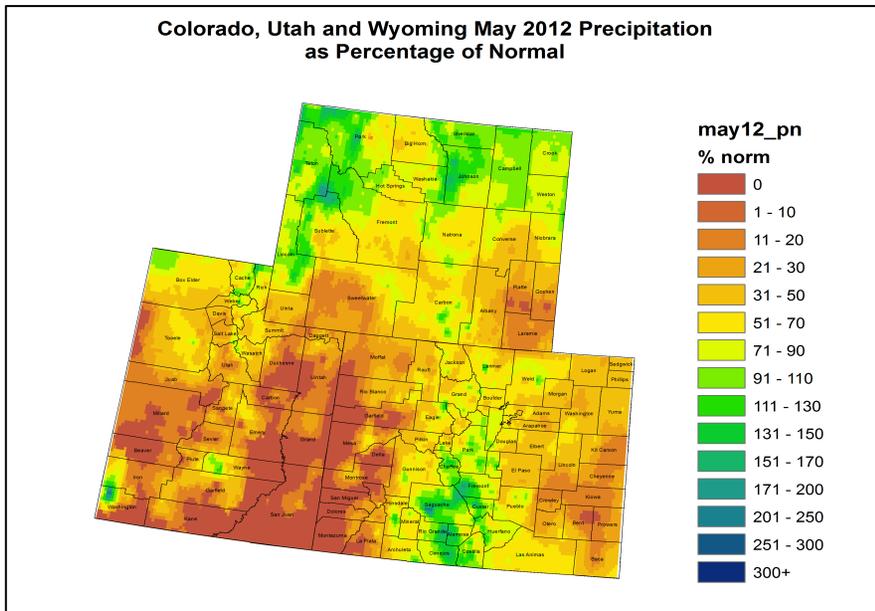


Fig. 1: May precipitation as a percent of average.

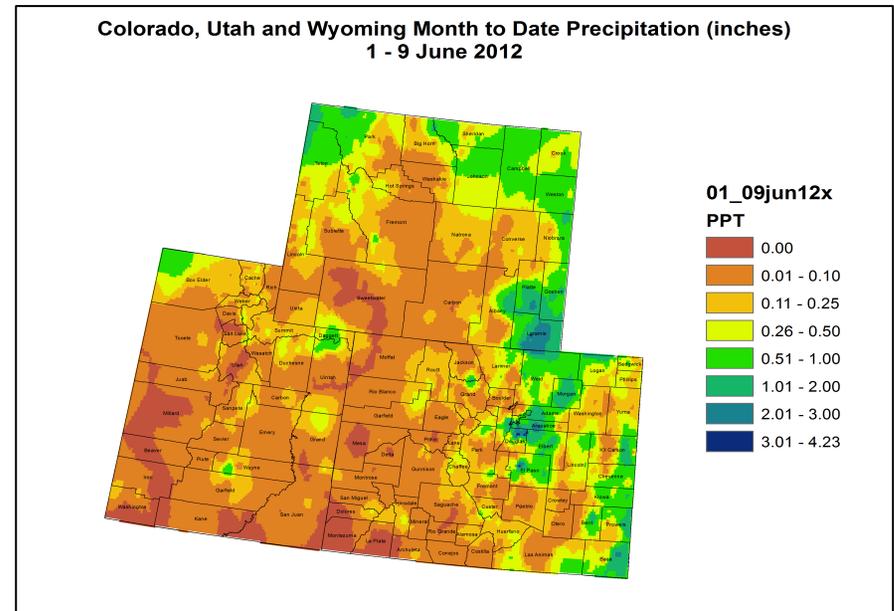


Fig. 2: June 1 – 9 precipitation in inches.

For the month of May, near normal precipitation fell in the San Luis Valley and Sangre de Cristo mountains, and also along the northern-most higher elevations of the Upper Colorado River Basin (UCRB) in Wyoming (Fig. 1). The northern and central mountains of Colorado, the San Juan mountains, and the Wasatch mountains in Utah all saw between 20% and 70% of average precipitation. Much of the west slope of CO, eastern UT, and the Four Corners region were very dry, receiving less than 20% of average precipitation for the month. Most of eastern CO received between 20% and 50% of average precipitation in May.

Last week, only isolated showers fell in the UCRB, with spotty accumulations between a quarter inch and 1 inch reported in some areas (Fig. 2). Most of the basin received less than .10 inches of precipitation for the week. Eastern WY and northeast CO received between half an inch and 2 inches of moisture in many areas. Southeast CO also saw weekly accumulations of over half an inch. Other parts of southeast CO (particularly along much of the Arkansas River) and the San Luis Valley saw less than .10 inches of precipitation for the week.

Snotel Water Year Precipitation Percentile Ranking for 11 June 2012 (Stations with 15+ years of data only)

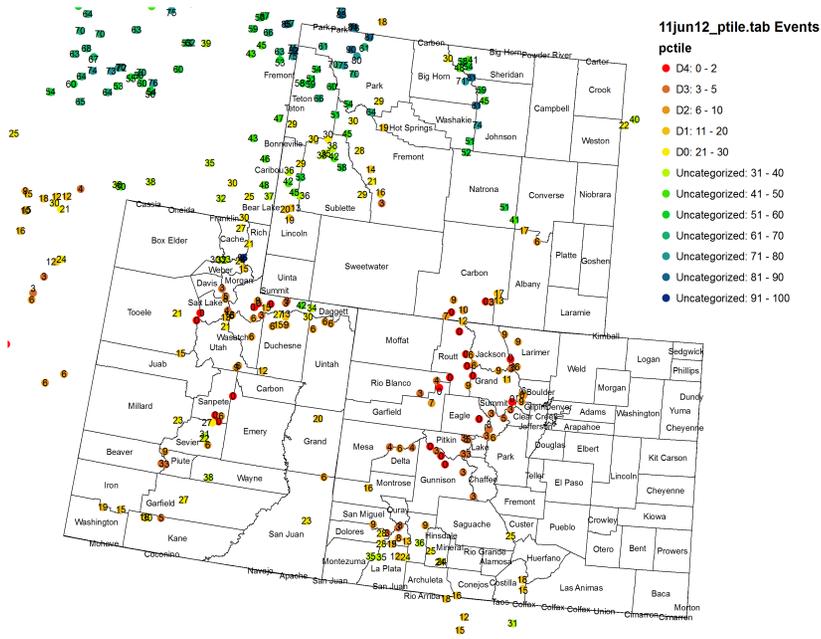


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21 – 30% is Drought Monitor D0 category).

Gunnison River Basin Snow Water Equivalent

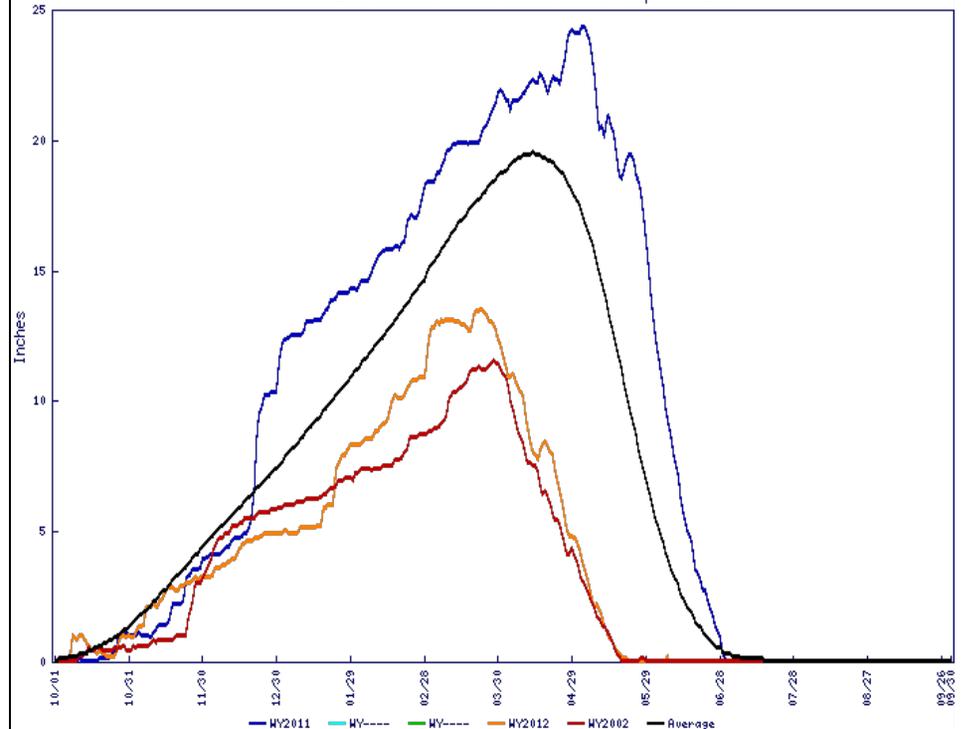


Fig. 4: SNOTEL WYTD SWE for the Gunnison basin (orange line: current, black line: average, red line: 2002, blue line: 2011).

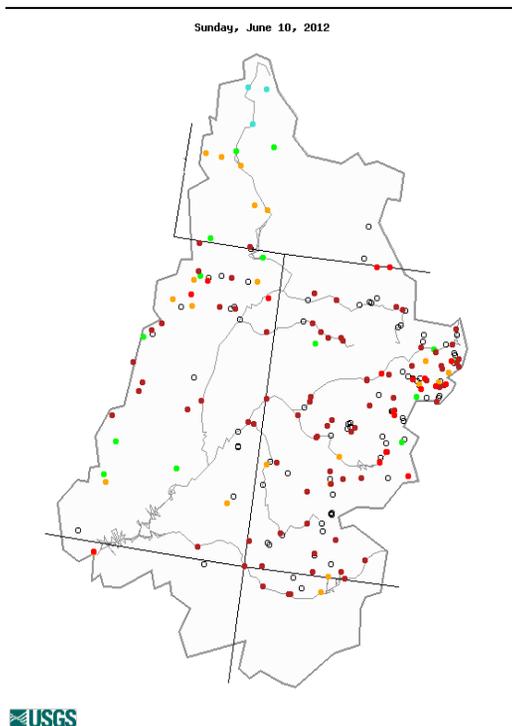
Water-year-to-date (WYTD), SNOTEL precipitation percentiles are lowest for the Yampa and Gunnison basins in CO, with many sites reporting in the lowest 5th percentile or below (Fig. 3). The Wasatch range in UT and the northern mountains of CO are also dry, with most precipitation percentiles in the single digits. SNOTEL percentiles in the Upper Green basin in WY are generally above the 30th percentile. In the San Juan basin, a few SNOTEL percentiles remain around the 30th percentile, but there are many SNOTEL sites now reporting percentiles in the teens and single digits.

Snowpack conditions around the UCRB are all well below average and many sites have completely melted out. This is a combined result of less than average seasonal snowpack accumulations and much earlier melting. In Figure 4, accumulated snow water equivalent around the Gunnison basin peaked about a month earlier than average. Accumulations were slightly higher than 2002 accumulations but melting occurred earlier than 2002. This is similar for many of the sub-basins in the UCRB.

Streamflow

As of June 10th, 13% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows (Fig. 5). Only 3 gages in the basin are recording above average normal flows, while about 87% of the gages in the basin are recording below normal flows. 72% percent of the gages in the basin are recording much below normal or low streamflows. The gages on the Upper Green River are showing near normal flows. Most gages on the Yampa, Colorado, Gunnison, Dolores and San Juan rivers are currently recording flows below the 10th percentile. Low flows are mainly concentrated in headwater regions.

Flows on two of three key gages in the UCRB saw large decreases last week (Fig. 6). Flows on the Green River at Green River, UT and the San Juan River near Bluff, UT have dropped to the 1st and 3rd percentiles, respectively. Though the San Juan River saw a larger peak, this was mainly due to releases from upstream Navajo Reservoir. The Colorado River near the CO-UT state line has stayed nearly steady for the past week, with flows at the 3rd percentile. Flows at all three key gages are much below normal for this time of year.



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 June 10th.

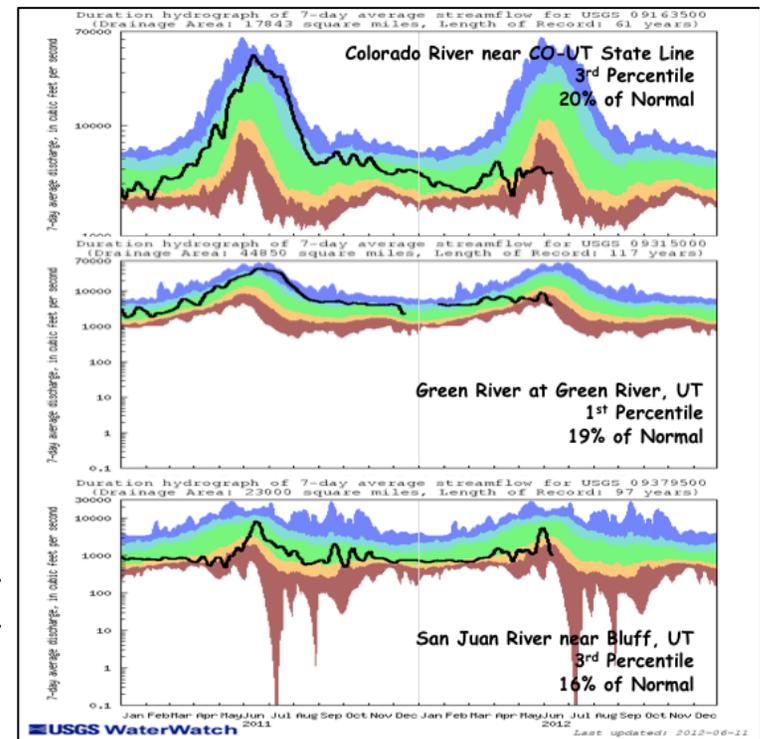


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Most of the UCRB experienced above average temperatures for the week. Western CO experienced temperatures 4 to 8 degrees above average, while parts of northern UT were slightly cooler than average. Eastern CO also experienced much warmer than average temperatures. The VIC model shows extremely dry soil moisture conditions for almost all of the UCRB. Very dry soils in the lowest 5th percentile are modeled in western CO, eastern UT, and much of southern WY. Very dry soils are also evident for most of CO east of the basin. Satellite vegetation conditions show the driest vegetation over northwest CO and eastern UT, with slightly better (but still dry) conditions over southwest WY and the Four Corners region (Fig. 7). Very dry vegetation is also showing up over northeast CO.

Blue Mesa, Flaming Gorge, McPhee, and Navajo reservoirs saw volume decreases during the month of May while the other reservoirs saw volume increases. All reservoirs normally experience large volume increases this time of year, but none of the reservoirs saw those large increases last month. McPhee and Flaming Gorge are currently above their June average volumes, while the rest of the reservoirs are slightly below their June averages. Daily inflows into the major reservoirs in the basin are much below average for this time of year.

Precipitation Forecast

A large area of high pressure centered over the southwest U.S. will dominate the weather over most of the UCRB throughout the upcoming week. This ridge will result in persistence of the incredibly dry airmass over the basin with little in the way of precipitation anticipated over all but the Continental Divide of CO (Fig. 8). A weak cold front may provide a focus for showers and thunderstorms over northern portions of the basin moving into this weekend, however any precipitation that does fall is expected to remain less than 0.25 inches of liquid at the most. By Monday an upper-level disturbance is expected to pass over the basin, with plenty of uncertainty within forecast models on the exact placement and strength of the system. The northern half of the UCRB will again benefit the most from this feature while southern and western areas remain dry and warmer than average.

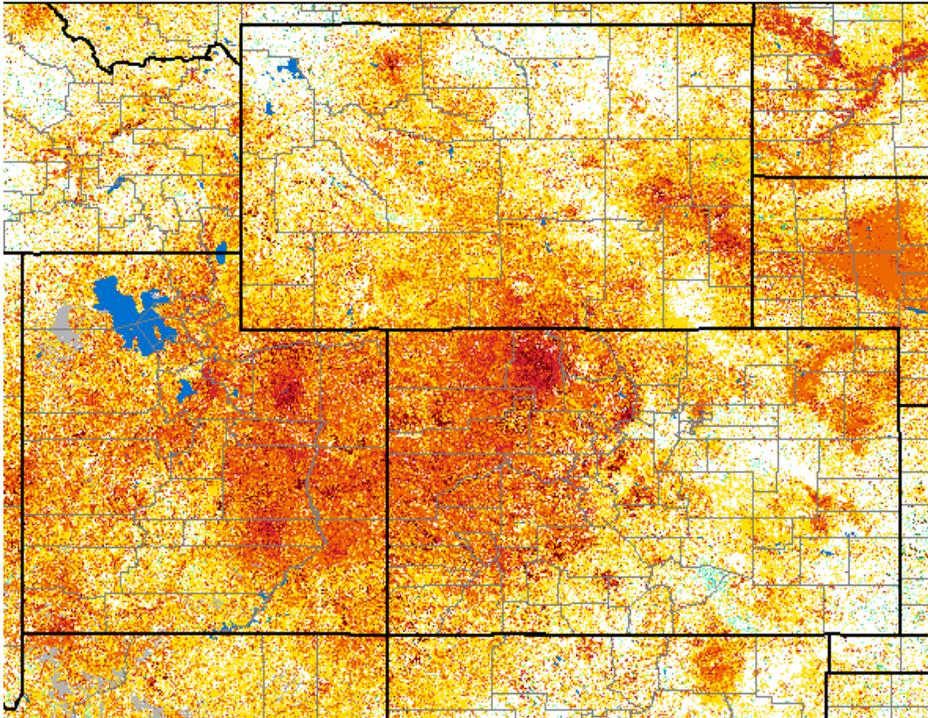


Fig. 7: eMODIS VegDRI satellite vegetation conditions as of June 10th.

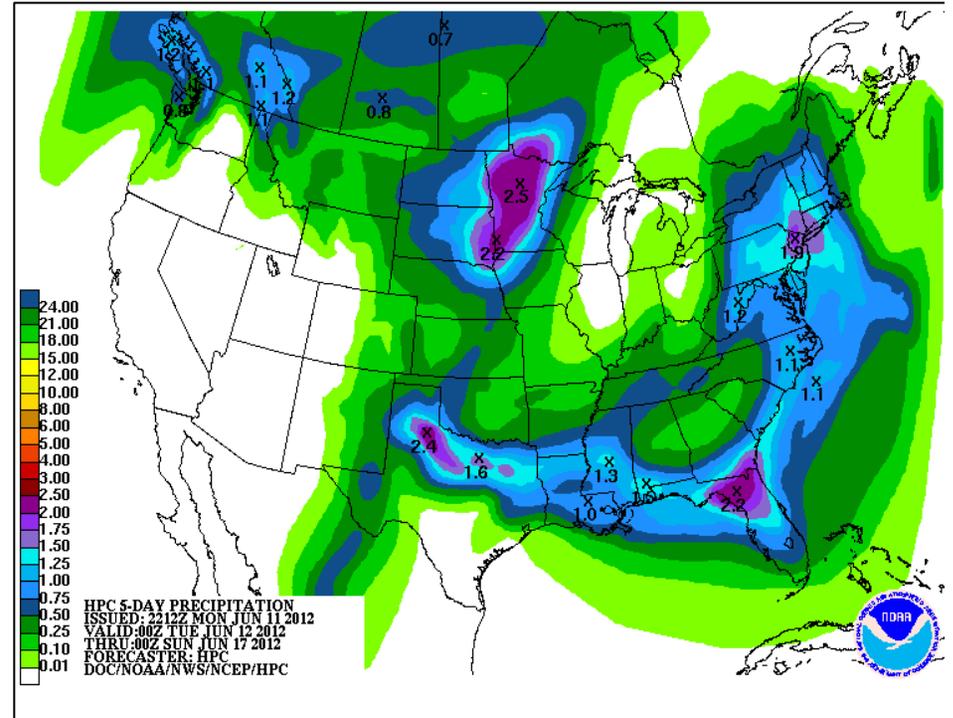
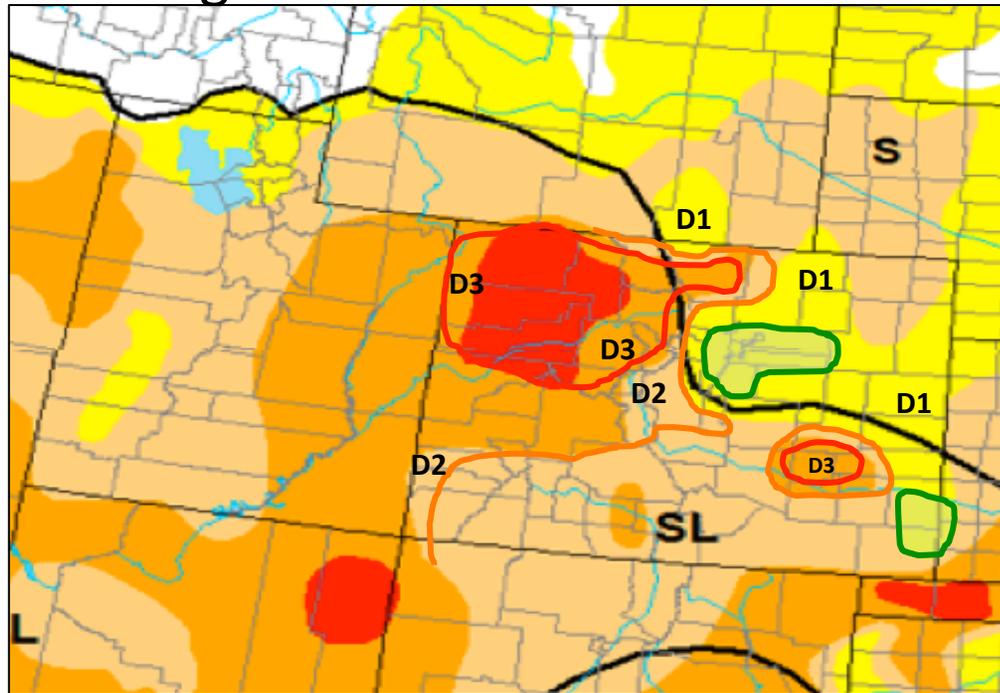


Fig. 8: Hydrologic Prediction Center's Quantitative Precipitation Forecast (QPF) through 00UTC Sunday.

Drought and Water Discussion



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

Fig. 9: June 5th release of U.S. Drought Monitor for the UCRB.

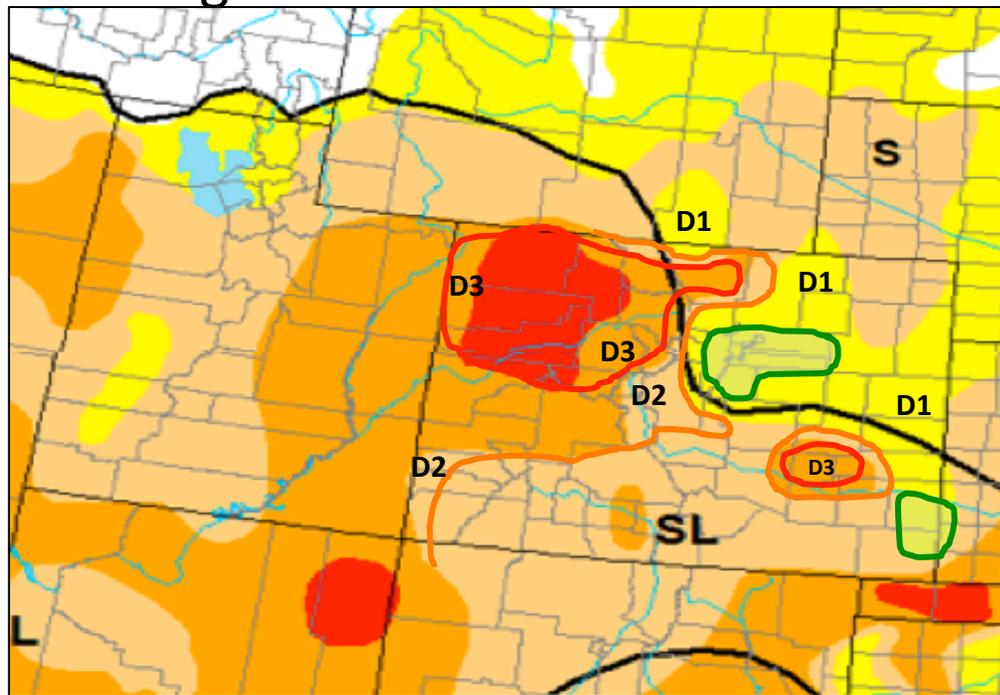
UCRB:

D2 – small areas still in D1 (Summit, Grand, and Jackson counties) should currently be in D2. The D2 should also be expanded near the Four Corners region (Fig. 9, orange line).

D3 – The west side of the D3 should be expanded to cover western CO through Garfield, Rio Blanco, and Moffat counties (Fig. 9, red line). VegDRI satellite depictions show this area to be extremely dry, on-the-ground reports in western CO indicate extreme dryness and little green-up. Streamflows in the area are in the lowest 5th percentiles at many gages and standardized precipitation indices (SPIs) are less than -2 on the 6-month timescale. The east side of D3 should be expanded toward the upper headwaters regions of the Colorado and Blue rivers where flows are below the 5th percentile, reports are that spring was the earliest and warmest on record, and that there is a dramatic lack of water. It should also cross the Divide along Jackson County.

D4 – no D4 this week, though northwest CO will be closely monitored for possible near-future degradations.

Drought and Water Discussion



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

Fig. 9: June 5th release of U.S. Drought Monitor for the UCRB.

Eastern CO:

D1 – widespread D1 should be expanded throughout most of northeast and southeast CO, EXCEPT in areas inside the green shapes, which should stay D0 (Fig. 9, green shapes). Though recent precipitation has fallen and SPIs may not be indicative, this region has experienced extremely warm temperatures, very low humidities, high winds, very high ET rates, and much of the moisture falling is not benefiting the soils and crops.

D2 – In northern CO, D2 should be expanded over the rest of Larimer County and into western Weld County— Fort Collins and Greeley have experienced their driest springs on record. The D2 should also be expanded just east of the Continental Divide, over the headwaters of the Arkansas River and into Park and Teller counties, where many ag impacts are being reported. D2 should also be expanded along the Arkansas River in southeast CO and north into Lincoln County where ag impacts are extremely bad (Fig. 9, orange lines).

D3 – D3 should be introduced around Crowley County in southeast CO and into Larimer County in northern CO, with both areas showing SPIs less than -2 on the 6-month timescale (Fig. 9, red shapes).