

Spring
2011



July 6th, 2011

NIDIS - UPPER COLORADO BASIN PILOT PROJECT

Weekly Climate, Water & Drought Assessment

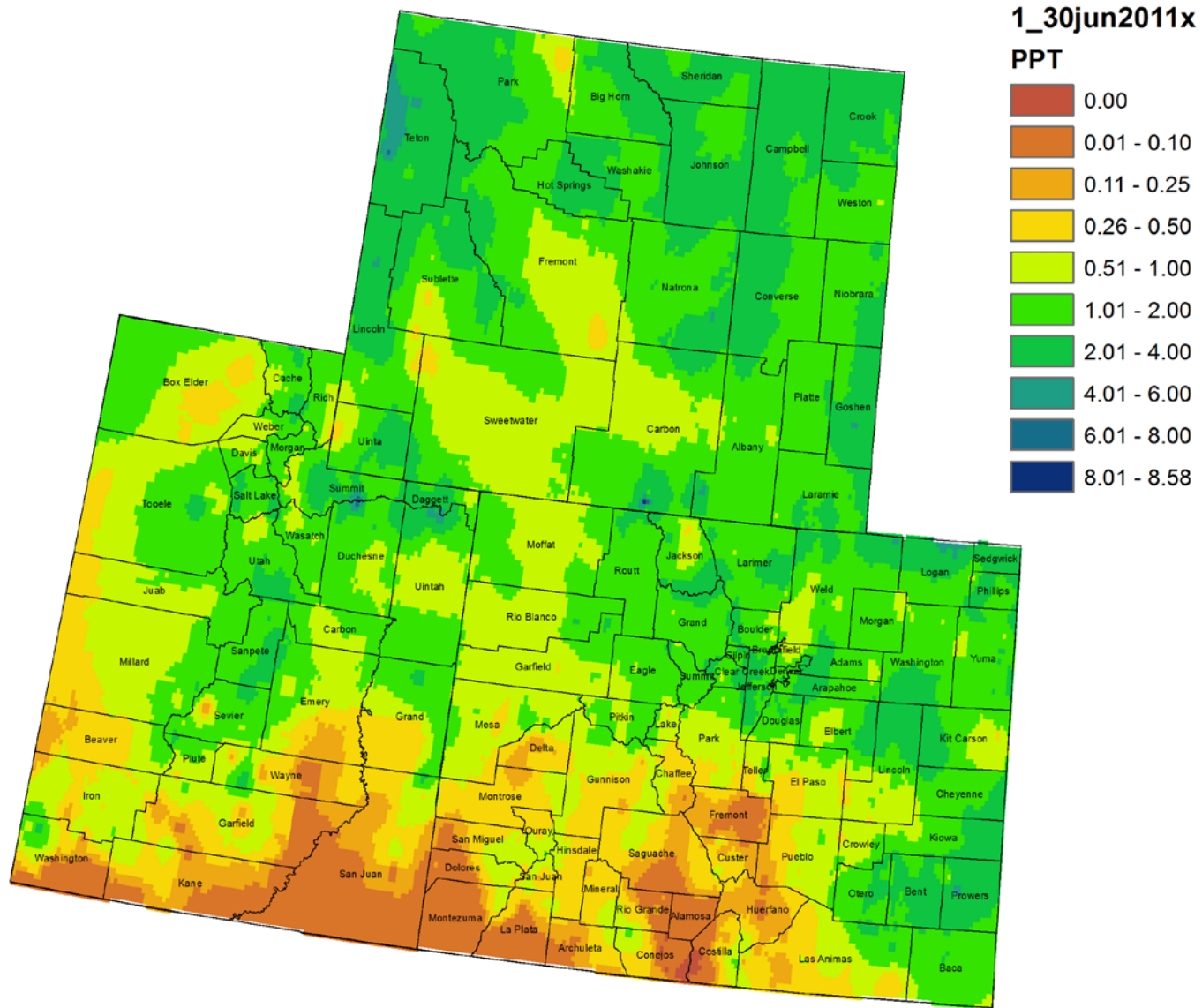
Today's Agenda

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

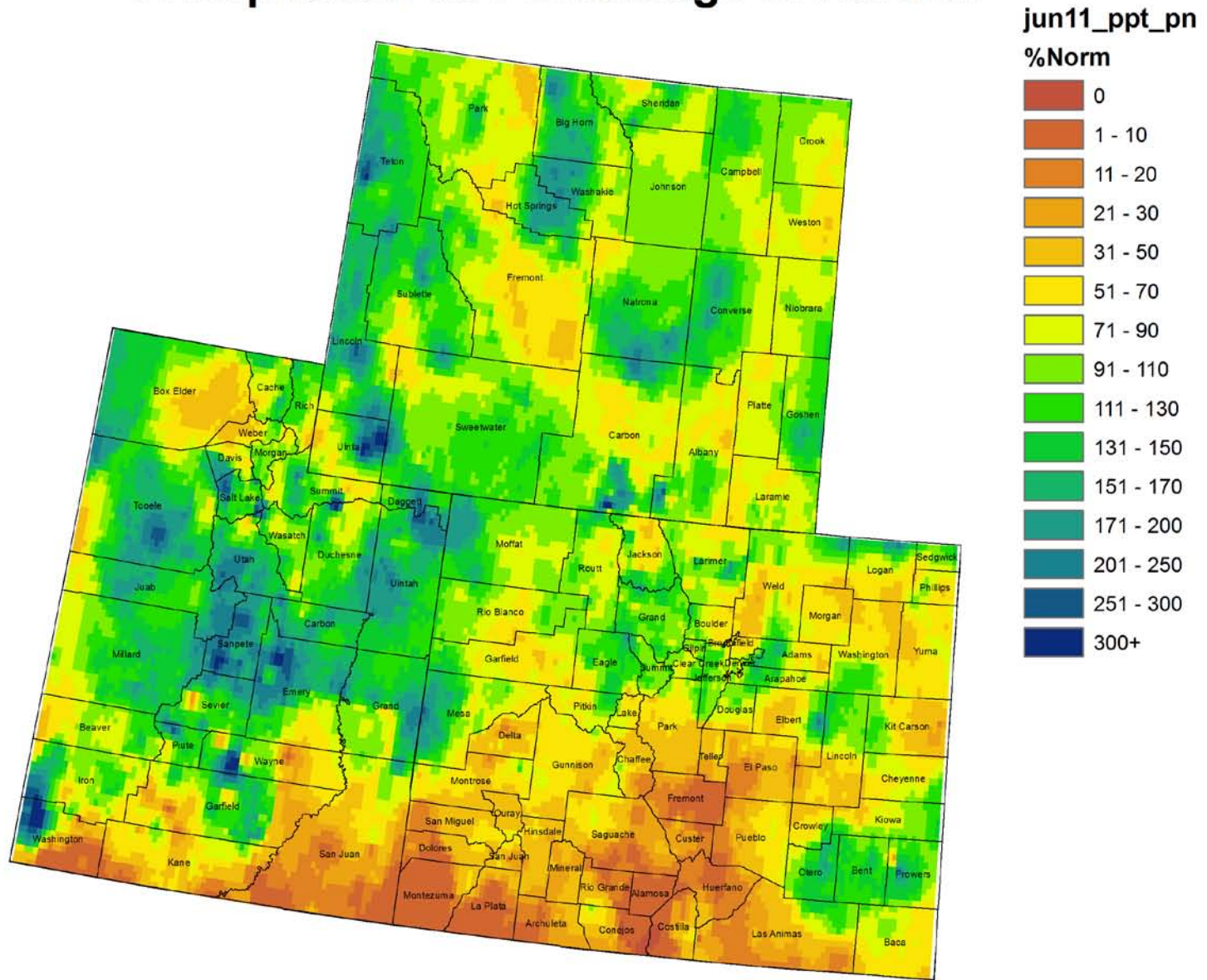
Precipitation/Snowpack Update



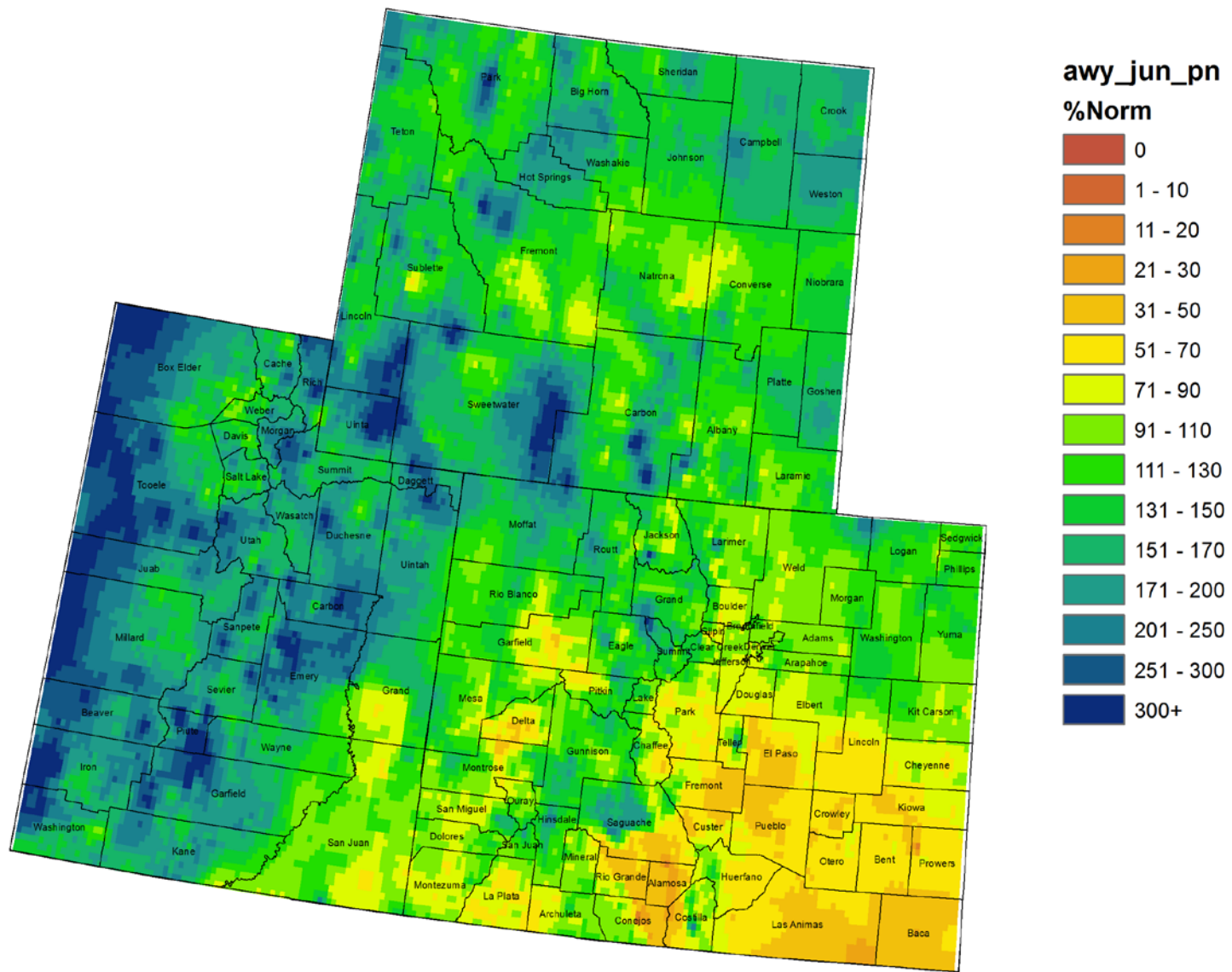
Colorado, Utah and Wyoming June 2011 Precipitation (in)



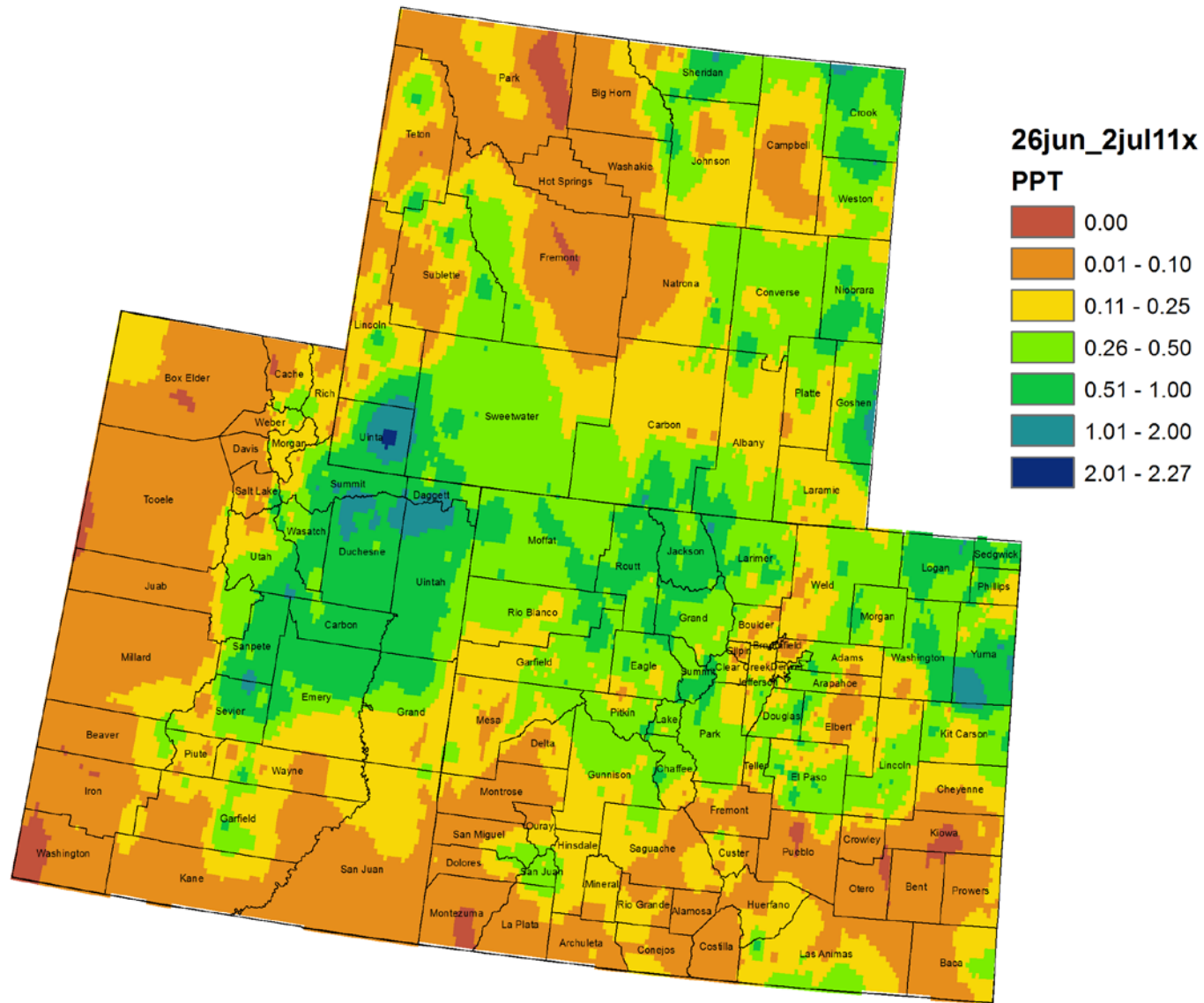
Colorado, Utah and Wyoming June 2011 Precipitation as Percentage of Normal



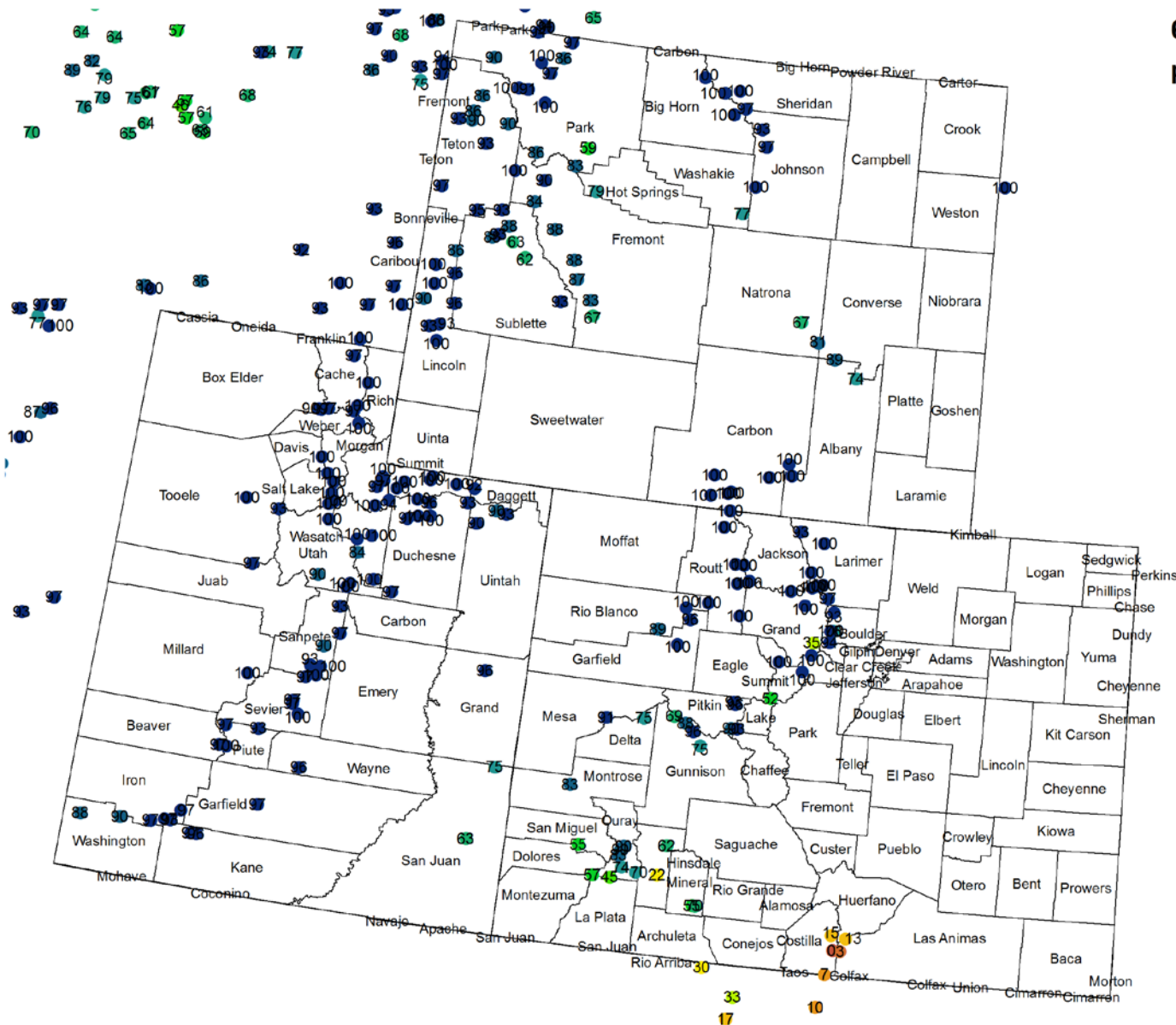
Colorado, Utah and Wyoming Water Year 2011 Precipitation as Percentage of Normal (Oct 10 - Jun 11)



Colorado, Utah and Wyoming 7 Day Precipitation (in) 26 June - 2 July 2011



Snotel Water Year Precipitation Percentile Ranking for 6 July 11 (Stations with 20+ years of data only)

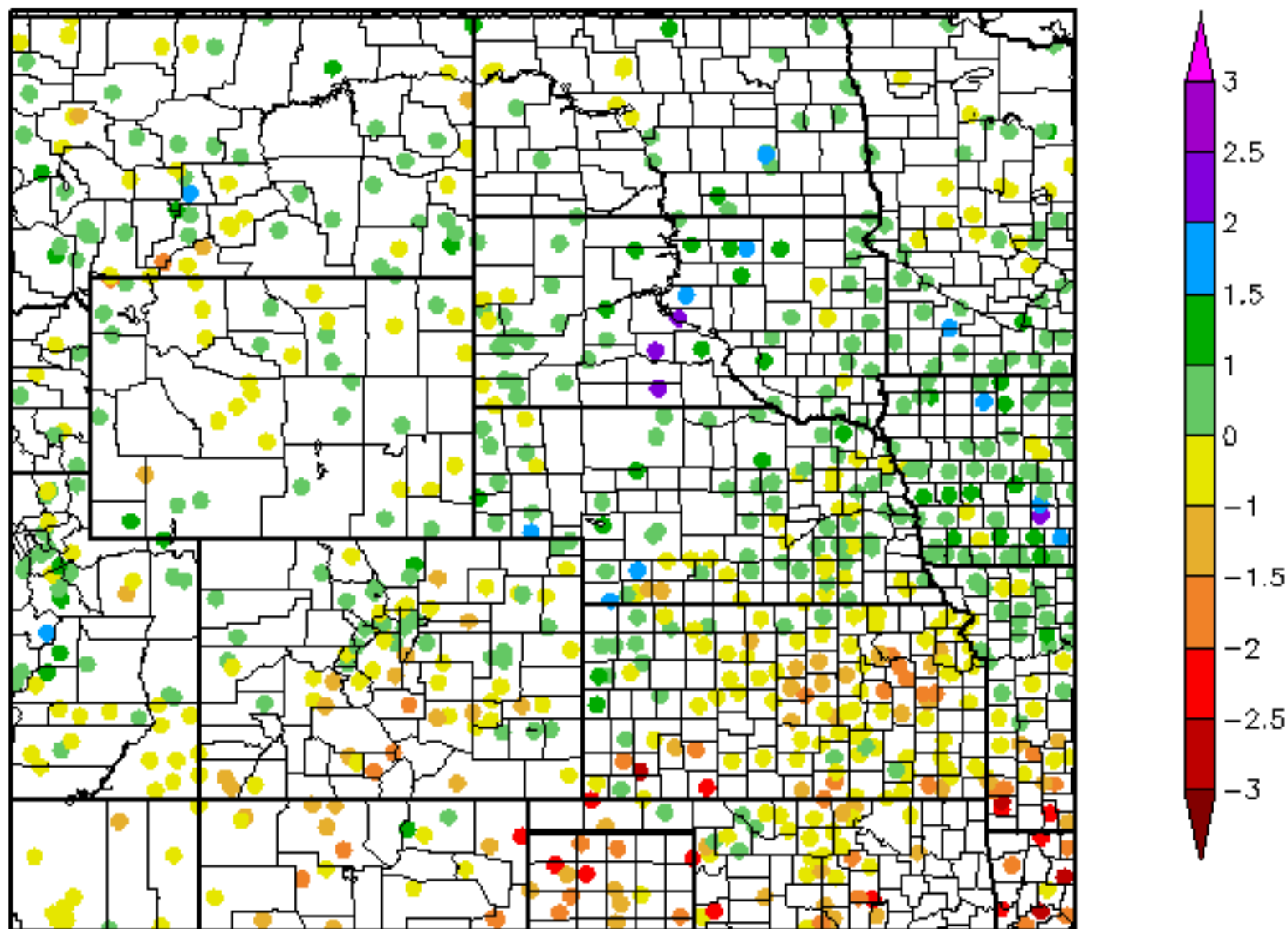


6July11_ptile.tab Events pctile

- 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

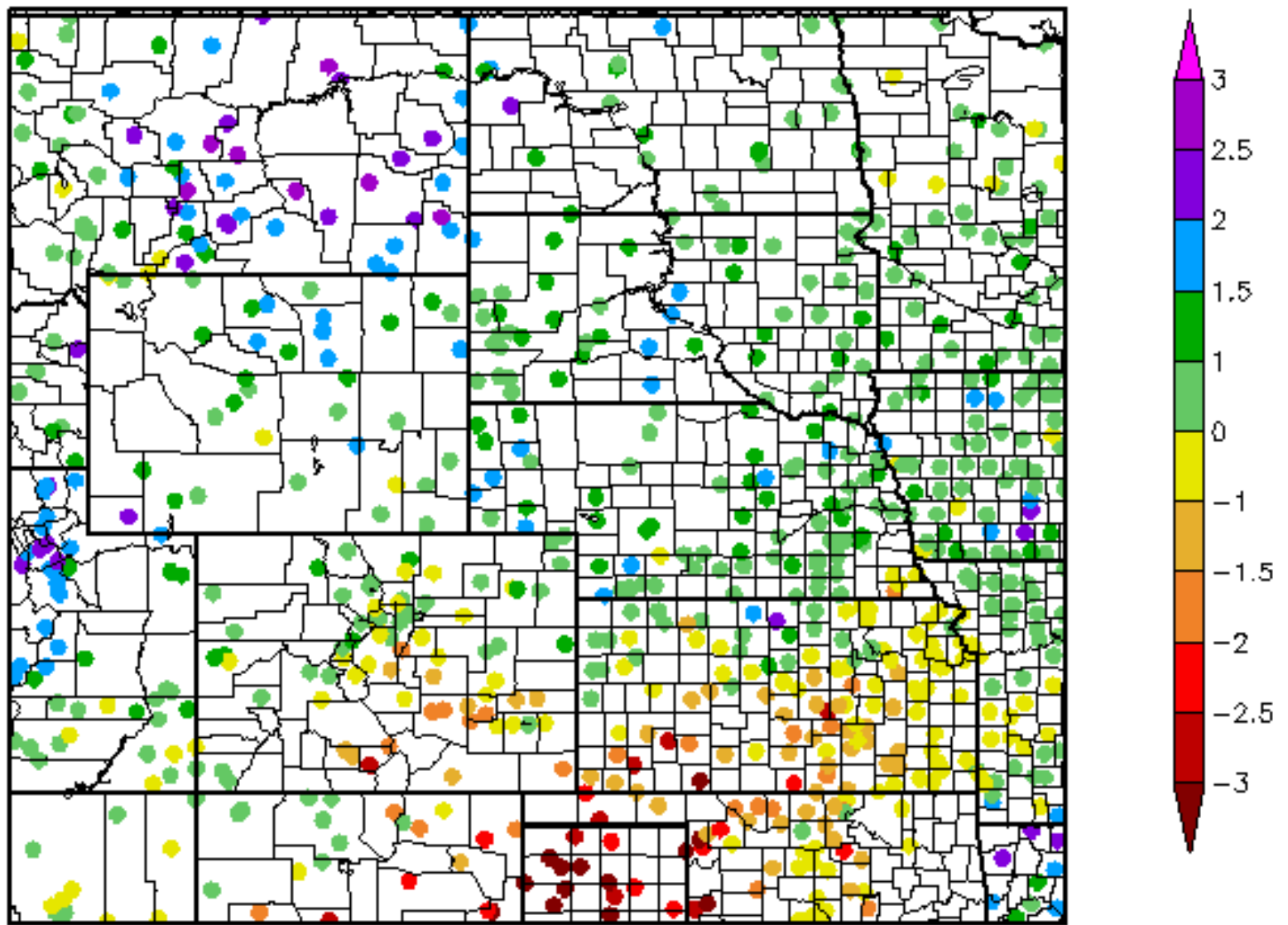
30 Day SPI

6/6/2011 - 7/5/2011



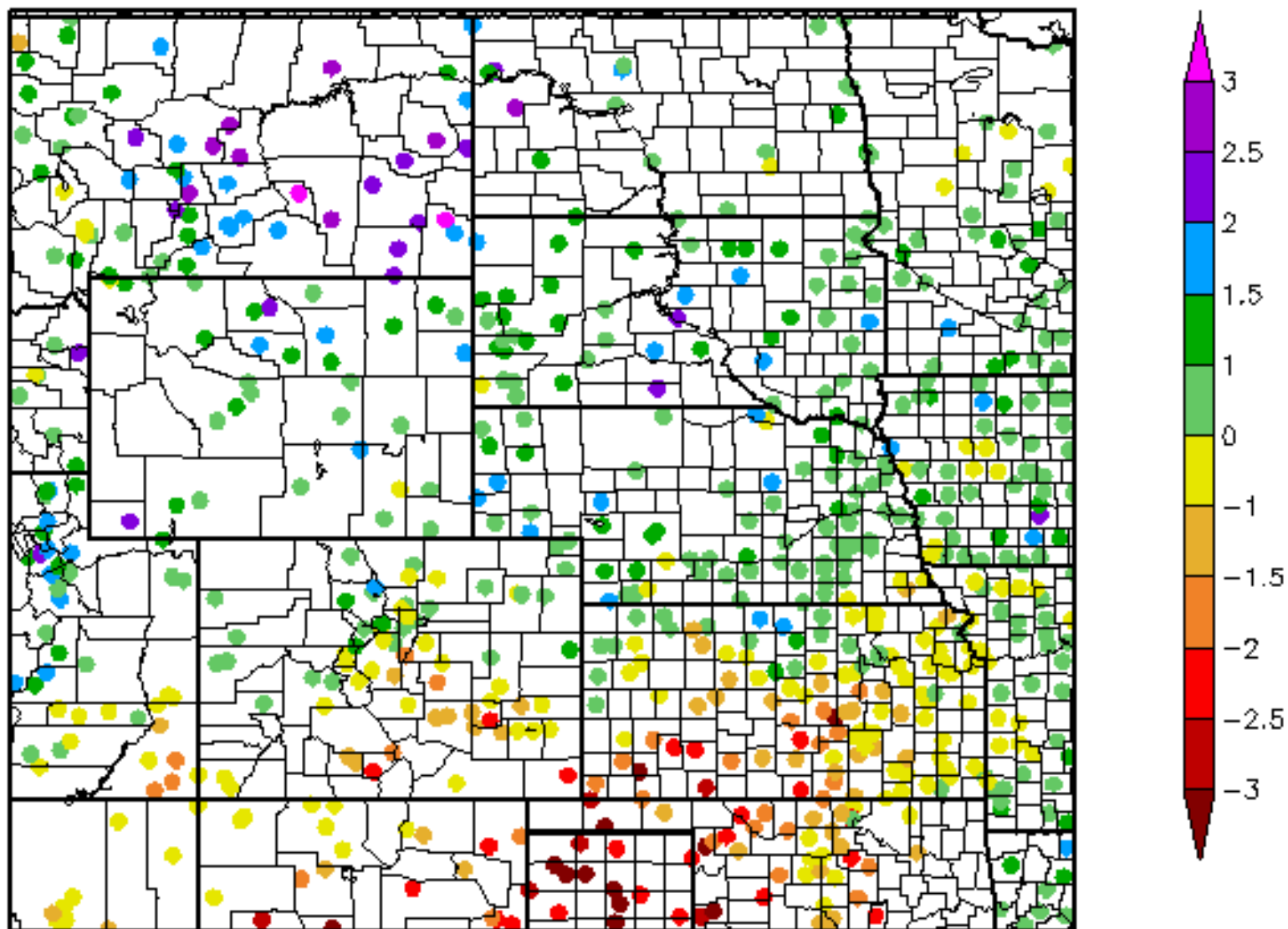
90 Day SPI

4/7/2011 - 7/5/2011

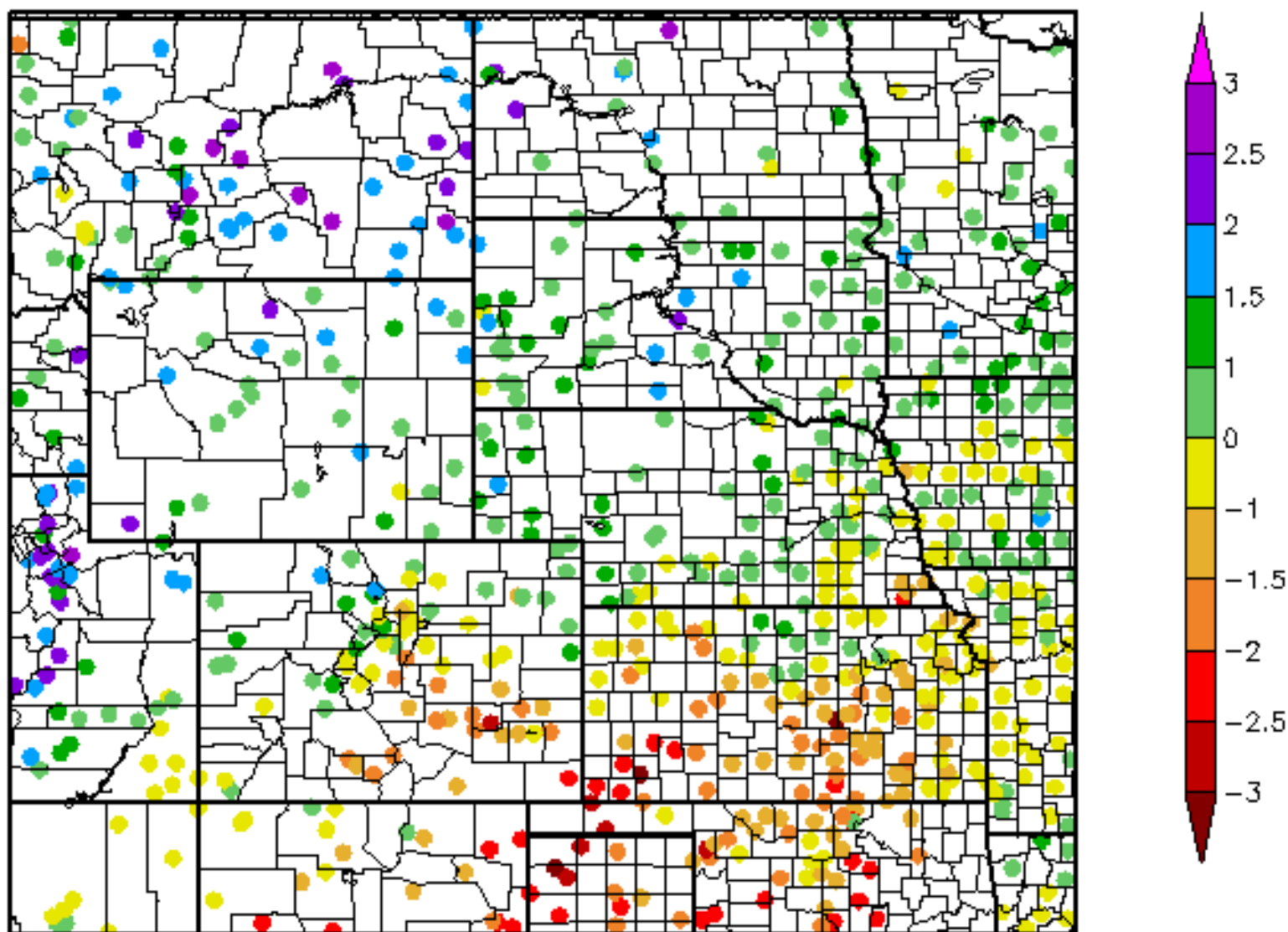


6 Month SPI

1/6/2011 - 7/5/2011



Water Year SPI 10/1/2010 – 7/5/2011

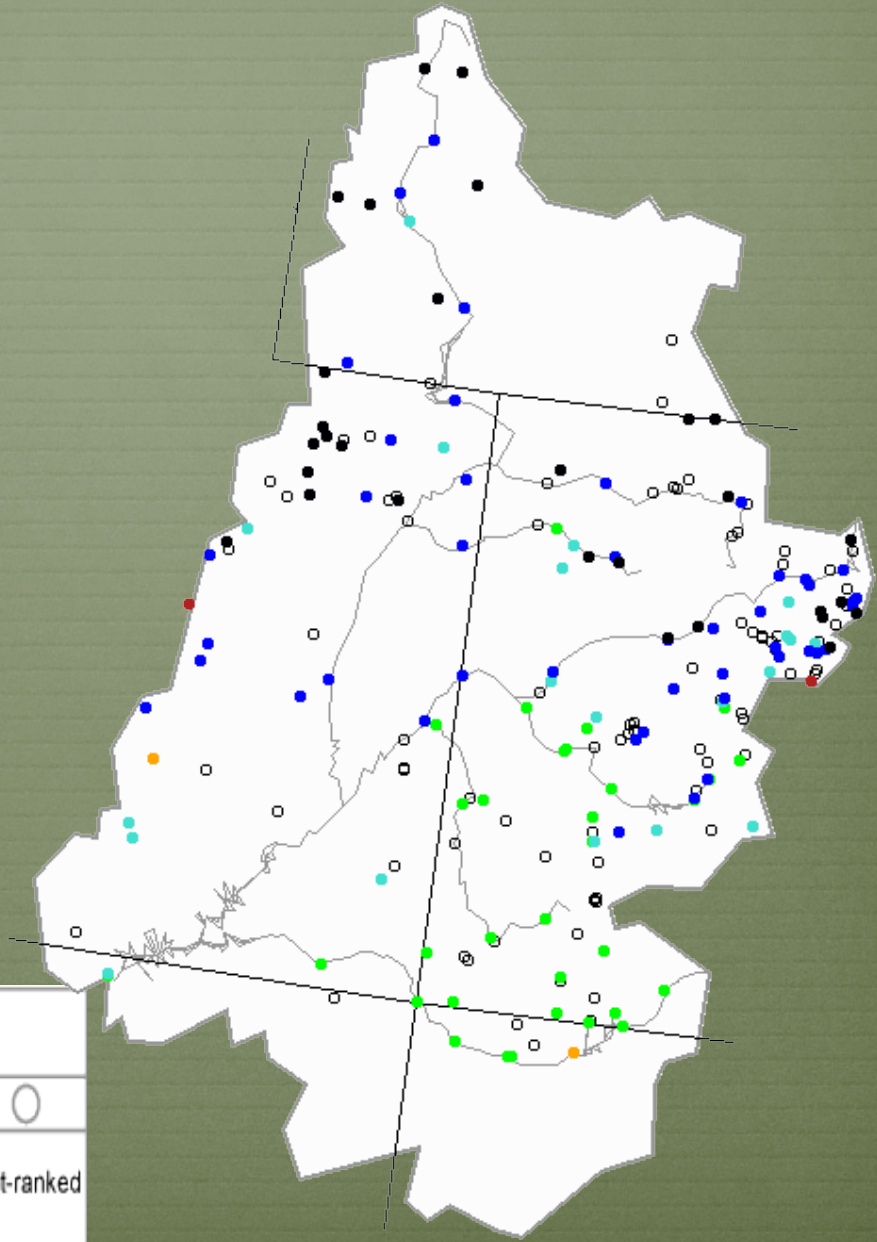


Streamflow Update

Michael Lewis USGS



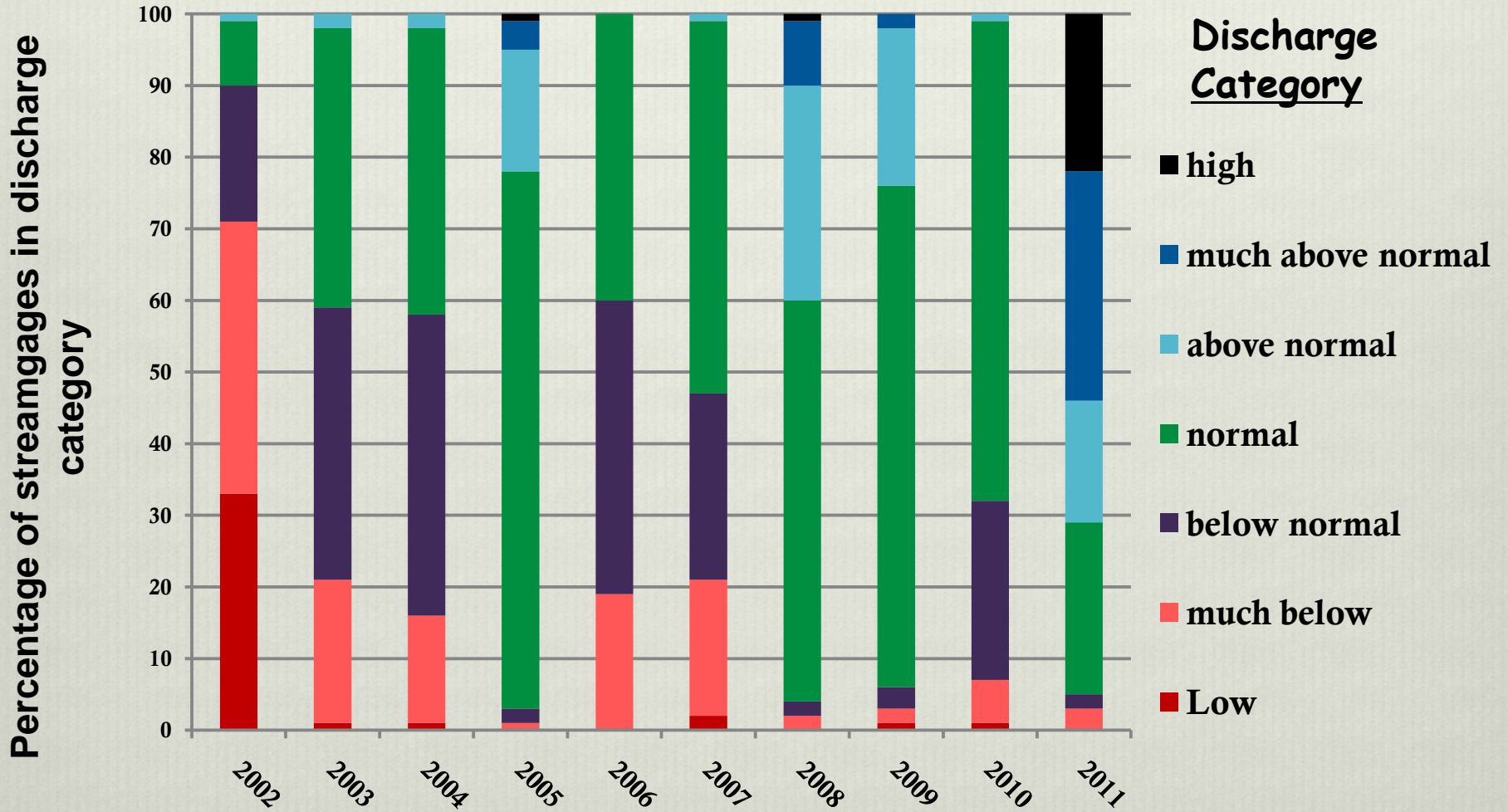
7-day average discharge compared to historical discharge for the day of the year (July 4th)



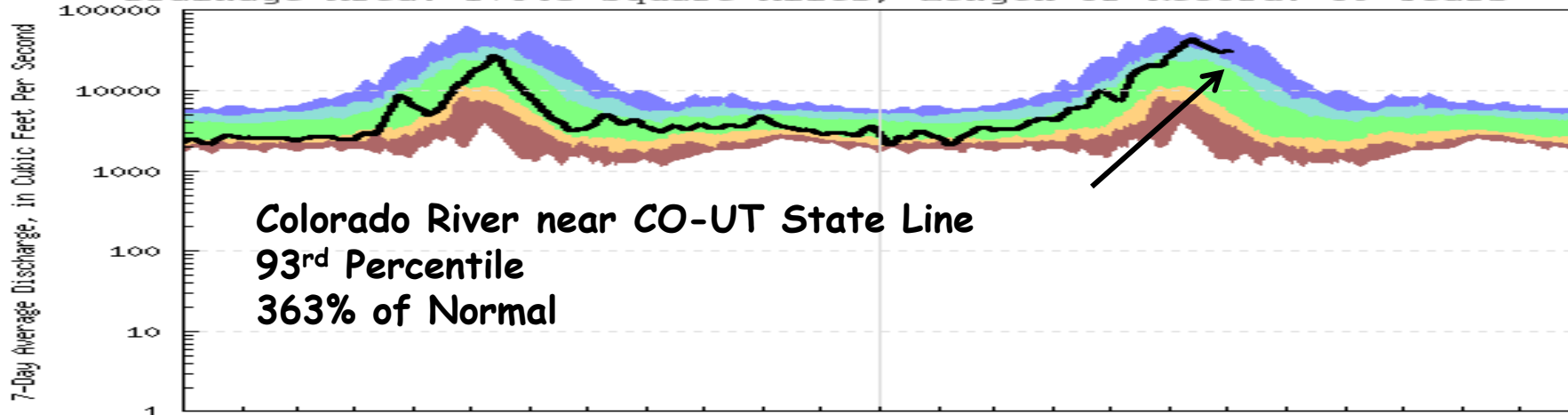
Explanation - Percentile classes

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

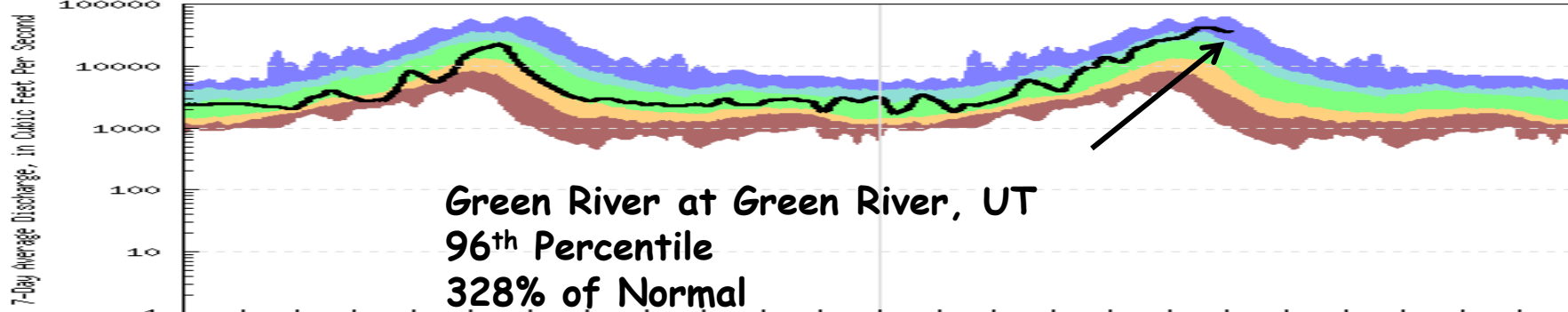
-Upper Colorado River Basin- Comparison of 7-day Average Discharge For June 26th, 2002-2011



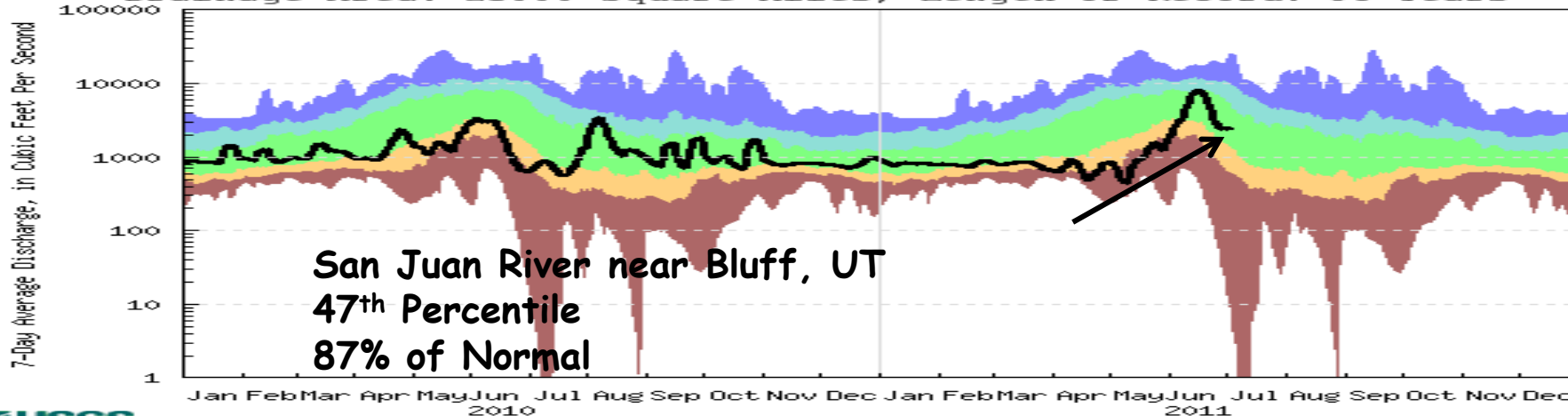
USGS 09163500 COLORADO RIVER NEAR COLORADO-UTAH STATE LINE
Drainage Area: 17843 Square Miles, Length of Record: 59 Years



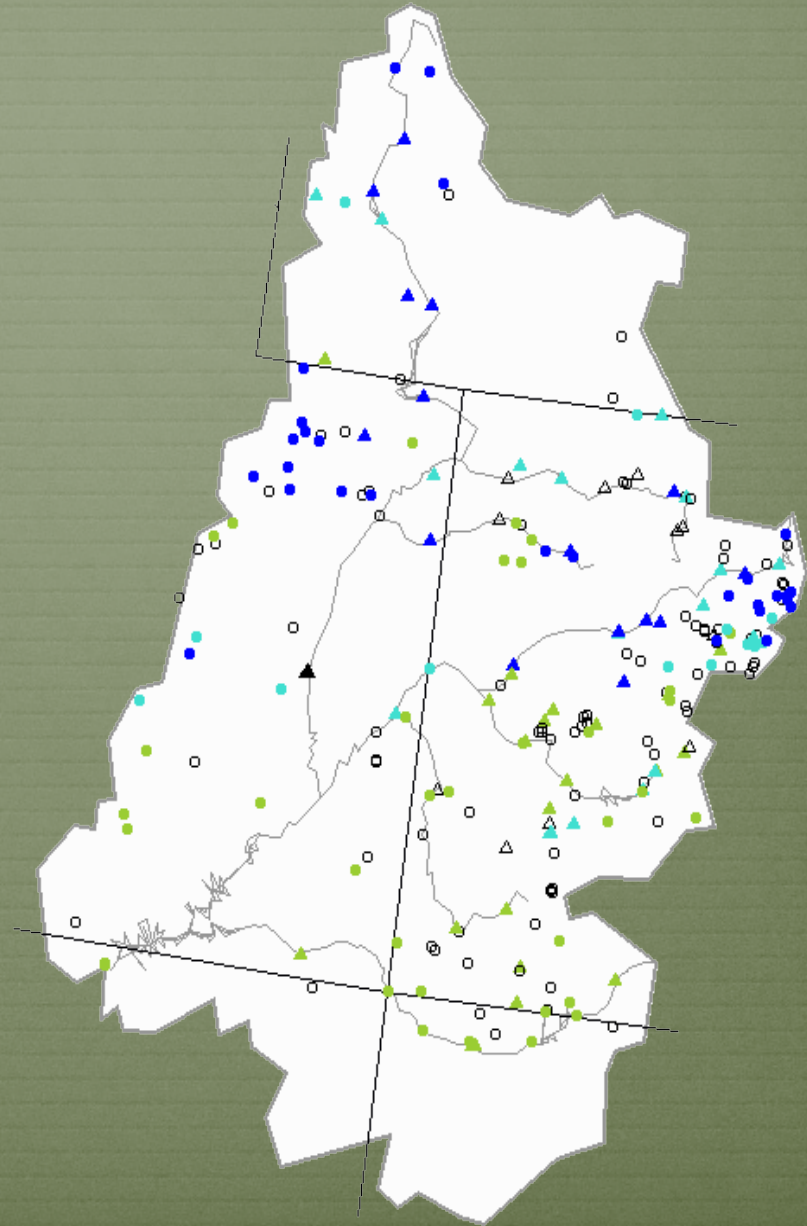
USGS 09315000 GREEN RIVER AT GREEN RIVER, UT
Drainage Area: 44850 Square Miles, Length of Record: 110 Years


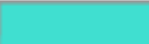

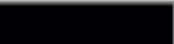



USGS 09379500 SAN JUAN RIVER NEAR BLUFF, UT
Drainage Area: 23000 Square Miles, Length of Record: 85 Years

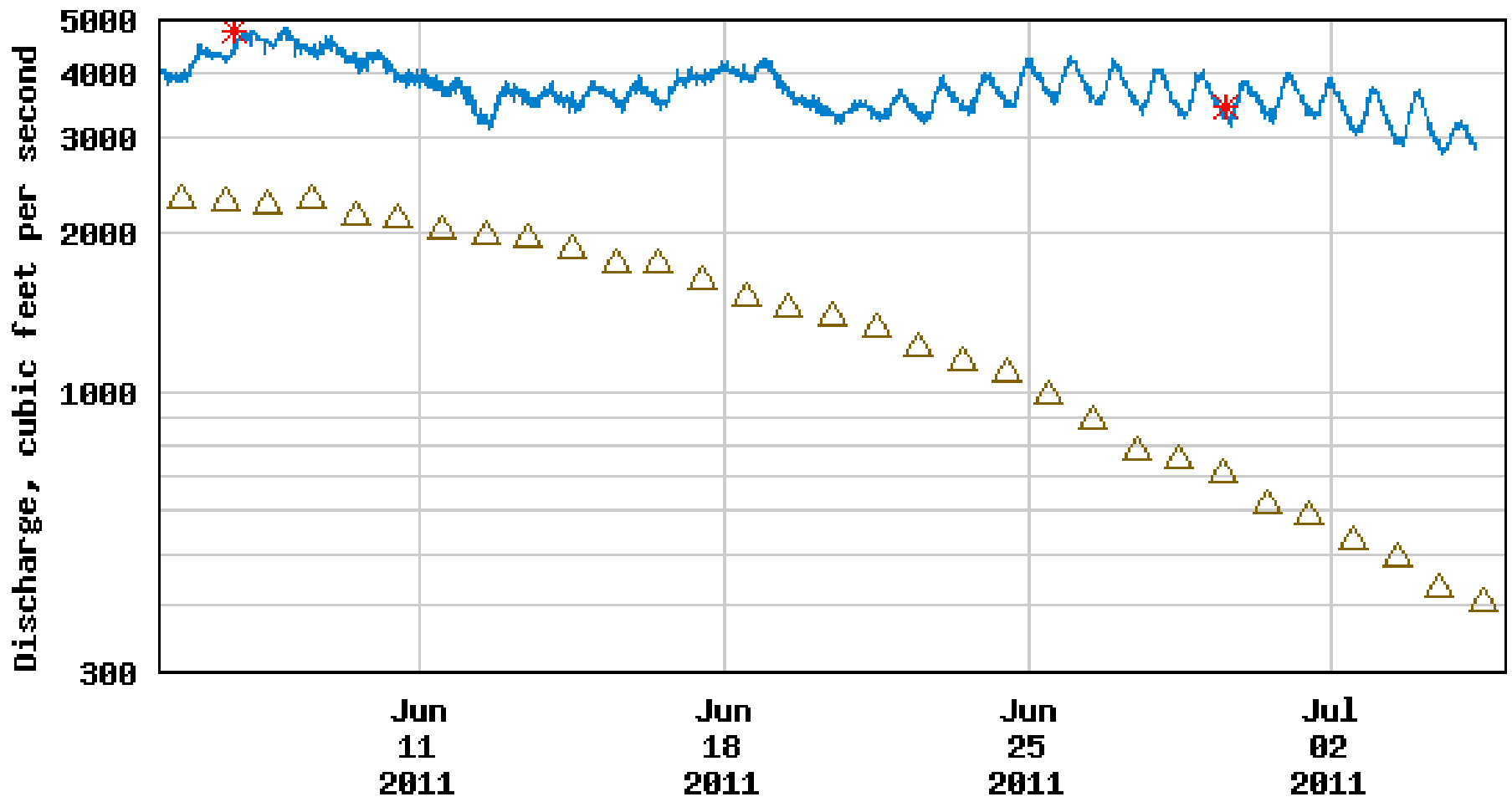


Real-time discharge compared to historical discharge for the day of the year (July 5th)



Explanation - Percentile classes				
				
<95	95-98	>= 99	River above flood stage	Not ranked
△ Streamgauge with flood stage		○ Streamgauge without flood stage		

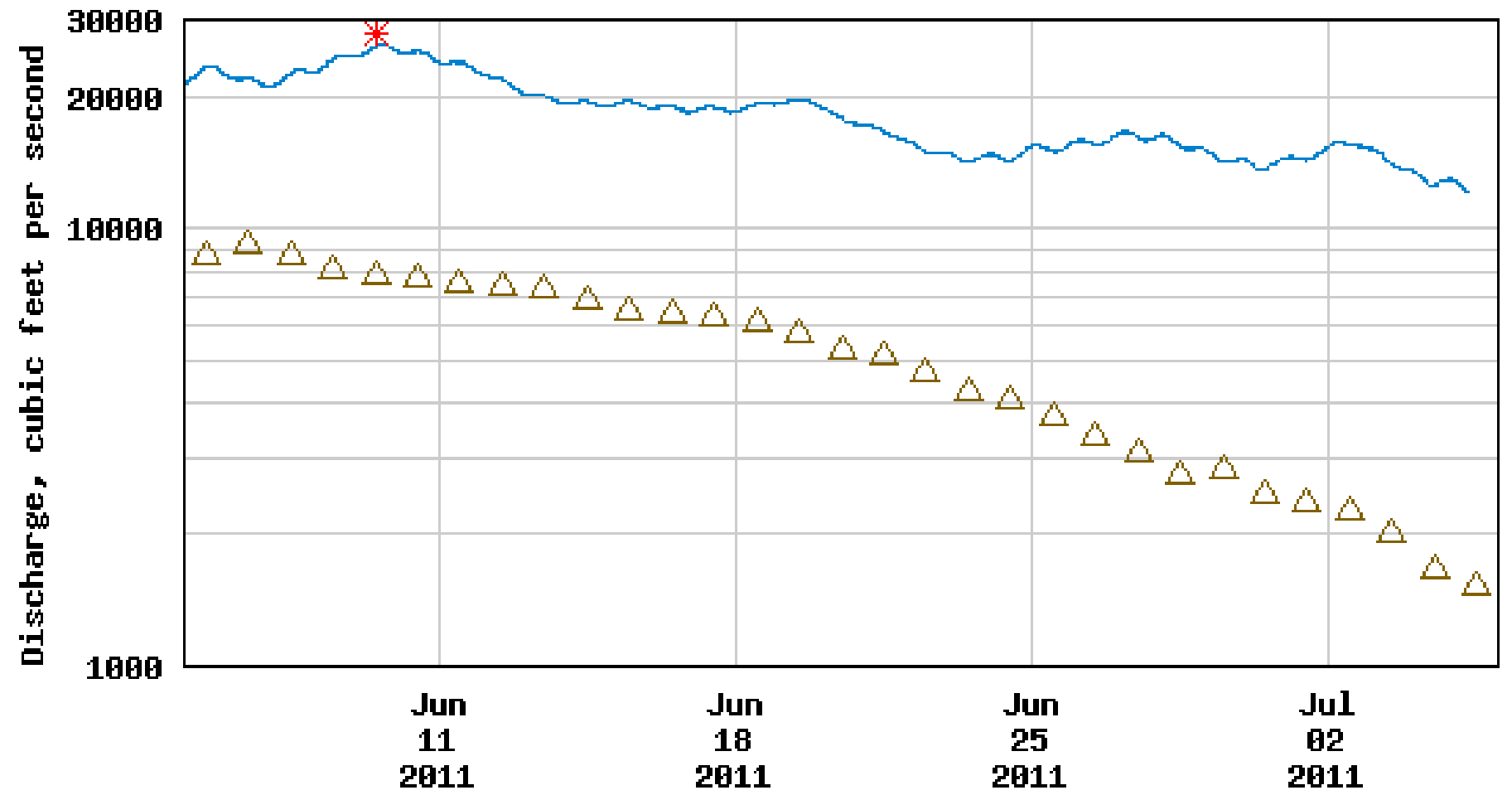
USGS 09239500 YAMPA RIVER AT STEAMBOAT SPRINGS, CO



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

- △ Median daily statistic (101 years)
- * Measured discharge
- Discharge

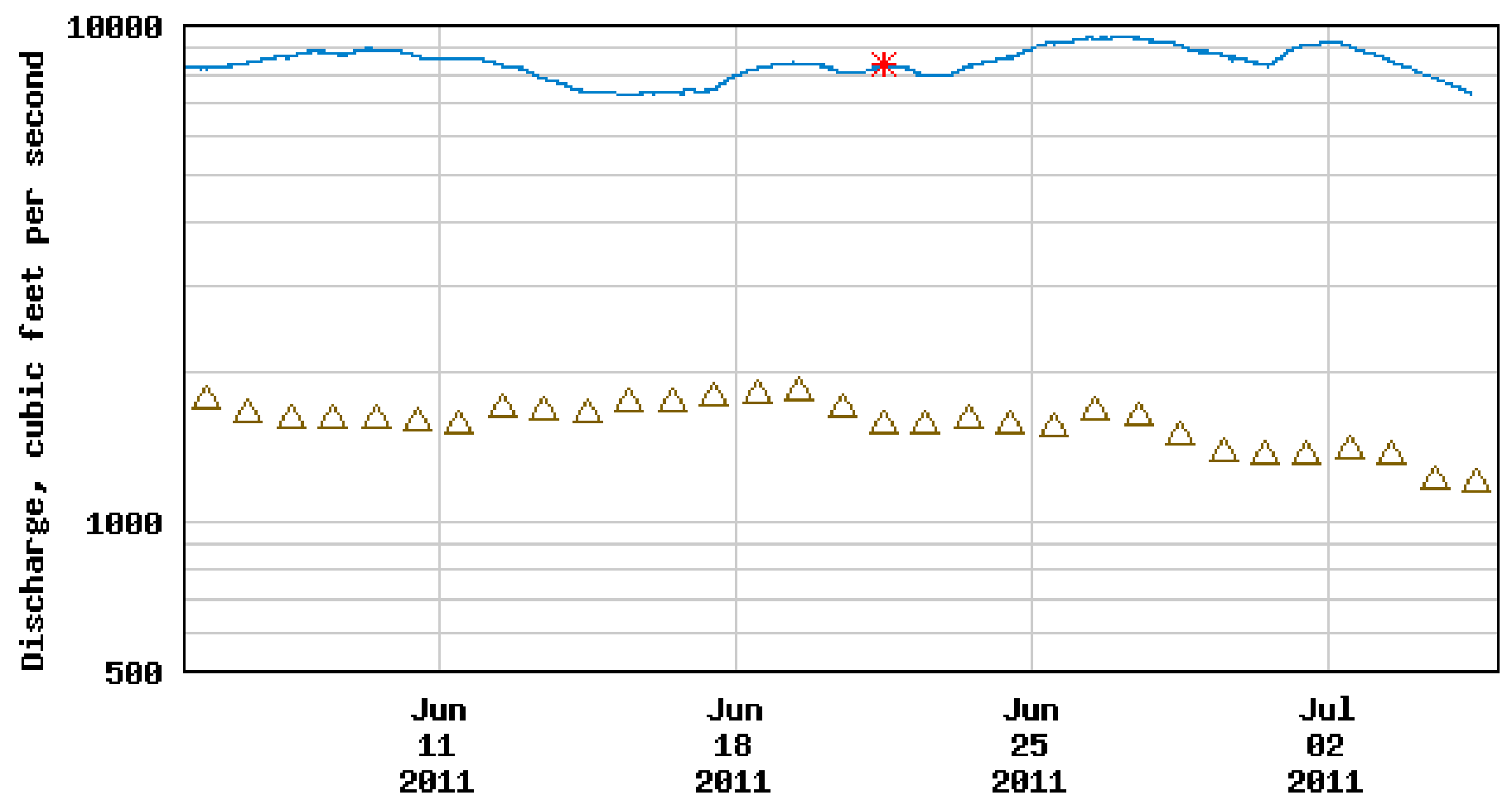
USGS 09260050 YAMPA RIVER AT DEERLODGE PARK, CO






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

- △ Median daily statistic (26 years) * Measured discharge
- Discharge

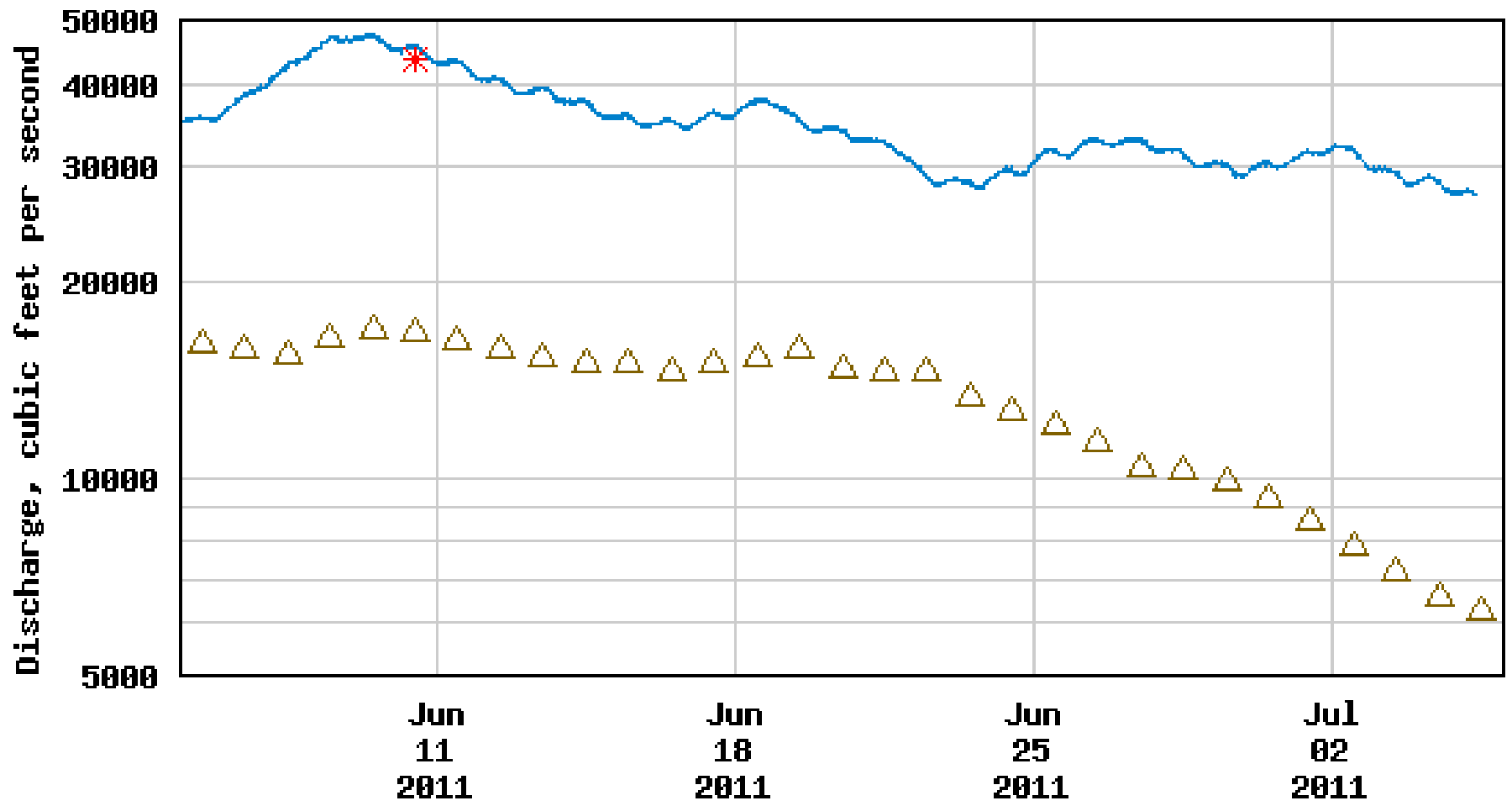
USGS 09058000 COLORADO RIVER NEAR KREMMLING, CO



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

-  Median daily statistic (48 years)
-  Measured discharge
-  Discharge

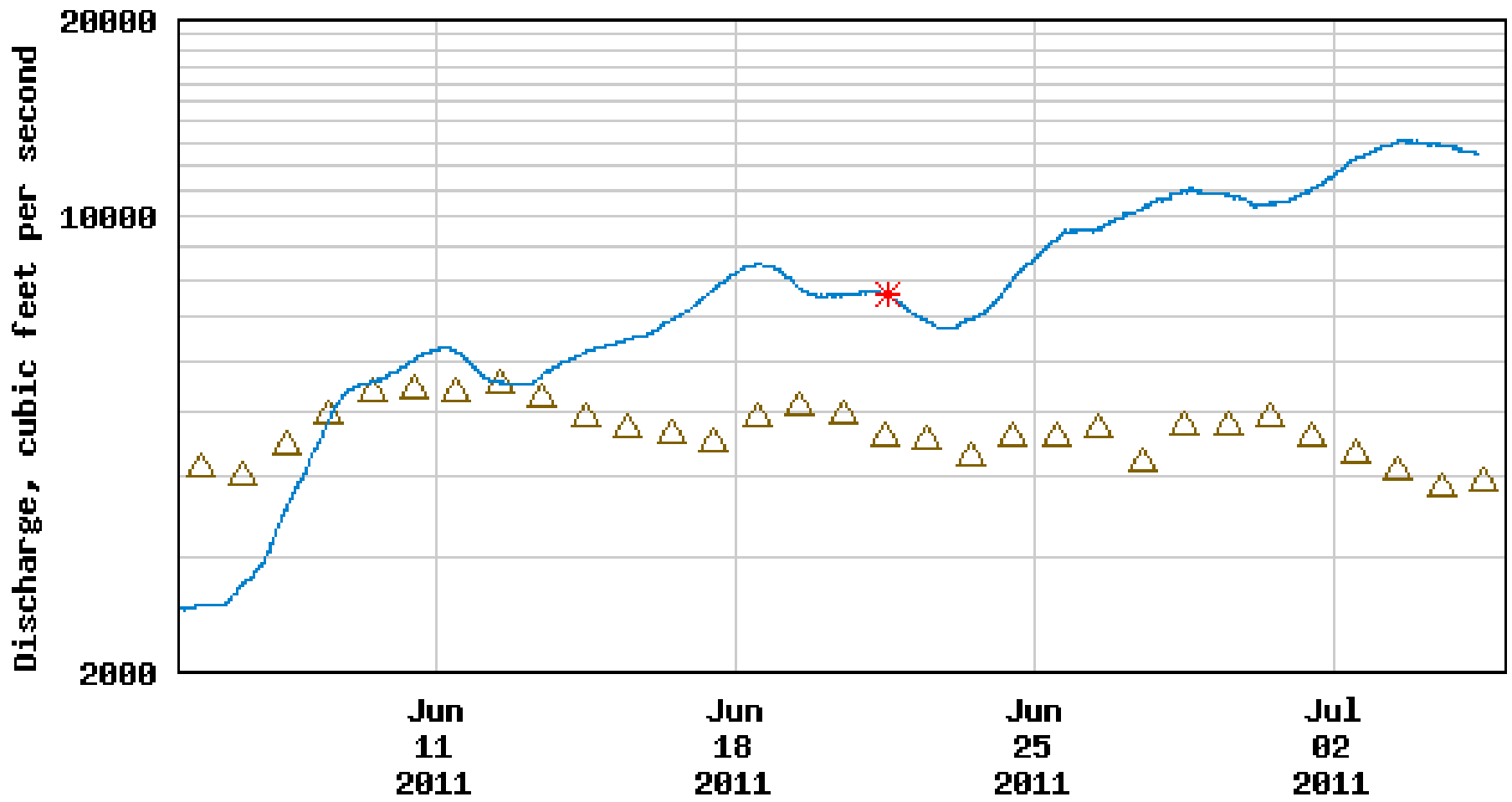
USGS 09163500 COLORADO RIVER NEAR COLORADO-UTAH STATE LINE



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

- △ Median daily statistic (60 years)
- * Measured discharge
- Discharge

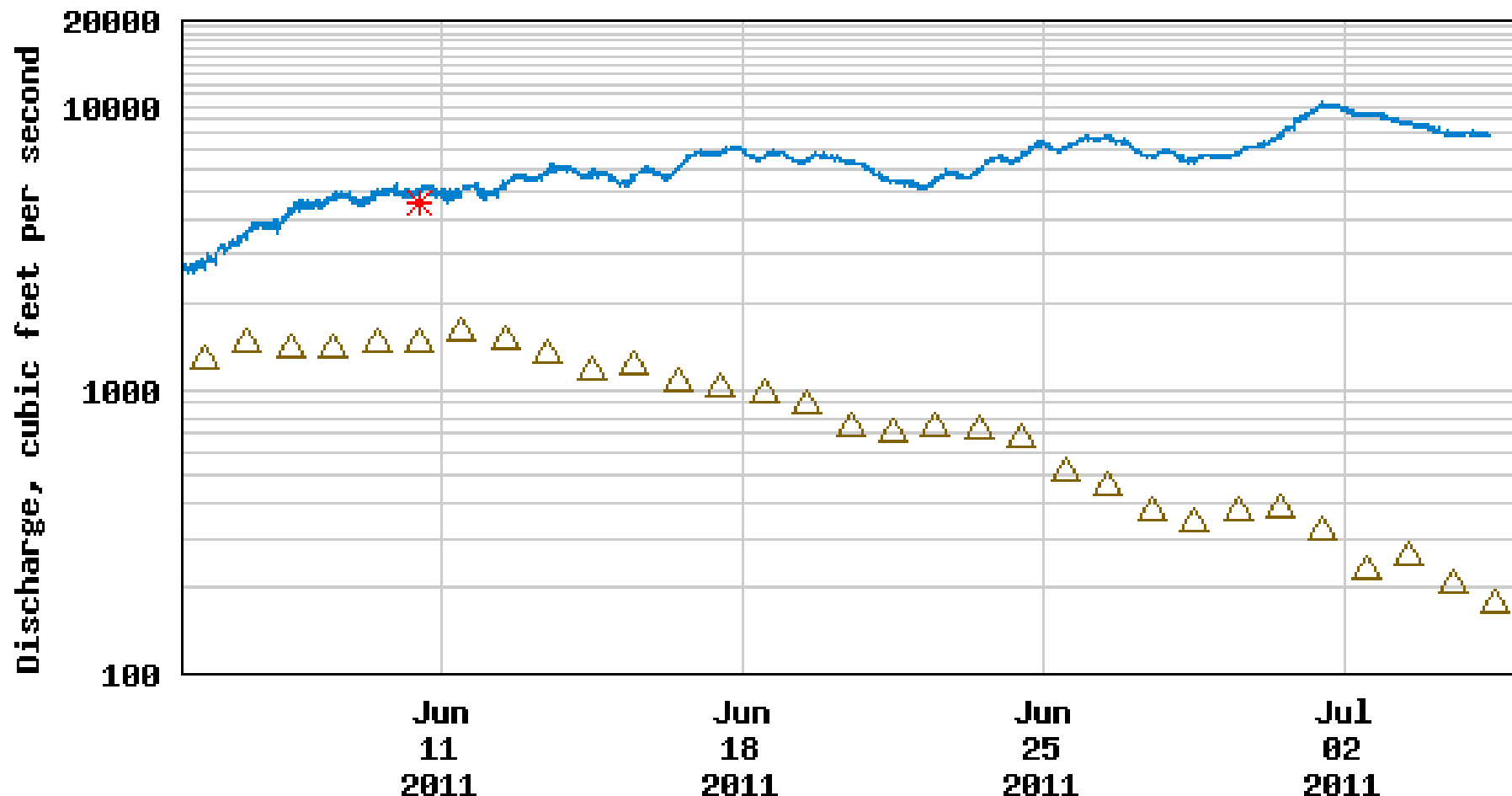
USGS 09209400 GREEN RIVER NEAR LA BARGE, WY





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

- △ Median daily statistic (47 years)
- * Measured discharge
- Discharge

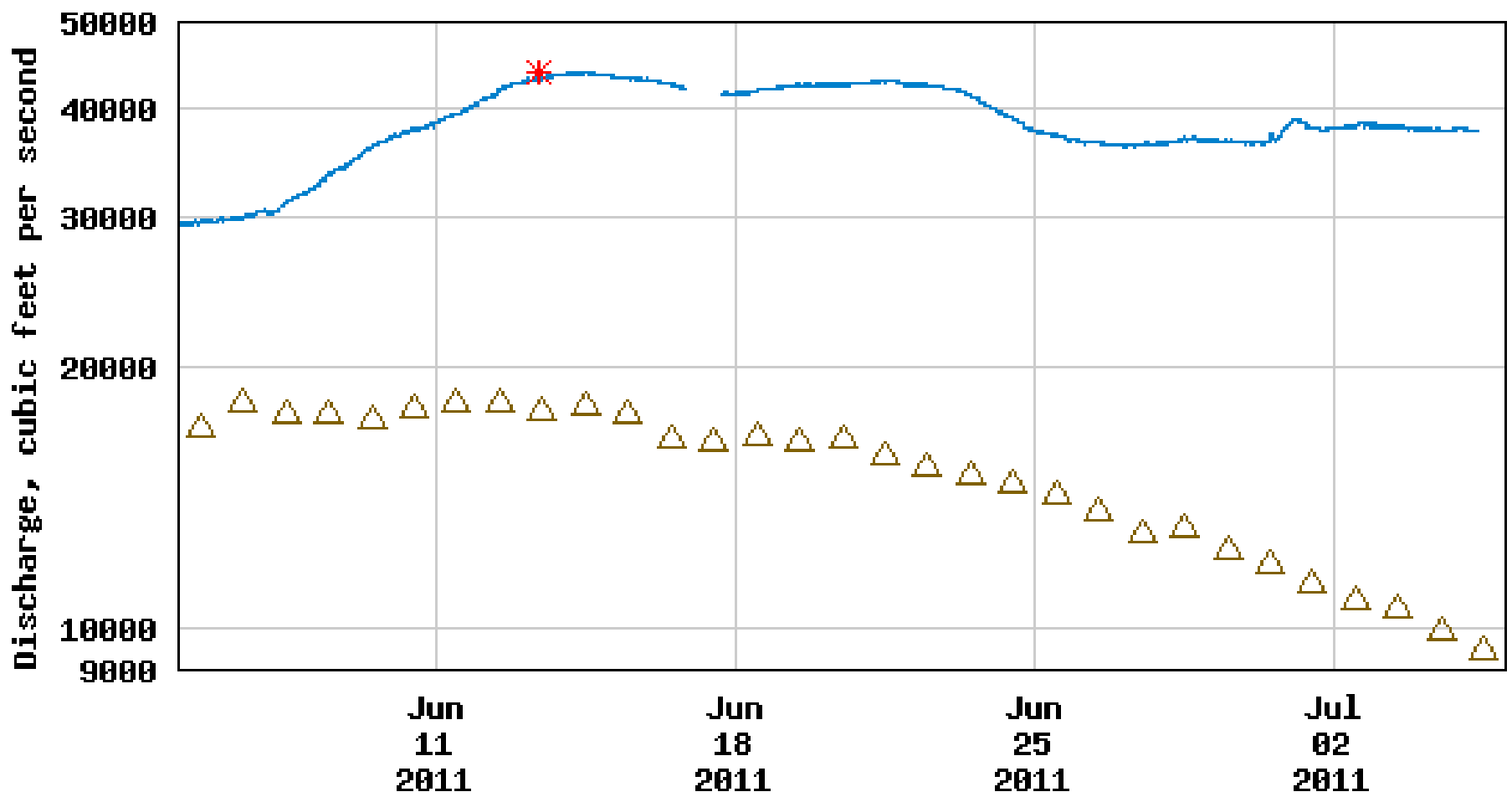
USGS 09302000 DUCHESNE RIVER NEAR RANDLETT, UT



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

-  Median daily statistic (68 years) * Measured discharge
-  Discharge

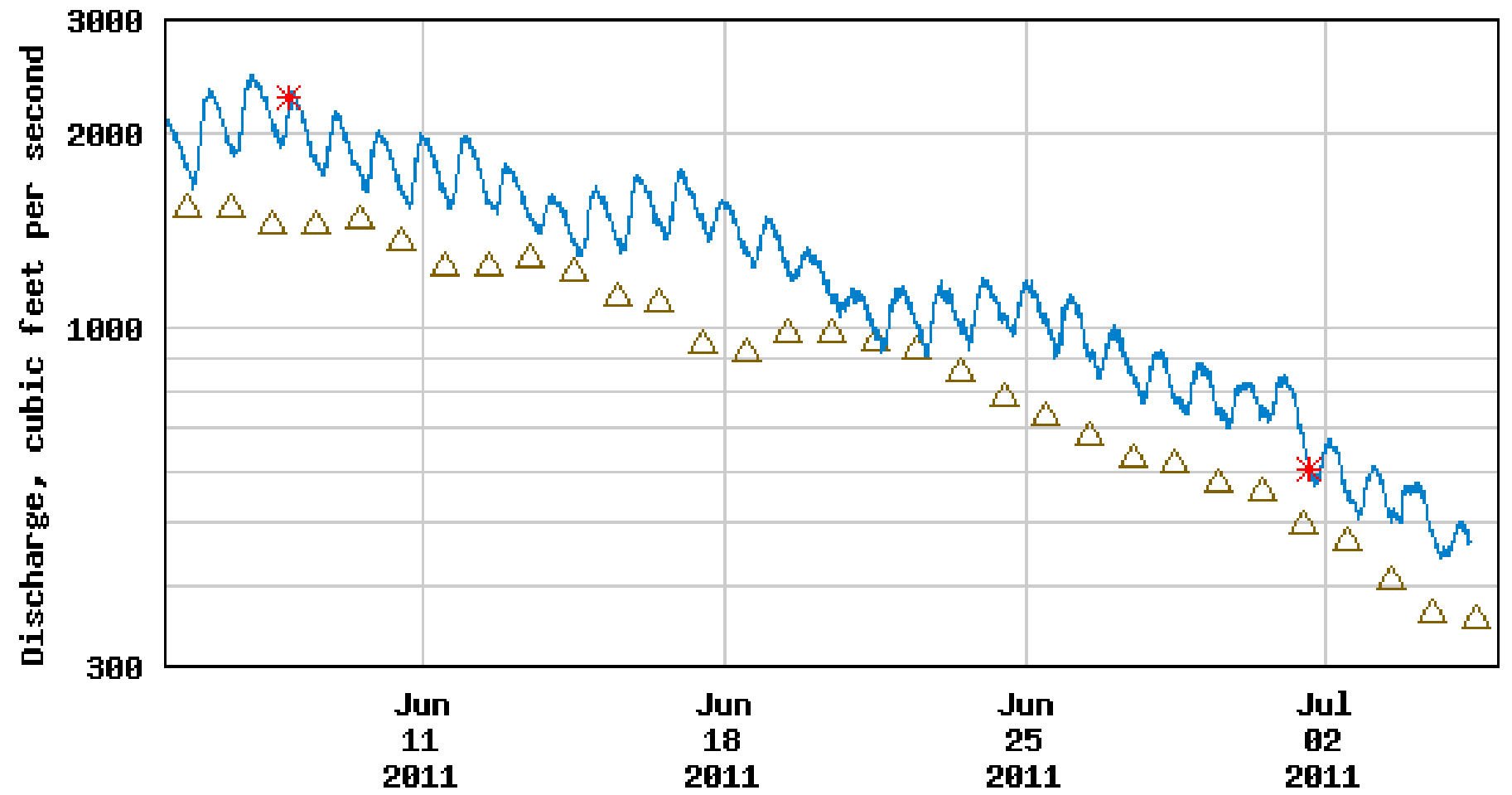
USGS 09315000 GREEN RIVER AT GREEN RIVER, UT



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

- △ Median daily statistic (111 years)
- * Measured discharge
- Discharge

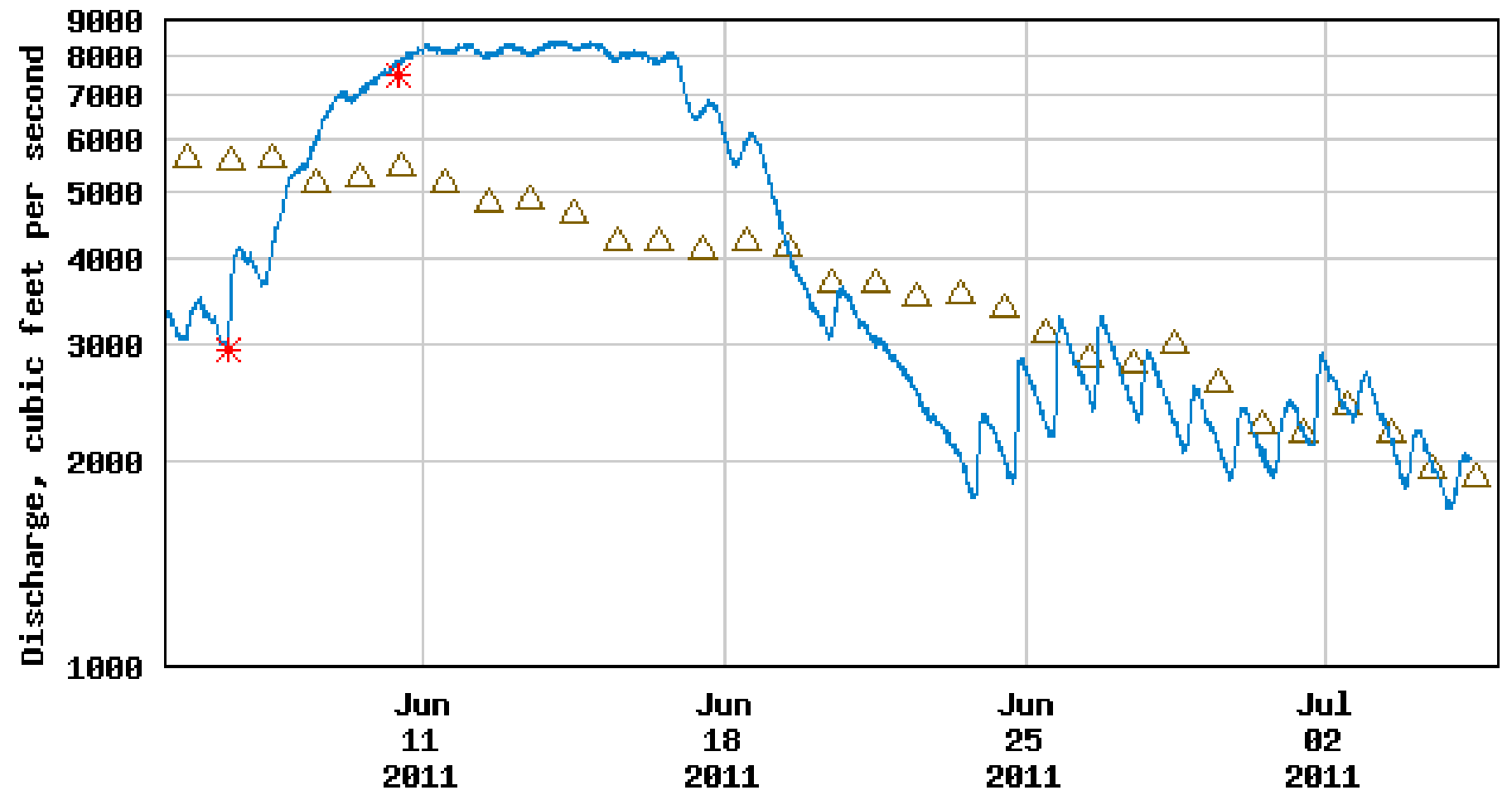
USGS 09342500 SAN JUAN RIVER AT PAGOSA SPRINGS, CO



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

- △ Median daily statistic (75 years)
- * Measured discharge
- Discharge

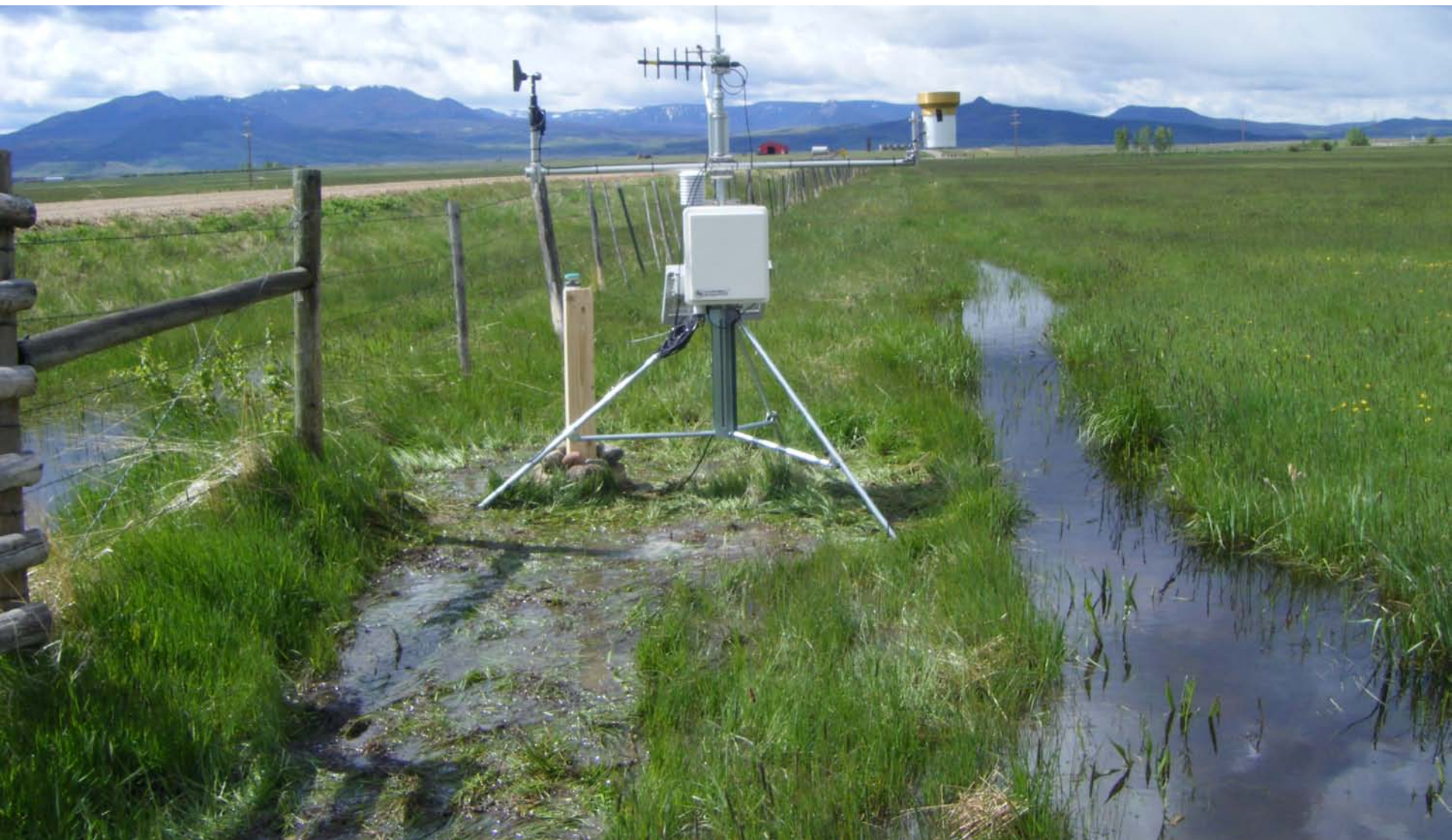
USGS 09379500 SAN JUAN RIVER NEAR BLUFF, UT



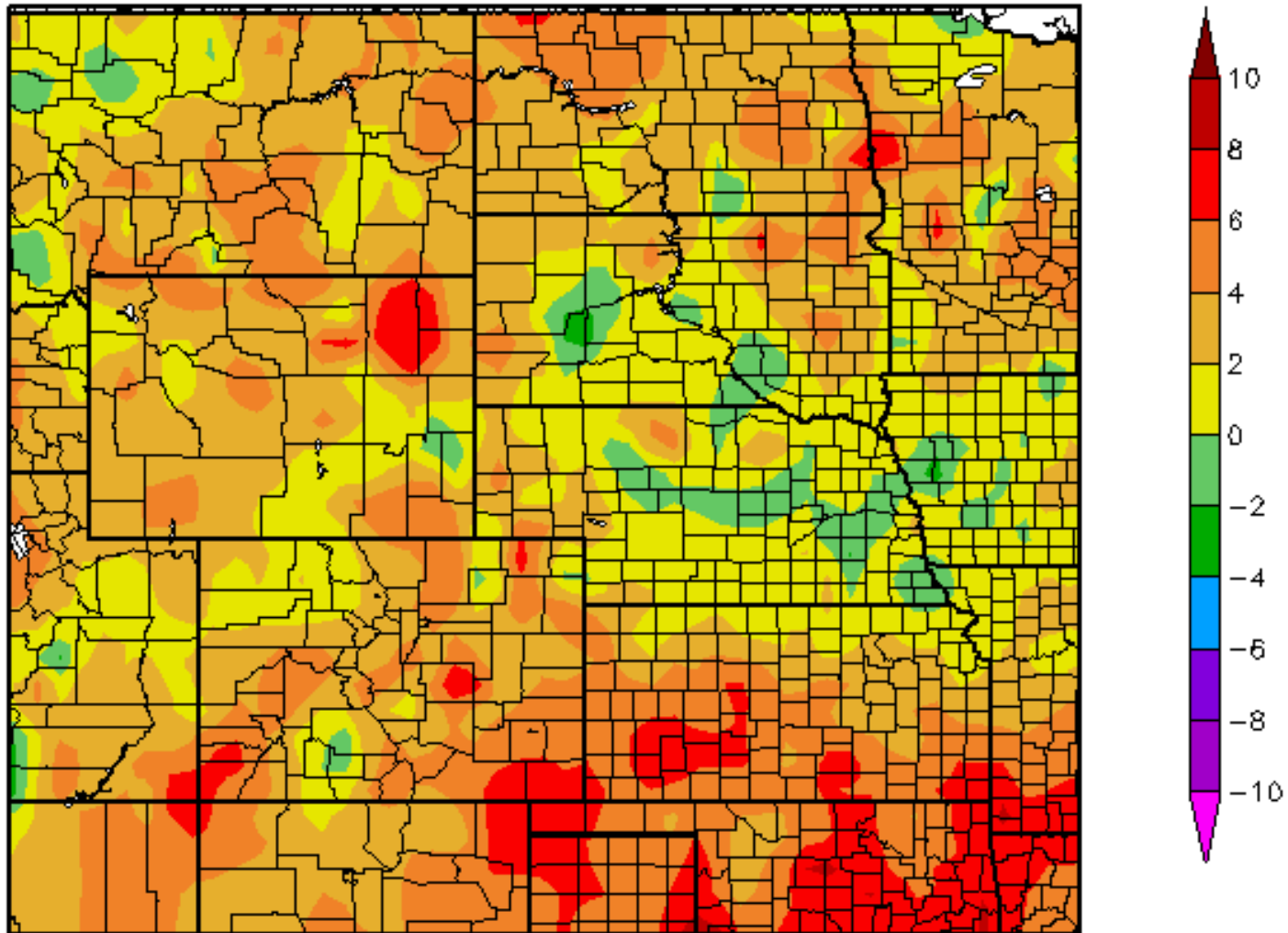
---- Provisional Data Subject to Revision ----

- △ Median daily statistic (87 years)
- * Measured discharge
- Discharge

Water Demand



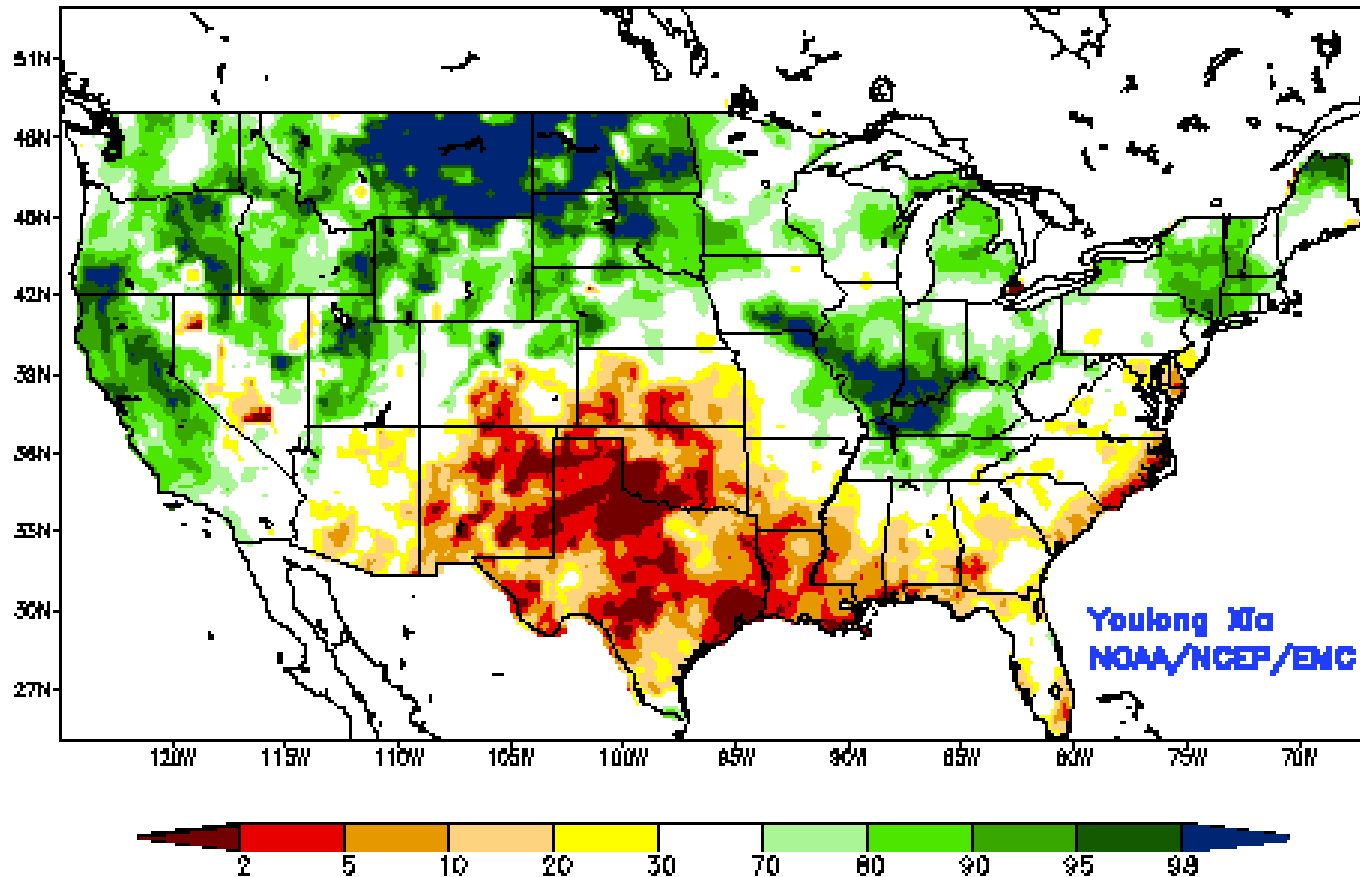
Temperature Departure from Normal 06/28/2011 – 07/04/2011



NLDAS Soil Moisture

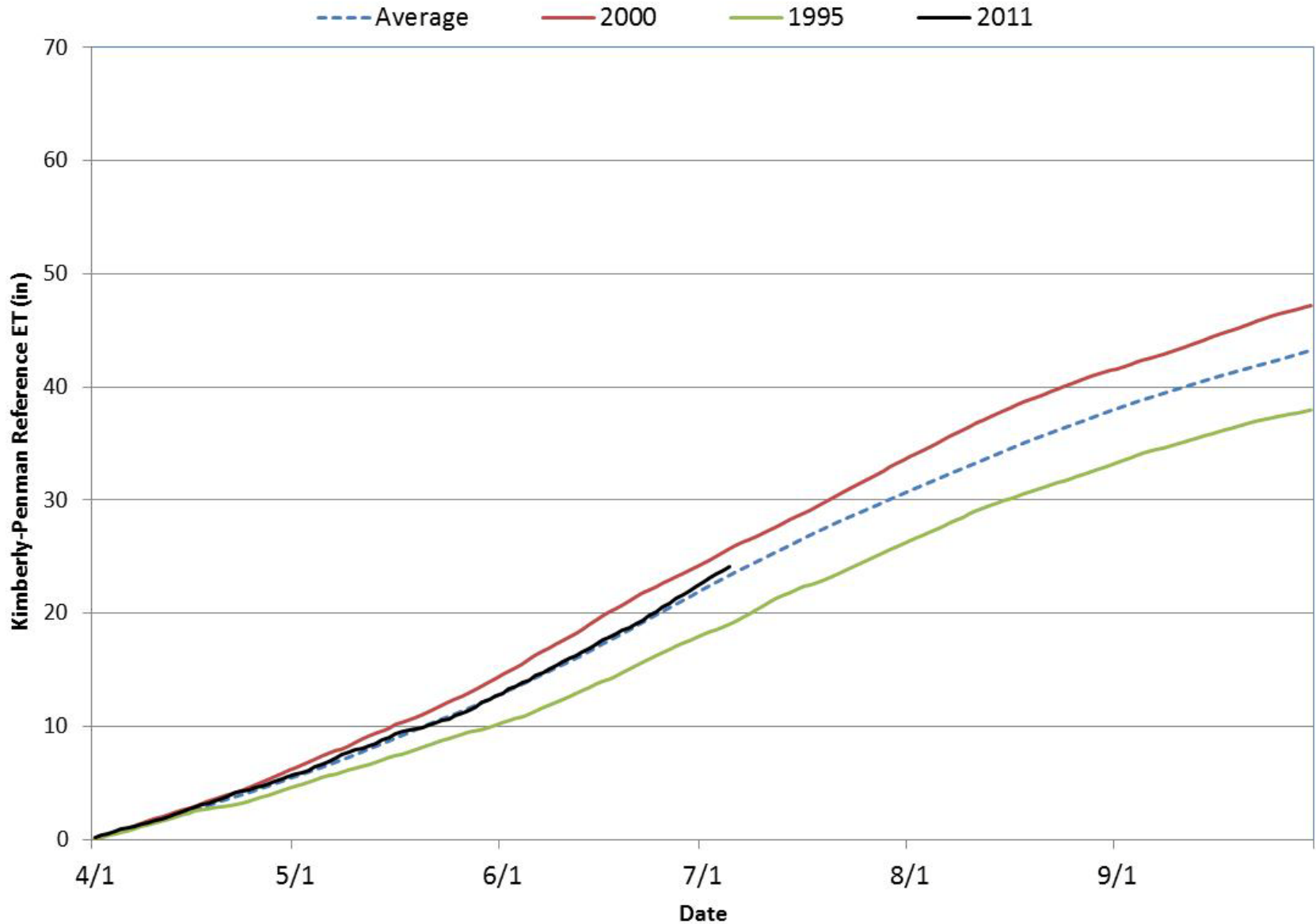
30 June 2011

Ensemble-Mean - Current Total Column Soil Moisture Percentile
NCEP NLDAS Products Valid: JUN 30, 2011



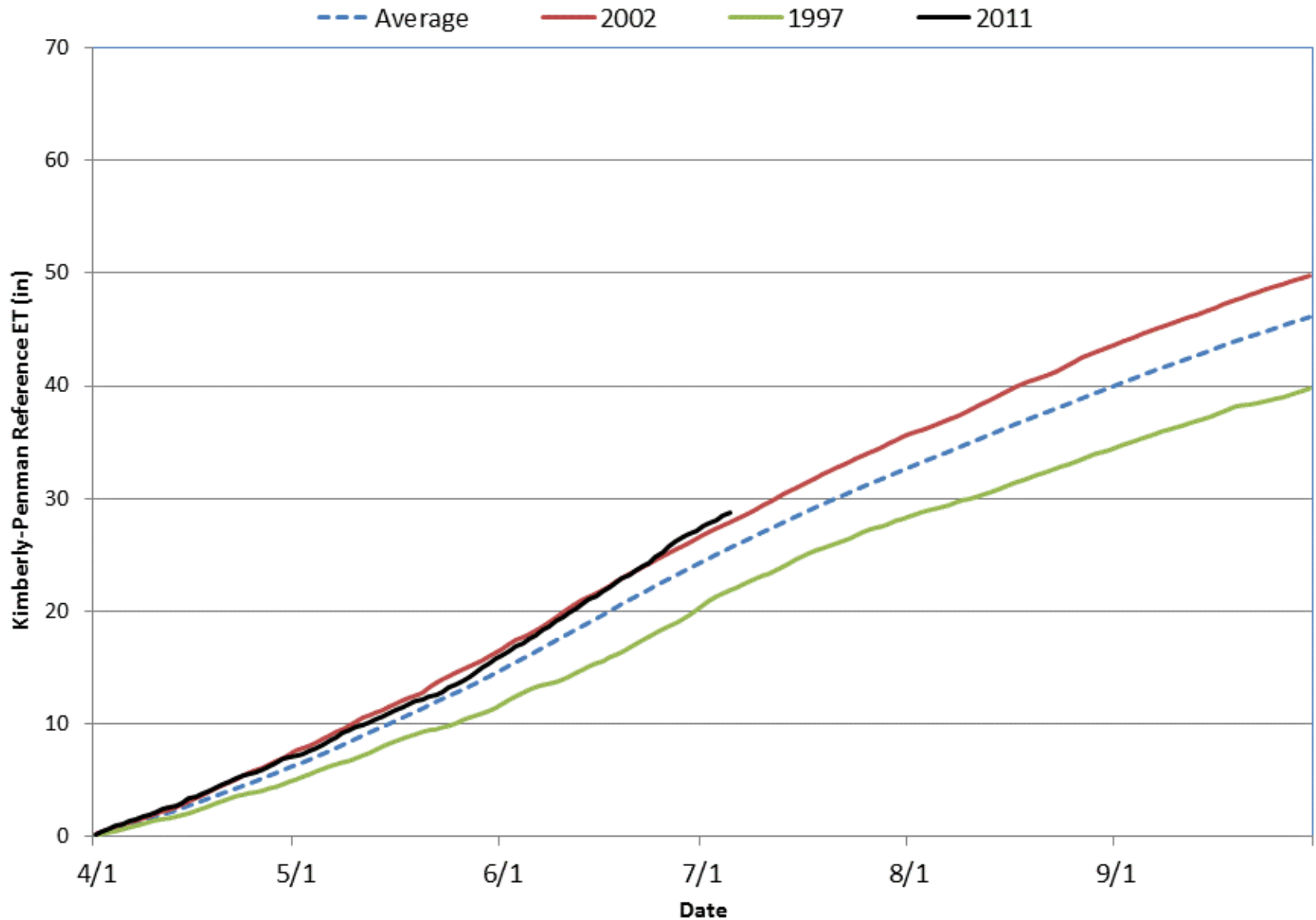
Cortez Reference ET – SW CO

CTZ01 Kimberly-Penman Reference ET (1992 - 2011)



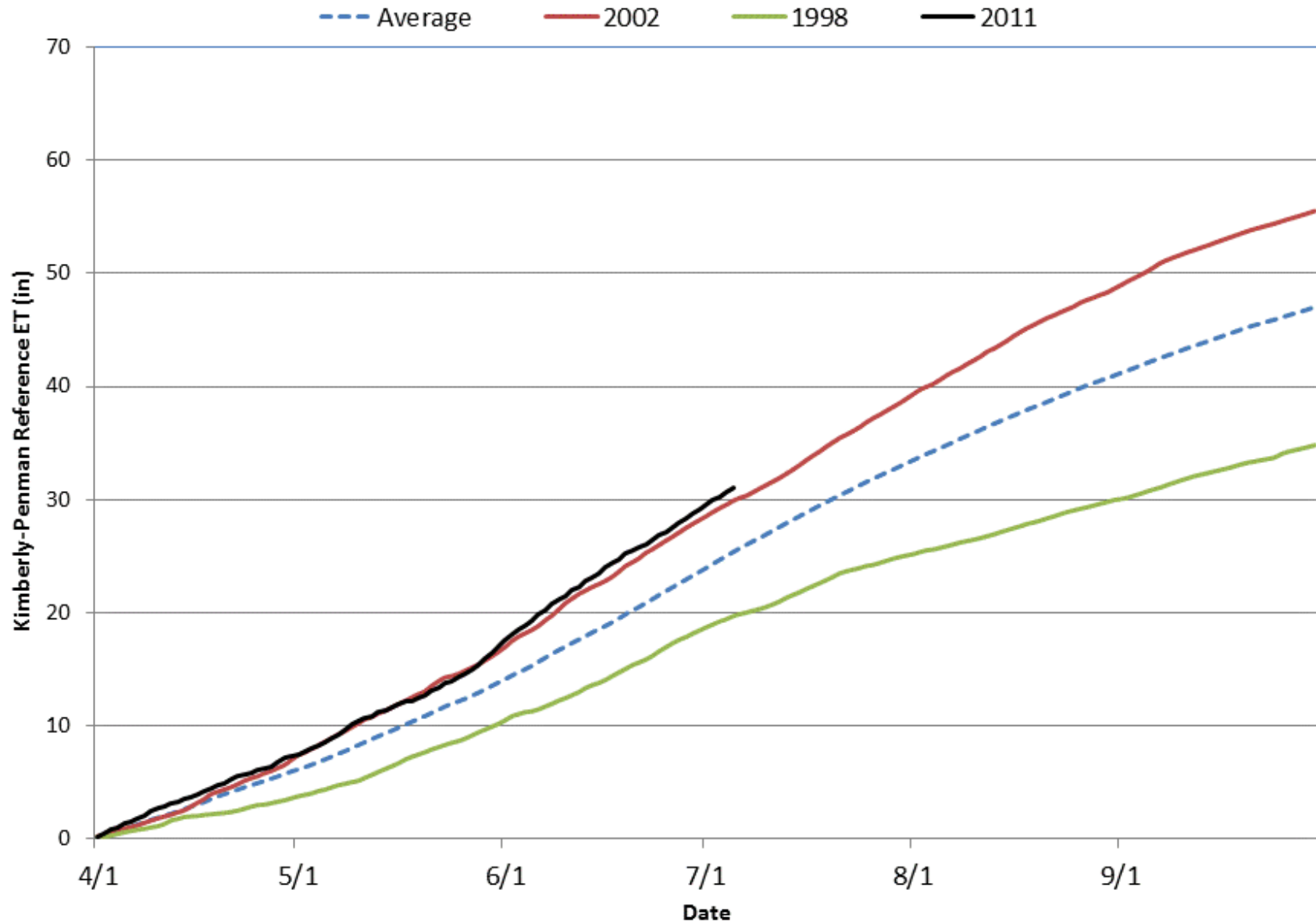
Center Reference ET - SLV

CTR01 Kimberly-Penman Reference ET (1994 - 2011)



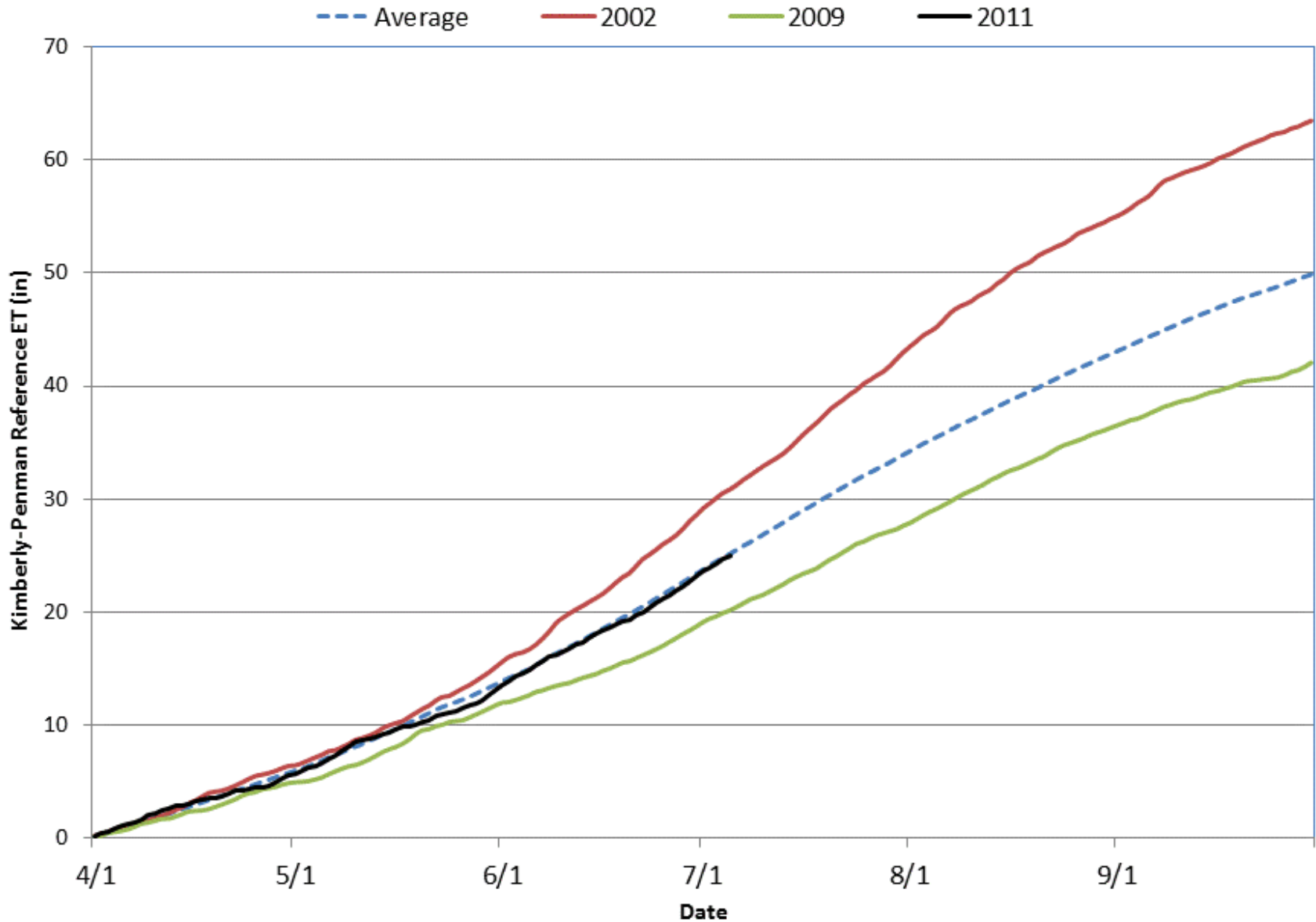
Avondale Reference ET – AR Basin

AVN01 Kimberly-Penman Reference ET (1993 - 2011)



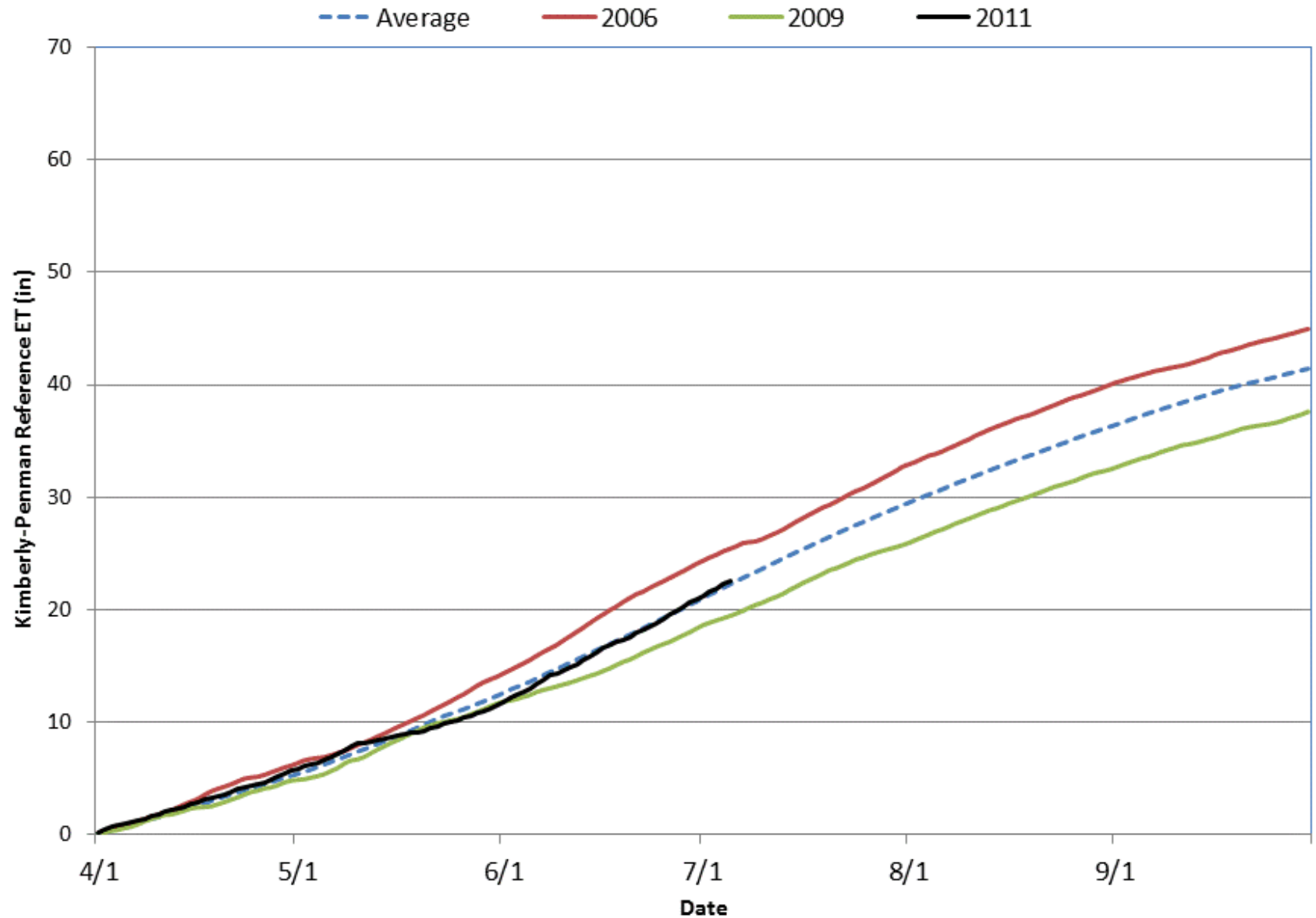
Idalia Reference ET – Eastern CO

IDL01 Kimberly-Penman Reference ET (1992 - 2011)



Lucerne Reference ET – N. Front Range

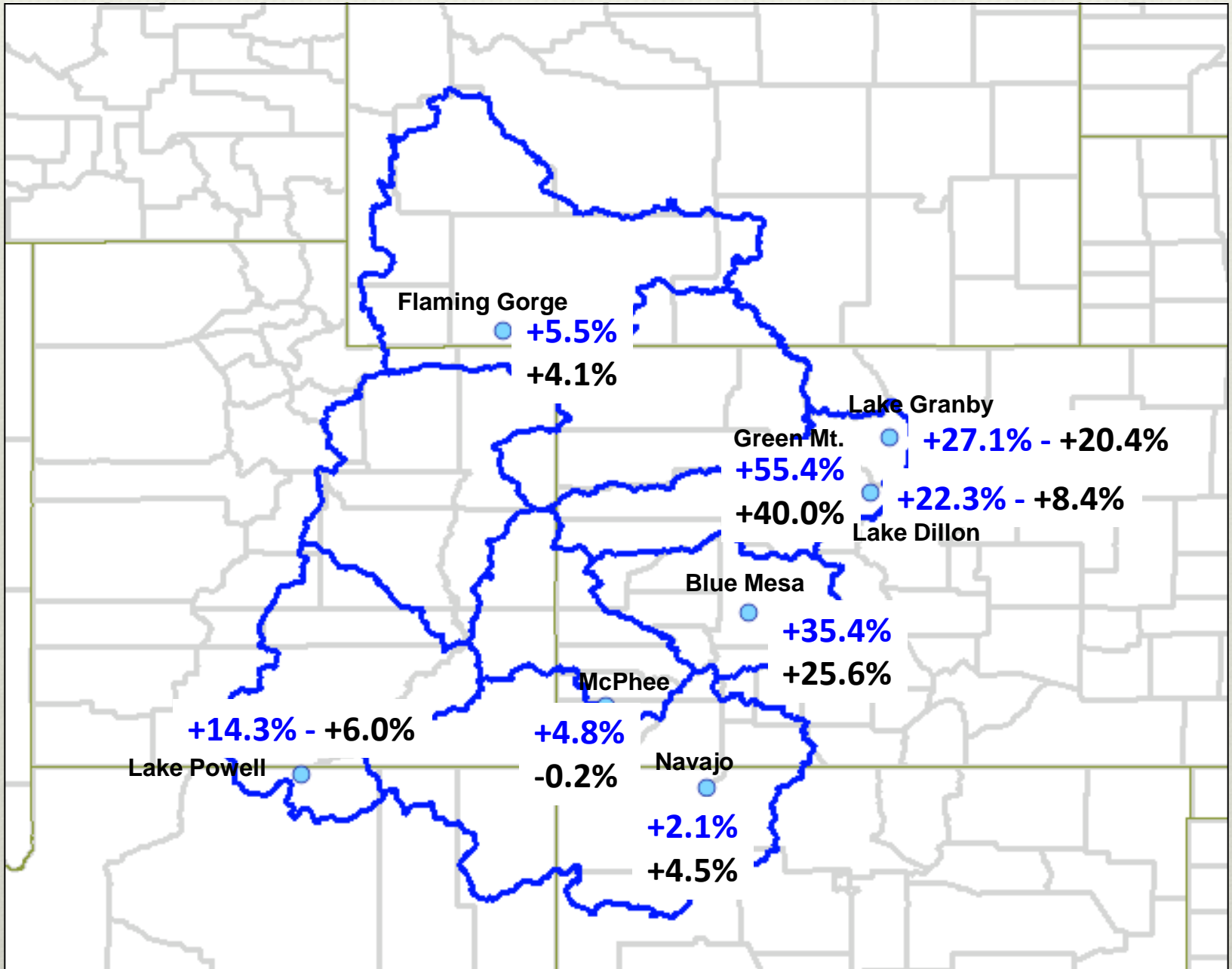
LCN01 Kimberly-Penman Reference ET (1992 - 2011)



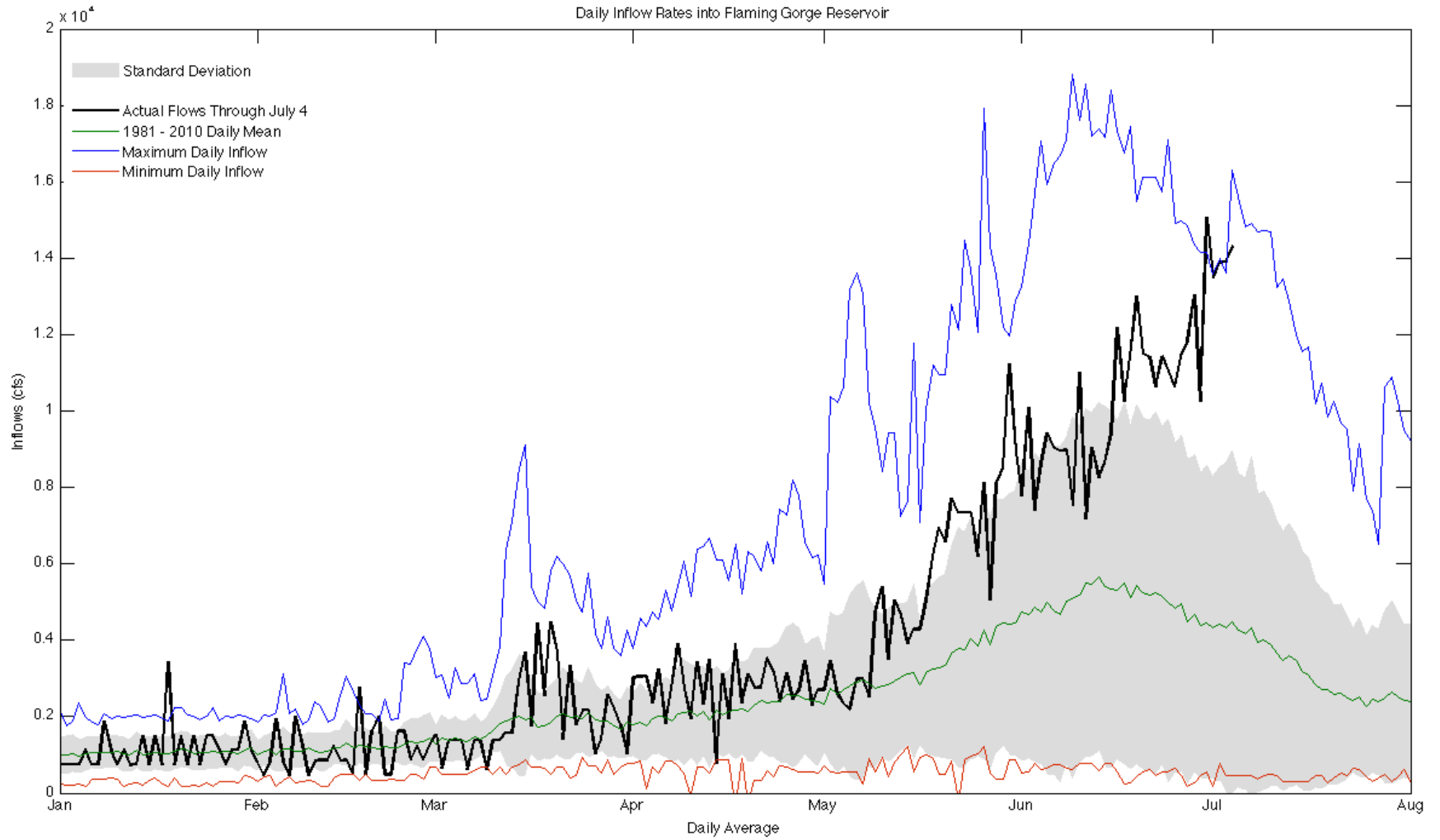
Reservoir Update



June Reservoir Storage Volume Change

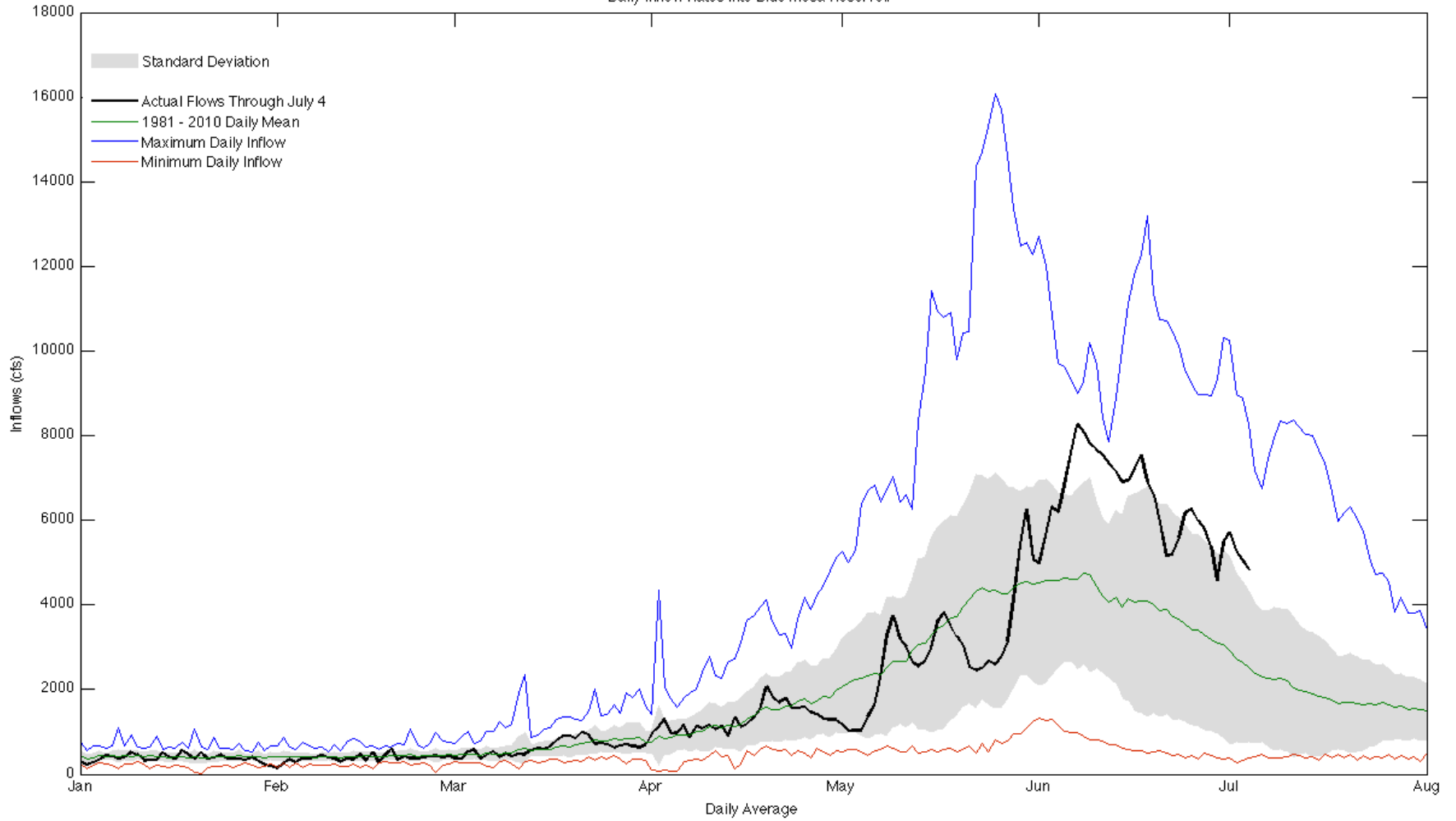


Flaming Gorge Reservoir Inflows as of 7/4/2011



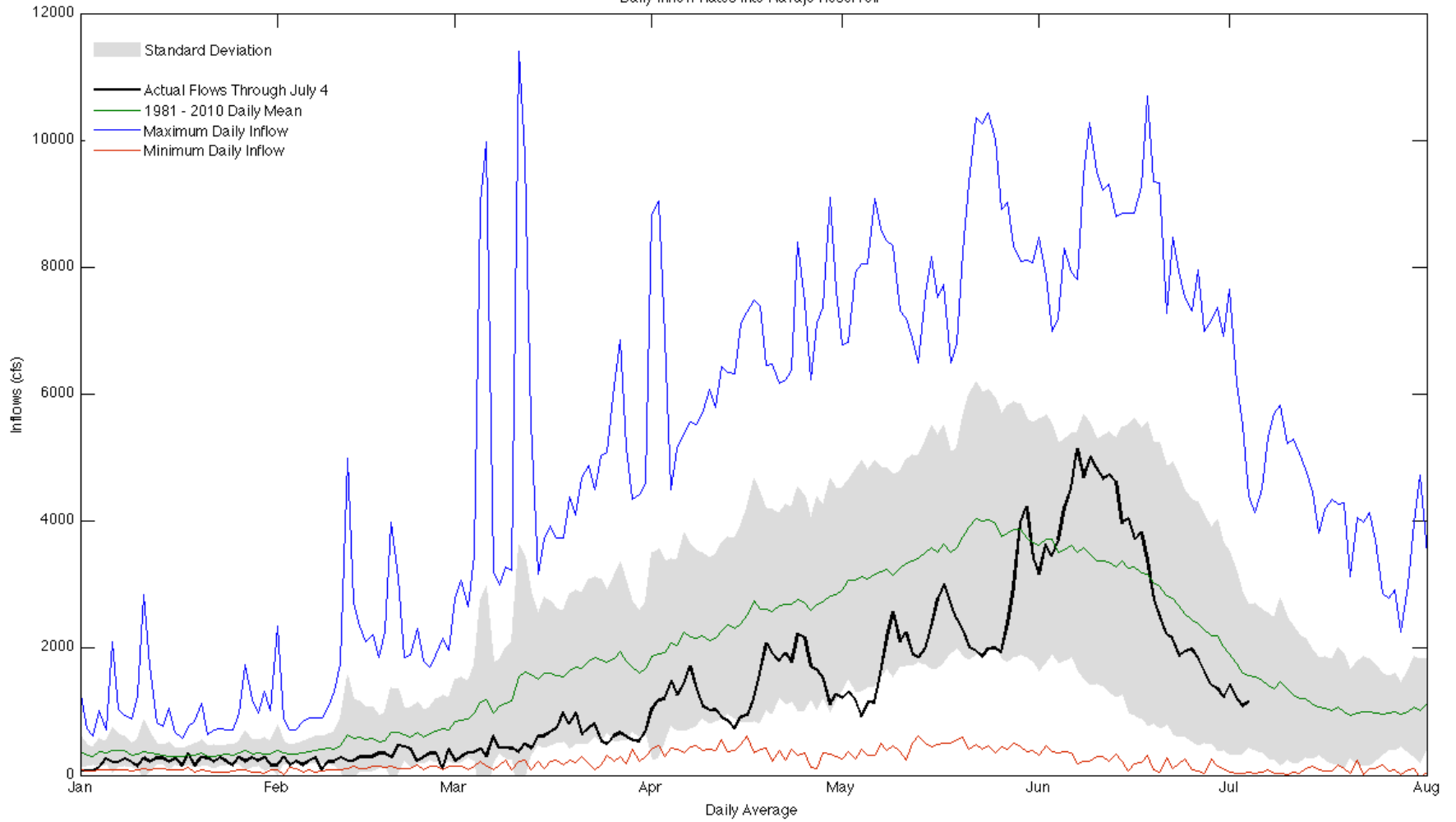
Blue Mesa Reservoir Inflows as of 7/4/2011

Daily Inflow Rates into Blue Mesa Reservoir

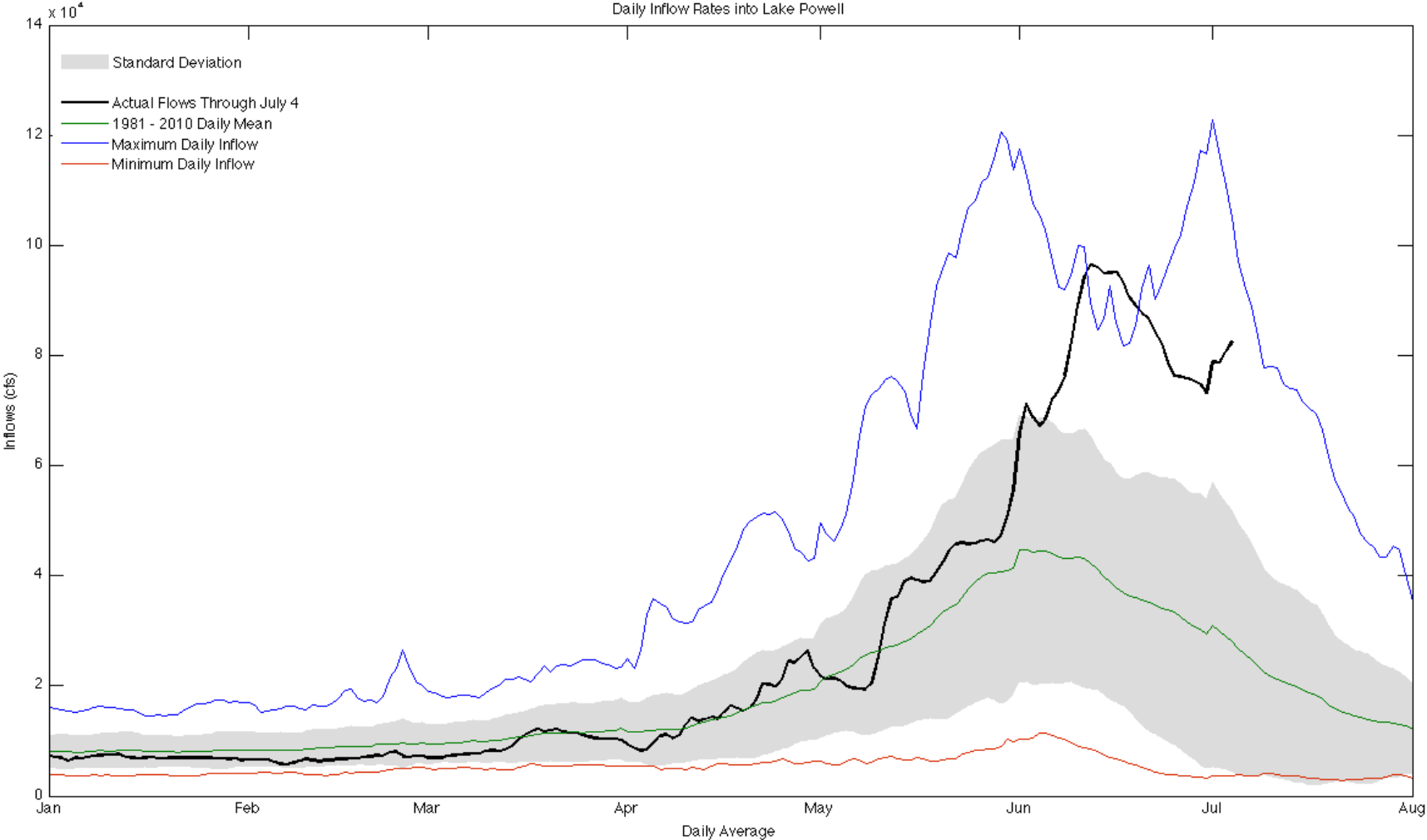


Navajo Reservoir Inflows as of 7/4/2011

Daily Inflow Rates into Navajo Reservoir

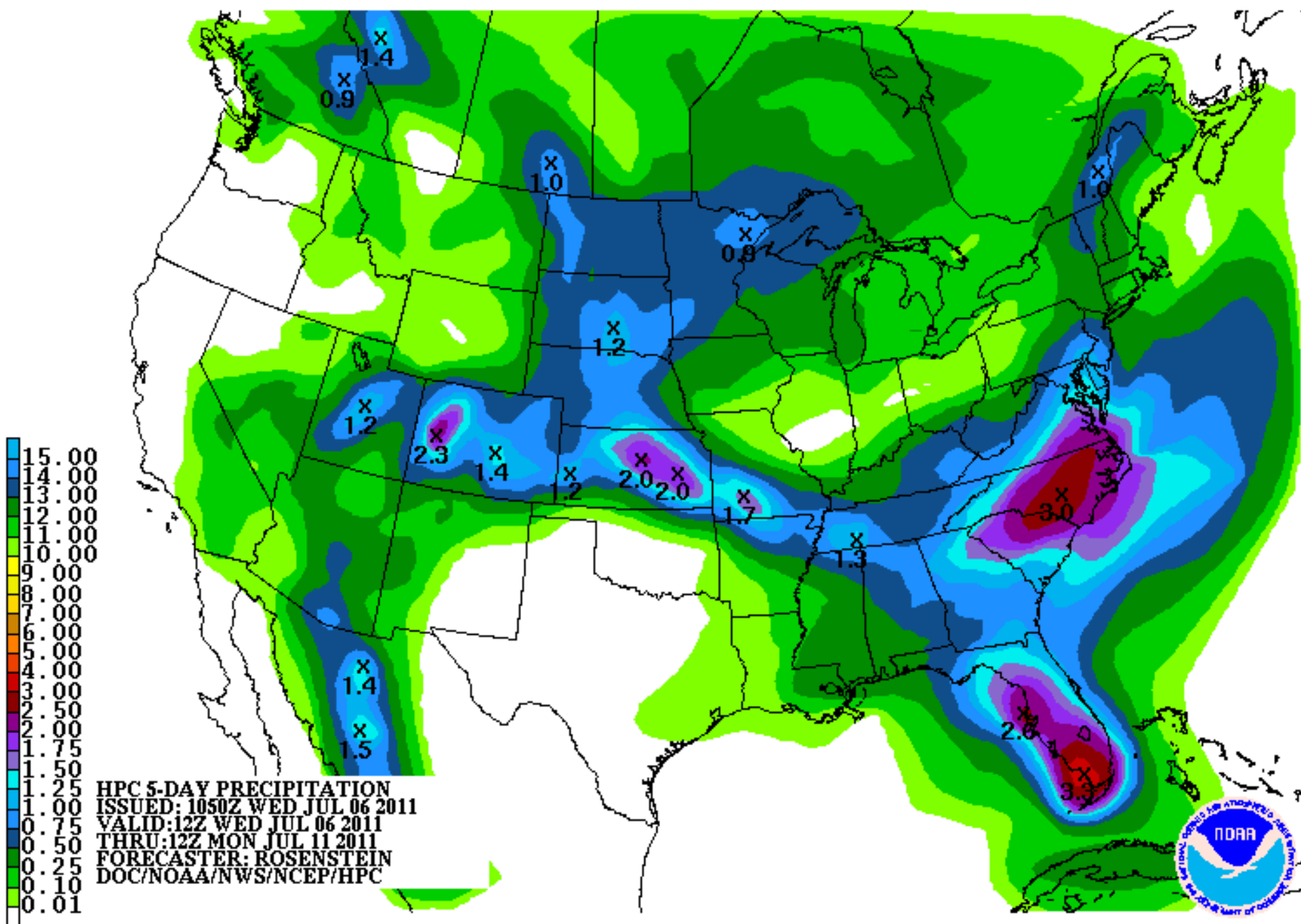


Lake Powell Inflows as of 7/4/2011

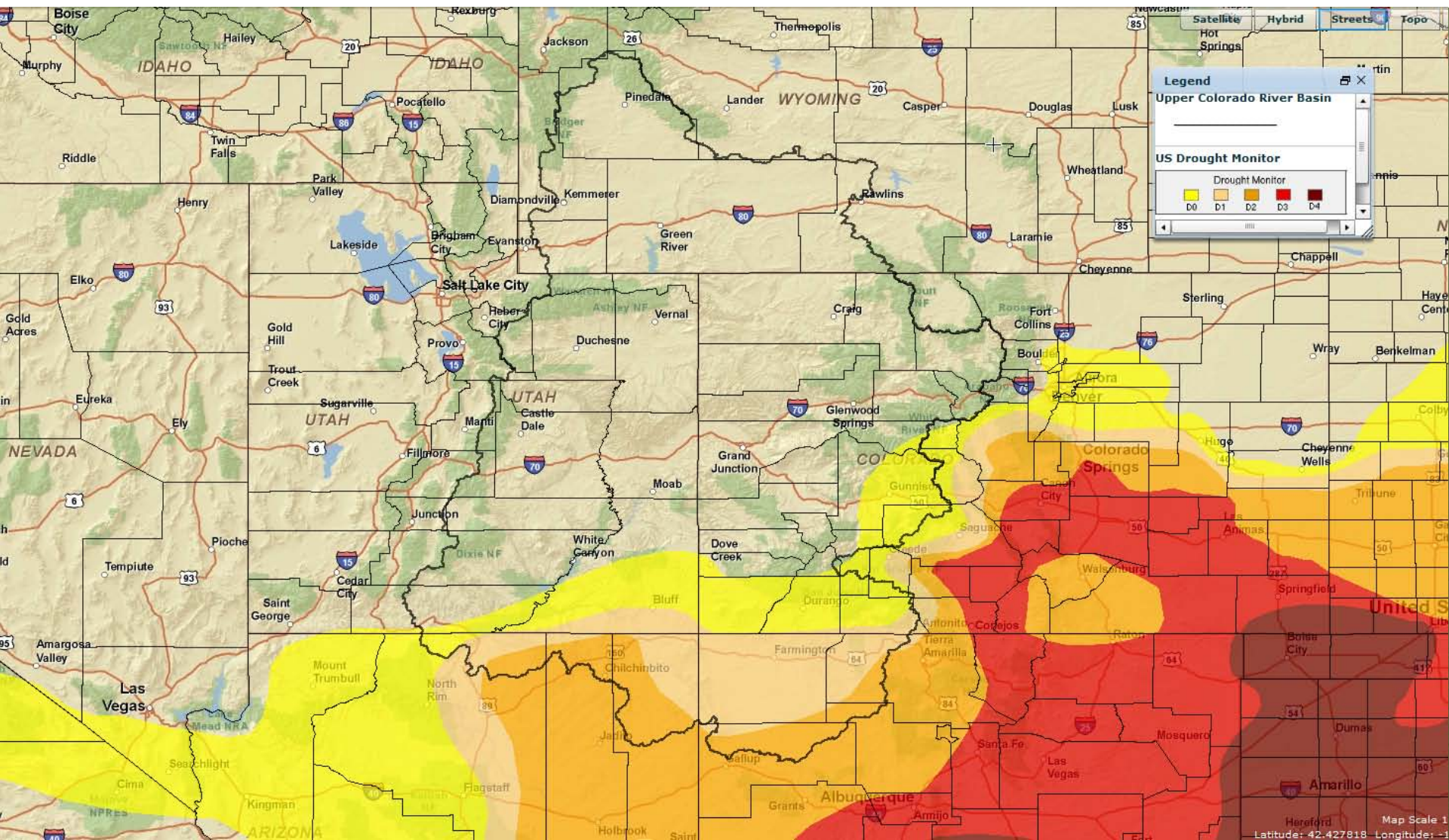


Precipitation Forecast





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

July 6, 2011

Precipitation and Snowpack

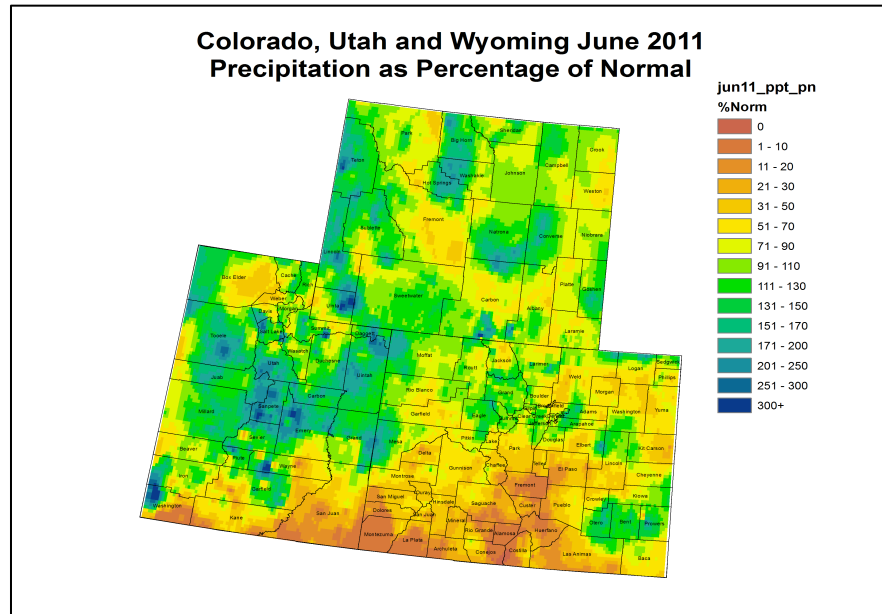


Fig. 1: June precipitation as a percent of average.

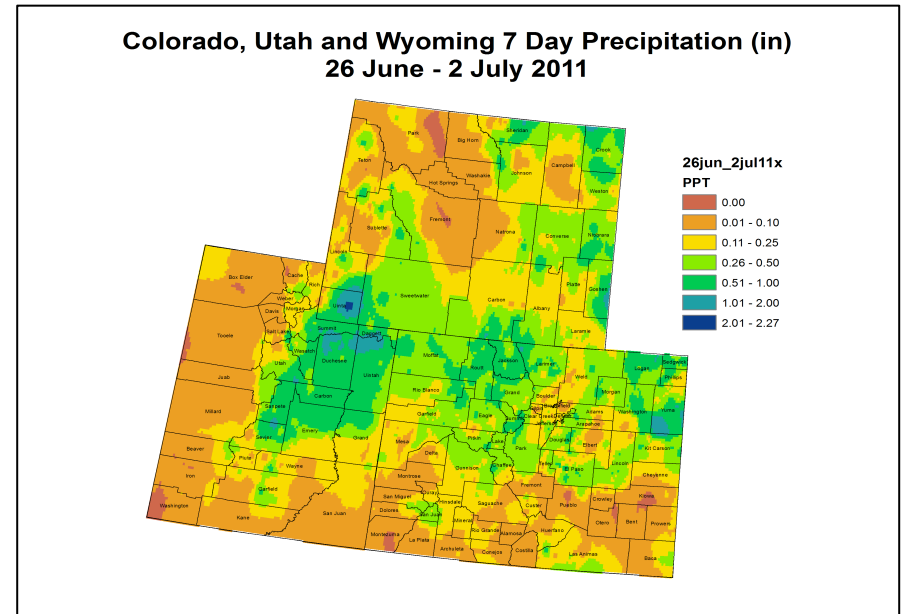


Fig. 2: June 26 – July 2 precipitation in inches.

For the month of June, much of the northern portions of the Upper Colorado River Basin (UCRB) received between 100% to 200% of their average precipitation (Fig. 1). The Four Corners was the driest region of the basin for the month, receiving less than 30% of average. The San Luis Valley was also very dry for the month, only seeing about 10% of its average precipitation. Much of eastern Colorado received between 50% and 100% of average precipitation for the month, with parts of southeastern CO seeing over 100% of average from just a couple of storms.

Last week, the heaviest amounts of precipitation fell over northeast Utah and southwest Wyoming with amounts totalling between half an inch to over 2 inches in some spots (Fig. 2). The mountains of northern CO and northeast CO received between a quarter inch to an inch of moisture for the week. The drought stricken areas in the southern portion of the UCRB and in southern CO remained dry, seeing less than a tenth of an inch over the week.

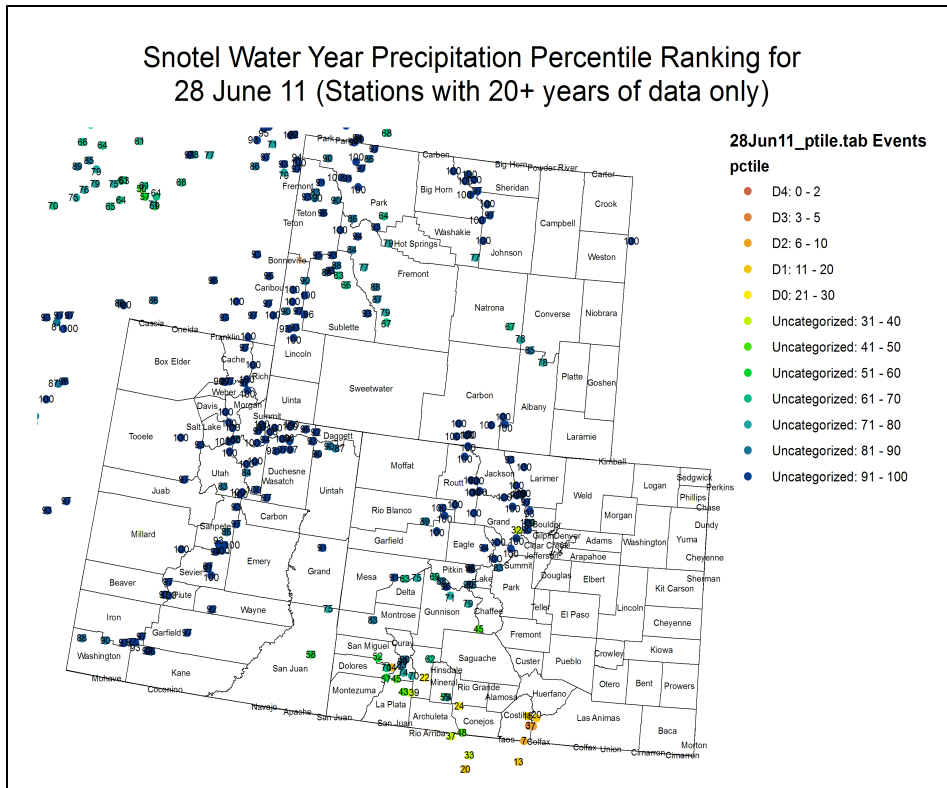


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21-30% is Drought Monitor’s D0 category).

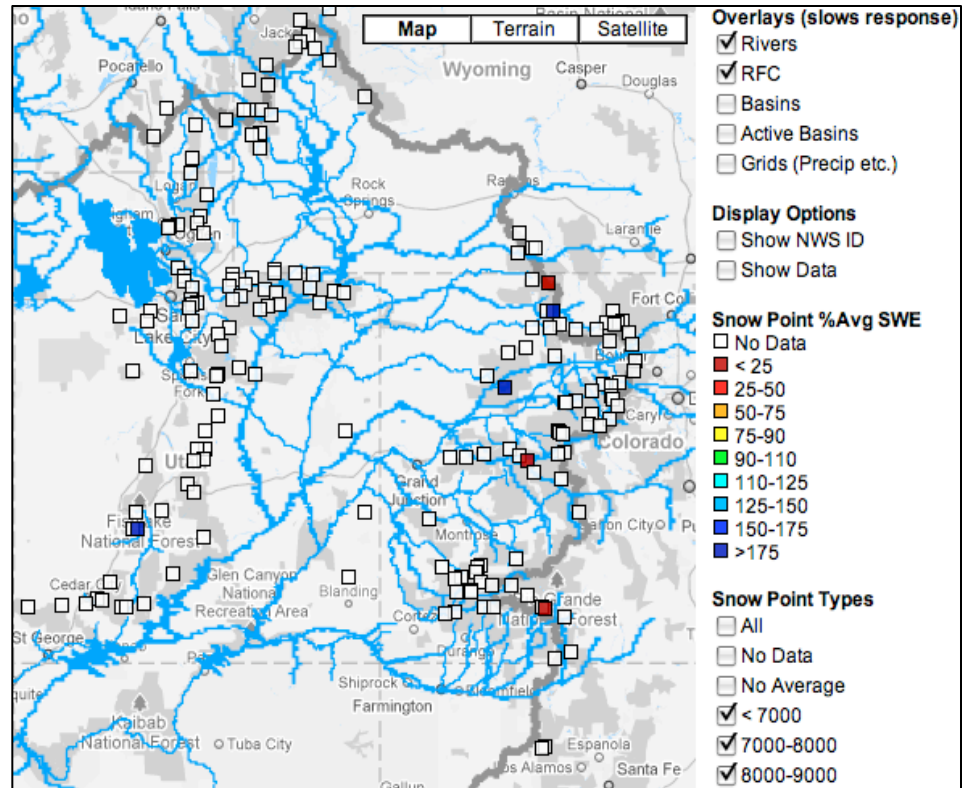


Fig. 4: SNOTEL WYTD accumulated snow water equivalent as a percent of average.

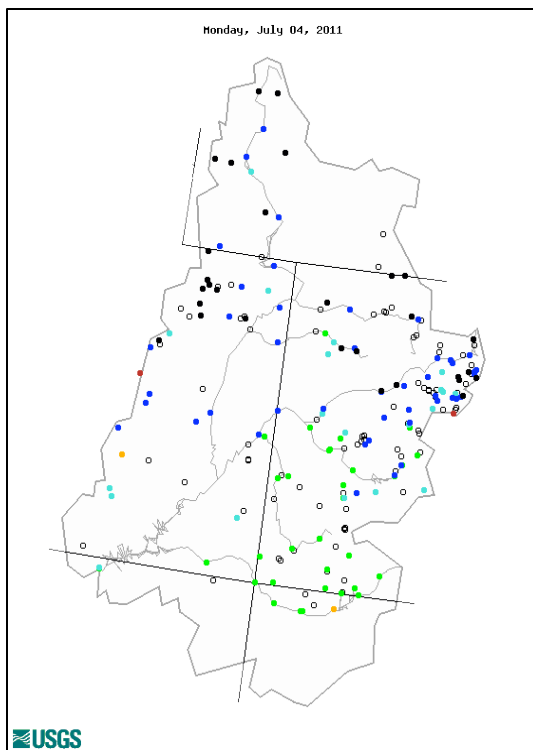
The majority of the SNOTEL sites in the UCRB are showing very high (and in many cases, record high) percentile rankings for water-year-to-date (WYTD) precipitation (Fig. 3). The Rio Grande and San Juan basins in southern CO are the driest, though the higher elevations of the San Juan basin have improved somewhat from the earlier part of the water year. Several sites in the Sangre de Cristos show percentiles worthy of D1 – D2.

After a near record season high for snowpack in the UCRB, the majority of the SNOTEL sites have now completely melted their accumulated snowpack for the season (Fig. 4 – white squares indicate sites that have completely melted out). Only a few higher elevation sites have remaining snowpack left on them– the Tower site in the Yampa River basin still has over 30 inches of snow water equivalent.

Streamflow

As of July 4th, about 95% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows with over 70% of the gages recording flows above the 75th percentile (Fig. 5). As of July 5th, 1 gage was still exceeding the National Weather Service flood stage—the Green River at Green River, UT site. Many of the gages in the northern part of the UCRB are still recording real-time flows at or above the 99th percentile, while flows in the southern part of the basin have receded.

Key gages on the Colorado River near the CO-UT state line and the Green River at Green River, UT have above normal 7-day average streamflow at the 93rd and 96th percentiles, respectively (Fig. 6). Streamflow on the San Juan River near Bluff, UT is at the 47th percentile. Flows on the San Juan had decreased as a response to the decreased releases from Navajo combined with the lower snowpack now being completely melted out.



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 July 4th.

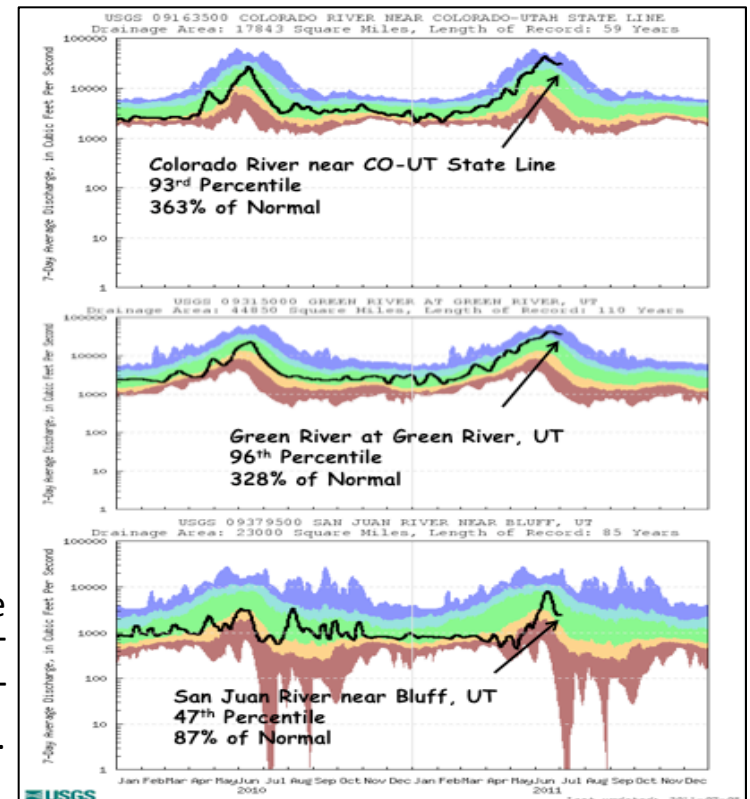


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Last week, above average temperatures were seen across most of the UCRB and eastern plains of CO. Much warmer temperatures (6° to 8° above average) were observed over the Four Corners and southeastern CO. Soil moisture conditions remain poor for the San Luis Valley. Soil moisture is above average along the Wasatch range in UT, in the northern CO mountains, and in northeast CO (Fig. 7). Soil moisture models indicate improved conditions over southeast CO as a response to the one storm two weeks ago—these models are likely erroneously overestimating moisture that is not actually being observed in the region.

All of the major reservoirs in the UCRB have experienced rapid storage increases in June. Daily inflows into Flaming Gorge, Blue Mesa, and Lake Powell are all well above their averages for this time of year. Inflows into Navajo have dipped below their average for this time of year. Lake Powell has seen large increases in volume and is now at 83% of average. It is projected that Lake Powell's elevation will continue to rise through late July—projected elevation levels would be the highest they've been since October 2001.

Precipitation Forecast

Since the 3rd of July, a pattern shift has resulted in the influx of subtropical moisture into the UCRB and surrounding areas. This wetter pattern will continue through Thursday, bringing scattered showers and thunderstorms throughout the region with widespread totals between a tenth and a quarter of an inch. Locally heavier amounts and possible flash flooding in a few spots can be expected. As an upper low moves into the Pacific Northwest on Friday, the subtropical moisture plume in the UCRB will shift to the south and east. By Sunday, the western edge of the subtropical moisture will extend from near the Four Corners up through south-central WY. Areas west of this line will see a significant drying trend, with only a few late-day thunderstorms possible. Another trough will move into the Pacific Northwest early next week and will bring drier southwesterly flow into the UCRB. Significant moisture will still be persistent for far eastern CO.

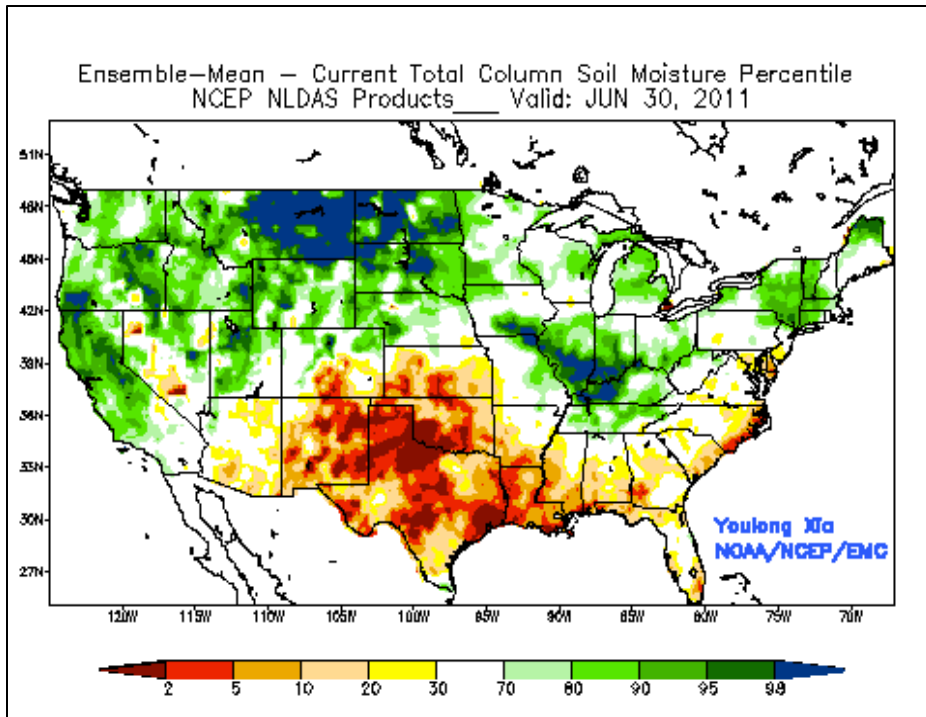


Fig. 7: NLDAS total column soil moisture percentiles for June 30th.

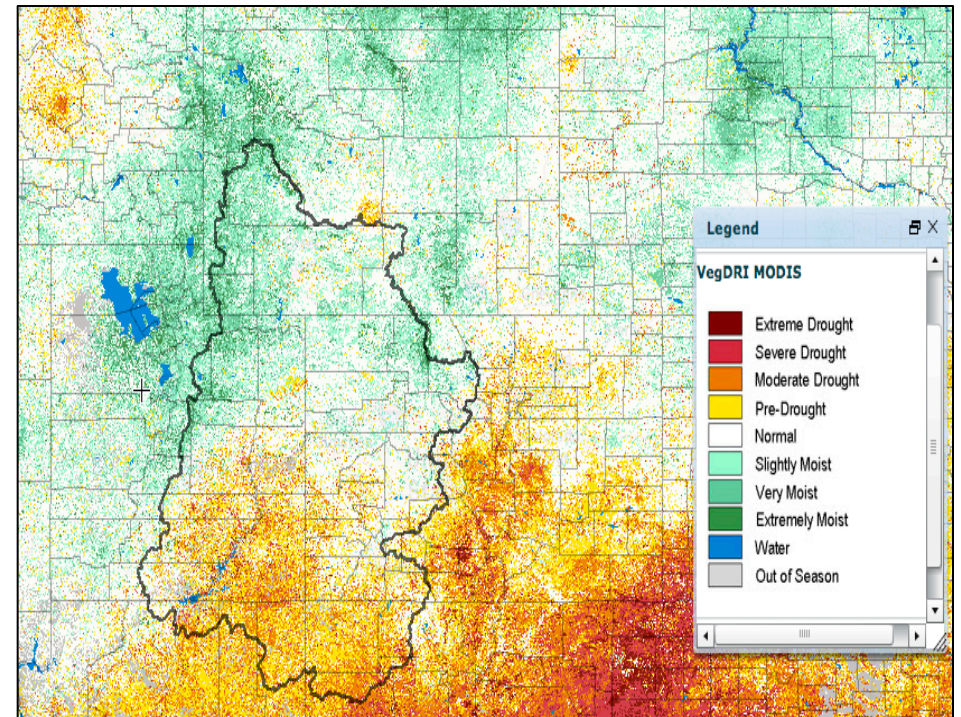
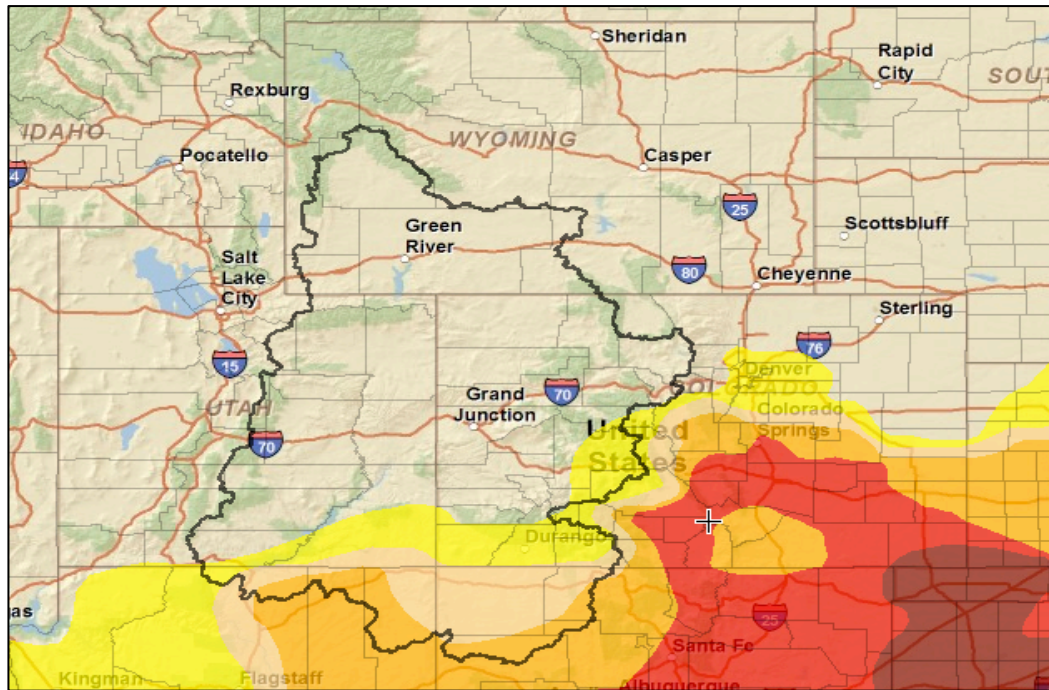


Fig. 8: June 27th VegDRI map, based on satellite-derived observations of vegetation.

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 28th release of U.S. Drought Monitor for the UCRB

In the UCRB, the current U.S. Drought Monitor (USDM) author expanded the D0 in the Four Corners region, covering more of San Juan County, UT to better match the current VegDRI conditions which show drought conditions throughout the southern portion of the basin (Fig. 8).

Status quo is recommended for the remainder of the UCRB for the current USDM map (Fig. 9).

A D4 introduction is being recommended for Alamosa County in the San Luis Valley. SPIs are very negative on many time scales and local experts indicate that D4 would be justified based on impacts. In the Arkansas basin, an adjustment of the gradient in Cheyenne County is recommended, moving the D0 and D1 lines to the north to better depict the dryness observed there.