

**Summer  
2012**



**July 17<sup>th</sup>, 2012**

**NIDIS - UPPER COLORADO BASIN PILOT PROJECT**

**Weekly Climate, Water & Drought Assessment**

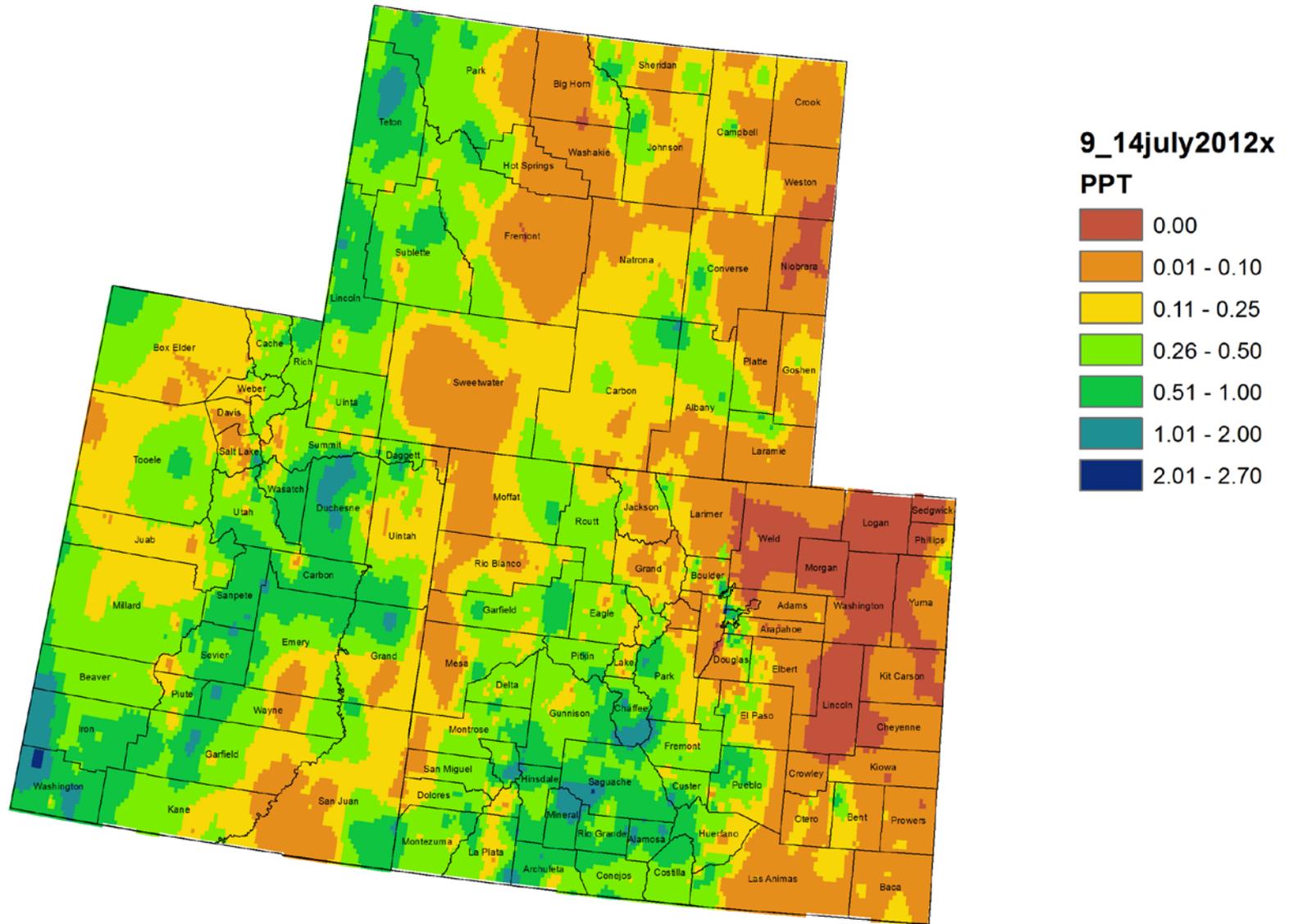
# Today's Agenda

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

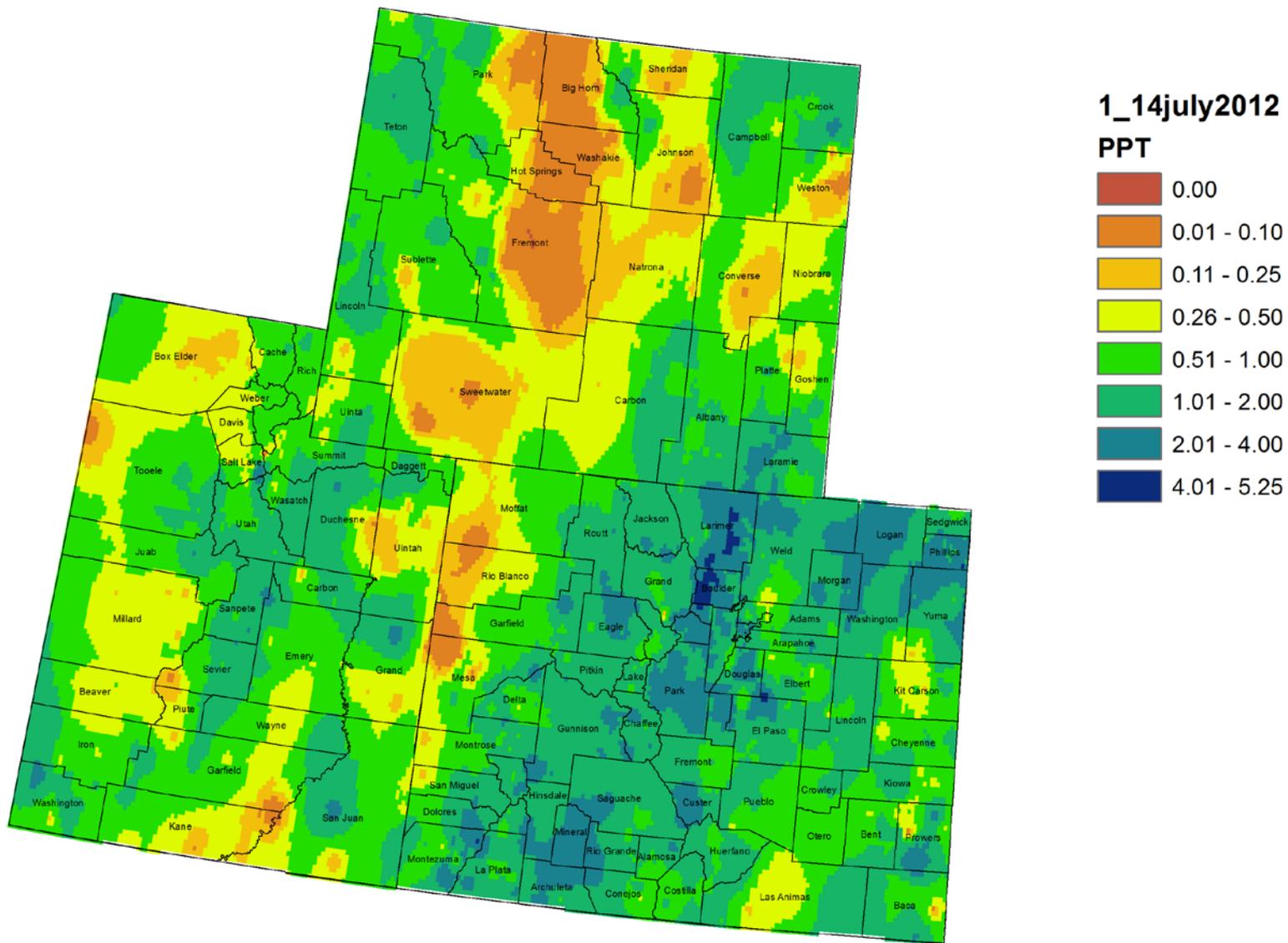
# Precipitation/Snowpack Update



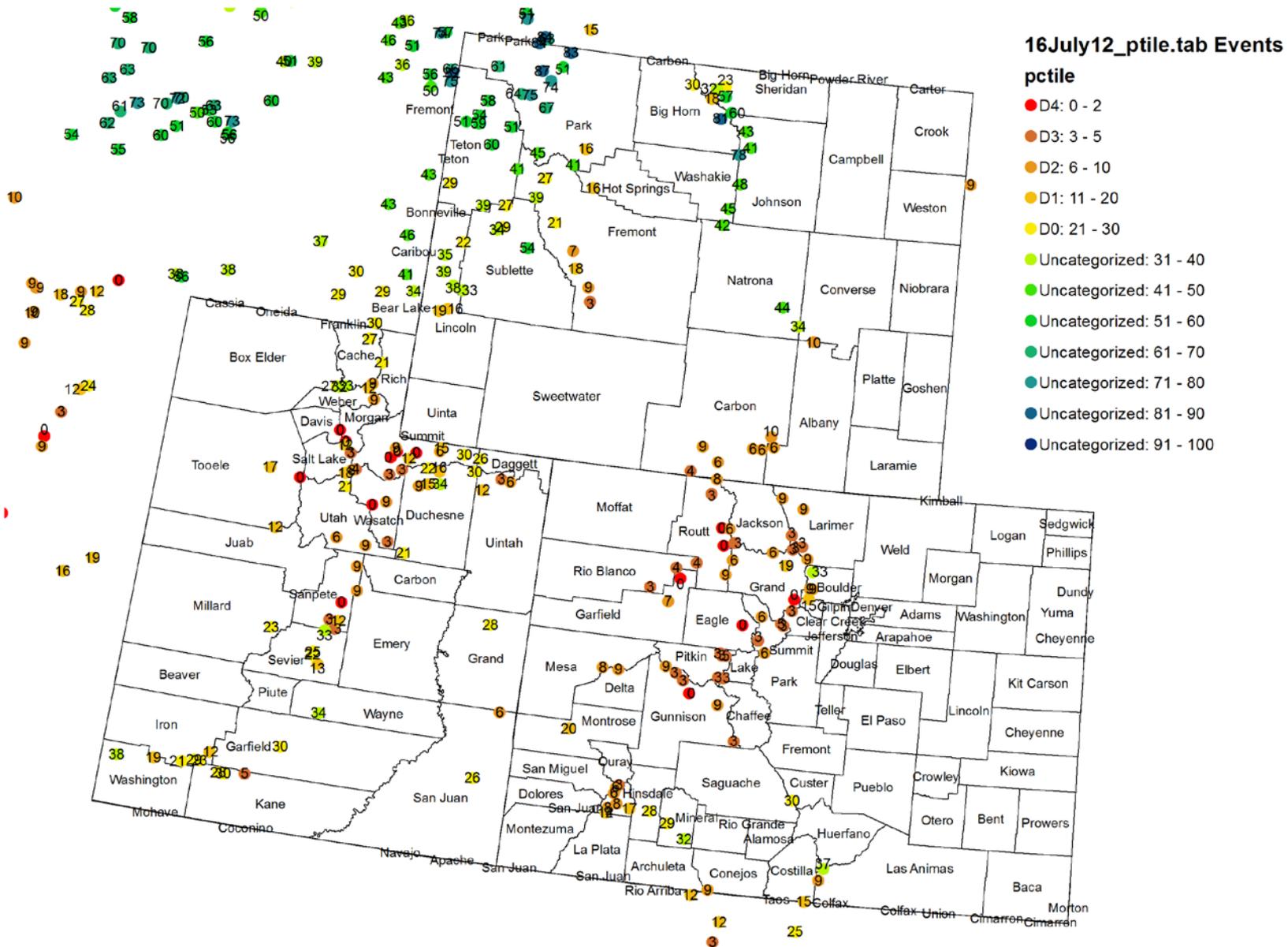
# Colorado, Utah and Wyoming Precipitation (in) 9 - 14 July 2012



# Colorado, Utah and Wyoming Month to Date Precipitation (in) 1 - 14 July 2012

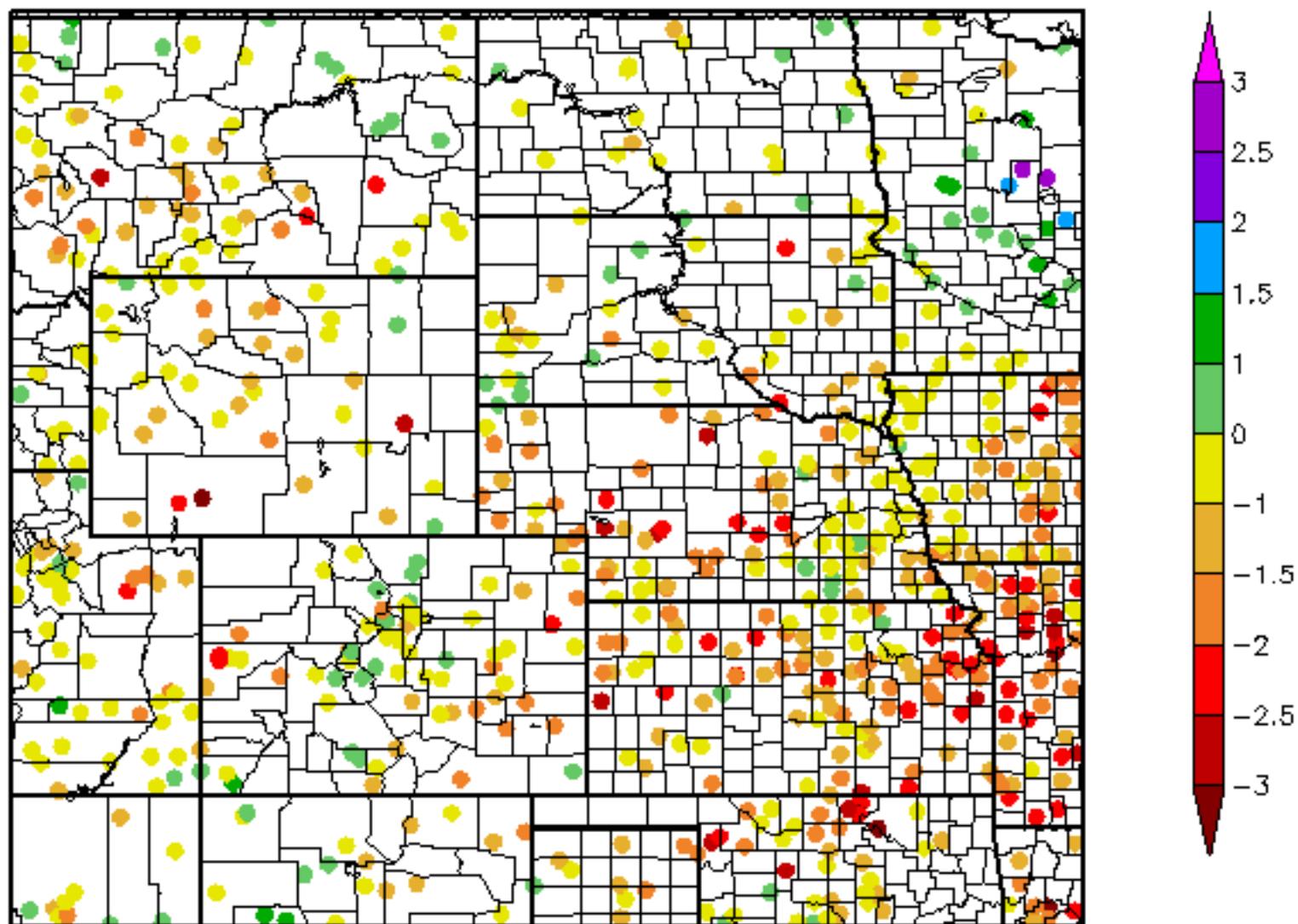


# Snotel Water Year Precipitation Percentile Ranking for 16 July 2012 (Stations with 15+ years of data only)



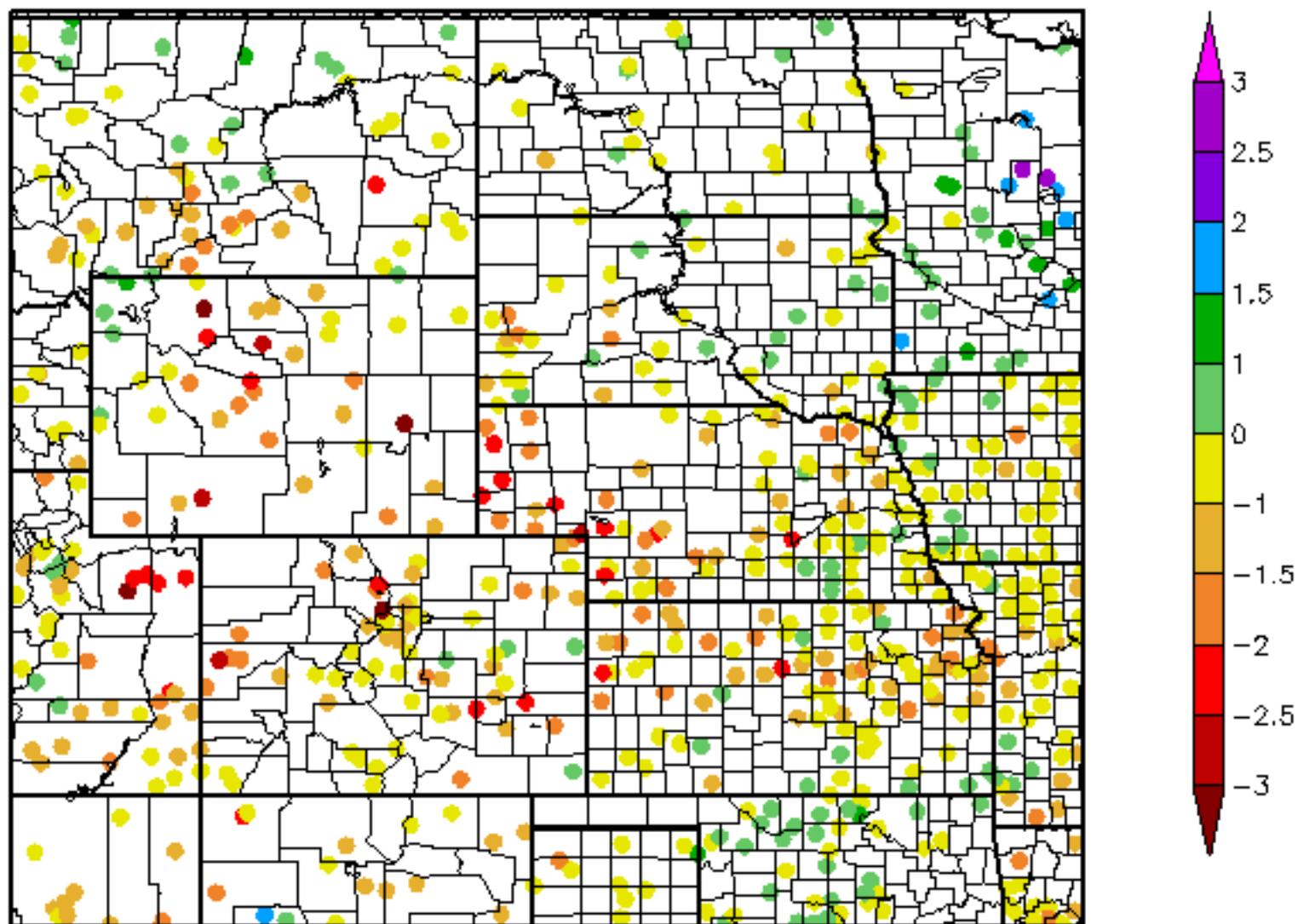
# 60 Day SPI

5/17/2012 - 7/15/2012



# 6 Month SPI

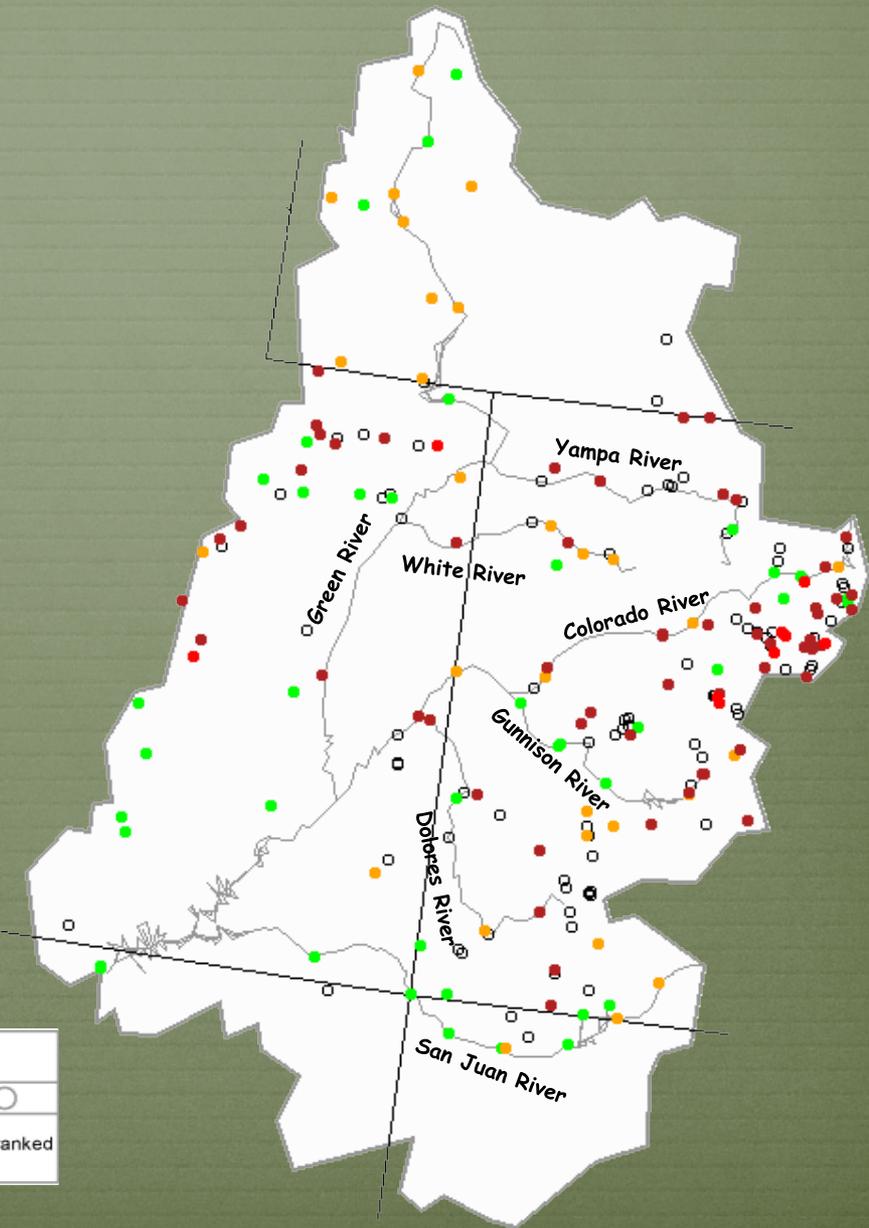
1/16/2012 - 7/15/2012



# Streamflow Update

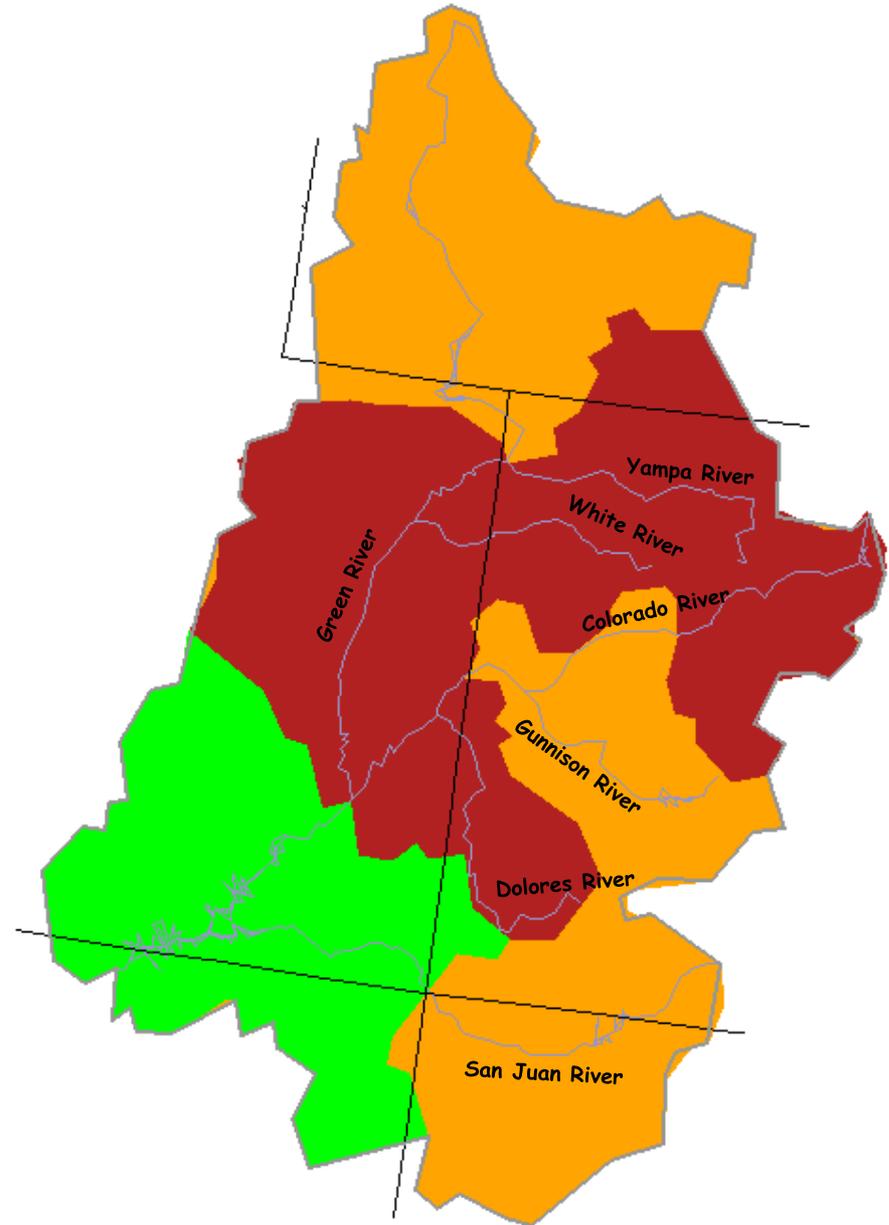


7-day average discharge compared to historical discharge for the day of the year (July 16<sup>th</sup>)



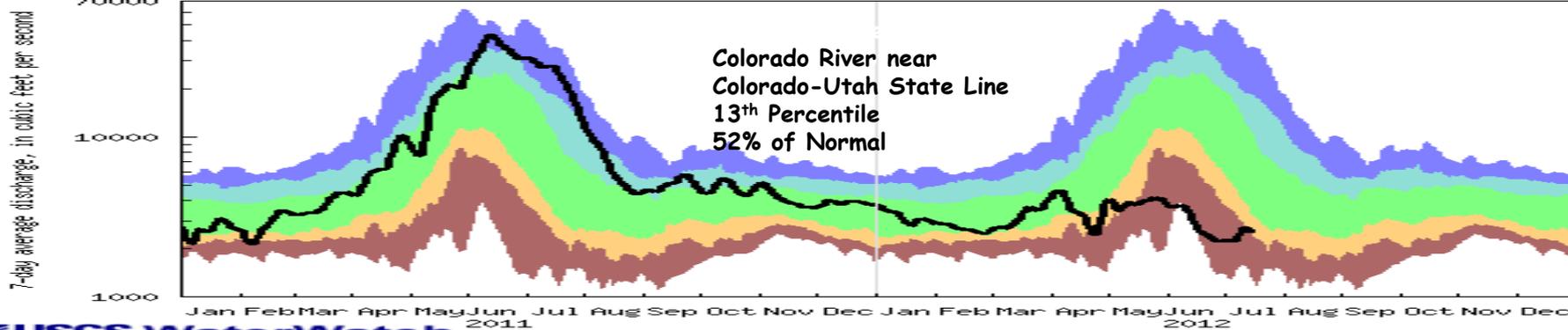
Explanation - Percentile classes							
●	●	●	●	●	●	●	○
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

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

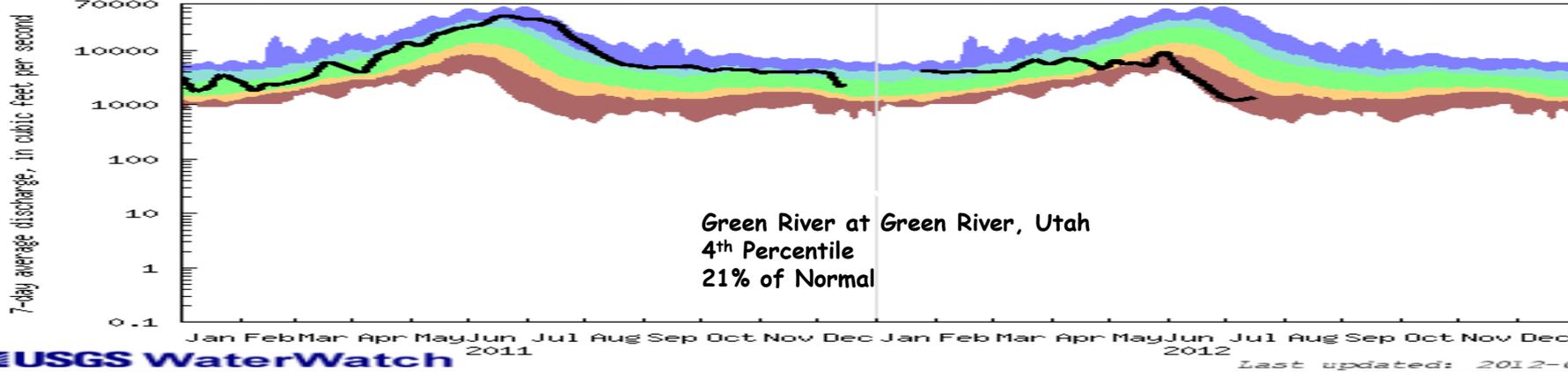


Explanation - Percentile classes						
	<10	10-24	25-75	76-90	>90	
Low	Much below normal	Below normal	Normal	Above normal	Much above normal	High

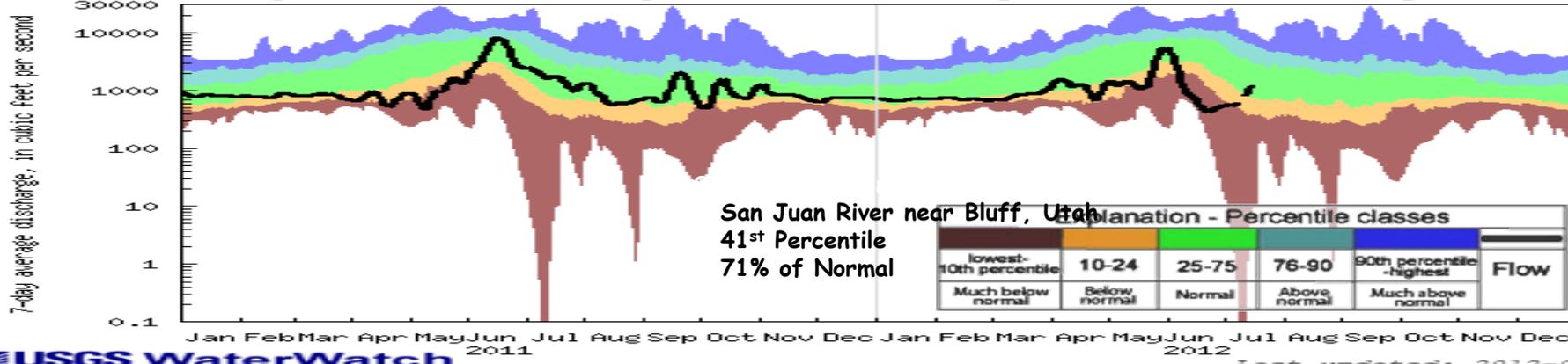
Duration hydrograph of 7-day average streamflow for USGS 09163500  
 (Drainage Area: 17843 square miles, Length of Record: 61 years)



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

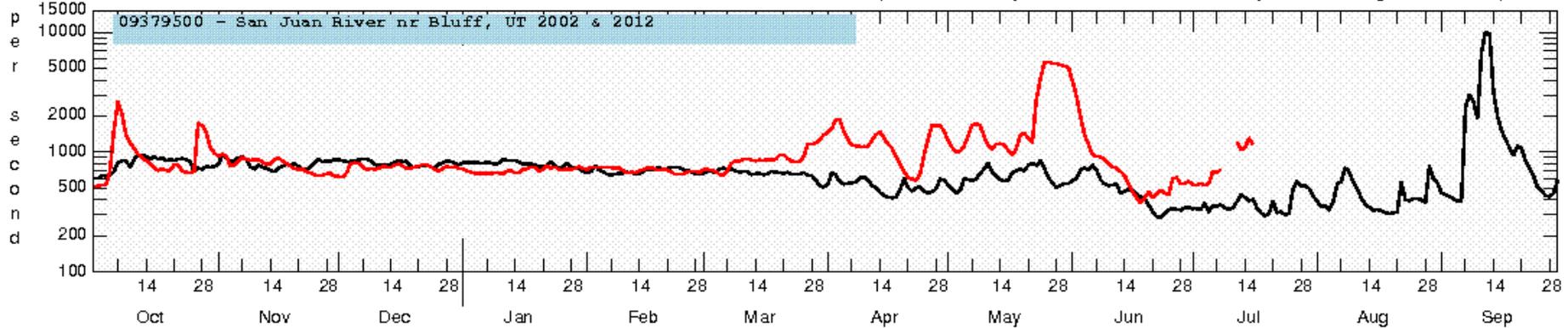
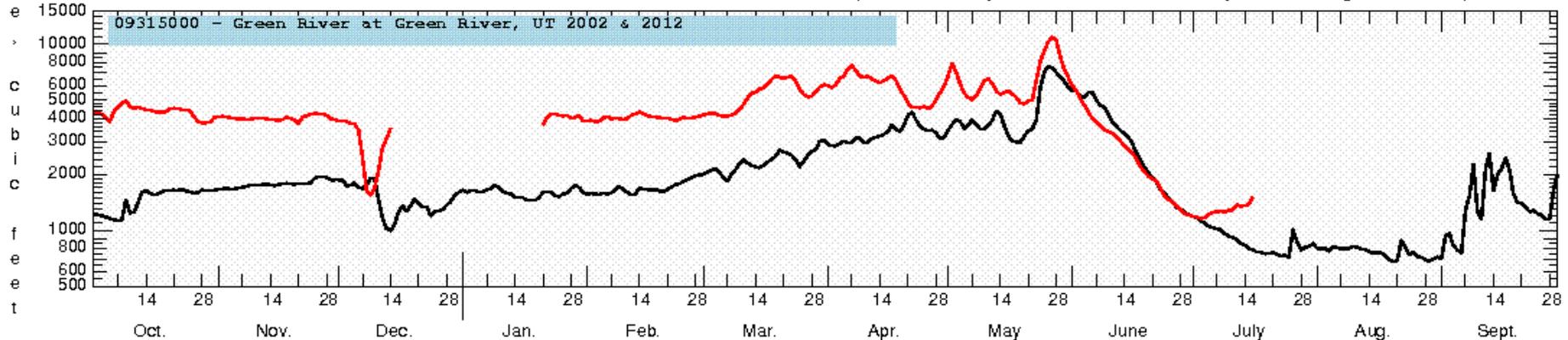
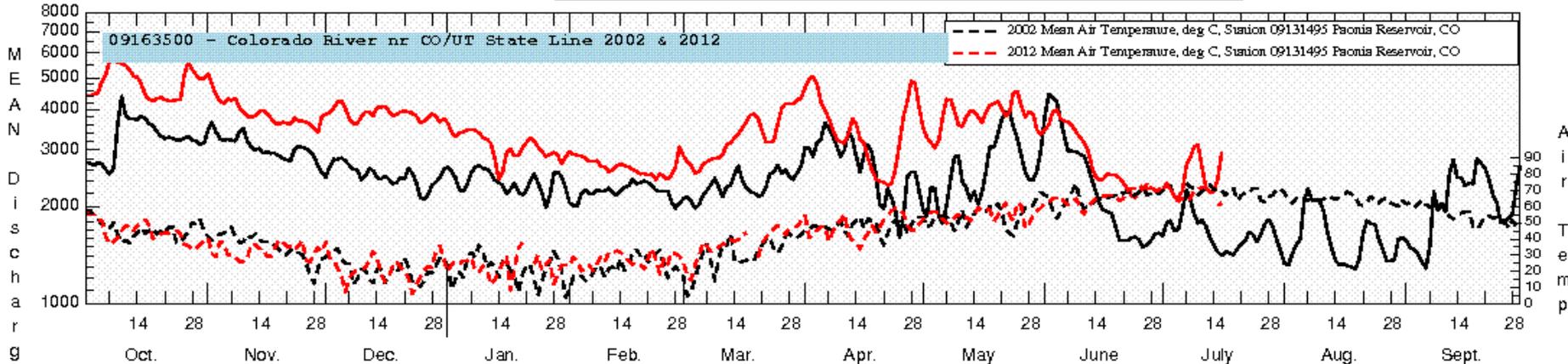


Duration hydrograph of 7-day average streamflow for USGS 09379500  
 (Drainage Area: 23000 square miles, Length of Record: 97 years)

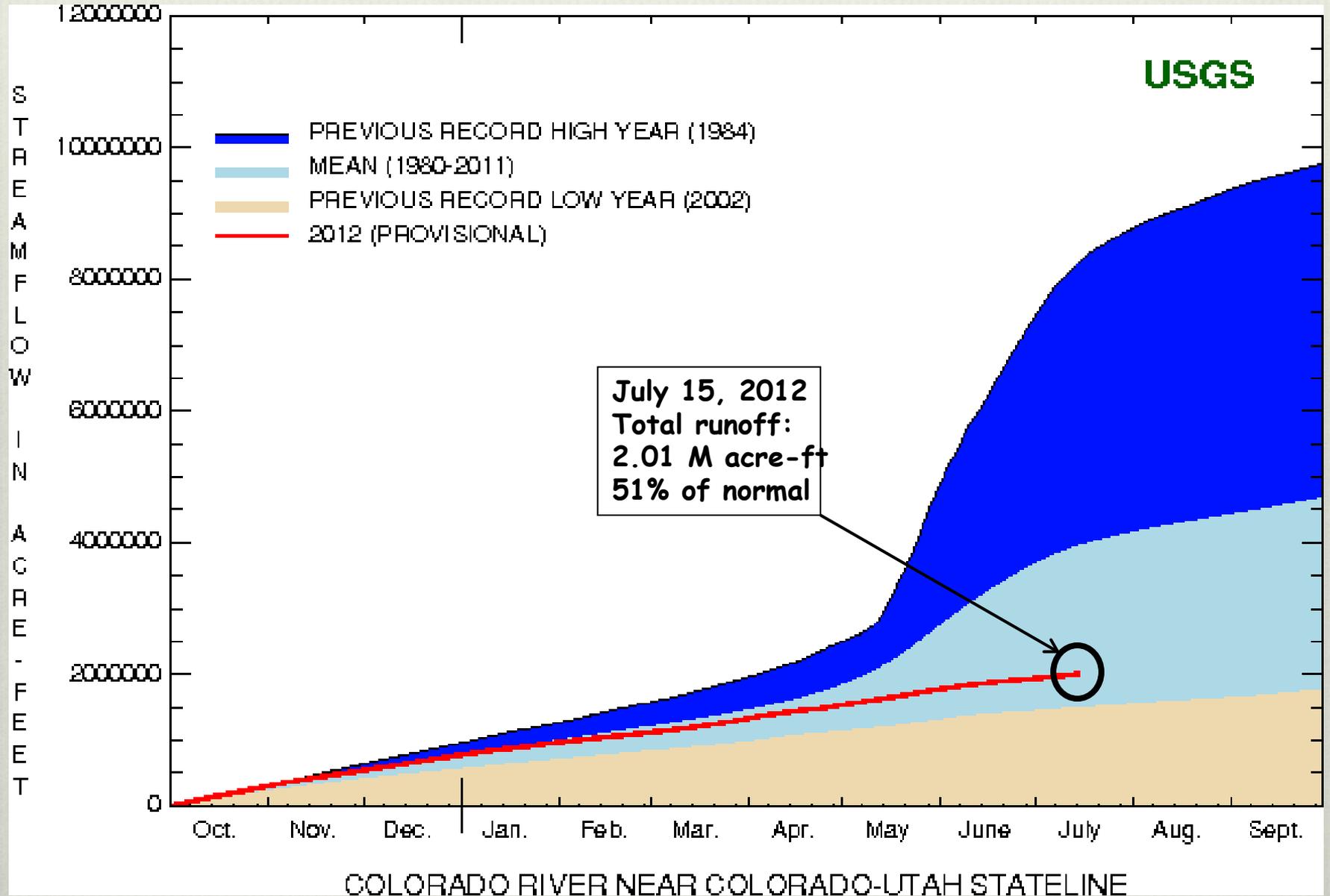


# Colorado River Basin 2002 vs. 2012 Mean Daily Discharge Comparison at Select Stations

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

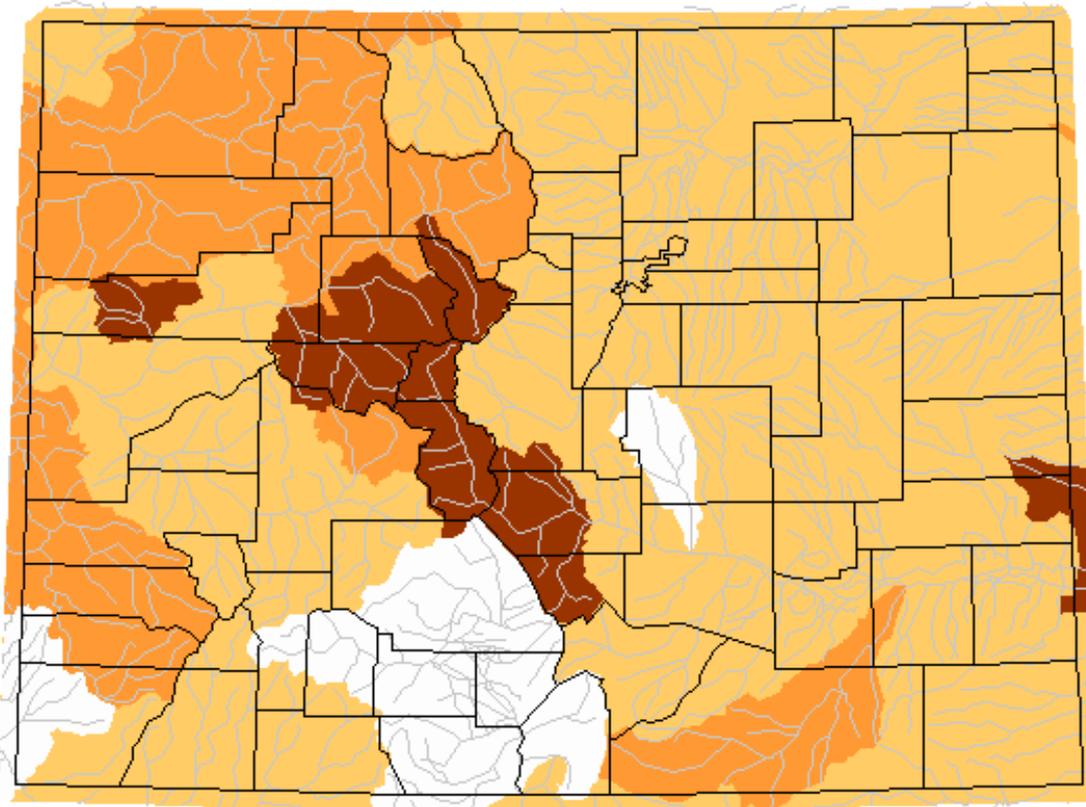


# Total Streamflow Volume Colorado River nr CO/UT State Line Oct 1, 2011 to July 15, 2012



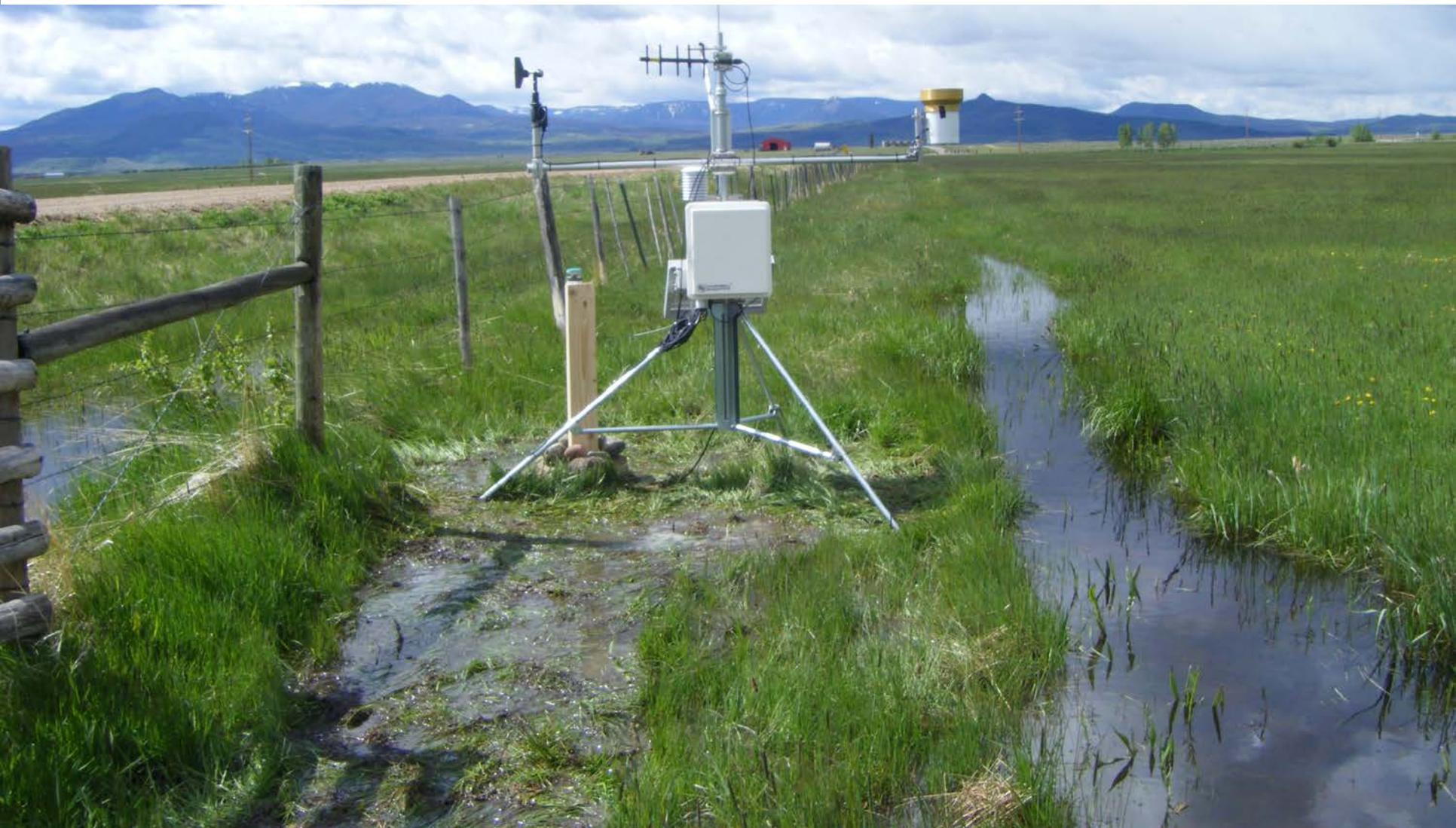
# 7-day average streamflow compared to historical streamflow

Monday, July 16, 2012

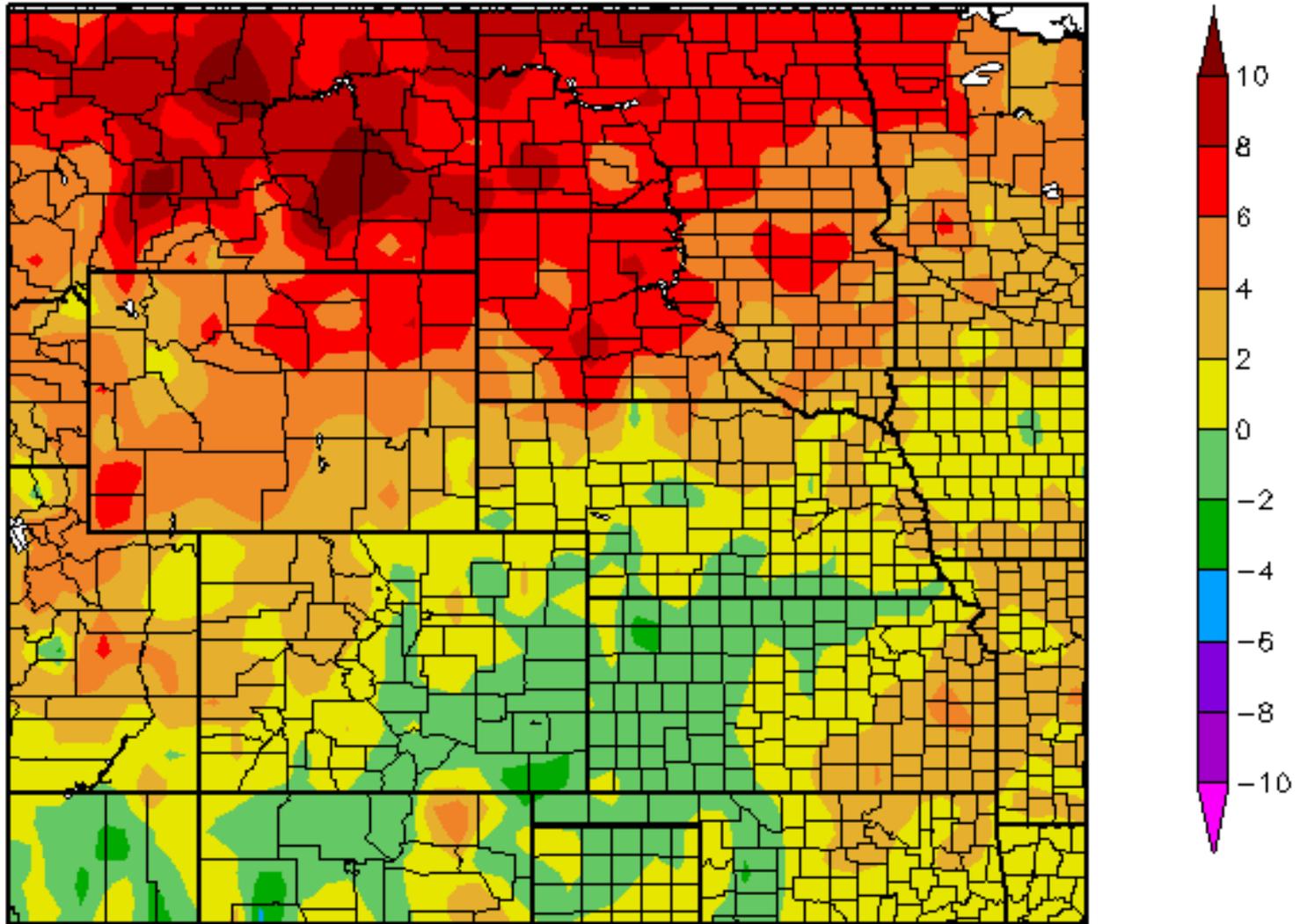


Explanation - Percentile classes				
Low	$\leq 5$	6-9	10-24	Insufficient data for a hydrologic region
Extreme hydrologic drought	Severe hydrologic drought	Moderate hydrologic drought	Below normal	

# Water Demand

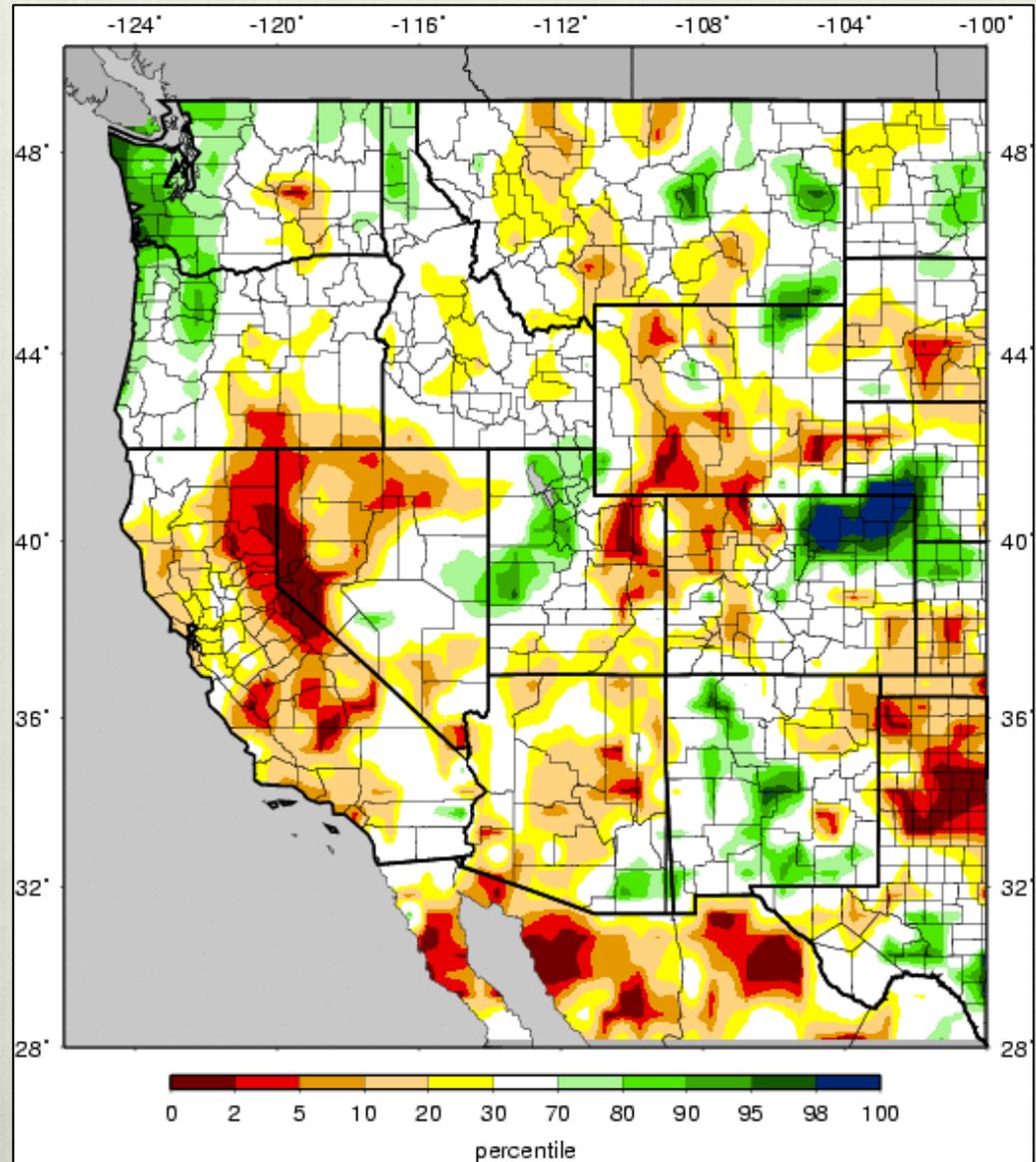


# Temperature Departure from Normal 07/09/2012 – 07/15/2012



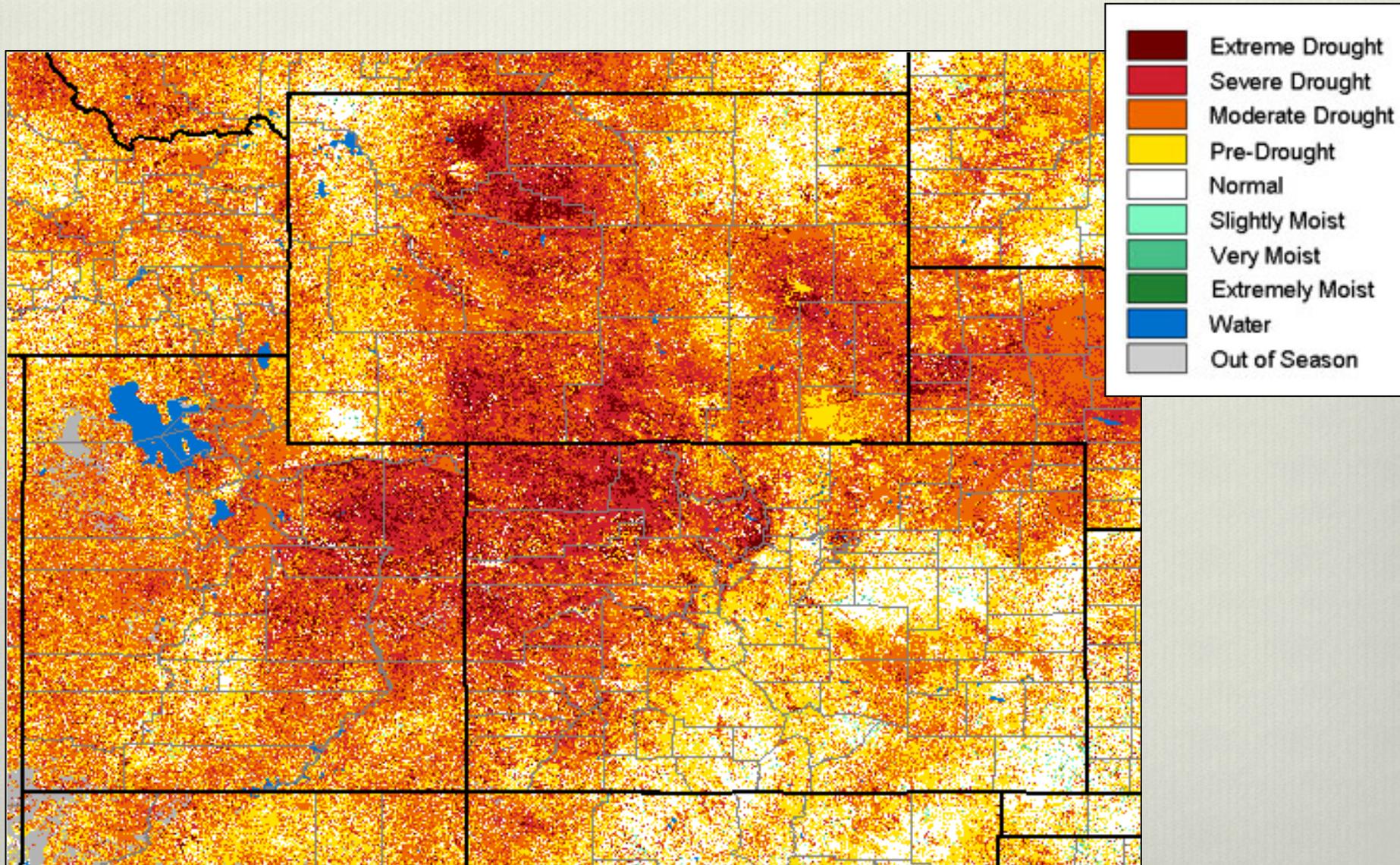
# VIC Soil Moisture

## 15 July 2012



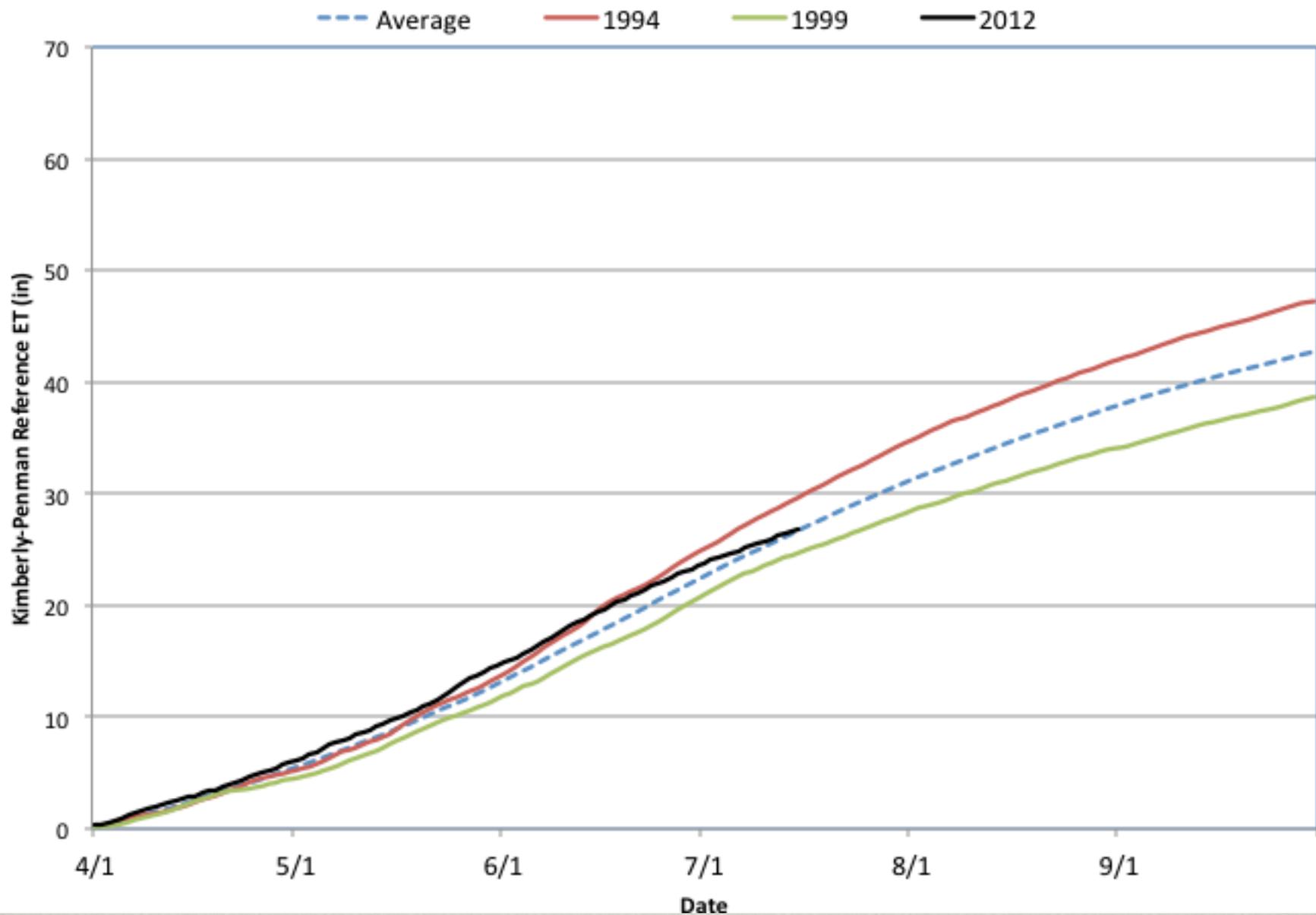
# eMODIS VegDRI Vegetation

## 15 July 2012

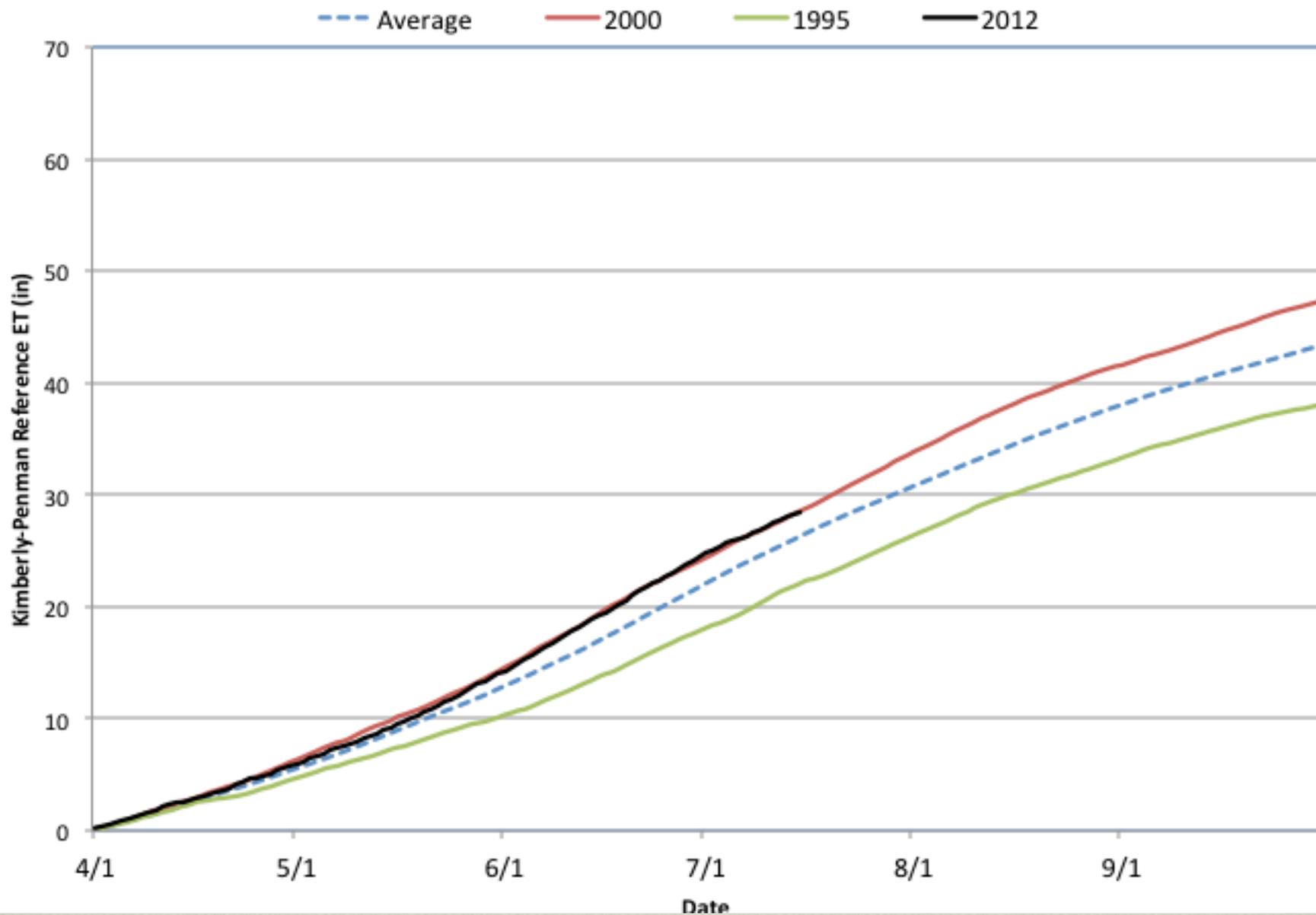




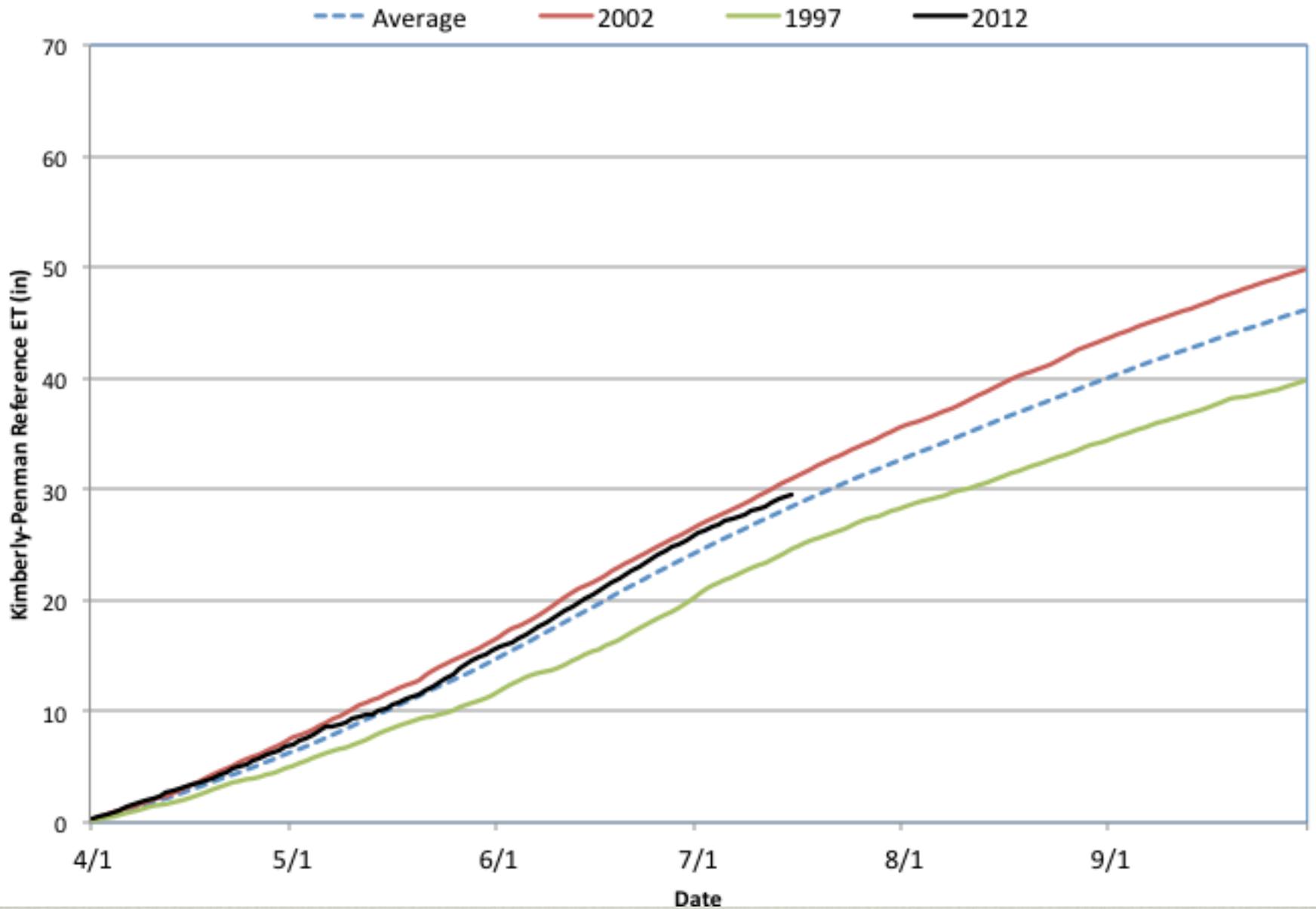
## Olathe Kimberly-Penman Reference ET (1993 - 2012)



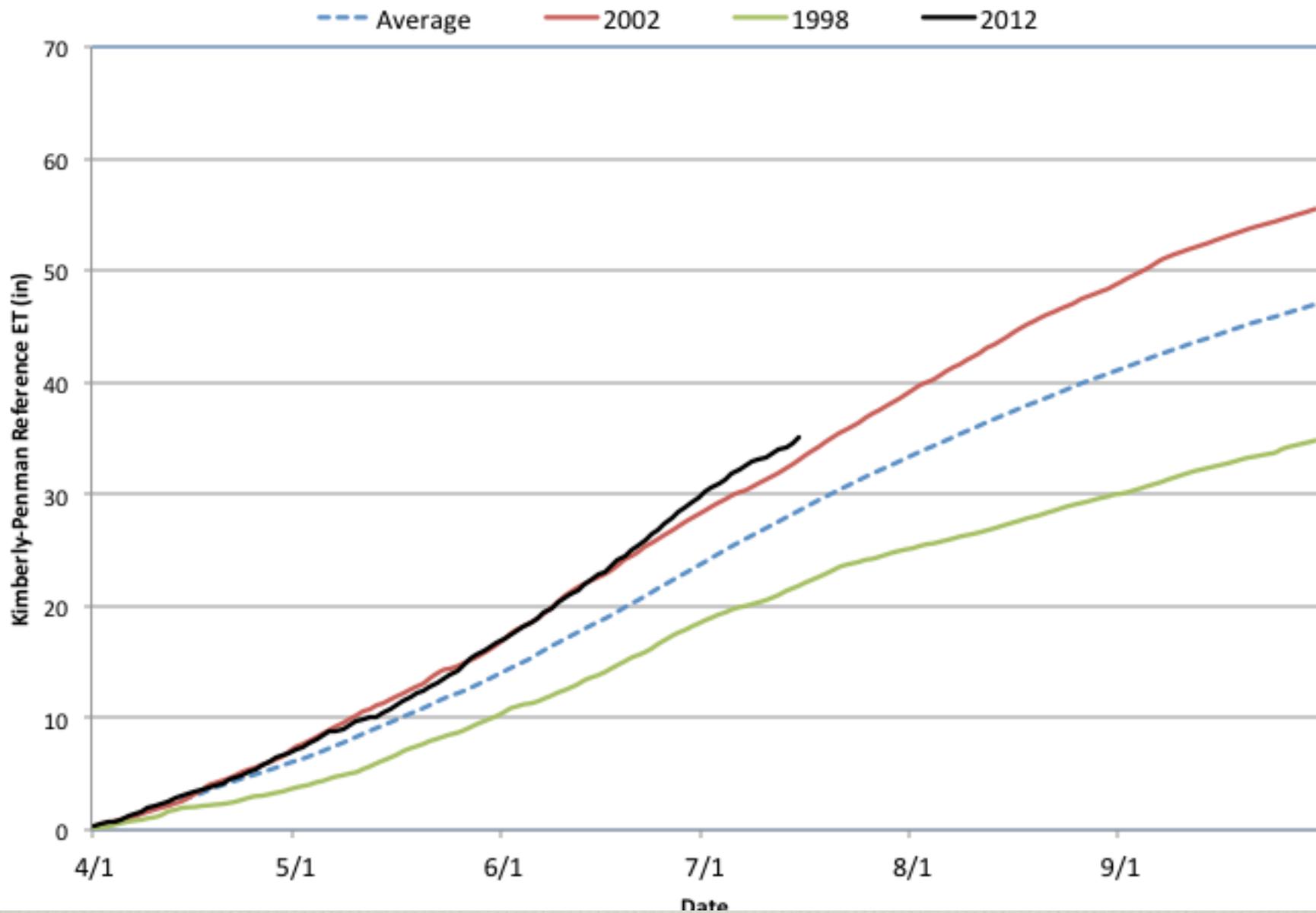
### Cortez Kimberly-Penman Reference ET (1992 - 2012)



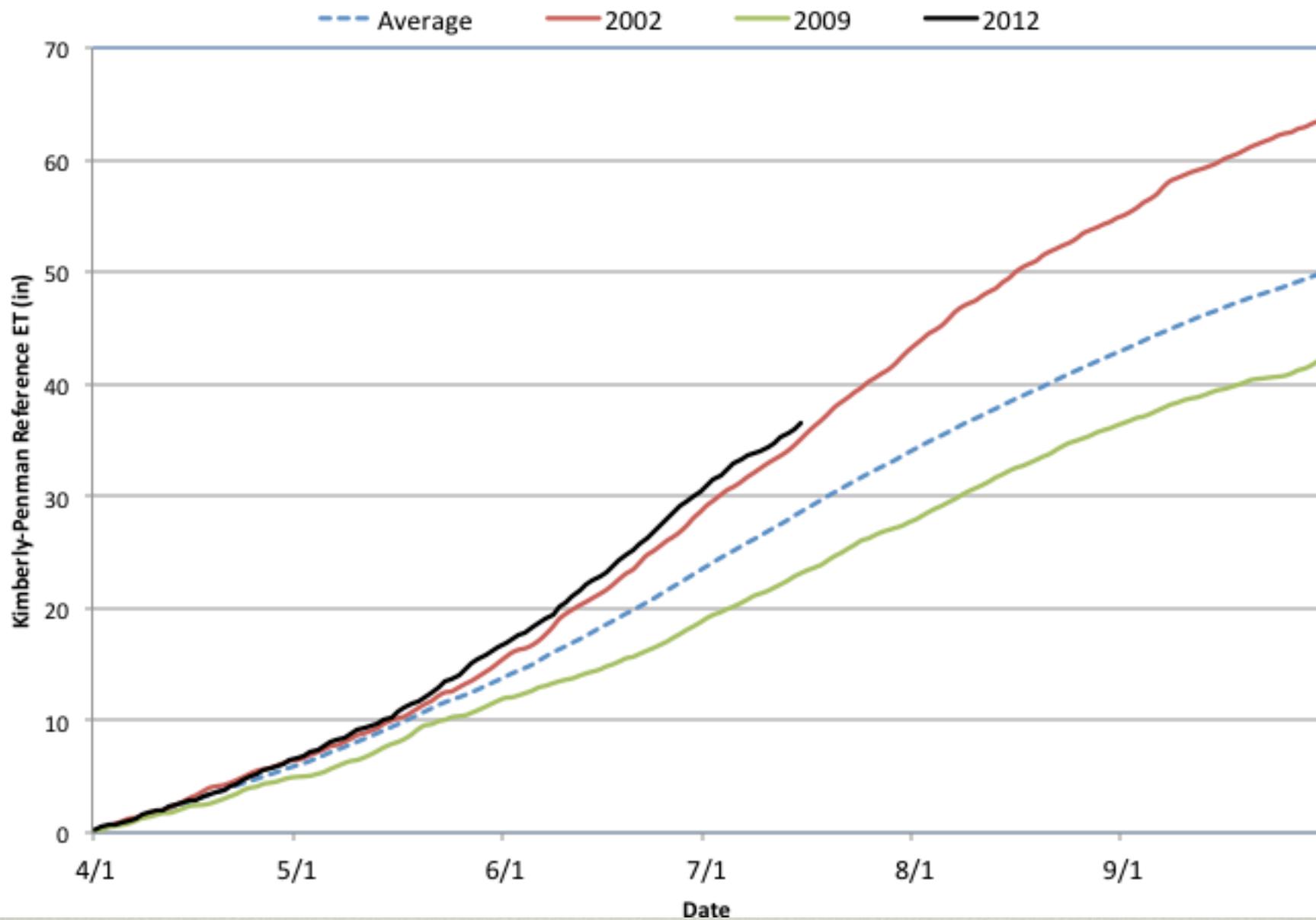
### Center Kimberly-Penman Reference ET (1994 - 2012)



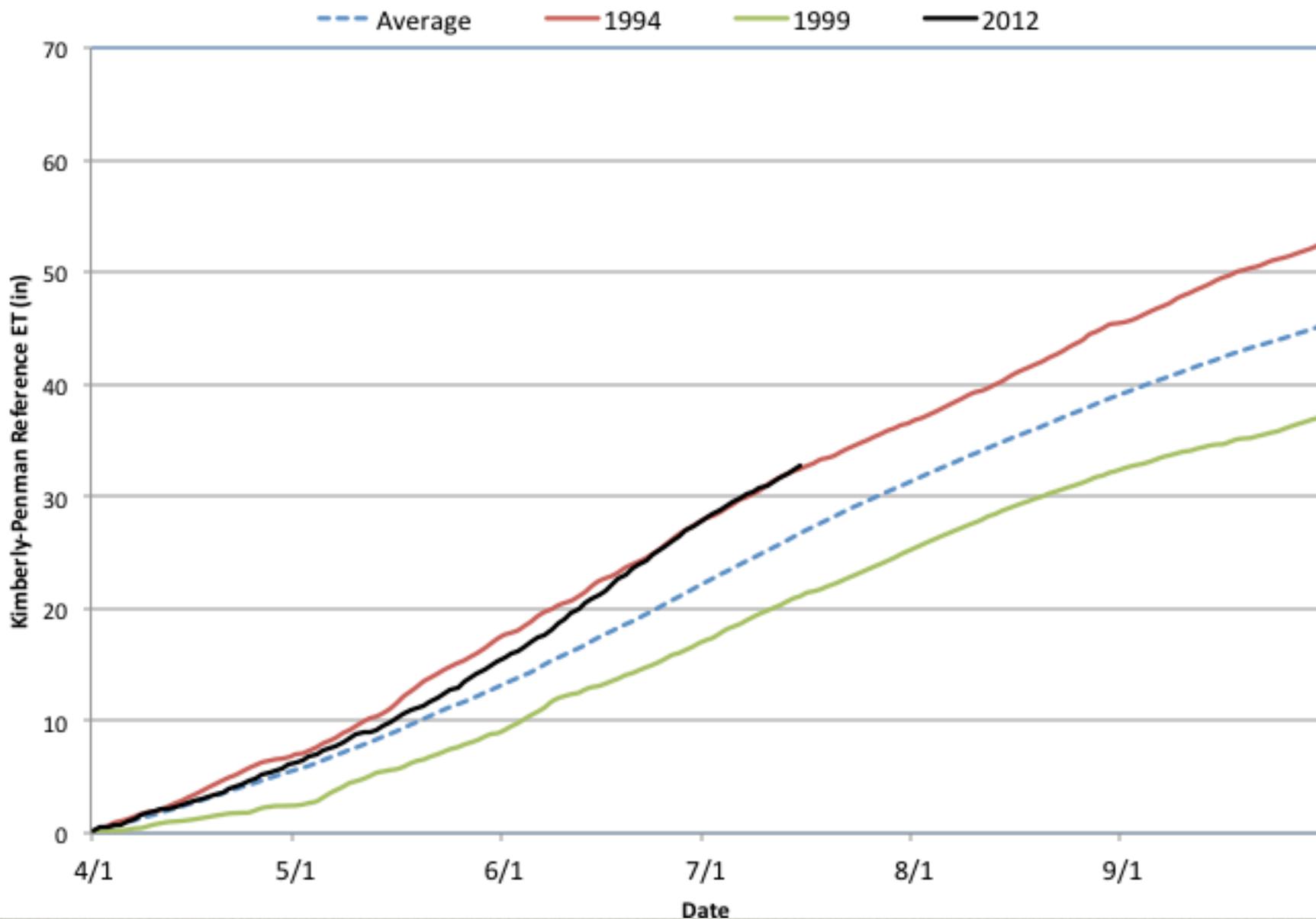
# Avondale Kimberly-Penman Reference ET (1993 - 2012)



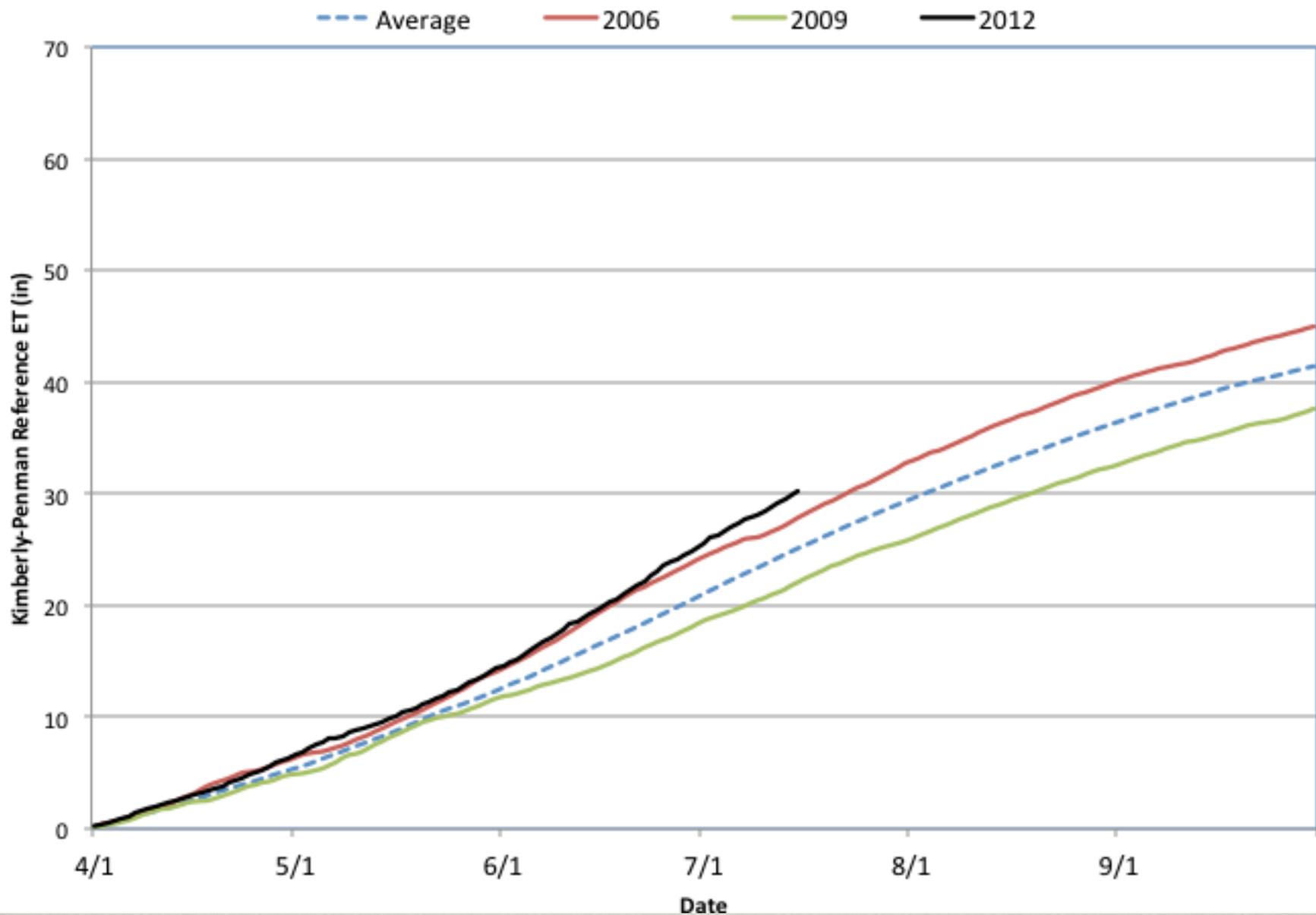
## Idalia Kimberly-Penman Reference ET (1992 - 2012)



## Holyoke Kimberly-Penman Reference ET (1992 - 2012)



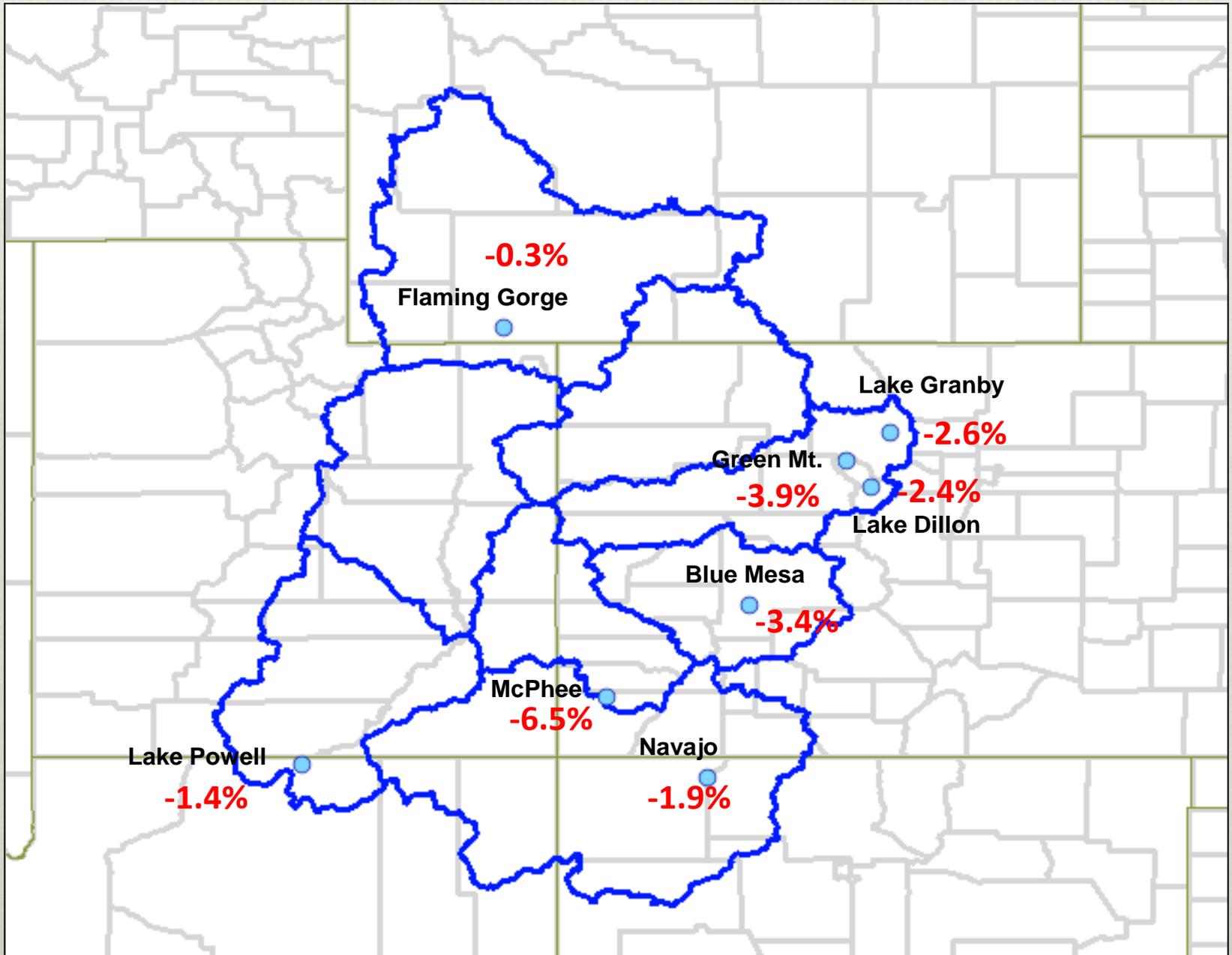
# Lucerne Kimberly-Penman Reference ET (1992 - 2012)



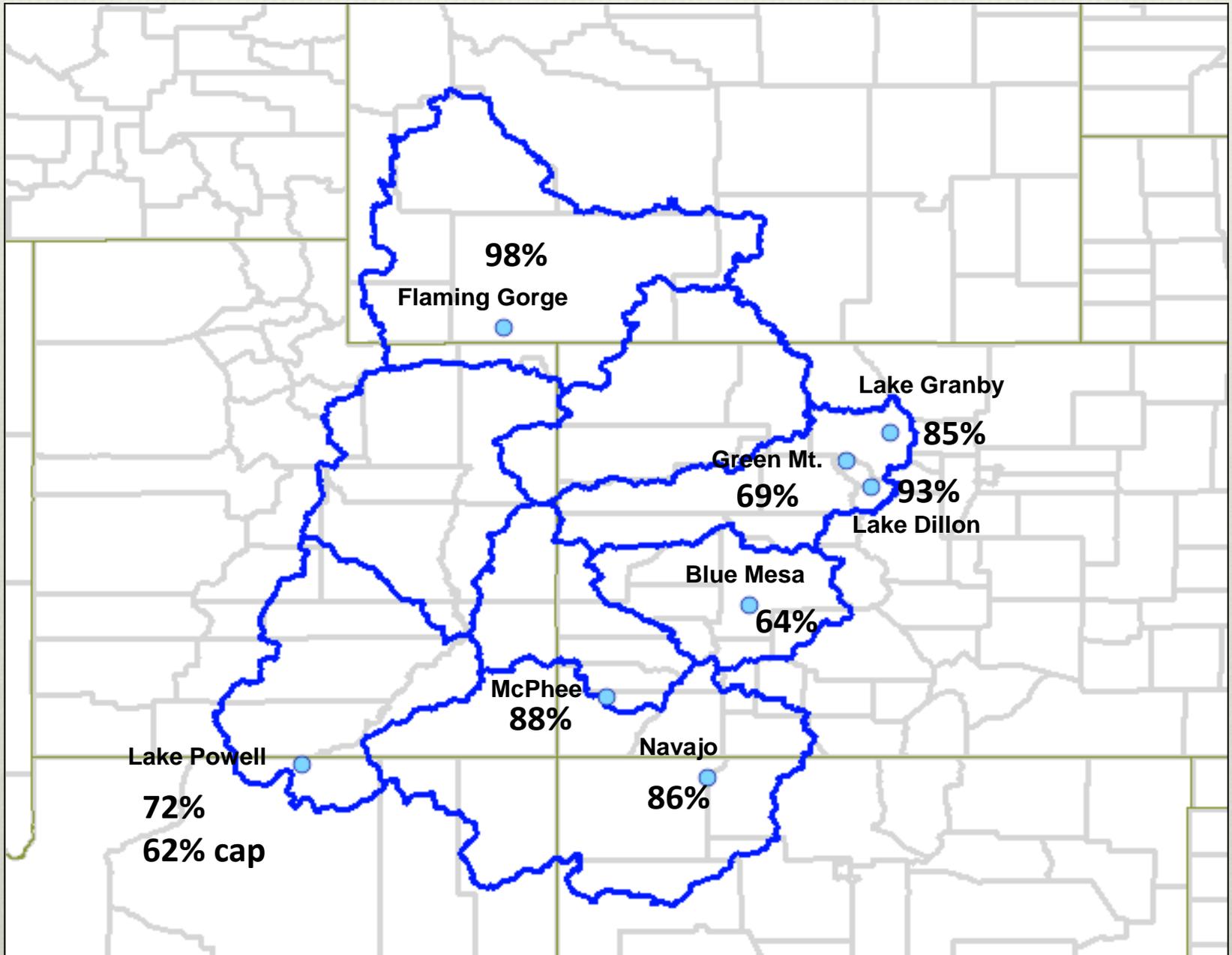
# Reservoir Update



# July Reservoir Storage Volume Changes

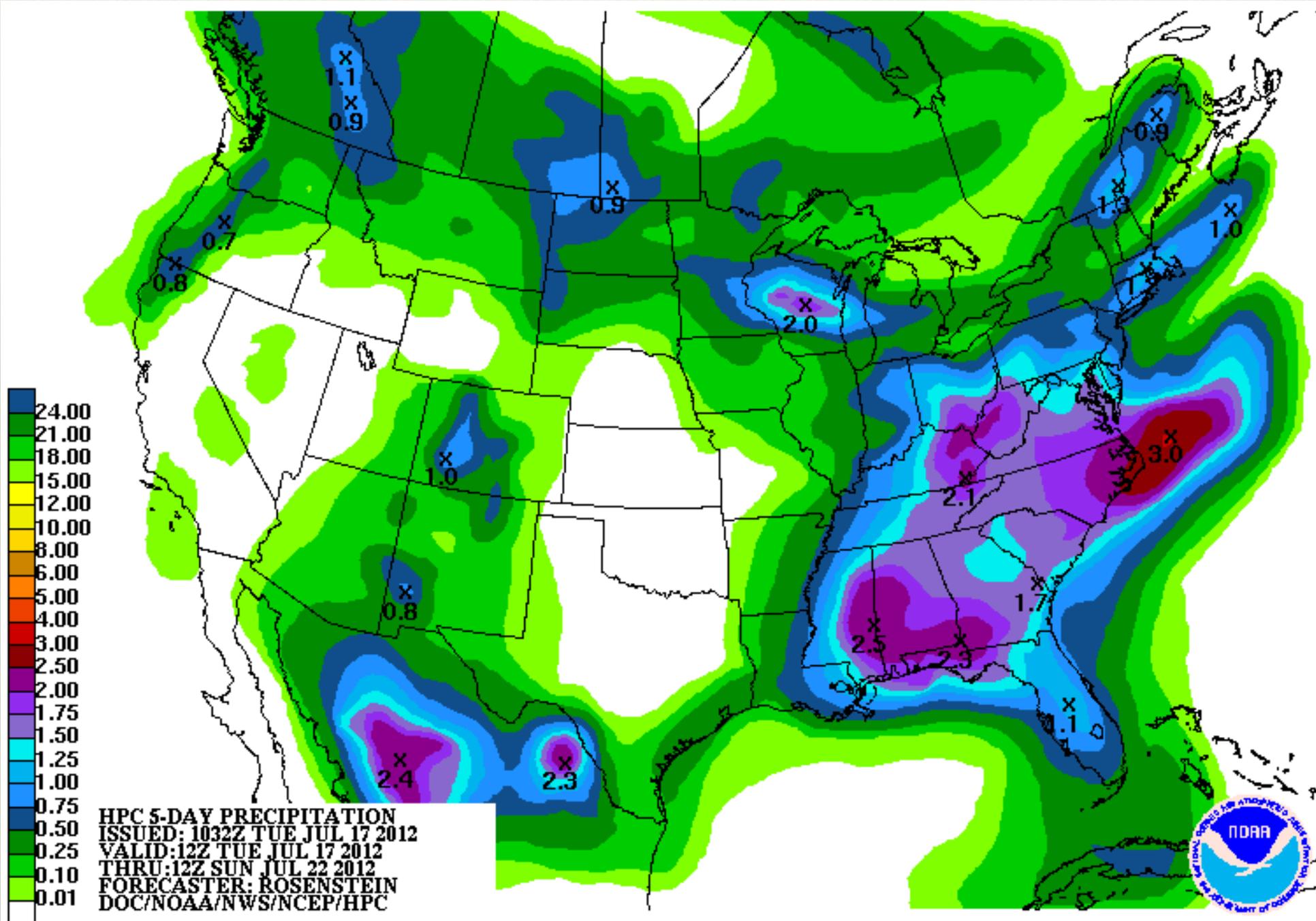


# July Average Reservoir Storage Volume



# Precipitation Forecast







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**NIDIS - UPPER COLORADO BASIN PILOT PROJECT**

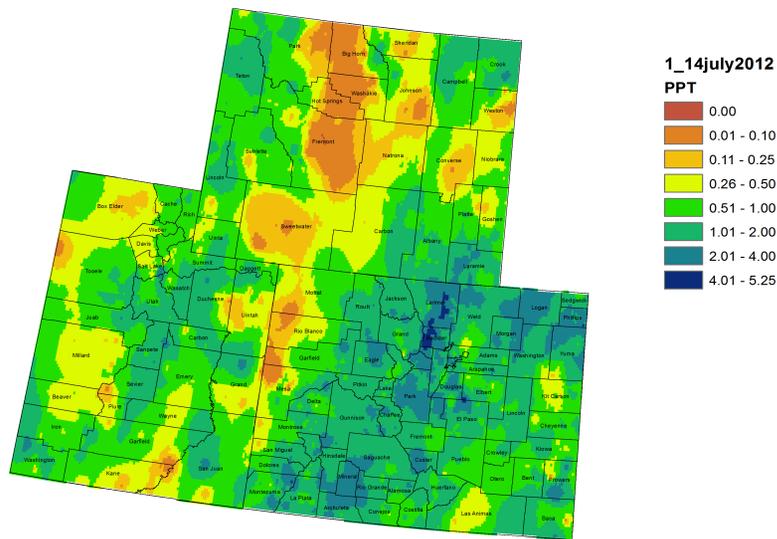
**For more information**

# NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

July 17, 2012

Colorado, Utah and Wyoming Month to Date Precipitation (in)  
1 - 14 July 2012



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

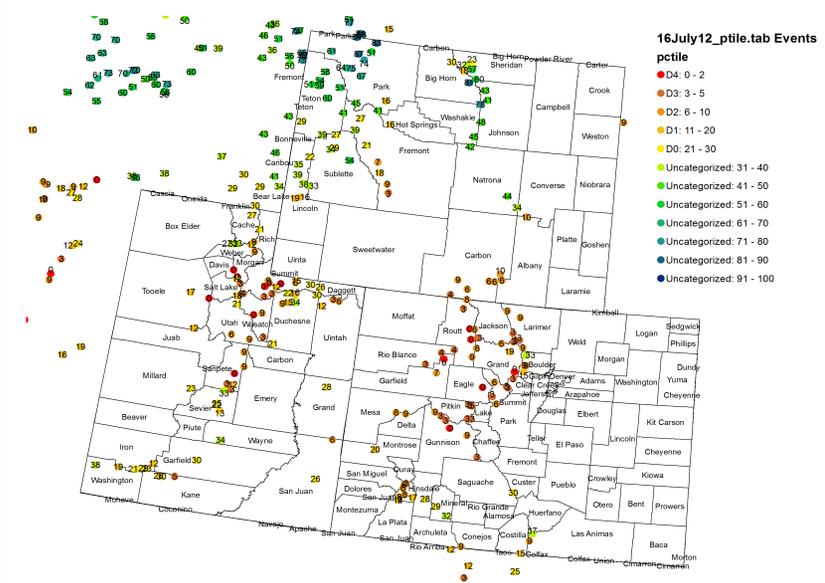


Fig. 1: July month-to-date precipitation in inches.

Fig. 2: SNOTEL WYTD precipitation percentiles (50% is median, 21 - 30% is Drought Monitor D0 category).

## Precipitation

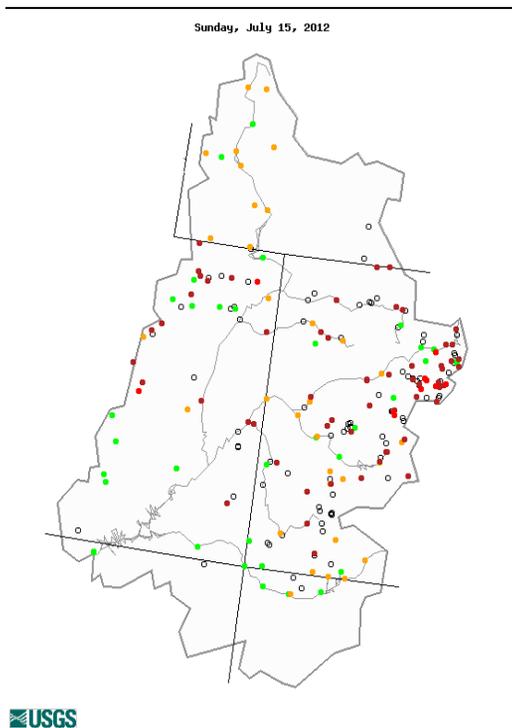
For the month of July so far, widespread precipitation has fallen over most of the Upper Colorado River Basin (UCRB, Fig. 1). Most areas have received between a half inch to two inches for the month. Some areas of the San Juans in the southern part of the basin have received over two inches. Parts of eastern Utah, the western slope of Colorado and southwest Wyoming have been a bit drier, receiving less than half an inch of precipitation, month-to-date. East of the basin, most of Colorado received between half an inch to over two inches of precipitation with some isolated areas in Boulder and Larimer counties receiving over four inches.

Water-year-to-date (WYTD), SNOTEL precipitation percentiles are low for the Yampa and Gunnison basins in CO, and the Wasatch range in UT, with many sites reporting in the lowest 10<sup>th</sup> percentile or below (Fig. 2). The northern mountains of CO are also dry, with most sites reporting precipitation percentiles in the teens and single digits. SNOTEL percentiles in the Upper Green basin in WY are around the 30<sup>th</sup> percentile, and percentiles in the San Juan basin are in the teens.

# Streamflow

As of July 15<sup>th</sup>, about 26% of the USGS streamgages in the UCRB recorded normal (25<sup>th</sup> – 75<sup>th</sup> percentile) 7-day average streamflows (Fig. 3). There are no gages in the UCRB recording above normal flows, while about 50% percent of the gages in the basin are recording much below normal or low (i.e. lowest on record) streamflows (improved from 65% two weeks ago). Much below normal flows are mainly on the Yampa River and smaller tributaries in the CO and UT mountains. Low flows are mainly confined to the headwaters regions just west of the Continental Divide in the northern and central CO mountains.

Flows on the three key gages in the UCRB saw increases last week, mainly in response to precipitation (Fig. 4). Flows on the Green River at Green River, UT are still much below normal at the 4<sup>th</sup> percentile. Lower streamflows on the Green River are primarily due to lower flows from the Yampa River. Flows on the Colorado River near the CO-UT stateline increased to the below normal range and are at the 12<sup>th</sup> percentile. Flows on the San Juan River near Bluff, UT are near normal at the 39<sup>th</sup> percentile.



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. 3: 7-day average discharge compared to historical discharge for July 15<sup>th</sup>.

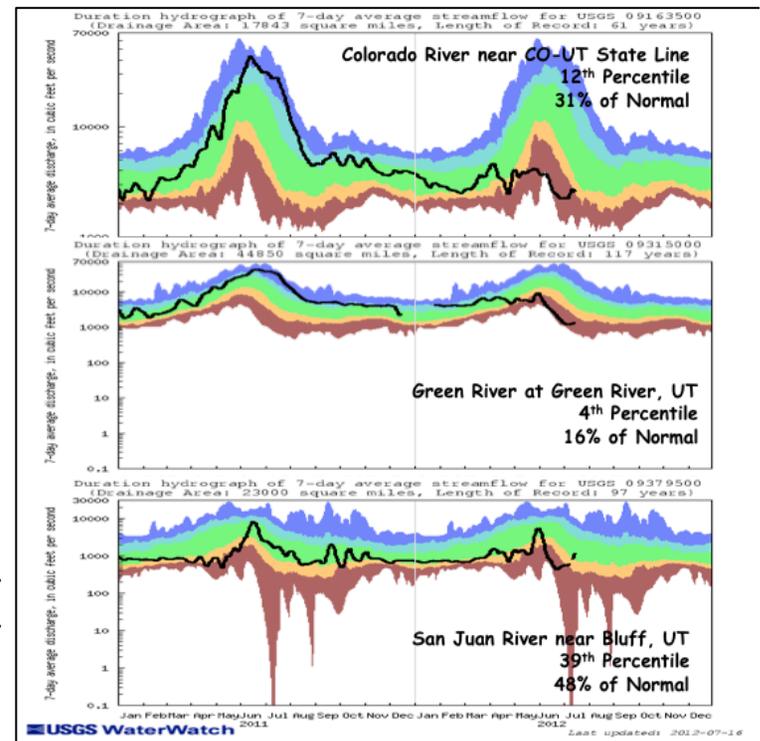


Fig. 4: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

## Water Supply and Demand

Temperatures across much of the UCRB were warmer than average last week with temperatures between 2 and 8 degrees warmer than normal on the north side of the basin and closer to average temperatures around the Four Corners.. The rest of CO experienced closer to average to slightly below average temperatures last week, slightly reducing water demand. Satellite vegetation conditions show the driest vegetation over northwest CO and northeast UT, with dry conditions extending into southern WY and into the Four Corners region (Fig. 5). Very dry vegetation is also showing up over northeast CO and along the Arkansas valley in southeast CO. Reference ET rates throughout the basin are high, but have stabilized a little over the past two weeks. East of the basin, reference ET rates are very high, with some of the highest accumulations observed at many sites (Fig. 6).

For the month of July so far, all of the reservoirs have seen volume decreases with McPhee, Blue Mesa and Green Mountain seeing the largest decreases. Volume decreases are normal for this time of year, due to the high demand for irrigation. All of the major reservoirs are below their July storage averages, with Blue Mesa at 64% of average, Green Mountain at 69% of average, and Lake Powell currently at 72% of average.

## Precipitation Forecast

A trough over the Pacific Northwest will drop south into northern California over the next couple days, pushing hotter, drier air over much of the UCRB and shifting the monsoon plume eastward. Residual moisture will result in a chance for isolated thunderstorms mainly over the higher elevations through the end of the week with a greater chance of thunderstorms and near normal temperatures across southern CO and the eastern plains. With the passage of the Pacific trough, expect a return to monsoonal flow for the UCRB sometime this weekend and into early next week. The 8 to 14 day forecast shows a good chance for continued monsoonal moisture over the area with near normal temperatures.

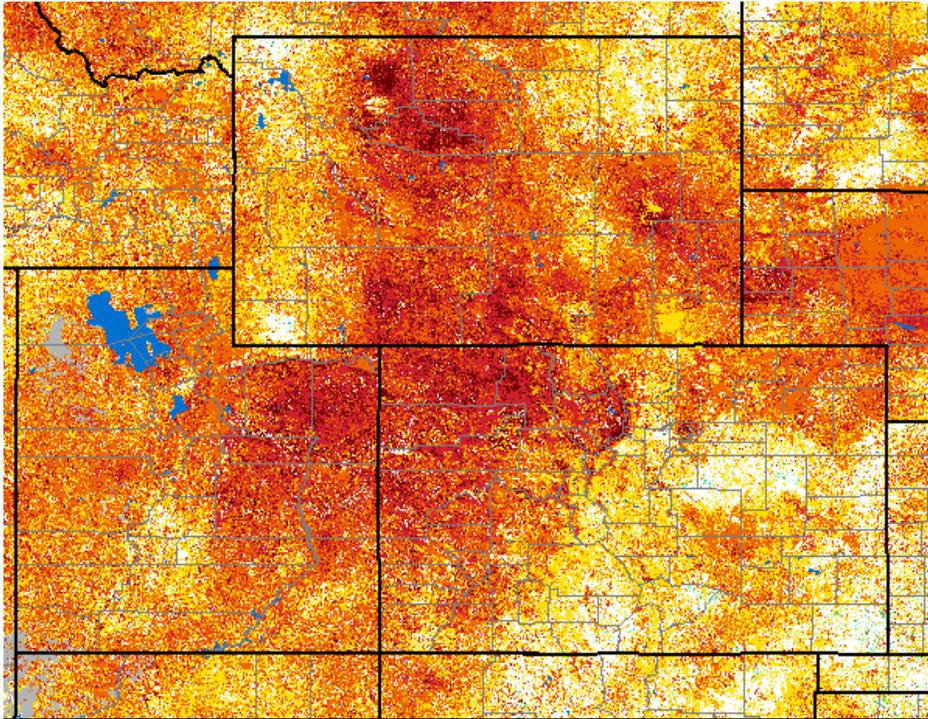


Fig. 5: eMODIS VegDRI satellite vegetation conditions as of July 15<sup>th</sup>.

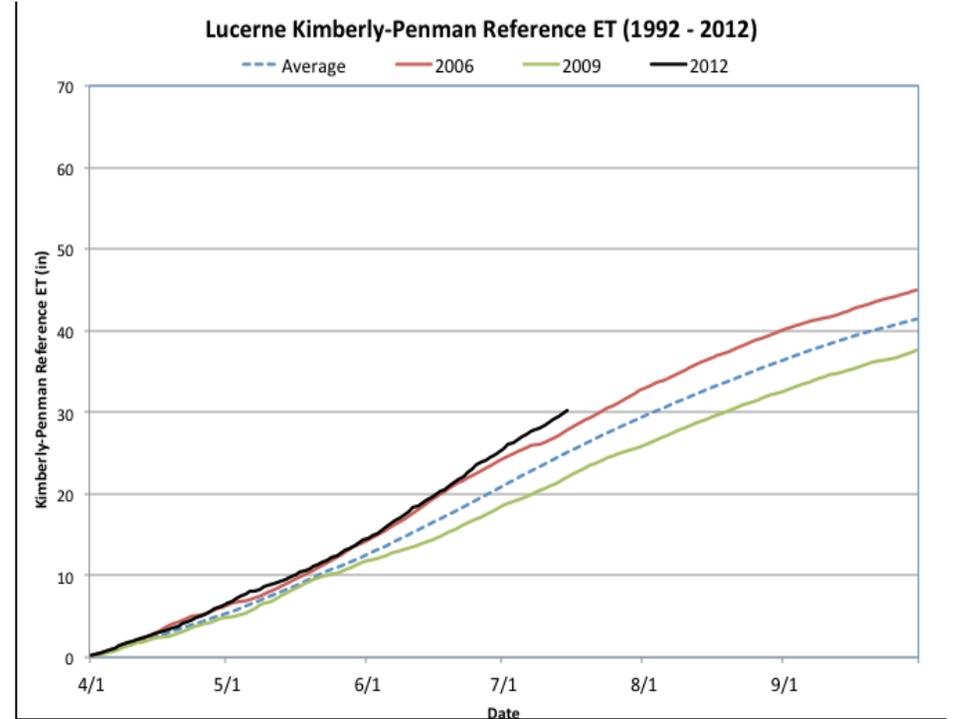
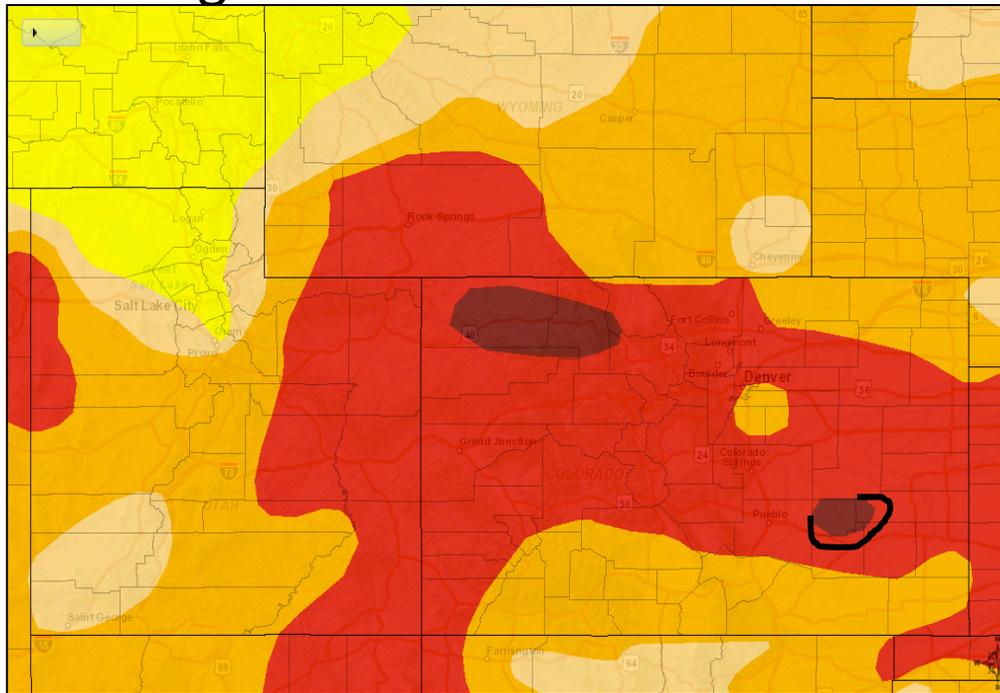


Fig. 6: Accumulated reference ET (black line) at Lucerne, CO in the northeast region, compared to the max year (red), min year (green), and average (dashed line).

# 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. 7: July 10<sup>th</sup> release of U.S. Drought Monitor for the UCRB.

**UCRB:** There remains disagreement about the D4 in northwest CO. Some precipitation has fallen over the region in the past couple weeks, streamflows have improved, and some reports are that impacts in the area only warrant a D3. One report from Routt County is that before the rains, on-the-ground conditions are the worst seen in the past 50 years, but that recent rains have led to short-term improvements; however, if more rain does not fall, conditions will quickly return to very bad. Some think D4 should be immediately removed while others would prefer to wait a week to see if more precipitation can further solidify any improvements seen. As there is no consensus, we defer to the U.S. Drought Monitor (USDM) author’s final decision. Status quo is recommended for the rest of the UCRB on the current depiction of the USDM map (Fig. 7).

**Eastern CO:** Several reports along the Arkansas valley in southeast CO are that conditions are some of the worst observed, with total liquidation of herds, totally dormant grasses and large crop losses. Without data to support widespread degradation, we recommend a slight expansion of D4 (Fig. 7, black line) and will revisit the possibility of further degradations next week. Status quo is recommended for the rest of eastern CO.