

# Autumn 2010

October 5<sup>th</sup>, 2010  
Review of Water Year 2010



**Weekly Climate, Water & Drought Assessment**

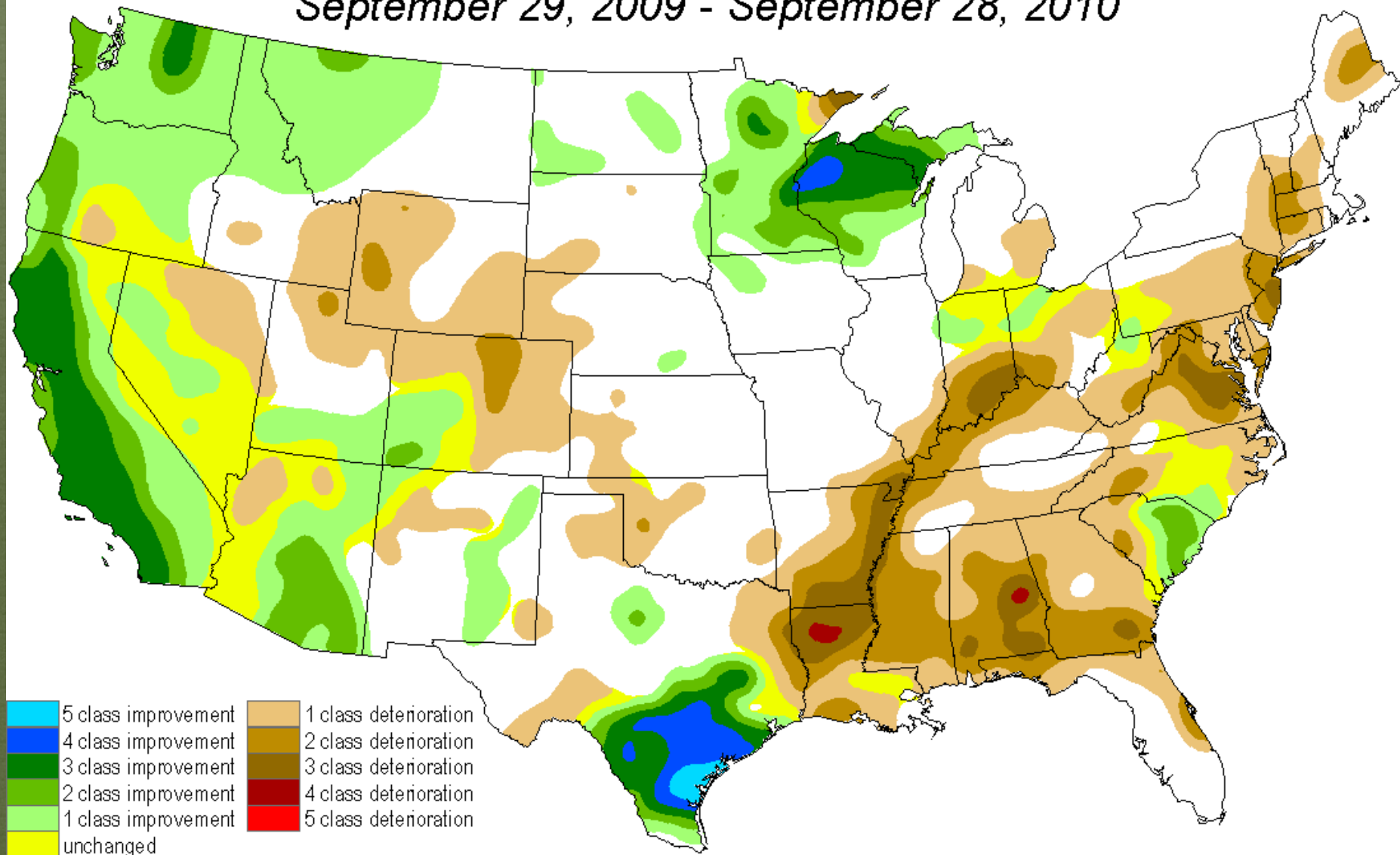
# Today's Agenda

- Assessment of current water conditions and review of Water Year 2010
- Precipitation Forecast
- Recommendations for Drought Monitor



# Water Year 2010 Net Drought Monitor Change

*September 29, 2009 - September 28, 2010*



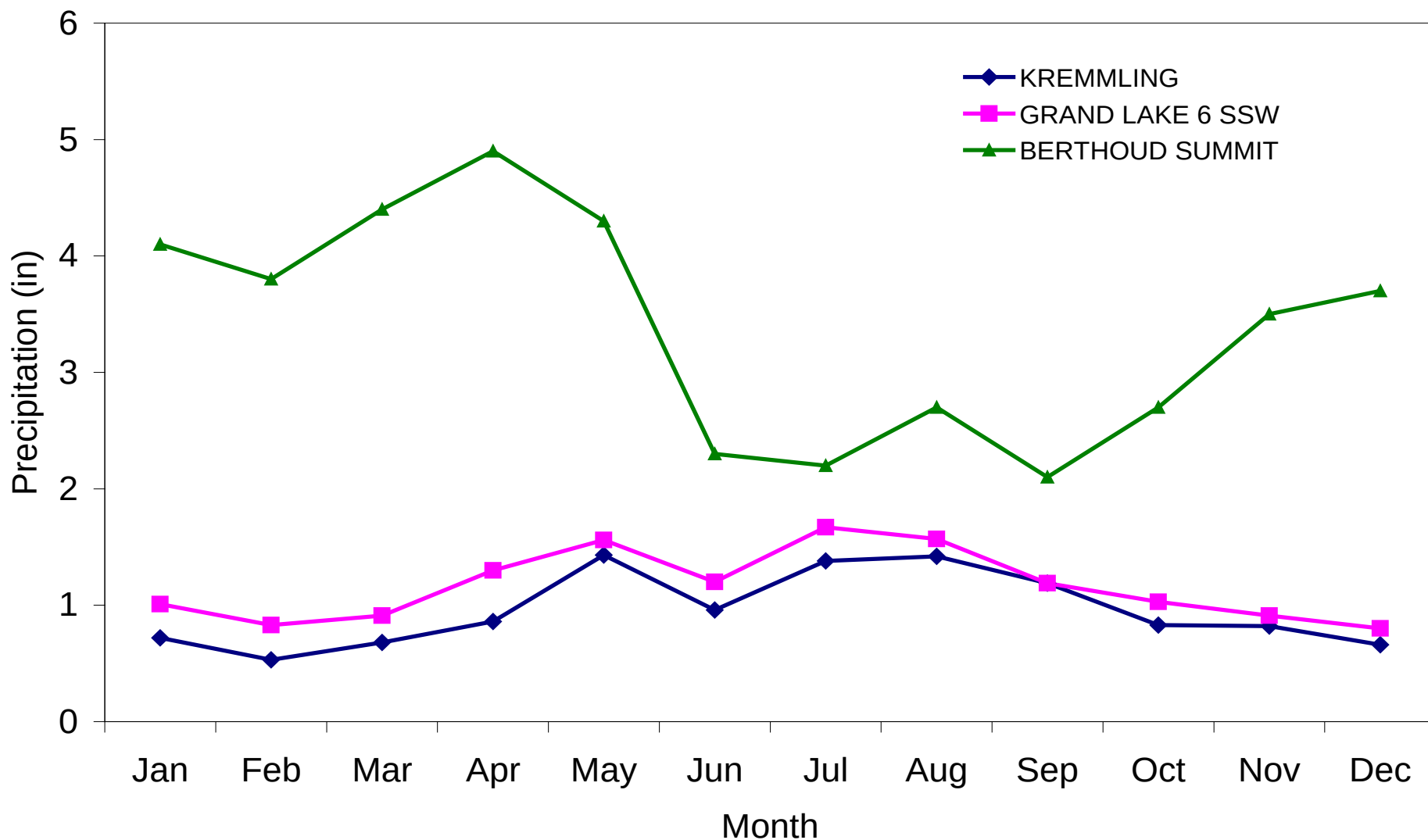
# Precipitation/Snowpack Update



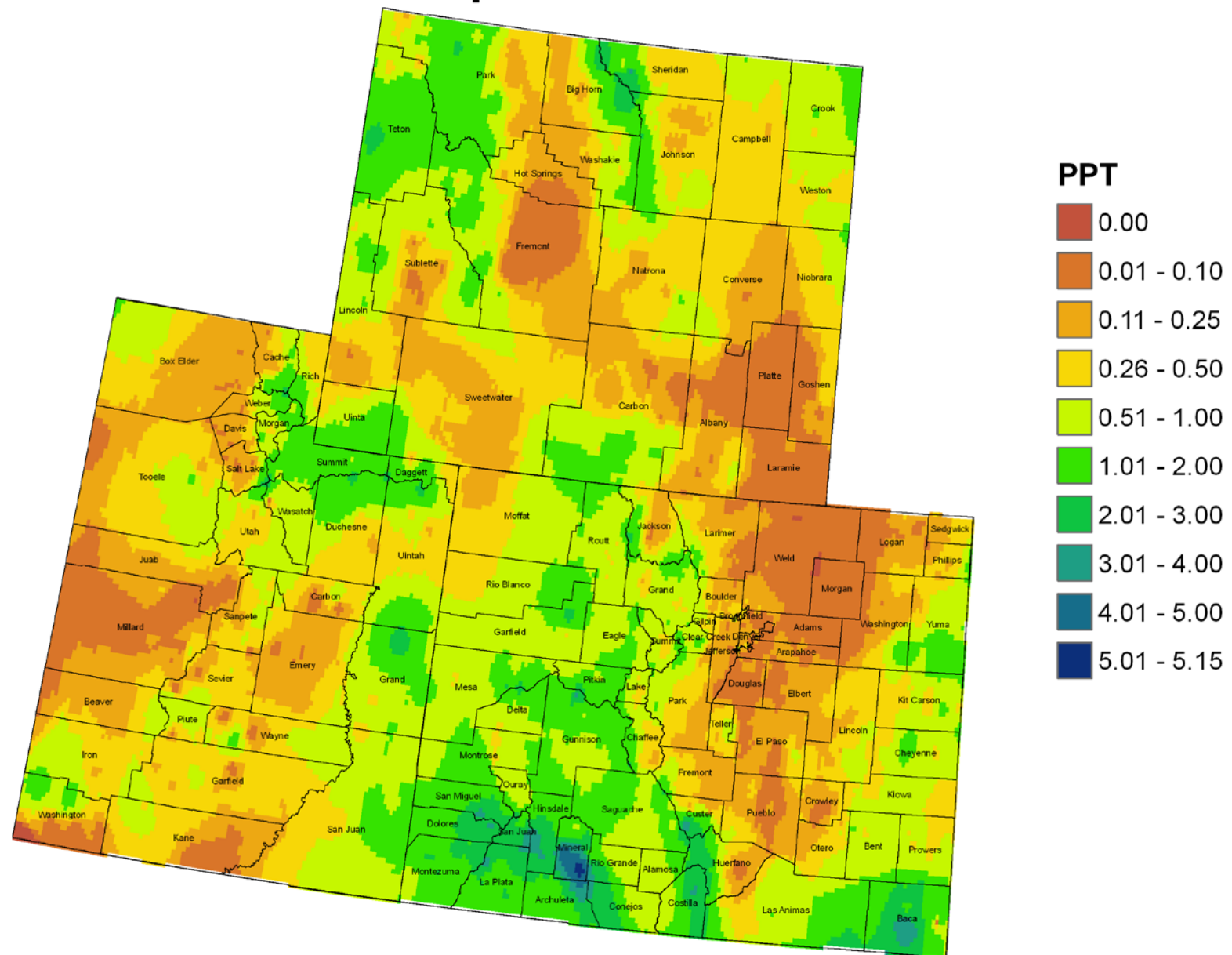


# Upper Colorado Normal Precipitation

Upper Colorado River Basin Normal Monthly Precipitation

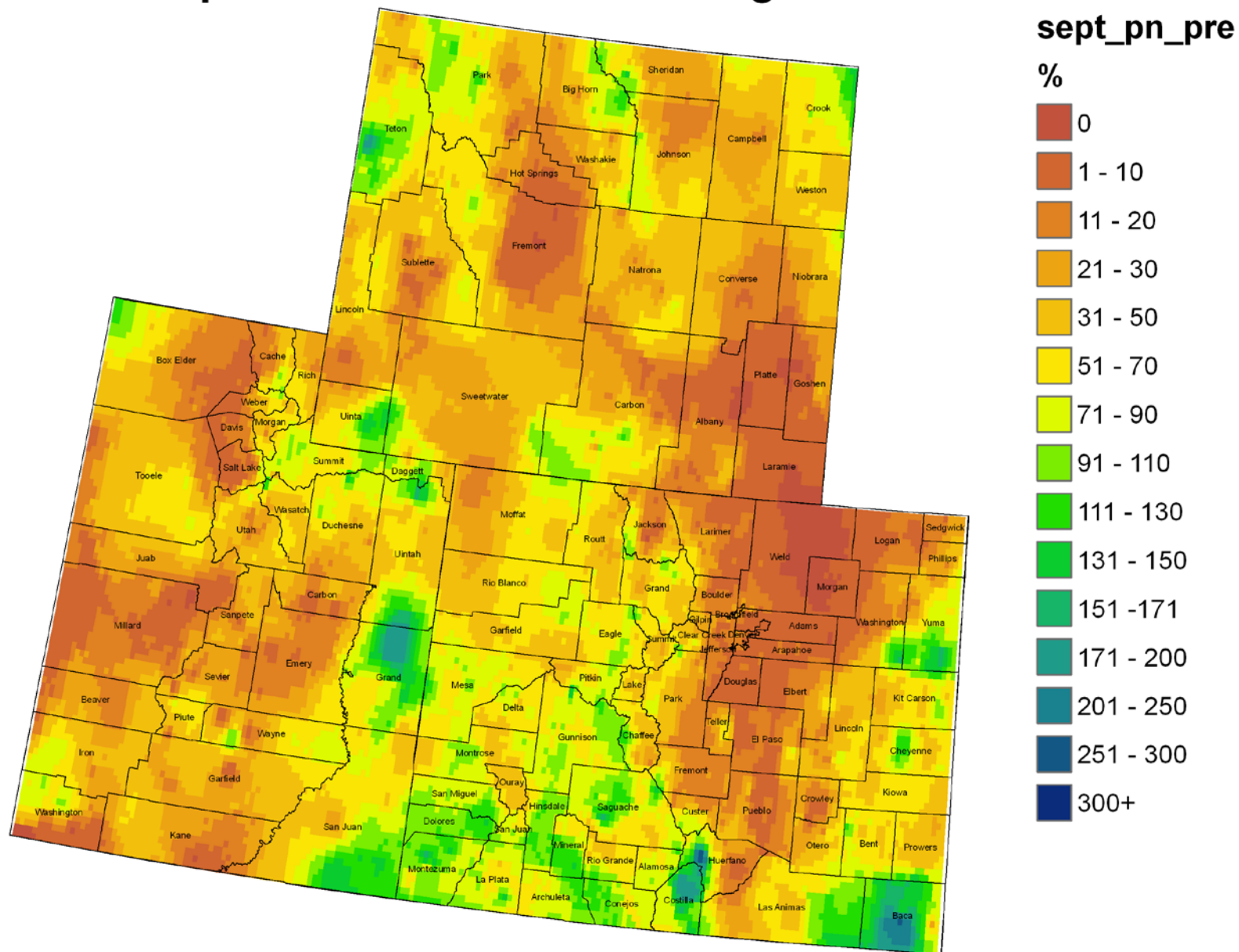


# Colorado, Utah and Wyoming Precipitation (in) September 2010





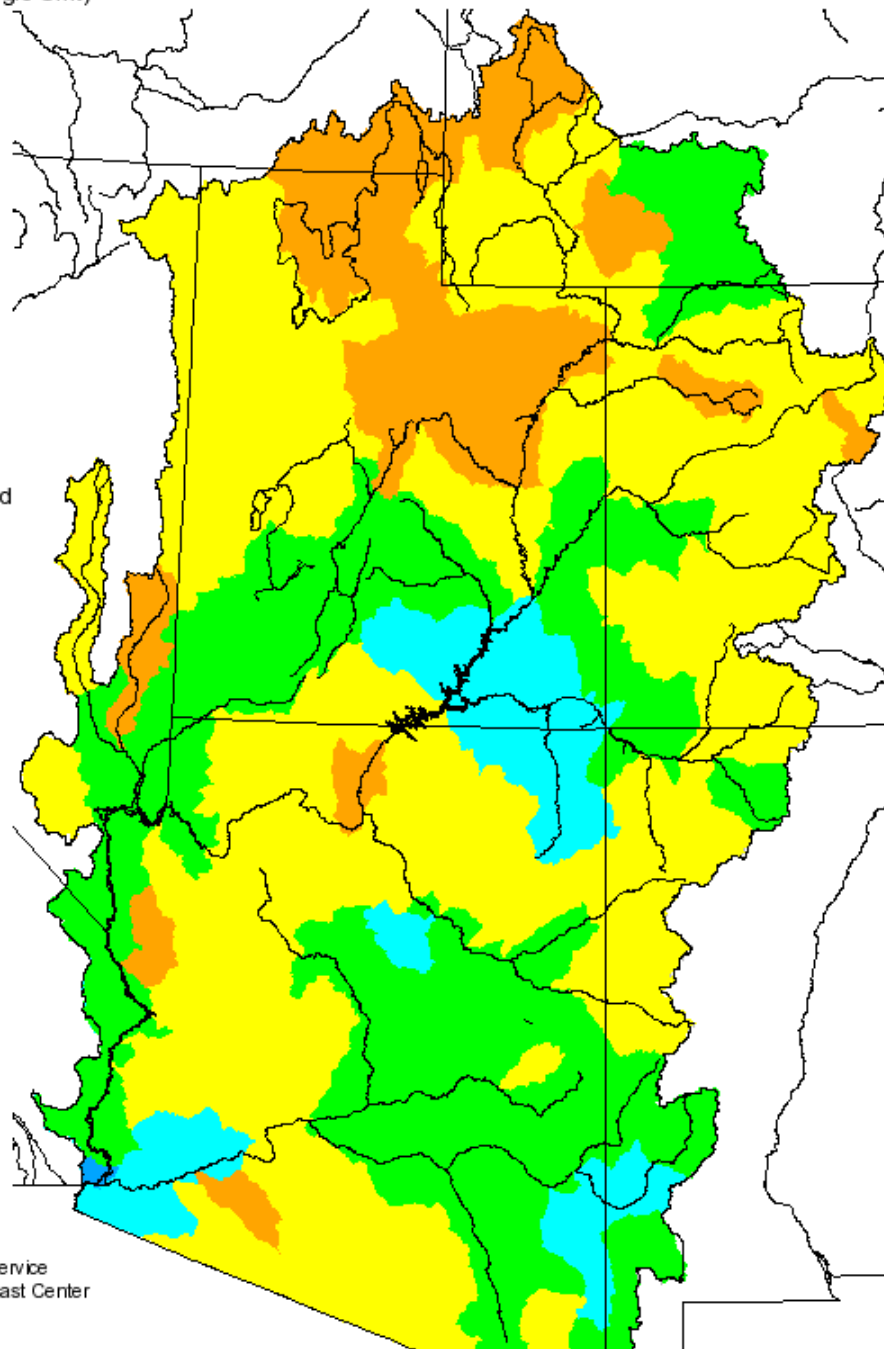
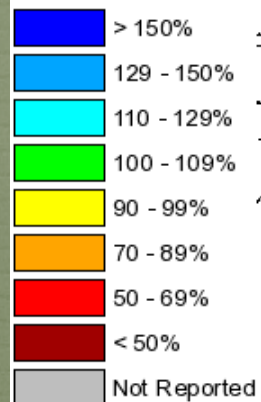
# Colorado, Utah and Wyoming Precipitation September 2010 As Percentage of Normal



# Seasonal Precipitation, October 2009 - September 2010

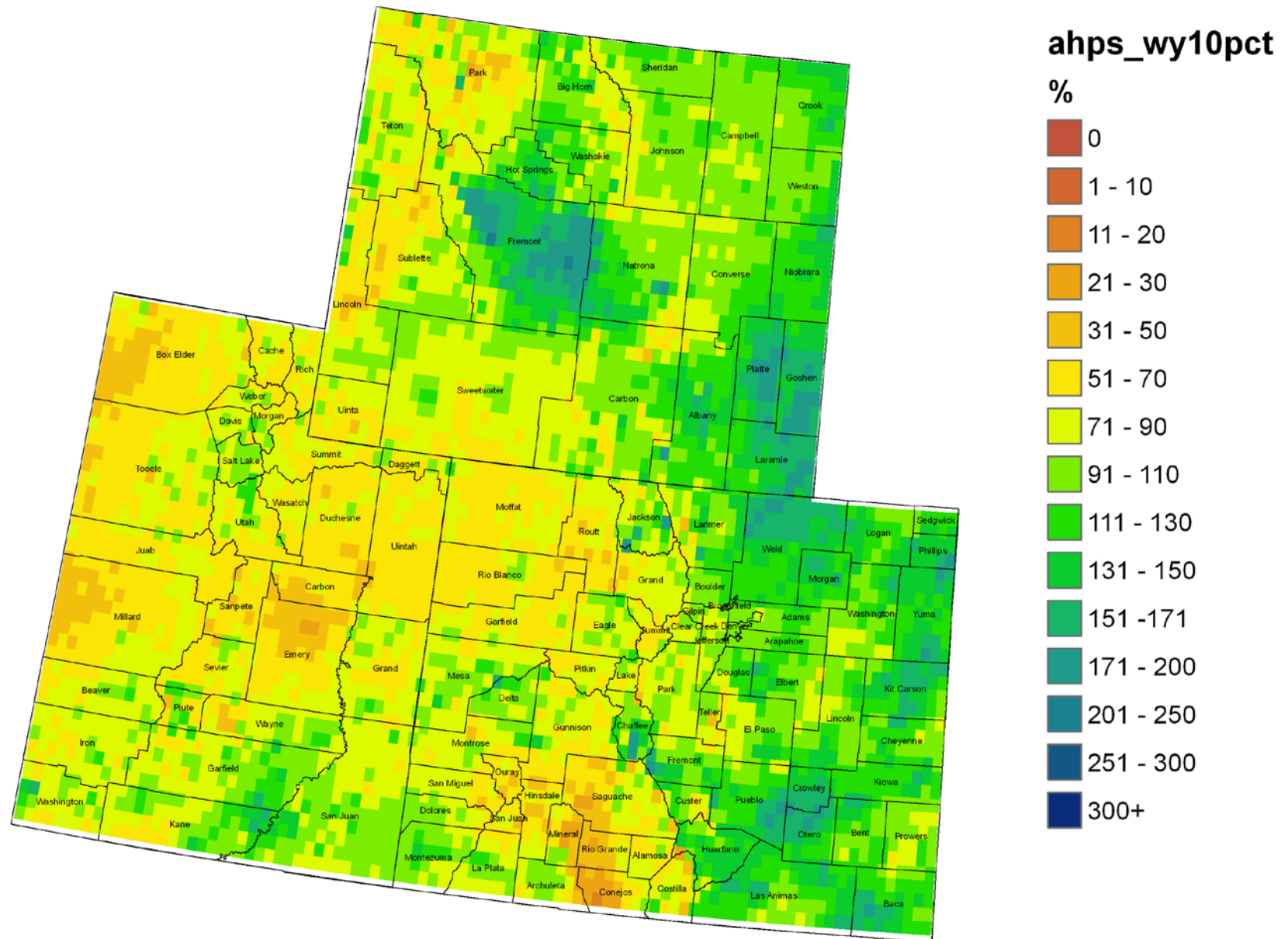
(Averaged by Hydrologic Unit)

## % Average



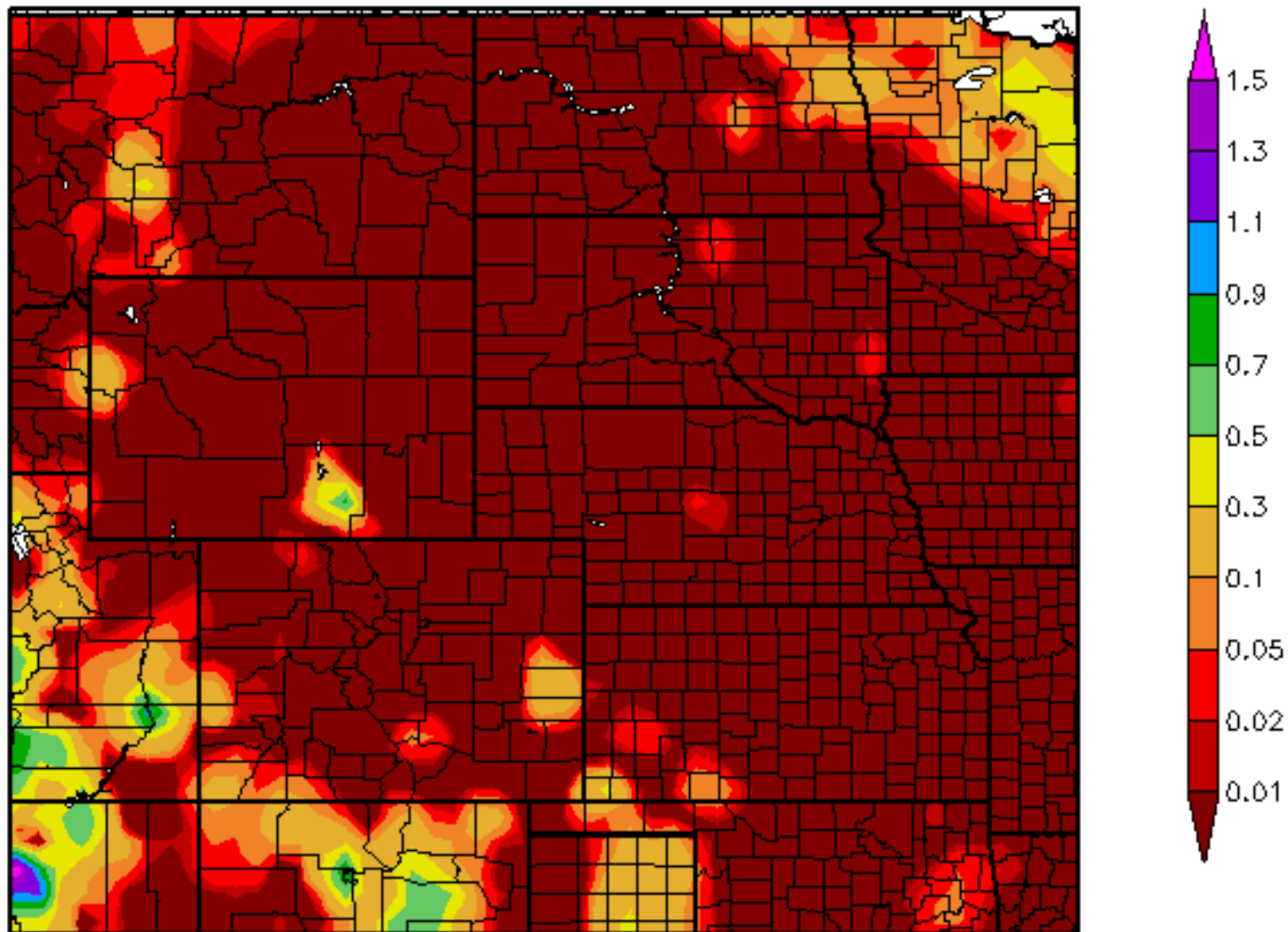
Prepared by  
NOAA, National Weather Service  
Colorado Basin River Forecast Center  
Salt Lake City, Utah  
[www.cbafc.noaa.gov](http://www.cbafc.noaa.gov)

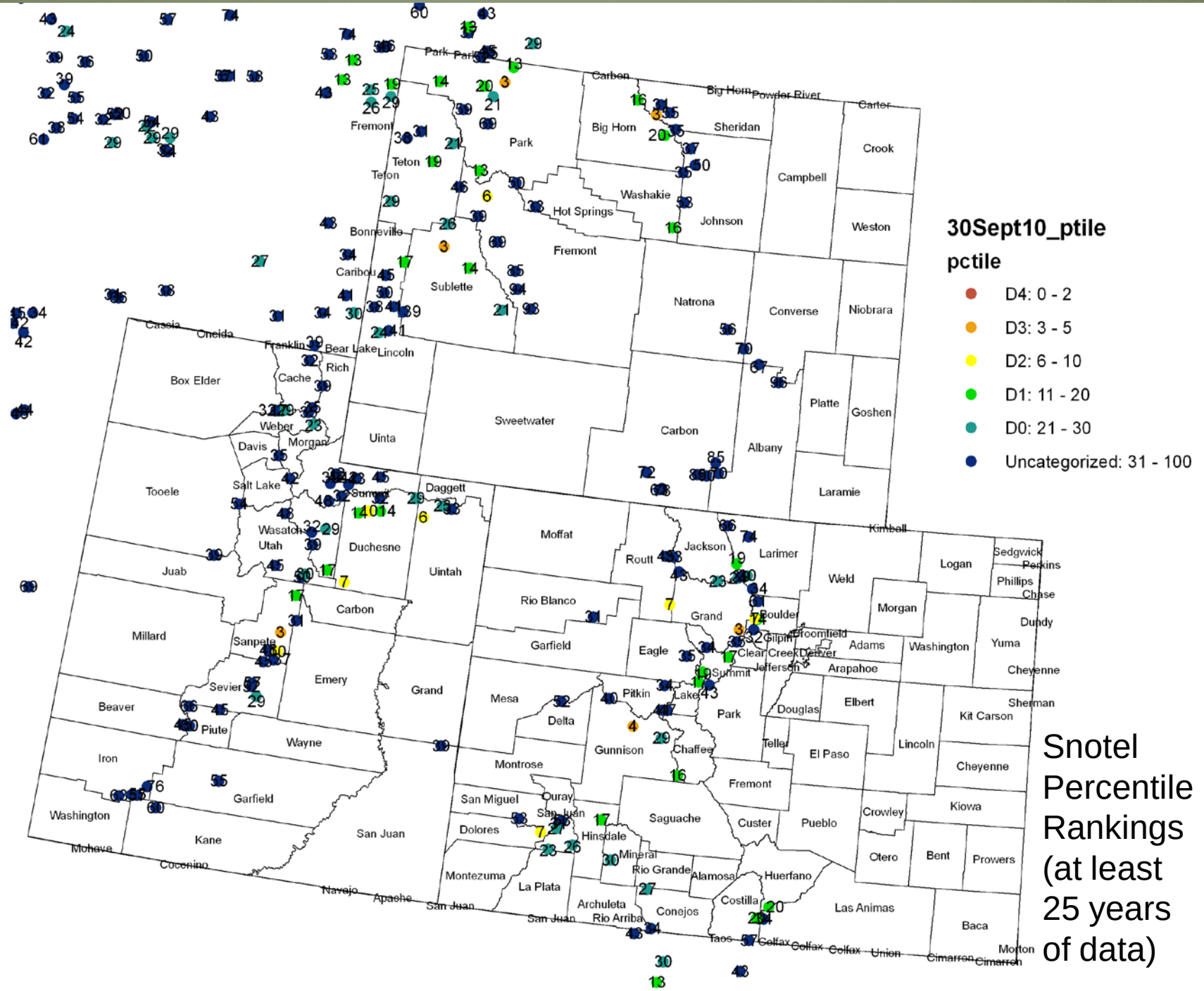
## Colorado, Utah and Wyoming Water Year 2010 Precipitation as Percentage of Normal





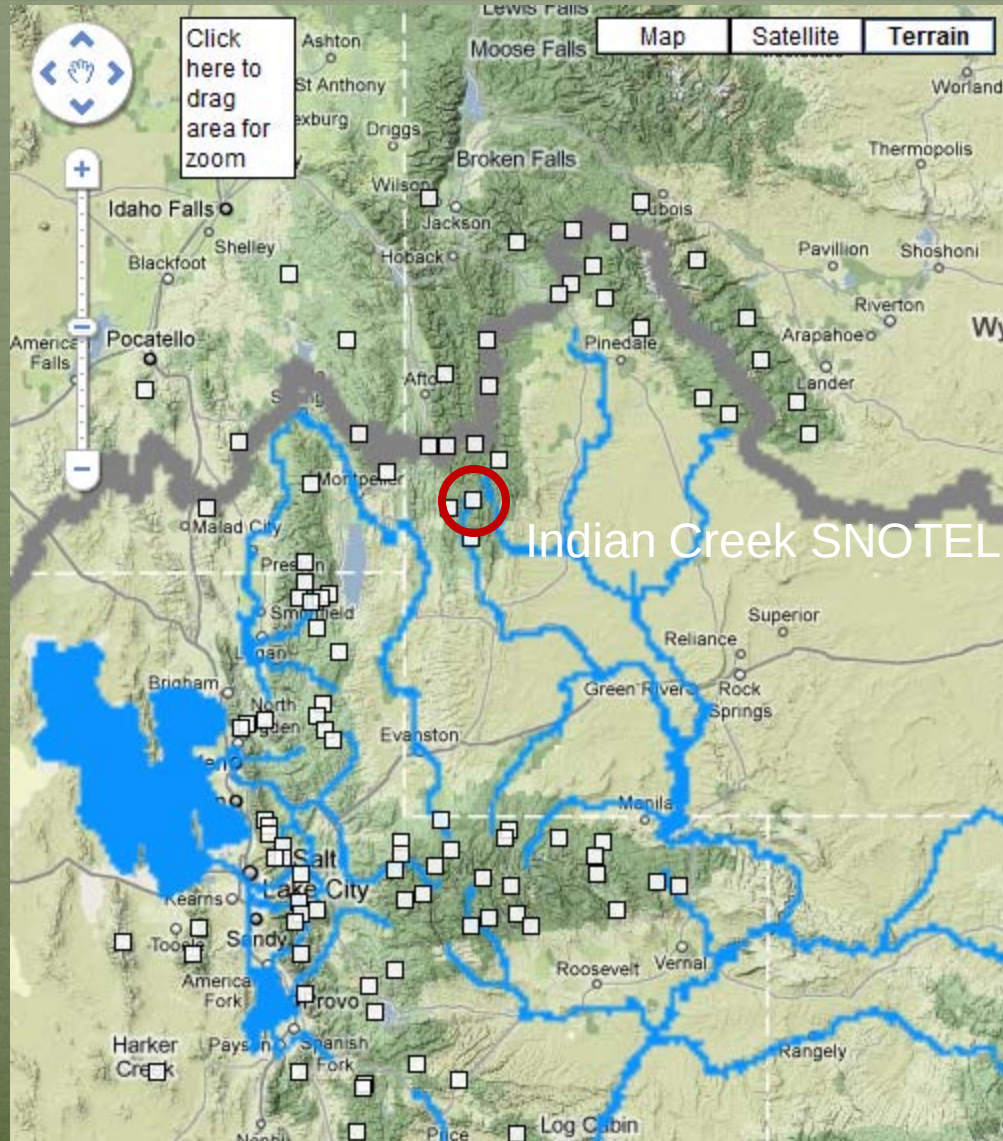
Precipitation (in)  
9/28/2010 – 10/4/2010







# Green River Basin

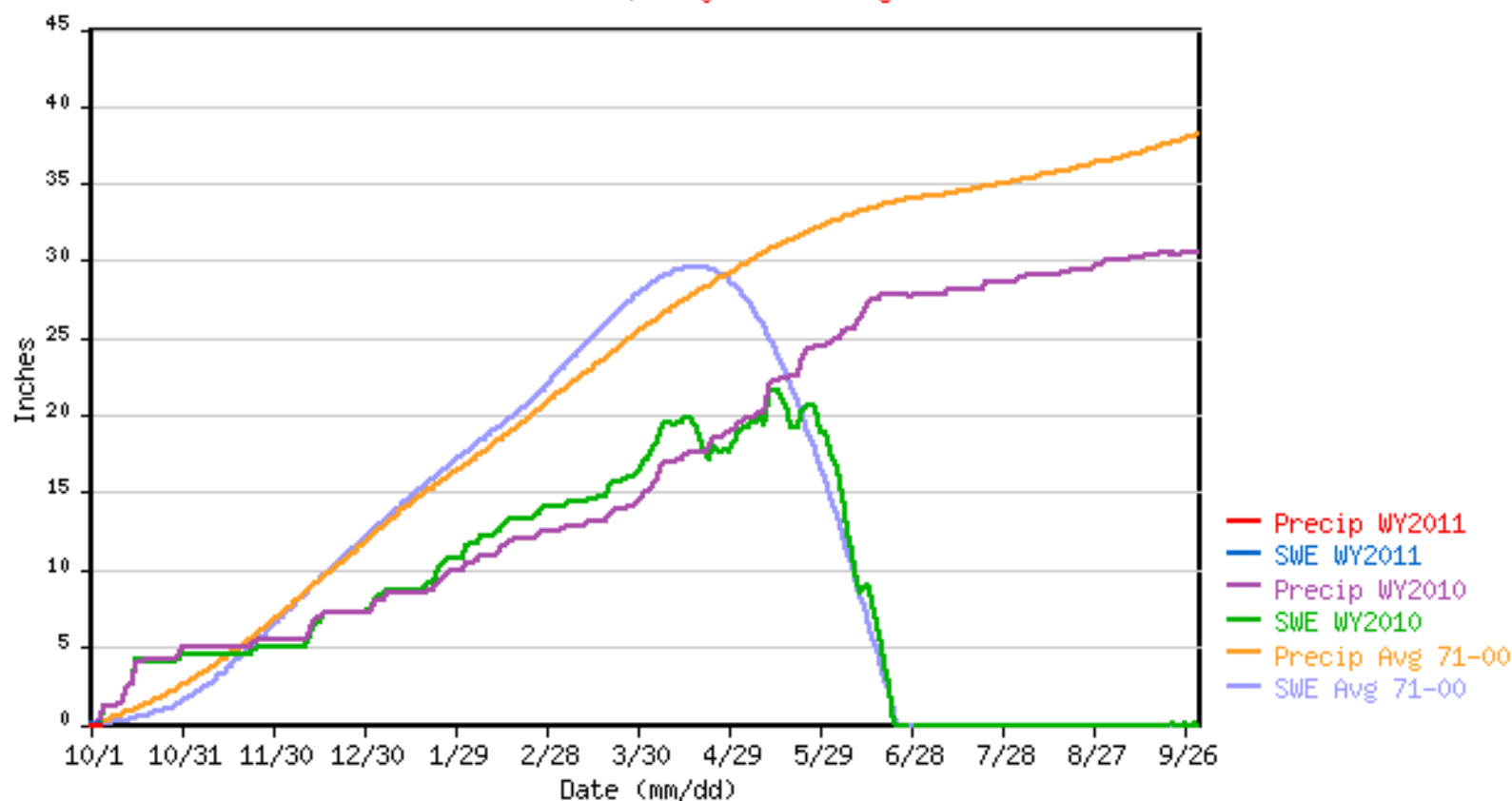




# Green River Basin

INDIAN CREEK SNOTEL as of 10/04/2010

\*\*\* Provisional Data, Subject to Change \*\*\*



# Duchesne River Basin

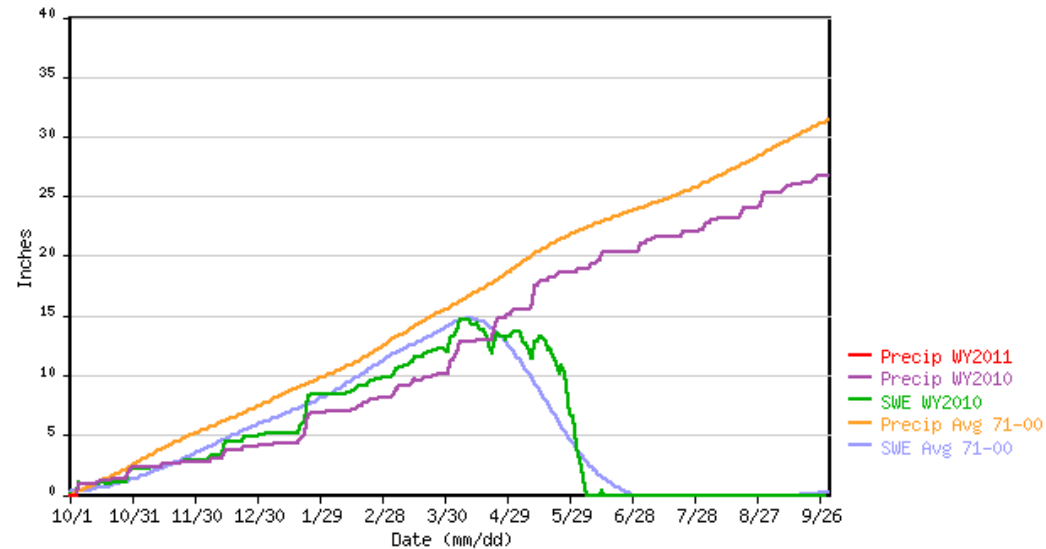




# Duchesne River Basin

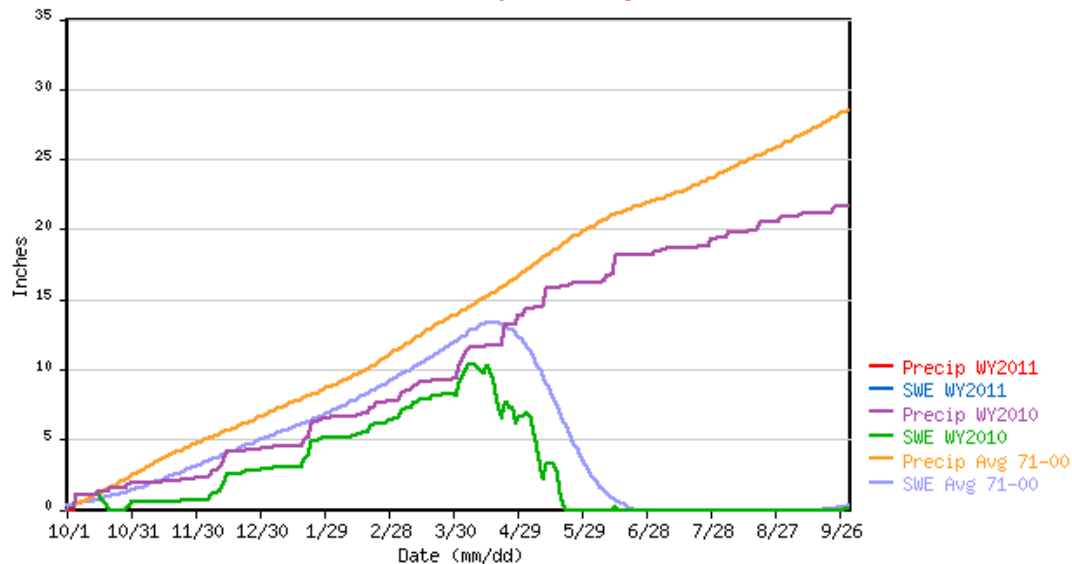
CHEPETA SNOTEL as of 10/04/2010

\*\*\* Provisional Data, Subject to Change \*\*\*



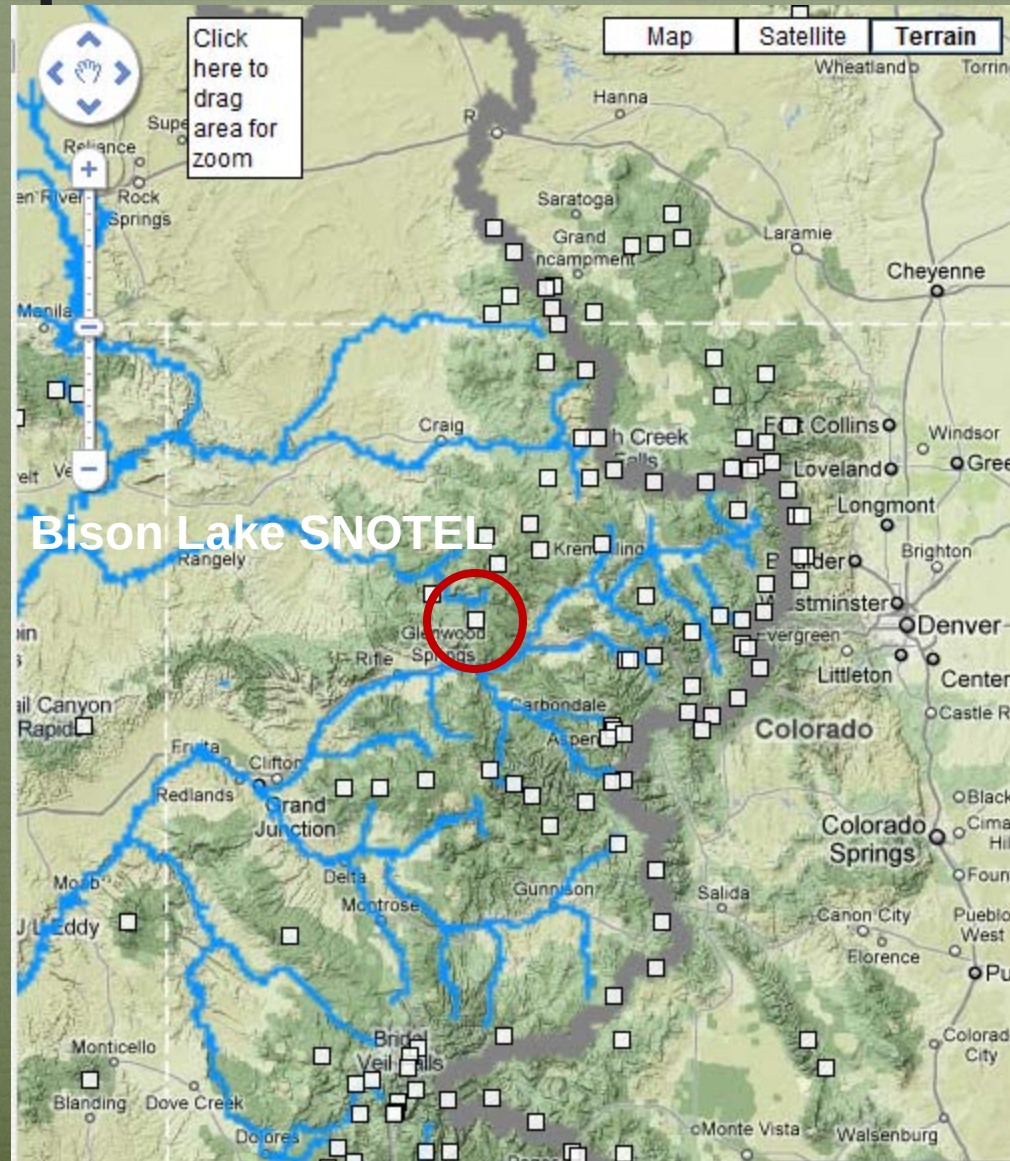
MOSBY MTN. SNOTEL as of 10/04/2010

\*\*\* Provisional Data, Subject to Change \*\*\*





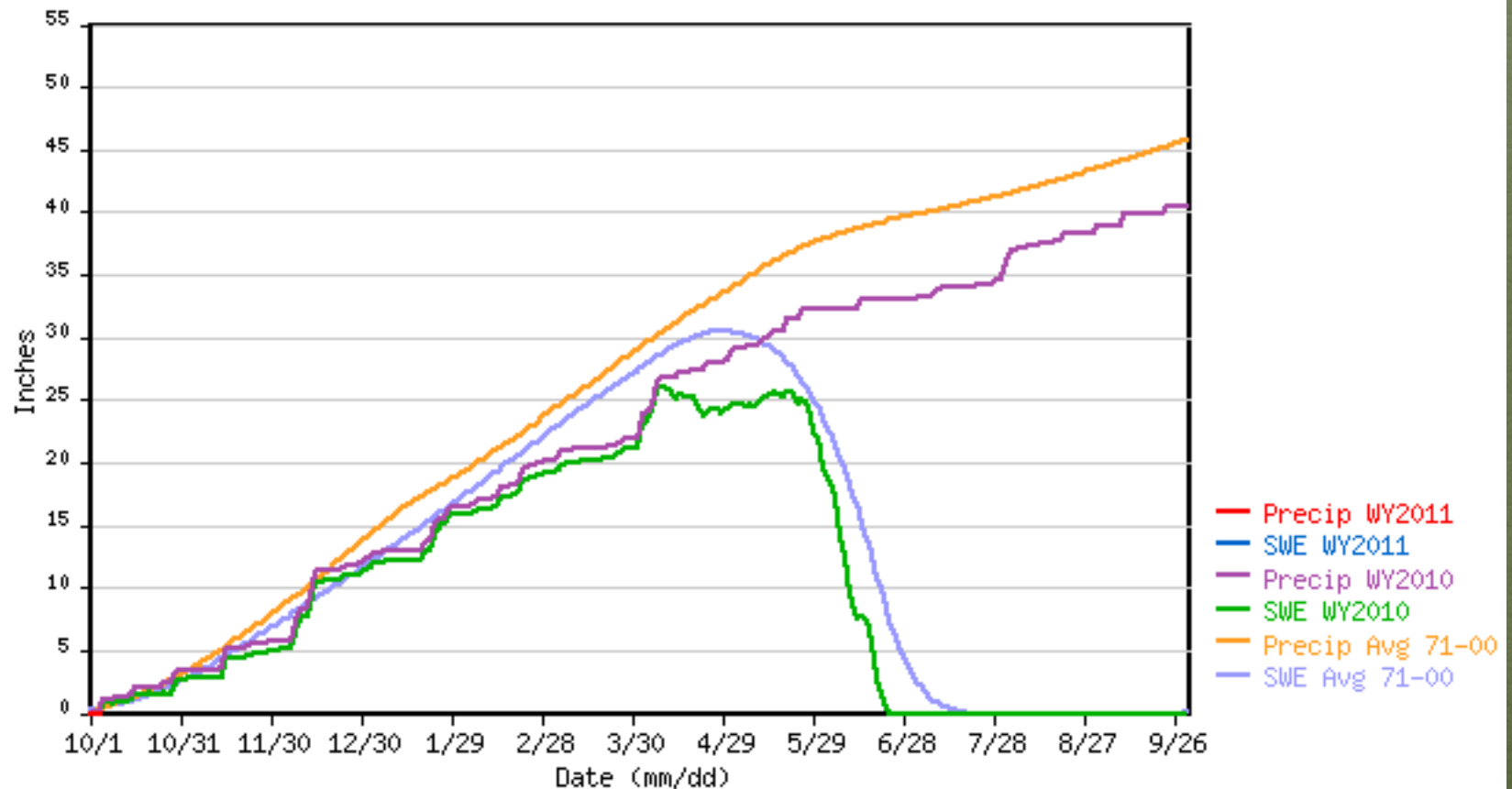
# Upper Colorado Basin



# Upper Colorado Basin

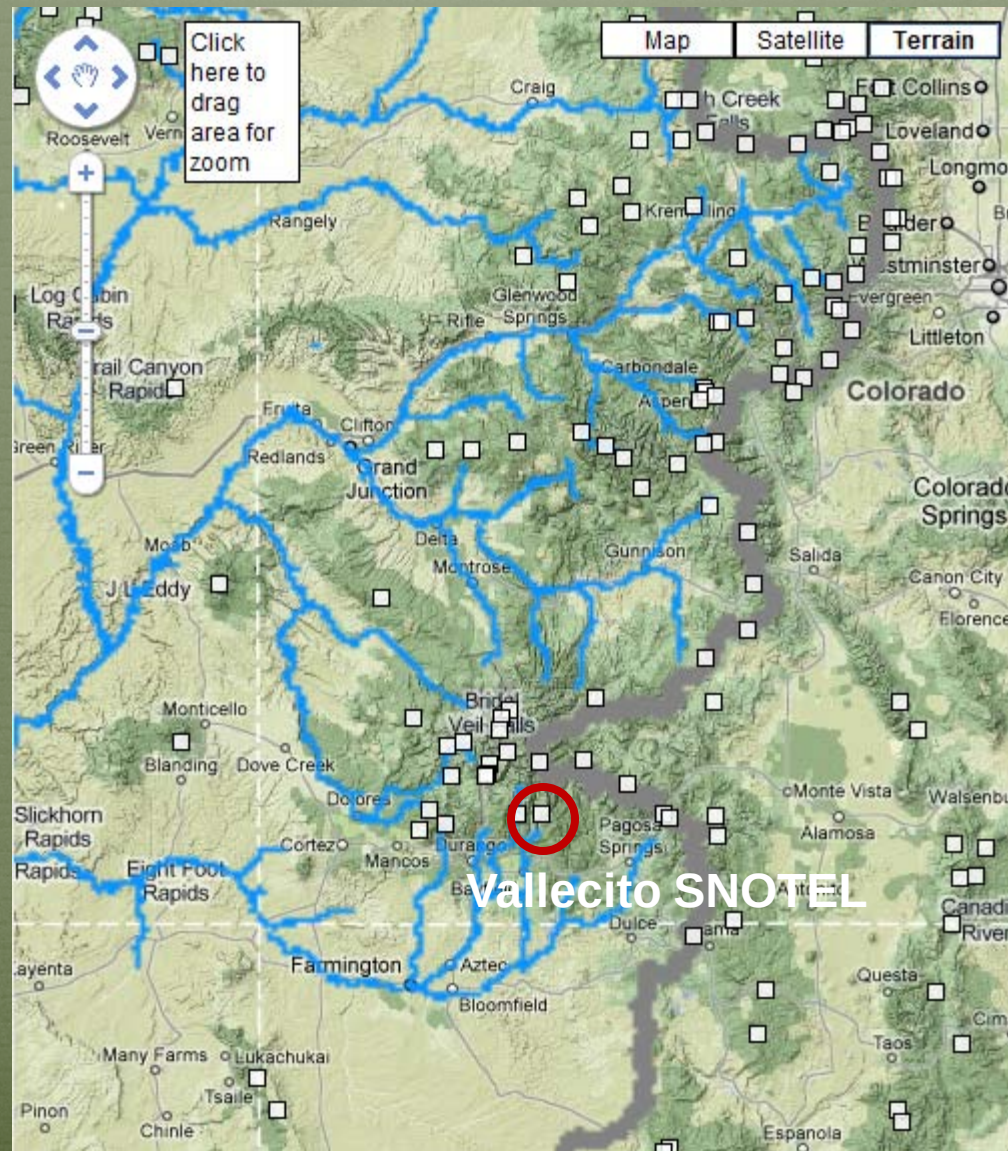
BISON LAKE SNOTEL as of 10/04/2010

\*\*\* Provisional Data, Subject to Change \*\*\*





# San Juan Basin

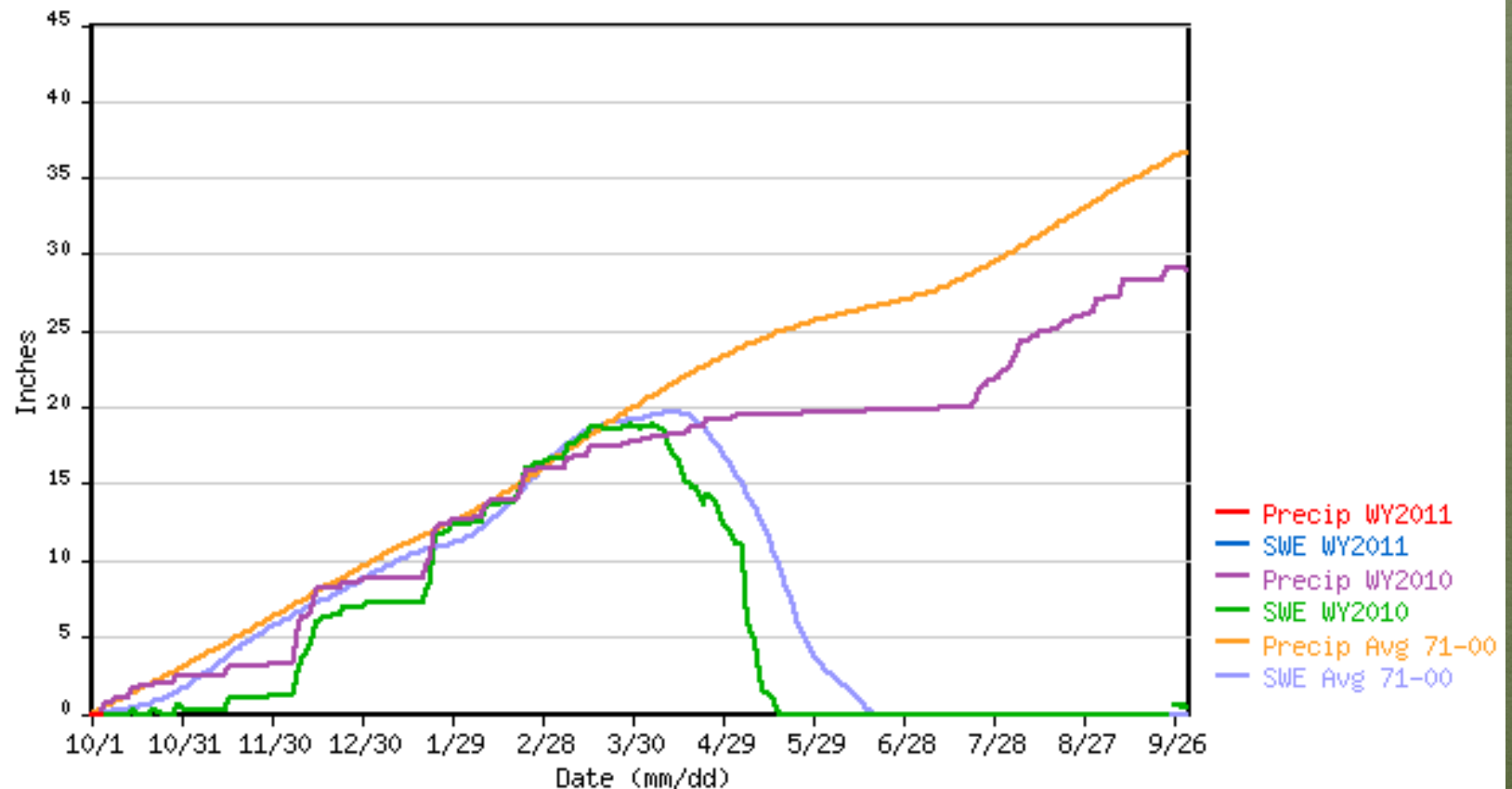




# San Juan Basin

VALLECITO SNOTEL as of 10/04/2010

\*\*\* Provisional Data, Subject to Change \*\*\*



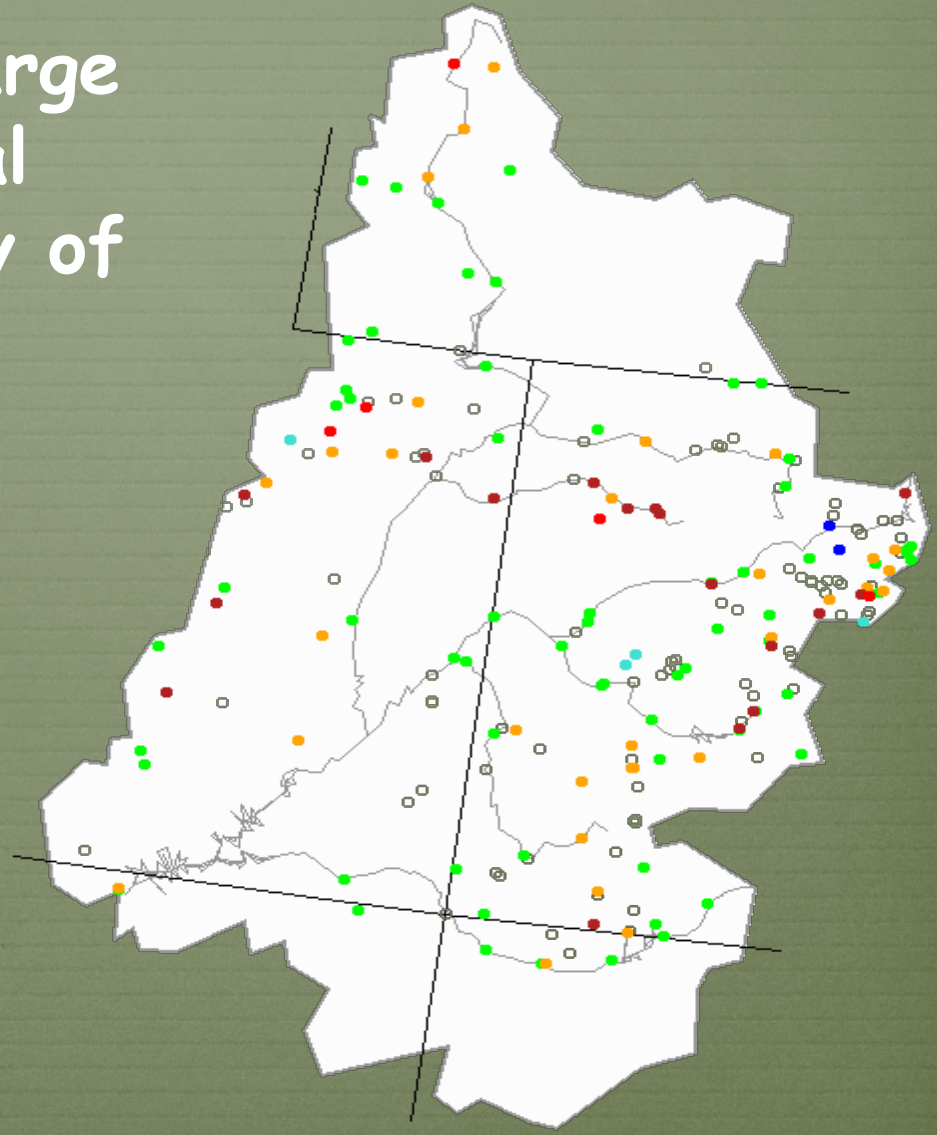
# Streamflow Update

Cory Angeroth USGS





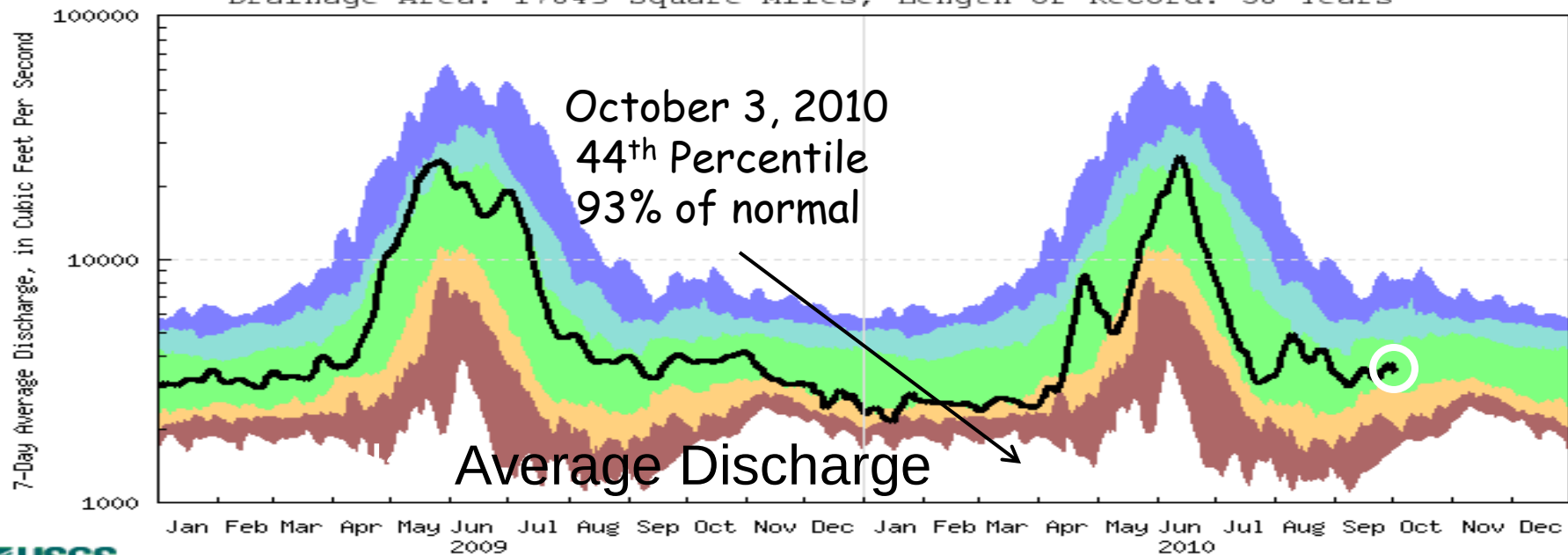
7-day average discharge  
compared to historical  
discharge for the day of  
the year  
(October 3)



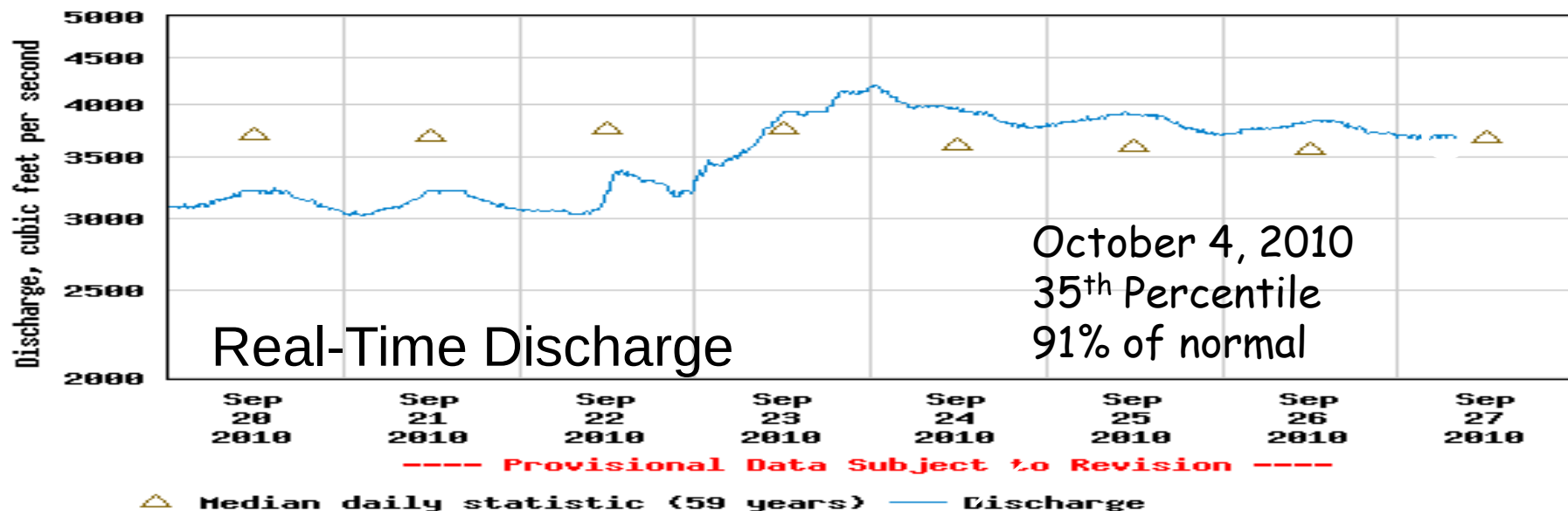
Explanation - Percentile classes

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

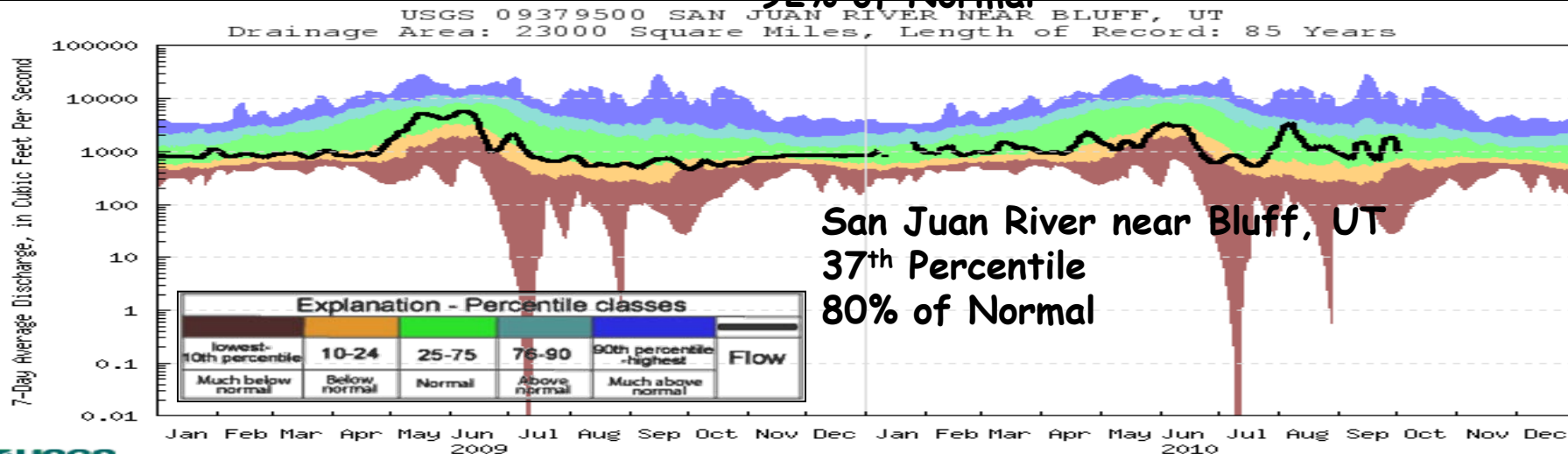
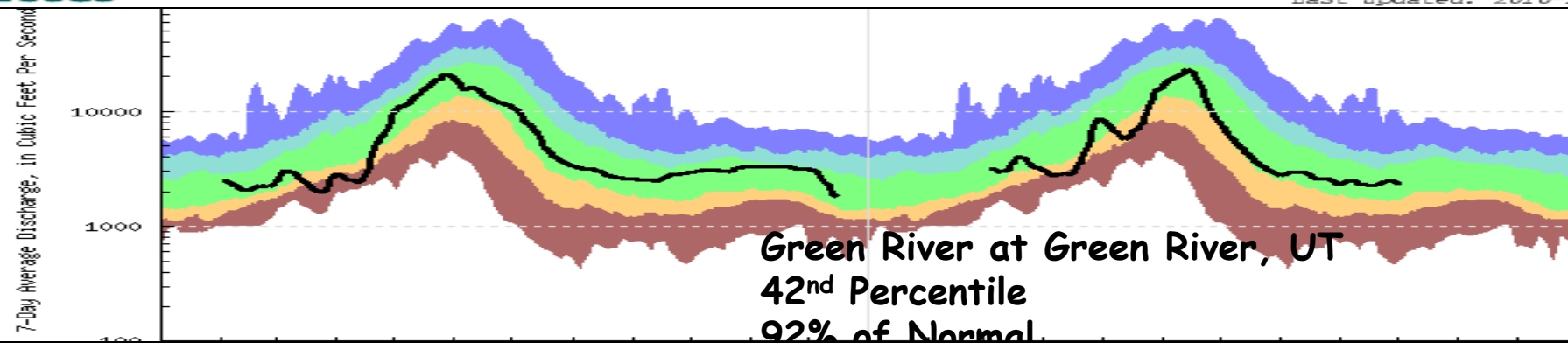
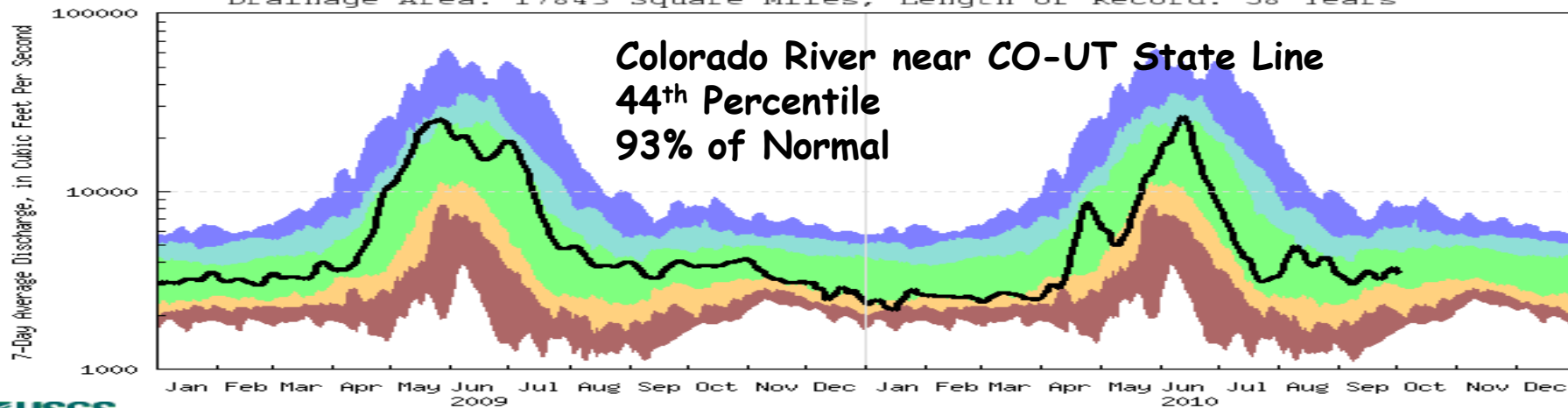
USGS 09163500 COLORADO RIVER NEAR COLORADO-UTAH STATE LINE  
Drainage Area: 17843 Square Miles, Length of Record: 58 Years



USGS 09163500 COLORADO RIVER NEAR COLORADO-UTAH STATE LINE

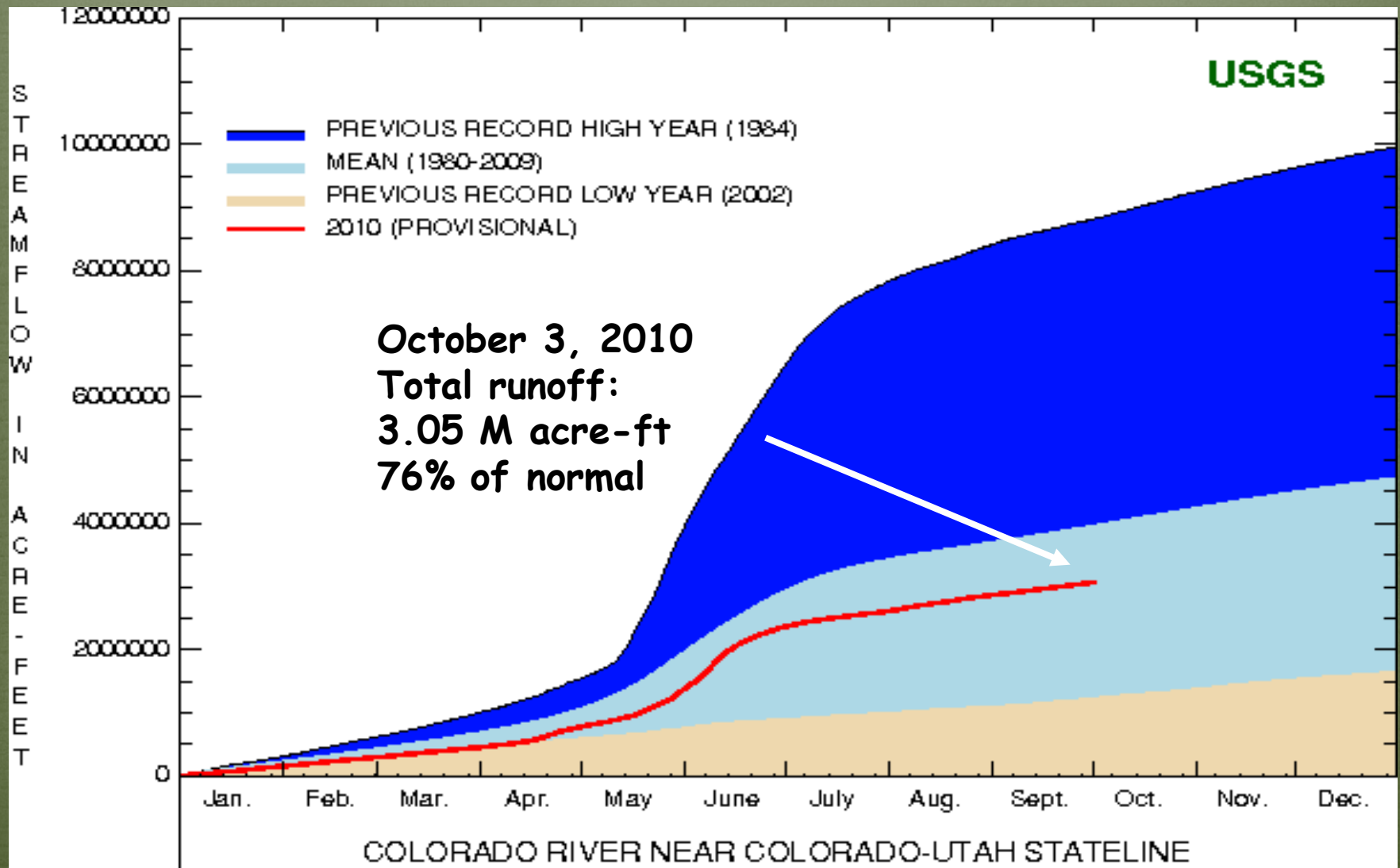






# Cumulative Runoff

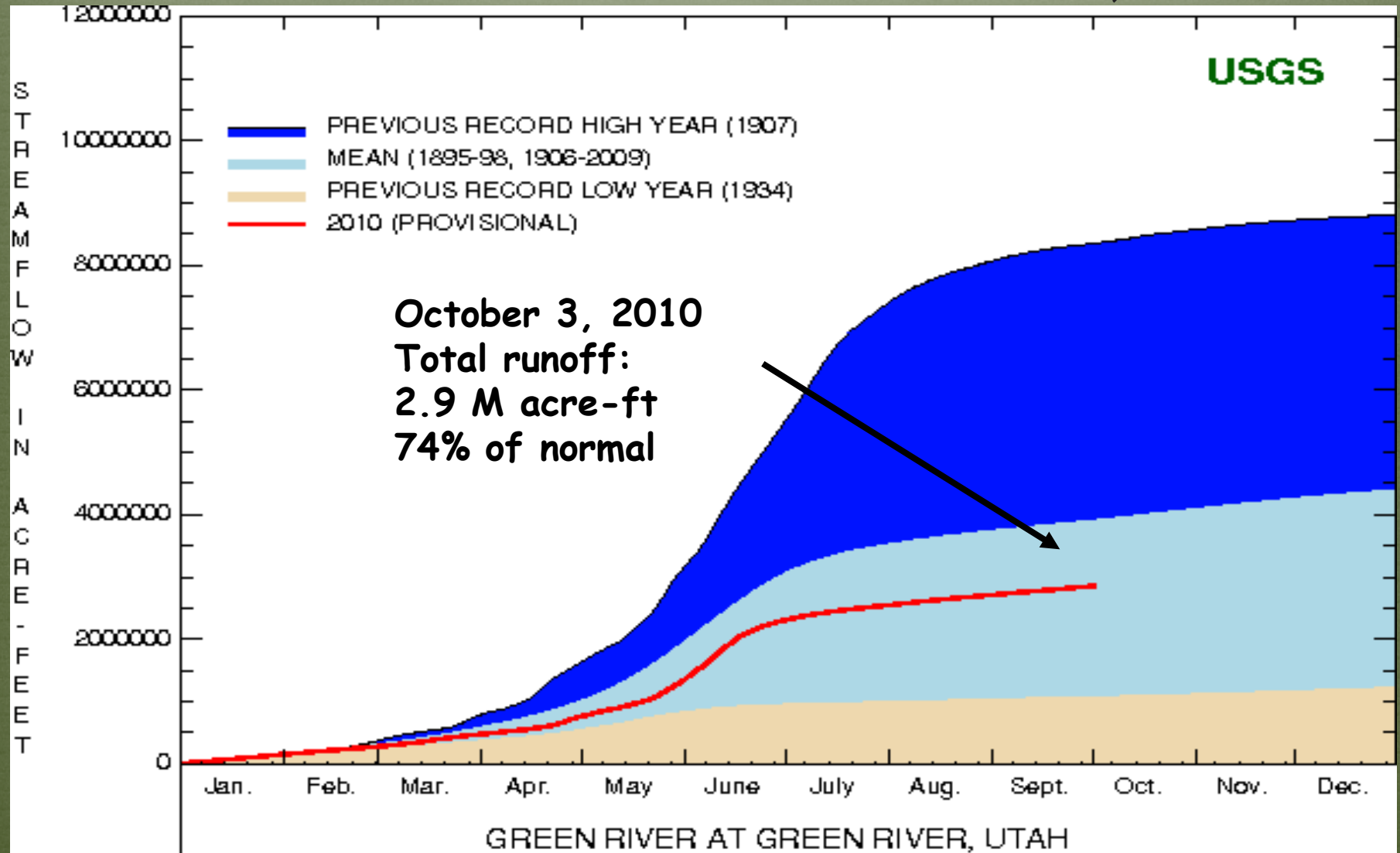
## Colorado River at CO-UT Line





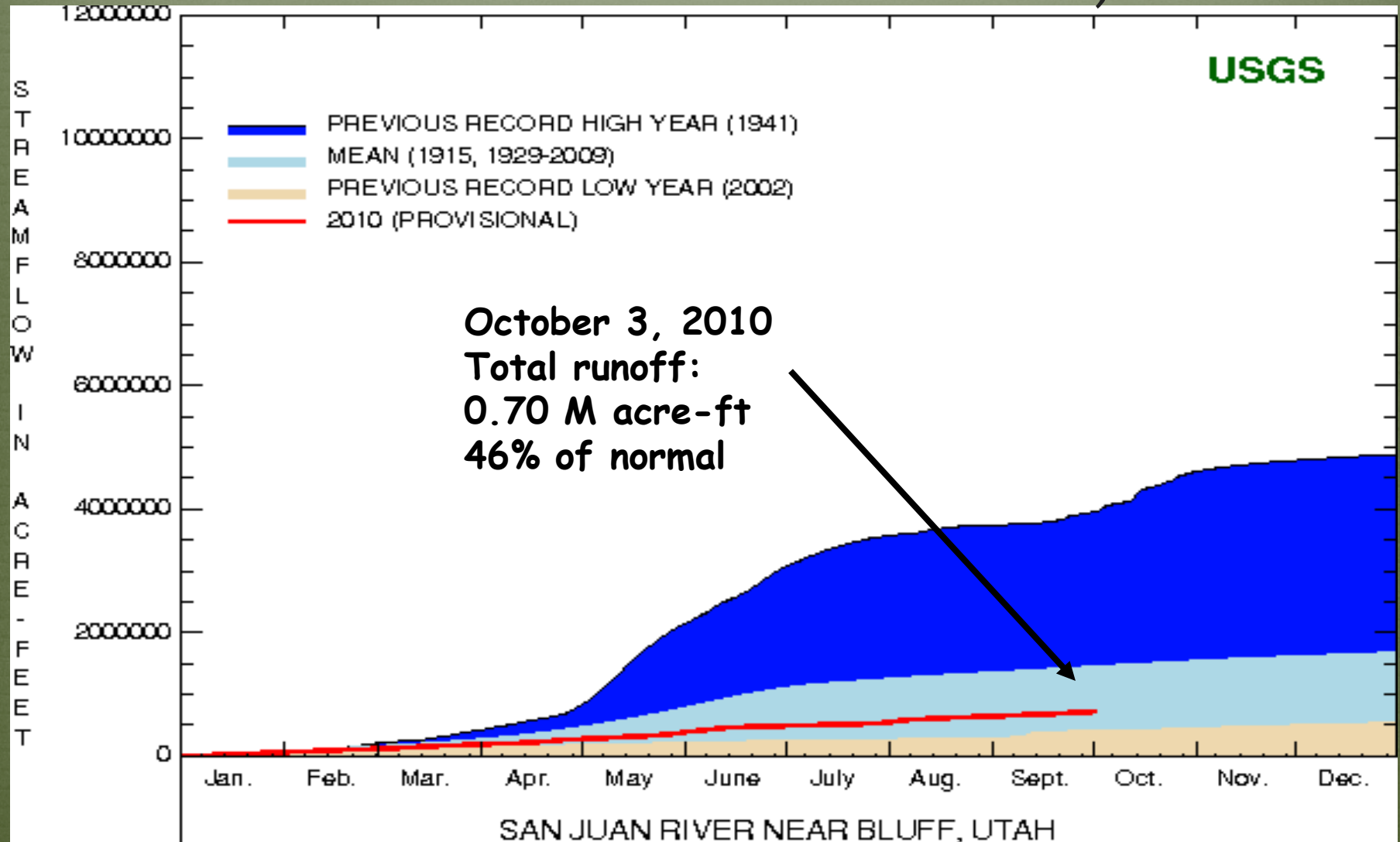
# Cumulative Runoff

## Green River at Green River, UT



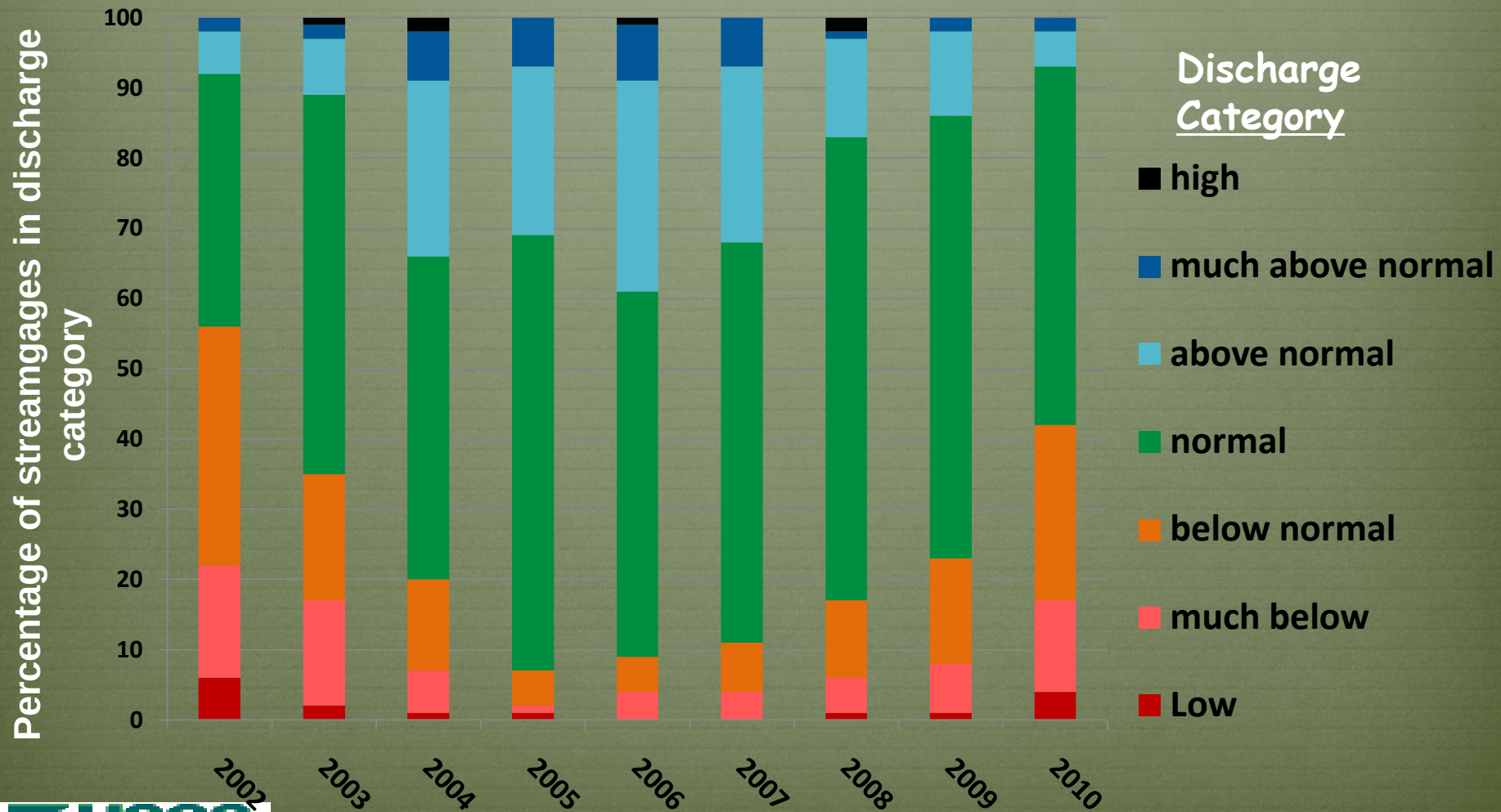
# Cumulative Runoff

## San Juan River at Bluff, UT





# -Upper Colorado River Basin- Comparison of 7-day Average Discharge For October 2, 2002-2010

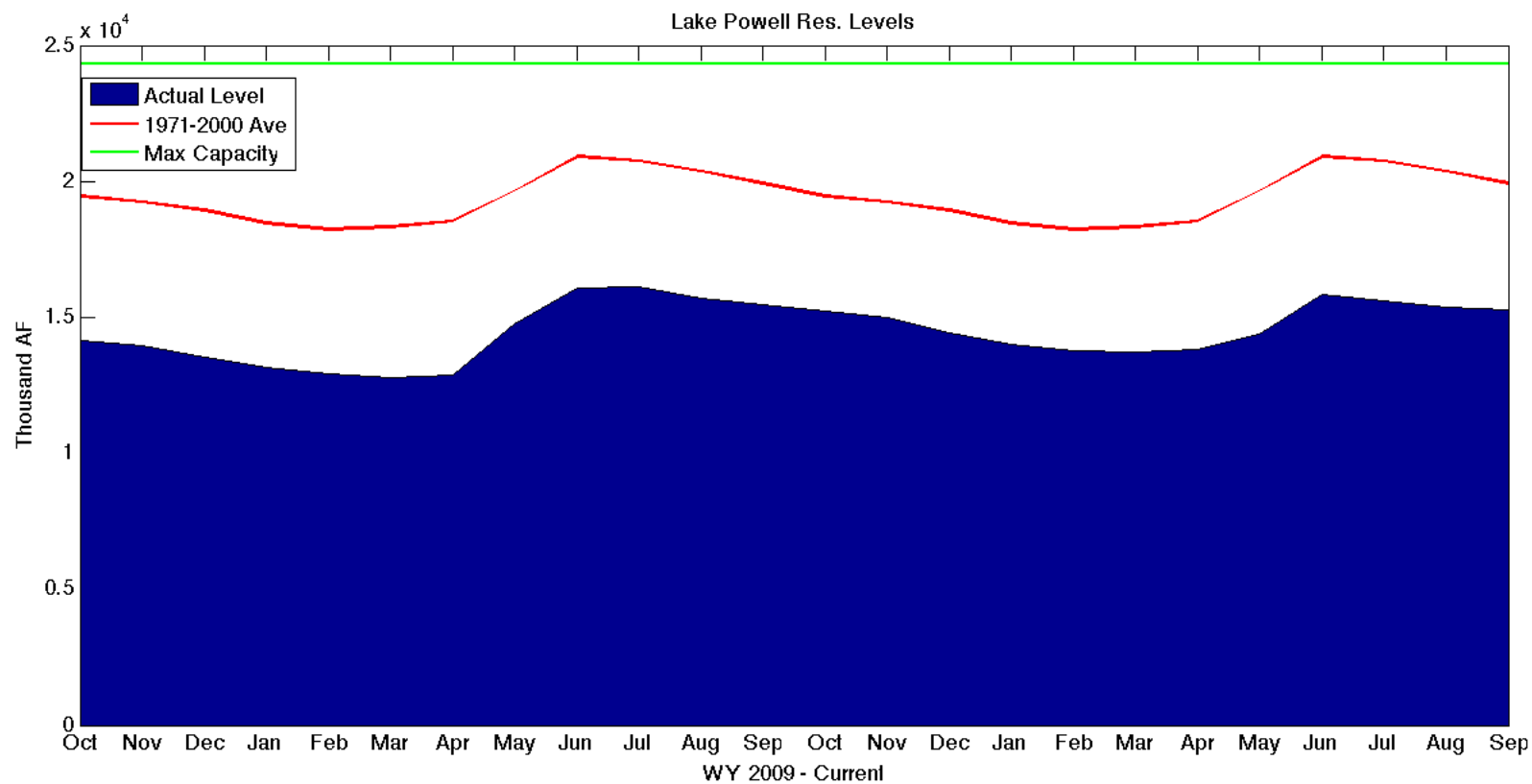




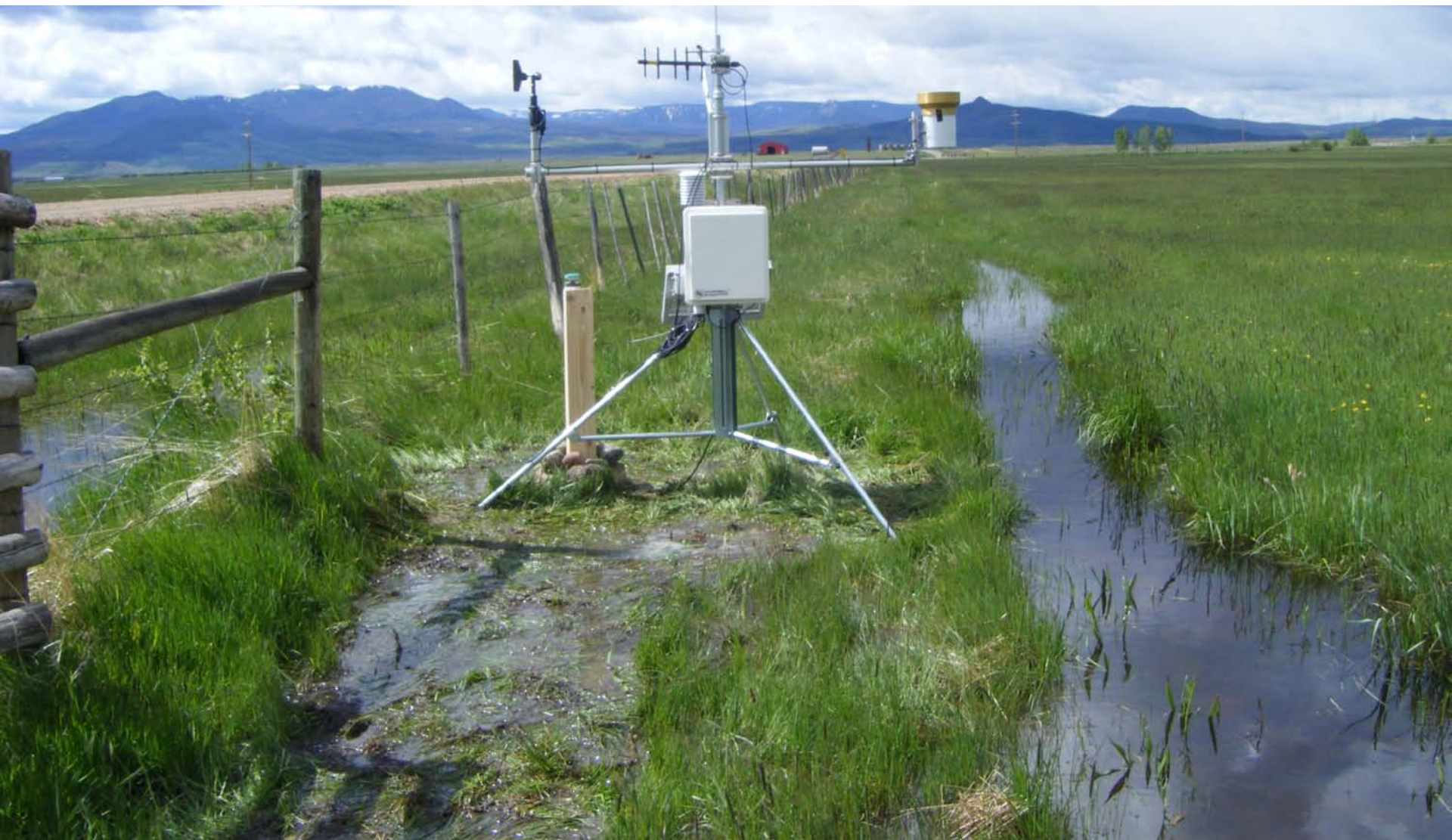
# Reservoir Update







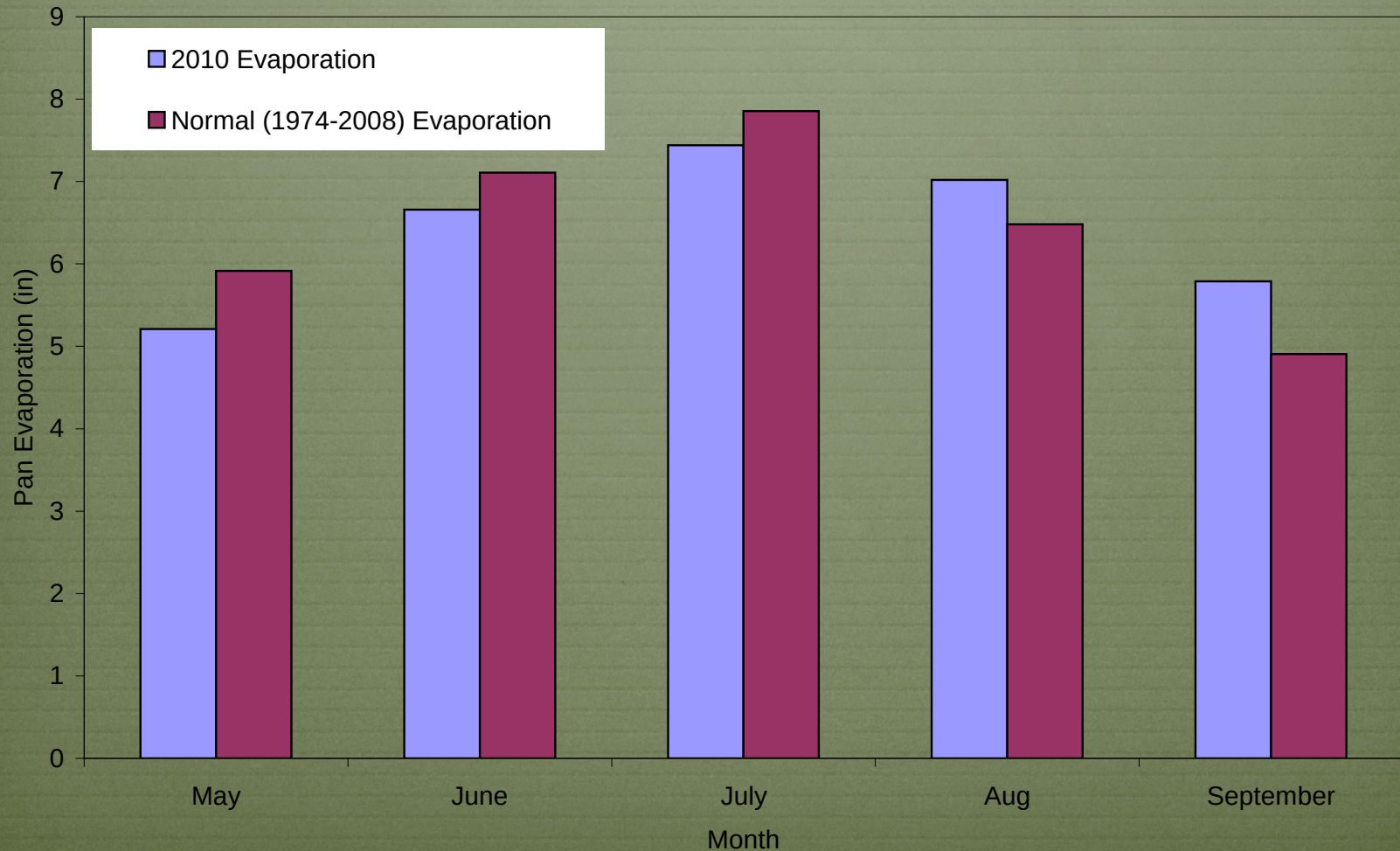
# Water Demand



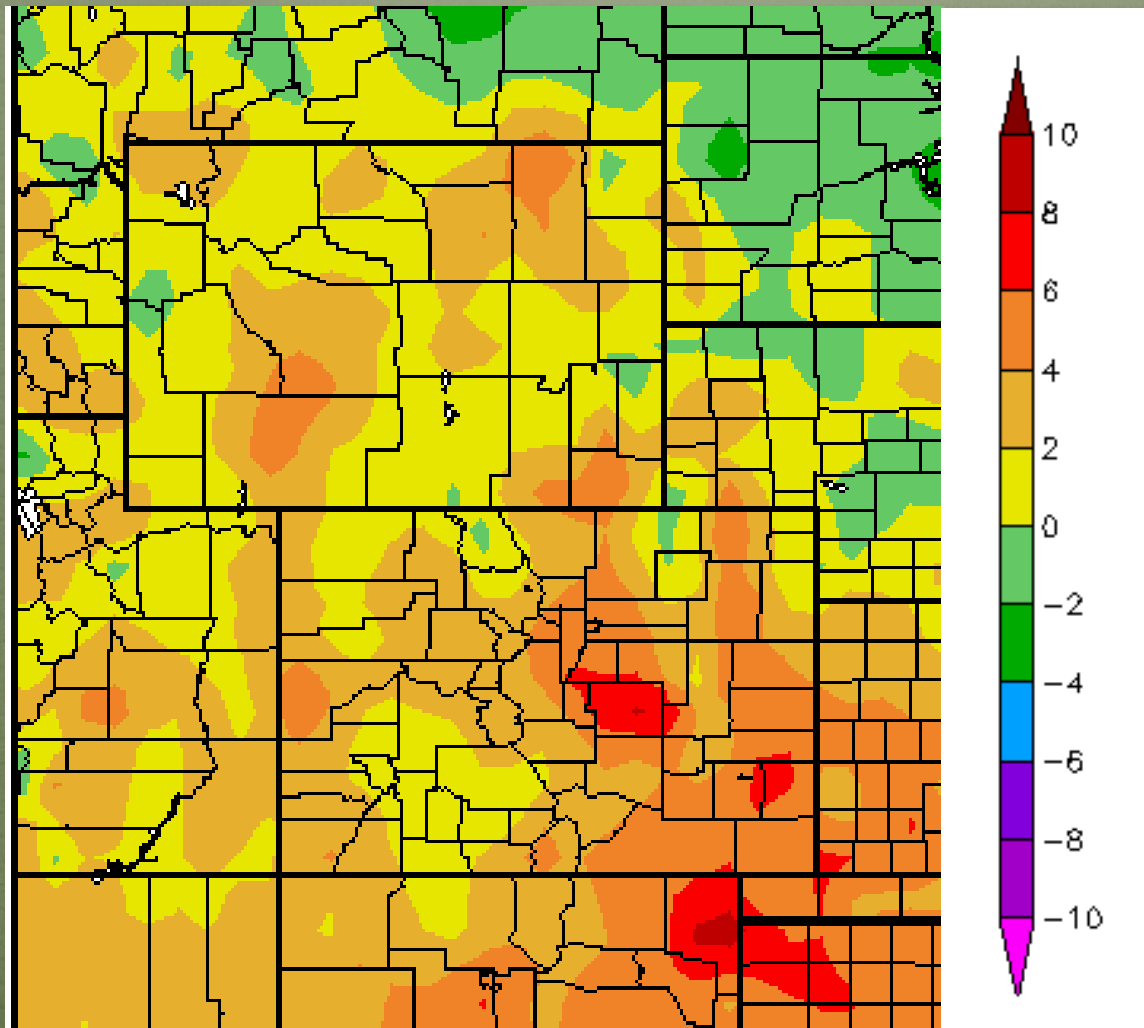


# Pan Evaporation

**Fort Collins, CO Pan Evaporation Compared to Normal 2010**



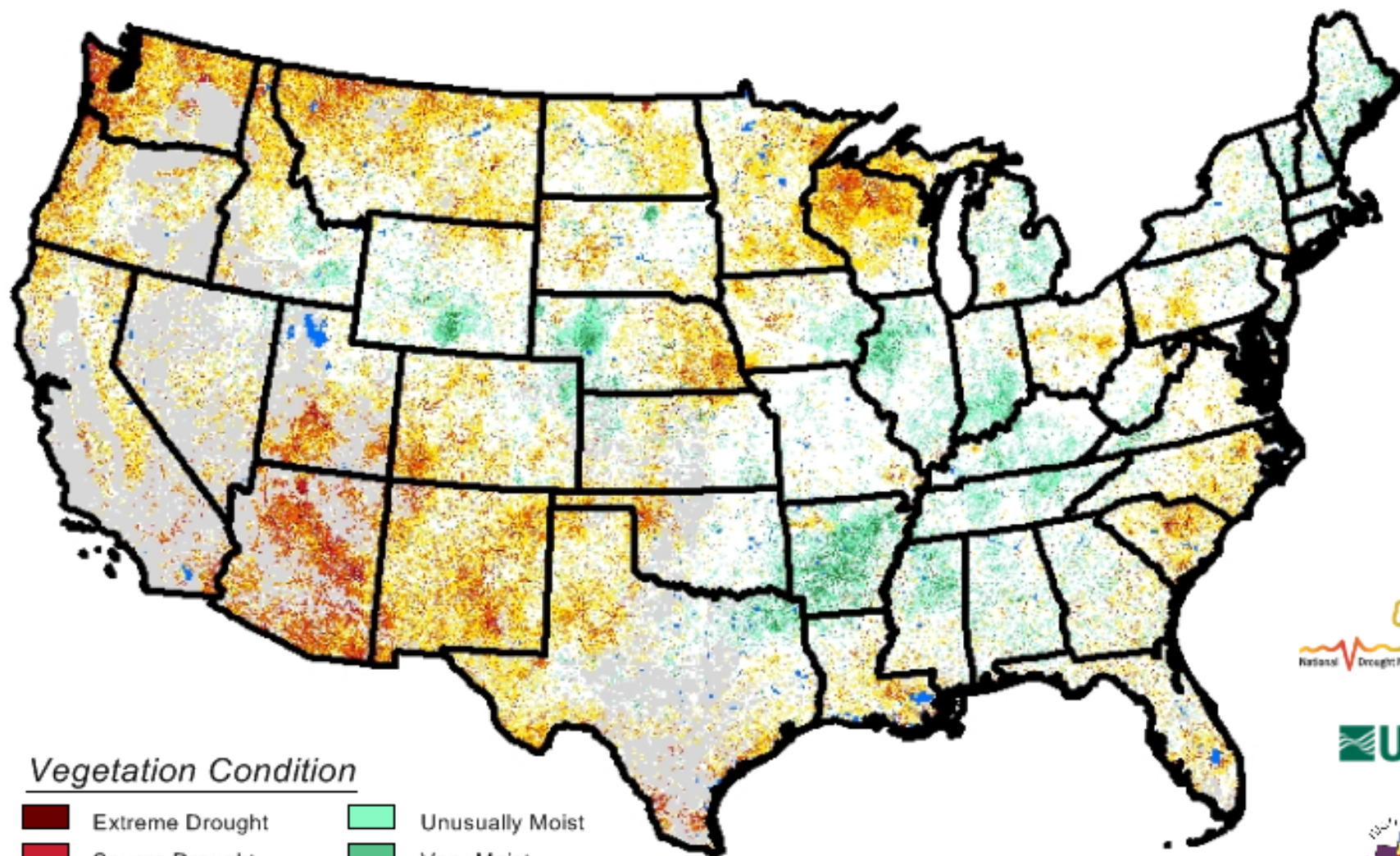
# Temperature Departure from Normal 9/1/2010 – 9/30/2010





# Vegetation Drought Response Index Complete

October 5, 2009



## Vegetation Condition

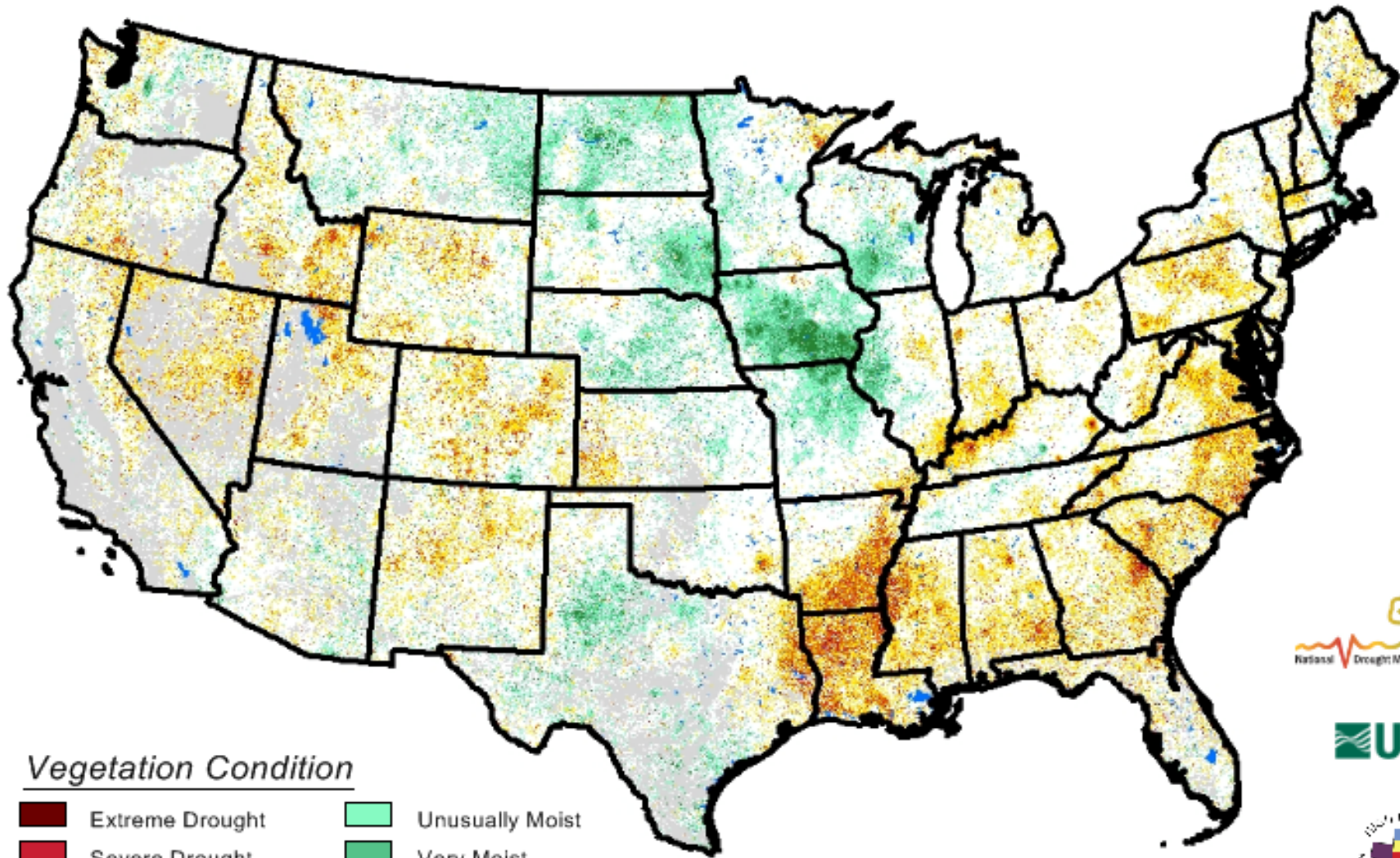
|                                                                                    |                  |                                                                                     |                 |
|------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------------------|-----------------|
|  | Extreme Drought  |  | Unusually Moist |
|  | Severe Drought   |  | Very Moist      |
|  | Moderate Drought |  | Extremely Moist |
|  | Pre-Drought      |  | Out of Season   |
|  | Near Normal      |  | Water           |



# Vegetation Drought Response Index

## Complete

September 20, 2010



### Vegetation Condition

|                                                                                    |                  |                                                                                     |                 |
|------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------------------|-----------------|
|  | Extreme Drought  |  | Unusually Moist |
|  | Severe Drought   |  | Very Moist      |
|  | Moderate Drought |  | Extremely Moist |
|  | Pre-Drought      |  | Out of Season   |
|  | Near Normal      |  | Water           |

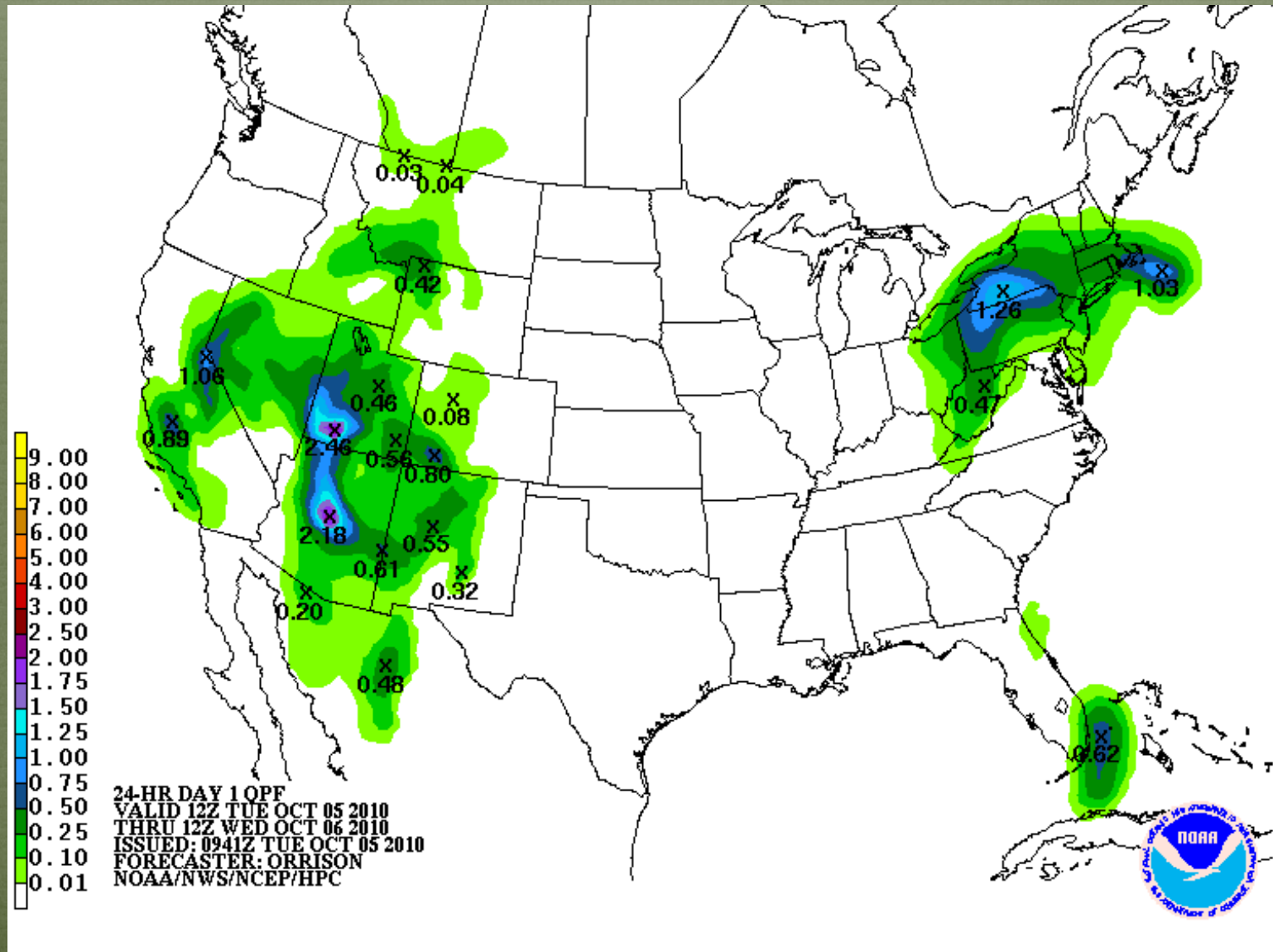




# Precipitation Forecast

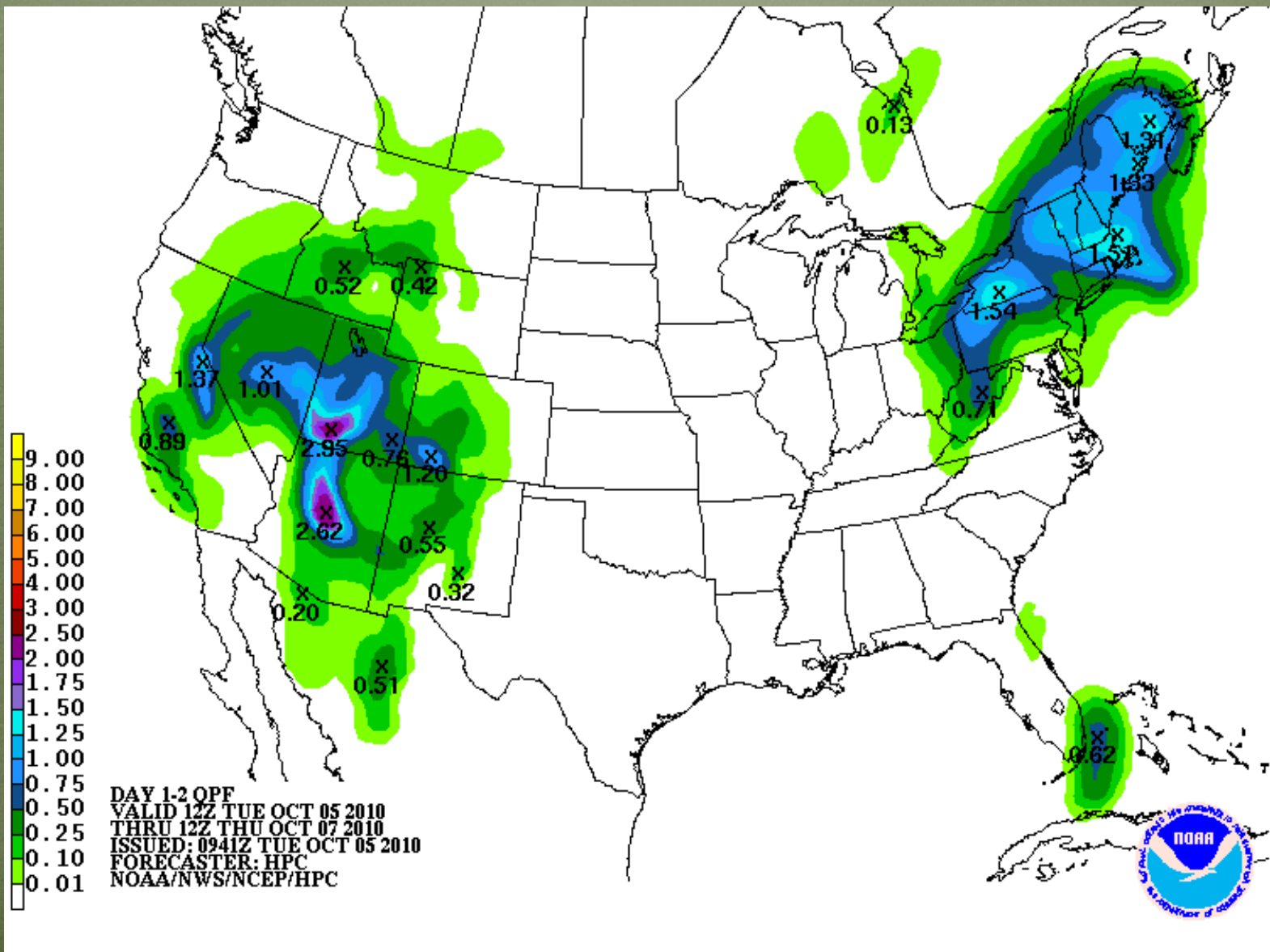


# Day 1 Outlook Tues - Wed

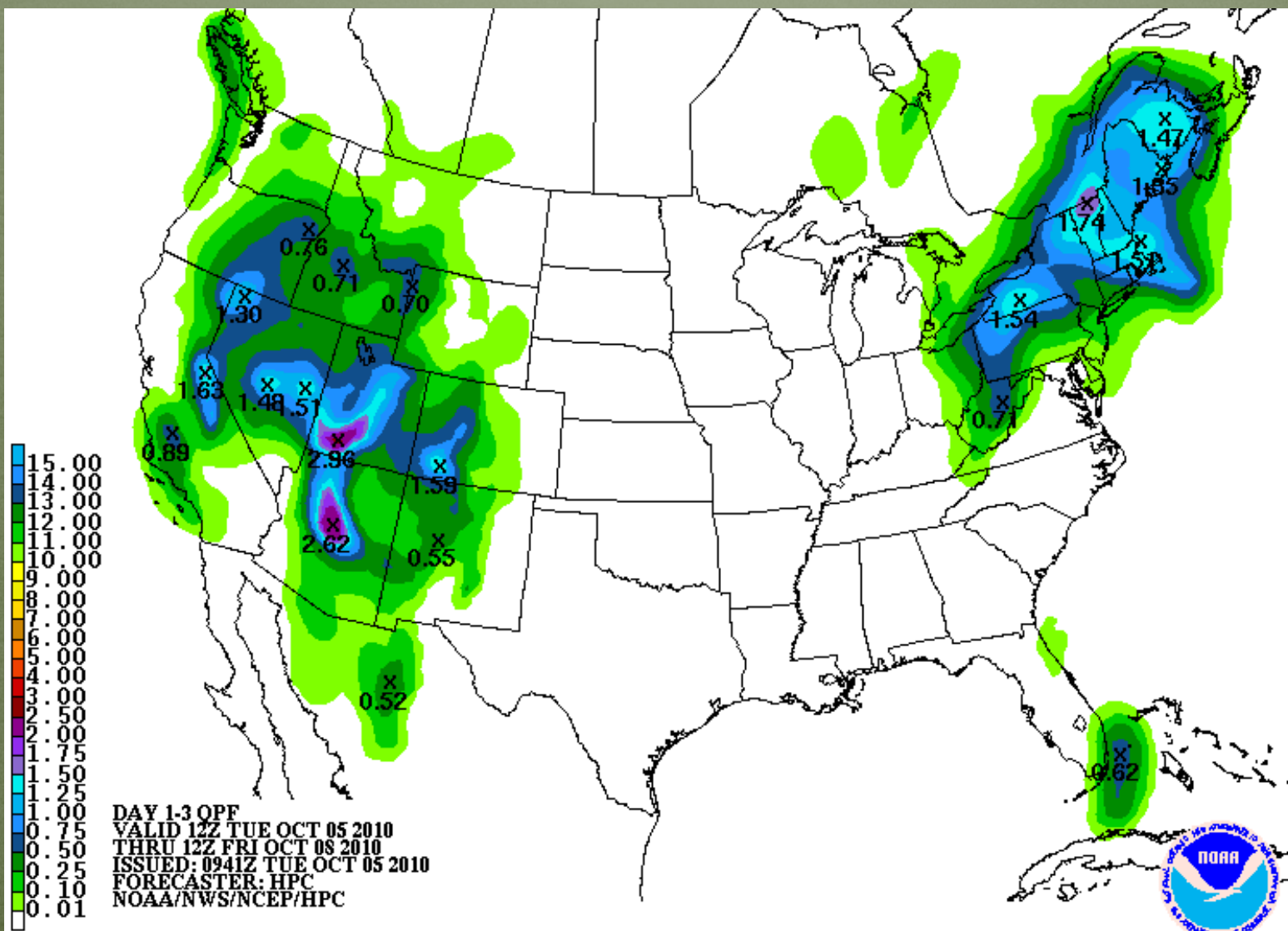




# 2 Day Outlook Tues - Thurs

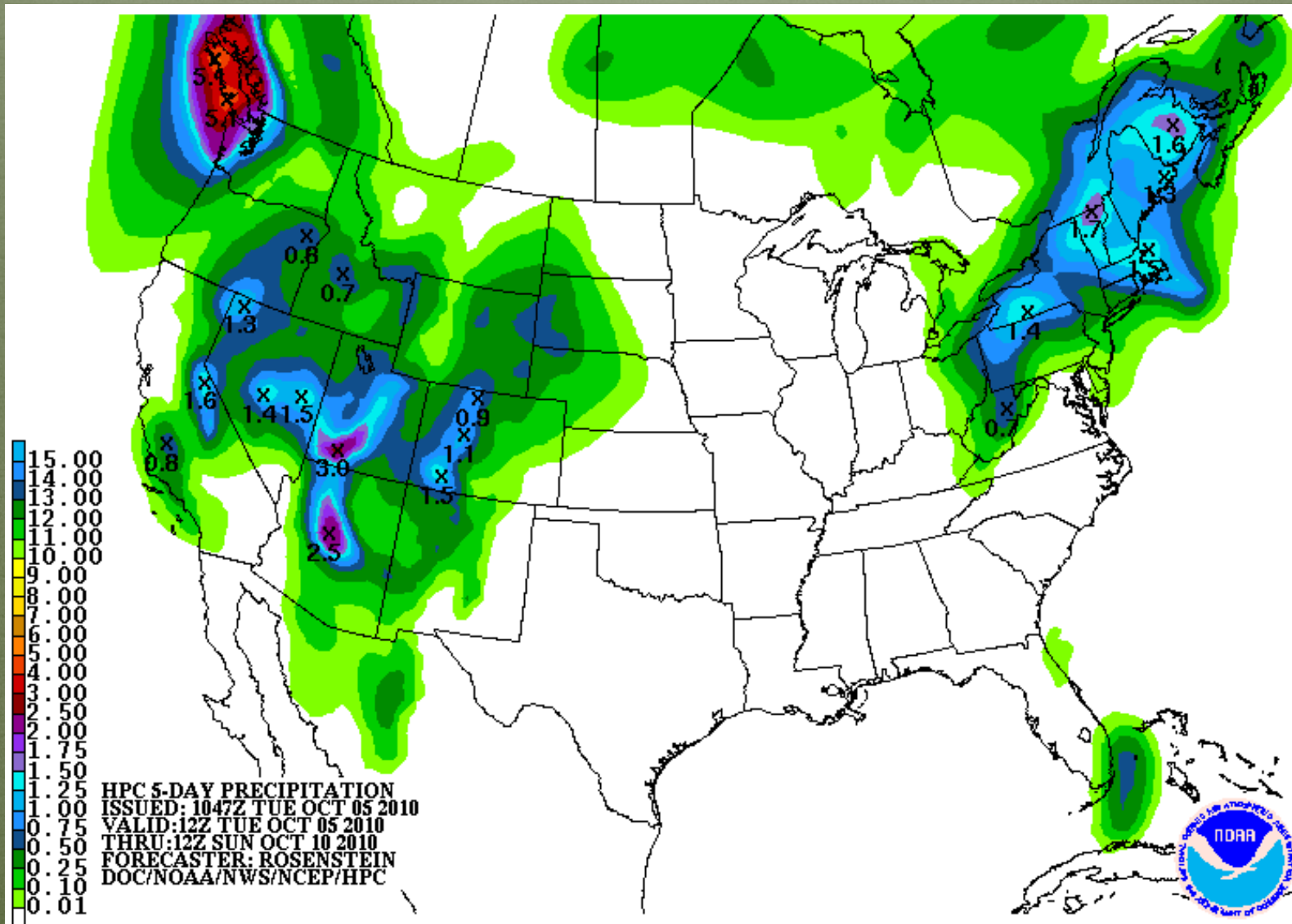


# 3 Day Outlook Tues - Fri

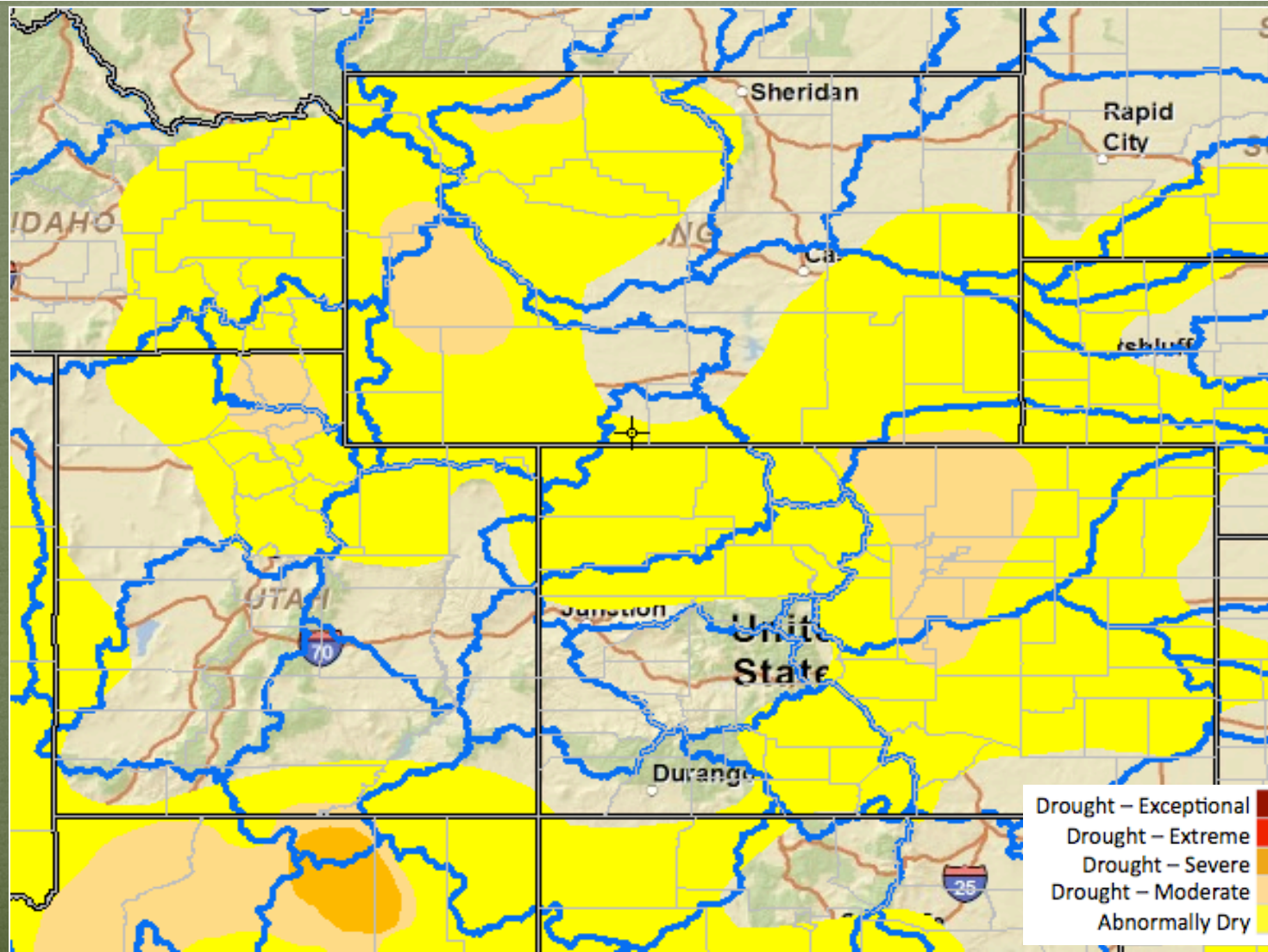




# 5 Day Outlook Tues - Sun



# Recommendations





**OPEN**

**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

October 5, 2010



# Precipitation and Snowpack

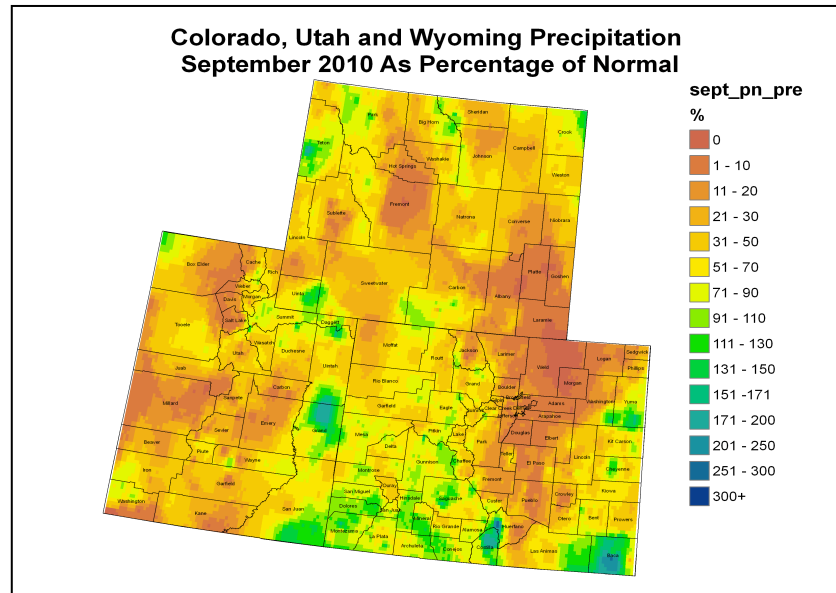


Fig. 1: September precipitation as percent of average

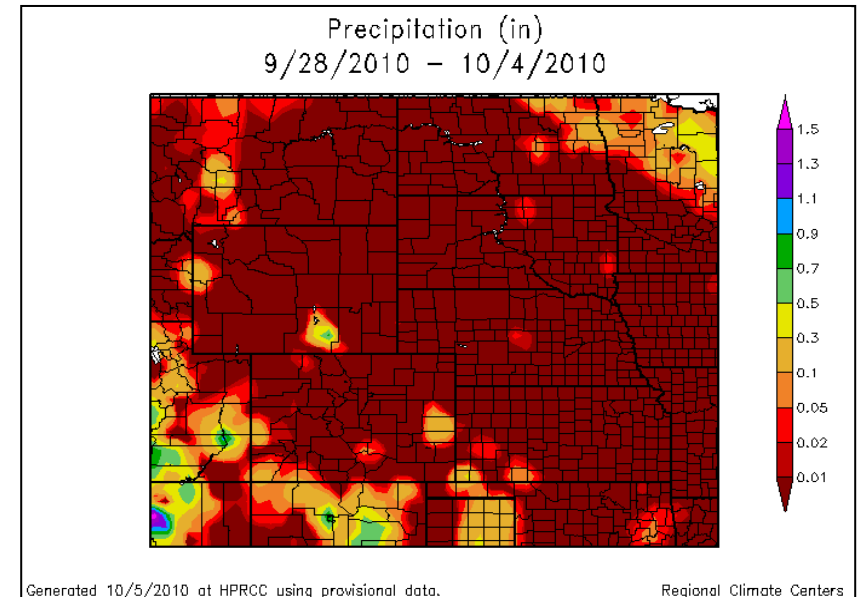


Fig. 2: Sep 28 – Oct 4 precipitation in inches

Dry conditions prevailed over much of the Upper Colorado River Basin (UCRB) and surrounding areas for the month of September (Fig. 1). The Upper Green was the driest region of the UCRB with less than 50% of its average September precipitation. The eastern plains of Colorado, SE Wyoming, and western Utah were also very dry. A handful of storms did provide beneficial moisture in some areas, however. Parts of eastern Utah and the San Juan basin received near or above average amounts of precipitation

For the past week, dry conditions continued (Fig. 2). Most of the region saw very little to no precipitation. Eastern Utah received amounts ranging from one tenth to three quarters of an inch. The bulls-eye of precipitation in Carbon County, WY appears to be erroneous as no surrounding areas received any moisture.

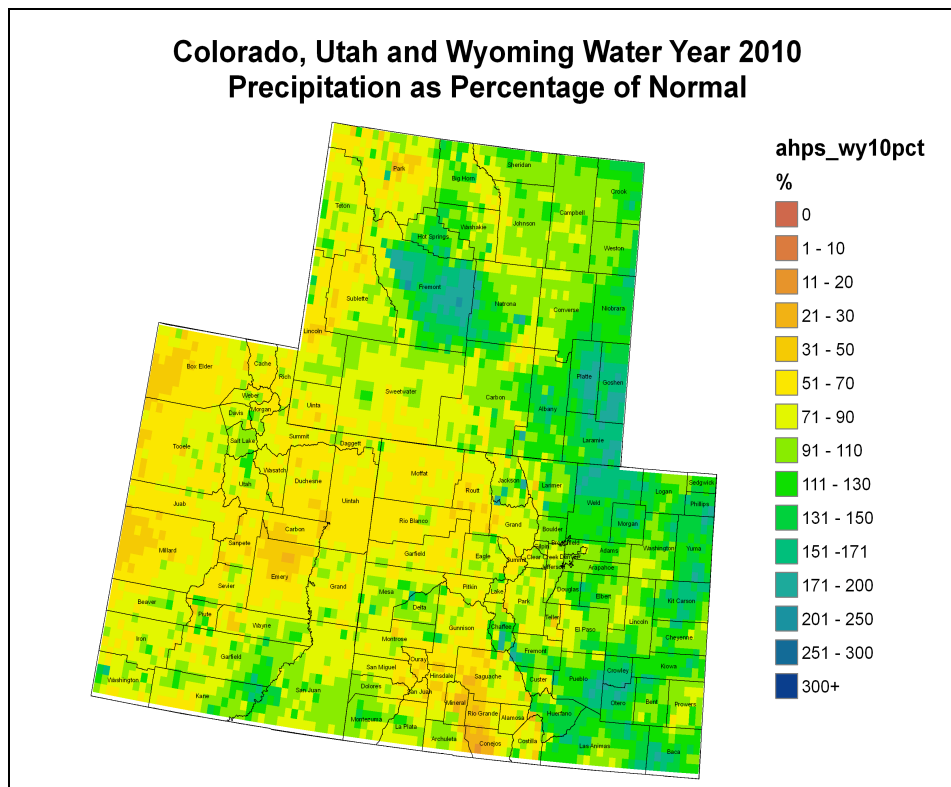


Fig. 3: Advanced Hydrologic Prediction Service WY2010 precipitation as percent of normal for CO, WY, and UT.

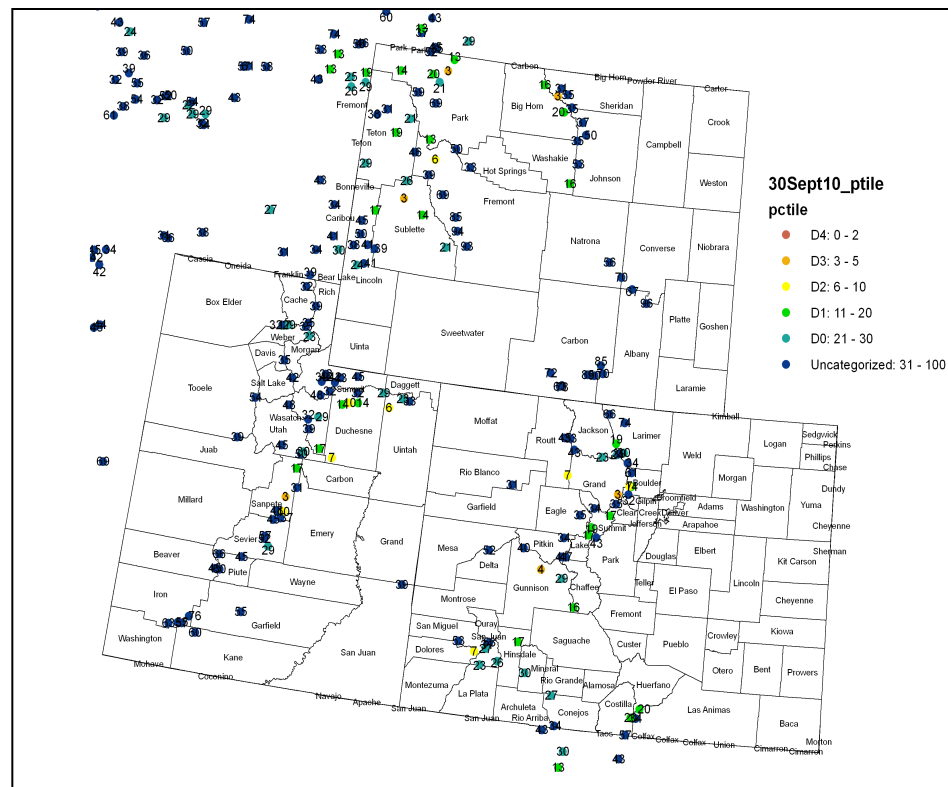


Fig. 4: SNOTEL WY2010 precipitation percentiles (50% is median, 21-30% is Drought Monitor's D0 category).

For the water year as a whole (WY2010, Oct. 2009 – Sept. 2010) most of the UCRB saw near average precipitation (Fig. 3). Emery County, UT in the Dolores basin was driest, only receiving around 50% of its annual precipitation. The Rio Grande basin in southern CO was also very dry, due to lack of moisture at the beginning of WY2010, and again in the late spring and summer. Though eastern portions of CO and WY have recently been dry, WY2010 precipitation amounts were mostly above average.

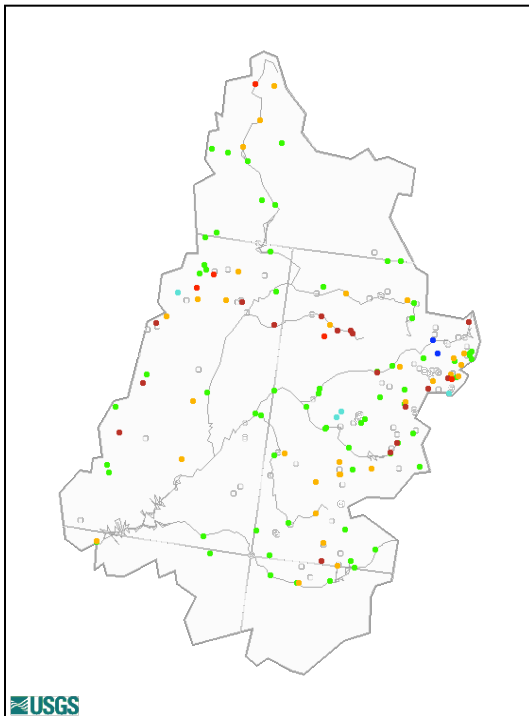
WY2010 percentiles for the SNOTEL sites in the UCRB show the lowest values corresponding with locations of current abnormal dryness (D0 category, lower than the 30<sup>th</sup> percentile) on the U.S. Drought Monitor map—in the Rio Grande basin, the Upper and Lower Green River basins and near the Colorado headwaters region (Fig. 4).



# Streamflow

As of October 3<sup>rd</sup>, over 40% of the USGS streamgages reported below normal (24<sup>th</sup> percentile or less) 7-day average streamflows (Fig. 5). This is a large increase from the end of August when only 10% of the streamgages were recording below normal flows. Below normal flows are mainly concentrated around the Colorado Headwaters region, along the White River, and in the Lower Green River basin.

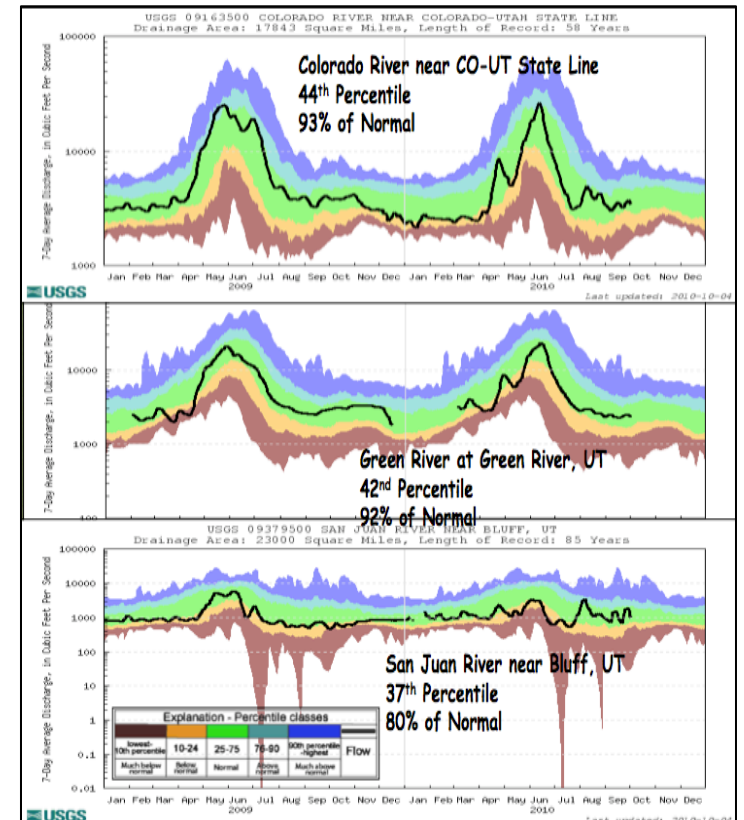
Looking at hydrographs from specific sites around the UCRB, though these examples are all in the normal range, all are slightly below 100% for 7-day average discharge (Fig. 6). On the Colorado River near the CO-UT border, current streamflows are at 93% of normal and cumulative runoff for the calendar year is 76% of normal. On the Green River at Green River, UT, streamflow is at 92% of normal and cumulative runoff is 74% of normal. Near Bluff, UT on the San Juan River, streamflow is only 80% of normal and cumulative runoff is 46% of normal.



| Explanation - Percentile classes   |                                       |                                      |                                     |                                     |                                      |                                      |            |
|------------------------------------|---------------------------------------|--------------------------------------|-------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|------------|
| <span style="color: red;">●</span> | <span style="color: orange;">●</span> | <span style="color: green;">●</span> | <span style="color: cyan;">●</span> | <span style="color: blue;">●</span> | <span style="color: black;">●</span> | <span style="color: black;">○</span> |            |
| Low                                | <10<br>Much below<br>normal           | 10-24<br>Below<br>normal             | 25-75<br>Normal                     | 76-90<br>Above<br>normal            | >90<br>Much above<br>normal          | High                                 | Not-ranked |

Fig. 5: USGS 7-day average streamflow compared to historical streamflow for October 3<sup>rd</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

Temperatures remained above average for the UCRB over the past week. Over the month of September, most of the UCRB saw temperature anomalies of +2° to +4°F. These hot conditions, combined with above normal evaporation throughout the plains during late summer, has meant high demand for water during the past few. The Vegetation Health Index in eastern Colorado and Wyoming shows a lot of plant stress (Fig. 7) and dry soils have expanded throughout the area this past month.

At the end of Water Year 2010, the Bureau of Reclamation stated that UCRB reservoir storage was at 56.7% of capacity. For the major reservoirs in the basin, levels on October 1<sup>st</sup> were 84% of average, down 2% from one year ago. Most of the reservoirs are currently near 100% of average for this time of year, and Lake Powell is currently at 78% of average. Of the reservoirs that have seen a decline from last year, this is largely due to lower than average inflows this summer (Fig. 8) and high demand in the early fall from reservoirs that provide water to the east slopes (Fig. 9).

## Precipitation Forecast

A change from the recent hot and dry conditions can be expected for this week. A storm system, currently located in southern California will move east. This storm will be most beneficial to the Lower Colorado River Basin, but could also bring good amounts of precipitation to the southern mountains of the UCRB. Portions of the San Juans could get over an inch of moisture over the next two days. Later in the week, this activity will spread northeast, bringing rains into the central mountains and along the Continental Divide, though WY could miss out on this moisture. This system, more convective in nature, will not be a widespread precipitation event, but will likely lead to more localized heavy amounts. A chance for some snow accumulation is possible over 10,000ft for the latter part of this week. After Sunday, the models are in disagreement with the placement of the next low pressure system, but there is the possibility for rain in the early part of next week. For the remainder of fall and early winter, the Climate Prediction Center is calling for above average temperatures and below average precipitation.



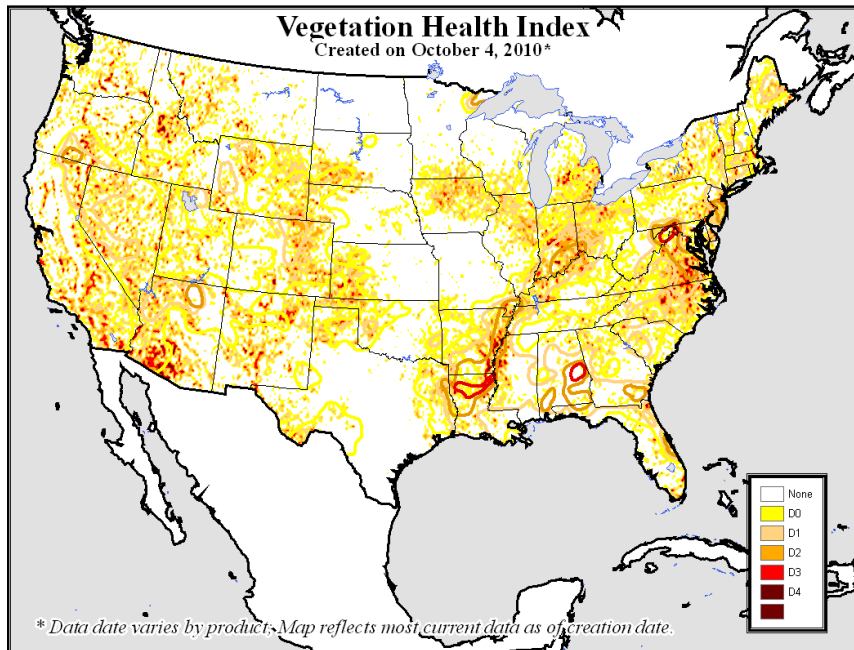


Fig. 7: Vegetation Health Index percentiles as of October 4<sup>th</sup>.

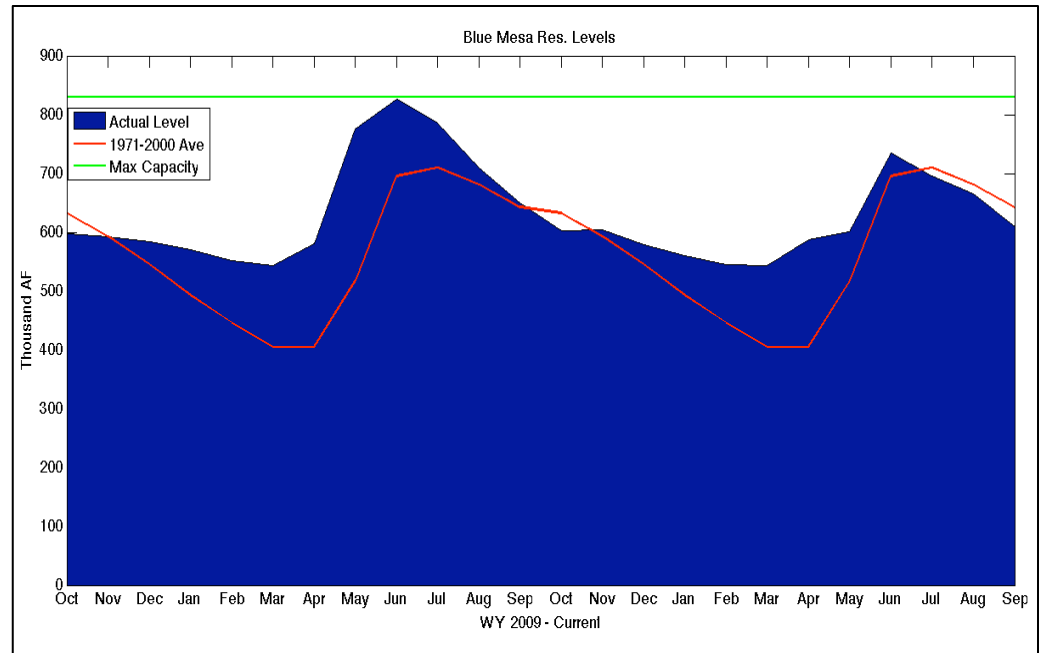


Fig. 8: Blue Mesa Reservoir levels (Gunnison basin) for WY2009 – WY2010, with the 1971 – 2000 average (red line) and the maximum capacity (green line).

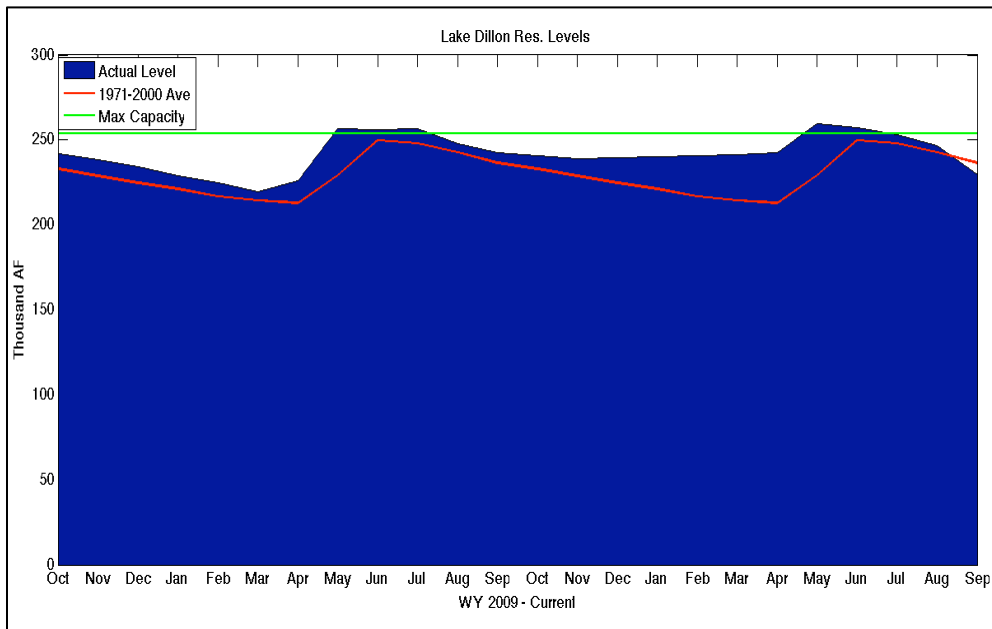


Fig. 9: Lake Dillon Reservoir levels (Colorado basin) for WY2009 – WY2010, with the 1971 – 2000 average (red line) and the maximum capacity (green line).

# Drought and Water Discussion

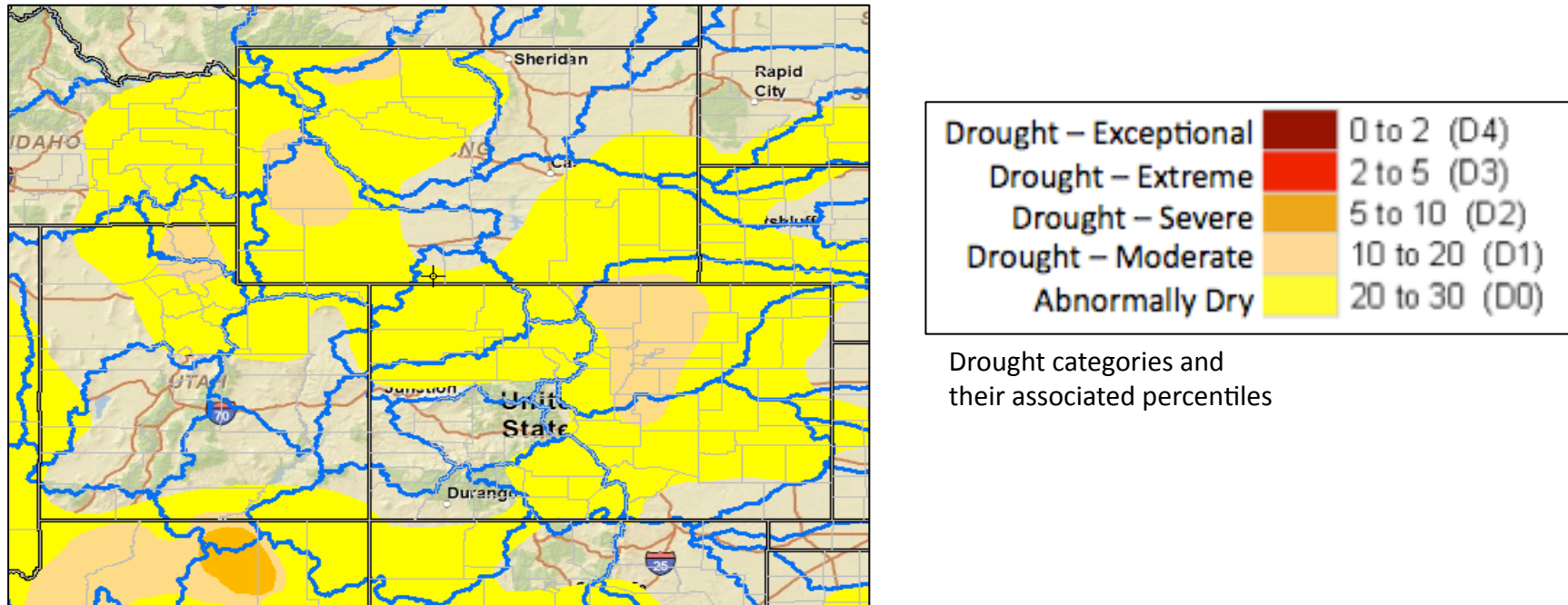


Fig. 10: September 28 release of U.S. Drought Monitor for the UCRB

There have been no strong suggestions for changes to the current U.S. Drought Monitor map over the UCRB (Fig. 10). No experts from Wyoming or Utah have provided comments to either the NIDIS conference call, or to the DM author. There have been suggestions to introduce D1 into the northern part of the Nebraska panhandle, but to hold off on the southern portion, so this should not affect the South Platte basin. There are currently some impacts reported from eastern Colorado, related to fall planted winter wheat, that could warrant the introduction of D1. Statistical analysis shows that this D1 might currently be limited to Washington County. However, this D1 may not be connected to the current D1 in Colorado. This, combined with very little changes over the last week, has led some to call for status quo over the region and reassess the situation next week. Status quo is recommended for the remainder of the UCRB as well.