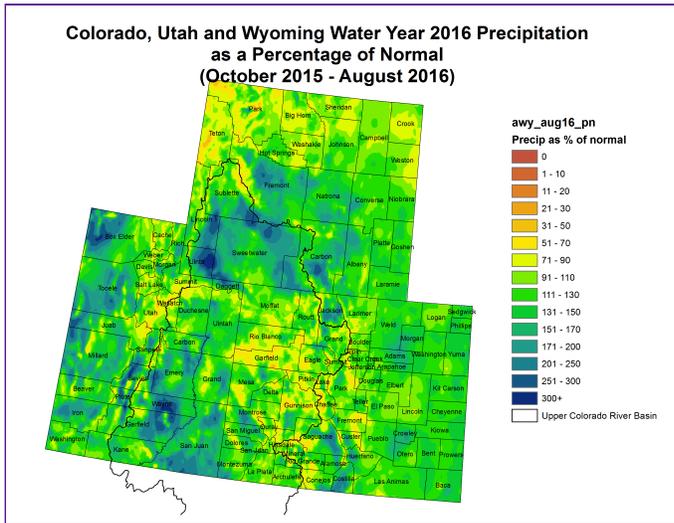
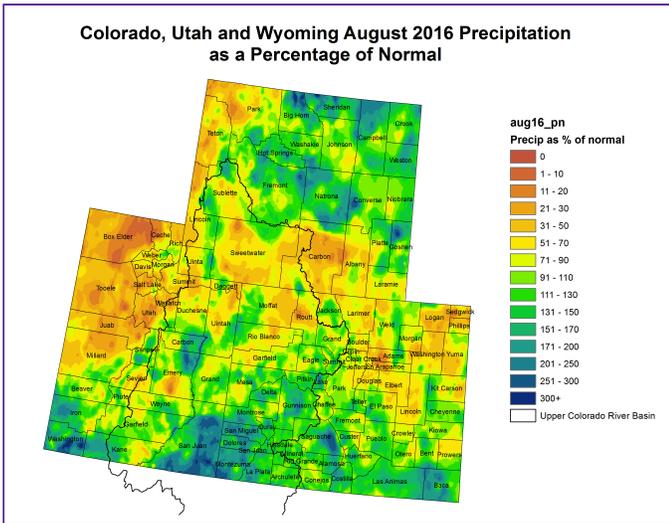
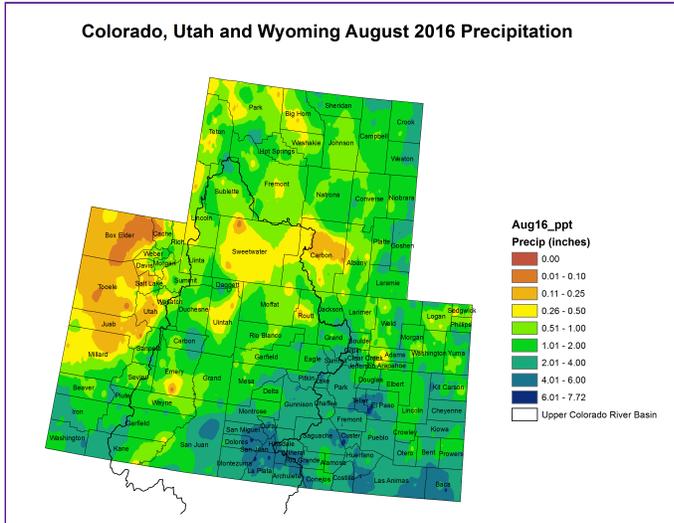
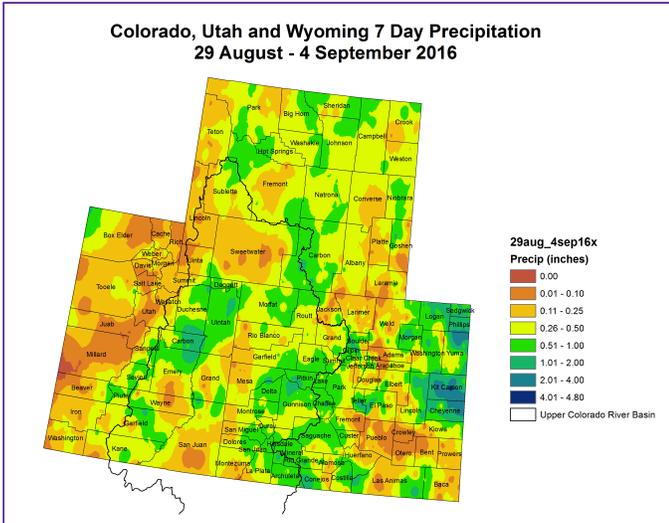


NIDIS Upper Colorado River Regional Drought Early Warning System

September 6, 2016



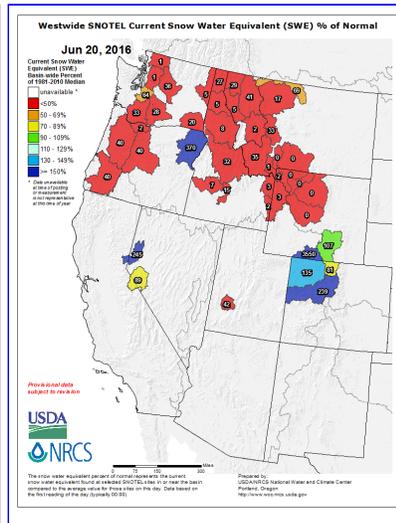
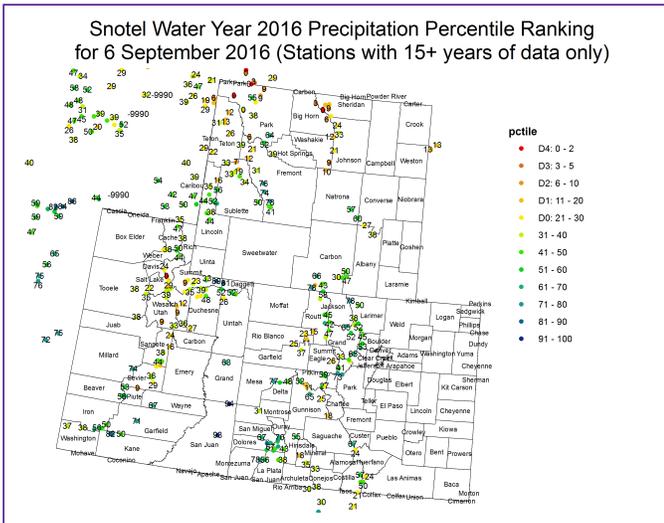
- Precipitation Discussion
- SNOTEL
- SPI
- Streamflow
- Surface Water
- ET
- Temperature
- Outlook
- USDM



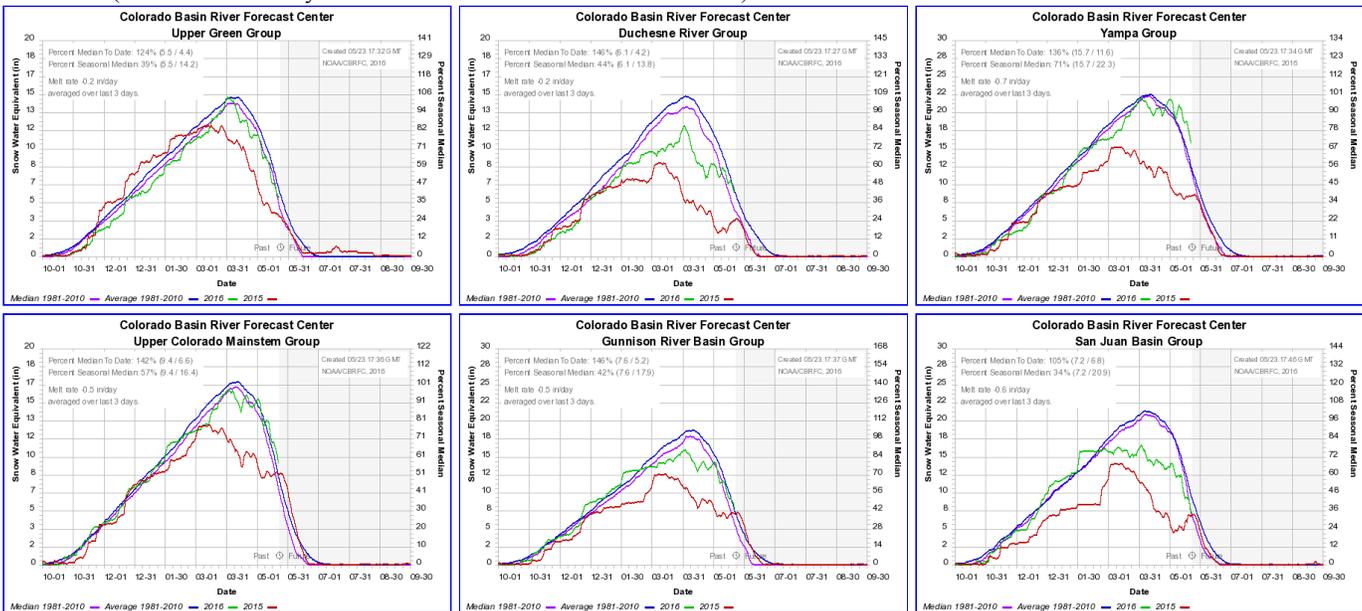
The images above use daily precipitation statistics from NWS COOP, CoCoRaHS, and CoAgMet stations. From top to bottom, and left to right: most recent 7-days of accumulated precipitation in inches; current month-to-date accumulated precipitation in inches; last month's precipitation as a percent of average; water-year-to-date precipitation as a percent of average.

Additional Precipitation Links: (will take you to an outside website)

- [AHPS Precipitation](#)
- [High Plains Regional Climate Center's ACIS Maps](#)

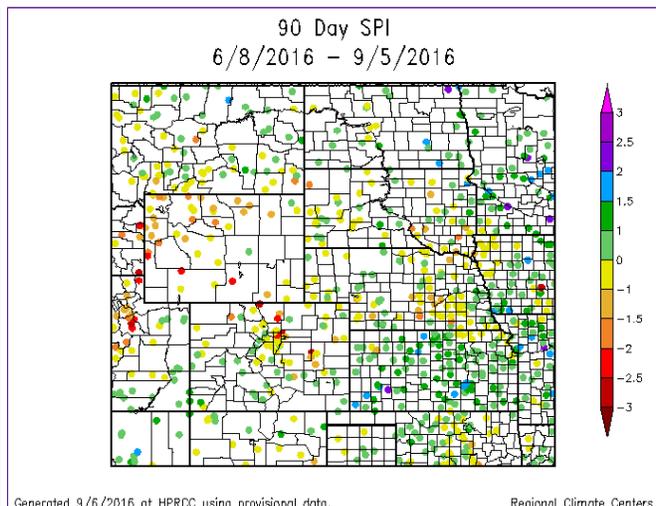
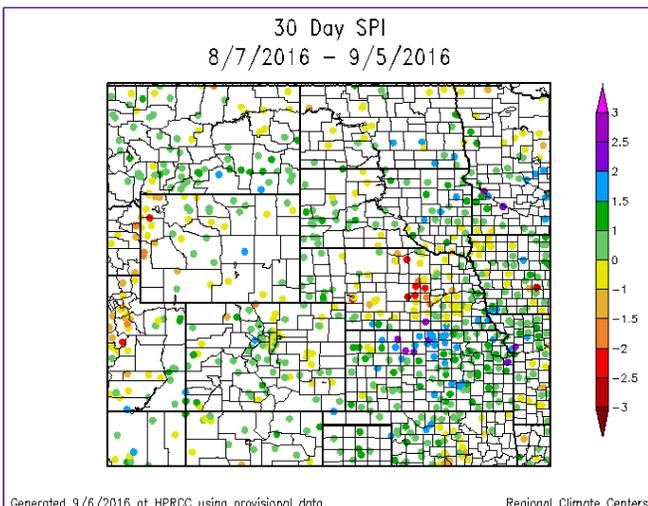


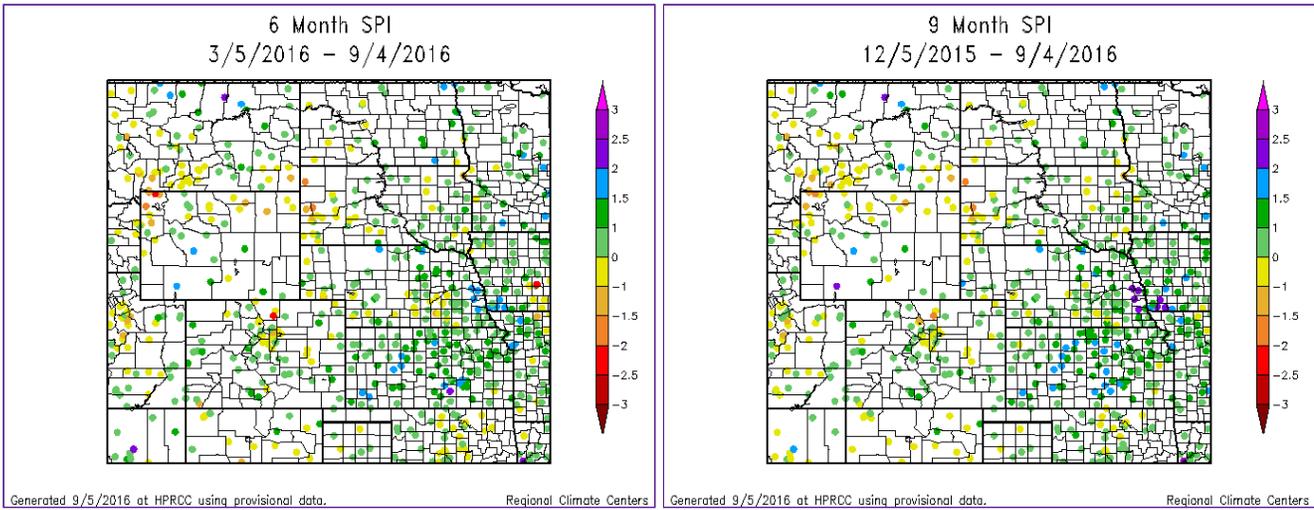
The top left image shows the Natural Resources Conservation Service's SNOTEL water-year-to-date precipitation percentile rankings. The top right image shows sub-basin averaged snow water equivalent accumulations as a percent of average. The images below show accumulated snow water equivalent in inches (green) compared to average (blue) and last year (red) for several different sub-basins across the UCRB (and were created by the Colorado Basin River Forecast Center).



Additional SNOTEL and Snowpack Links: (will take you to an outside website)

- [CBRFC Snow Conditions Map](#)
- [NOHRSC Regional Snow Analyses: Central Rockies](#)

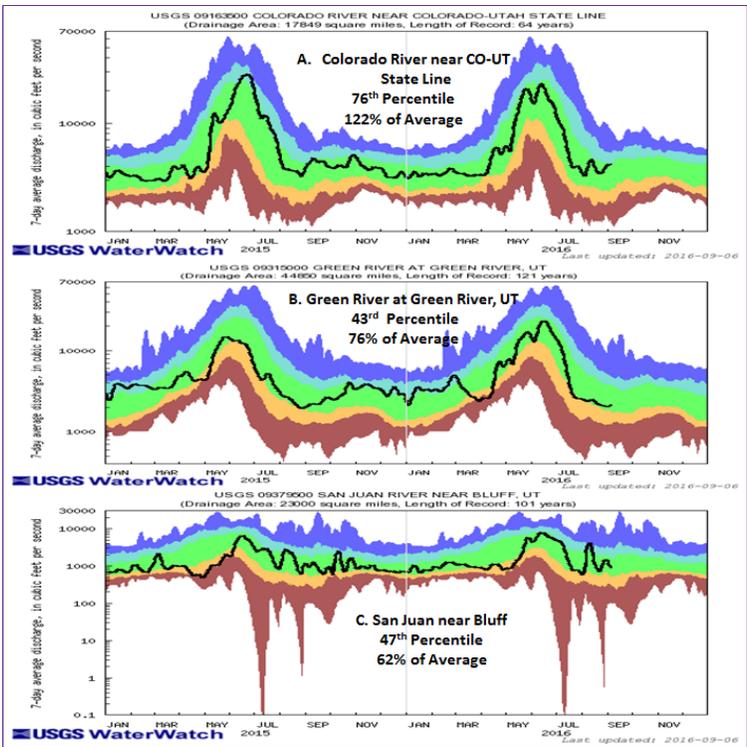
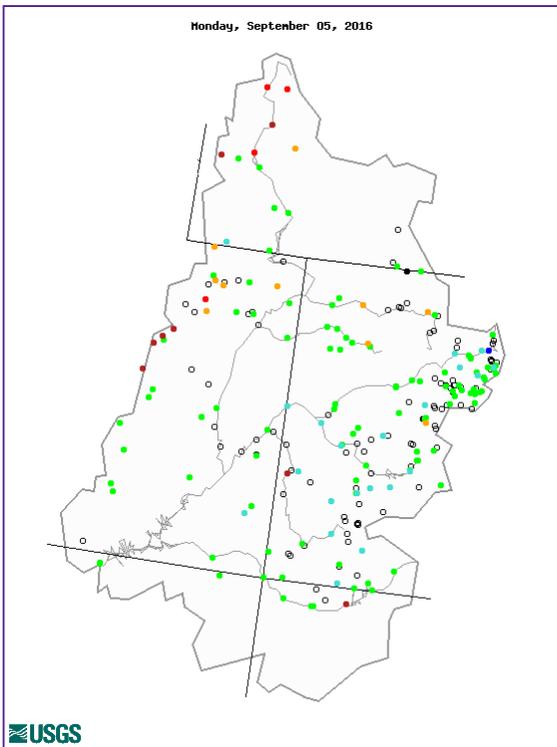




Standardized Precipitation Index standardizes precipitation accumulations for a specified time period into percentile rankings. -1.0 to -1.5 is equivalent to a D1 to D2. -1.5 to -2.0 is equivalent to a D2 to D3. -2.0 and worse is equivalent to a D3 to D4. 30- and 60-day SPIs focus on short-term conditions while 6- and 9-month SPIs focus on long-term conditions. SPI data provided by High Plains Regional Climate Center.

Additional SPI Links: (will take you to an outside website)

- [WestWide Drought Tracker SPI Maps](#)
- [HPRCC's SPI Maps](#)



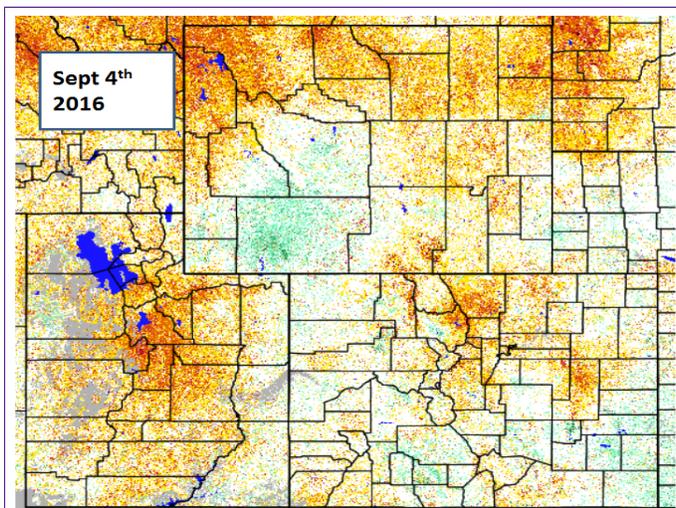
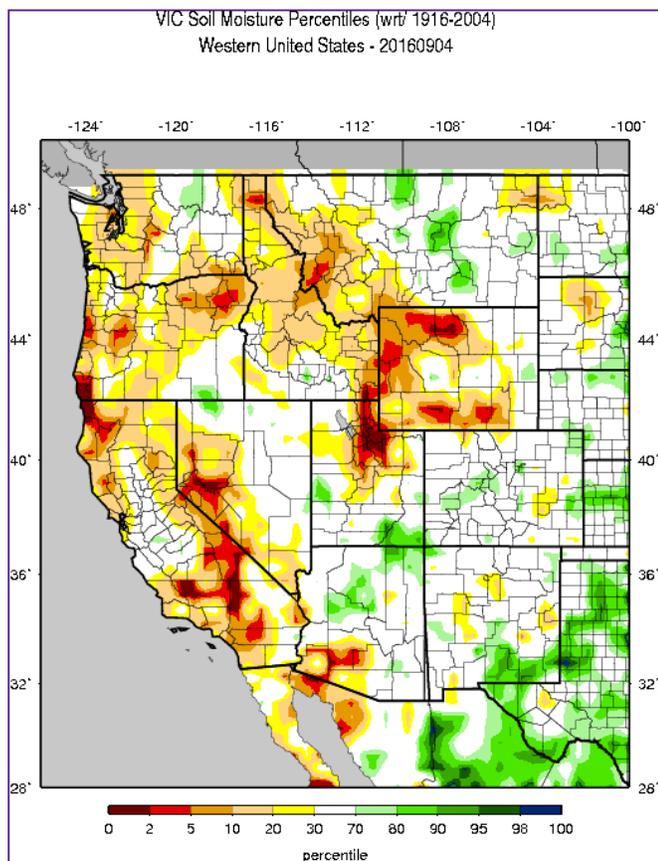
Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

The top left image shows 7-day averaged streamflows as a percentile ranking across the UCRB. The top right image shows 7-day averaged discharge over time at three key sites around the UCRB: The Colorado River at the CO-UT state line; the Green River at Green River, UT; and the San Juan River near Bluff, UT. All streamflow data provided by United States Geological Survey.

Additional Streamflow and River Links: (will take you to an outside website)

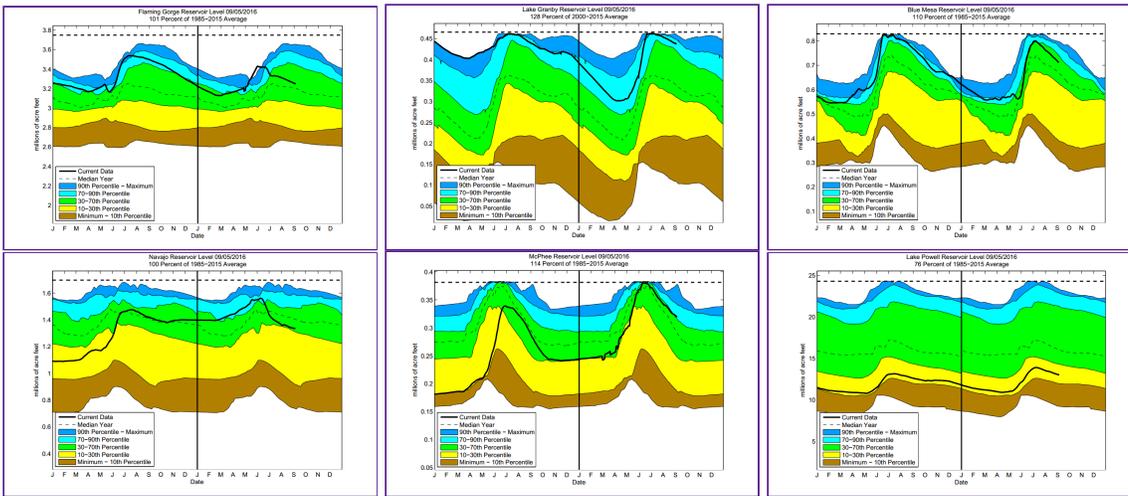
[USGS Streamflow Drought](#)

[CBRFC Peak Flow Forecast Conditions Map](#)



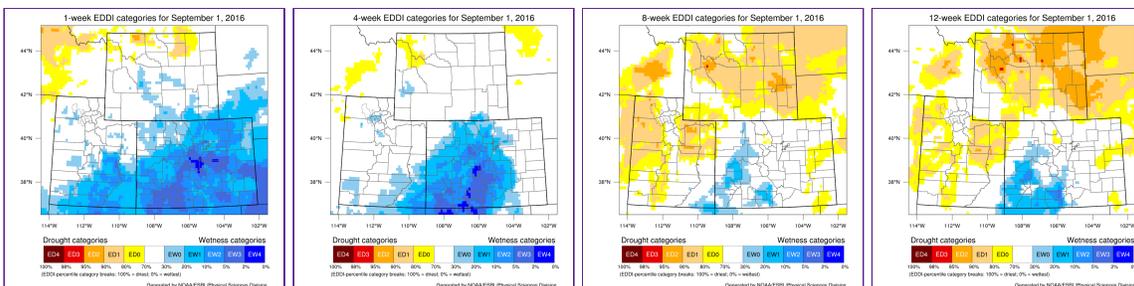
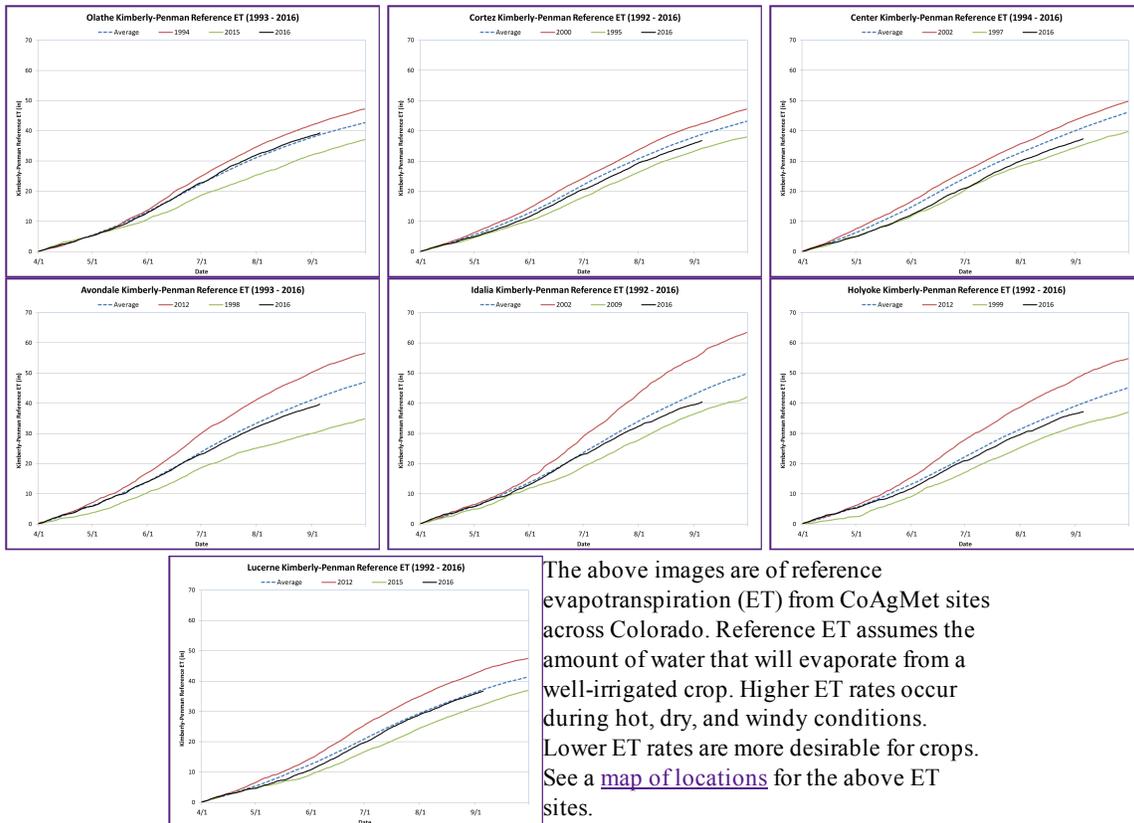
The top left image shows VIC modeled soil moisture as a percentile ranking. The top right image shows satellite-derived vegetation from the VedGRI product (which updates on Mondays).

The graphs shown below are plots of reservoir volumes over the past full year and current year to date (black). The dashed line at the top of each graphic indicates the reservoir's capacity, and the background color-coded shading provides context for the range of reservoir levels observed over the past 30 years. The data are obtained from the Bureau of Reclamation. Some of the reservoir percentiles don't line up at the new year due to differences in reservoir levels at the beginning of 1985 and the end of 2014. Dead storage has been subtracted. Note: Lake Granby data are obtained from the Colorado Division of Water Resources, and only goes back to the year 2000.



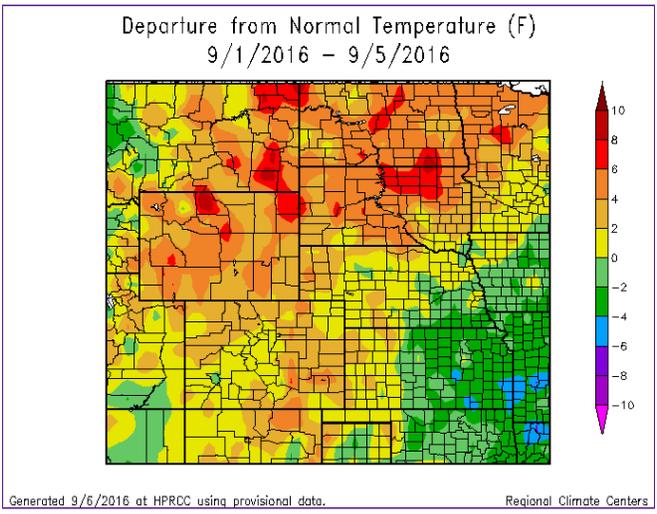
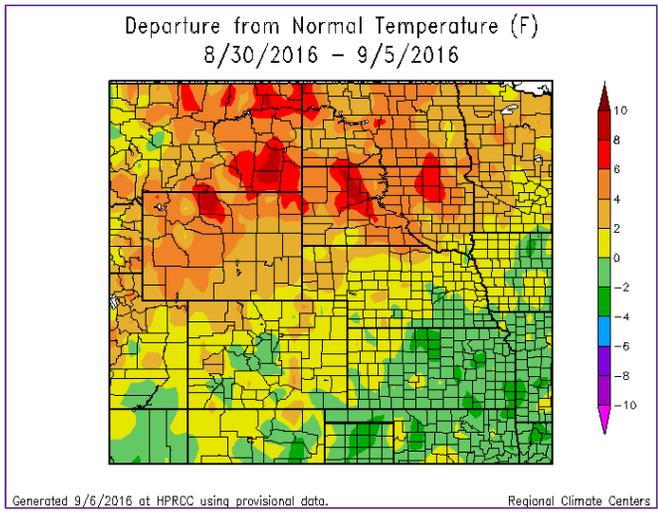
Additional Surface Water Links: (will take you to an outside website)

[NLDAS Drought Monitor](#)

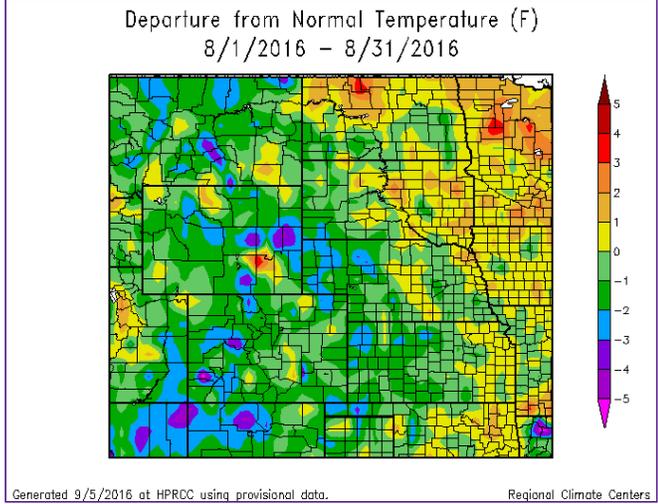


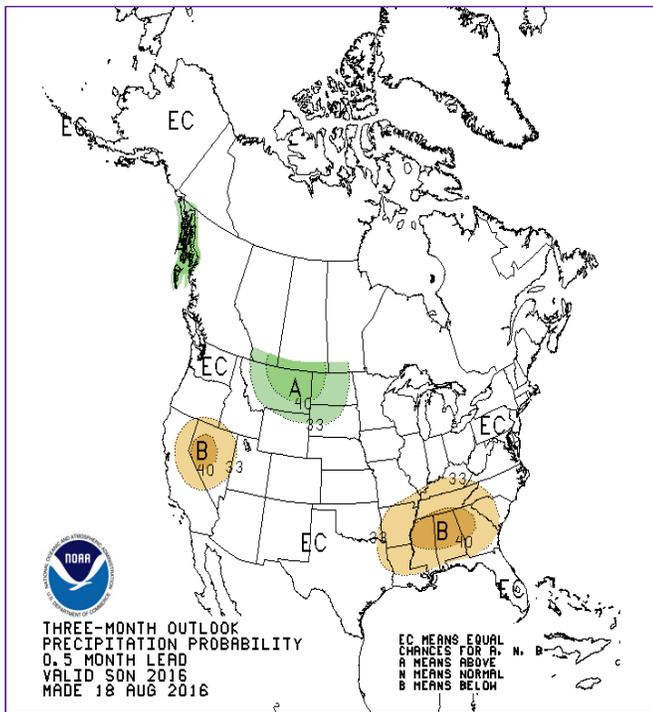
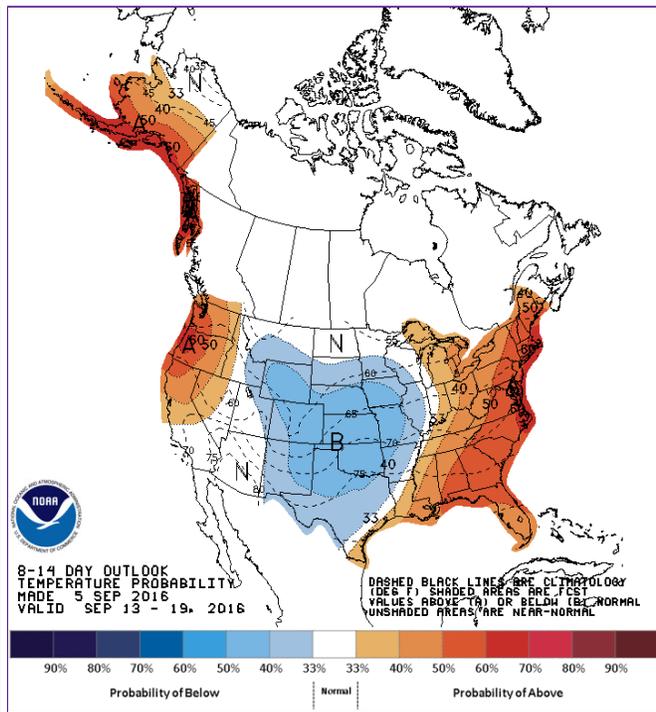
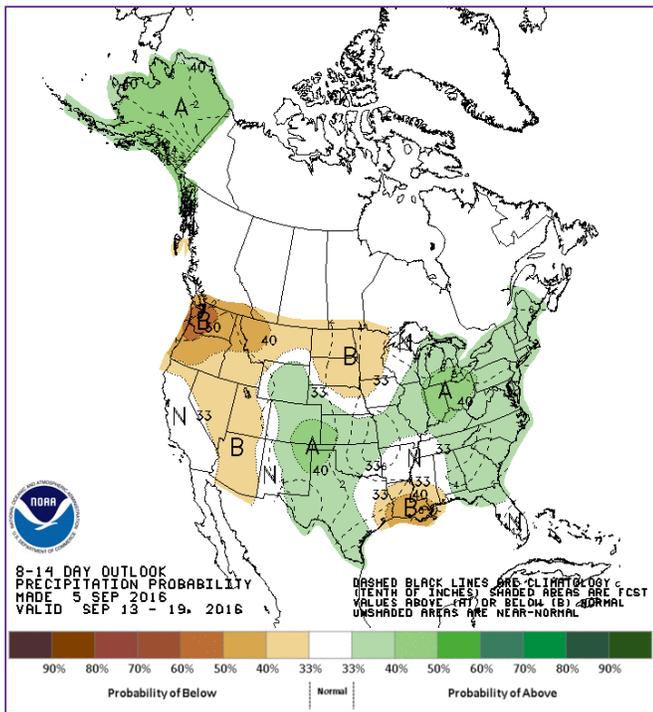
The above images are available courtesy of NOAA's Evaporative Demand Drought Index (EDDI). Drought classification listed is a function of the depth of reference evapotranspiration accumulated over a given period of record with respect to a climatology of 1981-2010. The drought categories displayed are in

line with the US Drought Monitor's Percentile Ranking Scheme <http://droughtmonitor.unl.edu/AboutUs/ClassificationScheme.aspx>. Data used to generate these maps come from the North American Land Data Assimilation System Phase-2 (NLDAS-2) project, which assimilates observations of temperature, wind speed, radiation, and vapor pressure deficit. The date indicates the last day of the period of record, and the week number indicates the window size for the period of record..



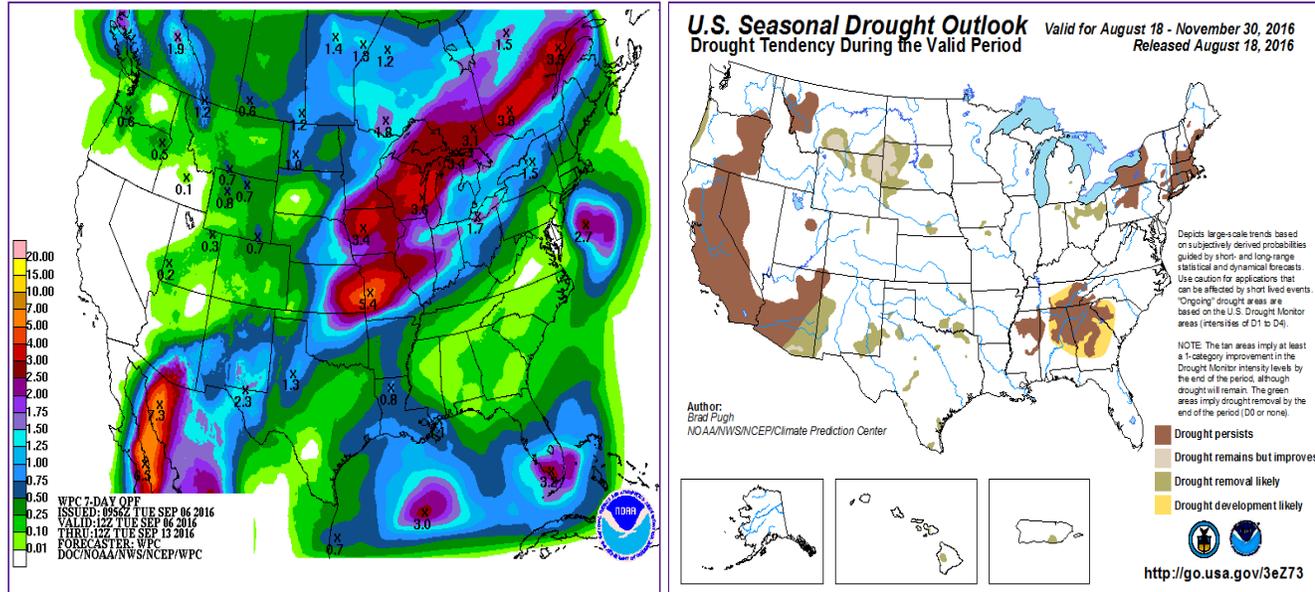
All images show temperature departures from average over different time periods (last 7 days on top left; month-to-date on top right; last full month on bottom). Temperature departure maps provided by HPRCC ACIS.





The top two images show Climate Prediction Center's Precipitation and Temperature outlooks for 8 - 14 days. The middle image shows the 3 months Precipitation outlook. The bottom left image shows the Weather Prediction Center's Quantitative Precipitation Forecast accumulation for the seven days between Tuesday 12Z and ending Tuesday 12Z. The bottom right image shows the Climate Prediction

Center's most recent release of the U.S. Seasonal Drought Outlook.



8/16

Next Week:

Wednesday-Friday: The large-scale weather pattern is expected to be relatively calm and seasonal between now and Friday afternoon. There will be enough heat and moisture in the region for afternoon thunderstorms to develop over the mountains. The Central Rockies, Sangre de Cristos, and San Juans are expected to receive over half an inch of precipitation. Totals farther west in the UCRB and on the eastern plains will likely be lower. The low elevations of the basin and extreme eastern Colorado may not receive any precipitation at all.

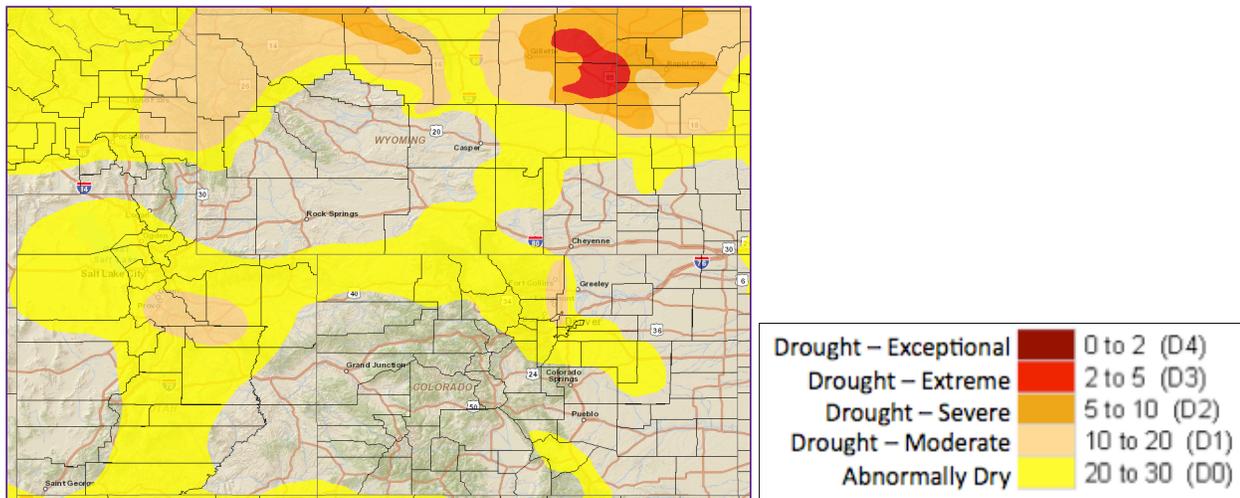
The Weekend and Beyond: As a cold front dives into the region Friday evening the precipitation will shift to the east side of the Continental Divide while the basin dries out. Weekend accumulations are expected to average over 0.50" for eastern Colorado with the heaviest totals over the northern Front Range and Sangre de Cristos. Some areas are likely to be missed, but this activity will be less convective than the precipitation we have been seeing over the past several months. Rainfall totals should be closer to, but still not anywhere near, uniform. The drier, clearer air will keep the UCRB and eastern Colorado dry Monday through Wednesday of next week. Some small accumulations may still be possible for south and southeast Colorado.

Longer Term:

Precipitation: The UCRB is predicted to be drier than average over the 8-14 day time period as drier air from the north shuts off monsoonal flow. Eastern Colorado, however, will see an increased chance of above average precipitation over this time frame due to increased frontal activity. Beyond two weeks the Climate Prediction Center is forecasting equal chances of above and below average precipitation for the Upper Colorado River Basin and eastern Colorado.

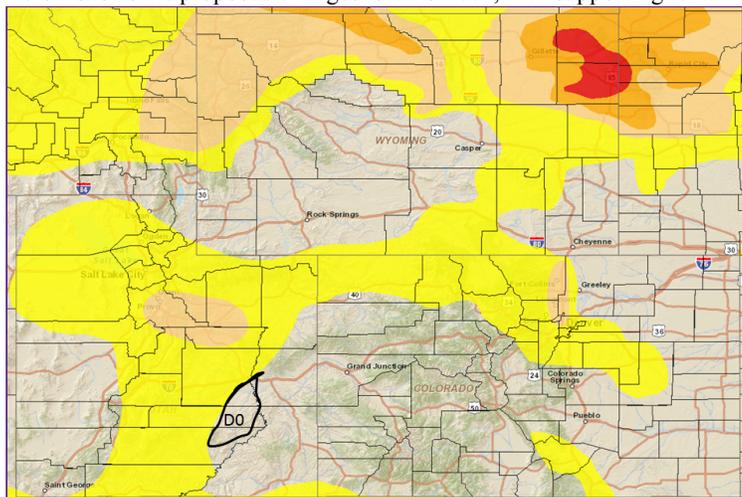
Temperature: Over the 8-14 day time frame there is an increased likelihood of below average temperatures for the UCRB and eastern Colorado as some cooler air is anticipated to plunge southward this weekend. The fall season is forecasted increased chances of above average temperatures.

Drought: Development of new drought is predicted as being unlikely for any given location in the Upper Colorado River Basin and eastern Colorado over the August through October time frame. Pockets of additional D0 and D1 in places that are trending drier, however, would not be surprising.



Above is the most recent release of the U.S. Drought Monitor map for the UCRB region.

Below shows the proposed changes for this week, with supporting text.



Summary: September 6, 2016

Last week was characterized by average precipitation totals in the UCRB with much of the region receiving 0.10-0.50" of precipitation. Some areas, generally at higher altitudes, received 0.50-1.00". East of the divide weekly precipitation accumulation totals were primarily driven by two clusters of thunderstorms propagating out east over the plains on August 31st and September 2nd. This made for wide variation in weekly precipitation totals across the eastern half of the state. Southern Kit Carson and northern Cheyenne Counties received the most precipitation. These areas received 2.00-3.00". The Arkansas River Valley from west of Pueblo to Rocky Ford received little to no rainfall. On average, the eastern plains picked up 0.50-1.00", and the Front Range received less.

Temperatures over the past week were warmer than average in the northern portion of the Upper Colorado River Basin, and below average in the southern part of the Upper Colorado River Basin. In the Upper Green River Basin temperatures were as much as 4-6 degrees above average. East of the divide temperatures were very close to normal, but were mostly 0-2 degrees above average.

Streamflows are currently in the normal to above normal range along the Colorado River mainstem, and in major tributaries to the south. The Colorado and San Juan Rivers have seen a miniature spike in flows in response to last week's precipitation. To the north and west of the Colorado River conditions have been drier and less favorable for above average flows. The Upper Green River and Duchesne River are registering below normal to much below normal flows.

Remotely-sensed vegetative health is following a pattern that is mostly consistent with streamflows. The UCRB west of the Green River and north of Sweetwater County are registering pre and moderate vegetative drought conditions. The Variable Infiltration Capacity soil moisture model shows much below average soil moisture in these areas as well. Conditions in much of the rest of the basin are in the normal range. East of the divide vegetative health

is a concern for the northern Front Range and for the plains immediately east of Denver. Drier than average soils are not being shown by the VIC model in this area.

As the warm season begins to draw to a close reservoir levels across the UCRB can be described as in the normal to below normal range. The reservoir giant, Lake Powell, has come up to 76% of its early September average, an improvement from 69% of average at this time last year. Conversely, most of the other large reservoirs in the basin are down slightly from their September 2015 levels. Growing season evapotranspiration levels have been above average in northeast Utah, but below average in southwest Colorado and the San Luis Valley. Growing season ET across the eastern half of Colorado has been in the normal range.

As summer turns to fall the sun hides for longer hours and the air cools, which will create much less pressing demand on plants to convert soil moisture to water vapor. The air also becomes less buoyant, and anticipated precipitation decreases for most of the UCRB and eastern Colorado. As such, the hydrologic cycle will be less dynamic and recommendations will come more slowly from now until snowpack season.

Recommendations

UCRB: It is recommended that D0 be expanded in southern Utah to include eastern Wayne and Emery Counties. Precipitation in this area has been between 50 and 70% of normal. During the monsoon season precipitation is climatologically supposed to go up in this region over the late summer. The impacts of this dryness are being seen from satellite NDVI measurements.

Eastern Colorado: Status quo. The northeast plains of Colorado have been drying out. Some eastward expansion of the D1 and D0 areas in northern Colorado may be a short time coming.

****Disclaimer:** The above recommendations are **recommendations only**, based on data, impacts, and input from local experts. These recommendations are sent to the U.S. Drought Monitor author on Tuesdays. The USDM author has sole discretion on final changes made in the region and can accept, reject, or modify the above recommendations and may have additional modifications. Additionally, any recommendations discussed during the NIDIS webinars that are agreed upon by the local experts and USDM author are **still subject to change**. Changes are final and official as of Thursday morning, and can be viewed on the official [U.S. Drought Monitor](#) website.

Additional Drought Index Links: (will take you to an outside website)

- [Palmer Drought Severity Index for Climate Divisions Updated Weekly](#)
- [WestWide Drought Tracker's PDSI Updated Monthly](#)
- [Surface Water Supply Index](#)

When available, maps and text are updated Tuesday afternoons.

- [View Printer Friendly Version](#) of current Drought and Water Assessment
- [View PDF](#) of current Drought and Water Assessment
- [Summary Archive](#)