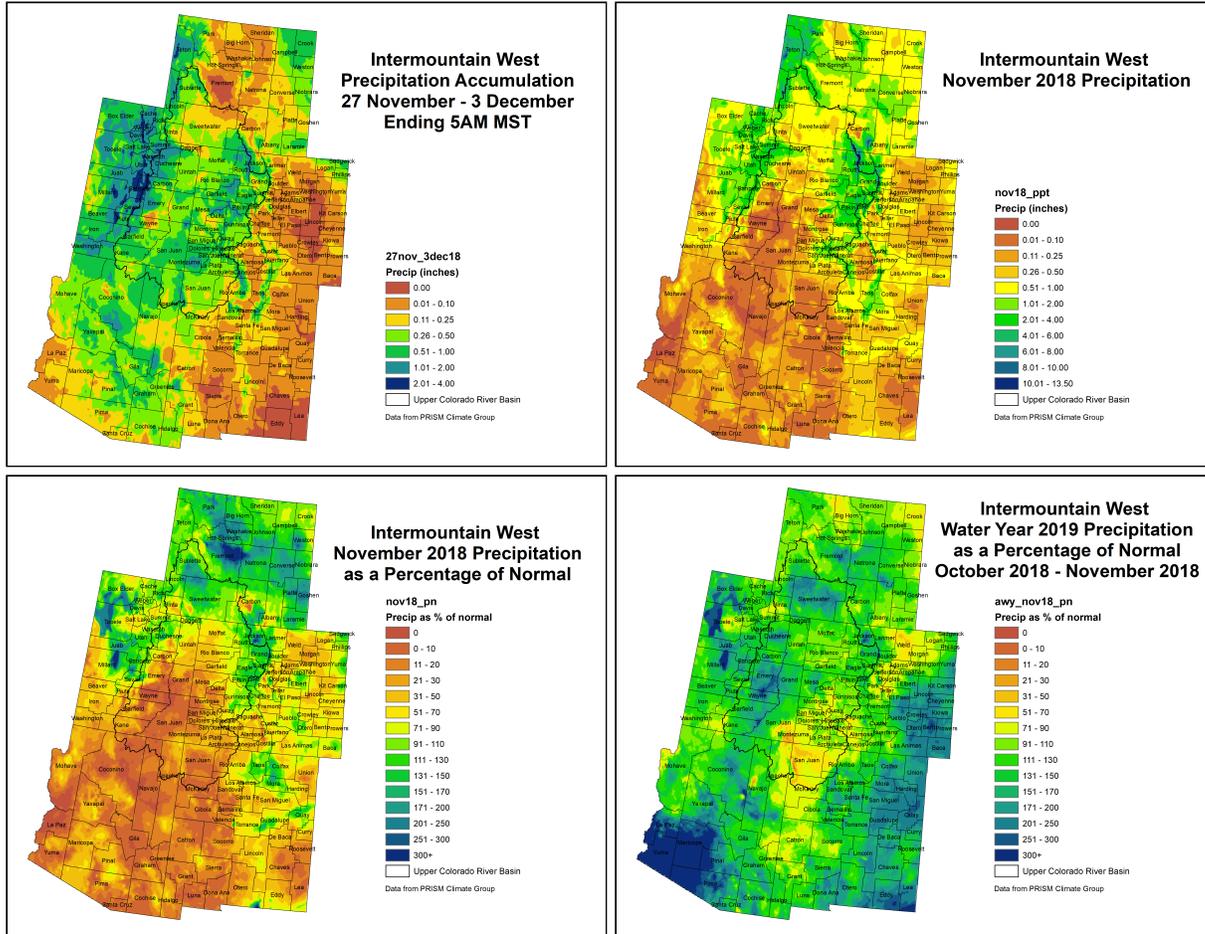


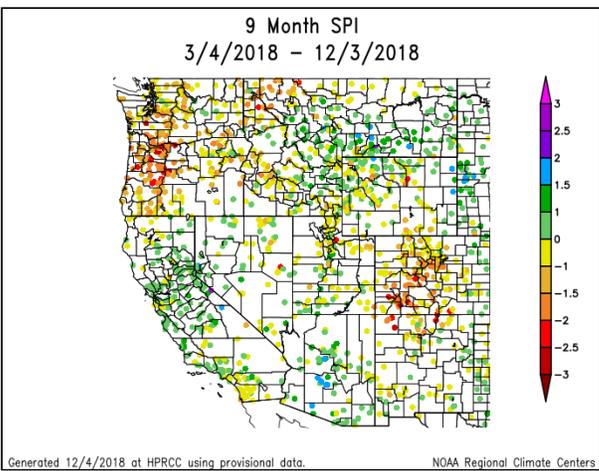
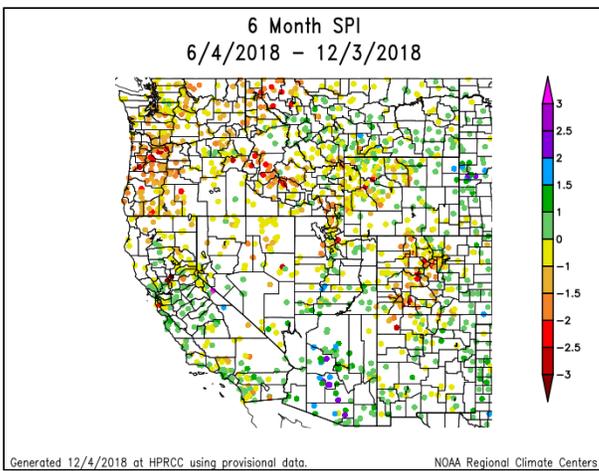
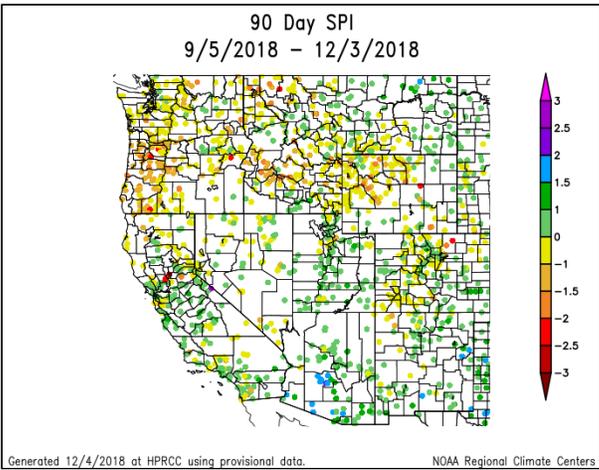
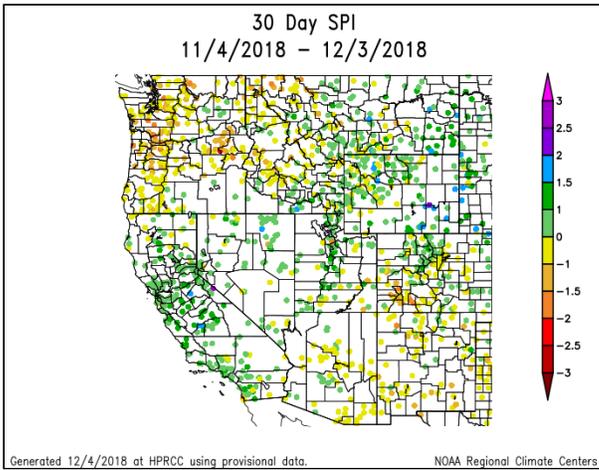
NIDIS Intermountain West Drought Early Warning System December 4, 2018

Precipitation



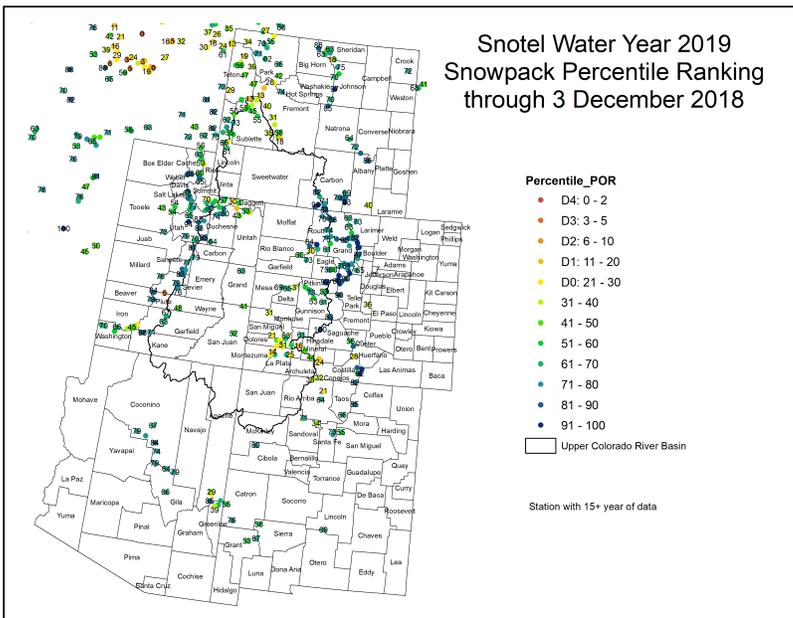
The images above use daily precipitation statistics from NWS COOP, CoCoRaHS, and CoAgMet stations. From top to bottom, and left to right: most recent 7-days of accumulated precipitation in inches; current month-to-date accumulated precipitation in inches; last month's precipitation as a percent of average;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

Standardized Precipitation Index



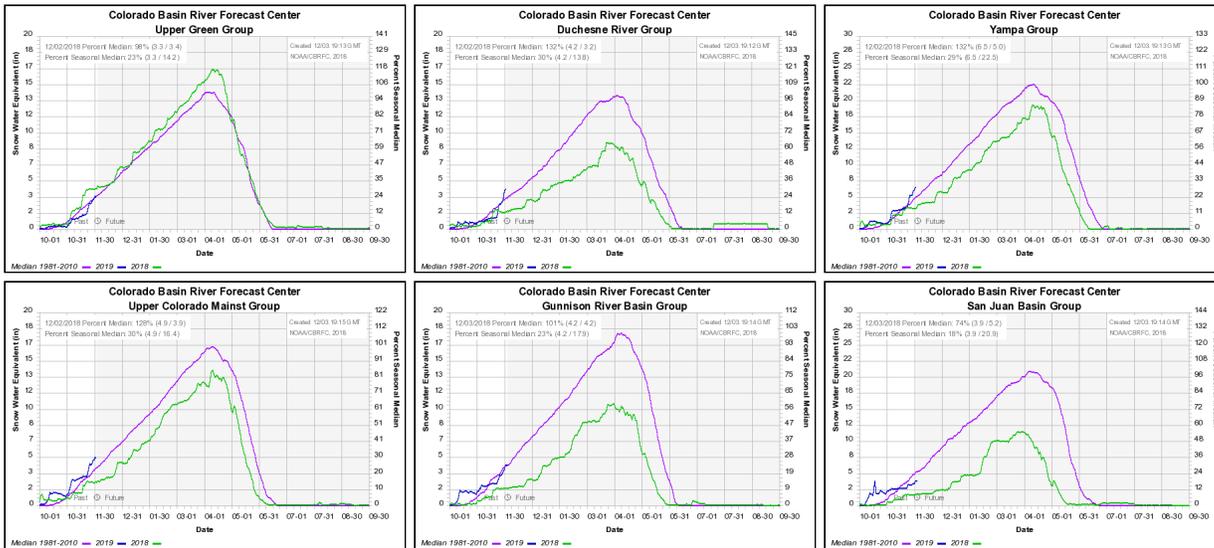
Standardized Precipitation Index standardizes precipitation accumulations for a specified time period into percentile rankings. -1.0 to -1.5 is equivalent to a D1 to D2. -1.5 to -2.0 is equivalent to a D2 to D3. -2.0 and worse is equivalent to a D3 to D4. 30- and 60-day SPIs focus on short-term conditions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

Snotel and Snowpack

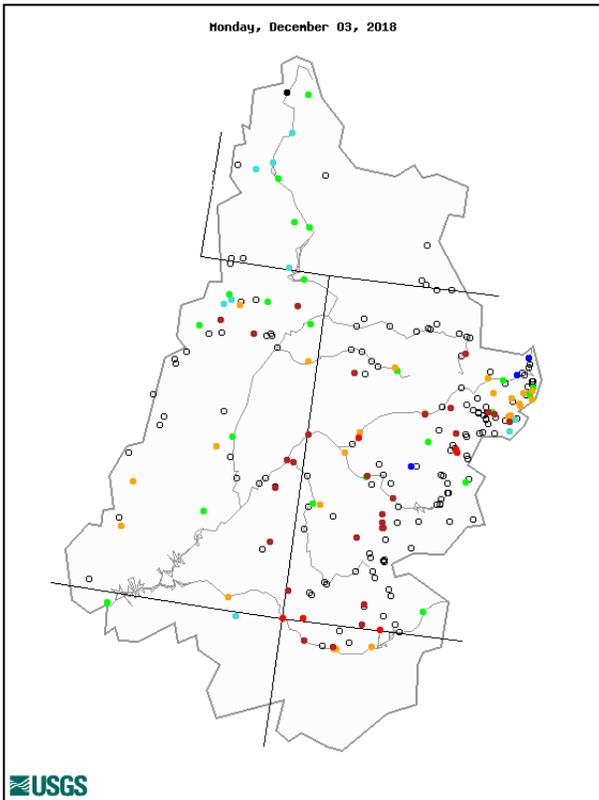


The above image shows SNOTEL snowpack percentiles for each SNOTEL site in the Intermountain West. The images below show accumulated snow water equivalent in inches

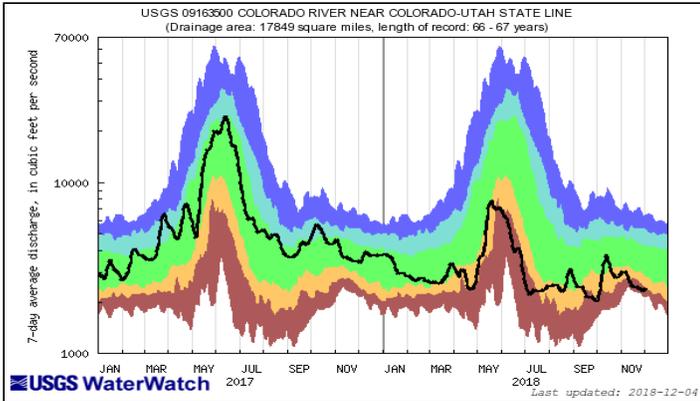
(green) compared to average (blue) and last year (red) for several different sub-basins across the UCRB (and were created by the Colorado Basin River Forecast Center).

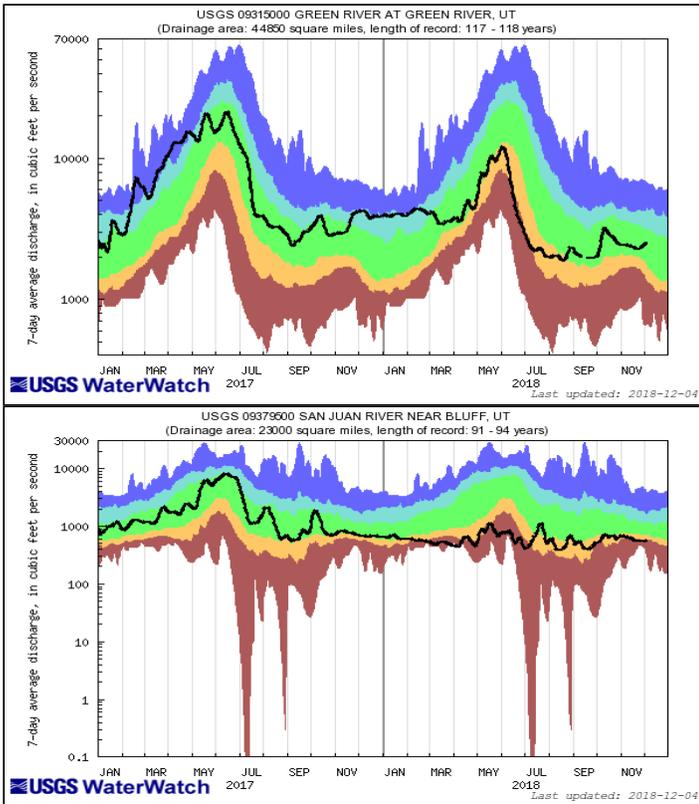


Streamflow



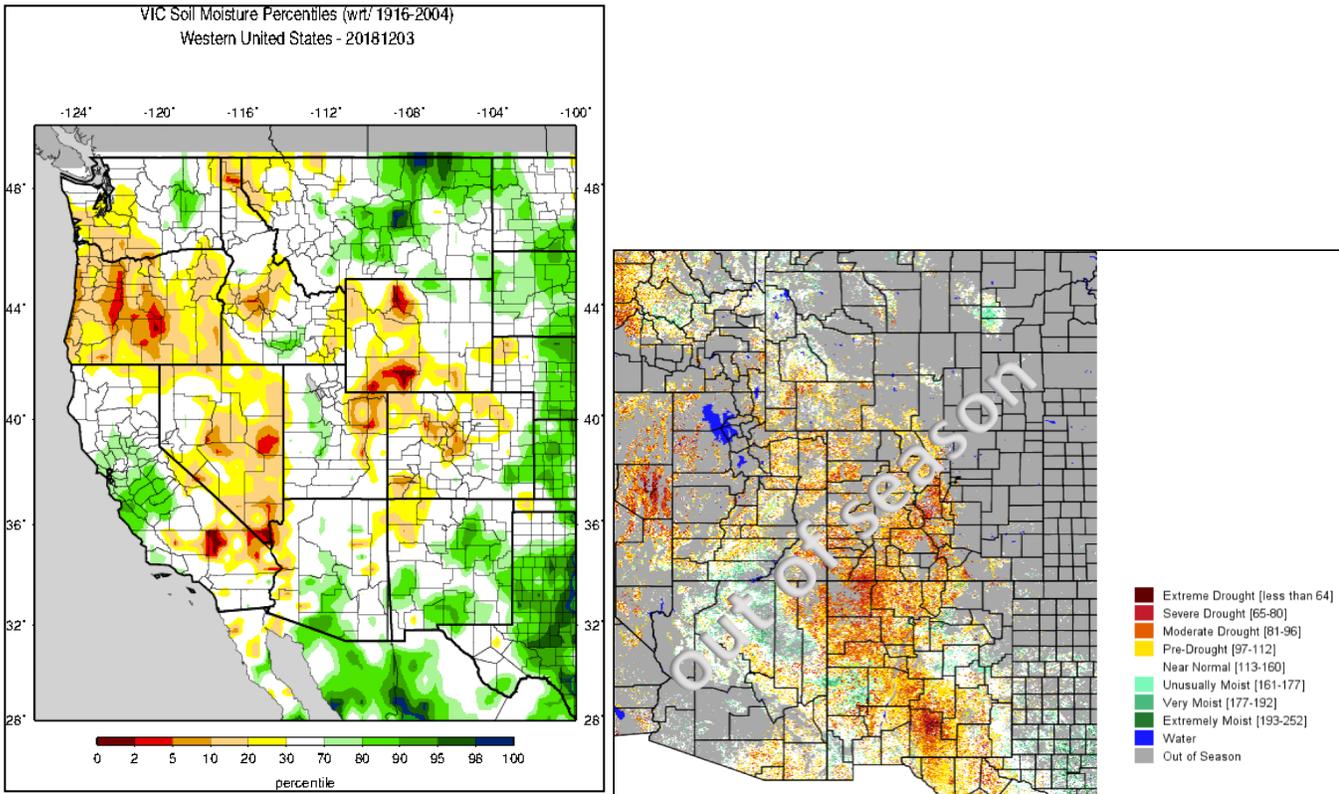
Explanation - Percentile classes							
●	●	●	●	●	●	○	
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		





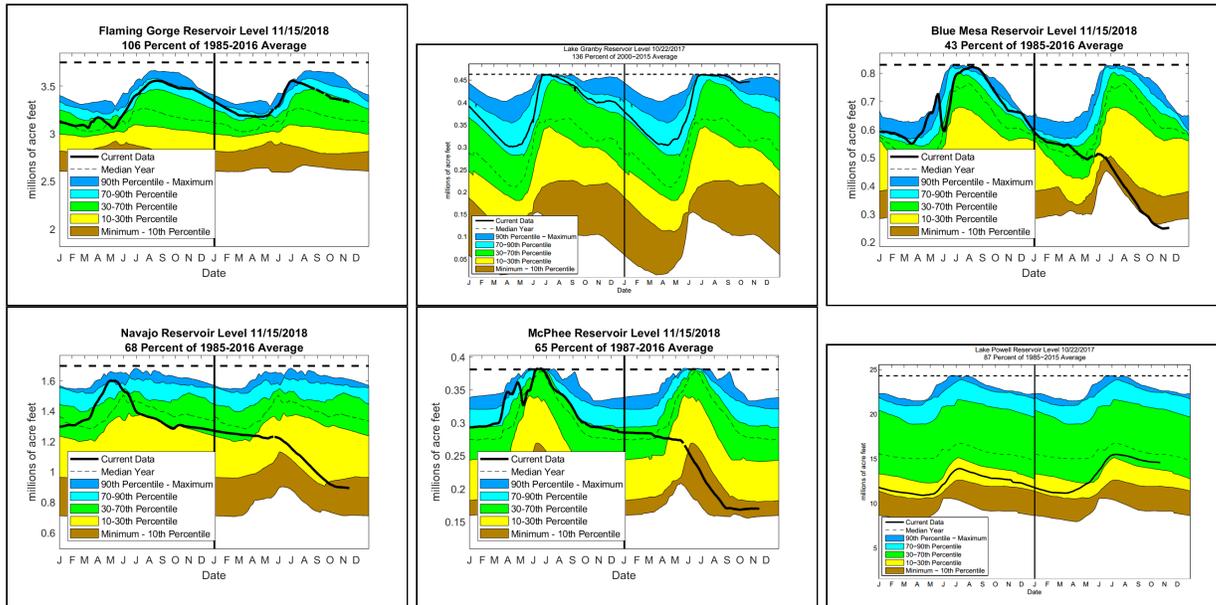
The top left image shows 7-day averaged streamflows as a percentile ranking across the UCRB. The top right image shows 7-day averaged discharge over time at three key sites around the UCRB: The Colorado River at the CO-UT state line; the Green River at Green River, UT; and the San Juan River near Bluff,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

Surface Water

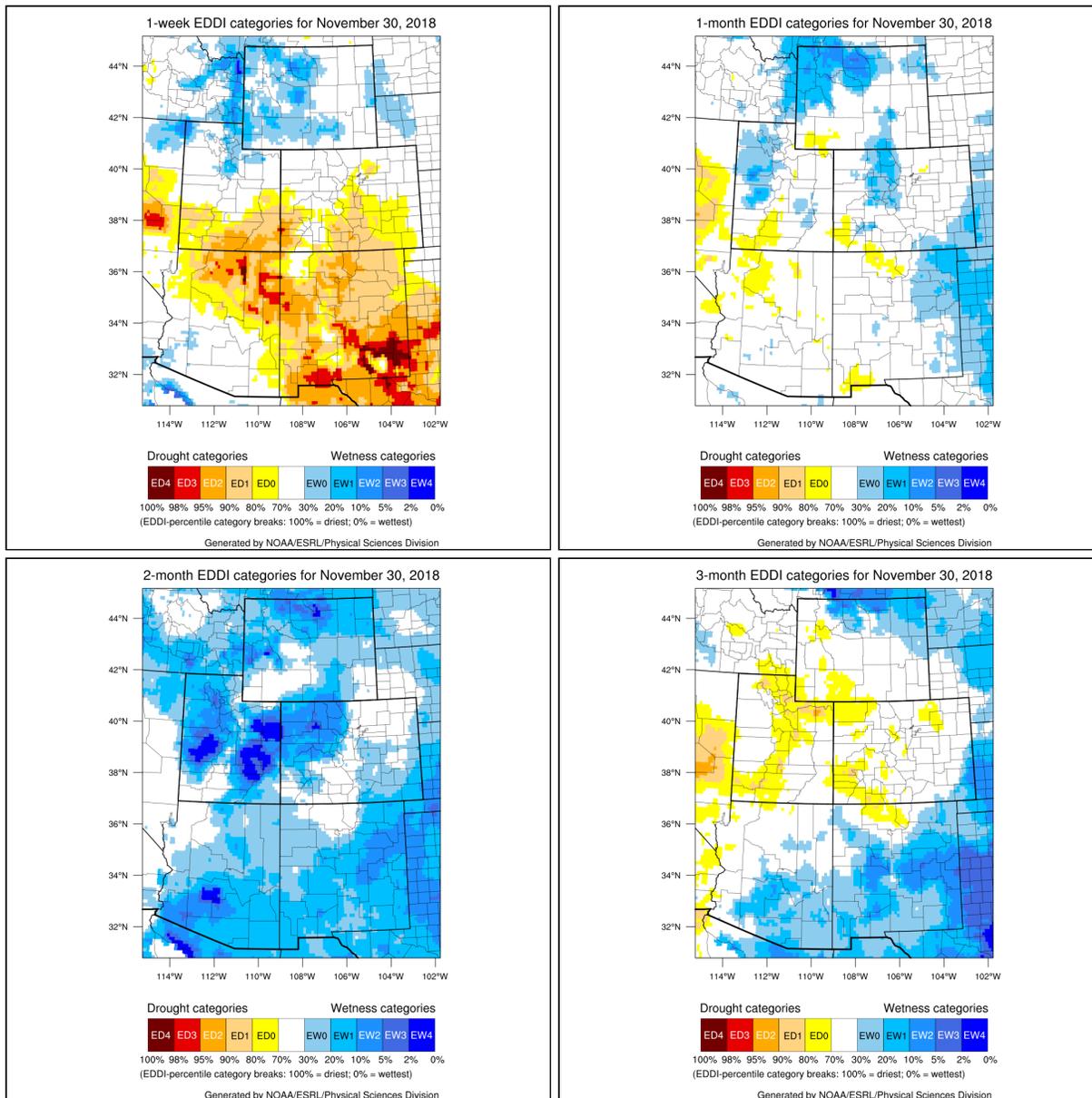


The top left image shows VIC modeled soil moisture as a percentile ranking. The top right image shows satellite-derived vegetation from the VegDRI product (which updates on Mondays).

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.

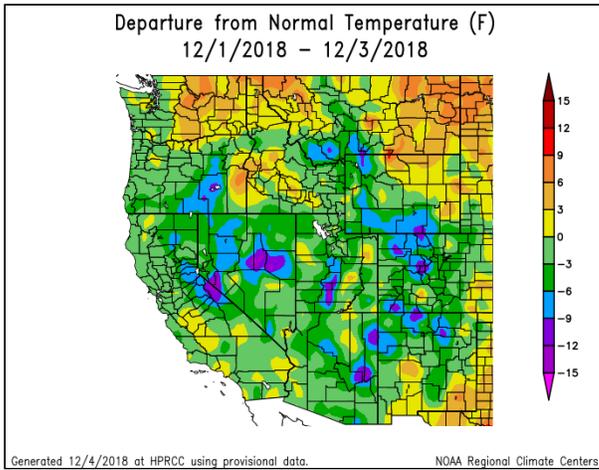
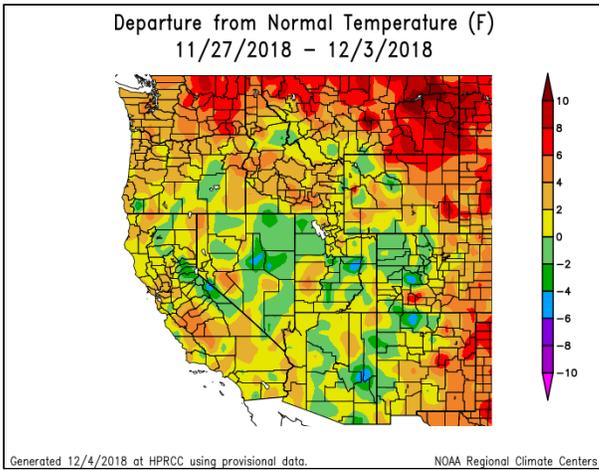


Evaporative Demand

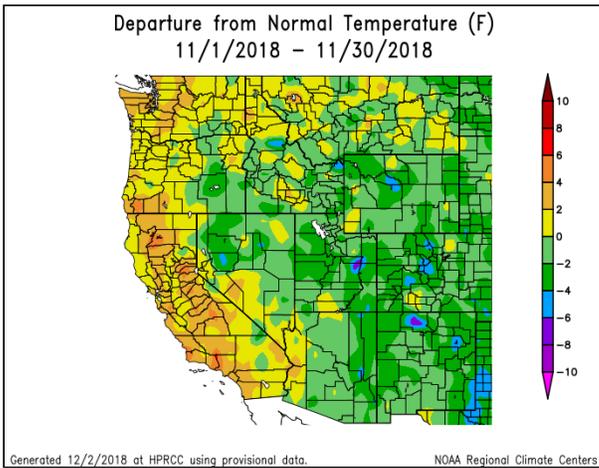


The above images are available courtesy of NOAA’s Evaporative Demand Drought Index (EDDI). Drought classification listed is a function of the depth of reference evapotranspiration accumulated over a given period of record with respect to a climatology of 1981-2010. The drought categories displayed are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

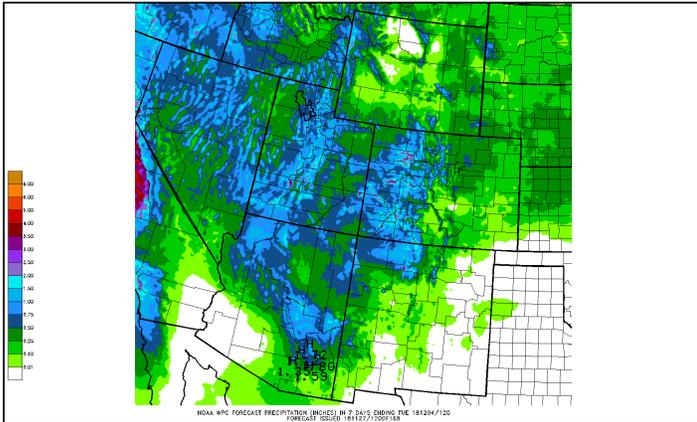
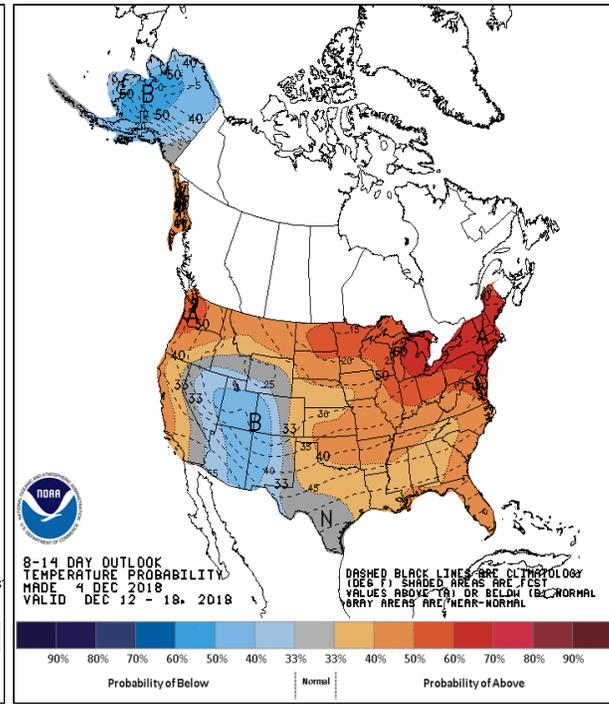
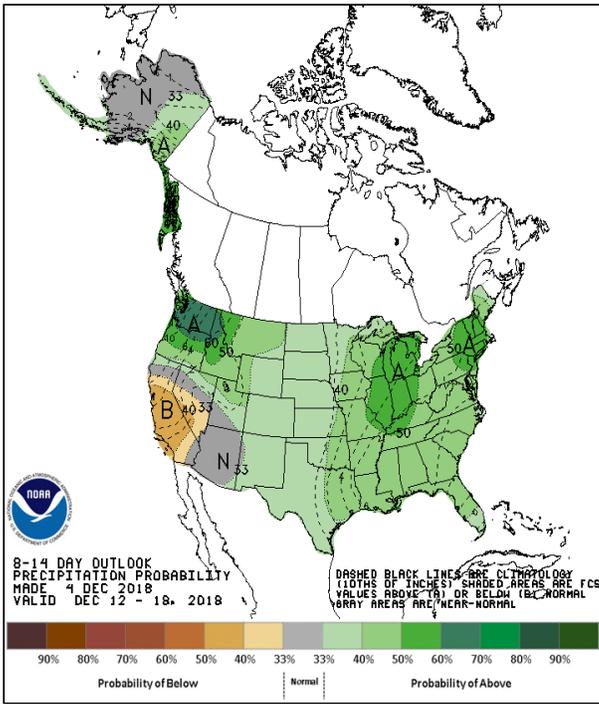
Temperature



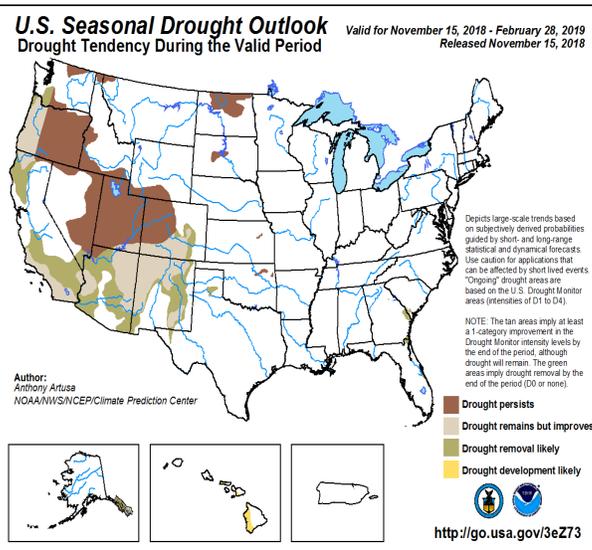
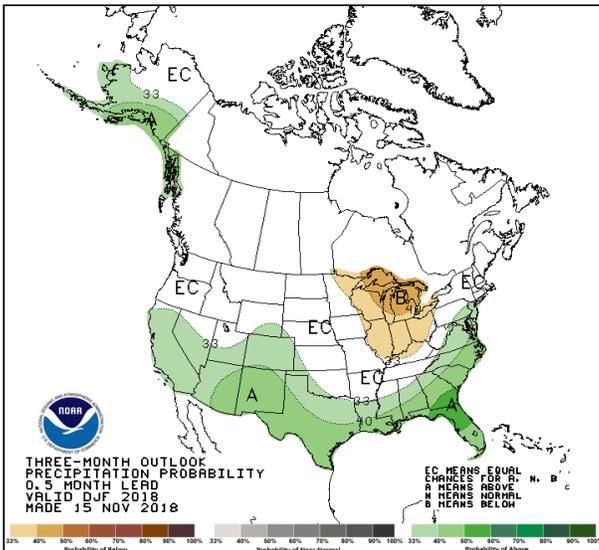
All images show temperature departures from average over different time periods (last 7 days on top left; month-to-date on top right; last full month on bottom). Temperature departure maps provided by HPRCC ACIS.



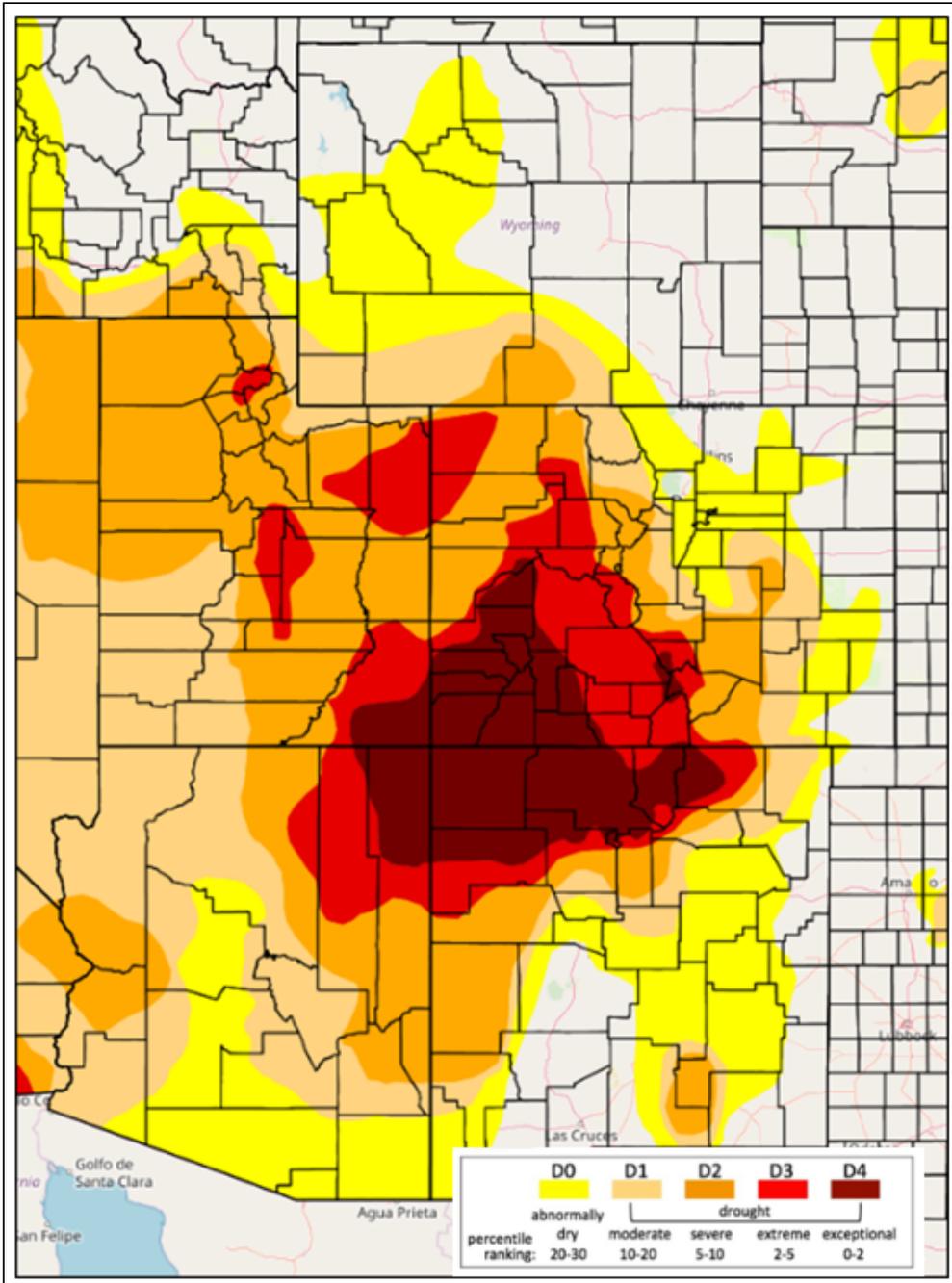
Condition Monitoring and Impacts



The top two images show Climate Prediction Center's Precipitation and Temperature outlooks for 8 - 14 days. The middle image shows the Weather Prediction Center's Quantitative Precipitation Forecast accumulation for seven days. The bottom left image shows the 3-month precipitation outlook from Climate Prediction Center, and the bottom right image shows the Climate Prediction Center's most recent release of the U.S. Seasonal Drought Outlook.

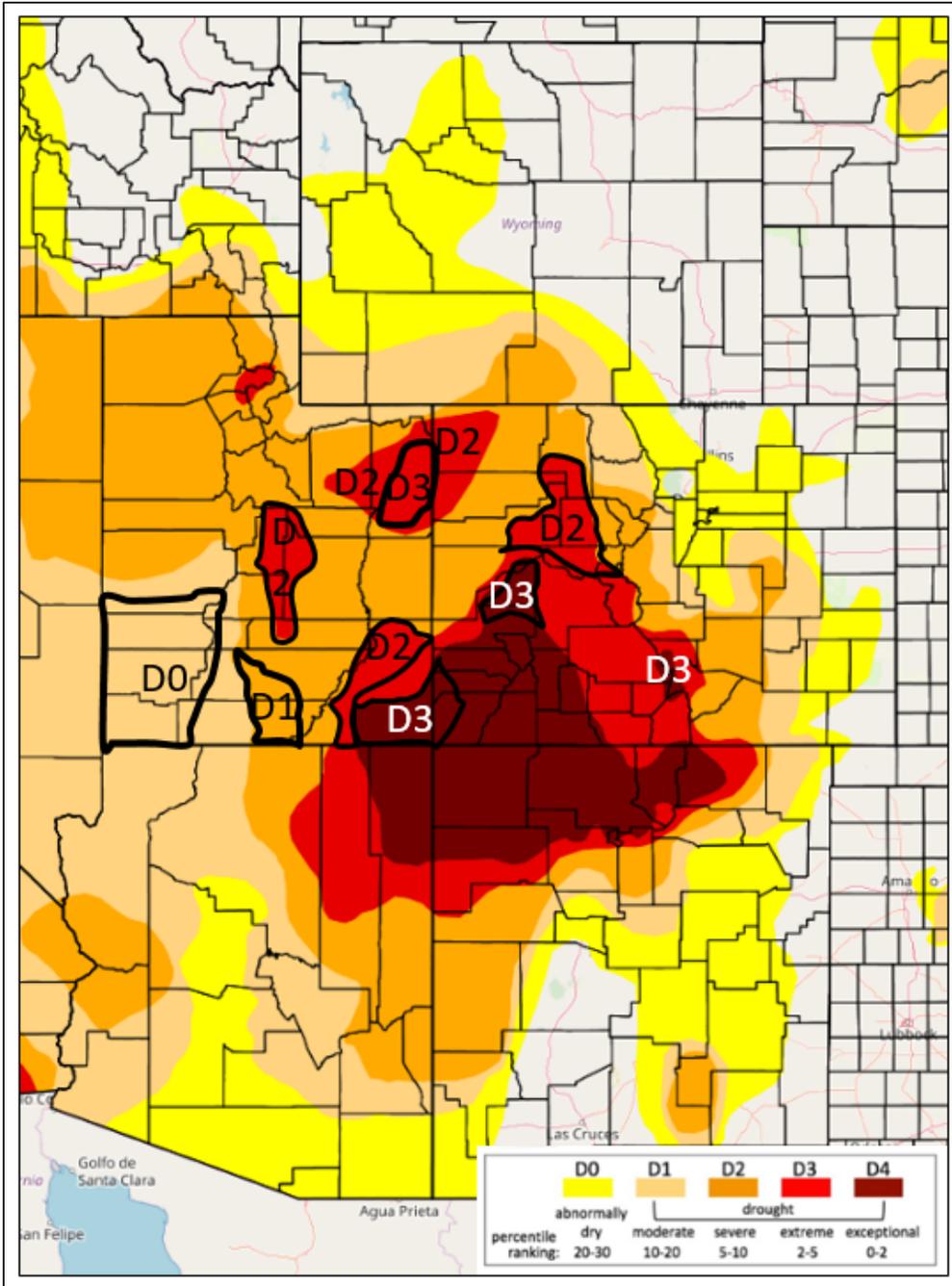


Summary and Recommendations



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)

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: December 4, 2018

The last seven days have been a boon for snowpack across much of the western, intercontinental US. Yay! With high elevation precipitation totals of 2-3", we saw large increases to percent of seasonal normal snowpack throughout the state of Utah, and in western Colorado. This was coupled with relatively seasonal temperatures. Conditions were warmer and drier with respect to normal east of the divide.

Snowpack in the Intermountain West is looking good for the season to date. Basins are hovering right around the 100% of normal mark in southwest Wyoming. All basins in Utah are now reporting above average. In Colorado, most major river basins are above average, but the San Juan and Rio Grande Basins are still lagging a little behind (82 and 89 percent of normal respectively). This is exciting, but it is still early. We are generally about 25% of the way through our high elevation snowpack accrual season.

61% of stream gages reporting in the Upper Colorado River Basin are recording below normal flows, but more are becoming ice affected by the day. Reservoirs are still at low levels in southern Colorado and Utah due to the short snow supply and hot summer of 2018. That'll remain the case through the winter. It will be critical to monitor come melt season.

Widespread precipitation should fall over the Lower Colorado River Basin this week, and east of the divide in New Mexico. Totals will be modest (mostly below 0.5"). The forecast is for seasonal-to-cool temperatures to take over the Upper Colorado Basin for the remainder of the week with high

pressure overhead and snow on the ground. Look for some deep nighttime temperature inversions to form. Some residual moisture will make it into the San Juans and northern Colorado Rockies. It will not be major mountain snow. The 8-14 day outlook is now calling for below average temperatures and a return to above average precipitation over the Upper and Lower Colorado River Basin. Temperatures east of the divide will likely be above average with precipitation near normal.

Recommendations:

UCRB: It is recommended that D4 be improved to D3 in southeast San Juan County, Utah, and in western Montezuma and Dolores Counties. Recent cool temperatures and moisture have chipped away at long term deficits. The Cortez 12 month SPI is now D1 level. Surface water supplies are low, and this area will merit a close eye through the snow season.

It is recommended that D4 be improved to D3 in Delta County, CO. The Mesa Lakes 12-month SPI is D3-level, but that was the worst indicator I could find in the area. Nearby SNOTELs have started the season in the normal range.

It is recommended that D3 be improved to D2 in the headwaters of the Colorado, Yampa, and White River Basins. This includes southern Routt County, western Rio Blanco and Garfield Counties, Pitkin County, Eagle County, and even spilling over Independence Pass into Lake County. By and large, this area has had a greater than 50th percentile start to the snow season with a number of SNOTELs in the 90+ percentile range. There's still a lot of snow season ahead of us, but this is a promising start to the snowpack.

It is recommended that D3 be improved to D2 in western Moffat and Rio Blanco Counties in Colorado, and in Duchesne County in Utah, leaving just a bubble of D3 where matching long-term SPIs still exist in Uintah County. Short-term SPIs here are now above average, and longer term SPIs are D0-D2-level. The Duchesne River Basin had a great week for building snowpack, standing at 134% of normal for the snow season to date.

It is recommended that D3 be improved to D2 in central Utah in Emery, Carbon, Sanpete, Sevier, and Wayne Counties. High elevation precipitation totals were 2-3", and while they were much lower in the valleys, long-term SPIs are up across the board (D0-D1 levels). This area was largely put into D3 based on impacts, including concerns about drinking water supplies. The start to the water year has pushed things in the right direction.

It is recommended that D3 be improved to D2 in northern and western San Juan County, Utah. Again, this week of precipitation improved long-term totals.

It is recommended that D2 be improved to D1 in central Kane and Garfield Counties. Sounding like a broken record, but precipitation totals were on the high side over the last week, and long-term SPIs no longer justify D2.

Eastern CO: It is recommended that D4 be improved to D3 in the Sangre de Cristos at the west end of Custer and Huerfano Counties. Considerable long-term deficits still exist, but this snow season is off to a good start. SNOTELs in the area are above the 50th percentile.

Western UT: We're not experts in SW UT per se, but take a look at St. George and the surrounding area. It may be time to go D0.