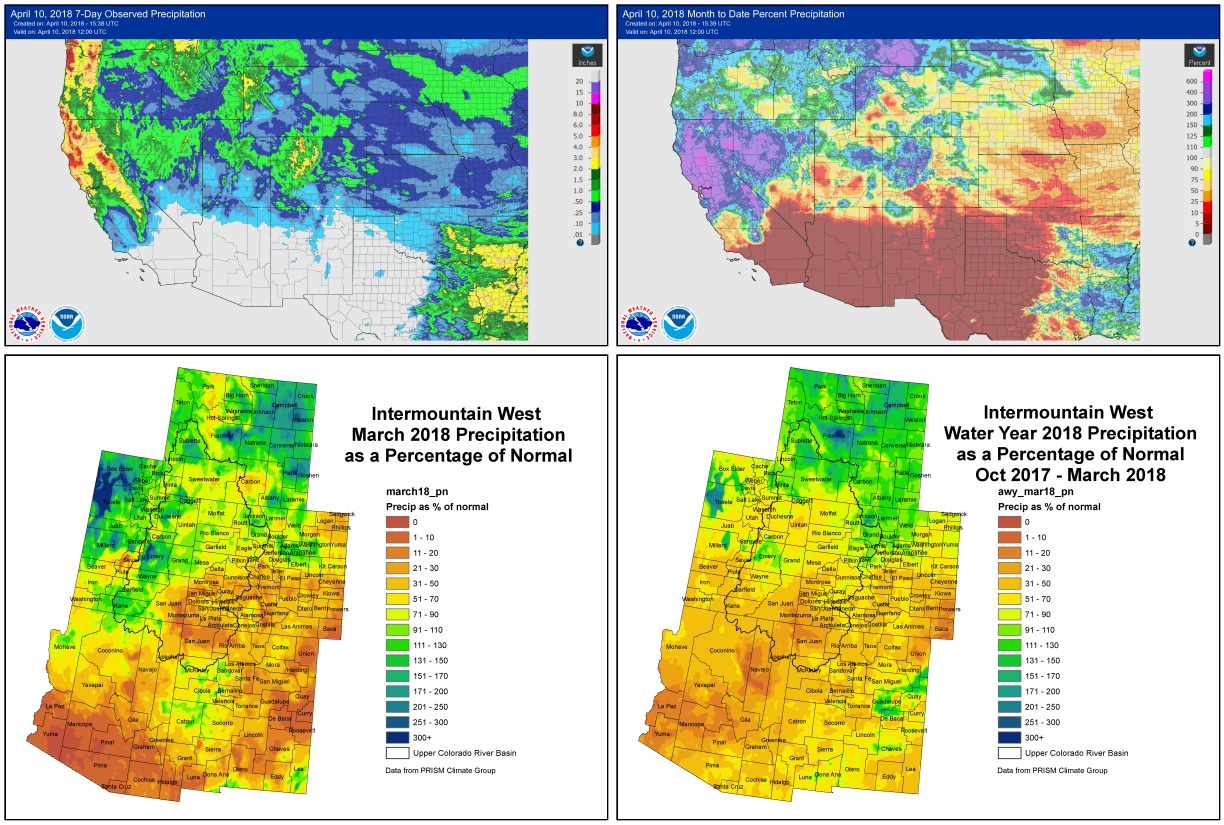
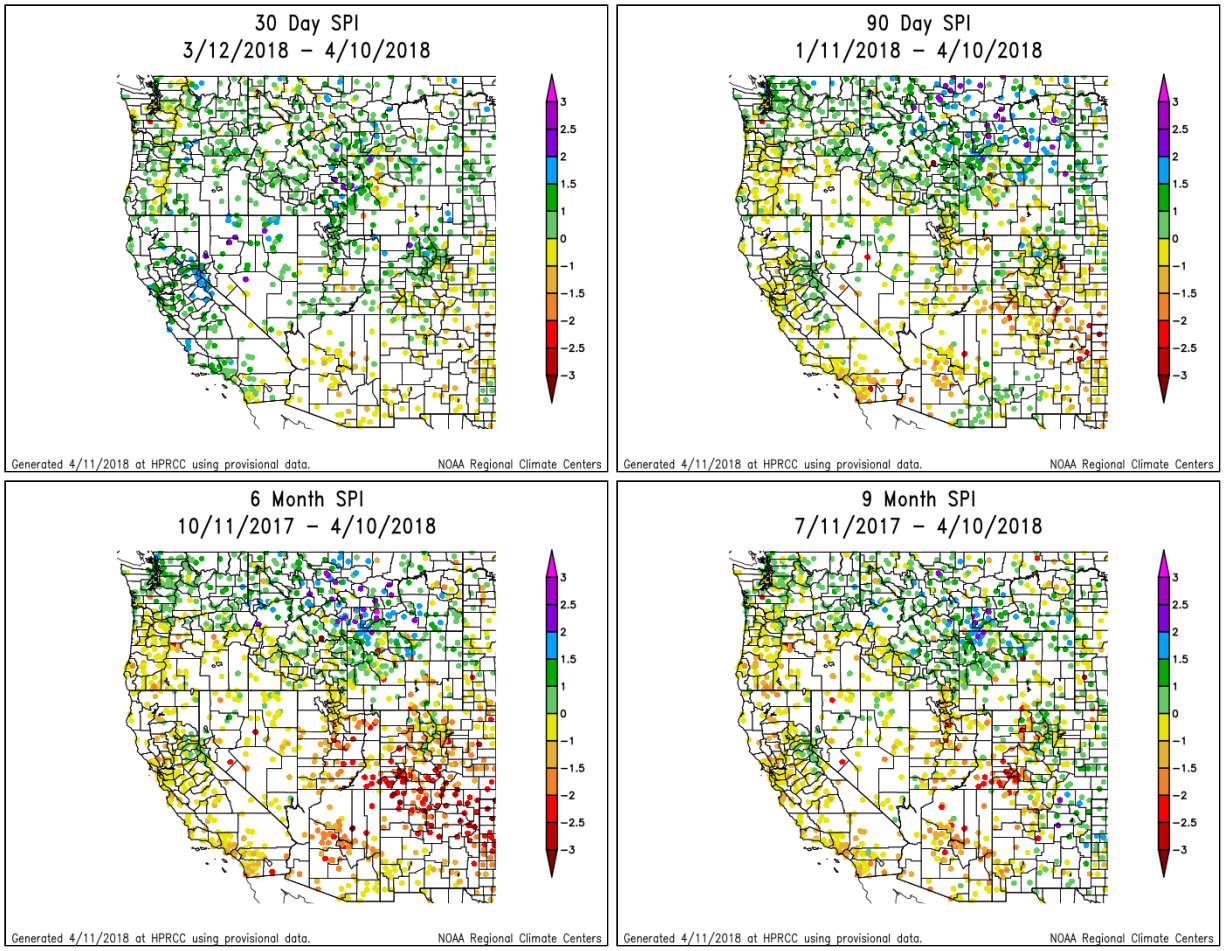
NIDIS Intermountain West
Drought Early Warning System
April 10, 2018

Precipitation



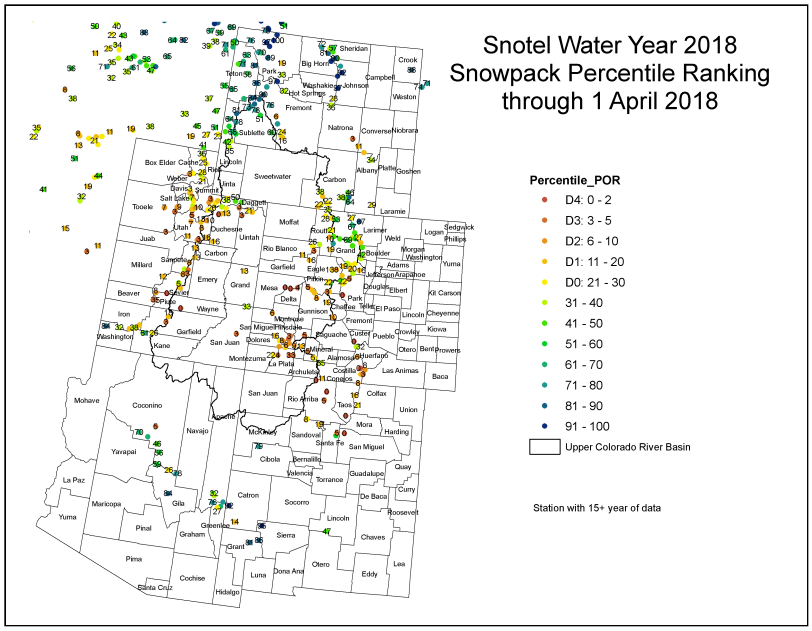
The images above use daily precipitation statistics from NWS COOP, CoCoRaHS, and CoAgMet stations. From top to bottom, and left to right: most recent 7-days of accumulated precipitation in inches; current month-to-date accumulated precipitation in inches; last month's precipitation as a percent of average;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

Standardized Precipitation Index



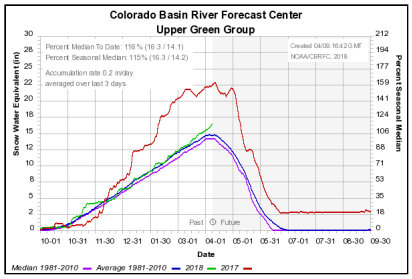
Standardized Precipitation Index standardizes precipitation accumulations for a specified time period into percentile rankings. -1.0 to -1.5 is equivalent to a D1 to D2. -1.5 to -2.0 is equivalent to a D2 to D3. -2.0 and worse is equivalent to a D3 to D4. 30- and 60-day SPIs focus on short-term conditions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

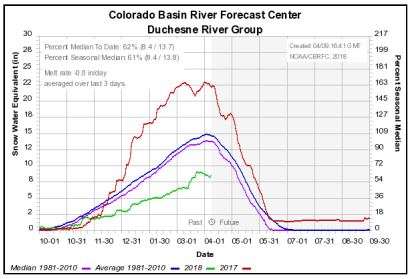
Snotel and Snowpack

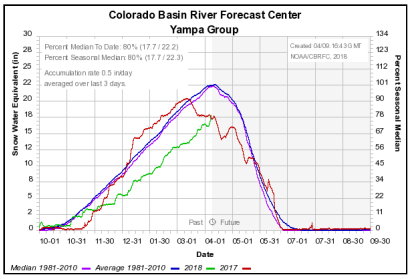


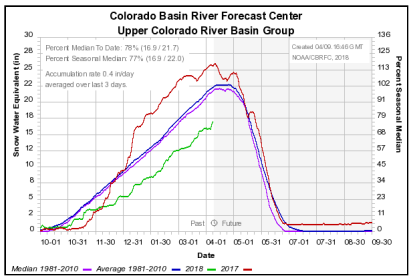
The above image shows SNOTEL snowpack percentiles for each SNOTEL site in the Intermountain West. The images below show accumulated snow water equivalent in inches

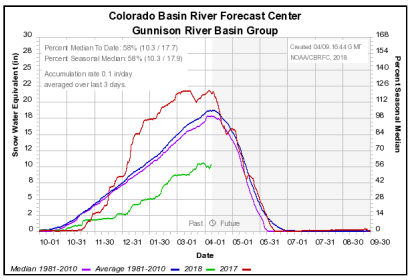
(green) compared to average (blue) and last year (red) for several different sub-basins across the UCRB (and were created by the Colorado Basin River Forecast Center).

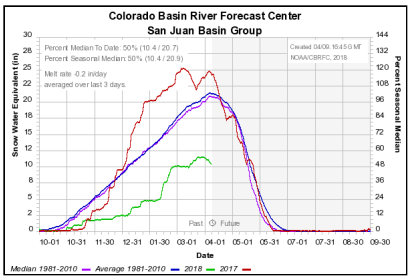




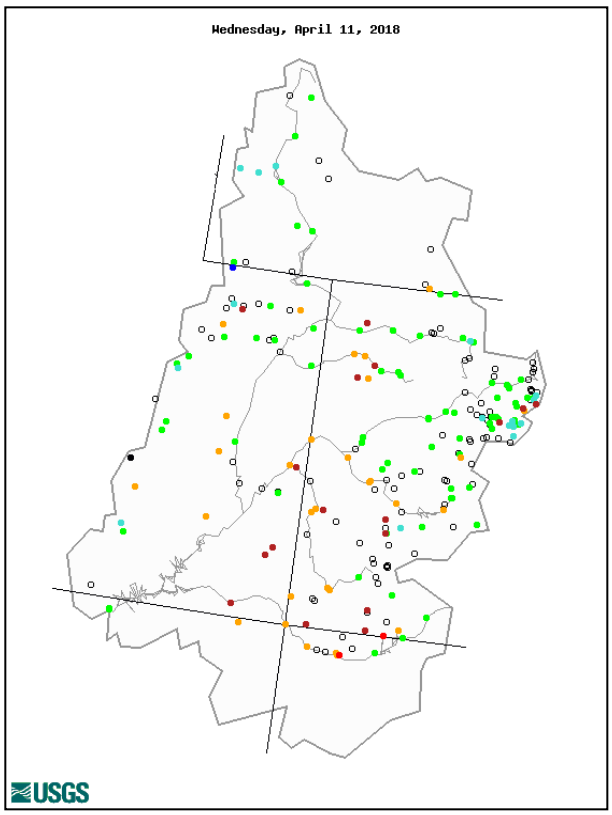




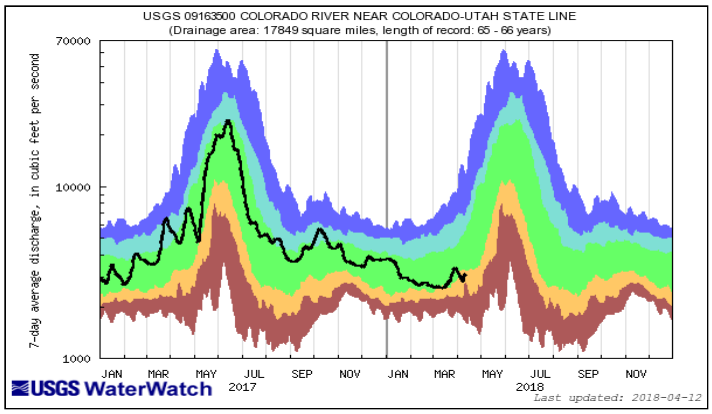


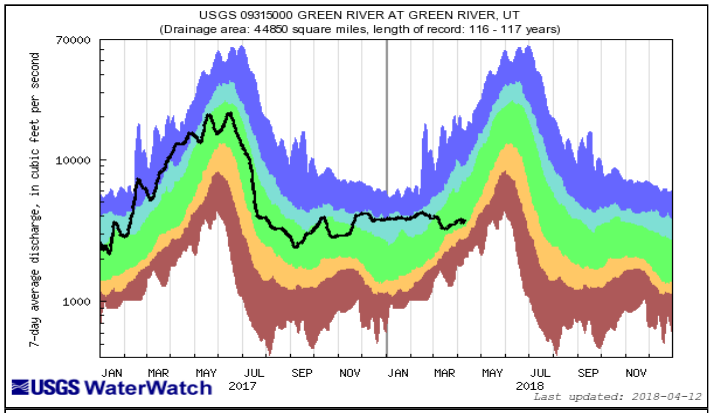


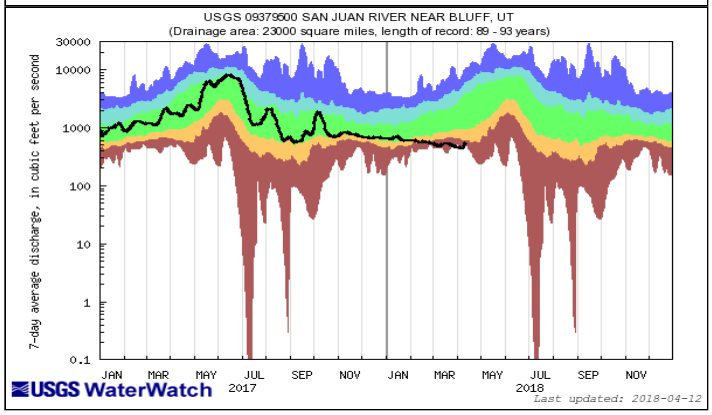
Streamflow



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		

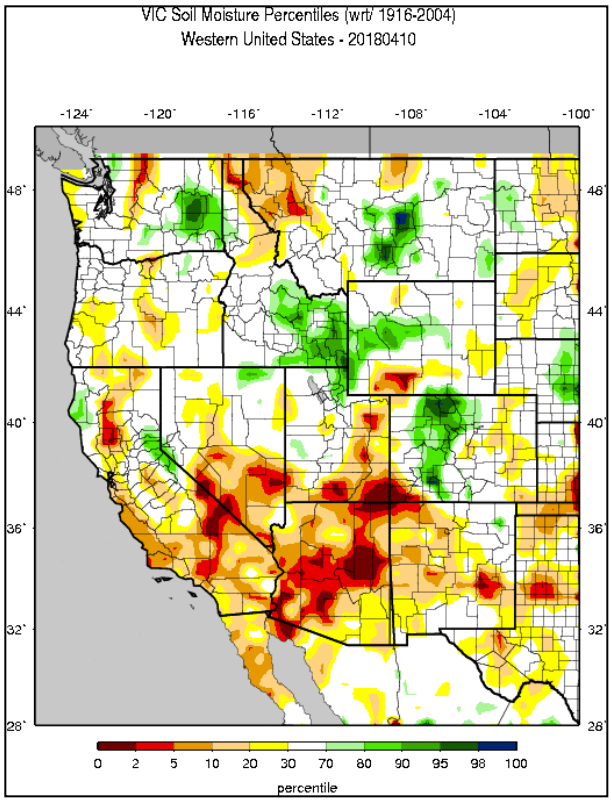


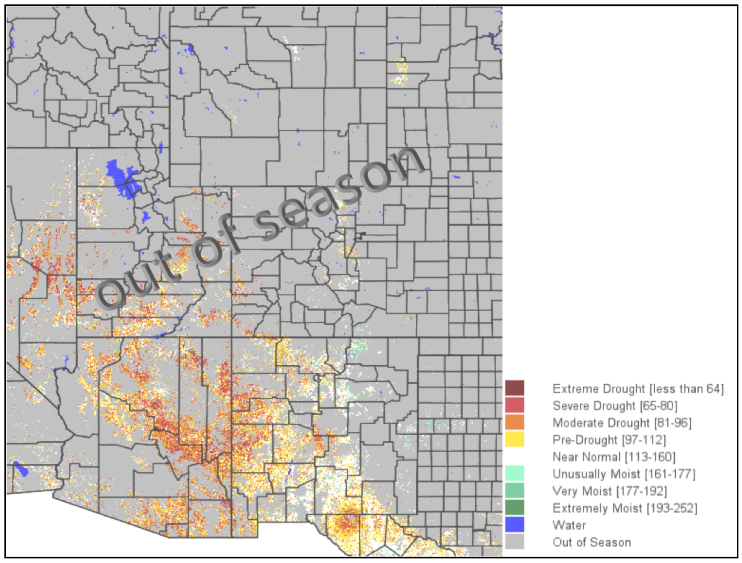




The top left image shows 7-day averaged streamflows as a percentile ranking across the UCRB. The top right image shows 7-day averaged discharge over time at three key sites around the UCRB: The Colorado River at the CO-UT state line; the Green River at Green River, UT; and the San Juan River near Bluff,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

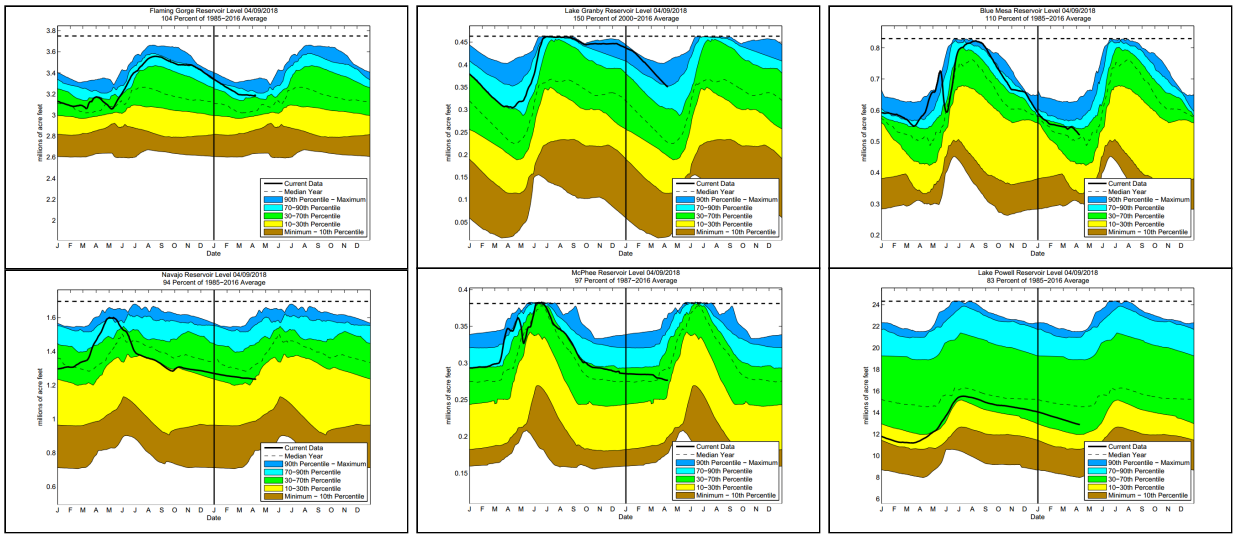
Surface Water



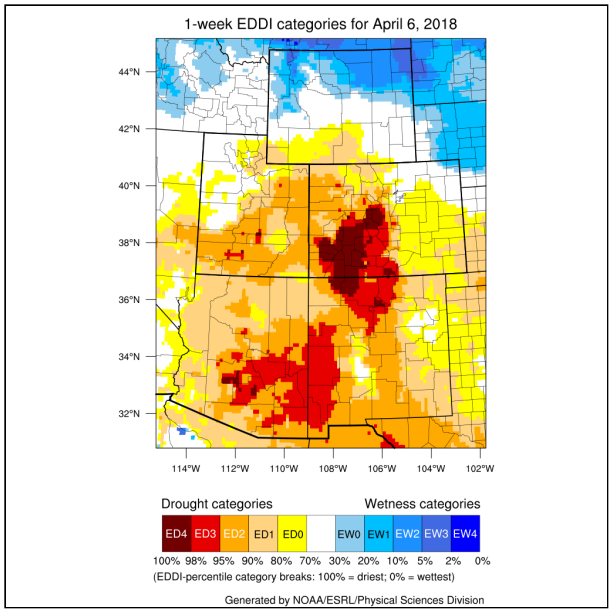


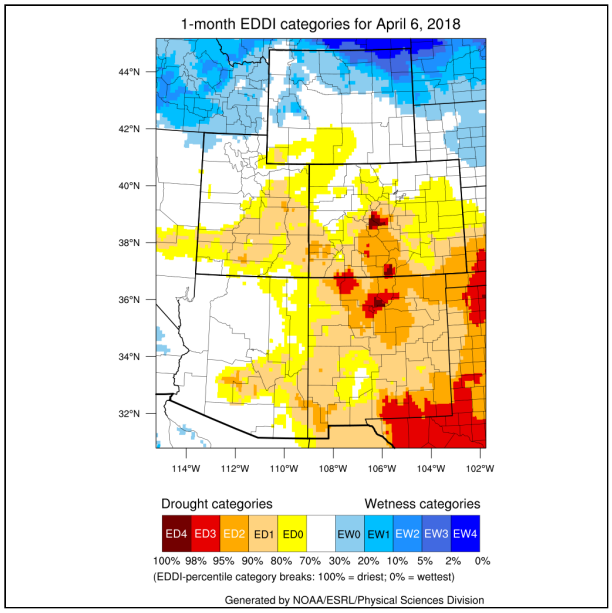
The top left image shows VIC modeled soil moisture as a percentile ranking. The top right image shows satellite-derived vegetation from the VegDRI product (which updates on Mondays).

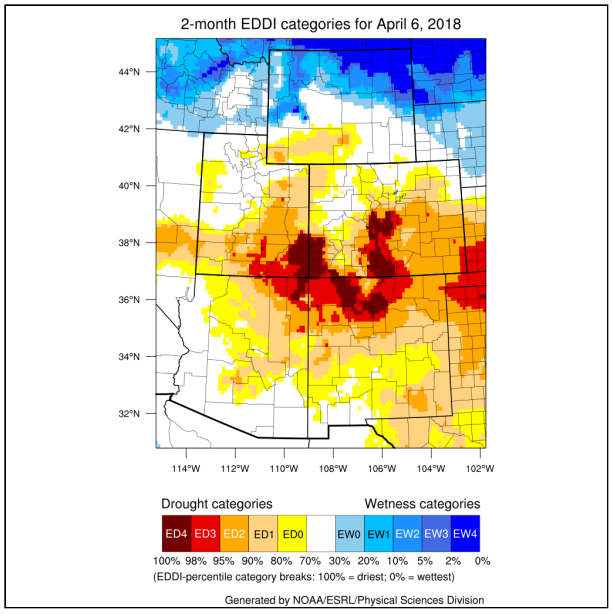
The graphs shown below are plots of reservoir volumes over the past full year and current year to date (black). The dashed line at the top of each graphic indicates the reservoir's capacity, and the background color-coded shading provides context for the range of reservoir levels observed over the past 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.

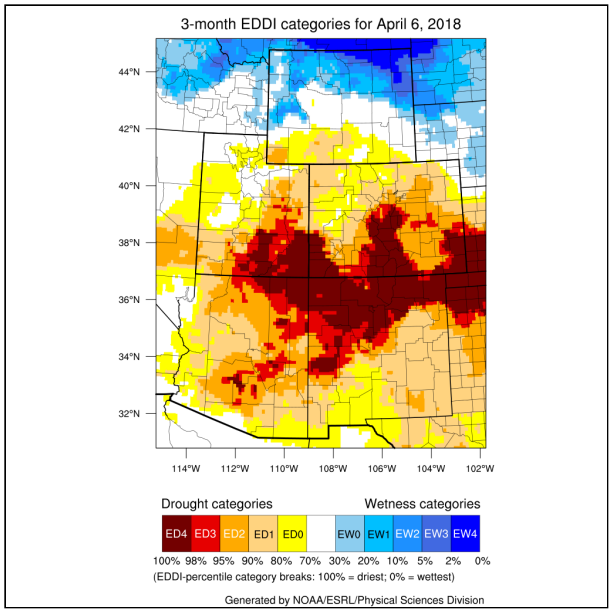


Evaporative Demand



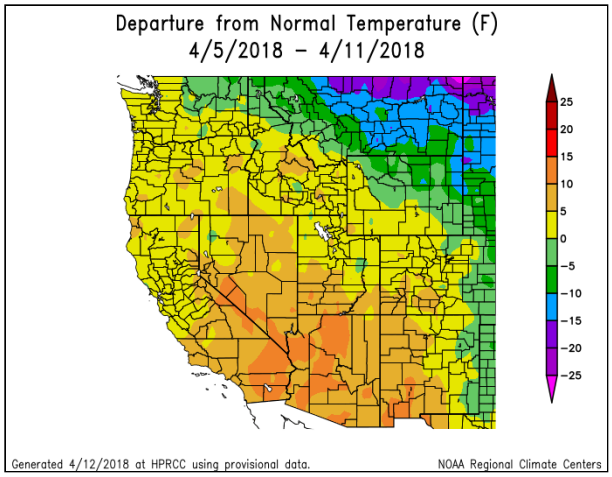


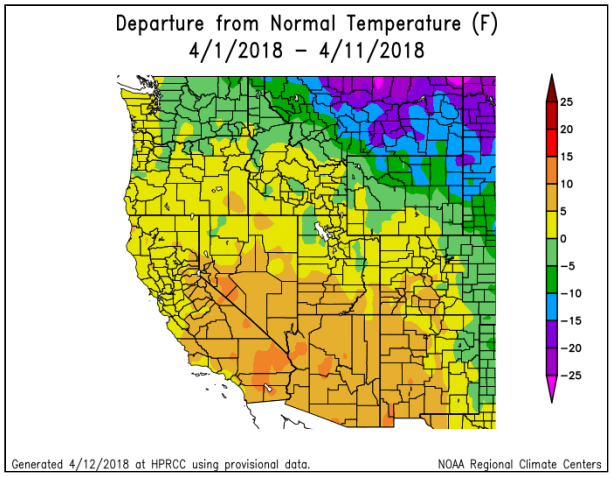




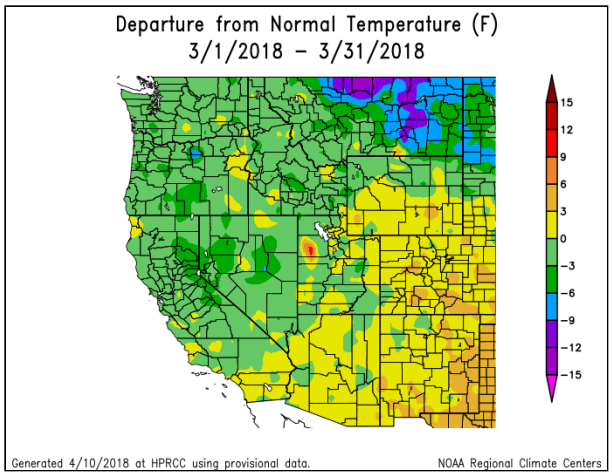
The above images are available courtesy of NOAA's Evaporative Demand Drought Index (EDDI). Drought classification listed is a function of the depth of reference evapotranspiration accumulated over a given period of record with respect to a climatology of 1981-2010. The drought categories displayed are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

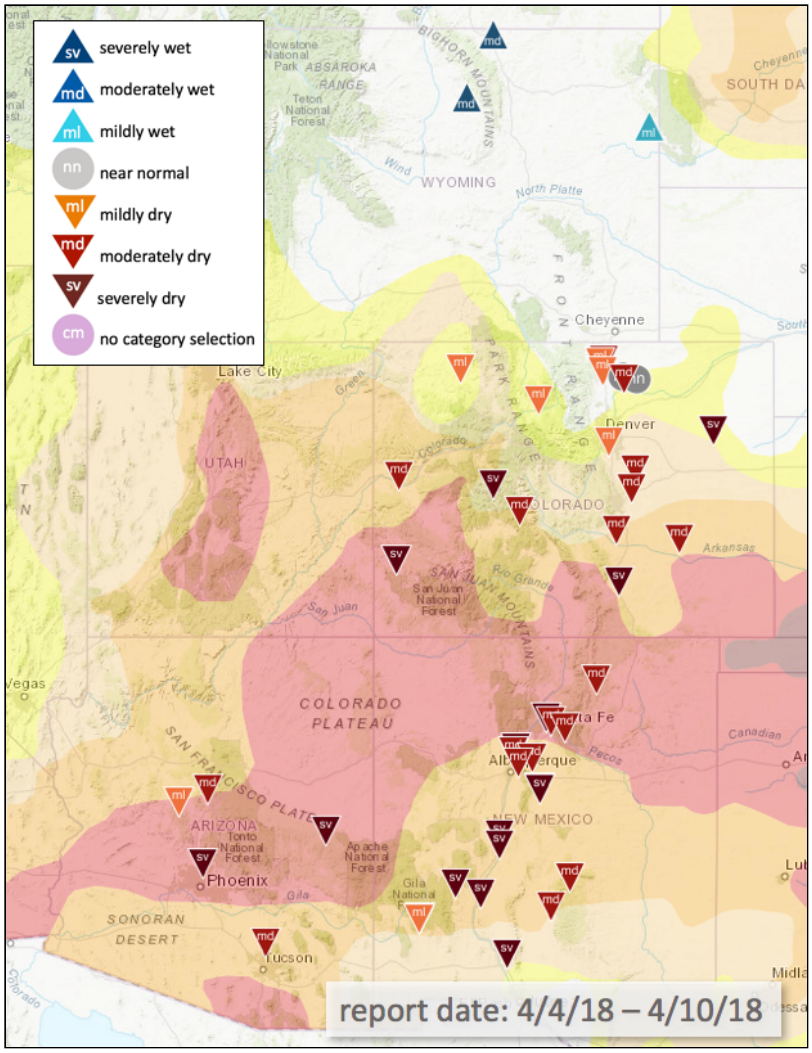




All images show temperature departures from average over different time periods (last 7 days on top left; month-to-date on top right; last full month on bottom). Temperature departure maps provided by HPRCC ACIS.



Condition Monitoring and Impacts



Map of current condition monitoring reports submitted to CoCoRaHS in the last week overlaid on the current U.S. Drought Monitor depiction. Specific impacts reports from local experts listed below.

CSU Extension

I drove from Akron down to Garden City, KS today. As I was driving I was observing conditions on the drive down 59, to 287 to 50. North of I-70 wheat conditions are about what I would expect with the late plantings. They are green but not growing fast as well. We broke dormancy about 2 to 3 weeks ago. South of I-70 you can tell that they are drier as you go farther south. One thing I did notice is the inconsistency of stands in wheat. You drive by 2 or 3 horrible looking fields stand wise and then you see some that look good but could use a rain. Watching them I somewhat came to the conclusion that most of the fields with poor stands were probably more due to farming practices and several looked as if they were planted back to wheat in continuous cropping practices. Continuous cropping wheat is generally much more risky than after fallow.

Once thing I did notice is the grass along the highway which is predominantly brome was under stress and wasn't really a "good" color. This shows that they haven't really had a good rain in the last couple of months. Traveling along hwy 50, even irrigated wheat looked poor which is confusing as they should have been irrigating that already with the dry conditions. Once into Kansas, the wheat crop deteriorated as you went east. Very poor stands were common and where you did see good stands you did see the discoloration of dry conditions. One interesting sight was seeing a dryland wheat field that was much further along than most with really good stands and right across the road was a very poor field. Even though they had a good stand, it was showing drought stress. Much of the wheat is in a condition that if they don't get a substantial rain in the next couple of weeks you probably can write it off for much if any yield potential. The area of Kansas that I drove is in D2 but looks substantially worse than most of the wheat in Colorado in the D2 area. Even though most of the wheat in Colorado appears to have been planted late, the root system isn't highly developed and is struggling to grow fast enough to access moisture.

Pastures are dry but most of them are typically warm season grasses in that region and don't break dormancy until May anyway.

Alamosa

Alfalfa has no flexibility at its crowns. Fields are being taken out. Conditions are similar to 2002.

Southwest Colorado

Allocations have been reduced by 20%. We're gearing up for wildfires.

Weld County

It's on the dry side, but not terrible. Wheat is okay. People have sprinklers on right now.

Otero County FSA

Little showers have been lifting our spirits, but the outlooks is still bad for dry land. Irrigated acreage and planting is being curtailed.

Kiowa County FSA

Wheat is struggling, but has perked up a bit. The next couple weeks will make or break the crop. It's not as bad as 2012. We are looking at status quo, D2.

Emery County FSA, UT

Soil moisture is awful. Winds have been strong, and we have been in the rain shadow for precipitation events.

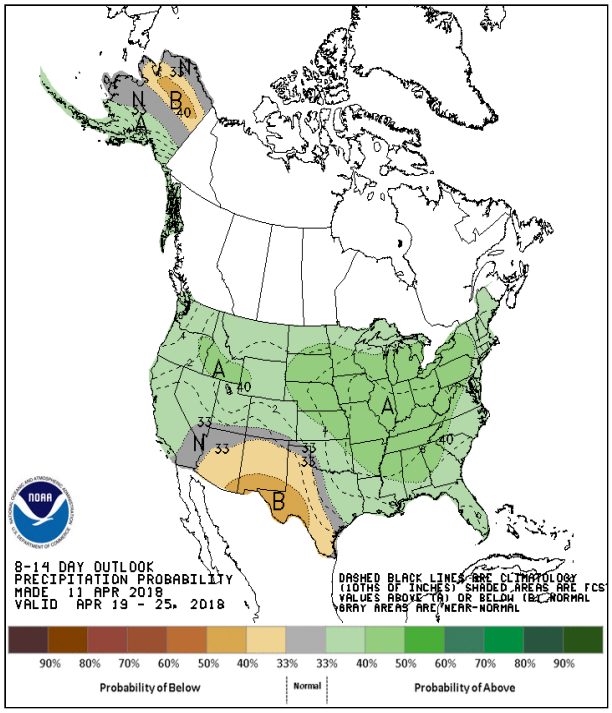
Elbert County FSA

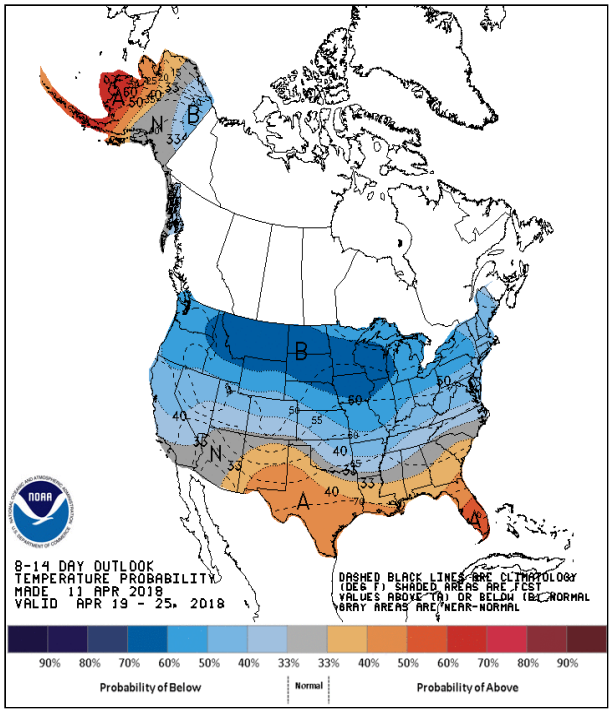
Soils are dry down to 4 or 5 feet deep. It has been windy and recent rains haven't done anything productive.

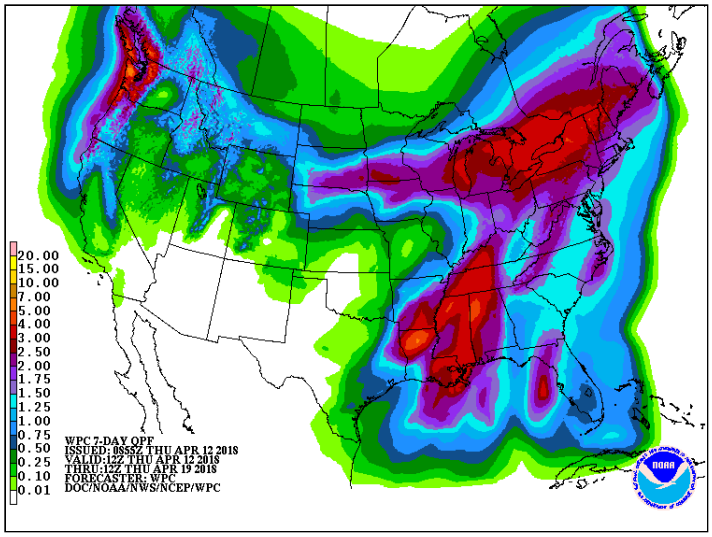
Lincoln County FSA

We have had a little rain to the south and snow to the north with lots of blowing wind and dirt.

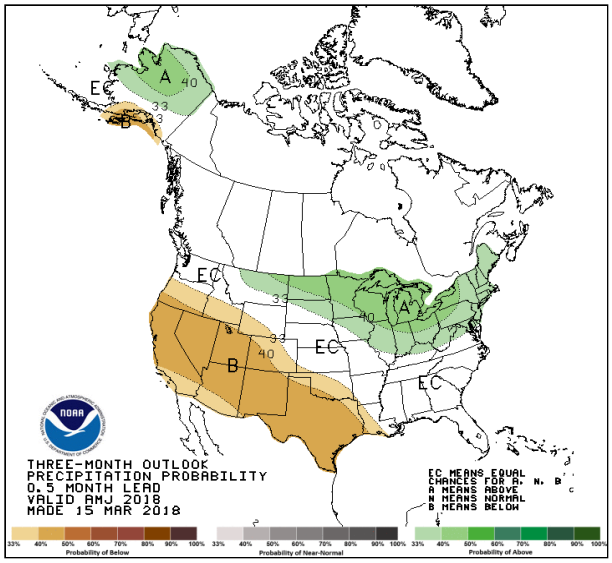
Outlook

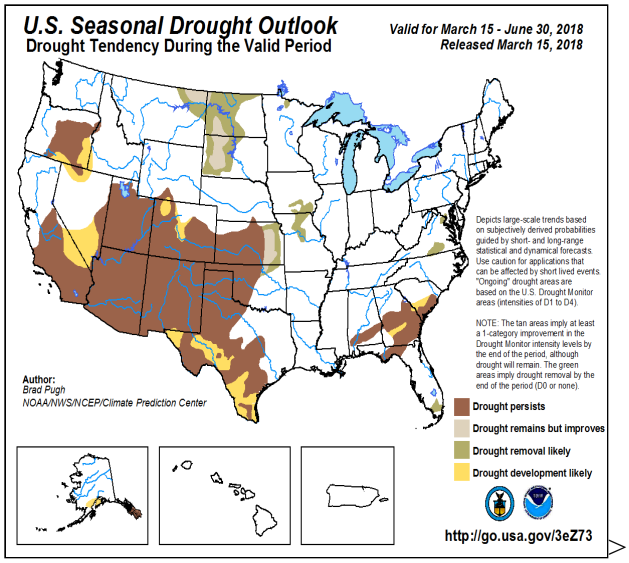




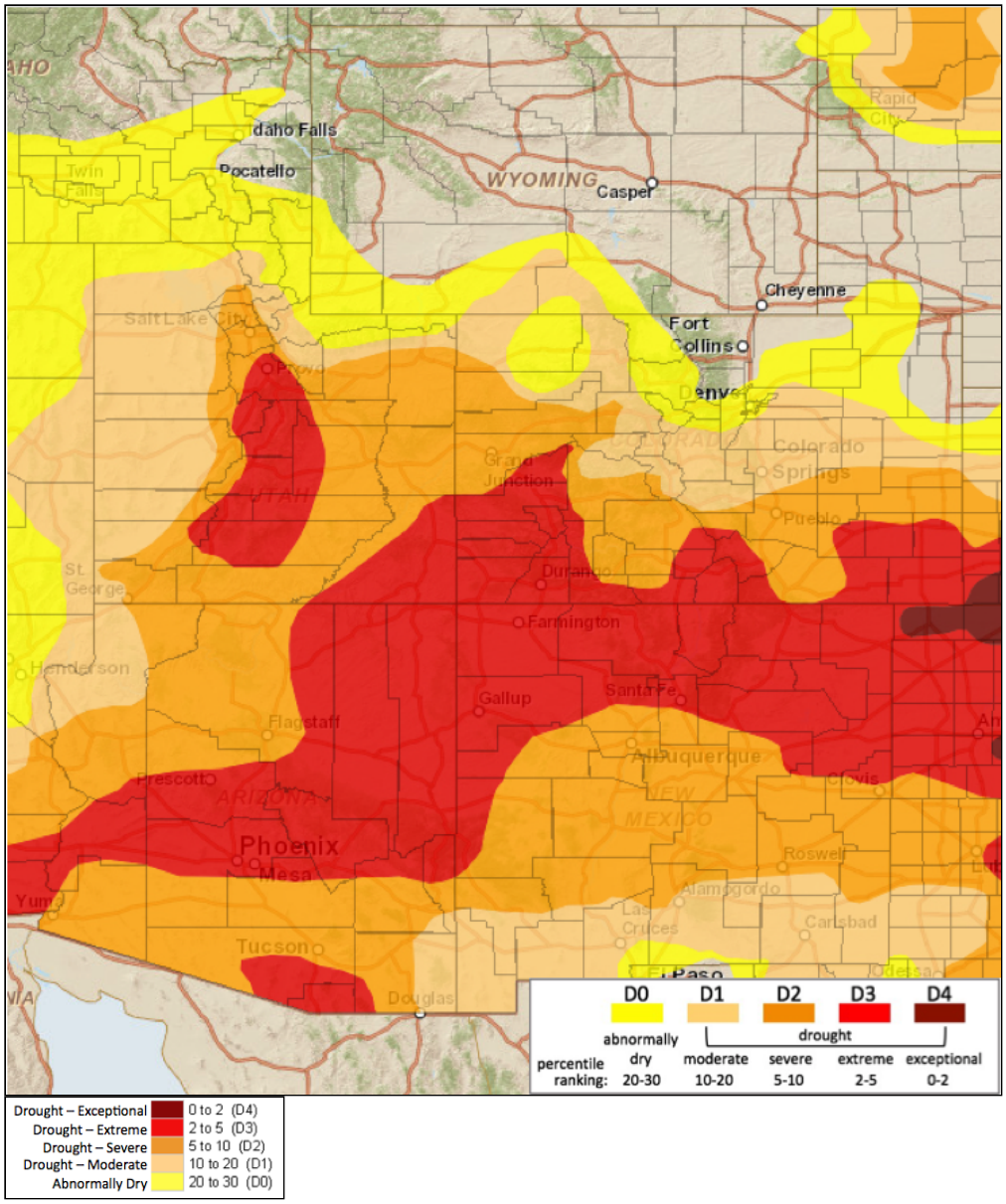


The top two images show Climate Prediction Center's Precipitation and Temperature outlooks for 8 - 14 days. The middle image shows the Weather Prediction Center's Quantitative Precipitation Forecast accumulation for seven days. The bottom left image shows the 3-month precipitation outlook from Climate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



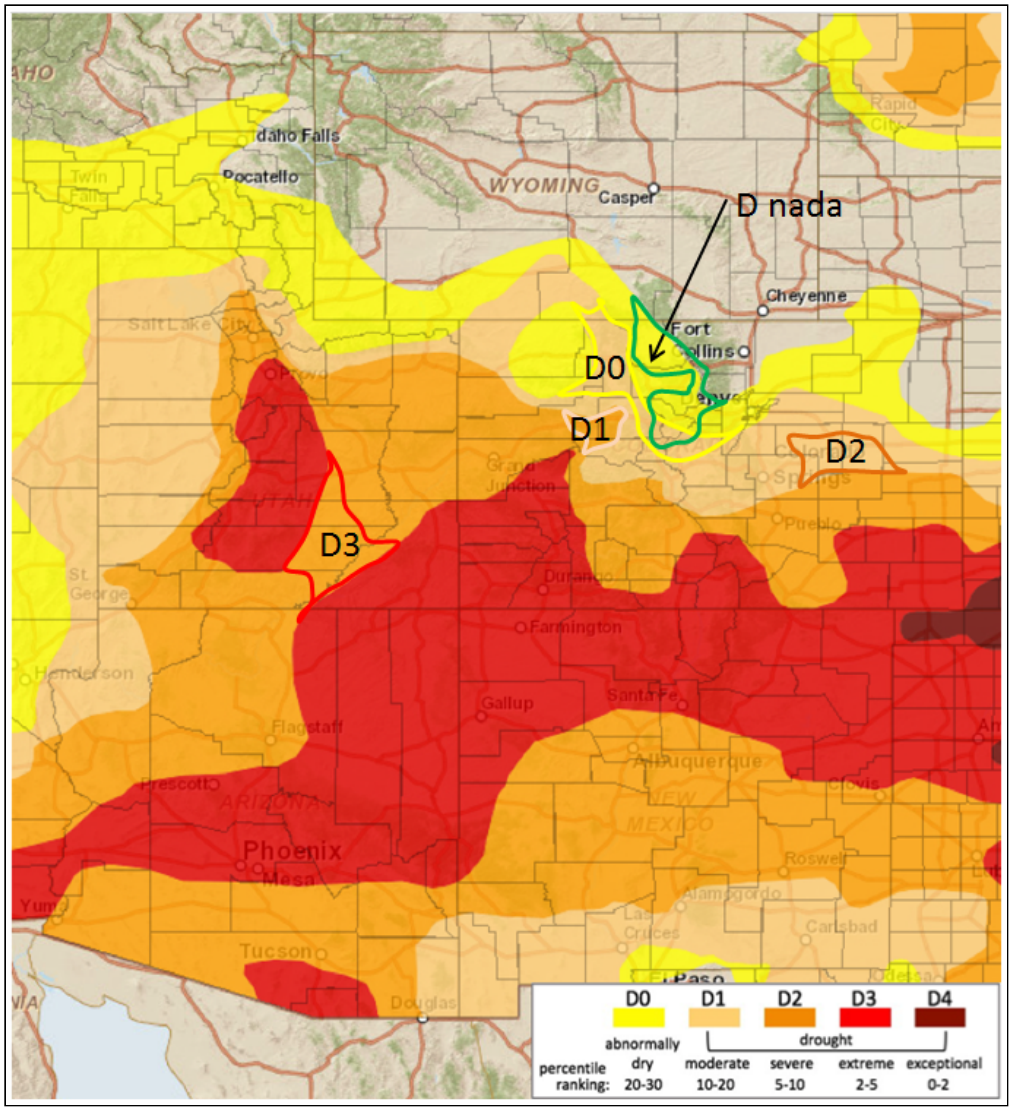


Summary and Recommendations



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: April 10, 2018

This week's weather pattern brought a welcome boost to precipitation and snowpack numbers in the northern watersheds of the IMW, but the southern watersheds, which need the moisture most desperately, are staring to lose their snowpack to the warmer temperatures and higher sun angles. The San Juan and Sangre de Cristos have peaked at lower than 50% of average and begun the melt cycle. For many SNOTEL sites, this marks the worst snowpack on record. The Arkansas and Gunnison River Basin have climbed to 63 and 57% of normal snowpack. Farther north, basins saw some good moisture over the last week, and the forecast shows hope of continued snow accumulation with a late peak in snowpack possible. Northern basins of Colorado have all recovered to over 85% of normal as a result of storms from Friday through Sunday. The Tetons and Upper Green River Basin are charging ahead with an above average snow year. The northern Wasatch and Uintah Ranges in Utah received 1-2" of precipitation over the last seven days, but snowpack is still quite low and variable (57-84% of normal).

The eastern plains of Colorado received widespread precipitation totals of 0.25-0.50" with pockets of 0.50-1.00". These are normal numbers for early-to-mid April. Friday's storm was fairly cold core for this time of year, so much of this precipitation did fall as snow. Precipitation was enough to raise spirits for

growers in SE CO, but not enough to overpower the dry and windy conditions as of late.

Steamflows are much below normal in the San Juan and Gunnison Basins, but mostly in the normal range from the Upper Colorado Mainstem north. Seeing 10th percentile and worse streamflows on the San Juan River is especially concerning right now as snowmelt has already begun. Streamflows in eastern Colorado are mostly in the normal to above normal range.

Reservoirs are also generally in better shape further north than south in the Upper Colorado River Basin too. Lake Granby, to the north, is forecast to spill for the 6th consecutive year. Navajo and McPhee Reservoirs, to the south, are trending into the below normal range and will not see as much of a boost from snowpack as normal.

A La-Nina-like precipitation pattern appears likely to dominate the IMW over the next two weeks. This will bring continued snow and cooler temperatures to our northern basins, but warmer and drier conditions to our southern basins. Cooler than average temperatures are also likely over our northern basins over the next two weeks, so there is likely to a big difference in timing of snowmelt between the San Juans and Sangre de Cristos as compared to the South Platte, Yampa-White, and Upper Green River Basins.

Recommendations

UCRB degradations: It is recommended that D3 be added in southern Emery County, central Wayne County, and eastern Garfield and Kane County to bridge the D3 divide between the Wasatch Range and San Juans. SPIs are below average on all timescales from 90 days to 9 months. The three months Evaporative Demand Drought Index shows D4-level conditions for the area at the three month timescale. Reports from FSAs confirm the severity of recent dryness with complete lack of soil moisture and blowing dust.

UCRB improvements: The pineapple express event from Friday through Sunday of last week was a major boost to the north central Rockies.

It is recommended that D2 be downgraded to D1 in western Eagle County, north-central Pitkin County, and eastern Rio Blanco County. SNOTEL water year to date precipitation is still behind in this area, but generally above the 10th percentile.

It is recommended that D1 be downgraded to D0 in Routt County, far east Eagle County, central Lake County, northern Park County, and southern Jefferson County. This area received anywhere from 2-6" of precipitation in the high elevations over the last week with at least 0.50" in the valleys. The Tower SNOTEL station, which is the climatologically wettest in the state, is back to the 37th percentile level.

It is recommended that D0 be removed in northern, eastern, and southern Grand County, northwest Park County, Jackson County, western Gilpin County, and southern Carbon County in Wyoming. While the Grand Valley is still showing some dryness, the Muddy Pass, Berthoud Pass, and Loveland Pass SNOTELs are now showing normal to slightly above normal water year to date precipitation.

We are recommending a small area with a two-category improvement for southern Summit County and extreme northeast Lake County. As I know Brian mentioned on the drought list serve a few weeks back, this is a bit of a USDM party foul, but this weekend's pineapple express event delivered a knockout punch to the area's moderate snow drought. Snow totals in this particular area over the weekend were generous, as high as two and a half feet. It was a heavy, wet snow providing 3-5" of liquid water content. This was enough for water year to date precipitation at Copper Mountain and Fremont Pass SNOTELS to rebound into the normal range.

Eastern Colorado: It is recommended that D2 be extended through extreme northwest Cheyenne County and southwest Kiowa County, northern Lincoln County, eastern Elbert County, and eastern El Paso County. Six month SPIs are in the -1 to -2.5 range. We have a bit of a COOP data hole in the area, but reports from extension confirm that recent dry and windy conditions in Elbert County are yielding impacts very much comparable to what we are experiencing in Kiowa County (currently D2).

To D4 or not to D4: With conversation stirring across the southern Rockies and southern plains about the inclusion of D4, we are really looking for places with no silver lining. Southeast Colorado has been historically dry to start this water year, but there's a silver lining in that streamflows and reservoir storage are still healthy from a wet 2017. This doesn't do squat for dryland and rangeland, but unfortunately very poor dryland and rangeland conditions are more frequent than 2% of the time. In south central Colorado and southwest Colorado snowpack is D4 level in many places and melting out early. Once again, the silver lining here tends to be reservoir storage from last year. These reservoirs will almost undoubtedly take a hit in 2018, but most growers should receive their irrigation. For southwest Colorado, it may not be the right week for D4 as precipitation totals over the last week were normal. Conditions are discouraging, but for now we're at peace with the current D3 depiction.