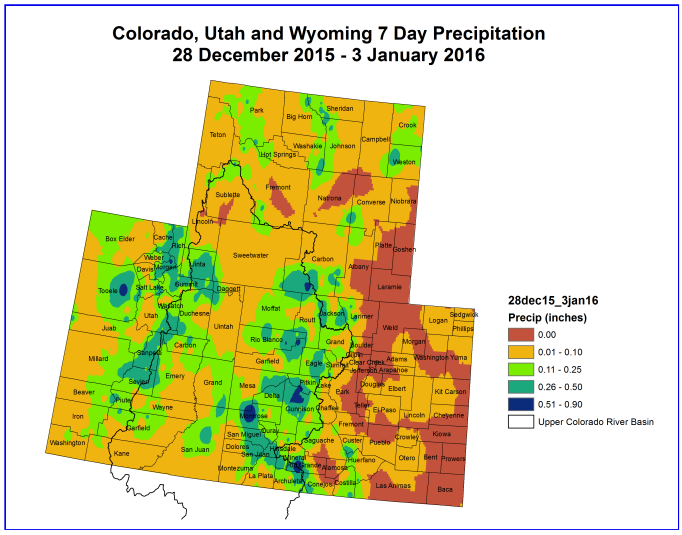
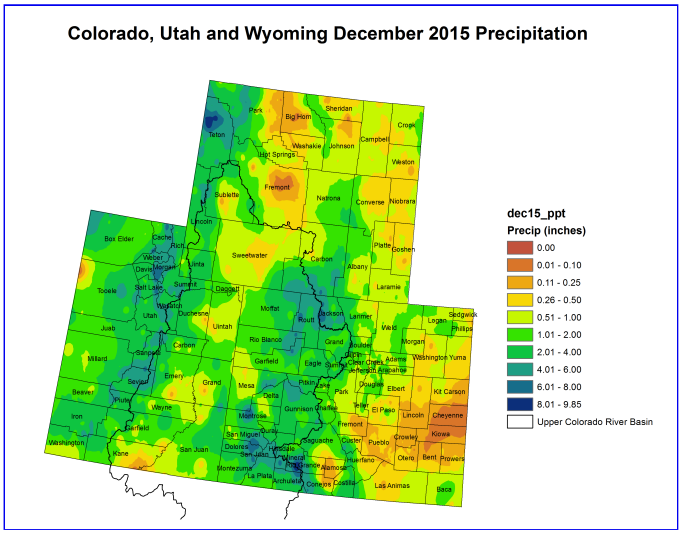
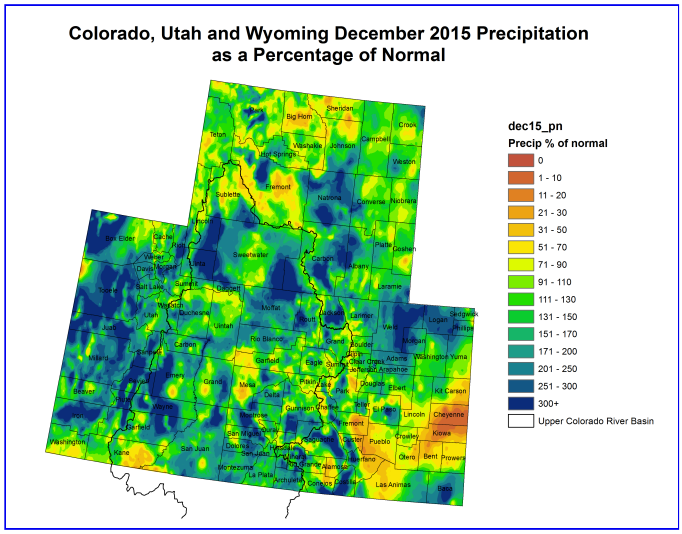
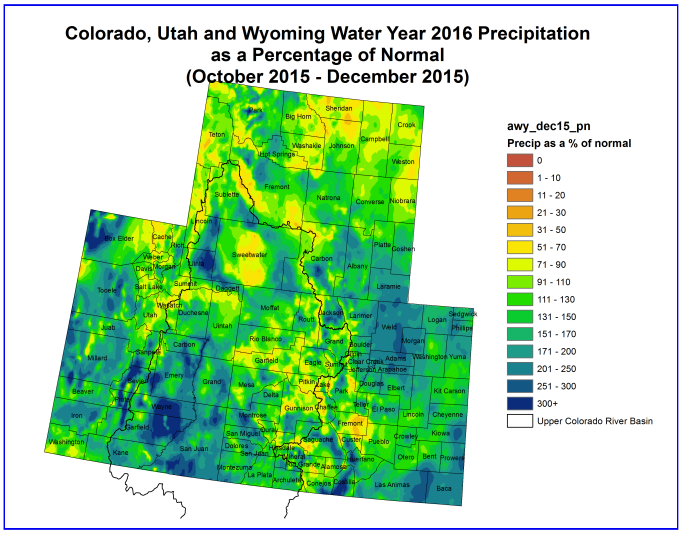
NIDIS Upper Colorado River Regional Drought Early Warning System
January 5, 2016









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.

Last Week Precipitation:

- Precipitation in the UCRB over the last week was spotty, with some areas in Garfield, Eagle, and Rio Blanco counties seeing about 0.5" of precip, while other areas in Garfield and Mesa only recieving up to 0.1".
- Much of the Green River basin was dry for the past week. Standouts are southwestern Carbon County and Uinta County. These areas saw 0.5" or more of precipitation.
- Eastern Utah as also very dry. Most areas only saw 0.1-0.25" of precipitation, with a few spots of up to 0.5" in the Summit/Daggett/Duchesne/Uintah county border, as well as spots in Grand and San Juan counties.
- Southwest Colorado was hit or miss with precipitation. Some areas in Montrose County and further south in Mineral and Rio Grande counties experienced nearly an inch of precipitation over the past week, while other

areas, especially in the four corners region, saw as little as 0.01-0.1".
- East of the divide was very dry over the past week. Large areas across the high plains saw no precipitation at all. There were however a few areas that got 0.25 to 0.5" of precip, such as southern Custer down to Costilla County, and ares in Jackson and Larimer counties.

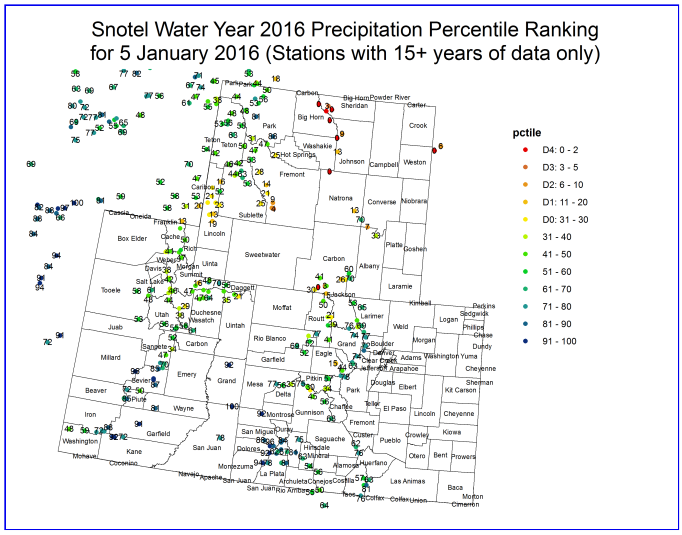
December Precipitation:

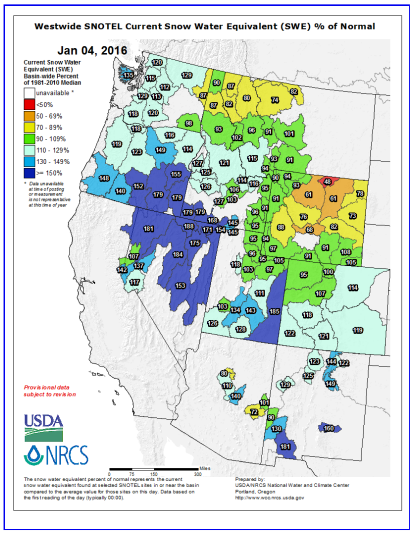
- December for the Upper Colorado River Basin was mostly in the normal range at 70-130% of normal. One area in northern Mesa County was over 300% of normal, as was an area in Grand County, Utah. Some portions of western Garfield and Mesa counties, however, were below 50% of normal.
- The Yampa and North Platte river basins both recieved above-average precipitation for the month of December, as did the Green River basin in Wyoming. There were a few areas in central Sweetwater County that only reached into the 70% of normal range.
- December precipitation for eastern Utah was, for the most part, at or above normal. A few standouts were areas in Emery, Grand, Kane, and southwestern San Juan counties that were only in the 20-30% of normal range, while large areas in Emery, Wayne, and Garfield counties were 300+% of normal, as were a couple of spots in Grand and San Juan counties.
- Southwestern Colorado was also at or above normal in terms of precipitation, with a dry spot in the Rio Grande River basin.
- Eastern Colorado was generally above normal for precip in the northeast and southeast corners, and much below normal in east-central Colorado. Areas in Cheyenne and Kiowa counties were as low as the 10% of normal range, while the corners of the state were over 300% of normal.

Water Year 2015 Precipitation (Oct-Sep):

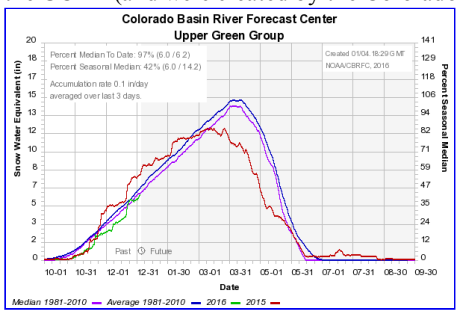
- As a result of a very wet Spring, Colorado east of the divide is still above average across the board for the water year to date with a few small exceptions. Isolated areas of Custer and Huerfano Counties are showing below 100% of average.
- The UCRB is mostly close to, but a little below normal for the water year to date.
- Most of the Upper Green River Basin is between 50 and 90% of normal for the water year to date. Central Sweetwater County is in great shape at over 110% of normal.
- Northeastern Utah is mostly between 75 and 100% of normal for the water year to date. Farther to the west over higher terrain percentages are a little lower at between 50 and 75%.
- Southeastern Utah has balanced out to a fairly typical water year to date. The area is between 75 and 125% of normal.
- AHAPS indicates a very dry band in Conejos, Rio Grande, Mineral, and southwest Saguache Counties. Here precipitation is less than 50% of average for the water year to date. Radar does tend to struggle in this area, so it may be worth taking another look at when our precipitation figures update. Most of western Colorado is just slightly dry. The area is between 75 and 110% of normal for the water year to date.
- The Rio Grande Basin is now showing a mixed bag of above and below normal water year to date conditions. Southern Costilla County is doing very well at over 150% of normal for the water year to date.

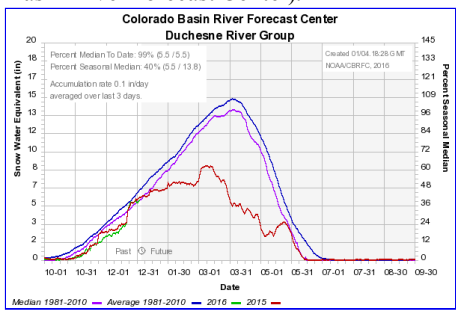
Additional Precipitation Links: (will take you to an outside website)
- AHPS Precipitation
- High Plains Regional Climate Center's ACIS Maps

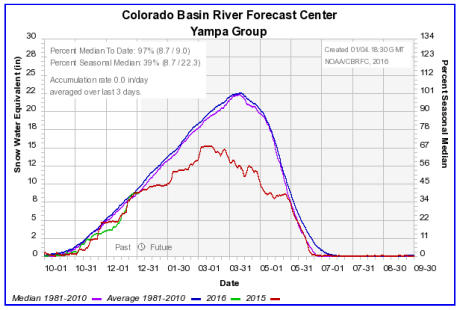


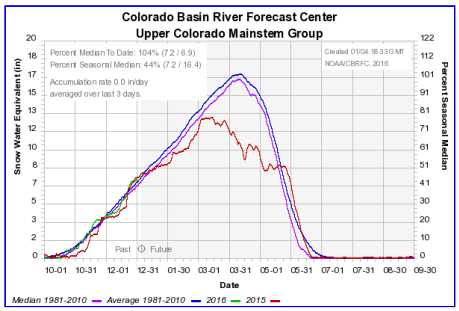


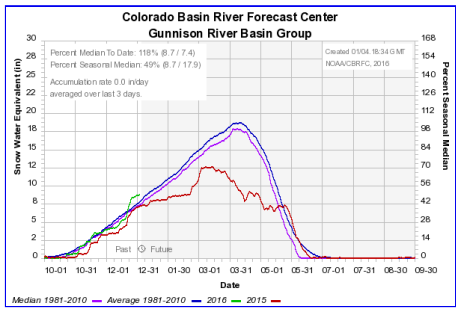
The top left image shows the Natural Resources Conservation Service's SNOTEL water-year-to-date precipitation percentile rankings. The top right image shows sub-basin averaged snow water equivalent accumulations as a percent of average. The images below show accumulated snow water equivalent in inches (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).

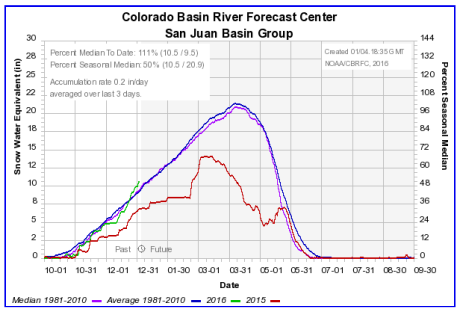












SNOTEL Precipitation Percentiles:

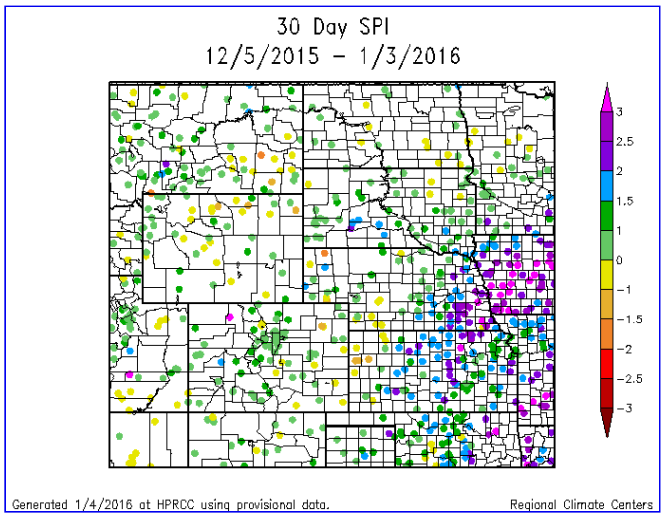
- SNOTEL Water Year precipitation percentiles in the Upper Green Basin are mostly in the near normal to above range, but highly variable. They range from the 6th to the 69th percentile.
- Eastern Utah is mostly above the median, ranging from the 45th to the 96th percentile.
- The Rocky Mountains in Colorado from the Front Range to the west a variable but generally near the median. Some stations are still between 25 and 40% of normal, while the eastern parts of the Front Range are much above their median, between 70-80%.
- The San Juans are almost completely above the 90th percentile, with a few nearing the highest precipitation totals on record. Snotel stations near the San Juan Valley are still at or a bit above their median.

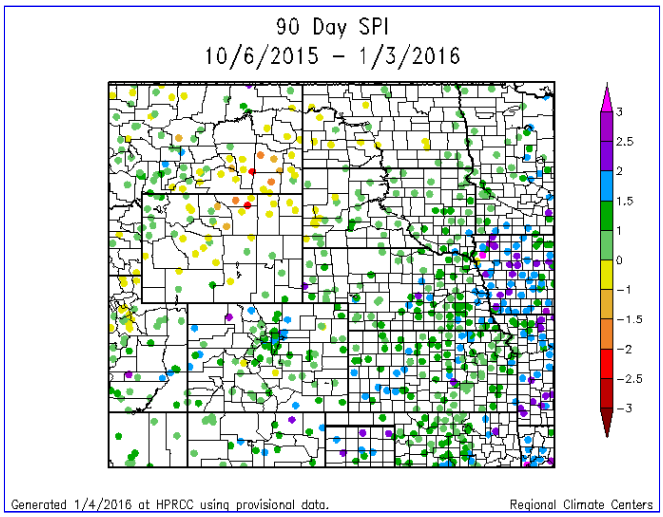
SWE Timeseries Graphs:

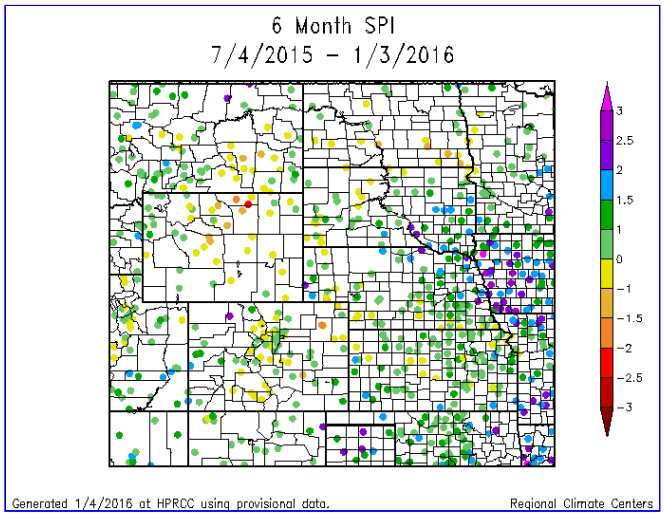
- The Upper Green Basin roughly at normal, at 97% of median snowpack for the season to date.
- The Duchesne basin is at normal as well, being at 99% of median snowpack.
- The Yampa River Basin down to 97% of median snowpack for the season to date.
- The Upper Colorado River Mainstem is now at 104% of median snowpack.
- The Gunnison Basin is at 118% of median snowpack for the season to date.
- The San Juan Basin increased to 111% of median snowpack for the season to date, up from 105% last week.

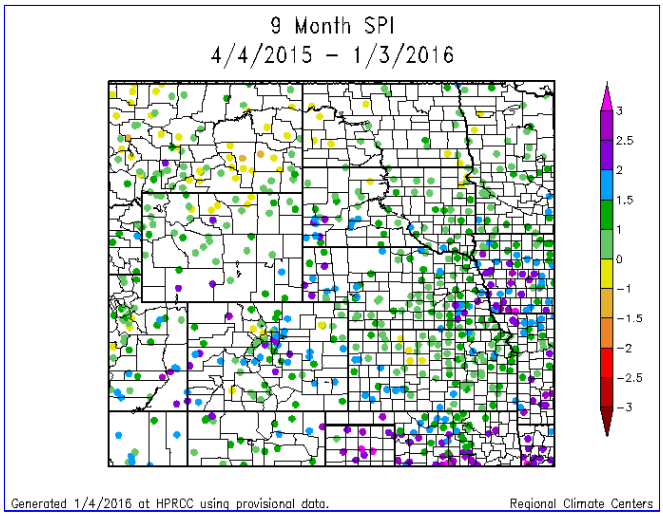
Additional SNOTEL and Snowpack Links: (will take you to an outside website)

- 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.

Short Term (30-day):

- The UCRB has SPIs generally in the normal range, between -1 and +1, but a few extremes are present.
- The Green River Basin is mostly in the normal range in the short term. One SPI in Sweetwater County is in the +2 to +2.5 range.
- Northeastern Utah is showing SPIs in the range of 0 to +1.
- In the southwest portion of Utah, there is a bit of dryness in SPIs, with most SPIs between +1 and -1.5. The driest SPI is along the Kane/Garfield County boarder.
- Western Colorado is now showing all short term SPIs above normal, with SPIs between 0 and +2. A station in Routt County is showing a SPI above +3.
- Eastern Colorado is mostly on the wetter side of the SPI scale, between 0 and +1.5. A few SPIs in Washington County in northeastern Colorado are dry, in the 0 to -1.5 range. A few SPIs in southwest Colorado are also showing a bit dry, down to -1.
- The Rio Grande Basin is in the 0 to +1.5 range.

Long Term (6-month):

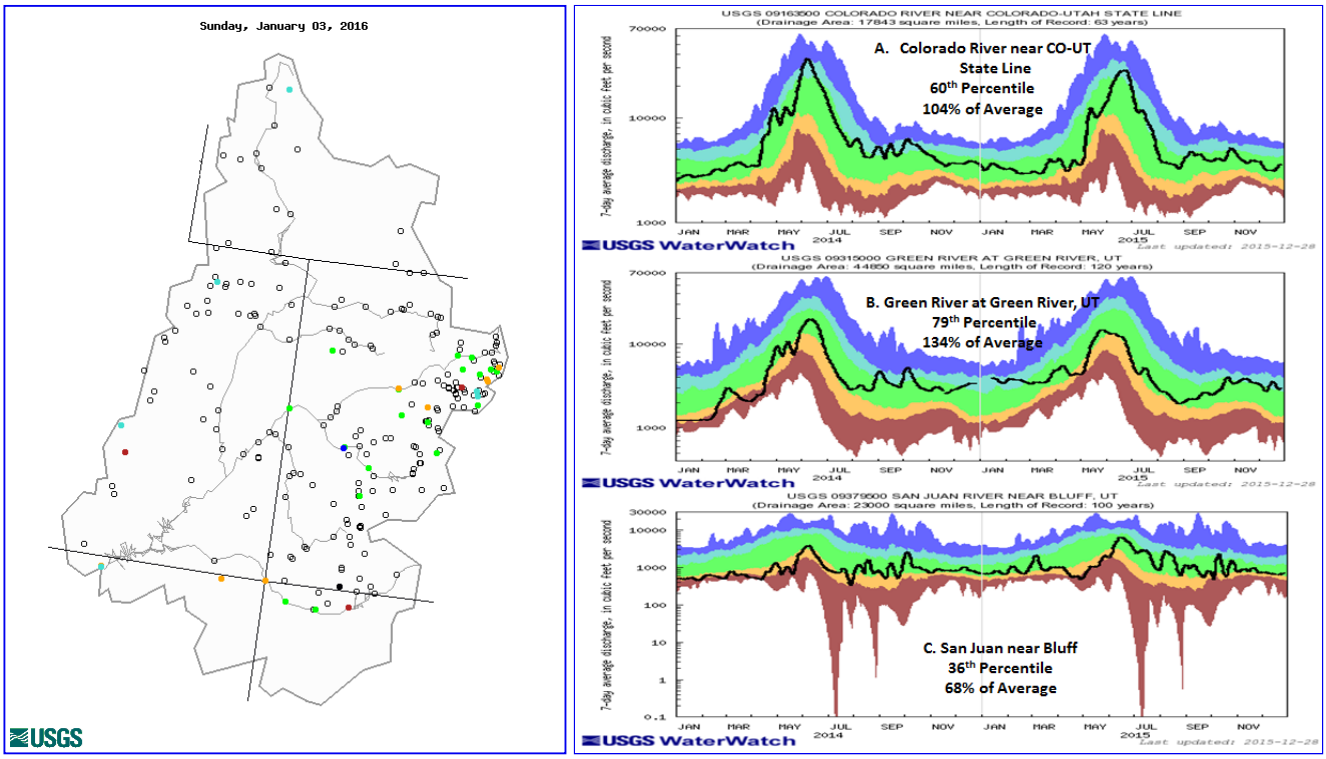
- The memory of a very wet late Spring is now outside the 6-month window, and much of the UCRB and

eastern Colorado has been in the normal range since.

- The Upper Green River basin is in the 0 to +1 range.
- Eastern Utah 6-month SPIs are mostly wet. Northern San Juan and eastern Wayne Counties have stations with SPIs above +2. Uintah County is showing an SPI in the 0 to -1 range.
- Western Colorado is showing SPIs mostly between -1 and +1. The driest SPIs show up in Grand, Summit, Lake, and Gunnison Counties.
- The San Luis Valley is showing 6-month SPIs in the 0 to -1 range.
- East of the divide the majority of 6-month SPIs are between -1 and +1. The northeast corner of the state is still showing some long-term dryness with SPIs down to -1.5. There are patches of dryness in Park, Crowley, El Paso, and Pueblo Counties as well.

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		

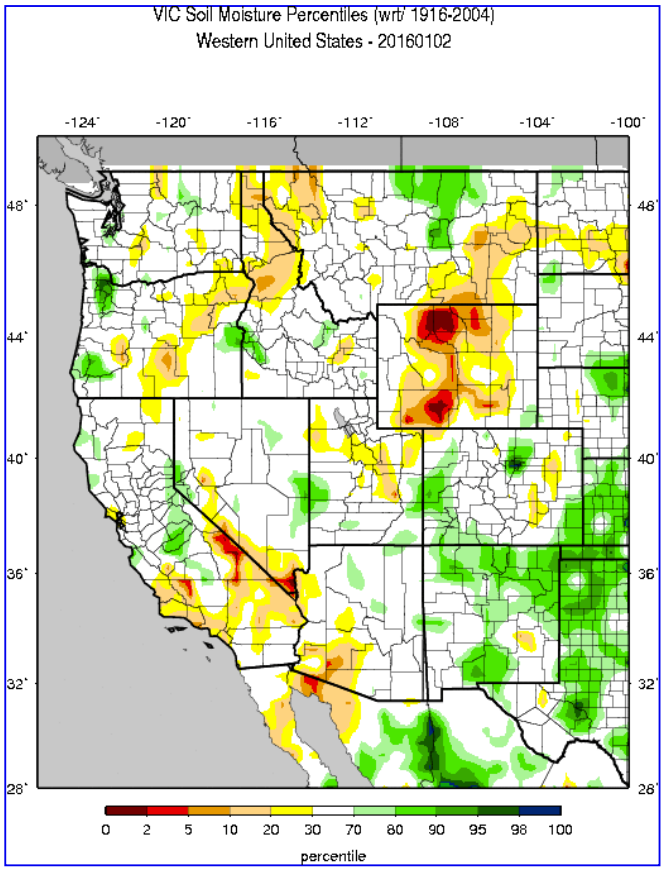
The top left image shows 7-day averaged streamflows as a percentile ranking across the UCRB. The top right image shows 7-day averaged discharge over time at three key sites around the UCRB: The Colorado River at the CO-UT state line; the Green River at Green River, UT; and the San Juan River near Bluff,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

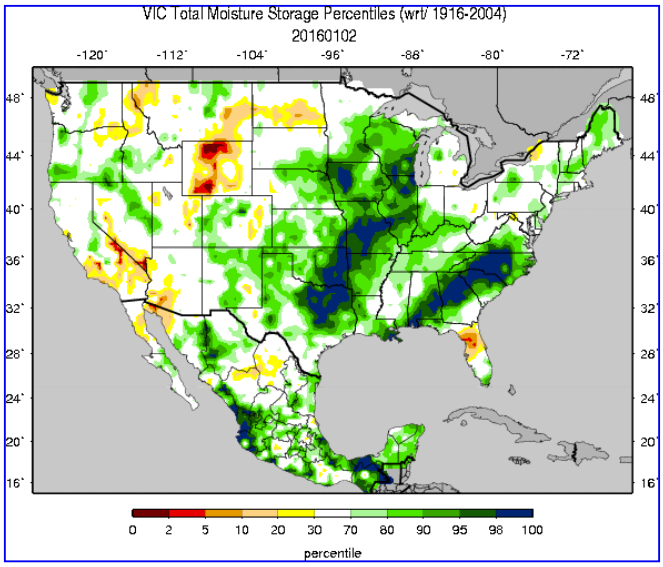
Streamflow Statistics:

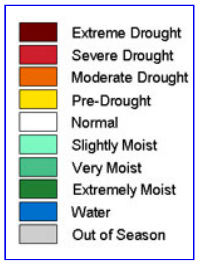
- The majority of stream gages in the UCRB are no longer reporting.
- 83% of gages are reporting in the normal to much above normal range for the 7-day average streamflow.
- 17% of gages are below to much below normal.
- The Colorado River at the CO-UT state line is at 104% of normal and in the 60th percentile.
- The Green River near Green River, UT is at 134% of normal and in the 79th percentile.
- The San Juan River near Bluff is at 68% of normal and the 36th percentile.

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

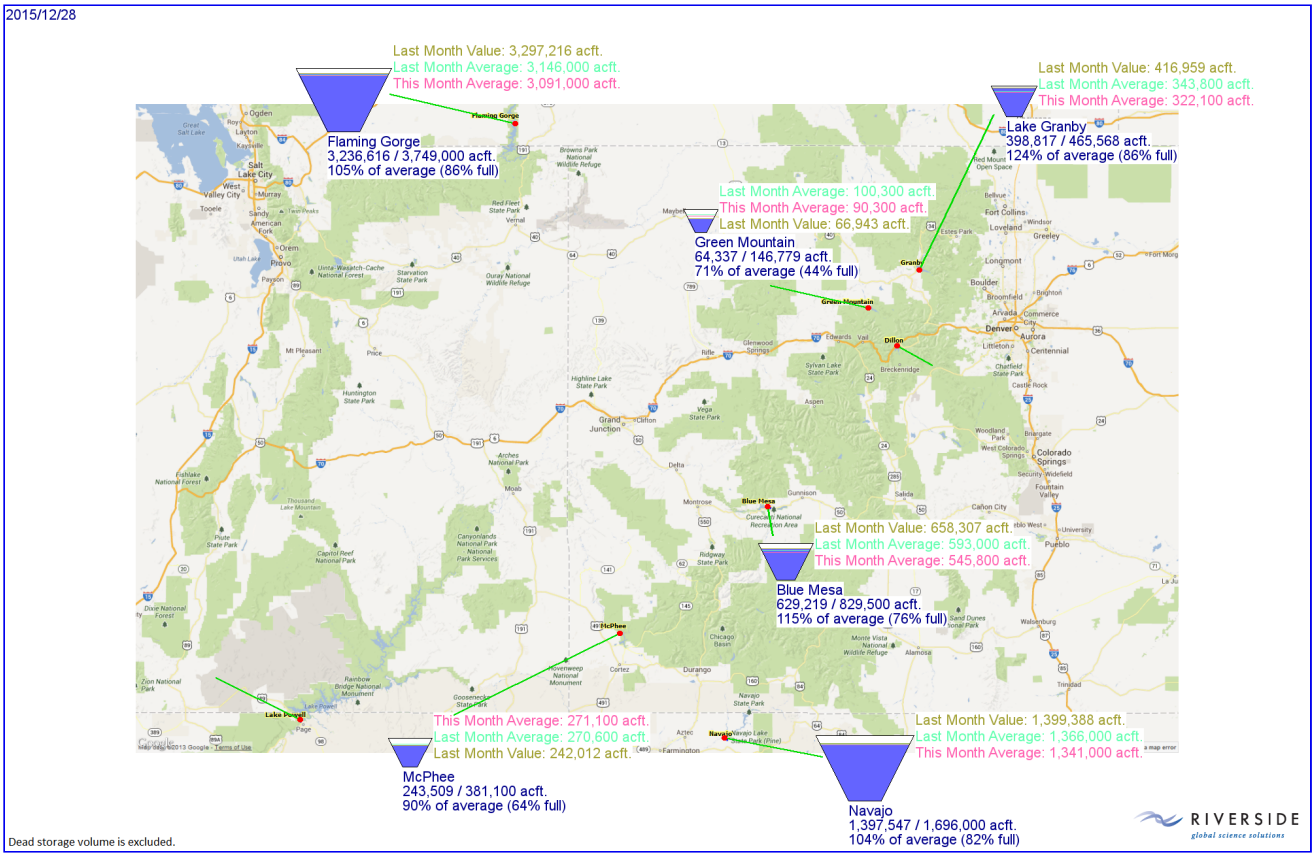
- USGS Streamflow Drought
- CBRFC Peak Flow Forecast Conditions Map





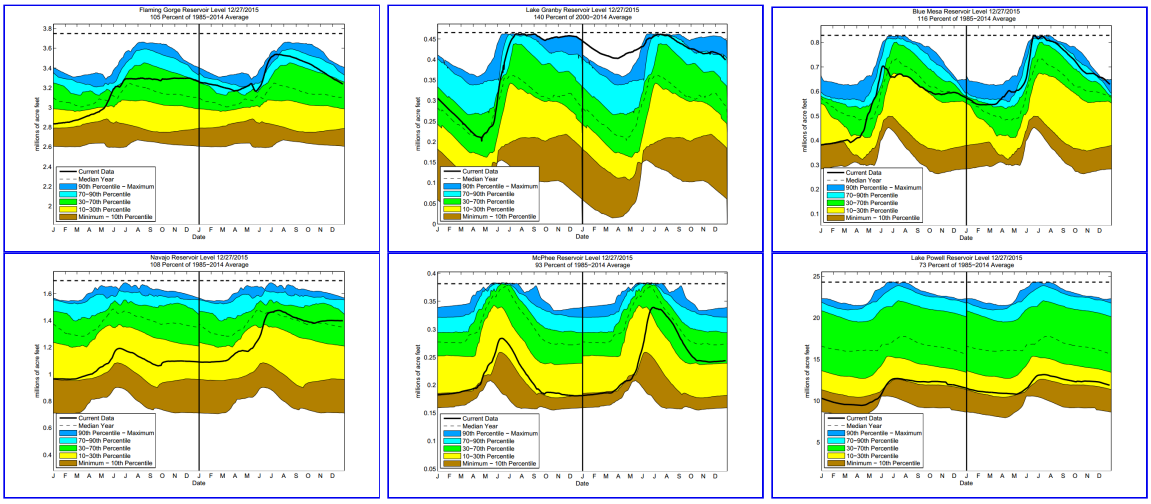


The top left image shows VIC modeled soil moisture as a percentile ranking. The top right image shows VIC+SWE.



The above image shows last month's and this month's current volumes of the major reservoirs in the UCRB, with percent of average and percent of capacity.

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.



VIC:

- Modeled soils moisture in the Green River Basin in Wyoming continues to be much below normal in Sweetwater County, below the 2nd percentile in the eastern portion of the county, although this area is very slowly shrinking. Dry soils, in the 10th to 30th percentile range, are also present in Sublette and Uinta Counties.
- The Yampa, White, and Duchesne Basins are mostly in the normal range with some drier soils (10-30th percentile) in the Yampa Basin.
- The Colorado River Basin is in the normal to above normal range, with some areas in Mesa County above the 90th precentile. The headwaters of the Colorado River still have soils in the normal range.

- The San Juan Basin is showing mostly wet soils between the 70th and 80th percentile.
- Soils in the Upper Rio Grande part of Colorado are mostly in the normal range with some wetter soils near the Colorado-New Mexico border.
- Soils in eastern Colorado are mostly in the normal range. Jefferson, Broomfield, Adams, Boulder, and southern Weld Counties are showing wet soils up to the 98th percentile. Some areas in east-central Colorado are showing soil moisture in the 10th-30th percentile range, but most of the high plains are in the normal range. Southeast Colorado is an exception, with eastern Kiowa down through Prowers and Baca counties seeing soil moisture in the 80th to 90th percentile.

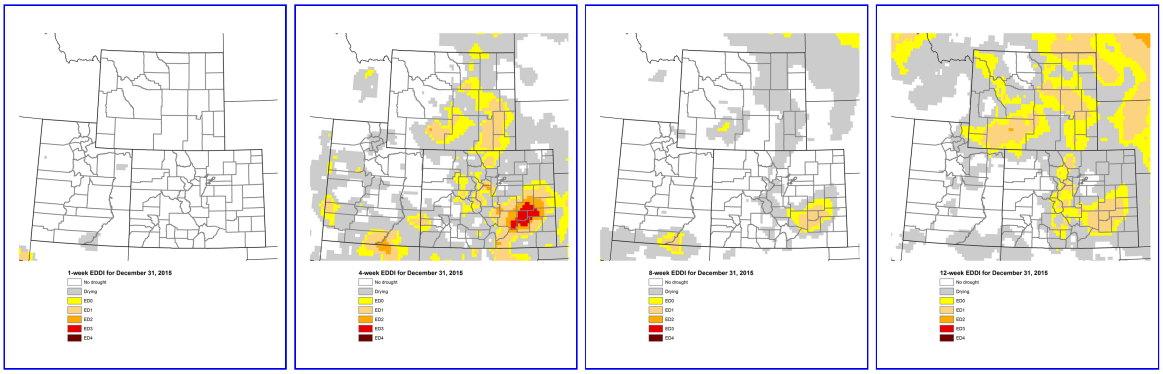
Reservoirs:

- Flaming Gorge is at 105% of the December average.
- Lake Granby is at 124% of the December average.
- Green Mountain is now at 71% of the December average and 44% full.
- Blue Mesa is at 115% of December average and 79% full.
- Navajo is at 104% of December average, 82% full.
- McPhee is at 90% of the December average and 64% full.
- Lake Powell percent of average is missing, but is 50% full.

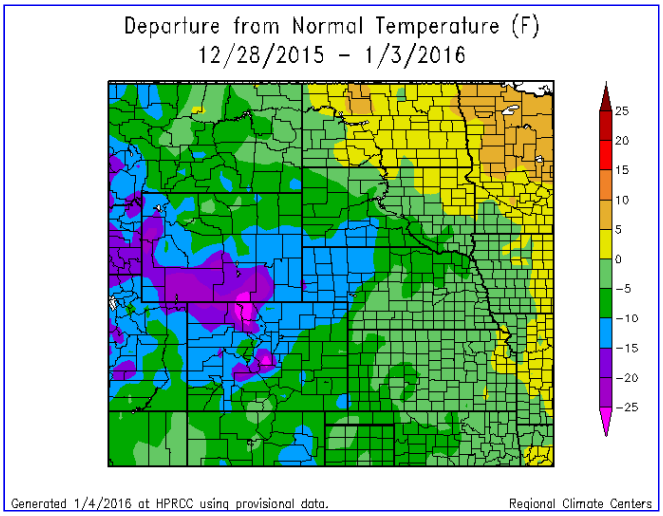
Additional Surface Water Links: (will take you to an outside website)

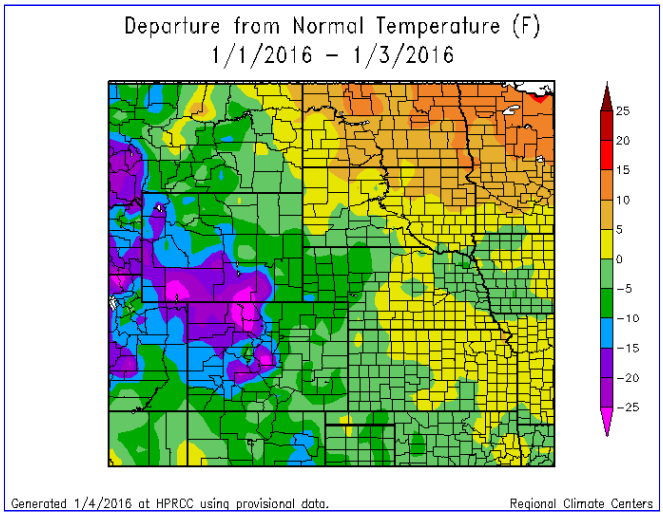
NLDAS Drought Monitor

Bureau of Reclamation Upper Colorado River Basin Teacup Diagrams

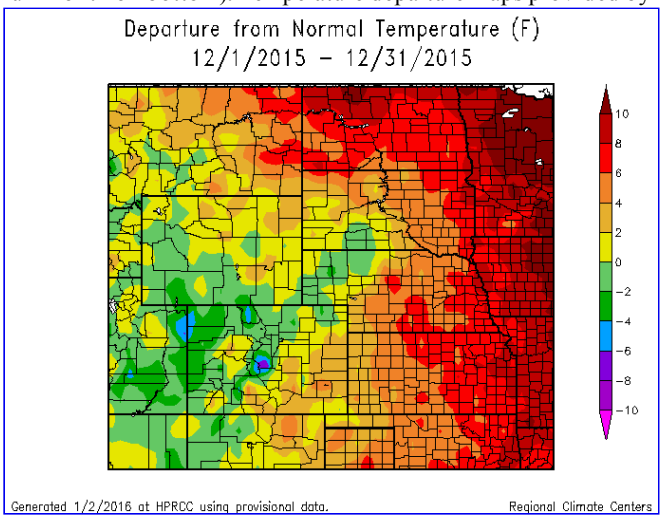


The above images are available courtesy of NOAA's Evaporative Demand Drought Index (EDDI). Drought classification listed is a function of the depth of reference evapotranspiration accumulated over a given period of record with respect to a climatology of 1981-2010. The drought categories displayed are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



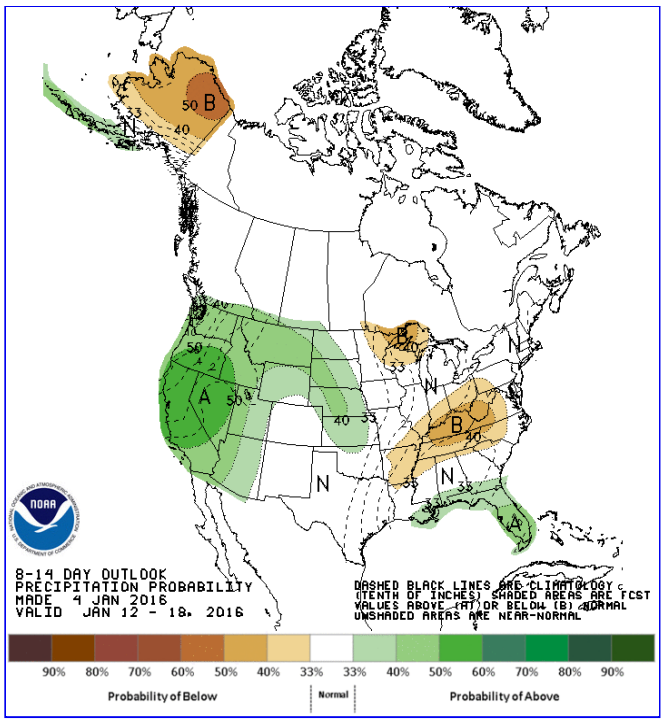
Last Week Temperatures:

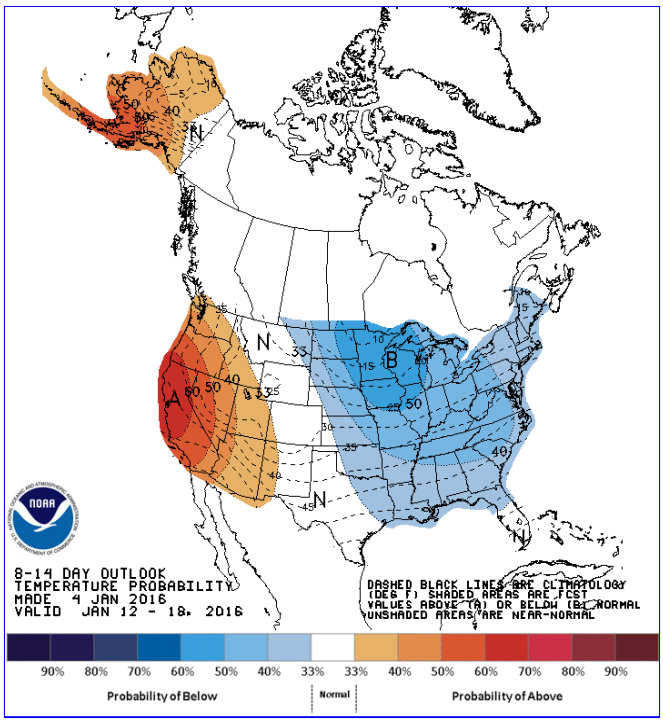
- The UCRB experienced colder than normal temperatures over the past week, between 10 and 15 degrees below average.
- North in the Yampa and North Platte river basins were even colder with some areas in Routt and Jackson counties seeing temepratures over 25 degrees below normal.
- The Green River basin in Wyoming was also much below normal with temperatures generally less than 15 degrees of normal.
- Eastern Utah saw temperatures still below normal but closer to average, especially in the southeast corner of the state where temperatures were mostly 5 to 10 degrees below normal. This same range was present in southern Colorado as well.
- In Colorado east of the divide, temperatures were again below normal. An area in southern Park County experienced temperatures as low as 25 degrees below normal. The majority of eastern Colorado, however, was 5 to 15 degrees below normal.

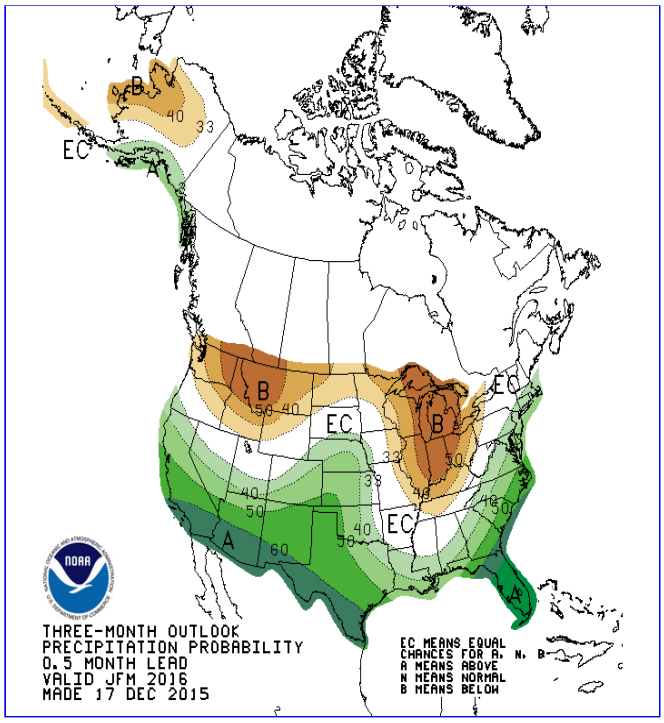
December Temperatures:

- The UCRB for the month of December was generally about normal in terms of temperatures. Parts of Garfield, Eagle, and Pitkin counties were about 4 degrees above normal, while further downstream in Mesa County temperatures were 4 below normal.
- The Green River basin in Wyoming were in the normal range for temperatures, as was eastern Utah. Eastern Uintah County was up to 6 degrees below normal.
- Southwest Colorado as also in the normal range for temperatures in the month of December, between -4 and +4 degrees of normal.
- Eastern Colorado was in the normal range of temperatures in the northeast portion of the state, while further

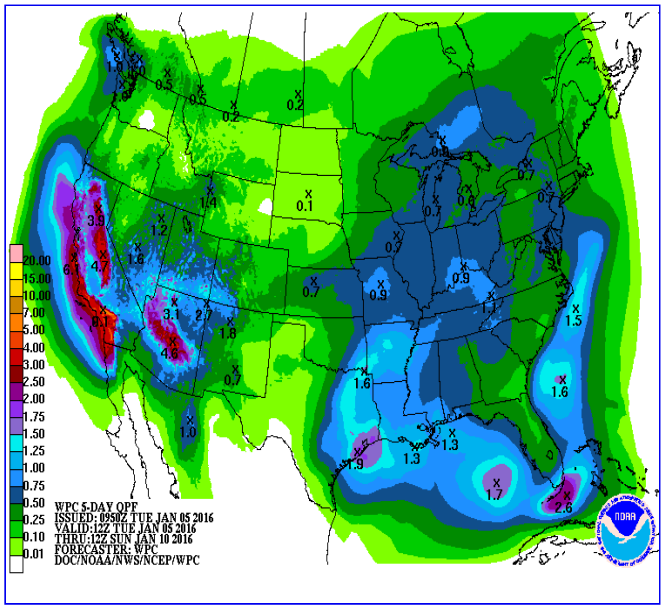
southeast temperatures trended towards the warm side at mostly 2 to 4 degrees warmer than average. North Bent County was nearly 6 degrees above normal. One major standout is southern Park County which saw December temperatures roughly 8 degrees below normal.

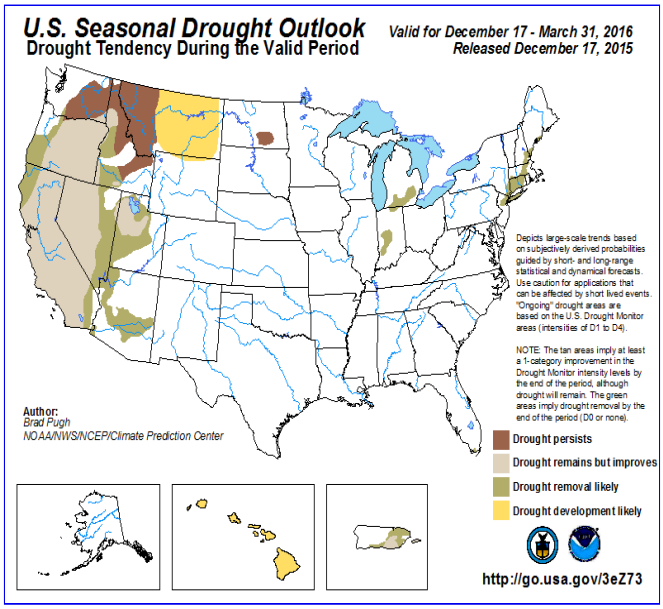






The top two images show Climate Prediction Center's Precipitation and Temperature outlooks for 8 - 14 days. The middle image shows the 3 months Precipitation outlook. The bottom left image shows the Hydrologic Prediction Center's Quantitative Precipitation Forecast accumulation for the five days between Tuesday 12Z and ending Sunday 12Z. The bottom right image shows the Climate Prediction Center's most recent release of the U.S. Seasonal Drought Outlook.



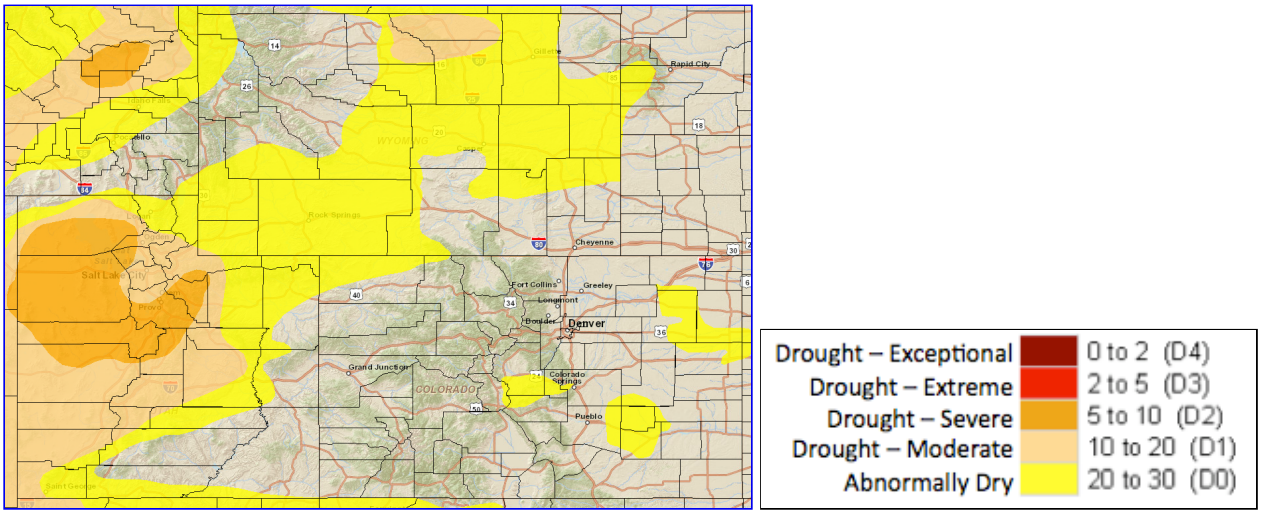


Short Term: (1/5)

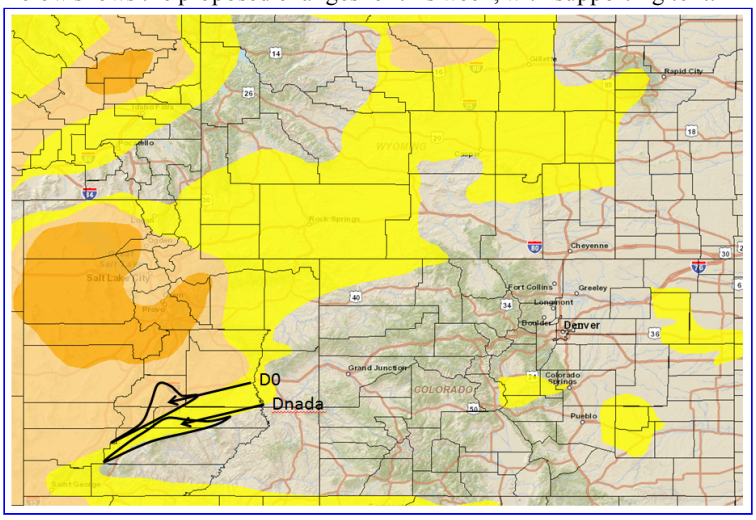
- As a slow moving low pressure system works its way into the region from the southwest the UCRB and eastern Colorado will see warmer temperatures than have been experienced over the last couple weeks. The Wasatch Range and the Four Corners Region will see some light precipitation, mostly below 0.10" of liquid water content.
- The inbound low pressure will move slowly and is forecast to track across the region in two phases, and won't fully exit onto the cental plains until Saturday night.
- Precipitation from the incoming storm will be most significant in the south and west portions of the UCRB. The Wasatch and San Juan Ranges are forecast 0.50-1.00" of liquid water content with isolated areas seeing higher totals, as much as 1.50". The Uintah and Rocky Mountains should receive at least 0.25" of precipitation as well. Precipitation from this storm is not confined to the mountains, and will reach lower elevations. Snowfall totals could be significant even at low elevations in southeast Utah and southwest Colorado. Much of southeast Colorado could experience over 0.25" by Saturday morning.
- Over the beginning of next week a cooling and drying trend sets in as an arctic high pressure airmass takes over from the north. Some very light snowfall will likely persist over the northern Rockies, but for the most part precipitation will shut off and temperatues will once again be very cold.
- Warmer air from the southwest is forecast to start flowing back into the region starting Tuesday of next week.

Longer Term:

- The 8-14 day precipitation outlook shows increased chances for above average precipitation for the northern and western portions of the UCRB and extreme northeast Colorado. The eastern part of the UCRB, and Colorado east of the divide are forecast equal chances of above and below average precipitation.
- The 8-14 day temperature outlook shows increased chances for above average temperature for the southwest portion of the UCRB. The rest of the UCRB and eastern Colorado are forecast equal chances of above and below average temperatures.
- The Climate Prediction Center January through March precipitation outlook shows increased chances for above average precipitation the south end of the UCRB. Most of Colorado east of the divide is forecast increased chances of above average precipitation, particularly towards the southeast corner of the state.
- The seasonal drought outlook for January through March indicates that drought improvement and removal are likely where it remains on the western fringe of the UCRB.



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: January 5, 2016

This past week was quieter than the last couple of weeks, with little to no precipitation across the eastern portion of Colorado and a few areas of moderate snowfall in the Rockies and western slopes. Snotel snowfall numbers throughout the Rockies remain mostly around their median values, with some above-normal percentiles along the Front Range and south in the San Juans especially. All areas in eastern Colorado currently affected by D0 lost out on precipitation over the past week. Cooler than normal temperatures across the board helped to keep the 1-week Evaporative Demand Drought Index (EDDI) out of drought stage, however moving longer term to the 4-week EDDI we still see most of the state in a dry spell, especially in the region comprising southern Lincoln, Crowley, western Kiowa, northern Otero, and eastern Pueblo counties. As it stands, this area (which is currently in D0) hasn't seen any improvements.

The Upper Colorado River Basin and into Utah did not see much in the way of precipitation over the past week either. However, temperatures were much below normal, and now even long-term SPIs throughout the region have begun to go positive. This is true for the area in Western Wayne and Garfield counties, currently in D0, and up into southeastern Sevier County, which is currently in D1. VIC soil moisture profiles for the UCRB and into southeastern Utah are in the normal to above-normal range as well, and Snotel precipitation percentile numbers across the southern Wasatch Mountains are mostly well above their median values.

Recommendations:

UCRB: We recommend that the eastern portion of the D0 in Garfield County, up to southern Wayne County in Utah be lifted, and the area of D1 currently in northwest Wayne, eastern Piute, and southeastern Sevier counties be downgraded to D0. As mentioned in the summary, snowpack as determined by Snotel stations, along with positive SPI values for both the short and long term, justifies this downgrade.

Eastern Colorado: Status quo.

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