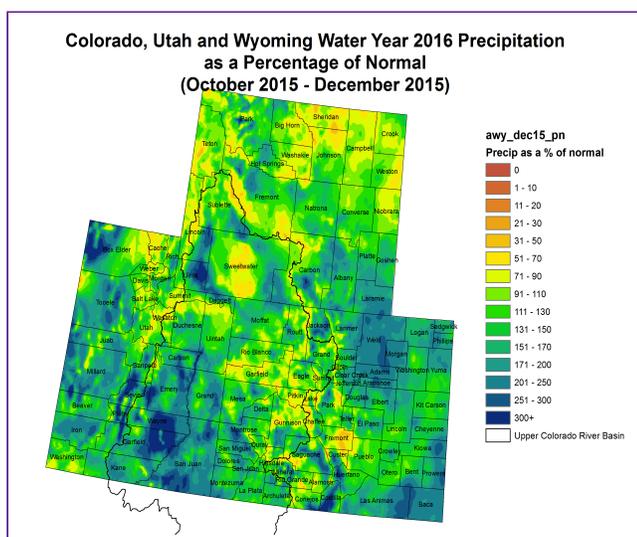
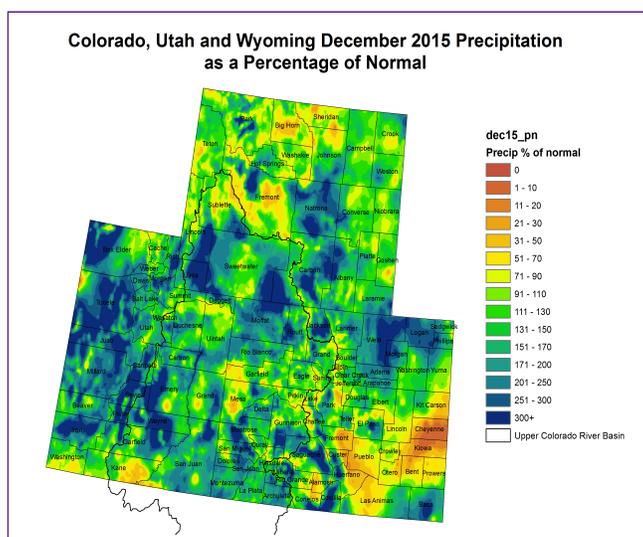
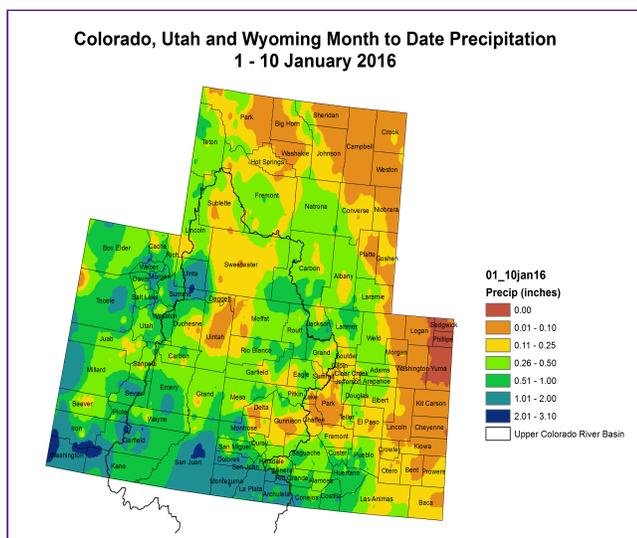
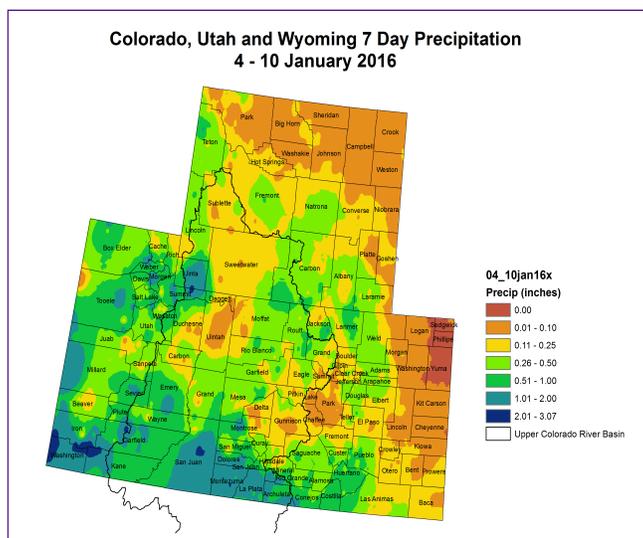


# PRECIPITATION



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.

## Last Week Precipitation:

- The southern portion of the UCRB had a big week of precipitation with over an inch falling in the San Juans and lower elevations south and west of there. The rest of the UCRB had a pretty normal week of precipitation.
- The Upper Green River Basin mostly received 0.10-0.50" of precipitation. Uinta County, WY had a good week with over 1.00" falling in much of the county.
- The Yampa-White Basin received 0.25-0.50" of precipitation for the most part. Areas farther west within the basin were drier.

- The Duchesne Basin received less than 0.25" for the most part. Higher elevation areas to the immediate west and north did better with over an inch falling in parts of the Uintah Range and over half an inch falling in parts of the northern Wasatch Range.
- Southeast Utah and the San Juans in southwest Colorado had a great week receiving 0.50-2.00" of precipitation.
- The Colorado Mainstem was mostly in the 0.10-0.50" range.
- The San Luis Valley received good moisture with 0.25-1.00" falling over the past week.
- The northern Front Range and areas immediately east of the Sangre de Cristos received some good moisture with conditions remaining drier farther out on the plains.

### **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 received 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.

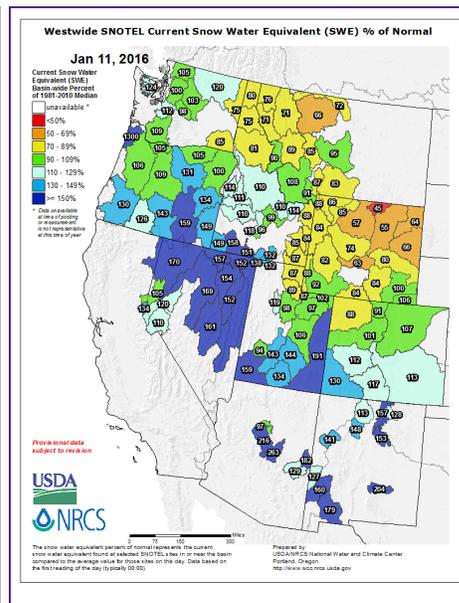
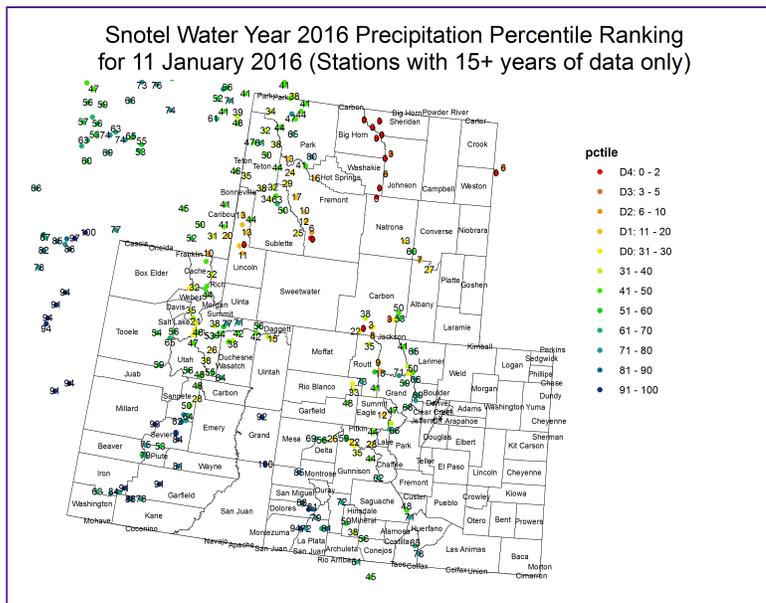
### **Water Year 2015 Precipitation (Oct-Sep):**

- 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

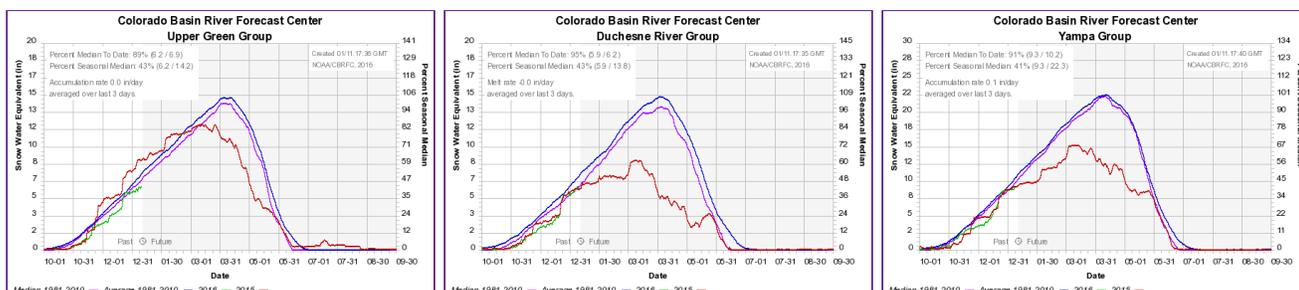
the water year to date. Farther to the west over higher terrain percentages are a little lower at between 50 and 75%.

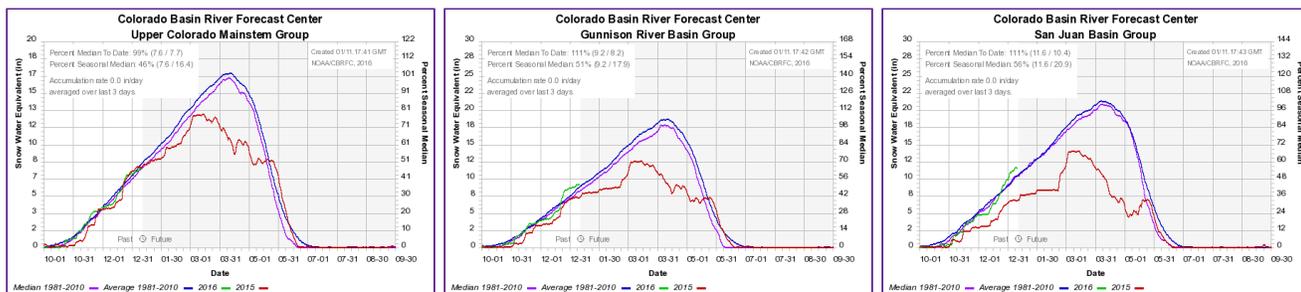
- Southeastern Utah has balanced out to a fairly typical water year to date. The area is between 75 and 125% of normal.
- AHAPS indicates a very dry band in Conejos, Rio Grande, Mineral, and southwest Saguache Counties. Here precipitation is less than 50% of average for the water year to date. Radar 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.

# SNOTEL AND SNOWPACK



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).





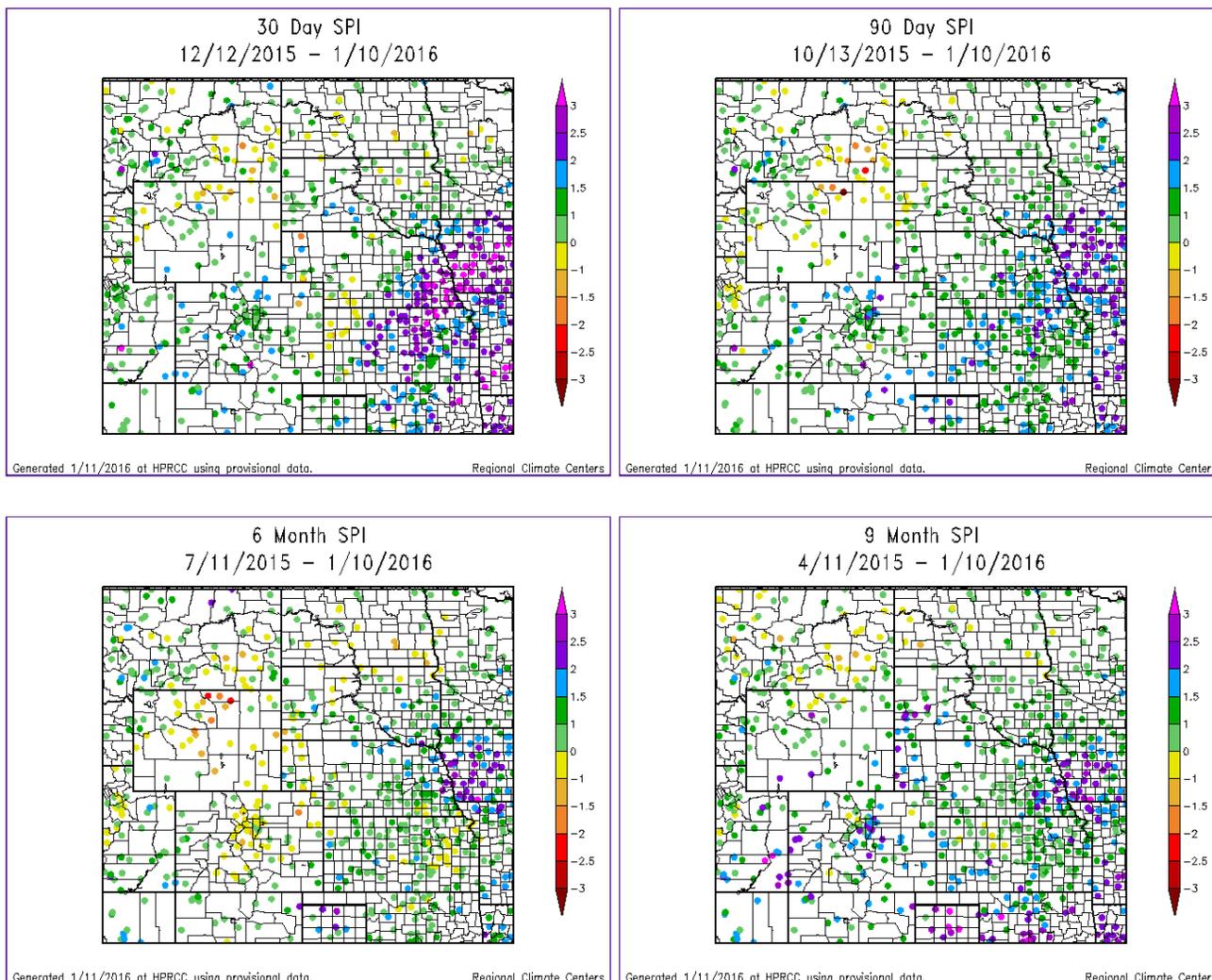
## SNOTEL Precipitation Percentiles:

- SNOTEL Water Year precipitation percentiles on the south side of the Upper Green Basin are in pretty sore shape with percentile rankings for the water year now between 0 and 25. The northern edge of the basin is in better shape with percentiles between 32 and 63.
- The Uintah Range is in the average range, but there is a lot of spread. SNOTEL water year to date percentiles are between 15 and 77.
- In the Wasatch Range there is a gradient from north to south with the northernmost percentiles being the lowest. The southern Wasatch Range and all SNOTEL precipitation percentiles in southeast Utah are well above average.
- The northernmost Rockies in Colorado extending into Wyoming along the Front Range and near Rabbit Ears and Buffalo Pass are on the low side to start the water year. Farther east in Larimer County some percentiles are above average, but in Carbon County, WY there is a station having the lowest precipitation water year on record.
- The Rockies of central Colorado are mostly above average, but percentiles range from 12 to 69, so there is a large spread.
- The San Juans are well above average to start the water year. Percentiles range from 38 to 94 with the 38 being a fairly large outlier.
- The Sangre de Cristos are above average with percentiles between 48 and 78.

## SWE Timeseries Graphs:

- Snowpack increased over all the basins over the last week, but only the San Juan Basin increased at above the normal rate.
- The Upper Green Basin roughly at normal, at 89% of median snowpack for the season to date. This is down 8% with respect to the median from last week.
- The Duchesne basin is at normal as well, being at 95% of median snowpack, which is a 4% fall from last week with respect to the median.
- The Yampa River Basin down to 91% of median snowpack for the season to date. This represents a 6% fall with respect to the median from last week.
- The Upper Colorado River Mainstem is now at 99% of median snowpack. Last week it was at 104%.
- The Gunnison Basin is at 111% of median snowpack for the season to date. This is still a fall from last week when snowpack was 118% of the median to date.
- The San Juan Basin increased to 111% of median snowpack for the season to date, which holds it steady with last week's percentage of the median.

# 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.

### Short Term (30-day):

- Nearly all SPIs in the UCRB are positive for the past 30 days. In the headwaters of the Upper Green River a couple SPIs remain between -1 and 0.
- The Green River Basin is mostly in the normal range in the short term. One SPI in Sweetwater County is in the +1.5 to +2 range.
- Northeastern Utah is showing SPIs in the range of 0 to +1.5.
- Southeast Utah is also showing SPIs primarily between 0 and +1.5. One SPI in San Juan County is between +1.5 and +2, and one SPI in western Wayne County is above +3.
- Western Colorado is now showing all short term SPIs above normal, with SPIs between 0 and +2.
- Eastern Colorado 30-day SPIs are also mostly in the 0 to +1.5 range. The Northern Front Range is showing several SPIs between +1.5 and +2. There are other SPIs this high in Logan County and Pueblo County. A couple SPIs near the eastern border are below 0.

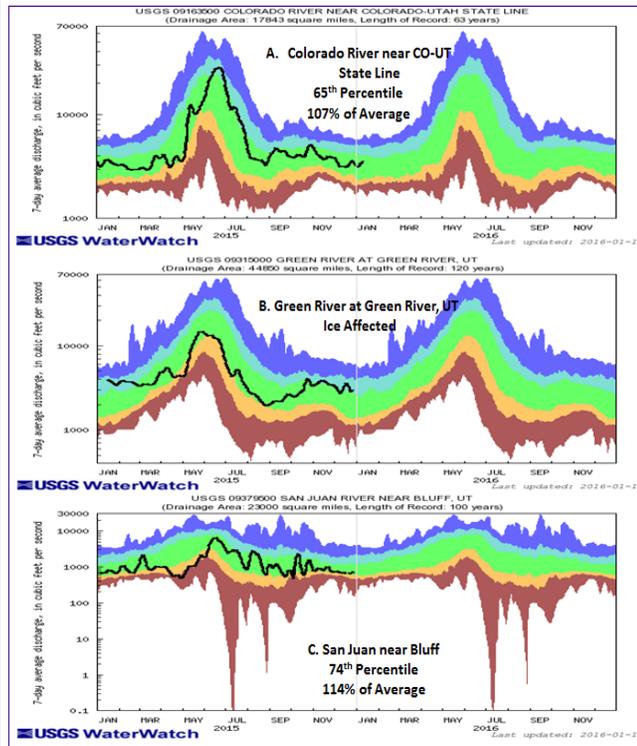
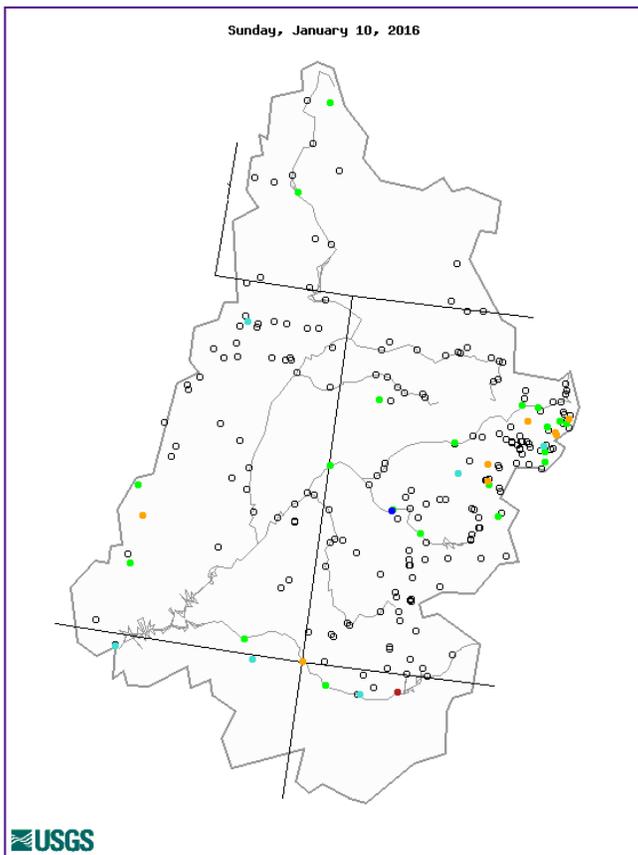
There is one SPI in Prowers County between -1 and 0 and one SPI between -1.5 and -1 in Washington County.

- The Rio Grande Basin showing SPIs that are all positive. One SPI in eastern Alamosa County is above +3.

### **Long Term (6-month):**

- 6-month SPIs are tending a bit on the wetter side for lower elevations and a bit on the drier side for higher elevations. One exception to this rule is in northeast Colorado where SPIs are still on the low side between -2 and 0.
  - The Upper Green River basin is in the normal range with SPIs between -1 and +1.
  - Eastern Utah 6-month SPIs are mostly wet with the vast majority of SPIs between 0 and +1.5. Duchesne County is showing one SPI between +1.5 and +2, and San Juan County is showing a couple SPIs between +1.5 and +2.
  - 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 normal 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 2. There are patches of dryness in Park, Crowley, El Paso, and Pueblo Counties as well.
- 

## **STREAMFLOW**



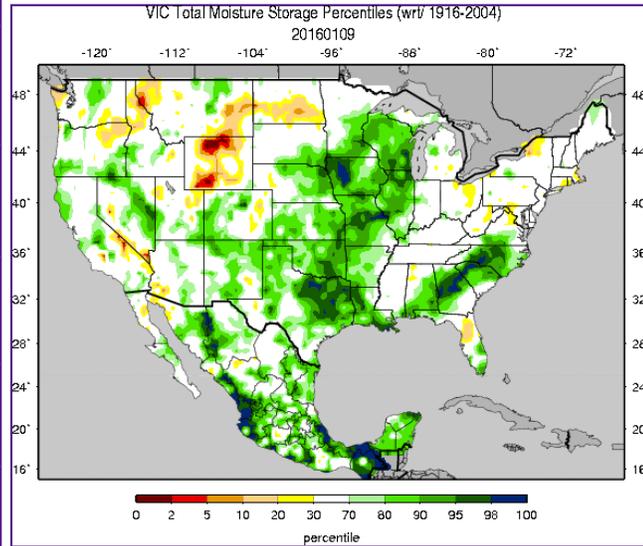
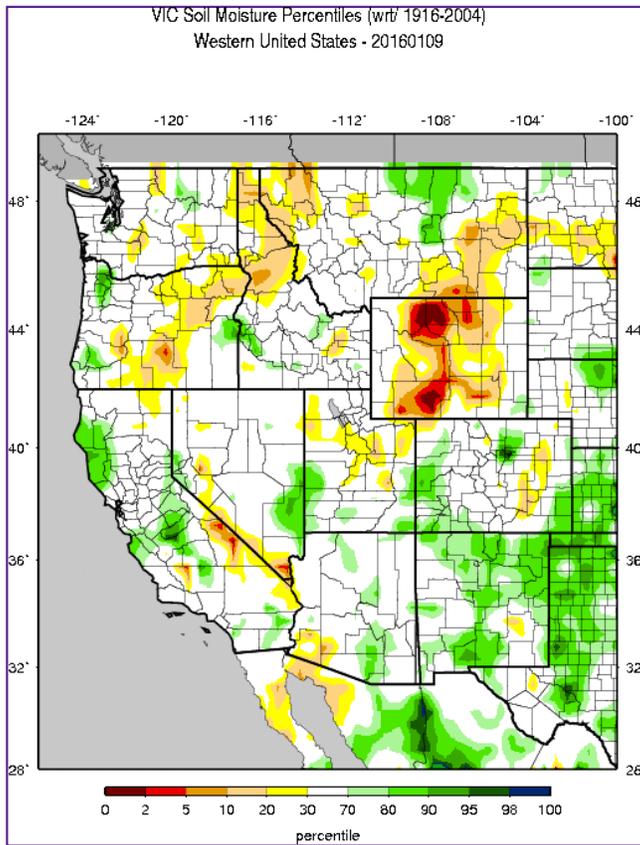
Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

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.

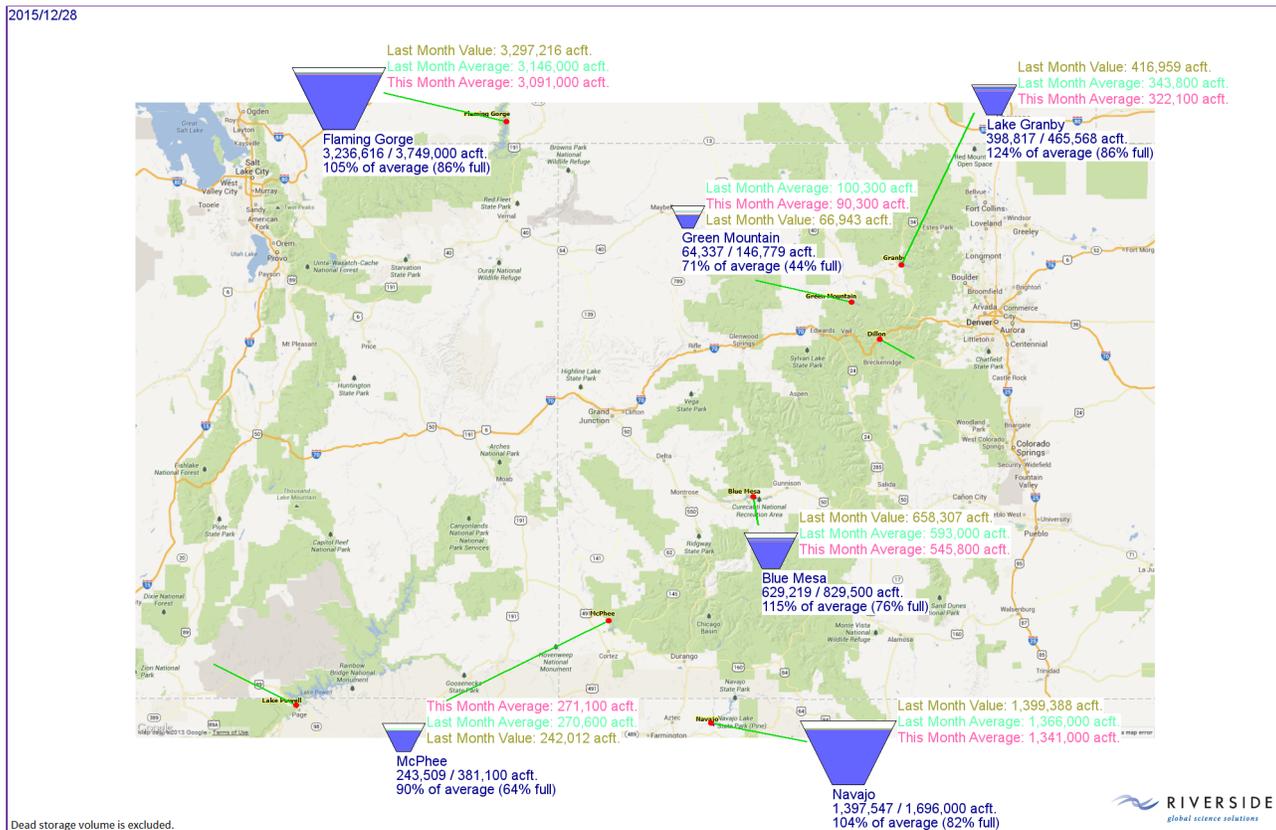
**Streamflow Statistics:**

- The majority of stream gages in the UCRB are no longer reporting. Only 36 out of over 100 gages are not ice-affected.
- 78% of gages are reporting in the normal to much above normal range for the 7-day average streamflow.
- Three of the 36 gages are reporting much below normal with one of the three reporting record low flows.
- One gage is reporting much above normal.
- The Colorado River at the CO-UT state line is at 107% of normal and in the 65th percentile.
- The Green River near Green River, UT is not reporting due to ice.
- The San Juan River near Bluff is at 114% of normal and the 74th percentile.

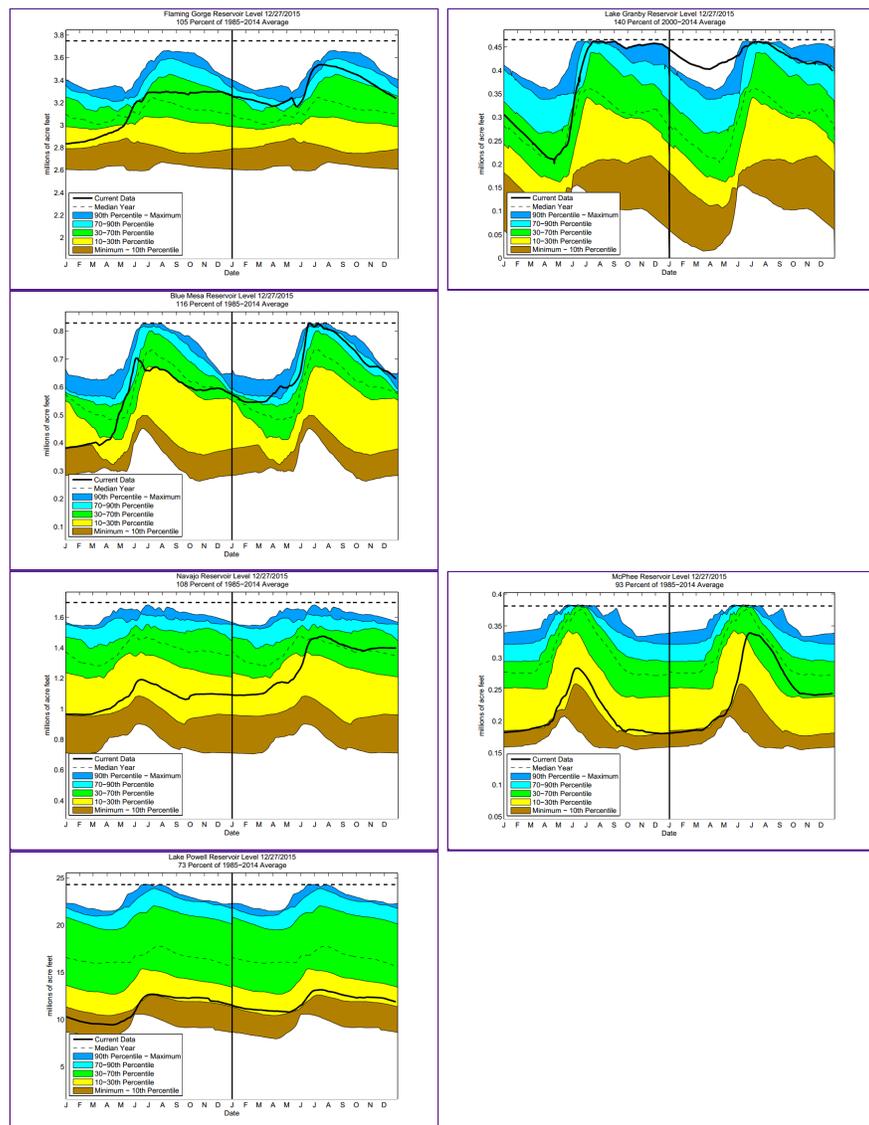
# SURFACE WATER



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, and conditions have been deteriorating over the past several weeks. In Sweetwater County, below the 2nd percentile in the eastern portion of the county. All of Sweetwater, and now parts of Sublette and Uinta Counties are below the 30th percentile.
- Soils in eastern Utah are mostly in the normal range with a bit of a gradient from northwest to southeast. Areas farther north and west such as Duchesne, Uintah, and Emery Counties are indicating some

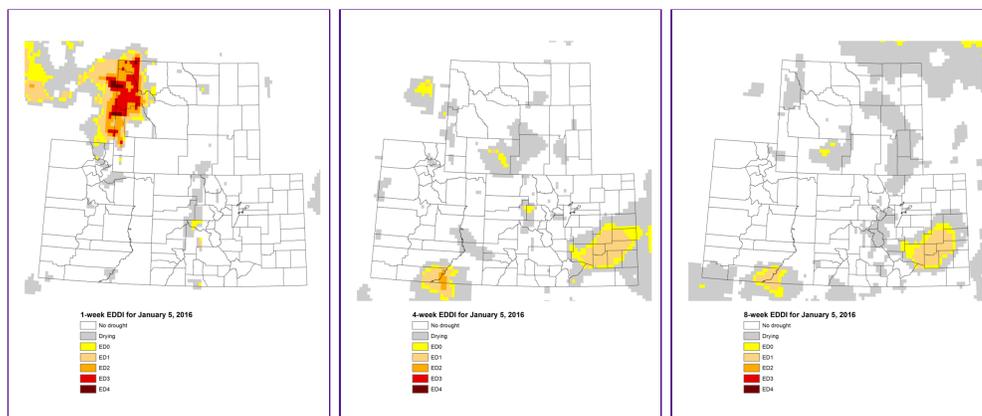
dry patches of soil between the 10th and 30th percentile. Some areas farther south and east such as eastern San Juan and eastern Grand Counties are showing soils between the 70th and 90th percentile.

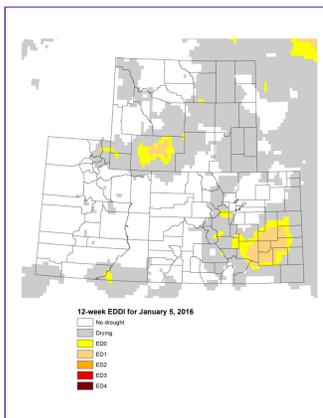
- Soils in western Colorado are by and large either in the normal range or a bit above normal. Areas farther south are more likely to be above normal. Some dry soils extend down into Moffat County from the north. Soils in Mesa County are as wet as the 95th percentile.
- Soils in the Upper Rio Grande part of Colorado are mostly in the normal range with some wetter soils near the Colorado-New Mexico border.
- Soils in northeastern 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.
- Soils in southeast Colorado range from dry to wet. Soils in eastern Pueblo and El Paso Counties as well as Crowley and Otero Counties are still showing up below the 30th percentile. Soils in the southeast corner of the state in Baca, Prowers, and eastern Kiowa Counties are between the 70th and 90th percentile.

### Reservoirs (12/28):

- 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.

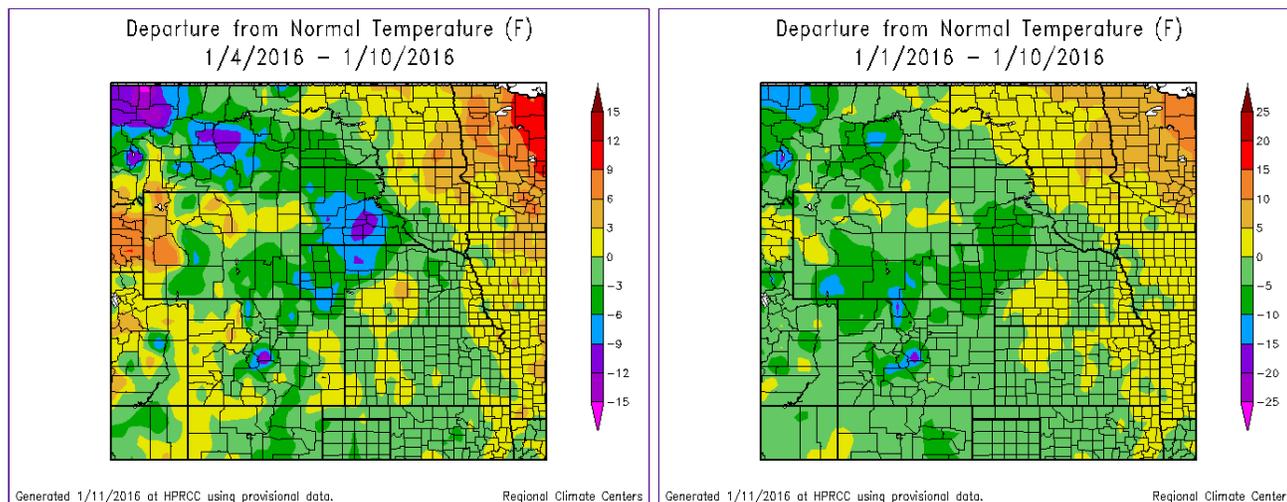
## EVAPOTRANSPIRATION



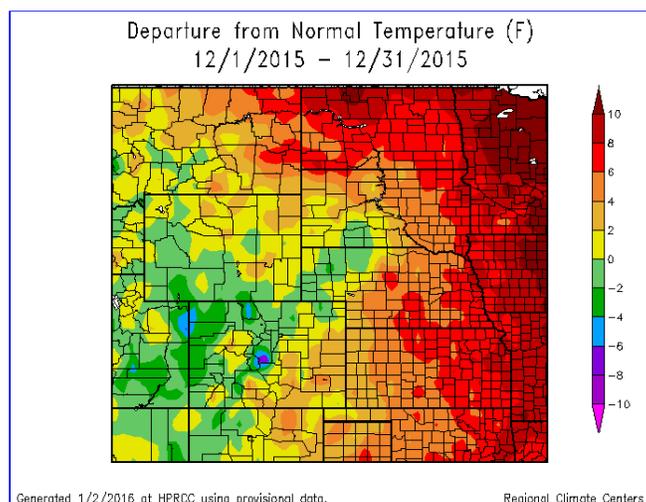


The above images are available courtesy of NOAA's Evaporative Demand Drought Index (EDDI). Drought classification listed is a function of the depth of reference evapotranspiration accumulated over a given period of record with respect to a climatology of 1981-2010. The drought categories displayed are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

## 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.



### Last Week Temperatures:

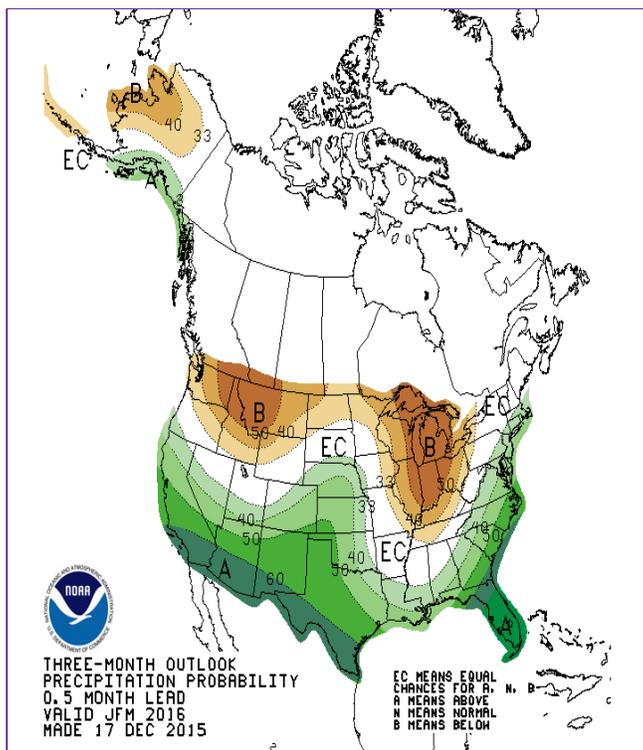
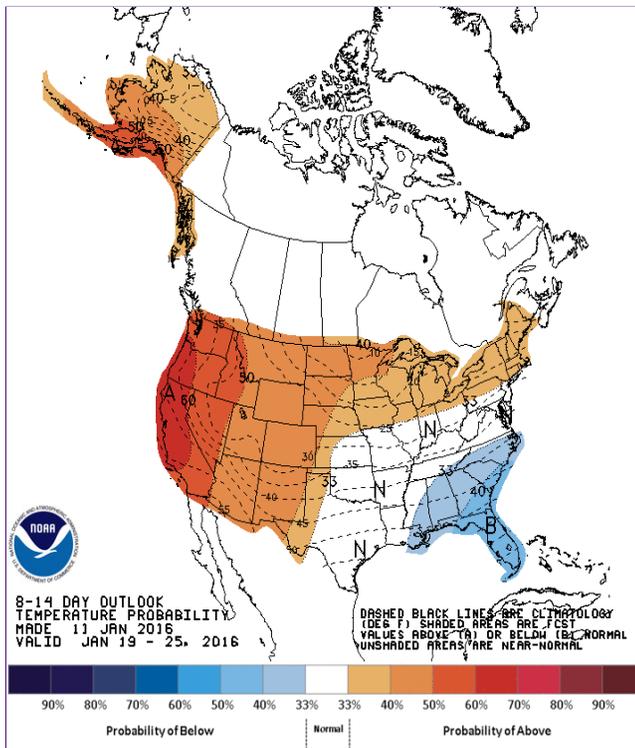
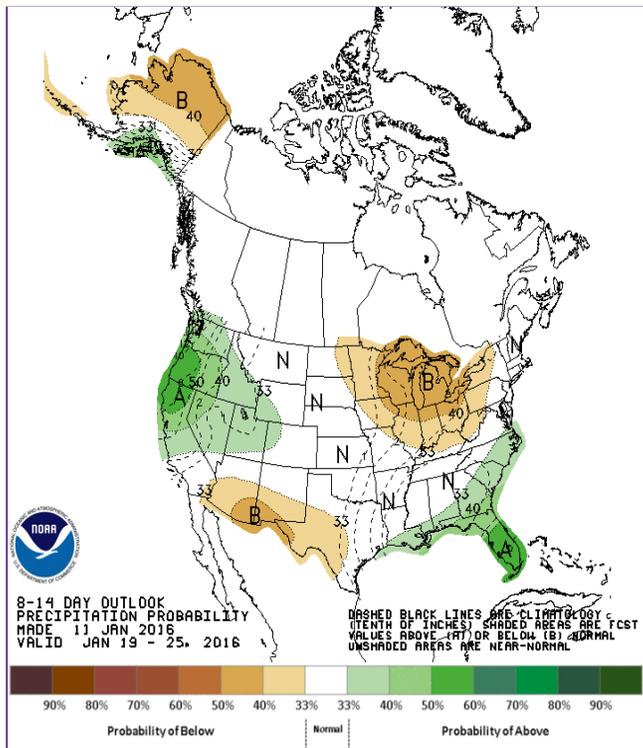
- The UCRB experienced fairly normal temperatures over the past week with some areas on the warm side and some on the cool side.
- The Upper Green River Basin in Wyoming was also much above normal near the mountains and below normal out on the plains. Central Sweetwater County was 3-6 degrees below normal, but Sublette and Lincoln Counties were 3-9 degrees above 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.
- Western Colorado was mostly within three degrees of normal on either side. Parts of Routt, Garfield and Eagle Counties were as much as 3-6 degrees above normal, and parts of Gunnison and Saguache Counties were as much as 3-6 degrees below normal.
- In Colorado east of the divide temperatures were mostly 0-6 degrees cooler than normal. Southern Park County and bordering parts of Chaffee and Fremont County were as much as 12-15 degrees below normal. The southeast corner of the state, and areas in east-central Colorado were 0-3 degrees above normal.
- The Rio Grande Basin was mostly within three degrees of 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

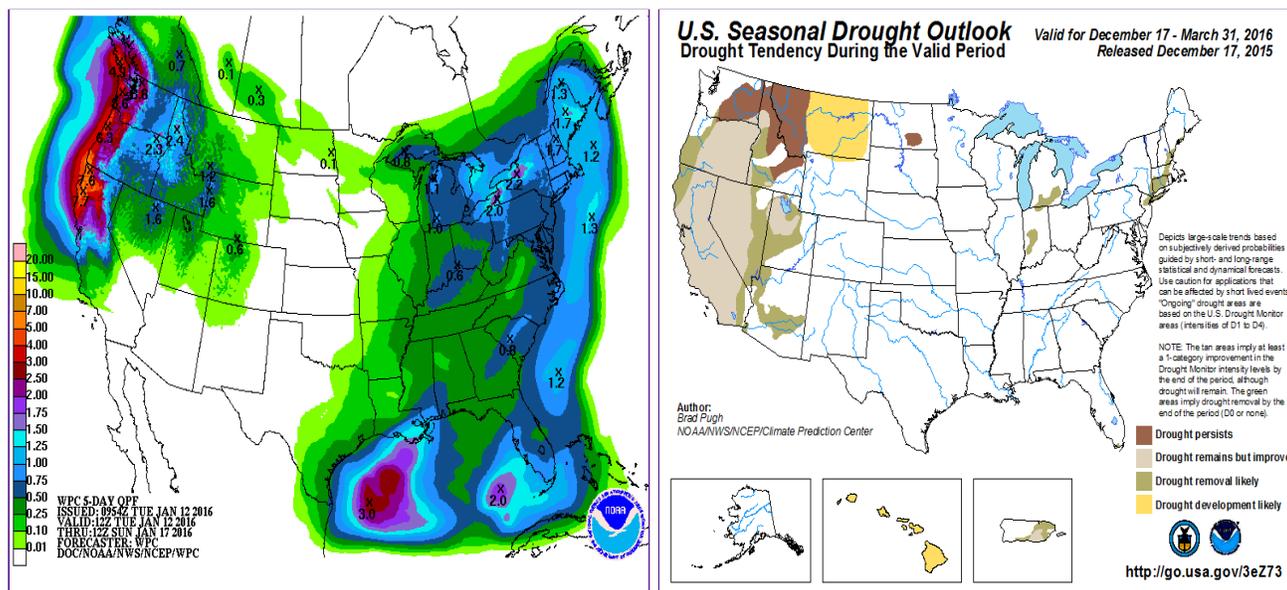
average. North Bent County was nearly 6 degrees above normal. One major standout is southern Park County which saw December temperatures roughly 8 degrees below normal.

# FORECAST AND OUTLOOK



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: (1/12)

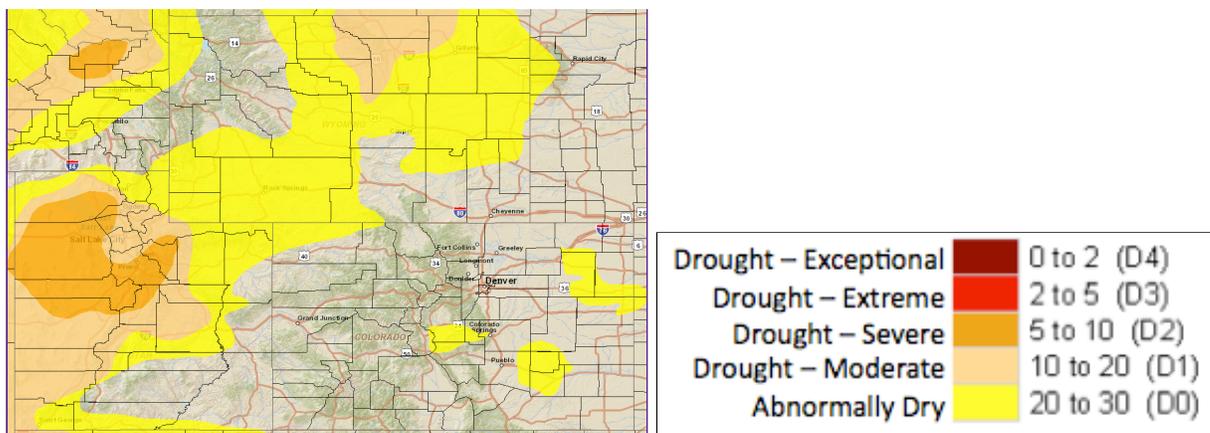
- The coming week will be active in terms of temperature changes east of the divide, and a week for light snow in the UCRB. Most precipitation totals will be unremarkable. The Upper Green Basin is in the best position to have a strong week of precipitation.
- As of today high pressure resides over the intermountain west and some warmer temperatures are creeping in from the southwest. The next weather-maker for the region is currently residing just off the Oregon coast. As this system approaches between now and Thursday morning eastern Colorado will warm into the 40s today and 50s tomorrow. West of the divide temperatures are forecast to stay much more constant. The whole region should stay dry.
- On Thursday morning low pressure starts forming in the lee of the Rockies and moisture is tracked in from the northwest. As this low exits out onto the plains maximum temperatures will take a 15+ degree dive east of the Rockies, but once again stay more stagnant west of the divide, but with cloud cover and snowfall.
- On Thursday the Upper Green Basin will see widespread light snowfall with higher precipitation rates over the mountains. Some areas may pick up over one half inch.
- Friday morning through Sunday morning this moisture moves farther down into the basin and the Wasatch and Uintahs in Utah will see some precipitation, over a half inch in spots. The Rockies in northern Colorado could also see over half an inch with the majority of Colorado west of the divide receiving at least some light snow.
- Early next week the light snow looks to persist over most of the UCRB except the far south reaches. Eastern Colorado is forecast to

remain dry, but become colder again.

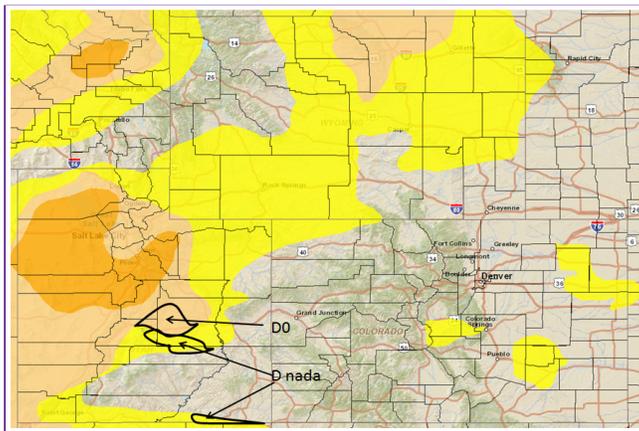
### Longer Term:

- The 8-14 day precipitation outlook shows increased chances for above average precipitation for the northern and western portions of the UCRB. 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 across the entirety of the UCRB and Colorado east of the divide. These chances wane only slightly from west to east.
- 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.

## U.S. DROUGHT MONITOR



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 12, 2016

The past week was mostly cooler than average with wet conditions in the southern portion of the basin and dry to moderate conditions in the northern portion of the basin. One trough did bring some good snowfall east of the divide in the northern Front Range and on the east side of the Sangre de Cristos, but the plains remained drier than normal. The San Luis Valley had a splendidly wet week as well.

Despite receiving some snow most basins north of the San Juans did fall off of median-pace snowpack a little bit over the past week. This merits keeping an eye on, but snowpack is still within the normal range, and is 80-110% of average for the UCRB from the Gunnison Basin north. Basins south of there are 110-190% of normal, which is consistent with what one might expect from a strong El Nino year.

Evaporative Demand over the cold season thus far (last 12 weeks) has remained higher than average in southeast Colorado, central Sweetwater County, and surprisingly, part of southwest San Juan County. These higher evaporative demand totals don't scale with a growing season anomaly of the same percentile ranking. Improvements in soil moisture and total water storage over much of southeast Utah were noted following last week's precipitation. Soil dryness increased in both spatial extent and severity in southwest Wyoming where conditions have been drier. SNOTEL precipitation percentiles for the water year to date are rather low on the south end of the Upper Green River Basin and on the north end of the Yampa River Basin. This merits keeping a close watch on as well.

## Recommendations:

**UCRB:** It is recommended that D0 be removed from southeast and southern San Juan County in Utah following over an inch of precipitation for the area this week. We are comfortable with letting go of the D0 all the way to our western border in central Kane County if it's agreeable with the neighbors, but at least the portion outlined should go.

It is recommended that D1 be downgraded to D0 in west-central Emery County as well as extreme southeast Sanpete County and extreme northeast Sevier County. It is recommended that D0 be removed in

southwest and south-central Emery County as well as extreme north-central Wayne County and extreme eastern Sevier County. Soils have rebounded into the normal range here and both short-term SPIs as well as SNOTEL water year to date precipitation percentiles are in good shape here following over half an inch of moisture.

**Eastern Colorado:** Status quo.