

## National - Significant Events for September - November 2017

### Highlights for the Basin

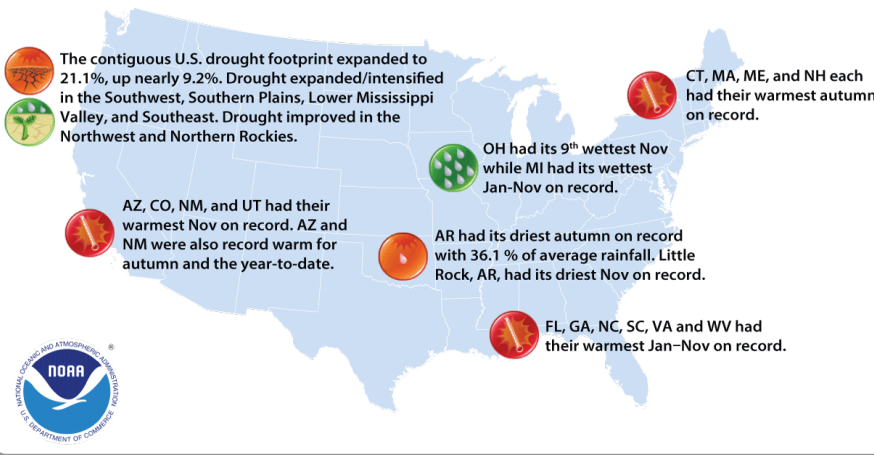
Fall temperatures were above average for the majority of the Basin; however, the season ended quite warm, with many western states ranking in the top 10 warmest Novembers on record. This included Colorado (record warmest) and Wyoming (8th warmest). Precipitation, on the other hand, varied widely throughout the fall. This resulted in no top 10 rankings for wettest or driest fall.

Missouri had its 13th driest fall on record, which was accompanied by its 5th driest September and 11th driest November. Only 5% of the state was in drought conditions at the start of the season, but this increased to nearly 40% by the end.

On October 2-3, an early season snowstorm hit northern Montana bringing heavy, wet snow, which helped to reduce fire activity in the region. Havre, MT set a new 2-day snowfall record for October, with 13.0 inches.

Late November was extremely warm, with hundreds of records broken. Denver, CO had its warmest November day since its records began in 1872, with a temperature of 81°F on the 27th. This broke the old record of 80°F, set just last year.

### U.S. Selected Significant Climate Anomalies and Events for November and Autumn 2017



The average U.S. temperature during November was 45.1°F, 3.4°F above average, the seventh warmest on record. The autumn U.S. temperature was 55.7°F, or 2.1°F above average and the 10th highest on record. November U.S. precipitation total was 1.58 inches, 0.65 inch below average, and the 19th driest on record. The autumn precipitation total was 6.43 inches, 0.45 inch below average.

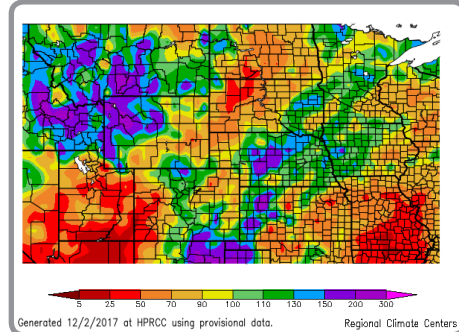
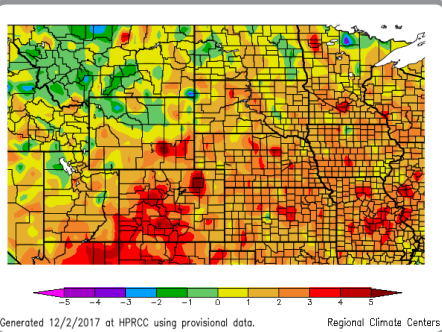
Please Note: Material provided in this map was compiled from NOAA's State of the Climate Reports. For more information please visit: <http://www.ncdc.noaa.gov/sotc>

## Regional - Climate Overview for September - November 2017

### Temperature and Precipitation Anomalies

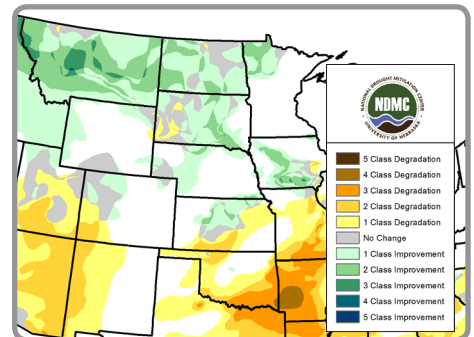
Departure from Normal Temperature (°F)  
September 1 - November 30, 2017

Percent of Normal Precipitation (%)  
September 1 - November 30, 2017



### Drought

U.S. Drought Monitor Class Change  
3 Months: September 5 - November 28, 2017



Overall, fall temperatures were above normal, with slightly below-normal temperatures across the northern tier of the Basin. The September and October temperature patterns were similar, with above-normal temperatures in the east and below-normal temperatures in the west. November started off quite cold, but quickly rebounded with record breaking warmth during the last two weeks. Despite this, much of North Dakota ended the month in the 4-6°F below normal range. Areas of Colorado and Wyoming, however, had monthly departures up to 10°F above normal.

Precipitation varied across the Basin this fall, with extremes on both ends of the spectrum. Drier areas included western Colorado, southern Missouri, and portions of the Dakotas where precipitation totals were less than 50% of normal. Meanwhile, precipitation in excess of 200% of normal occurred within a swath from southern Colorado through western Kansas and central Nebraska, as well as western portions of Montana and Wyoming. These extremes caused both improvements and degradations in drought conditions across the Basin.

Significant changes occurred to the U.S. Drought Monitor this fall. Drought conditions developed across south-central Kansas and southern Missouri. As precipitation deficits mounted, numerous impacts to the agricultural sector were reported, in addition to decreased streamflows. In the Northern Plains, drought conditions continued this fall, but many improvements occurred. For instance, 91% of the state of Montana was experiencing drought at the beginning of the season, compared to 53% at the end of November. Conditions also largely improved across the Dakotas.

## Regional - Impacts for September - November 2017

### Drought Continues to Cause Impacts

Although the growing season has come to a close, a number of drought-related agricultural impacts continue to be reported. At the end of November, 38% of winter wheat was rated in poor to very poor condition in South Dakota. Meanwhile, numerous issues were reported in Missouri, where many producers were moving cattle and/or hauling water because of low stock pond levels.

Additionally, bird populations were down significantly across the Northern Plains this fall, including pheasants, grouse, and Hungarian partridges. In North Dakota, this year's pheasant count was the lowest in 20 years.

### Large Butterfly Migration Across the Plains

According to Nebraska Extension, conditions were just right across California and northern Mexico last winter and spring to create a stunning butterfly migration this fall. Painted Lady butterflies, in particular, could be seen in large numbers as they migrated across the Plains and Midwest during the month of September. Butterfly lovers could easily find butterflies in home gardens across the region. However, the butterflies were not a welcome sight everywhere, as the caterpillars of Painted Lady butterflies fed on soybean pods, causing damage in some areas.

### High Winds Down Corn Across Nebraska

A number of conditions led to thousands of acres of damaged corn across Nebraska this fall. According to Nebraska Extension, high heat during the pollination stage led to weakened shanks, while cooler conditions in August produced large, heavy ears. Heavy rains in early October caused stalk rot, which further weakened the crop. When high winds struck the region later in the month, stalks either snapped, or corn was stripped to the ground. Generally, losses were in the 20-100 bushels per acre range.

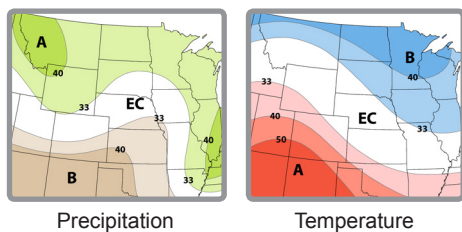


Above: (Top) Dry stock ponds in Hettinger County, North Dakota, photo courtesy North Dakota State University Extension; (Middle) painted lady butterflies on sedum flowers, photo courtesy Natalie Umphlett; and (Bottom) corn ears, which fell to the ground after high winds in Nebraska, photo credit Jenny Rees, Nebraska Extension.

## Regional - Outlook for January - March 2018

### 3-Month Precipitation and Temperature Outlooks

Valid for January - March 2018



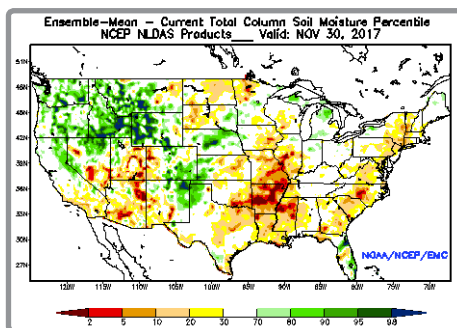
EC: Equal chances of above, near or below normal  
A: Above normal, B: Below normal

According to the Climate Prediction Center, current La Niña conditions are likely to continue through winter, with a transition to ENSO-neutral conditions possible in spring.

Through March, above-normal precipitation is favored across much of the northern parts of the region, as well as portions of Missouri, while increased chances for below-normal precipitation exist across the south. For temperatures, below-normal conditions are favored to the north, while above-normal conditions could occur across portions of Wyoming, Colorado, and Kansas. For more information on La Niña in the Basin, see: <https://hprcc.unl.edu/pdf/LaNina-MOBasin-2017-Final.pdf>.

### Soil Moisture Conditions

11/30/2017



Persistent drought conditions over the past summer and fall continued to impact soil moisture conditions, with drier soils across much of the Northern Plains. Dry soils were also evident across Missouri, eastern Kansas, and western Colorado, where drought conditions have recently emerged. Meanwhile, wetter soils were present across the western halves of Montana and Wyoming, as well as eastern Colorado, western Kansas, and central Nebraska. Soil moisture at this time of the year can be indicative of conditions at the start of the spring - given that the soils have already frozen. This map shows the percent of average soil moisture conditions from a NOAA model called NLDAS.

## MO River Basin Partners

High Plains Regional Climate Center  
[www.hprcc.unl.edu](http://www.hprcc.unl.edu)

Kansas State, Department of Agronomy  
[www.agronomy.k-state.edu](http://www.agronomy.k-state.edu)

National Drought Mitigation Center  
[www.drought.unl.edu](http://www.drought.unl.edu)

National Integrated Drought Information System  
[www.drought.gov](http://www.drought.gov)

National Oceanic and Atmospheric Administration  
National Weather Service - Central Region  
[www.crh.noaa.gov/crh](http://www.crh.noaa.gov/crh)

National Centers for Environmental Information  
[www.ncdc.noaa.gov](http://www.ncdc.noaa.gov)

Missouri River Basin Forecast Center  
[www.crh.noaa.gov/mbrfc](http://www.crh.noaa.gov/mbrfc)

Climate Prediction Center  
[www.cpc.ncep.noaa.gov](http://www.cpc.ncep.noaa.gov)

North Central Climate Science Center  
<http://nccsc.colostate.edu>

South Dakota State University Extension  
<http://igrow.org>

American Association of State Climatologists  
[www.stateclimate.org](http://www.stateclimate.org)

U.S. Army Corps of Engineers - Missouri River Basin  
Water Management Division  
[www.usace.army.mil](http://www.usace.army.mil)

U.S. Department of Agriculture  
Regional Climate Hubs  
[www.usda.gov/oce/climate\\_change/regional\\_hubs.htm](http://www.usda.gov/oce/climate_change/regional_hubs.htm)

U.S. Bureau of Reclamation  
[www.usbr.gov](http://www.usbr.gov)

U.S. Geological Survey, Water Mission Area  
[www.usgs.gov/water](http://www.usgs.gov/water)

Western Governors' Association  
[www.westgov.org](http://www.westgov.org)