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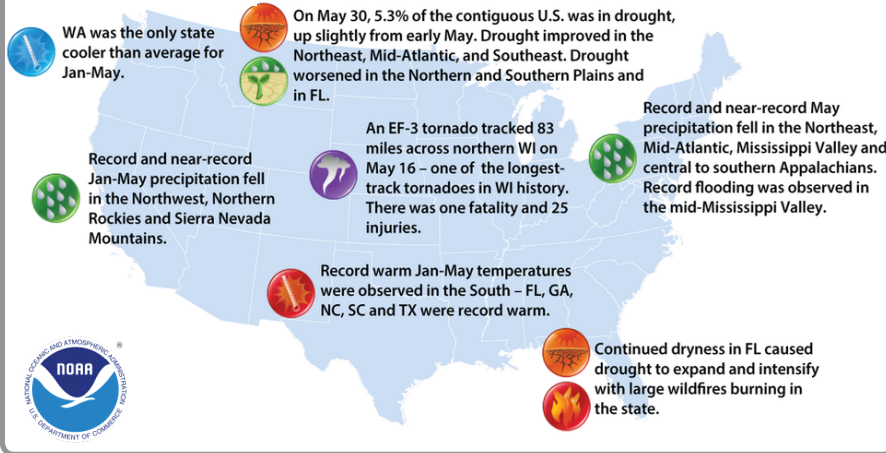


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National - Significant Events for March - May 2017

U.S. Selected Significant Climate Anomalies and Events for May and Spring 2017



The average U.S. temperature during May was 60.6°F, 0.4°F above average. The spring U.S. temperature was 53.5°F, 2.6°F above average, and the eighth highest on record. May U.S. precipitation was 3.31 inches, 0.40 inch above average. The spring precipitation total was 9.39 inches, 1.45 inches above average, and the 11th wettest on record.

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>

Highlights for the Basin

Overall, it was a warm spring with each state in the above to much above average range. Colorado and Wyoming were ranked highest in the region as the 8th warmest on record. Spring precipitation was varied with Missouri and Kansas ranking as the top 4th and 5th wettest, respectively, and North Dakota ranking as the 9th driest.

On May 8, severe thunderstorms with very large hail impacted the Denver, CO area. The hail struck during rush hour, causing damage to over 100,000 vehicles, in addition to homes and businesses. According to early estimates, this storm may have broken the record as the state's costliest at \$1.4 billion in damage.

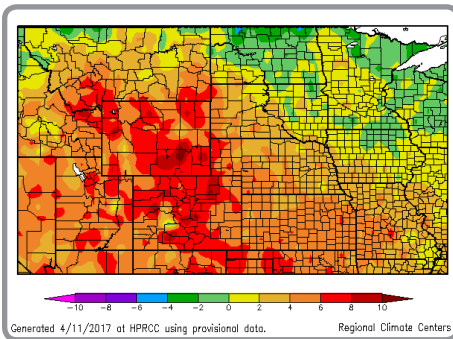
A mid-May snowstorm impacted Colorado, bringing 2-3 feet of snow to the mountains from the 18th-20th. The heavy snow impeded travel as all roads on the east side of Rocky Mountain National Park were closed. This was one of the snowiest Mays on record in the Estes Park area.

On the May 23rd release of the U.S. Drought Monitor, only 4.52% of the nation was depicted in drought - the smallest area in drought since 2000, when the U.S. Drought Monitor began.

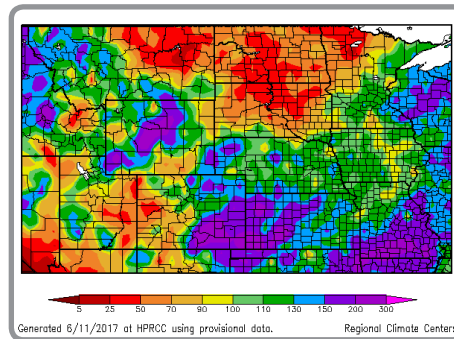
Regional - Climate Overview for March - May 2017

Temperature and Precipitation Anomalies

Departure from Normal Temperature (°F)
March 2017

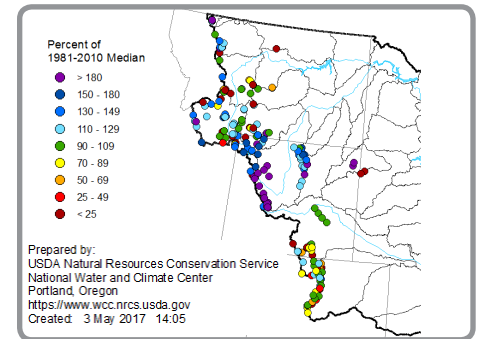


Percent of Normal Precipitation (%)
March 1 - May 31, 2017



Snowpack and Streamflow

Missouri Basin Mountain Snowpack
as of 05/01/2017



Temperatures were, overall, on the warm side this spring, with most locations ending the season about 2°F above normal. March had the largest departures of the season, with much of the west and south in the 4-8°F above normal range. April and May were largely near normal, with much of the region having slightly above-normal temperatures in April and slightly below-normal temperatures in May. Despite near-normal temperatures these two months, some locations ranked in the top 10 warmest springs on record due to the extremely warm month of March.

There was a large contrast in precipitation across the region this spring, with dry conditions in areas of Montana and the Dakotas, and excessive precipitation across areas of central Wyoming, eastern Colorado, western Kansas, and southern Missouri. Heavy precipitation eliminated drought in Colorado, Kansas, and Missouri, while drought conditions returned to portions of the Dakotas. The extremes on both sides of the spectrum caused several locations to rank in either the top 10 wettest or driest springs on record.

Rocky Mountain snowpack, particularly in parts of Montana and Wyoming, was above average this spring. For the Missouri River Basin, snowpack typically peaks in mid-April; however, several late-season snows shifted the peak about two weeks later than average, according to the U.S. Army Corps of Engineers. For the month of May, streamflows for many tributaries of the Missouri River in Montana and Wyoming were much above normal to high. As temperatures warm, minor to moderate flooding is expected, especially in and around the Wind River Indian Reservation.

Regional - Impacts for March - May 2017

Historic Flooding in Missouri

A potent storm system at the end of April brought heavy rainfall to a large area stretching from northeastern Oklahoma/southeastern Kansas through northern Arkansas, the majority of Missouri, and into southern portions of Illinois and Indiana. Rainfall totals of 4-8 inches were widespread, with isolated locations receiving up to 12 inches over just a two-day period. This resulted in major to historic flooding along many rivers, including tributaries of the Missouri River, such as the Gasconade River. Impacts from this event were numerous and included road closures, damage to infrastructure, flooded fields, and even fatalities. At one point, according to the Missouri Department of Roads, over 300 roads were closed due to flooding in Missouri alone.

Spring Conditions Impact Agriculture

The combination of cool and wet conditions this spring has impacted producers across parts of Kansas and Nebraska. Disease issues in wheat have emerged including wheat stripe rust and wheat streak mosaic virus. There were also concerns that wet conditions may cause root rot and disease in corn. To the east, many producers have requested seed to replant their corn fields due to the excessive wetness. According to a report by DTN, corn replant this year is nearing historic highs. Late planting and replanting could lead to freeze concerns in the fall.

A late April/early May blizzard brought over a foot of snow to portions of eastern Colorado and western Kansas. Snow blanketed an already stressed wheat crop, while thousands of cattle perished in fields. Baca County, Colorado was hit particularly hard with over 10,000 cattle deaths reported. Wheat futures soared as damage estimates were released. At the end of May, 25% of the winter wheat crop in Kansas was rated poor to very poor.

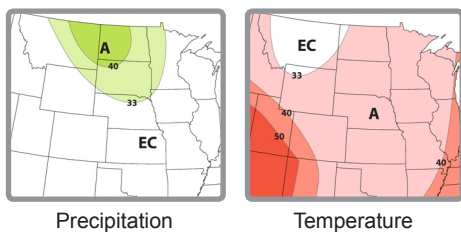


Above: (Top) Flooding along the Gasconade River near Mount Sterling, MO, photo courtesy James Helmering ; (Middle) thousands of cattle perished in eastern Colorado in a late-April blizzard, photo courtesy 9News Denver; and (Bottom) yellow corn is common in cool and wet springs, however this should not impact yields, photo courtesy Troy Ingram, UNL CropWatch.

Regional - Outlook for July - September 2017

3-Month Precipitation and Temperature Outlooks

Valid for July - September 2017



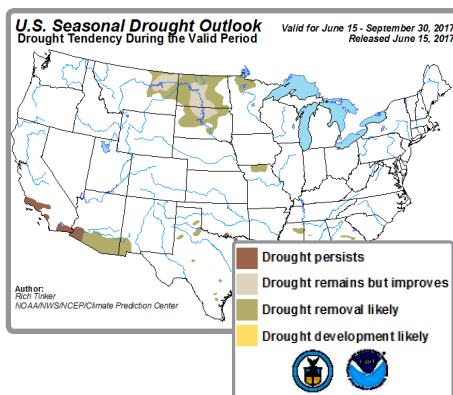
EC: Equal chances of above, near or below normal
A: Above normal, B: Below normal

According to the Climate Prediction Center, ENSO-neutral conditions are currently present and are favored to continue through the summer and fall.

Over the next three months, above-normal precipitation is favored for northern areas of the Basin. The highest likelihood for above-normal precipitation includes an area encompassing eastern Montana, western North Dakota, and northwestern South Dakota - an area where drought has recently developed. Meanwhile, above-normal temperatures are favored for the majority of the region, with the highest likelihood in southwestern Colorado and the bootheel of Missouri.

U.S. Seasonal Drought Outlook

Valid for 06/15/2017 - 09/30/2017



Drought conditions rapidly developed at the beginning of summer for portions of the Dakotas and eastern Montana, with numerous impacts to agriculture already reported. May and June precipitation is particularly important for this area, not only for agriculture, but also for other sectors, such as recreation and tourism. Although recent rains have brought temporary relief, conditions should be monitored closely in the near-term. The seasonal drought outlook indicates that drought conditions across this area should improve through early fall.

MO River Basin Partners

- High Plains Regional Climate Center
www.hprcc.unl.edu
- Kansas State, Department of Agronomy
www.agronomy.k-state.edu
- National Drought Mitigation Center
www.drought.unl.edu
- National Integrated Drought Information System
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- National Oceanic and Atmospheric Administration
National Weather Service - Central Region
www.crh.noaa.gov/crh
- National Centers for Environmental Information
www.ncdc.noaa.gov
- Missouri River Basin Forecast Center
www.crh.noaa.gov/mbrfc
- Climate Prediction Center
www.cpc.ncep.noaa.gov
- North Central Climate Science Center
<http://nccsc.colostate.edu>
- South Dakota State University Extension
<http://jgrow.org>
- American Association of State Climatologists
www.stateclimate.org
- U.S. Army Corps of Engineers - Missouri River Basin Water Management Division
www.usace.army.mil
- U.S. Department of Agriculture
Regional Climate Hubs
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