9-2017

Umphlett QCI Sept 2017

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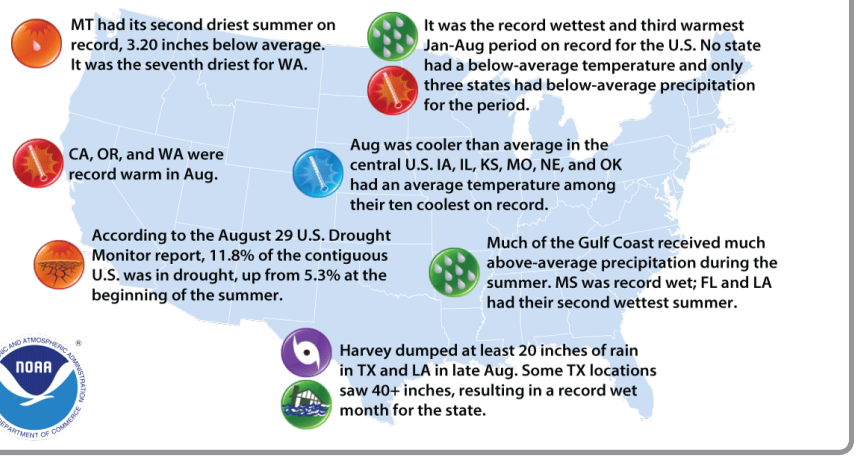
Quarterly Climate Impacts and Outlook

Missouri River Basin

September 2017

National - *Significant Events for June - August 2017*

U.S. Selected Significant Climate Anomalies and Events for August and Summer 2017



The average U.S. temperature during August was near the long-term average. The summer U.S. temperature was 72.7°F, or 1.3°F above average and the 15th highest on record. August U.S. precipitation was 3.34 inches, 0.7 inch above average, and seventh wettest. The summer precipitation total was 9.19 inches, the 16th 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

Summer 2017 was full of extremes in the Basin. For example, Colorado had its 12th driest June followed by its 8th wettest July, while Nebraska had its 2nd driest June and its 12th wettest August. Montana's weather was consistently warm and dry, with the state having its 2nd driest and 8th warmest summer on record (since 1895).

Some areas of Montana received less than an inch of rain this summer and others went for long stretches without measurable rainfall. For instance, Helena's last measurable rainfall of the summer occurred July 9th.

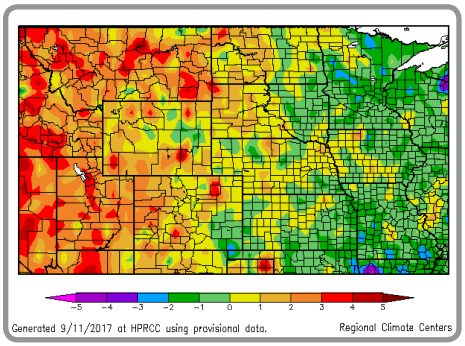
Iowa, Kansas, Missouri, and Nebraska all ranked in the top 10 coolest Augusts on record. For locations like Grand Island, NE, this was the first time since records began that the temperature did not reach 90°F during the month of August.

Although severe weather is not uncommon during the summer months, some storms were notable. On June 16th, a tornado damaged two E-4B Doomsday Planes at Offutt Air Force Base, and a series of hail storms stripped crops bare in central Nebraska in mid-August.

Regional - *Climate Overview for June - August 2017*

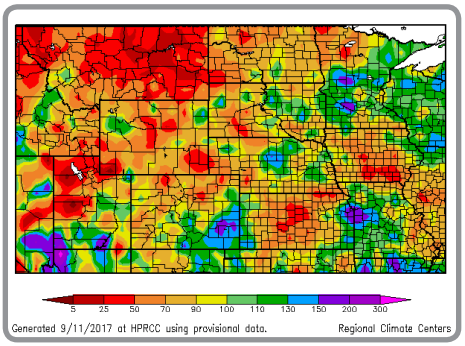
Temperature and Precipitation Anomalies

Departure from Normal Temperature (°F)
June 1 - August 31, 2017



Temperatures were, overall, above normal in the west and below normal in the east this summer. Although the season started off extremely hot and dry, July had the largest departures of the season, with much of the drought-stricken areas of central and eastern Montana and western parts of the Dakotas in the 4-8°F above normal range. August, in stark contrast, was on the cool side for the majority of the Basin, with eastern areas having departures of 4-6°F below normal. Although the cool weather helped ease drought impacts, this was untimely for crop development.

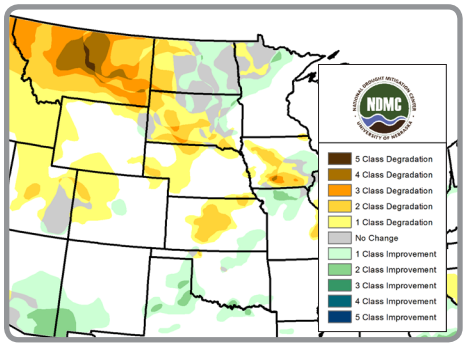
Percent of Normal Precipitation (%)
June 1 - August 31, 2017



It was an extremely dry summer for northern areas of the Basin, with mixed conditions to the south. Aside from a few isolated areas, June was dry, with large swaths of the region receiving less than 50% of normal precipitation. Dry conditions lingered into July, especially in the north, but some areas of southern Colorado, central Nebraska, and eastern South Dakota managed to pick up rainfall in excess of 150% of normal. August was the wettest month of the season, especially for eastern parts; however, Montana continued to be dry.

Drought

U.S. Drought Monitor Class Change
3 Months: June 13 - September 5, 2017



A combination of hot and dry conditions led to rapid drought development and expansion across the northern plains this summer. At the end of spring, moderate drought conditions were present only in central portions of the Dakotas, but by September 5th, 43% of the Missouri River Basin was in drought, with over a million people impacted. The governors of Montana, North Dakota, and South Dakota all issued emergency drought declarations for portions of their states in response to the deteriorating conditions. Numerous impacts to a variety of sectors continue to be reported across the northern plains.

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Regional - *Impacts for June - August 2017*

Wildfires Impact Montana and Beyond

Drought conditions fueled fires in Montana and the Pacific Northwest this summer and early fall. In the Missouri Basin, many of the fires were located in western Montana; however the largest fire of the season, the Lodgepole Complex, burned over 270,000 acres in east-central parts of the state. Another notable fire was the Sprague Fire, which burned the famous Sperry Chalet, located in Glacier National Park. Air quality alerts were instituted in many locations, as well as some evacuation orders. Smoke from these fires made for hazy skies across the Basin multiple times. More than 1 million acres have burned in Montana this fire season and copious amounts of precipitation will be needed to help contain them.

Kansas City, MO Area Flooding

Major flash flooding impacted the Kansas City area on July 26-27 and August 21-22. In both instances, several hours of heavy rainfall led to flooding that required water rescues and extensive property damage. In the July event, rainfall totals of 5-7 inches caused record-setting flooding for the Indian and Tomahawk Creeks. According to the National Weather Service in Kansas City/Pleasant Hill, the newly-set river stage record at Indian Creek was surpassed just a few weeks later in the August flooding event where widespread rainfall of 4-6 inches fell.

Numerous Impacts to Agriculture

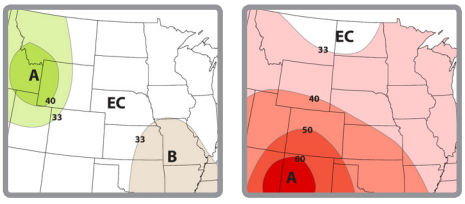
Summer conditions led to a variety of impacts to agriculture this year. Drought in the northern plains took its toll on wheat, corn, and soybean production, as well as cattle ranches. Wheat was hit particularly hard with production down significantly compared to last year. Lingering wetness in southern areas of the Basin caused the spread of crop diseases, such as Wheat Streak Mosaic Virus and diplodia leaf streak. Meanwhile, a late season frost in June damaged corn in the Dakotas.

Above: (Top) Fiery sunrise in Lincoln, NE, made possible from Pacific Northwest fires, photo courtesy Ken Dewey; (Middle) flash flooding in Kansas City, MO, photo courtesy NewsChopper 9 KMBC; and (Bottom) cattle en route to pipeline water in Bowman County, ND, photo courtesy the Drought Impact Reporter, which can be accessed here: http://droughtreporter.unl.edu/.

Regional - *Outlook for October - December2017*

3-Month Precipitation and Temperature Outlooks

Valid for October - December 2017



Precipitation Temperature

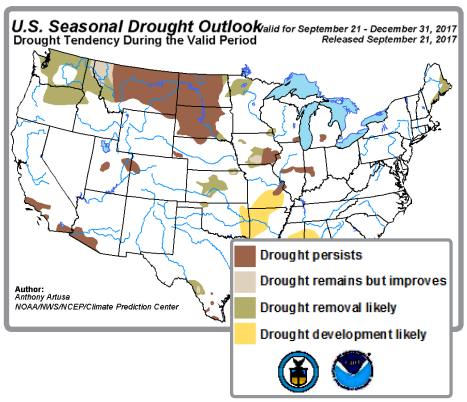
EC: Equal chances of above, near or below normal
A: Above normal, **B:** Below normal

According to the Climate Prediction Center, ENSO-neutral conditions continued through the summer and into early fall. Although ENSO-neutral conditions are currently present, a La Niña Watch has been issued as there are increasing chances for the development of La Niña conditions through the late fall and into winter.

Over the next three months, above-normal precipitation is favored for parts of the upper Basin, while below-normal precipitation is favored for lower parts of the Basin. Meanwhile, above-normal temperatures are favored for the majority of the region, with the highest likelihood in southern areas of Colorado.

U.S. Seasonal Drought Outlook

Valid for 09/21/2017 - 12/31/2017



At the start of fall, drought conditions that had rapidly developed and expanded over the summer were still impacting a large portion of the northern plains. Recent rains have helped improve conditions in areas of the western Dakotas, although drought conditions remain. The seasonal drought outlook indicates that the majority of current drought conditions should persist through the end of the year. Drought conditions in western Montana and central Kansas, however, are likely to improve or be removed, while drought is likely to develop in areas of southern Missouri.

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
www.drought.gov

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://igrow.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
www.usda.gov/oce/climate_change/regional_hubs.htm

U.S. Bureau of Reclamation
www.usbr.gov

U.S. Geological Survey, Water Mission Area
www.usgs.gov/water

Western Governors' Association
www.westgov.org

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