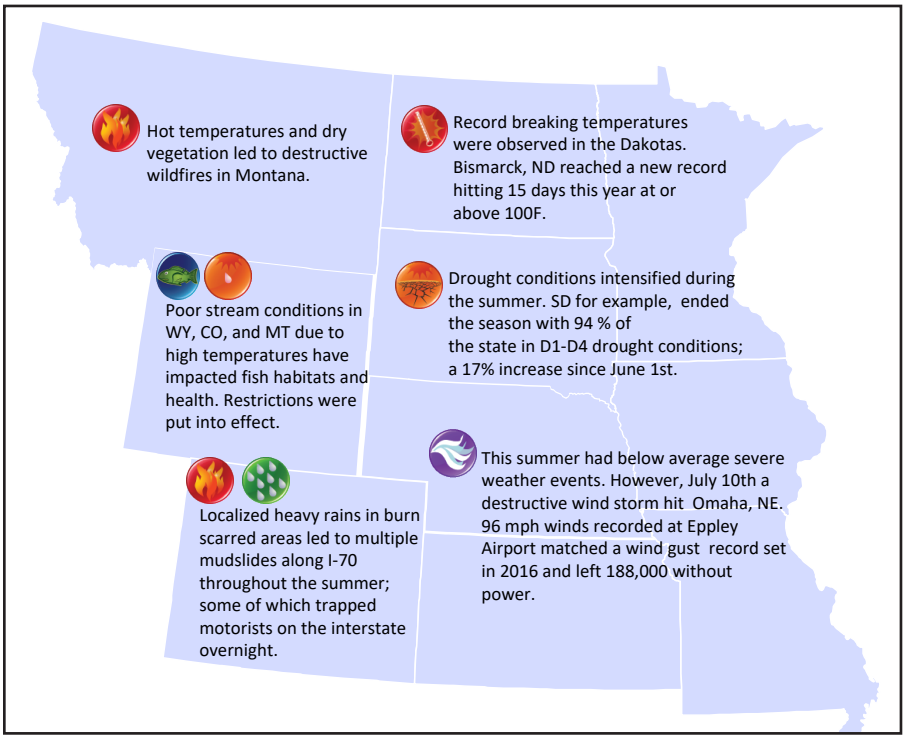
Quarterly Climate Impacts and Outlook

Missouri River Basin

September 2021

Regional – *Significant Events for June - August 2021*



Highlights for the Basin

Extreme heat and reduced precipitation in the region this summer had a major impact on crops, grasslands, and wildlife. Many states ranked in the top 10 warmest summers on record, such as Montana (2nd warmest), North Dakota (3rd warmest) and South Dakota (4th warmest). Montana also had its 10th driest summer on record.

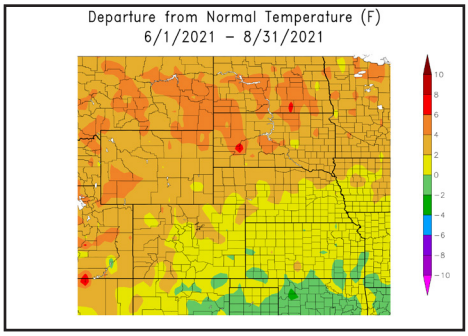
Wildfires across the West and Canada were prominent this summer. Impacts from these fires were felt in states across the region, as smoke funneled into the area creating smokey skies and poor air quality.

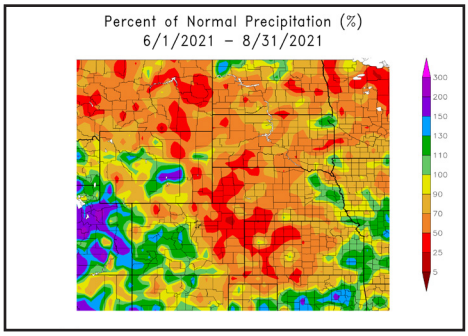
Due to the drought, upper Missouri Basin river flows were well below normal throughout the summer and had little relief due to a lack of precipitation.

Regional – *Climate Overview for June - August 2021*

Temperature and Precipitation Anomalies

Departure from Normal Temperature (°F) (left) and Percent of Normal Precipitation (right) for Summer 2021

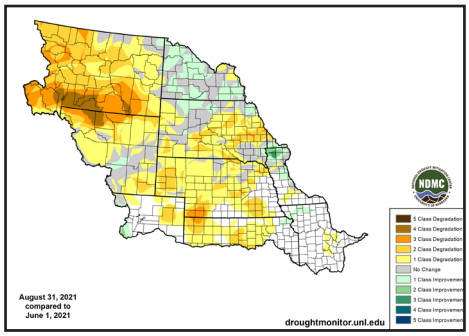




Warm temperatures and dry conditions persisted throughout the summer. Almost the entirety of the region observed above normal temperatures, with the greatest departures from normal in Montana, Wyoming, and the Dakotas. Warm overnight temperatures were also present this summer. Wyoming and Montana ranked the second warmest overnight temperatures on record. These above normal temperatures resulted in many areas in our region ranking in the top 5 warmest summers on record and the contiguous United States ranking the warmest summer on record. Below normal precipitation was present this season for most of the region. Portions of Colorado and Wyoming did observe above normal precipitation from monsoonal rains.

Changes in Drought Conditions

June 1- August 31, 2021



Drought conditions in the region continued to persist or worsen throughout the summer. This is most prominent in Montana, where most of the state observed worsening conditions and ended the summer with 98.7 percent of the state in D2-D4 drought conditions. Parts of the Dakotas and Colorado, while still dry, did observe some improvements in drought conditions.

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Regional – *Impacts for June- August 2021*

Row Crops

Heat and lack of precipitation took a toll on crops throughout the summer. Extreme heat created low crop yields and quickened the process of crop growth this season causing earlier than average maturation and harvest. For instance, Spring Wheat had its worst yield since 1989. Grasshoppers, which have thrived in the warm, dry conditions, are also causing havoc on crops by eating them to the ground in some areas.

Livestock

Persistent drought conditions in the region continued to impact pastures and livestock. Many pastures and rangelands were in poor to very poor condition this summer. As a result, the USDA provided additional disaster assistance this summer for livestock and livestock providers. In some areas, cattle sales are also increasing due to lack of feed and poor quality of stock pond water from harmful algal blooms.

Ecosystems

Wildlife and pollinators are being impacted in portions of the region, due to drought conditions. North Dakota, a leader in honey production, has reported dwindling hive sizes as bees die from the extreme heat. This is causing a decline in honey production for the year. Pronghorn fawn survival rates plummeted in Montana, due to poor forage conditions. Some portions of the state observed declines of up to 40 percent.

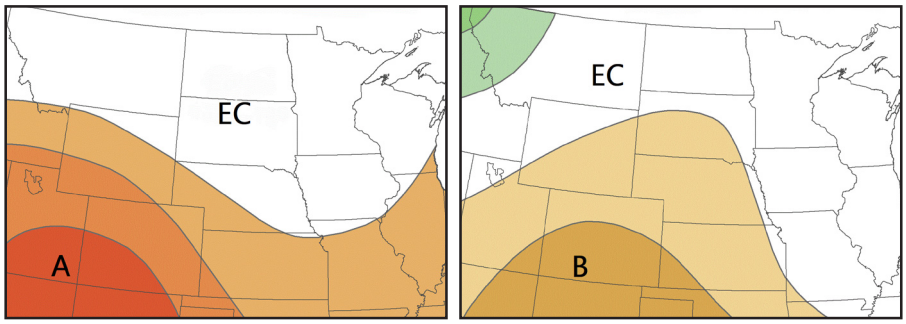
Above: Drought stressed sorghum in KS, credit Toby Whitthuhn (left); Dry conditions at Grub Reservoir in MT, credit Michael Downey (center); Pronghorn in MT, credit Sean Carpenter (right).

Regional – *Outlook for October- December 2021*

Temperature

Precipitation

Outlooks for October - December 2021



EC: Equal chances of above, near, or below normal

A: Above normal, B: Below normal

According to NOAA's Climate Prediction Center, the outlook for the upcoming season indicates increased chances of warmer temperatures for the southern portion of the region. This includes Kansas, Colorado, and areas of Nebraska and Wyoming, with the highest chances in Colorado. For the remainder of the region, equal chances of above, below, and near-normal temperatures are favored. Slightly below-normal precipitation is likely in much of the region, aside from the Northern High Plains which leans toward equal chances of above, below, and near-normal precipitation. Without substantial precipitation, drought conditions are likely to continue through the next season. As we continue to move into fall and winter, we are likely to experience La Niña conditions; more information on La Niña will follow in the coming months.

MO River Basin Partners

High Plains Regional Climate Center
www.hprcc.unl.edu

National Drought Mitigation Center
http://drought.unl.edu/

National Integrated Drought Information System
https://www.drought.gov/

NOAA NCEI
www.ncdc.noaa.gov

NOAA NWS- Central Region
www.weather.gov/crh

NOAA NWS Climate Prediction Center
www.cpc.ncep.noaa.gov

NOAA NWS Missouri Basin River Forecast Center
www.weather.gov/mbrfc

American Association of State Climatologists
https://www.stateclimate.org/

U.S. Army Corps of Engineers
www.nwd-mr.usace.army.mil/rcc/

U.S. Bureau of Reclamation
https://www.usbr.gov/

USDA Natural Resources Conservation Service
www.nrcs.usda.gov

USDA Northern Plains Climate Hub
www.climatehubs.oce.usda.gov

USGS, Water Mission Area
www.usgs.gov/water

Western Governors' Association
http://westgov.org

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