Quarterly Climate Impacts and Outlook

Missouri River Basin

June 2023

Regional – Significant Events for March - May 2023



Highlights for the Basin

Record snowfall continued into April in the northern portions of the Basin. Bismarck, North Dakota received over 120 inches of snow in the past year, setting a new annual snowfall record.

Cooler temperatures allowed for snowpack to remain in North Dakota until a sudden warm-up led to rapid melting in April. Major flooding took place in the James River basin after tributaries were overwhelmed by the sudden influx of moisture, leading to millions of dollars in damage.

Air quality was very poor across much of the region as smoke from major wildfires in Canada spilled south over several weeks in May. Subsequently, air quality alerts were issued in many areas due to dense and dangerous levels of smoke.

Regional – Climate Overview for March - May 2023

Temperature and Precipitation Anomalies

Departure from Normal Temperature (°F) (left) and Percent of Normal Precipitation (right) for Spring 2023



Cooler temperatures dominated the northern and western parts of the Basin, leading to North Dakota to its 2nd coldest March-April. Temperatures rapidly flipped in May, with near-record warmth across the north. Montana recorded their warmest statewide minimum temperatures in May, with several counties observing record high temperatures.

Precipitation was below normal for much of the basin this spring. Eastern Nebraska experienced record-to-near-record dryness this spring, exacerbating drought conditions. Drought-stricken portions of southwest Nebraska and northwest Kansas received as much rain in May 2023 as all of 2022.

Changes in Drought Conditions March 7 - May 30, 2023



The map above shows the areas of increasing and decreasing categories of drought. Drought conditions improved across much of the high plains and upper Missouri basin. Up to four class improvements occurred in central Montana in response to above-normal precipitation. Southeast Nebraska, eastern Kansas, and especially Missouri experienced rapid worsening of drought.



Regional – Impacts for March - May 2023

Agriculture

Despite recent rainfall in parts of Kansas, winter wheat is expected to be down nearly 60 percent this year. As of May 30th, 69 percent of winter wheat was rated to be in poor or very poor condition. Projected yields are expected to be among the worst since 1963, with many fields left abandoned. Farmers in the state are struggling to procure feed for cattle, despite having culled herds the previous year. The dryness across eastern Nebraska and South Dakota has forced producers to utilize irrigation earlier than usual in an attempt to help with corn emergence.

Water Resources

Flooding occurred in several locations this spring due to a variety of factors. The rapid warm-up and subsequent melting impacted the Milk River in Montana, with nearrecord crests. In southwestern Nebraska, heavy rain over a short period led to record crests along the Republican River. On the other side of the state, Lincoln, Nebraska began implementing water restrictions after receiving 7.5 inches less than normal precipitation this spring. Soil moisture in eastern Nebraska is below 5 percent at the end of May. On a good note, the United States Army Corps of Engineers projects runoff for the Missouri River to be slightly above average for the year.



Above: Stock pond in Decatur County, Kansas on May 4th (left), compared to May 12th (center), credit Gannon Rush (left); Shields River in central Montana, credit Brett Heitshusen (right).

Regional - Outlook for July - September 2023



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 above-normal temperatures across Colorado, Kansas, and the western parts of Montana and Wyoming. Slight chances of above-normal precipitation are present in Kansas, Nebraska, South Dakota, Wyoming, and southern Montana. The rest of the Basin has equal chances of above, below, and near-normal precipitation.

An El Niño Advisory has been issued, with weak conditions being observed. Conditions are expected to gradually strengthen towards the winter of 2023-2024.

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

Bureau of Indian Affairs – Great Plains Region www.bia.gov/regional-offices/great-plains