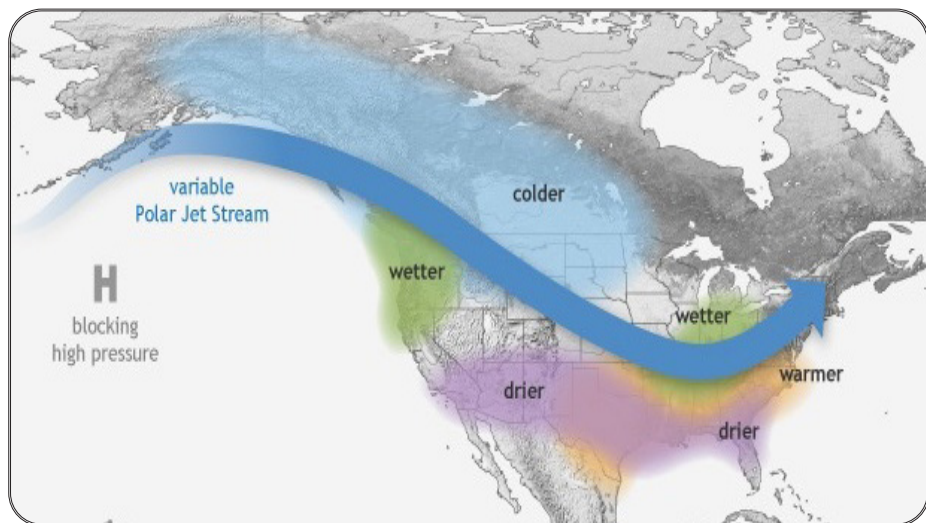




Typical La Niña Winter Pattern



Highlights for the Basin

A La Niña develops when sea surface temperatures in the eastern equatorial Pacific are consistently cooler than average for an extended period of time. These cool waters affect the location of the jet streams, which impacts weather in North America. The most notable impacts occur in winter.

While no two La Niña events are alike, there are some general patterns that are predictable. For instance, the polar jet stream is typically farther north than usual during La Niña winters.

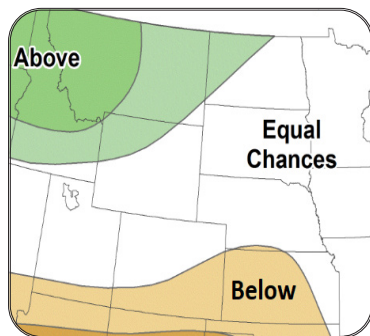
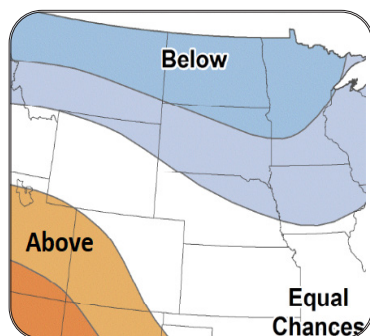
The image (source: NOAA) above shows the typical pattern in the winter during La Niña events. The polar jet stream, indicated by the thick blue arrow, tends to transverse through the Missouri Basin, making it the dividing line between cold and warm air masses. This means that colder conditions could be in store for areas of the upper Basin, while the southern Basin and the Plains could be warm and dry.

For the Missouri River Basin states, the typical winter La Niña pattern leads to increased chances for below-normal temperatures across the northern states. In addition, the northern Rockies often see increased chances of above-normal precipitation.

La Niña Outlook

Winter Temperature and Precipitation Outlooks

Valid for December 2022 - February 2023



Temperature

Precipitation

Probability (Percent Chance)

Probability (Percent Chance)

Above Normal	Below Normal
33-40%	33-40%
40-50%	40-50%

Above Normal	Below Normal
33-40%	33-40%
40-50%	40-50%

As of mid-October, NOAA's Climate Prediction Center outlooks largely follow a typical La Niña pattern for the Missouri River Basin. Cooler temperatures are slightly favored in the northern part of the basin, while warmer temperatures are slightly favored in western Colorado. The rest of the basin has equal chances of above-, below-, and near-normal temperatures.

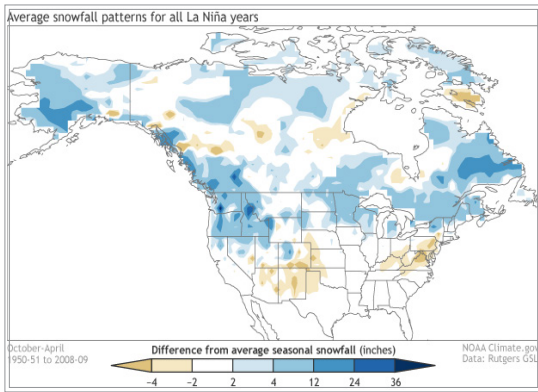
The winter precipitation outlook has a slightly increased chance of below-normal precipitation in the southern portions of the basin and above-normal chances across Montana and northwestern Wyoming. For the rest of the area, there are equal chances of above-, below-, and near-normal precipitation.

A La Niña Advisory is currently in effect, which means La Niña conditions have developed and are expected to continue. Sea surface temperatures in the east-central tropical Pacific are moderately below normal and near their peak minimum. According to the NOAA Climate Prediction Center, there is a 76 percent chance that La Niña conditions will last through the Northern Hemisphere winter, with a 57 percent chance that conditions will transition to ENSO-neutral by early spring.

Image courtesy of the National Oceanic and Atmospheric Administration.



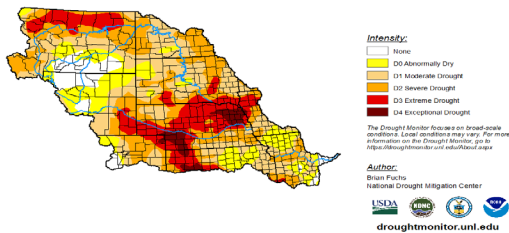
Potential Winter and Spring Impacts



Changes to historical snowfall patterns for La Niña. Blue indicates above normal snowfall.

U.S. Drought Monitor
Missouri Watershed

November 8, 2022
(Released Thursday, Nov. 10, 2022)
Valid 7 a.m. EST



Drought conditions for the Missouri River Basin as of November 10, 2022.

Missouri River and Streams

Persistent and intense drought is affecting rivers and streams across the region. As a result, the U.S. Army Corps of Engineers expects runoff to be below normal through the winter and likely spring. Due to the unpredictability of precipitation during La Niña, it is hard to predict any major changes to conditions. Even with above-normal precipitation, drought conditions may not improve and persist into spring.

Economy

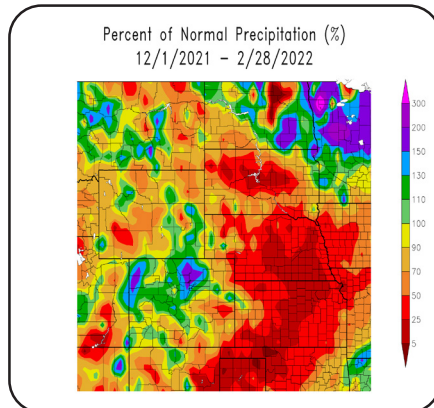
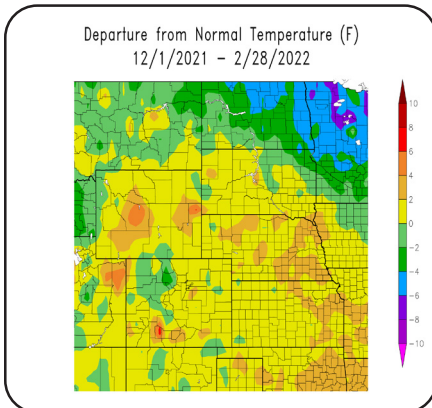
The increased chances of above-normal precipitation in the northwestern part of the basin could lead to enhanced snow activities such as skiing or snowboarding. While the above-normal precipitation would be welcomed, the below-normal temperatures could lead to frozen pipes and increased heating costs.

Agriculture

With much of the Missouri River Basin heading into winter with drought conditions, several potential risks are present. With anticipated cold outbreaks, frost depths could be deeper due to dry soils. With low soil moisture present, agriculture will be heavily dependent on spring precipitation for recharge. The absence of snow cover associated with below-normal precipitation, particularly in drought-stricken areas, would impact winter wheat and alfalfa. The ongoing drought has created an elevated fire risk for much of the region.

Comparisons and Limitations

Winter Conditions of Past La Niñas



The maps above show the winter conditions of the most recent La Niña event in 2021-2022. Most of the Basin was warmer than average. Precipitation was also below normal for much of the region except for the Rocky Mountains and eastern North Dakota. Locations in the southern portions of the basin recorded their driest winter and lowest snowfall on record. This most recent La Niña did not conform to expectations, which shows that no two La Niña events are the same. As a result, it is important to note that there are limits to the predictability of impacts this winter, and other factors should be considered. For instance, in the Missouri Basin, La Niña is *not* known to predict: 1) first freeze in the fall, 2) last freeze in the spring, 3) potential for ice storms or blizzards, 4) track or intensity of any single weather system, or 5) potential for drought/flooding in the spring.

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

