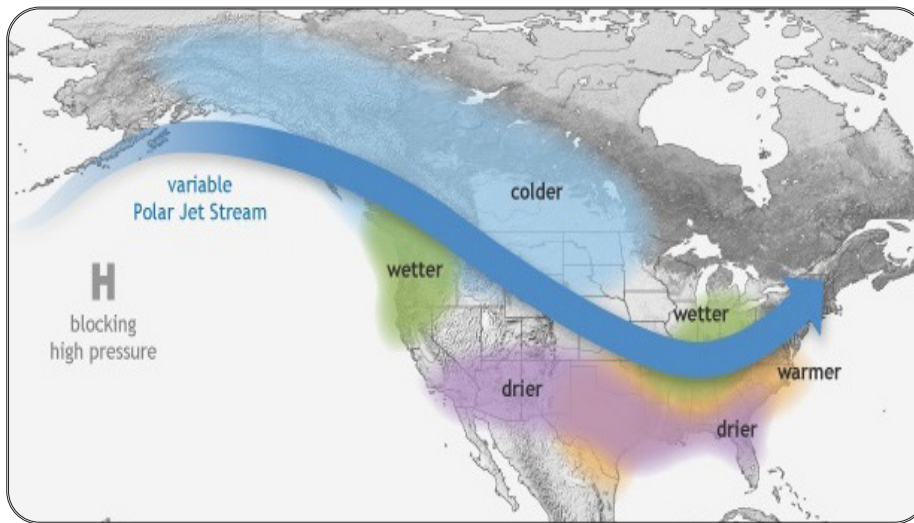


Typical La Niña Winter Pattern



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 further south than usual during La Niña winters.

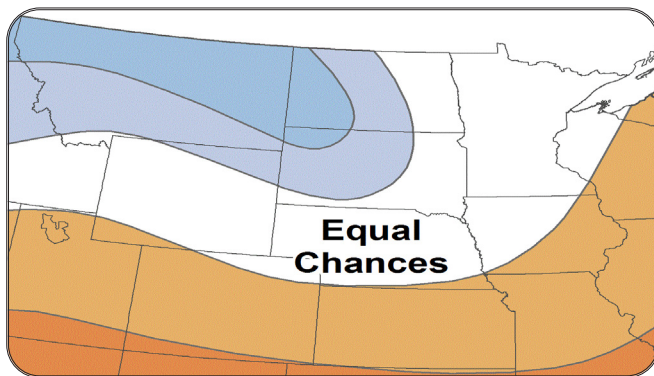
The image (source: NOAA) above shows the typical pattern in the winter during La Niña events. The polar jet stream tends to transverse through the Missouri Basin, making it the dividing line between cold and warm air masses. This means that colder conditions could be in store for areas of the upper Basin, 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 upper Basin. The northern Rockies may also have increased chances for above-normal snowpack.

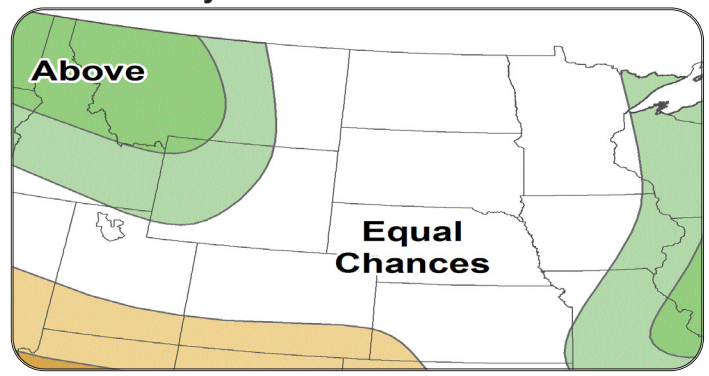
La Niña Outlook

Winter Temperature and Precipitation Outlooks

Valid for December 2021 - February 2022



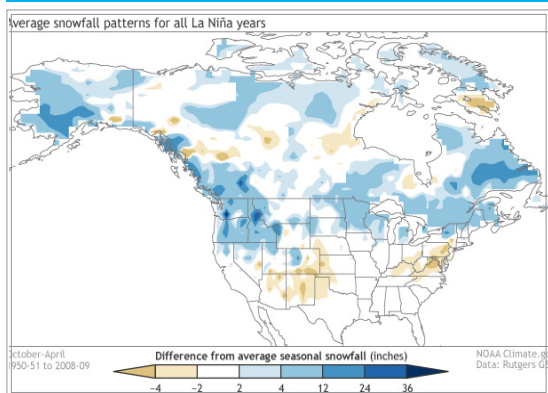
Temperature



Precipitation

As of mid-October, NOAA's Climate Prediction Center outlooks largely follow a typical La Niña pattern for the Missouri River Basin. Generally, the region has increased chances for cooler (blue), wetter (green) conditions across the north, and warmer (orange), drier (tan) conditions across the south. Below-normal temperatures are likely in Montana and portions of the Dakotas and Wyoming, while above-normal temperatures are likely across Colorado, Kansas. Above-normal precipitation is likely across much of Montana and Wyoming, while below-normal precipitation is likely in southern Colorado and Kansas. Much of the region, including the Dakotas, Nebraska, Kansas, western Montana and Wyoming, and Northern Colorado, are likely to observe equal chances of above-, below-, and near-normal precipitation. La Niña conditions have continued this fall and forecasts indicate that this La Niña will strengthen, peaking as a moderate or even strong event in late fall or early winter. According to the Climate Prediction Center, there is an 87% chance that these conditions will last through the winter and about a 60% chance that La Niña will continue into the early spring. A La Niña Advisory is currently in effect.

Potential Winter and Spring Impacts



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



Ice over Missouri River in ND. Photo courtesy: Michael Swenson.

Missouri River

According to the U.S. Army Corps of Engineers, the 2021 runoff forecast for the upper Basin is 15.0 MAF, which is more than 10 MAF below normal. Widespread drought conditions have impacted streamflow and reservoir inflows in certain areas this summer and fall. Even with recent above normal precipitation, it may not lead to increased runoff due to drier-than-normal soils in areas. According to the U.S. Army Corps of Engineers releases from Gavins Point Dam will be reduced to winter rates starting on November 22.

Economy

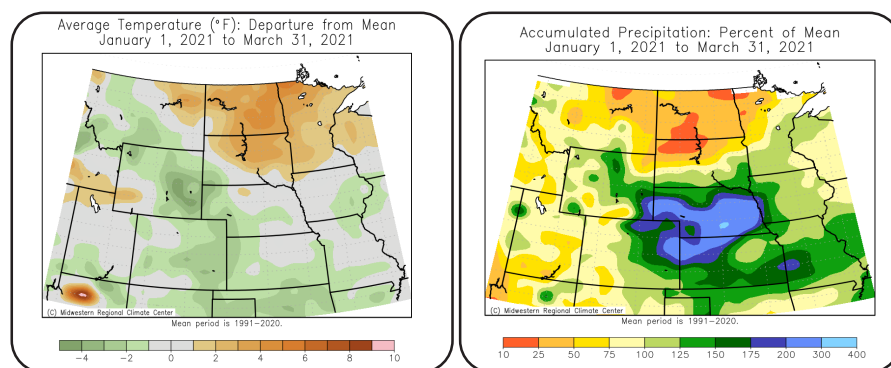
For the Missouri Basin, impacts in the region could be mixed. For instance, northern areas expecting a cold snowy winter could have increased costs for heating and snow removal, in addition to travel difficulties. However, an increased snowpack in the northern Rockies could be welcomed by ski resorts and other outdoor enthusiasts.

Agriculture

In the Missouri Basin, widespread drought conditions have contributed to the fall harvest progressing quickly. However, dry conditions could be an issue for winter wheat if timely rains do not materialize. Winter outlooks from NOAA for November through February are leaning slightly towards above-normal precipitation in northwest Wyoming and much of Montana, with higher chances in western Montana, which could help to begin mitigating drought there. Across the region, concerns for the winter may include calving/lambing issues due to cold conditions in northern areas, and the overwintering of pests due to warm conditions in southern areas.

Comparisons and Limitations

Winter Conditions of Past La Niñas January - March 2021



Maps courtesy: Midwestern Regional Climate Center

The maps above show the winter conditions of the most recent La Niña event last winter in 2020-2021. Most of the Basin was cooler (as shown in green) than average. While precipitation varied in the region, the highest amounts were seen not in the northwestern portion of the Missouri River Basin, but in Nebraska, Kansas, and portions of Colorado. This most recent La Niña did not conform to expectations which goes to show 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