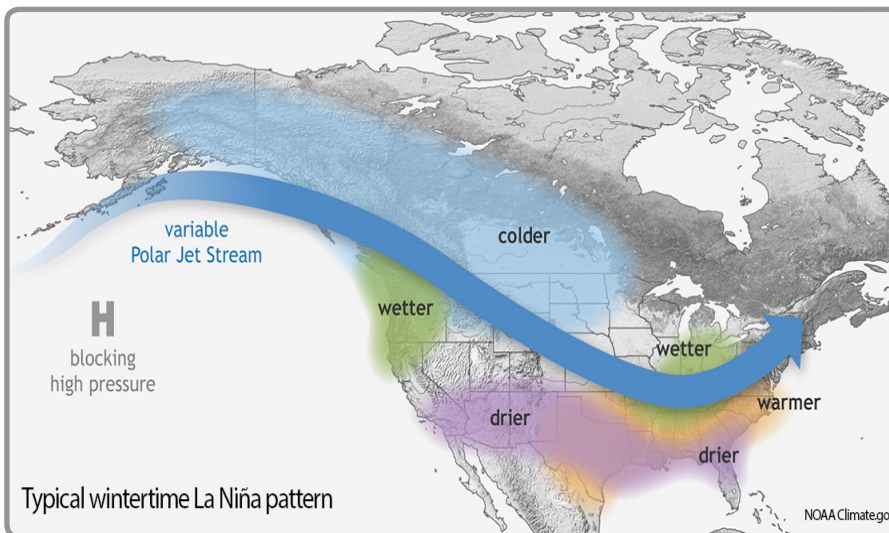




Typical La Niña Winter Pattern



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 jet streams, which causes impacts in North America. The most notable impacts occur in the winter, when the wind patterns in the atmosphere are strongest.

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 south than usual during La Niña winters.

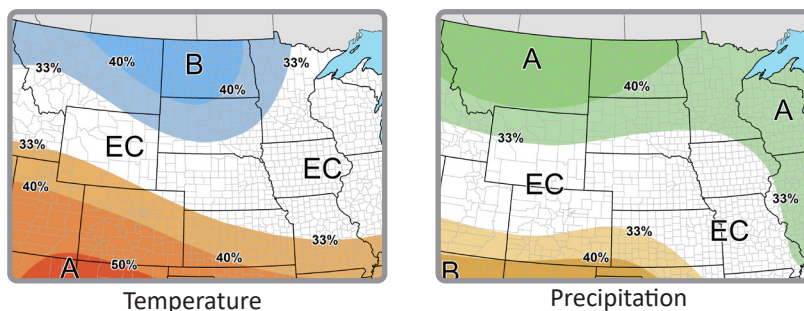
The image above shows the typical pattern in the winter during La Niña events. The polar jet stream tends to traverse right through the Missouri Basin, making it the dividing line between cold and warm air masses. This means that colder conditions could be in store for areas of the upper Basin, while the southern Plains could be warm and dry.

For the Missouri 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 an above-normal snowpack.

Image courtesy of the National Oceanic and Atmospheric Administration.

La Niña Outlook

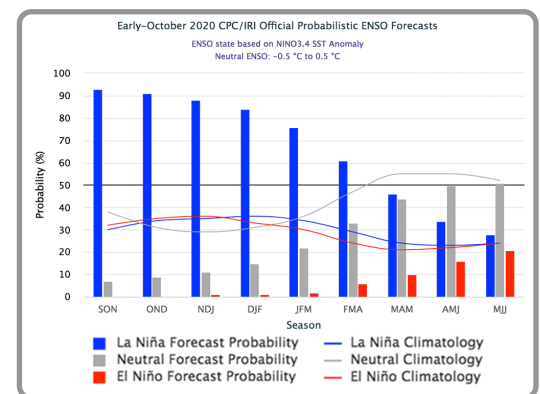
Winter Temperature and Precipitation Outlooks Valid for December 2020 - February 2021



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

As of mid-October, NOAA's Climate Prediction Center outlooks largely follow a typical La Niña pattern for the Missouri Basin states. Generally, the region has increased chances for cooler, wetter conditions across the north, and warmer, drier conditions across the south. Normal to below-normal temperatures are favored in North Dakota and portions of Montana, Wyoming, and South Dakota, while normal to above-normal temperatures are favored across much of Colorado and Kansas, along with southern areas of Wyoming. Normal to below-normal precipitation is favored across southern areas of Colorado and Kansas, while normal to above-normal precipitation is favored across Montana, North Dakota, northern Wyoming, and much of South Dakota.

La Niña Probability Winter 2020-2021



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 a greater than 85% chance that these conditions will last through the winter and about a 60% chance that La Niña will continue into the early spring, as shown in the image above. A La Niña Advisory is currently in effect.



Potential Winter and Spring Impacts

Agriculture



Fall harvest in full swing, photo courtesy Ken Dewey.

La Niña conditions can have worldwide impacts to the agricultural sector. In the Missouri Basin, widespread drought conditions have helped the fall harvest progress quickly. However, dry conditions could be an issue for winter wheat if timely rains do not materialize. Potential concerns for the winter include the overwintering of pests due to warm conditions in southern areas, and calving/lambing issues due to cold conditions in northern areas.

Missouri River



The Platte River, a tributary of the Missouri River, photo courtesy Ken Dewey.

According to the U.S. Army Corps of Engineers, after a near-record year in 2019, the 2020 runoff forecast for the upper Basin was 30.2 MAF, which is just above average. Widespread drought conditions have impacted streamflows and reservoir inflows in certain areas this summer and fall. Releases from Gavins Point will be adjusted upward, as needed, to help meet water intake and navigation needs downstream. Conditions will be monitored throughout the winter.

Economy

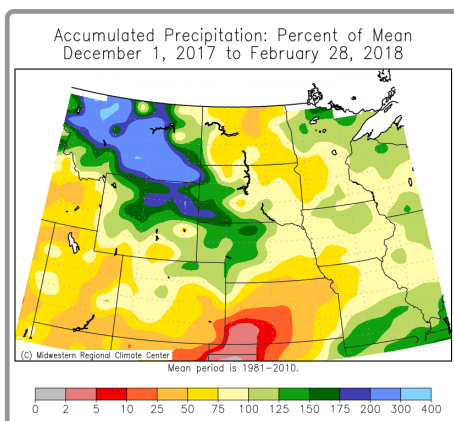
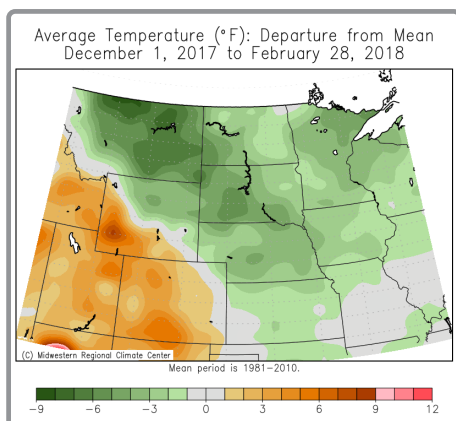


Snowy scene in Colorado, photo courtesy Bill Sorensen.

Although losses occur regardless of ENSO phase, according to insurance data, La Niña events tend to result in the largest economic losses worldwide. For the Missouri Basin, impacts could be mixed. For instance, northern areas expecting a cold and 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 outdoor enthusiasts.

Comparisons and Limitations

Winter Conditions During Past La Niña Years



Maps courtesy of the Midwestern Regional Climate Center

The maps above show the winter conditions of the most recent La Niña event in 2017-18. Much of the Basin was cooler than average, and, although precipitation varied, the highest amounts occurred from Montana through central Nebraska. Because no two La Niña events are alike, it is important to note that there are limits to the predictability of impacts this winter and other factors should be considered.

While past La Niña events can help inform forecasters about certain conditions, there are limitations. For instance, in the Missouri Basin, La Niña is *not* known to impact: 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

Missouri Basin Partners

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

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

National Oceanic and Atmospheric Administration
<https://www.noaa.gov/>

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

NOAA NCEI
www.ncdc.noaa.gov

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

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

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

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

U.S. Army Corps of Engineers
www.usace.army.mil

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