La Niña in Winter

A La Niña develops when sea-surface temperatures in the equatorial Pacific Ocean are cooler than average for an extended period of time. This affects the location of jet streams, causing impacts in North America. The most notable impacts occur in the winter, when the wind patterns in the atmosphere are strongest.

The typical La Niña winter weather pattern brings the polar jet stream into Alaska, then plunging into the central and eastern U.S. This path can bring below-normal temperatures into the northern U.S., especially the northern Rockies across the northern Plains and into the Great Lakes. Meanwhile, the southern Plains often are left warm and dry. The Pacific jet stream tends to track close to the Pacific Northwest, bringing increased chances for moisture there. Finally, odds increase slightly for wetter-than-normal conditions in the Ohio River Valley.

For the Missouri Basin, this typically means increased chances for below-normal temperatures in the upper Basin. Additionally, the northern Rockies also may have increased chances for an above-normal snowpack.

Winter Outlook

Winter Temperature and Precipitation Outlooks

Valid for December 2017 - February 2018

Despite the relative weakness of the current La Niña, the winter outlook largely follows a typical La Niña pattern for the Missouri Basin states. Above-normal precipitation is favored for areas of the northern Rockies, the panhandle of Nebraska, and the Dakotas. Meanwhile, increased chances for below-normal precipitation exist to the south of the region. For temperatures, below-normal conditions are favored to the north, while above-normal conditions could occur across portions of Wyoming, Colorado, and Kansas. The temperature and precipitation outlooks are consistent with a more active storm track across the northern half of the region this winter. Learn more about the limitations of this forecast on page 2.

The seasonal outlooks above combine many factors including climate models, the effects of long-term trends, soil moisture, and the El Niño Southern Oscillation cycle (ENSO). Because these outlooks combine many inputs, they do not match the typical La Niña conditions exactly. To learn more, or to retrieve the latest temperature, precipitation, and drought outlooks, please visit the Climate Prediction Center at: http://www.cpc.ncep.noaa.gov.
Potential Winter and Spring Impacts

Agriculture

La Niña conditions can have worldwide impacts to the agricultural sector. Here in the Missouri River Basin region, drought conditions, which emerged in the late spring and early summer, are proving to be a challenge for winter wheat, particularly in areas of the Dakotas. However, wetter soils in areas of central Montana, western Wyoming, eastern Colorado, western Kansas, eastern South Dakota, and much of Nebraska will be beneficial for spring planting and forage growth next year. Other potential concerns 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 Missouri River Mainstem Reservoir System is well positioned for the 2018 runoff season. The 2017 runoff for the upper Basin is expected to be slightly above average (115% of long-term average). Over the winter, the U.S. Army Corps of Engineers will be evacuating the remaining stored flood waters. The 2018 runoff season will begin with full conservation storage, while having all of the 16.3 million acre feet of flood control storage available to capture runoff from mountain and Plains snowmelt and rainfall events this spring and summer. The full conservation pool will allow for full support for all authorized purposes that require water flowing through the dams, such as navigation and downstream water supply.

Economy

La Niña conditions can have impacts to a wide variety of sectors. Although losses occur regardless of the ENSO phase, according to insurance data, on average, La Niña events tend to result in the largest economic losses worldwide. For the Missouri River Basin, there could be both positive and negative impacts to the economy. For instance, northern areas of the Plains expecting a cold and snowy winter could have increased costs for home heating and snow removal, in addition to potential difficulties related to travel. In areas of the northern Rockies, however, an increased snowpack could be welcomed by ski resorts and outdoor enthusiasts.

Comparisons and Limitations

No Two La Niñas are the Same

The images above show the overall conditions from the last weak wintertime La Niña event of 2000-2001. Although the below-normal temperatures align well with a typical La Niña winter, the precipitation pattern was quite different, with dry conditions across Montana and wet conditions across the central and southern Plains. Because no two La Niña events are alike, it is important to note that there are limits to the predictability of La Niña impacts this winter. Short term climatic influences that are not predictable beyond a week or two can play havoc with the seasonal forecasts and can overshadow the “typical” La Niña pattern. Even the strength of the La Niña (weak vs. strong) has an influence on whether temperatures will be above- or below-normal in some cases.

La Niña impacts can be limited by many factors, including:
• It may be weak, with little or no discernible influence on weather patterns.
• It may be masked by other weather and climate signals.
• Single extreme events can “buck the trend” of the averages for the rest of the season, with one or two high-impact events overshadowing the average conditions.

La Niña can affect some temperature and precipitation signals in the region, but it is not known to affect:
• First freeze date in the fall (either early or late).
• Last freeze date in the spring (either early or late).
• Potential for ice storms or blizzards.
• Track or intensity of any single weather system.

Missouri Basin Partners

High Plains Regional Climate Center
www.hprcc.unl.edu
International Research Institute for Climate and Society
http://iri.columbia.edu
National Drought Mitigation Center
www.drought.unl.edu
National Integrated Drought Information System
www.drought.gov
National Oceanic and Atmospheric Administration
National Weather Service - Central Region
www.crh.noaa.gov/crh
National Centers for Environmental Information
www.ncdc.noaa.gov
Climate Prediction Center
www.cpc.ncep.noaa.gov
American Association of State Climatologists
www.stateclimate.org
U.S. Army Corps of Engineers - Missouri River Basin
www.usace.army.mil
Water Management Division
U.S. Department of Agriculture - Climate Hubs
www.usda.gov/oce/climate_change/regional_hubs.htm
Missouri Basin Region La Niña Impacts and Outlook | November 2017
https://www.drought.gov/drought/dews/missouri-river-basin