Typical La Niña Winter Pattern

Highlights for the Basin
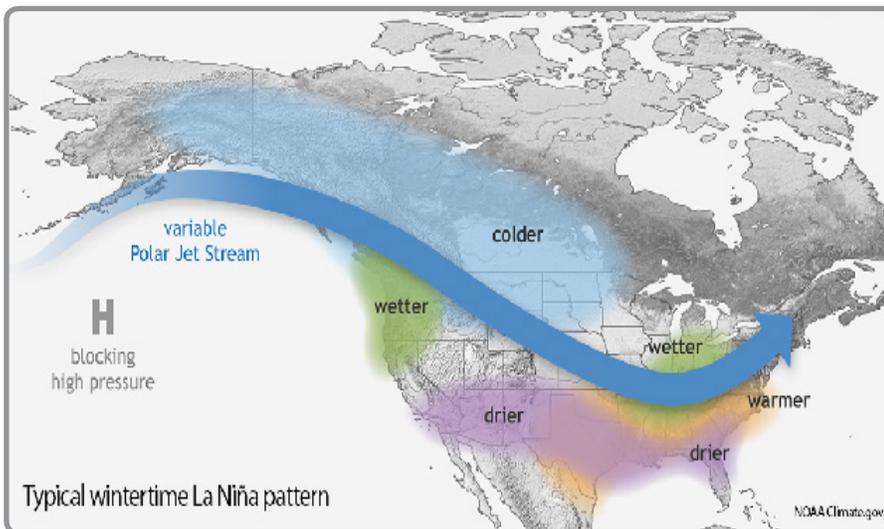

As shown by the thick blue arrow in the above graphic, a typical storm path during La Niña tends to track across the northwestern U.S. and dive just south of the Great Lakes. This generally means increased chances of precipitation for the Pacific Northwest, portions of the Great Lakes, and the Ohio River Valley, with occasional cold air outbreaks across the north.

Image courtesy of the National Oceanic and Atmospheric Administration.

There is a 3 in 4 chance of La Niña developing this winter and a 1 in 4 chance it will not. A La Niña develops when sea surface temperatures in the central and eastern equatorial Pacific are consistently cooler-than-average for an extended period of time. These cool waters affect the location of jet streams, which impacts North America. The most notable impacts occur in the late winter and early spring.

While no two La Niña events are alike, some general patterns are predictable. For instance, storm paths typically bring below-normal temperatures to much of the Great Lakes region, particularly across the western Great Lakes area. The southern Great Lakes may also see a slight shift toward wetter-than-normal conditions. It should be noted the strength of La Niña may impact lake ice extent and thickness.
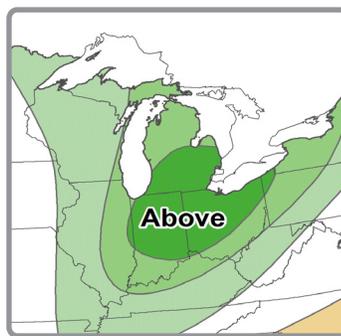
La Niña Outlook

Winter Temperature and Precipitation Outlooks
Valid for January - March 2025
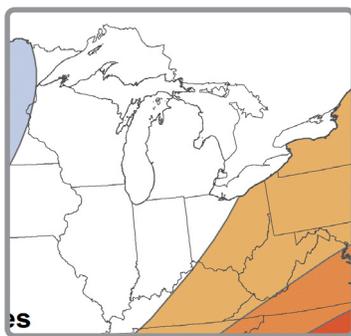
Temperature

Precipitation

The winter temperature outlook (issued in October) indicates that the western and central Great Lakes regions have equal chances of above-, below-, and near-normal temperatures while the eastern Great Lakes region has a slightly increased chance of above-normal temperatures.

The winter precipitation outlook shows slightly increased chances of above-normal precipitation for the entire Great Lakes region, with higher probabilities over the southern portion of the basin.

A La Niña Watch is currently in effect, which means La Niña conditions are favorable for development. Sea surface temperatures across most of the central and eastern tropical Pacific are currently near average, and the ocean-atmosphere system reflects ENSO-neutral conditions.
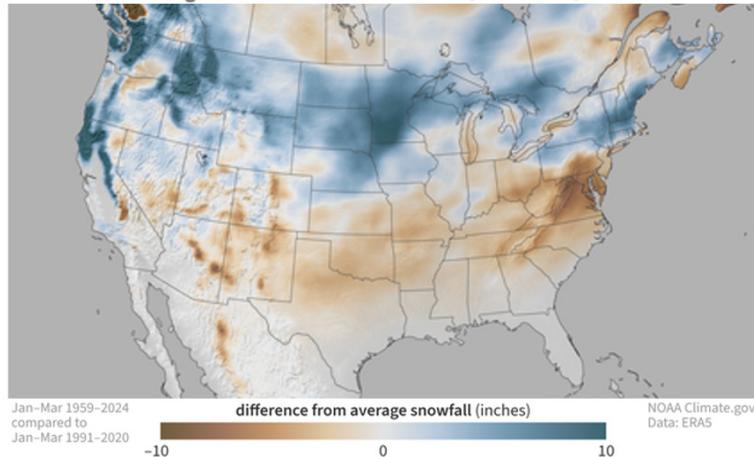
According to the NOAA Climate Prediction Center, there is a 75 percent chance that weak La Niña conditions will emerge by the end of November and persist through January-March 2025.

Images courtesy of the National Oceanic and Atmospheric Administration.

Potential Winter and Spring Impacts

Snowfall during weak La Niña winters (Jan–Mar)

difference from average snowfall (inches)

Jan–Mar 1959-2024 compared to Jan–Mar 1991-2020

NOAA Climate.gov Data: ERA5

−10   0   10

The image above shows areas that tend to receive more (blue) or less (tan) than average snowfall during a weak La Niña year. Northern and eastern portions of the Great Lakes tend to have above-normal snowfall.

Agriculture

Above-normal snowpack across the Great Lakes could insulate crops from harsh conditions. Cold outbreaks can adversely impact livestock producers due to increased operating costs and animal stress. Drier areas could benefit from the expected wetness.
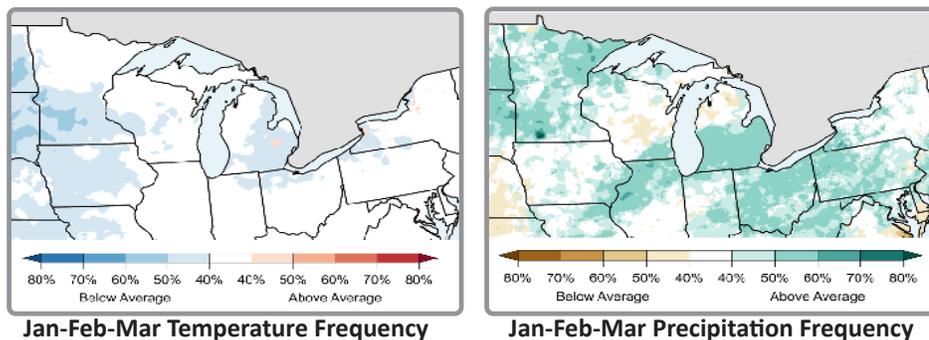
Economy

Cold and wet winters with above-normal snowfall can impact some economic sectors. Common negative impacts are increases in heating costs, snow removal, and difficulties in transportation. Sectors that depend on winter weather conditions, like winter recreation, snow removal businesses, towing companies, and road salt sales, will likely see a benefit from increased snowfall. More ice on the Great Lakes could potentially delay the navigation season for shipping in the spring.

Water Levels and Lake Ice

There is an increased chance of higher snowfall across portions of the basin. Increased snowpack may lead to a higher risk of spring runoff and flooding. The potential for more ice later in the winter may result in less lake evaporation. Current lake temperatures are running slightly warmer than normal, which may increase the chance of lake-enhanced snow.

Comparisons and Limitations

Winter Conditions During Past La Niña Years

80% 70% 60% 50% 40% 40% 50% 60% 70% 80%
Below Average   Above Average

Jan-Feb-Mar Temperature Frequency

80% 70% 60% 50% 40% 40% 50% 60% 70% 80%
Below Average   Above Average

Jan-Feb-Mar Precipitation Frequency

The above left map shows how frequently winter (Jan-Feb-Mar) temperatures were cooler (blues) or warmer (reds) than normal in 12 past weak La Niña events from 1950-2023. The above right map shows how frequently winter (Jan-Feb-Mar) precipitation was wetter (green) or drier (tan) than normal. Darker colors are more frequently warmer/colder or drier/wetter during La Niña winters. Locations with light colors or white indicate variable conditions from event to event.

It should be noted that each La Niña is different and other factors may influence the overall winter. La Niña impacts can be limited by many factors, including long-term trends and being overcome by short-term weather events.

While past La Niña events can help inform forecasters, there are limitations. In the Great Lakes, 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 springtime drought or flooding.

Maps: NOAA Physical Sciences Laboratory

Great Lakes Partners

Midwestern Regional Climate Center

American Assoc. of State Climatologists

National Integrated Drought Information System

Great Lakes Integrated Sci. and Assessments

USDA Midwest Climate Hub

National Oceanic and Atmospheric Administration

Great Lakes Enviro. Research Lab.

Great Lakes Sea Grant Network

NWS Climate Prediction Center

NWS Central Region Headquarters

North Central River Forecast Center

National Centers for Environmental Information