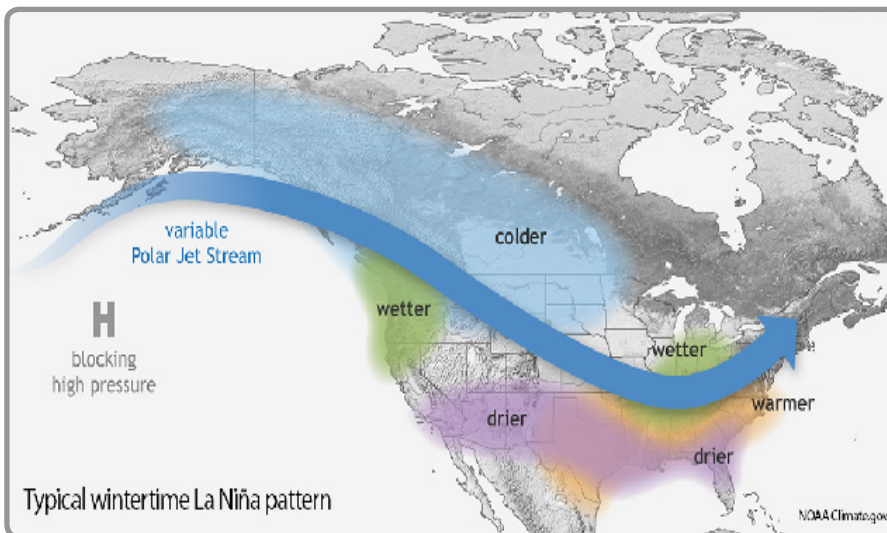


Typical La Niña Winter Pattern



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 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.

Highlights for the Basin

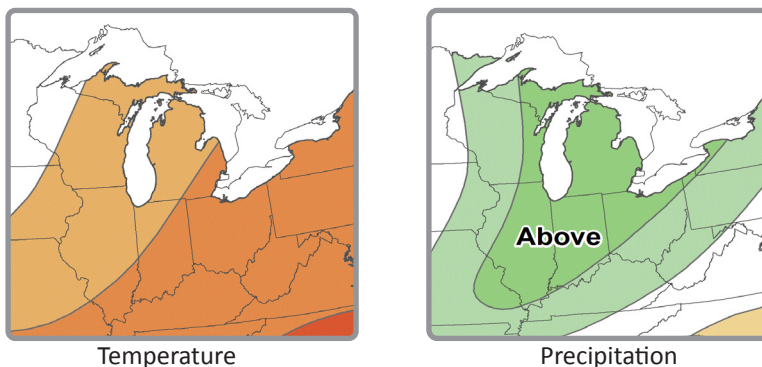
A La Niña develops when sea surface temperatures in the eastern equatorial Pacific are consistently cooler-than-average for an extended period of time. These cool waters affect the location of jet streams, which impacts North America. The most notable impacts occur in the late winter and early spring.

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. This pattern typically brings 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 December 2021 - February 2022



Temperature Probability (Percent Chance)			Precipitation Probability (Percent Chance)		
Above Normal	Equal Chances	Below Normal	Above Normal	Equal Chances	Below Normal
33-40%		33-40%	33-40%		33-40%
40-50%		40-50%	40-50%		40-50%

The winter temperature outlook (issued in October) indicates that the majority of the Great Lakes region has slightly increased chances of above-normal temperatures, with higher probabilities in the east. The far western portion of the region has equal chances of above-, below-, and near-normal temperatures.

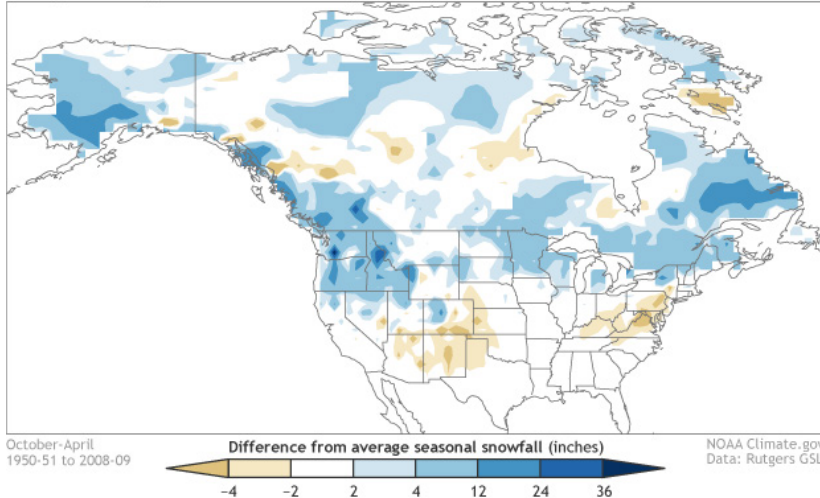
The winter precipitation outlook shows a slightly increased chance of above-normal precipitation for the entire Great Lakes region, with higher probabilities over the center of the region. Increased precipitation may have positive implications, such as increased snowpack for winter recreation, along with negative impacts like increased runoff in the spring.

A La Niña Advisory is currently in effect, which means La Niña conditions have developed and are expected to continue. Forecasts indicate this La Niña will strengthen, peaking as a moderately strong event in late fall or early winter. According to the NOAA Climate Prediction Center, there is an 87% chance that these conditions will last through the winter and about a 63% chance that La Niña will continue into the early spring.

Images courtesy of the National Oceanic and Atmospheric Administration.

Potential Winter and Spring Impacts

Average snowfall patterns for all La Niña years



The image above shows areas that tend to receive more (blue) or less (tan) than average snowfall during a La Niña year. The Great Lakes tend to have above-normal snowfall during La Niña years.

Agriculture

La Niña winters tend to have above-normal snowpack across the Great Lakes, which could insulate crops to harsh conditions. Cold outbreaks can adversely impact livestock producers due to increased operating costs and animal stress. Also, the southern and eastern Great Lakes currently has abundant soil moisture, meaning wetter-than-normal conditions could lead to delayed spring planting.

Economy

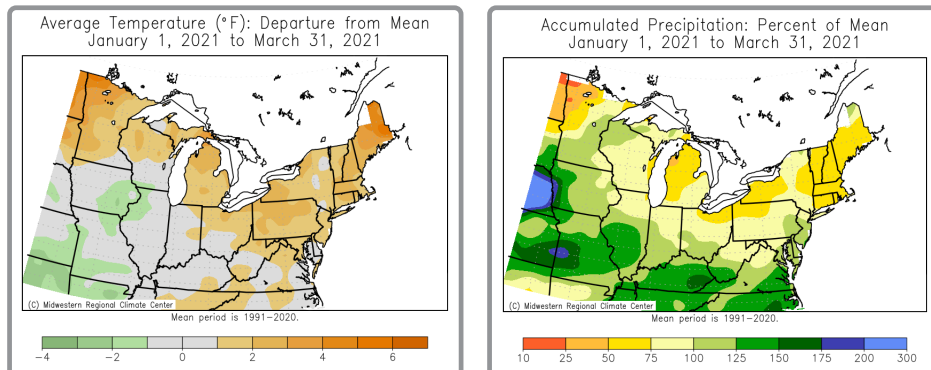
Cold and wet winters with above-normal snowfall can impact some economic sectors. Common negative impacts are increases in heating costs, snow removal, and difficulties in transportation. Sectors that depend on winter weather conditions, like winter recreation, snow removal businesses, towing companies, 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 Ice

With the increased chances of above-normal precipitation, the likelihood of more snow accumulation is greater. Increased snowpack may lead to a higher chance for more runoff and flooding in the spring. The potential for more ice later in the winter may result in less evaporation, thus keeping lake levels high. Increased runoff and decreased evaporation may take less water away from the system than normal. These factors could lead to higher lake levels.

Comparisons and Limitations

Winter Conditions During Past La Niña Years



The maps above illustrate the late winter (Jan.-Feb.-Mar.) conditions during the last La Niña event in 2020-21. Much of the basin was warmer-than-normal (left map, orange colors) and precipitation was well below-normal (right map, yellow colors). As shown by last year's unexpected pattern, please note that each La Niña is different and La Niña impacts may be limited by many factors, including long-term trends and being overcome by short-term and local weather events.

While past La Niña events can help inform forecasters about certain conditions, there are some limitations. For instance, 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 courtesy of the Midwestern Regional Climate Center

Great Lakes Partners

Midwestern Regional Climate Center
mrcc.purdue.edu

National Oceanic and Atmospheric Administration
www.noaa.gov

NOAA NCEI
www.ncei.noaa.gov

Great Lakes Environmental Research Laboratory
www.glerl.noaa.gov

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

Great Lakes Sea Grant Network
www.seagrant.noaa.gov

North Central River Forecast Center
www.weather.gov/ncrfc

Ohio River Forecast Center
www.weather.gov/ohrfc

Great Lakes Integrated Sciences and Assessments
glisa.umich.edu

American Association of State Climatologists
www.stateclimate.org

National Integrated Drought Information System
www.drought.gov

USDA Midwest Climate Hub
www.climatehubs.usda.gov