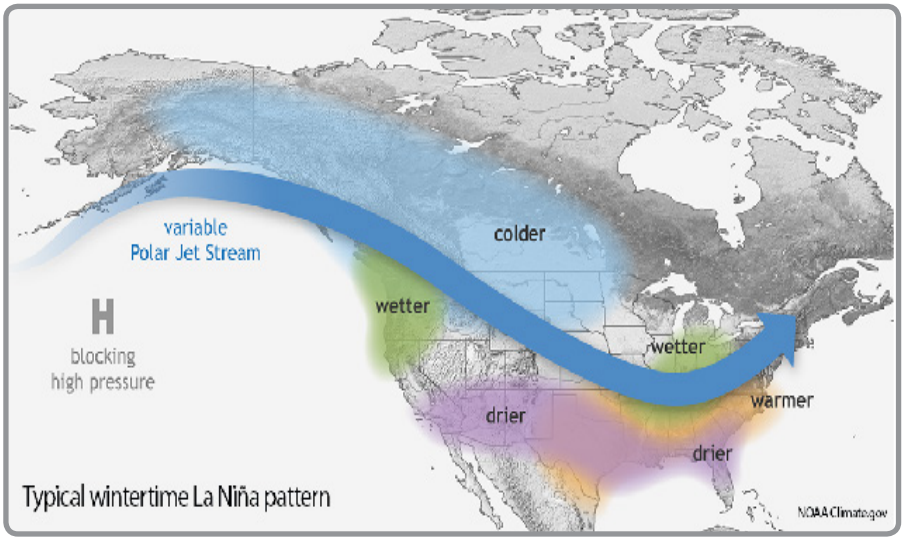
La Niña Impacts and Outlook

Great Lakes Region

November 2022

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 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.

Highlights for the Basin

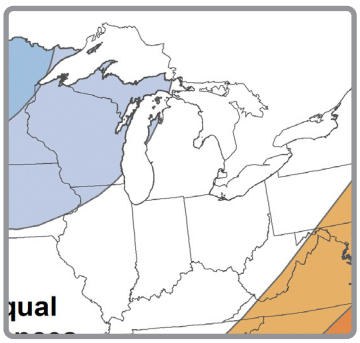
A La Niña develops when sea surface temperatures in the central and eastern equatorial Pacific are consistently cooler-than-average for an extended period of time. These cool waters affect the location of jet streams, which impacts North America. The most notable impacts occur in the late winter and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

While no two La Niña events are alike, there are some general patterns that are predictable. For instance, the polar jet stream is typically farther north 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.

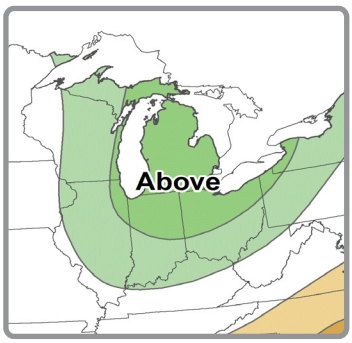
La Niña Outlook

Winter Temperature and Precipitation Outlooks

Valid for December 2022 - February 2023



Temperature



Precipitation

Temperature Probability (Percent Chance)

Above Normal		Equal Chances	Below Normal	
33-40%			33-40%	
40-50%			40-50%	

Precipitation Probability (Percent Chance)

Above Normal		Equal Chances	Below Normal	
33-40%			33-40%	
40-50%			40-50%	

The winter temperature outlook (issued in October) indicates that the western Great Lakes region has slightly increased chances of below-normal temperatures while the eastern 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 most of the Great Lakes region, with higher probabilities over the center of the region. Only a small section of western Lake Superior has equal chances of above-, below, and near-normal precipitation.

A La Niña Advisory is currently in effect, which means La Niña conditions have developed and are expected to continue. Sea surface temperatures in the east-central tropical Pacific are moderately below normal and near their peak minimum. According to the NOAA Climate Prediction Center, there is a 76 percent chance that La Niña conditions will last through the Northern Hemisphere winter, with a 57 percent chance that conditions will transition to ENSO-neutral by early spring.

Images courtesy of the National Oceanic and Atmospheric Administration.

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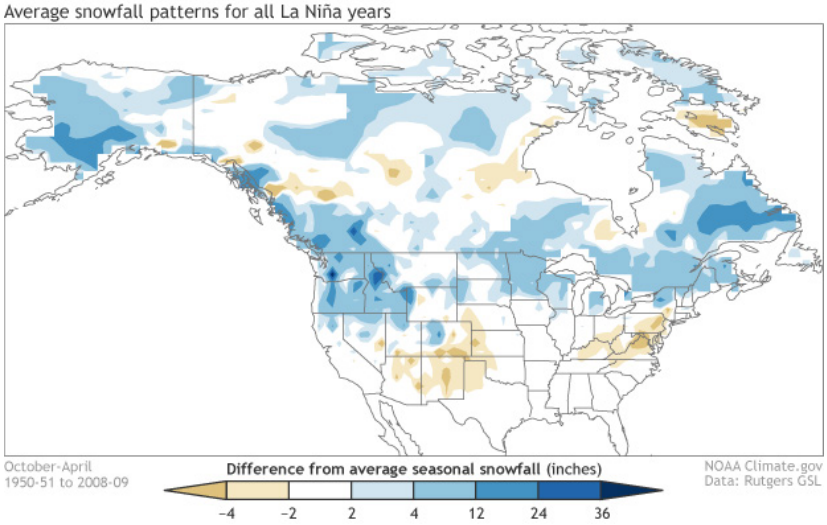
Potential Winter and Spring Impacts

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 from harsh conditions. Cold outbreaks can adversely impact livestock producers due to increased operating costs and animal stress. Much of Michigan has abundant soil moisture, so a wet winter could lead to delayed spring planting. Drier areas, however, could benefit from the expected wetness.

Economy

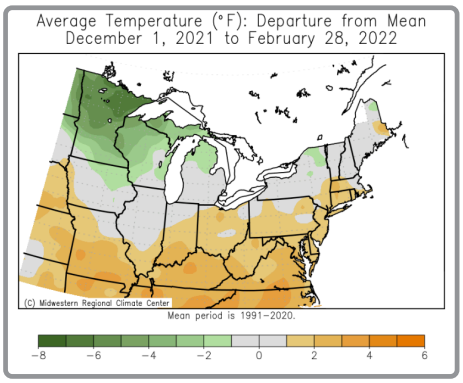
Cold and wet winters with above-normal snowfall can impact some economic sectors. Common negative impacts are increases in heating costs, snow removal, and difficulties in transportation. Sectors that depend on winter weather conditions, like winter recreation, snow removal businesses, towing companies,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

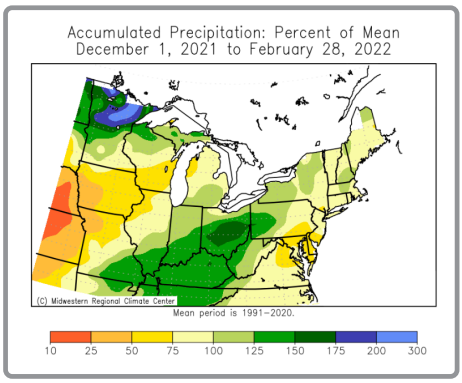
Water Levels and Ice

There is an increased chance of higher snow accumulations. 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 cooler than normal, which also increases the chance of greater ice extent. Together, cool water and more ice could result in less lake-enhanced snowfall.

Comparisons and Limitations

Winter Conditions During Past La Niña Years





The maps above illustrate the winter (Dec-Jan.-Feb.) conditions during the last La Niña event in 2021-22. The basin had below-normal temperatures in the west and near-normal temperatures in the east (left). Precipitation was above normal except for portions of Lake Michigan (right). 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, 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
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- 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

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