El Niño Impacts and Outlook

Great Lakes Region

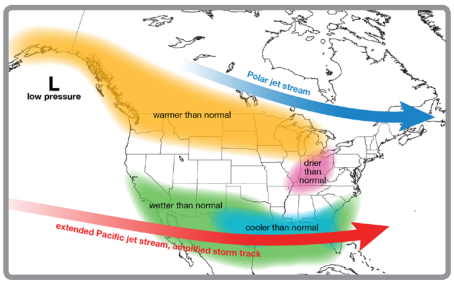
February 2016

Winter 2015/16 El Niño Update

What is El Niño?

An El Niño develops when sea surface temperatures are warmer than average in the equatorial Pacific for an extended period of time. This is important to North America because El Niño has an impact on our weather patterns, most predominantly in the winter.

Typical El Niño Winter Pattern



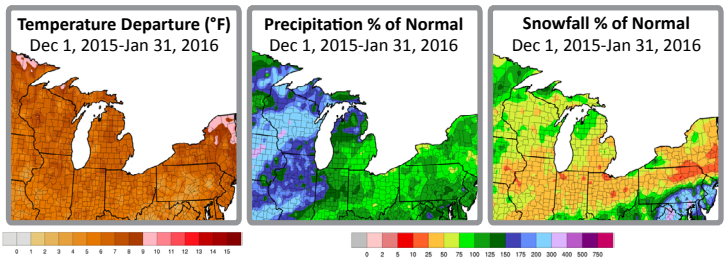
NOAA/Illinois StateWater Survey (https://www.climate.gov/news-features/department/enso-blog).

Although each El Niño is different, there are some general patterns that are predictable. For instance, the polar jet stream is typically farther north than usual, while the Pacific jet stream remains to the south.

With the Great Lakes positioned between the storm tracks, warmer and possibly drier conditions can develop during El Niño events. This does not mean that cold weather does not happen during El Niño winters, but typical extreme cold weather may be milder and less frequent. Warmer conditions may reduce total snowfall in the basin and lead to minimal ice cover on the Great Lakes. In addition, the above-normal temperatures could reduce the amount of snowpack accumulation in the season.

Winter 2015/16 To Date

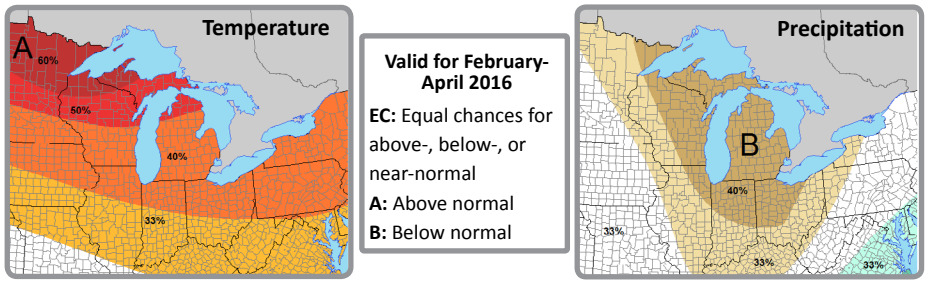
While the weather pattern this winter so far does share some similarities with the typical El Niño winter pattern, there are some differences as well. As predicted, temperatures have been above normal and in fact, December 2015 is now the warmest December on record for many locations across the Great Lakes basin (since records began in 1895). Snowfall has been significantly below normal across a majority of the basin. As of January 31, ice cover extent on the Great Lakes is 8%, which is significantly below normal for this time of year. In addition, ice accumulation began late this year towards the end of December. On the other hand, overall precipitation has differed from the typical El Niño winter pattern and conditions have been very wet. The reason for some of the discrepencies from the typical pattern is that each El Niño episode can be different, and strong events in the past have brought varying conditions to the basin. Other atmospheric factors like the North Atlantic, Arctic, and Pacific Decadal oscillations also play a big role in determing weather patterns in the Great Lakes basin.



Departure maps: Midwestern Regional Climate Center

El Niño Outlook

Temperature and Precipitation Outlooks



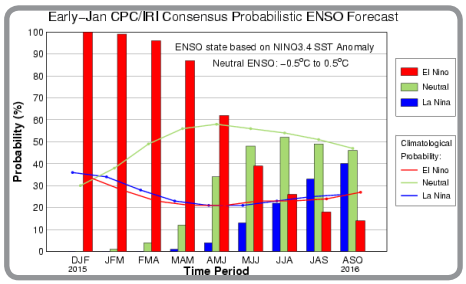
Percentages represent the probability for above-normal, below-normal, or equal chances.

The February-April outlook from the Climate Prediction Center (CPC) shows an increased chance of above-normal temperatures in the U.S. Great Lakes basin, especially in the northern and western reaches. Meanwhile, the precipitation outlook indicates a greater chance for below-normal precipitation across most of the basin, with higher probabilities in the western and central portions. Environment Canada (EC) is also forecasting above-normal temperatures for February-April for the Canadian Great Lakes basin. However, precipitation in the Canadian basin is less conclusive with equal chances for above-, near-, or below-normal precipitation. The prediction of a warmer than average spring in the Great Lakes could lead to earlier breakout and melting of Great Lakes ice cover. This forecast could have implications for many sectors, in both positive ways (reduced heating costs, fewer transportation costs and delays, and potential for a longer growing season/early field work) and negative ways (potential for freeze damage to specialty crops during cold snaps if spring warm-up occurs earlier).

The seasonal outlooks above combine many factors including dynamical models, the effects of long-term trends, soil moisture, and the El Niño Southern Oscillation cycle (ENSO).

El Niño Evolution

El Niño conditions were officially declared in Spring 2015. Conditions strengthened as predicted through November 2015, when the sea-surface temperature anomalies peaked at around 2.3°C on the Oceanic Niño Index (ONI). The peak makes this El Niño one of the strongest on record, tied with the El Niño of 1997/98. The bar chart below shows the likelihood of El Niño, La Niña, or neutral conditions over the upcoming seasons. The odds are highest for El Niño (red bars) through late spring, when the highest odds shift toward neutral (green bars) or La Niña (blue bars) through the summer and into the fall. This is a typical evolution of the ENSO pattern.



The letters along the bottom are abbreviations for three-month periods, from December-January-February (DJF) through August-September-October (ASO).

Contact: Mackenzie Solomon
NOAA's Office of Legislative & Intergovernmental Affairs
mackenzie.solomon@noaa.gov, 202.482.2497