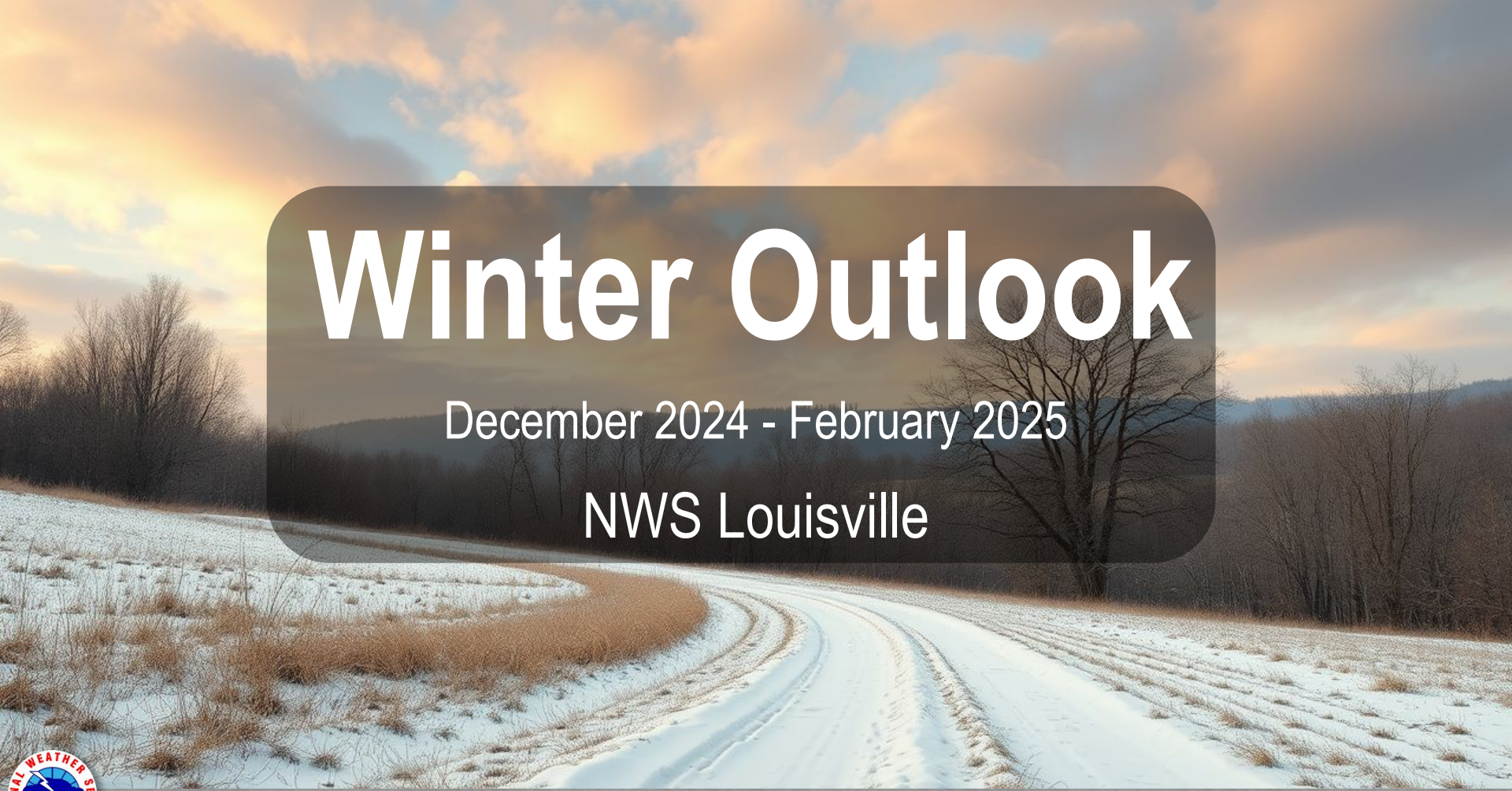

Winter Outlook
December 2024 - February 2025
NWS Louisville

Key Messages

WINTER OUTLOOK 2024-25

Climate Prediction Center (CPC) Outlook

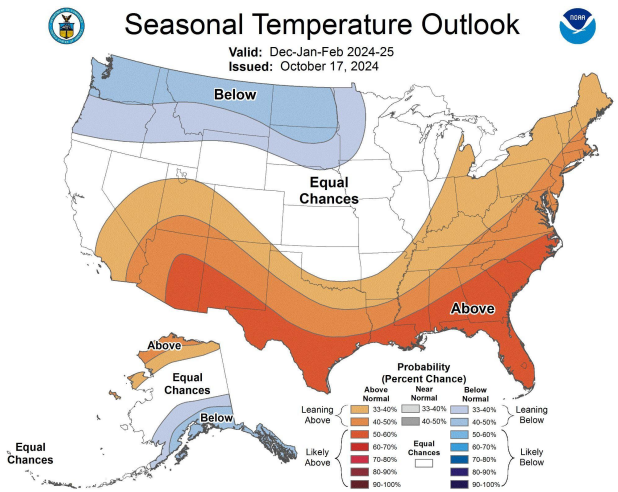
Temperature Outlook:

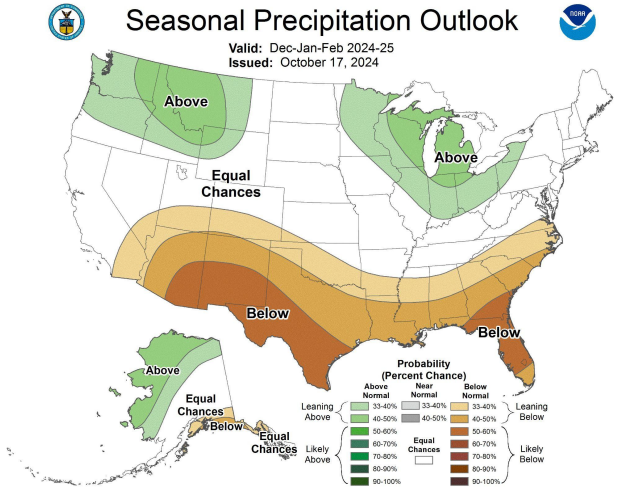
- Warmer-than-average temperatures are favored from the southern tier of the U.S. to the eastern Great Lakes, eastern seaboard, New England, and northern Alaska. These probabilities are strongest for parts of the Southwest, southern Texas, along the Gulf Coast, and Southeast.
- Below-average temperatures are most likely in southern Alaska and from the Pacific Northwest eastward to the northern High Plains.
- The remaining areas have equal chances of below-, near-, or above-average seasonal mean temperatures.

Precipitation Outlook:

- Wetter-than-average conditions are most likely in the Great Lakes states, northern and western Alaska, and the Pacific Northwest.
- The greatest likelihood for drier-than-average conditions is in states bordering the Gulf of Mexico, as well as in Texas and southern New Mexico.
- The remaining areas have equal chances of below-, near-, or above-average seasonal total precipitation.

* The CPC winter outlook shows only the most likely outcome where there is greater confidence. Other outcomes are always possible, but less likely.





Official Outlook Rationale

- A weak, short La Niña event is favored to emerge (60% chance) this fall and expected to persist through November-January (75% chance).

- La Niña typically leads to a more northerly storm track during the winter months, leaving the southern tier of the country warmer and drier. However, a weak La Niña is less likely to result in the typical La Niña impacts, compared to a stronger La Niña signal.

- Continuation of ENSO neutral conditions cannot be completely ruled out.

- Recent seasonal trends were also considered in this outlook.

- La Niña will not be the only factor this winter. Other atmospheric factors, both large-scale and local, will come into play. Unfortunately it is very difficult to predict these other patterns on a seasonal timescale.

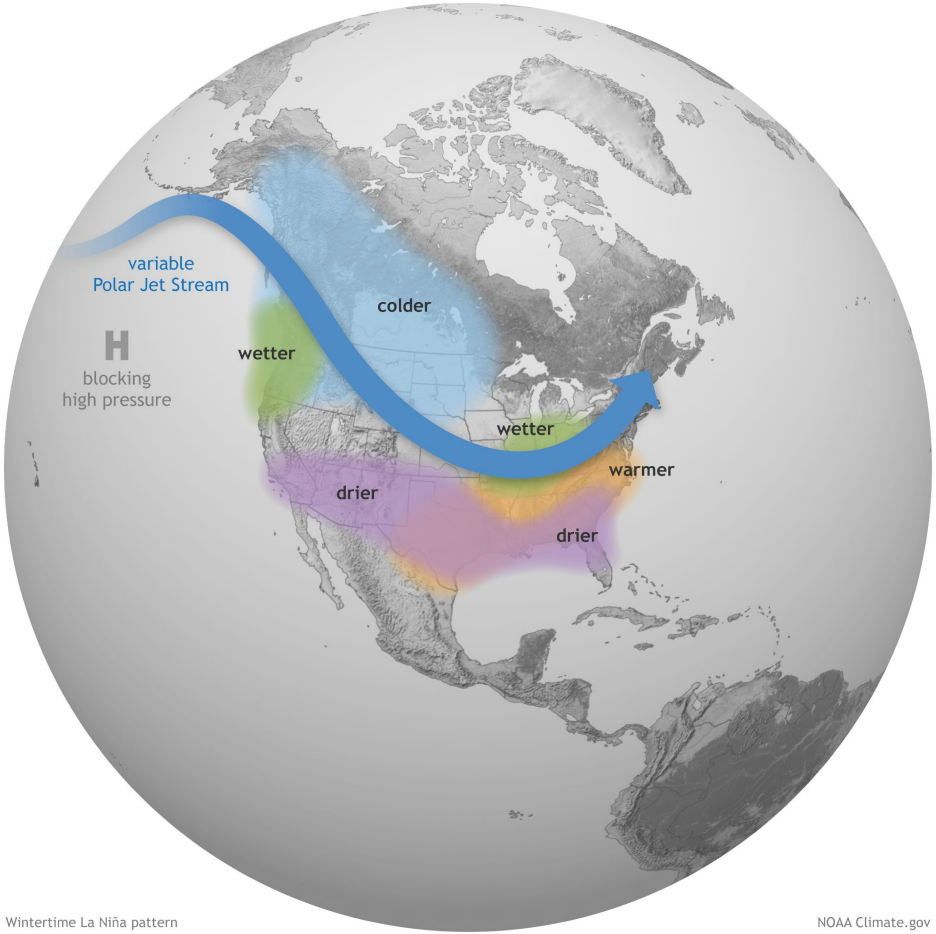
La Niña Explained

La Niña is anomalously cool water in the central and eastern tropical Pacific Ocean that triggers a cascade of changes in tropical rainfall and wind patterns around the globe.

For the United States, the Pacific jet stream often meanders high into the North Pacific and is less reliable across the southern tier of the United States.

The influence on the U.S. is strongest during the winter (December-February), but it may linger into early spring.

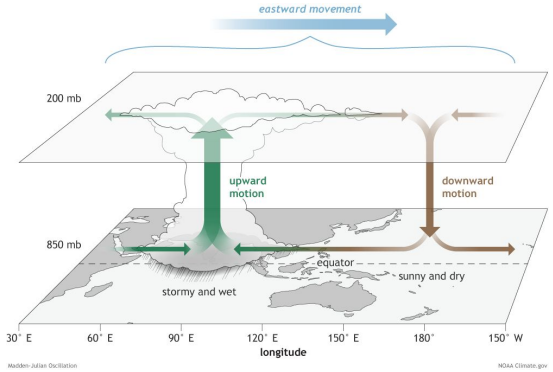
Not all of the impacts happen during every La Niña episode. Each event is unique and unfolds alongside many other complex atmospheric factors.



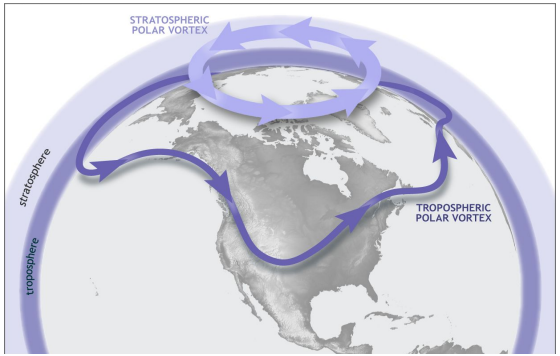
Wintertime La Niña pattern

NOAA Climate.gov

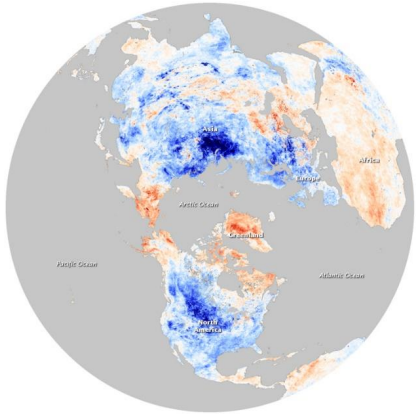
Other contributing factors



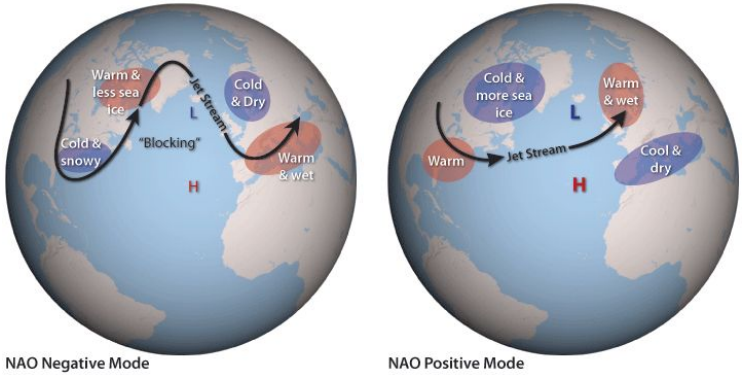
Madden-Julian Oscillation



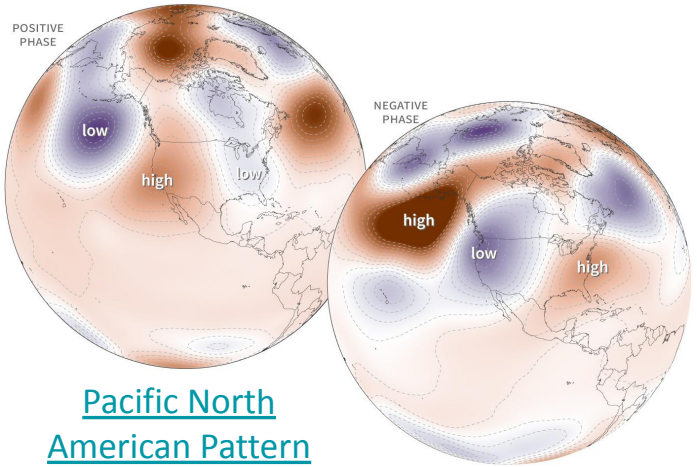
Polar Vortex



Arctic Oscillation



North Atlantic Oscillation

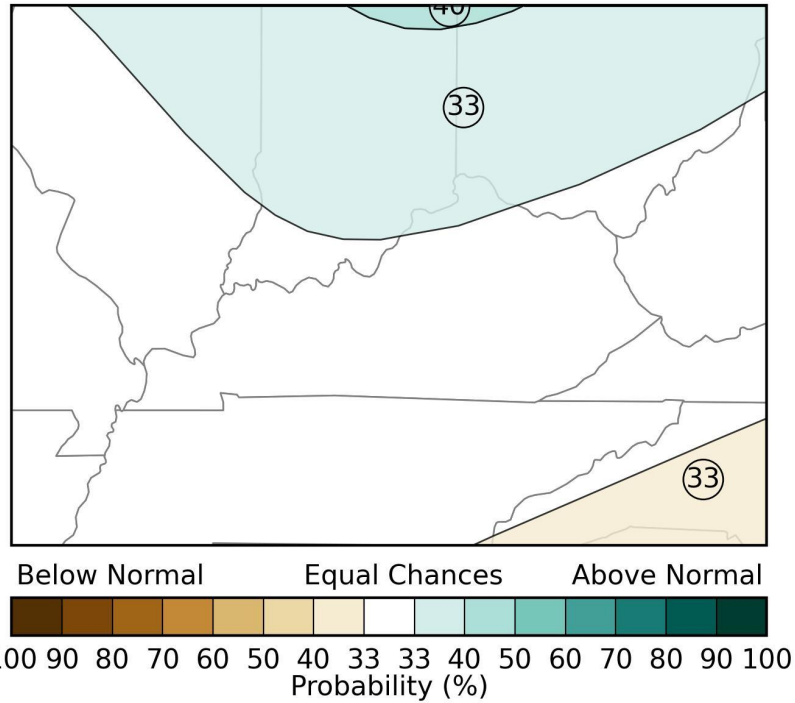


Pacific North American Pattern

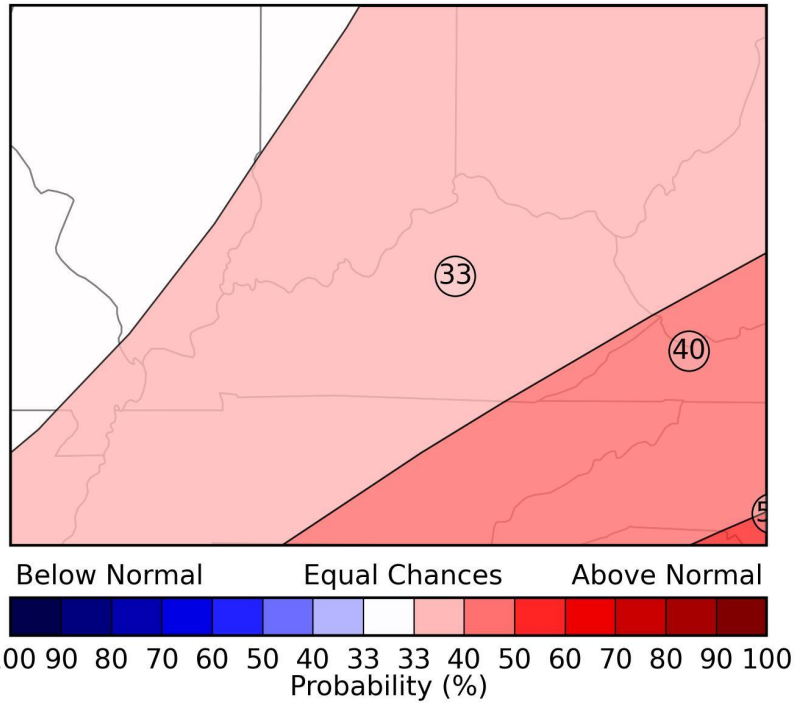
Local CPC Outlooks

Wetter-than-average conditions are slightly favored across portions of southern Indiana with equal chances of below-, near-, and above-average precipitation for most of Kentucky. Chances lean toward a warmer than normal winter throughout the Ohio Valley.

Precipitation Outlook



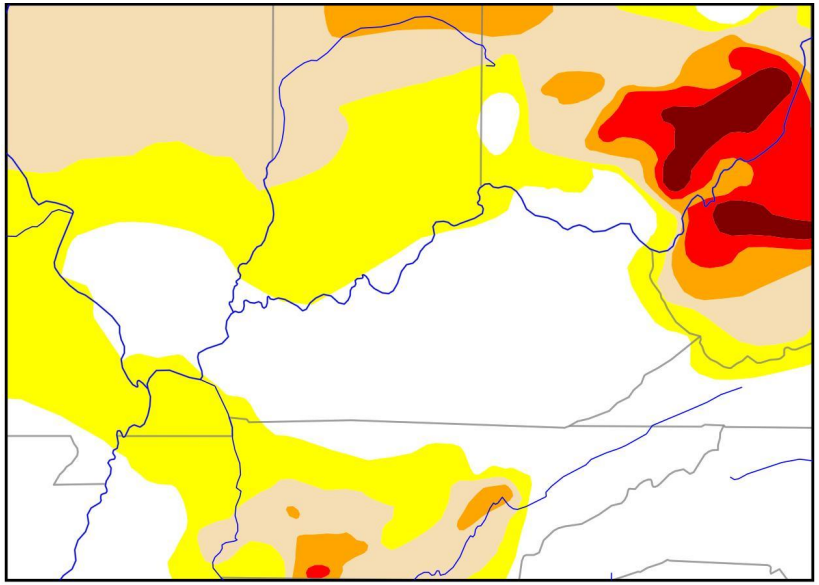
Temperature Outlook



Local Drought Outlook

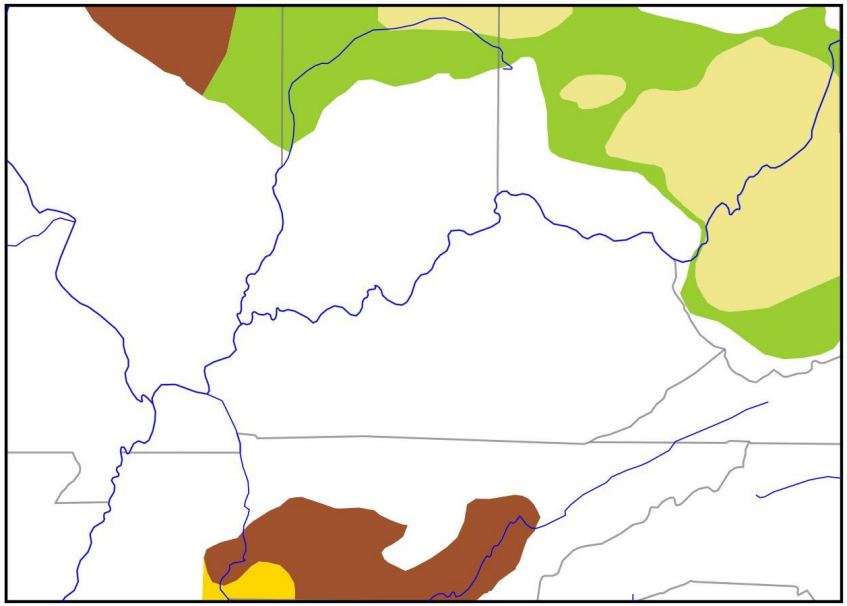
Drought is most likely to improve or disappear in the Ohio Valley thanks to increased odds of above-average precipitation this winter.

Current Drought Status



D0 - Abnormally Dry
D1 - Moderate Drought
D2 - Severe Drought
D3 - Extreme Drought
D4 - Exceptional Drought

Seasonal Drought Outlook



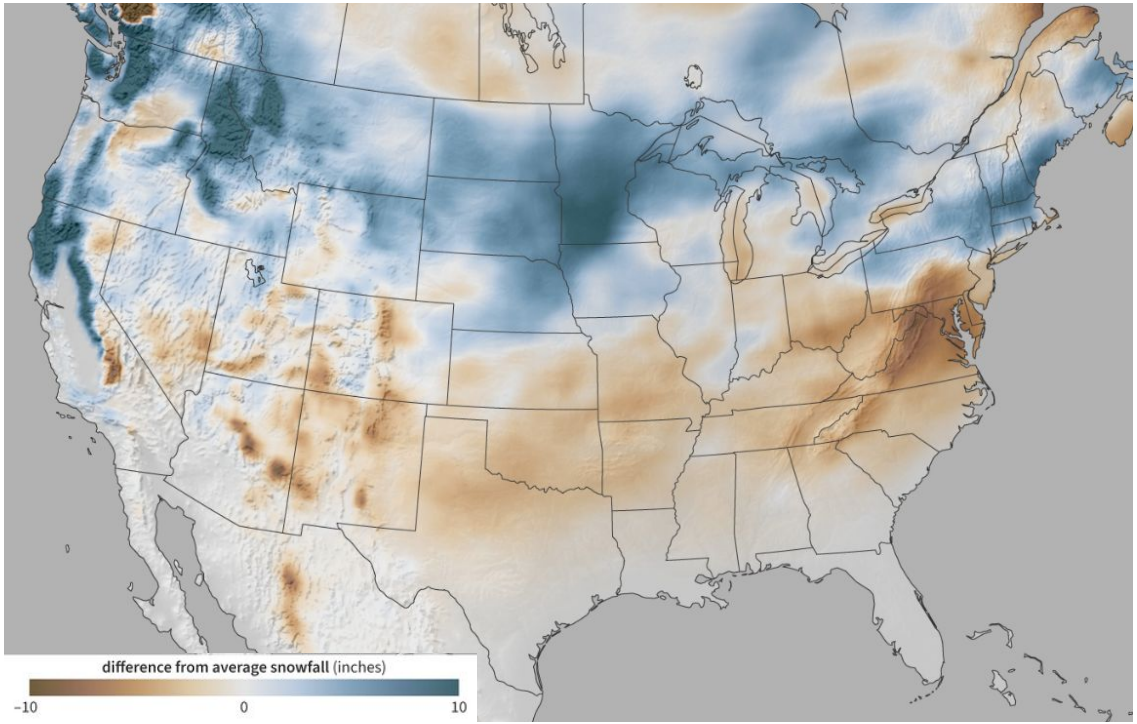
Drought persists
Drought remains but improves
Drought removal likely
Drought development likely

Seasonal Climatology - Snowfall

Seasonal total snowfall is extremely difficult to predict since it is dependent on both temperature and precipitation.

This image shows mean seasonal snowfall anomalies of past weak La Niña episodes since 1959, with long term trends removed. In general terms, snowfall is increased across the northern U.S. and decreased in the south.

Important: This map only represents average seasonal total snowfall anomalies for weak La Niña and it is not a forecast for this winter. Every ENSO event has its own snowfall footprint.

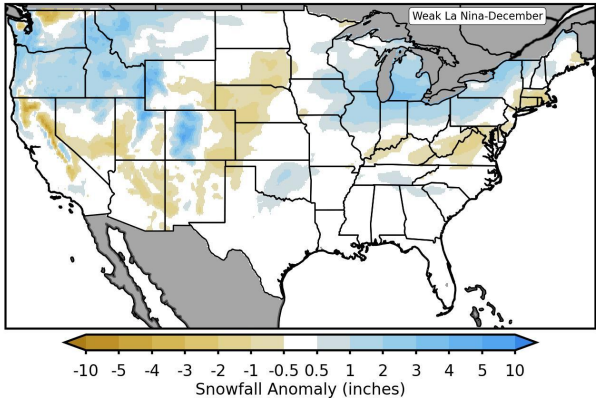


January-March snowfall departure from normal during weak La Niña winters (1959-2024, ERA5 dataset). The signal is somewhat mixed in the middle and lower Ohio Valley, suggesting only a weak correlation between weak La Niña and local January-March snowfall.

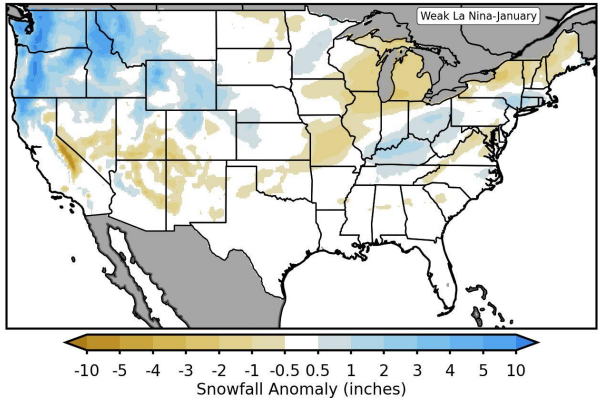
Monthly Climatology - Snowfall

These maps are derived from a local study and show averages from past weak La Niñas for December through February. Note that these maps are not an explicit forecast for this winter.

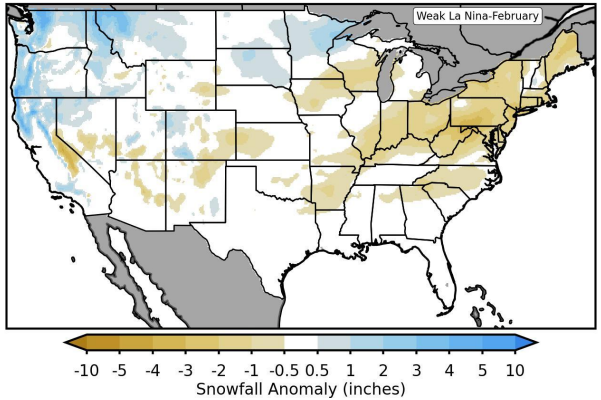
December



January



February



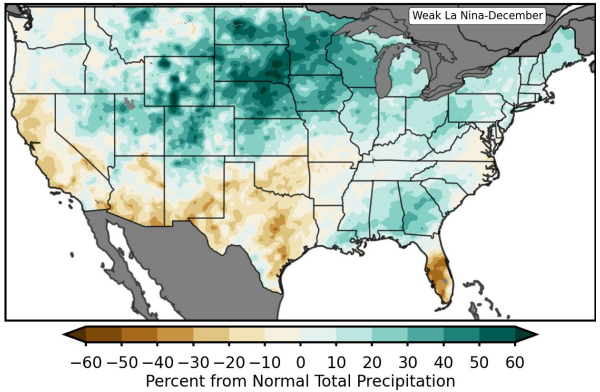
Typically, January is the month when the highest positive snowfall anomalies of the winter occur in the Ohio Valley during weak La Niñas.

Monthly Snowfall Anomalies by ENSO phase were determined using ERA5 Land Reanalysis dataset

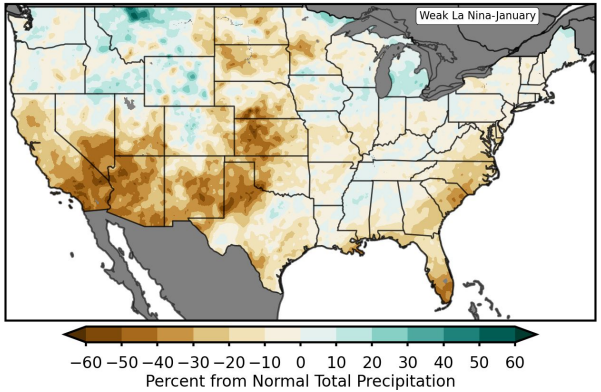
Monthly Climatology - Precipitation

These maps are derived from a local study and show averages from past weak La Niñas. While these maps are not an explicit forecast for this winter, they give an idea of how this episode has behaved in the past.

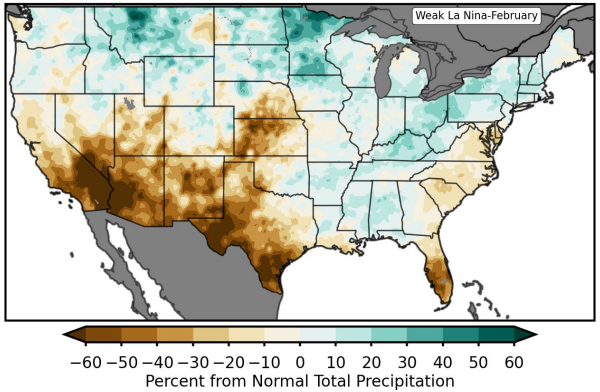
December



January



February



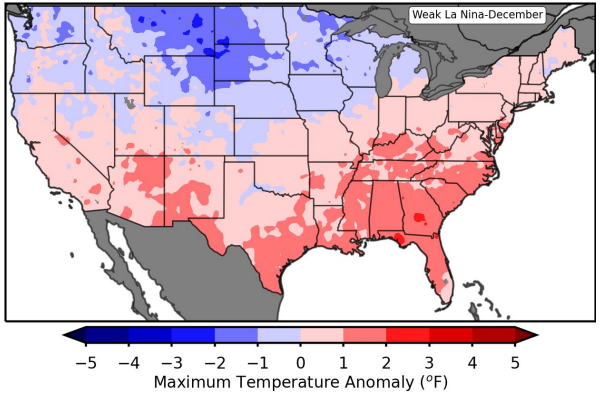
Typically, December and February have higher total precipitation anomalies than January in the Ohio Valley during weak La Niñas.

Monthly Precipitation Anomalies by ENSO phase were determined using NCEI's nClimGrid dataset

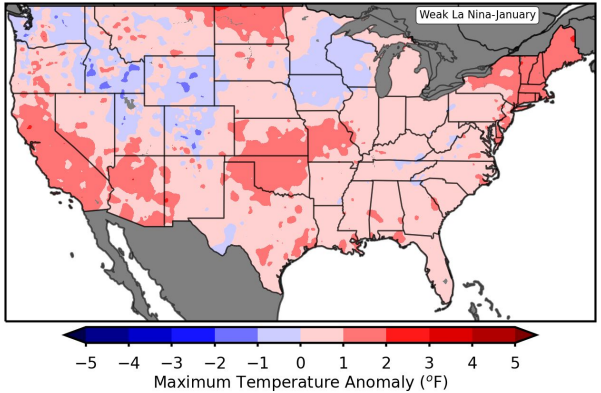
Monthly Climatology - Max Temp

These maps are derived from a local study and show averages from past weak La Niñas. While these maps are not an explicit forecast for this winter, they give an idea of how this episode has behaved in the past.

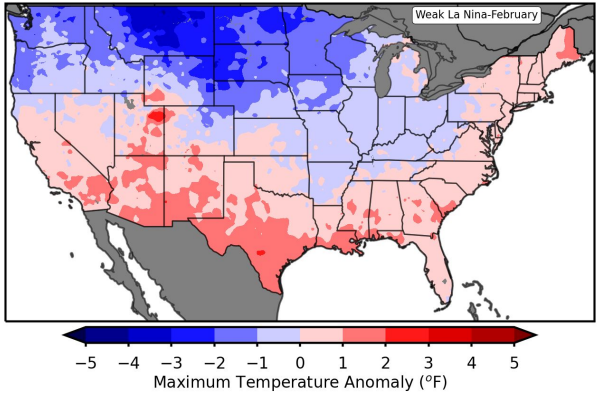
December



January



February



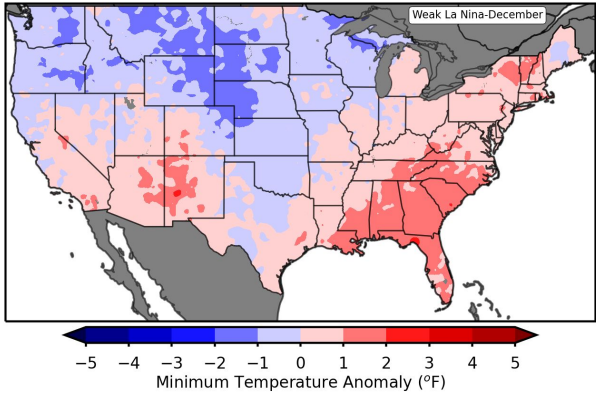
On average, warmer-than-average maximum temperatures are noted for December with a gradual trend to below normal values towards the end of the season.

Monthly Max Temperature Anomalies by ENSO phase were determined using NCEI's nClimGrid dataset

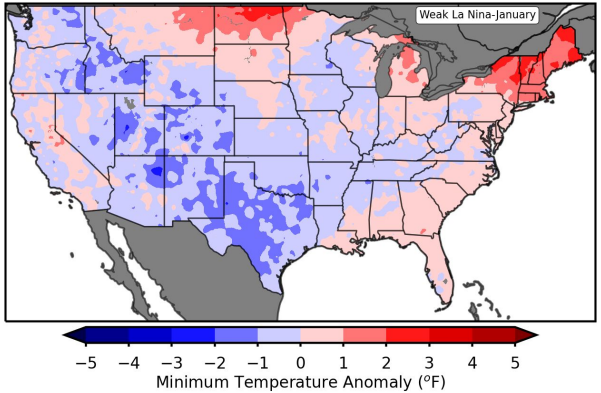
Monthly Climatology - Min Temp

These maps are derived from a local study and show averages from past weak La Niñas. While these maps are not an explicit forecast for this winter, they give an idea of how this episode has behaved in the past.

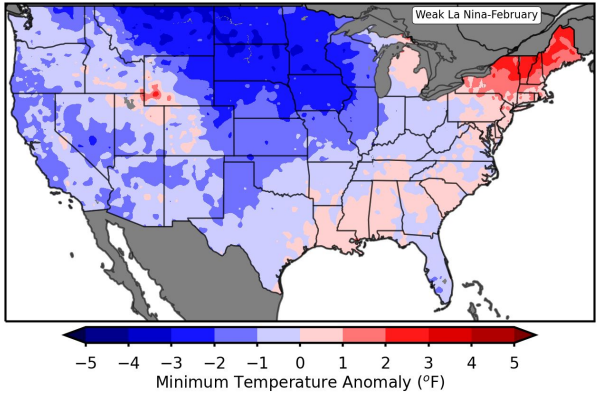
December



January



February



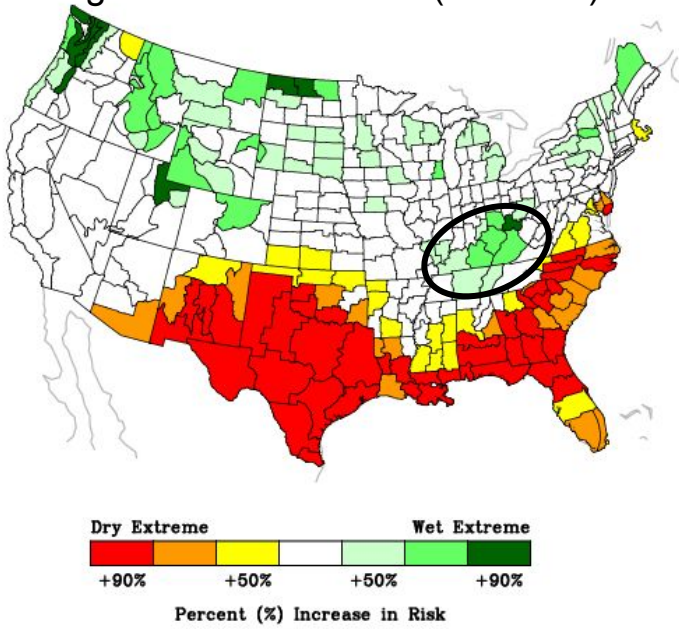
On average, warmer-than-average minimum temperatures are noted for December with a gradual trend to below normal values towards the end of the season.

Monthly Min Temperature Anomalies by ENSO phase were determined using NCEI's nClimGrid dataset

Risk of Seasonal Climate Extremes

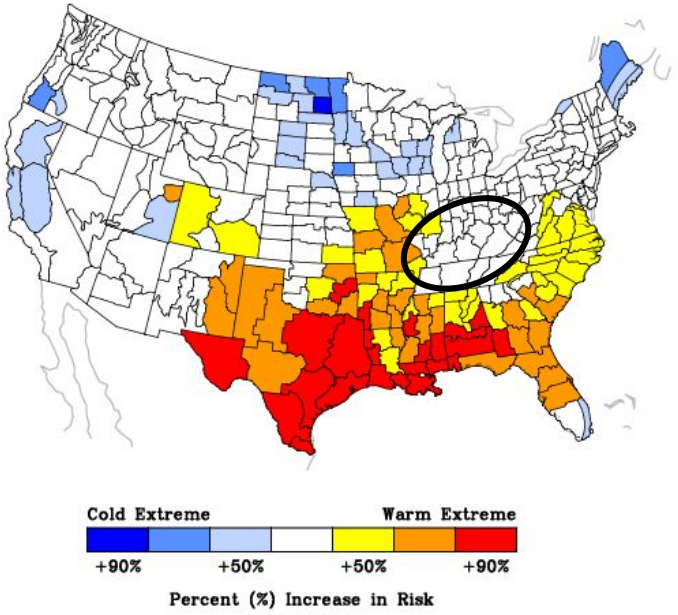
WINTER OUTLOOK 2024-25

Increased risk of precipitation extremes during *all* La Niña winters (Dec-Feb)



Looking at all La Niñas together (weak, moderate, and strong), there is an increase in the chance of precipitation extremes during December-February.

Increased risk of temperature extremes during *all* La Niña winters (Dec-Feb)



Looking at all La Niñas together (weak, moderate, and strong), there is little if any increase in the chance of temperature extremes during December-February.

*Some extremes may only be associated with very strong ENSO events.

Summary

What's Currently Expected

- A weak and brief La Niña is likely to impact the 2024-25 meteorological winter (Dec 1-Feb 28).
- Wetter-than-average conditions are favored across portions of southern Indiana with equal chances of below-, near-, and above-average precipitation for most of Kentucky.
- Chances lean toward a warmer than normal winter throughout the Ohio Valley overall.
- Significant drought is unlikely in the Ohio Valley.

What's Uncertain

- On shorter time scales, other—less predictable—climate patterns can cancel out or amplify the typical La Niña impacts.
- Strong Arctic Oscillation episodes typically last a few weeks and are difficult to reliably predict more than two weeks in advance.
- Seasonal snowfall accumulations as snow forecasts are generally not predictable more than a week in advance.

The next CPC Winter Outlook will be issued on Thursday, November 21, 2024

Questions or Comments?

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