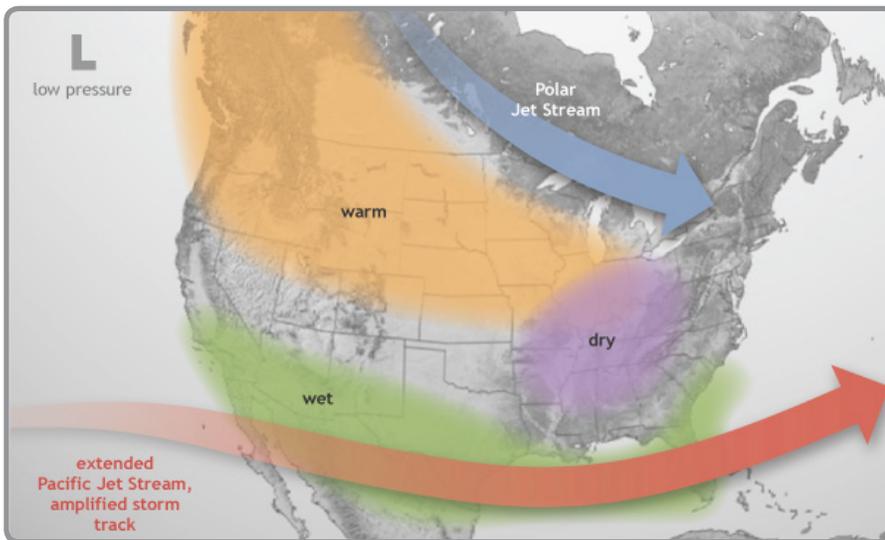


### Typical El Niño Winter Pattern



The image above shows the typical pattern in the winter during El Niño events. The polar jet stream tends to stay to the north of the Missouri Basin region, while the Pacific jet stream remains across the southern U.S. With the Missouri Basin isolated between the storm tracks, warmer and possibly drier conditions can develop during El Niño events.

Image courtesy of the National Oceanic and Atmospheric Administration.

### Highlights for the Basin

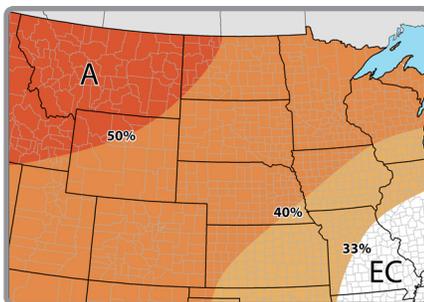
An El Niño develops when sea surface temperatures are warmer than average in the equatorial Pacific for an extended time. This is important to North America because El Niño can impact our weather patterns, especially in the winter.

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 across the southern U.S.

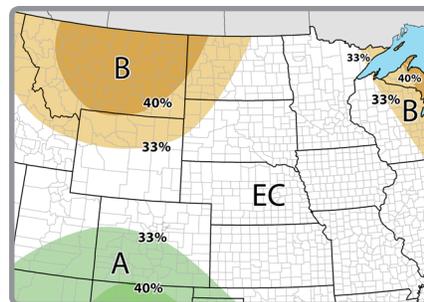
This pattern brings above-normal temperatures to much of the Missouri River Basin region, particularly across the north. But, this does not mean cold weather will not happen this winter. Extreme cold weather may be milder and less frequent, however.

### El Niño Outlook

#### Winter Temperature and Precipitation Outlooks Valid for December 2018 - February 2019



Temperature

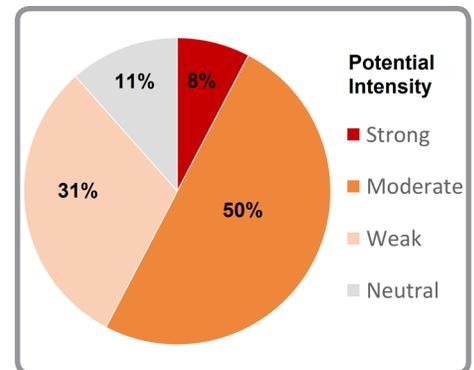


Precipitation

EC: Equal chances of above, near, or below normal  
A: Above normal, B: Below normal

As of October, the winter outlooks for the region show that below-normal precipitation is favored for the headwaters of the Missouri River, while above-normal precipitation is favored for areas of the southern Rockies. This could have implications for many sectors, in both positive ways (increased snowpack to the south could be welcomed by ski resorts) and negative ways (reduced snowpack to the north could impact spring runoff). Meanwhile, the temperature outlook indicates that above-normal temperatures are favored across the majority of the region, with the exception of portions of Missouri, where equal chances for above, near, or below normal temperatures exist.

#### El Niño Strength Winter 2018-19



According to the Climate Prediction Center, ENSO-neutral conditions are present. Outlooks favor the development of a weak to moderate El Niño event, which could continue through the winter (70-75% chance). An El Niño Watch is in effect. The chart above shows the potential intensity of this winter's El Niño, with data from the International Research Institute for Climate and Society.

## Potential Winter and Spring Impacts

### Missouri River



Platte River, a tributary of the Missouri River, photo courtesy Bill Sorensen.

This year, the combination of an above-normal snowpack and heavy rains has led to one of the highest runoffs for the Upper Missouri River Basin on record. According to the U.S. Army Corps of Engineers, 2018 runoff above Sioux City, Iowa is forecast at 40.6 million acre feet, which is 160 percent of average. Above-average releases will continue through the fall in order to evacuate all stored floodwaters. Snowpack will be monitored through the spring.

### Agriculture



Getting ready for spring planting, photo courtesy Ken Dewey.

With the potential for above-normal temperatures across the Basin this winter, a variety of impacts could occur. For livestock producers, reduced needs for extra forage and hay could be beneficial as hay stocks are near historic lows. For winter wheat producers, a warmer winter could signal less risk to the crop. Looking ahead to spring, planting issues could be a concern across parts of the Basin, where autumn rains have produced ample soil moisture.

### Ecosystems

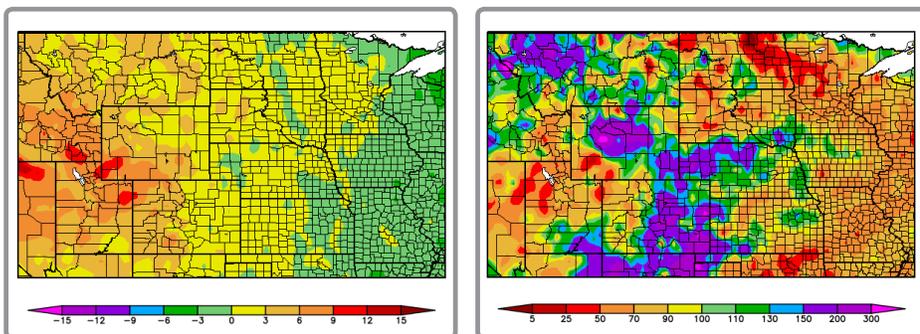


Sandhill cranes in central Nebraska, photo courtesy Ken Dewey.

In the northern tier of the Basin, where warmer and drier conditions are possible, increased fire danger could be an issue this winter and spring, especially in areas where forage has accumulated. If a lower snowpack occurs as a result of the drier conditions, reduced runoff could occur in the spring, which may impact wildlife later in the season. Warmer conditions could also accelerate the growth of non-native cool-season plants, such as cheatgrass.

## Comparisons and Limitations

### Winter Conditions During Past El Niños Departure from Normal Temperature (°F) (left) and Percent of Normal Precipitation (right) for Winter 2014-15



Maps courtesy of the High Plains Regional Climate Center.

The maps above illustrate the winter conditions of the last weak El Niño, which occurred in 2014-15. Much of the Basin was warmer than average, but precipitation signals varied. Please note that each El Niño is different and other factors can be considered, such as antecedent conditions or the Arctic Oscillation, which trumped the El Niño during the winter of 2009-10.

While past El Niño events can help inform forecasters about certain conditions, there are some limitations. For instance, in the Missouri Basin, El Niño is *not* known to impact: 1) potential for ice storms or blizzards, 2) track or intensity of any single weather system, 3) first freeze in the fall (early or late), or 4) last freeze in the spring (early or late).

## MO River Basin Partners

High Plains Regional Climate Center  
[www.hprcc.unl.edu](http://www.hprcc.unl.edu)

National Drought Mitigation Center  
<http://drought.unl.edu/>

National Oceanic and Atmospheric Administration  
<https://www.noaa.gov/>

National Integrated Drought Information System  
<https://www.drought.gov/>

NOAA NCEI  
[www.ncdc.noaa.gov](http://www.ncdc.noaa.gov)

NOAA NWS- Central Region  
[www.crh.noaa.gov/crh](http://www.crh.noaa.gov/crh)

NOAA NWS Climate Prediction Center  
[www.cpc.ncep.noaa.gov](http://www.cpc.ncep.noaa.gov)

NOAA NWS Missouri Basin River Forecast Center  
[www.crh.noaa.gov/mbrfc](http://www.crh.noaa.gov/mbrfc)

American Association of State Climatologists  
<https://www.stateclimate.org/>

U.S. Army Corps of Engineers  
[www.usace.army.mil](http://www.usace.army.mil)

USDA Northern Plains Climate Hub  
[www.climatehubs.oce.usda.gov](http://www.climatehubs.oce.usda.gov)