

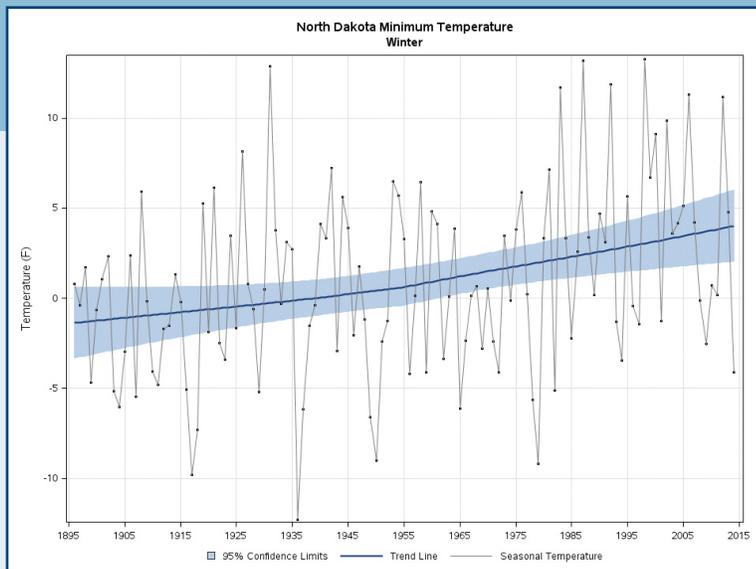
# THE ATMOSPHERIC RESERVOIR

*Examining the Atmosphere and Atmospheric Resource Management*

## Above Normal Lows

By Mark D. Schneider

High temperatures usually get the limelight when warmer than average weather conditions occur. On February 19, when Bismarck reached a record high temperature of 60 degrees Fahrenheit and Grand Forks International Airport topped out at 44 degrees for their daily record, little was said about the 36 and 34 degree low temperatures that each location experienced. Bismarck's 36-degree low temperature actually ties the year 1930 for record high daily minimum temperature. In addition, both Bismarck and Grand Forks' low temperatures were above the average daily high temperatures at each reporting station. This same scenario occurred quite often throughout the winter season.



Courtesy of the National Centers for Environmental Information.

In general, days with record highs are dependent on above normal low temperatures. During the winter, when there are fewer hours of sunlight this becomes an even greater factor. Think of this as running a race and receiving a head start. Its not usual to have a 50 or 60-degree daily warmup in February, so the February 19 high temperature of 60 degrees was heavily reliant on the 36-degree low temperature as a significant starting point. Above normal low temperatures helped Bismarck record its second warmest February since 1895. In addition, North Dakota's all-time record high temperature of 73 degrees on February 27 in Bismarck wouldn't have been possible without the assistance of an above normal low temperature on that day.

During this "meteorological" winter (December, January, and February) there were significantly less days when the temperature dropped below zero in North Dakota. Bismarck only recorded 11 days below zero, Dickinson 10 days, Fargo 16 days, Garrison 12 days, Grand Forks 24 days, Hettinger 10 days, Jamestown 14 days, Minot 14 days, and Williston 15 days. In addition, no below zero temperatures were recorded during the entire month of February in Bismarck, Dickinson, and Hettinger.

Warmer temperatures this winter can be attributed to the large-scale pattern of a split-flow jet stream (strong El Nino) that kept much of the arctic air north of our state. On a more localized scale, there were factors such as lack of snow cover and fewer clouds during peak afternoon heating hours owing to warmer sunny days. Warmer temperatures melted snow and some of this moisture remained in the lower atmosphere causing dew points to hover in the twenties and thirties. Because air temperatures remain at or above the dew point temperature, warm overnight lows in the twenties and thirties were common this winter.

There has been a steady increase in average low temperatures in North Dakota since 1895, most noticeably during the winter months. The graph shows the approximate five degree Fahrenheit increase in average low temperatures according to the trend line. North Dakota isn't the only state that has seen a significant increase in average low temperatures during the winter. Other northern tier states such as Maine, Michigan, Minnesota, New Hampshire, Vermont, and Wisconsin show average winter low temperature increases in the five-degree range.

So let's give credit where credit is due and recognize our low temperatures. The next time a record high temperature is reported, look closer at the daily low temperature, because its very likely that it was also exceptional.

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