



North Dakota Climate Bulletin

Winter 2006-2007

Volume: 1 No: 1

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North Dakota State Climate Office
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From the State Climatologist



The Climate Bulletin is a digital quarterly publication of the North Dakota State Climate Office, the College of Agriculture Food Systems and Natural Resources, North Dakota State University in Fargo, North Dakota.

A wet December followed by a dry January and wet February statewide are some of the highlights in this issue. Temperature wise, despite the cold spells in February which made the February 2007 the 33rd coldest of all, the winter of 2007 was the 25th warmest winter since 1895. The winter temperature trend for the period of record (1895 to present) is 0.52° F per decade. The “*Season in Graphics*” is the graphical display of the total precipitation departure from normal and average temperature departure from normal. It also displays the time series of monthly total precipitation and average temperature of North Dakota for respective months of the season. The Climate Prediction Center’s spring outlook gives 10% greater chance to be warmer than normal than the other categories while the outlook promises no relief from the ongoing statewide drought. In this issue, the “Science Bits” features “Normals Defined”, explaining how climate normals, departure from normals and percent of normals are calculated. We hope you will enjoy this issue. This bulletin can be accessed from <http://www.ndsu.edu/ndsco/> that hosts other great resources for climate and weather information.



Adnan Akyüz, Ph.D.
North Dakota State Climatologist

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Weather Highlights



Seasonal Summary:

by B. A. Mahoney

December 2006

December started out with a blast of cold air that sent temperatures across the state below normal. The north central region's minimum air temperatures were in the minus twenties. But on December 7th, the cold air mass pulled out and the temperature rose to above normal. The mild temperatures and fairly dry conditions persisted for the remainder of the month. The warmer temperatures made December 2006 the 5th warmest on record out of the past 112 years.

Along with the cold air at the beginning of December came a few snow showers that fell from the 1st through about the 6th. The snow showers were spotted across the state and varied anywhere from a trace to an inch and a half. Mid-December was dry across the state save but a few spots that received brief snow showers. December would have ended as very dry but one last snow storm from 29th through the 31st brought the central and eastern parts of the state to near normal or above normal precipitation. The western third of the state, especially the southern part ended December with below average to far below average precipitation.

January 2007

As the late December snow storm came to a close, the mild air temperatures continued into January. The average air temperature of the 1st through the 10th was in the 20's for all but the northeastern region where the average was in the upper teens. Temperatures fell around the 11th as cold arctic air settled in. The average minimum air temperature of the 11th through the 16th were in the teens and 20s below for much of the state, except the far southwest which saw single digits below. Temperatures again climbed to above zero for most places from the 20th through the 26th after which cold below zero temperatures returned for the remainder of the month. The January monthly average, though colder than December, still came to average air temperature above normal or near normal across the state.

The arctic air from Canada had little moisture therefore January precipitation totals were very low. Most of the state was below 50% of normal precipitation. A few small isolated areas saw upwards of 75% to near normal precipitation. All in all, January ended on a very dry note.

February 2007

Bitter cold temperatures continued from the 1st through the 15th of February. Several places had departure from normal air temperature's in the minus twenties. The extremely cold air pulled out around the 16th. For the most part, the remainder of the month saw temperatures fluctuate between 10 ° F below and 10 ° F above the normal air temperature (February ND normal air temperature is 15.4 ° F). The February average monthly temperature departure from normal was below average for the state and ranged from a departure of -11 ° F in the north east corner to -6 ° F in the south western corner of the state.

February snowfall was light with several days between snow events. Two major snow storms that spanned from about the 25th through March 2nd dropped heavy amounts snow (preliminary amounts of 10" to 18") and caused blizzard conditions in the eastern part of the state. The western part of the state also received snow from these storms but the amounts varied greatly from one place to the next (preliminary amounts of 2" to 8"). The snow storm that closed February brought the total monthly precipitation to above normal for most of the state. The upper central area had below normal precipitation.

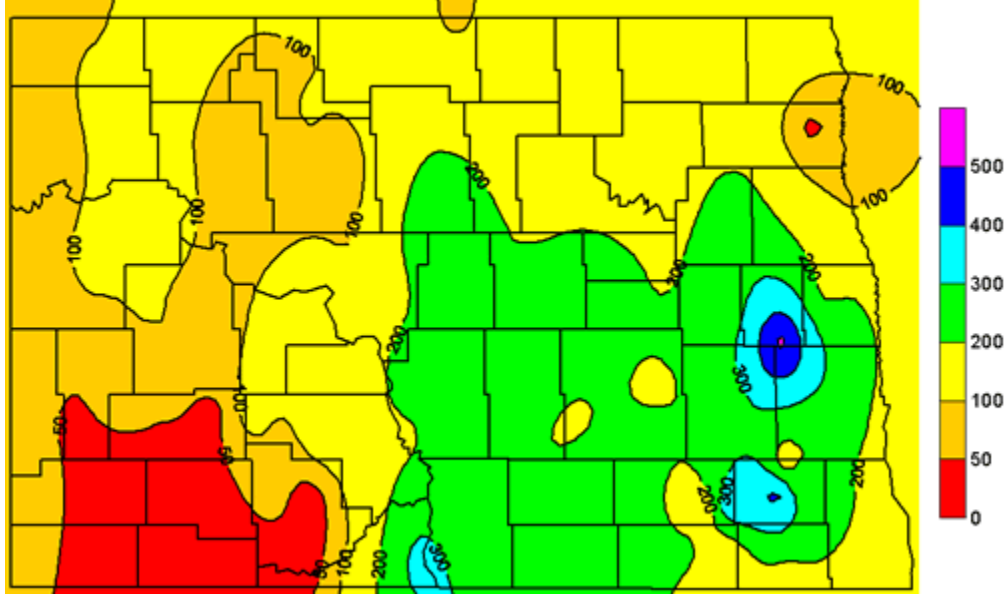
Season in Graphics

Winter 2006 Weather in North Dakota:

Total Precipitation percent of mean (1971-2000)

Precipitation Percent of Normal

(Data from NWS Cooperative Network)

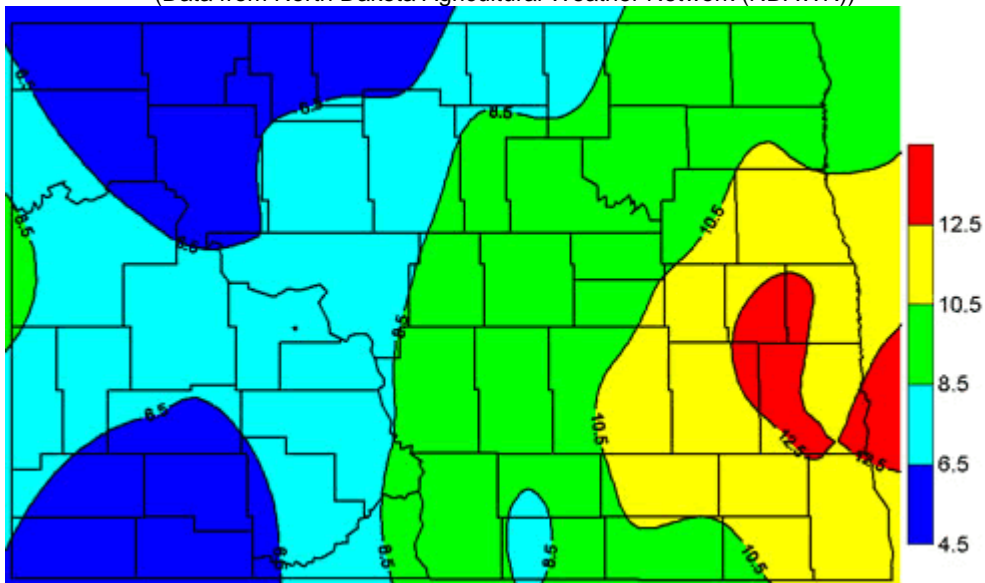


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Average Temperature (°F) Deviation from Mean (1971-2000)

Departure From Normal Monthly
Average Air Temperature in degrees F

(Data from North Dakota Agricultural Weather Network (NDAWN))



North Dakota State Climate Office

December 2006

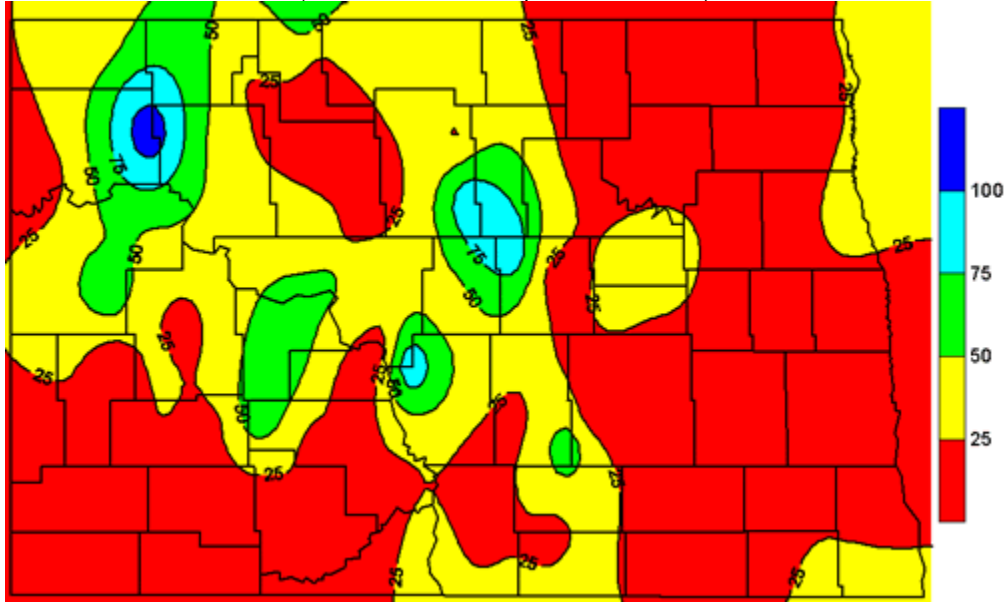
Season in Graphics

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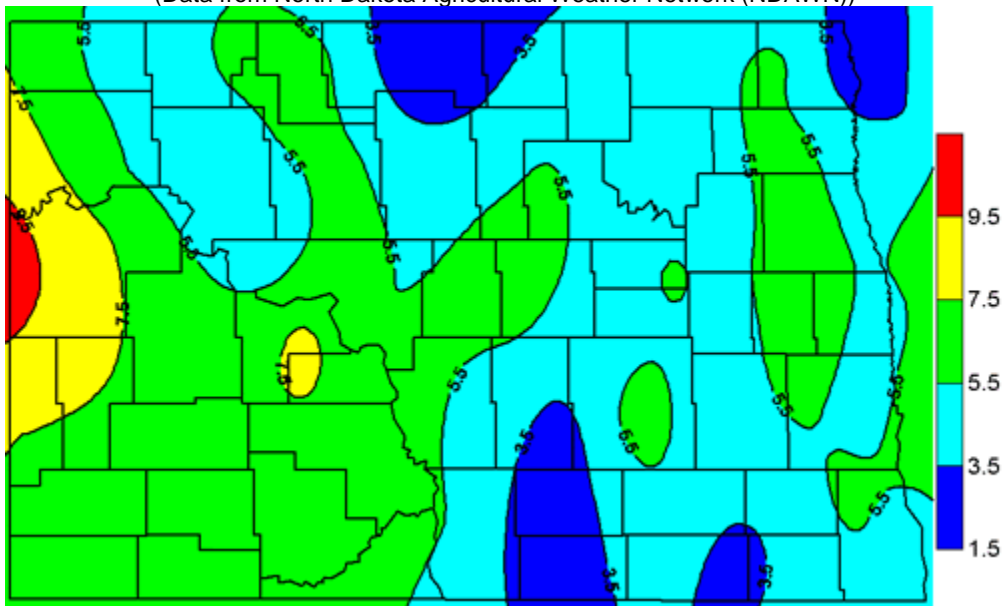


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Average Temperature (°F) Deviation from Mean (1971-2000)

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Average Air Temperature in degrees F

(Data from North Dakota Agricultural Weather Network (NDAWN))



North Dakota State Climate Office

January 2007

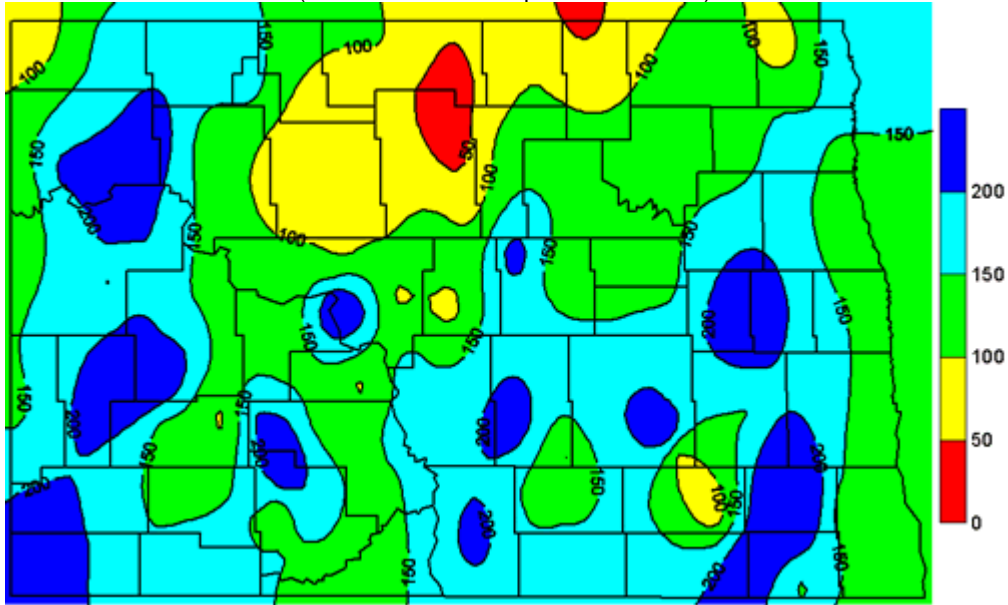
Season in Graphics

Winter 2006 Weather in North Dakota:

Total Precipitation percent of mean (1971-2000)

Precipitation Percent of Normal

(Data from NWS Cooperative Network)

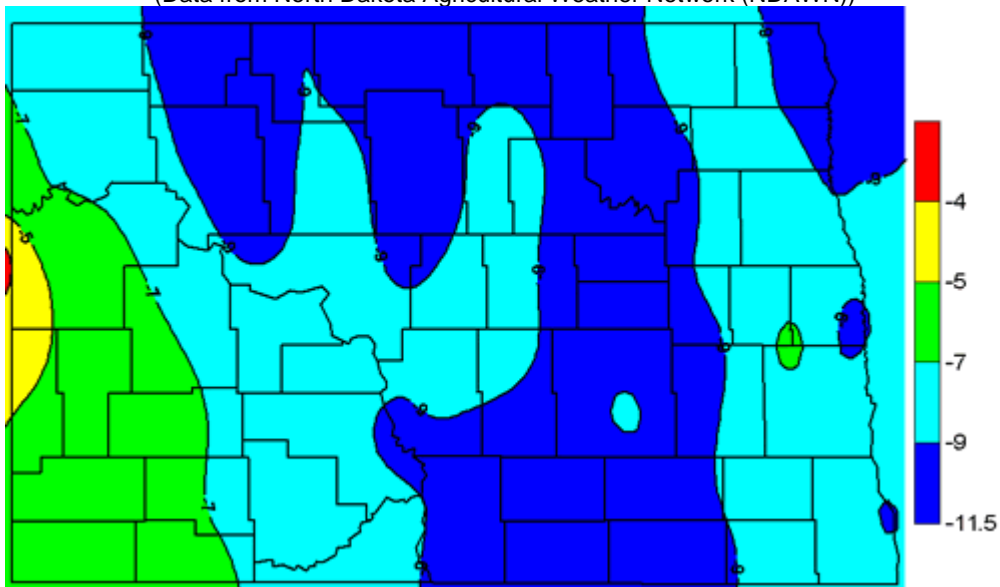


North Dakota State Climate Office

Average Temperature (°F) Deviation from Mean (1971-2000)

Departure From Normal Monthly
Average Air Temperature in degrees F

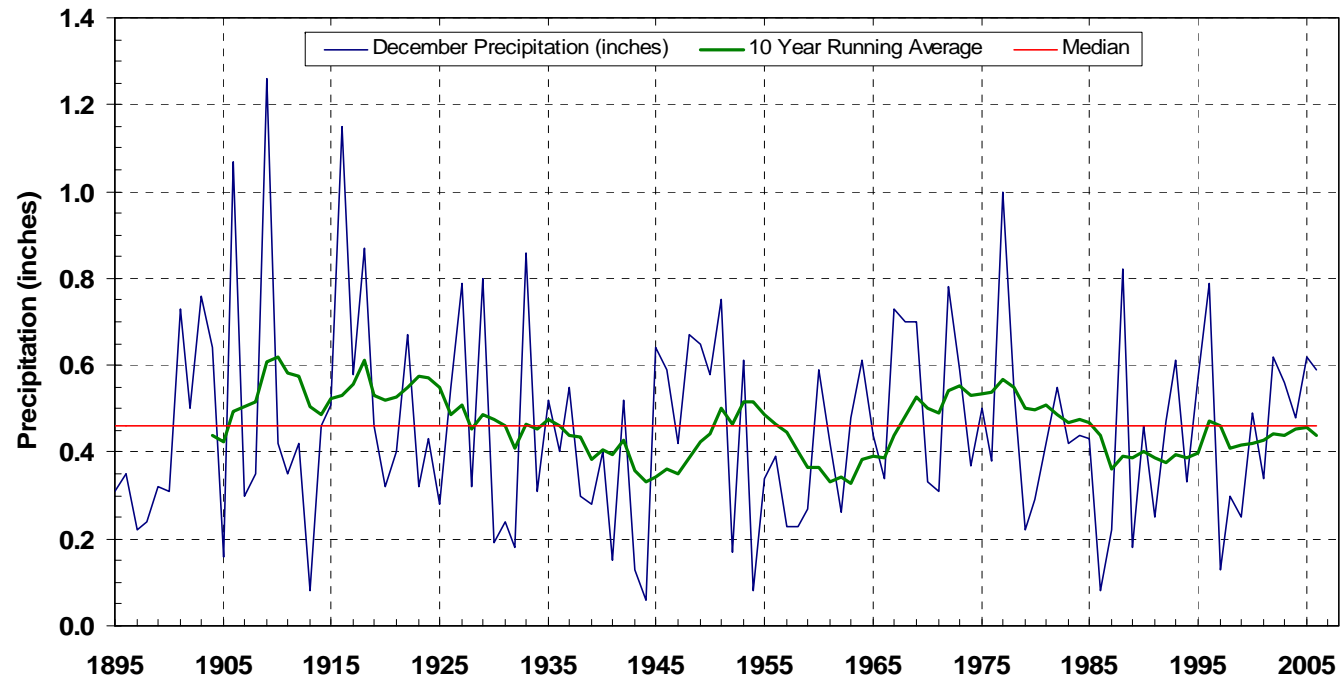
(Data from North Dakota Agricultural Weather Network (NDAWN))



North Dakota State Climate Office

February 2007

Historical December Precipitation for North Dakota

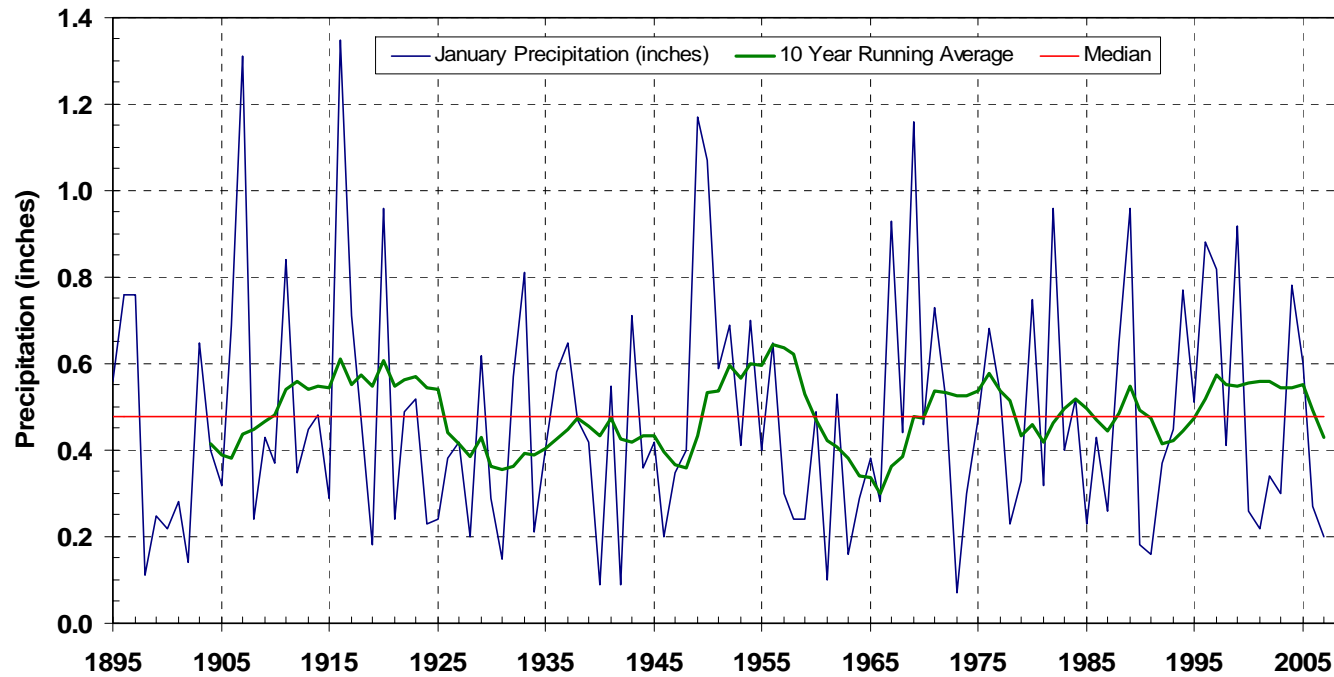


December Precipitation Statistics

2006 Amount: **0.59 inches**
Maximum: 1.26 inches in 1909
State Normal: 0.43" (1971-2000)

Monthly Ranking: 31st Wettest in 112 years
Minimum: 0.06 inches in 1944
Years in Record: 112

Historical January Precipitation for North Dakota

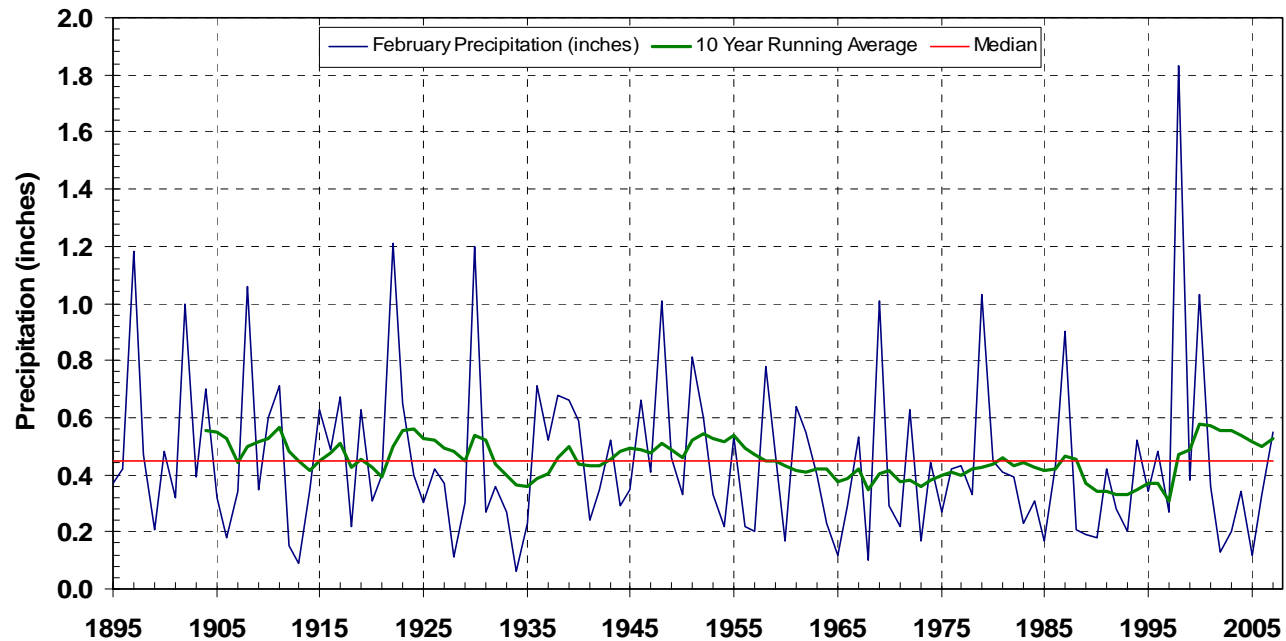


January Precipitation Statistics

2007 Amount: **0.20 inches**
Maximum: 1.35 inches in 1916
State Normal: 0.50" (1971-2000)

Monthly Ranking: 14th Driest in 113 years
Minimum: 0.07 inches in 1973
Years in Record: 113

Historical February Precipitation for North Dakota



February Precipitation Statistics

2007 Amount: **0.55 inches**

Maximum: 1.83 inches in 1998

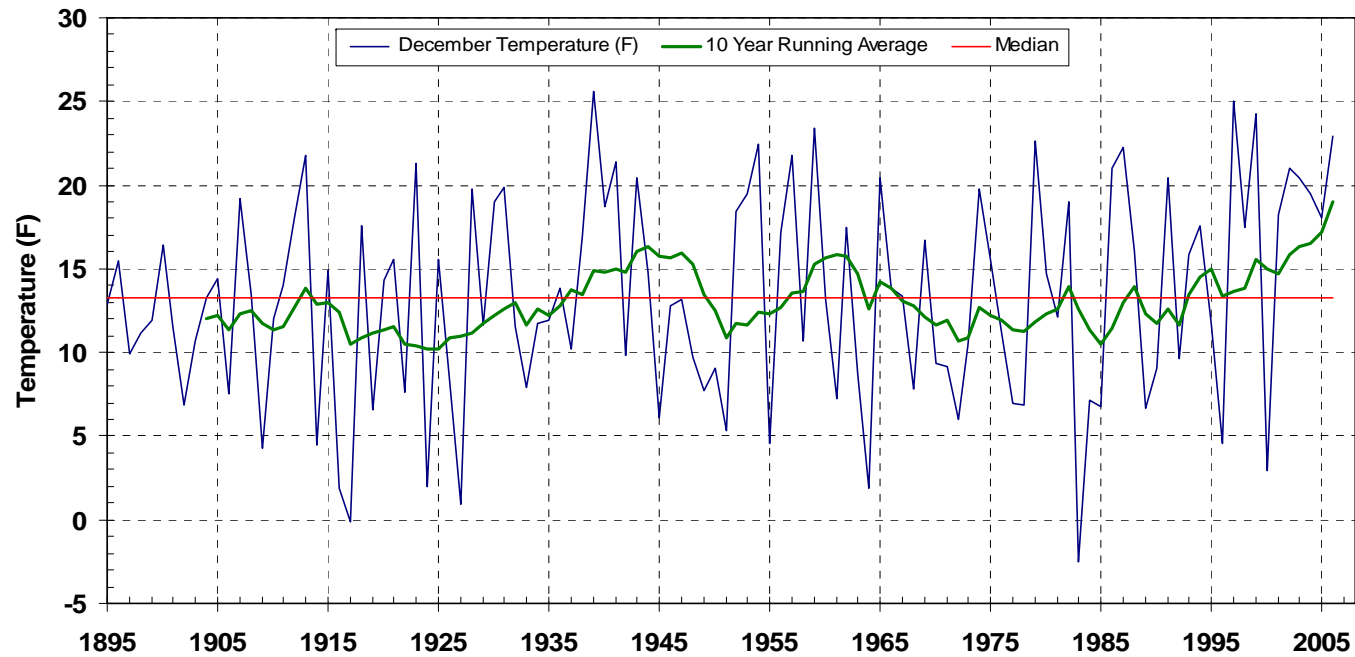
State Normal: 0.45" (1971-2000)

Monthly Ranking: 29th Wettest in 113 years

Minimum: 0.06 inches in 1934

Years in Record: 113

Historical December Temperature for North Dakota



December Temperature Statistics

2006 Average: **22.9 °F**

Maximum: 25.6 °F in 1939

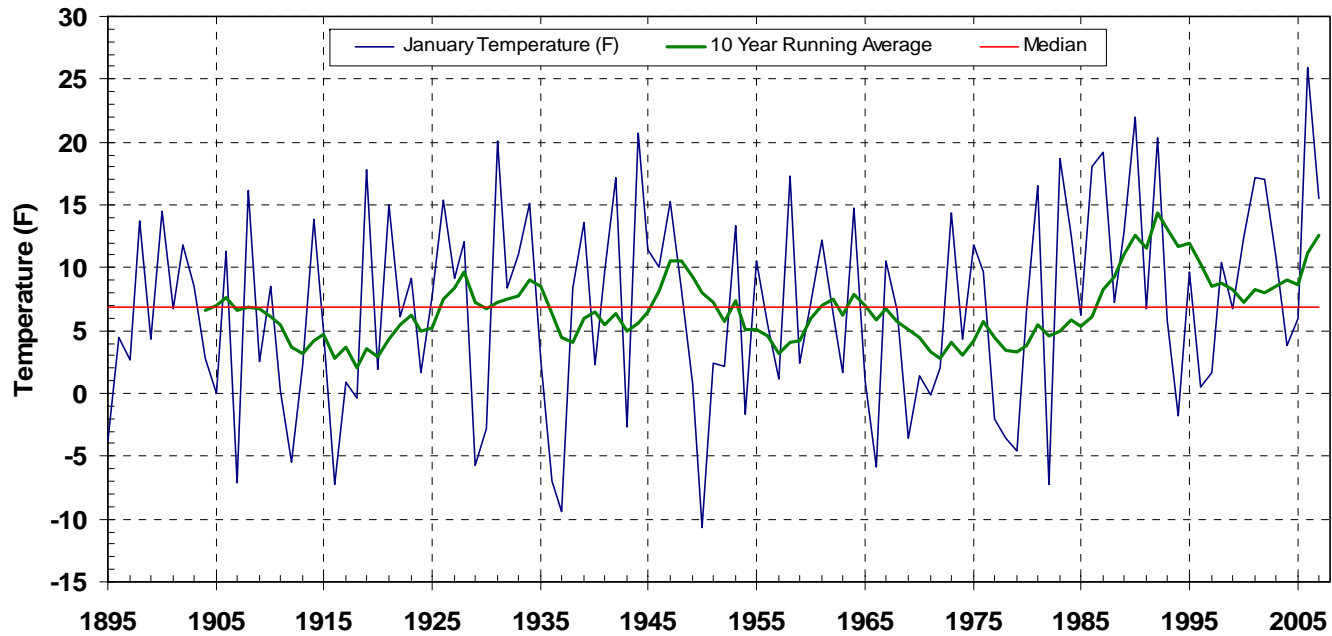
State Normal: 13.0 °F (1971-2000)

Monthly Ranking: 5th Warmest in 112 years

Minimum: -2.5 °F in 1983

Years in Record: 112

Historical January Temperature for North Dakota



January Temperature Statistics

2007 Average: **15.5 °F**

Maximum: 25.9 °F in 2006

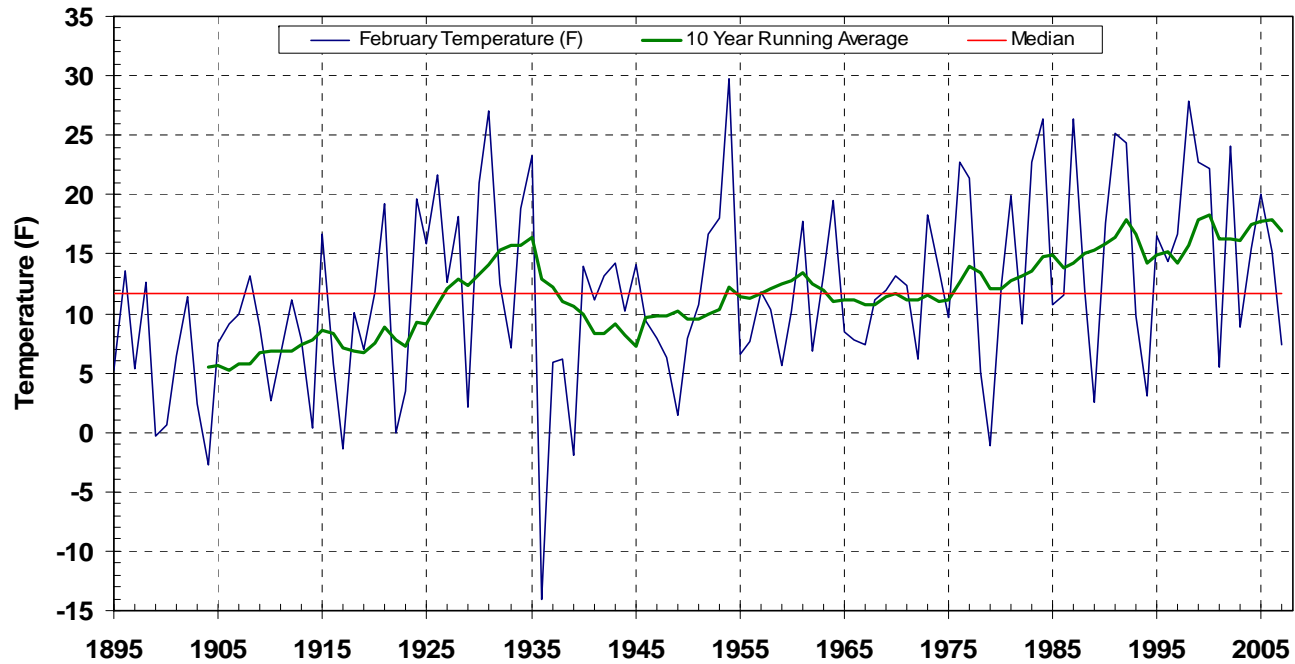
State Normal: 7.9 °F (1971-2000)

Monthly Ranking: 16th Warmest in 113 years

Minimum: -10.7 °F in 1950

Years in Record: 113

Historical February Temperature for North Dakota



February Temperature Statistics

2007 Average: **7.4 °F**

Maximum: 29.7 °F in 1954

State Normal: 15.4 °F (1971-2000)

Monthly Ranking: 33rd Coolest in 113 years

Minimum: -14.1 °F in 1936

Years in Record: 113



Storm Center



State Tornado, Hail, and Wind Reports for Winter 2006-2007 by B. A. Mahoney

North Dakota Counties Tornado Hail Wind
 0 0 0

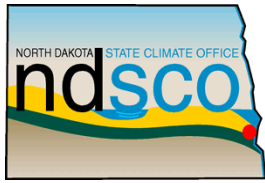
Reports by Month					
Month	Wind	Hail	Tornado	Injury	Casualty
Total December	0	0	0	0	0
Total January	0	0	0	0	0
Total February	0	0	0	0	0

Maximum by County	
County with Most Tornado Reports	None
County with Most Hail Reports	None
County with Most Wind Reports	None
County with Most Total Reports	None

Maximum by Date	
Date with Most Tornado Reports	None
Date with Most Hail Reports	None
Date with Most Wind Reports	None
Date with Most Total Reports	None

Maximum Event	
Largest Hail (inches)	0
Highest Wind (mph)	-

Injuries	0
Casualties	0



Spring Outlook



Spring 2007: Seasonal Climate Outlooks by M. Ewens

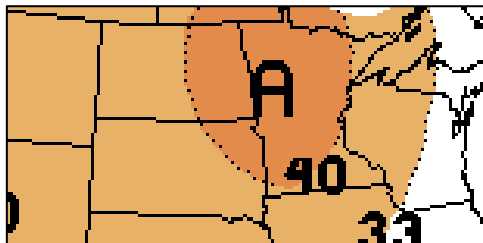
The science of climate forecasting, while still in its infancy, has come a long way in the past several decades. New technologies including satellites, buoys and advances in climate computer models have broadened the depth of knowledge we have on climate and its many interactions. For example, the Tropical Atmosphere Ocean (TAO) Project has greatly enhanced our ability to detect subtle changes in the phase of the El Niño Southern Oscillation (ENSO) signal. This in turn has led to a greater ability to predict the start of an El Niño or La Niña. Advances in computer modeling, such as the Climate Forecast System (CFS) have enhanced the predictability of large scale, long term climate events.

Statistical models have improved to the point where the Climate Prediction Center (CPC) now issues 13, three month seasonal outlooks for more than a year in advance. These outlooks are a mixture of statistical modeling, deterministic procedures and human intervention. The human intervention is still a critical part of the process, with climate experts at the CPC using their experience and knowledge of climate forcing interactions to make the best outlooks possible.

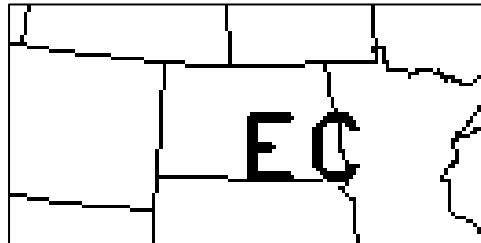
The seasonal statewide outlooks for March, April and May show a trend toward warmer. For the 3-month period from March through May, there is a greater than 40% chance for the Eastern North Dakota to have above normal temperature while the rest of the state has slightly better chance than climatologic expectation of 1/3. Precipitation outlook for the next 3-month period however calls for equal chances of wetter than normal, dryer than normal and near normal conditions.

These outlooks are updated on the third Thursday of each month, with a final monthly outlook issued at the end of each month and posted at the following link:

http://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead01/off_index.html



3-Month Average Temperature Outlook
March-April May



3-Month Average Precipitation Outlook
March-April May



Science Bits



Climate Normals Defined

by Dr. John Enz

Calculation of Normals: A climatic Normal is defined as the average of a variable such as temperature or precipitation for a continuous 3-decade (30-year) period. As each decade ends, the oldest decade in the calculation is dropped and the most recent complete decade is added to the Normal period. The last Normal period was the 30 years, 1961-1990. Then in 2001, the 1961-1970 decade was dropped and the 1991-2000 decade was added to produce the current Normal period of 1971-2000.

For example, to calculate the Normal maximum temperature for June 6, the average of the maximum temperature for every June 6th during the 1971-2000 period is calculated. That is, all 30 of the June 6th maximum temperatures are summed, and then the sum is divided by 30 to get the average, or in this case, the Normal maximum temperature for June 6. This would be repeated for any other variable.

Calculation of Departure from Normal Air Temperature: The Departure from Normal Air Temperature for a month is always the difference between the average air temperature for a specific month, and the normal average air temperature for the same month. The normal value is always subtracted from the measured value so if the difference is negative the measured value is below normal and if the difference is positive the measured value is above normal. For example the:

Departure from Normal Fargo February 2007 Average Air Temperature
= Fargo February 2007 Average Temp – Fargo February Normal Average Temp
= 6.6 °F – 14.1 °F = -7.5 °F

This means that February 2007 average temperature was 7.5 °F below normal.

Calculation of Percent of Normal Precipitation: The Percent of Normal Precipitation for a month is always the total precipitation for a specific month divided by the normal precipitation, and that value is then multiplied by 100. The measured value is always divided by the normal value which gives you the percent of normal. Therefore, anything over 100% is naturally greater than normal and anything less than 100% is below normal. For example the:

Percent of Normal Fargo February 2007 Precipitation (inches)
= (Fargo February 2007 Precipitation / Fargo February Normal Precipitation) * 100
= (0.73" / 0.59") * 100 = 124 %

This means that February 2007 total precipitation was 24% above normal.

CONTACTING THE NORTH DAKOTA STATE CLIMATE OFFICE

Please contact us if you have any inquiries, comments, or would like to know how to contribute to this [quarterly bulletin](#).

North Dakota State Climate Office

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