



# North Dakota Climate Bulletin

Winter 2008-2009

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**NDSCO**

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## **From the State Climatologist**



The North Dakota 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.

Compared historically, North Dakota had a colder and a wetter winter following another wet but warm fall. When combined with the saturated soil in eastern ND, it remains a concern for the increased possibility of spring flooding in the Red River Valley. Current models predict that there is a 98% chance that Red River in Fargo will exceed the major flood stage of 30 feet this spring. The Community Collaborative Rain Hail and Snow Network (CoCoRaHS) currently has 50 observers representing 19 counties. Temperature-wise, this winter was the 23<sup>rd</sup> coldest since 1895. Precipitation-wise, it was the 4<sup>th</sup> wettest winter since 1895. The total precipitation amounts as a percentage of the normal and average temperature departure from normal are shown on pages 6 through 8 (Season in-Graphics) followed by the time series of monthly total precipitation and average temperature of North Dakota for respective months of the season. This bulletin can be accessed at <http://www.ndsu.edu/ndSCO/>. This website hosts other great resources for climate and weather information.

Adnan Akyüz, Ph.D.  
North Dakota  
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Photo by Tobosa



# Weather Highlights



## Seasonal Summary:

by B. A. Mullins

### December 2008

The state average precipitation was 0.80 inches which is above the 1971-2000 normal of 0.44 inches. December 2008 state average precipitation ranked 8<sup>th</sup> wettest in the last 114 years with a maximum of 1.26" in 1909 and a minimum of 0.06" in 1944.

The total precipitation for December ranged from approximately 0.1 to nearly 3 inches. The higher amounts from 1.7 to over 2 inches were measured in the northwest, central, and southeast parts of the State. All parts of the State recorded over 100% of normal precipitation. The precipitation percent of normal ranged from about 100% to 600%. The higher amounts of over 300% of normal were recorded in the northwest, central, and southeast part of the State.

The US Drought Monitor is unchanged from last month classifying the areas to the north and east of the Missouri river as having no drought conditions. Most of the southwest corner of the state was classified under moderate drought conditions. From the November report, the USDA, National Agricultural Statistics Service, North Dakota Field Office reported topsoil moisture of 7% very short, 11% short, 64% adequate, and 18% surplus with subsoil moisture reported as 13% very short, 20% short, 51% adequate, and 7% surplus (Weekly Weather and Crop Bulletin Vol. 95, No. 48).

The National Weather Service (NWS) recorded record December snowfall at Fargo, Grand Forks, and Bismarck. Grand Forks had a record December snowfall of 30.1 inches which broke the previous record of 27.6 inches set in 1918. Grand Forks December snowfall is the second highest monthly total with the highest monthly total being 31.5 inches in January 1989. Fargo recorded 33.5 inches of snow in December which broke the previous record of 29.2 inches set in 1927. Fargo December snowfall was also a record snowfall for any month by beating the previous 31.5 inches set in January 1989. Bismarck recorded 33.3 inches of snow in December breaking the previous record of 21.7 inches set in 1916. Bismarck December snowfall was also a record for any month by beating the previous record of 31.1 inches set in March 1975. In addition, Bismarck total seasonal snowfall through December 2008 is 45.7 inches breaking the previous record of 44.4 inches of measured seasonal snow through December 1993.

The National Weather Service (NWS) reported breaking several snowfall and precipitation records. Bismarck had record snowfall on the 13<sup>th</sup> and 14<sup>th</sup>. Grand Forks had record snowfall on the 15<sup>th</sup>, 20<sup>th</sup>, 23<sup>rd</sup>, and 27<sup>th</sup>. Fargo had record snowfall on the 30<sup>th</sup>. A list of the daily records can be found later in this publication under "North Dakota Record Event Reports for winter 2008-2009."

According to the preliminary reports of the National Weather Service's Storm Prediction Center (SPC), December had no reports of hail, high winds or tornadoes.

The top December daily maximum wind speeds recorded from NDAWN all fell on the 14<sup>th</sup> of December. The top five were 50.5 mph at Prosper, 49.4 mph at Oakes, 48.3 mph at Marion, 48.3 mph at Wahpeton, and 48.0 mph at Ekre.

The state average air temperature was 3.2°F which is well below the 1971-2000 normal of 13.0°F. December 2008 state average air temperature ranked 8<sup>th</sup> coolest in the past 114 years with a maximum of 25.6°F in 1939 and a minimum of -2.5 °F in 1983.

December was a cold month with average air temperatures ranging from -1°F in the northeast to 11°F in the southwest corner of the state. The average monthly temperatures were below normal across the State. The departure from normal temperature ranged from -10 in the north central to -6 in the south central part of the State.

The National Weather Service recorded record low maximum air temperatures on the 15<sup>th</sup> at Minot with -15°F, Dickinson with -13°F, and Bismarck with -10°F. Jamestown had a record low temperature of -22°F on the 16<sup>th</sup> of December. The coldest daily minimum air temperatures from the North Dakota Agricultural Weather Network (NDAWN) were Mohall on the 22<sup>nd</sup> with -33.8°F, Bottineau on the 24<sup>th</sup> with -33.3°F and on the 22<sup>nd</sup> with -32.9°F, Hofflund on the 22<sup>nd</sup> with -32.7°F and on the 21<sup>st</sup> with -32.1°F, Harvey on the 22<sup>nd</sup> with -31.1°F, Crosby on the 15<sup>th</sup> with -30.9°F, and Karlsruhe on the 22<sup>nd</sup> with -30.7°F. The warmest daily maximum air temperature from NDAWN was Sidney, MT on the 1<sup>st</sup> with 49.6°F.

## **January 2009**

The North Dakota (ND) state average precipitation was 0.53 inches which was just above to the 1971-2000 normal state average of 0.50 inches. January 2009 state average precipitation ranked the 38<sup>th</sup> wettest in the past 115 years with a maximum of 1.35 inches in 1916 and a minimum of 0.07 inches in 1973.

Heavy snow fell across the State during the first half of January setting National Weather Service (NWS) daily precipitation records at Williston, Bismarck, Fargo, and Grand Forks. The second half of January was dryer with a few light snow showers. The monthly total percent of normal precipitation was 150% to 400% of normal in the northwest, central, and parts of the south central regions. The southwest corner and the eastern third of the State was 25% to 70% of normal precipitation. The majority of the monthly total precipitation ranged from 0.1 to 1.5 inches with amounts less than 0.25 inches falling in the southwest and the northeast corners of the State. The northwest, central, and southeast parts of the State had precipitation amounts primarily between 1.0 and 1.5 inches.

The US Drought Monitor classified the areas to the north and east of the Missouri river as having no drought conditions. The counties in the center of the southwest corner of the state were classified under moderate drought conditions with surrounding counties listed as abnormally dry.

The National Weather Service (NWS) broke eight records for precipitation and snowfall. A list of January NWS records is listed later in this publication under “North Dakota Record Event Reports for Winter 2008-2009.”

According to the preliminary reports of the National Weather Service’s Storm Prediction Center (SPC), January had no reports of hail, high winds or tornadoes.

The majority of January's highest daily maximum wind speeds recorded from NDAWN fell on the 31<sup>st</sup>. The top five maximum wind speeds were 55.1 mph at Bowman on the 12<sup>th</sup>, 54.8 mph at Lisbon on the 31<sup>st</sup>, 53.3 mph at Pillsbury on the 31<sup>st</sup>, 53.2 mph at McHenry on the 31<sup>st</sup>, and 53.0 mph at both Beach on the 13<sup>th</sup> and Grafton on the 31<sup>st</sup>.

The state average air temperature was 4.0°F which is below the 1971-2000 normal of 7.9°F. January 2009 state average air temperature ranked the 44<sup>th</sup> coolest in the past 115 years with a maximum of 25.9°F in 2006 and a minimum of -10.7°F in 1950.

Average air temperatures for the first half of January were near or below normal. The middle of January saw extreme arctic cold temperatures. The National Weather Service (NWS) recorded a record -44°F on January 15<sup>th</sup> at Bismarck. The cold temperatures were followed by a brief warm up to above normal temperatures before temperatures fell to below normal again. The last couple of days in January saw well above normal temperatures with NWS setting a record 44°F at both Grand Forks and Fargo on the 31<sup>st</sup>. The monthly average air temperatures ranged from 16°F in the southwest corner to -3°F in the northeast corner. The departure from normal air temperatures ranged from 3°F along the far west edge of the State to -7°F along the eastern edge of the State. Over three-fourths of the State had below normal air temperatures with departures from normal of -2°F to -5°F.

The National Weather Service (NWS) also recorded a record low temperature at Grand Forks airport of -38°F on the 13<sup>th</sup> which broke the previous record of -31°F set in 1979. The coldest daily minimum air temperatures from the North Dakota Agricultural Weather Network (NDAWN) were all on the 15<sup>th</sup> of January with the top five being -43°F at Hazen, -41°F at Hofflund, Bottineau and Karlsruhe, and -40°F at Crosby. The warmest daily maximum air temperatures from NDAWN were all set on the 31<sup>st</sup> with the top five being 45°F at Ekre and Hofflund, 44°F at Sidney MT, Leonard, and Galesburg.

## **February 2009**

The state average precipitation was 1.07 inches which is above the 1971-2000 normal of 0.45 inches. February 2009 state average precipitation ranked 5<sup>th</sup> wettest in the past 115 years with a maximum of 1.83 inches in 1998 and a minimum of 0.06 inches in 1934.

All areas across the State had above normal precipitation. The East half of the state had primarily between 150% and 300% of normal precipitation. The West half of the state had between 150% to 500% plus, percent of normal precipitation. February precipitation totals ranged from between 0.5 to 1.25 inches in the East and 0.5 to 2 inches plus in the West. Scattered light snows fell throughout the month with two major high precipitation events falling from the 8<sup>th</sup> through the 11<sup>th</sup> and from the 25<sup>th</sup> through the 27<sup>th</sup>. The National Weather Service (NWS) reported breaking several records from the 8<sup>th</sup> through the 10<sup>th</sup> at Bismarck, Jamestown, Grand Forks, Fargo, Minot, and Williston.

The US Drought Monitor classified the areas to the north and east of the Missouri river as having no drought conditions. Most of the counties in the southwest corner of the state had no drought conditions. Only a few counties in the far Southwest corner had the lowest drought intensity of abnormally dry. The counties classified as the abnormally dry include Golden Valley, Billings, Slope and Bowman. The Western half of Stark, Hettinger, and Adams counties were also classified as abnormally dry.

According to the preliminary reports of the National Weather Service's Storm Prediction Center (SPC), February had no reports of hail, high winds or tornadoes.

The majority of February's highest daily maximum wind speeds recorded from NDAWN fell on the 1<sup>st</sup>. The top five maximum wind speeds which all fell on the 1<sup>st</sup> included 52.3 mph at Dazey, 49.0 mph at McHenry, 44.4 mph at Baker, 44.4 mph at Rugby, and 43.7 mph at Wahpeton.

The state average air temperature was 11.7°F which is below the 1971-2000 normal of 15.4°F. February 2009 state average air temperature ranked the 62<sup>nd</sup> coolest in the past 115 years with a maximum of 29.7°F in 1954 and a minimum of -14.1 °F in 1936.

February average air temperatures ranged from less than 4°F in the North to 20°F in the far Southwest corner with most of the state falling between less than 4°F to 16°F. The departures were below normal across the State. The temperature departures ranged from 8 degrees below normal, primarily in the Northwest, to 2 degrees below normal in the East and the far Southwest corner. The first few days of February were very cold but temperatures rebounded from the 5th through the 11th. The National Weather Service (NWS) recorded record high minimum air temperatures on the 9<sup>th</sup> at Fargo and Bismarck, and on the 10<sup>th</sup> at Grand Forks and Fargo. The last half of the month was cooler than normal for all of North Dakota with extreme cold temperatures on the 26<sup>th</sup> through the 28<sup>th</sup>.

The coldest daily minimum air temperatures from the North Dakota Agricultural Weather Network (NDAWN) were recorded on the 3<sup>rd</sup> and the 27<sup>th</sup>. The top five coldest NDAWN daily temperatures were Roseau MN at -31.3°F on the 3<sup>rd</sup>, Cando at -30.0°F on the 27<sup>th</sup>, Stephen MN at -28.6°F on the 3<sup>rd</sup>, Rolla at -28.5°F on the 27<sup>th</sup>, and Roseau MN at -27.8°F on the 27<sup>th</sup>. The top five NDAWN daily maximum temperatures were 54.8°F on the 5<sup>th</sup> at Hettinger, 53.1°F on the 5<sup>th</sup> at Bowman, 49.7°F on the 5<sup>th</sup> at Beach, 49.5°F on the 5<sup>th</sup> at Williston, and 48.1°F on the 23<sup>rd</sup> at Beach.

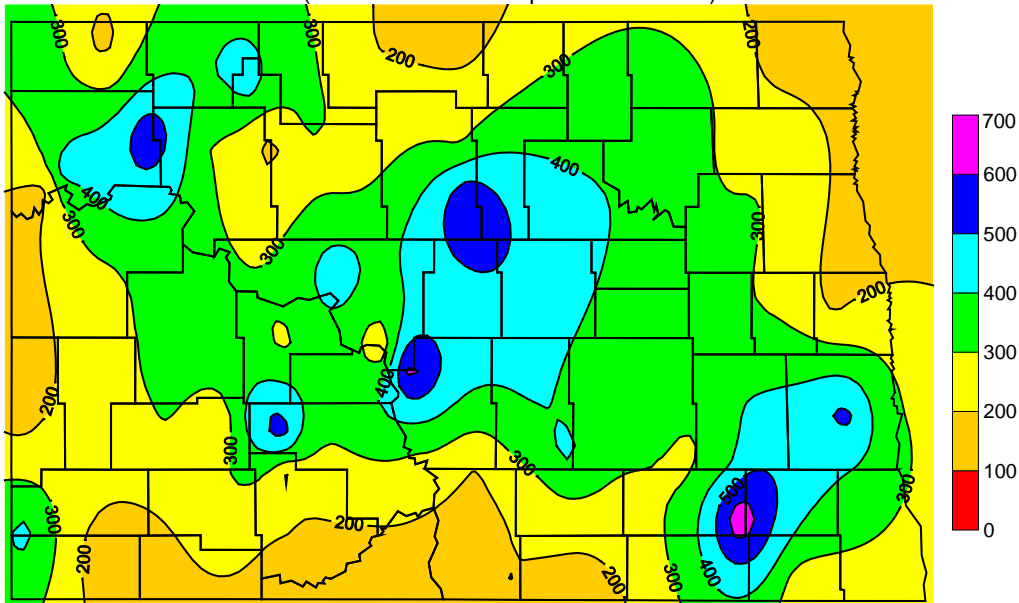
# Season in Graphics

## Winter 2008-2009 Weather in North Dakota:

Total Precipitation percent of mean (1971-2000)

Precipitation Percent of Normal

(Data from NWS Cooperative Network)

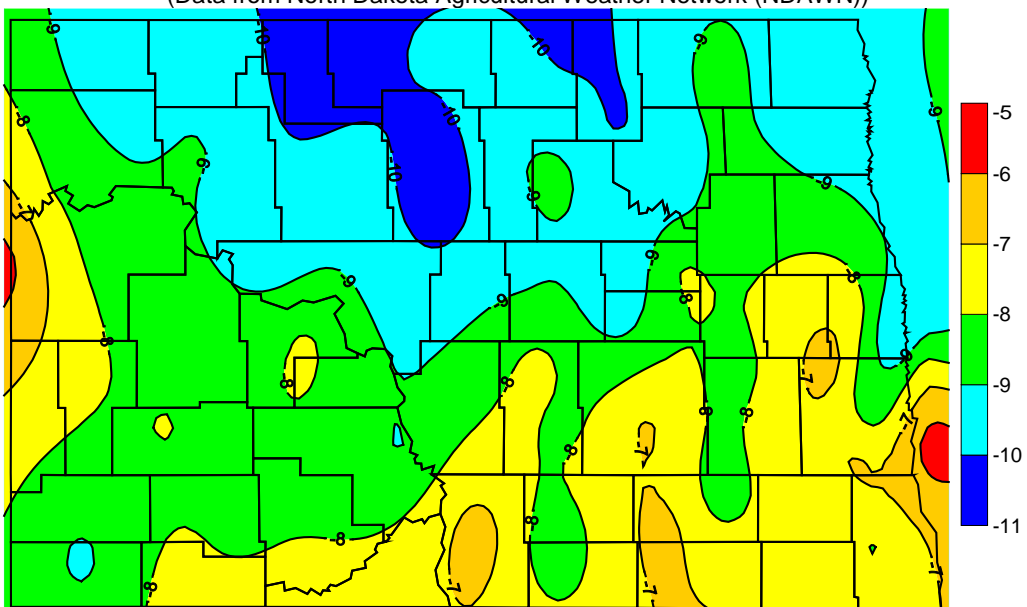


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Average Temperature (°F) Deviation from Mean (1971-2000)

Departure From Normal Monthly  
Average Air Temperature in degrees F

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



North Dakota State Climate Office

December 2008

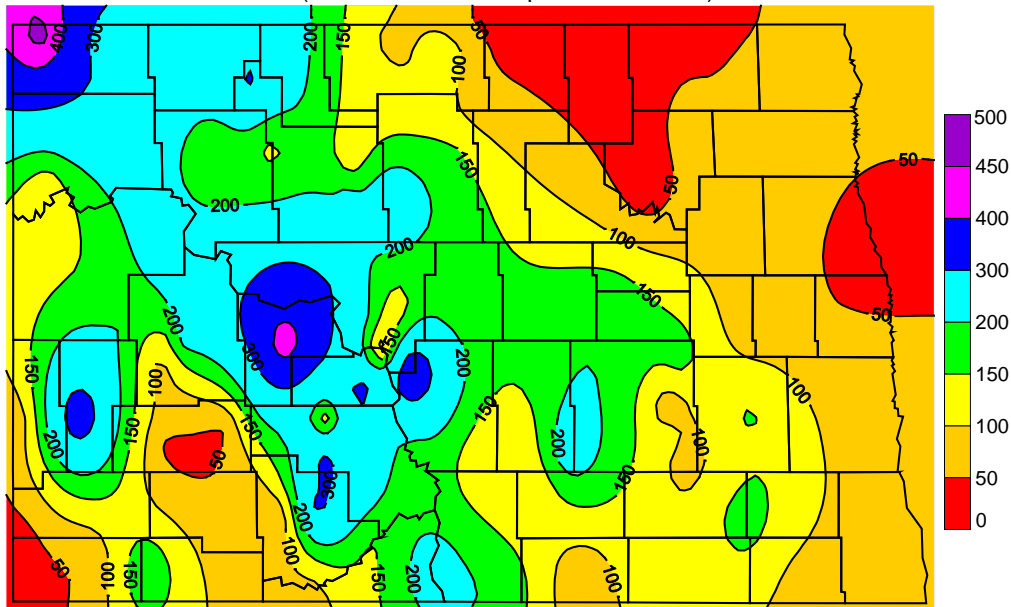
# Season in Graphics

## Winter 2008-2009 Weather in North Dakota:

Total Precipitation percent of mean (1971-2000)

Precipitation Percent of Normal

(Data from NWS Cooperative Network)

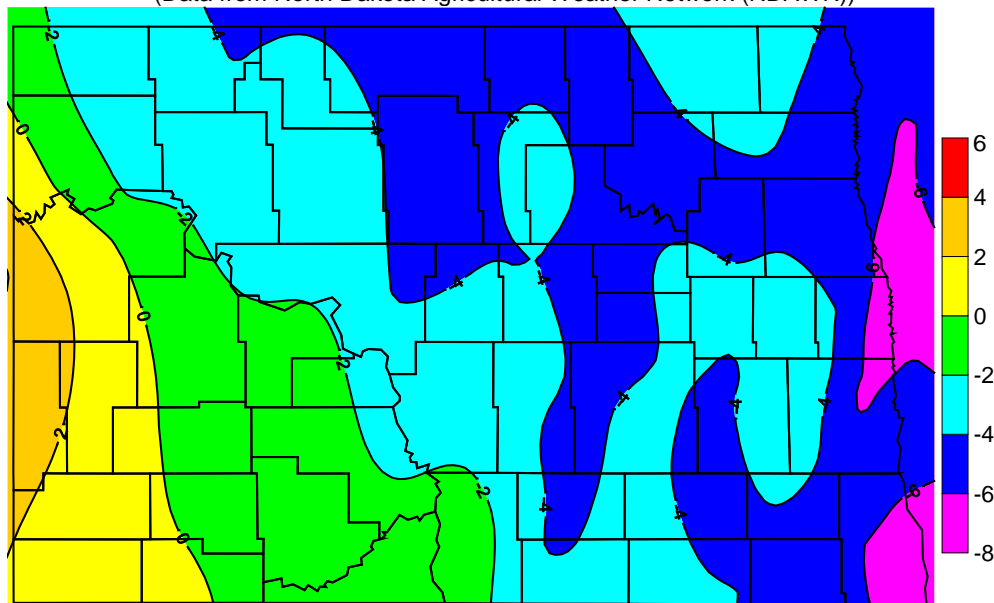


North Dakota State Climate Office

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

January 2009

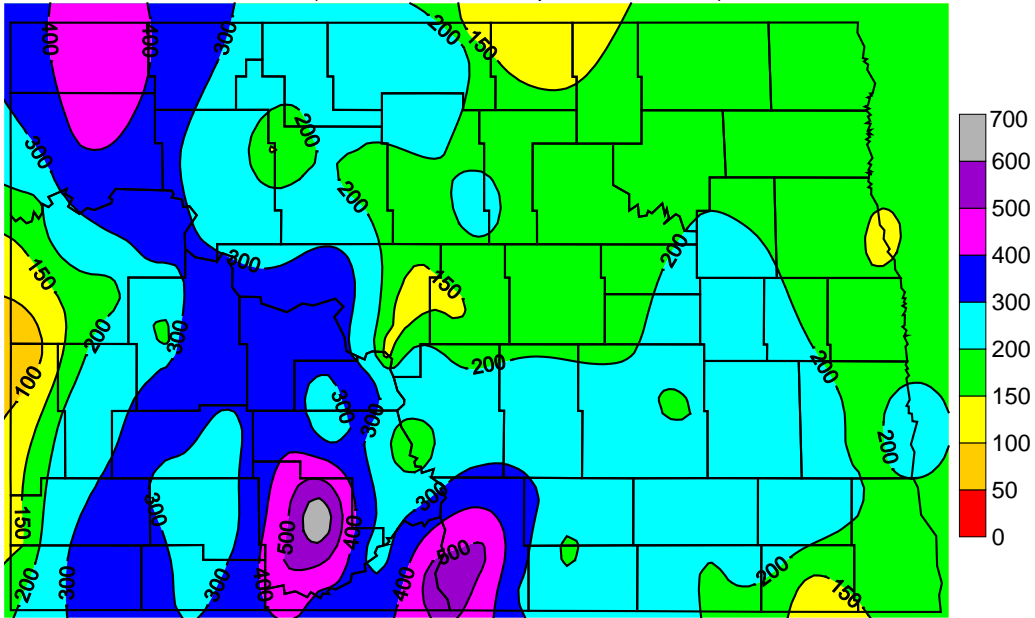
# Season in Graphics

## Winter 2008-2009 Weather in North Dakota:

Total Precipitation percent of mean (1971-2000)

Precipitation Percent of Normal

(Data from NWS Cooperative Network)



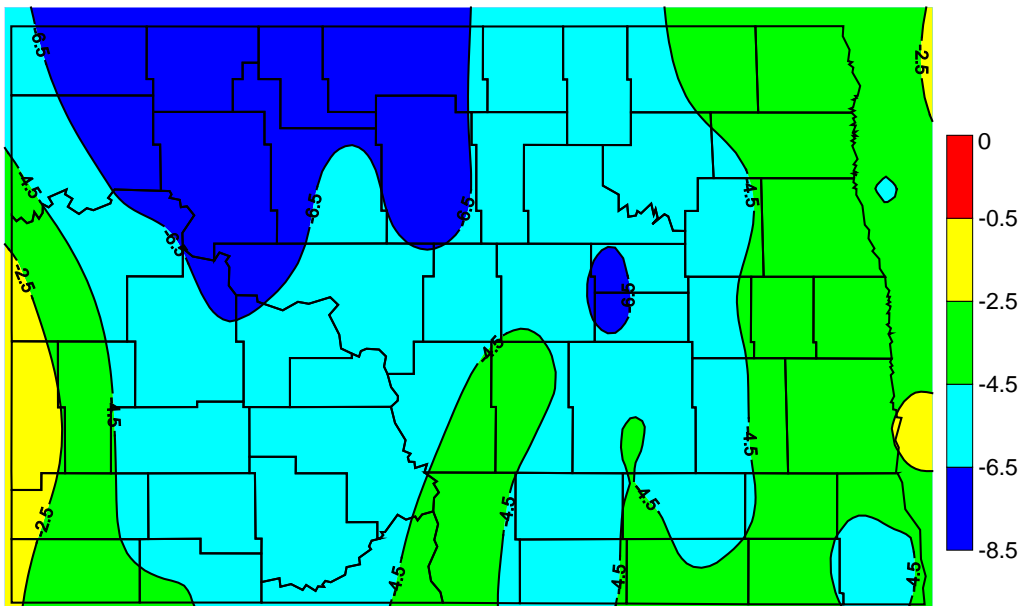
North Dakota State Climate Office

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))

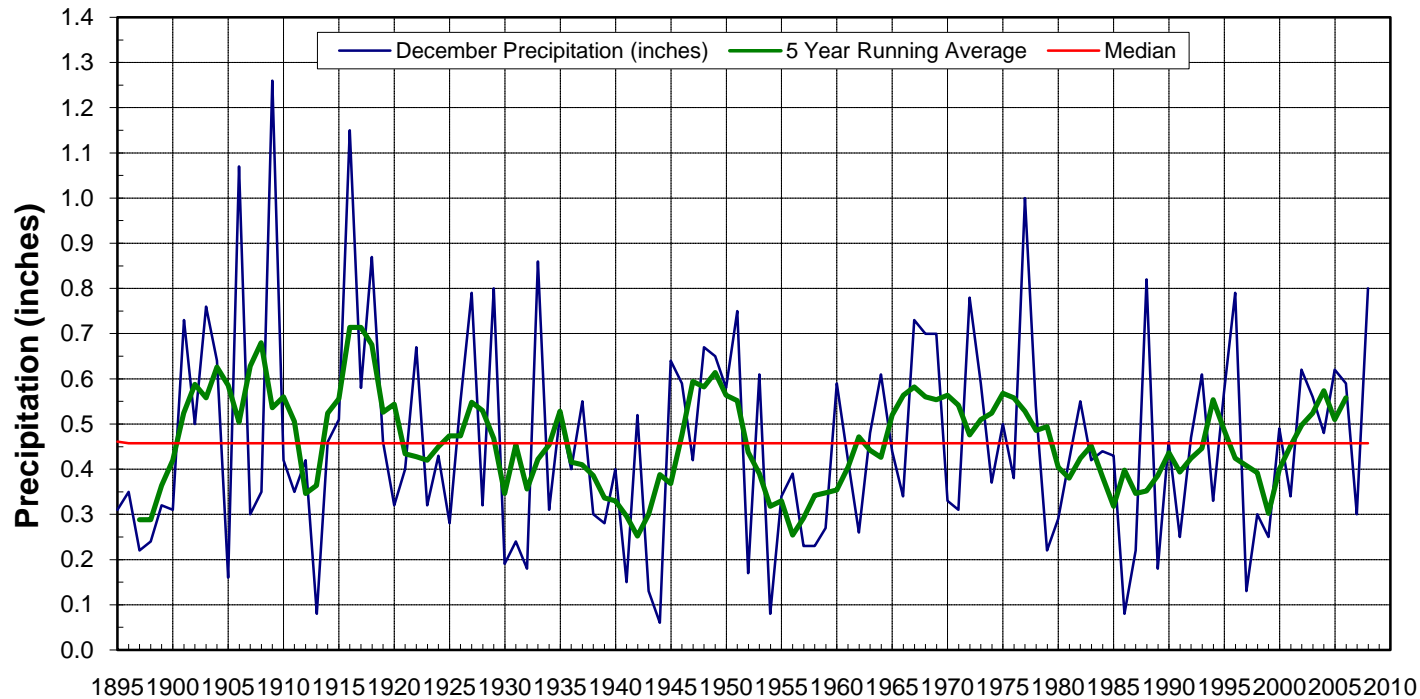


North Dakota State Climate Office

February 2009



# Historical December Precipitation for North Dakota

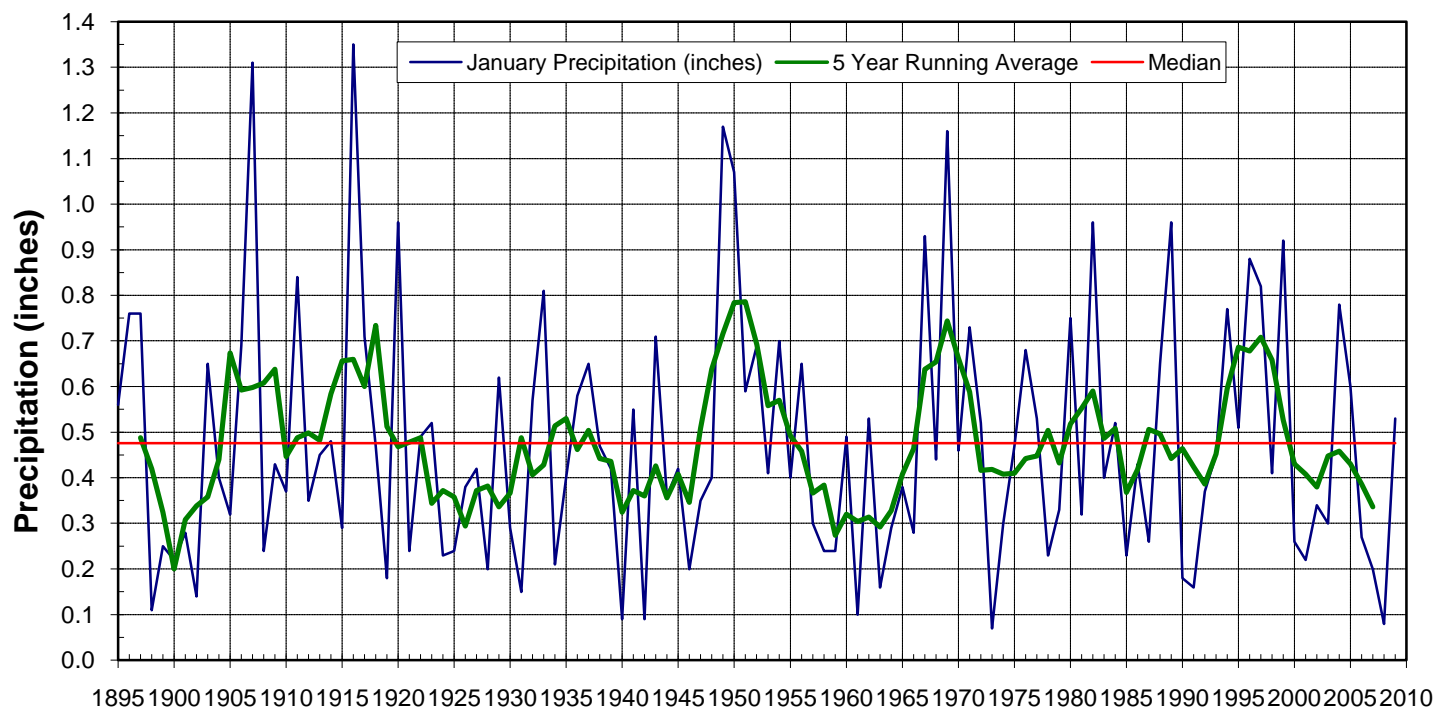


## December Precipitation Statistics

2008 Amount: **0.80 inches**  
Maximum: 1.26 inches in 1909  
State Normal: 0.44" (1971-2000)

Monthly Ranking: 8<sup>th</sup> Wettest in 114 years  
Minimum: 0.06 inches in 1944  
Years in Record: 114

# Historical January Precipitation for North Dakota

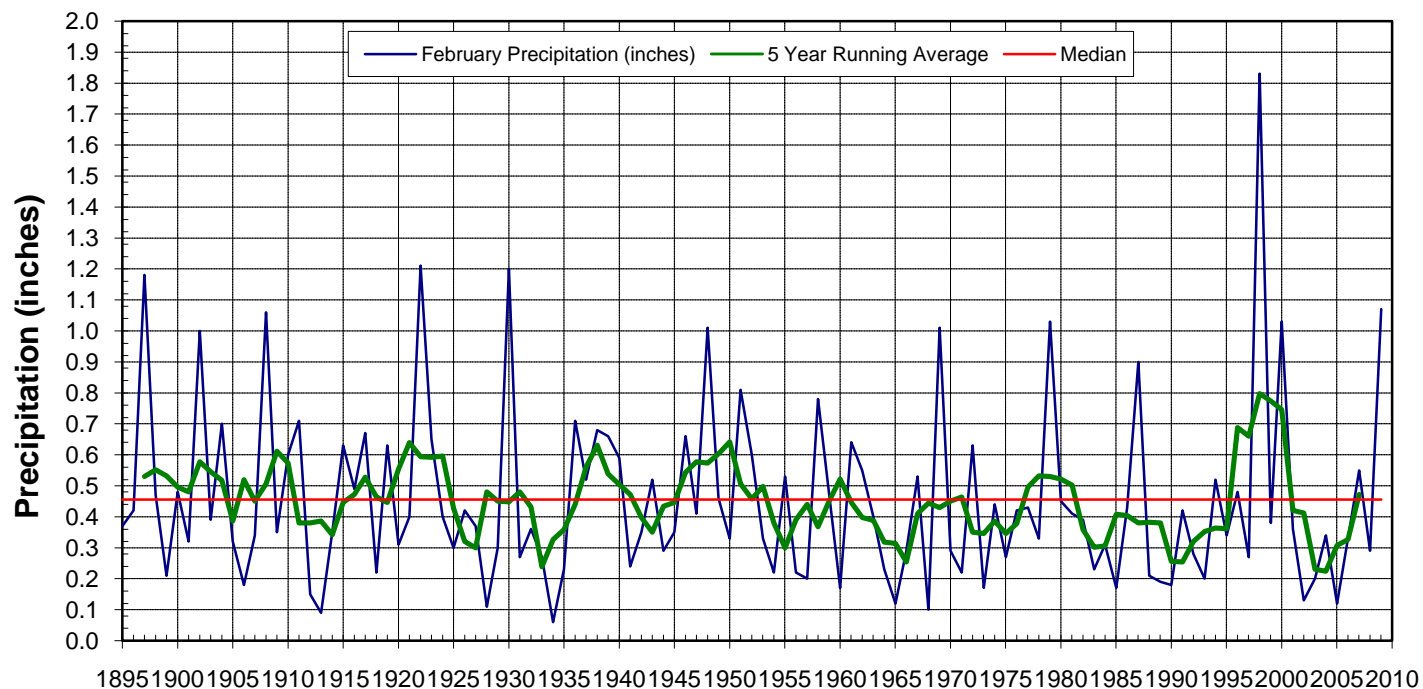


## January Precipitation Statistics

2009 Amount: 0.53 inches  
Maximum: 1.35 inches in 1916  
State Normal: 0.50" (1971-2000)

Monthly Ranking: 38<sup>th</sup> Wettest in 115 years  
Minimum: 0.07 inches in 1973  
Years in Record: 115

# Historical February Precipitation for North Dakota

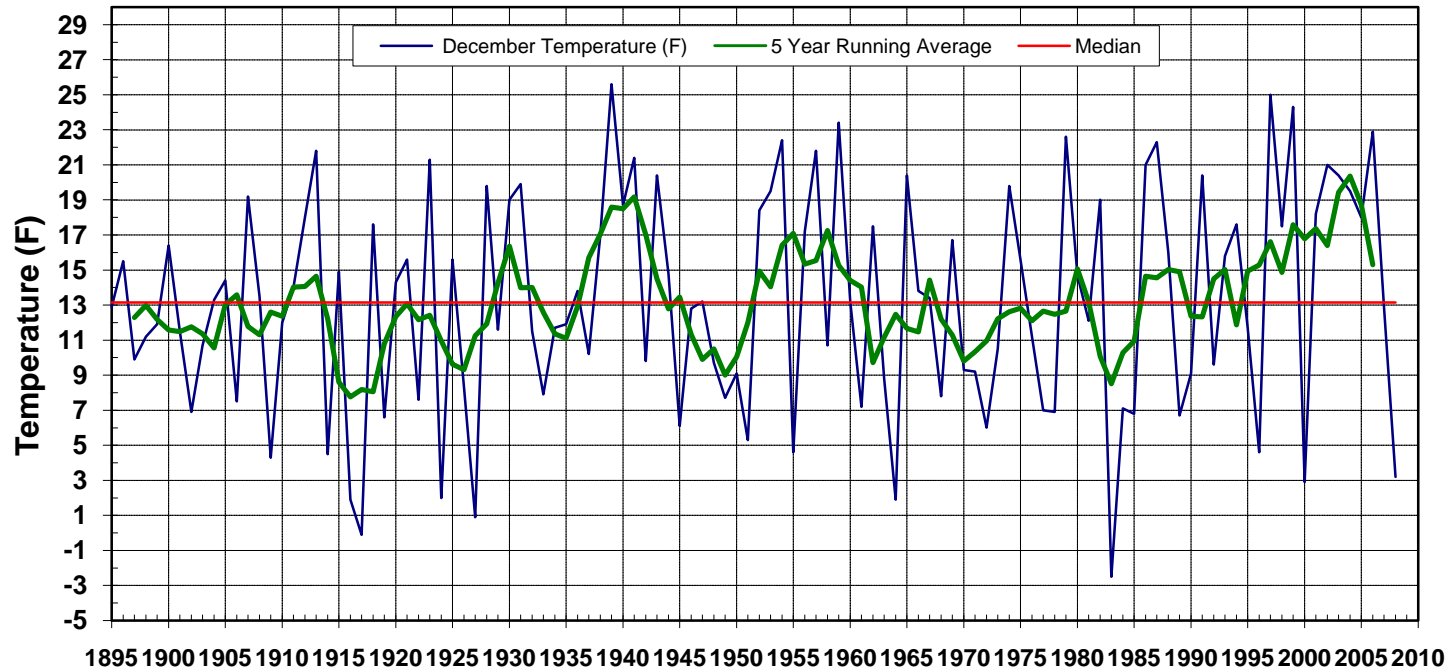


## February Precipitation Statistics

2009 Amount: 1.07 **inches**  
 Maximum: 1.83 inches in 1998  
 State Normal: 0.45" (1971-2000)

Monthly Ranking: 5<sup>th</sup> Wettest in 115 years  
 Minimum: 0.06 inches in 1934  
 Years in Record: 115

# Historical December Temperature for North Dakota



## December Temperature Statistics

2008 Average: **3.2°F**

Maximum: 25.6°F in 1939

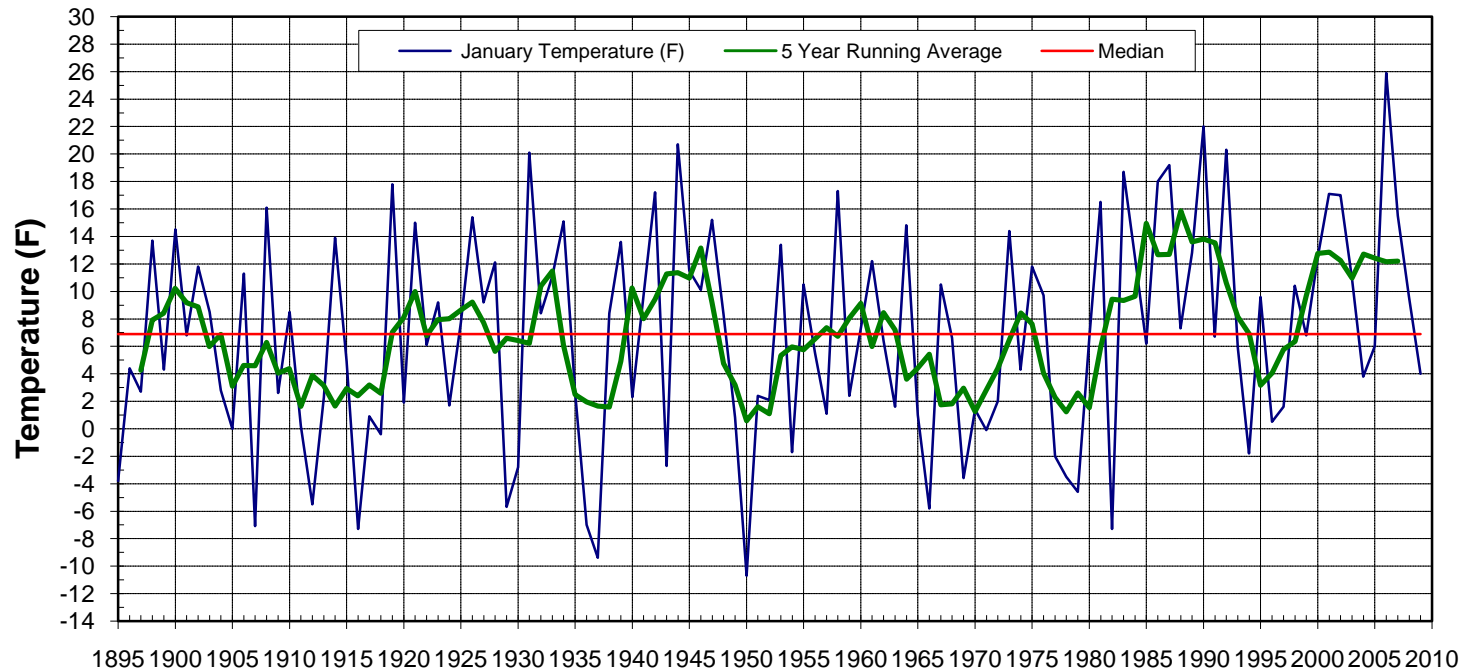
State Normal: 13.0°F (1971-2000)

Monthly Ranking: 8<sup>th</sup> Coolest in 114 years

Minimum: -2.5° F in 1983

Years in Record: 114

# Historical January Temperature for North Dakota



## January Temperature Statistics

2009 Average: 4.0°F

Maximum: 25.9°F in 2006

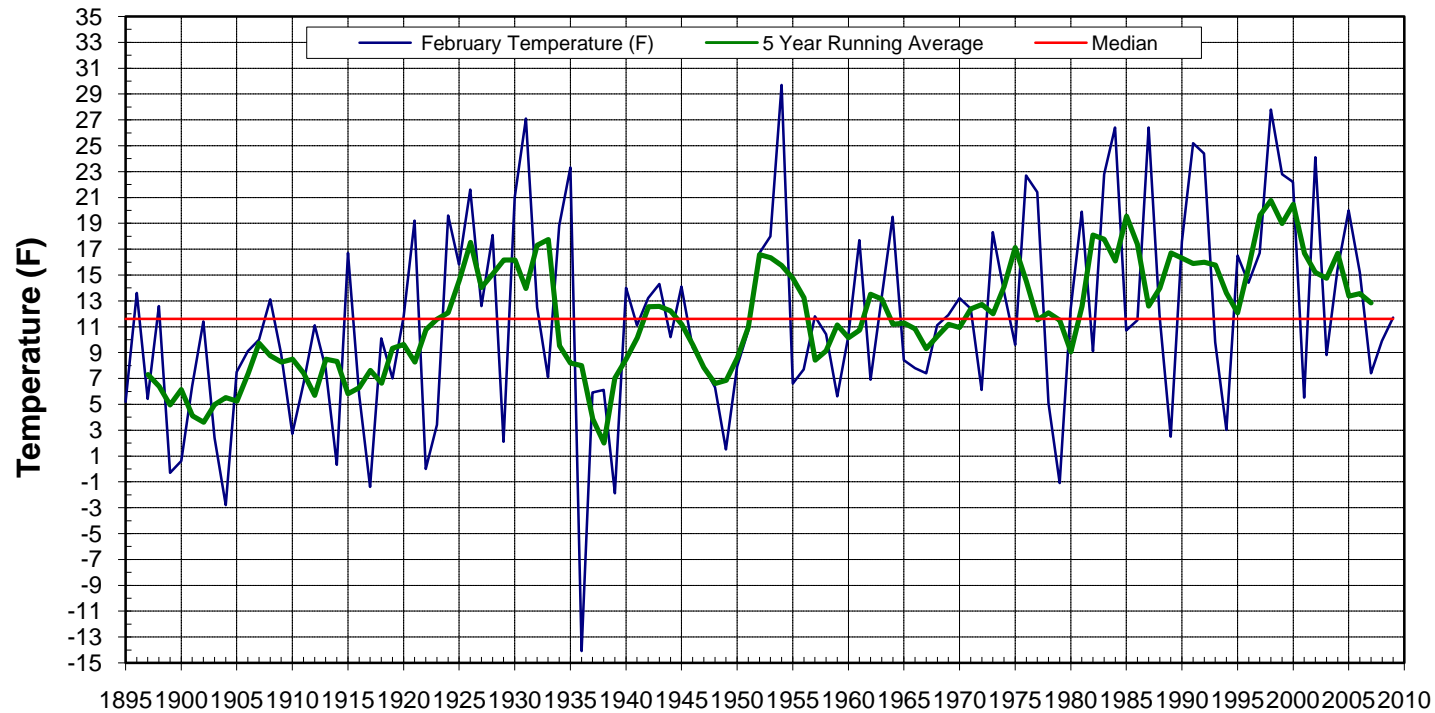
State Normal: 7.9°F (1971-2000)

Monthly Ranking: 44<sup>th</sup> Coolest in 115 years

Minimum: -10.7°F in 1950

Years in Record: 115

# Historical February Temperature for North Dakota



## February Temperature Statistics

2009 Average: **11.7°F**

Maximum: 29.7°F in 1954

State Normal: 15.4°F (1971-2000)

Monthly Ranking: 62<sup>nd</sup> Coolest in 115 years

Minimum: -14.1°F in 1936

Years in Record: 115



# Storms & Record Events



## State Tornado, Hail, and Wind Reports for Winter 2008-2009 by B. A. Mullins

|                                   |             |             |                |
|-----------------------------------|-------------|-------------|----------------|
| <b>North Dakota 3 Month Total</b> | <b>Wind</b> | <b>Hail</b> | <b>Tornado</b> |
|                                   | <b>0</b>    | <b>0</b>    | <b>0</b>       |

| Reports by Month      |      |      |         |
|-----------------------|------|------|---------|
| Month                 | Wind | Hail | Tornado |
| <b>Total December</b> | 0    | 0    | 0       |
| <b>Total January</b>  | 0    | 0    | 0       |
| <b>Total February</b> | 0    | 0    | 0       |

## North Dakota Record Event Reports for Winter 2008-2009

| Date     | Location        | Type of Record                           | Previous Record                   |
|----------|-----------------|------------------------------------------|-----------------------------------|
| 12/13/08 | Bismarck        | Record snowfall of 5.9 inches.           | 3.2 inches set in 1909            |
| 12/14/08 | Bismarck        | Record snowfall of 6.6 inches.           | 5.1 inches set in 1994.           |
| 12/14/08 | Bismarck        | Record liquid equivalent of 0.29 inches. | 0.25 inches set in 1994.          |
| 12/15/08 | Grand Forks     | Record snowfall of 5.1 inches.           | 2.0 inches set in 1955.           |
| 12/15/08 | Minot           | Record low maximum temperature of -15°F. | -7°F set in 1926 and 1951.        |
| 12/15/08 | Dickinson       | Record low maximum temperature of -13°F. | -11°F set in 1951.                |
| 12/15/08 | Bismarck        | Record low maximum temperature of -10°F. | -6°F set in 1951.                 |
| 12/16/08 | Jamestown       | Record low temperature of -22°F.         | -21°F set in 1983.                |
| 12/20/08 | Grand Forks NWS | Record snowfall of 5.7 inches.           | 4.5 inches set in 1996.           |
| 12/20/08 | Grand Forks AP  | Record snowfall of 5.4 inches.           | 3.6 inches set in 1967.           |
| 12/23/08 | Grand Forks AP  | Record liquid equivalent of 0.25 inches. | 0.24 inches set in 1964.          |
| 12/23/08 | Grand Forks AP  | Record snowfall of 4.2 inches.           | 2.4 inches set in 1964.           |
| 12/24/08 | Grand Forks AP  | Record low temperature of -24°F.         | Ties previous record set in 1948. |
| 12/27/08 | Grand Forks NWS | Record snowfall of 2.5 inches.           | 2.0 inches set in 1988.           |
| 12/30/08 | Fargo           | Record snowfall of 8.8 inches.           | 7.2 inches set in 1972.           |
| 12/08    | Grand Forks NWS | Record December snowfall of 30.1 inches. | 27.6 inches set in 1918.          |
| 12/08    | Bismarck        | Record December snowfall of 33.3 inches. | 21.7 inches set in 1916.          |
| 12/08    | Bismarck        | Record monthly snowfall of 33.3 inches   | 31.1 inches set in March 1975.    |
| 12/08    | Fargo           | Record December snowfall of 33.5 inches  | 29.2 inches set in 1927.          |
| 12/08    | Fargo           | Record monthly snowfall of 33.5 inches   | 31.5 inches set in January 1989.  |
| 01/03/09 | Grand Forks NWS | Record snowfall of 3.2 inches.           | 2.0 inches set in 1897.           |
| 01/03/09 | Grand Forks AP  | Record precipitation of 0.14 inches.     | 0.07 inches set in 1994.          |
| 01/03/09 | Grand Forks AP  | Record snowfall of 2.3 inches.           | 1.4 inches set in 1994.           |
| 01/03/09 | Fargo           | Record precipitation of 0.28 inches.     | 0.22 inches set in 1897.          |
| 01/03/09 | Fargo           | Record snowfall of 2.8 inches.           | 2.5 inches set in 1897.           |
| 01/08/09 | Williston       | Record precipitation of 0.37 inches.     | 0.30 inches set in 1949.          |
| 01/08/09 | Bismarck        | Record precipitation of 0.21 inches.     | 0.20 inches set in 1877.          |
| 01/13/09 | Grand Forks AP  | Record low temperature of -38°F.         | -31°F set in 1979.                |

|                 |                 |                                           |                            |
|-----------------|-----------------|-------------------------------------------|----------------------------|
| <b>01/14/09</b> | Bismarck        | Record snowfall of 5.4 inches.            | 3.4 inches set in 1967.    |
| <b>01/15/09</b> | Bismarck        | Record low temperature of -44°F.          | -36°F set in 1971.         |
| <b>01/31/09</b> | Grand Forks NWS | Record high temperature of 43°F.          | 42°F set in 1952.          |
| <b>01/31/09</b> | Grand Forks AP  | Record high temperature of 44°F.          | 40°F set in 1993.          |
| <b>01/31/09</b> | Fargo           | Record high temperature of 44°F.          | 41°F set in 1993.          |
| <b>02/08/09</b> | Bismarck        | Record high precipitation of 0.23 inches. | 0.12 inches set in 1926.   |
| <b>02/08/09</b> | Jamestown       | Record high precipitation of 0.19 inches. | 0.18 inches set in 1974.   |
| <b>02/09/09</b> | Grand Forks AP  | Record high precipitation of 0.47 inches. | 0.38 inches set in 1966.   |
| <b>02/09/09</b> | Fargo           | Record high precipitation of 0.26 inches. | 0.24 inches set in 1894.   |
| <b>02/09/09</b> | Fargo           | Record high minimum temperature of 34°F.  | 30°F set in 1976.          |
| <b>02/09/09</b> | Minot           | Record precipitation of 0.34 inches.      | 0.14 inches set in 1979.   |
| <b>02/09/09</b> | Bismarck        | Record high minimum temperature of 34°F.  | 30°F set in 1976 and 1996. |
| <b>02/09/09</b> | Williston       | Record snowfall of 5.4 inches.            | 1.7 inches set in 1916.    |
| <b>02/10/09</b> | Williston       | Record snowfall of 2.5 inches.            | 2.3 inches set in 1902.    |
| <b>02/10/09</b> | Williston       | Record rainfall of 0.24 inches.           | 0.23 inches set in 1902.   |
| <b>02/10/09</b> | Grand Forks AP  | Record rainfall of 0.15 inches.           | 0.10 inches set in 1996.   |
| <b>02/10/09</b> | Grand Forks AP  | Record high minimum temperature of 34°F.  | 28°F set in 1977.          |
| <b>02/10/09</b> | Fargo           | Record high minimum temperature of 34°F.  | 28°F set in 1928.          |





# Seasonal Outlook



## Spring Climate Outlooks

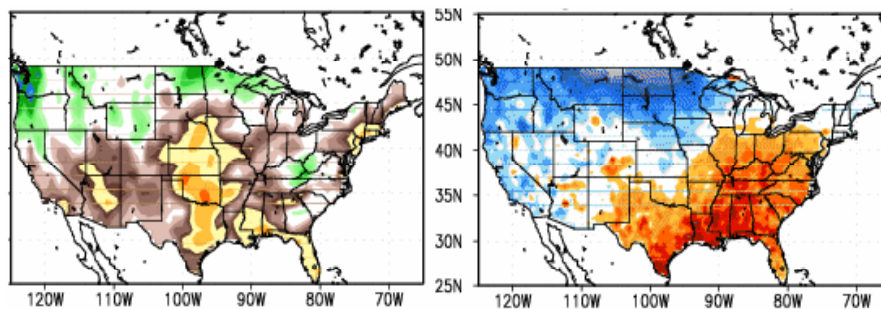
by M. Ewens<sup>1</sup>

During the winter season of 2008/2009, a weak, borderline moderate La Niña developed in the equatorial Pacific Ocean. A La Niña occurs when cold water below the surface moves upward to the surface, causing a widespread, significant cooling from the west coasts of Ecuador to the International Dateline along the Equator. La Niña affects the climate across a large part of the northern hemisphere by displacing the jet stream north of its usual winter position. This in turn typically brings colder and somewhat snowier weather to the northern plains. That certainly was the case this past winter!

During the spring, the La Niña normally weakens, allowing weather patterns to return to a more normal state. However, the affects of the La Niña can take up to several months to be removed from the atmosphere. In other words, the cooler than normal “signal” often persists into the March and April time frame.

The official outlook for the spring months of March – May 2009 is not presented here. The Climate Prediction Center (CPC) indicates there are equal chances for normal, above or below normal temperatures and precipitation over the northern plains. These outlooks are updated on the third Thursday of each month, with a final monthly outlook issued at the end of each month. These outlooks are available at [http://www.cpc.ncep.noaa.gov/products/OUTLOOKS\\_index.shtml](http://www.cpc.ncep.noaa.gov/products/OUTLOOKS_index.shtml)

However, local research suggests a more definitive outlook. On average, when there is a moderate La Niña during the winter, the following springs are usually colder and wetter than normal over a large part of the northern plains (See the graphics below).



**La Nina affected precipitation (left) and temperature (right) patterns across the United States for the spring months of March, April and May. The northern plains are typically wetter (green shading) and colder (blue shading) in La Nina spring seasons.**

North Dakota State Climate Office has links to National Weather Service’s local 3-month temperature outlooks into the fall of 2009. Those outlooks can be accessed from the following web site for your location: <http://www.ndsu.nodak.edu/ndsu/ndSCO/outlook/L3MTO.html>

Also the readers will find the following National Weather Service office web sites very useful for shorter term weather forecasts:

Eastern North Dakota: <http://www.crh.noaa.gov/fgf/>  
Western North Dakota: <http://www.crh.noaa.gov/bis/>

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# Hydro-Talk



## Western North Dakota Hydrology by A. Schlag<sup>2</sup>

Cold and wet is fast becoming the most used adjectives to describe the winter of 2008-2009. Even the brief warm spell in January brought moisture in the form of rain just to add to the state's most significant winter since 1996-97. However to break it down into a little more detail, I will include some statistics and observations within the Bismarck Hydrologic Service Area for the 2008-09 winter season (defined as December through the end of February) in Table 1. Numbers under the precipitation column shows the amount in water equivalent. Normal values are the average for the period from 1971 through 2000.

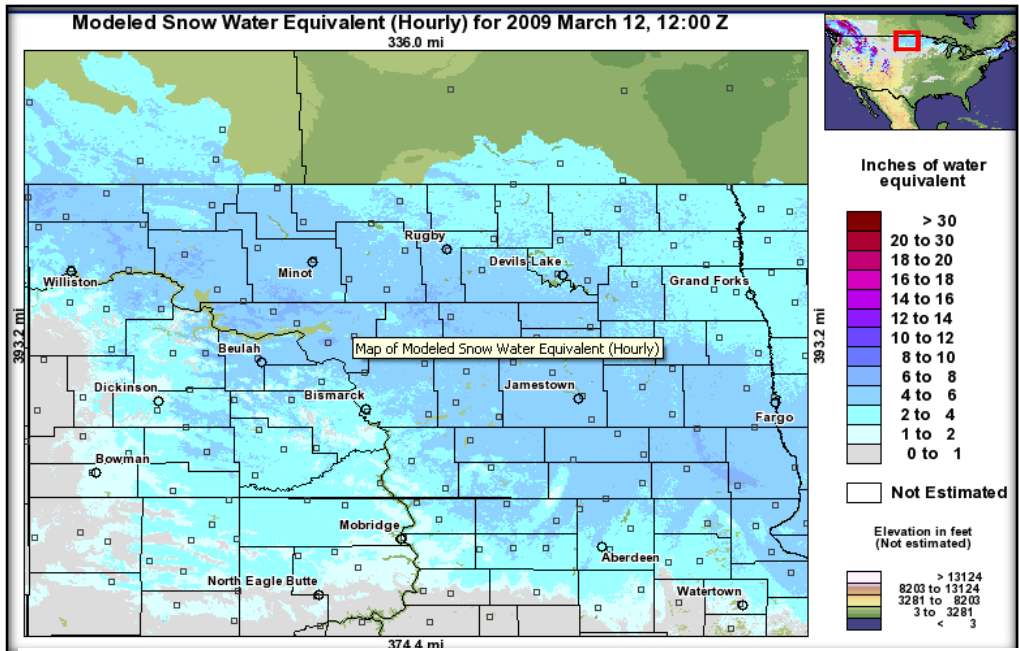
Table 1. Winter Season Summary for Select Cities.

| Location  | Average Temperature (F) | Departure From Normal (°F) | Precipitation (in) | Departure From Normal (in) |
|-----------|-------------------------|----------------------------|--------------------|----------------------------|
| Williston | 7.7                     | -4.9                       | 4.76               | +3.26                      |
| Minot     | 7.5                     | -5.0                       | 4.31               | +2.25                      |
| Dickinson | 12.0                    | -4.5                       | 2.72               | +1.60                      |
| Bismarck  | 9.7                     | -3.3                       | 3.02               | +1.63                      |
| Jamestown | 6.1                     | -5.3                       | 3.13               | +1.56                      |

Bismarck broke a daily low record on January 15 with -44. The previous record was -36 and set in 1971. It was ver close to the all time record low temperature recorded in Bismarck which was -45 and set on January 13, 1916. Bismarck did however break its all time record snowfall for one month with 33.3 inches of snow in December. It also broke the old record of 48.6 inches of snow for the “winter” months which had stood since 1995-96 season with 58 inches of snow this winter season. More detailed statistics and data on this winter season are available under the climate page at: <http://www.weather.gov/bismarck>

Water content (shown in figure 1) in the state’s snowpack remains unusually high in a pattern extending from northwestern North Dakota to extreme southeastern North Dakota. In the center of this band of snow, water equivalents exceeding 6 inches are common with an occasional 8 inches being reported. However, water equivalents diminish to less than one inch as you go southwest from this swath of heavy snow and 1 to 3 inches are more common to the northeast. This early in March still sees most rivers near their seasonal norms and covered by ice, however with warmer weather just around the corner one should be watchful for flood conditions. Spring runoff from this heavy snowpack has the potential for creating significant flooding in just about every watershed in North Dakota. Even the Little Missouri River with fairly nominal amounts of moisture in its basin has already been near or above flood stage due to ice jams created when modest amounts of water broke up river ice and water subsequently backed up behind ice dams at Medora.

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**Figure 1. Snow Water Equivalent in North Dakota on March 12, 2009 (Modeled at 12:00 GMT)**

*People near rivers who notice abnormally fast rising water should immediately report this to the local authorities including the county emergency managers and the National Weather Service office in either Grand Forks or Bismarck.*

Most small reservoirs, prairie potholes, and small stock dams should substantially benefit with existing moisture and anything near normal precipitation through the spring season. This comes as a welcome relief to many as fish kills from low water resulting are being reported on small lakes and waterfowl production suffered last year from disappearing prairie potholes.

The reservoirs behind Jamestown, Pipestem, Baldhill, and Heart Butte dams should all go into summer at full water supply levels. Similarly, Lake Darling should be able to meet its operational goals.

Lake Sakakawea, Lake Oahe, and perhaps even Patterson Lake will benefit from heavy local runoff. Still, the majority of water for Oahe and Sakakawea comes from the mountain snowpack and the plains of eastern Montana and those areas are currently normal to slightly below normal for this time of year.

*The Bismarck National Weather Service Forecast Office: [www.weather.gov/bis](http://www.weather.gov/bis)*

*The Grand Forks National Weather Service Forecast Office: [www.weather.gov/fgf](http://www.weather.gov/fgf)*



# Science Bits



## CoCoRaHS in North Dakota

by F.A. Akyüz<sup>3</sup>

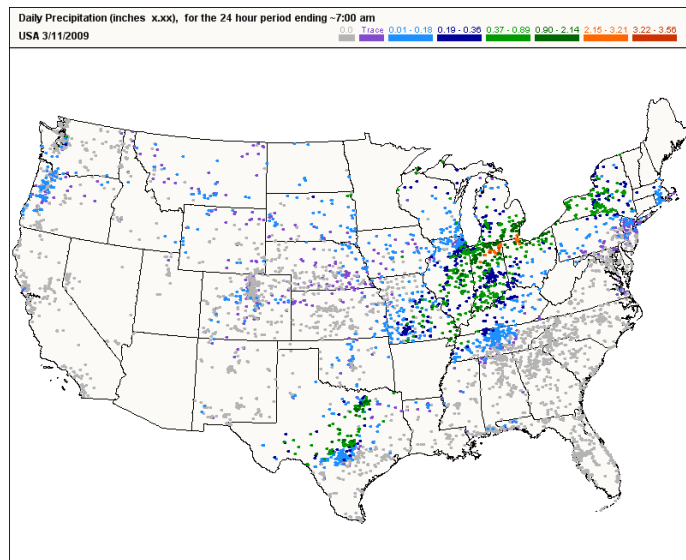
We announced in November the startup of a new statewide rain and snowfall reporting network, called CoCoRaHS. CoCoRaHS is an acronym for the Community Collaborative Rain, Hail and Snow network, and is the fastest growing national network of home-based and amateur rain and snow observers. Since then 50 volunteer observers, representing 19 different counties, signed up and are reporting daily observations using the web based data entry system.

Our goal is to have approximately 1000 volunteer observers by 2010 in North Dakota. The CoCoRaHS network can supplement the precipitation measurements currently made by other North Dakota precipitation observation networks.

Anyone with an interest in the weather and has access to the Internet can sign up. The only equipment needed is a cylindrical rain gauge with a 4 in-diameter (see the figure on the right) available from the network for \$22 plus shipping and a yardstick to measure the snow depth. Simple training is available at <http://www.cocorahs.org> .



We know that there are many decisions made every day that have to do with our weather and climate such as accurate assessment of drought intensity, and the flood potential in your area. During the growing season it would help determine water deficit for irrigation modeling, or the effect of drought; it might be water supply or stream flow forecasts or even floods. And by obtaining high-resolution information we can really improve the database and therefore improve the quality of decisions that are made.



One of the most unique things about CoCoRaHS is that it will give weather enthusiasts an opportunity to contribute to a national map. Volunteers will be able to start from the national map and see their data among nearly 12,000 such volunteer observers across the country. After submitting the information, the map is automatically updated with the new data. The map on the left is showing the recent precipitation event on March 11. Colored dots indicated the amount of precipitation that fell. One can click on the individual state and even on individual counties to zoom into your local area to capture the detail of variability in snow and rainfall. The data is displayed immediately after submission. Observers can be as descriptive or as brief as they want to be.

North Dakota is the 37<sup>th</sup> state in the network and has been participating since November 1, 2008. To get started, visit the web site at <http://www.cocorahs.org> . Click on the “Join CoCoRaHS” link under the “Main Menu”. Training slides are available under the “Resources” menu.

For more information on CoCoRaHS:  
Web site: <http://www.cocorahs.org> .

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# CONTACTING THE NORTH DAKOTA STATE CLIMATE OFFICE

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

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