



# North Dakota Climate Bulletin

Spring 2014

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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, College of Agriculture, Food Systems and Natural Resources, North Dakota State University in Fargo, North Dakota.

This spring was the 38<sup>th</sup> coldest on record in ND and it was the 44<sup>th</sup> wettest spring statewide since

1895.

All three months of the season were wetter and cooler than normal. However, the second half of May was well above normal. Will the warming in the late half of May continue into June to interrupt eight consecutive colder-than-normal months in a row since September 2013 or was it just a small bump on the road? The state shows a very steep cooling-trend in state average spring temperatures during the last 30 years which may be attributed to the steep increasing-trend in state average spring precipitation accumulations during the same period. The weather highlights in each month as well as graphical displays of statewide temperature and precipitation, and plus seasonal hydrologic and climate outlooks can be found later in this bulletin.

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 State Climatologist



*Ice-out, Lake Sakakawea, ND-Vern Whitten Photography*



# Weather Highlights



## Seasonal Summary:

by Daryl Ritchison

### March 2014

The state average precipitation was 0.43 inches which is below the 1981-2010 normal of 0.83 inches. March 2014 state average precipitation ranked 33rd driest in the last 120 years with a maximum of 2.31 inches in 1902 and a minimum of 0.11 inches in 1930.

The most notable weather event during the month was a severe blizzard that moved across the upper Midwest on March 31. Wind gusts over 50 mph were recorded in Valley City, Fargo, Emerado, Cooperstown and at the Grand Forks Air Force Base. That severe wind in combination of heavy snow in excess of 10 inches in some locations produced drifts over 6 feet. Many roads were closed, including Interstate 29 from the North Dakota/South Dakota line to Canada and Interstate 94 from Fargo to Bismarck because of near zero visibility being reported.

The highest snowfall fell in a band from the southwestern to northeastern corners of the state. The highest snow amount was an estimated 20 inches in Grafton. That would be the highest daily total of record for that location. With the exception of a small portion of southwestern North Dakota that was hit with an even stronger blizzard in October 2013, the March 31 event was the strongest storm of the 2013-2014 cold season when snow totals and wind speeds are combined for the rest of the state.

The National Weather Service (NWS) reported record snowfall on March 31 at Bismarck and Grand Forks NWS with 8.1 inches and 11.5 inches, respectively. A complete list of record events can be found in the "Storms and Record Events" section later in this bulletin.

The US Drought Monitor April 15, 2014 report had no drought conditions reported for North Dakota. (<http://droughtmonitor.unl.edu/>)

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported a topsoil moisture of 1% very short, 4% short, 81% adequate, and 14% surplus with a subsoil moisture reported as 1% very short, 2% short, 86% adequate, and 11% surplus. (Weekly Weather and Crop Bulletin Vol. 101, No. 15).

According to the preliminary reports of the National Weather Service's Storm Prediction Center (SPC), severe weather reports for March had 0 reports of high wind, 0 hail reports, and 0 reported tornadoes.

The top five March daily maximum wind speeds recorded from NDAWN were all on the 31st and included Robinson with 50.5 mph, Pillsbury with 50.1 mph, Linton with 49.4 mph, Leonard with 48.7 mph and Marion with 48.0 mph. NDAWN wind speeds are measured at a height of 10 feet (3 m).

The state average air temperature was 22.8 °F which is below the 1981-2010 normal of 28.0 °F. March 2014 state average air temperature ranked 50th coolest in the past 120 years with a maximum of 40.6 °F in 2012 and a minimum of 7.00 °F in 1899.

The month of March started off very cold with many locations in the state recording high temperatures from -10 °F to -5 °F on March 1. Of note, most of the high temperatures that day occurred at 12:01 AM or other times shortly thereafter, with afternoon highs even colder than the official daily high. It was a testament to how extremely cold that particular air mass was for the time of year. A complete list of record events can be found in the “Storms and Record Events” section later in this bulletin.

NDAWN’s highest recorded daily air temperature for March was 67.8 °F at Mott on the 29th. The lowest recorded daily air temperature was -32.5 °F at Greenbush, MN, on the 1<sup>st</sup>.

## **April 2014**

The state average precipitation was 2.09 inches which is above the 1981-2010 normal state average of 1.22 inches. April 2014 state average precipitation ranked the 20th wettest in the past 120 years with a maximum of 3.71 inches in 1986 and a minimum of 0.11 inches in 1987.

The most notable precipitation event during the month was a large slow moving storm that impacted much of the central part of the United States in late April. In North Dakota, although some snowfall was recorded in the western part of the state, that storm system was principally a rain maker. The storm came with many waves of rainfall and by the time that area of low pressure moved out of the area all of the NDAWN stations recorded over one inch of rain. The highest totals were in southeastern North Dakota where some locations recorded over three inches of rain.

The excessive rain recorded in southeastern North Dakota attributed to quick rises for streams and rivers, especially in the southern Red River Valley. The Wild Rice at Abercrombie, North Dakota rose to 17.14 feet, just shy of the 18 foot major flood stage for that location. The Red River gauge at Wahpeton, North Dakota rose to 12.5 feet, not too far from the 13 foot moderate stage. In Fargo, (see Figure 4) the Red River rose into the moderate flood stage with a crest near 26.7 feet on May 2.

Although the heaviest rain was near the headwaters of the Red River, even locations far removed from the heaviest rain recorded notable river rises. As an example, the Red River at East Grand Forks rose into the minor flood stage and Pembina, North Dakota, along the Canadian border, the Red River gauge crested near flood stage.

The National Weather Service (NWS) reported record rainfall of 0.68 inches at the Grand Forks Airport on the 23<sup>rd</sup>, a record 0.84 inches at Jamestown on the 28<sup>th</sup>, and a record 1.30 inches at the Grand Forks Airport on the 28<sup>th</sup>. A complete list of record events can be found in the “Storms and Record Events” section later in this bulletin.

The US Drought Monitor May 13, 2014 report had no drought conditions listed for the state (<http://droughtmonitor.unl.edu/>).

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported a topsoil moisture of 0% very short, 1% short, 66% adequate, and 33% surplus with a subsoil

moisture reported as 0% very short, 1% short, 78% adequate, and 21% surplus. (Weekly Weather and Crop Bulletin Vol. 101, No. 19).

According to the preliminary reports of the National Weather Service's Storm Prediction Center (SPC), severe weather reports for April had 0 reports of high wind, 0 hail reports, and 0 reported tornadoes.

The top five April daily maximum wind speeds recorded from NDAWN were 54.8 mph on the 23rd at Linton, 54.4 mph on the 27th at Britton, SD, 53.7 mph on the 26th at Britton, SD, 53.7 mph on the 19th at Leonard and 53.3 mph on the 9th at Hettinger. NDAWN wind speeds are measured at a height of 10 feet (3 m).

The state average air temperature was 38.0 °F which is below the 1981-2010 normal of 42.4 °F. April 2014 state average air temperature ranked the 25th coolest in the past 120 years with a maximum of 50.2 °F in 1987 and a minimum of 31.2 °F in 2013.

With the exception of a brief warm periods on April 9 and then a couple of days around April 20, the month was persistently below average which led to almost no spring planting occurring during the month.

The National Weather Service (NWS) reported breaking low temperature records on the 15th at Grand Forks NWS and Fargo with 11 °F, and 12 °F, respectively. A complete list of record events can be found in the "Storms and Record Events" section later in this bulletin.

NDAWN's highest recorded daily air temperature for April was 81.0 °F at Ekre on the 9th. The lowest recorded daily air temperature was -11.7°F at Greenbush, MN on the 2nd.

## **May 2014**

The state average precipitation was 2.30 inches which is below to the 1981-2010 normal of 2.53 inches. May 2014 state average precipitation ranked 64<sup>th</sup> driest in the past 120 years with a maximum of 5.96 inches in 1927 and a minimum of 0.23 inches in 1905.

The National Weather Service (NWS) reported record rainfall of 2.67 inches at the Dickinson Airport on the 25<sup>th</sup> and another record at the Dickinson Airport on the 26th with 1.61 inches being recorded. A complete list of record events can be found in the "Storms and Record Events" section later in this bulletin.

The US Drought Monitor June 3, 2014 report had no drought conditions listed for the state (<http://droughtmonitor.unl.edu/>).

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported a topsoil moisture of 0% very short, 5% short, 68% adequate, and 27% surplus with a subsoil moisture reported as 0% very short, 2% short, 77% adequate, and 22% surplus. (Weekly Weather and Crop Bulletin Vol. 101, No. 23).

According to the preliminary reports of the National Weather Service's Storm Prediction Center (SPC), severe weather reports for May had 2 reports of high wind, 14 hail reports, and 1 reported tornado. That tornado caused extensive damage to a "man camp" just south of Watford City on May 26. It was rated an EF-2, destroyed 13 trailers and damaging two others. At least nine

individuals were injured, one critically. More detailed information about the Watford City tornado is featured in the “Science Bits” section later in this bulletin.

The top five May daily maximum wind speeds recorded from NDAWN were from Berthold on the 28th with 52.3 mph, Ada on the 30th with 47.6 mph, Watford City on the 29th with 46.2 mph, Berthold on the 29th with 45.8 mph and Dunn on the 26th with 45.1 mph. NDAWN wind speeds are measured at a height of 10 feet (3 m).

The state average air temperature was 53.5 °F which is near the 1981-2010 average of 54.1°F. May 2014 state average air temperature ranked the 54<sup>th</sup> warmest in the past 120 years with a maximum of 64.5°F in 1934 and a minimum of 44.4 °F in 1907.

The month of May was dominated by two separate airmasses. The first 15 days of the month, most NDAWN sites recorded temperatures five to seven degrees below average. The second half of the month, most NDAWN sites recorded temperatures of five to seven degrees above average, meaning, in the end, the month finish near the current 30 year average.

The cool air during the first part of May was a continuation of a prolong period of colder than average temperatures that began in October 2013. The combination of a cool astronomical autumn and the lack of truly warm conditions not being observed until the second half of May meant that there was an extended period from the last 80° high temperature of 2013 and the first 80° reading in 2014.

Fargo recorded 238 straight days with a high temperature below 80° which ranked as the 12th longest such period since 1891. Bismarck recorded 242 days in a row without an 80° temperature which ranked as the 11<sup>th</sup> longest such streak since 1874 and the residents of Williston had to wait even longer with 247 days without an 80° temperature being observed. That was the 4<sup>th</sup> longest such periods since 1894.

Other cities with extended periods between 80° days included Grand Forks that recorded 240 consecutive below 80° days which was the 9<sup>th</sup> longest such period on record and the Minot Experiment Station with 247 days between 80° days which ranked 6<sup>th</sup> on record.

The National Weather Service (NWS) reported two record lows and one record high in May. The Bismarck Airport recorded a record low of 24°F on May 15. The Dickinson Airport tied a record low on May 15. The Fargo Airport tied a record high temperature of 90 °F on the 24th. A complete list of record events can be found in the “Storms and Record Events” section later in this bulletin.

NDAWN’s highest recorded daily air temperature for May was 94.4 °F at Prosper, ND on the 30<sup>th</sup>. The lowest recorded daily air temperature was 20.0 °F at Hazen, ND, on the 15<sup>th</sup>.

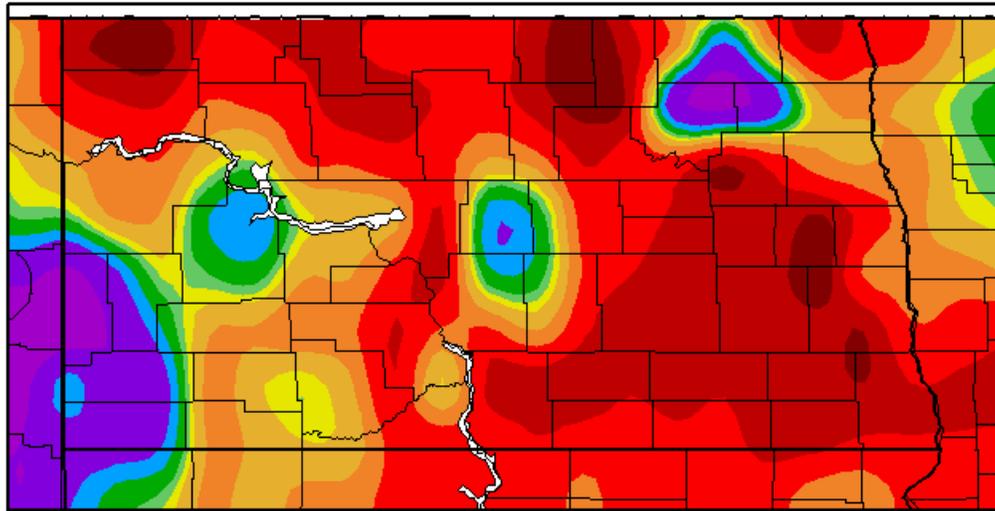
# Season in Graphics

## Spring 2014 Weather in North Dakota:

Total Precipitation percent of mean (1981-2010)

Precipitation Percent of Normal

(Data from NWS Cooperative Network)



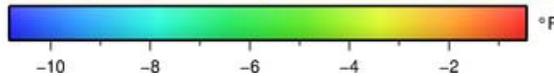
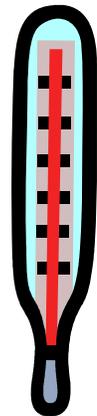
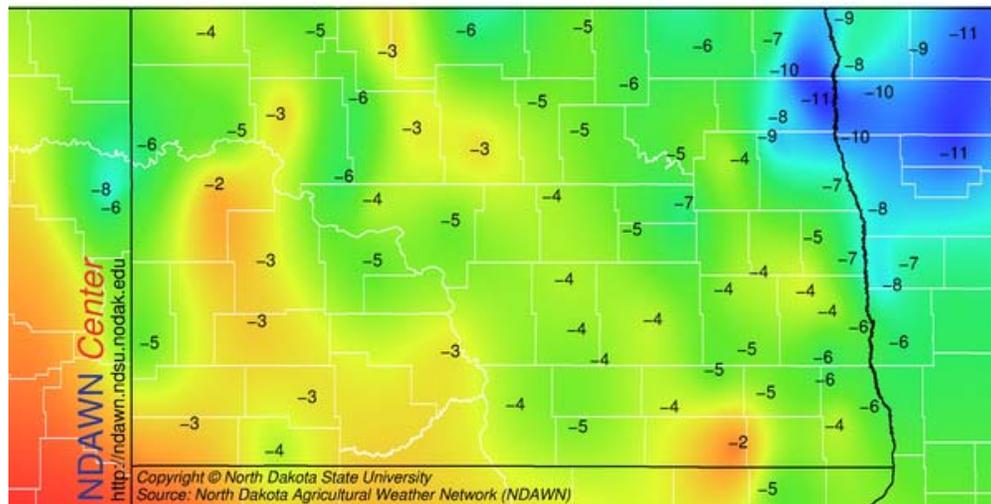
North Dakota State Climate Office

Average Temperature (°F) Deviation from Mean (1981-2010)

Departure From Normal Monthly

Average Air Temperature in degrees F

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



NDAWN Center  
http://ndawn.ndsu.nodak.edu

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Source: North Dakota Agricultural Weather Network (NDAWN)

March 2014

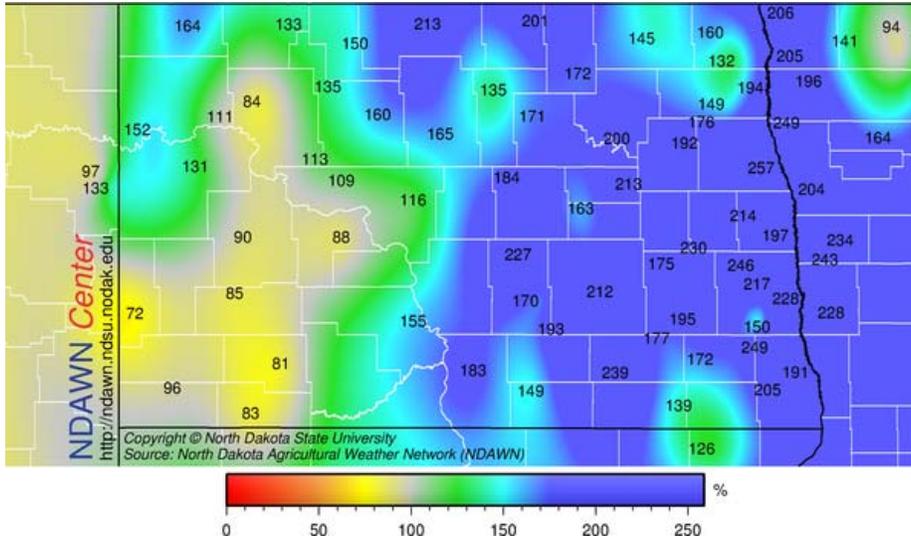
# Season in Graphics

## Spring 2014 Weather in North Dakota:

Total Precipitation percent of mean (1981-2010)

Precipitation Percent of Normal

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

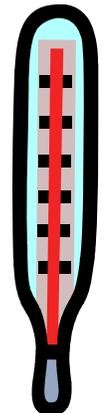
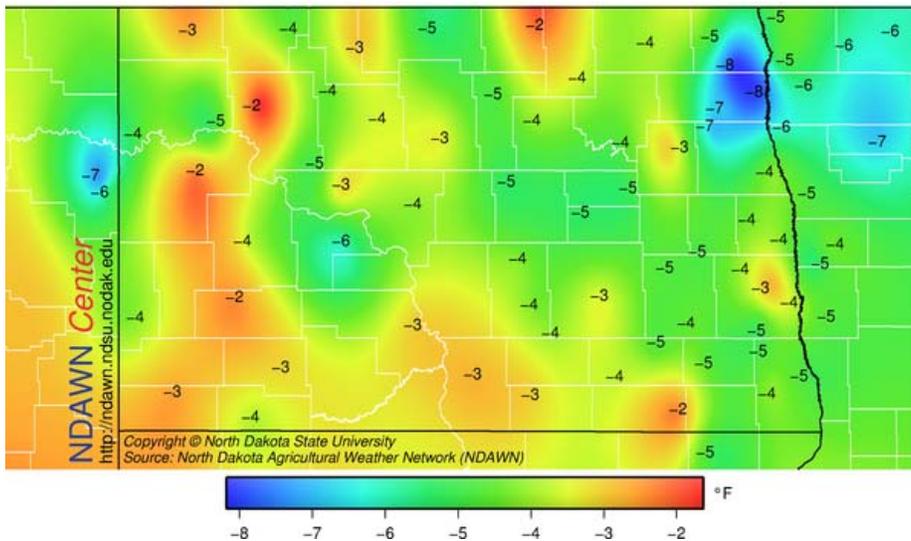


North Dakota State Climate Office

Average Temperature (°F) Deviation from Mean (1981-2010)

Departure From Normal Monthly  
Average Air Temperature in degrees F

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



North Dakota State Climate Office

April 2014

May 2014

# Season in Graphics

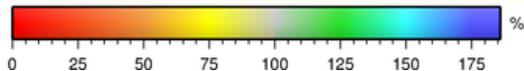
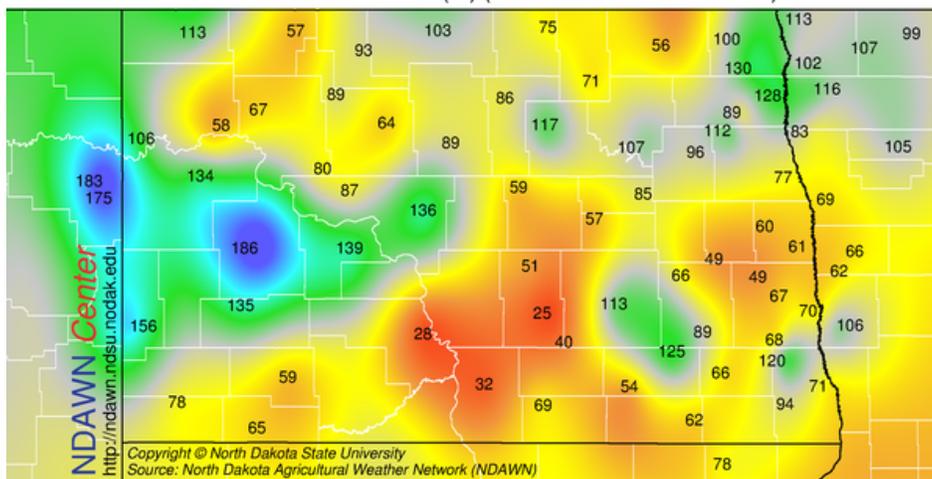
## Spring 2014 Weather in North Dakota:

Total Precipitation percent of mean (1981-2010)

Precipitation Percent of Normal

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

Percent of Normal Rainfall (%) (2014-05-01 – 2014-05-31)



North Dakota State Climate Office

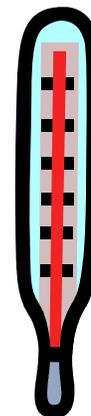
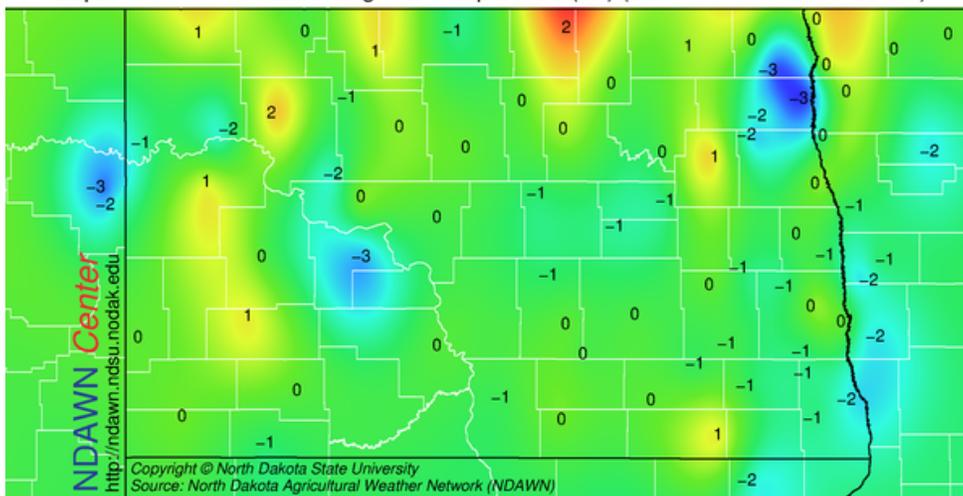
Average Temperature (°F) Deviation from Mean (1981-2010)

Departure From Normal Monthly

Average Air Temperature in degrees F

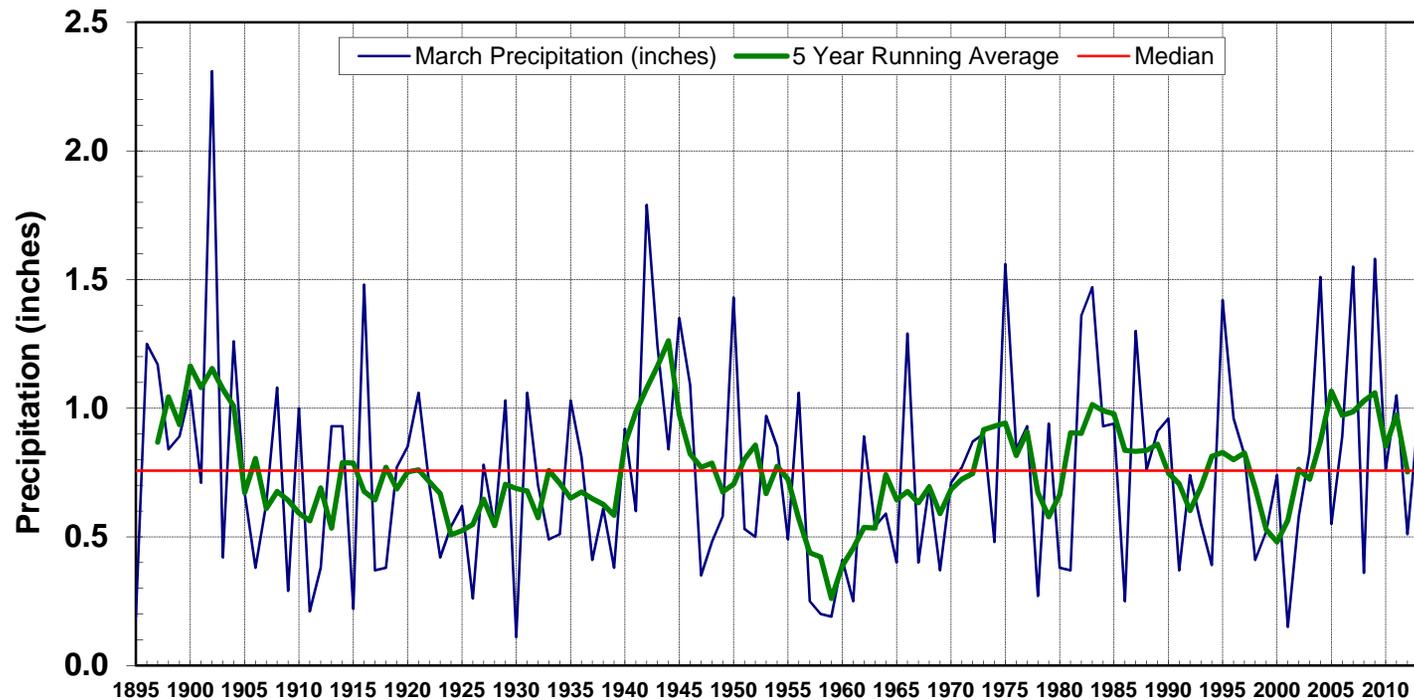
(Data from North Dakota Agricultural Weather Network (NDAWN))

Departure from Normal Average Air Temperature (°F) (2014-05-01 – 2014-05-31)



North Dakota State Climate Office

# Historical March Precipitation for North Dakota

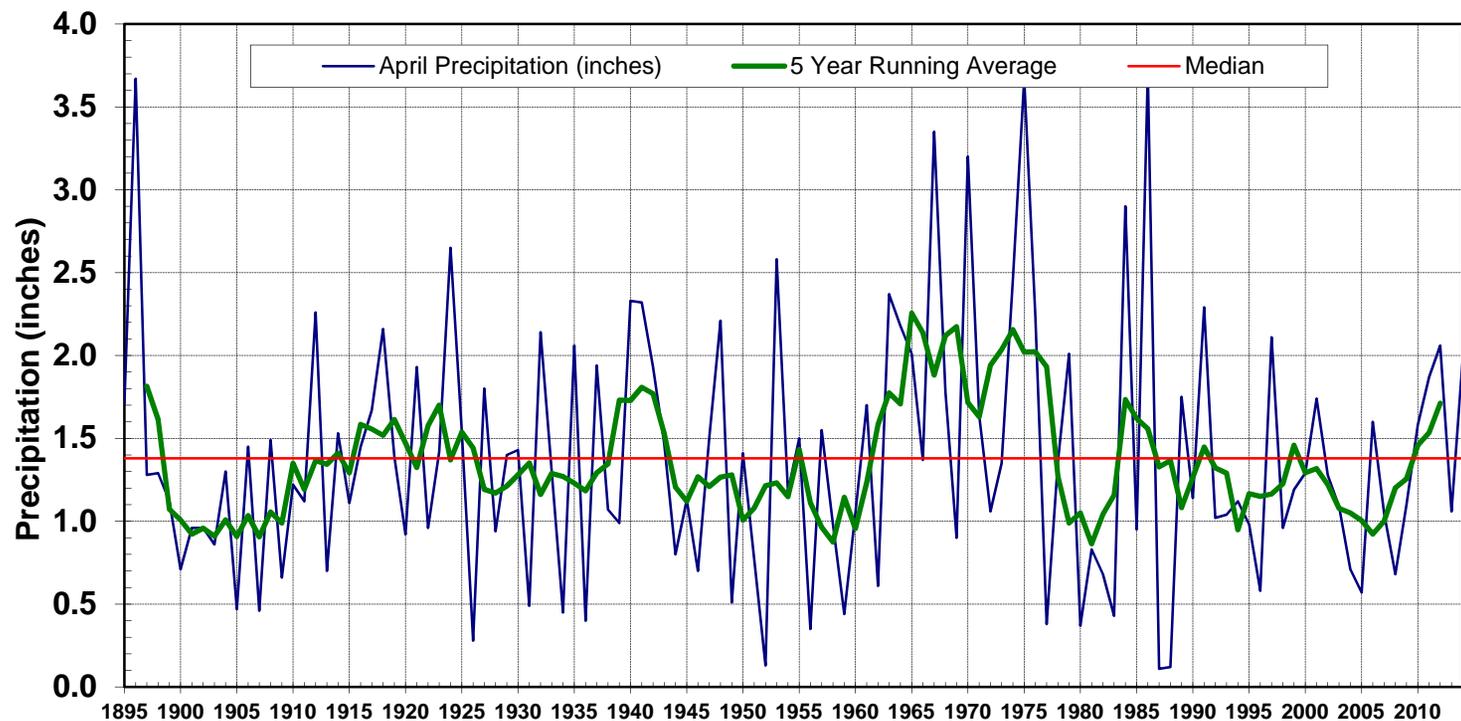


## March Precipitation Statistics

2014 Amount: **0.43 inches**  
Maximum: 2.31 inches in 1902  
State Normal: 0.83" (1981-2010)

Monthly Ranking: 33rd driest in 120 years  
Minimum: 0.11 inches in 1930  
Years in Record: 120

# Historical April Precipitation for North Dakota

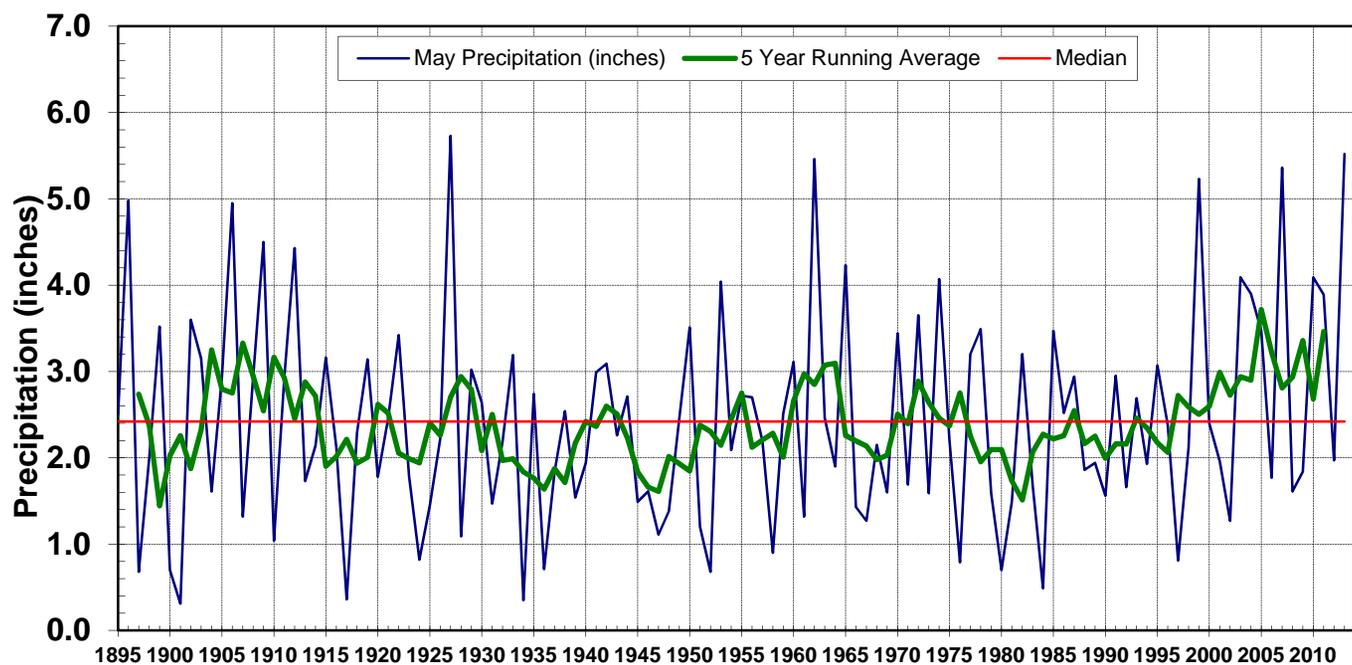


## April Precipitation Statistics

2014 Amount: 2.09 inches  
Maximum: 3.71 inches in 1986  
State Normal: 1.22" (1981-2010)

Monthly Ranking: 20th wettest in 120 years  
Minimum: 0.11 inches in 1987  
Years in Record: 120

# Historical May Precipitation for North Dakota

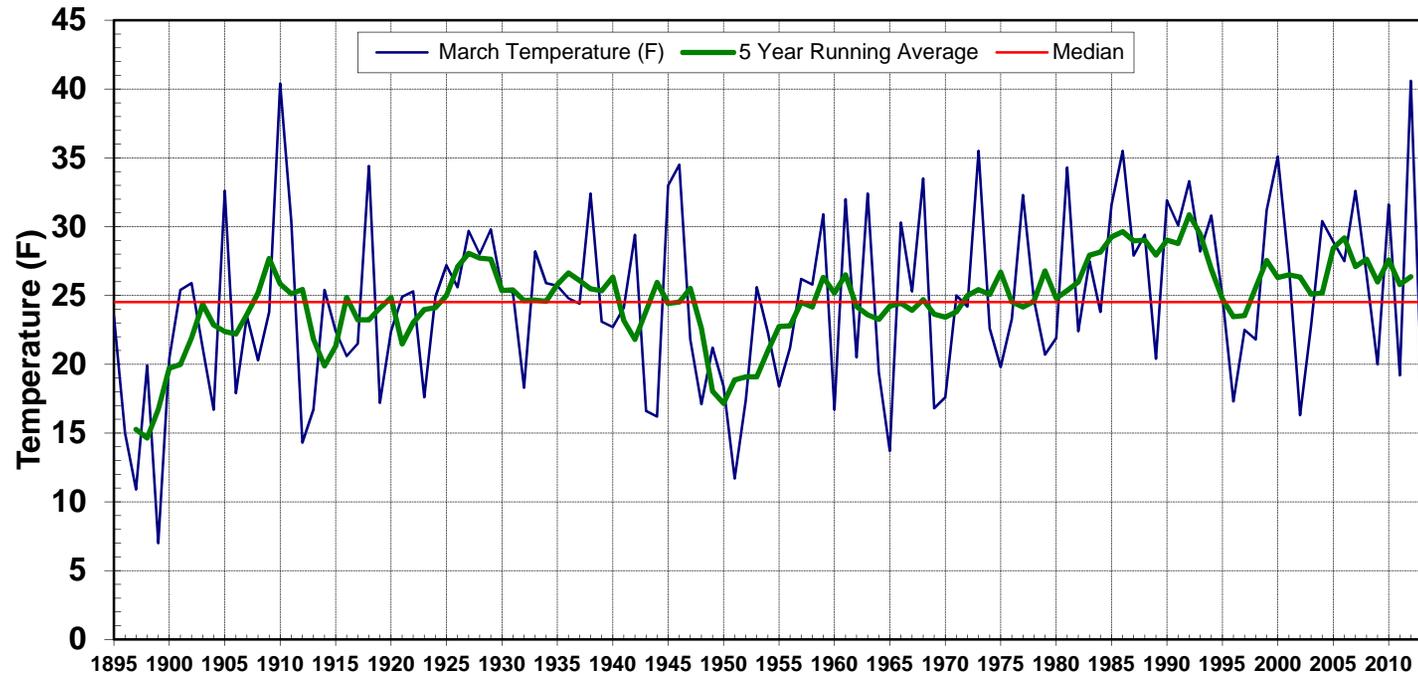


## May Precipitation Statistics

2014 Amount: 2.30 **inches**  
Maximum: 5.73 inches in 1927  
State Normal: 2.53" (1981-2010)

Monthly Ranking: 64th driest in 120 years  
Minimum: 0.31 inches in 1901  
Years in Record: 120

# Historical March Temperature for North Dakota

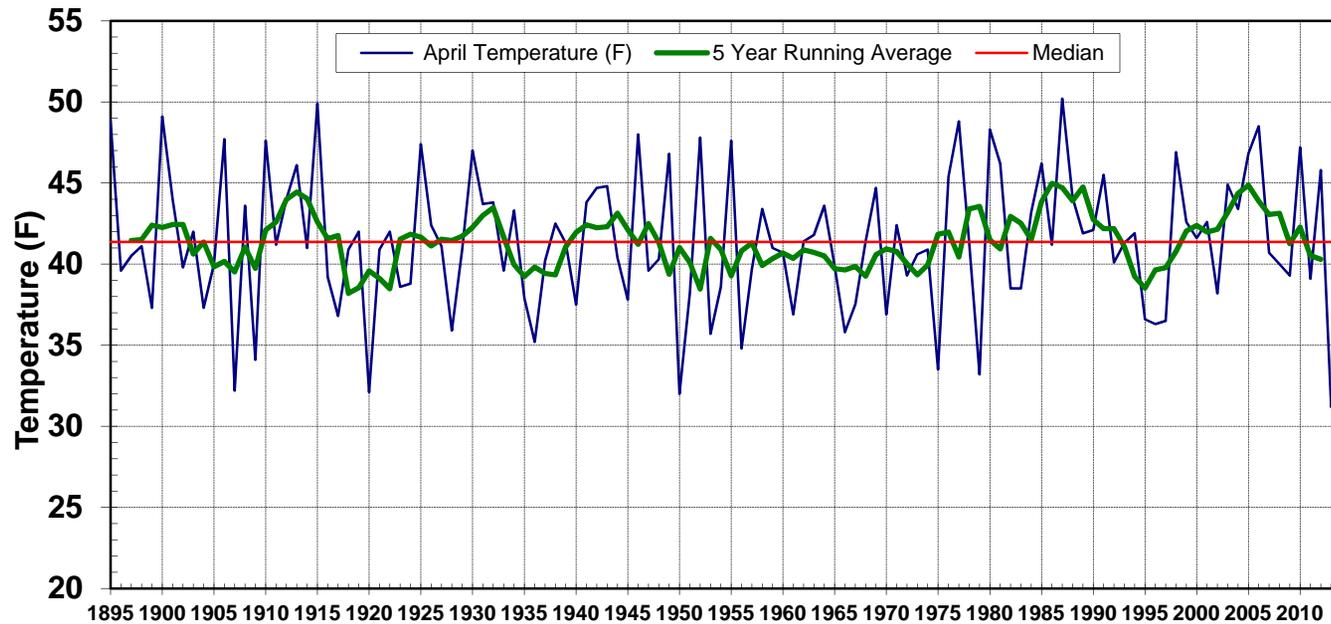


## March Temperature Statistics

2014 Average: **22.8** °F  
Maximum: 40.6 °F in 2012  
State Normal: 27.5 °F (1981-2010)

Monthly Ranking: 50th Coolest in 120 years  
Minimum: 7 °F in 1899  
Years in Record: 120

# Historical April Temperature for North Dakota



## April Temperature Statistics

2014 Average: 38.0 °F

Maximum: 50.2 °F in 1987

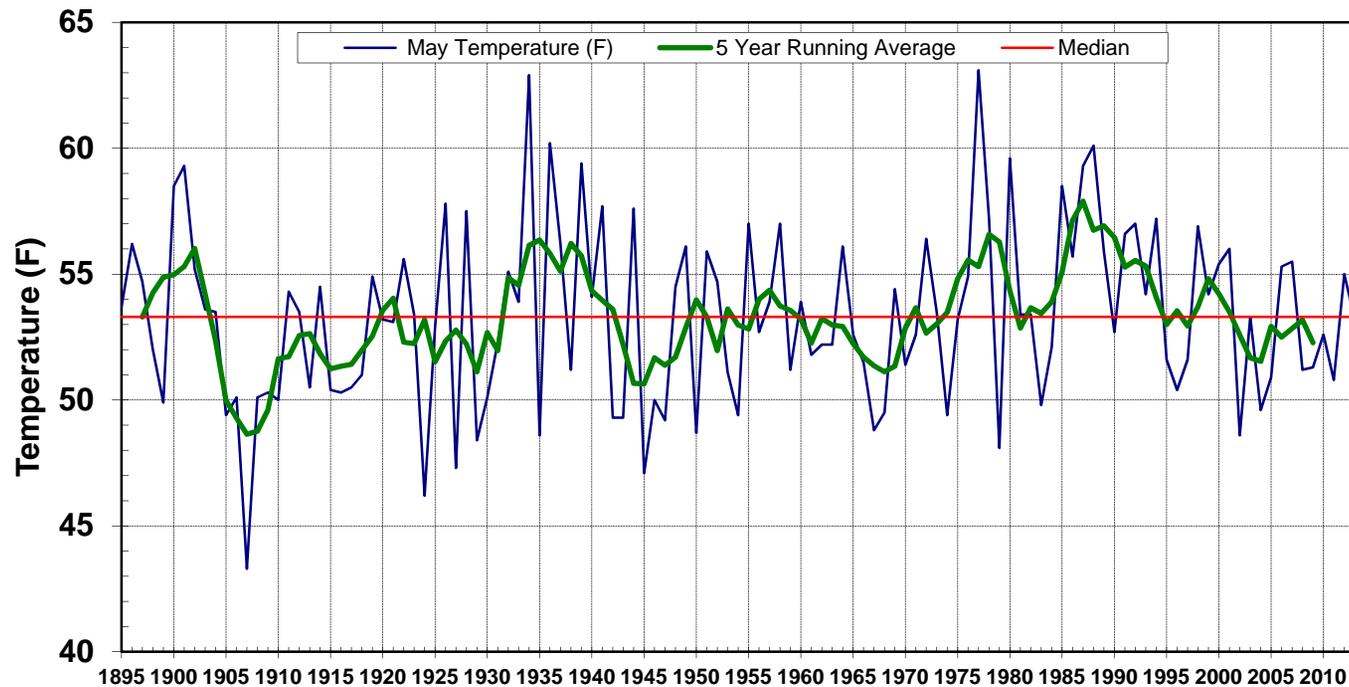
State Normal: 42.4 °F (1981-2010)

Monthly Ranking: 25th Coolest in 120 years

Minimum: 31.2 °F in 2013

Years in Record: 120

# Historical May Temperature for North Dakota



## May Temperature Statistics

2014 Average: **53.5 °F**

Maximum: 63.1 °F in 1977

State Normal: 54.1 °F (1981-2010)

Monthly Ranking: 62th warmest in 120 years

Minimum: 43.3 °F in 1907

Years in Record: 120



# Storms & Record Events



## State Tornado, Hail, and Wind Reports for Spring 2014

by D. Ritchison

<b>North Dakota 3 Month Total</b>	<b>Wind</b>	<b>Hail</b>	<b>Tornado</b>
	<b>2</b>	<b>14</b>	<b>1</b>

Reports by Month			
Month	Wind	Hail	Tornado
Total March	0	0	0
Total April	0	0	0
Total May	2	14	1

## North Dakota Record Event Reports for Spring 2014

Date	Location	Type of Record	Previous Record
03/01/14	Dickinson	-8 ° F low maximum temperature	-5 ° F in 1962
03/01/14	Minot	-11 ° F low maximum temperature	-6 ° F in 1916
03/01/14	Jamestown	-7 ° F low maximum temperature	-4 ° F in 1925
03/01/14	Bismarck	-6 ° F low maximum temperature	-5 ° F in 1919
03/01/14	Grand Forks AP	-11 ° F low maximum temperature	-3 ° F in 1972
03/01/14	Grand Forks NWS	-9 ° F low maximum temperature	-4 ° F in 1916
03/01/14	Fargo	-8 ° F low maximum temperature	-2 ° F in 1943
03/02/14	Grand Forks AP	0 ° F low maximum temperature	1 ° F in 2003
03/03/14	Grand Forks AP	-19 ° F low temperature	-15 ° F in 1960
03/21/14	Grand Forks AP	0.27 inches of rainfall	0.22 inches in 2008
03/31/14	Bismarck	8.1 inches of snowfall	1.6 inches in 1932
03/31/14	Bismarck	0.54 inches of rainfall	0.44 inches in 1877
03/31/14	Grand Forks NWS	11.5 inches of snowfall	4.1 inches in 2001
04/02/14	Grand Forks AP	-6 ° F low temperature	-2 ° F in 1954 and 1979
04/15/14	Grand Forks NWS	11 ° F low temperature	12 ° F in 2000
04/15/14	Fargo	12 ° F low temperature	15 ° F in 1935
04/23/14	Grand Forks AP	0.68 inches of rainfall	0.47 inches in 1979
04/28/14	Jamestown	0.84 inches of rainfall	0.41 inches in 1975
04/28/14	Grand Forks AP	1.30 inches of rainfall	0.65 inches in 1954
05/15/14	Bismarck	24 ° F low temperature	25 ° F in 1959
05/15/14	Dickinson	25 ° F low temperature	Ties 1929
05/23/14	Jamestown AP	2.96 inches of rainfall	1.08 inches in 1971
05/24/14	Fargo AP	90° maximum temperature	Ties 2010
05/25/14	Dickinson AP	2.67 inches of rainfall	1.39 inches in 2010
05/26/14	Dickinson AP	1.61 inches of rainfall	0.99 inches in 1973



# Seasonal Outlook



## Summer 2014 Climate Outlooks by . M. Ewens<sup>1</sup>

After another unusually cool and damp spring, the 2014 Summer Season started with the hope of warmer and drier conditions. The hopes for warmer and drier weather appear to be somewhat in vain as a developing El Niño threatens to keep the climate cool and damp. After almost 4 years of either La Niña or neutral water temperatures in the equatorial Pacific, the 2014 El Niño is forecast to be a significant event.

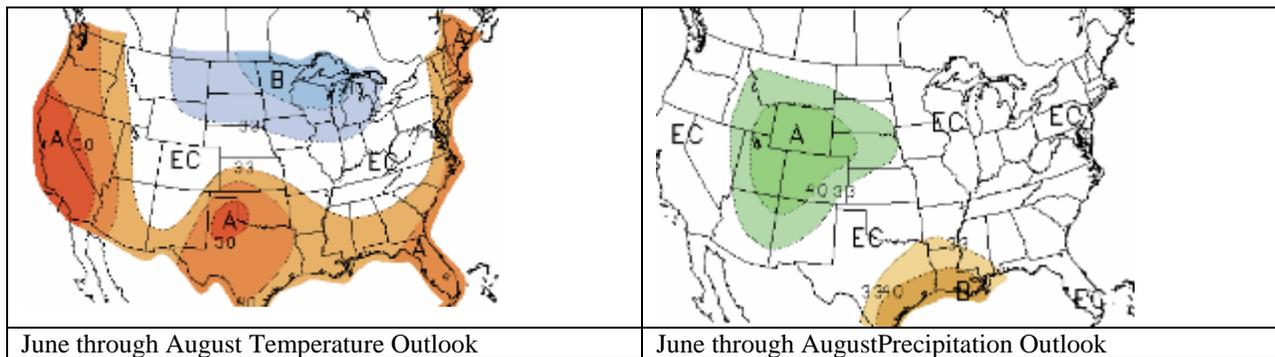
El Niño - and its counterpart La Niña –is cyclical changes in the temperature along the Equator from the west coast of Peru and Ecuador, sometimes reaching all the way to New Guinea and the Indonesian sub-continent. This change in temperatures then impacts the flow of weather systems across the Pacific, eventually causing persistent changes to the weather across much of the World.

North Dakota, South Dakota and Minnesota are situated in one area of the globe that is usually very sensitive to the El Niño or La Niña. In an El Niño summer, more frequent wet weather systems move across the Pacific and into the Northern Plains. This usually results in a cooler and wetter first half of summer, which transitions to a drier and warmer late summer and fall.

The June – August 2014 Climate Prediction Center Outlook suggests that the next 3 months will feature more frequent cooler than normal days, with equal chances for above, below or median rainfall. Much of South Dakota will more likely see wetter than average conditions.

What of the winter? As of this writing the consensus is a weak to moderate El Niño will form, which would typically bring warmer and drier conditions to the northern plains. After several cold and snowy winters, this may be a break many folks are looking for. Stay tuned for updates later in the year!

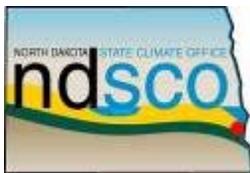
The latest outlook from the Climate Prediction Center (CPC) for the next three months can be seen below. The CPC is forecasting equal chances of above, below or normal precipitation a slightly higher than average chance of below normal temperatures. You can find their current and future outlooks at <http://www.cpc.ncep.noaa.gov/products/predictions/90day>.



Also, the North Dakota State Climate Office has links to the National Weather Service’s local 3-month temperature outlooks for the upcoming year. Those forecasts can be found at: <http://www.ndsu.edu/ndSCO/outlook/L3MTO.html>. The readers will also 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/>

<sup>1</sup> The corresponding author: Mark Ewens is the Data Acquisition Program Manager at the NOAA’s National Weather Service, Weather Forecast Office in Grand Forks, ND. E-Mail: [Mark.Ewens@noaa.gov](mailto:Mark.Ewens@noaa.gov).



# Hydro-Talk



## North Dakota's Latest Hydrologic Status

by A. Schlag<sup>2</sup>

In retrospect, we seem to have made it through our spring flood season with only minor to moderate problems. The low point, at least for western North Dakota, would have to be the ice jam flooding. The most memorable of the problems this year for many are likely to be aerial images of relatively modest amounts of crude oil floating off of flooded oil well sites and into the Missouri River. However, there were also homes affected by the high water and this often leads to the question as to how the National Weather Service defines flooding, and the respective categories of Minor, Moderate, Major, and Record flooding. Most people who live in flood prone areas are likely more familiar with the terminology, but for those who aren't, here are some key definitions the NWS uses when helping set the actual river stages used to trigger Flood

### Warnings:

**Action Stage** – the stage which; when reached by a rising stream, lake, or reservoir presents the level where the NWS or a partner/user needs to take some type of mitigation action in preparation for possible significant hydrologic activity. Note: can often be the same as Forecast Issuance Stage, or where the NWS begins to offer forecasts for that location.

**Minor Flooding** – minimal or no property damage, but possibly some public threat.

**Moderate Flooding** – some inundation of structures and roads near stream. Some evacuations of people and/or transfer of property to higher elevations.

**Major Flooding** – extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations.

**Record Flooding** – flooding which equals or exceeds the highest stage or discharge at a given site during the period of record keeping. Note: some records exist for floods in the Moderate category because of a lack of known impacts.

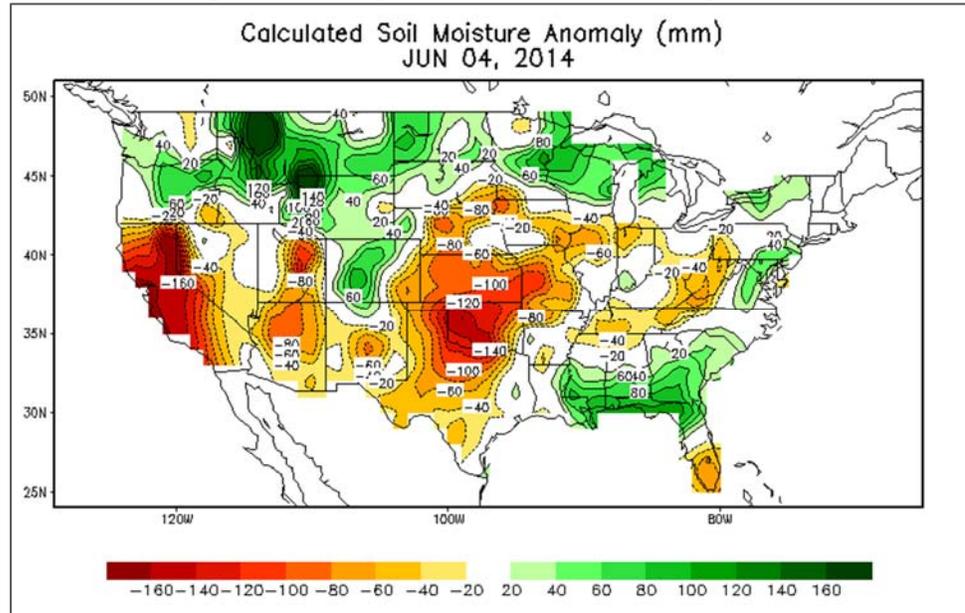
The take-home message on this is that river stages used to trigger the differing levels of flooding are subject to change as conditions on the ground change. Homes and often flooded roads may get raised or even relocated and this causes impacts to change over time. Conversely, unexpected impacts may be discovered when flood waters reach stages not seen in many years. In an effort to keep the NWS trigger points and Flood Warnings in-line with the definition of flooding, the NWS welcomes feedback on specific impacts and appropriateness of the stages in place. Every few years the NWS may even initiate discussion on if the current stages used to define minor, moderate, and major flooding are acceptable to the locally affected population.

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<sup>2</sup> The corresponding author: Allen Schlag is the Service Hydrologist at the NOAA's National Weather Service, Weather Forecast Office in Bismarck, ND. E-Mail: [Allen.Schlag@noaa.gov](mailto:Allen.Schlag@noaa.gov)

## Looking towards summer...

Weather-wise, the Climate Prediction Center is calling for an above normal chance of a cooler than normal summer with an equal chance for above normal, near normal, or below normal precipitation. When we combine that with the later than normal entry into summer-like weather overall and an extended cold and wet period in May, we shouldn't be too surprised that soil moisture content is still considered to be well above normal for most of western North Dakota, as shown in the graphic to the right. Quite simply, evaporation and transpiration rates for returning water back to the atmosphere would appear to be at lower than normal rates thus far in the year.



As we are now near the middle of June, we find ourselves in the heart of thunderstorm season across North Dakota. Thunderstorms are certainly capable of producing several inches of rain over a fairly short period of time, however they tend to be too small in areal coverage to create problems along most of the larger rivers and streams across North Dakota. Instead the region tends to be more susceptible to short-lived flash flood events along our smaller creeks, rural roads, and urban areas. So while history teaches us that nearly anything is possible when talking about the whims of a Northern Plains climate, it also suggests that we should be reasonably safe from moderate to major flooding along our bigger streams and rivers.



# Science Bits



## Tornado in the Bakken: The Watford City Tornado by Patrick Ayd<sup>3</sup>

The first tornado in 2014 in North Dakota was a damaging one, striking a man camp in the Bakken 5 miles south of Watford City on May 26. The tornado was on the ground for approximately 10 minutes from 646 to 656 MDT (Figure 1). During this time the tornado traveled one half mile with a maximum width of 100 yards. A Damage Assessment Team from the National Weather Service in Bismarck surveyed the damage on May 27. The tornado caused severe damage to several trailers, campers and vehicles. Based on the damage present, it was estimated as an EF2 tornado with a peak wind speed of 120mph. On the EF (Enhanced Fujita) scale, tornadoes are rated from zero to five.

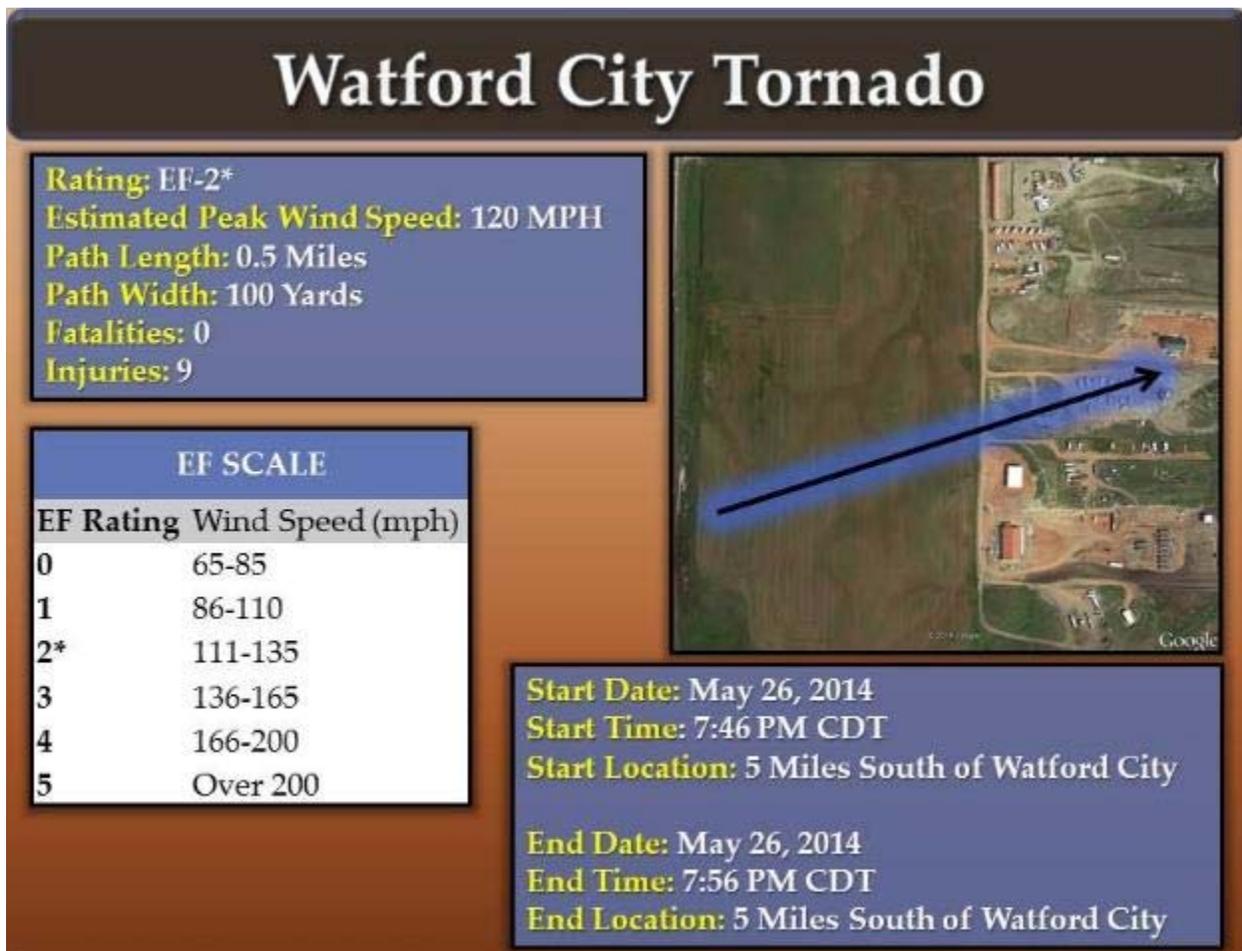


Figure 1: Tornado Impact Summary

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Nine were injured in the tornado, fortunately there were no fatalities. This event should remind us of the importance of having a severe weather plan, especially those who live in mobile homes, campers or trailers. These structures provide very little protection, and can be easily tossed and tumbled in not only a tornado, but, strong winds within a severe thunderstorm.

Nearly 40% of tornado deaths are associated with those who were in mobile homes. Plan ahead and always have more than one way to receive severe weather warnings at all times of the day. Tornado sirens are designed to be heard by those outside not inside, and can be knocked out by damaging winds. If the power goes out, a weather radio with battery backup is a lifesaving tool to alert you to impending dangerous weather. Plenty of severe weather undoubtedly lies ahead and we progress through the summer and early fall. On average, North Dakota has 23 reported tornadoes per year. Tornadoes do not just occur in summer. The earliest tornado to occur in North Dakota was March 26, 2003, near Edmunds. The latest tornado to occur was on November 1, 2000, impacting the northern portions of Bismarck. Take the time to be prepared.

# 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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