



# North Dakota Climate Bulletin

Spring 2015

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

This spring was the 20th warmest and 37th wettest on record statewide since 1895.

Even with March and April being unusually dry, May being the 10th wettest on record, caused the entire season to appear wet. Fargo, Jamestown, Ashley, Montpelier, Courtenay, and Casselton recorded the wettest May on record. In March, 93 stations broke daily maximum temperature records, including an impressive 82° on March 29 in Medora. Two stations broke the earliest 80 degree-day of the year record in their station history. The state average spring temperatures declined 1°F per decade during the last 30 years which may be attributed to the increasing-trend in state average spring precipitation accumulations during that period. The weather highlights in each month as well as graphical displays of statewide temperature and precipitation, 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



*Rain Gauge by Akyuz*



# Weather Highlights



## Seasonal Summary:

by Daryl Ritchison

### March 2015 Summary and Statistics

After a cold February, the weather pattern quickly changed and March turned out mostly mild and dry. The lack of snow cover from the winter and the corresponding widespread exposed soils allowed for a rapid warmup once that pattern change occurred. The first week of March temperatures remained below average but widespread maximums in the 50s and 60s occurred on March 9 and the rest of the month above average temperatures were observed most of the time. Many locations recorded the first 60° high of the year about 3 weeks earlier than average plus Fargo and Grand Forks recorded the earliest 70° in a year with a high of 75° in Fargo and 70° in Grand Forks on March 15 which is a good month earlier than normal.

The state average precipitation was 0.42 inches which is below the 1981-2010 normal of 0.83 inches. March 2015 state average precipitation ranked tied for the 31st driest in the last 121 years with a maximum of 2.31 inches in 1902 and a minimum of 0.11 inches in 1930.

The US Drought Monitor March 31, 2015 reported 95% of North Dakota in D0 (abnormally dry) or D1 (moderate drought) conditions. Of that 21% was in Moderate drought which was confined to the far eastern portion of the state. (<http://droughtmonitor.unl.edu/>)

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported a topsoil moisture of 2% very short, 27% short, 67% adequate, and 4% surplus with a subsoil moisture reported as 2% very short, 20% short, 73% adequate, and 5% surplus. (Weekly Weather and Crop Bulletin Vol. 102, No. 13).

The state average air temperature was 33.0 °F which is above the 1981-2010 normal of 27.5 °F. March 2015 state average air temperature ranked 11th warmest in the past 121 years with a maximum of 40.6 °F in 2012 and a minimum of 7.0 °F in 1899.

NDAWN's highest recorded daily air temperature for March was 81.4 °F at Watford City on March 28. The lowest recorded daily air temperature was -22.1 °F at Bottineau, ND, on March 5.

According to the preliminary reports of the National Weather Service's Storm Prediction Center (SPC), severe weather reports for March had 8 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 28th and included Bowman with 56.6 mph, Hettinger with 53.0 mph, Turtle Lake with 50.1 mph, Cando with 49.8 mph and Mandan with 48.0 mph. NDAWN wind speeds are measured at a height of 10 feet (3 m). The strong wind that day was associated with a strong mid-latitude cyclone and the tight pressure gradient in combination with a high pressure center in Canada moving into the state behind that system.

## April 2015 Summary and Statistics

The above average temperatures and dry conditions that prevailed in March continued in April. The lack of rain in combination with the higher sun angle and greater evaporative potential lead to some very dry conditions in April. Although planting season started early, the dry top soils made for difficult planting in some locations. In fact, it was so dry, that the only beneficial moisture fell on April 18-19 when anywhere from 0.25 – 0.75 inches of rain was recorded in many areas, otherwise, the month would have been one of the very driest on record. The parched top soils in combination of a cold/dry arctic air mass that moved into North Dakota after that rain system lead to lows in the 10s on April 22 and 23 that was cold enough for some record low minimums to be set (see storms and record events later in this bulletin).

The state average precipitation was 0.59 inches which is below the 1981-2010 normal state average of 1.22 inches. April 2015 state average precipitation ranked the 18th driest in the past 121 years with a maximum of 3.71 inches in 1986 and a minimum of 0.11 inches in 1987.

The US Drought Monitor April 28, 2015 reported 81% of North Dakota in D0 (abnormally dry) or D1 (moderate drought) conditions. Of that 21% was in Moderate drought which was confined to the eastern portion of the state. (<http://droughtmonitor.unl.edu/>)

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported a topsoil moisture of 4% very short, 29% short, 64% adequate, and 3% surplus with a subsoil moisture reported as 2% very short, 21% short, 74% adequate, and 3% surplus. (Weekly Weather and Crop Bulletin Vol. 102, No. 17).

The state average air temperature was 44.3 °F which is above the 1981-2010 normal of 42.4 °F. April 2014 state average air temperature ranked the 29th warmest in the past 121 years with a maximum of 50.2 °F in 1987 and a minimum of 31.2 °F in 2013.

NDAWN's highest recorded daily air temperature for April was 83.0 °F at Crary on April 30. The lowest recorded daily air temperature was 7.0 °F at Cavalier on the April 3.

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 49.4 mph at Prosper, 49.0 mph at Carrington and 48.7 mph at Turtle Lake on April 2. A 48.4 mph gust was reported at Robinson at April 1 and a 48.4 mph at Wahpeton on April 13. NDAWN wind speeds are measured at a height of 10 feet (3 m).

## May 2015 Summary and Statistics

As May started, many parts of North Dakota had recorded 8 consecutive months with below average precipitation. That dryness ended quickly as a series of moisture laden storms impacted the state during the month. Fargo and Jamestown for example both set records for the highest rain amounts for any May. Several daily rainfall records were set during the month at the major climate sites in the state (see storms and record events later in this bulletin). Also Jamestown set a monthly daily rainfall record when 2.75 inches of rain was recorded at the Jamestown State Hospital on May 11. That surpassed the previous daily monthly record of 2.43 inches set on May 25, 2010. Records date back 122 years at that location. Because of the abundant moisture and associated cloud cover, below average temperatures were recorded in May making it the only cool month of the season.

The state average precipitation was 4.17 inches which is well above the 1981-2010 normal of 2.53 inches. May 2015 state average precipitation ranked 10th wettest in the past 121 years with a maximum of 5.96 inches in 1927 and a minimum of 0.23 inches in 1901.

The US Drought Monitor June 2, 2015 reported 20% of North Dakota in D0 (abnormally dry) conditions. All of that 20% was confined to the far western portion of the state. (<http://droughtmonitor.unl.edu/>)

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported a topsoil moisture of 5% short to very short and 20% surplus with a subsoil moisture reported as 5% short or very short and 17% surplus. (Weekly Weather and Crop Bulletin Vol. 102, No. 22).

The state average air temperature was 52.4 °F which is below the 1981-2010 average of 54.1°F. May 2015 state average air temperature ranked the 47th coolest in the past 121 years with a maximum of 63.5°F in 1934 and a minimum of 44.4 °F in 1907.

NDAWN's highest recorded daily air temperature for May was 88.9 °F at Marion, ND on May 2. The lowest recorded daily air temperature was 20.7 °F at Hazen, ND, on May 19.

According to the preliminary reports of the National Weather Service's Storm Prediction Center (SPC), severe weather reports for May had 4 reports of high wind, 6 hail reports, and 0 reported tornadoes.

The top five May daily maximum wind speeds recorded from NDAWN were from Leonard on May 2 with 54.7 mph, Kennedy on May 28 with 54.4 mph, Jamestown on May 2 with 53.7 mph, Fingal on May 10 with 51.9 mph and Crary on May 17 with 51.9 mph. NDAWN wind speeds are measured at a height of 10 feet (3 m).

March 2015

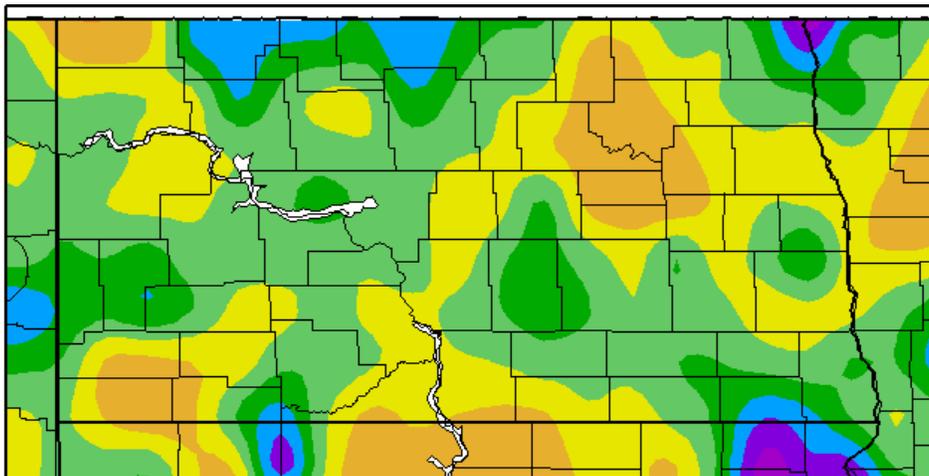
# Season in Graphics

## Spring 2015 Weather in North Dakota:

Total Precipitation percent of mean (1981-2010)

Precipitation Percent of Normal

(Data from NWS Cooperative Network/HPRCC)



Generated 4/11/2015 at HPRCC using provisional data.

Regional Climate Centers

North Dakota State Climate Office

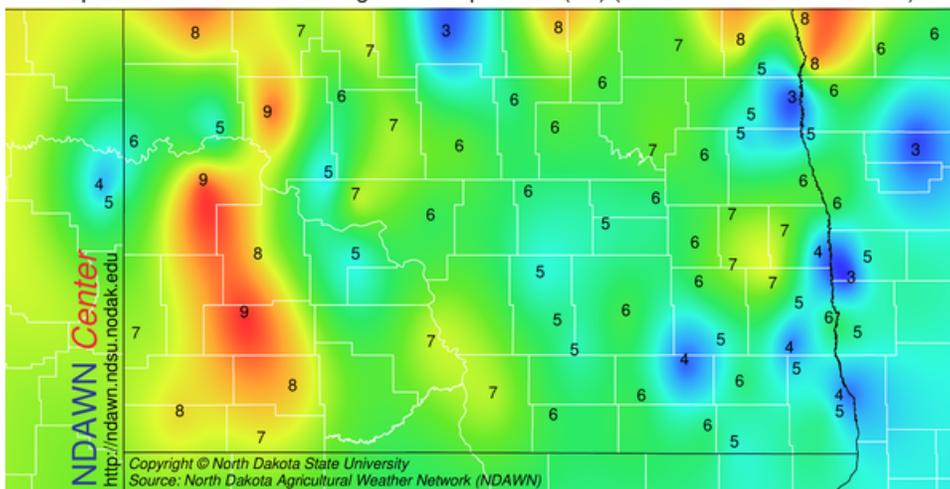
Average Temperature (°F) Deviation from Mean (1981-2010)

Departure From Normal Monthly

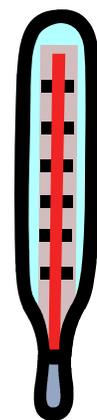
Average Air Temperature in degrees F

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

Departure from Normal Average Air Temperature (°F) (2015-03-01 – 2015-03-31)



North Dakota State Climate Office



April 2015

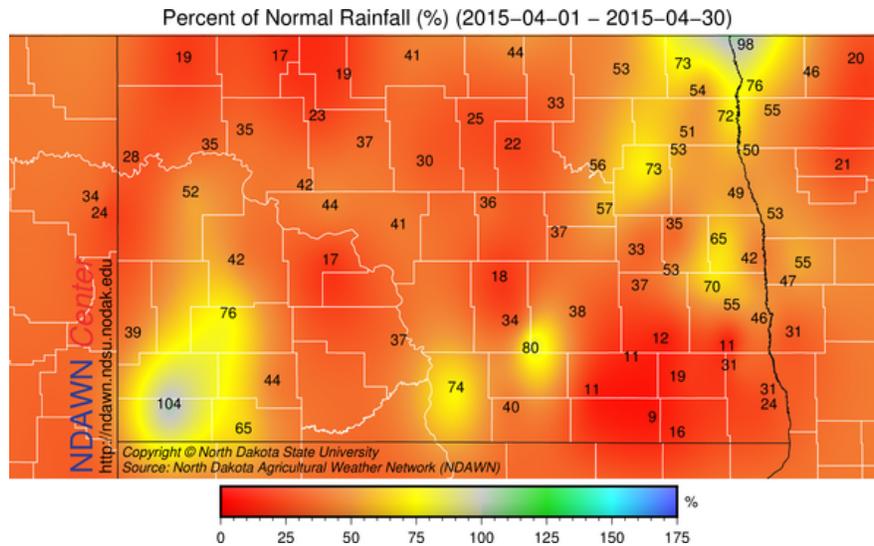
# Season in Graphics

## Spring 2015 Weather in North Dakota:

Total Precipitation percent of mean (1981-2010)

Precipitation Percent of Normal

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



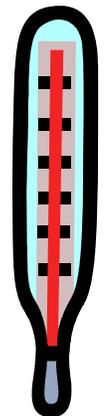
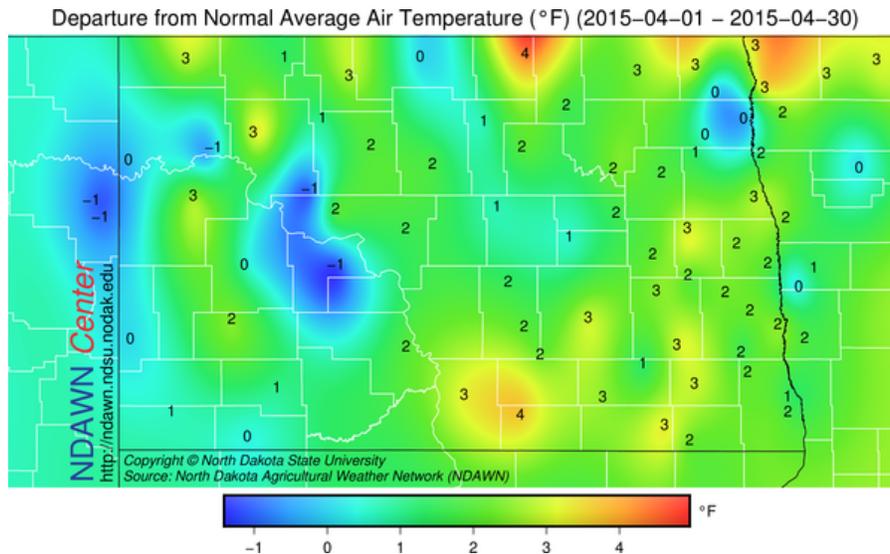
North Dakota State Climate Office

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

# Season in Graphics

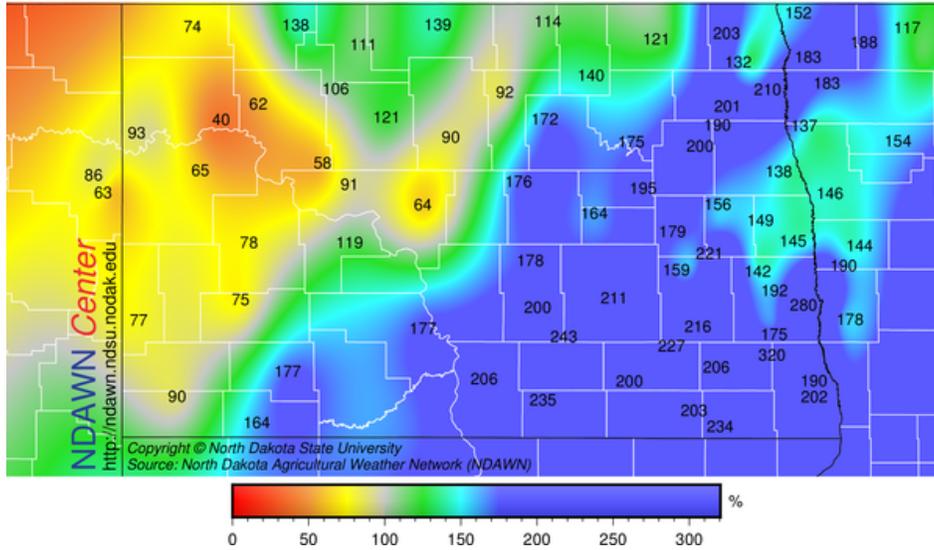
## Spring 2015 Weather in North Dakota:

Total Precipitation percent of mean (1981-2010)

Precipitation Percent of Normal

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

Percent of Normal Rainfall (%) (2015-05-01 – 2015-05-31)



North Dakota State Climate Office

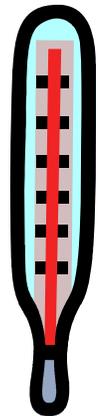
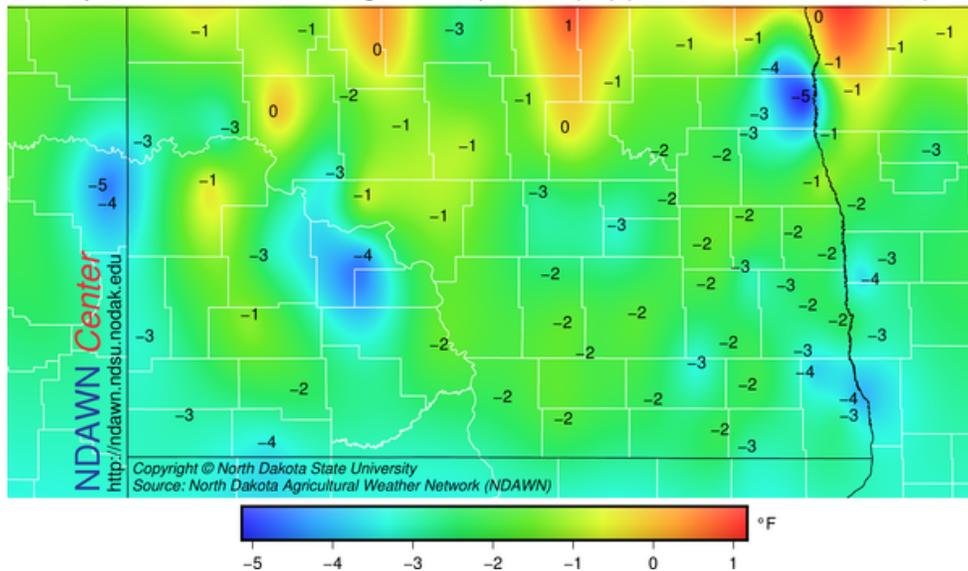
Average Temperature (°F) Deviation from Mean (1981-2010)

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) (2015-05-01 – 2015-05-31)

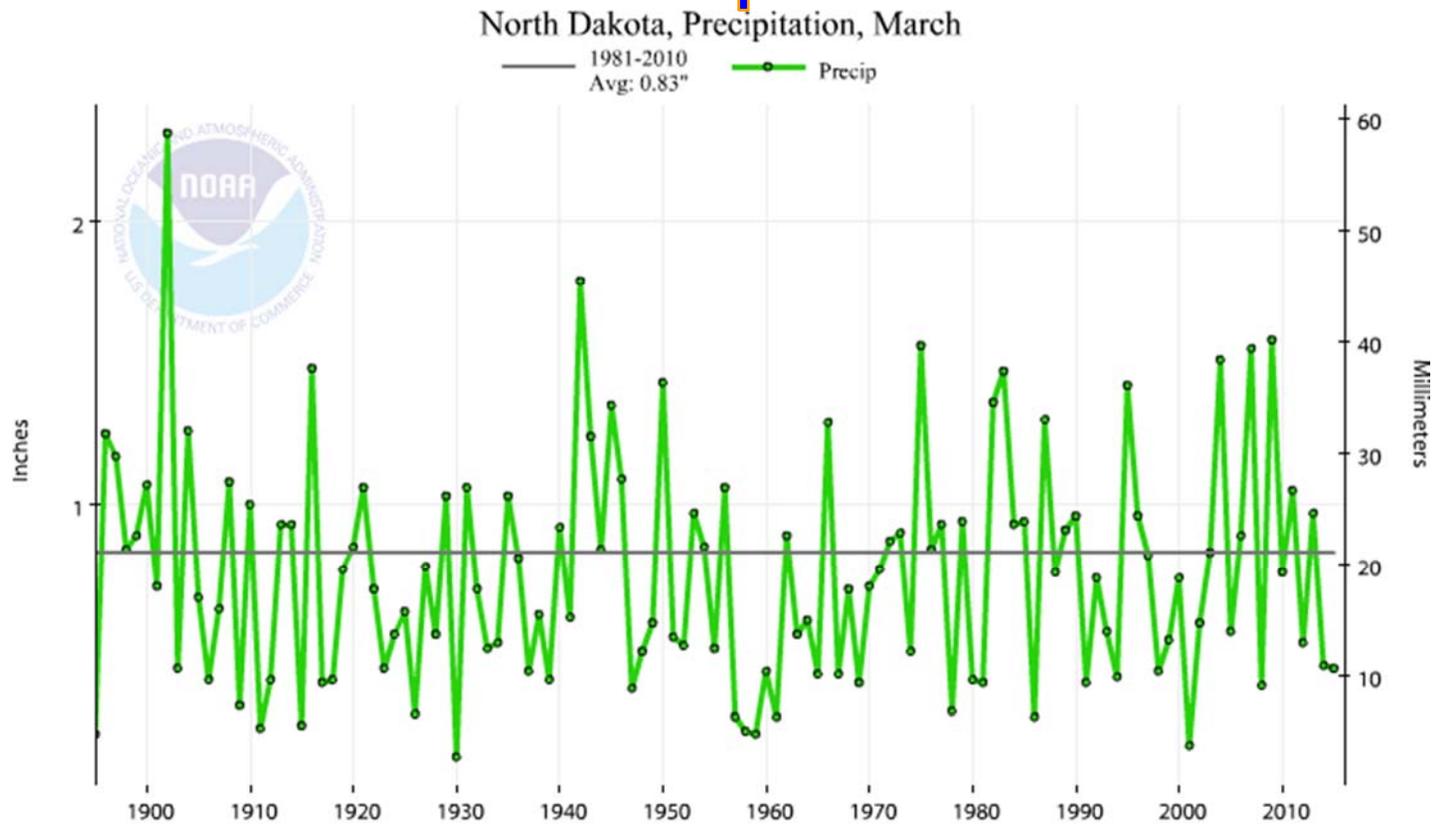


North Dakota State Climate Office

May 2015



# Historical March Precipitation for North Dakota

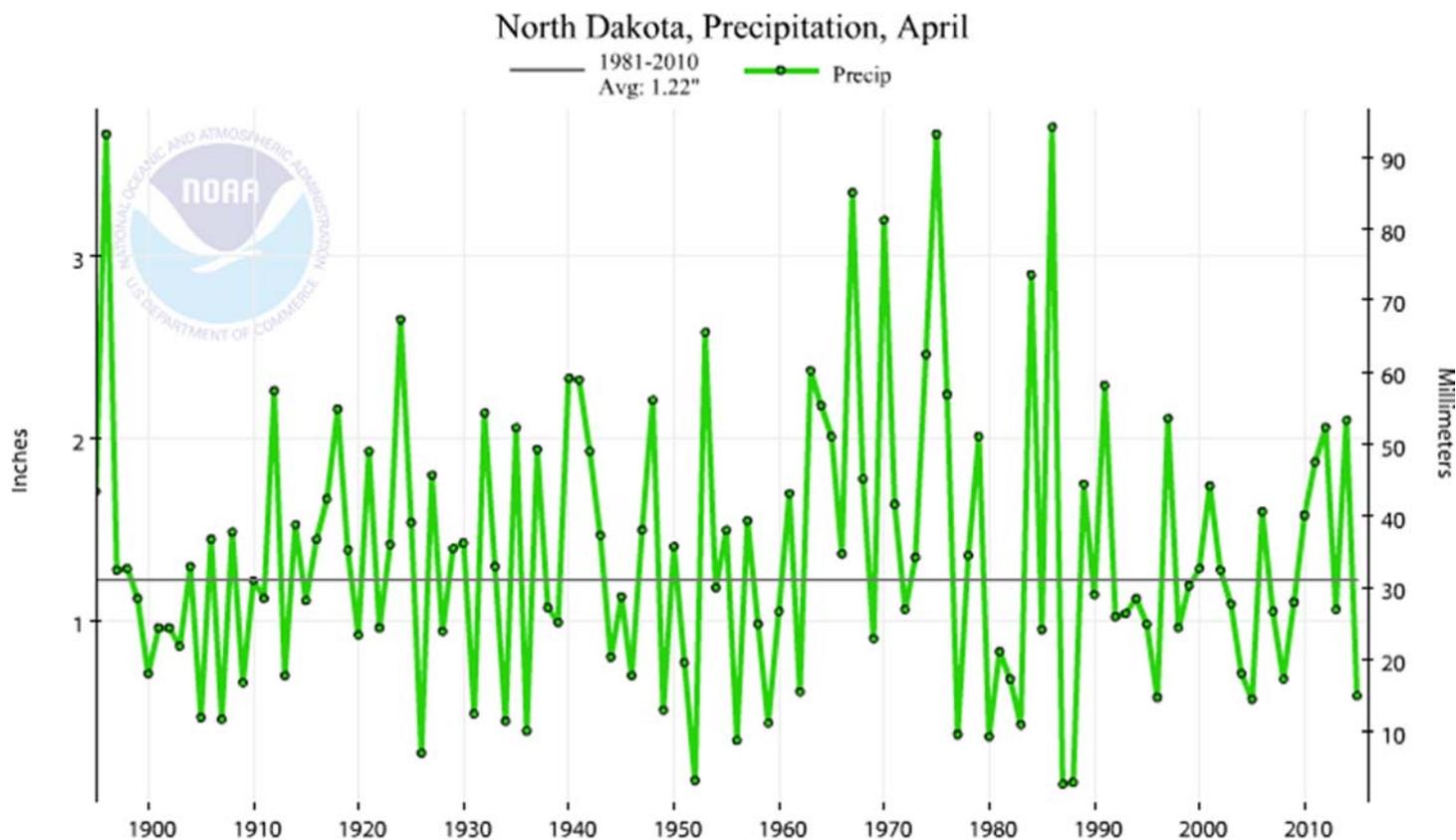


## March Precipitation Statistics

2015 Amount: **0.42 inches**  
Maximum: 2.31 inches in 1902  
State Normal: 0.83 inches (1981-2010)

Monthly Ranking: 31st driest  
Minimum: 0.11 inches in 1930  
Years in Record: 121

# Historical April Precipitation for North Dakota

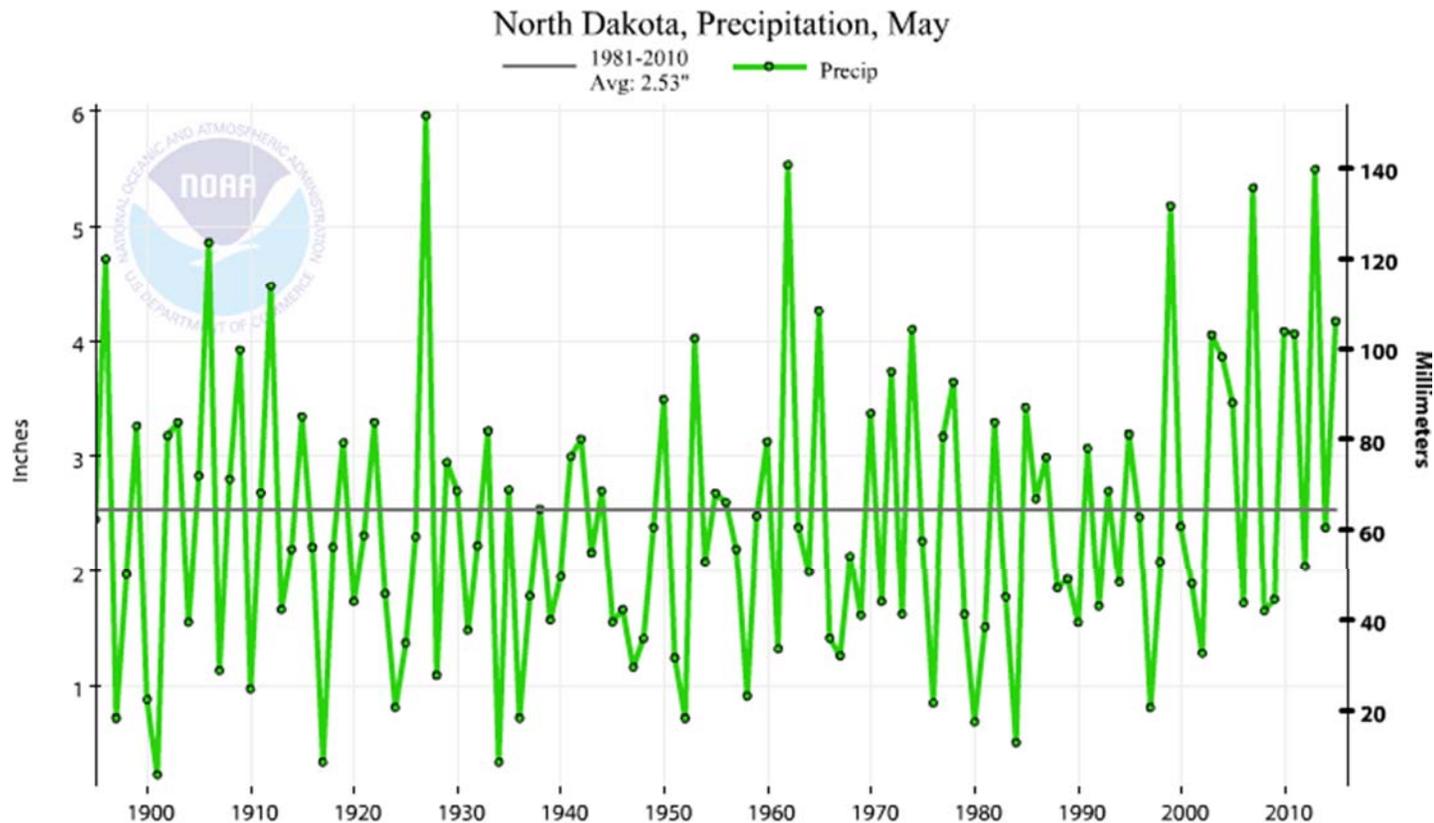


## April Precipitation Statistics

2015 Amount: 0.59 inches  
Maximum: 3.71 inches in 1986  
State Normal: 1.22 inches (1981-2010)

Monthly Ranking: 18th driest  
Minimum: 0.11 inches in 1987  
Years in Record: 121

# Historical May Precipitation for North Dakota

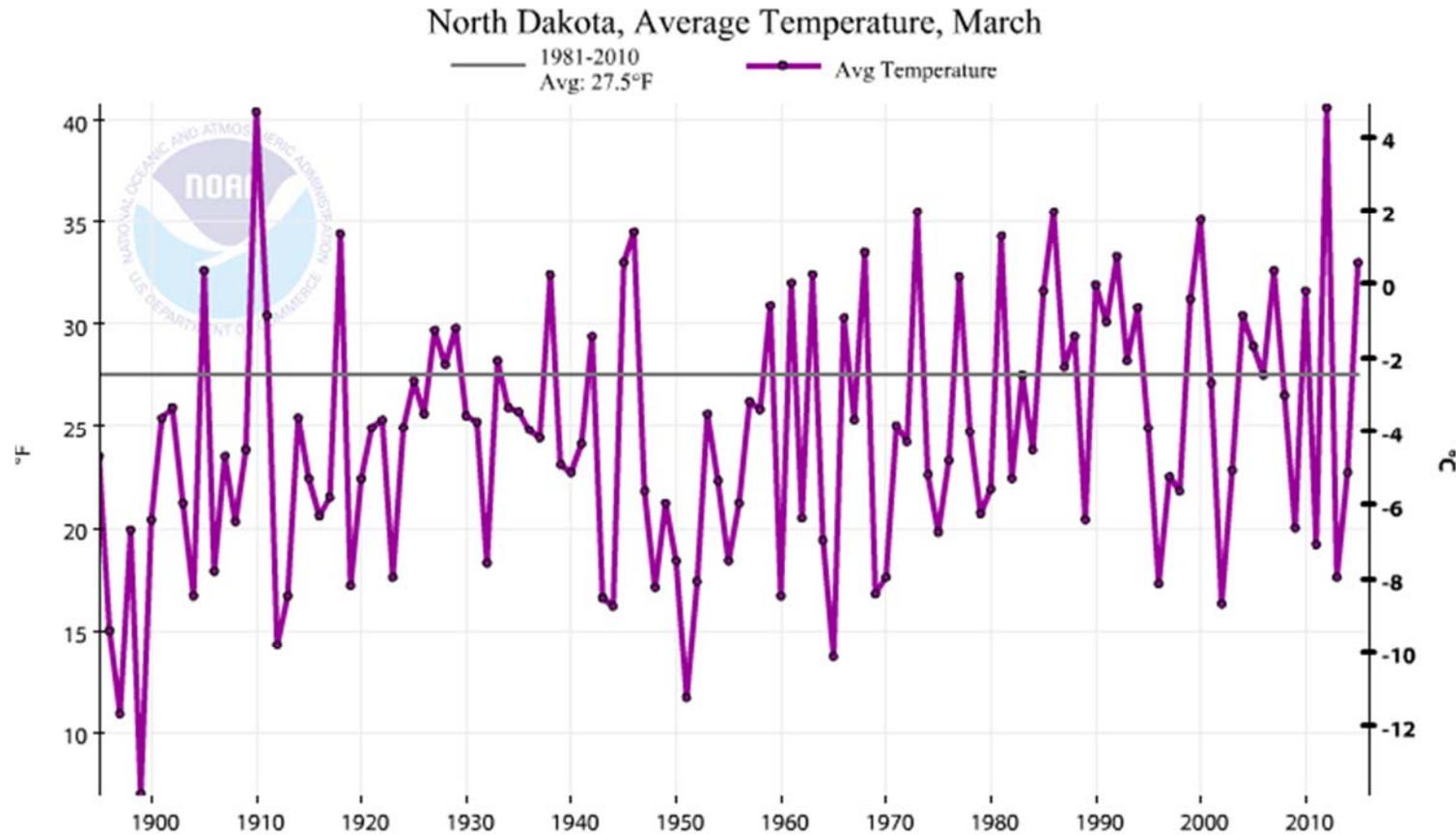


## May Precipitation Statistics

2015 Amount: 4.17 inches  
Maximum: 5.73 inches in 1927  
State Normal: 2.53 inches (1981-2010)

Monthly Ranking: 10th wettest  
Minimum: 0.23 inches in 1901  
Years in Record: 121

# Historical March Temperature for North Dakota

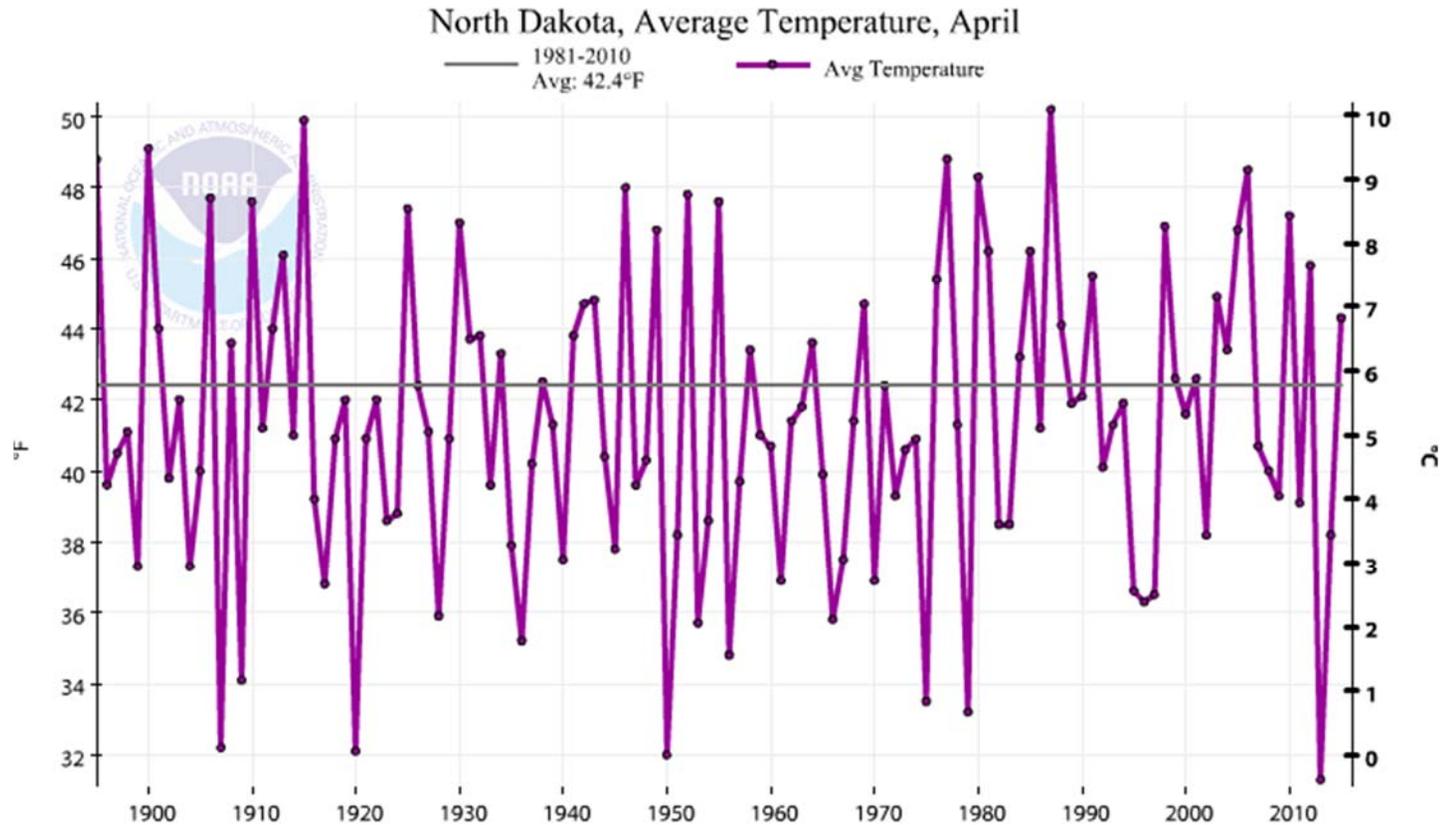


## March Temperature Statistics

2014 Average: **33.0** °F  
Maximum: 40.6 °F in 2012  
State Normal: 27.5 °F (1981-2010)

Monthly Ranking: 11th Warmest  
Minimum: 7 °F in 1899  
Years in Record: 121

# Historical April Temperature for North Dakota



## April Temperature Statistics

2015 Average: 44.3 °F

Maximum: 50.2 °F in 1987

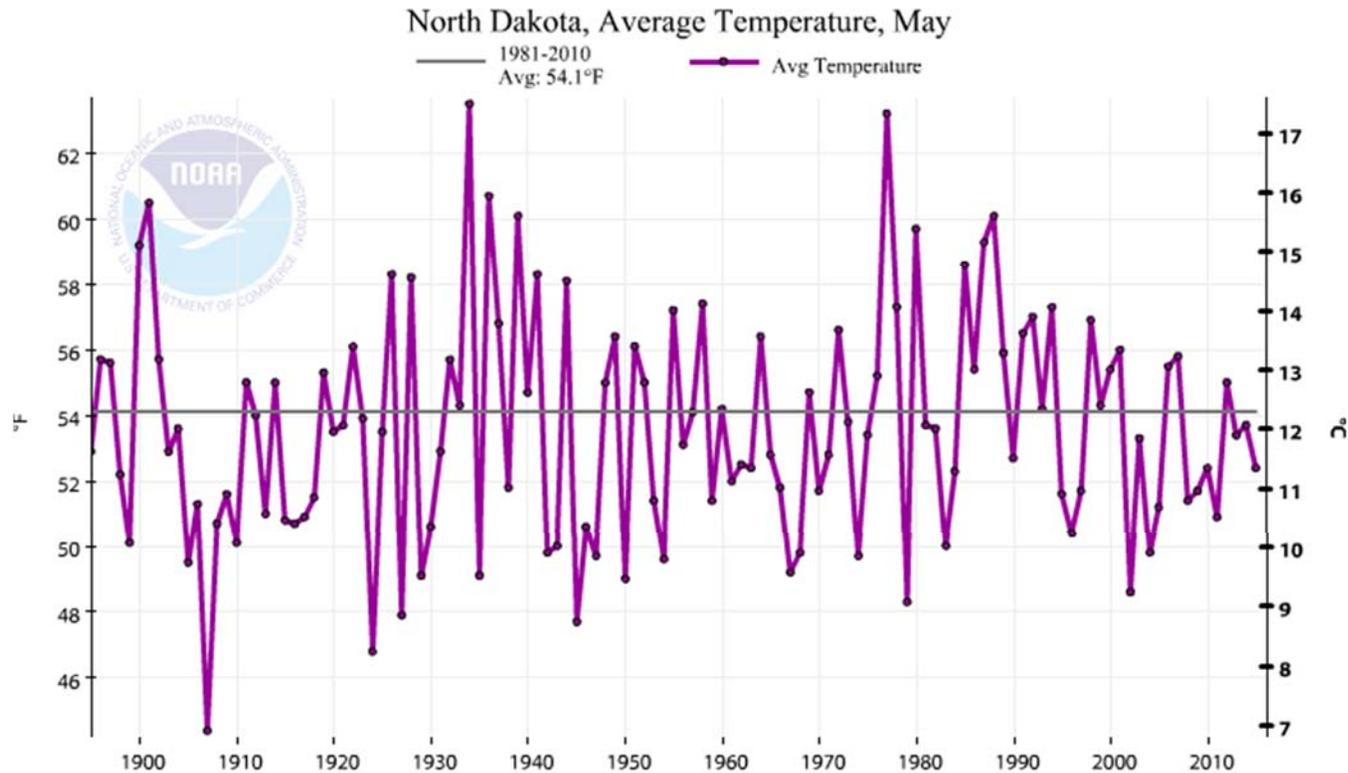
State Normal: 42.4 °F (1981-2010)

Monthly Ranking: 29th Warmest

Minimum: 31.2 °F in 2013

Years in Record: 121

# Historical May Temperature for North Dakota



## May Temperature Statistics

2015 Average: **52.4 °F**

Maximum: 63.5 °F in 1934

State Normal: 54.1 °F (1981-2010)

Monthly Ranking: 47th coolest

Minimum: 43.3 °F in 1907

Years in Record: 121



# Storms & Record Events



## State Tornado, Hail, and Wind Reports for Spring 2015

by D. Ritchison

North Dakota 3 Month Total	Wind 12	Hail 6	Tornado 0
Reports by Month			
Month	Wind	Hail	Tornado
Total March	8	0	0
Total April	0	0	0
Total May	4	6	0

## North Dakota Record Event Reports for Spring 2015

Date	Location	Type of Record	Previous Record
03/08/15	Williston	54° F maximum temperature	53° in 1990
03/08/15	Grand Forks (NWS)	48° F maximum temperature	Ties 48° set in 1905
03/09/15	Grand Forks (NWS)	58° F maximum temperature	54° in 1977
03/09/15	Fargo	58° F maximum temperature	55° in 1902
03/09/14	Grand Forks AP	57° F maximum temperature	Tied 57° set in 1977
03/10/15	Fargo	58° F maximum temperature	Tied 58° set in 1911
03/11/15	Fargo	59° F maximum temperature	Tied 59° set in 2012
03/12/15	Fargo	63° F maximum temperature	62° set in 1910
03/12/15	Grand Forks AP	59° F maximum temperature	56° set in 2012
03/13/15	Jamestown	67° F maximum temperature	61° set in 1945
03/14/15	Bismarck	72° F maximum temperature	62° set in 2013
03/15/14	Grand Forks (NWS)	69° F maximum temperature	59° set in 1927
03/15/15	Grand Forks AP	70° F maximum temperature	59° set in 2012
03/15/15	Fargo	75° F maximum temperature	62° set in 2012
03/15/15	Jamestown	67° F maximum temperature	64° set in 1927
03/15/15	Minot (Exp Station)	65° F maximum temperature	62° set in 1938
03/16/15	Jamestown	70° F maximum temperature	64° set in 1981
03/28/15	Williston	79° F maximum temperature	74° set in 1986
03/31/15	Bismarck	76° F maximum temperature	75° set in 2012
03/31/15	Minot (Airport)	70° F maximum temperature	Tied 70° set in 2012
04/01/15	Fargo	73° F maximum temperature	Tied 73° in 2012
04/11/15	Grand Forks (AP)	78° F maximum temperature	Tied 78° in 1968
04/23/15	Fargo	15° F minimum temperature	17° set in 1957
04/23/15	Grand Forks (AP)	18° F minimum temperature	22° set in 1958
05/15/15	Bismarck	1.57" of rain	0.57" set in 1992
05/17/15	Jamestown	2.75" of rain	0.85" set in 1942
05/17/15	Minot (Exp Station)	1.41" of rain	0.70" set in 1977
05/17/15	Fargo	2.60" of rain	2.10" set in 1996
05/18/15	Grand Forks (NWS)	1.87" of rain	1.79" set in 1996
05/18/15	Jamestown	2.50" of rain	0.74" set in 1951
05/19/15	Grand Forks (AP)	27° F minimum temperature	28° set in 2002
05/19/15	Bismarck	25° F minimum temperature	27° set in 2002



# Seasonal Outlook



## Summer 2015 Climate Outlooks

by R. Kupec<sup>1</sup>

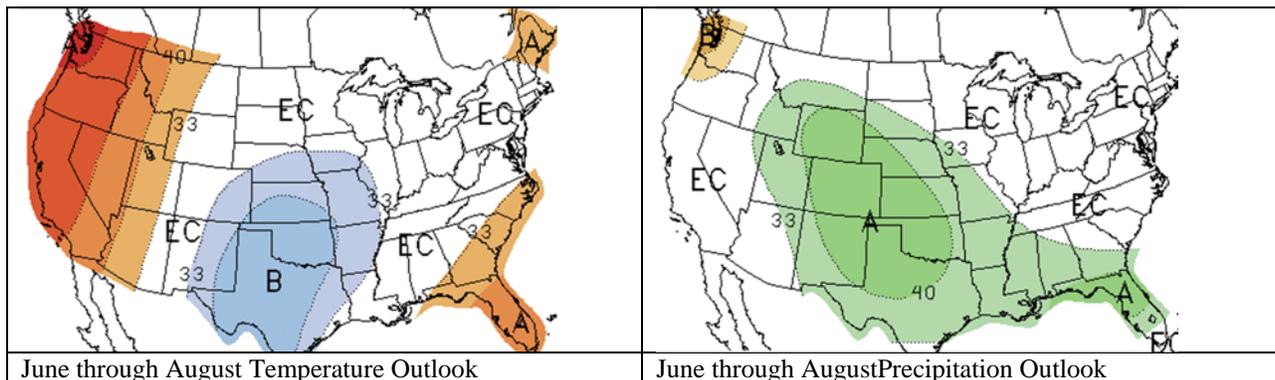
Our dry start to spring suddenly turned wet in May. As noted in the Spring Outlook, that is typical across most of North Dakota during a weak or neutral El Niño pattern. Now it appears though that the long predicted development of an El Niño in the Pacific Ocean may finally be coming to fruition. For much of the spring, weak positive or neutral sea surface temperatures were recorded in the South Pacific. During May, a notable rise in ocean temperatures occurred, prompting the Climate Prediction Center (CPC) to forecast a 90% likelihood that El Niño conditions will continue and likely strengthen through the summer months.

Trying to discern the impact on summer weather in North Dakota of a weak or strengthening El Niño is difficult. The correlation between El Niño and precipitation is lowest of any of the four seasons. Most of our precipitation in the summer comes from thunderstorms, which tend to be more localized, therefore broad patterns are more difficult to discover. During a weak summer El Niño average, to slightly wetter than average conditions across much of the state. The exception appears to be the northwest corner of the state where several stations show drier conditions. If the El Niño becomes strong over the summer, then the tendency is for slightly drier conditions, except in the southwest, where the signals are mixed or actually trend slightly wet at some stations.

Temperature trends are also difficult to link with El Niño in the summer months but do show slightly stronger correlations than does precipitation. Across the state the overall trend is for slightly cooler weather. During a stronger El Niño, cooler temperatures become especially pronounced during August. There is a well-established relationship between El Niño and cooler autumn temperatures in our area. It's possible that the dip in August temperatures may be the early onset of autumn El Niño conditions. The cooler end to summer seems to be slightly more pronounced across the northern tier of the state.

The weakness of the correlation between El Niño and our summer weather is likely behind the Climate Predictions Center's forecast for an equal chance of below or above average temperature and precipitation in our area (See figure below). Even though the signals are weak, summer 2015 looks to be heading for slightly cooler and slightly wetter conditions across much of the state. If the El Niño does strengthen, then much of the state could be looking at a cooler August. And if that carries into September, an earlier than average frost would be a possibility. The next CPC outlook will be out around June 18<sup>th</sup> and is available 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/data/enso/#c343262>.

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: Rob Kupec is Chief Meteorologist - KVRR TV in Fargo, ND. [ркуpec@kvrr.com](mailto:ркуpec@kvrr.com).

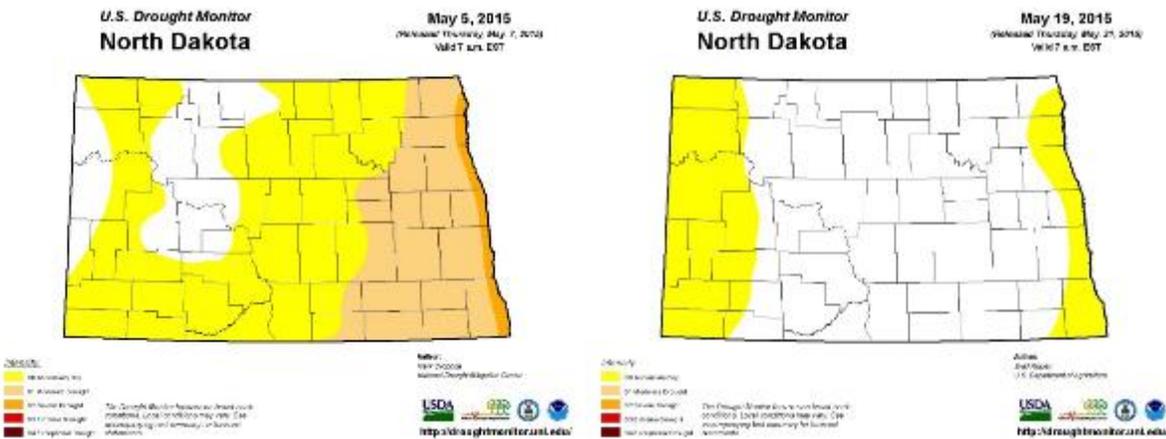


# Hydro-Talk



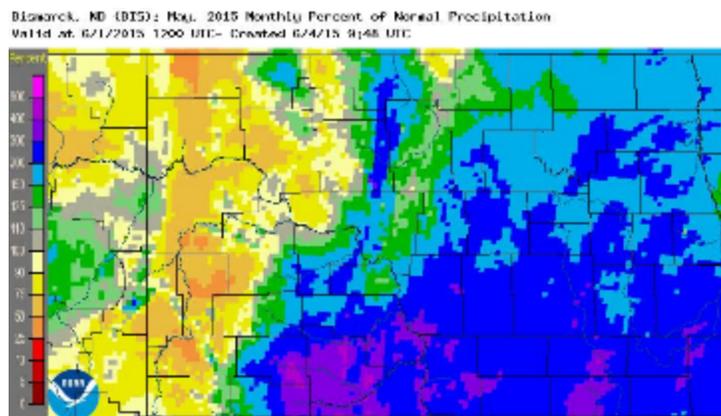
## North Dakota's Latest Hydrologic Status by A. Schlag<sup>2</sup>

Much like the long standing adage of “if you don’t like the weather in North Dakota, wait five minutes”, one can almost say that about the status of drought in North Dakota as well. OK, maybe not 5 minutes, but not that long ago a life-long friend commented that we always seem to only be a week away from either a drought or a flood in North Dakota. I must admit, I find both a fairly accurate way to describe life up here in the Northern Great Plains. In looking at the below images, the dry conditions that persisted through the winter months saw a steady ratcheting up of the drought designations through spring, resulting in widespread abnormally dry conditions up to what was considered severe drought along the eastern most part of the Red River Valley. Truthfully, the only thing that kept the drought designations from being even greater was the simple fact that impacts were minimized by the region being in the winter season.



The vast improvement from one rendition of the USDM to that of two weeks later was the direct result of some fairly unusual heavy rains across much of North Dakota that largely fell between the 6<sup>th</sup> and 18<sup>th</sup> of May and produced an unusually wet month of May.

Yep, North Dakota is indeed a land of extremes and it really doesn’t take very long to go from one to the next. In this case, one could likely make the assumption that only the preceding dry period is what prevented what would have been widespread minor flooding.



<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)



# Science Bits



## Summer Severe Weather Communication- A two-way Street! by Greg Gust<sup>3</sup>

A Northern Plains summer convective season, which some years can run from late March into early November, will typically produce some very intense periods with quickly developing storms (in a matter of minutes), rapid storm movements (often 30 to 80 mph storm motion), and truly devastating storm impacts (think wildfire or tornado). These things affect our area every year, sometimes much more often and sometimes much less, and each of us will likely have to contend with such an event this summer.

We in the weather business refer to Summer-period severe weather related watches, warning, and advisories as “short-fuse” products - *like a short-fuse on a stick of dynamite!* ... as compared to the “long-fuse” weather issues we contend with during our Winter-period.

And we’ll use something like the graphic on the right to train individuals to identify “Where’s the Storm?”, “How’s it moving?”, and “Where and I relative to the storm?” ... so they can make better informed decisions when confronting or being confronted with such extreme weather possibilities.

**Where's the storm?**  
- Is it located to my south, west, or north?

**How's it moving?**  
- Is it moving from southwest to northeast or northwest to southeast?  
- Toward me, or away?

**Where am I relative to the storm?**  
- What am I likely to see or experience?  
- Can I get to a shelter safely and quickly?

**Can you answer all these questions, all the time?** For SkyWarn Storm Spotters and for your general Severe Weather Awareness, we recommend you maintain a high level of situational awareness... which includes a method for tracking storm development and movement, while maintaining awareness of your own personal safety and the safety of your friends and families.

**Summer Weather Awareness Issues:** With storms developing and moving so quickly it is imperative that we all strive to stay as weather-aware as possible, and first and foremost to this effort is to stay **heads-up and eyes wide-opened**.

**How do you stay informed?**  
**Face ? Tweet ? Smart ?**

**@DumbBunny: get home now!**  
**#KickbuttTor, #NDSVR**

**Like us and Follow us: @NWSBismarck and @NWSGrandForks**

While that literally means that we need to pay attention to us surrounding and what may be heading our direction, it also infers that we should use what is available to us to develop and maintain “situational awareness”. This could range from monitoring broadcast media reports, regularly checking NOAA/NWS webpage (<http://www.weather.gov/>) based weather forecast information to plan your activities, or to engage various social media platforms to assess what others may be saying about the weather.

<sup>3</sup> The corresponding author: Greg Gust is the Warning Coordination Meteorologist at the NOAA’s National Weather Service, Weather Forecast Office in Grand Forks, ND. E-Mail: [gregory.gust@noaa.gov](mailto:gregory.gust@noaa.gov)

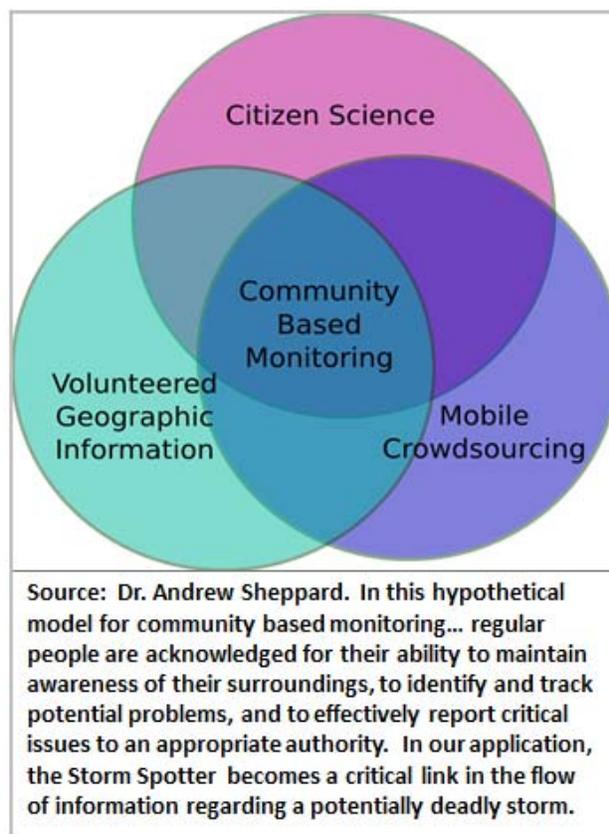
**BUT** ...regardless of what one may prefer as a source for information (broadcast media, internet based media, or social media) it is essential that everyone, young and old, new media or ancient, find and use multiple means of getting such information... *and then actually respond to it!*

**More Two-Way Communication is Needed.** We encourage you all to make it part of your daily process to check the latest local weather forecast at least twice day (sometime in the AM and sometime in the PM), at a minimum, so that you are aware of what weather might be coming your way. But that's typically a one-way information feed. The Community Based Monitoring model depicted below suggests that there is a lot of information which each of us brings to the table... we bring forecast and warnings, you may bring validation and ground-truth reporting... all of which combines to produce a better method for informed decision making. There are various two-way communications feeds which you can participate in right now:

**Regular Media:** We appreciate the contacts you may make with other broadcast media outlets and with your local First Response type organizations, i.e. your reports of damage to your local radio station or sheriff's office. We will often have such reports passed on to us as well -and in the social media world, we may receive those as retweets in very short order.

**Social Media:** We want to stay in close touch with you during periods of inclement weather, and encourage you to Friend us, or Like us, or even Follow us on either Facebook or Twitter (sorry, that's about all we have). You can find us easily [@NWSBismarck](#) and/or [NWSGrandForks](#). We may not be able to chat with everyone at all times, but we will post significant weather information to these sites very quickly, and we will greatly appreciate any ground-truth you may be able to provide back to us.

**SkyWarn Spotter Training:** For those of you who are really into severe weather and the **detection, reporting, and survival** issues related to this... we do conduct SkyWarn classes in nearly every county in the state at least every year or two... typically in the springtime (late March through early June) period. Check our webpages for a **SkyWarn Calendar**: <http://www.weather.gov/bis/skywarn> or <http://www.weather.gov/fgf/skywarn>, and a class location near you.



Meanwhile, we hope you can get out there and truly enjoy the great variety of wonderful summer-time weather these Northern Plains provide us with. Just remember to stay safe and help keep us informed.

# 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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## North Dakota State Climate Office

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