North Dakota Climate Bulletin

Summer 2012

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NDSCO

Editors

Adnan Akyüz, Ph.D.

Barbara Mullins

Graphics

Mullins & North Dakota State Climate Office

Contributing Writers:

Barbara A. Mullins

Daryl Ritchison

Allen Schlag

Greg Gust

North Dakota State Climate Office

www.ndsu.edu/ndsco

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 warmer and drier summer. Temperature-wise, this summer was the 8th warmest statewide since 1895. Precipitation-wise, it was the 19th driest summer statewide since 1895.

Warm and dry conditions were some welcoming changes after three consecutive major floods in the Red River Valley at first. However, it has been the second warmest six month period (March-through-August) and the 29th driest such period statewide, which caused drought conditions to settle. As of September 13, 28% of the state was under severe, and 52% of the state is under moderate drought category. USDA designated seven primary and 15 contiguous counties as natural disaster areas in ND. So far, it has been the worst drought to affect ND since 2008 when 38% of the state were under extreme drought.

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

Flaxseed field. McLean County, ND by Akyüz

Weather Highlights

Seasonal Summary:

by B. A. Mullins

June 2012

The state average precipitation was 2.61 inches which is below the 1981-2010 normal of 3.38 inches. June 2012 state average precipitation ranked 29th driest in the last 118 years with a maximum of 7.21 inches in 2005 and a minimum of 1.14 inches in 1974.

The North Dakota Agricultural Weather Network (NDAWN) June percent of normal precipitation ranged from ~40% in the northeast to ~180% of normal in the northwest and mostly below normal conditions in between. In the beginning of the month, the National Drought Monitor (DM) was depicting northeastern parts as moderate drought (D1, based on the DM categorization). Dry conditions in the northeast and southwest portions of the state exacerbated the drought conditions even further. By the end of the month, more than 10% of the state was under moderate drought including a newly added southwestern D1. A very localized storm on June 7 bringing 1.75", 1.1" and 0.92" of rainfall in Hofflund, Ross and Crosby respectively in the northwestern ND skewed the monthly total in favor of above normal precipitation in the region. Despite the magnitude of precipitation deficit in dry regions through the end of June, drought impact was minimal because of the charged soil moisture conditions from the previous seasons. However, dry dug outs, and some reports of drought stress on crops were seen in some isolated areas.

The National Weather Service (NWS) recorded breaking no precipitation records in June. A list of records can be viewed in the "Storms and Record Events" section later in this bulletin.

The US Drought Monitor July 3, 2012 report had drought conditions in eastern and the southwest regions. Drought conditions in those areas ranged from Abnormally Dry (D0) to Moderate (D1).

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported a topsoil moisture of 7% very short, 38% short, 54% adequate, and 1% surplus with a subsoil moisture reported as 5% very short, 28% short, 65% adequate, and 2% surplus (Weekly Weather and Crop Bulletin Vol. 99, No. 27).

According to the preliminary reports of the National Weather Service's Storm Prediction Center (SPC), there were 48 reported hail events, 28 reported high winds, and 6 reported tornadoes.

The top five June daily maximum wind speeds recorded from NDAWN were 58.7 mph at Berthold on the 26th, 52.6 mph at Crosby on the 9th, 49.0 mph at Hofflund on the 9th, 49.0 mph at Prosper on the 7th and 48.3 mph at Linton on the 11th. NDAWN wind speeds are measured at a height of 10 feet (3 m).

The state average air temperature was 65.5 °F which is above the 1981-2010 normal of 63.37 °F. June 2012 state average air temperature ranked 23rd warmest in the past 118 years with a maximum of 74.2 °F in 1988 and a minimum of 56.2 °F in 1915.

June daily average air temperatures ranged from the low 60s in the northern ND, to the low 70s in the southeastern ND. On the average, the daily temperatures were between 1 to 4 °F greater than the normal daily temperatures in June. One exception is northwestern Ward County where the daily average temperatures were 1°F below normal. A strong cold front swept through the state on June 11 dropping the temperatures as severe as 18 °F below their seasonal averages at certain locations especially in Wells County.

The National Weather Service (NWS) reported breaking a couple temperature records in June. Fargo had a record high temperature on the 9th of 96 °F. Dickinson had a record high temperature on the 26th of 98 °F. A list of the records can be viewed in the "Storms and Record Events" section later in this bulletin.

NDAWN's highest recorded daily air temperature for June was 105.2 °F at Bowman on the 26th. The lowest recorded daily air temperature was 34.3 °F at Cando on the 12th.

July 2012

The state average precipitation was 2.04 inches which is below the 1981-2010 normal state average of 2.88 inches. July 2012 state average precipitation ranked the 36th driest in the past 118 years with a maximum of 7.88 inches in 1993 and a minimum of 0.62 inches in 1936.

The North Dakota Agricultural Weather Network (NDAWN) July percent of normal precipitation ranged from ~10% to an isolated ~180% of normal in Adams County. The greatest majority of the state had below normal precipitation with the driest areas of less than 50% of normal in the north central and east central regions. Throughout July there were hit and miss rain events across the state with very few that were wide spread. According to the U.S. Drought Monitor July 31st assessment, the eastern and south west corner of the state had a drought intensity of D2 (severe drought) with nearby areas as D1 (moderate drought). The north central region had a drought intensity of D1 (moderate drought). The few areas assessed with no drought conditions included the far north west corner, parts of west central, and central regions with the remaining areas assessed as D0 (abnormally dry). Based on the coverage and the intensity of the current drought in North Dakota, it is the worst drought to impact North Dakota since July 29, 2008.

The National Weather Service (NWS) reported breaking a few precipitation records in July. The NWS recorded a record rainfall at Bismarck Airport of 1.4 inches on the 6th, Fargo Airport of 2.35 inches on the 24th, and Grand Forks Airport of 1.96 inches also on the 24th. See the "Storms and Record Events" section later in this publication for details on event records.

The US Drought Monitor July 31, 2012 reported the eastern and south west corner of the state had a drought intensity of D2 (severe drought) with nearby areas as D1 (moderate drought). The north central region had a drought intensity of D1 (moderate drought). The few areas assessed with no drought conditions included the far north west corner, parts of west central, and central regions with the remaining areas assessed as D0 (abnormally dry).

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported a topsoil moisture of 23% very short, 44% short, 33% adequate, and 0% surplus with a subsoil moisture reported as 14% very short, 44% short, 41% adequate, and 1% surplus (Weekly Weather and Crop Bulletin Vol. 99, No. 31).

According to the preliminary reports of the National Weather Service's Storm Prediction Center (SPC), there were 49 wind reports, 53 hail reports and 2 reported tornadoes in July.

The top five July daily maximum wind speeds recorded from NDAWN were 57.6 mph on the 6th at Edgeley, 54.1 mph on the 28th at Bowbells, 52.6 mph on the 4th at Humboldt, 49.4 mph on the 6th at Marion, and 49.0 mph on the 4th at Cavalier. NDAWN wind speeds are measured at a height of 10 feet (3 m).

The state average air temperature was 73.8 °F which is above the 1981-2010 normal of 69.01 °F. July 2012 state average air temperature ranked the 2nd warmest in the past 118 years with a maximum of 79.7 °F in 1936 and a minimum of 61.8 °F in 1992.

July daily average air temperatures ranged from ~70 °F in the north to ~75 °F in the south and western regions. The departure from normal average air temperatures were above normal across the state with a range of ~2 °F to ~8 °F. Daily average air temperatures were above normal most of the month with only a few days with below normal temperatures. Many places had below normal average air temperatures on the 6th, 15th, 26th, and 27th. The National Weather Service recorded record high air temperatures at Bismarck, Minot, Jamestown, and Dickinson on the 19th with 104 °F, 101 °F, 101 °F, and 102 °F, respectively.

The National Weather Service (NWS) reported breaking record high temperatures and record high minimum temperatures on the 19th and 20th. See the "Storms and Record Events" section later in this publication for a complete list on event records.

NDAWN's highest recorded daily air temperature for July was 104.1 °F at Hazen on the 19th. The lowest recorded daily air temperature was 40.5 °F at Bottineau on the 27th.

August 2012

The state average precipitation was 1.74 inches which is less than the 1981-2010 normal of 2.10 inches. August 2012 state average precipitation ranked 44th driest in the past 118 years with a maximum of 5.02 inches in 1900 and a minimum of 0.72 inches in 1961.

Based on the North Dakota Agricultural Weather Network (NDAWN), August precipitation in North Dakota ranged from mostly well below normal conditions to well above normal conditions. The greatest majority of the state had below normal precipitation with the driest areas of less than 50% of normal in the north western and east central regions. Throughout August the drought conditions did not differ significantly from July. According to the U.S. Drought Monitor August 28st assessment, 17.5% of the state was experiencing severe drought (D2), and 22% of the state was experiencing moderate drought (D1). Based on the short and medium range forecast, below normal precipitation drought conditions will intensify through the end of the growing season. According to the NASS ND Field Office, 23% of the corn is in mature stage, and 26% and 90% of dry edible beans, and canola respectively are harvested.

The National Weather Service (NWS) did not report breaking any precipitation records for August. See the "Storms and Record Events" section later in this publication for a complete list on event records.

The US Drought Monitor August 28, 2012 report had 91.02% of the state as abnormally dry (D0) to severe drought (D2). The severe drought areas were in the east central and southwest corner (http://droughtmonitor.unl.edu/).

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported a topsoil moisture of 19% very short, 53% short, 28% adequate, and 0% surplus with a subsoil moisture reported as 14% very short, 54% short, 32% adequate, and 0% surplus (Weekly Weather and Crop Bulletin Vol. 99, No. 36).

According to the preliminary reports of the National Weather Service's Storm Prediction Center (SPC), severe weather reports for August had 18 reports of high wind, 13 hail reports, and 0 reports of tornadoes.

The top five August daily maximum wind speeds recorded from NDAWN included Ekre on the 3rd with 69.5 mph, McHenry on the 24th with 58.7 mph, Mavie, MN on the 24th with 56.9 mph, McHenry on the 3rd with 56.9 mph and Carrington on the 24th with 53.0 mph. NDAWN wind speeds are measured at a height of 10 feet (3 m).

The state average air temperature was 66.8 °F which is below the 1981-2010 normal of 67.52 °F. August 2012 state average air temperature ranked the 57th warmest (61st coolest) in the past 118 years with a maximum of 73.6 °F in 1983 and a minimum of 60.9 °F in 1977.

August daily average air temperatures ranged from ~65 °F in the northeast to ~70 °F in the western regions. The departure from normal average air temperatures were below normal across the state with a range of ~2 °F to ~3 °F with the exception of pockets of above normal areas. Below normal temperature conditions slowed down the impacts of below normal precipitation in drought stricken areas. After the official ranking for August is available, this would be the first time ND would have a cooler than normal month after 12 consecutive months of warmer than normal months since June 2011, if August is indeed cooler than normal in ND.

The National Weather Service (NWS) reported breaking four temperature records on the 29th. The four records were Grand Forks airport with 97 °F, Minot with 104 °F, Dickinson with 105 °F, and Williston with 99 °F. See the "Storms and Record Events" section later in this publication for a complete list on August event records.

NDAWN's highest recorded daily air temperature for August was 105.6 °F at Hazen on the 29th. The lowest recorded daily air temperature was 36 °F at Greenbush, MN on the 17th.

Season in Graphics

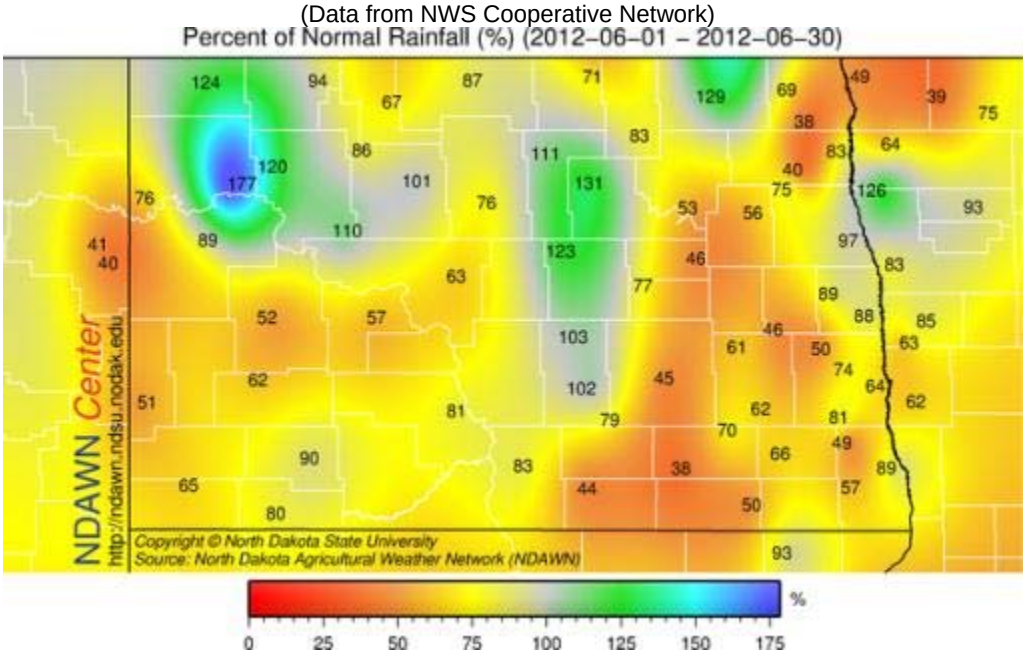
Summer 2012 Weather in North Dakota:

June 2012

Total Precipitation percent of mean (1971-2000)

Precipitation Percent of Normal

(Data from NWS Cooperative Network)

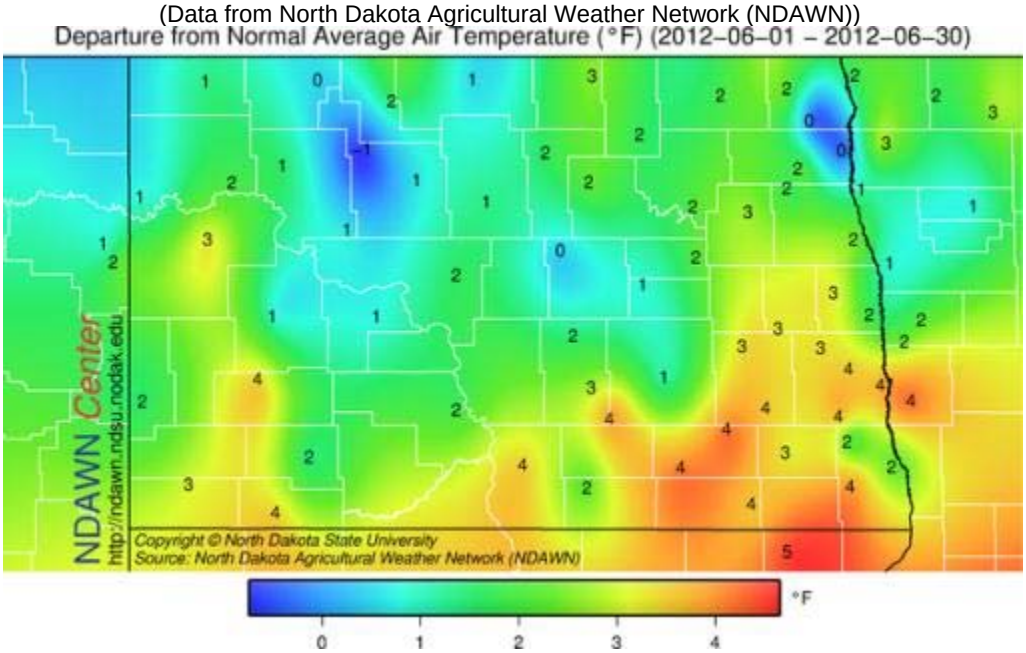


North Dakota State Climate Office

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

Season in Graphics

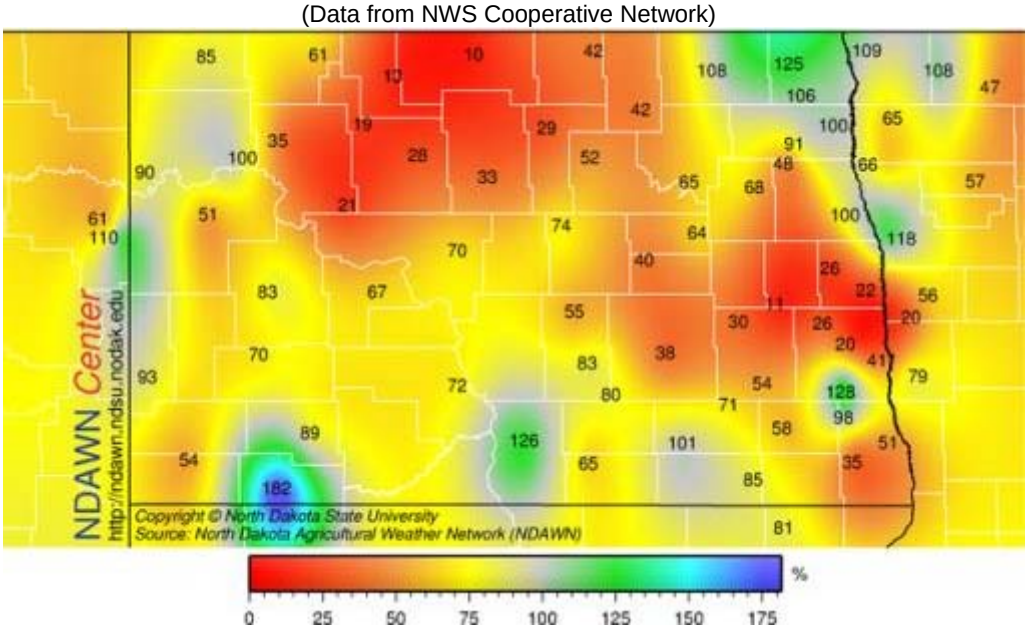
July 2012

Summer 2012 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)

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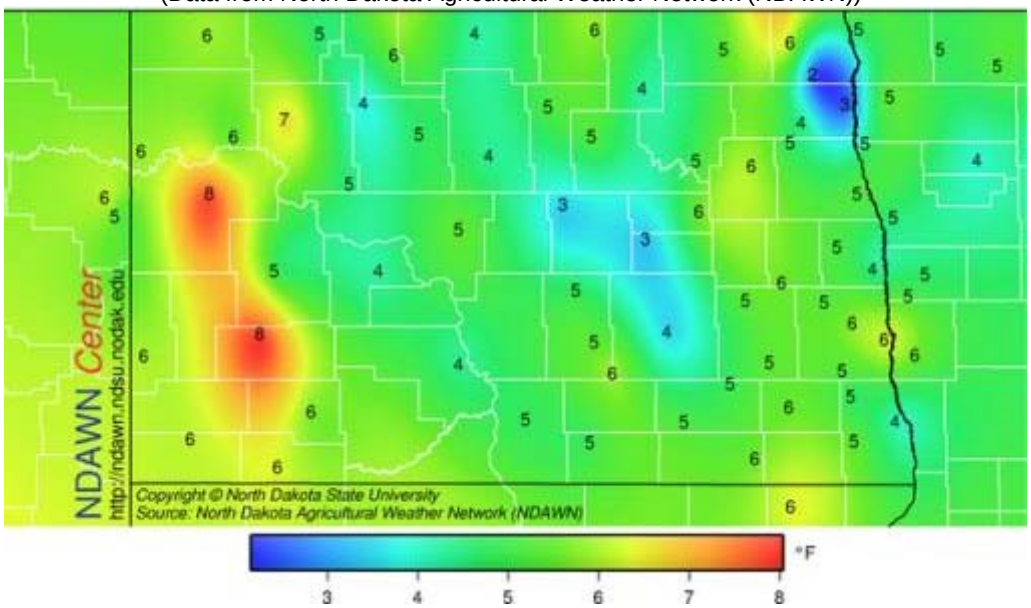
Average Air Temperature in degrees F

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



North Dakota State Climate Office

Season in Graphics

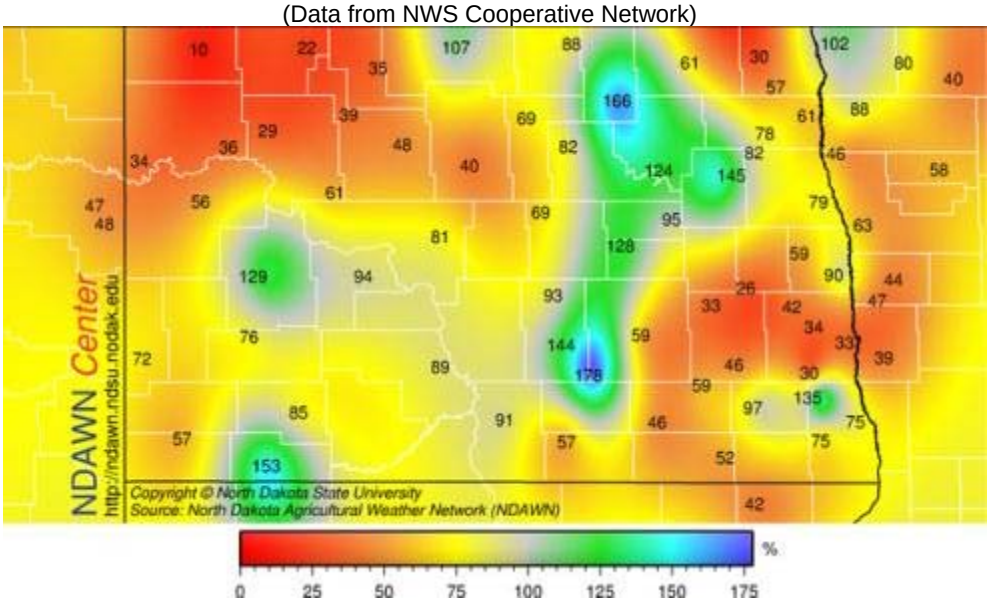
Summer 2012 Weather in North Dakota:

August 2012

Total Precipitation percent of mean (1971-2000)

Precipitation Percent of Normal

(Data from NWS Cooperative Network)



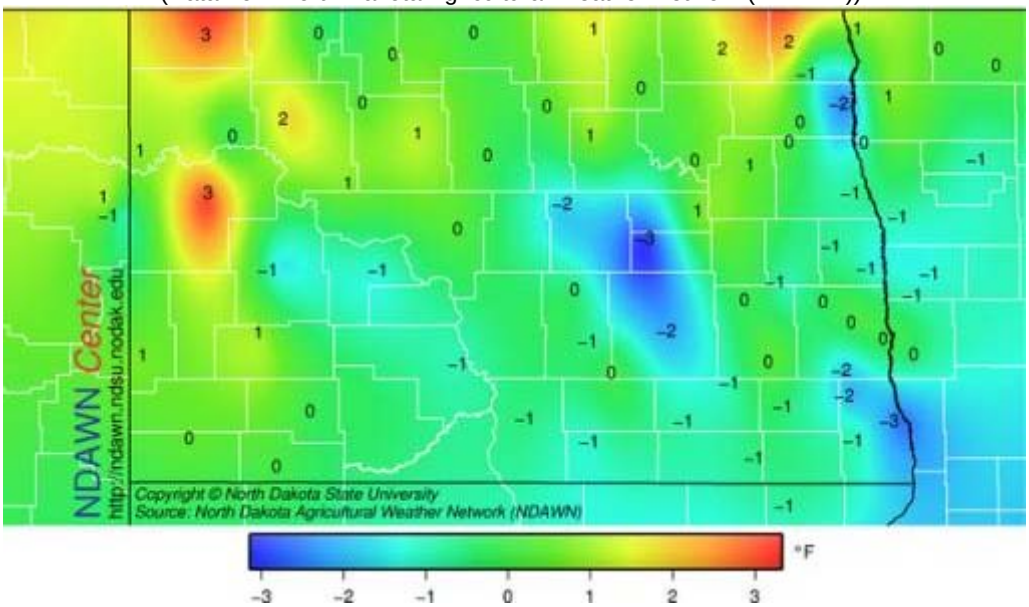
North Dakota State Climate Office

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

Departure From Normal Monthly

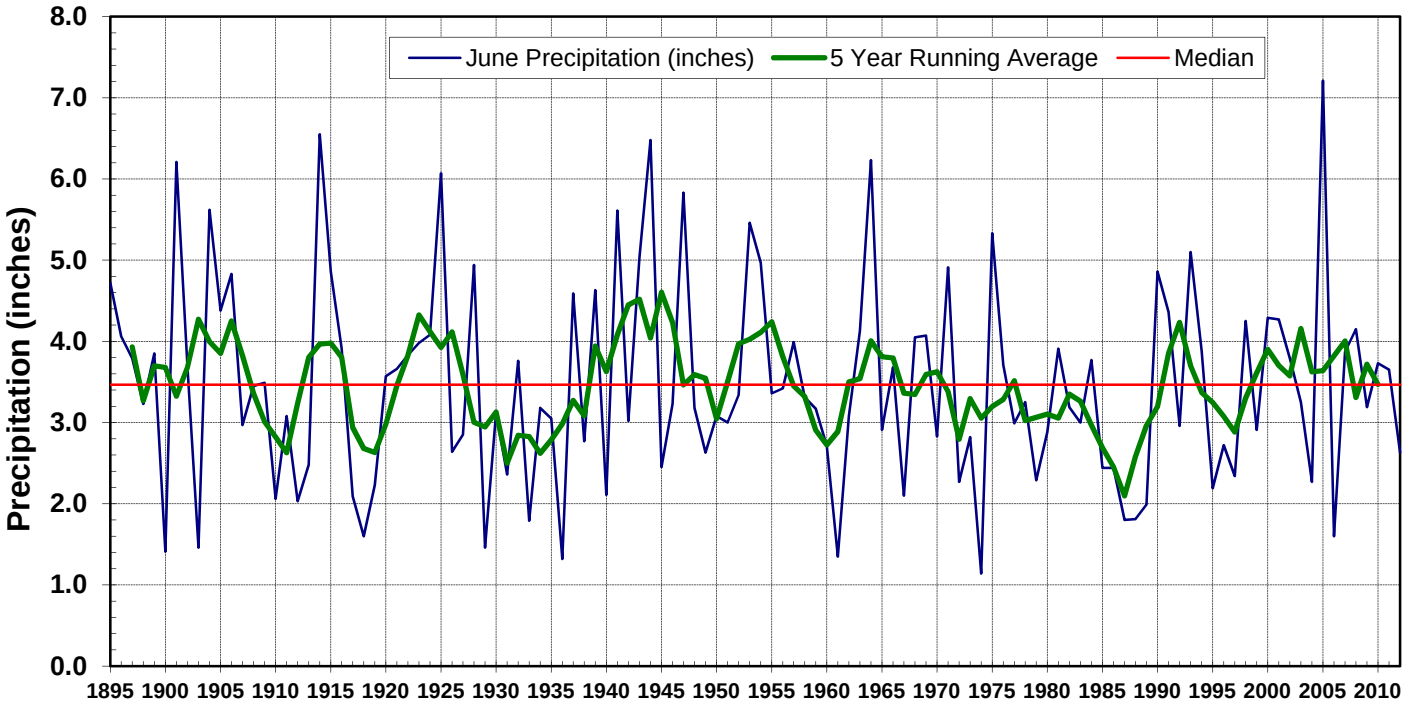
Average Air Temperature in degrees F

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



North Dakota State Climate Office

Historical June Precipitation for North Dakota

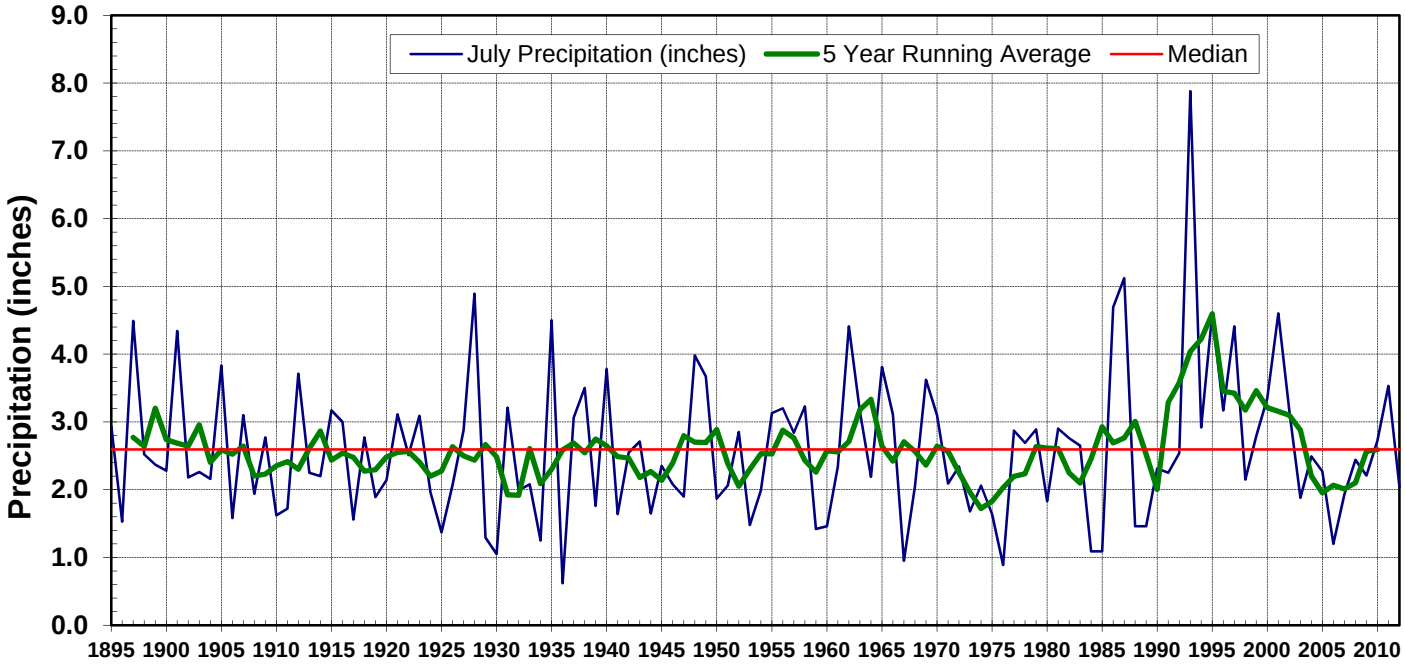


June Precipitation Statistics

2012 Amount: 2.61 inches
Maximum: 7.21 inches in 2005
State Normal: 3.38" (1981-2010)

Monthly Ranking: 29th driest in 118 years
Minimum: 1.14 inches in 1974
Years in Record: 118

Historical July Precipitation for North Dakota

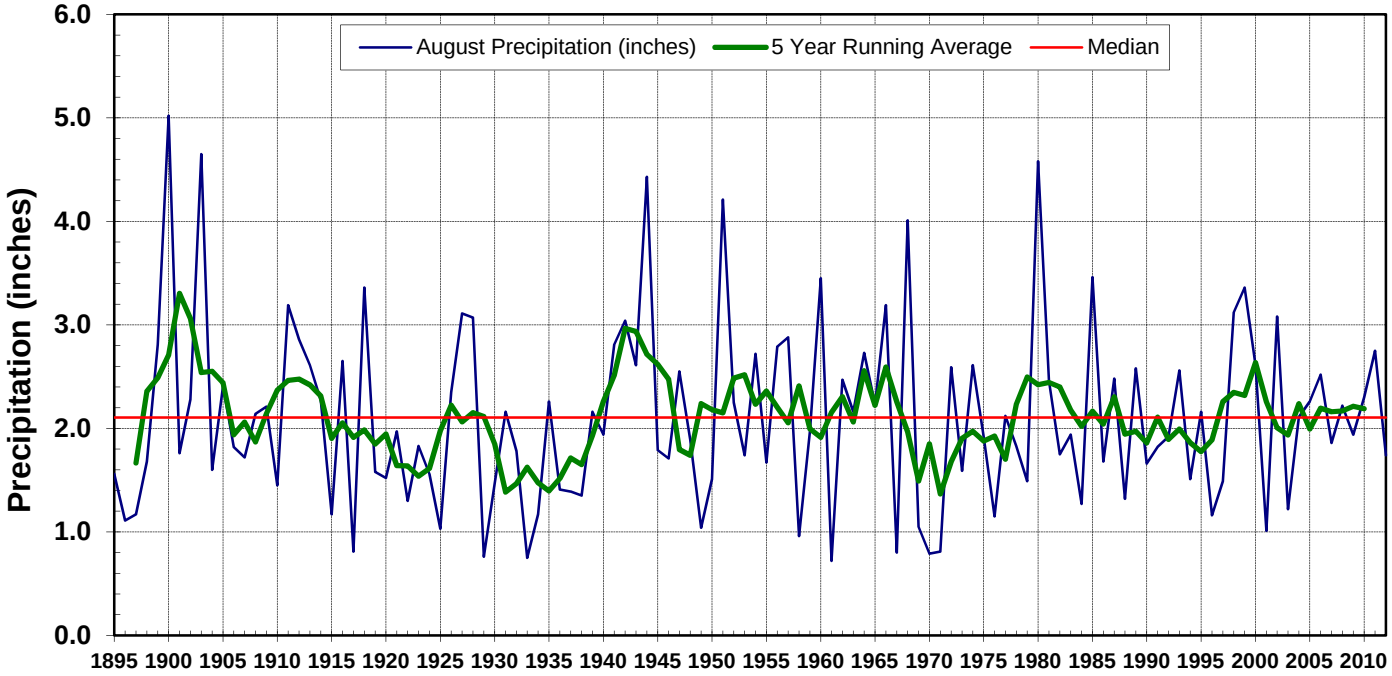


July Precipitation Statistics

2012 Amount: 2.04 inches
Maximum: 7.88 inches in 1993
State Normal: 2.88" (1981-2010)

Monthly Ranking: 36th Driest in 118 years
Minimum: 0.62 inches in 1936
Years in Record: 118

Historical August Precipitation for North Dakota

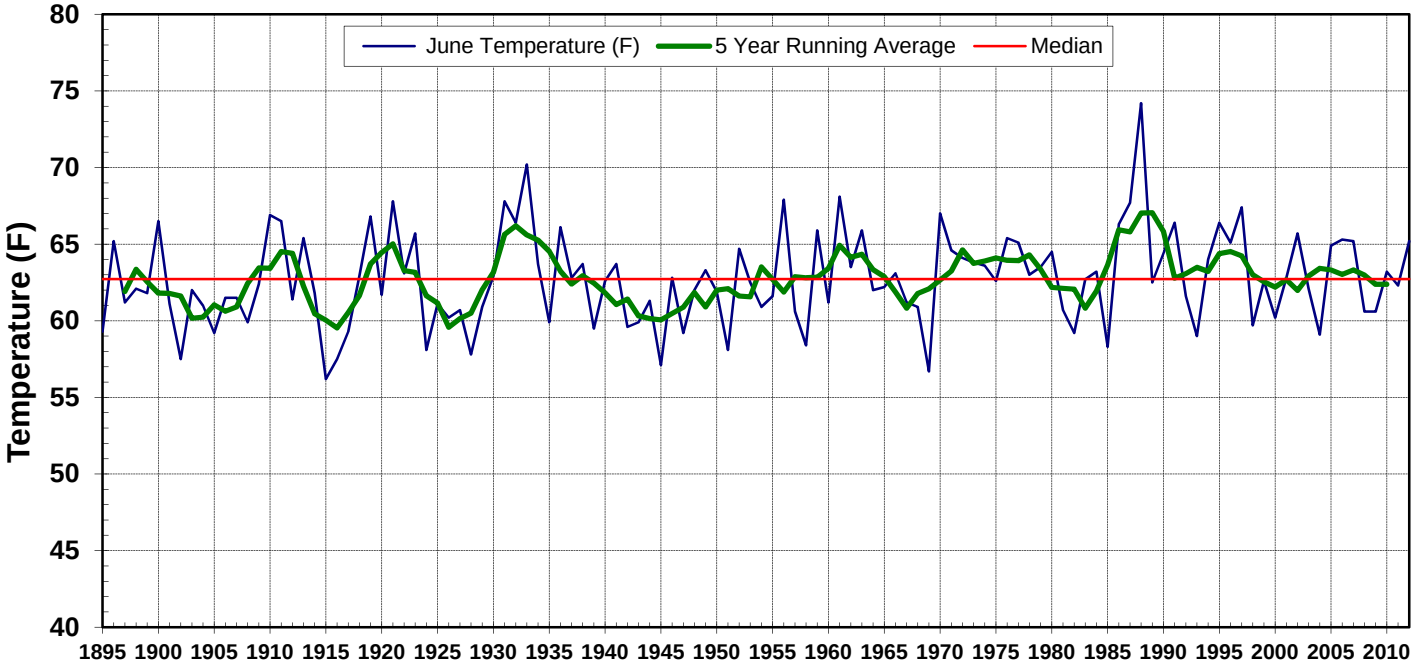


August Precipitation Statistics

2012 Amount: 1.74 inches
Maximum: 5.02 inches in 1900
State Normal: 2.10” (1981-2010)

Monthly Ranking: 44th Driest in 118 years
Minimum: 0.72 inches in 1961
Years in Record: 118

Historical June Temperature for North Dakota

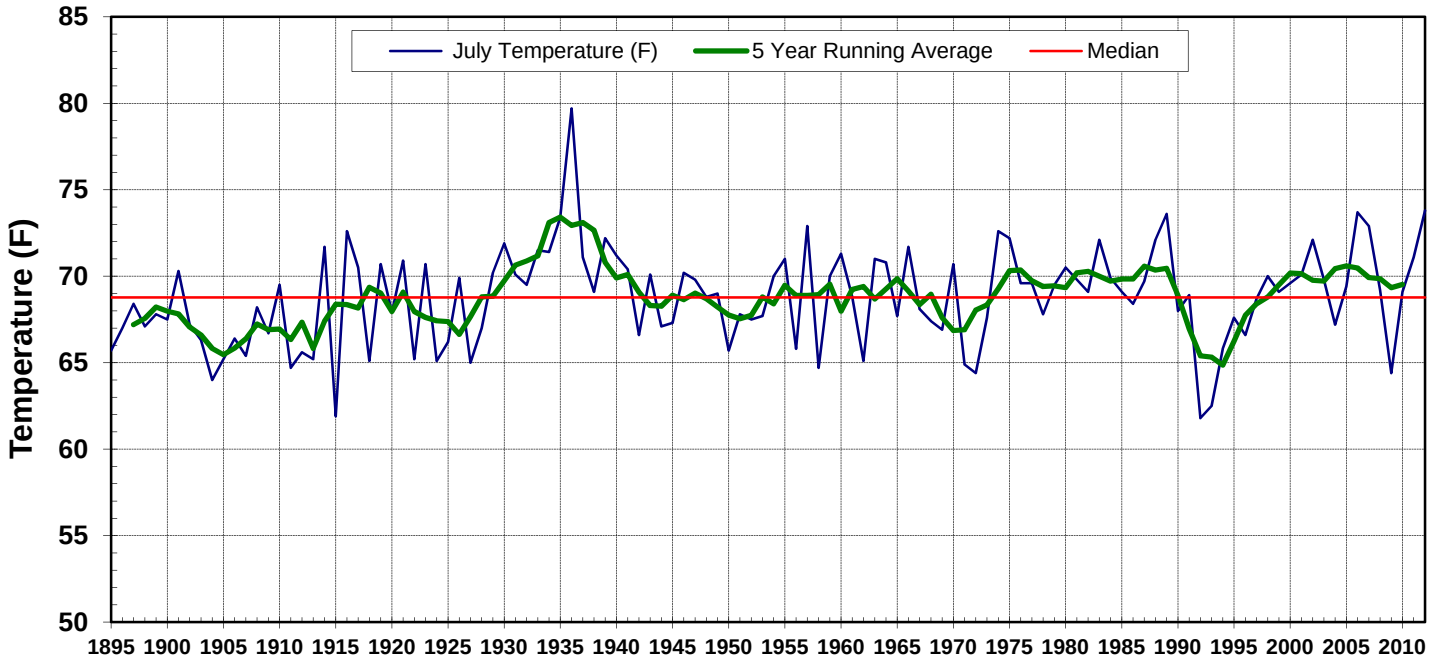


June Temperature Statistics

2012 Average: 65.5 °F
Maximum: 74.2 °F in 1988
State Normal: 63.37 °F (1981-2010)

Monthly Ranking: 23rd Warmest in 118 years
Minimum: 56.2 °F in 1915
Years in Record: 118

Historical July Temperature for North Dakota

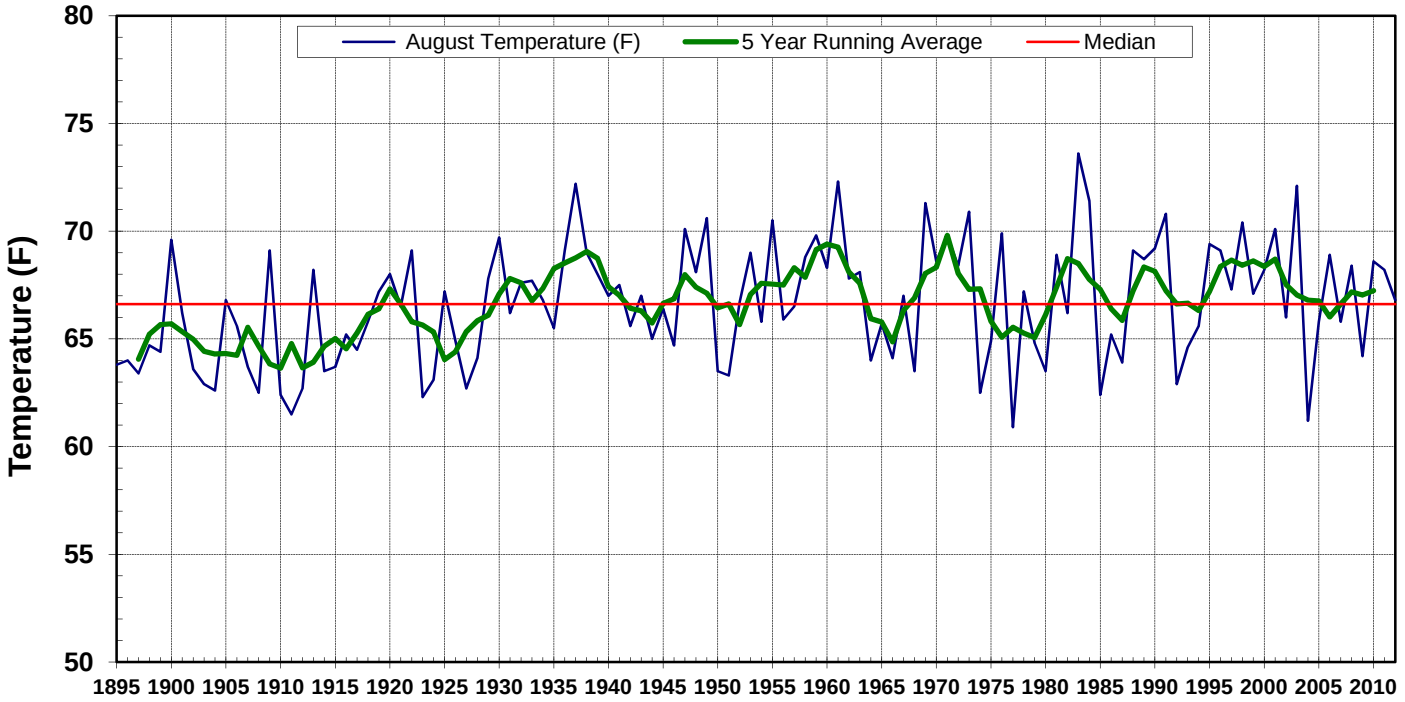


July Temperature Statistics

2012 Average: 73.8 °F
Maximum: 79.7 °F in 1936
State Normal: 69.01 °F (1981-2010)

Monthly Ranking: 2nd Warmest in 118 years
Minimum: 61.8 °F in 1992
Years in Record: 118

Historical August Temperature for North Dakota



August Temperature Statistics

2012 Average: 66.8 °F
Maximum: 73.6 °F in 1983
State Normal: 67.52 °F (1981-2010)

Monthly Ranking: 57th Warmest in 118 years
Minimum: 60.9 °F in 1977
Years in Record: 118

Storms & Record Events

State Tornado, Hail, and Wind Reports for Summer 2012 by B. A. Mullins

North Dakota 3 Month Total	Wind	Hail	Tornado
	95	114	8

Reports by Month			
Month	Wind	Hail	Tornado
Total June	28	48	6
Total July	49	53	2
Total August	18	13	0

North Dakota Record Event Reports for Summer 2012

Date	Location	Type of Record	Previous Record
06/09/12	Fargo	High temperature of 96 °F	95 °F set in 1976
06/26/12	Dickinson	High temperature of 98 °F	Ties previous record set in 1961
07/04/12	Fargo	High minimum temperature of 74 °F	72 °F set in 1938
07/06/12	Bismarck	High rainfall of 1.40 inches	0.90 inches set in 1939
07/19/12	Bismarck	High temperature of 104 °F	100 °F set in 2005
07/19/12	Minot	High temperature of 101 °F	99 °F set in 1974
07/19/12	Jamestown	High temperature of 101 °F	Ties previous record set in 1899
07/19/12	Dickinson	High temperature of 102 °F	101 °F set in 2003
07/20/12	Fargo	High temperature of 100 °F	Ties previous record set in 1960
07/20/12	Fargo	High minimum temperature of 74 °F	73 °F set in 2002
07/20/12	Grand Forks NWS	High minimum temperature of 71 °F	Ties previous record set in 2002
07/24/12	Fargo	Rainfall of 2.35 inches	1.30 inches set in 1993
07/24/12	Grand Forks AP	Rainfall of 1.96 inches	1.30 inches set in 1993
07/24/12	Grand Forks NWS	Rainfall of 2.06 inches	1.22 inches set in 1902
08/29/12	Grand Forks AP	High temperature of 97 °F	95 °F set in 1991
08/29/12	Minot	High temperature of 104 °F	99 °F set in 1961
08/29/12	Dickinson	High temperature of 105 °F	103 °F set in 1999
08/29/12	Williston	High temperature of 99 °F	98 °F set in 1981

Seasonal Outlook

Fall 2012 Climate Outlooks

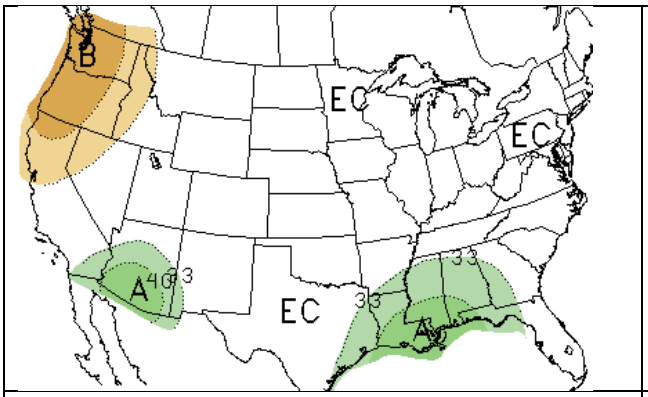
by D. Ritchison[1]

Persistence can be a powerful forecasting tool, especially with long-term trends. For example, most of North Dakota has recorded above average temperatures and below normal precipitation for four straight seasons. With such an unrelenting pattern, it would be easy to think that this trend will continue through autumn, yet, there are signs of some subtle changes that will break down this pattern that has dominated the weather not only in North Dakota, but in much of the lower 48 states for these many months.

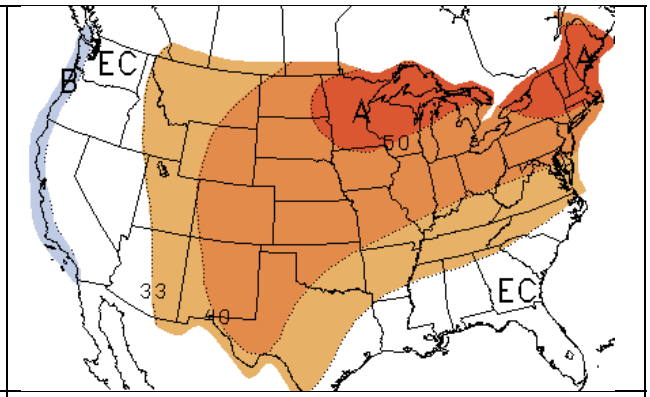
There has been a large dominating area of high pressure in the middle and upper portions of the atmosphere over the central part of the United States since the latter part of 2011. This has pushed the jet stream, the main storm track, well into Canada leaving much of the Great Plain states and the Midwest dry and abnormally warm. In recent weeks there has been a subtle change to this pattern with that dominating area of high pressure centered a bit farther west allowing for a slight alteration in the upper-level wind flow.

Although this has continued to keep the area fairly dry, it has allowed for more frequent intrusions of cooler air into the region and it is this pattern I believe will become more prevalent during the next three months and has already lead to some early frosts for some parts of North Dakota. My strong suspicion is the first frost of the year for other parts of the state will be close to the long-term average date in late September.

The latest summer outlook from the Climate Prediction Center (CPC) for the next three months can be seen below and differs from my analysis. The CPC is forecasting equal chances of the area finishing either above, below or near normal for both precipitation and temperatures in the entire state. You can find the current and future outlooks, when new ones become available, at http://www.cpc.ncep.noaa.gov/products/predictions/90day .



September through November Precipitation Outlook



September through November Temperature Outlook

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/

[1] The corresponding author: Daryl Ritchison is a broadcast meteorologist working at WDAY-TV Fargo, ND.
E-Mail: daryl@ritchison.com

Hydro-Talk

Impacts of the dry summer on the State's Hydrology

by A. Schlag[2]

Just to prove once again that Mother Nature has a warped sense of humor, a mere year removed from historic flooding on the Souris and Missouri Rivers and drought is now the topic widely discussed at the coffee shop. The natural progression of drought starts with a mere deficit in precipitation over time producing a meteorological drought, followed by an agricultural drought where vegetation becomes stressed as soil moisture is depleted, and then finally a hydrologic drought where rivers, reservoirs, and lakes are low enough to cause water shortages and eventual water restrictions.

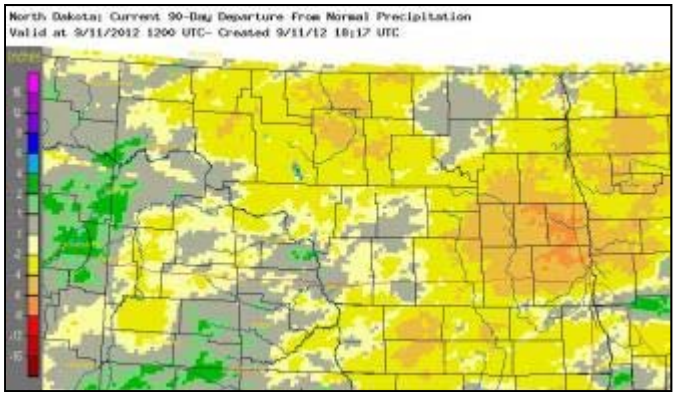


Figure 1. 90-day Departure from Normal Precipitation Map of North Dakota.

Figure 1 shows the departure from normal over the past 90 days, or roughly covering the majority of the normal agricultural growing season in North Dakota. Given this rather substantial deficit observed across much of North Dakota one would expect crop yields and native vegetation to reflect the meteorological drought.

The impacts of the dry summer on rivers, lakes, and streams really take some time to show up. While North Dakota has widely been below average precipitation since August of 2011, the rivers and streams largely defied the lack of rain through the spring and early summer. In Figure 2, the monthly streamflow percentiles from the USGS are shown and clearly do not reflect the lack of precipitation to the degree suggested by earlier maps.

The rivers and streams have been supported this year by an abundant supply of groundwater stockpiled during the past three very wet years. While streamflow is rarely robust when primarily supported by groundwater, it has been adequate to keep individual streams from taking up long-term residence in the lowest category even though many sites commonly have near-zero flow this time of year. One thing is clear…**IF** the region continues to experience well below normal for precipitation for the long-term, impacts to surface water availability will be more of a concern in 2013 as we are only at the beginning of what could then be considered a hydrologic drought.

[2] 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

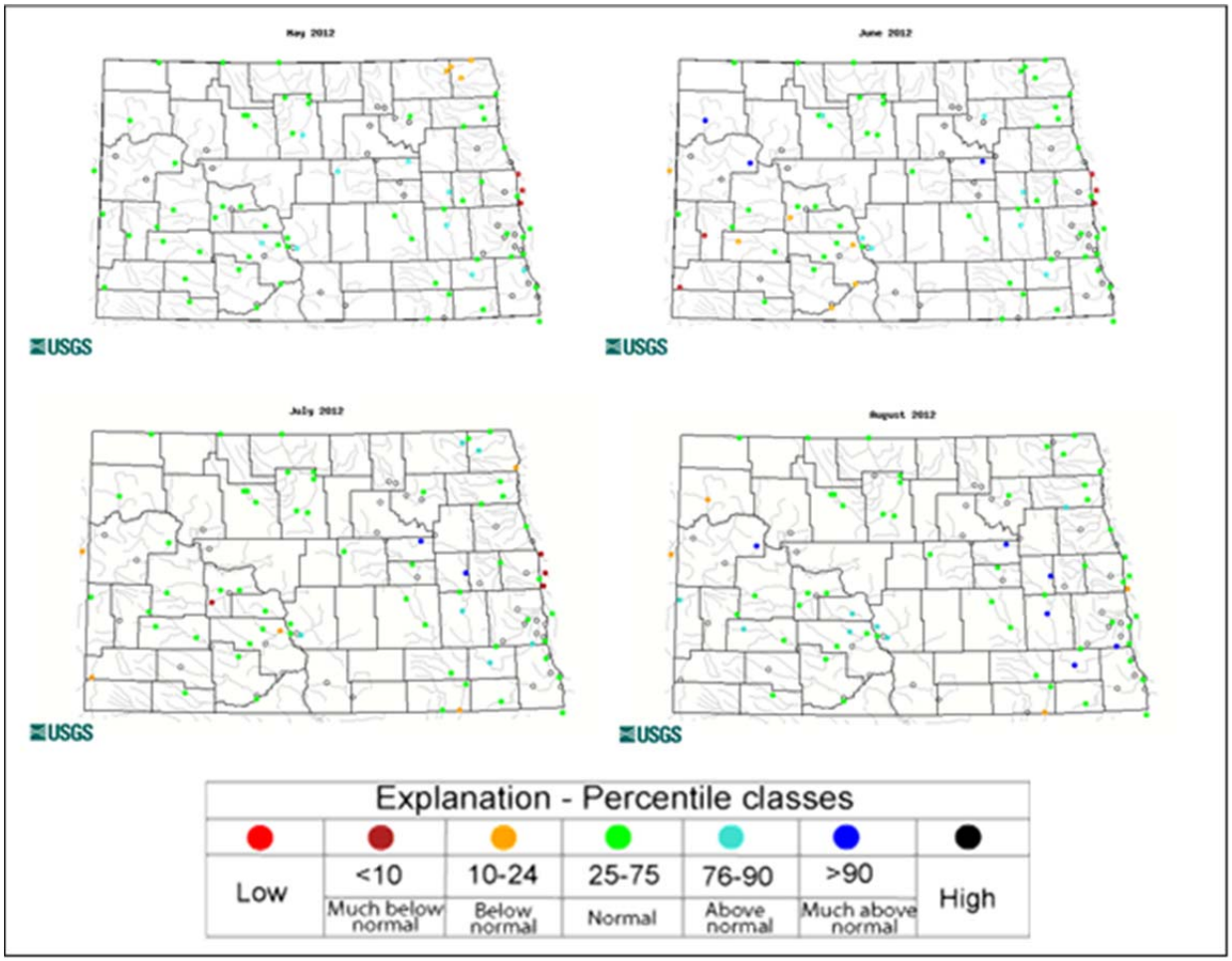


Figure 2. USGS monthly streamflow percentiles (Upper Left: May 2012, Upper Right: June 2012, Lower Left: July 2012, Lower Right: June 2012).

Science Bits

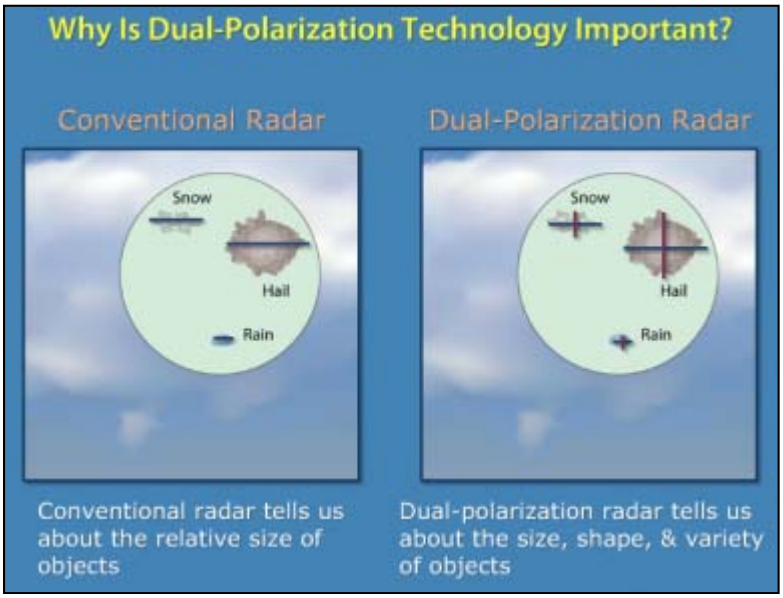
Dual-Polarized Doppler Radars now serving North Dakota

by Greg Gust[3]

The "good news" is that all four of the network Doppler Radars serving North Dakota have been fully upgraded to operate as dual-polarized (dual-pol) radars. As of September 7, 2012 roughly two-thirds of the network upgrade has been completed in the nation. Here are the dates when these upgrades were fully available for locations servicing North Dakota:

Location	Upgraded Since
Mayville (KMVX)	**May 24, 2012**
Minot AFB (KMBX)	**July 20, 2012**
Bismarck (KBIS)	**July 27, 2012**
Aberdeen (KABR)	**August 7, 2012**

The "bad news", from a warning meteorologist's perspective, is that we haven't had much of a convective season to really see what the new Dual-Pols can do for us. Much of the state has spent this convective season on the cusp of a moderate to severe drought, with storm coverage, intensity, and frequency being drastically reduced as compared to the previous anomalously wet years - and any weather radar does its best work when it has hydrometeors to sample, so our drought has kept our radar case study files rather dry...

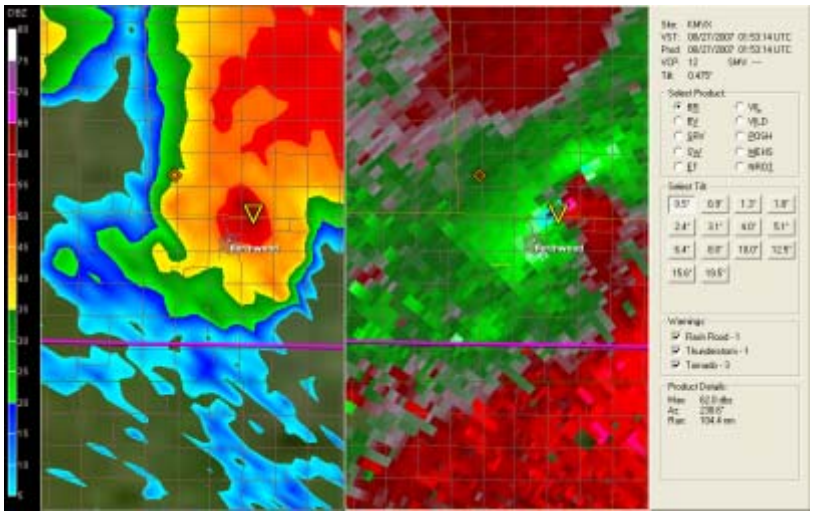


The best is really yet to come, because one of the strongest selling points for Dual-Pol radars is that they better distinguish between all forms of frozen or wet precipitation, and can better help us to identify areas of potential for freezing rain, sleet, or heavy snow out of what previously could have appeared as one uniform area of either rain or snow, depending on surface temperatures alone. The Dual-Pol radars are able to do this because they now "see" in two dimensions, what the general shape of a collection of hydrometeors in a sample bin might be (image on the left: courtesy of the NWS Warning Decision Training Branch)

So we look forward to the advantage dual-pol radar should give us in dealing with our coming autumnal and wintertime mixed precipitation scenarios. And we gleefully anticipate some of the added benefits we expect to see over the coming years. Such as:

[3] The corresponding author: Greg Gust is the Warning Coordination Meteorologist at National Weather Service, Grand Forks ND: Gregory.Gust@noaa.gov

1. **Better areal precipitation estimates:** As mentioned earlier, this dry summer season has left us with very few good examples of where dual-pol products may have shown improvement in either determining total precipitation or hydrometeor type. Anecdotally I can recall at least one example where we felt the old Storm Total Precipitation (STP) product was handling a certain heavier rain event better than the new dual-pol Storm Total Accumulation (STA) Product, and at least one where the STA was clearly the better estimator. Unfortunately, we don't yet have the tools to review any dual-pol products from those particular archived cases.
2. **Better hail discrimination:** Our old methods for determining potential hail size relied on Vertically Integrated Liquid (VIL) or VIL Density, though neither method actually detected hail. The Dual-Pol radar can now see likely hail shaped particles and determine size distribution more directly. If large hail is lofted in the upper part of a Cumulonimbus a forecaster still needs to understand the environment those hailstones will eventually fall through. If they fall through the relatively dry "vault" area of the storm, then we can expect a high survivability rate and resultant large hail impacting the surface. If a saturated "tropical" type air mass with clouds extending below the hail then we can expect a lot of melting to occur and smaller stones impacting the surface.
3. **Seeing the tornado debris:** The actual physical configuration of the radars and their beam dimensions haven't changed with the upgrade, and there is still a fairly large distance separating these radars across the northern plains. As a result, the further a tornado "hook" is located from the radar the wider the radar beam has spread and the less likely the radar will be able to clearly distinguish a hook - this has not changed with Dual-Polarization. Likewise, to see tornado debris, a storm would likely have to be fairly close to the existing radar, maybe within 40 or so miles, and it would have to be a fairly large tornado, generating a fair amount of large debris.



Prior to Dual-Polarization, this would have shown up as an area of very intense reflectivity, similar to very heavy rain or large hail. The picture above shows the conventional 0.5 degree base reflectivity and velocity products, side-by-side, during the Northwood Tornado event of 26 August 2007, at a time when EF4 damage was likely occurring (conventional radar image generated using "GR2 Analyst" software). You will note the reflectivity image (left side) shows the classic "debris ball" signature common to the conventional radar at close range. The Tornado Vortex Signature (TVS) is also present on the images, and shows where the radar algorithms detect a potential tornado signature based on the strength of the rotation in the supercell updraft vortex, often prior to tornado touchdown. The dual-pol upgrade promises to show clearer evidence of the debris a tornado is producing, and thus a clearer indication that a tornado is indeed occurring.

We trust that upcoming storms will provide fodder for us to examine each of these types of phenomena in greater detail... and better showcasing the actual product suite now available with the Dual-Pol radar.

Meanwhile, you can check-out the links below where you will find Dual-Pol related FAQs, and online training materials suitable for either the professional meteorologist or the backyard weather watcher.
http://www.wdtb.noaa.gov/courses/dualpol/outreach/
http://www.wdtb.noaa.gov/courses/dualpol/documents/FAQsOnDualPolRadar.pdf

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North Dakota State Climate Office

College of Agriculture, Food Systems, and Natural Resources
North Dakota State University
231 Walster Hall, Fargo, ND 58108
Administration: 701-231-8901
Climate Services: 701-231-6577
Fax: 701-231-7861

URL: http://www.ndsu.edu/ndsco
E-mail: Adnan.Akyuz@ndsu.edu