

2013 Growing Season Weather Summary for North Dakota

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Introduction

The 2013 growing season (the period from April through September) for North Dakota can simply be characterized as “wet” and “cold” when compared to the 30-year average from 1981 to 2010. The state average precipitation during the 2013 growing season was 17.73” (up 7.08” from last year) which was the 8th wettest growing season among the past 119 years since 1895. Historical records indicate that the state average precipitation values range between the lowest value of 5.62” in 1936 and the highest value of 20.03” in 1941. On the average the state experienced 0.047” increase in precipitation per decade since 1895 (Figure 1). Compared historically, spring, summer and fall was 5th wettest, 54th driest, and 2nd wettest respectively.

Likewise, the state average temperature during the 2013 growing season was 57.5°F (down 3.5°F from last year) which was the 45th coolest growing season among the past 119 years since 1895. Historical state average growing season temperature values in North Dakota range between 62.5°F in 1988 and 52.7°F in 1907. The average growing season temperature in North Dakota increased linearly by 0.16°F per decade since 1895 (Figure 2). Compared historically, spring, summer and fall was 4th coldest, 46th warmest, and 13th warmest respectively

Table 1 shows temperature and precipitation rankings for select locations in ND. Table 2 summarizes the length of growing season based on the number of consecutive days between the last and first day of frost and ranking for those select locations in ND. Figures 3 and 4 show statewide precipitation percent of normal, and temperature departure from normal conditions respectively averaged over the period from April 1 through September 30. In Figure 3, numbers above 100 indicates wetter than normal, while less than 100 indicates dryer than normal conditions. In Figure 4, negative numbers indicate cooler than normal, while positive numbers indicate warmer than normal conditions (zero is no different than the normal). The values in the map represent the magnitude of daily average departures from normal.

Table 1. April-September 2013 Average Temperature and Precipitation Rankings for Select North Dakota Locations.

City	Temperature Ranking	Precipitation Ranking
Bowman	49 th Warmest	The Wettest
Bismarck	67 th Coolest	8 th Wettest
Cavalier	21 st Warmest	38 th Wettest
Fargo	37 th Warmest	4 th Wettest
Minot Exp. Station	23 rd Warmest	The Wettest
Williston Exp. Station	37 th Coolest	3 rd Wettest
North Dakota Average	45th Coolest (119 years)	8th Wettest (119 years)

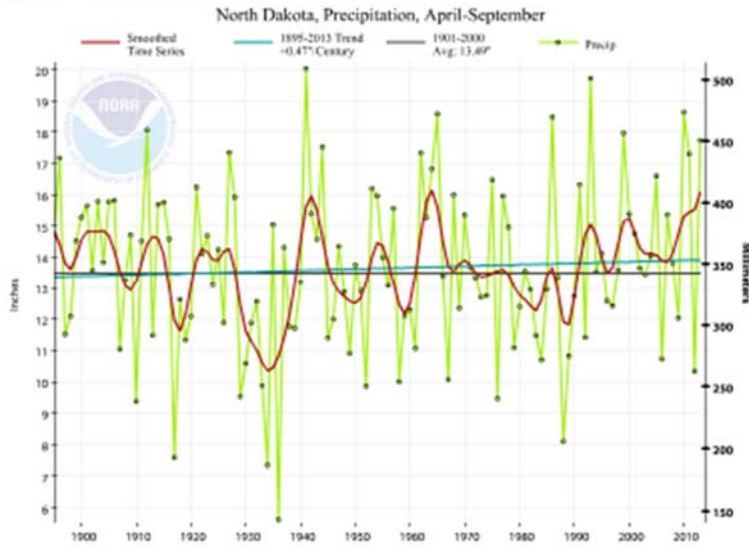
Table 2. 2013 Growing Season Length Rankings for Select North Dakota Locations.

City	Length of Growing Season (Days)	Ranking
Bowman	146 (5/11- 10/5)	12 th Longest
Bismarck	146 (5/12-10/6)	21 st Longest
Cavalier	155 (5/13-10/16)	4 th Longest
Fargo	156 (5/12-10/16)	15 th Longest
Minot Exp. Station	146 (5/11-10/5)	10 th Longest
Williston Exp. Station	145 (5/11-10/4)	14 th Longest
North Dakota Average	149 Days	12th Longest



North Dakota Seasonal Average Precipitation

Growing Season 2013



Highest Value: 20.03" in 1941
 Lowest Value: 5.62" in 1936
 Trend: 0.47"/Century

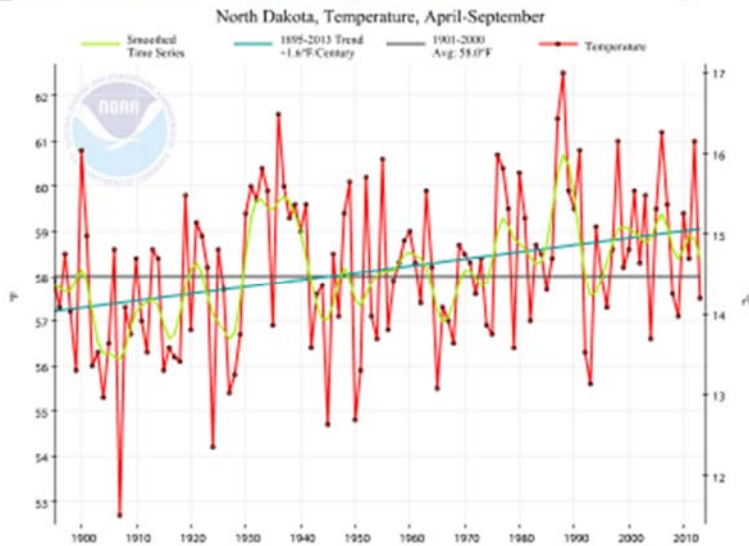
Current Value: 17.73"
 1981-2010 Average: 13.84"
 Current Ranking: 8th Wettest

Figure 1. State Historical Growing Season Average Precipitation since 1890.



North Dakota Seasonal Average Temperatures

Growing Season 2013



Highest Value: 62.5° in 1988
 Lowest Value: 52.7° in 1907
 Trend: 0.16°F/Decade

Current Value: 57.5°
 1981-2010 Average: 57.8°
 Current Ranking: 45th Coolest

Figure 2 State Historical Growing Season Average Temperatures since 1890.

2013 Growing Season Drought Conditions:

Figure 5 shows the state's drought coverage and severity for the period from April through September. The vertical axis is the accumulated coverage and the horizontal axis is the time. The intensity scale is labeled from D0 through D3. D0, D1, D2 and D3 represent "Abnormally Dry", "Moderate Drought", "Severe Drought" and Extreme Drought" conditions respectively. At the beginning of the growing season, south-western parts for the state was the driest. Only less than one percent of the state was experiencing extreme drought in southern Bowman and Adams counties. During this time, almost 50% of the state was experiencing at least a moderate drought. The drought conditions improved throughout the season with the entire state experiencing at least a moderate drought by the end of the growing season (Figure 6).

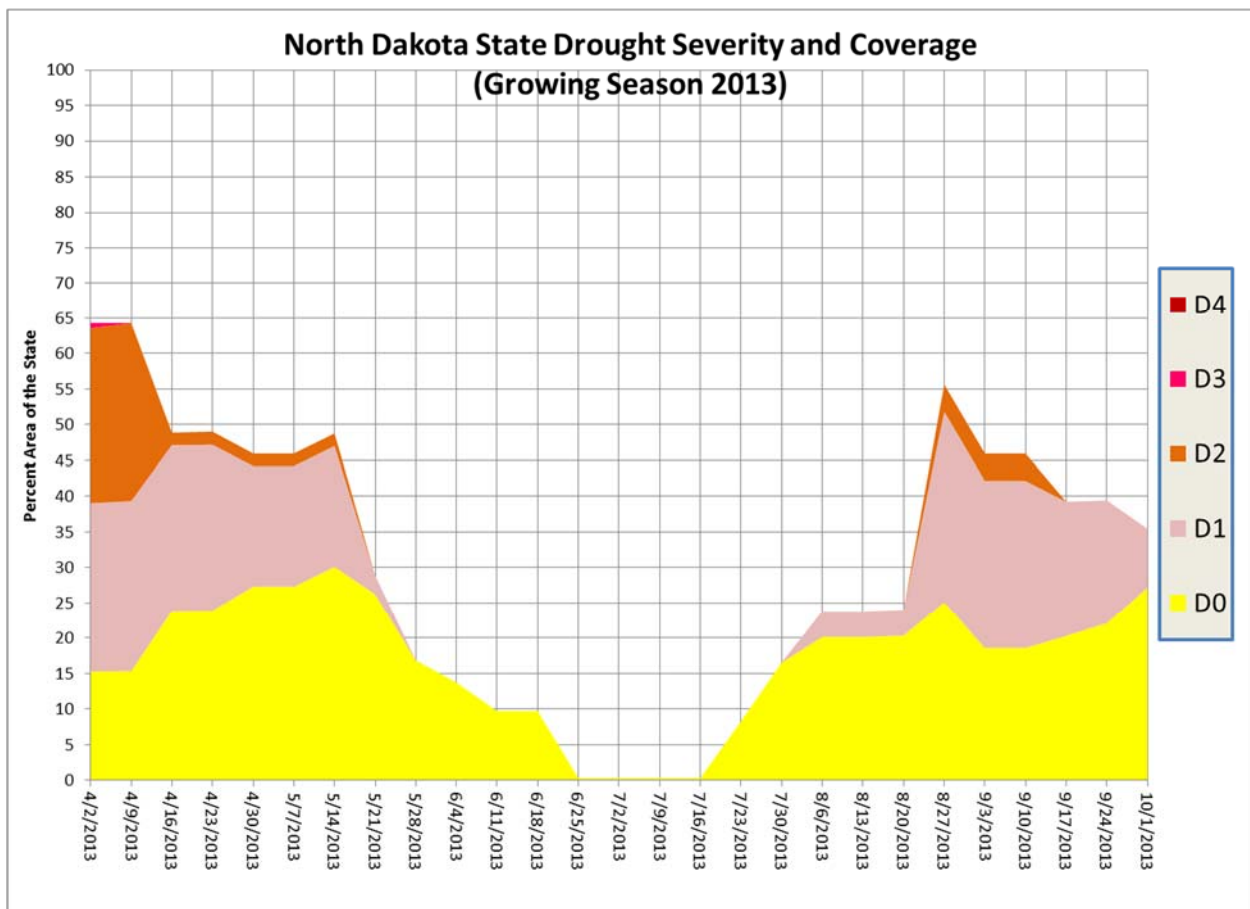


Figure 5. April through September 2013 North Dakota State Drought Severity and Coverage.

U.S. Drought Monitor Weekly Comparison

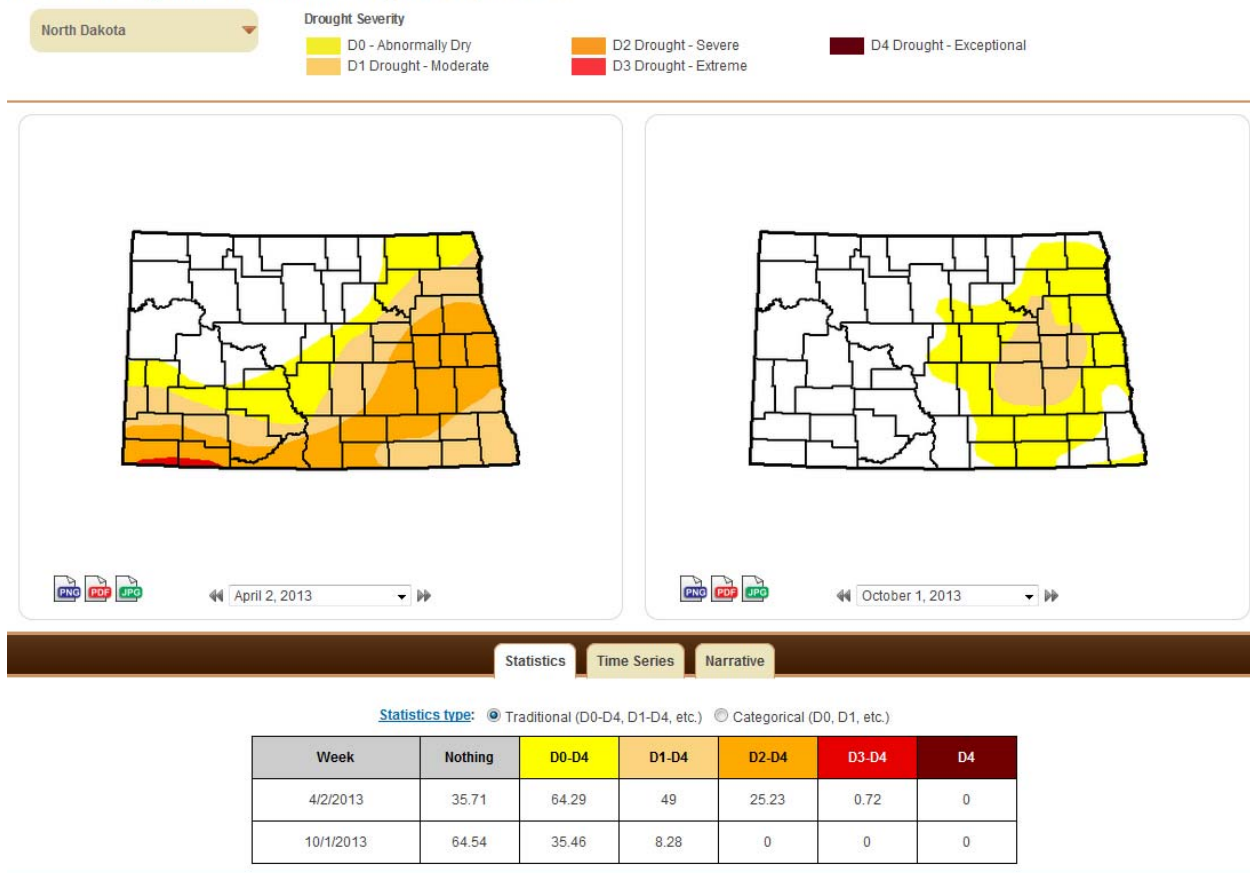


Figure 6. Drought Coverage and Intensity Comparison between the beginning and the end of the 2013 Growing Season.

Monthly Weather Summary:

Weather conditions during the individual months of the growing season in 2013 are discussed in detail below. Graphics associated with each text are located at the end of the monthly summaries.

April 2013

The state average precipitation was 1.21 inches which is below the 1981-2010 normal state average of 1.23 inches. April 2013 state average precipitation ranked the 55th driest in the past 119 years with a maximum of 3.86 inches in 1896 and a minimum of 0.11 inches in 1987.

Percent of normal precipitation totals were above normal in the central, southeast, and eastern regions and below normal elsewhere based on the High Plains Regional Climate Center (HPRCC) analysis. HPRCC total

precipitation amounts were ~0.5 inches in the below normal regions and greater than 1.5 inches in the areas with above normal precipitation. Most of the precipitation that fell in April was in the form of snow. April ranked 4th snowiest month in Fargo with 16.7 inches and the snowiest month in Bismarck with 21.8 inches. 17.3 inches of snow fell in Bismarck on April 14th which broke the record for a daily snowfall for any day in Bismarck. The greatest amount of the April snow fell during the storm event from the 14th through the 15th. The highest amounts fell in the south central regions

with totals reaching 15 to over 20 inches. The southeast received about 8 to 10 inches during that storm.

The National Weather Service (NWS) reported breaking snowfall records at Bismarck and Fargo. See the “Storms and Record Events” section later in this publication for details on April event records.

The U.S. Drought Monitor April 23rd report listed 49.04% of the state as having anywhere from Abnormally Dry (D0) through Severe Drought (D2). Severe Drought (D2) was only reported for 1.84% of the state with 50.96% of the state having no drought conditions.

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported a topsoil moisture of 1% very short, 11% short, 71% adequate, and 17% surplus with a subsoil moisture reported as 4% very short, 30% short, 61% adequate, and 5% surplus (Weekly Weather and Crop Bulletin Vol. 100, No. 18).

According to the preliminary reports of the National Weather Service’s Storm Prediction Center (SPC), there were no severe weather reports of wind, hail or tornadoes in April.

The top five April daily maximum wind speeds recorded from NDAWN were 46.9 mph on the 30th at Mandan; 45.8 mph on the 24th at Linton; 45.1 mph on the 30th at Linton; 44.7 mph on the 24th at Mandan; and 44.7 mph on the 14th at Turtle Lake. NDAWN wind speeds are measured at a height of 10 feet (3 m).

The state average air temperature was 31.0 °F which is below the 1981-2010 normal of 42.37 °F. April 2013 state average air temperature ranked the coolest in the past

119 years. The maximum of state average temperature was 50.2°F in 1987.

NDAWN April average air temperatures ranged from ~24 °F in the north to ~35 °F in the southwest. Departure from normal average air temperatures ranged from -16 °F to -7 °F. The daily average temperatures were primarily far below normal throughout the state for the first 24 days of April breaking several low temperature records from the 18th through the 23rd. According to the National Climatic Data Center (NCDC), April was the 3rd coldest average temperature at Bismarck with 34.5 °F and it was the 5th coldest average temperature at Fargo with 33.8 °F. Fargo also broke the latest first 50 degree day in the recorded history. It happened on April 26th when the thermometer reached the 50 °F threshold for the first time in 2013. The previous record was set 133 years ago on April 17, 1881. After the 24th, average daily air temperatures were above normal across the state for most of the remaining days. The two-day (26th-27th) average maximum temperature at Bismarck ranked 6th warmest with 78.0 °F.

The National Weather Service (NWS) reported breaking several low temperature records in the in April. Most of the low temperature records were on the 20th and included Minot at 13 °F, Jamestown at 13 °F, Bismarck at 15 °F, and Grand Forks NWS at 18 °F. See the “Storms and Record Events” section later in this publication for a complete list on April event records. NDAWN’s highest recorded daily air temperature for April was 80.2 °F at Linton on the 27th. The lowest recorded daily air temperature was -9.0 °F at Bottineau on the 1st.

May 2013

The state average precipitation was 5.52 inches which is above the 1981-2010 normal of 2.53 inches. May 2013 state average

precipitation ranked 2nd wettest in the past 119 years with a maximum of 5.73 inches in 1927 and a minimum of 0.31 inches in 1901. The North Dakota Agricultural Weather Network recorded percent of normal precipitation totals were slightly below normal in the far southeast corner and above normal elsewhere. NDAWN total precipitation amounts ranged from 11.34 inches at Bowman to 2.61 inches at Wyndmere. The first half of May was dry with few rain events. Beginning on the 16th rain fell frequently if not daily throughout the rest of the month. The highest monthly totals of over 9 inches fell in the southwest, northeast, and around the Jamestown area. NDAWN recorded a four day total rainfall from the 18th through the 21st of 7.97 inches at Jamestown. The heavy rain caused Interstate 94 to flood which made travel hazardous.

The National Weather Service (NWS) reported breaking multiple rainfall records on the 19th – 20th and the 29th – 31st. See the “Storms and Record Events” section later in this publication for a complete list on May event records.

The U.S. Drought Monitor May 28th report listed 16.86% of the state as having Abnormally Dry (D0) and only 0.01% as Severe Drought (D2). No drought conditions were reported for 83.13% of the state. The Abnormally Dry conditions were reported in the far southwest corner and the southeast.

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported a topsoil moisture of 0% very short, 1% short, 53% adequate, and 46% surplus with a subsoil moisture reported as 0% very short, 4% short, 70% adequate, and 26% surplus (Weekly Weather and Crop Bulletin Vol. 100, No. 24).

According to the preliminary reports of the National Weather Service’s Storm

Prediction Center (SPC), severe weather reports for May had 13 reports of high wind, 11 hail reports, and 2 reported tornado.

The top five May daily maximum wind speeds recorded from NDAWN included Linton on the 30th with 58.7 mph, Streeter on the 18th with 58.4 mph, Linton on the 18th with 57.3 mph, Turtle Lake on the 20th with 54.1 mph and Jamestown on the 18th with 53.0 mph. NDAWN wind speeds are measured at a height of 10 feet (3 m).

The state average air temperature was 53.2 °F which is below the 1981-2010 normal of 54.01 °F. May 2013 state average air temperature ranked the 57th coolest in the past 119 years with a maximum of 63.10°F in 1977 and a minimum of 43.30 °F in 1907. NDAWN May average air temperatures ranged from ~51 °F in the north to ~57 °F in the southeast. Departure from normal average air temperatures ranged from -4 °F to 2 °F. The below normal average air temperatures felt throughout April continued into the first few days of May. On the 13th average air temperatures warmed up into the 70’s. Average air temperatures hovered near normal for the remainder of the month.

The National Weather Service (NWS) reported that Bismarck had tied the record high temperature on the 13th with 91 °F. No further temperature records for May were reported. See the “Storms and Record Events” section later in this publication for a complete list of May event records. NDAWN’s highest recorded daily air temperature for May was 94.6 °F at Prosper on the 13th. The lowest recorded daily air temperature was 15.2 °F at Hazen on the 2nd.

June 2013

The state average precipitation was 3.88 inches which is above the 1981-2010 normal of 3.38 inches. June 2013 state average precipitation ranked 39th wettest in the last

119 years with a maximum of 7.21 inches in 2005 and a minimum of 1.14 inches in 1974. North Dakota experienced its 58th wettest June based on the preliminary state rankings. However, the spatial distribution of the monthly total precipitation was highly variable. The North Dakota Agricultural Weather Network recorded percent of normal precipitation totals ranged from nearly 250% between Dickey and Sargent counties and nearly 20% in Foster County. June total precipitation amounts ranged from 9.24" in Valley City to 0.8" in Carrington. Heavy rainfall caused interstate 94 to close in Valley City which made travel hazardous. The persistent rainfall in drought stricken areas in south central and south eastern parts of the state ended the 2-yr long drought spell. Drought Monitor of June 26th report listed no areas in ND under any drought conditions. The persistent rainfall event halted field work in much of the state. Based on the USDA's State Agricultural Statistics Service there were only on average of 15.2 suitable days for field work in ND. The National Weather Service (NWS) recorded breaking three precipitation records in June. Grand Forks Airport on the 4th had a record 1.49 inches of rain. Minot also on the 4th had a record 1.70 inches. Fargo on the 25th had a record 2.56 inches. A list of records can be viewed in the "Storms and Record Events" section later in this bulletin. The US Drought Monitor July 2, 2013 report had no drought conditions in 99.68% of the state. The USDA, National Agricultural Statistics Service, North Dakota Field Office reported a topsoil moisture of 0% very short, 6% short, 69% adequate, and 25% surplus with a subsoil moisture reported as 0% very short, 4% short, 76% adequate, and 20% surplus (Weekly Weather and Crop Bulletin Vol. 100, No. 27). According to the preliminary reports of the National Weather Service's Storm

Prediction Center (SPC), there were 51 reported hail events, 40 reported high winds, and 8 reported tornadoes in June. The top five June daily maximum wind speeds recorded from NDAWN were 64.4 mph at Linton on the 22nd, 63.4 mph at Galesburg on the 25th, 58.4 mph at Cavalier on the 27th, 55.8 mph at Crosby on the 14th and 53.7 mph at Crosby on the 20th. NDAWN wind speeds are measured at a height of 10 feet (3 m). The state average air temperature was 63.2 °F which is below the 1981-2010 normal of 63.37 °F. June 2013 state average air temperature ranked 48th warmest in the past 119 years with a maximum of 74.2 °F in 1988 and a minimum of 56.2 °F in 1915. North Dakota experienced its 60th warmest June since 1895 based on the preliminary state rankings. June average air temperatures ranged from a maximum of 57.5 °F in Fargo to a minimum of 52.2 °F in Foxholm (near Minot). Based on the NDAWN Network, departure from normal average air temperatures ranged from 3 °F in the north to -2 °F in the west. A high pressure system in southern MN, associated with a warm front and southerly flow, pushed the mercury above 90 degree- mark in some of the eastern North Dakota locations. The National Weather Service (NWS) reported breaking no temperature records in June. 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 95.5 °F at Kennedy, MN on the 19th. The lowest recorded daily air temperature was 33.9 °F at Tappen on the 2nd.

July 2013

The state average precipitation was 2.28 inches which is below the 1981-2010 normal state average of 2.88 inches. July 2013 state average precipitation ranked the 55th driest

in the past 119 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 recorded precipitation totals were generally below normal in the east and west central edge with near normal and above elsewhere. There were many scattered thunderstorms throughout the month. The greatest NDAWN total precipitation amount was 5.62 inches at Minot which is 220% above normal. The Storm Prediction Center (SPC) reported one tornado on the 9th in Morton County. The SPC reported two tornadoes spotted on the 21st in McHenry and Ramsey County along with a significant amount of hail in several Counties. Some locations in the southwest reported baseball sized hail. The end of July was cool and dry. The dry conditions have stressed crops in many areas. The U.S. Drought Monitor June 30th report listed 16.55% of the state as being Abnormally Dry (D0) and included McIntosh, Logan, Kidder, Stutsman, Eddy, Foster and Griggs Counties.

The National Weather Service (NWS) reported breaking one rainfall record on the 5th at Dickinson with 0.82 inches. The previous record was 0.79 inches set in 1964. See the "Storms and Record Events" section later in this publication for details on event records.

The US Drought Monitor August 6, 2013 report had no drought conditions listed for 76.18% of the state. Abnormally dry (D0) conditions were reported for 20.15% of the state in the southeast. Stutsman County was reported as having moderate (D1) drought conditions.

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported a topsoil moisture of 7% very short, 32%

short, 56% adequate, and 5% surplus with a subsoil moisture reported as 5% very short, 27% short, 63% adequate, and 5% surplus (Weekly Weather and Crop Bulletin Vol. 100, No. 32).

According to the preliminary reports of the National Weather Service's Storm Prediction Center (SPC), there were 51 wind reports, 46 hail reports and 3 reported tornadoes in July.

The top five July daily maximum wind speeds recorded from NDAWN were 69.1 mph on the 8th at Dunn, 62.7 mph on the 8th at Hazen, 61.2 mph on the 29th at Mott, 54.8 mph on the 12th at Mavie, MN, and 53.7 mph on the 5th at Berthold. NDAWN wind speeds are measured at a height of 10 feet (3 m).

The state average air temperature was 68.1 °F which is below the 1981-2010 normal of 69.01 °F. July 2013 state average air temperature ranked the 49th coolest in the past 119 years with a maximum of 79.7 °F in 1936 and a minimum of 61.8 °F in 1992. NDAWN July average air temperatures ranged from ~65 °F in the north to ~72 °F in the southeast. Departure from normal average air temperatures ranged from 1 °F to -4 °F. The daily average air temperatures were primarily above normal until the 19th after which a cold air mass settled in causing the daily average air temperatures to fall below normal for the remainder of the month. Average air temperatures were 5 to 20 °F below normal on the 27th and 28th. The National Weather Service reported new minimum average air temperature records set on the 27th at Jamestown and Bismarck with 42 °F and 39 °F, respectively. Grand Forks Airport and Jamestown set new minimum average air temperatures on the 28th with 42 °F and 41 °F, respectively. The National Weather Service (NWS) reported breaking several minimum

temperature records on the 27th and 28th. 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 98.4 °F at Sidney, MT on the 11th. The lowest recorded daily air temperature was 34.5 °F at Hazen on the 27th.

August 2013

The state average precipitation was 1.69 inches which is less than the 1981-2010 normal of 2.10 inches. August 2013 state average precipitation ranked 43rd driest in the past 119 years with a maximum of 5.02 inches in 1900 and a minimum of 0.72 inches in 1961.

The North Dakota Agricultural Weather Network recorded precipitation totals of below normal in the eastern half of the state and parts of the north central regions. The first six days of August had scattered showers with the more widely spread rainfall on the 6th. The National Weather Service reported record rainfall at Dickinson and Minot on the 6th with 0.64 inches and 0.83 inches respectively along with two tornadoes spotted in Richland County. A long dry spell followed during which most of the rainfall was in the west. On the 29th a wide spread rain event covered most of the northern half, central, and eastern parts of the state. Scattered showers continued on the 30th in the central region and 31st primarily in the northeast. The National Weather Service storm report recorded a tornado in Morton County on the 30th and in Pembina County on the 31st. Over the summer, drought conditions gradually worsened for the eastern part of the state. The US Drought Monitor at the end of June reported no drought conditions for 99.68% of the state. Abnormally dry (D0) conditions began to develop for 20.15% of the state at the end of July with Stutsman County increased to

moderate (D1) conditions. The US Drought Monitor August 27th report has 44.35% of the state, the western half, with no drought or dry conditions. The northeast was reported as Abnormally Dry (D0) and the southeast was reported with Moderate (D1) drought conditions that surrounded Stutsman County whose drought condition was elevated to Severe (D2).

The National Weather Service (NWS) reported breaking two precipitation records on August 6th. Dickinson reported 0.64 inches of rainfall and Minot 0.83 inches breaking previous records of 0.49 inches set in 1999 and 0.68 inches set in 2011, respectively. See the “Storms and Record Events” section later in this publication for a complete list on event records.

The US Drought Monitor September 3, 2013 report had 45.97% of the state as abnormally dry (D0) to severe drought (D2). The drought area was in the southeast. Severe drought was reported in Stutsman County (<http://droughtmonitor.unl.edu/>).

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported a topsoil moisture of 16% very short, 35% short, 46% adequate, and 3% surplus with a subsoil moisture reported as 11% very short, 35% short, 51% adequate, and 3% surplus (Weekly Weather and Crop Bulletin Vol. 100, No. 36).

According to the preliminary reports of the National Weather Service’s Storm Prediction Center (SPC), severe weather reports for August had 34 reports of high wind, 13 hail reports, and 2 reports of tornadoes.

The top five August daily maximum wind speeds recorded from NDAWN included Hazen on the 29th with 68.0 mph, Sidney, MT, on the 5th with 57.3 mph, Kennedy, MN, on the 31st with 53.0 mph, Crosby on

the 26th with 52.3 mph and St. Thomas on the 31st with 52.3 mph. NDAWN wind speeds are measured at a height of 10 feet (3 m).

The state average air temperature was 68.4 °F which is above the 1981-2010 normal of 67.52 °F. August 2013 state average air temperature ranked the 34th warmest in the past 119 years with a maximum of 73.6 °F in 1983 and a minimum of 60.9 °F in 1977. NDAWN August average air temperatures ranged from ~66 °F in the north to ~72 °F in the south. Departure from normal average air temperatures ranged from 3 °F to -2 °F. Daily average air temperatures can be summarized as the first half being below normal and the second half above normal. The average air temperature of the first half of the month were 4 to 10 °F below normal with the second half being 5 to 9 °F above normal.

The National Weather Service (NWS) reported breaking one temperature record on the 20th at Bismarck with 102 °F breaking the previous record of 100 °F set in 1976. 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 102.02 °F at Streeter on the 20th. The lowest recorded daily air temperature was 36.9 °F at Ada, MN on the 13th.

September 2013

The state average precipitation was 3.15 inches which is above the 1981-2010 normal of 1.71 inches. September 2013 state average precipitation ranked 10th wettest in the last 119 years with a maximum of 5.00 inches in 1900 and a minimum of 0.20 inches in 2012.

The North Dakota Agricultural Weather Network recorded precipitation totals of below normal in the northeastern part of the

state and above normal most elsewhere with the highest amounts to the west and southwest. The first six days of September were dry with much the remainder of the month having scattered showers. Wide spread rains fell from the 7th through the 9th. Rain totals of 1 to 2 inches fell in the southeast on the 14th. Roughly a half inch fell in the west on the 23rd. Rainfall with totals around a half to an inch fell in the east on the 28th which helped alleviate drought conditions in the area. However the late September rains hampered small grain harvest.

The National Weather Service (NWS) recorded breaking nine precipitation records in September. These record breaking rainfall events happened from the 7th through the 9th, the 14th, and the 28th. A list of records can be viewed in the “Storms and Record Events” section later in this bulletin.

The US Drought Monitor September 24, 2013 report had no drought conditions in 60.55% of the state, 17.34% had Moderate Drought (D1), with the remaining 22.11% being reported as Abnormally Dry.

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported a topsoil moisture of 5% very short, 19% short, 70% adequate, and 6% surplus with a subsoil moisture reported as 6% very short, 21% short, 70% adequate, and 3% surplus (Weekly Weather and Crop Bulletin Vol. 100, No. 39).

According to the preliminary reports of the National Weather Service’s Storm Prediction Center (SPC), there were 8 reported hail events, 10 reported high winds, and 0 reported tornadoes in September. The top five September daily maximum wind speeds recorded from NDAWN were 56.6 mph at Dazey on the 29th, 55.1 mph at Dazey on the 25th, 52.3 mph at Bowbells on the 18th, 48.7 mph at Crary on the 9th and 48.7 mph at Dazey on the 30th. NDAWN

wind speeds are measured at a height of 10 feet (3 m).

The state average air temperature was 61.70 °F which is above the 1981-2010 normal of 56.77 °F. September 2013 state average air temperature ranked 7th warmest in the past 119 years with a maximum of 63.4 °F in 1897 and a minimum of 45.2 °F in 1965.

NDAWN September average air temperatures ranged from ~59 °F in the north to ~65 °F in the south. Departure from normal average air temperatures were 2 °F to 7 °F above normal across the state. For many places the September average air temperatures ranked in the top 10 warmest. Grand Forks area average temperature ranked 9th warmest, Fargo area was 5th, Bismarck area was 6th, and Williston area was 8th warmest (<http://rcc-acis.unl.edu/>).

The unusually warm September temperatures balanced the impact of a late spring planting for most crops by adding the necessary growing degree days for maturity.

The National Weather Service (NWS) reported breaking no temperature records in September. 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 September was 98.0 °F at Bowman on the 6th. The lowest recorded daily air temperature was 29.8 °F at Humboldt, MN on the 21st.

Conclusion of the 2013 Growing Season:

Drought conditions significantly improved throughout the growing season with warmer than normal temperatures towards the end of the season, crops continued to progress towards maturity. In many parts of the state, drier than normal fall was welcomed as it provided opportunity to farmers to be able to get into their fields and get some work done. By the late October the USDA rated topsoil moistures as follows: 0% very short, 3% short, 80% adequate, and 11% surplus. Corn was harvested only 33% (well behind the previous year of 94%). There were serious statewide shortages of propane gas as farmers mechanically dried their grains for long term storage.

Percent of Normal Rainfall (%) (2013-04-01 – 2013-04-30)

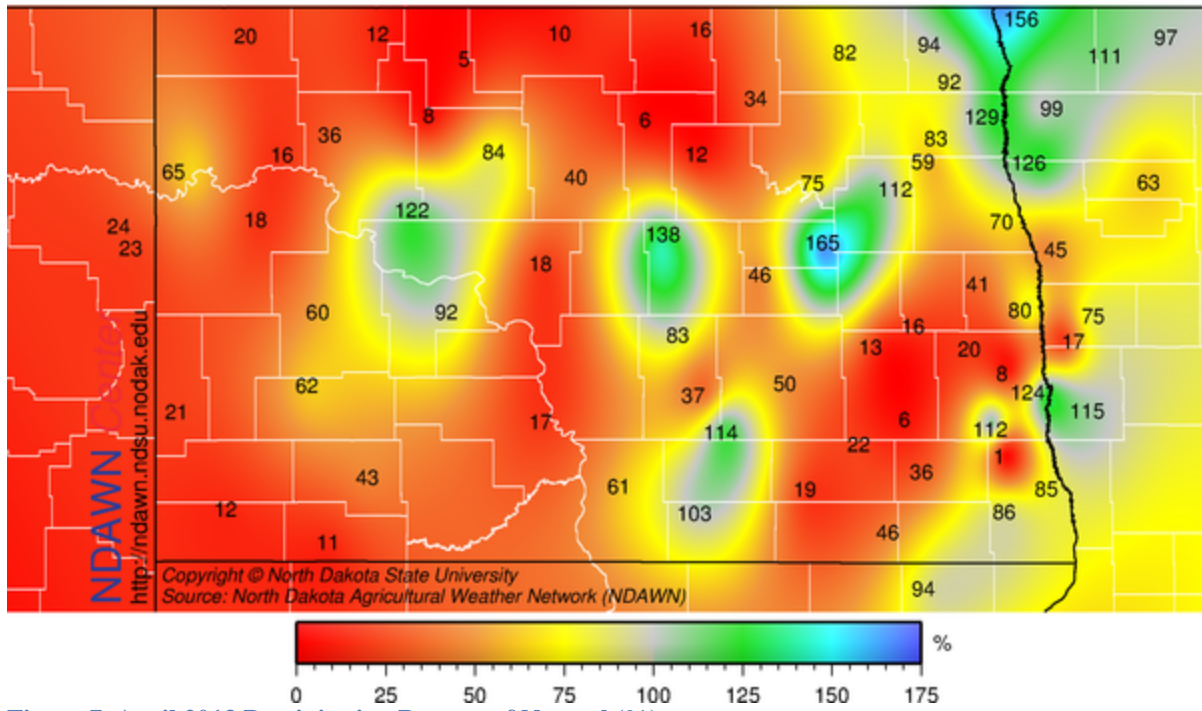


Figure 7. April 2013 Precipitation Percent of Normal (%).

Departure from Normal Average Air Temperature (°F) (2013-04-01 – 2013-04-30)

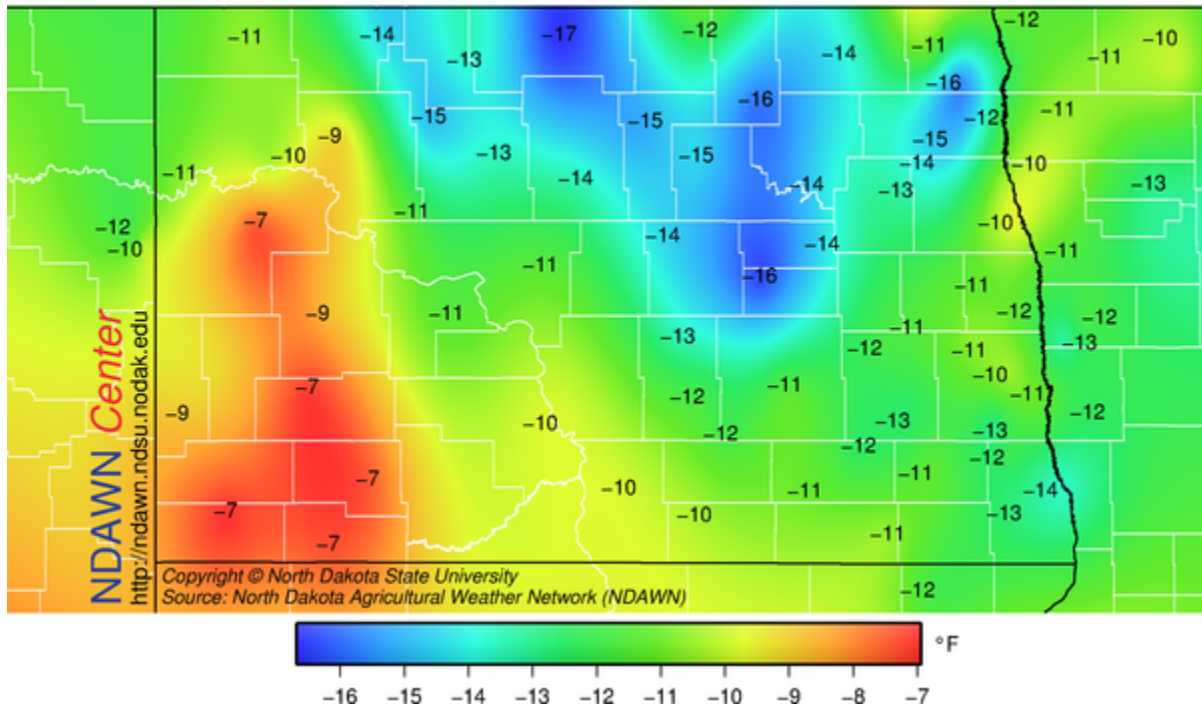


Figure 8. April 2013 Temperature Departure from Normal (°F).

Percent of Normal Rainfall (%) (2013-07-01 – 2013-07-31)

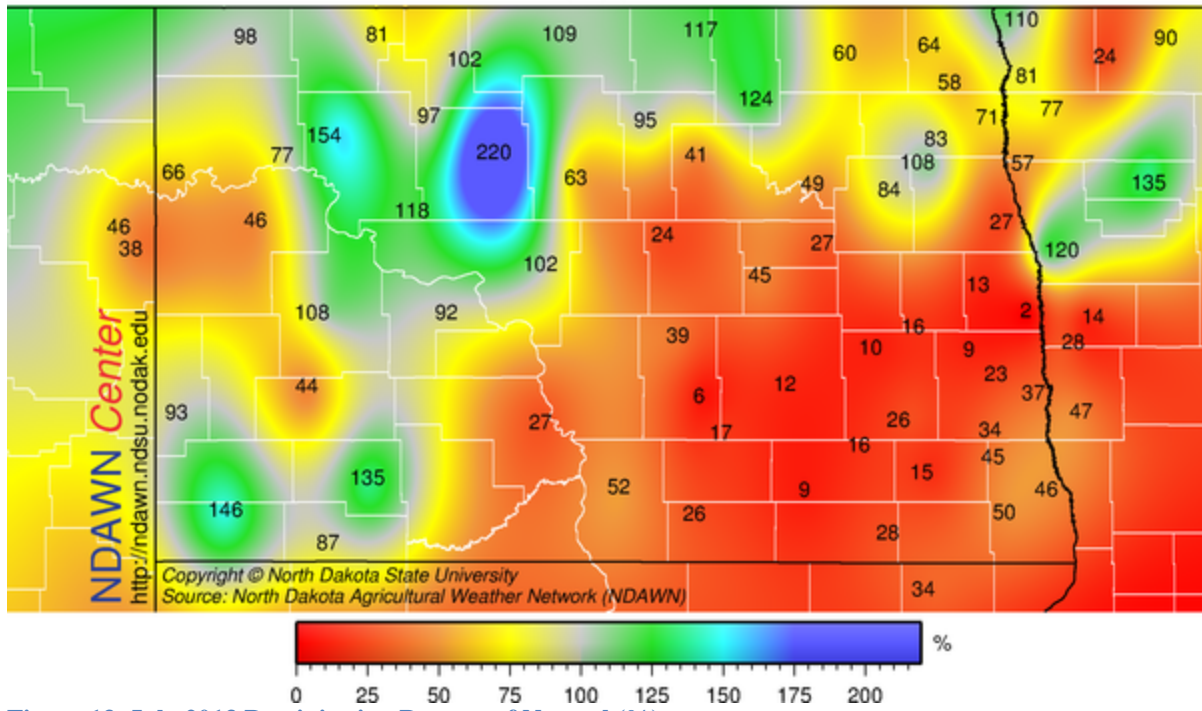


Figure 13. July 2013 Precipitation Percent of Normal (%).

Departure from Normal Average Air Temperature (°F) (2013-07-01 – 2013-07-31)

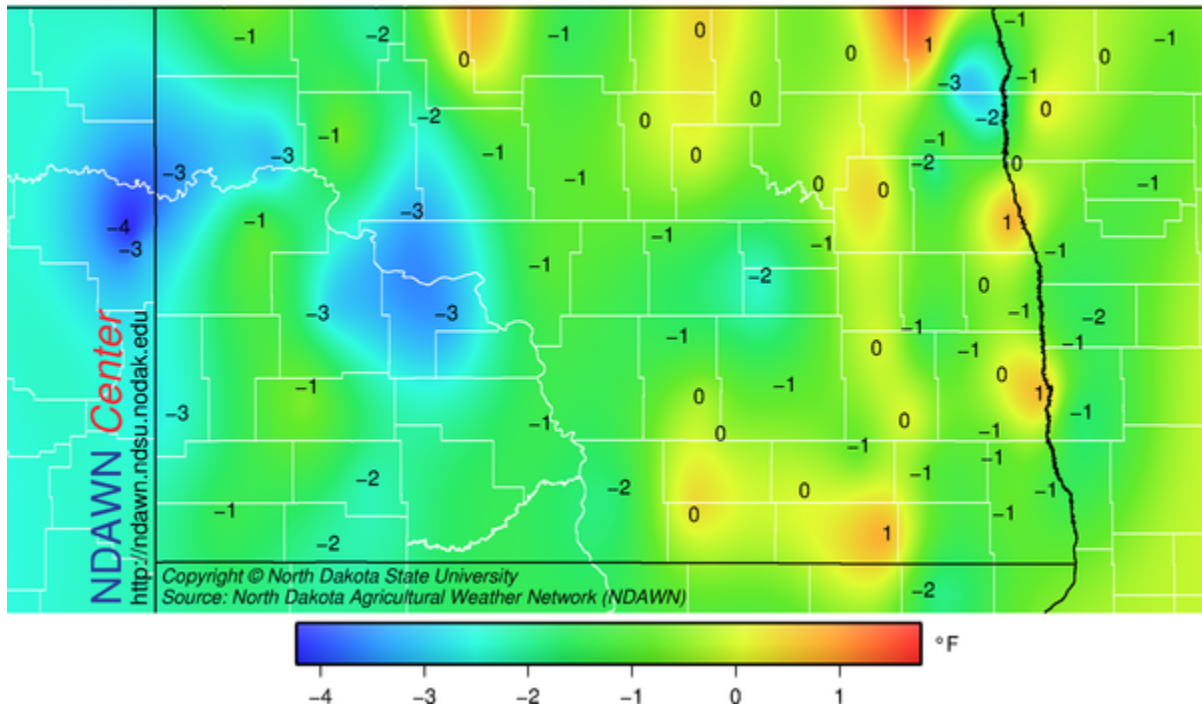


Figure 14. July 2013 Temperature Departure from Normal (°F).

Percent of Normal Rainfall (%) (2013-08-01 – 2013-08-31)

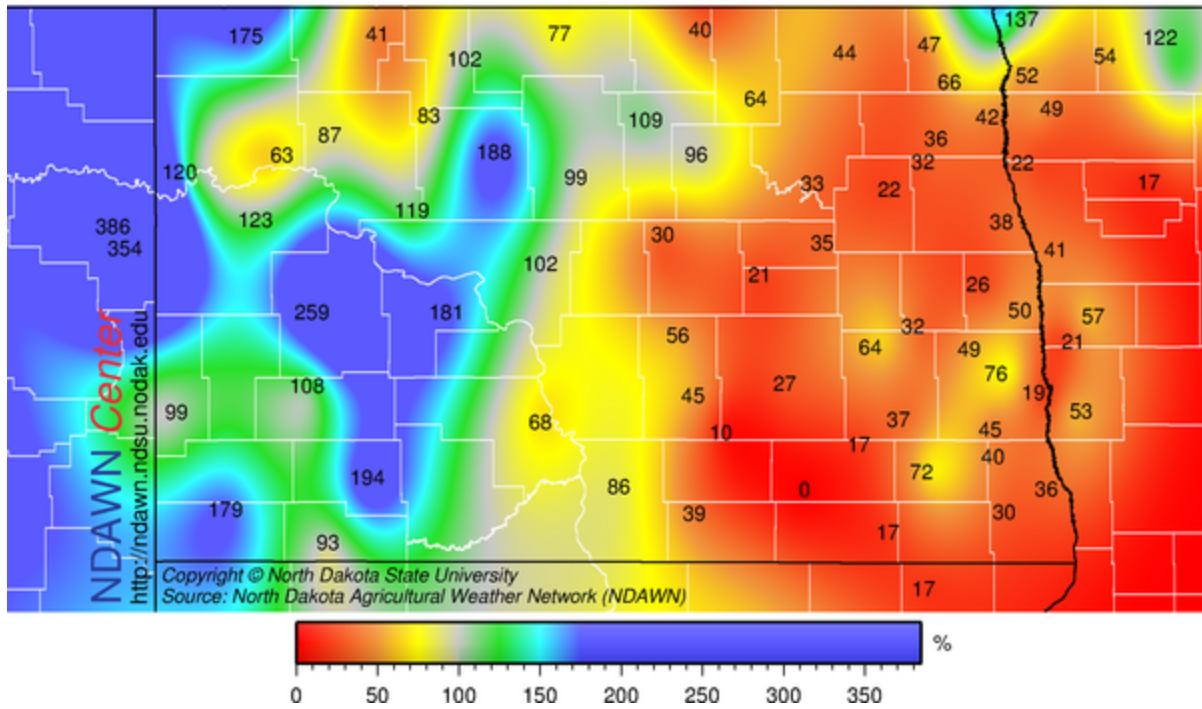


Figure 15. August 2013 Precipitation Percent of Normal (%).

Departure from Normal Average Air Temperature (°F) (2013-08-01 – 2013-08-31)

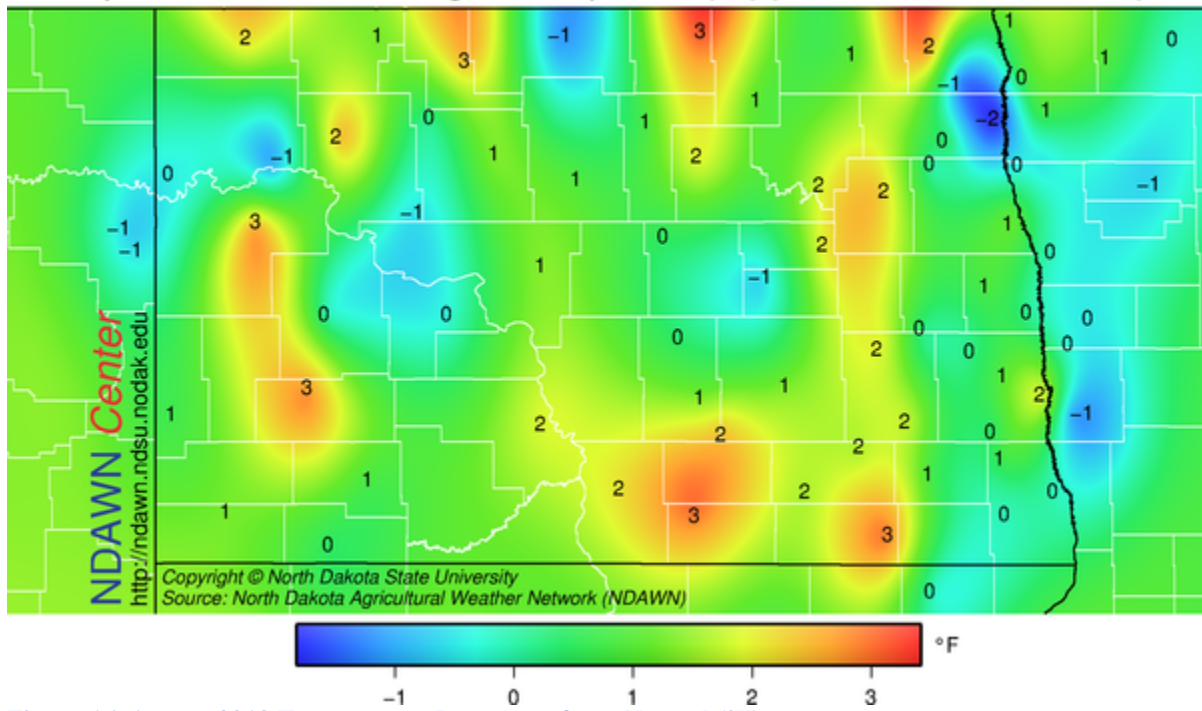


Figure 16. August 2013 Temperature Departure from Normal (°F).

Percent of Normal Rainfall (%) (2013-09-01 – 2013-09-30)

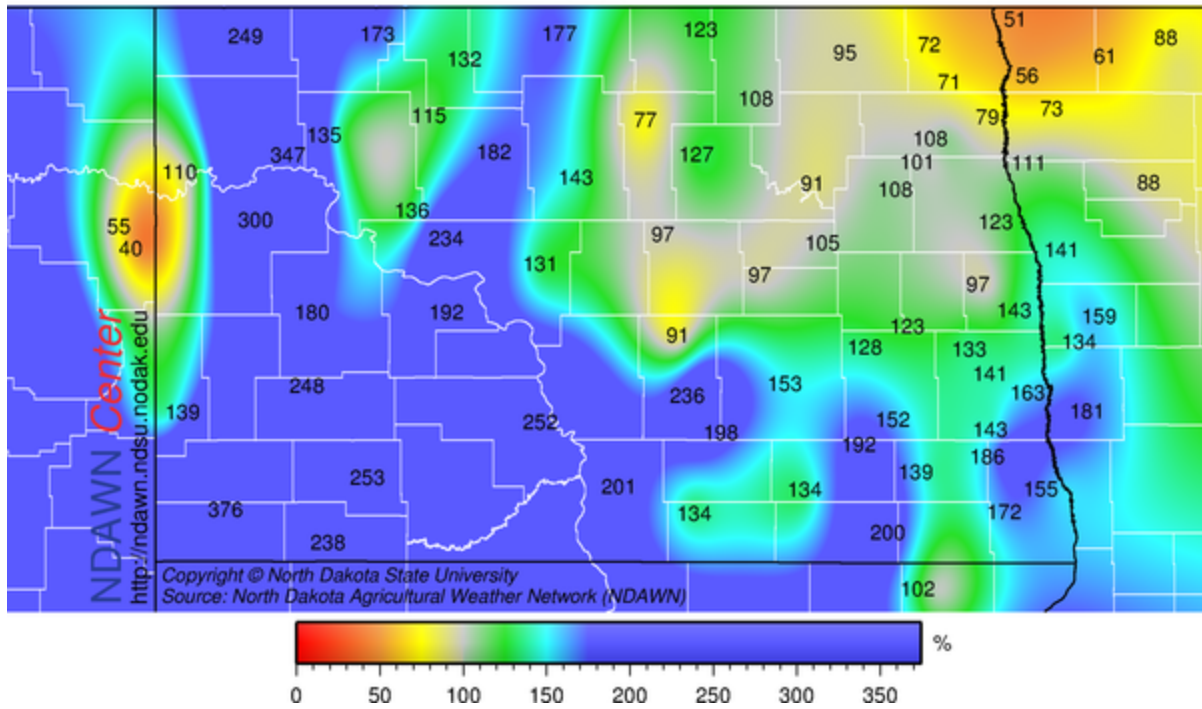


Figure 17. September 2013 Precipitation Percent of Normal (%).

Departure from Normal Average Air Temperature (°F) (2013-09-01 – 2013-09-30)

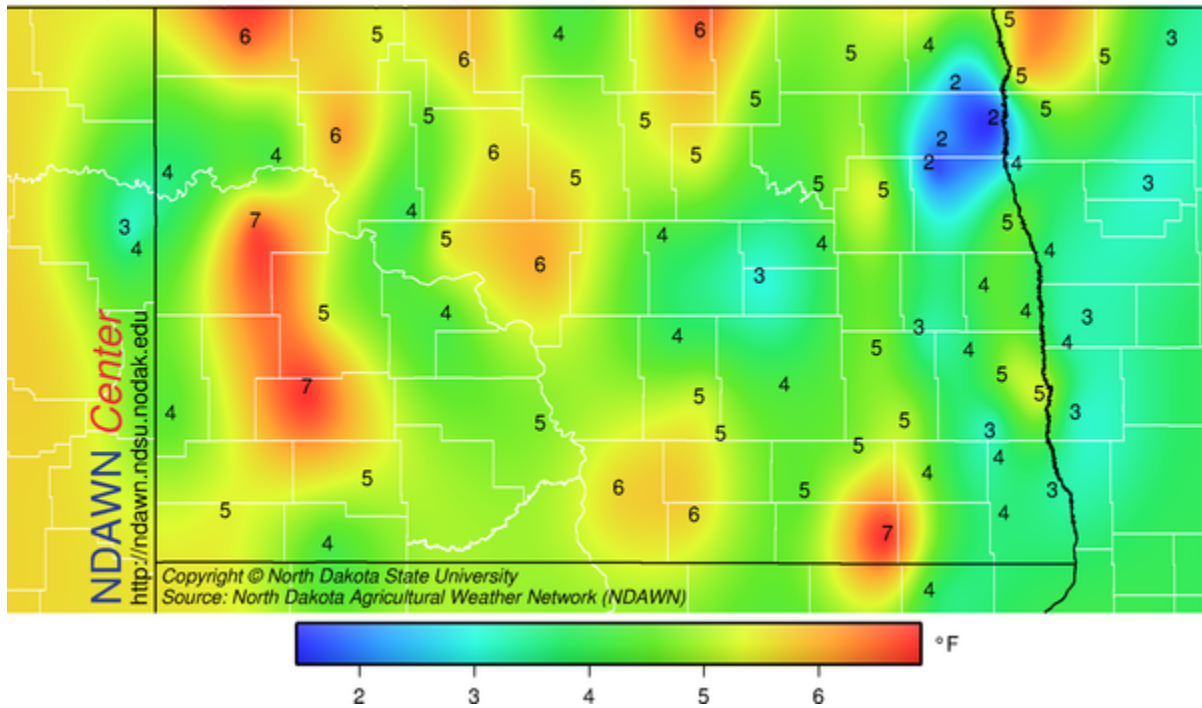


Figure 18 September 2013 Temperature Departure from Normal (°F).