North Dakota Climate Bulletin

Fall 2013

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In This Issue

NDSCO

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From the State Climatologist

The North Dakota Climate Bulletin is a digital quarterly publication of the North Dakota State Climate Office, the College of Agriculture, Food Systems and Natural Resources, North Dakota State University in Fargo, North Dakota.

Compared historically, North Dakota had a warmer and wetter than normal fall. Temperature-wise, this fall was the 49th warmest statewide since 1895. Precipitation-wise, it was the 2nd wettest fall statewide since 1895 despite much drier than normal November which allowed farmers to prep their fields for the next growing season.

On the average, North Dakota farmers enjoyed an approximate growing season length of 150 days. Average last day of spring frost occurred on May 11 and the average first day of fall frost was October 19.

There were no significant storm events that occurred in North Dakota. Only 10 significant wind and 8 hail events were reported with no tornados sighted. The storm and daily record weather events are listed on pages 15.

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

Circumzenithal Arc. Photo by Donna Jacob

Weather Highlights

Seasonal Summary:

by B. A. Mullins

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.

October 2013

The state average precipitation was 4.00 inches which is above the 1981-2010 normal state average of 1.48 inches. October state average precipitation ranked the 3rd wettest in the past 119 years with a maximum of 4.71 inches in 1982 and a minimum of 0.10 inches in 1952.

October 2013 was wet with Bismarck ranking the wettest, Williston the 6th, Jamestown the 4th, Dickinson the 4th, Williston the 6th, Minot the 5th, and Fargo the 8th wettest. The North Dakota Agricultural Weather Network recorded precipitation totals of above normal for all but the far northeast corner which had below normal precipitation. A major storm system happened on the 4th and 5th dropping heavy snowfall in the southwest and rainfall in the south central region. Official snowfall totals for the 24 hour snowfall ending on the 5th in the southwest ranged from 6 inches to 18 inches which fell at Hettinger. The heavy snow drifts laid sunflowers to the ground. The sunflower fields hit the worst suffered losses of 20 to 80%. Some areas around Hettinger lost cattle in the heavy snow storm. A second storm on the 11th produced record rainfall in the western part of the state and a third storm on the 14th produced record rainfall across the state. The U.S. Drought Monitor October 29th report listed the northeast corner as abnormally dry with no drought conditions for the remainder of the state.

The National Weather Service (NWS) reported breaking several rainfall records primarily on the 11th and the 14th. See the "Storms and Record Events" section later in this publication for details on event records.

The US Drought Monitor November 19, 2013 report had no drought or abnormally dry conditions listed for 92.01% of the state. Abnormally dry (D0) conditions were reported for 7.99% of the state in the northeast.

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported a topsoil moisture of 0% very short, 3% short, 79% adequate, and 18% surplus with a subsoil moisture reported as 0% very short, 5% short, 83% adequate, and 12% surplus (Weekly Weather and Crop Bulletin Vol. 100, No. 47).

According to the preliminary reports of the National Weather Service's Storm Prediction Center (SPC), there were no wind reports, hail reports, or tornadoes reported in October.

The top five October daily maximum wind speeds recorded from NDAWN were 54.4 mph on the 20th at Dazey, 53.7 mph on the 11th at Marion, 53.0 mph on the 11th at Hazen, 51.5 mph on

the 4th at Linton, and 50.8 mph on the 11th at Berthold. NDAWN wind speeds are measured at a height of 10 feet (3 m).

The state average air temperature was 41.2 °F which is below the 1981-2010 normal of 43.24 °F. October state average air temperature ranked the 24th coolest in the past 119 years with a maximum of 54.8 °F in 1963 and a minimum of 32.5 °F in 1925.

NDAWN October average air temperatures ranged from ~39 °F in the north to ~45 °F in the southeast. Departure from normal average air temperatures were from 0 °F to 5 °F below normal. Daily average air temperatures for October started slightly above normal but dropped quickly from the 3rd through the 6th. Average daily air temperatures rebounded to above normal for most areas from the 7th through the 11th. The remainder of October was cool with many days having below normal average air temperatures with the 28th and 29th being at least 10 °F below normal for most areas.

The National Weather Service (NWS) reported breaking no temperature records in October. 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 October was 79.1 °F at Sidney, MT on the 7th. The lowest recorded daily air temperature was 7.8 °F at Humboldt on the 29th.

November 2013

The state average precipitation was 0.21 inches which is below the 1981-2010 normal of 0.72 inches. November state average precipitation ranked 24th driest in the past 119 years with a maximum of 2.51 inches in 2000 and a minimum of 0.02 inches in 1939.

November 2013 was below normal for nearly all of North Dakota. Only Sheridan County had above to near normal precipitation. The first significant storm system past through on the 8th and 9th producing less than a tenth of an inch in the north and under a half inch in the south. On the 10th the first snowfall totals of less than an inch fell in the southwest. Spotty showers fell from the 16th through the 19th producing some measurable snowfall. A wide spread system on the 20th had up to a half inch of precipitation for some areas in the west and central regions also producing anywhere from a trace to 6 inches of snow. The north and northeast had scattered precipitation from the 25th through the 30th. The U.S. Drought Monitor November 26th report listed the northeast corner as abnormally dry with no drought conditions for the remainder of the state.

The National Weather Service (NWS) reported breaking no precipitation records in November. See the "Storms and Record Events" section later in this publication for a complete list on event records.

The US Drought Monitor December 10, 2013 report had no drought conditions for 94.41% of the state with 5.59% as abnormally dry (D0). The abnormally dry area was in the northeast corner of the state (http://droughtmonitor.unl.edu/).

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported a topsoil moisture of 0% very short, 3% short, 79% adequate, and 18% surplus with a subsoil moisture reported as 0% very short, 5% short, 81% adequate, and 14% surplus (Weekly Weather and Crop Bulletin Vol. 100, No. 48).

According to the preliminary reports of the National Weather Service's Storm Prediction Center (SPC), severe weather reports for November had no reports of high wind, hail reports, or tornadoes.

The top five November daily maximum wind speeds recorded from NDAWN included Perley, MN, on the 3rd with 45.1 mph, Berthold, on the 27th with 42.9 mph, Kennedy, MN, on the 25th with 42.6 mph, Eldred, MN, on the 3rd with 41.9 mph and McHenry on the 9th with 41.9 mph. NDAWN wind speeds are measured at a height of 10 feet (3 m).

The state average air temperature was 25.8 °F which is below the 1981-2010 normal of 27.44 °F. November state average air temperature ranked the 45th coolest in the past 119 years with a maximum of 37.4 °F in 2001 and a minimum of 7.30 °F in 1896.

NDAWN November average air temperatures ranged from ~22 °F in the north to ~30 °F in the southwest. Departure from normal average air temperatures were from 0 °F to 5 °F below normal. Daily average air temperatures for November were between near normal and ~10 °F below normal for the first 10 days. Daily average air temperatures dropped to ~20 °F below normal on the 11th. Temperatures rebounded on the 14th to above normal followed by several days of primarily above normal average air temperatures for most. The daily average air temperatures dropped to ~20 °F to ~30 °F below normal from the 21st through the 23rd. The remainder of the month was primarily near normal to ~10 °F below normal for many areas.

The National Weather Service (NWS) reported breaking one temperature record on the 23rd at Minot with -17 °F breaking the previous record of -13 °F set in 1950. 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 November was 62.0 °F at Prosper on the 13th. The lowest recorded daily air temperature was -25.4 °F at Bottineau on the 23rd.

Season in Graphics

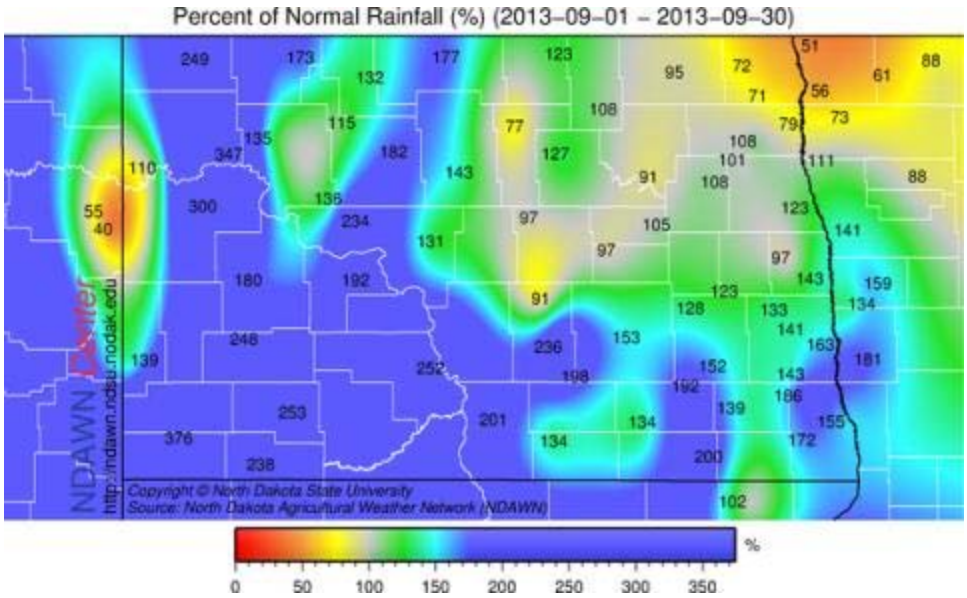
Fall 2013 Weather in North Dakota:

September 2013

Total Precipitation percent of mean (1981-2010)

Precipitation Percent of Normal

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

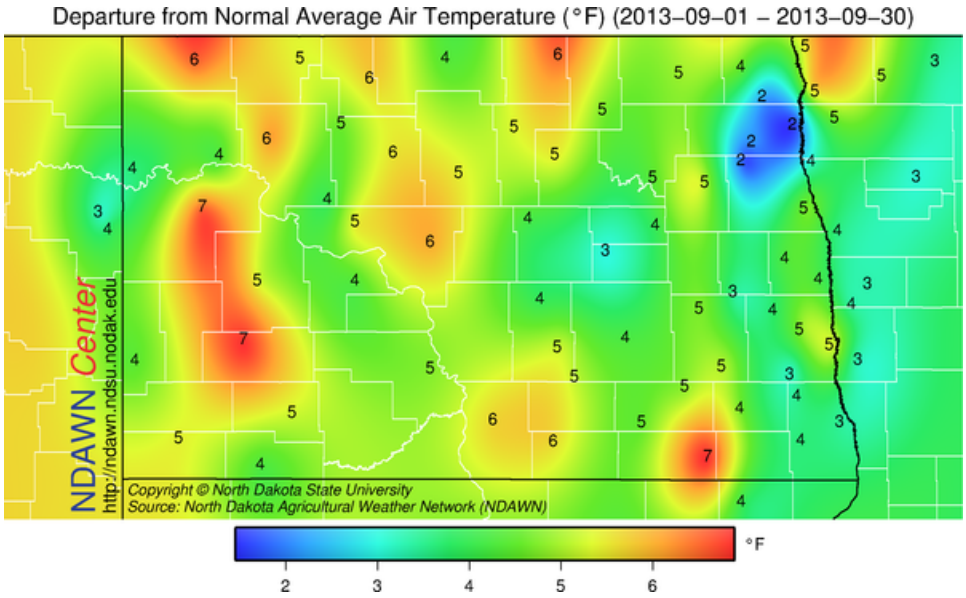


North Dakota State Climate Office

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

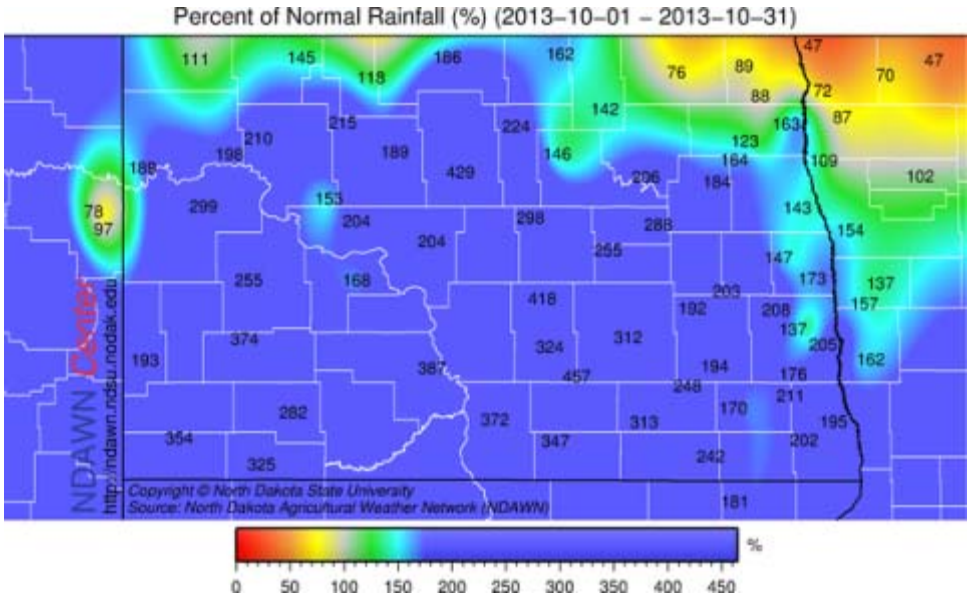
October 2013

Fall 2013 Weather in North Dakota:

Total Precipitation percent of mean (1981-2010)

Precipitation Percent of Normal

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

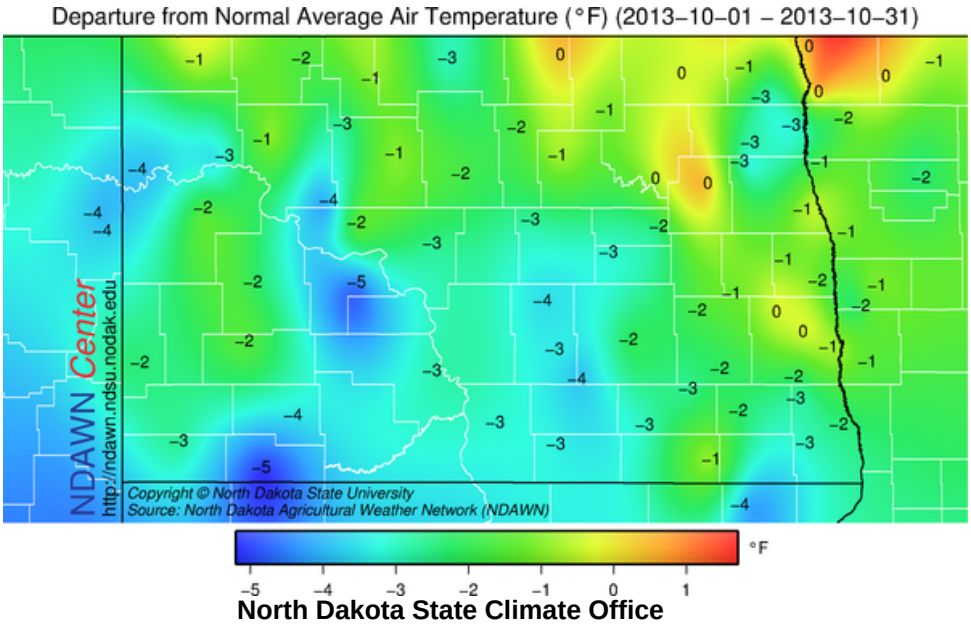


North Dakota State Climate Office

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

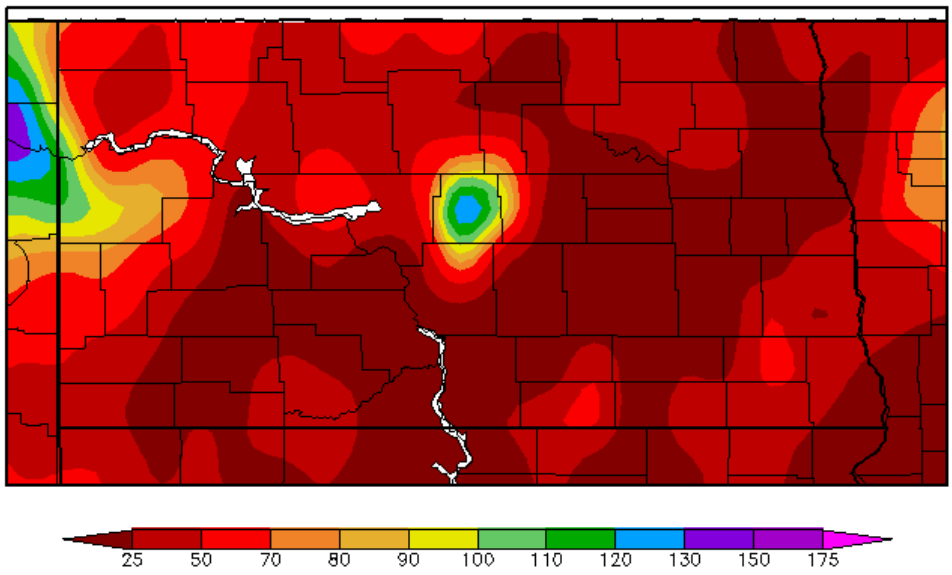
Fall 2013 Weather in North Dakota:

November 2013

Total Precipitation percent of mean (1981-2010)

Precipitation Percent of Normal

(Data from High Plains Regional Climate Center (HPRCC))

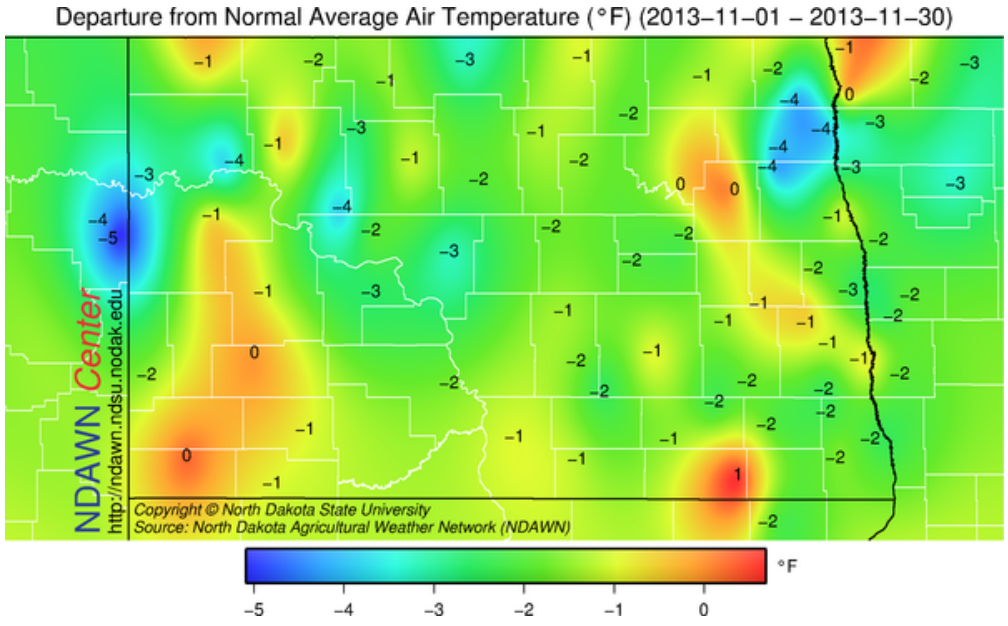


North Dakota State Climate Office

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

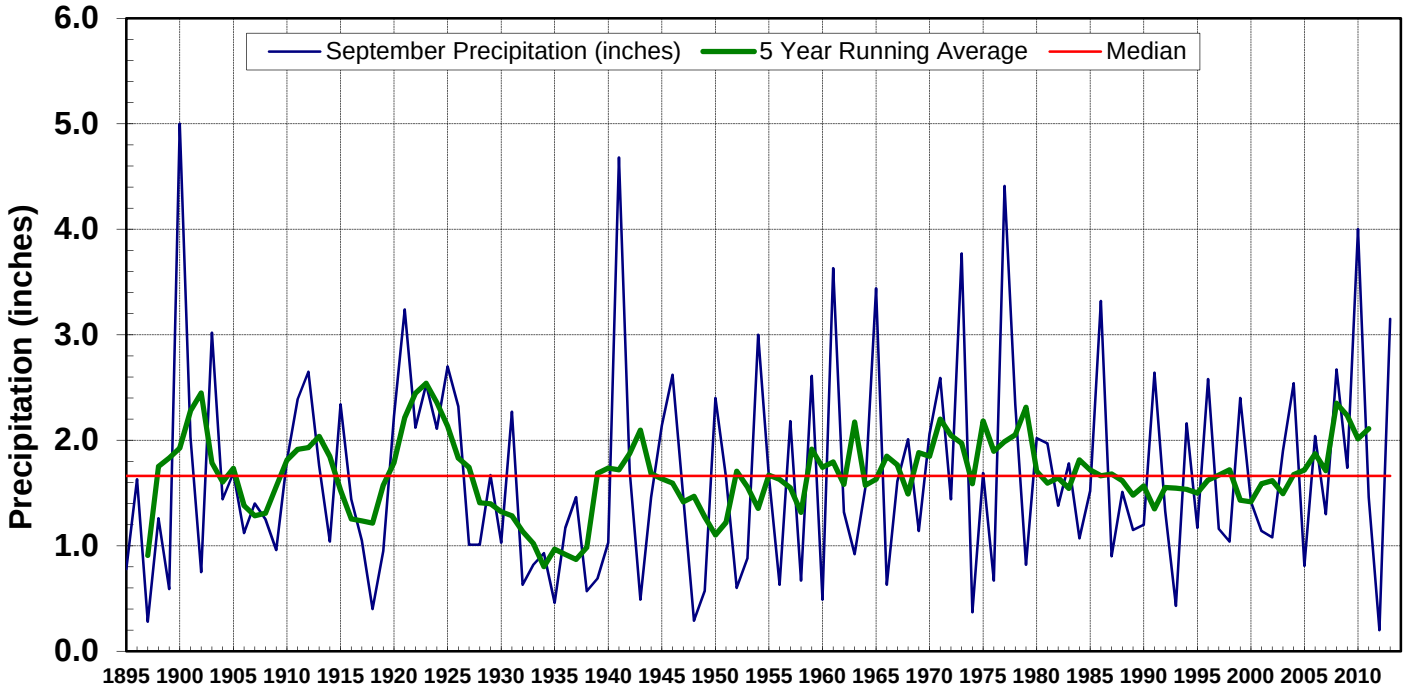
Departure From Normal Monthly
Average Air Temperature in degrees F

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



North Dakota State Climate Office

Historical September Precipitation for North Dakota

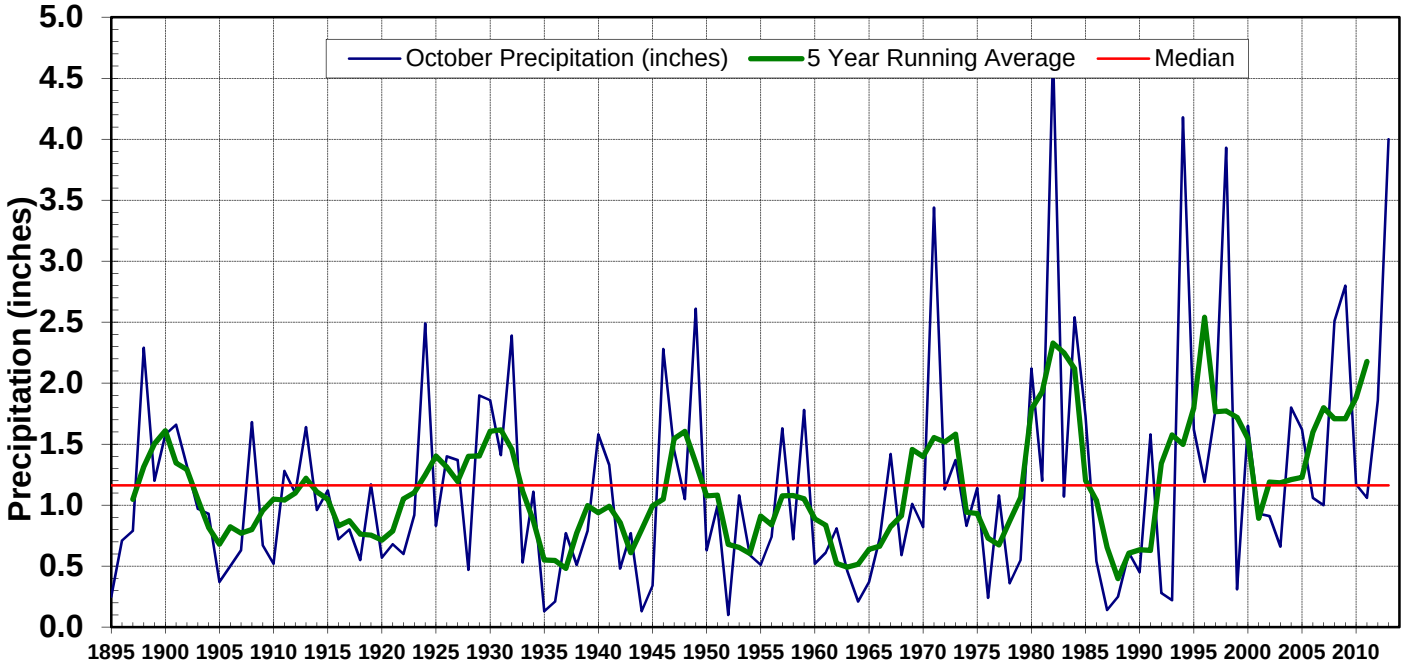


September Precipitation Statistics

2013 Amount: 3.15 inches
Maximum: 5.00 inches in 1900
State Normal: 1.71" (1981-2010)

Monthly Ranking: 10th wettest in 119 years
Minimum: 0.20 inches in 2012
Years in Record: 119

Historical October Precipitation for North Dakota

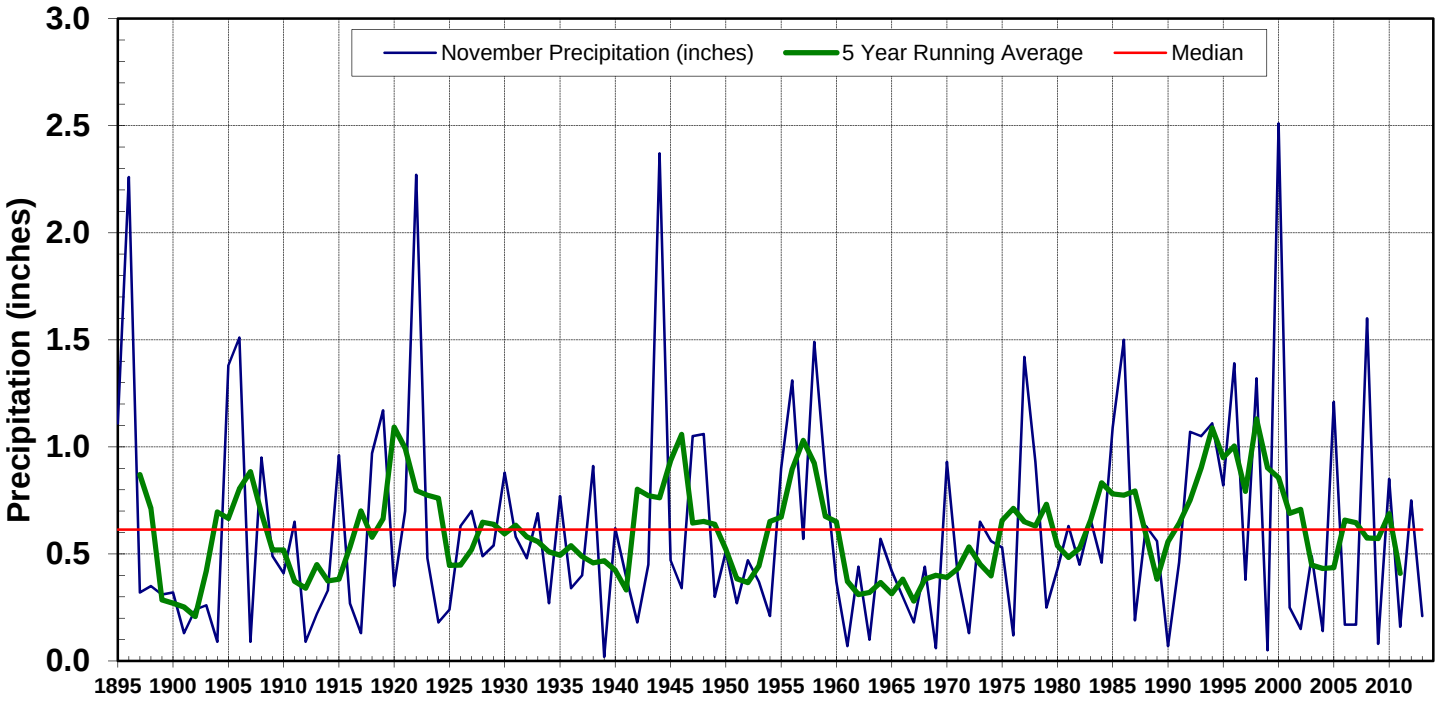


October Precipitation Statistics

2013 Amount: 4.00 inches
Maximum: 4.71 inches in 1982
State Normal: 1.48” (1981-2010)

Monthly Ranking: 3rd Wettest in 119 years
Minimum: 0.10 inches in 1952
Years in Record: 119

Historical November Precipitation for North Dakota

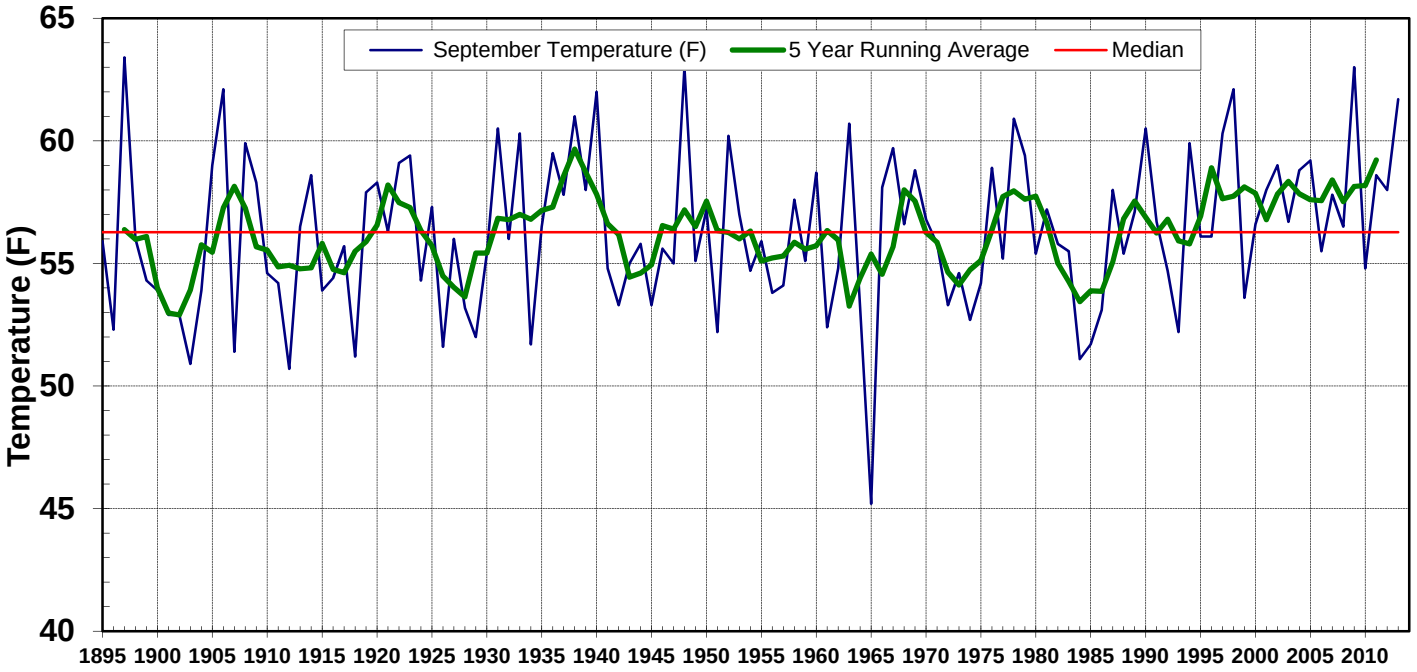


November Precipitation Statistics

2013 Amount: 0.21 inches
Maximum: 2.51 inches in 2000
State Normal: 0.72” (1981-2010)

Monthly Ranking: 24th driest in 119 years
Minimum: 0.02 inches in 1939
Years in Record: 119

Historical September Temperature for North Dakota

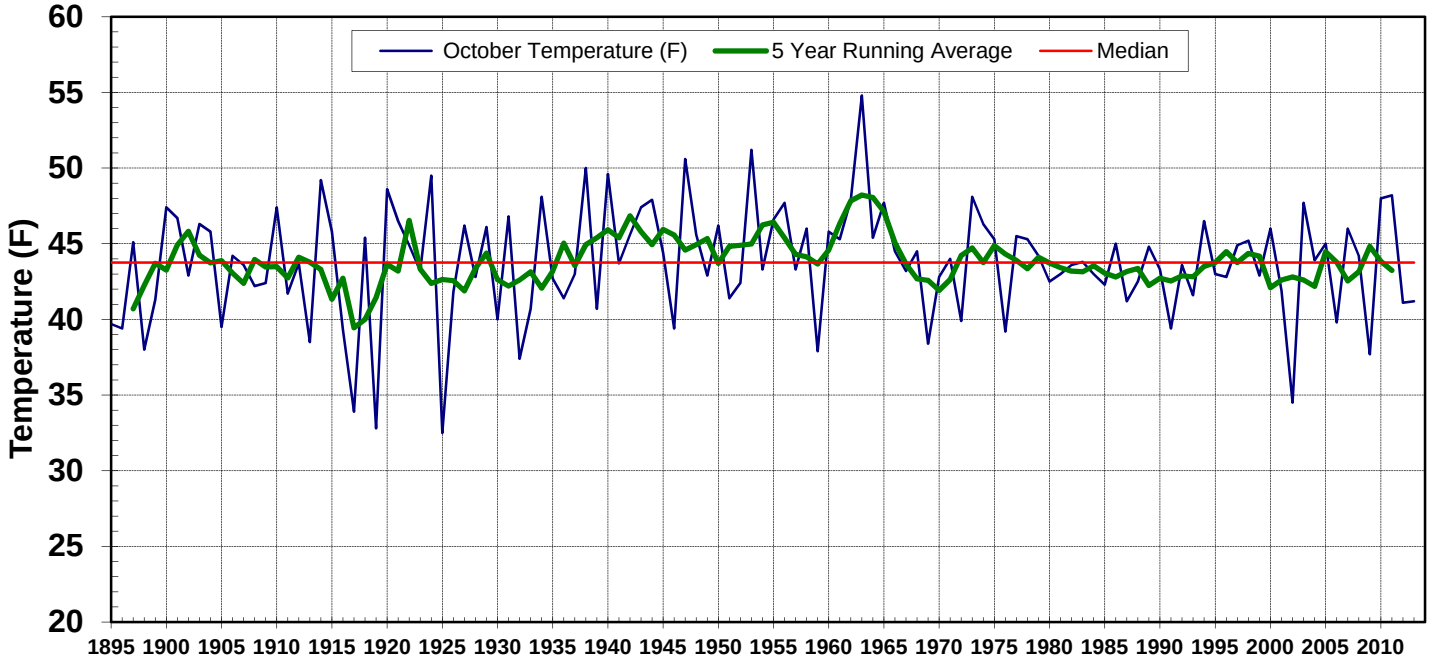


September Temperature Statistics

2013 Average: 61.70 °F
Maximum: 63.40 °F in 1897
State Normal: 56.77 °F (1981-2010)

Monthly Ranking: 7th warmest in 119 years
Minimum: 45.20 °F in 1965
Years in Record: 119

Historical October Temperature for North Dakota

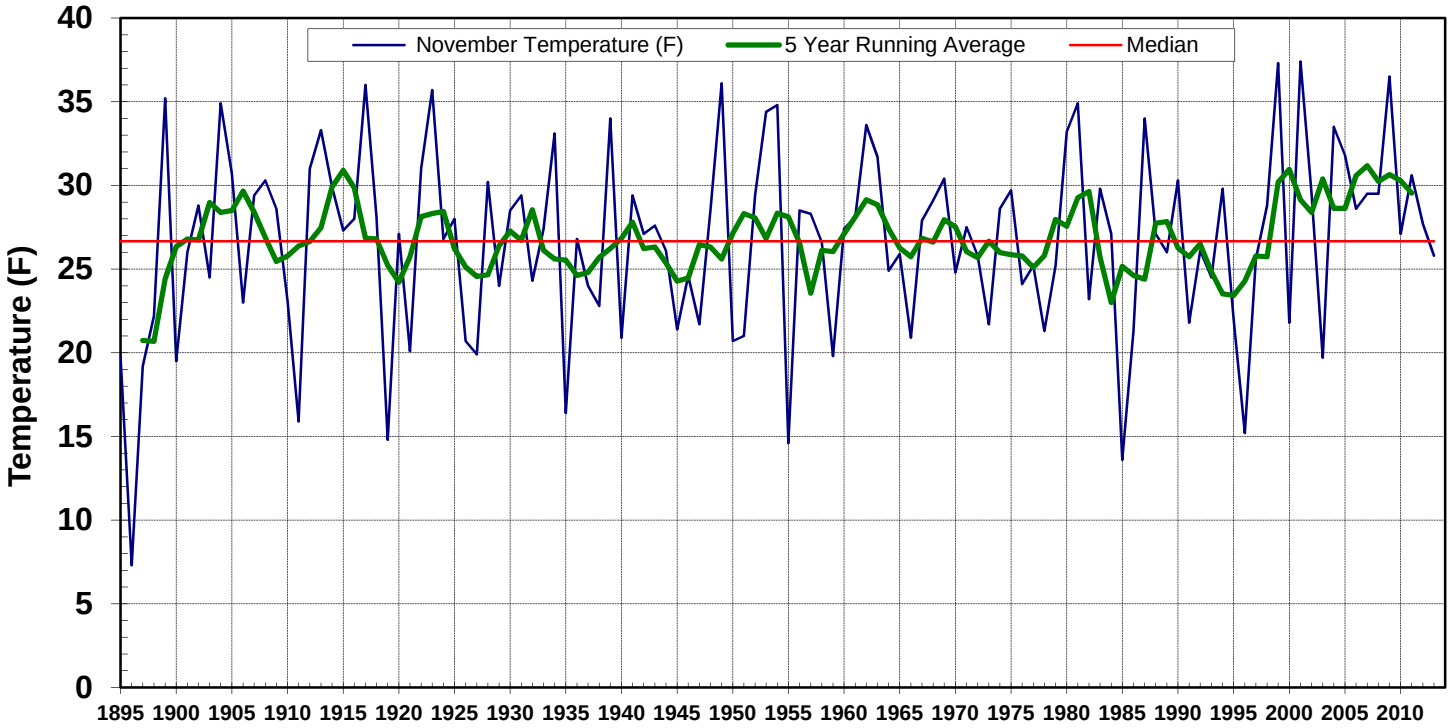


October Temperature Statistics

2013 Average: 41.2 °F
Maximum: 54.80 °F in 1963
State Normal: 43.24 °F (1981-2010)

Monthly Ranking: 24th coolest in 119 years
Minimum: 32.50 °F in 1925
Years in Record: 119

Historical November Temperature for North Dakota



November Temperature Statistics

2013 Average: 25.8 °F
Maximum: 37.40 °F in 2001
State Normal: 27.44 °F (1981-2010)

Monthly Ranking: 45th coolest in 119 years
Minimum: 7.30 °F in 1896
Years in Record: 119

Storms & Record Events

State Tornado, Hail, and Wind Reports for Fall 2013

by B. A. Mullins

North Dakota 3 Month Total	Wind	Hail	Tornado
	10	8	0

Reports by Month			
Month	Wind	Hail	Tornado
Total September	10	8	0
Total October	0	0	0
Total November	0	0	0

North Dakota Record Event Reports for Select Cities: Fall 2013

Date	Location	Type of Record	Previous Record
09/07/13	Williston	1.23 inches of rainfall	1.03 inches in 1941
09/08/13	Fargo	1.16 inches of rainfall	Ties 2007
09/08/13	Dickinson	1.87 inches of rainfall	0.82 inches in 2007
09/09/13	Bismarck	1.76 inches of rainfall	1.02 inches in 1913
09/09/13	Dickinson	0.17 inches of rainfall	0.12 inches in 1986
09/09/13	Jamestown	0.89 inches of rainfall	0.73 inches in 2005
09/09/13	Minot	0.83 inches of rainfall	0.40 inches in 1950
09/14/13	Fargo	1.32 inches of rainfall	1.02 inches in 1889
09/14/13	Dickinson	0.42 inches of rainfall	0.31 inches in 2001
09/28/13	Jamestown	0.45 inches of rainfall	0.32 inches in 1990
10/04/13	Bismarck	1.07 inches of rainfall	0.89 inches in 1998
10/11/13	Dickinson	2.38 inches of rainfall	0.86 inches in 1998
10/11/13	Williston	1.74 inches of rainfall	0.49 inches in 1998
10/11/13	Minot	1.04 inches of rainfall	0.77 inches in 1998
10/14/13	Fargo	1.27 inches of rainfall	0.82 inches in 1984
10/14/13	Grand Forks AP	0.67 inches of rainfall	0.45 inches in 1975
10/14/13	Grand Forks NWS	0.77 inches of rainfall	0.48 inches in 1975
10/14/13	Bismarck	1.02 inches of rainfall	0.35 inches in 2000
10/14/13	Dickinson	1.20 inches of rainfall	0.10 inches in 1975
10/14/13	Jamestown	0.98 inches of rainfall	0.34 inches in 2009
10/15/13	Bismarck	4.42 inches of rainfall	4.30 inches in 1982
10/20/13	Grand Forks NWS	Trace of snow	Ties 2006
11/23/13	Minot	-17 °F low temperature	-13 °F in 1950

Seasonal Outlook

Winter 2013-14 Climate Outlooks

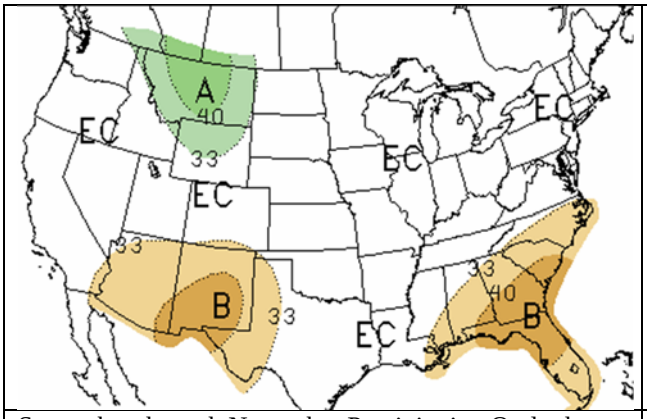
by D. Ritchison[1]

After several colder than average winters from 2007 through 2011, the past two winters were not so harsh. Two years ago the state recorded one of the warmest winters on record and last year, although thought of as a wet and cold winter, actually finished very near the long-term average for both temperature and precipitation. It was March and April 2013 that were exceptionally cold and snowy that extended the cold season well into traditional spring.

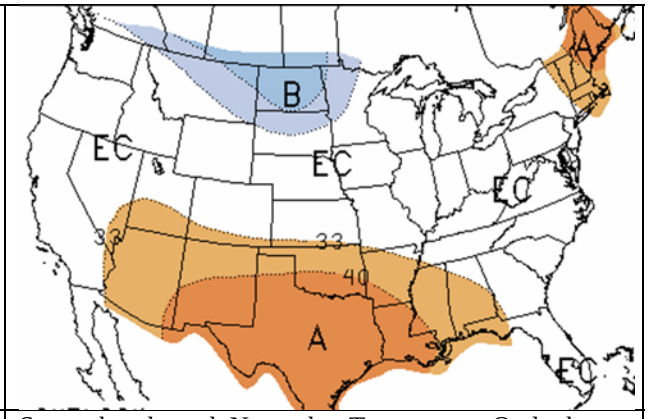
There are several reasons to believe that this winter will return to the cold and snowy winters of a few years ago. First, the well above average autumn snow cover in Eurasia can be a precursor to colder than average winters in North Dakota. The October snow pack in Siberia finished well above average this year. Another concern was the late season surge of typhoons in the western Pacific. Some of the same oceanic and atmospheric mechanisms involved in that surge can lead to weak El Nino conditions in the central Pacific developing during the winter. Although an El Nino is often thought of as bringing warm winters to these parts, that is frequently not the case when the warm waters are concentrated in the central portion of the Pacific. This is especially true when the Pacific Ocean in its cold phase as is currently the case.

Those two scenarios in addition to other cold signals that include; a weak solar cycle, an early local snow cover and a quick extensive buildup of Arctic sea ice. Analogs (comparable set ups in the past) tended to finish with below average temperatures and above average snowfall with these and other similar conditions.

The latest outlook from the Climate Prediction Center (CPC) for the next three months can be seen below. The CPC is forecasting equal chances of above, below or normal temperatures and precipitation for this area that seems to follow my ideas. You can find their current and future outlooks 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:

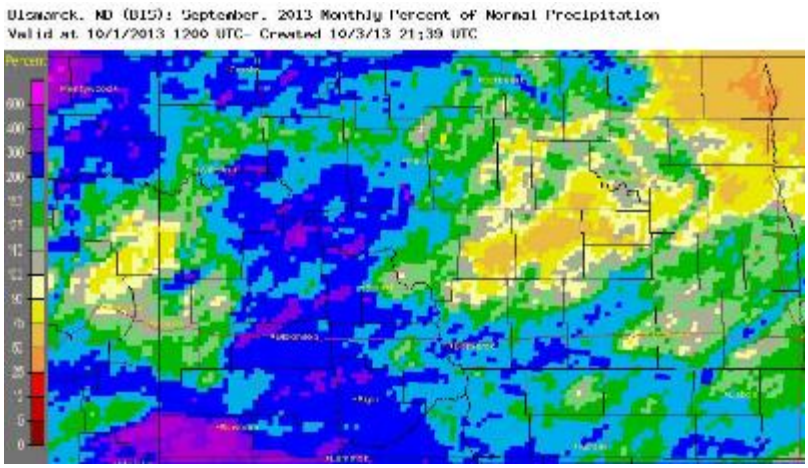
Eastern North Dakota: http://www.crh.noaa.gov/fgf/
Western North Dakota: http://www.crh.noaa.gov/bis/

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

Hydro-Talk

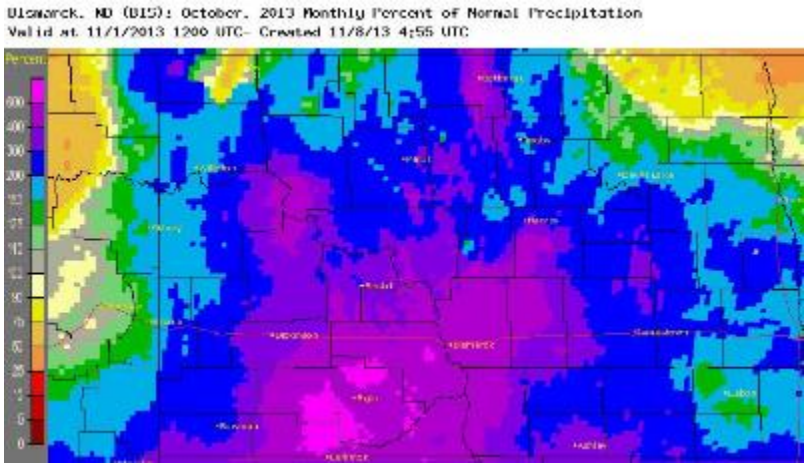
North Dakota Hydrologic Outlook

by A. Schlag[2]



It would seem that a person could spend a lifetime being amazed at the extremes we experience in North Dakota over the course of a year. Not only do we see extreme temperature and precipitation swings from one season to the next, but even within a season from one year to the next we are conditioned to expect wild swings from the 30-year normal for that particular month. Many locations across western North Dakota saw record to near record precipitation this fall from September through end of October.

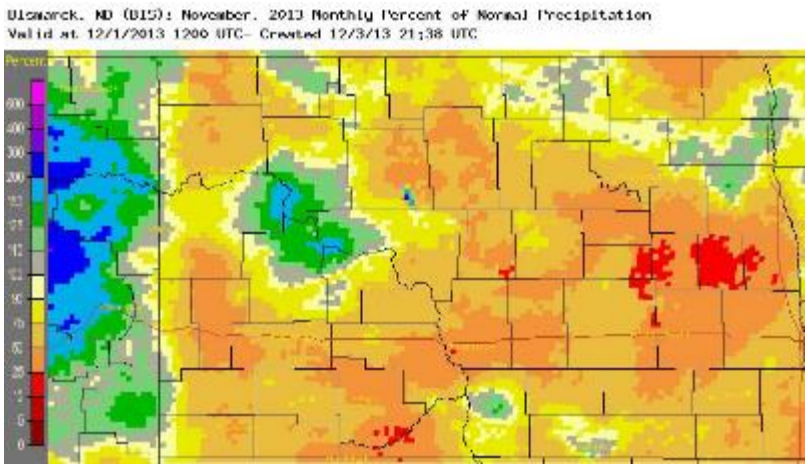
As usual though, the switch back to a less than "normal" precipitation pattern came swiftly. November, in the image to the right, generally shows a lower than normal precipitation pattern across the vast majority of North Dakota.



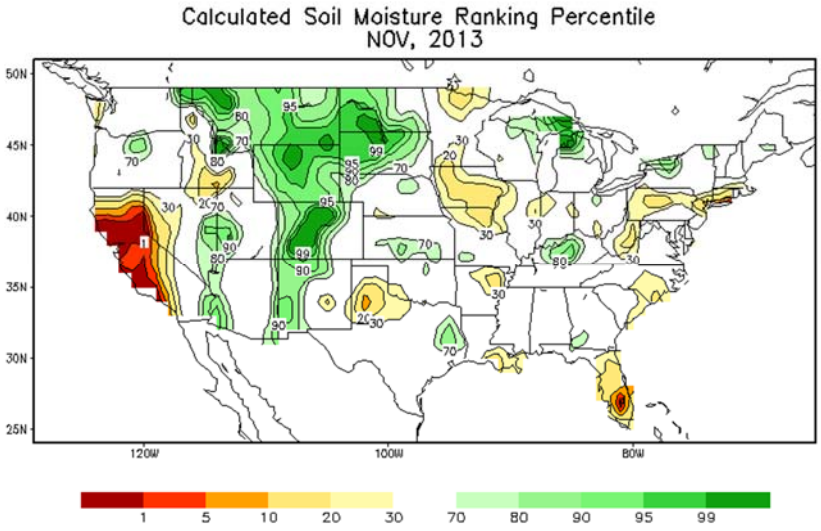
The question(s) of what spring will bring in 2014 are already being asked. While we have long-term climate outlooks, a person can also look at the local conditions just before freeze up that also affect spring flooding. First and foremost, soil moisture levels across the Missouri, James, and Souris watersheds remains very high, probably far more than most can recall. Some of the interesting indicators of this that we have observed in the news lately are the widely reported Ice Circle on the Sheyenne River, and somewhat lesser reported ice statues on the Souris and other small rivers as seen on local news coverage such as the one in the link provided below: (http://www.kxnet.com/story/24177686/ice-sculptures-on-mouse-river). Both phenomena are tied directly to the wet fall we have seen.

[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

Higher than normal flows in the Sheyenne allowed the normal summertime eddy to remain in place during ice formation on the Sheyenne River where chunks of ice became trapped in the circular swirl of and eddy. This excellent example of an ice circle would not be as likely to occur if the river were lowered only a foot or so and the eddy were to become less energetic (See: http://www.foxnews.com/science/2013/11/26/unusual-ice-circle-forms-in-north-dakota-river/). Similarly, smaller western ND streams and rivers went into iced over conditions with greater than normal flow, normal is near zero on these streams. The ice statues are created by turbulent flow over a low-head or beaver dam when the bubbles formed in the turbulent stream burst and continue to wet a freezing surface.



What this tells me is that the strong groundwater contribution to the streams confirms the excess soil moisture as shown in maps like the one on the right. Secondly, the unusually cold entry into December is producing frost depth at an alarming rate. Lack of significant snow cover in early December has already provided a frost depth of roughly 20 inches in the Bismarck area.



Wet and frozen soils are key ingredients to many of our spring floods over the past several years. What we do not yet know are the eventual water equivalent in the snowpack come spring, and the exact conditions under which we will see the eventual melt. As of right now it is simply safe to say that the first indicators available are not favorable to the region, however…it is important to remember that we still cannot have floods like those of the past few years without considerably more snow and something of an unfavorable melt pattern.

Science Bits

Odds of a Major Flood in the Spring of 2014

by Adnan Akyüz[3]

It is never too early to talk about flooding. A flood depends on many factors including ones that have not unfolded yet. Conditions thus far are showing some concerning signals. However, there are many factors that affect flooding such as fall precipitation, soil moisture, frost depth, the Red River stage during spring, winter precipitation, melting rate, and additional liquid precipitation just prior to the peak river stage. In addition to those dynamic factors that vary from year to year, there are also some static factors that impact flooding the same way every year: topography and synchrony of thaw/snow melt.

Although flooding in the Red River is a function of conditions in the entire basin, climate data in Fargo has so far proven to be a good anolog for the Red River stage in Fargo. Historical records show that fall precipitation is a great early warning indicator, as it impacts soil moisture and river stage prior to next spring. Statewide, the fall of 2013 was the second wettest fall in recorded history. Long term statewide fall precipitation trend is 0.76" per century which is the steepest seasonal trend in North Dakota. The trend is even steeper (1.19" per century) when only east central ND is considered. In other words, east central ND receives on average 1.19" additional precipitation in the fall season in comparison to 100 years ago. This is the strongest correlation with increasing frequency of major floods for the Red River. In comparison fall 2013 is the 7th wettest in Fargo's recorded history since 1881. Furthermore, all three highest fall precipitation cases in the past led to major flooding of the Red River in Fargo (Table 1)

Table 1. Three Greatest Fall Precipitation and Red River Peak Stage in the following spring in Fargo, ND

Ranking	Year	Fall Precipitation (in)	Red River Peak Stage in Following Spring (feet)
1	2008	10.67	40.84
2	1977	10.26	34.41
3	2000	9.75	36.69

We periodically monitor precipitation accumulation from September through April. The graphic below (Fig 1) shows accumulated precipitation from September 1 through December 15, 2013 (green line) and the highest accumulation during the same period (blue line) which is the 2008-2009 season as well as the normal accumulation (brown line). The current pattern is the 5th highest accumulation and displays a very similar pattern with 2008-09. Unfortunately, many other factors acted together in the following spring to produce the historic record flood which reached its peak river stage of 40.84' on March 28, 2009.

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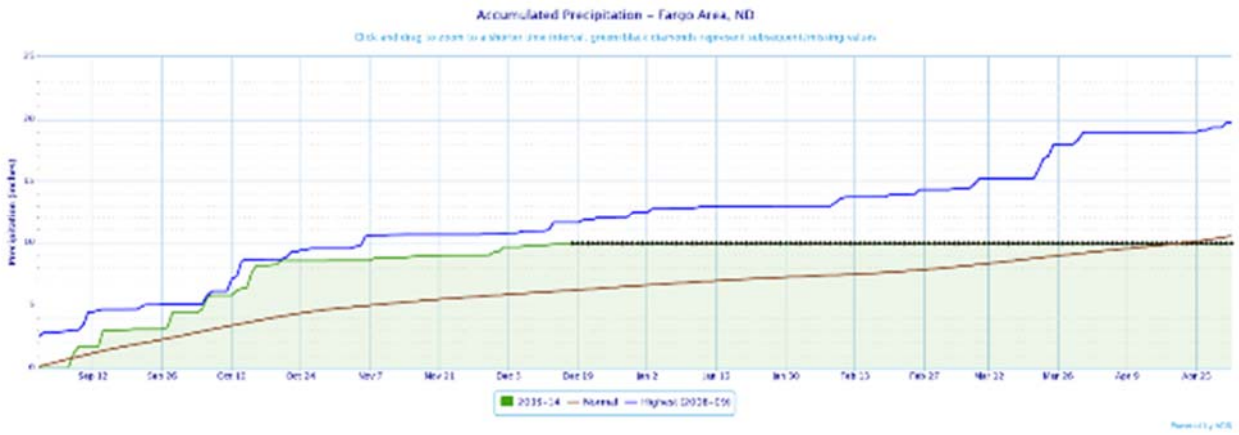

Figure 1. Fargo accumulated precipitation from September 1 2013 through December 15 (green line), September 1, 2008 through April 30, 2009 (blue line), and the normal accumulated precipitation for the same perid (brown line)

Although fall precipitation is an important early warning factor for the following spring flooding, it does not constitute panic alone. Let's examine some of the other factors that we know so far.

Soil moisture: North Dakota does not have an observation network to quantify the soil moisture conditions. Instead, we look at models such as North American Land Data Assimilation System (NLDAS) by NOAA. The current NLDAS model is showing near-normal range soil moisture conditions in the northern Red River Valley but above normal soil moisture conditions in the southern Valley. The soil moisture conditions today are not as conducive to play a favorable role for a major flood as it was this time of the year in 2008.

Winter Weather Outlook: Even though the forecast is favorable for slightly above normal precipitation, the forecast do not pose high degree of certainty in this area.

There are definitely more factors that need to be played out before flooding becomes a concern. It certainly needs to be noted that our municipal leaders and their administration have proven to be experienced and competent in responding. Furthermore, the cities along the Red River had implemented very useful mitigation measures since 2009. It is also worth mentioning that the communities involved with previous floods have also proven their readiness and support of others.

CONTACTING THE NORTH DAKOTA STATE CLIMATE OFFICE

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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