



North Dakota Climate Bulletin

Winter 2012-2013

Volume: 7 No: 1

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Editors

Adnan Akyüz, Ph.D.
Barbara Mullins

Graphics

Mullins & North Dakota State Climate
Office

Contributing Writers:

Barbara A. Mullins
Daryl Ritchison
Allen Schlag
Whitten Vern

From the State Climatologist



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

Temperature-wise, this winter was the 39th warmest statewide. Precipitation-wise, it was the 38th driest winter statewide since 1895.

Despite the drier than normal conditions statewide, wetter than normal conditions in the east central and south eastern ND along with existing snow pack into late March created favorable conditions for potential major flooding in the Red River of the North. Will the ongoing widespread drought conditions in the eastern ND lessen the magnitude of the much anticipated major flood in the main-stem and the tributaries of the Red River? What are the probabilities of major flooding elsewhere in ND? What is the seasonal climate outlook into the spring? The answers can be found in this issue.

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



ND Oil Patch by Vern Whitten Photography©

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Weather Highlights



Seasonal Summary:

by B. A. Mullins

December 2012

The state average precipitation was 0.39 inches which is below the 1981-2010 normal of 0.52 inches. December 2012 state average precipitation ranked 50th driest in the last 118 years with a maximum of 1.29 inches in 2008 and a minimum of 0.06 inches in 1944.

The High Plains Regional Climate Center (HPRCC) percent of normal precipitation was above normal in the far northwest and parts of the south central with below normal primarily in the east and far southwest. HPRCC total precipitation amounts were less than an inch across the state with amounts of less than a half inch in the east and southwest. A snow storm from the 7th through the 10th produced a three day snowfall total of 1 to 8 inches. Eight inches fell at St. Anthony and Watford City. Seven inches fell at Havana.

The National Weather Service (NWS) reported no record precipitation in December. A complete list of record events can be found in the “Storms and Record Events” section later in this bulletin.

The US Drought Monitor January 1, 2013 report had Severe (D2) to Extreme (D3) drought conditions for 30.51% of the state. The report had Abnormally Dry (D0) to Moderate drought (D1) conditions for 58.4% of the state and no drought conditions for 11.09% of the state.

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported an average snow depth of 4.7 inches on December 30. Road conditions were rated 96% open, 4% difficult, 0% closed with 10% drifted, 12% icy, 0% muddy, and 78% dry. (Weekly Weather and Crop Bulletin Vol. 100, No. 1).

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

The top five December daily maximum wind speeds recorded from NDAWN were all on the 3rd and included McHenry with 46.2 mph, Crary with 45.1 mph, Cando with 44.4 mph, Edgeley with 44.0 mph and Watford City with 43.7 mph. NDAWN wind speeds are measured at a height of 10 feet (3 m).

The state average air temperature was 13.2 °F which is below the 1981-2010 normal of 14.02 °F. December 2012 state average air temperature ranked 58th warmest in the past 118 years with a maximum of 25.6 °F in 1939 and a minimum of -2.5 °F in 1983.

NDAWN December average air temperatures ranged from ~6 °F in the far north to ~20 °F in the southwest. Departure from normal average air temperatures ranged from near normal to 4 °F below normal. The 1st through the 6th of December had average air temperatures near and above normal. Temperatures fell sharply to below normal from the 7th through the 13th when

temperatures rebounded to near normal. The near normal temperatures held through the middle of the month then fell sharply again to below normal for the holidays.

The National Weather Service (NWS) recorded breaking no temperature records in December. A complete list of record events can be found in the “Storms and Record Events” section later in this bulletin.

NDAWN’s highest recorded daily air temperature for December was 60.8 °F at Britton, SD, on the 2nd. The lowest recorded daily air temperature was -28.5 °F at Bottineau on the 31st.

January 2013

The state average precipitation was 0.26 inches which is below the 1981-2010 normal state average of 0.49 inches. January 2013 state average precipitation ranked the 28th driest in the past 119 years with a maximum of 1.35 inches in 1916 and a minimum of 0.07 inches in 1973.

Precipitation amounts were below normal for most of North Dakota with most areas being less than 50% of normal based on the High Plains Regional Climate Center (HPRCC) analysis. The far southeast corner had above normal precipitation of ~140%. HPRCC total precipitation amounts were less than 0.6 inches for all but the southeast corner which had approximately an inch of precipitation. A winter storm that tracked across the state on the 11th and 12th brought two day snow totals ranging from 7 inches to less than an inch. The winter storm on the 28th brought a wintery mix that turned to snow. The National Weather Service (NWS) had the highest snow accumulations in the east and included Mooreton with 13 inches, Colfax with 10.5 inches and Lidgerwood with 10 inches.

The National Weather Service (NWS) reported breaking one precipitation records. Fargo had record precipitation of 0.53 inches on the 28th. A complete list of record events can be found in the “Storms and Record Events” section later in this bulletin.

The US Drought Monitor February 5, 2013 report had 48.33% of the state with moderate to severe drought (D1-D2). No drought conditions covered 34.53% with the remaining 17.14% being abnormally dry. No drought conditions were reported in the north central, northwest and west central regions.

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported an average snow depth of 4.1 inches on January 27th. Road conditions were rated 94% open, 5% difficult, 1% closed with 16% drifted, 15% icy, 0% muddy, and 69% dry. (Weekly Weather and Crop Bulletin Vol. 100, No. 5).

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

The top five January daily maximum wind speeds recorded from NDAWN were 49.4 mph on the 19th at Edgeley, 49.4 mph on the 8th at McHenry, 48.7 mph on the 19th at Robinson, 48.3 mph on the 19th at Crary and 48.3 mph on the 19th at Lisbon. NDAWN wind speeds are measured at a height of 10 feet (3 m).

The state average air temperature was 10.70 °F which is above the 1981-2010 normal of 10.53 °F. January 2013 state average air temperature ranked the 40th warmest in the past 119 years with a maximum of 25.9 °F in 2006 and a minimum of -10.7 °F in 1950.

NDAWN January average air temperatures ranged from ~4 °F in the northeast to ~18 °F in the southwest. Departure from normal average air temperatures ranged from -2 °F to 3 °F. Daily average air temperatures were near normal or above for the first 10 days. Arctic air moved in on the 11th and brought below normal temperatures that lingered through the 14th. Temperatures rebounded to near normal for most areas from the 15th through the 18th. Cold air moved in on the 19th driving temperatures well below normal with minimum air temperatures dropping to below -20 °F over the next few days in the northeast. Temperatures gradually climbed to near normal by the 28th but then took a sharp turn to below normal temperatures for most that lasted through the end of the month.

The National Weather Service (NWS) reported breaking no temperature records in January. A complete list of record events can be found in the “Storms and Record Events” section later in this bulletin.

NDAWN’s highest recorded daily air temperature for January was 50.9 °F at Hettinger on the 26th. The lowest recorded daily air temperature was -31.1 °F at Bottineau on the 24th.

February 2013

The state average precipitation was 0.44 inches which is below to the 1981-2010 normal of 0.45 inches. February 2013 state average precipitation ranked 45th wettest in the past 119 years with a maximum of 1.83 inches in 1998 and a minimum of 0.06 inches in 1934.

Precipitation amounts were below normal for the southwestern part of North Dakota based on the High Plains Regional Climate Center (HPRCC) analysis. The far southeast corner had above normal precipitation of ~200% to ~400%. HPRCC total precipitation amounts were less than 0.9 inches for all but the southeast corner which had ~1 to ~2 inches of precipitation. A winter storm on the 10th and 11th brought two day snow totals as high as 20 inches in Fairmount, 15.5 inches in Lidgerwood, and 15.0 inches in McLeod.

The National Weather Service (NWS) reported record snowfall at Grand Forks NWS with 4.8 inches on the 10th. Fargo had record precipitation on the 10th of 0.89 inches and record snowfall of 9.3 inches also on the 10th. A complete list of record events can be found in the “Storms and Record Events” section later in this bulletin.

The U.S. Drought Monitor March 5th report listed 23.85% of the state as having severe drought (D2) mostly in the southwest, far south, and east central regions. No drought was reported at 33.52% of the state with the remaining 42.63% having abnormally dry or moderate drought conditions (D0-D1).

The USDA, National Agricultural Statistics Service, North Dakota Field Office reported an average snow depth of 7.0 inches on February 24th. Road conditions were rated 92% open, 7% difficult, 1% closed with 12% drifted, 15% icy, 2% muddy, and 71% dry. (Weekly Weather and Crop Bulletin Vol. 100, No. 9).

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

The top five February daily maximum wind speeds recorded from NDAWN were from Linton on the 2nd with 51.5 mph, St. Thomas on the 18th with 49.0 mph, Ada, MN, on the 18th with 48.7 mph, Warren, MN, on the 18th with 48.7 mph and Hofflund on the 2nd with 47.6 mph. NDAWN wind speeds are measured at a height of 10 feet (3 m).

The state average air temperature was 16.2 °F which is above the 1981-2010 normal of 15.6 °F. February 2013 state average air temperature ranked the 33rd warmest in the past 119 years with a maximum of 29.7 °F in 1954 and a minimum of -14.1 °F in 1936.

NDAWN February average air temperatures ranged from ~8 °F in the northeast to ~27 °F in the southwest. Departure from normal average air temperatures ranged from -6 °F to 6 °F.

Temperatures throughout the month were generally above normal in the west and below normal in the east. The coldest days of the month were the 19th and 20th when minimum temperatures plunged to ~10 °F to as much as ~25 °F below zero. Quiet weather with near normal February temperatures covered the last part of the month from the 22nd to the 28th.

The National Weather Service (NWS) reported breaking no temperature records in February. A complete list of record events can be found in the "Storms and Record Events" section later in this bulletin.

NDAWN's highest recorded daily air temperature for February was 48.7 °F at Beach on the 16th. The lowest recorded daily air temperature was -31.9 °F at Bottineau on the 1st.

Season in Graphics

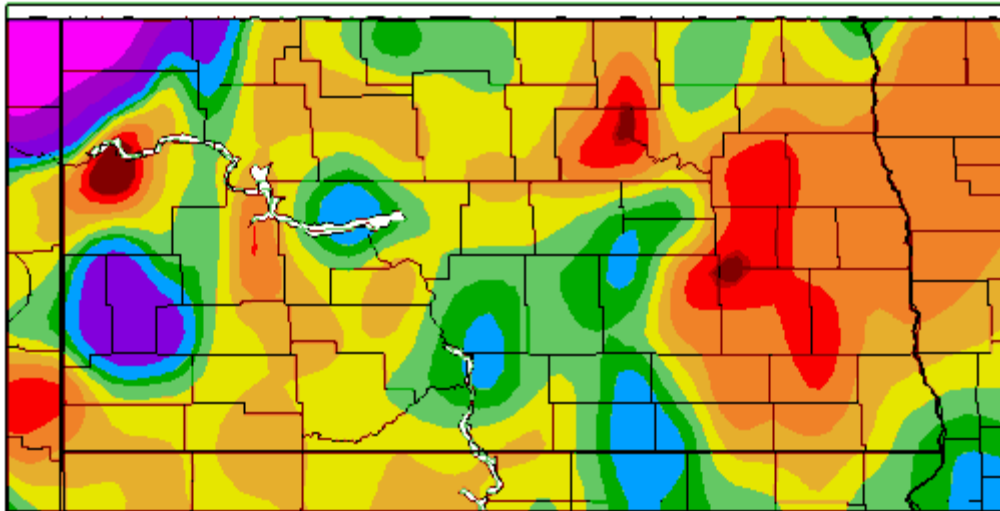
Winter 2012-2013 Weather in North Dakota:

Total Precipitation percent of mean (1981-2010)

Precipitation Percent of Normal

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

December 2012



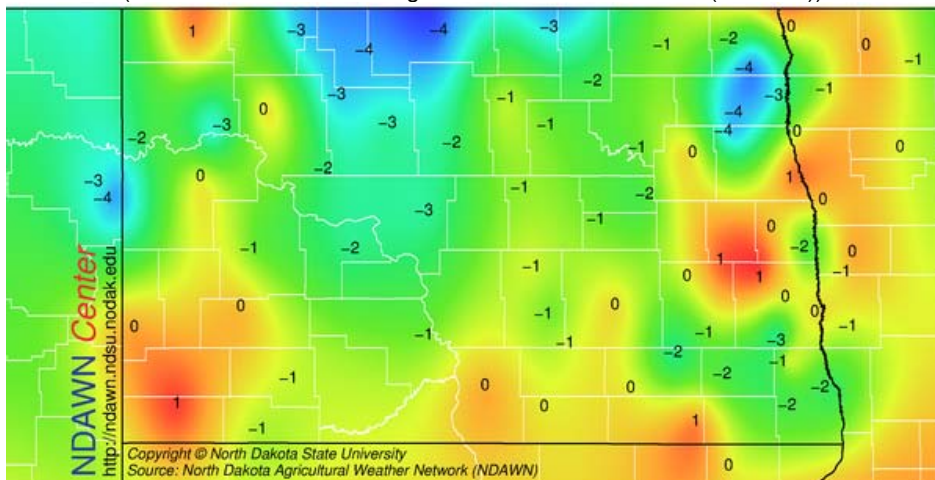
North Dakota State Climate Office

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

Departure From Normal Monthly

Average Air Temperature in degrees F

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



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

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Source: North Dakota Agricultural Weather Network (NDAWN)



North Dakota State Climate Office



January 2013

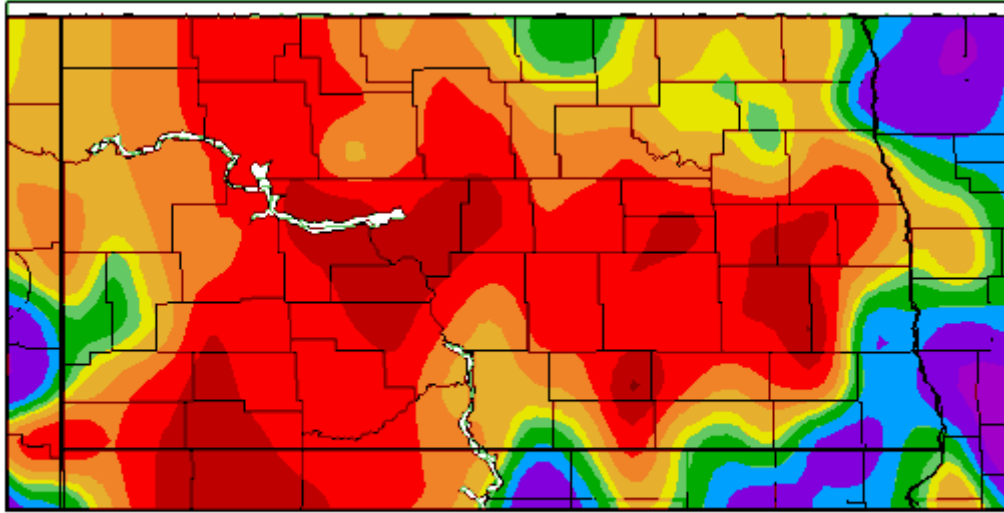
Season in Graphics

Winter 2012-2013 Weather in North Dakota:

Total Precipitation percent of mean (1981-2010)

Precipitation Percent of Normal

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



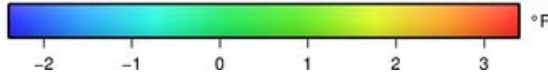
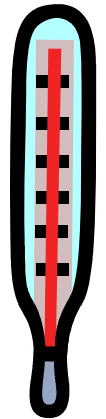
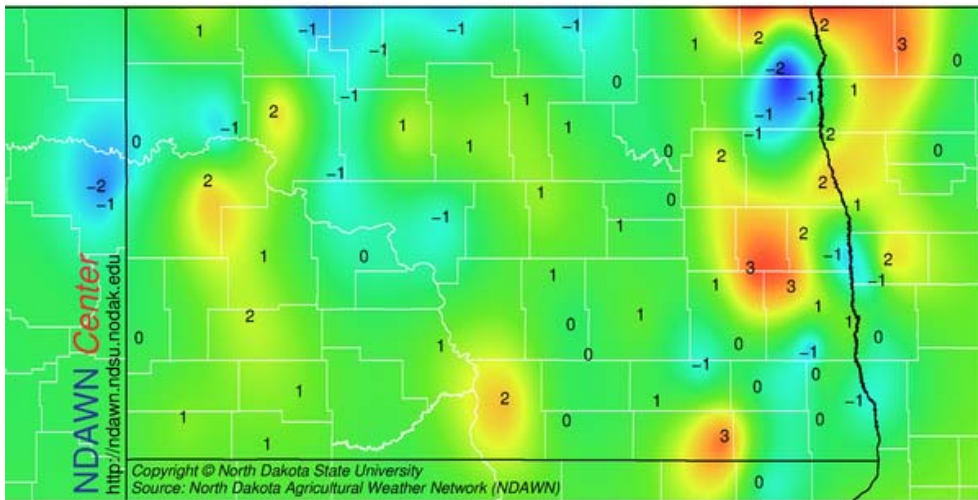
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Average Temperature (°F) Deviation from Mean (1981-2010)

Departure From Normal Monthly

Average Air Temperature in degrees F

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



North Dakota State Climate Office

February 2013

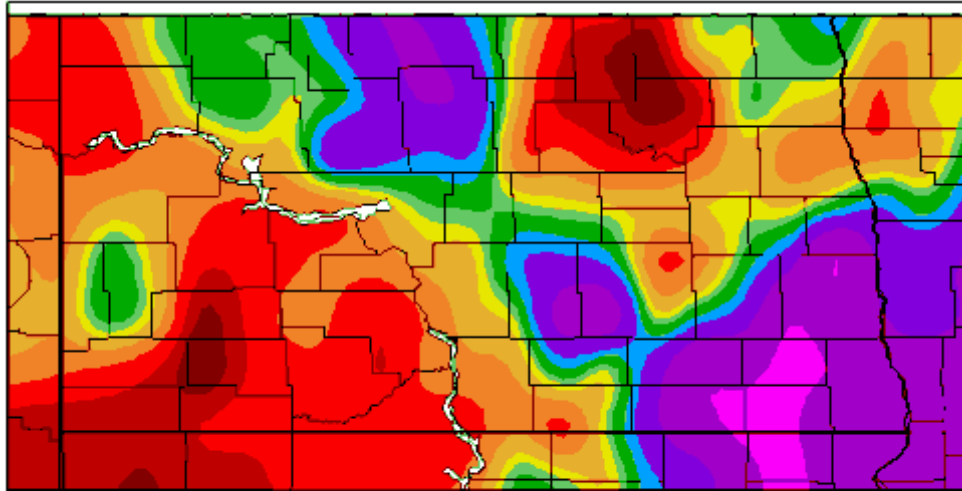
Season in Graphics

Winter 2012-2013 Weather in North Dakota:

Total Precipitation percent of mean (1981-2010)

Precipitation Percent of Normal

(Data from NWS Cooperative Network)



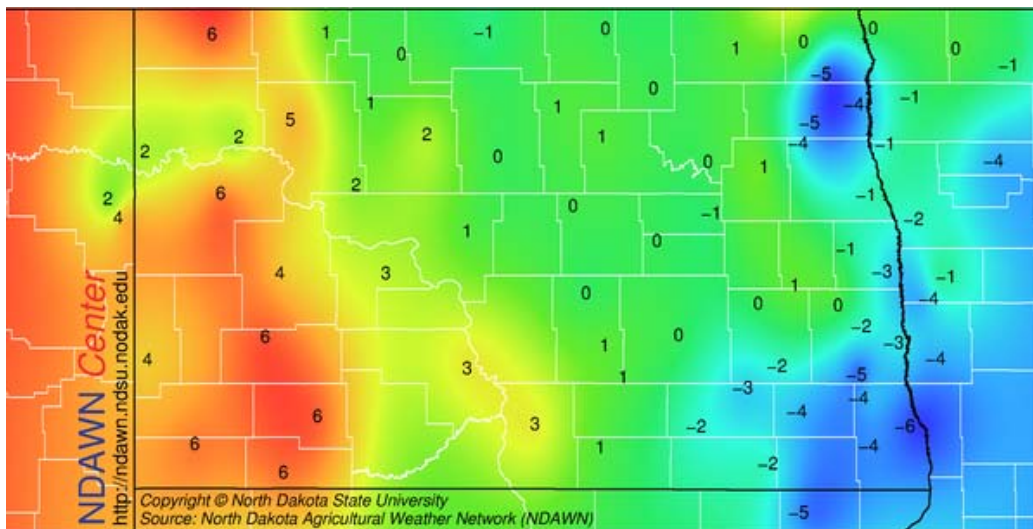
North Dakota State Climate Office

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

Departure From Normal Monthly

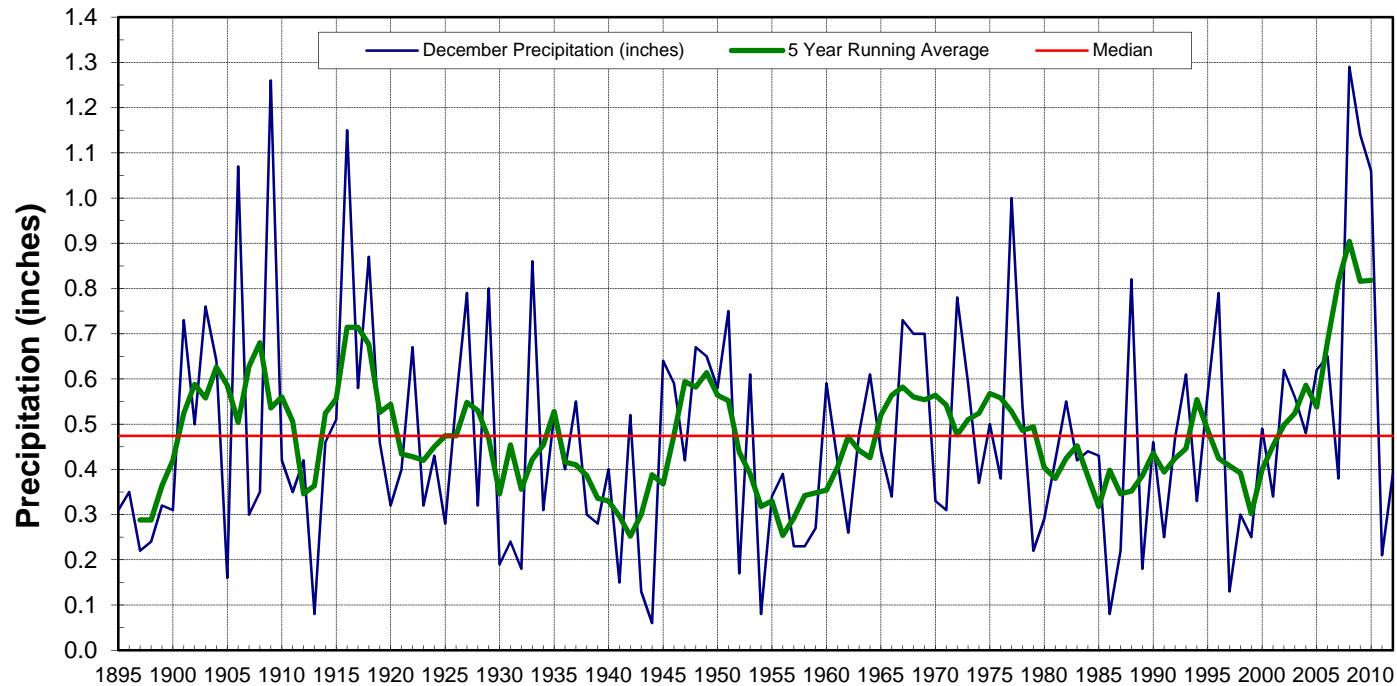
Average Air Temperature in degrees F

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



North Dakota State Climate Office

Historical December Precipitation for North Dakota



December Precipitation Statistics

2012 Amount: **0.39 inches**

Maximum: 1.29 inches in 2008

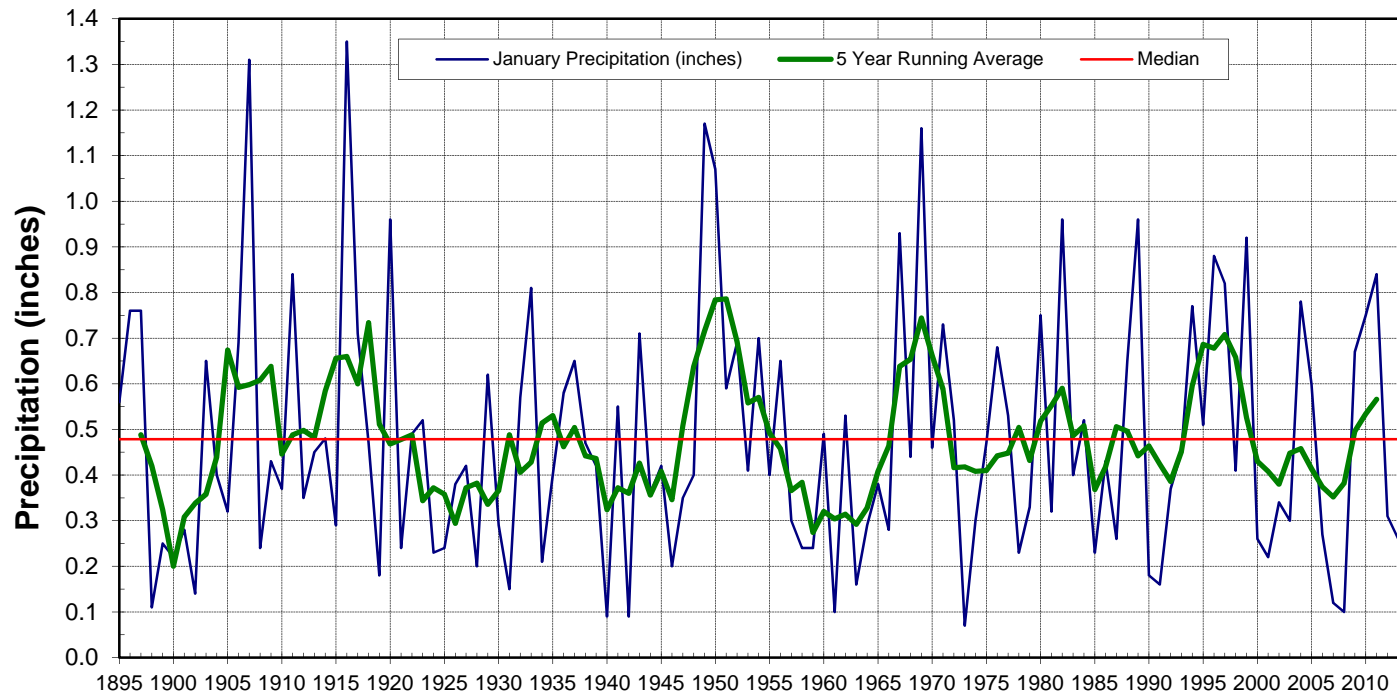
State Normal: 0.52" (1981-2010)

Monthly Ranking: 50th driest in 118 years

Minimum: 0.06 inches in 1944

Years in Record: 118

Historical January Precipitation for North Dakota

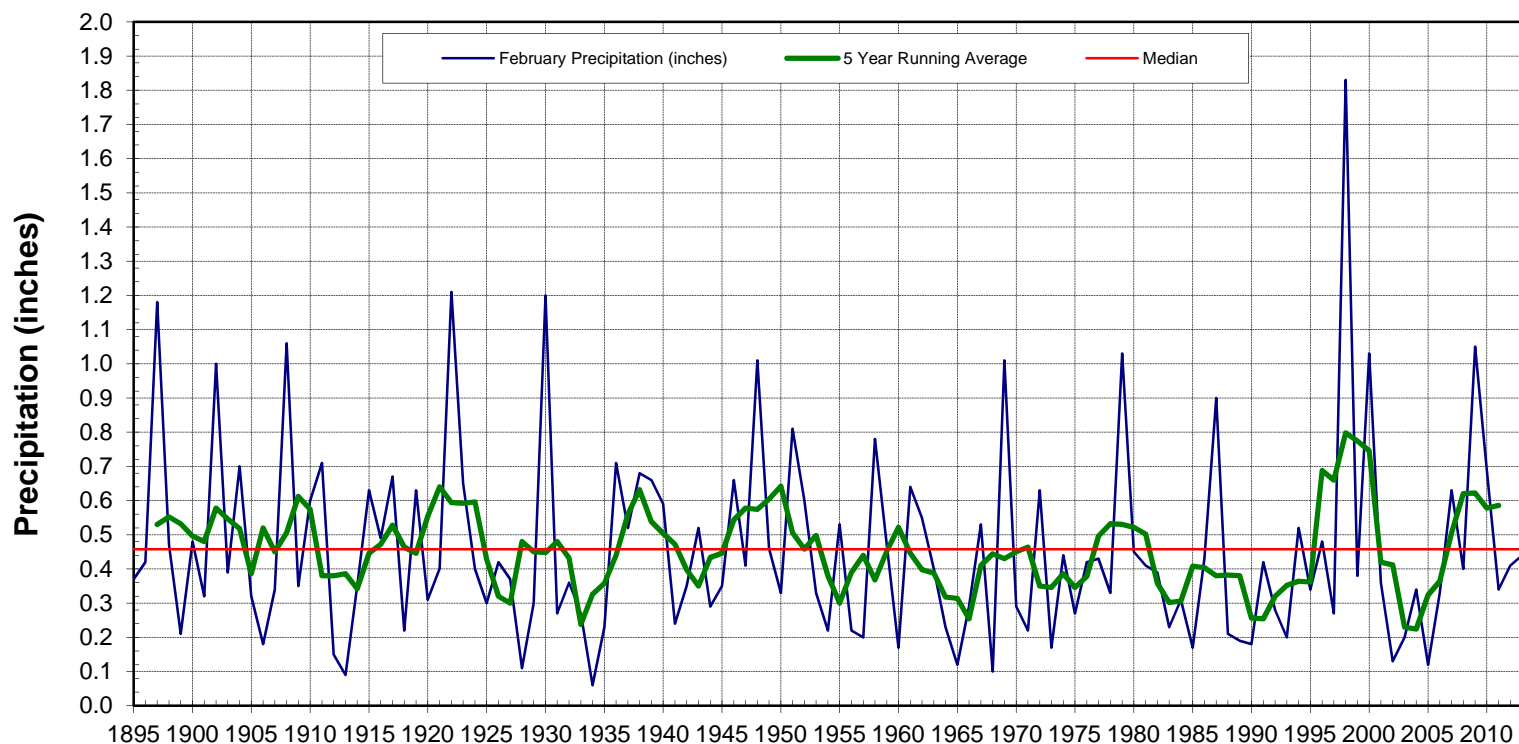


January Precipitation Statistics

2013 Amount: 0.26 inches
Maximum: 1.35 inches in 1916
State Normal: 0.49" (1981-2010)

Monthly Ranking: 28th driest in 119 years
Minimum: 0.07 inches in 1973
Years in Record: 119

Historical February Precipitation for North Dakota



February Precipitation Statistics

2013 Amount: 0.44 **inches**

Maximum: 1.83 inches in 1998

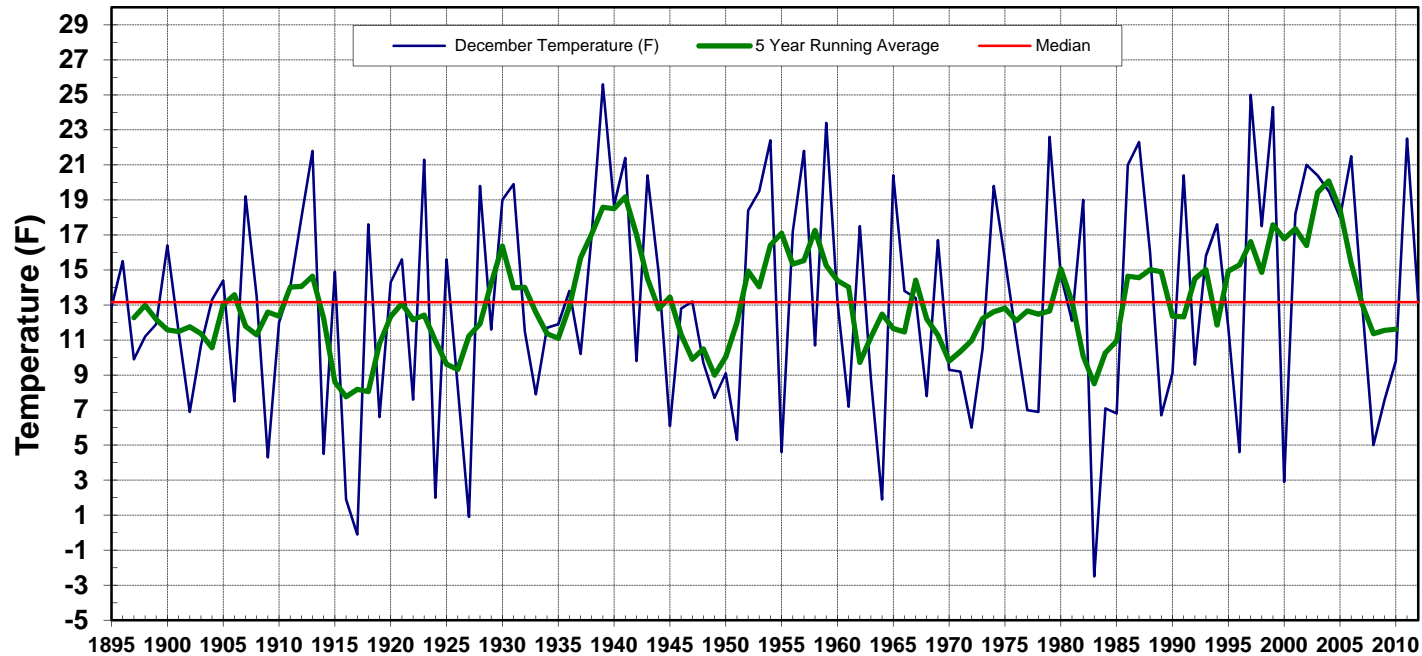
State Normal: 0.45" (1981-2010)

Monthly Ranking: 45th wettest in 119 years

Minimum: 0.06 inches in 1934

Years in Record: 119

Historical December Temperature for North Dakota



December Temperature Statistics

2012 Average: **13.2** °F

Maximum: 25.6 °F in 1939

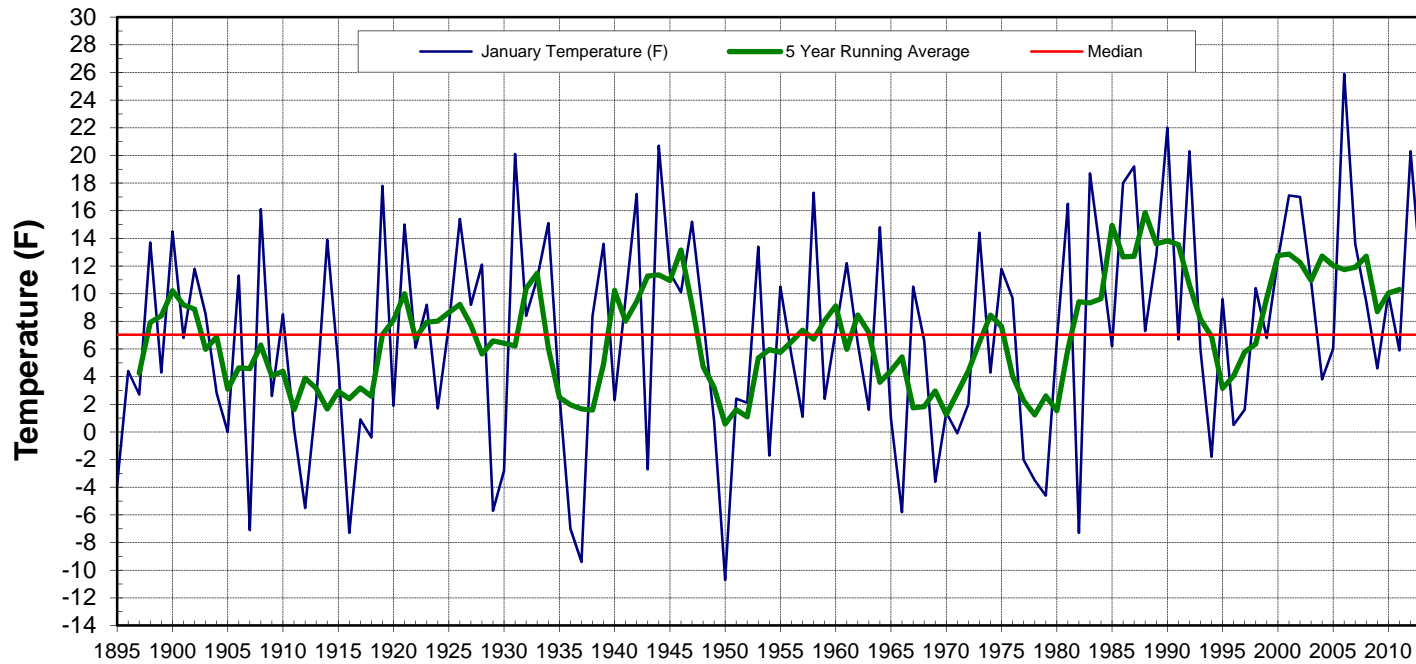
State Normal: 14.02 °F (1981-2010)

Monthly Ranking: 58th Warmest in 118 years

Minimum: -2.5 ° F in 1983

Years in Record: 118

Historical January Temperature for North Dakota

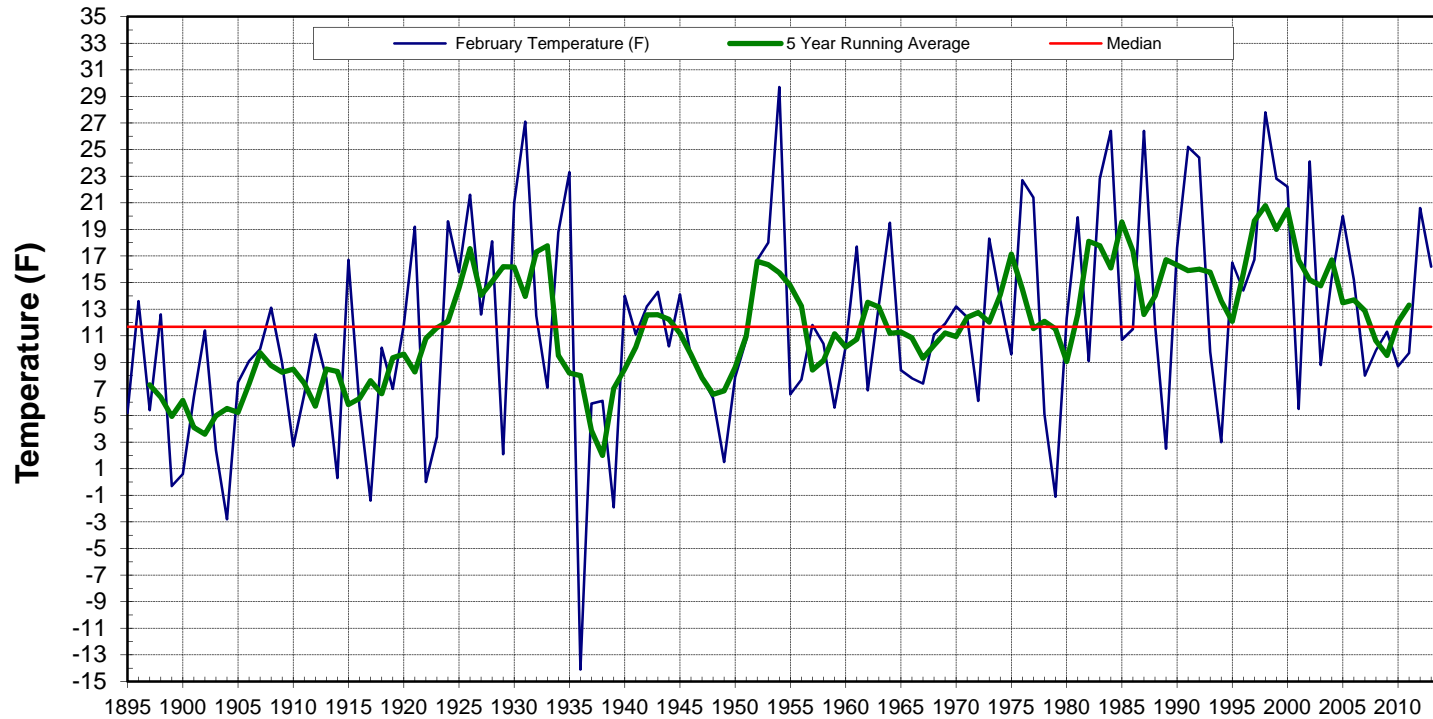


January Temperature Statistics

2013 Average: 10.7 °F
Maximum: 25.9 °F in 2006
State Normal: 10.53 °F (1981-2010)

Monthly Ranking: 40th Warmest in 119 years
Minimum: -10.7 °F in 1950
Years in Record: 119

Historical February Temperature for North Dakota



February Temperature Statistics

2013 Average: **16.2 °F**

Maximum: 29.7 °F in 1954

State Normal: 15.6 °F (1981-2010)

Monthly Ranking: 33rd warmest in 119 years

Minimum: -14.1 °F in 1936

Years in Record: 119



Storms & Record Events



State Tornado, Hail, and Wind Reports for Winter 2012-2013 by B. A. Mullins

North Dakota 3 Month Total	Wind	Hail	Tornado
	0	0	0

Reports by Month			
Month	Wind	Hail	Tornado
Total December	0	0	0
Total January	0	0	0
Total February	0	0	0

North Dakota Record Event Reports for Winter 2012-2013

Date	Location	Type of Record	Previous Record
01/28/13	Fargo	0.53 inches of precipitation	0.29 inches in 1996
02/06/13	Grand Forks Airport	0.11 inches of precipitation	Ties 2010
02/10/13	Grand Forks NWS	4.8 inches of snowfall	3.1 inches in 1995
02/10/13	Fargo	0.89 inches of precipitation	0.34 inches in 2009
02/10/13	Fargo	9.3 inches of snowfall	3.1 inches in 1953



Seasonal Outlook



Spring 2013 Climate Outlooks by D. Ritchison¹

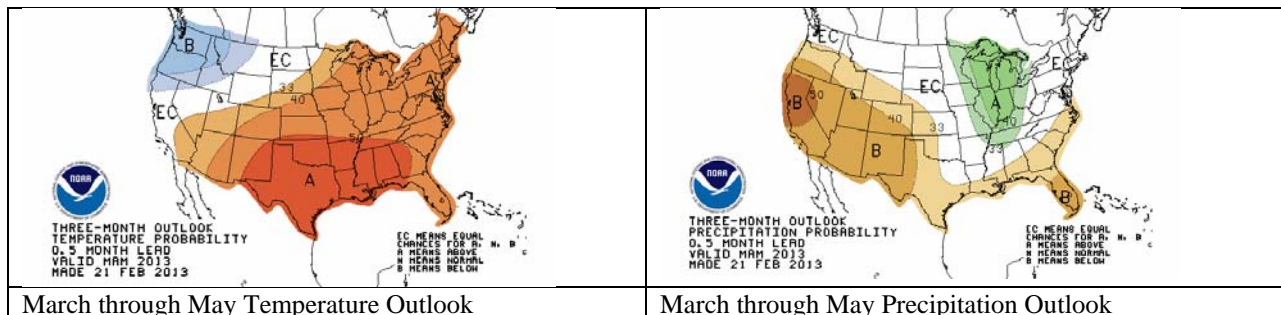
There is an old saying that droughts do not start or end in the winter. There is some truth to that, especially in this region. The main reason is winter precipitation averages only around two inches (liquid equivalency) in North Dakota, which is nothing more than a good summer thunderstorm. Granted, many parts of the state recorded above average precipitation during the past three months and some noticeable river flooding will likely be occurring in April. Yet, there are several examples of spring flooding during dry stretches, where the ongoing drought continued. Spring and early summer rains will still be the principal factors in determining if the drought from 2012 will continue for another growing season.

March is likely to finish below average for temperatures and above average for precipitation in much of the state with the possible exception of the southwestern part of North Dakota. April also looks to be cooler than average as the March weather pattern lingers through at least the first half of that month. Precipitation in April is expected to be generally above average.

Other years in the past that have had similar weather patterns to what has occurred so far in 2013 have tended to turn a bit drier and warmer in May. But even a change in the pattern in that time frame would probably leave the spring season slightly below average for temperatures and above average for precipitation when averaged for the entire three-month period.

The latest spring 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 but have cool and wet areas near by which would match my thoughts. You can find their current and future outlooks at <http://www.cpc.ncep.noaa.gov/products/predictions/90day>.

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



The readers will also find the following National Weather Service office web sites very useful for shorter term weather forecasts:

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

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



Hydro-Talk



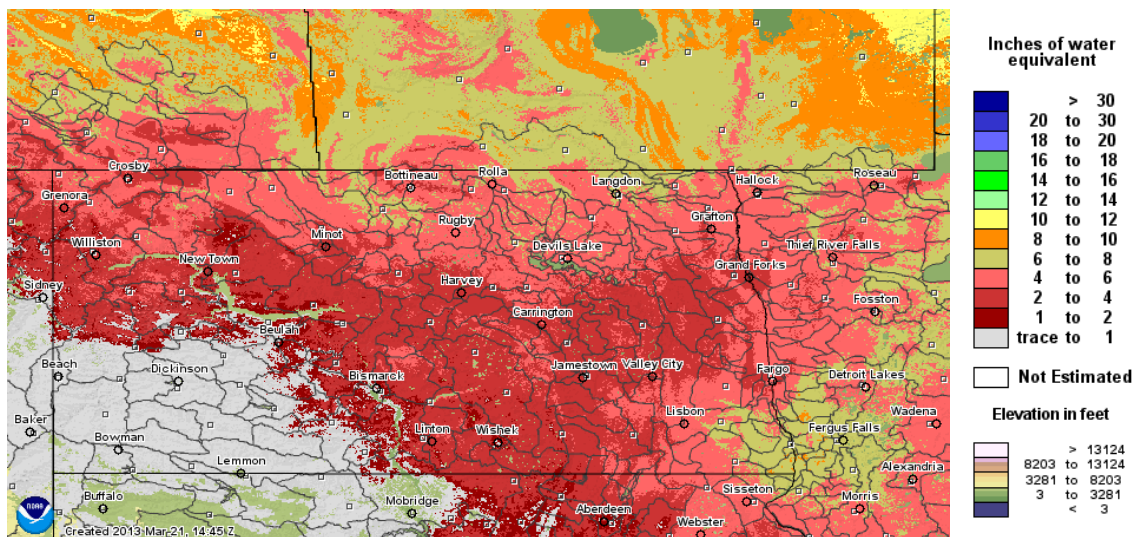
Spring 2013 Hydrologic Outlook

by A. Schlag²

Well, as the spring rains and snowmelt season is rapidly approaching, let's talk a little about the flood risks around the state.

Barring any extraordinarily heavy spring rains, the highest risk of flooding on rivers exists along the Red River Basin, and the rural areas along the Souris River. Devils Lake has a greater than 25% probability of rebounding back to its 2011 record high of 1454.3 above the Mean Sea Level (MSL) and roughly a 10% chance of reaching 1455.0 MSL.

The rest of the state as shown below has a Snow-Water Equivalent (SWE) roughly described as nearly non-existent south and west of the Missouri River to a fairly normal to slightly above normal snowpack north and east of the Missouri all the way out into the James River Basin and the Turtle Mountains.



Given the current amount of SWE on the ground, soil moisture content, frost depth, and the fairly rapid increase in SWE over the past few weeks; not only is there significant flood risk along the main-stems of the Souris and Red Rivers, but the potential for significant overland flooding exists in both those watersheds and the James River basin.

The below Table 1 shows the current, or conditional (CS) risk of flooding along with the model's representation of the historical (HS) risk of flooding for the Souris, Missouri, and James River basins.

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

TABLE 1 PROBABILITIES FOR MINOR, MODERATE AND MAJOR FLOODING IN WESTERN ND
VALID PERIOD: 3/25/2013 - 6/23/2013

LOCATION	: CURRENT AND HISTORICAL								
	: CHANCES OF EXCEEDING FLOOD								
	: CATEGORY IN PERCENT (%)								
	CATEGORICAL			MINOR		MODERATE		MAJOR	
	FLOOD STAGES (FT)			CS HS		CS HS		CS HS	
	MINOR	MOD	MAJOR	CS	HS	CS	HS	CS	HS
DES LACS RIVER.....									
FOXHOLM	16.0	18.0	19.0	19	<5	13	<5	11	<5
SOURIS RIVER.....									
SHERWOOD	18.0	20.0	25.0	9	<5	<5	<5	<5	<5
SOURIS NR FOXHOLM	10.0	13.0	15.0	>95	49	27	36	<5	<5
MINOT 4NW	14.0	17.0	22.0	27	16	14	<5	<5	<5
MINOT	1549.0	1551.0	1555.0	13	<5	8	<5	<5	<5
LOGAN	34.0	36.0	38.0	75	21	14	6	<5	<5
SAWYER	22.0	24.0	26.0	70	19	27	11	6	<5
VELVA	1505.0	1510.0	1515.0	65	14	<5	<5	<5	<5
WINTERING RIVER.....									
KARLSRUHE	7.0	9.0	10.0	49	8	<5	<5	<5	<5
SOURIS RIVER.....									
TOWNER	52.0	54.0	56.0	>95	62	>95	44	23	8
BANTRY	11.0	12.0	14.0	>95	62	>95	49	18	<5
WILLOW CREEK.....									
WILLOW CITY	10.0	14.0	16.0	>95	37	70	13	19	<5
SOURIS RIVER.....									
WESTHOPE	10.0	14.0	16.0	>95	50	80	21	60	16
LITTLE MUDDY CREEK.....									
WILLISTON	10.0	12.0	14.0	22	63	<5	28	<5	10
LITTLE MISSOURI RIVER.....									
MARMARTH	18.0	23.0	30.0	<5	5	<5	<5	<5	<5
MEDORA	15.0	18.0	20.0	<5	7	<5	6	<5	5
WATFORD CITY	20.0	24.0	30.0	<5	<5	<5	<5	<5	<5
KNIFE RIVER.....									
MANNING	15.0	17.0	20.0	<5	18	<5	<5	<5	<5
SPRING CREEK.....									
ZAP	14.0	18.0	20.0	5	22	<5	7	<5	<5
KNIFE RIVER.....									
HAZEN	21.0	24.0	25.0	5	25	<5	11	<5	8
HEART RIVER.....									
MANDAN	17.0	23.0	28.0	<5	6	<5	<5	<5	<5
APPLE CREEK.....									
MENOKEN	15.0	16.0	17.0	32	55	18	47	5	25
CANNONBALL RIVER.....									
REGENT	22.0	24.0	26.0	<5	<5	<5	<5	<5	<5
CEDAR CREEK.....									
RALEIGH	12.0	14.0	16.0	<5	<5	<5	<5	<5	<5
CANNONBALL RIVER.....									
BREIEN	10.0	20.0	23.0	20	38	<5	<5	<5	<5
BEAVER CREEK.....									
LINTON	9.0	11.0	13.0	34	38	27	29	14	24
JAMES RIVER.....									
GRACE CITY	12.0	14.0	15.0	<5	10	<5	6	<5	5
PIPESTEM CREEK.....									
PINGREE	9.0	11.0	13.0	7	12	<5	6	<5	<5
JAMES RIVER.....									
LAMOURE	14.0	16.0	18.0	<5	9	<5	5	<5	<5

The Red River Valley has had a recent history of significant spring flood seasons and this year is shaping up to be no exception. Table 2 below presents the same information as the Table 1 for the Red River and its tributaries.

TABLE 2--PROBABILITIES FOR MINOR...MODERATE AND MAJOR FLOODING IN EASTERN ND
VALID PERIOD: 3/25/2013 - 6/23/2013

LOCATION	CATEGORICAL FLOOD STAGES (FT)			: CURRENT AND HISTORICAL CHANCES OF EXCEEDING FLOOD CATEGORIES AS A PERCENTAGE (%)					
	MINOR	MOD	MAJOR	: MINOR		MODERATE		MAJOR	
				CS	HS	CS	HS	CS	HS
RED RIVER OF THE NORTH.....									
WAHPETON	10.0	12.0	14.0	>95	54	>95	30	>95	12
HICKSON	30.0	34.0	38.0	>95	16	>95	8	25	<5
FARGO	18.0	25.0	30.0	>95	72	>95	32	>95	19
HALSTAD	26.0	32.0	37.5	>95	32	91	14	53	6
GRAND FORKS	28.0	40.0	46.0	>95	54	>95	32	50	9
OSLO	26.0	30.0	36.0	>95	62	>95	50	80	17
DRAYTON	32.0	38.0	42.0	>95	41	>95	30	41	11
PEMBINA	39.0	44.0	49.0	>95	46	>95	40	>95	19
NORTH DAKOTA TRIBUTARIES.....									
ABERCROMBIE	10.0	12.0	18.0	>95	45	>95	35	>95	16
VALLEY CITY	15.0	16.0	17.0	19	14	17	8	14	6
LISBON	15.0	17.0	19.0	38	8	24	<5	16	<5
KINDRED	16.0	19.0	20.5	91	21	54	9	28	<5
WEST FARGO DVRSN	18.0	20.0	21.0	>95	25	71	16	51	9
HARWOOD	884.0	886.0	891.0	90	21	77	17	28	8
ENDERLIN	9.5	12.0	14.0	58	21	8	8	<5	<5
MAPLETON	905.0	908.0	910.0	93	32	35	11	<5	<5
HILLSBORO	10.0	13.0	16.0	35	14	28	8	11	<5
MINTO	6.0	8.0	11.0	>95	30	77	11	<5	<5
GRAFTON	12.0	13.5	14.5	>95	19	80	<5	48	<5
WALHALLA	11.0	16.0	18.0	>95	17	6	<5	<5	<5
NECHE	18.0	19.0	20.5	>95	24	>95	21	>95	12

LEGEND:

- CS = CONDITIONAL SIMULATION (OUTLOOK FOR CURRENT CONDITIONS)
- HS = HISTORICAL SIMULATION (OUTLOOK FOR NORMAL CONDITIONS)

Perhaps just as disconcerting for our rural areas, the ground under much of the heavy snowpack remains well frozen and can inhibit infiltration. Frozen ground under the snow when combined with spring rains that enhance melting of the snow tends to produce a much greater runoff volume than the melting of a snowpack with the same SWE.

This suggests substantial overland flooding is all but assured given even all but the most gentle of melt seasons. The current 6-10 and 8-14 day CPC outlooks suggest a lack of good melting conditions through the end of March as they favor below normal precipitation and below normal to near normal temperatures. This is expected to transition into a near normal temperature with slightly above normal precipitation pattern for the month of April. Hence, no expectation of significant melt generation or flooding exists until sometime in April.



Science Bits

Photographing the Change

by Vern Whitten³

Being an aerial photographer for 30 years has been a compelling career. I learned so much about weather and its impact on our land, and the view from "The best seat in the house" is truly amazing. When there are climate influences happening, comparing photographs between months, or years, can be dramatic. We see our photos as being essential to land and water management, land developers, farmers, meteorologists, government officials, etc.

The following photos were taken of Creel Bay on Devils Lake. (Devils Lake is in the background). When I took the photo of this subdivision in 1995 (Figure 1), the water had been rising since the early 1990's. I had no idea what would happen over the next few years. The second view is taken 4 years later, in 1999, and shows dramatic change. Figure 2 shows just how the water "took over" the land.

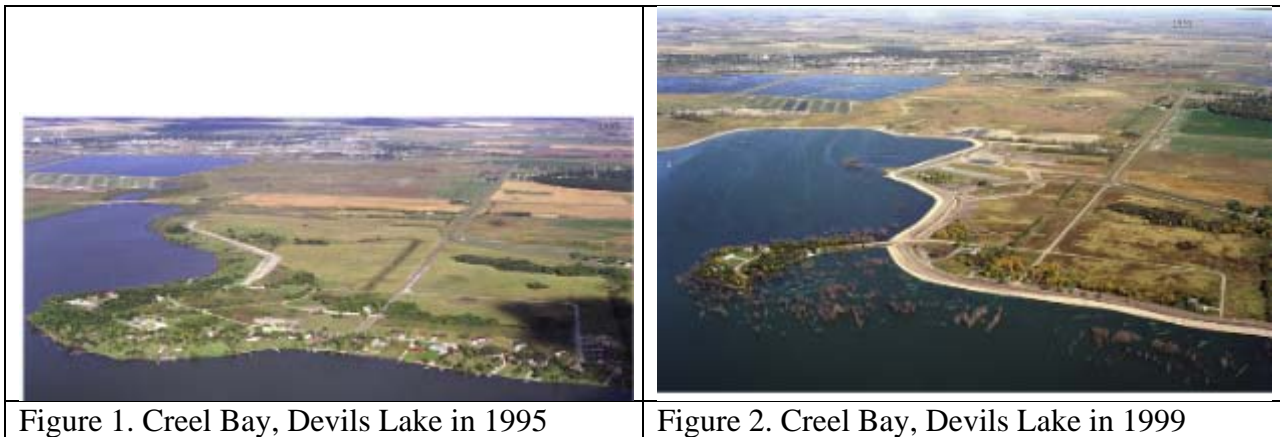


Figure 1. Creel Bay, Devils Lake in 1995

Figure 2. Creel Bay, Devils Lake in 1999

This is history, and I am privileged to have been able to share this with so many people.

In order to photograph change, I did not have to wait 4 years in some instances. For example, the record snowfall of over 100 inches during the winter of 1996 and 1997 precipitated incredible spring flooding in our Red River Valley. The following photos in figures 3 and 4 were taken looking north up I29 towards Fargo during the height of the flood.

³ The corresponding author: Vern Whitten is a professional Photographer at Vern Whitten Photography e-mail: whittenaerials@aol.com web site: www.vernwhittenphotography.com



Figure 3. Fargo, ND (4/17/1997)



Figure 4. Fargo, ND (8/25/1997)

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](#).

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

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