



# North Dakota Monthly Climate Summary

December 2016

Volume: 10, No: 12

## Precipitation

North Dakota  
State Climate  
Office

**NDSU** NORTH DAKOTA  
STATE UNIVERSITY

North Dakota State University

College of Agriculture, Food  
Systems, and Natural  
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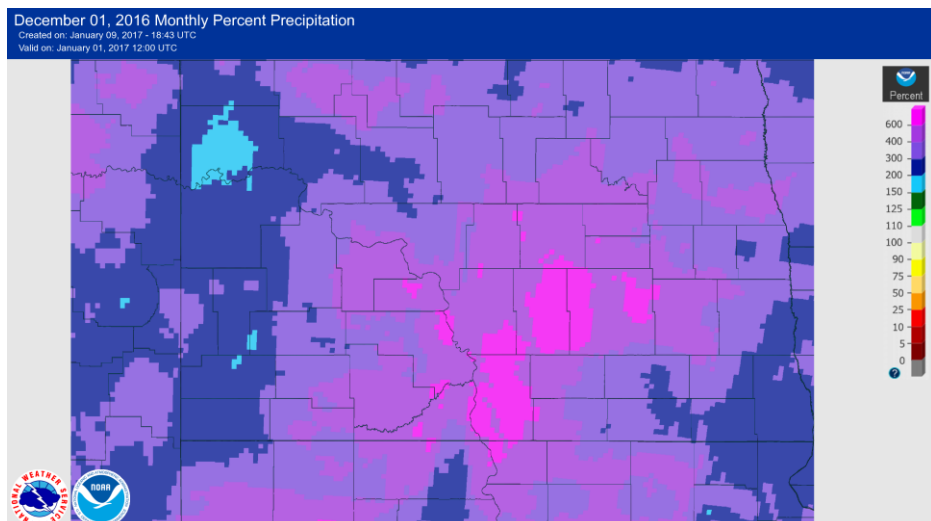
<http://www.ndsu.edu/ndSCO>

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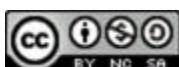
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Based on the National Centers for Environmental Information (NCEI), statewide total December precipitation was 1.23", 0.66" greater than the last year, and 0.75" greater than the 1981-2010 average, making it the 3rd wettest December in the 122-year period of record. It was the wettest December since 2010. Above-average precipitation was observed in most areas of North Dakota, particularly in central and south central parts of the state where 500% of normal was common (Figure 1). The greatest monthly accumulation was 3.85" recorded in Tolley, Renville County. The least amount of monthly precipitation accumulation was 0.19" recorded in Bowman, Bowman County. However, the greatest monthly snow accumulation was 43" recorded in Bottineau, Bottineau County. The greatest 24-hr precipitation was 3" that was recorded in Center, Oliver County on December 5. The highest 24-hr snowfall of 18" was recorded in both Underwood and Turtle Lake locations in McLean County on December 26. Based on historical records, statewide December precipitation showed a slight positive long-term trend of 0.06" per century since 1895. The highest and the lowest December precipitation for the state ranged from 1.27" in 2008 to 0.05" in 1944 (Figure 2).



**Figure 1. Precipitation Percent of Normal in December 2016 for North Dakota (NOAA)**



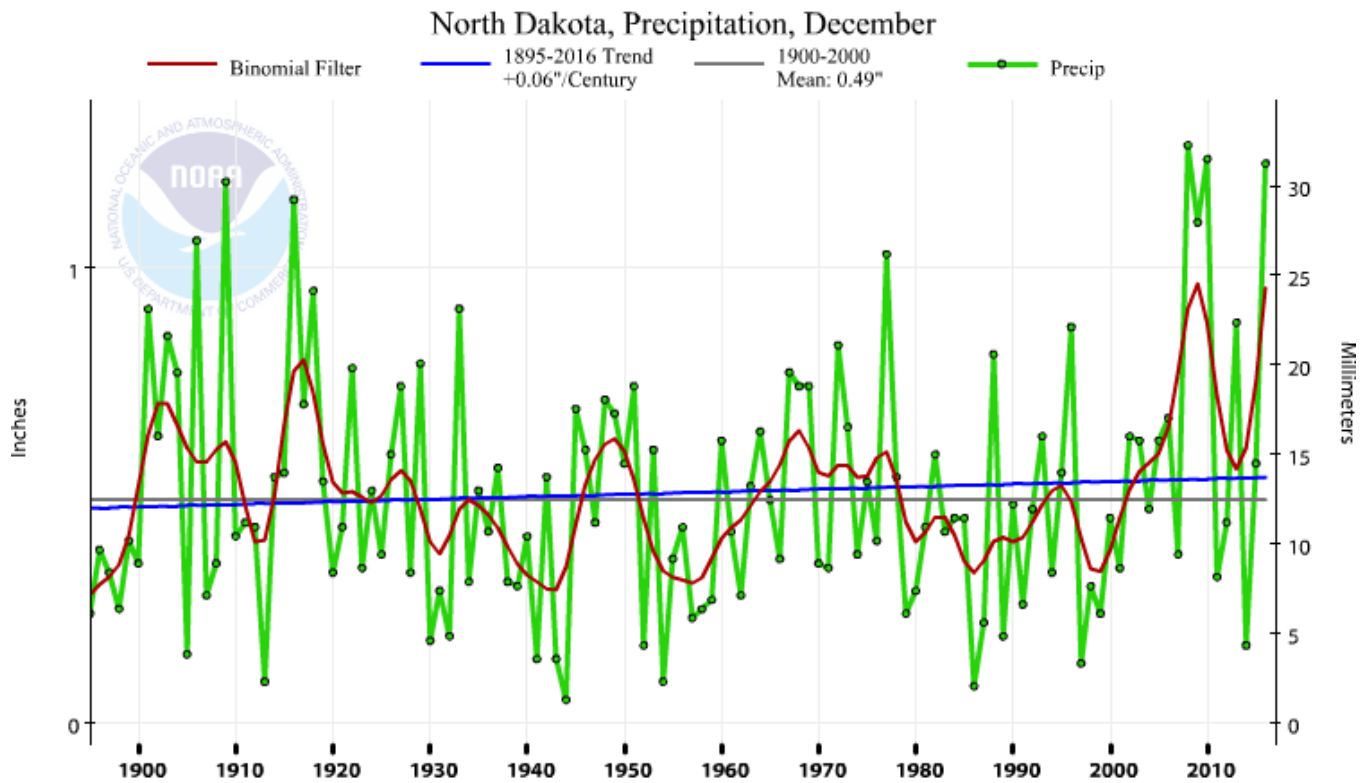
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### December Precipitation Statistics

Record High Value: 1.27 inches in 2008  
 Record Low Value: 0.05 inches in 1944  
 Trend: 0.06" per Century

December 2016 Value: 1.23 inches  
 1981-2010 Average: 0.52"  
 Monthly Ranking: 3rd Wettest  
 Record Length: 122 Years

Figure 2. Historical December Precipitation Time Series for North Dakota.



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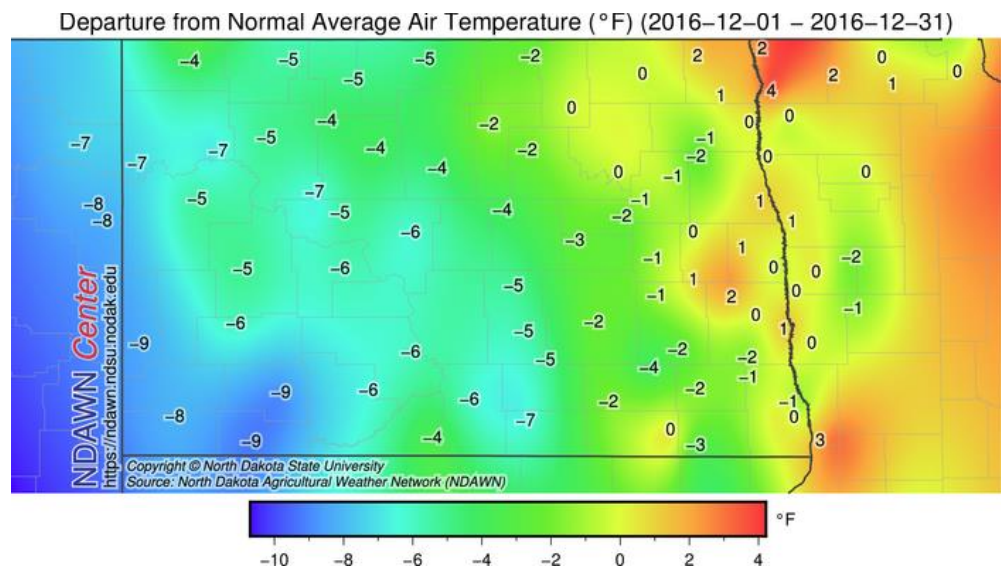
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## Temperature

The official state average December temperature was 10.3°F, 10.8° colder than the last year, and 3.7° colder than the 1981-2010 average, making it the 43rd coldest December in the 122-year period of record. Below-average temperatures were observed almost all across North Dakota except for the eastern parts of the state along the Red River Valley of the North.



*Figure 3. Temperature Departure from Normal in December 2016 for North Dakota (NDAWN).*

The coldest anomalies were observed in the southwestern regions (Fig. 3). The state's highest and lowest daily temperatures ranged from 46° on December 30 at Theodore Roosevelt Airport in Stark County to -17° on December 18 in Esmond, Benson County. Based on historical records, the state average December temperature showed an increasing trend of 0.23°F per decade since 1895. The highest and the lowest monthly state December average temperatures ranged from 39.2° in 2016 (this year) to 6.1° in 1896 (Figure 4).



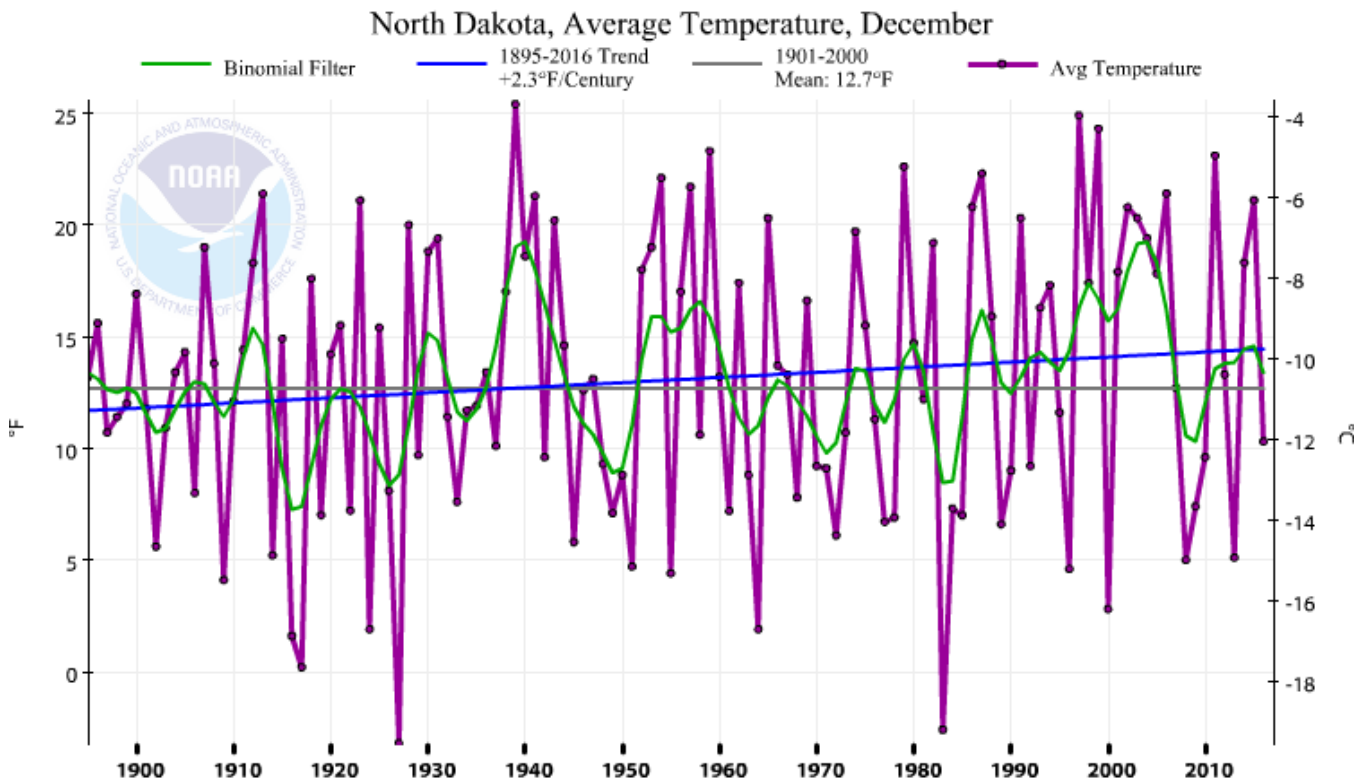
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**December Temperature Statistics**  
 Record High Value: 25.4°F in 1939  
 Record Low Value: -3.2°F in 1927  
 Trend: 0.23°F per Decade

December 2016 Value: 10.3°F  
 1981-2010 Average: 14.0°F  
 Monthly Ranking: 433rd Coldest  
 Record Length: 122 Years

Figure 4. Historical December Temperature Time Series for North Dakota.



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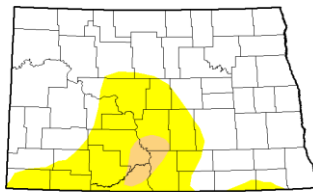
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## Notable Impacts

### U.S. Drought Monitor North Dakota



November 29, 2016  
(Released Thursday, Dec. 1, 2016)  
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0	D1	D2	D3	D4
Current	73.40	26.60	2.79	0.00	0.00	0.00
Last Week	73.40	26.60	2.79	0.00	0.00	0.00
3 Months Ago	88.25	10.74	1.78	0.29	0.00	0.00
Start of Calendar Year	81.32	30.68	5.47	0.00	0.00	0.00
Start of Water Year	86.70	3.30	0.41	0.00	0.00	0.00
One Year Ago	57.11	42.89	0.27	0.00	0.00	0.00

**Intensity:**  
 D0 Abnormally Dry  
 D1 Moderate Drought  
 D2 Severe Drought  
 D3 Extreme Drought  
 D4 Exceptional Drought

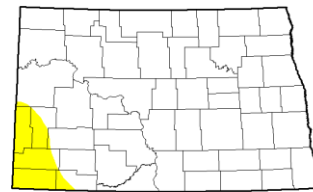
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:  
Richard Higgins  
NCIS/NOAA



<http://droughtmonitor.unl.edu/>

### U.S. Drought Monitor North Dakota



December 27, 2016  
(Released Thursday, Dec. 29, 2016)  
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0	D1	D2	D3	D4
Current	93.87	6.13	0.00	0.00	0.00	0.00
Last Week	87.75	12.25	1.36	0.00	0.00	0.00
3 Months Ago	88.25	3.30	0.41	0.00	0.00	0.00
Start of Calendar Year	81.32	30.68	5.47	0.00	0.00	0.00
Start of Water Year	86.70	3.30	0.41	0.00	0.00	0.00
One Year Ago	57.11	42.89	0.27	0.00	0.00	0.00

**Intensity:**  
 D0 Abnormally Dry  
 D1 Moderate Drought  
 D2 Severe Drought  
 D3 Extreme Drought  
 D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:  
Brad Poffey  
U.S. Department of Agriculture



<http://droughtmonitor.unl.edu/>

Figure 5. Drought Monitor map Comparison for North Dakota in the Beginning (on the left) and at the end (on the right) of December 2016.

**Drought Monitor:** Based on the Drought Monitor (DM) the drought conditions diminished in central ND, especially along the Missouri River corridor south of Bismarck (Figure 5). By the end of the month, less than 10% of the state was designated as “Abnormally Dry” based on the DM for December 27, 2016. Figure 6 below shows the statewide drought coverage in % and intensity (i.e. D1, D2, etc...) in time scale representing the state from the beginning to the end of the month with one-week resolution.

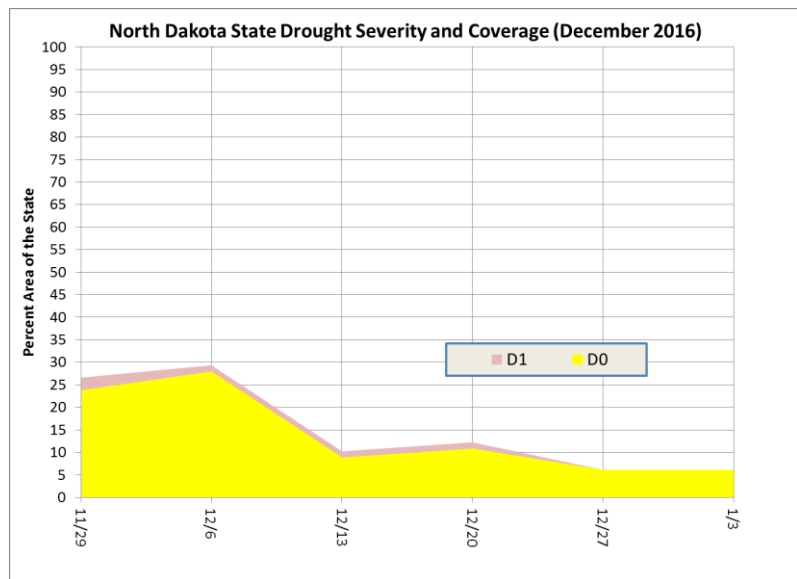


Figure 6. North Dakota State Drought Severity and Coverage Graph for December 2016.

**Storm Reports:** NDAWN’s highest peak gust in December was 57 mph recorded at the Watford City weather station on December 21, 2016. Linton also reported similar wind speeds on the same day. Bottineau in Bottineau County received a total of 43” of snow in December (an all-time monthly record). Turtle Lake in McLean County, Esmond in Benson County, Lansford in Bottineau County, Streeter in Stutsman County, and



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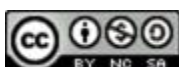
Lake Metigoshe in Bottineau County received in excess of 30" in December which is also the all-time highest December snowfall on record for all of the locations. Three blizzard warnings were issued by the National Weather Service (NWS) in Bismarck; on December 5, 7 and 25. Also, three blizzard warnings were issued by the NWS in Eastern North Dakota; on December 6, 7 and 25.

**Daily Record Event in December:** Across the observation network of weather stations with at least 30 years of history, a total of 66 temperature and precipitation related records were set or tied, and 43 daily highest snowfall records were set or tied. Details of the records are in the following table.

<i>Category</i>	<i>December</i>
<i>Highest Daily Max Temp.</i>	0
<i>Highest Daily Min Temp.</i>	7
<i>Lowest Daily Max Temp.</i>	13
<i>Lowest Daily Min Temp.</i>	14
<i>Highest Daily Precipitation</i>	32
<i>Highest Daily Snowfall</i>	43
<i>Total</i>	<b>109</b>

**Agricultural Impact:** Heavy snowfall and blizzard conditions across the state on December 5, 6, 7 and 25 across the state made access to feed and facilities difficult for many North Dakota livestock producers. Red River stage levels at Fargo location measured 99 percentile before freeze up in December. Combined with the heavy snowfall and snowpack throughout the Red River Valley, spring planting may be negatively impacted for farmlands along the Red River Valley of the North.

*Acknowledgment: Many thanks to Loretta Herbel (NDAES) for her diligent editorial corrections.*



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