North Dakota Climate Bulletin

Autumn 2024 **Volume 18, No. 4**

In this Issue:

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From the office of the State Climatologist

The North Dakota Climate Bulletin is a quarterly publication of North Dakota's weather and climate from the North Dakota State Climate Office in the School of Natural Resource Sciences at North Dakota State University in Fargo, North Dakota.

Autumn (September – November) 2024 was hot and dry for much of the state. Above average temperatures lingered long into autumn until a late November cold snap. The average temperature for the three-month period was 47.3°F and ranks as the 6th warmest fall on record (130 years). With the exception of the Northeast corner of the state, a majority of area in North Dakota had a severe lack of precipitation. Only 14 stations in ND recorded above average precipitation during the autumn season, prompting intense drought conditions.

Weather created disastrous environmental conditions throughout the year that were inducive to wildfires. In early October, persistent high winds over 60 mph spread multiple fires out of control across McKenzie County, prompting a large response by fire departments.

Figure 1: Aurora Borealis (Northern Lights) captured by the camera at the Turtle Lake NDAWN Station on October 7th 2024

Detailed monthly summaries can be found at www.ndsu.edu/ndsco

Cassidy Holth, Assistant to the North Dakota State Climatologist.

**Only North Dakota stations used for NDAWN data. All MN and MT stations omitted.*

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Seasonal Summary

Precipitation

Statewide Autumn (September 1-November 30) precipitation averaged 0.82 inches, a half inch below normal average precipitation of 1.36 inches for the season. The Northeast corner of ND endured a very wet September, over 3 inches above average at the Langdon NDAWN station. This inconvenienced harvest slightly but ultimately the warm, dry weather assisted in drying out the top layer of soil. The rest of the state however did not fare as well. Some places in Southwestern ND never saw more than an inch of rain from September-November. Similarly, Southeastern ND where it is typically wetter, had only 30-40% of normal precipitation.

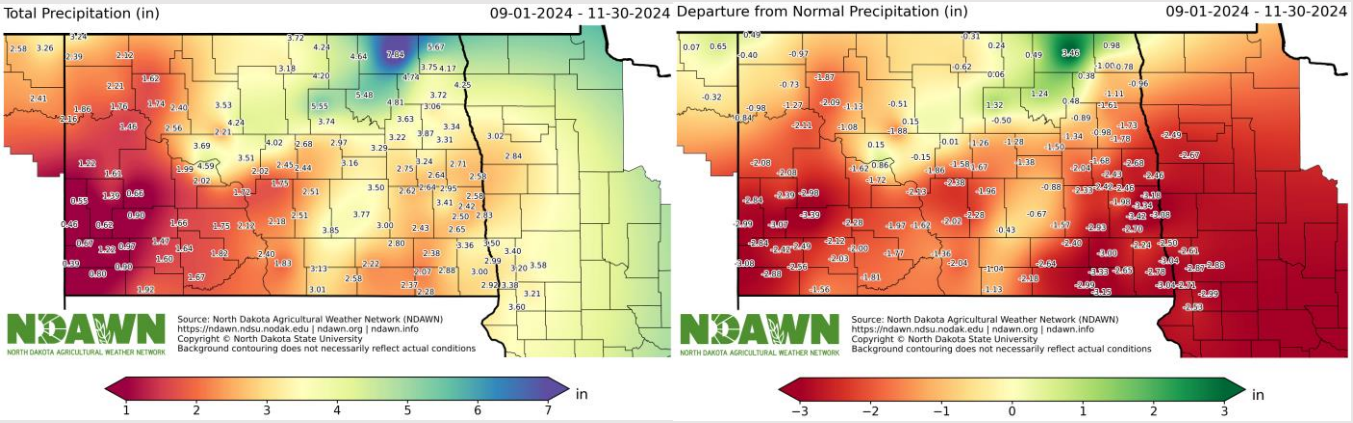

Figure 2: Total precipitation (left) and departure from normal (right) recorded by NDAWN stations between 9/1/2024-11/30/2024

A historically hot and dry September pushed Western ND into a category 3, Extreme Drought. 19% of North Dakota experienced that level of drought, which peaked and persisted through most of November. Southeastern ND slowly joined the drought ranks through autumn as the ground continued to dry and precipitation relief was nowhere to be found. It its peak in mid-November, the Southeast entered severe drought, and 78% of ND was in some sort of drought. This has dipped slightly since a large stratiform precipitation event in November.

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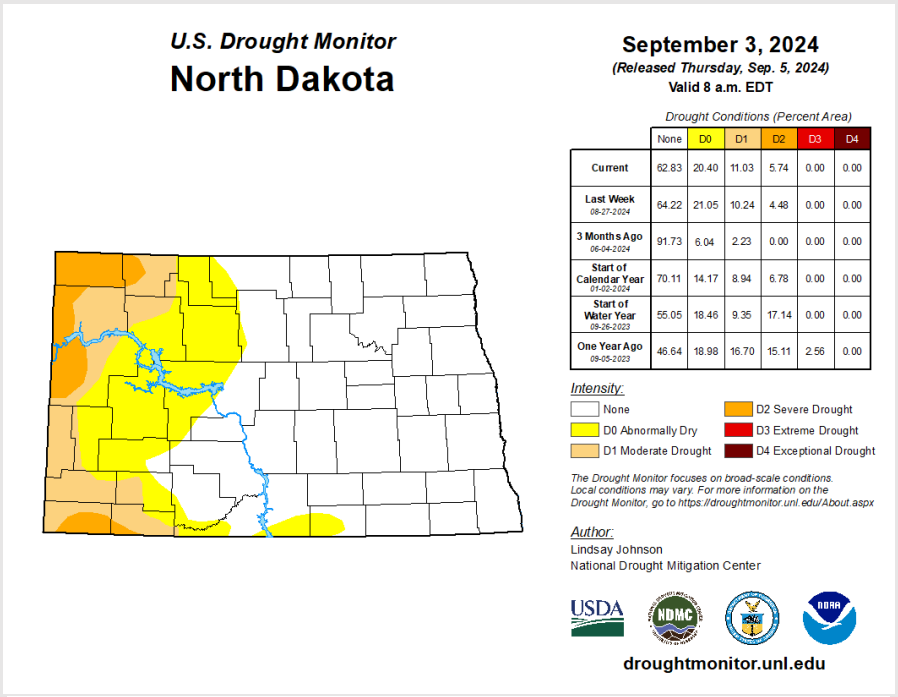

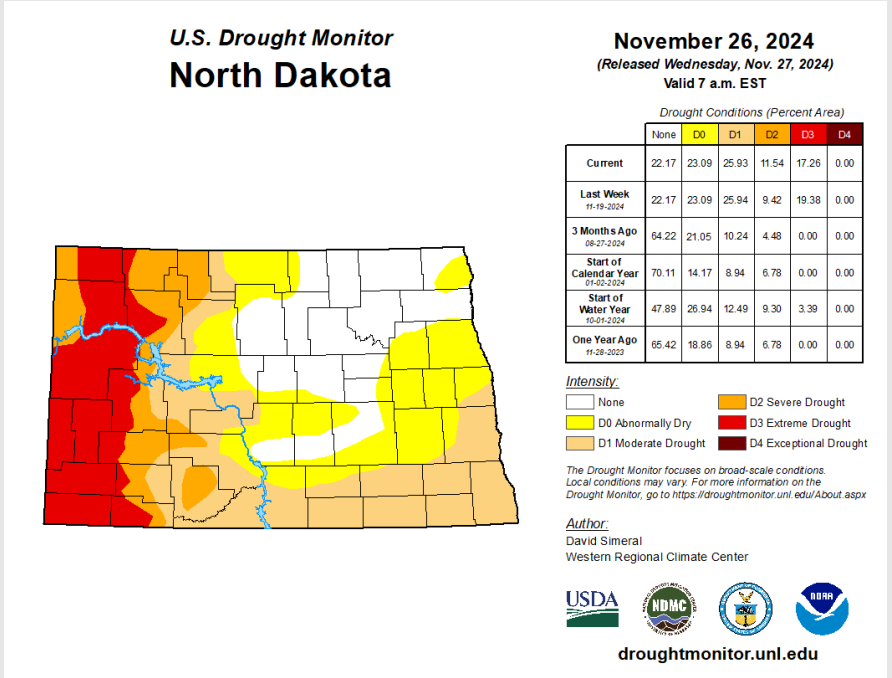

Figure 3: U.S. Drought Monitor conditions on 9/3/2024 (Top) and 11/26/2024 (Bottom) percentage of area under drought increased significantly due to persistent heat and little rain

**Only North Dakota stations used for NDAWN data. All MN and MT stations omitted.*

Historically, autumn precipitation varies greatly year to year, as fall weather can be very cold or very warm, determining what type of precipitation will fall. Rain equates to more precipitation than snow, so snowy years typically have less precipitation. In 2024 however, above average temperatures did not bring rain, and North Dakota had a record-breaking driest fall with an average statewide precipitation of 0.82 inches (NDAWN). It was the second time in history that North Dakota received less than an inch on average throughout the three month span, the first in 1976 with 0.99 inches.

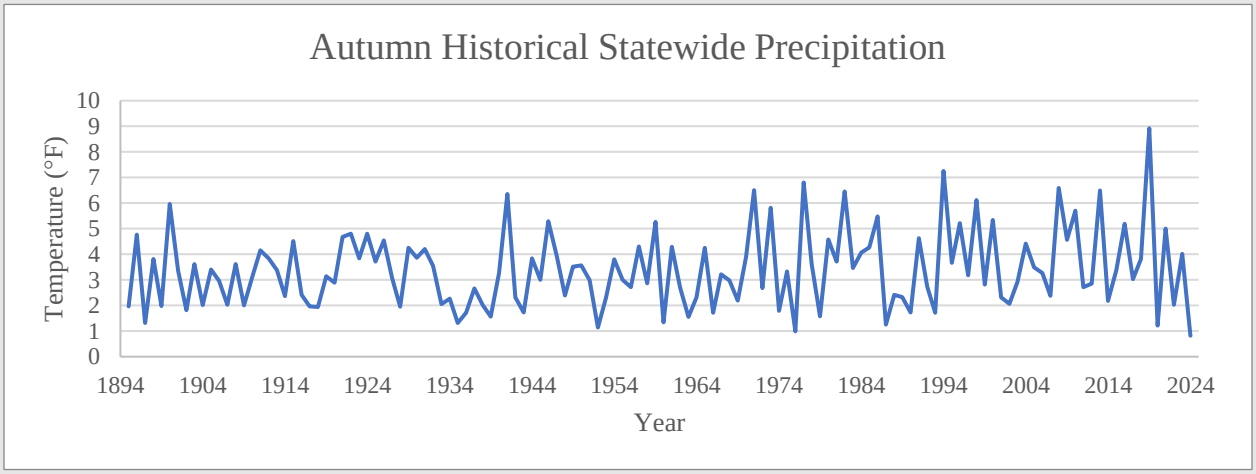

Figure 4: Historical average autumn precipitation for North Dakota. Climate data from 1895-2024 (NCEI)

North Dakota Autumn Precipitation Summary

	Precipitation	Normal	Anomaly	Rank	Wettest/Driest Since	Record Year
Autumn 2024 ***September-November***	0.82”	1.36”	-0.54”	130th Wettest	Wettest since 2023	2019
				1st Driest	Driest	2024

Table 1: Ranking from NCEI NOAA based on data for the Autumn season September-November 1895-2024. Precipitation amounts averaged from records at NDAWN stations in North Dakota

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Temperature

The average temperature across North Dakota for the three-month period was 4°F warmer than the normal average temperature (NDAWN, Figure 5). All three months of the fall were well above average until it abruptly cooled down in late November, Western ND cooled off slightly more than Eastern ND. The statewide average temperature was 47.3°F and ranks as the 6th warmest autumn on record (130 years). The average maximum temperature was 5.4°F above average, and ranks as the 3rd warmest on record.

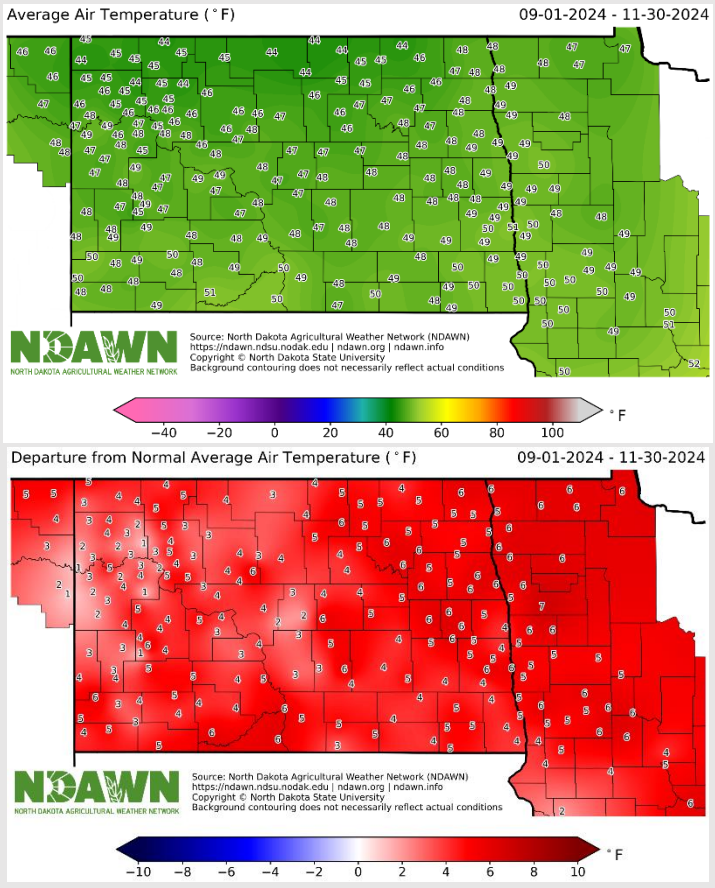

Figure 5: Average temperature (Top) and departure from normal average temperature (Bottom) across North Dakota NDAWN Stations from 9/1/2024-11/30/2024 (NDAWN)

**Only North Dakota stations used for NDAWN data. All MN and MT stations omitted.*

The statewide minimum and maximum temperatures were both above normal by a few degrees. The statewide maximum temperature across ND was 60.0°F, the 3rd warmest on record. Minimum temperatures were 3°F warmer than normal, at 34.6°F it ranks as the 7th warmest on record. Despite the above average temperatures, the minimum temperature recorded during the autumn months was -22°F at the Epping NDAWN station in Williams County. This occurred late into November and Western ND saw widespread below zero temperatures. The maximum temperature occurred in September, 102°F at the Hettinger NDAWN Station in Adams County. 124°F temperature swing in just three month demonstrates the variability of the weather in the Northern Plains, especially with a lack of moisture.

North Dakota Autumn Temperature Summary

Autumn 2024 September-November	Average T	Avg max T	Avg min T	Maximum	Minimum
	47.32°F	60.02°F	34.61°F	102°F	-22°F
Anomaly	+4.19°F	+5.35°F	+3.04°F		
Rank					
Warmest	6th Warmest	3rd Warmest	7th Warmest		
Coolest	125th Coolest	128th Coolest	124th Coolest		
Record					
Warmest	49.1°F (1963)	62.7°F (1963)	37.2°F (2016)	109°F (Larimore, September 8, 1906)	
Coolest	32.2°F (1896)	43.3°F (1896)	21.1°F (1896)		-39°F (Pembina, November 30, 1898)

Table 2: Autumn temperature summary for North Dakota. 2024 statistics from NDAWN station data. Ranking and records based on NCEI climate data (1895-2024) (NOAA)

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Storm Reports & Record Events

NWS Issued Warnings

Throughout September-November 2024, North Dakota had little severe weather with a quiet and dry weather pattern. There were a few exceptions in September, when a widespread severe thunderstorm tore through Central North Dakota overnight and into the early morning hours on the 16th, prompting several Severe Thunderstorm Warnings. Quarter sized hail was prominent with some reports up to 2.5 inches. This storm however brought much needed rain to parts of the West, as it was the last big rain event of 2024. Just a couple days later, multiple non-severe thunderstorms followed a similar path, and one produced a funnel that warranted a Tornado Warning on 9/18/2024.

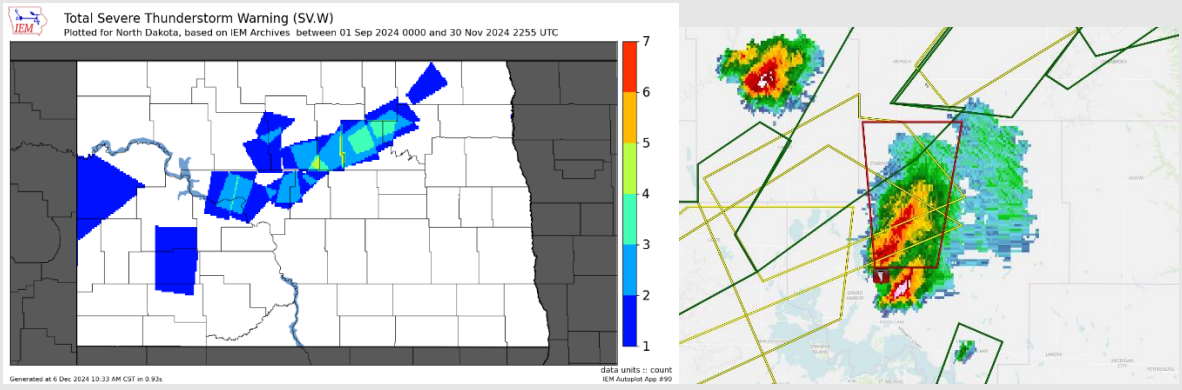

Figure 6: Severe Thunderstorm Warnings issued in North Dakota between 9/1/2024 – 11/30/2024 (Left) and one Tornado warning issued on September 18th 2024 (Right)

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Warm and dry weather created hazardous conditions when a strong front blew through Western North Dakota on October 4th. Wind gusts as high as 69 mph were recorded just 10 feet off the surface the following day. This unfortunately fueled multiple wildfires that burned thousands of acres and damaged property.

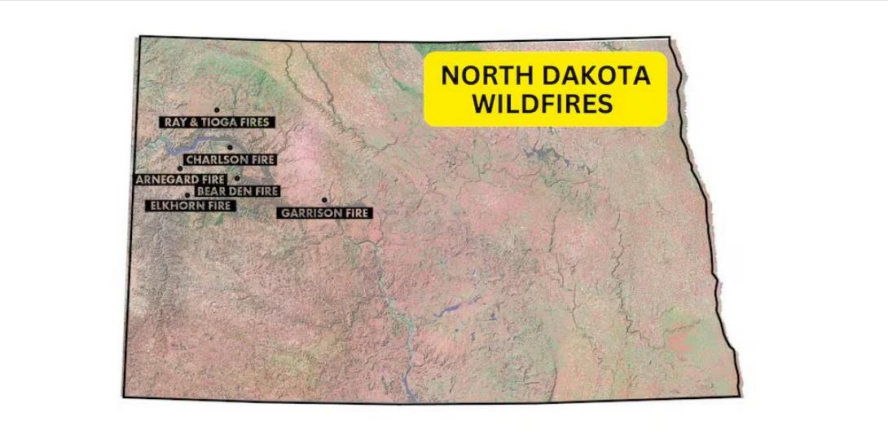

Figure 7: Map of the locations of wildfires that broke out on October 4-6th 2024

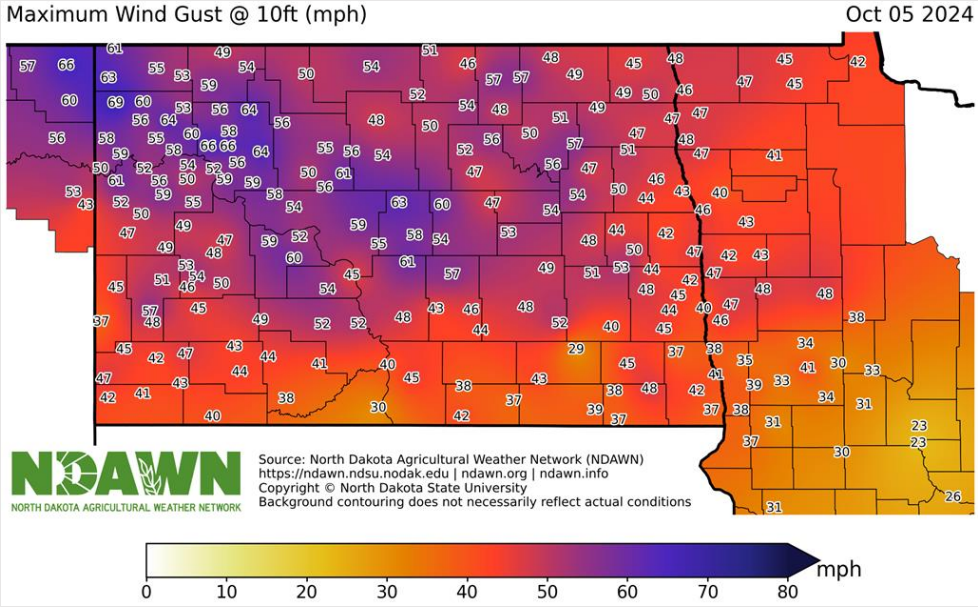

Figure 8: Maximum Wind Gusts recorded on October 5th at each NDAWN station that fueled wildfires

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In late November the weather began to take a colder turn. Snow began to fall around November 18th and made its way eastward, bringing frigid temperatures and strong winds along with it. Persistent poor conditions prompted a Blizzard Warning for North Central North Dakota from both the Bismarck and Grand Forks National Weather Service. A Winter Weather Advisory was issued for areas that did not meet blizzard criteria, and a Wind Advisory where snow did not fall in the Southwest/ South Central.

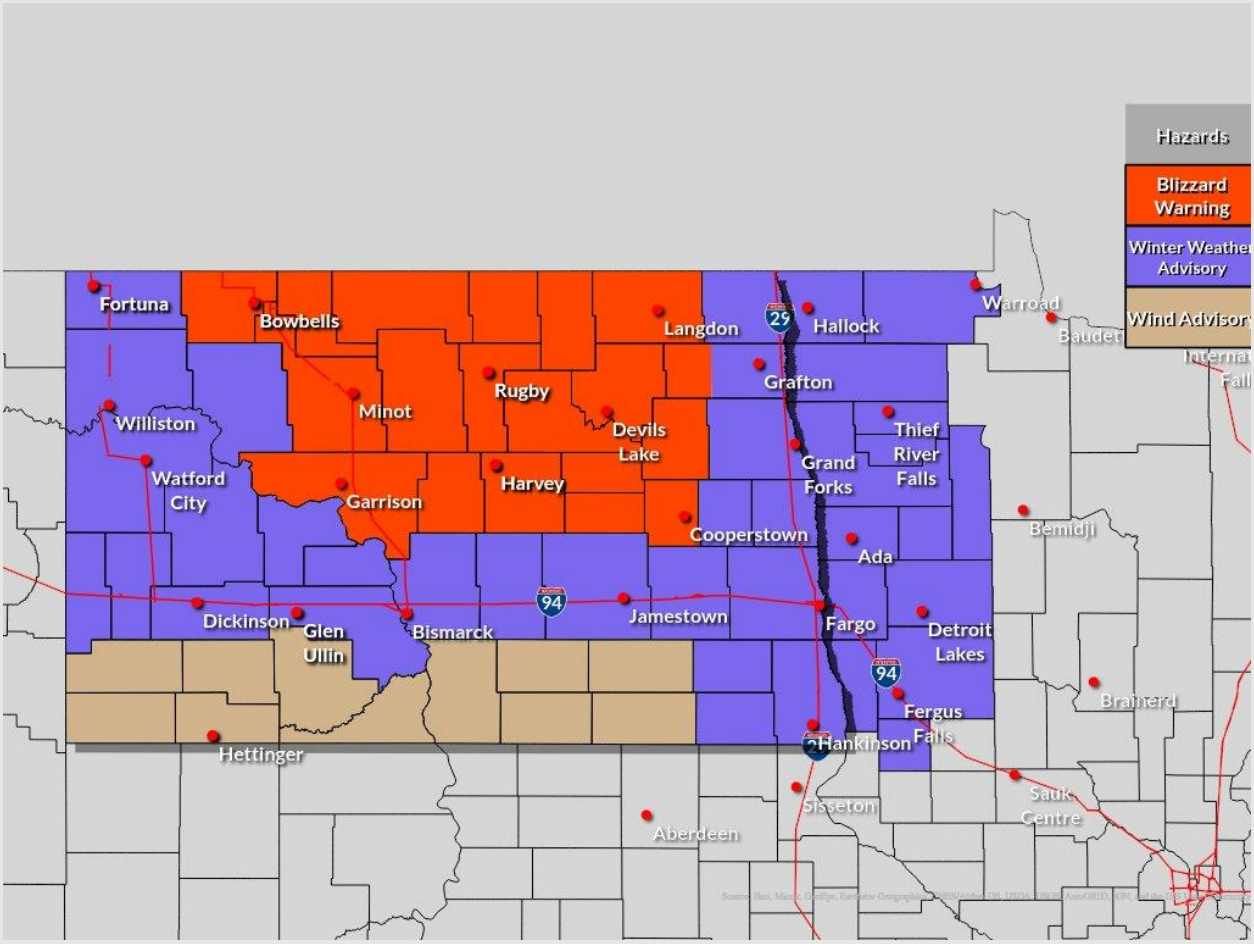

Figure 9: Warnings and Advisories issued on 11/19/2024 during a windy snow event. Rain preceded the snow in the Southeast

**Only North Dakota stations used for NDAWN data. All MN and MT stations omitted.*

Figure 10: Blizzard conditions at the Carrington NDAWN station on 11/20/2024

Figure 11: The first blanket of snow to end the above average temperatures at the Tobacco Garden NDAWN station on 11/16/2024

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Image/Data Sources

Climate at a Glance | National Centers for Environmental Information (NCEI)

Iowa Environmental Mesonet (IEM)

NDAWN Weather

SPC Storm Reports

NCEI Storm Events Database

NWS Grand Forks and Bismarck

U.S. Drought Monitor

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