NDAWN
NORTH DAKOTA AGRICULTURAL WEATHER NETWORK

MESONET MINUTE

SUMMER 2025

A rainbow rises above a sunflower field as seen by the station camera at Carson 9ENE.

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Updates From the Field

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It was a busy summer with twenty-one stations added to the North Dakota Agricultural Weather Network (NDAWN) and four sites upgraded with additional instrumentation.

Images 1 & 2: Photos of the NDAWN Crew – from L to R, Jonathan Rosencrans, Reece Wagner, Nick Antonoplos (in back), Julia Poblotzki, and "Skiddy" (Case skid steer generously provided by High Plains Equipment Devils Lake)

Twelve of the new stations were installed in North Dakota:

- Benedict 4SE, McLean County
- Columbus 12S, Burke County
- Halliday 4N, Dunn County
- Heaton 1S, Wells County
- Kintyre 3S, Emmons County
- Marshall 5N, Dunn County
- Neudorf 10SW, Logan County
- Shields 2N, Grant County
- St. Anthony 8SW, Morton County
- St. Gertrude 12S, Grant County
- Taylor 6NW, Stark County
- Woodworth 2NE, Stutsman County

The remaining nine new stations were installed in Minnesota, in cooperation with the Minnesota Department of Agriculture:

- Cologne 4SE, Carver County
- Eyota 1SE, Olmsted County
- Fairfax 5NE, Renville County
- Geneva 3W, Freeborn County
- Godahl 1N, Brown County
- Kenyon 2NE, Goodhue County
- Madison 5SW, Lac qui Parle County
- Pine Island 5SW, Dodge County
- Windom 4SE, Jackson County

Updates From the Field

Of the four stations upgraded, three stations are in North Dakota – Center 5S, Oliver County; Dry Fork 1SE, Williams County; and Tappen 3E, Kidder County – and one is in Montana – Dagmar 7WSW, Sheridan County.

All twenty-five stations from this summer feature all-season precipitation gauges; snow depth sensors; soil moisture and temperature probes at depths of 2”, 4”, 8”, 20”, and 40”; and deep soil temperatures with fourteen measurements at various depth increments to a depth of 7.5 feet. These sensors are in addition to the standard weather instruments that every NDAWN station has to record rainfall, temperature, humidity, wind speed & direction, and barometric pressure.

They also have high resolution cameras that upload photos continuously during daytime hours, with some operational overnight as well.

Image 3: A soil pit with the five soil moisture & temperature sensors

NDAWN now has a total of 245 fully-equipped weather stations – 181 in North Dakota, 58 in Minnesota, and 6 in Montana – and 12 rain-gauge only sites. Most excitingly, NDAWN has at least one station in every county in North Dakota. The 53rd and final county was Logan County, which was filled on August 27 with Neudorf 10SW.

McKenzie County has the most weather stations with thirteen. Eight counties have one station – Adams, Eddy, Foster, Griggs, Logan, Ransom, Renville, and Sioux. Per capita, Slope County takes the prize with five stations for 706 people (2020 Census) – 141 people per station.

Image 4: Looking south at the Neudorf 10SW NDAWN station

Summer Statistics

Select statistics for the period of June 1 – August 31 are presented below.

	Highest	Lowest
Maximum Temperature	104.5°F at Alexander 7SW (7/9/25)	49.7°F at Peace Garden (6/8/25)
Minimum Temperature	80.9°F at Hastings 4S (6/22/25)	30.0°F at Tioga 7NW (8/24/25)
Average Temperature	70.8°F at Waseca 1SW	62.6°F at Wales 1W
Departure from Average Temperature	+1.7°F at Fountain 3W	-3.1°F at Tioga 7NW
Total Precipitation	26.75" at Waseca 1SW (177% | +11.62" of normal)	4.47" at Buford 3SE (64% | -2.48" of normal)
Daily Precipitation	8.26" at Waseca 1SW (8/17/25)	0.57" at Skogmo 3N (8/7/25)
Peak Wind Gust at 10ft	98.8 mph at Galesburg 4SSW (6/21/25)	31.6 mph at Peace Garden (7/3/25)
Peak Wind Gust at 33ft	101.1 mph at Linton 5NW (6/20/25)	39.1 mph at Peace Garden (6/8/25)

Maximum and minimum temperatures are based on daily values. Average temperature, departure from average temperature, total precipitation, and average wind speed are based on the combined seasonal values. Peak wind gusts and daily precipitation are based on each station's daily maximum for the season. Maps of monthly, seasonal, and annual statistics can be found at ndawn.info/climate_statistics.html.

"Records Are Made to be Broken"

A new NDAWN record for highest daily precipitation was set at Waseca 1SW on August 17 with 8.26" of rain. The storm total for that event was a remarkable 9.83"! Wirch 7NW set the record for a North Dakotan NDAWN station with a daily rainfall total of 7.20" on August 5. Most of this rain fell within a three-hour period.

Top 10 Highest Daily Rainfall in NDAWN History

Rank	Station	Date	Rainfall (in.)
1	**Waseca 1SW**	**2025-08-17**	**8.26**
2	Little Falls 6SE	2020-06-29	7.51
3	Eldred 2W	2002-07-10	7.43
4	**Wirch 7NW**	**2025-08-05**	**7.20**
5	Harvey 3S	2020-06-30	6.27
6	Kempton 6SE	2020-06-30	5.69
7	Langdon 1E	1995-08-18	5.64
8	Britton 2E	2005-06-29	5.54
9	Niles 3SE	2020-06-30	5.45
10	Maddock 2N	2020-06-30	5.45

Disclaimer: While NDAWN now has over 200 stations, for the majority of NDAWN's history there have been fewer than 75 stations. Thus, not all stations have lengthy historical data. The oldest stations have data back to 1990.

Figure 1: The ten highest precipitation totals recorded at NDAWN with values set in the summer of 2025 bolded

Records Are Made to be Broken

NDAWN records for wind were obliterated by the June 20-21 derecho and subsequent mesoscale convective vortex. Severe thunderstorms brought high wind, with gusts reaching up to 101 mph, and large hail, with sizes around 3 inches in diameter reported around Jamestown and Marion. Numerous tornadoes were reported, with notable impacts in Enderlin, where a preliminary EF-3+ tornado tragically killed three people, and other areas like Spiritwood, New Salem, and Valley City, where tornadoes ranged from EF-2 to EF-3+ in intensity.

By definition, a derecho has a wind damage swath extending for more than 400 miles, wind gusts of at least 58 mph along most of its length, and several, well-separated 75 mph or greater gusts, according to the National Oceanic and Atmospheric Administration (NOAA). This long-lived straight-line wind event started in the late afternoon of June 20 at the Montana-North Dakota border and continued across North Dakota, Minnesota, and into Wisconsin in the morning hours of June 21.

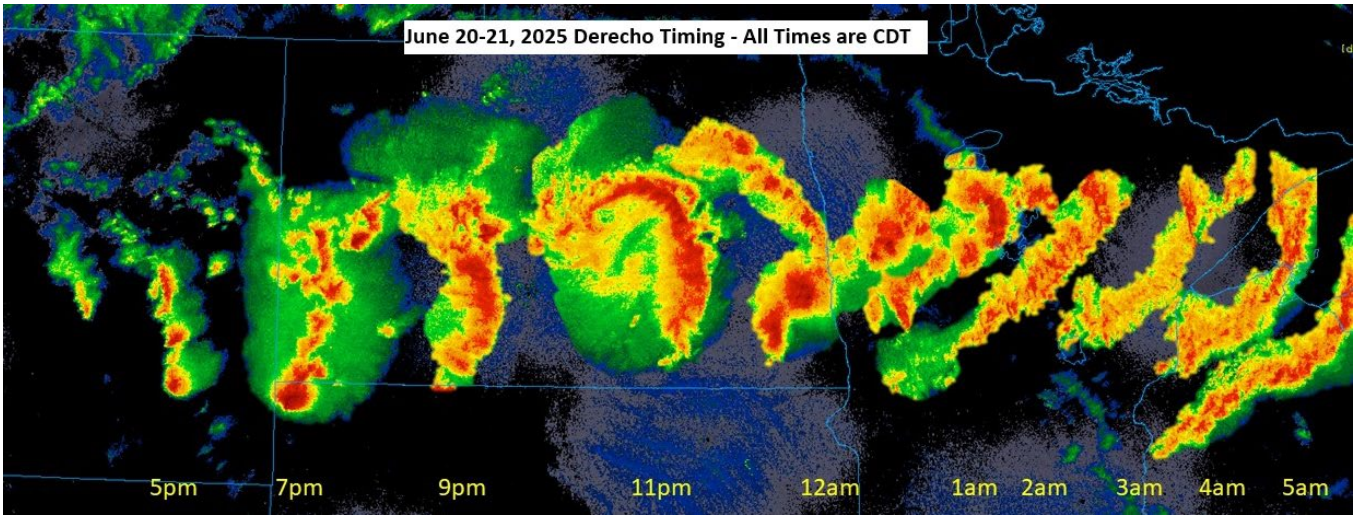


Figure 2: Radar Composite of the June 2025 Derecho (image from NWS Grand Forks)

Additionally, a Mesoscale Convective Vortex (MCV), which is essentially a low-pressure system, developed on the northern end of the bow echo. MCVs are not uncommon with derecho events, but this one was unusually intense and long-lasting. There was significant damage within the path of the MCV, as areas near and south of Highway 200 experienced 1 to 2 hours of winds between 60 and 90 mph or stronger.

Records Are Made to be Broken

The Linton 5NW station recorded a derecho-associated wind gust of 101.1 mph at 33 feet above ground level (AGL) at 21:37 CDT, which is the strongest wind ever recorded at an NDAWN station since inception in 1989. Galesburg 4SSW recorded the strongest wind recorded at an NDAWN station at 10 feet AGL with 98.8 mph at 01:26 CDT, which was associated with the MCV.

Ironically, Galesburg 4SSW was the previous record-holder of the highest 10ft wind speed recorded at NDAWN, with a wind speed of 94.3 in 2017. As for the highest wind speeds ever recorded at NDAWN at 33ft, 9 of the top 10 were due to this event and occurred within a 5.5-hour span. Four days prior, on June 16, Hettinger NW recorded the 6th-ranked wind speed.

Top 10 Highest 33ft Wind Speeds in NDAWN History

Rank	Station	Date	Peak Gust (mph)
1	**Linton 5NW**	**2025-06-20**	**101.1**
2	**Robinson 3NNW**	**2025-06-20**	**98.8**
3	**Ayr 1NW**	**2025-06-21**	**96.1**
4	**Woodworth 2NE**	**2025-06-20**	**94.4**
5	**Elgin 10NW**	**2025-06-20**	**93.8**
6	Hettinger NW	2025-06-16	93.8
7	**Wing 8N**	**2025-06-20**	**92.4**
8	**Courtenay 5W**	**2025-06-20**	**89.4**
9	**Carson 9ENE**	**2025-06-20**	**87.7**
10	**Jud 1S**	**2025-06-20**	**86.7**

Disclaimer: Although NDAWN has been around since 1989 and now has over 100 stations with data at 33ft, the first such station wasn't built until 2015 and until 2021, there were only 25.

Top 10 Highest 10ft Wind Speeds in NDAWN History

Rank	Station	Date	Peak Gust (mph)
1	**Galesburg 4SSW**	**2025-06-21**	**98.8**
2	**Dazey 2E**	**2025-06-20**	**94.8**
3	Galesburg 4SSW	2017-07-04	94.3
4	Greenbush 7W	2014-09-19	93.1
5	Robinson 3NNW	2018-07-08	92.0
6	**Dazey 2E**	**2025-06-21**	**90.1**
7	Brorson 5NW	2021-06-10	90.2
8	Mott 1N	2019-07-12	89.9
9	McHenry 8N	2016-07-04	89.5
10	Grassy Butte 2E	2020-08-11	89.1

Disclaimer: While NDAWN now has over 200 stations, for the majority of NDAWN's history there have been fewer than 75 stations. Thus, not all stations have lengthy historical data. The oldest stations have data back to 1990.

Figure 3: The ten highest wind speeds recorded at NDAWN at 33ft (top) and 10ft (bottom) with values set during the June derecho bolded.

It should be noted that although NDAWN has been around for 36 years and now has 245 stations, for the majority of NDAWN's history there have been fewer than 75 stations. Additionally, NDAWN now has 139 stations with data at 33ft, but the first such station wasn't built until 2015 and until 2021, there were only 25. Thus, not all stations have lengthy historical data. The oldest stations have data for 30+ years.

Records Are Made to be Broken

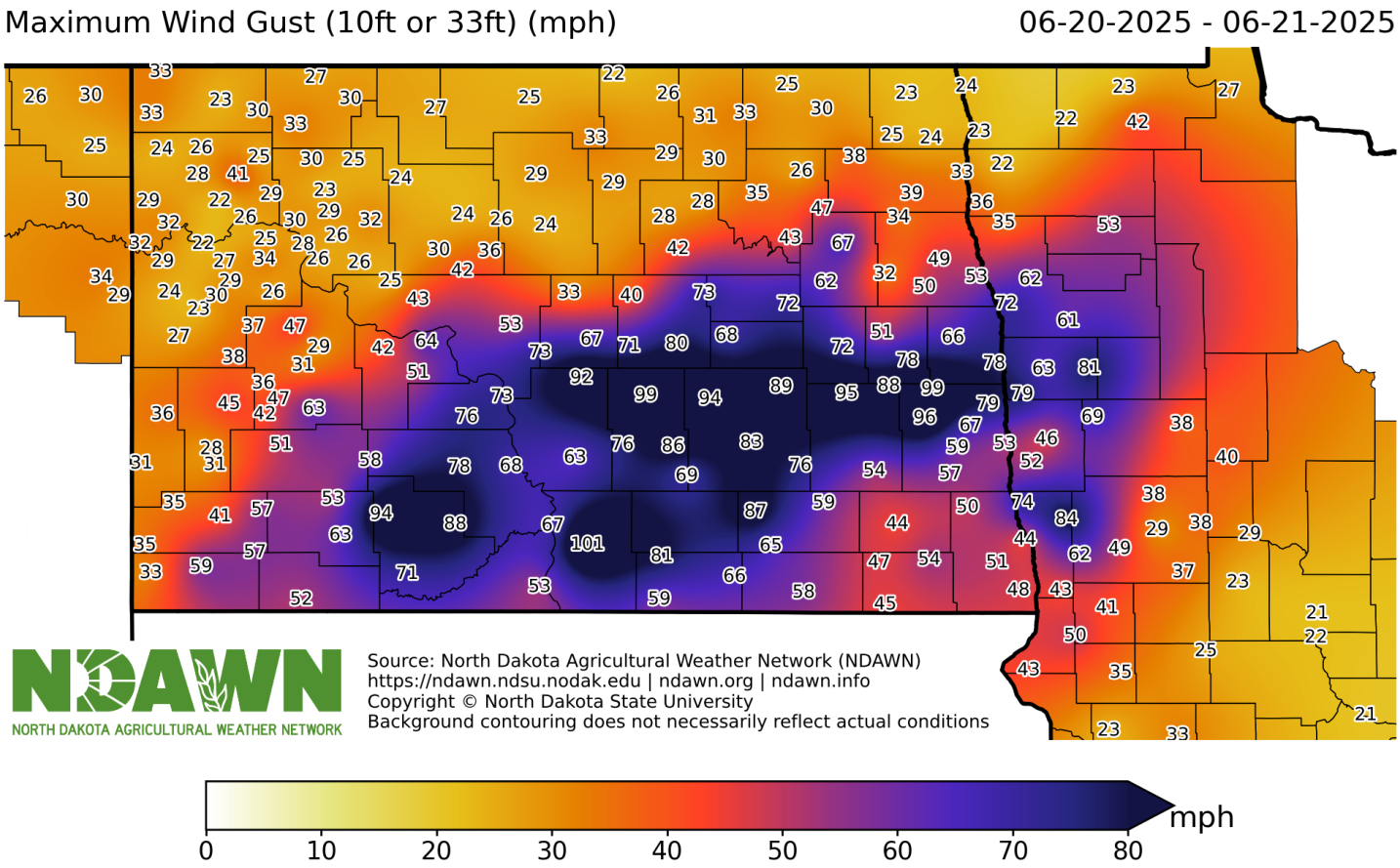


Figure 4: Maximum Wind Gust at 33ft or 10ft at NDAWN stations on June 20-21, 2025

Some more superlatives to show the magnitude of this storm (time in CDT):

- Hourly Average Wind Speed (10ft): Dazey 2E – 61.7 mph from 00:00 – 01:00
- Hourly Average Wind Speed (33ft): Woodworth 2NE – 65.3 mph from 23:00 – 00:00
- Sustained Wind Speed (10ft): Dazey 2E – 74.4 mph at 01:01
- Sustained Wind Speed (33ft): Woodworth 2NE – 79.6 mph at 23:20
- Duration of Sustained Wind Speeds Above 50 mph (10ft): Dazey 2E – 1 hour 33 minutes from 00:01 – 01:34
- Duration of Sustained Wind Speeds Above 50 mph (33ft): Robinson 3NNW – 1 hour 15 minutes from 22:26 – 23:41
- Duration of Wind Gusts Above 58 mph (10ft): Dazey 2E – 1 hour 43 minutes from 23:56 – 01:39

Note: Dazey 2E does not have wind data available at 33ft

Records Are Made to be Broken

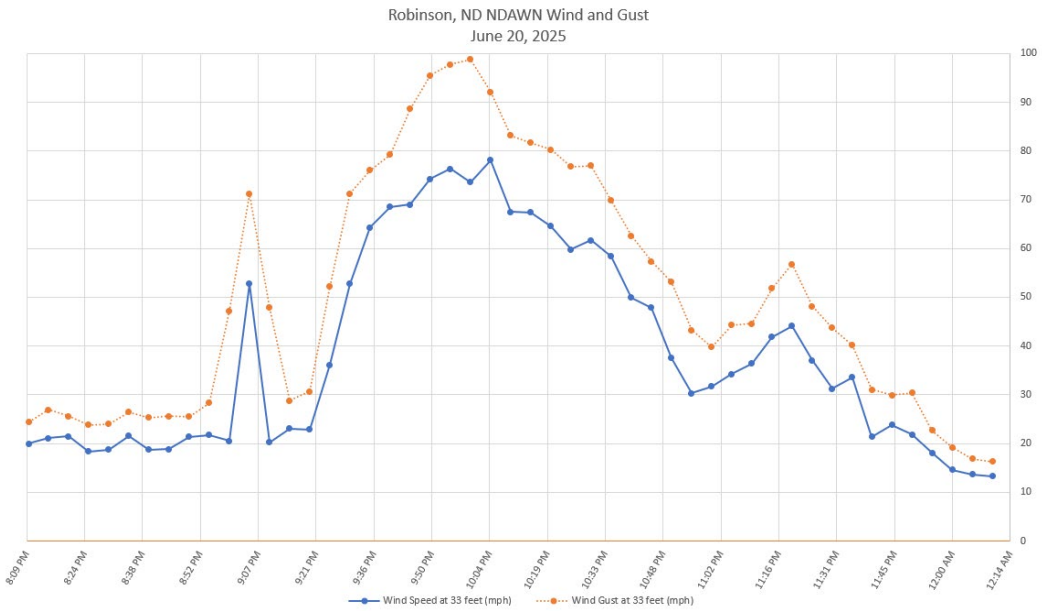


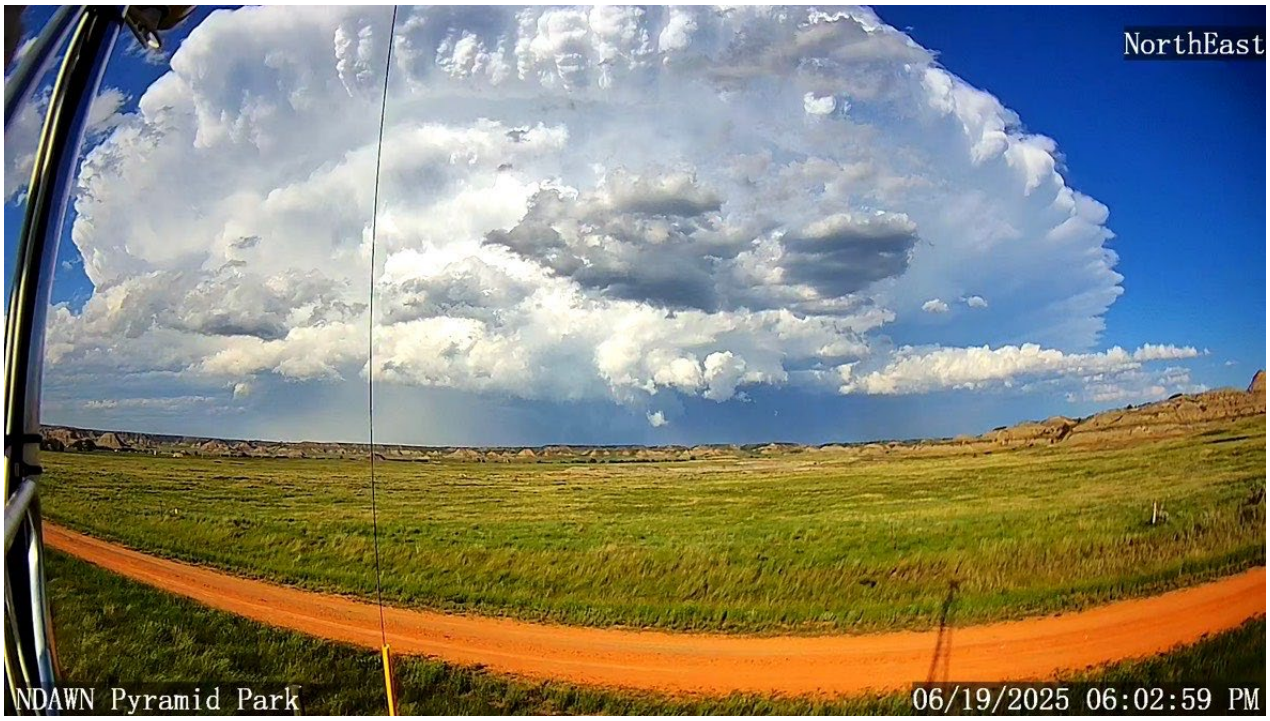
Figure 5: Sustained Wind (2-minute average) and Gusts at 33ft at the Robinson 3NNW NDAWN station during the evening of June 20, 2025. Time is in CST.

This graph shows visually how long-lasting the wind at Robinson 3NNW truly was. There was an initial gust over 70 mph, followed by over an hour of winds exceeding 60 mph with higher gusts, peaking at 98.8 mph during the MCV-enhanced winds.

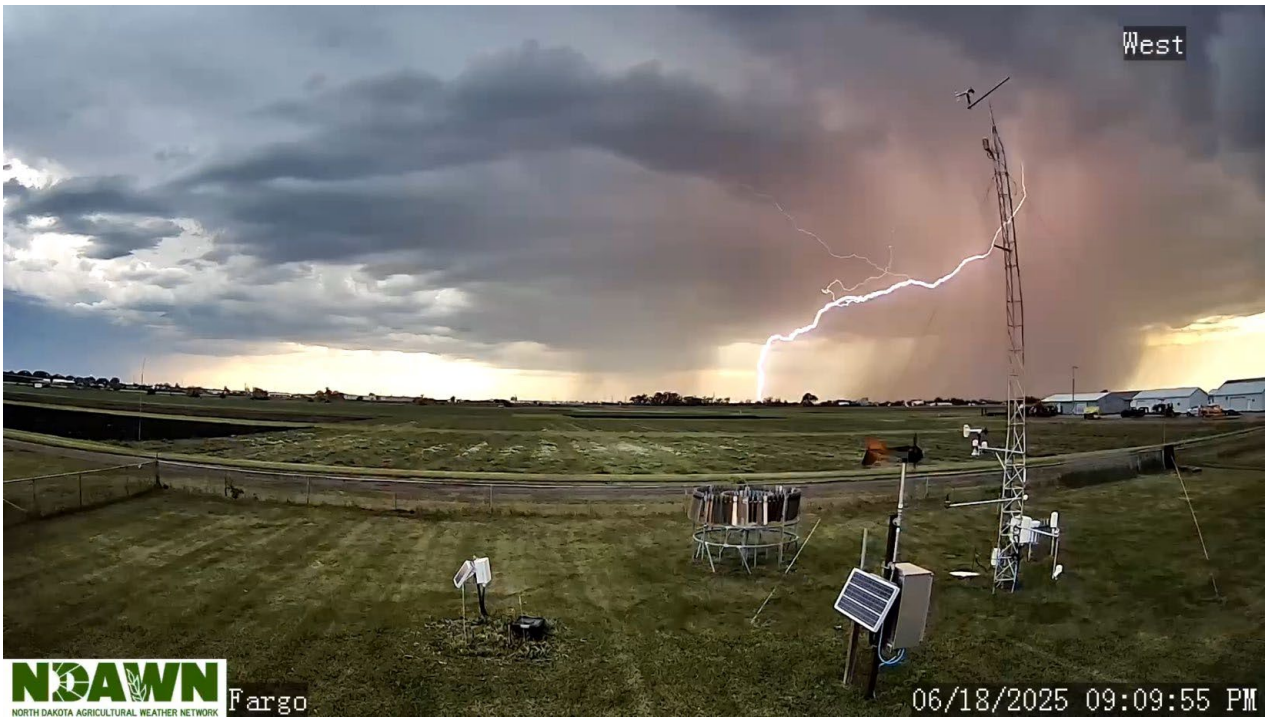
Image 5: An image captured by the Linton 5NW station camera shortly before the 101.1 mph gust hit the station

Around the State with Station Cameras

Around the State



Around the State



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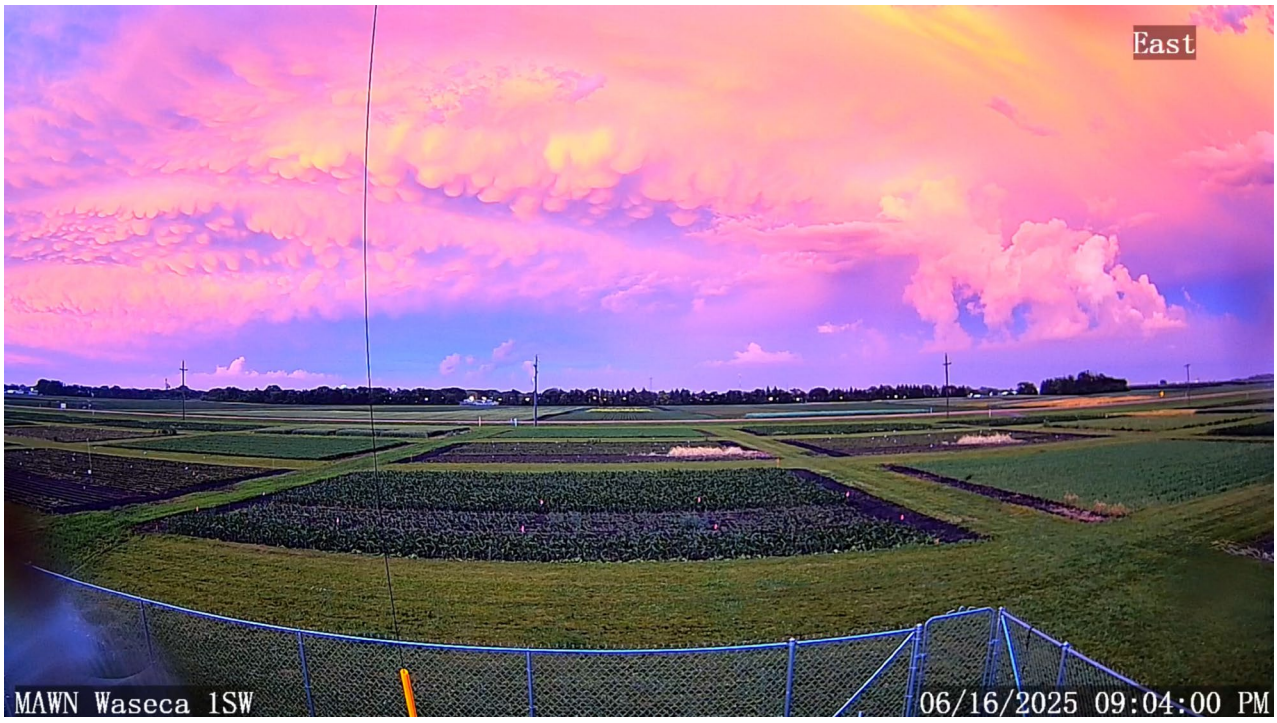

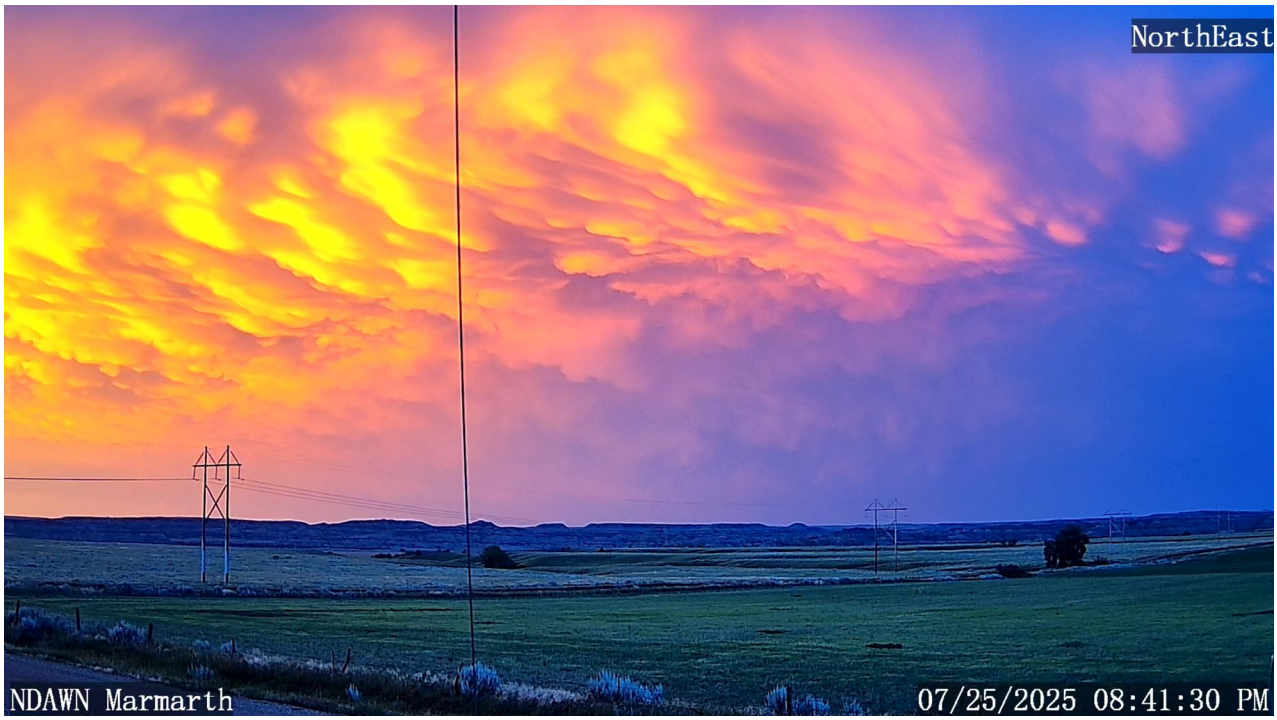

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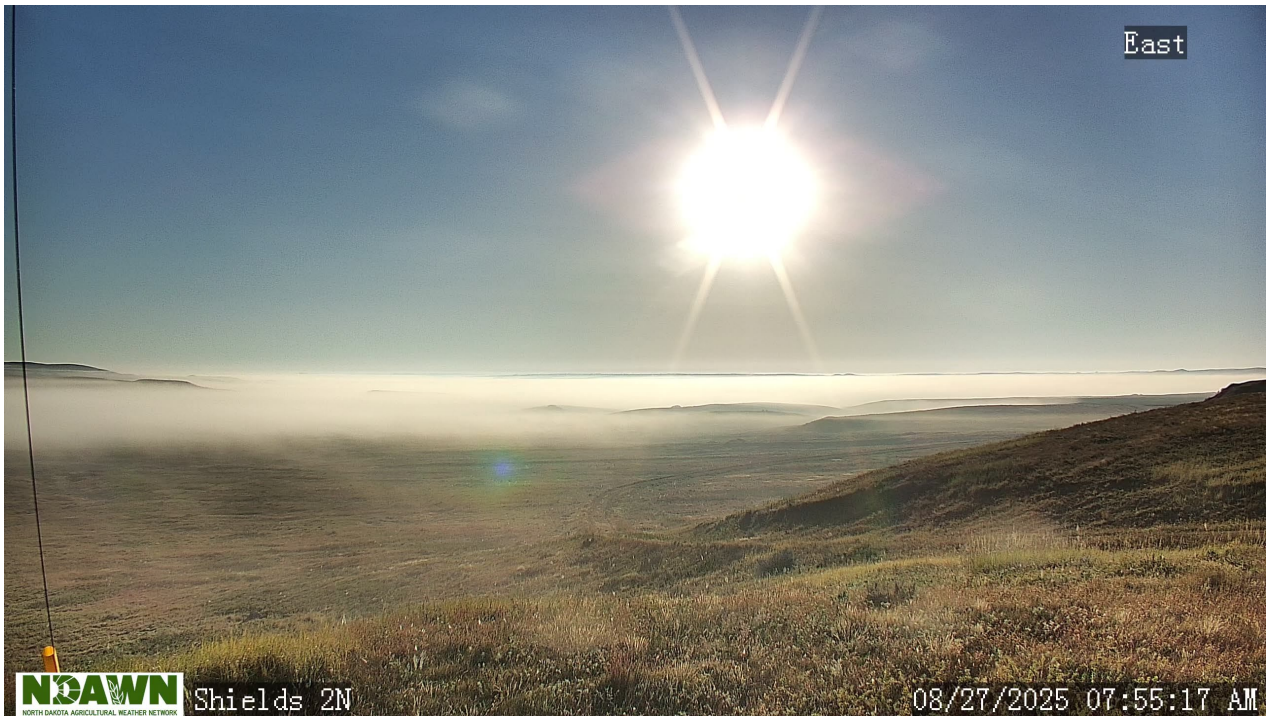

Around the State