

The Weather Whisper

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2024 Iowa Record Tornadoes

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With 4 months still to go, Iowa has set the record number of tornadoes across the state for a single calendar year.

Does that mean more tornadoes actually occurred this year than what has occurred in the past? To help quantify that question, let's take a deeper dive into how the National Weather Service has accounted for tornadoes in the past and how that has changed over the years.

Tornado reporting in Iowa dates back over 200 years. The first report of a tornado in Iowa was made by the Lewis and Clark expedition in 1804 noting: "...our course passed much fallen timber, apparently the ravages of a dreadful hurricane which had passed obliquely across the (Missouri) river from N. W. to S. E. about twelve months since. Many trees were broken off near the ground the trunks of which were sound and four feet in diameter." This "hurricane" was more than likely a tornado which occurred in 1803. Tornado reports remained limited for much of the 1800s but became slightly more numerous in the 1870s when Gustavus Hinrichs instituted the first statewide weather service in 1875 with reports remaining steady into the mid 1900s.

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Iowa Tornadoes in 2024 - Record Broken -

Top 5 Iowa Tornado Years

1. 122 in 2024*
2. 120 in 2004
3. 114 in 2021 (note 63 occurred on 12/15/21 which is both the daily and monthly Iowa record)
4. 105 in 2001 and 2008

*count as of 8/17/2024

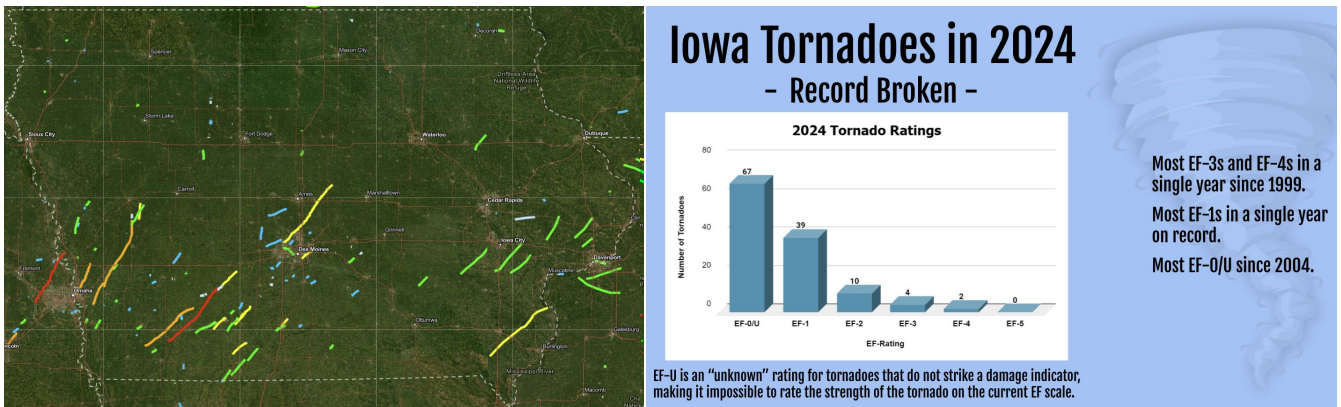
While 122 is an exceptional number of tornadoes, several factors have influenced the higher tornado count in more recent years and make direct comparisons difficult. This includes but is not limited to better communication and recording devices, social media, a more active storm spotting and chasing network, and better radar technology. There have also been improvements in the science with regards to tornadoes associated with linear convective systems.



Top 5 years by the number of tornadoes in Iowa.
(Click image to view larger.)

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A formalized process for the reporting and cataloging of tornadoes across the United States occurred in 1950 with the implementation of the *Storm Data* publication. Reports were received via local Weather Bureau offices and sent to the National Severe Storms Forecasting Center (the forerunner of the Storm Prediction Center) to be archived. Many of the reports from the 1950s into the early 1980s were received via newspaper articles with a handful received via telephone. However, as communications technology began to improve in the 1980s and 1990s, the number of reports began to increase as telephone reports were called in to local weather service offices along with many offices beginning to actively search for damage reports. Improvements in video technology with many recording platforms becoming affordable and small enough to be handheld increased reports further. The combination of these factors pushed tornado numbers higher over this period with 302 tornadoes occurring during the decade of the 1970s ballooning to 473 tornadoes across the state by the 1990s. By the early 2000s, several years had tornado tallies above 100 tornadoes including the (previous to 2024) record year of 2004 with 120 tornadoes.



Left: All identified and rated 2024 tornado tracks across Iowa, as of 8/25/2024. **Right:** 2024 tornado rating breakdown and notable statistics. (Click images to view larger.)

Since the 2004 record, numerous improvements in technology and meteorology have occurred, likely explaining the continued trend in tornado numbers in the last 20 years. In May 2008, the NWS Des Moines radar (KDMX) was upgraded to Super Resolution which provided a higher definition of storms. In September 2012, KDMX was upgraded to dual-polarization. Dual-polarization brought many improvements including the ability to see tornadic debris signatures. Great advances in remote sensing have also occurred over the past 20 years and NWS Des Moines is one of the pioneer NWS offices to utilize remote sensing to find tornadic damage. Iowa cropland from late June through September are excellent identifiers for where tornadoes may have occurred even though the peak Iowa tornado season is not during this time period. Satellite imagery has become more available since 2016 when Sentinel-2 10 meter resolution satellite imagery became available. Prior to 2016, NWS Des Moines relied on high resolution Orthophoto satellite imagery that was captured once per year. In 2014, Orthophoto imagery helped identify the majority of the 35 tornado tracks that occurred on August 31, 2014, which set the

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record for most tornadoes across Iowa in a single day at the time. The previous daily record was 28 which occurred on April 11, 2001. The daily record was surpassed again when 63 tornadoes occurred on December 15, 2021, which is also the [monthly record for Iowa](#). Over half of the tornadoes identified from this event were through the use of satellite and radar data. Tornado reports have also increased thanks to social media and NWS Des Moines' partnership with local officials, to name a few. As an example, many local Emergency Managers have drones which can identify tornado tracks via the aerial imagery.

Finally, meteorology and storm surveying techniques continue to improve within the National Weather Service. A better understanding of Quasi-linear Convective System (QLCS) tornadoes have allowed these events to be accounted for while in the past, many of these tornadoes were labeled as damaging winds. Both August 31, 2014 and December 15, 2021 (events described earlier in this article) were QLCS tornado events, not the more popularly known supercell tornadoes.

Back to the original question, are there more tornadoes today? Given the changing methodology, technology and science, trends within the data are difficult to discern, even after rigorous statistical analysis. This leaves us with no direct answer as it is mostly an apples to oranges comparison over time.

Spotter Feature of the Month: Scud Clouds

Formal spotter training may be complete for 2024, but the continuing education does not have to end there! The spotter feature of the month series exists to highlight one or more phenomena each month to educate our spotters and Weather Ready Nation Ambassadors on various weather they may see and can [report to their local NWS!](#)



Scud clouds that formed in Dallas County on July 31st, 2024. These are NOT funnel clouds or tornadoes.

Photo Credit: Mike P.

(Click image to view larger.)

Scud Clouds

Scud clouds, also known as scary looking clouds (SLCs) are slowly-turning and sometimes slowly-twisting finger-like clouds. Unlike funnels and tornadoes, scud clouds are very "ragged" in appearance and virtually have no rotation in the horizontal (left to right). Funnels and tornadoes, in comparison to scud clouds, are usually much smoother in appearance and rotate very rapidly. Although infrequent, very low hanging scud clouds close to the ground can occur when surface conditions near a storm are warm and very humid, as occurred on July 31, 2024, and seen at left.

New NWS Des Moines Spanish Language Webpage

Protecting lives and property is the mission of the NWS. To expand life-saving message accessibility, NWS Des Moines has recently debuted a new Spanish language web page to reach the more than 100,000 Iowans who speak Spanish at home - the second highest spoken language in the state. The main NWS Des Moines webpage remains unchanged and can be found at weather.gov/desmoines while the NWS Des Moines-Español version is at: <https://www.weather.gov/dmx/espanol> and includes safety resources covering weather hazards like severe weather, hot and cold temperatures, lightning, flooding and how to get weather alert information.

Reminder safety information is always available in English at <https://www.weather.gov/dmx/preparedness>

Protegiendo vidas y propiedades es la misión del SNM. Para ampliar la accesibilidad de mensajes que salvan vidas, el SNM Des Moines ha debutado una página web en español para aumentar nuestro alcance a los más de 100,000 ciudadanos de Iowa que hablan español en sus casas - el segundo idioma más hablado del estado. Nuestra página principal en inglés del SNM Des Moines sigue sin cambios y puede ser encontrada en weather.gov/desmoines mientras la página web en español está disponible en

<https://www.weather.gov/dmx/espanol> e incluye recursos de seguridad sobre riesgos del tiempo como tormentas severas, temperaturas cálidas y invernales, relampagos, inundaciones, y como recibir alertas sobre el tiempo.



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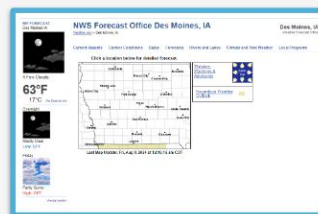
¡Noticias!

- Recientemente hemos debutado el nuevo sitio web en Español del Servicio Meteorológico Nacional de Des Moines.
- www.weather.gov/dmx/espanol



In English:

- We recently debuted our Spanish Language version of the NWS Des Moines website!
- No changes to the main webpage at weather.gov/desmoines



On the Cover:

Tornado path observed in National Agriculture Imagery Program (NAIP) aerial data. Imagery depicts a tornado path that occurred on 8/31/2014, an event described on page 2. (Click image to view larger.)



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