



Nebraska Severe Weather Awareness Week

March 22 - 26, 2021



From Hemingford to Falls City, we can all agree there is something for everyone when it comes to Nebraska weather. The National Weather Service wants Nebraskans to be “Weather-Ready” when severe weather threatens. March 22-26 is Nebraska Severe Weather Awareness Week and we encourage everyone to take the opportunity to develop and practice a severe weather plan for your home or office, learn something new about severe weather and its impacts, or just brush up on a topic.

No Site Spared



New this year are maps of hail, wind, and tornado reports across Nebraska. It’s clear, every corner of the state had its share of severe weather.

Looking closer at the map of hail reports, notice how individual thunderstorms or a series of thunderstorms produced large hail along a path (north central Nebraska) or in clusters (south central and southwest Nebraska most notably). That is very common from more intense thunderstorm complexes.

Another interesting point is the location of wind reports. While there are reports from just about everywhere, some reports are “aligned” in the same direction or appear to be in a relatively straight line. These reports most likely represent wind gusts recorded by automated wind sensors, such as sensors operated by the Nebraska Department of Transportation, railroads or even home weather stations available online.

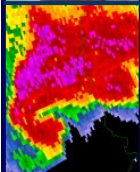


Local NWS offices are good at “data-mining” and these maps represent reports obtained by the NWS from automated weather sensors, spotters, law enforcement, emergency management and the public. We rely heavily on the reports provided. Not only do they verify what type of severe weather the storm is producing, but they are a valuable messaging component of severe weather information. Studies have shown reliable reports of severe weather and/or the impact of a weather event are a key driver for people to make informed risk and safety decisions which may save their life.

Tornado Number Trends



2020 was a “down” year for tornadoes in Nebraska, and there is nothing wrong with that! Only 21 tornadoes were reported which is less than half of the 30-year average of 51. Interestingly, the majority of the tornadoes were reported in central and western Nebraska.



Over the last 15 years, tornadoes numbers have generally declined on average across the state on a yearly basis. While there are some short term weather and climate-related trends which can influence severe weather frequency, such as drought or El Nino/La Nina, the exact reason for the longer decline is unknown. However, we can’t let our guard down! The NWS hopes you will check the many safety facts and terms so you and your loved ones will be safe before, during and after the storm.



Statewide Tornado Safety Drill



**Test Warning:
11:00 a.m. CDT
10:00 a.m. MDT**

Do you & your family know what to do if a tornado threatens?

Practice your plan of action!



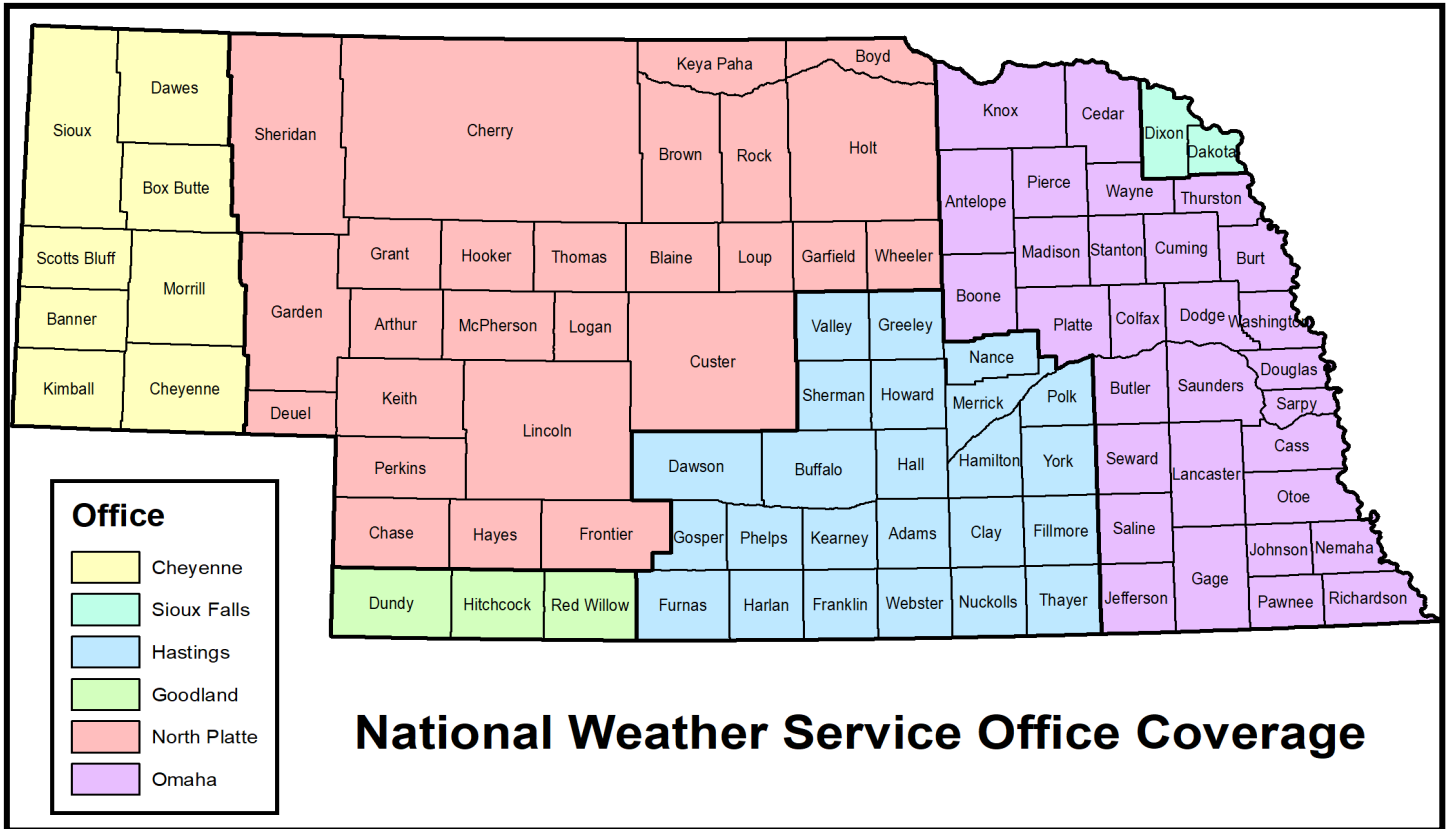
What's Inside?	
National Weather Service Coverage Map	2
NOAA Weather Radio All Hazards	3
2020 State Tornado & Severe Weather Facts	4
2020 State Tornado Graphical Facts	5
2020 State Severe Weather Reports	7
Social Media Information	8
Severe Weather Terminology	9
Tornado Safety	10
Flood Safety	11
Lightning Safety	12
2021 Spring Flood Outlook	13
2021 Spring/Summer Climate Outlook	14
Nebraska Historical Severe Weather Events	15
Nebraska Panhandle 2020 Review	16
Extreme Southwestern Nebraska 2020 Review	18
Western & North Central Nebraska 2020 Review	20
South Central Nebraska 2020 Review	22
Eastern Nebraska 2020 Review	24





National Weather Service Offices Serving Nebraska

Severe Weather Awareness Week | March 22 - 26, 2021



Panhandle **Cheyenne, WY**

1301 Airport Parkway
Cheyenne, WY 82001

www.weather.gov/cheyenne
nws.cheyenne@noaa.gov
(307) 772-2468

West and North Central **North Platte**

5250 E. Lee Bird Drive
North Platte, NE 69101

www.weather.gov/northplatte
nws.northplatte@noaa.gov
(308) 532-4936

Extreme Southwest **Goodland, KS**

920 Armory Road
Goodland, KS 67735

www.weather.gov/goodland
nws.goodland@noaa.gov
(785) 899-7119

South Central **Hastings**

6365 N. Osborne Drive West
Hastings, NE 68901

www.weather.gov/hastings
nws.hastings@noaa.gov
(402) 462-4287

East **Omaha/Valley**

6707 N. 288th Street
Valley, NE 68064

www.weather.gov/omaha
nws.omaha@noaa.gov
(402) 359-9443

Extreme Northeast **Sioux Falls, SD**

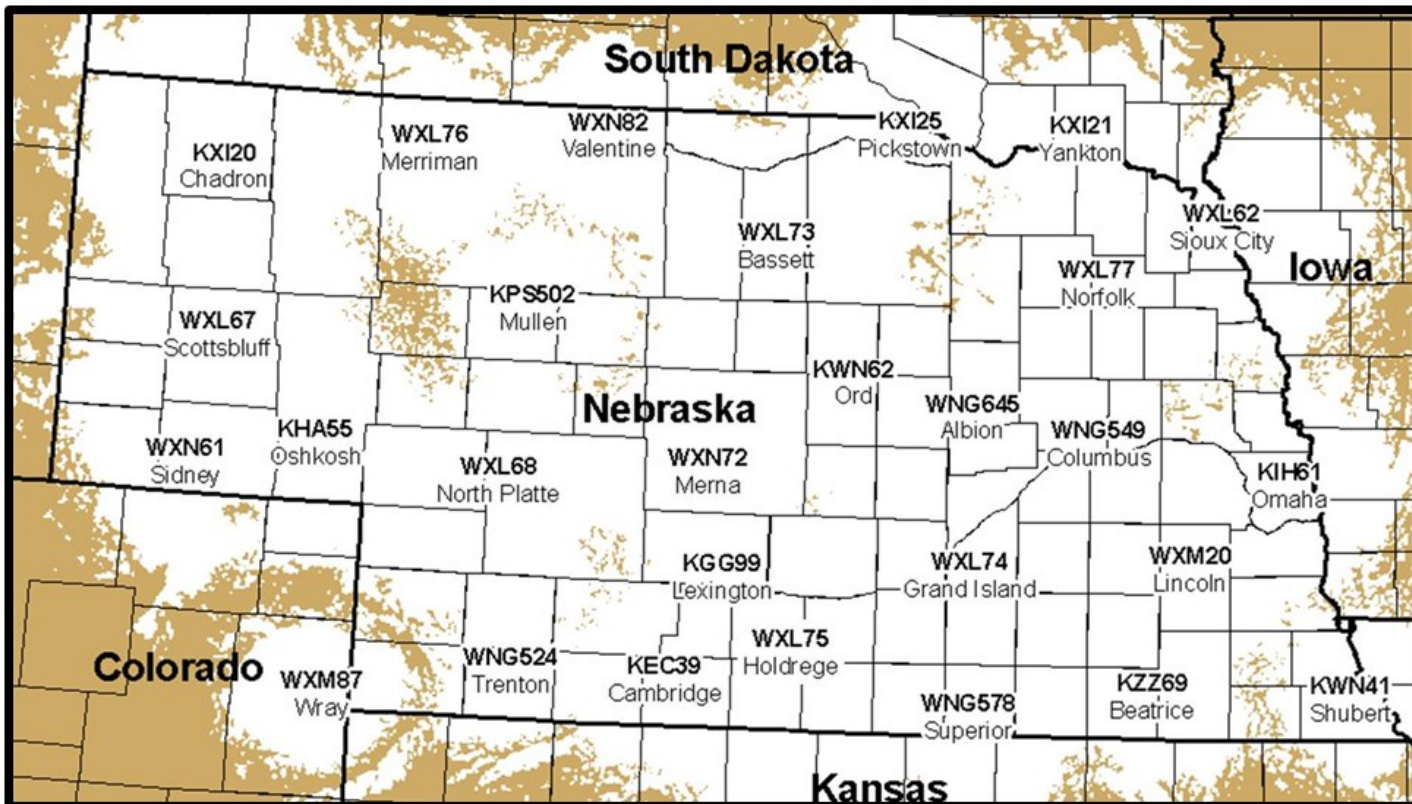
26 Weather Lane
Sioux Falls, SD 57104

www.weather.gov/siouxfalls
nws.siouxfalls@noaa.gov
(605) 330-4247



NOAA Weather Radio All-Hazards

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NOAA Weather Radio All Hazards (NWR) is a nationwide network of radio stations broadcasting continuous weather information directly from the nearest National Weather Service office. NWR broadcasts official Weather Service warnings, watches, forecasts and other hazard information 24 hours a day, 7 days a week.

Working with the Federal Communication Commission's (FCC) Emergency Alert System, NWR is an "All Hazards" radio network, making it your single source for comprehensive weather and emergency information. In conjunction with Federal, State, and Local Emergency Managers and other public officials, NWR also broadcasts warning and post-event information for all types of hazards, including natural (such as tornadoes or floods), environmental (such as chemical releases or oil spills), and public safety (such as AMBER alerts or 911 Telephone outages).

Known as the "Voice of NOAA's National Weather Service," NWR is provided as a public service by the National Oceanic and Atmospheric Administration (NOAA). NWR includes 1000 transmitters, covering all 50 states, adjacent coastal waters, Puerto Rico, the U.S. Virgin Islands, and the U.S. Pacific Territories. NWR requires a special radio receiver or scanner capable of picking up the signal. Broadcasts are found in the VHF public service band at these seven frequencies (MHz):

162.400	162.425	162.450	162.475	162.500	162.525	162.550
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Coverage information and SAME Codes for every county in Nebraska can be found at:

www.weather.gov/nwr/nebraska





2020 Nebraska Tornado/Severe Weather Facts

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Tornadoes: 21 (20 less than the 1950-2020 average of 41 & 30 less than the 30 year average of 51)

Deaths: 0 **Injuries:** 0

Longest track: 4.2 mi (July 8th - Near Silver Creek in Merrick County)

Greatest width: 250 yards (July 2nd - Near Marsland in Dawes County)

Strongest: EF2 (July 2nd - Near Marsland in Dawes County)

Most in a county: 3 (Custer & Perkins Counties)

Days with at least 1 confirmed tornado: 11

Most in one day: 5 (June 8th & July 8th)

Most in one month: 8 (June)

First tornado of 2020: May 22nd (EFU Near Barneston in Gage County)

Last tornado of 2020: August 14th (EF0 - Near Saronville in Clay County)

Note: EFU = The EF-U designation was created to classify tornadoes where the wind speed is unknown due to no discernable damage

2020 Monthly Tornado Totals

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Total	0	0	0	0	2	8	6	5	0	0	0	0	21	100%
EF5	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
EF4	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
EF3	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
EF2	0	0	0	0	0	0	1	0	0	0	0	0	1	5%
EF1	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
EF0	0	0	0	0	1	6	1	4	0	0	0	0	12	57%
EFU	0	0	0	0	1	2	4	1	0	0	0	0	8	38%



2020 Season Peak...

Hail Size: 3.25" on August 15th - Near Hemingford (Box Butte County)

Wind Gust: Estimated: 100 MPH on July 10th - Near Milburn (Custer County)

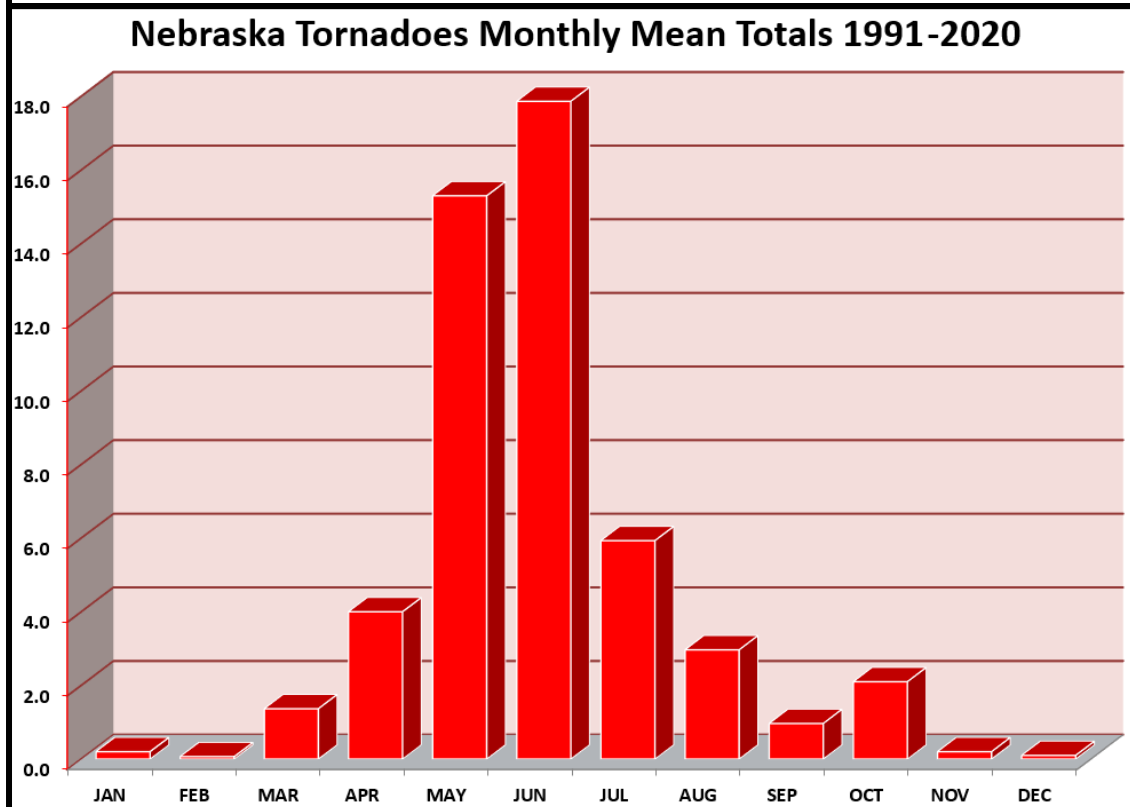
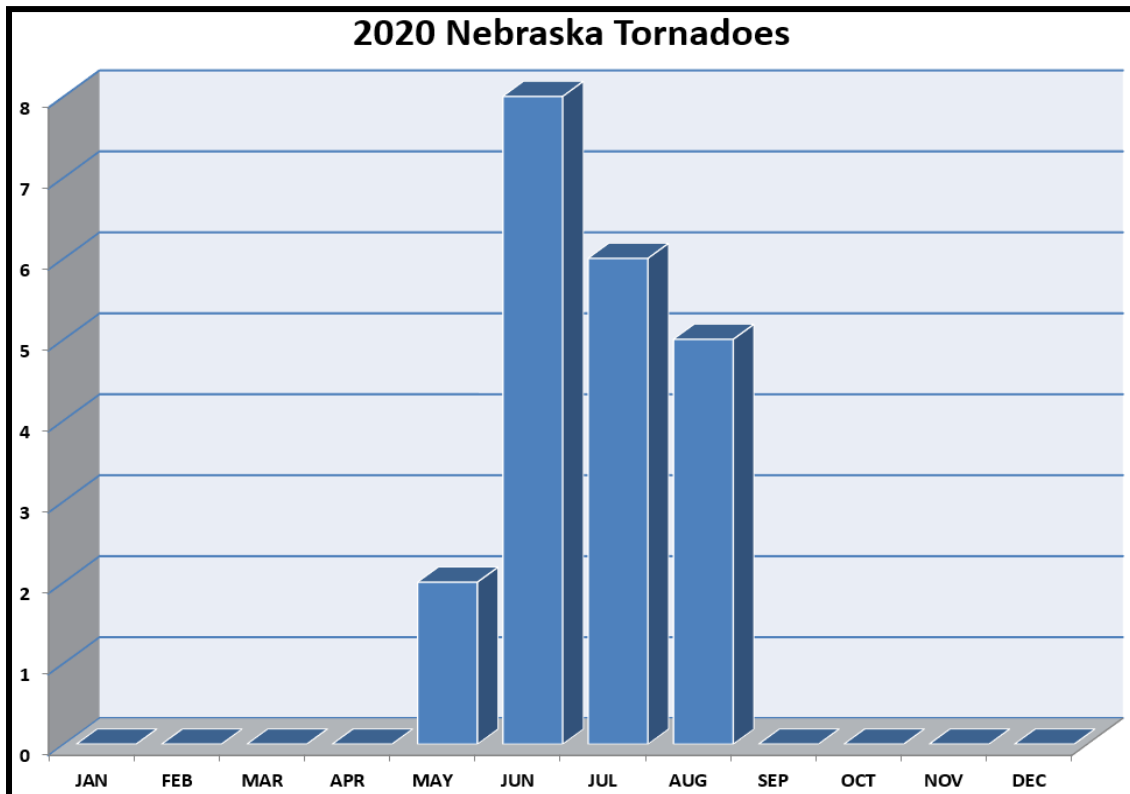
Measured: 94 MPH on July 8th - Sidney Airport ASOS (Cheyenne County)





Nebraska Tornado Facts

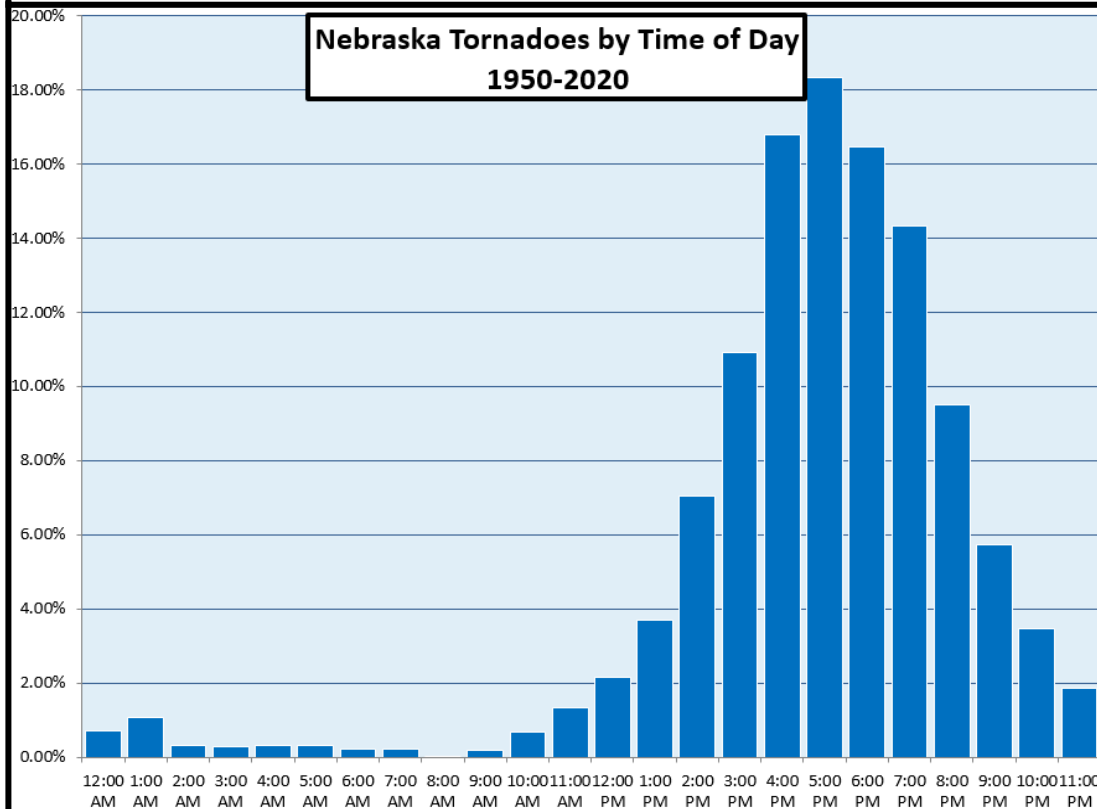
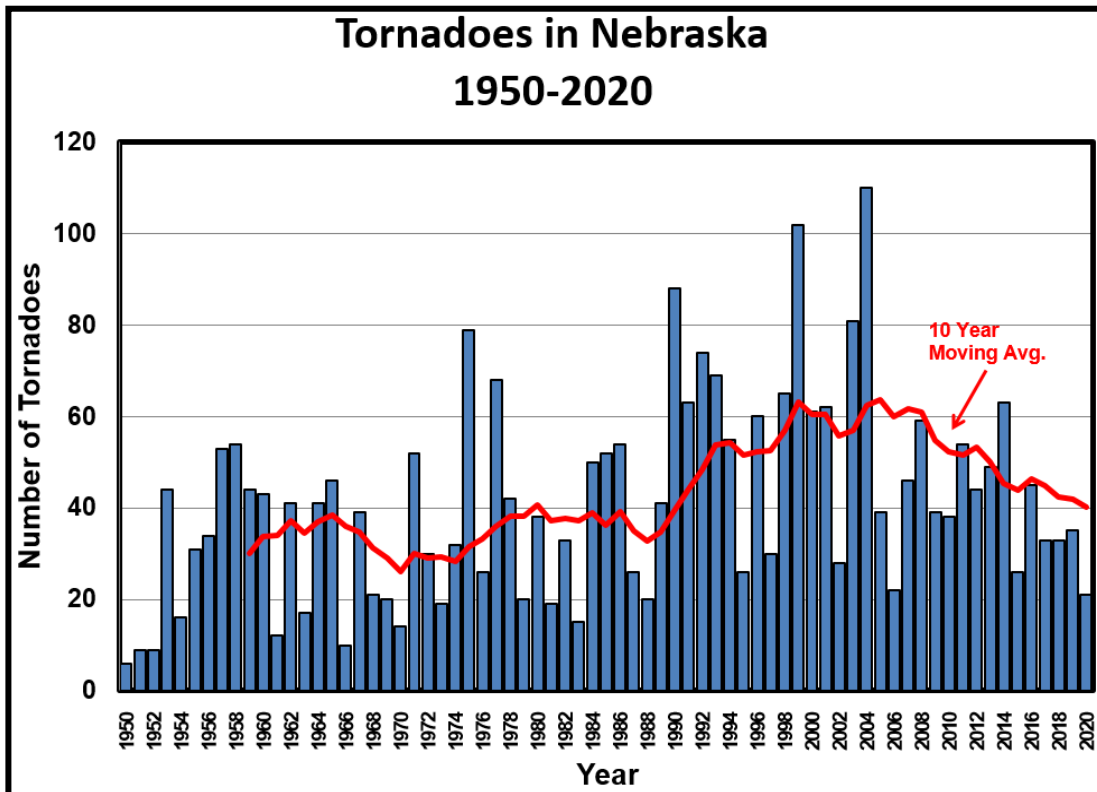
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Nebraska Tornado Facts

Severe Weather Awareness Week | March 22 - 26, 2021



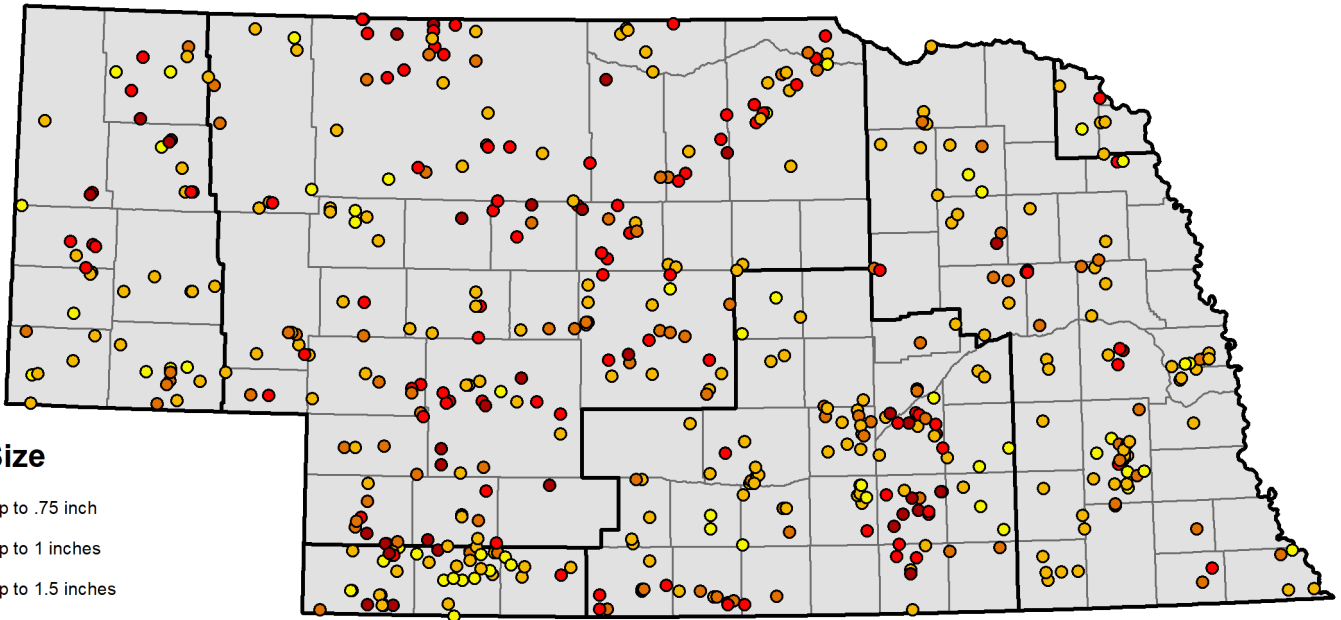


Nebraska Severe Weather Reports

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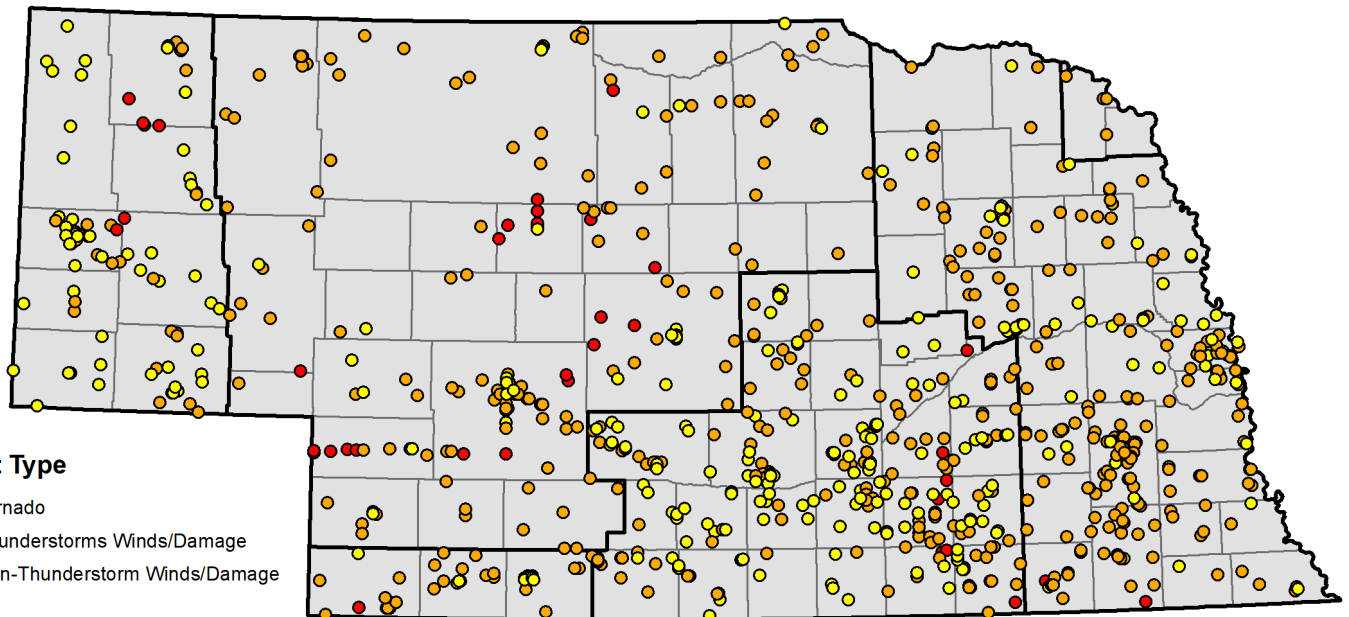


Below are images showing hail, tornado and wind reports received during the 2020 severe weather season.



Hail Size

- Up to .75 inch
- Up to 1 inches
- Up to 1.5 inches
- Up to 2 inches
- Larger than 2 inches



Report Type

- Tornado
- Thunderstorms Winds/Damage
- Non-Thunderstorm Winds/Damage

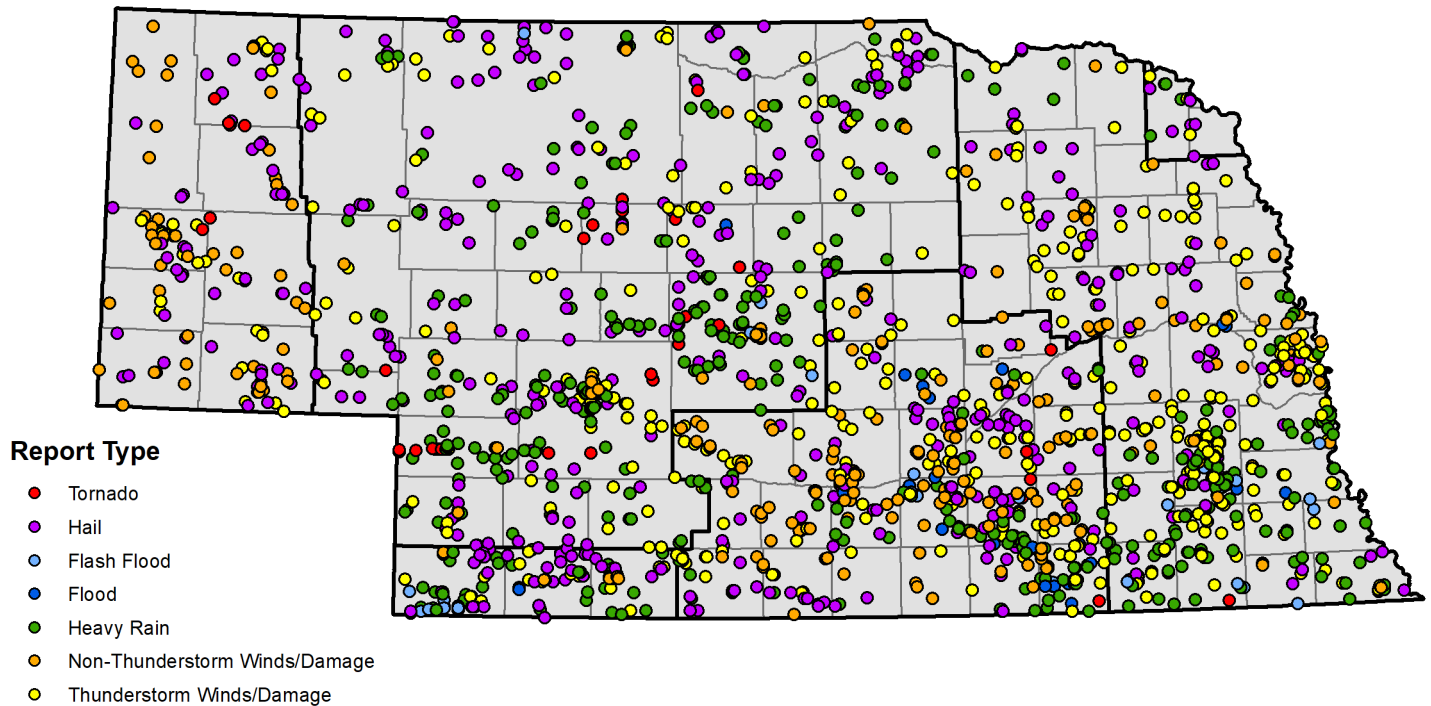


Nebraska Severe Weather Reports

Severe Weather Awareness Week | March 22 - 26, 2021



Below an image showing combined tornado, wind, hail, heavy rain and flood reports received during the 2020 severe weather season.



Have you found us on your favorite social media platform?

Find and follow us for the latest weather, climate facts and other interesting information!



NWS Omaha/Valley, NE

NWS Hastings, NE

NWS North Platte, NE

NWS Cheyenne, WY

NWS Goodland, KS

NWS Sioux Falls, SD



NWSOmaha

NWSHastings

NWSNorth Platte

NWSCheyenne

NWSGoodland

NWSSioux Falls



US National Weather Service Omaha

US National Weather Service Hastings

US National Weather Service North Platte

US National Weather Service Cheyenne

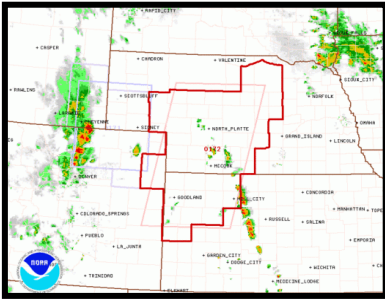
US National Weather Service Goodland

US National Weather Service Sioux Falls



Severe Weather Terminology

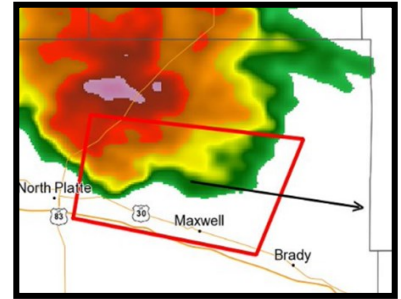
www.weather.gov/safety



WATCH

Be Prepared!

- Issued by the Storm Prediction Center.
- Timeframe: Hours ahead. Be Alert!
- Watch areas are typically large, covering numerous counties & even states.
- Check for forecast updates.
- Monitor sky conditions.
- Know where to take shelter.



WARNING

Take Action!

- Issued by the local NWS forecast offices.
- Timeframe: Severe weather in the area is imminent. Take shelter!
- Warning areas are small, perhaps a handful of counties at most.
- Continue to check for forecast updates, as conditions can change rapidly.



Severe Thunderstorm

A thunderstorm is considered “severe” when it produces:

- Quarter size hail (1”) or larger
- Wind of 58 MPH or higher
- A tornado



Flash Flood

A rapid water rise that occurs with little to no advanced warning.

Usually the result of intense rainfall in a short time.

Can also be caused by dam/levee failures or ice jams.



Funnel Cloud

A funnel shaped appendage extending from a cloud.

Associated with a violently rotating column of air.

It **IS NOT** in contact with the ground.



Tornado

A violently rotating column of air from a cloud that **IS** in contact with the ground.

Be cautious!
The tornado may not be visible until it has picked up dirt and debris.



Tornado Safety

www.weather.gov/safety



A tornado is a violently rotating column of air extending from the base of a thunderstorm down to the ground. Tornadoes are capable of completely destroying well-made structures, uprooting trees, and hurling objects through the air like deadly missiles. Tornadoes can occur at any time of day or night and at any time of the year. Although tornadoes are most common in the Central Plains and the southeastern United States, they have been reported in all 50 states. Are you prepared?

BEFORE

Be Weather-Ready: Know the risk in your area. Have a NOAA Weather Radio and be sure to stay up to date with the latest weather information.

Have A Plan: Create a family plan with contact information and an emergency meeting place. Practice your plan!

Shelter: Pick a safe room in your home such as a basement, cellar or an interior room on the lowest floor with no windows. If you live in a mobile home, identify a nearby shelter you can get to quickly. Practice with your family by having regular drills. Prepare an Emergency Kit.

Warnings: Know how your community sends warnings. Some have outdoor sirens, others depend on media and smart phones to alert residents. Have multiple ways to receive warnings!



DURING

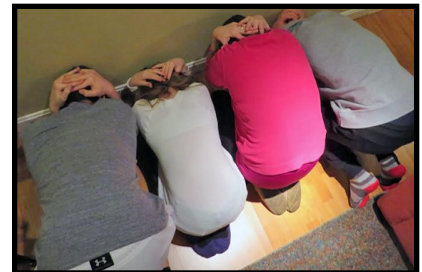
Stay Weather-Ready: Continue to listen NOAA Weather Radio and local news to stay updated about severe weather watches and warnings.

At Your House: If you are in a tornado warning, go to your basement, safe room, or an interior room away from windows. Don't forget pets if time allows.

At Your Workplace or School: Follow your tornado drill and proceed to your tornado shelter location quickly and calmly. Stay away from windows and do not go to large open rooms such as cafeterias, gymnasiums, or auditoriums.

Outside: Seek shelter inside a sturdy building immediately. Sheds and storage facilities are not safe, neither is a mobile home or tent. If you have time, get to a safe building.

In a vehicle: Being in a vehicle during a tornado is not safe. The best course of action is to drive to the closest shelter. If you are unable to make it to a safe shelter, either get down in your car and cover your head, or abandon your car and seek shelter in a low lying area such as a ditch or ravine.



AFTER

Stay Informed: Continue to listen to NOAA Weather Radio and local news for the latest. Multiple rounds of severe thunderstorms are possible during severe weather outbreaks. Follow instructions of local authorities!

Contact Loved Ones: Let them know you're okay. Text messages or social media can be a more reliable than phone calls.

Assess the Damage: After the threat has ended, check for damage. If possible, wear long pants, a long-sleeved shirt and sturdy shoes. Stay out of damaged buildings.

Help Your Neighbor: If you come across people that are injured and you are properly trained, provide first aid to victims until emergency response teams arrive.





Flood Safety

www.weather.gov/safety



Flooding is a coast-to-coast threat to the United States every year. If you know what to do when flooding occurs, you can increase your chances of survival. Sometimes floods develop slowly and can be anticipated. More often, flash floods can occur within minutes and sometimes without any advance warning. Being properly prepared can save your life and give you peace of mind. Never underestimated the power of water.

Before a flood is the time to prepare!

NOW is the time to make a plan. Important questions to consider:

- What is my flood risk?
- Are we located in a floodplain?
- Where is water likely to collect?
- Where do I go if there is a flood?

Create a communications plan to follow in the event of a disaster and be sure to assemble an emergency kit.



During a Flood...

- **Stay Informed!** Monitor NOAA Weather Radio, local radio/television and the internet or social media for the latest information and updates.
- **Get To Higher Ground!** Get out of areas that are subject to flooding and move to a safe area before access is cut off by flood waters. If told to evacuate, do so immediately!
- **DO NOT** drive into flooded roadways or around a barricade, as 12-18 inches of water can carry away most vehicles. The depth of the water may not be obvious and the roadway may no longer be intact. If your vehicle stalls, leave it and move to higher ground before water sweeps you and your vehicle away.
- **DO NOT** walk, swim, or play in flood water. You likely cannot determine how quickly the water is flowing or if there are holes or submerged debris. You may be swept away! If water is moving swiftly, as little as 6 inches of water can knock you off of your feet. There is also a danger of hazardous materials polluting the water. Also remember that water is an electrical conductor, if there are power lines down, there is a threat of electrocution.
- **DO NOT** go into any room if water is covering electrical outlets or cords. If you see sparks or hear buzzing, crackling, snapping or popping noises - Get Out! Do not go into flooded basements, the structures may be compromised.



After a Flood - Now What?

- Avoid flood waters and disaster areas. Obey road closures and other instructions.
- Stay informed! Tune into local news for updated information. Ensure water is safe before using or consuming. Check with utility companies about outages. Never use a portable generator indoors, carbon monoxide poisoning kills!
- Let your family and friends know you are okay.



Lightning Safety

www.weather.gov/safety



Lightning is fascinating to watch but is also extremely dangerous. In the United States, there are approximately 25 million lightning strikes every year. Each of those flashes is a potential killer. While lightning fatalities have decreased over the past 30 years, it remains a threat that needs to be taken seriously. Too many people wait far too long to get to safe shelter when thunderstorms approach. These delayed actions lead to many of the lightning deaths and injuries reported each year.

Though lightning strikes peak in summer, people are struck year round. In the U.S., an average of at least 20 people are killed each year by lightning and hundreds more are injured. Some survivors suffer lifelong health problems.

Don't become a statistic - Be Prepared!

Outdoor Safety

- There is **NO** safe place outdoors when thunderstorms are in the area!
- Plan ahead before going outdoors. Have a way to get the latest weather information. Know what to do and where to go if storms develop.
- When you hear thunder, immediately move to safe shelter: a building or an enclosed, metal-topped vehicle with windows up. Do NOT seek shelter in dugouts, under a picnic shelter or other non-sturdy shelter.
- Wait at least 30 minutes after the last rumble of thunder before heading back outdoors!



Outdoors - But Safe Shelter Is Not Nearby

If you absolutely cannot get to safety, you can slightly lessen the threat of being struck. But don't kid yourself, you are NOT safe outdoors! Before you head out, know the latest forecast.

- Avoid open fields and elevated areas such as hills, mountain ridges or peaks. Stay away from tall and isolated objects.
- If camping in an open area, head for a valley, ravine or other low area. Tents offer NO protection!
- If you are in a group, spread out to avoid the current traveling between members.
- Immediately get out of and away from water and wet items. Stay away from any object that conducts electricity (barbed wire fences, power lines, windmills, etc.).



Indoor Safety

- Avoid anything that puts you in direct contact with electricity (plugged into a wall).
- Avoid plumbing. Do not wash your hands, bathe or wash dishes.
- Stay away from windows and doors and stay off porches.
- Do not lie on concrete floors and do not lean against concrete walls.
- Protect your pets! Dog houses are not safe. Don't leave pets chained up outside.



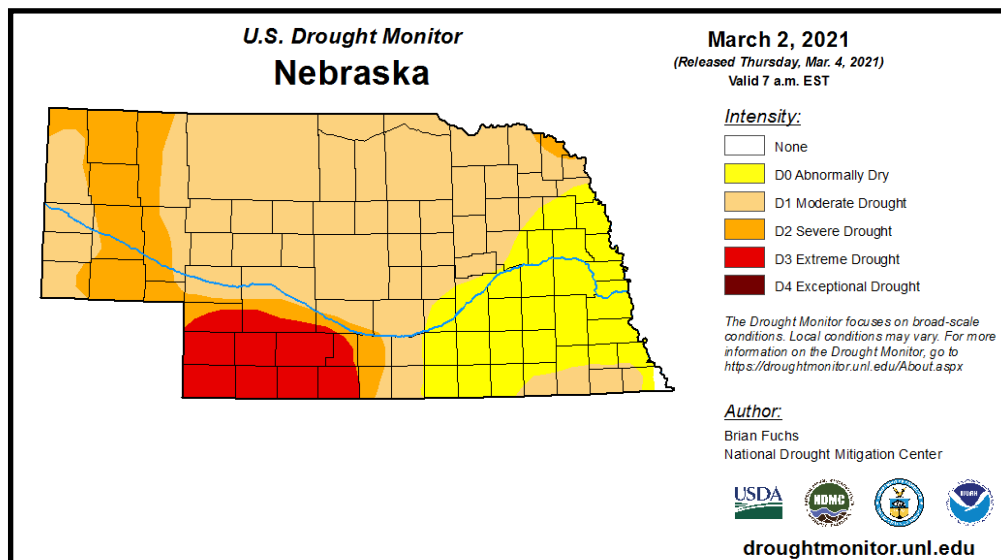
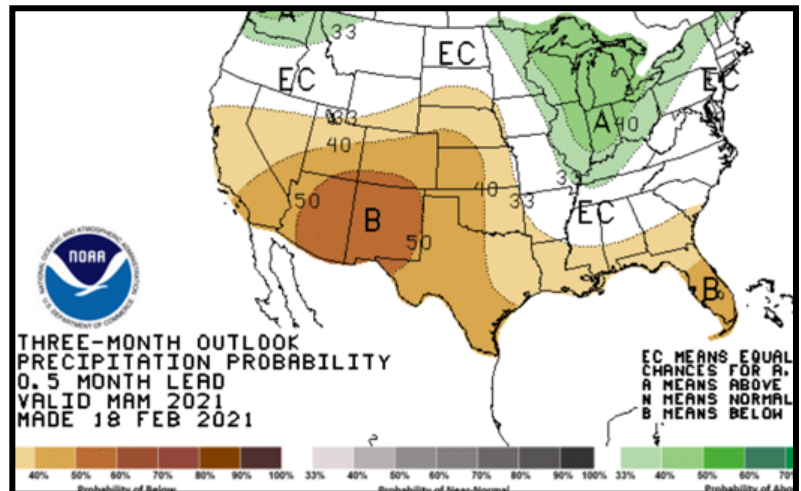
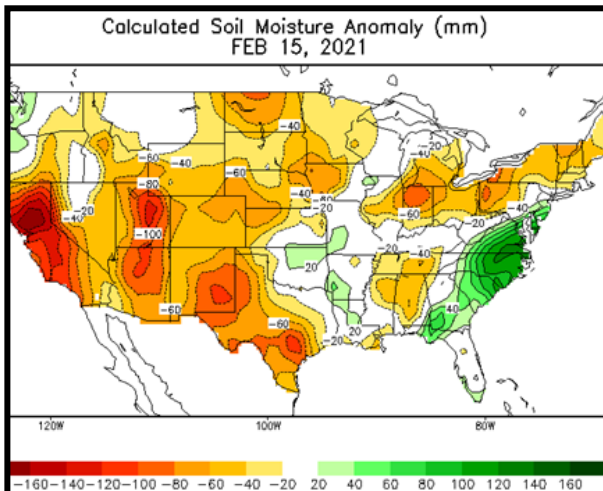
2021 Nebraska Spring Flood Outlook



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Each year, the NWS assesses the spring time flooding potential for Nebraska. This year, the overall flooding risk is below normal to near normal. Most of Nebraska has been in a drought since last summer and soil moisture is below normal. The three month precipitation outlook of March through May indicates the highest probabilities lean towards drier than normal conditions. The snow cover in Nebraska has all melted and will be a non-issue in this flood outlook. The mountain snowpack in Colorado and Wyoming that feeds the Platte River is below normal and thus Nebraska is expected to receive less runoff down the Platte River from mountain snow melt this year. The snowpack across the mountains of Montana that feed the Missouri River was near normal and the flood risk along the Missouri River can generally be characterized as near normal this spring. Ultimately the location and amount of spring rainfall will play heavily into how much flooding we see across the region over the next few months. It is also important to remember that even in dry periods we can still see localized heavy rainfall and flooding.

A threat for ice jams will persist across eastern portions of Nebraska until all of the ice melts or flushes down river.





2021 Spring/Summer Climate Outlook



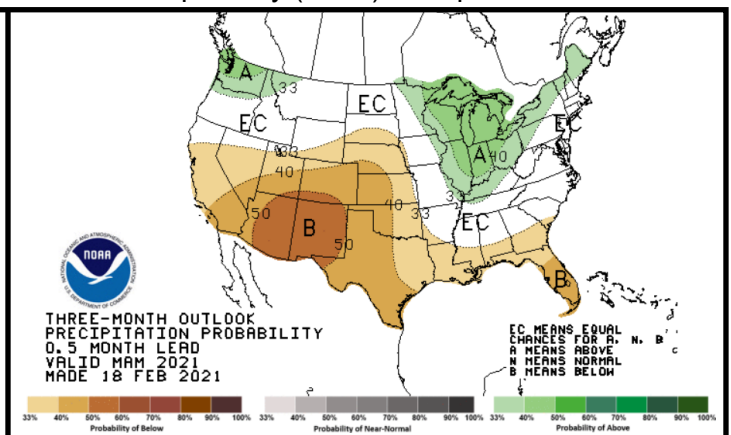
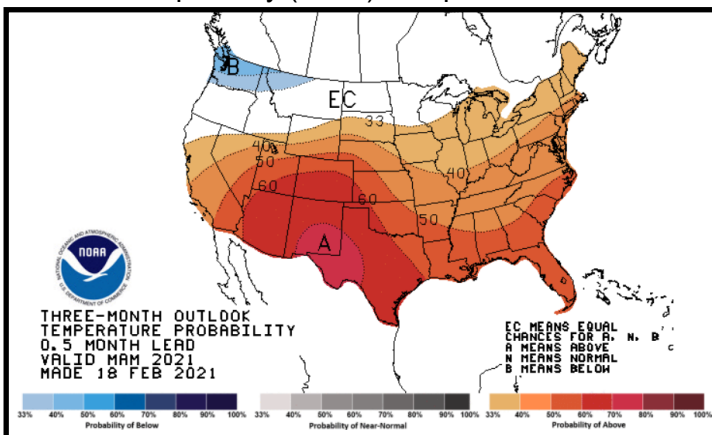
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A highly variable winter impacted Nebraska this year, with well above normal temperatures for the months of December and January, followed by record cold in February. When all is said and done, the winter of 2020-2021 will actually go down in the books as being close to "normal" temperature wise, with near to above normal precipitation - although many of us will likely not forget the extreme February we experienced for quite some time.

So what does the spring hold? This year's spring outlook from NOAA is favoring above normal temperatures and below normal precipitation across Nebraska. This outlook is being largely driven by La Niña conditions across the tropical Pacific Ocean, which can influence the position of the jet stream, and hence weather across the region.

March-April-May (MAM) Temperature Outlook

March-April-May (MAM) Precipitation Outlook

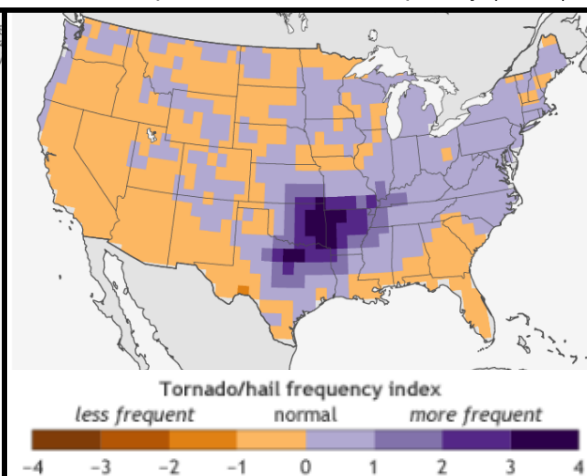
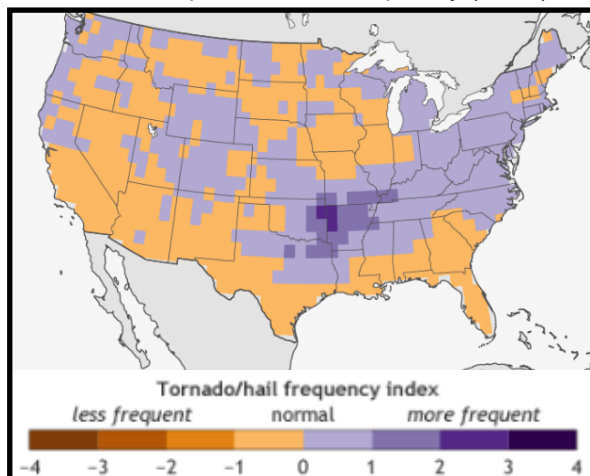


For more information on these outlooks, see: <https://www.cpc.ncep.noaa.gov/>

But what about severe weather? With a general poleward shift of the jet stream during La Niña years, several research studies have shown a moisture transport/instability shift that favors the development of severe storms across parts of Nebraska (see the plots below). So while overall this spring is favored to be warmer and drier than normal across the local area, we continue to expect severe storms and tornadoes, in fact, after a couple of years of less active severe weather seasons, we actually could see an uptick in severe weather this spring.

La Niña Impact on Hail Frequency (MAM)

La Niña Impact on Tornado Frequency (MAM)



For more info, see: <https://www.climate.gov/news-features/blogs/enso/enso-and-tornadoes>





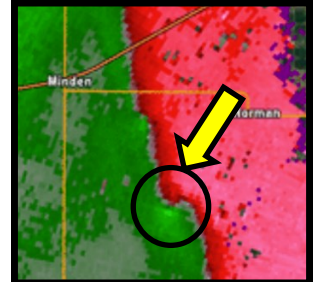
A Look Back At Past Nebraska Severe Weather Events

Severe Weather Awareness Week | March 22 - 26, 2021



5 Years Ago - Christmas Day Tornadoes

Christmas Day 2016 brought the 'latest calendar year' tornadoes to Nebraska since at least 1950 (when tornado records begin). A wide variety of severe weather occurred across the Central Plains on Christmas Day, with a line of thunderstorms dropping three weak tornadoes as it passed through south central Nebraska. One tornado was rated EF-1, damaging trees and power poles near Funk in Phelps County. The other two brief tornadoes were rated EF-0, dropping down near Minden (Kearney County) and near Gibbon (Buffalo County). The image to the right shows the signature of the tornado southeast of Minden via the KUEX radar Storm Relative Velocity product.

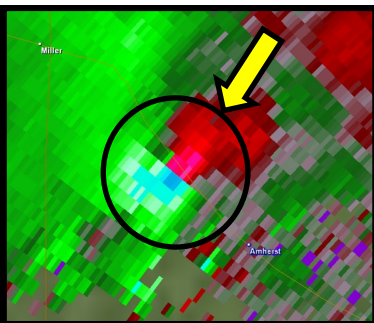


About a month prior to this, on **November 27th** (just days after Thanksgiving), three weak tornadoes touched down in Franklin, Webster, and Nuckolls counties, making them the '3rd latest calendar year' tornadoes in Nebraska since at least 1950. The strongest was an EF-1, touching down just east of Red Cloud (left - by Red Cloud Fire Department), damaging trees, irrigation pivots and destroying an outbuilding.

Learn more about these events at: www.weather.gov/gid/Christmas2016Tornadoes
www.weather.gov/gid/nov272016tors

10 Years Ago - South Central Nebraska Tornado Outbreak

With 12 confirmed tornadoes, June 20, 2011, ended up as one of the most active tornado days in recent history across the NWS Hastings coverage area. There were two main corridors of tornadic storms, one focused west of Highway 281, the other mainly east of Highway 281 and north of Interstate 80. The final tornado breakdown per the EF-Scale included two EF-3, four EF-2, three EF-1 and three EF-0. Despite considerable damage to mainly rural residences, these tornadoes resulted in no fatalities and only one known non-life threatening injury when a semi-truck was tipped over near Elm Creek in Buffalo County.



The first EF-3 rated tornado touched down just northwest of Amherst in Buffalo County just after 4 PM, causing damage to a couple of farmsteads and downing metal transmission line towers. Its estimated max wind speed was 160 MPH. The image to the left shows the strong tornado signature near Amherst via the KUEX radar Storm Relative Velocity product.

The second EF-3 rated tornado touched down later that evening a few miles east of Polk in Polk County, traveling north before lifting just north of the Highway 92/39 junction. Its max estimated wind speed was 140 MPH, causing the destruction of a farmstead along Highway 92.

The top image to the right is of damage to the farmstead along Highway 92 west of Osceola, from the NWS Storm Survey. The bottom image to the right is of that damaging tornado, taken from just west of Osceola by Greg Dumas.

Learn more about this event at:
www.weather.gov/gid/multipletornadoesjune202011





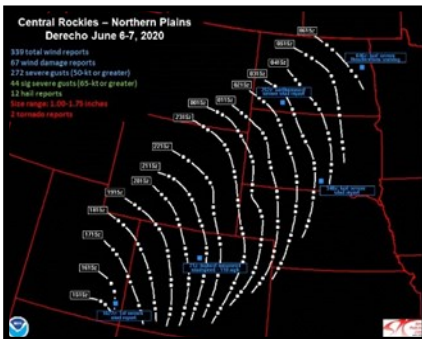
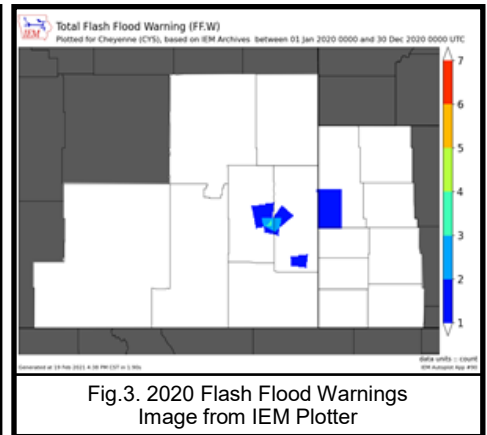
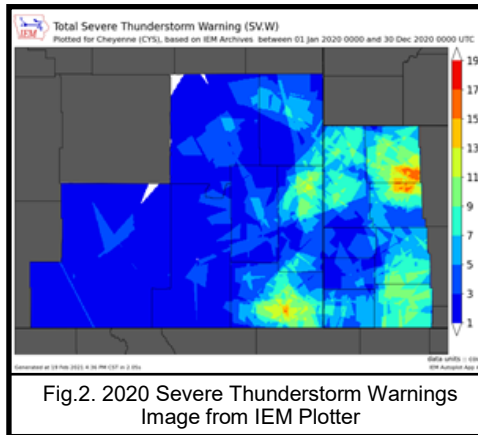
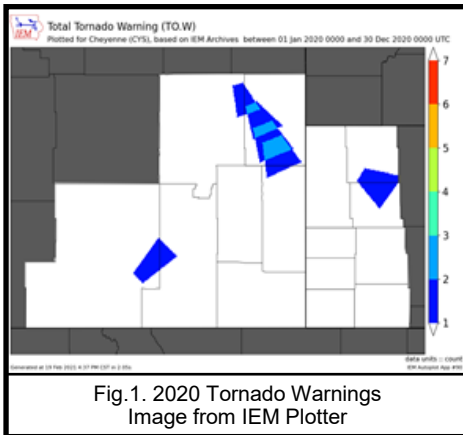
2020 Nebraska Severe Weather Summary

Severe Weather Awareness Week | March 22 - 26, 2021



Nebraska Panhandle - NWS Cheyenne, WY

The 2020 severe weather season across the western Nebraska Panhandle was below average for total number of severe wind, large hail and tornado events overall, but there were still several noteworthy impacts. The greatest overlap and number of severe thunderstorm warnings were issued for Dawes and Box Butte Counties with another localized maximum for southern Morrill and Cheyenne Counties in the southern Panhandle. Only one tornado warning and one flash flood warning were issued for the Nebraska Panhandle. Two tornadoes occurred, one being a brief landspout and another rated EF-2.



Severe weather season began in late **May** when a localized squall line occurred across Kimball and Cheyenne Counties. However, this was only a precursor to a much larger and more significant broken line of thunderstorms on **June 6th** that moved through entire NE Panhandle. This day brought a rare and widespread High Plains Derecho brought widespread wind damage to the NE Panhandle with winds of 65 to 80 mph. Per image (left) from NWS Storm Prediction Center (SPC), this derecho started west of the Continental divide in Colorado and Utah early in the morning and swept across the mountains and into the High Plains of CO, WY, much

of NE, and into the Dakotas. June 6th had the most 75mph+ wind reports across the entire U.S. since 2004. NWS Cheyenne received numerous reports of sheds blown over, metal roofs ripped off outbuildings and large trees uprooted. Two injuries were reported as metal siding was blown across a highway, striking two motorcyclists. **Late June** brought 2.5" to 3.0" hail to Dawes County with the community of Crawford being the most impacted. Hail damaged both roofs and cars, punching straight through windshields and windows.



On **July 2nd**, the most visually impressive tornado of season occurred (left). A NWS damage survey confirmed an EF-2 tornado that developed 5.8 miles east of Marsland and traveled to the west-northwest for 3.4 miles. Several large hardwood tree trunks and branches were snapped. Trees were uprooted, a center pivot point mangled and three steel power poles were destroyed.



2020 Nebraska Severe Weather Summary

Severe Weather Awareness Week | March 22 - 26, 2021



Nebraska Panhandle - NWS Cheyenne, WY Continued...

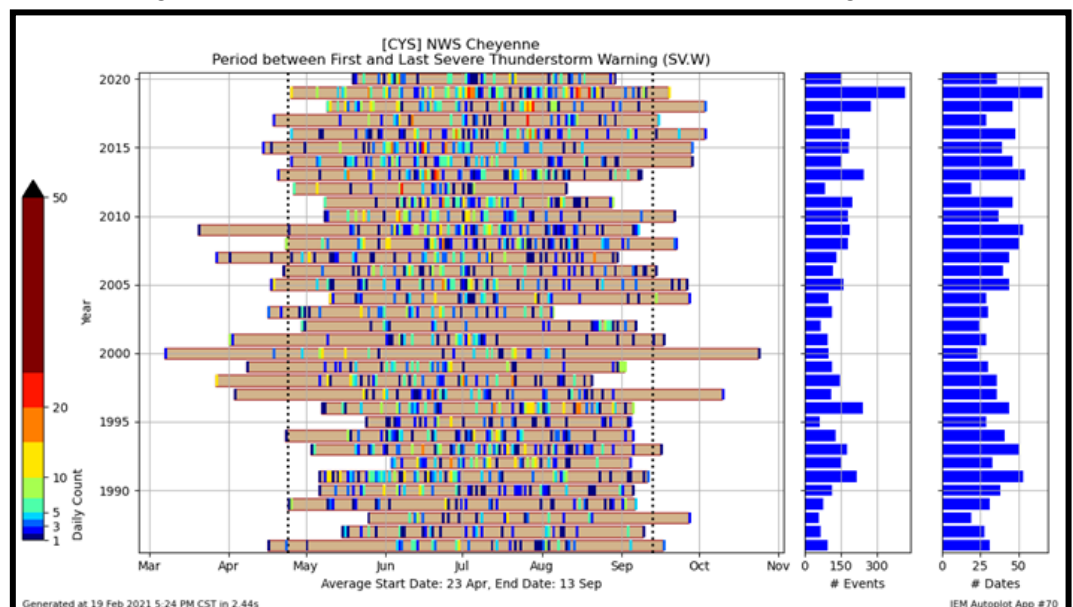
Followed shortly thereafter on **July 8th**, strong downburst winds occurred in Cheyenne County with measured wind gusts of nearly 90 mph. The next day, **July 9th**, severe thunderstorms impacted Box Butte County with large hail up to the size of golf balls and hen eggs. **July 18th-19th** also saw several rounds of large hail up to hen egg size and severe wind gusts of 60 to 70 mph.



August has fewer reports of severe weather but still a few notable events. An observer documented the quick lifespan of a landspout tornado over open country on **August 8th** northeast of Scottsbluff (left). No official survey was performed as no official damage was reported and the tornado was given an EF-U (unknown) rating. Timing and location of the brief landspout tornado were based on spotter reports. A week later, 3.25" hail stones were measured in Box Butte County near Hemingford from a very robust thunderstorm on **August 15th**. Two days later, **August 17th**, it was Dawes County's turn with severe storms that produced hail stones up to ping pong ball size. Due to outflow wind gusts, Chadron Public Radio reported power outages to 450 customers covered by the Nebraska Public Power District. To round out the month, on **August 27th**, there was a measured wind gust of 75 mph at the Chadron Municipal Airport.

The severe weather season ended early in 2020 for the Nebraska Panhandle as an early winter event occurred in September. No other severe weather reports occurred through the rest of 2020. In the figure below, courtesy Iowa State IEM Plotter, the 2020 time period between the first and last severe thunderstorm warning was the shortest since 1992. For the 2020 severe season (that does include statistics from southeast Wyoming), it started well after the average start date of April 23rd and ended before the average end date of September 12th.

Furthermore, 2020 totaled nearly 150 severe and tornado warnings combined which was about 60% less than 2019. 2019 was the most active year by far through the statistical period of record. Despite some of the impacts in 2020, the lower number of reports and warnings were a welcomed reprieve.





2020 Nebraska Severe Weather Summary

Severe Weather Awareness Week | March 22 - 26, 2021



Extreme Southwestern Nebraska - NWS Goodland, KS

The 2020 severe weather season was moderately active across extreme Southwestern Nebraska with several smaller events taking place. The season started out on **May 3rd and 4th** with penny to quarter sized hail reported across Dundy and Hitchcock counties. Wind gusts up to 80 mph were reported, destroying a small shed and snapping a few trees in half.

Year	Tornado Count
2020	1
2019	4
2018	1
2017	0
2016	1
5-Year Avg.	1.4

The season's lone tornado report came from Dundy County on **June 4th**. A brief landspout developed about ten miles west of Benkelman in association with a developing thunderstorm in the area. The landspout was rated as an EF-U. The EF-U designation has been created to classify tornadoes where no damage has been reported and thus the wind speed is unknown. The one tornado may seem low compared to the 2019 season's four tornadoes for extreme Southwestern Nebraska, however, the five year average for Dundy, Hitchcock and Red Willow counties is 1.4 tornadoes per year.

Convective weather quieted down for nearly a month with the next reported severe weather occurring on **July 2nd** when thunderstorms in Eastern Colorado crossed into Nebraska and Kansas. Hail ranging in size from pennies to quarters fell across portions of Dundy County and wind gusts to 74 mph were reported in Hitchcock County. A line of thunderstorms moving across Red Willow County on **July 8th** brought down a tree limb roughly three car lengths long.

July 12th Wind and Hail Event:

One of the larger events occurring across extreme Southwestern Nebraska occurred during the afternoon and evening hours of July 12th. During the afternoon, thunderstorms initiated along a dry line in Central Colorado. Through the course of the afternoon and evening, storms moved across the state line into Kansas and Nebraska, producing severe winds and hail. Hail ranging in size from penny to tennis ball was reported across Dundy and Hitchcock counties.

Thunderstorms produced wind gusts estimated at 91 mph in Eastern Dundy County in the town of Benkelman and north-northwest of Max. Tree damage was reported in both locations with limbs down and in at least two cases, trees uprooted or blown over. Broken windows due to hail and wind were reported in Hitchcock and Red Willow counties where gusts of up to 91 mph were reported. Power outages were reported in several towns across Hitchcock County.

Storms again moved through Dundy and Hitchcock counties on **July 20th**. Hail ranging in size from nickels to ping pong balls were reported along with 50 to 60 mph wind gusts in Hitchcock County. A lightning strike was the reported cause of an oil supply tank fire near Trenton. Slow moving storms caused prolonged rainfall over Dundy County, near the town of Parks. This resulted in part of a road and a small bridge being washed out around Rock Creek.





2020 Nebraska Severe Weather Summary

Severe Weather Awareness Week | March 22 - 26, 2021



Extreme Southwestern Nebraska - NWS Goodland, KS Continued...

Tri-State Flood - July 23rd and 24th:

On the evening of July 23rd, a cluster of thunderstorms crossed the border from Eastern Colorado into extreme Southwestern Nebraska. The storms appeared to become stationary over Dundy County as new storms cells developed to the southwest of the initial cluster and trained into the ongoing storms over the county. As the evening progressed, storms spread south and west into portions of Northwest Kansas and Eastern Colorado. Rain continued overnight, tapering off from west to east on the 24th.



Floodwater running out of the banks of the South Fork of the Republican River, south of Benkelman. Photo by Jason Frederick.

Rainfall ranged from around four to nine inches within the area where storms had appeared to be stationary over Dundy, Cheyenne and Yuma counties. Several roads across Dundy County were washed out, resulting in residents being stranded in some instances. At least one Amtrak train was stranded due to the tracks being washed out between Haigler and Parks.

The Republican River at Benkelman reached a peak height of almost nine and a half feet. Of the more notable road closures was Highway 34 from Benkelman to Highway 385 at Wray.

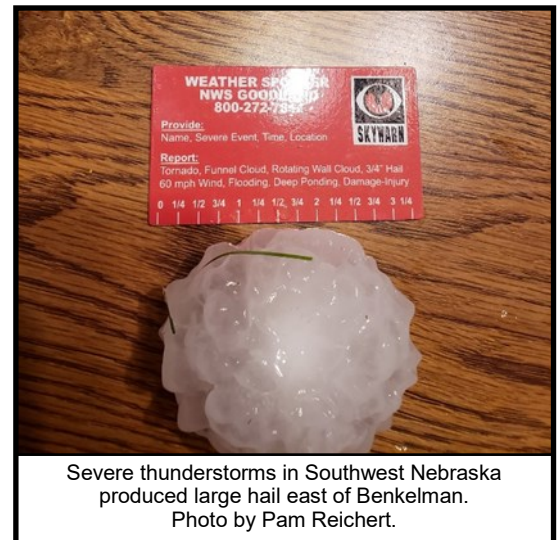
Saturated ground from previous flooding a few days earlier combined with the additional rainfall resulted in up to four feet of water covering at least one road between Parks and Doane.

Floodwater in the Republican River moved downstream on July 24th and 25th, into Hitchcock County. Flood stage was reported to have been met between the Dundy-Hitchcock county line and Stratton on the 25th. No damage was reported in Hitchcock County from the floodwater.

August 16th Hail Storm:

The final, large-scale, severe weather event across extreme Southwestern Nebraska occurred on the afternoon of August 16th. A cluster of supercell thunderstorms developed in Southwest Nebraska, moving south across the Kansas-Nebraska border. Thunderstorms produced varying sizes of hail across Dundy, Hitchcock and Red Willow counties.

Several reports of golfball to tennis ball sized hail came in from around Dundy County. Penny to quarter sized hail was reported in Hitchcock County and reports of quarter to golf ball sized hail was reported in Red Willow County. No known damage occurred as a result of the storms.



Severe thunderstorms in Southwest Nebraska produced large hail east of Benkelman. Photo by Pam Reichert.



2020 Nebraska Severe Weather Summary

Severe Weather Awareness Week | March 22 - 26, 2021



Western & North Central Nebraska - NWS North Platte, NE

The 2020 severe weather season was fairly quiet across western and north central Nebraska. The season had a late start, with the first episode of severe weather occurring at the beginning of May, and lasted until the end of August. A total of 10 tornadoes were reported in the area, all of which were EF0 or EF1.

Severe season kicked off on **May 3rd** with isolated thunderstorms forming in the Nebraska Panhandle, strengthening as they moved east during the afternoon. They were able to produce hail up to the size of ping-pong balls. On **May 23rd**, thunderstorms formed in the Panhandle and southwest Nebraska along a cold front, intensifying as they moved east into central Nebraska. These storms produced hail up to the size of golf balls. Along with hail, they resulted in intense wind gusts strong enough to knock down large trees, including a gust of 86 mph in Broken Bow. The storms continued past midnight into the morning of **May 24th**, causing flash flooding due to heavy rain in Custer County.

Thunderstorms formed almost every day across the area between June 2nd and June 7nd. On **June 2nd**, a funnel cloud was spotted with a storm, and baseball sized hail fell west of Hamlet. The next day, on **June 3rd**, storms formed along the South Dakota state line into central and southwest Nebraska, moving southeast, bringing heavy rain, lime sized hail and strong wind gusts up to 70 mph capable of knocking down tree limbs one foot in diameter. Thunderstorms formed on **June 4th**, **June 6th** and **June 7th** along a front, bringing gusty winds on all three days and tennis ball sized hail on the 7th. Spotters reported broken windows and destroyed outdoor furniture in the early morning hours on the 7th in Cherry County. On **June 8th**, weak EF0 tornadoes touched down in Custer, Lincoln and Blaine counties and did not cause any damage. However, a destroyed shed, flipped vehicles and toppled large trees could be attributed to 70 mph gusts in the area. Large hail was reported with these storms, including a 4.25-inch wide hailstone, between the size of a softball and a grapefruit, in Rock County, which was the largest reported hailstone of the season. There were a few reports of flash flooding, including one foot of water on a road in Custer County.



Tree damage in North Platte from the June 3rd thunderstorm.
Photo by Shawn Jacobs.



2020 Nebraska Severe Weather Summary

Severe Weather Awareness Week | March 22 - 26, 2021



Western & North Central Nebraska - NWS North Platte, NE Continued...

A powerful system moved across Nebraska on **June 9th**, bringing gusty winds throughout the morning and afternoon, with some gusts over 70 mph. Scattered thunderstorms on **June 17th** brought severe hail to northern Nebraska. Severe weather returned on June 20th with scattered thunderstorms across the area, including weak EF0 tornado spotted in Blaine County as well as tennis ball sized hail. In Logan County, hail partially stripped a cornfield. More scattered storms occurred across the area from **June 24th** to **June 26th**, bringing gusty winds and large hail.



Severe thunderstorm near Oshkosh on July 19th.
Photo by Caleb Brown.

Isolated thunderstorms produced large hail and gusty winds on **July 2nd**, and supercells formed in the northern Sandhills on **July 6th**. Strong winds from a supercell snapped a power pole near Merriman on **July 7th**. On **July 8th**, isolated afternoon thunderstorms produced landspout tornadoes in Perkins and Thomas counties. They were weak and did not cause any damage. Later, the storms coalesced into a line that brought damaging wind gusts up to 75 mph to north central Nebraska. Reported damages include roofs torn off buildings and downed trees and power lines. Severe weather continued the next day, **July 9th**, as supercells in northwest Nebraska moved southeast through the state, bringing severe wind gusts through the evening. A peak gust of 87 mph was reported at the North Platte Airport. Trees were downed along the Interstate 80 corridor. Other damage included a flipped semi truck near Sutherland and a flipped pivot south of

Maxwell. The next day, **July 10th**, more severe storms moved through central Nebraska, with a gust of 100 mph in Custer County. A semi truck was blown over on US 83 in Cherry County and a corn field was shredded in Custer County. Supercells produced more strong winds on **July 13th**, including an 87 mph gust in North Platte. A flagpole was snapped and a camper was rolled in Lincoln County. On **July 20th**, additional supercells produced baseball sized hail and damaging winds, damaging grain storage bins in Perkins County and breaking windows and downing power lines in Lincoln County. Scattered thunderstorms brought continued large hail and strong winds several times the rest of July, including on the **25th**, on which a grain auger was flipped and a shed was blown over in Blaine County.

Scattered severe thunderstorms moved across the area in the afternoon of **August 4th** and evening of **August 5th**, producing large hail. A line of severe thunderstorms moved across western and north central Nebraska on the evening of August 5th, with gusts up to 74 mph in Valentine. On **August 13th**, scattered thunderstorms produced tennis ball sized hail and an EF0 tornado in Brown County. The tornado was very brief and no damage was reported. A series of severe episodes occurred on **August 15th, 16th, and 26th**, with large hail reported. The last severe storms of the season occurred on **August 30th**. There were reports of a funnel cloud in Holt County, as well as golf ball sized hail.



2020 Nebraska Severe Weather Summary

Severe Weather Awareness Week | March 22 - 26, 2021

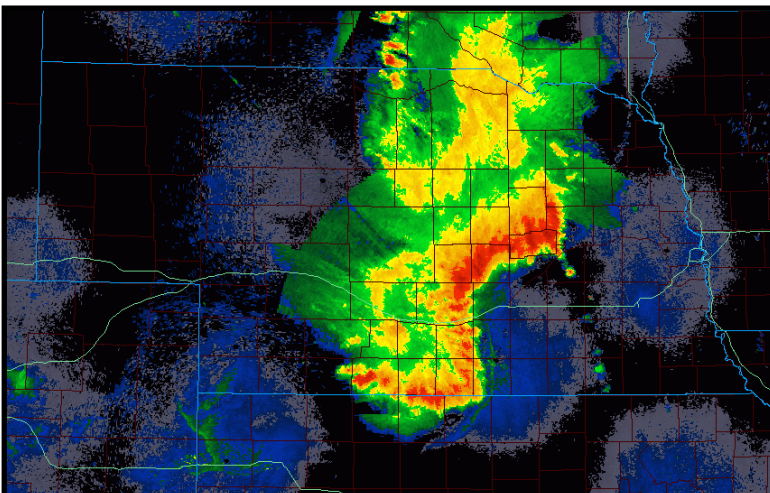


South Central Nebraska - NWS Hastings, NE

After a few reports of hail in March, the severe weather season began in earnest around **Memorial Day**. Heavy rain leading up to the holiday caused widespread flooding in southern Adams County. Campers at the Crystal Lake Recreation area were evacuated, State Highway 74 near Ayr was closed for a time due to high water, sandbagging was needed in Holstein and a BNSF trestle bridge was damaged north of Ayr. All of this was caused by a series of rain events dropping 3" to 6" of rain leading up to the weekend.

Once the holiday weekend arrived, severe thunderstorms produced strong winds, hail, more flooding and the first tornado of 2020 in south central Nebraska. A brief landspout tornado was witnessed by several people in northern Nuckolls County. The EF0 rated tornado was a classic landspout with a long, translucent condensation/dust funnel. The landspout upended eleven empty railroad cars on its 3.3 mile path. The weekend wrapped up with 4" to 8" of rain in northwest Adams and southern Hall Counties. A home just northwest of Kenesaw was flooded and its residents had to be evacuated. Numerous rural roads were impassable and damaged by the flood.

June kept the ball rolling with no less than 10 separate severe events. High winds whipped the area on **June 3rd**. The York Airport recorded at 79 mph wind gust. Snapped power poles and power outages were reported in the York area. Those same storms produced 60 to 70 mph wind gusts across Thayer County resulting in extensive tree damage. A series of smaller events tumbled through the middle of the month before more widespread severe weather closed out the month. Hail and high winds spared few from **June 27th-30th**. Winds estimated at 75 mph damaged grain bins and a shed near Minden. Nearly 80 mph winds snapped power poles and overturned pivots west of Aurora. On the 30th, the combination of quarter to golf ball size hail and strong winds cause crop damage in parts of Hall county.



Regional radar showing the QLCS moving across central Nebraska around 11:30 PM on July 8th. Image courtesy of the College of DuPage.

As summer settled in, the most widespread event of the year occurred on **July 8th**. An extensive line of thunderstorms called a Quasi-Linear Convective System (QLCS) ripped across the area during the late evening. While much of the area experienced hail and wind, the strongest winds were roughly east of U.S. Highway 281. Winds up to 80 mph snapped trees, power poles and crops. Many small towns reported lengthy power outages. Multiple roads were blocked by downed tree limbs. A wind gust of 75 mph was recorded at Carleton in northwest Thayer County. This event also brought the second tornado of the year along a short path near Silver Creek in Merrick County. Damage by this EF0 rated tornado was primarily confined to trees and overturned irrigation pivot systems, though minor damage was noted at one farmstead. The

tornado had estimated peak winds of 85 mph and path length of 4.2 miles.

Just two days later on **July 10th**, high winds of at least 75 mph caused widespread damage in Cozad in central Dawson County during the early morning hours. Roof, tree and building damage was reported, including the town square gazebo being pushed to a 45 degree angle. Later in the day, 60+ mph winds were reported across Buffalo and Kearney counties causing minor damage.



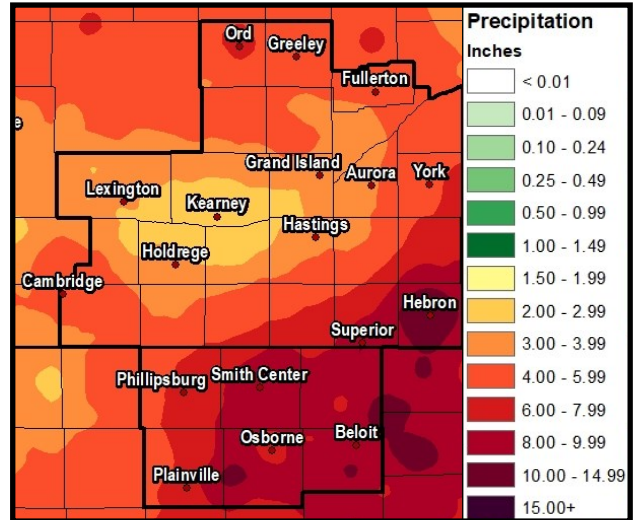
2020 Nebraska Severe Weather Summary

Severe Weather Awareness Week | March 22 - 26, 2021



South Central Nebraska - NWS Hastings, NE Continued...

One of the more unique climate related facts occurred in July when Hebron experienced its wettest month on record and not just for July, but any month in history! Thirteen days of rain resulted in 16.70" of total precipitation for the month, or about 12" more than normal. By the end of the month, flooding had become an issue in the county. From **July 26th-29th**, rural roads were covered or washed out by water and portions of Highways 5, 81 and 136 were all closed for a time due to flooding. The image to the right shows estimated rainfall for the entire month of July.



August brought the next set of tornadoes to the area, but thankfully the overall damage was limited. Three brief, EF0 rated tornadoes were confirmed in Hamilton and Clay counties on **August 14th**, all from the same parent thunderstorm. Sporadic crop damage was the main impact from the tornadoes during their short lifespan. On the same day, baseball size hail busted a vehicle's windshield east of Clay Center.



August 16th brought more rain and hail, this time centered on Grand Island with half-dollar size hail. However, the rains basically shut off after mid-August leaving only one lone report of nickel size hail at North Loup on **August 30th** as the final report of the month.

After a dry and warm September, the final event of the season came on Columbus Day, **October 11th**. A strong cold front producing high winds also triggered a line of severe thunderstorms east of Hastings. Winds of 60 to 75 mph resulted in widespread blowing dust (and cornstalks) causing near zero visibility at times which resulted in a four vehicle accident on U.S. Highway 81 just north of Bruning. Also in Bruning, an empty 500 gallon tank was blown onto Main Street. Parts of Clay, Fillmore and Thayer counties sustained the most damage from the storms.



2020 Nebraska Severe Weather Summary

Severe Weather Awareness Week | March 22 - 26, 2021



Eastern Nebraska - NWS Omaha/Valley, NE

2020 was a below normal year for severe weather occurring in eastern Nebraska and southwest Iowa. Only two tornadoes were confirmed the entire year.

The severe weather season started early on **March 19th** when thunderstorms near a warm front produced large hail. Hail up to half dollar size fell in Millard. The hail was larger in southwest Iowa when 2-3" diameter hail fell near Stanton, Villisca and Red Oak. April was a quiet month with the only severe weather episode occurring on the morning of **April 13th** where up to 2" hail fell in east Lincoln and Waverly. In early May there was only one isolated hail report, but later in the month there were a couple more significant events. On **May 22nd**, a low pressure system moving across northern Kansas produced some marginally severe hail, some brief flash flooding in Lincoln. There were funnel cloud reports and a brief tornado south of Barneston in Gage County. On **May 24th** there was cold front that produced thunderstorms with damaging winds. Trees were toppled and houses suffered roof damage in some areas from the high winds. Winds gusted to up to 75 mph at several locations in Madison County. The NWS office in Valley recorded a 71 mph wind gust.

June was more active with severe weather than previous months. There were nine days of severe weather during the month. On **June 9th**, a brief tornado was reported near Fairbury. There were also numerous reports of hail ranging from 1-1.75" in diameter and winds ranging from 65 to 75 mph. The winds downed many large limbs and trees across east central and southeast Nebraska. From **June 18th** through the **30th**, there were several storm events that produced damaging winds, hail up to 2" in diameter and lowland flash flooding.

Strong Wind With No Rain How does this happen?

This morning (Aug 10), much of eastern NE and southwest IA experienced 50-70 mph winds with widespread tree damage. Yet a lot of this wind happened without so much as a drop of rain. Read on to find out how!

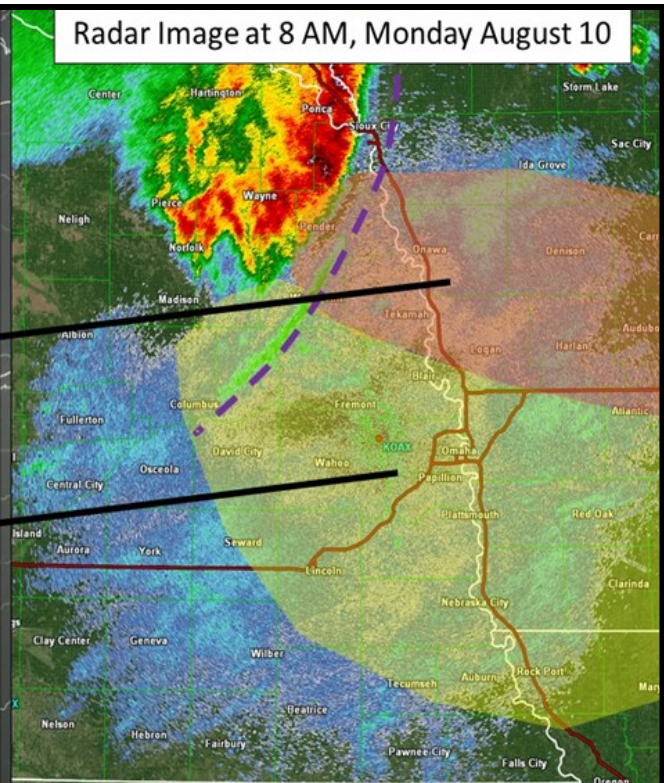
Very Unstable – Supported Severe Storms

The orange-shaded area supported continued intense thunderstorms all morning, but ESPECIALLY as storms moved farther east where air near the ground was more unstable and strong winds could more easily reach the ground to cause damage.

Very Stable Near-Ground Air

The yellow-shaded area had a more complex evolution of strong wind. Here the air near the ground was very stable, not allowing much thunderstorm development. HOWEVER, the rain-cooled air from storms to the north rapidly spread southeast (cold air is denser than warm air), and became trapped in the stable (it acts like a cap or lid). This let the cold air accelerate southeast well away from the original storms, bringing widespread damaging winds with it!

Radar Image at 8 AM, Monday August 10





2020 Nebraska Severe Weather Summary

Severe Weather Awareness Week | March 22 - 26, 2021



Eastern Nebraska - NWS Omaha/Valley, NE Continued...

The early part of July was active, particularly **July 6th** through the **10th**. Storms from several weather systems produced large hail and damaging winds. The worst damage occurred in Gage and Lancaster counties where trees were blown down, a pole barn toppled and a wind gust of 80 mph was measured. The weather turned quiet after the **10th**. The next thunderstorm events occurred on the **26th** and **29th** when slow-moving thunderstorms dumped heavy rain across southeast Nebraska. Many roads were closed due to water over the roadway.

In August, the most significant weather event occurred on the morning of the **10th**. A line of thunderstorms was moving east-southeast out of southeastern South Dakota. This would later develop into a long-lived damaging windstorm event called a "derecho". The first report of wind damage was near Niobrara where a large tree was blown down. More trees were then toppled as the system moved southeast. Some of the intense winds moved out well to the south of the thunderstorms complex, and the winds gusted without any precipitation (see diagram on previous page). Peak wind gusts included 62 mph at Lincoln, 64 mph near Offutt Air Force Base, 67 mph at Omaha Eppley Airfield, and even a personal weather station in Omaha measured a gust of 77 mph. The wind caused widespread power outages in the Omaha metropolitan area. Homes were damaged by falling trees. In Iowa, Harlan had a measured gust of 64 mph. The storms system continued east and gained strength going across Iowa where devastating damage took place. The system rolled across Illinois, Indiana and Michigan producing wind damage before winding down.

On **August 16th**, severe thunderstorms in Saunders County produced tennis ball size hail near Colon and golf ball size hail near Wahoo (see below).



Baseball size hail near Colon on August 16th.
Photo by Weldon Hoppe.

The remainder of August and all of September were relatively quiet with only two severe weather events.

On **October 11th**, the last reports of severe weather occurred when a cold front generated a line of thunderstorms. Damaging winds accompanied the storms, with peak gusts of 76 mph at Lincoln Airport, 63 mph at Beatrice, 64 mph at Falls City, 61 mph at Shenandoah, IA and 60 mph at Omaha Eppley Airfield. These winds toppled trees and downed power lines. Large hail up to baseball size was reported near Madison.