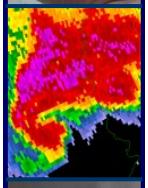
Nebraska Severe Weather Awareness Week 2022

March 21 - 25, 2022







It's fair to say that 2021 brought unique weather to all portions of Nebraska. From tornado outbreaks and dust storms to tornado warnings and snow squall warnings being issued on the same day, our weather has been impactful. The National Weather Service remains committed to working with leaders from across the state to build "Weather-Ready" communities.

March 21-25 is Nebraska Severe Weather Awareness Week. We encourage everyone to take time to review and practice your severe weather plan for your home or office. If you don't have a plan, this is a great time to consider developing one and sharing it with others. Preparing an emergency kit with basic supplies such as food, water, blankets and a flashlight can save precious time when reacting to an actual event. By working together to ensure we are ready for disaster, we can better prepare our families, friends, and communities for these times.

Your Storm Reports in Action

Although it is not common for severe weather to occur in the winter, Nebraska has had at least one reported tornado during each month of the year since official records have been kept. The reports we receive from our partners and the public contribute to keeping our neighbors and fellow Nebraskans safe when disaster strikes.

The ground truth provided gives forecasters an idea of what a storm is doing. These reports are used in research aimed at better understanding how storms work. Your storm reports play a vital role in keeping others safe, both now and in the years to come.

Tornado Number Trends

Tornadoes reported across Nebraska in 2021 were down slightly from the 30-year average of 51. Of the 44 tornadoes occurring in the state last year, over half these tornadoes occurred on either May 26th or December 15th.

Storm reports are eyewitness reports providing critical information to meteorologists making warning decisions. This real time information allows forecasters to have ground truth of what is actually happening below where the radar cannot see.

We are grateful to our storm spotters, partners, and local community members for your continued support and assistance in providing this information.

Statewide Tornado Safety Drill

Test Warning:
10:00 a.m. CDT
9:00 a.m. MDT

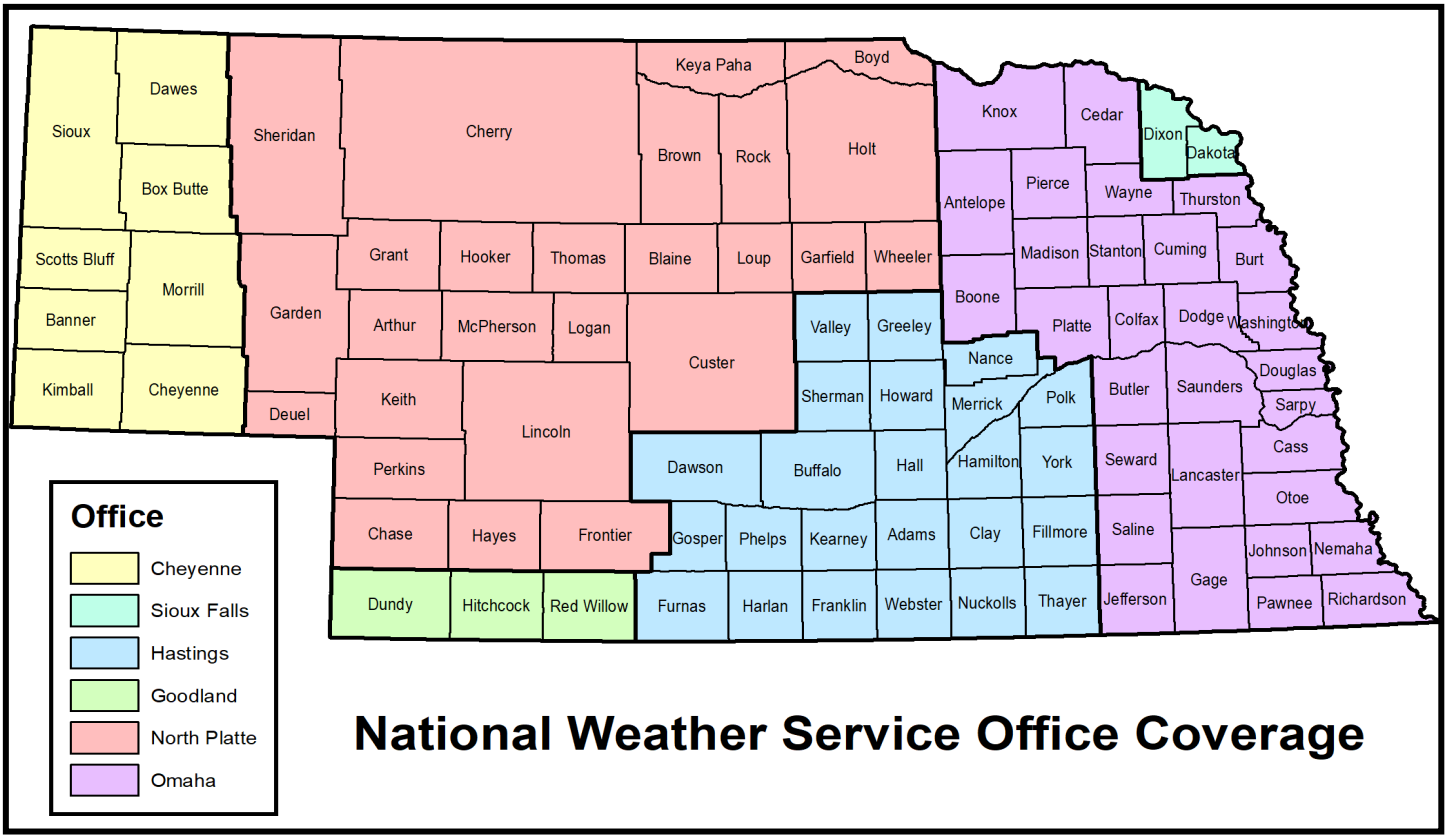
Do you and your family know what to do if a tornado threatens?

Practice your plan of action!

What's Inside?

National Weather Service Offices Serving Nebraska

Severe Weather Awareness Week | March 21 - 25, 2022



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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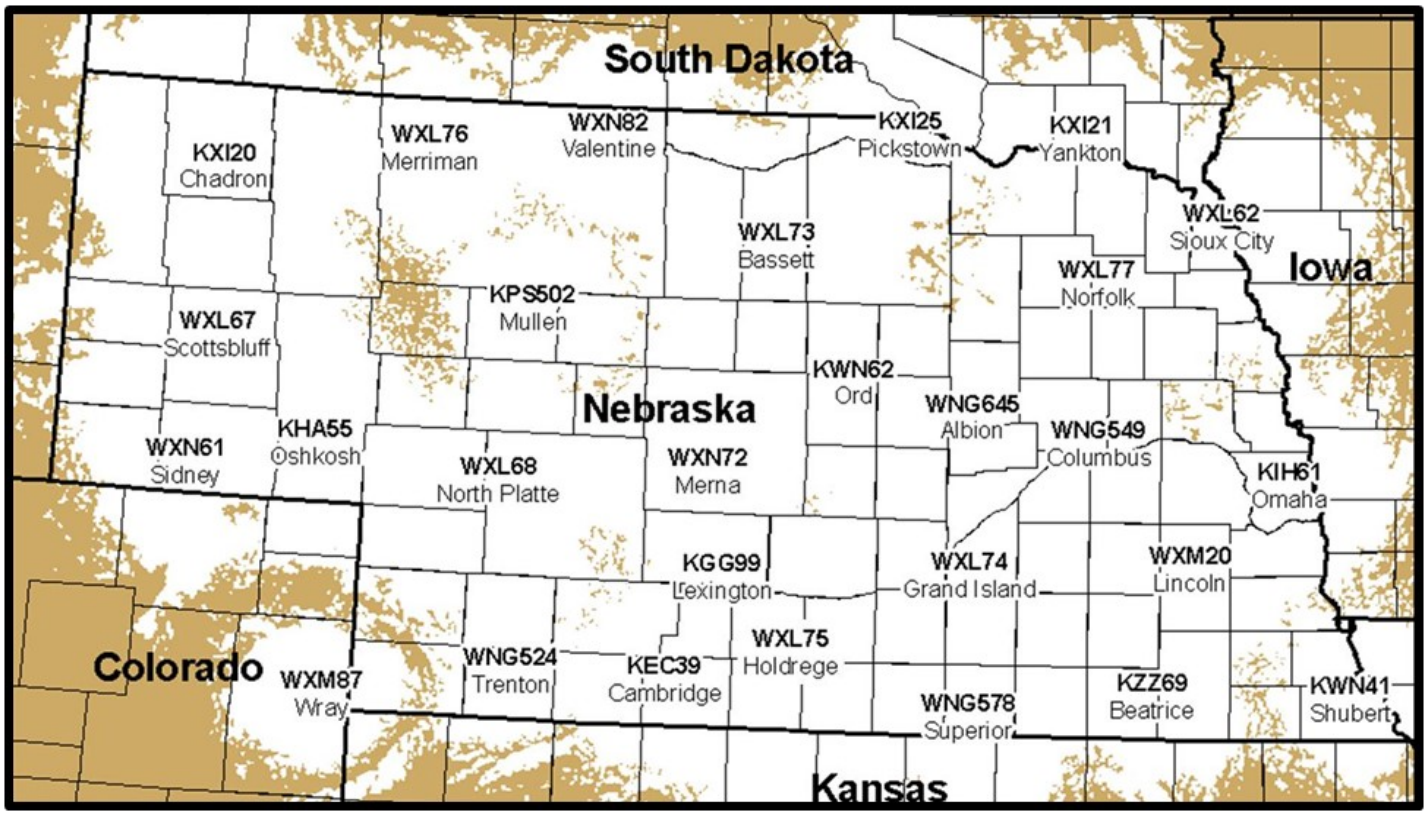

NOAA Weather Radio All Hazards (NWR) is a nationwide network of radio stations broadcasting continuous weather information directly from the nearest National Weather Service office. NWR broadcasts official Weather Service warnings, watches, forecasts and other hazard information 24 hours a day, 7 days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

Coverage information and SAME Codes for every county in Nebraska can be found at:

www.weather.gov/nwr/nebraska

2021 Nebraska Tornado/Severe Weather Facts

Severe Weather Awareness Week | March 21 - 25, 2022

Tornadoes: 44 (2 more than the 1950-2021 average of 42 & 7 less than the 30 year average of 51)

Deaths: 0 **Injuries: 2**

Longest track: 12.9 mi (December 15th - In Hamilton County)

Greatest width: 575 yards (May 26th - In Dundy County)

Strongest: Multiple EF2 Tornadoes

Most in a county: 6 (Cuming County)

Days with at least 1 confirmed tornado: 11

Most in one day: 28 (December 15th)

Most in one month: 28 (December) **Most December Tornadoes in Nebraska in a single year!**

First tornado of 2021: March 14th (EFU In Hitchcock County)

Last tornado of 2021: December 15th (EF1 - In Thurston County)

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

2021 Monthly Tornado Totals

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Total	0	0	1	0	14	0	1	0	0	0	0	28	44	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	1	0	0	0	0	0	0	6	7	5%
EF1	0	0	0	0	0	0	0	0	0	0	0	16	16	0%
EF0	0	0	0	0	5	0	0	0	0	0	0	6	11	57%
EFU	0	0	1	0	8	0	1	0	0	0	0	0	9	38%

2021 Season Peak...

Hail Size: 4.3" on July 9th - Near Berea (Box Butte County)

Wind Gust: 99 MPH on December 15th - Near Ithaca (Saunders County)

Nebraska Tornado Facts

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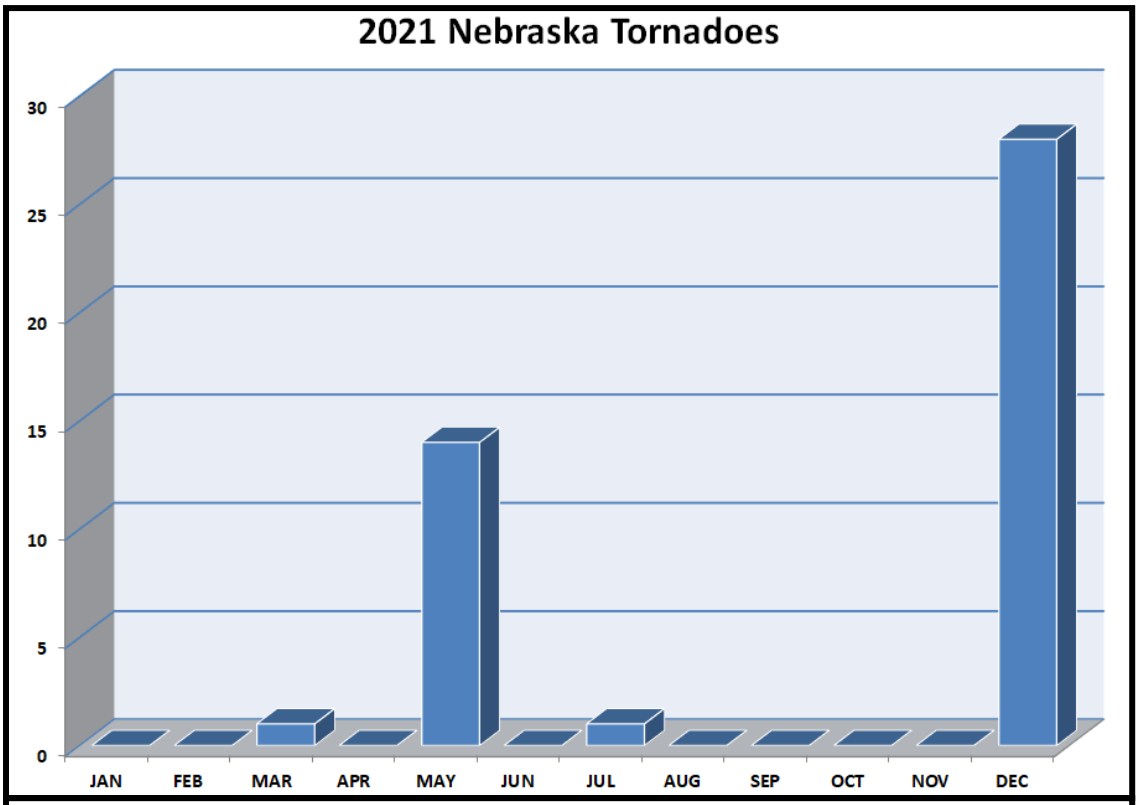

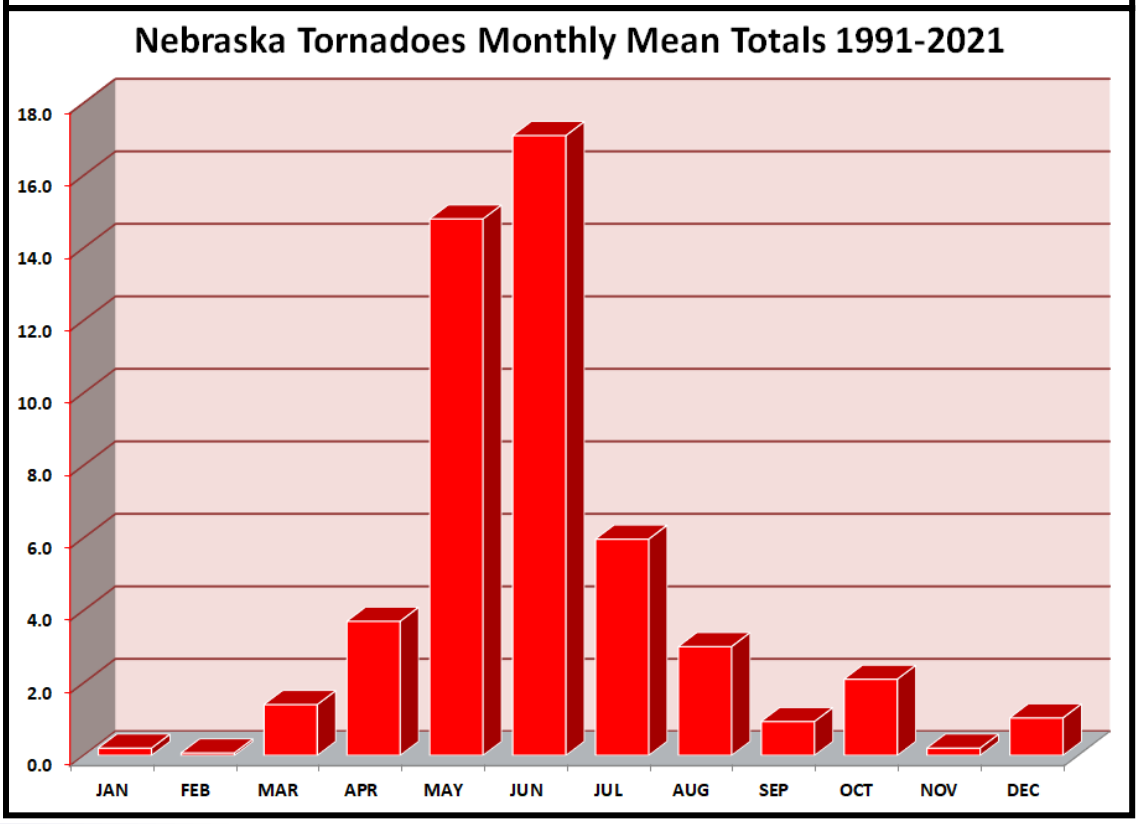

Nebraska Tornado Facts

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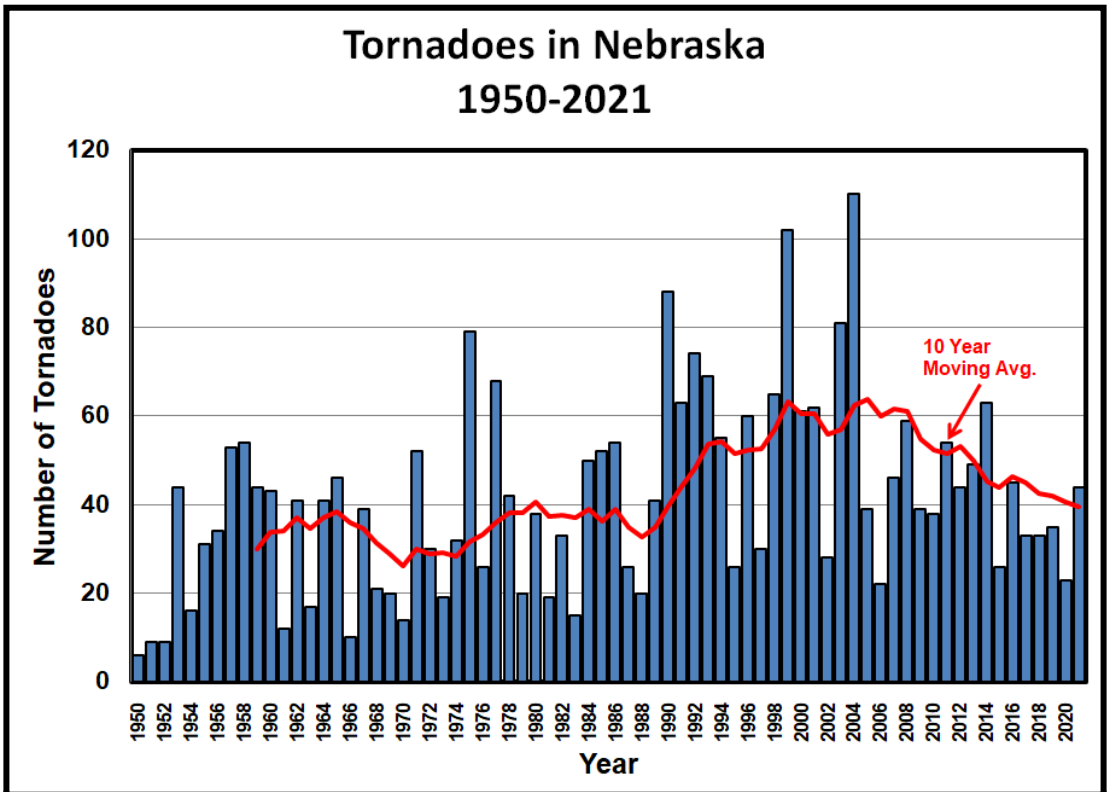
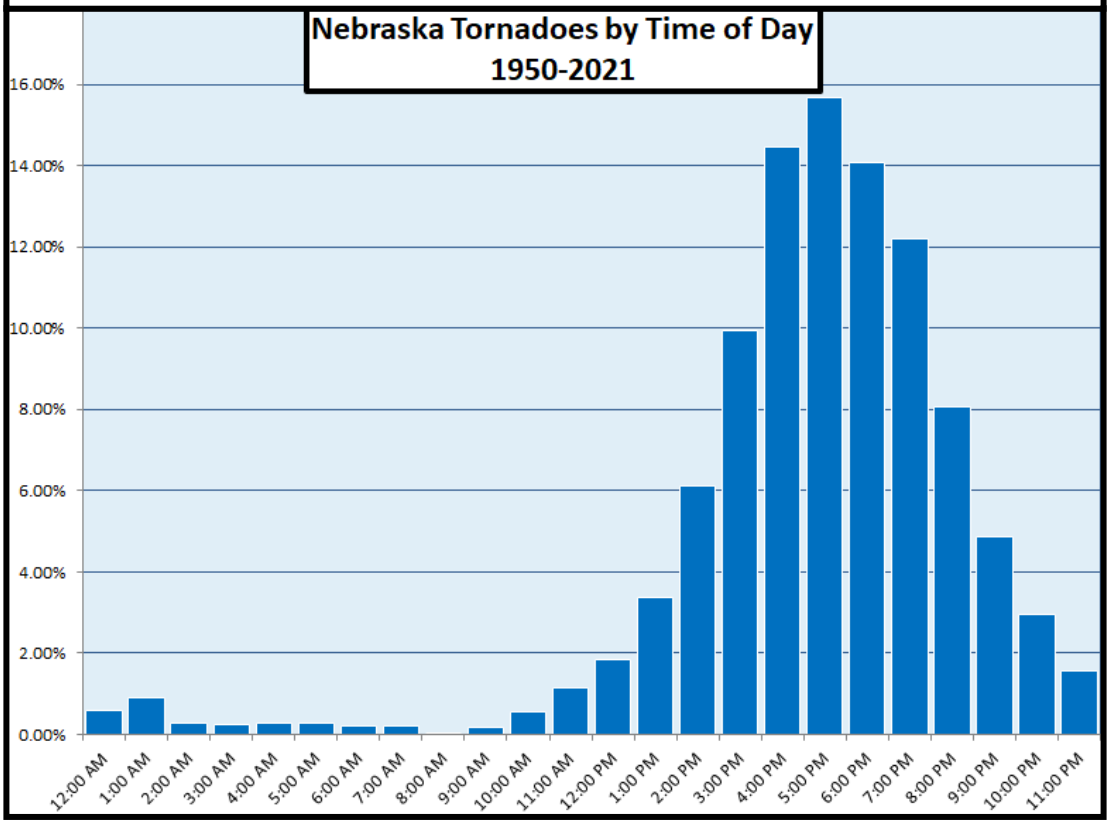
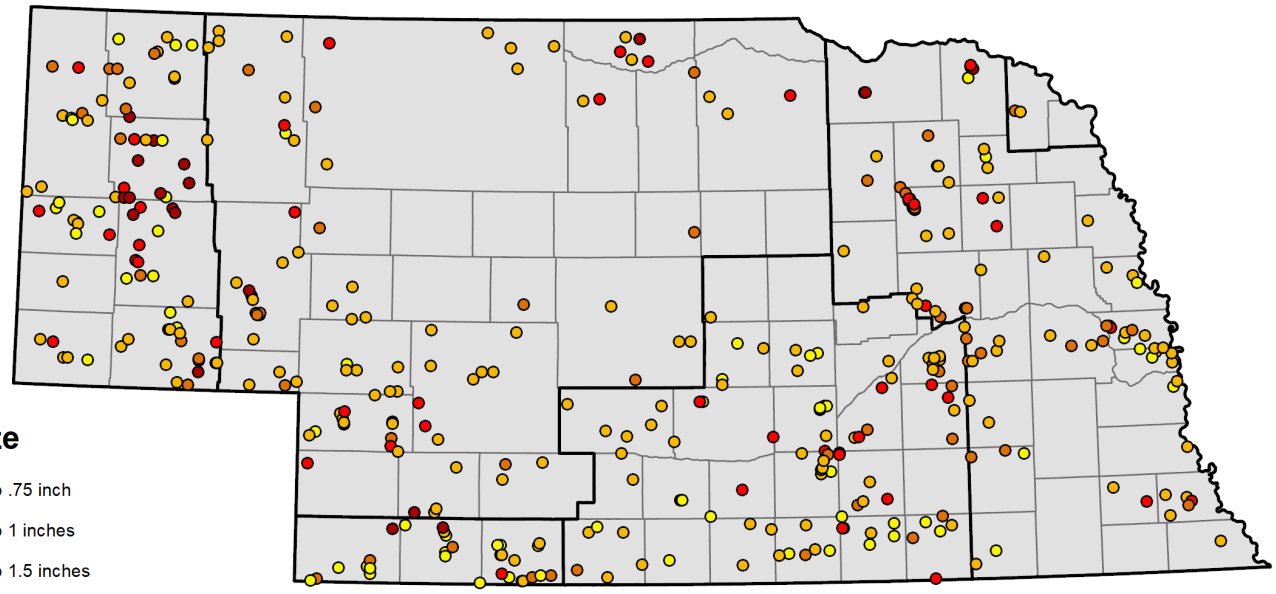




Nebraska
Severe Weather Reports

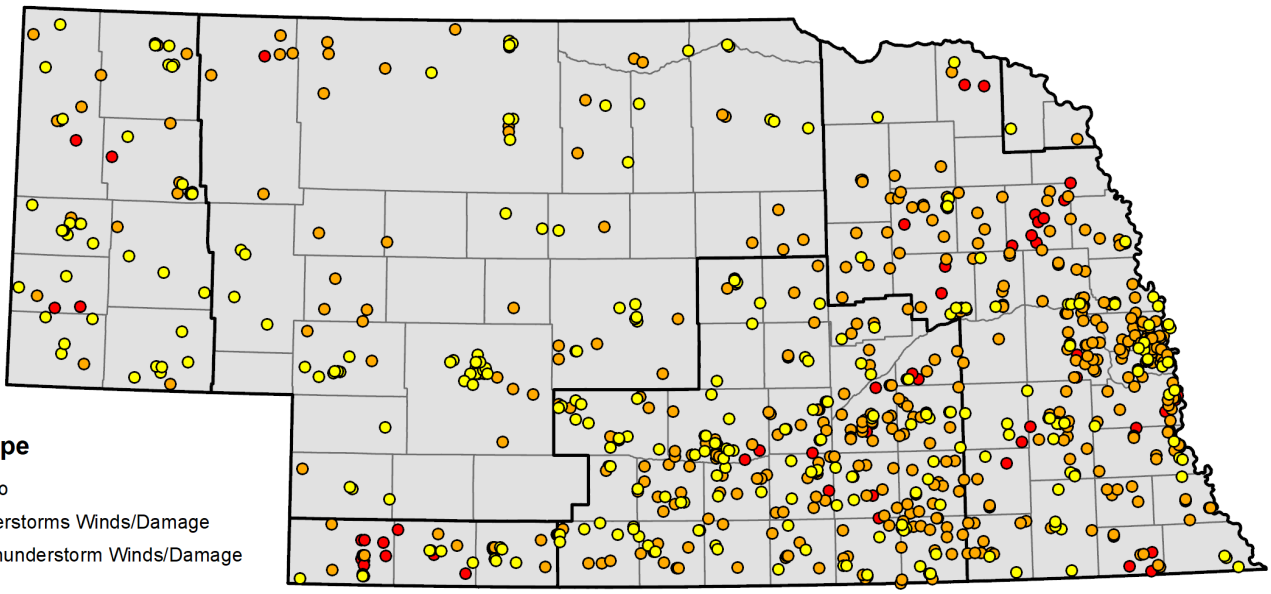
Severe Weather Awareness Week | March 21 - 25, 2022

Below are images showing hail, tornado and wind reports received during 2021.



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

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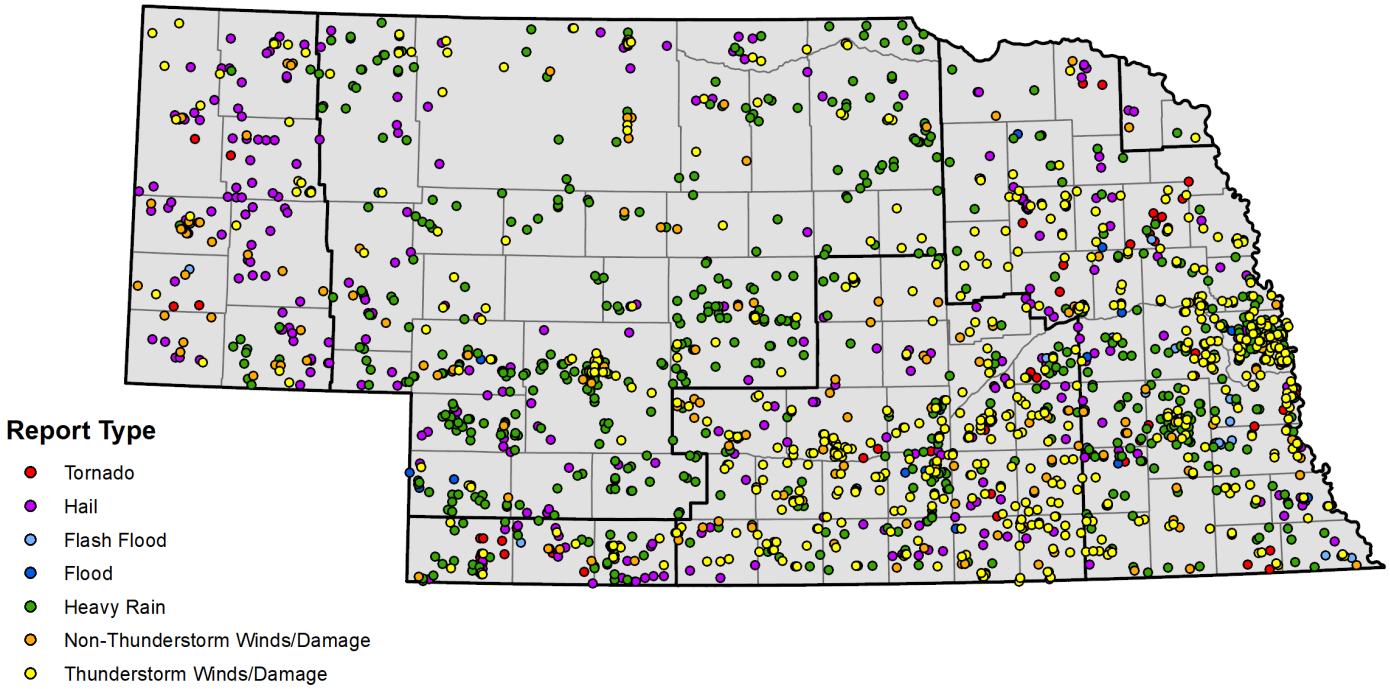
Below an image showing combined tornado, wind, hail, heavy rain and flood reports received during 2021.



Have you found us on your favorite social media platform?

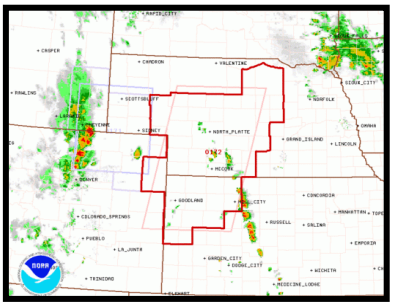
Find and follow us for the latest weather updates, climate facts, and cool pictures!

NWS Omaha/Valley, NE	**@NWSOmaha**	**US National Weather Service Omaha**
NWS Hastings, NE	**@NWSHastings**	**US National Weather Service Hastings**
NWS North Platte, NE	**@NWSNorthPlatte**	**US National Weather Service North Platte**
NWS Cheyenne, WY	**@NWSCheyenne**	**US National Weather Service Cheyenne**
NWS Goodland, KS	**@NWSGoodland**	**US National Weather Service Goodland**
NWS Sioux Falls, SD	**@NWSSiouxFalls**	**US National Weather Service Sioux Falls**

Find NWS North Platte on Instagram! @nwsnorthplatte

Severe Weather Terminology

www.weather.gov/safety



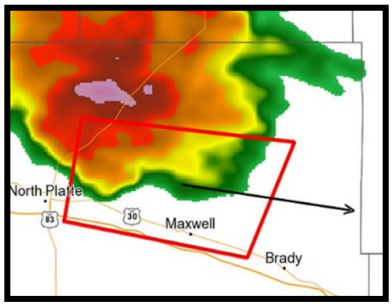
WATCH

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.

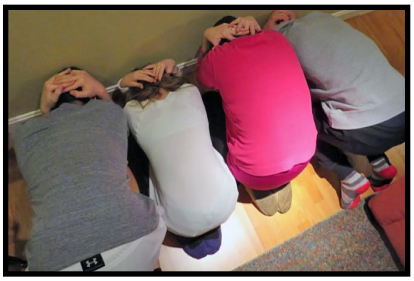
Have A Plan: Create a family plan with contact information and an emergency meeting place. Practice your plan!

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 on the lowest floor of the building 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 no shelter is available, take cover in a ditch or low lying area.

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 updates. Multiple rounds of severe thunderstorms are possible during severe weather outbreaks. Follow instructions of local authorities!

Contact Loved Ones: Let them know you are 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! As little as 6 inches of rapidly moving 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 as 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

When Thunder Roars, Go Indoors!

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.

Although 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 severely 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 structure.
- 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, there are ways to 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 such as telephone poles and trees.
- 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.

Recreational Safety

www.weather.gov/safety

A trip to your favorite camping spot or fishing lake should be exciting. Though, the excitement can quickly change to fear and resentment when inclement weather threatens your favorite recreational spot. The National Weather Service (NWS) can help ensure you have a wonderful time that is full of great memories and fun.

These tent poles were broken when a tent was blown away by a strong thunderstorm. Photo Credit: Darren Snively

To stay safe, you need to be aware of the expected weather and your surroundings. Storms can create a myriad of hazards, such as lightning, extremely gusty winds, flooding rains, large hail and even tornadoes. By simply following these suggestions, you can help raise awareness and stay safe while recreating.

What should you do before venturing out to your favorite recreation site? Always check the forecast and notify friends and family of your plans. Scout out your evacuation plan before arriving on site and then determine how long it would take to get to your safe shelter in the event inclement weather approaches. And it's always a good idea to test out your weather radio and ensure you have a first aid kit readily available.

Once you arrive at your destination, have fun, but always provide for safety first. This means identifying potential hazards to you and those recreating with you. Are you camping under a tree? If so, what happens if thunderstorm winds approach? Will you be boating? Are there wind or beach hazards you should remain alert to? Does your recreation site have limited access in and out? These are all valid questions that would need to be address to ensure a safe trip. The best way to remain situationally aware to changing weather conditions is simply to monitor the current and expected conditions and then act immediately once warnings are issued. If by chance you observe ongoing severe weather or damage, feel free to report it to the local National Weather Service office. Ground truth reports are especially appreciated from recreational areas.

Once you return home, consider being a positive force multiplier in the recreational community by including photos or sharing reviews to help others safely recreate. It's always a good idea to plan ahead, so start thinking about your next camping trip or day at the beach.

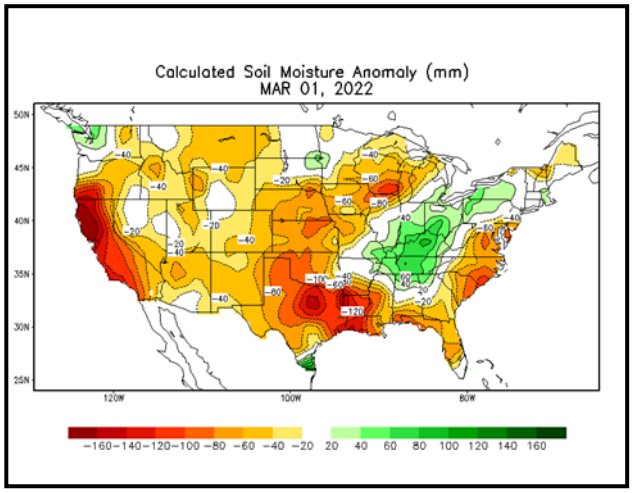
Something as simple as a falling tree branch during strong winds can injure a person in a tent. Photo Credit: Shawn Jacobs.

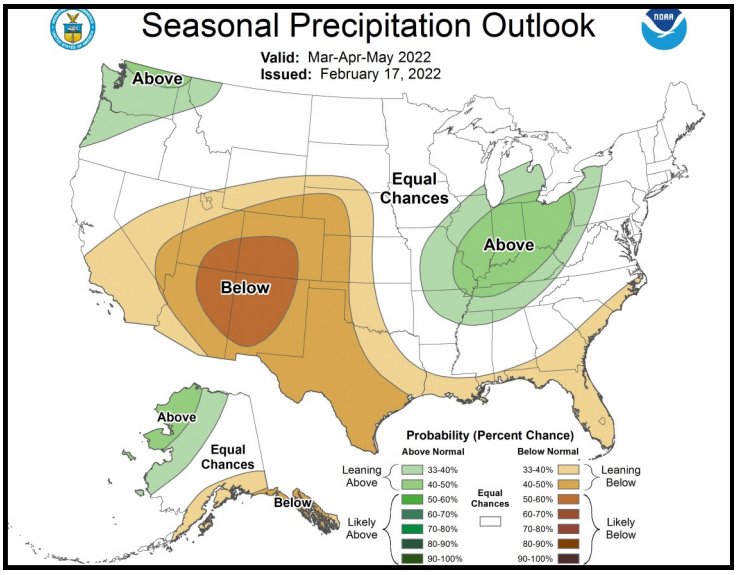
2022 Nebraska Spring Flood Outlook

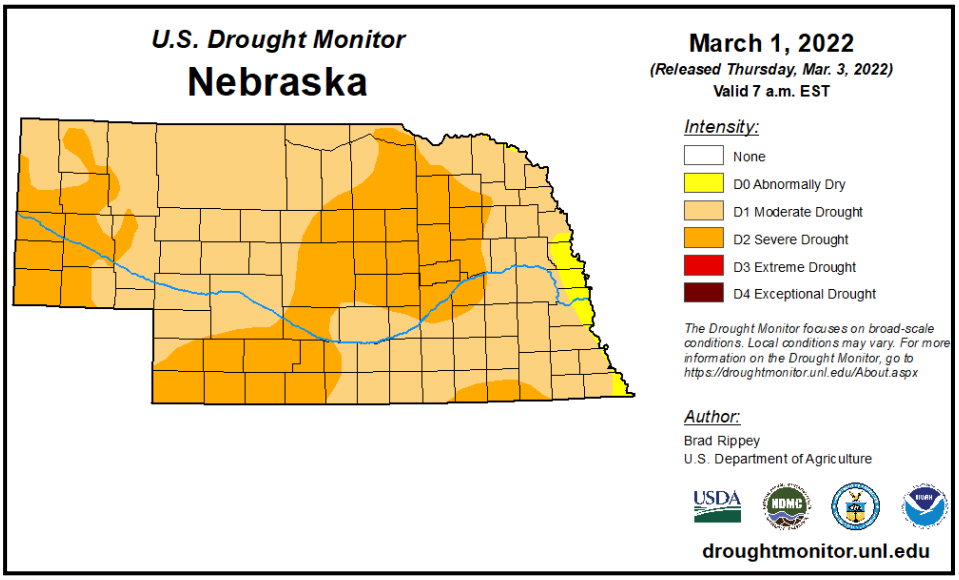
Severe Weather Awareness Week | March 21 - 25, 2022

Each year, the NWS assesses the spring time flooding potential for Nebraska. This year, the overall flooding risk is below normal. Nebraska has been in a drought since last summer and soil moisture is much below normal. The three month precipitation outlook of March through May is leaning 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 near normal at 95 to 100 percent. With reservoir storage in Wyoming below normal, 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 about 85 percent of normal and the flood risk along the Missouri River can generally be characterized as below 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 the current dry period, 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

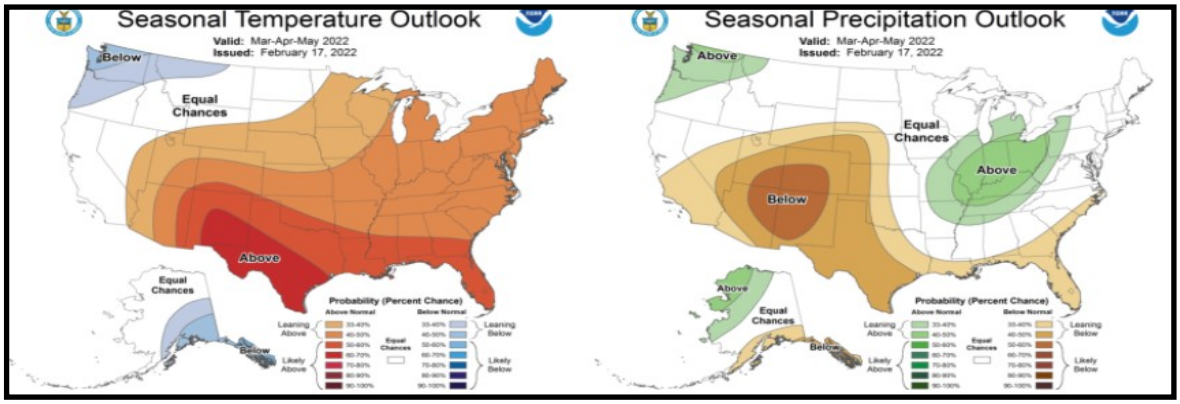
Severe Weather Awareness Week | March 21 - 25, 2022

Winter temperatures across Nebraska were well above normal in November and December with temperatures near normal to slightly above normal for January and February. The winter of 2021-22 will end up being above normal for temperatures and below normal for precipitation. Since November, almost all of Nebraska saw below normal precipitation with the greatest deficits in central and eastern Nebraska.

Approaching spring, what does the latest outlook hold for Nebraska? The latest temperature outlook for Nebraska, calls for above normal temperatures for the entire state. As for the precipitation outlook, it is mixed. For locations in western and central Nebraska, below normal precipitation is forecast. For the eastern third of Nebraska, the forecast is for equal chances for below, above, or near normal precipitation. A forecast of equal chances means there is not a strong enough long term forecast signal favoring below, above or near normal precipitation.

March-April-May (MAM) Temperature Outlook

March-April-May (MAM) Precipitation Outlook

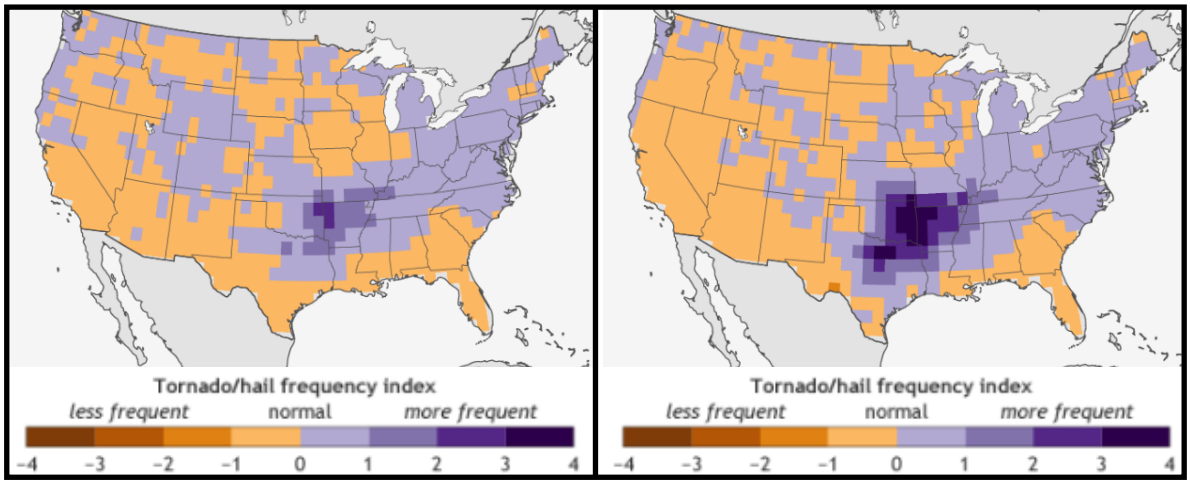


For more information on these outlooks, see: **https://www.cpc.ncep.noaa.gov/**

As we transition from La Nina conditions this winter to neutral ENSO conditions this spring, research has shown an increase in severe weather frequency in the Ozarks and the lower Mississippi Valley. Increases in tornado frequency in Nebraska are subtle. In fact, with similar ENSO conditions from winter 2020-21 to spring 2021, severe weather reports were lower than normal last year compared to a typical severe weather season.

La Niña Impact on Hail Frequency (MAM)

La Niña Impact on Tornado Frequency (MAM)



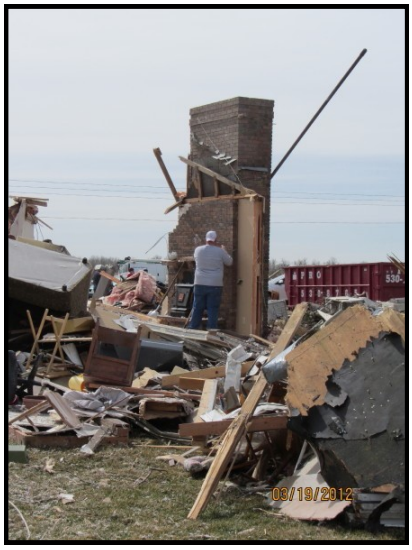
For more info, see: **https://www.climate.gov/news-features/blogs/enso/enso-and-tornadoes**

A Look Back At Past Nebraska Severe Weather Events

Severe Weather Awareness Week | March 21 - 25, 2022

10 Years Ago – North Platte Tornadoes

March 18, 2012 is a day that many in North Platte will not forget. A strong, isolated supercell developed along a dry line in southwest Nebraska and proceeded to move north into the evening. This supercell produced a series of tornadoes. The first one touched down near Lake Maloney, destroying a transmission tower and damaging two homes, later rated as EF-3 damage by NWS surveyors. Two people were injured. As that tornado dissipated near Interstate 80, another tornado touched down nearby and proceeded north. The second tornado crossed Interstate 80, flipping a semi truck and injuring its driver. It also destroyed an irrigation pivot and a cluster of outbuildings before lifting, resulting in EF-1 damage.



Damage observed in North Platte during NWS storm damage survey.

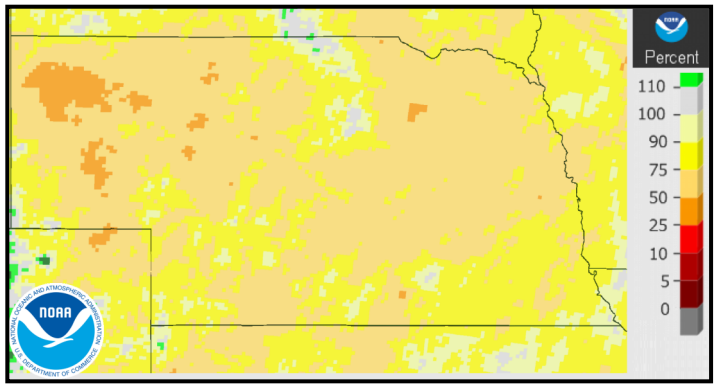

Tornado seen southwest of North Platte. Photo credit: Jake Berglund.

The third and perhaps most memorable tornado touched down near Front Street in North Platte, destroying two homes and damaging two surrounding homes, injuring two residents. The tornado then entered Union Pacific Bailey Yards damaging 31 train cars, 15 of which were blown off their tracks. Surveyors determined this to be EF-3 damage. The final tornado near North Platte touched down on the north edge of town, damaging two homes and destroying a barn, rated EF-2 damage. Winds were strong enough to drive wooden boards into the ground.

Additional tornadoes touched down near Ringgold and Valentine later that evening. EF-0 damage occurred in Ringgold, and the supercell produced hail the size of baseballs near Valentine.

10 Years Ago – Nebraska Drought

2012 is also remembered for the **worst drought in Nebraska since the 1950s**. Spring 2012 was the warmest spring on record across much of Nebraska, which allowed for an early growing season. The drought began to set in mid-summer during peak growing season as above normal temperatures continued and below normal rainfall fell. The culprit behind the heat and lack of rainfall was a strong ridge of high pressure that remained in place through much of the summer over the central United States, which only began to give way to cooler air in August. However, by that time it was too little too late and in autumn most of the state was classified as D4 - Exceptional Drought by the U.S. Drought Monitor, which is the most intense category. This was the driest calendar year for many locations across the state. Hot and dry conditions also led to a record fire year in Nebraska, with about half a million acres burned.



Percent of normal precipitation, Water Year 2012.

2021 Nebraska Severe Weather Summary

Severe Weather Awareness Week | March 21 - 25, 2022

Nebraska Panhandle - NWS Cheyenne, WY

July 9, 2021: Destructive Hail & Damaging Winds

During the late afternoon and evening of July 9, multiple rounds of supercells impacted the Nebraska Panhandle, bringing large, destructive hail (4-5") and severe, damaging winds, especially around the Hemingford and Alliance areas. Along with the NWS Cheyenne office, the Storm Prediction Center in Norman, Oklahoma grew increasingly concerned that multiple rounds of supercells were becoming more probable during the late afternoon and evening hours across the Nebraska Panhandle. An upgrade to an Enhanced Risk (Level 3 out of 5) was issued during the 1 PM MDT update and included hatched areas across the NE panhandle for the risk of large hail (>2") and destructive winds (>75mph). At 2:16 PM MDT, a Severe Thunderstorm Watch was issued for the Nebraska Panhandle.

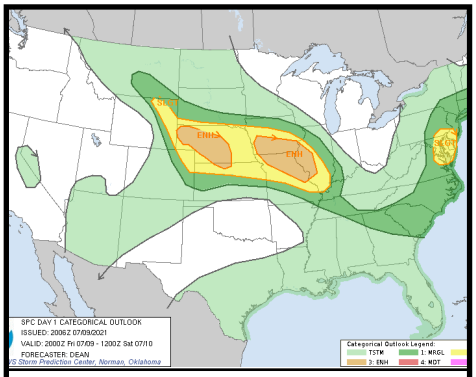


Fig.1: July 9, 2021, 20:06 UTC Convective Outlook

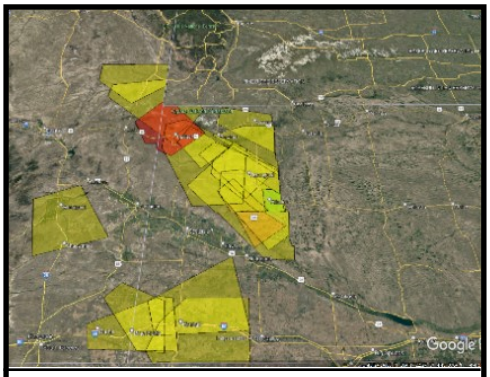


Fig.2: Warning Polygon Overlays, Image from Google Earth

Fig.3: Box Butte Supercell

The first round of severe thunderstorms developed across Southeast Wyoming and moved into Banner and Kimball Counties. Storms were clustered together, but a supercell emerged in Kimball County. This storm produced multiple reports of severe hail across the county. The largest hailstone reported with this storm was 1.75" (Ping Pong) 5 miles east of Bushnell. This first round would push into portions of southern Morrill and western Cheyenne Counties and weaken. But by 4:00 PM MDT, round two was getting underway across the northwest Nebraska Panhandle. A strong, long track supercell (Fig. 3) developed across Sioux County and quickly became severe. Reports of 1.75" occurred with this storm as it tracked across Sioux County. The supercell rapidly intensified as it moved into Box Butte County. Storm chasers along Dodge Road (West of Hemingford) reported hailstones ranging from 1" (Quarter) to 2.5" (Tennis Ball) as this storm approached. The storm continued to intensify with a classic Bounded Weak Echo Region (BWER) signature as it approached Alliance.

Fig. 4: 4.3" hailstone. Photo Credit: Dan Fitts

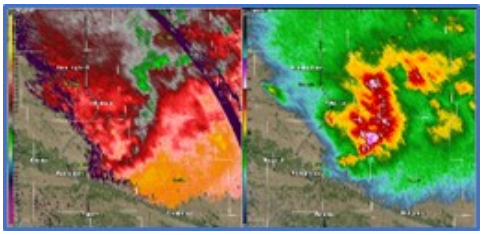


Fig. 5: Radar Reflectivity and Vorticity

Large destructive hail was observed around Alliance (Fig. 4) with upwards of 4 to 5" hail reported. An additional supercell developed on the southern flank of the lead storm and dropped 3" (Tea Cup) hailstones west of Alliance. The last round of storms transitioned from a hail threat to a wind threat. Merging thunderstorms across Box Butte County would eventually develop into a mini squall line with bowing segments (Fig. 5). At 10:07 PM MDT, the Alliance Airport ASOS measured an 86 mph wind gust! This storm would produce severe winds in and around the town of Alliance causing power outages and downing numerous trees.

Extreme Southwestern Nebraska - NWS Goodland, KS

May 26, 2021: Benkelman Tornadoes

The May 26th, 2021 tornado outbreak across extreme southwestern Nebraska and northwestern Kansas was one for the record books. Over the course of the afternoon, ten tornadoes formed within the Goodland area of responsibility, which ties June 1, 2003 and May 9, 2015 as the fifth highest number of tornadoes to occur in a single day within the Goodland County Warning Area (CWA). Of the ten tornadoes to develop, five occurred in Dundy County.

The day started out early with severe thunderstorms bringing golf ball sized hail to northwestern Kansas. A quasi-stationary warm front draped across extreme southwestern Nebraska and northwestern Kansas was the initiation point for afternoon thunderstorm development. As thunderstorms formed they moved to the north, producing several tornadoes and large hail up to the size of tennis balls. Strong thunderstorm winds also produced damage in McCook, Nebraska.

The first tornado developed around 2:20PM MST north of Benkelman. A few minutes later, the tornado lifted and a second tornado developed five miles north of Benkelman. The tornado damaged fencing and roofing panels. Additionally, it threw a shed roughly 200 yards. The tornado was rated as an EF-0 by a National Weather Service storm survey team.

A stronger tornado formed west-northwest of Max, leaving broken power poles in its wake. A home and several vehicles received damage in addition to the demolition of a grove of Elm trees. The tornado traveled 8.29 miles with a maximum width of 575 yards. The tornado dissipated 14 miles northwest of Max, Nebraska. An NWS storm survey team rated the tornado as an EF-2. This is the strongest tornado to impact the three Nebraska counties in the Goodland CWA (Dundy, Hitchcock and Red Willow) since the May 17th, 2019 McCook Tornado.

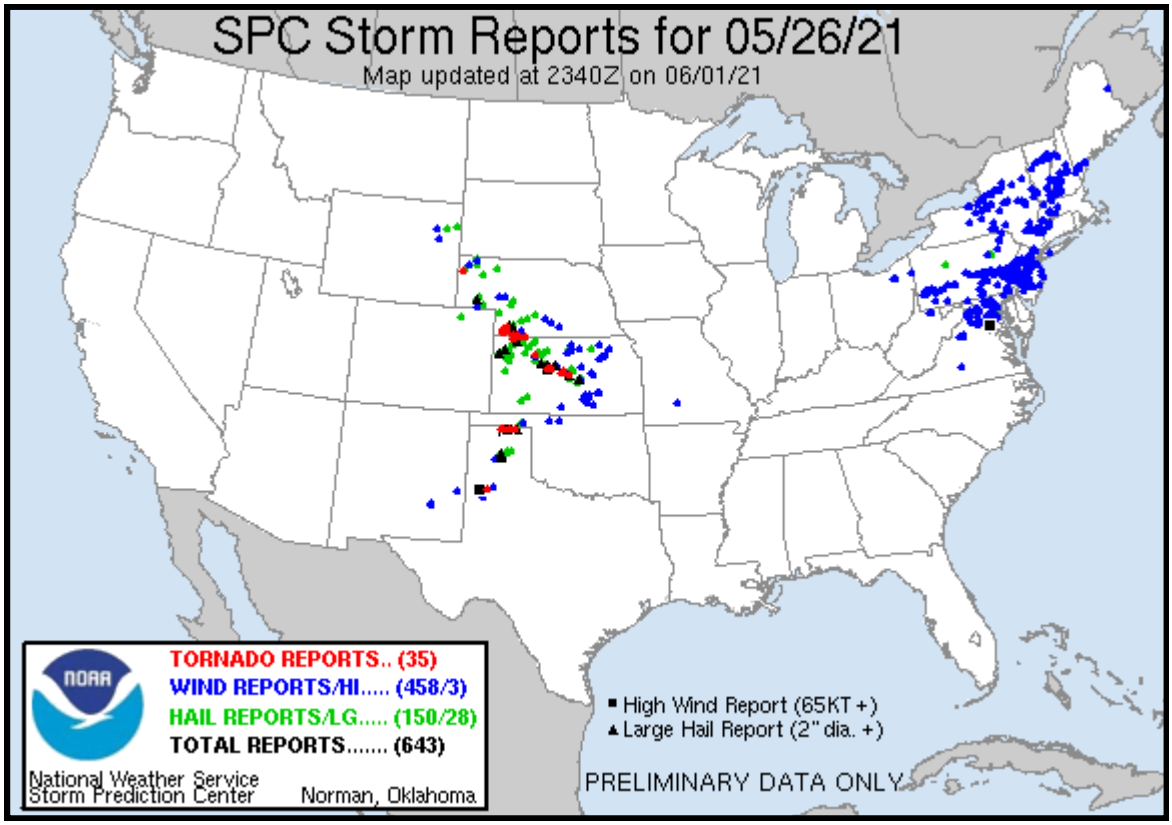
Another brief tornado touched down while the EF-2 was ongoing. This tornado occurred north-northwest of Max and had a path width of 50 yards.

One of several tornadoes to touch down near Benkelman on May 26th. Photo credit: Jason Frederick.

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

The final tornado in Dundy County also occurred north-northwest of Max, roping out in the northeastern part of the county after traveling a little over 4 ¼ miles and lasting 20 minutes. Through the course of the event, a total of five tornadoes occurred in Dundy County. This sets the record for the most tornadoes to occur in the county in a single day since 1950. A brief tornado also occurred in Hitchcock County several miles west of the Palisade Airport. The tornado moved just over 1.75 miles and had a peak width of 100 yards.

The events of May 26th highlight the importance of storm reports from trained storm spotters, law enforcement, the public, law enforcement and the media. These reports provide NWS meteorologists with ground truth to what they are seeing on radar. This helps with better warnings, more lead time for those in the path of the storms, and better data for researchers.



Severe storms produced large hail, wind and tornadoes across several states as seen in this storm reports image from the Storm Prediction Center.

2021 Nebraska Severe Weather Summary

Severe Weather Awareness Week | March 21 - 25, 2022

Western & North Central Nebraska - NWS North Platte, NE

September 11, 2021: The Nebraska Way

Campsite at Lake Ogallala. Photo Credit: Darren Snively.

"We have about 40 minutes," my husband, Darren, established. He and I sat admiring the glowing embers of the campfire. The fire was warm, the air was cool, the wind was calm. The crackling of the fire blended with the quiet laughter from the campsite beside us. The moonlight reflected off the lake, and the cottonwood trees on the shore cast shadows. Nestled under those cottonwoods, the kids slept in the tent, cocooned in their sleeping bags. Our campsite was tidy, with everything packed away for the evening. We had enjoyed the weekend of s'mores, swimming, and inhaling what we knew would be the last days of summer before the weather yielded to fall.

To the west, though, the wind was stirring. Up above, the clouds were growing darker and taller, nearer. Darren checked the radar on his phone. As a meteorologist, this was not unusual, to stare at the blobs moving across the screen. But this night, he looked at the radar every few minutes. The storm was coming, he said. And time was counting down.

Darren had warned about the weather all weekend, before we had even packed the gear in the car. "A chance of storms," he said. "They could be severe." With the tent and sleeping bags, he packed the weather radio. He preaches the importance of being weather-aware and had kept his eyes to the skies all day.

We were braced for the weather to come. Next door, though, our campsite neighbors, immersed in conversation, lingered after dinner. Unwashed dishes and food packages were strewn across their picnic table. I wondered if they knew the clouds would soon choke out the moonlight.

When Darren said, "15 minutes," I decided it was time to warn them. A storm would be here soon, I shared. High winds, thunder, lightning. I pointed to the cottonwood trees above their campsite. "Watch out for falling branches. The safest place will be in your car."

Cottonwood trees, Nebraska's state tree, are known for their deep-grooved bark and heart-shaped leaves. They're also known for uprooting. Their shallow root system can buckle to the wind and topple, not to mention the possibility of branches falling below. News stories of people dying that way haunted me.

Our neighbors began to clean from dinner.

We had waited all evening for the storm. It wasn't severe-warned, but we watched it on radar as it edged closer. We heard on the weather radio to expect strong winds. But when it came, the wind went from not even a whisper to a shout.

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

In a frenzy, Darren and I extinguished the fire, and the neighbors struggled to put away the last of their gear. Within those few minutes, the wind grew to a roar.

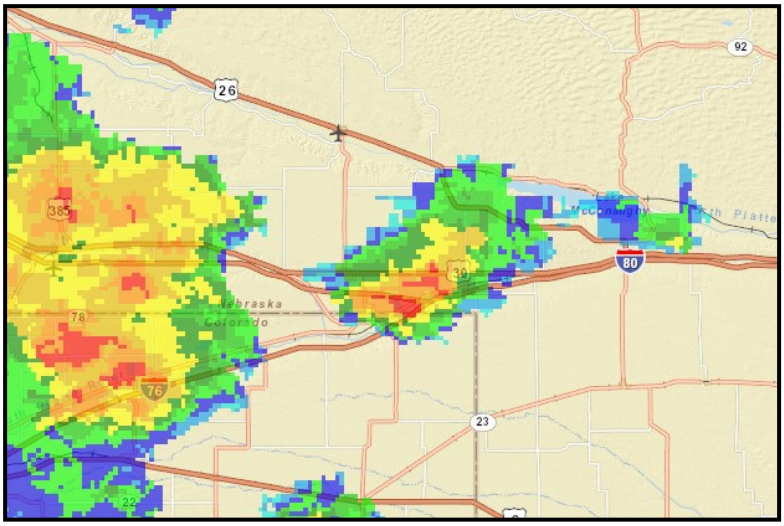
We ran to the tent to get the kids. Our tent was bowed down, flattened by wind. I unzipped the entrance and saw the tent's ceiling collapsed on top of my toddler. I pushed it up from the inside and grabbed the kids. The rain started before we got to our vehicle. We watched a small branch come down feet from where our son had lain.

Inside the car, the rain pelted the windows, and we felt the car bob with the force of the wind. Outside, the tent lurched, and we held our breath for the stakes to hold and the poles to flex. The neighbors' tent leaned, also strained from the wind. They were safe in their truck, and I wondered what they were thinking, if they were okay. I wished we could have talked to them.

Darren's eyes alternated between the storm surrounding us and the radar on his phone. The storm was not strong enough to be labeled "severe." Maybe 50 mph, Darren estimated. The wind huffed and puffed, and in the elements, we were like the pig who built his house out of straw.

When the wind quieted and the rain ran out, our toddler was asleep in his carseat. Outside, we called out to the neighbors, "Are you okay? Are you okay?" It's the question you ask after an event that unsettles your sense of safety; the question you ask twice because you're not sure if you really know the answer.

We were safe, but our tent was not. The wind had snapped a pole in half, and the splintered fiberglass had ripped through the rainfly like a knife. The trees, still standing upright, stirred as water dripped from their leaves. Our world seemed to have held its breath; a break in the storm brought a momentary calm, but we knew another storm was on its way and would soon unleash another wave of wind. Without the waterproofing of the rainfly, we imagined how wet we'd be by morning if we stayed out the night.



Radar image of storms approaching Lake Ogallala/Lake McConaughy.

Defeated, Darren and I grabbed armfuls of gear, sleeping bags, backpacks, and pillows. We emptied the tent of its contents and began the process of unsnapping and unfastening. The neighbors were soon by our side. "What can we do?" they offered, while we all fell in rhythm of taking down the tent.

Their tent, although off-kilter, stood. They would hold out for the night. Before we clambered to the car for our ride home, Darren shared the forecast and storms to come. They thanked us and we thanked them. No thanks were needed, though–to help the neighbors and to respect the weather is the Nebraska way.

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Sarah Snively, the doting wife of a meteorologist, is also a mother and teacher. In fair weather, she enjoys long walks and camping.

2021 Nebraska Severe Weather Summary

Severe Weather Awareness Week | March 21 - 25, 2022

South Central Nebraska - NWS Hastings, NE

December 15, 2021: Tornado Outbreak

On December 15, 2021, a powerful, fast moving weather system deposited a near catastrophic array of tornadoes, wildfires, high winds, hail and even some winter weather across south central Nebraska and north central Kansas. Given the widespread nature of the event, thankfully no injuries or direct fatalities occurred, despite the midday timing of tornadoes and high winds impacting schools and commerce, and the almost uncontrollable fires destroying some homes and several thousand acres just south of the Nebraska-Kansas border.

Severe weather in December is not unprecedented in this area. Tornadoes have occurred as recently as Christmas Day 2016. However, south central Nebraska was at the crossroads of multiple significant hazards. Widespread 60-80+ MPH wind gusts - both non-thunderstorm AND thunderstorm related, fast-moving tornadoes, extreme fire weather, reduced visibility from blowing dust/smoke, and brief snow squalls all affected portions of the forecast area within a six-hour time span, some of which overlapped in time and space.

Top: Tornado 3 miles northeast of Marquette in Hamilton County on December 15. Photo Credit: Rick Larson.

Bottom: Destroyed hot barn in northern Hamilton County. Photo from NWS Storm Damage Survey.

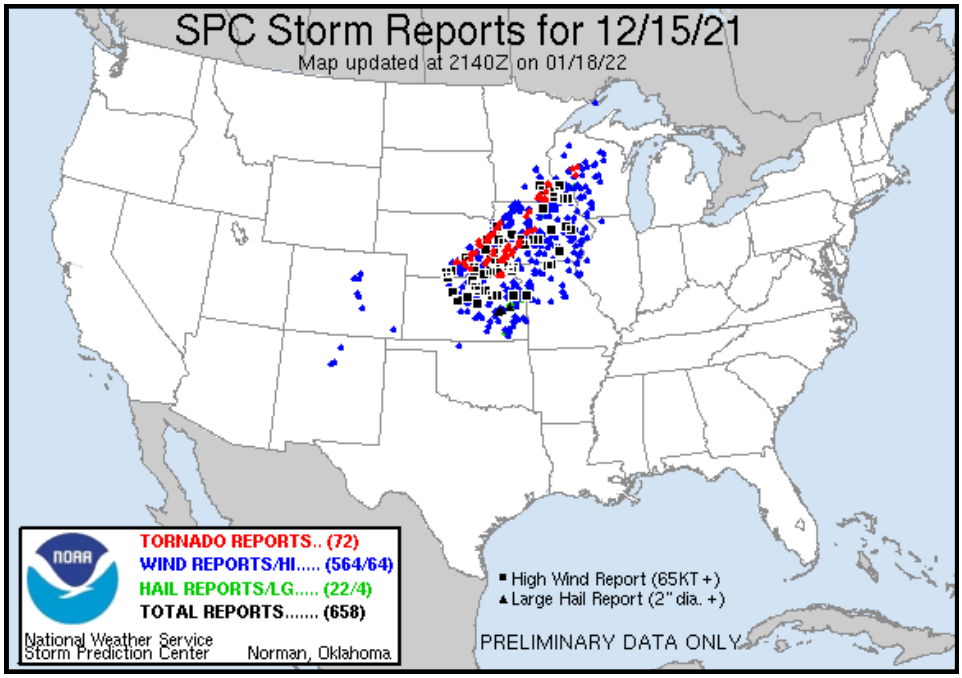
2021 Nebraska Severe Weather Summary

Severe Weather Awareness Week | March 21 - 25, 2022

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

This event was historic for south central Nebraska and the region as a whole. The sheer number of severe weather occurrences was impressive enough, and for just six days prior to the start of winter. In south central Nebraska alone:

- 11 Tornado Warnings with 9 confirmed tornadoes.
- Prior to this day, only 5 tornadoes had been confirmed in the *entire state of Nebraska, in December, since 1950.*
- 5 tornadoes rated EF1 and 4 tornadoes rated EF0 on the Enhanced Fujita Scale.
- 118 separate Local Storm Reports (LSR).
- 8 separate "hotspot" notifications for wildfires.
- First time issuance by the National Weather Service in Hastings of a Dust Storm Warning, Blowing Dust Warning and Snow Squall Warning…and basically issued all at once.



Storm reports image from the Storm Prediction Center shows tornado and strong wind reports across eastern Nebraska.

- Record high temperatures prior to the thunderstorms' arrival.

Left: A damaged metal building northwest of Hastings. NWS Storm Damage Survey.

Right: One of many damaged or blown over center pivot irrigation systems. NWS Storm Damage Survey.

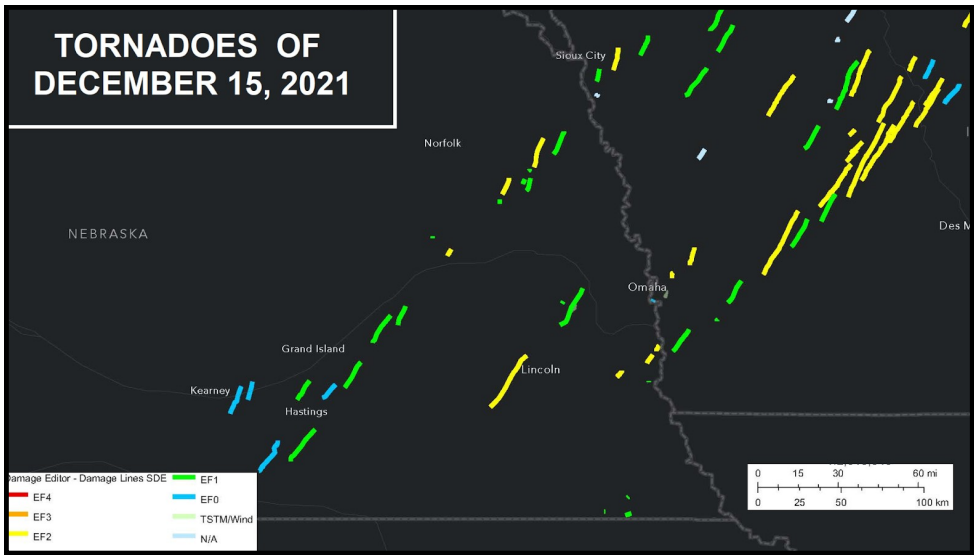
The events of December 15, 2021 were not just limited to south central Nebraska but stretched across eastern Nebraska, Iowa, Minnesota and Wisconsin. The line of thunderstorms was classified as the first ever "Serial Derecho" in the month of December as well, which was quite an accomplishment since most derechos occur between April and July.

2021 Nebraska Severe Weather Summary

Severe Weather Awareness Week | March 21 - 25, 2022

Eastern Nebraska - NWS Omaha/Valley, NE

December 15, 2021: Tornado Outbreak



On December 15th, a low pressure system brought a historic onslaught of swift moving severe thunderstorms with embedded tornadoes, followed by several hours of severe gradient winds and areas of blowing dust/smoke (and even a touch of wind-whipped snow) unfolded within Central and Eastern Nebraska. Temperatures soared in the afternoon with many locations observing temperatures in the 70s, which is approximately 40°F above normal. Daytime temperature records at Norfolk, Lincoln and Omaha were shattered. An influx of moisture contributed to the increased instability that would later help sustain the damaging derecho. Dew point temperatures in eastern Nebraska were observed in the upper 50s while in southwest Iowa they peaked at 64°F at Harlan. The dew point temperatures were 30°F warmer than climatic average for air temperature.

Barn flattened by a tornado east of Beemer. NWS Photo.

This would not only end up being the most impactful convective event on record during the month of December for the state of Nebraska (far eclipsing Christmas Day 2016), but also for other nearby states including Iowa and Minnesota. In fact, the nearly continuous swath of damaging winds that stretched from south central Nebraska/north central Kansas northeastward into southeast Minnesota/western Wisconsin was officially declared a serial derecho...the first December derecho on record in the United States. The 28 confirmed tornadoes within the state is a remarkable fact considering that prior to this day only five Nebraska tornadoes had occurred in December since 1950! The breakdown of tornadoes by Enhanced Fujita (EF) scale were 5 EF0s, 16 EF1s, and 7 EF2s.There were also dozens of measured reports of damaging winds in the 60-80+ MPH range (both thunderstorm/non-thunderstorm). The strongest measured wind gust was 93 mph at the Lincoln Airport. Based on past data, this is the highest wind speed ever recorded at the Lincoln Airport. There was also a peak thunderstorm gust of 85 MPH at Central Nebraska Regional Airport in Grand Island and a peak non-thunderstorm gust of 77 MPH by an unofficial mesonet weather station in southwestern Clay County. Fortunately, there were only 2 reported injuries, despite countless instances of damage primarily to irrigation pivots, outbuildings, power lines/poles, trees, and some homes.