Nebraska Severe Weather Awareness Week

March 23 - 27, 2015

Spring Has Sprung! Are you Weather-Ready?

Welcome to spring and the 2015 Nebraska Severe Weather Awareness Week. We hope you find the information in this packet and the special time set aside this week useful in preparing yourself, your family or your business for the hazards of Nebraska weather. The NWS wants you to not just be ready, but "**Weather-Ready**" for the upcoming severe weather season. When it comes to being Weather-Ready, there are a few simple things you should know:

Know Your Risk

Tornadoes, large hail, damaging thunderstorm winds, floods and lightning can be deadly for the unprepared. Knowing the weather-related risks posed to you is the first step in becoming Weather-Ready.

Take Action

You should prepare for the hazards of spring by knowing you are not powerless. You should devise a tornado drill plan for you, your family or your business. You should know what to do if lightning becomes a hazard or if flooding becomes threatening. With the hazard potential on the Plains, you should know what to do for each situation and be ready to "take action" if need be. It may save your life and those around you.

Be a Force of Nature

Be an example. Share your preparedness success story by posting on Facebook/Twitter or helping build an online community of prepared. Look for ways to assist at work or in your community to help your family, neighbors, co-workers, and entire community prepare. #newx

All of us at the National Weather Service are focused on the mission of protecting lives and property through our watches, warnings, advisories and forecasts. We hope you will take advantage of this special time set aside, and the information available, to make yourself and those around a bit safer by becoming "Weather-Ready".

Statewide Tornado Safety Drill

Between
10 & 11 a.m. CDT
9 & 10 a.m. MDT

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

Practice your plan of action!

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National Weather Service Offices Serving Nebraska

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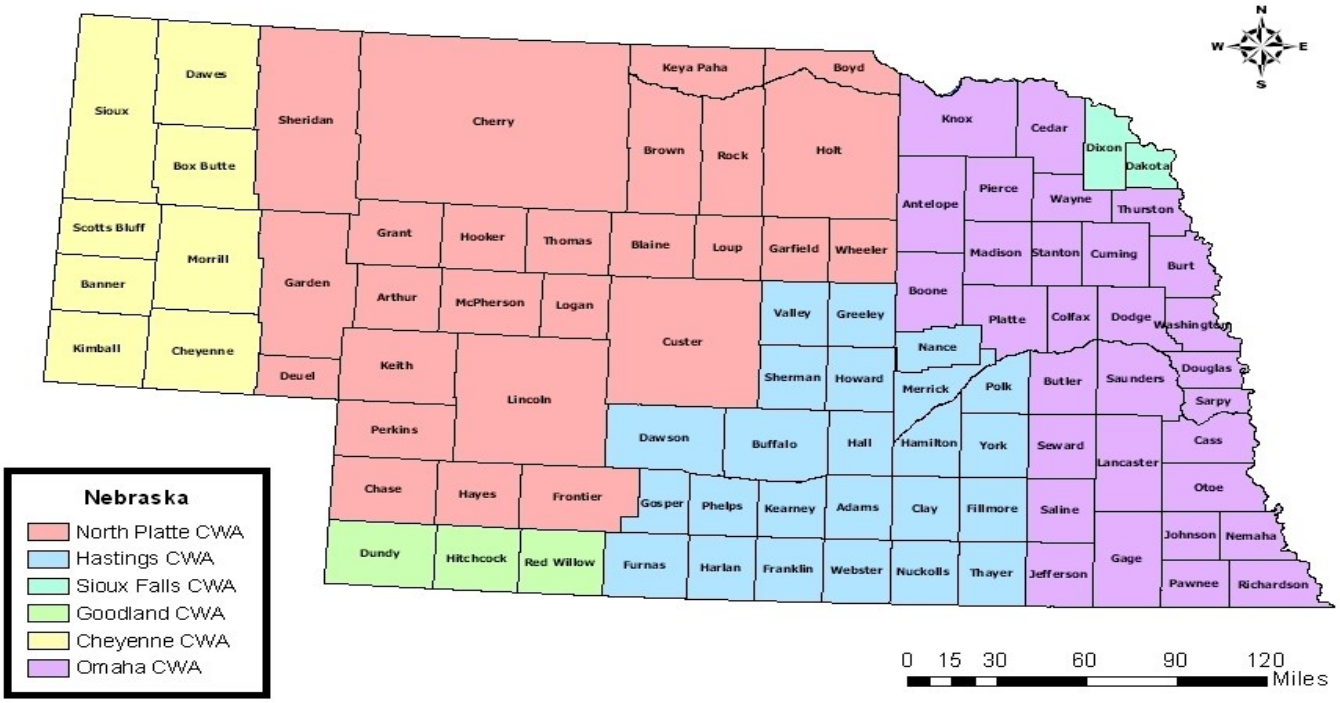
National Weather Service Coverage Area



Far West	West and North Central	Far Southwest
Cheyenne, WY	North Platte	Goodland, KS
www.weather.gov/cys	www.weather.gov/lbf	www.weather.gov/gld
NWSCheyenne	**NWSNorthPlatte**	**NWSGoodland**
@NWSCheyenne	**@NWSNorthPlatte**	**@NWSGoodland**
NWS Cheyenne	**NWS North Platte**	**NWS Goodland**

South Central	East	Far Northeast
Hastings	Omaha	Sioux Falls, SD
www.weather.gov/gid	www.weather.gov/oax	www.weather.gov/fsd
NWSHastings	**NWSOmaha**	**NWSSiouxFalls**
@NWSHastings	**@NWSOmaha**	**@NWSSiouxFalls**
NWS Hastings	**NWS Omaha**	**NWS Sioux Falls**

2014 Nebraska Tornado Facts

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Tornadoes: **63** (20 above the 1950-2014 average of 43 & 9 above the 30 year average of 54)

Deaths: **2** (June 16th in Pilger & near Wisner) **Injuries:** **21** (20 from June 16th in Pilger, 1 from May 11th near Daykin)

Longest Track: **23.94 miles** ("Pilger Tornado": 4.8 E Stanton to 7.9 E Altona on June 16th - Stanton to Wayne Counties)

Greatest Width: **1.5 miles** ("Beaver Crossing Tornado": May 11th - Fillmore to Seward Counties)

Strongest: **EF4** (4 on June 16th, affecting Stanton, Cuming & Wayne Counties)

Most in a county: **6** (Cedar & Cherry Counties)

Days of occurrence (Days with 1 or more tornadoes): **13**

Most in one day: **19** (May 11th)

Most in one month: **35** (June)

First tornado of the year: **April 27th** (EF0 - Near Upland in Franklin County)

Last tornado of the year: **September 9th** (EF1 - SW of Nebraska City - Otoe County)

2014 Monthly Tornado Totals

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Total	0	0	0	3	23	35	1	0	1	0	0	0	63	100%
EF5	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
EF4	0	0	0	0	0	4	0	0	0	0	0	0	4	6%
EF3	0	0	0	0	2	1	0	0	0	0	0	0	3	5%
EF2	0	0	0	0	4	5	0	0	0	0	0	0	9	14%
EF1	0	0	0	0	8	5	0	0	1	0	0	0	14	22%
EF0	0	0	0	3	9	20	1	0	0	0	0	0	33	53%

2014 Season Peak…

Hail Size: 5.00" on June 17th (South Central Cherry County)

Wind Gust: Estimated from storm survey: 118 mph on June 3rd - near Bassett (Rock County) to near Stuart (Holt County)
Measured: 91 mph on June 3rd - near Kennard (Washington County)

Nebraska
Tornado Facts

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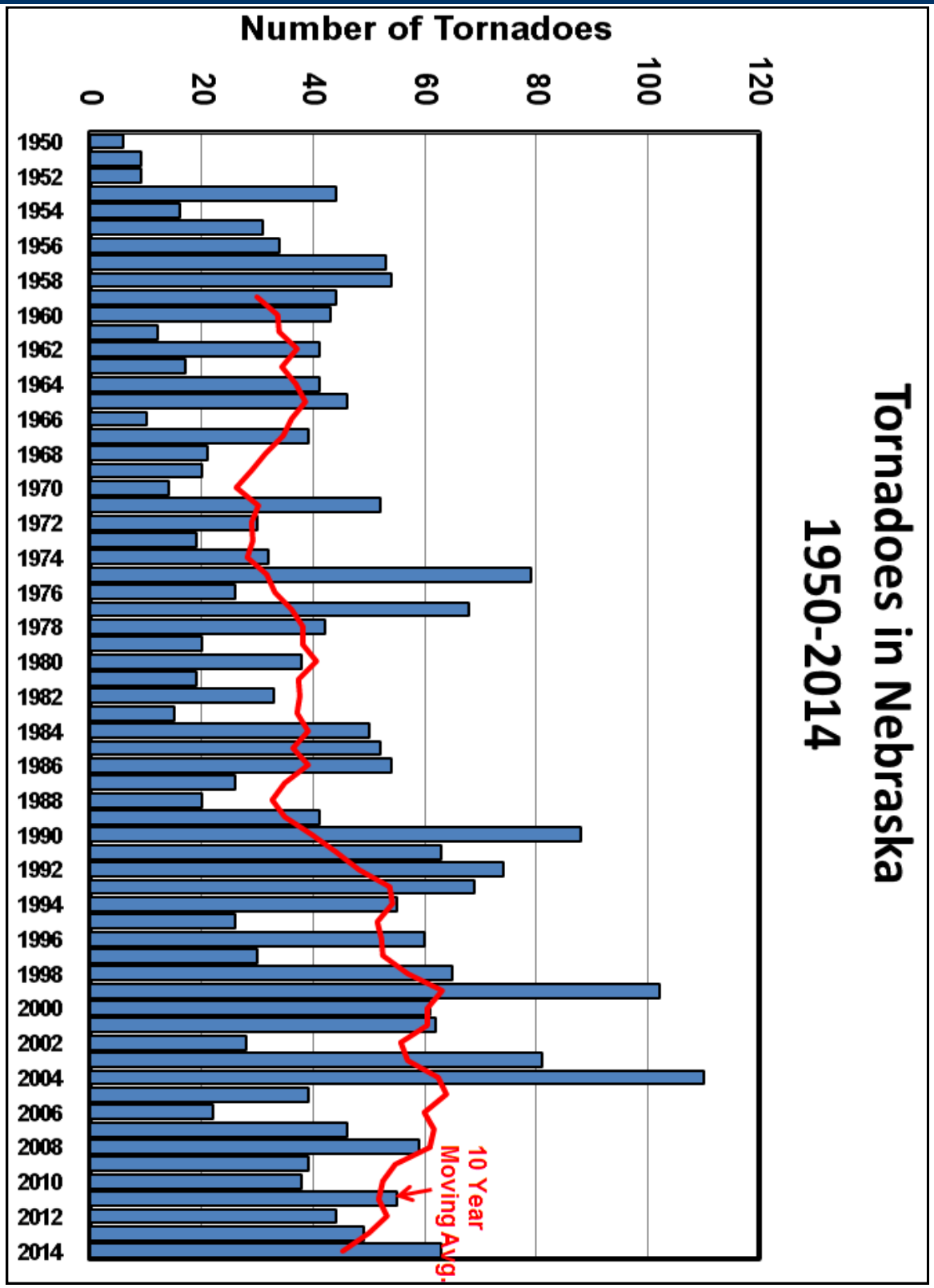

Nebraska
Tornado Facts

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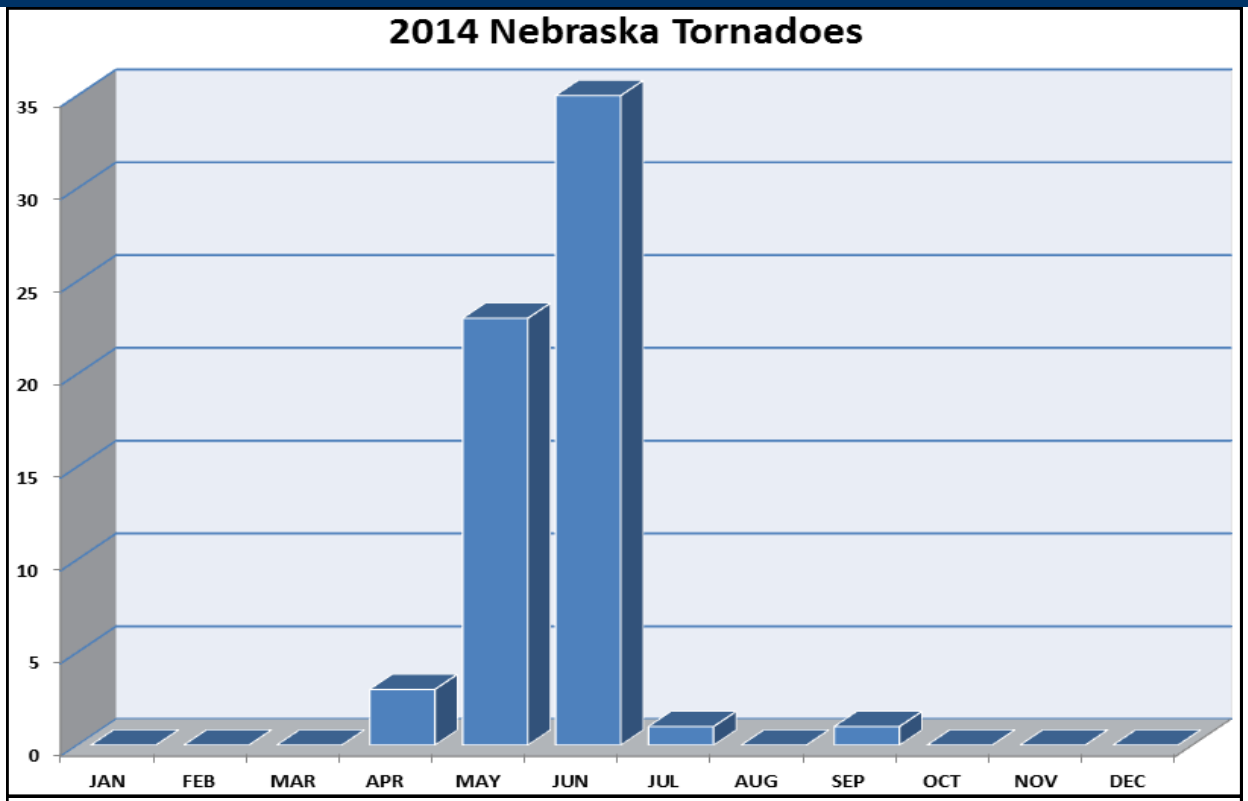

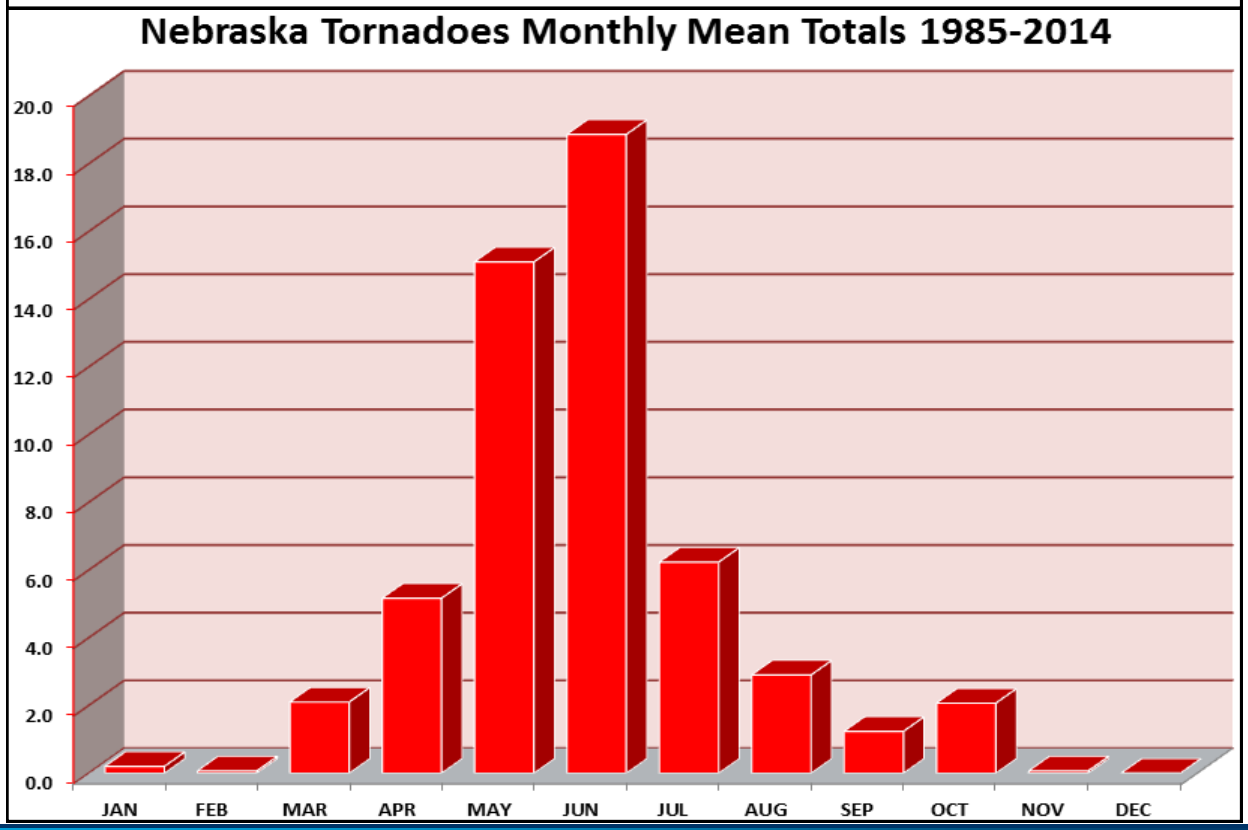

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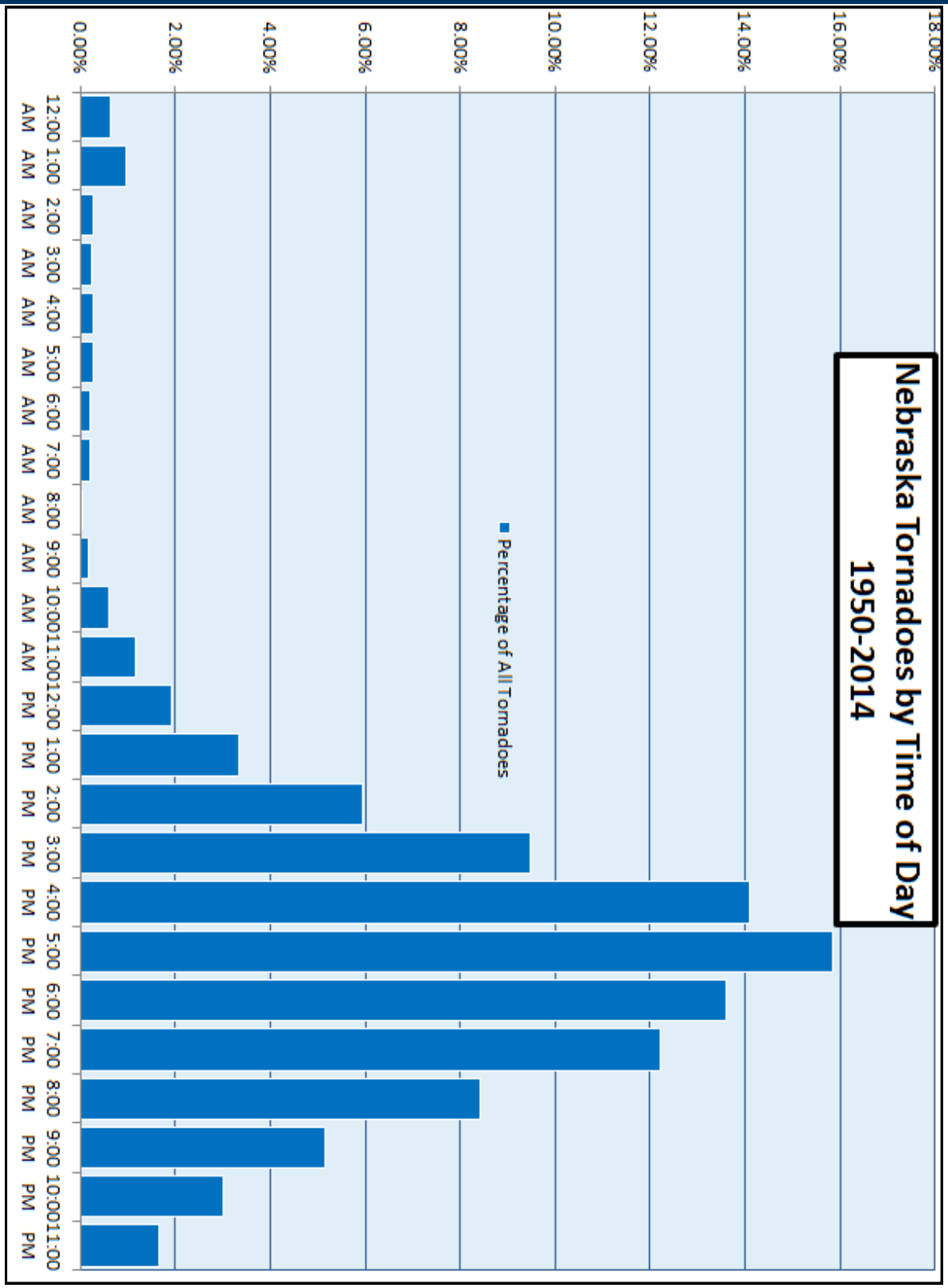

Changes To Storm Prediction Center Day 1, 2, 3 Convective Outlooks

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How are the outlooks changing for Day 1, Day 2 and Day 3?

The SPC has revised Day 1 through Day 3 categorical severe weather outlooks to better communicate risk and describe the likelihood of severe weather. Format changes also improve the use of SPC severe weather forecasts for customers who incorporate SPC outlooks into GIS systems.

The SPC has expanded the risk categories from four to five and clarified the risk previously labeled as "See Text". That descriptor is replaced by a categorical line and the term "Marginal" to denote areas with a 5% probability of severe weather. The upper end of the "Slight Risk" category is renamed "Enhanced" (short for "Enhanced Slight") to denote a threshold 30% probability of severe wind or hail and/or a 10% chance of a tornado during the Day 1 period. For Days 2 and 3, the "Enhanced" risk category denotes a 30% total severe probability. The Moderate and High risk thresholds will remain essentially unchanged.

Previous:

1. See Text
2. Slight (SLGT)
3. Moderate (MDT)
4. High (HIGH)

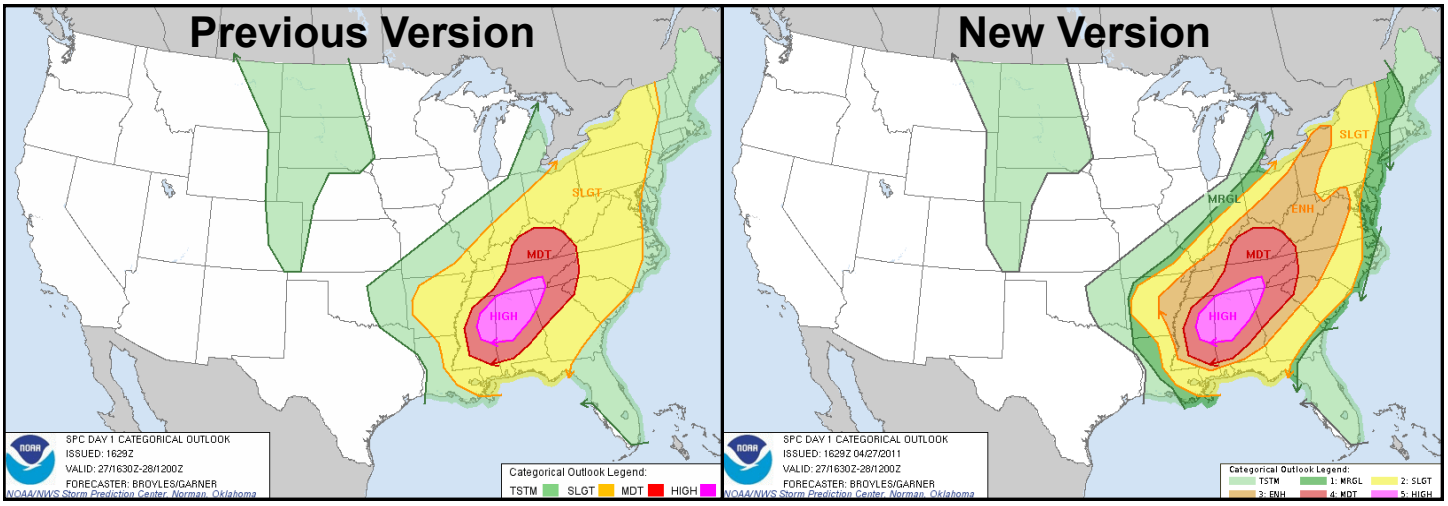
New:

1. Marginal (MRGL) - replaces the previous SEE TEXT and now is described with Categorical line.
2. Slight (SLGT)
3. Enhanced (ENH) - replaces upper-end SLGT risk probabilities, but is not a MDT risk
4. Moderate (MDT)
5. High (HIGH)

Why is the SPC doing this?

A primary goal of these changes is to bring better consistency to the risks communicated in SPC outlooks, from the short-range Day 1 outlooks through the extended range Day 4-8 outlooks. The changes have been made based on customer feedback and to better meet their needs. In addition, "See Text" did not convey a threat area, due to the lack of a contour in any "See Text" categorical forecast. And the previous "Slight Risk" category covered too broad a range of severe weather probability values.

More detailed information can be found here: **www.spc.noaa.gov/exper/dy1-3example/**



Severe Weather Terminology

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SEVERE THUNDERSTORM - A thunderstorm is considered severe when it produces any of the following: Hail 1" (quarter size) or larger in diameter, winds which equal or exceed 58 MPH or a tornado.

FUNNEL CLOUD - A funnel shaped cloud, usually extending from a convective cloud, which is associated with a violently rotating column of air that is NOT in contact with the ground.

TORNADO - A violently rotating column of air that extends from a convective cloud and is in contact with the ground. The entire column of air associated with a tornado is not always visible. A tornado may only be visible once it has picked up enough dirt and debris.

HAZARDOUS WEATHER OUTLOOK - A product which is issued daily, highlighting any potential significant weather in the area for the next 7 days.

WATCH - Issued when conditions are favorable for the development of severe weather in and close to the watch area. The size of the watch can vary depending on the weather situation and is usually issued for a duration of 4 to 8 hours. During the watch, people should review severe weather safety rules and be prepared to move to a place of safety if threatening weather approaches.

WARNING - Issued when severe weather is detected by radar or reported by storm spotters. Information in this warning will include the location of the storm, what areas will be affected, and the primary threat associated with the storm. People in the affected area should seek safe shelter immediately. Remember that severe thunderstorms can produce tornadoes with little or no advance warning. Warnings can be issued without a watch already in effect.

SIGNIFICANT WEATHER ADVISORY or **SPECIAL WEATHER STATEMENT** - Issued for "near" severe thunderstorms. Typically issued for storms with 3/4" (penny sized) hail and wind gusts near 50 MPH, but can also be issued for large amounts of small hail covering the ground. It is also used as a "heads up" for ongoing severe storms which may move into the area.

SEVERE WEATHER STATEMENT - A product issued which provides follow-up information on any severe weather warnings in effect and conditions which have occurred or are occurring. This information includes updated storm paths and any storm reports, such as hail size or damage, received from spotters.

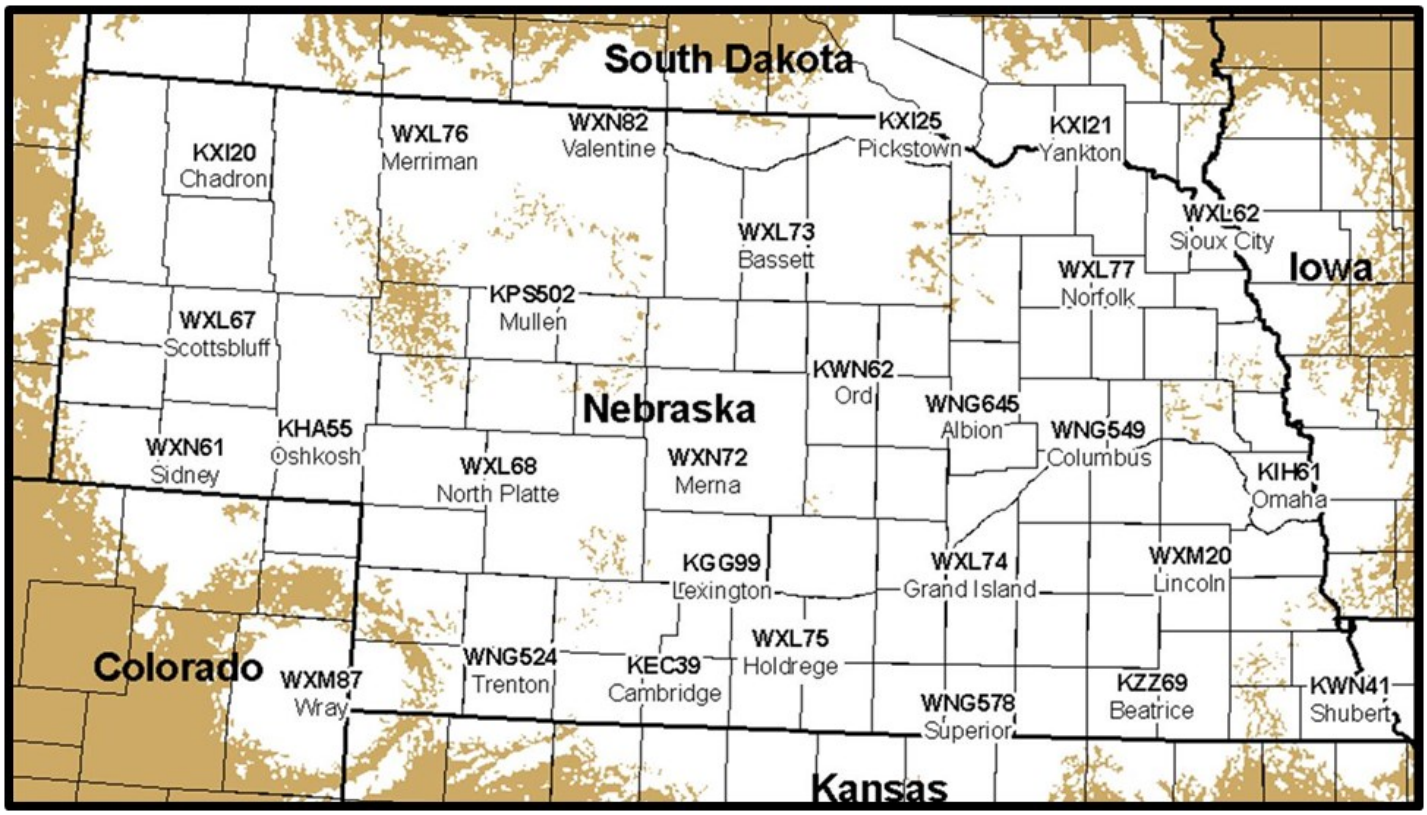
FLASH FLOOD - A rapid rise in water that occurs with little or no advanced warning, usually as the result of intense rainfall over a relatively small area in a short amount of time. Flash Floods can also be caused by dam or levee failures, ice jams, and topography.

FLASH FLOOD WATCH - Issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area. When a watch is issued, be aware of any potential flood hazards. Those in the affected area are urged to be ready to take quick action if a Flash Flood Warning is issued or flooding is observed.

FLASH FLOOD WARNING - Issued when flash flooding is in progress, imminent, or highly likely. Those in the affected area should evacuate immediately or move to higher ground if possible. Information in this warning will include the locations in the flood and any areas which may be impacted. Flash Flood Warnings can be issued without a Flash Flood Watch in effect.

NOAA Weather Radio All-Hazards (NWR)

Severe Weather Awareness Week - March 23 - 27, 2015



NOAA Weather Radio All Hazards 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/Maps/PHP/NE.php

Tornado Safety

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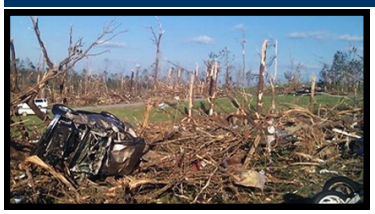
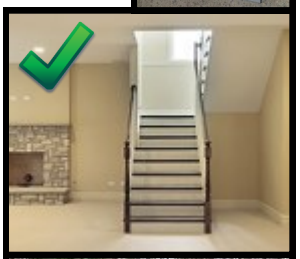


A tornado is a violently rotating column of air in contact with the ground that is capable of destroying anything in its path and hurling objects through the air like deadly missiles. They can produce winds in excess of 200 MPH, be over 1 mile wide and stay on the ground for over 50 miles! Although tornadoes occur in many parts of the world, they are found most frequently in the United States. In an average year, 1,200 tornadoes cause 60-65 fatalities and 1,500 injuries across the nation. Warnings save lives, however deaths and injuries still occur. Some people may not hear the warning, others did but did not believe it would happen to them. Are you and your family prepared for a tornado?

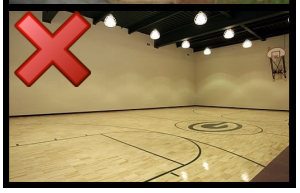
Be Ready Year Round!

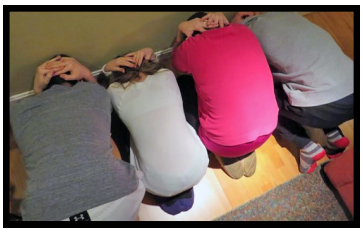
- Know the risk for your area. Tornadoes can occur at any time of day, any day of the year.
- Have a NOAA Weather Radio and battery back-up to receive warnings.
- Have a plan of action BEFORE severe weather threatens. You need to respond quickly when a warning is issued or a tornado is spotted.



Prepare!

- Know how your community sends warnings. Some have outdoor sirens, others depend on media and smart phones to alert residents.
- Pick a tornado safe room in your home such as a basement, cellar or an interior room on the lowest floor with no windows. Make sure all members of your family know to go there. If time allows, get your pets.
- Conduct a tornado drill regularly so everyone knows what to do if a tornado is approaching.
- Have a family plan that includes an emergency meeting place.





During a Tornado…

- Take shelter immediately! Remember that occasionally tornadoes can develop so quickly that advance warning is not possible. Stay alert when threatening weather is in your area!
- Get to an underground shelter, basement or safe room.
- Mobile homes are ***not safe!*** Abandon them immediately and go to the nearest sturdy building or shelter.

If you are outdoors, seek shelter immediately! If you cannot quickly get to shelter:

- Get into a vehicle, buckle your safety belt and try to drive to the closest shelter.
- If flying debris occurs while driving, pull over and park. As a last resort:
  - Stay in your vehicle with the seat belt on. Put your head down below the windows, covering with your hands and blanket if possible.
  - If you can safely get noticeably lower than the level of the road, exit your car and lie in that area, covering your head.

- <u>Your choice should be driven by your specific circumstances</u>!

More information and tips on preparing and staying safe during a tornado can be found at:
www.nws.noaa.gov/os/severeweather/index.shtml

Flash Flood Safety

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Flash floods are exactly what the name suggest: floods that happen in a flash! Second only to heat related deaths, flooding results in more deaths on average than any other weather hazard. Most occur at night, when it is more difficult to recognize flood dangers, and when people are trapped in vehicles. Do you and your family know what to do in case of a flood?

Remember…

- Don't underestimate the power of water!
- Remain aware of the situation. Water levels and the rate water is flowing can quickly change!
- **DO NOT** drive onto a flooded roadway or through flowing water. If you approach a roadway that is flooded, ***TURN AROUND - DON'T DROWN***.
- **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!

If a Flash Flood Warning is issued for your area…

- **If advised to evacuate, do so *immediately*!** Act quickly to save yourself. Get out of areas that are subject to flooding and move to a safe area before access is cut off by flood waters.
- **DO NOT** camp or park your vehicle along streams and washes during threatening conditions.
- **DO NOT** drive if not necessary. 12-18 inches of water can carry away most vehicles. Do not drive over a flooded road, the depth of the water may not be obvious and the roadway may no longer be intact. Never drive around a barricade, they are there for your protection! If your vehicle stalls, leave it immediately and move to higher ground before water sweeps you and your vehicle away.
- **DO NOT** try to walk, swim, or play in flood water! You may not be able to determine if there are holes or submerged debris or how quickly the water is flowing. 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.

- Always continue to monitor the situation through the National Weather Service website, your NOAA Weather Radio All-Hazards and favorite local television or radio stations.

For more information and safety tips, visit www.floodsafety.noaa.gov

Lightning Safety

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Lightning is fascinating to watch but is also extremely dangerous. In the U.S., there are about 25 million lightning flashes every year. Each of those 25 million flashes is a potential killer. While lightning fatalities have decreased over the past 30 years, lightning continues to be one of the top weather killers in the U.S. In addition, lightning injures many more people than it kills and leaves some victims with life-long health problems.

Though lightning strikes peak in summer, people are struck year round. In the U.S., an average of 51 people are killed each year by lightning.

Of the victims killed by lightning in 2014:

- 81% were male
- 54% occurred in July & August
- 49% were between the ages of 20-49
- 23% were near trees
- 23% were in/near water

Lightning: What You Need to Know

- ***NO PLACE*** outside is safe when thunderstorms are in the area!!
- When you hear thunder, immediately move to safe shelter: a substantial building with electricity or plumbing or an enclosed, metal-topped vehicle with windows up.
- Stay in safe shelter at least 30 minutes after you hear the last sound of thunder.

Indoor Lightning Safety

- Stay off corded phones, computers and other electrical equipment that put you in direct contact with electricity.
- Avoid plumbing, including sinks, baths and faucets.
- Stay away from windows and doors and stay off porches.
- Do not lie on concrete floors and do not lean against concrete walls.

Last Resort Outdoor Risk Reduction Tips

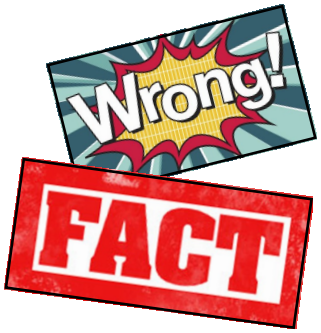
If you are caught outside with no safe shelter anywhere nearby the following actions may reduce your risk:

- Immediately get off elevated areas such as hills, mountain ridges or peaks.
- Never lie flat on the ground.
- Never shelter under an isolated tree.
- Never use a cliff or rocky overhang for shelter.
- Immediately get out of and away from ponds, lakes and other bodies of water.
- Stay away from objects that conduct electricity (barbed wire fences, power lines, windmills, etc.).

Avoid getting caught in a dangerous situation!
If you can hear thunder, you are close enough to be struck by lightning!

Myths & Facts

Severe Weather Awareness Week - March 23 - 27, 2015



Myth - If it is not raining, then there is no danger from lightning.

Fact - Lightning often strikes outside of heavy rain and may occur as far as 10 miles away from any rainfall.

Myth - Structures with metal or metal on the body attract lightning

Fact - Height, pointy shape and isolation are the dominant factors controlling where a lightning bolt will strike.

Myth - Lightning never strikes the same place twice.

Fact - Lightning often strikes the same place repeatedly, especially if it is a tall, pointy and isolated object.

Myth - The rubber soles of the shoes or rubber tires on a car will protect you from being struck by lightning.

Fact - Rubber-soled shoes and rubber tires provide no protection from lightning. The steel frame of a hard topped vehicle provides increased protection if you are inside and not touching metal.

Myth - Overpasses are safe shelters when a tornado strikes.

Fact - Overpasses are unsafe! They can concentrate the wind, causing it to be stronger. People have been killed and injured taking shelter under an overpass.

Myth - Low pressure with a tornado causes buildings to explode. Open a window before taking shelter.

Fact - Opening a window attempting to equalize pressure has no effect. Move to a safe area immediately!

Myth - An approaching tornado will always be visible.

Fact - While most have a visible funnel, it is not always the case. Tornadoes can be hidden by trees and terrain, or may even be wrapped in rain!

Myth - Rivers, lakes and mountains will protect you from a tornado.

Fact - No terrain is safe from a tornado and they can cross bodies of water. Every major river east of the Rockies has been crossed by a significant tornado, and high elevations in the Appalachians, Rockies, and Sierra Nevada have all experienced tornadoes.

Myth - Larger vehicles are safe to drive through flood waters.

Fact - Two feet of rushing water can carry most vehicles away, including SUVs and pickups.

Myth - Flash floods mainly occur in the eastern United States.

Fact - Flash floods have and can occur in all 50 states.

2014 Nebraska Severe Weather Summary

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Nebraska Panhandle - NWS Cheyenne, WY

The first severe thunderstorm of the 2014 season occurred north of Harrison, NE (Sioux County) on **April 26th**, which produced one inch hail.

Severe thunderstorm frequency increased in May. On **May 6th**, one inch hail and 60 MPH winds were reported south of Bushnell (Kimball County) and just west of Sidney (Cheyenne County). The next afternoon, one inch hail was observed at Bushnell and south of Kimball. An EF0 tornado touched down east of Kilpatrick Lake (Box Butte County) on **May 14th**. On **May 18th**, there were numerous funnel clouds sighted in Box Butte and Sioux counties, as well as one inch hail north and northeast of Alliance. An EF0 tornado touched down north of Lake Minatare (Scotts Bluff County). One to two inch hail was observed in Morrill, Kimball and Cheyenne counties on **May 19th**. The next afternoon, one inch hail was reported north of Mitchell and east of Minatare. An EF0 tornado touched down near South Morrill (Scotts Bluff County), and a funnel cloud was sighted northeast of Scottsbluff. On **May 25th**, one inch hail was observed northwest of Chadron (Dawes County) and south of Harrison. The next afternoon, intense slow moving thunderstorms produced flash flooding along Lodgepole Creek between Kimball and Dix and east of Potter. On **May 31st**, one inch hail was observed in parts of Scotts Bluff and Box Butte counties, with a wind gust of 60 MPH at Lake Minatare.

On **June 1st**, winds gusted to 65 MPH at Minatare and 73 MPH at Alliance, and one inch hail was reported northeast of Sidney. Severe thunderstorms produced very large hail **June 3rd** in Scotts Bluff and Morrill counties, with the largest 4.5 inches in diameter in a narrow swath from northeast of Minatare to northwest of Bayard. The next day, one to two inch hail and wind gusts of 60 to 70 MPH were reported in Sioux, Box Butte, Banner and Morrill counties. In Kimball County, quarter to ping pong ball size hail and an EF0 tornado were reported on **June 6th**. A week later, one inch hail fell east of Montrose and winds were clocked between 60 and 65 MPH near Chadron. One inch hail was reported northeast of Chadron and east of Dix on **June 21st**. Four days later, one inch hail was observed at Crawford and south of Harrison. On **June 26th**, one inch hail and 65 MPH winds were observed west of Potter, one inch hail fell at Bridgeport and winds gusted to 60 MPH northeast of Wild Horse Butte. The next afternoon, one inch hail fell west of Harrisburg and south of Gering, with flash flooding reported in Kimball and Scotts Bluff counties.

One to two inch hail and wind gusts to 60 MPH were reported across parts of Sioux, Dawes and Morrill counties on **July 4th**. One to two inch hail occurred in and around Scottsbluff on **July 7th** and Kimball on **July 9th**. Two days later, flash flooding was observed in southeast Kimball County and winds gusted between 60 and 70 MPH near Kilpatrick Lake, Potter and southwest of Kimball. On **July 13th**, an EF0 tornado touched down south of Kimball and winds gusted to 60 MPH northwest of Sidney. Severe thunderstorms produced one to two inch hail, wind gusts to 75 MPH and funnel clouds across portions of Dawes and Box Butte counties.

Severe thunderstorms produced wind gusts to 60 MPH across parts of Dawes and Morrill counties on **August 6th**. Two days later, one inch hail fell north of Angora and south of Crawford. On **August 18th**, there were numerous reports of one to two inch hail across much of the western Nebraska Panhandle. The next day, ping pong ball size hail was observed near Bayard. Quarter size hail was observed near Harrisburg on **August 25th** and near Scottsbluff on **August 26th**. On **August 31st**, winds gusted to 60 MPH near Chadron.

The 2014 severe weather season ended **September 29th** with ping pong ball size hail south of Alliance.

2014 Nebraska Severe Weather Summary

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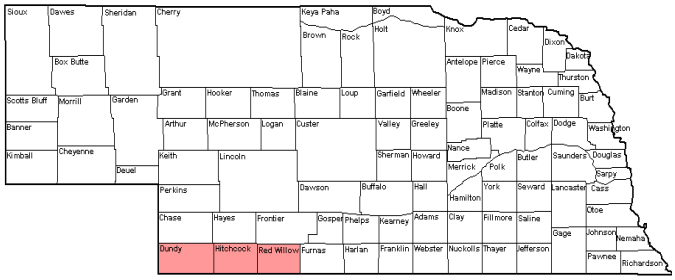
Far Southwestern Nebraska - NWS Goodland, KS

The highlights for southwest Nebraska included:

- Multiple high wind events within the first four months of the year
- Easing of drought conditions
- Over a foot of snowfall from a single storm
- Property damage near Trenton from thunderstorm winds
- Wind Chills of -25° F or lower



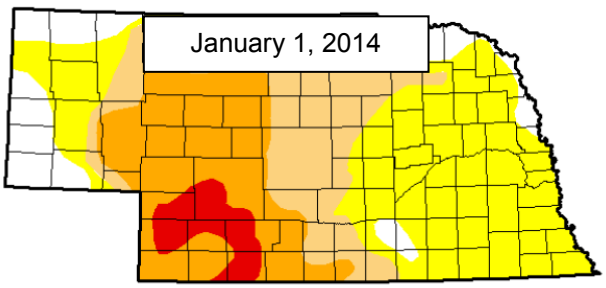
Nebraska Counties Served By WFO Goodland

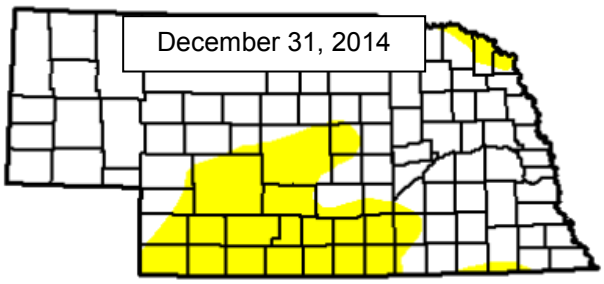
The year started off much windier than normal, with six separate high wind events moving across southwest Nebraska during January through April, when wind gusts of 58+ MPH were reported. During two of these events the wind gusts brought blowing dust with them, causing visibilities to fall below a quarter of a mile for southwest Nebraska. Fortunately no injuries or fatalities were reported despite the poor visibilities.

Precipitation was more generous across the southwest part of the state in 2014 compared to the previous year. Parts of Hitchcock and Red Willow counties received above average moisture with Dundy county coming in close to normal. The most dramatic improvement over 2013 came at McCook, which was nearly ten inches short of normal supplies in 2013 but over an inch and a half above normal in 2014.

Station	2014 Precip	Normal	Percent
Benkelman	18.71”	19.75”	95
Trenton Dam	22.26”	21.52”	103
McCook	24.19”	22.53”	107

2014 began with all of southwest Nebraska rated in either Severe (D2) or Extreme (D3) Drought. Thanks to more abundant rainfall during the year, significant improvement was seen by year’s end with the southwest counties improving to Abnormally Dry (D0).





Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

Far Southwestern Nebraska - NWS Goodland, KS Con't.

Despite the easing of drought conditions there was only one heavy snow storm that moved across southwest Nebraska last year, compared to three heavy snow storms in 2013. During **January 30th-31st**, a band of moderate to heavy snowfall moved across southwest Nebraska. Snowfall amounts ranged from 3" near Palisade to 14" at Haigler. One unique aspect of this storm was the lack of wind with the snow, which is quite rare for the High Plains.

The only significant property damage reported last year occurred on **June 27th** as a line of severe thunderstorms moved across southwest Nebraska. Near Trenton powerful thunderstorm winds ripped a section of roof off an enclosed metal building at the airport. In addition, an old farm wind mill nearby was bent and twisted.

Extreme cold events occurred at the beginning and end of the year for southwest Nebraska. The first extreme cold event occurred on **February 4th**, lasting until the 6th. Wind chills as low as -27° F were reported during this event. The second and final extreme cold event occurred at the very end of the year on **December 31st**, with wind chills of -25° F or lower reported. The winds were light for both events, but the arctic air mass brought brutally cold air south from Canada causing temperatures to fall into the teens below zero.

How to Become a Storm Spotter

What does it take to become a SKYWARN® spotter? If you have an interest in public service, want to be responsible for the safety of others, and have an interest in weather, being a volunteer storm spotter may be for you. To get started, attend spotter training. Most counties have storm spotting classes in the spring. Visit your local National Weather Service web page at **www.weather.gov** where you will find a schedule of classes in your area. The training covers the following topics:

- Basics of thunderstorm development
- Fundamentals of storm structure
- Identifying potential severe weather features
- What information to report
- How to report the information
- Basics of severe weather safety

The National Weather Service established the SKYWARN® program in the 1970s. It is estimated that over 290,000 spotters have been trained. SKYWARN® spotters coupled with Doppler radar technology, improved satellite and other data enables the NWS to issue more timely and accurate warnings for tornadoes, severe thunderstorms and flash floods.

More information can be found at the following web pages:

National SKYWARN® Homepage: www.skywarn.org

Weather Spotter's Field Guide: www.nws.noaa.gov/os/brochures/SGJune6-11.pdf

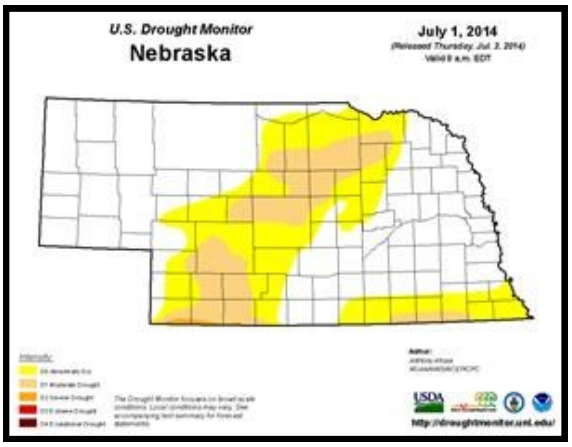
SKYWARN® Online Spotter Training: https://www.meted.ucar.edu/training_course.php?id=23

2014 Nebraska Severe Weather Summary

Severe Weather Awareness Week - March 23 - 27, 2015

Western & North Central Nebraska - NWS North Platte, NE

After two years of ongoing dry weather that led to an exceptional drought, the southwest received rain to relieve the remaining severe drought conditions in June 2014. The year 2014 was marked by periods of heavy rainfall, below normal tornado days and severe thunderstorm events that also produced hail, localized flash flooding and wind damage.



Drought Relief -

The drought relief was good news for farmers and ranchers. The drought that began in June of 2012 impacted the area that slowly eased from the north to southwest over the past year. Thunderstorms produced heavy rainfall in May, and by the end of June the severe drought conditions had also ended in our southwest forecast area (shown right).

Late Start to Severe Weather -

In 2014, the severe weather season had a later start and lasted for six months. The first severe thunderstorm warnings were issued on **April 27th** as storms erupted and moved into north central Nebraska. While those storms produced some hail, it was not until June that supercell thunderstorms developed and produced tornadoes, hail to the size of grapefruits (4.25" diameter), localized flash flooding and wind damage.

Tornado Day	# Tornadoes	County	Date
1	2	Sheridan Cherry	**June 6th**
2	6	Custer (1) Garfield (5)	**June 16th**
3	6	Cherry (5) Hooker (1)	**June 17th**

Three tornado days occurred, well below the normal of 11 tornado days per year (shown left). Climatologically, June is the peak month for tornadoes in western and north central Nebraska, and was the only month tornadoes were observed in 2014. Three severe weather episodes resulted in supercell thunderstorms that produced a total of 14 tornadoes.

On **June 3rd**, the first tornado was recorded, however a storm survey determined an intermittent line of wind damage. The National Weather Service survey team surveyed the damage from near Bassett to 7 miles east of Stuart. The strong winds, estimated to 118 mph, downed large trees, power poles and nearly 50 tall poles at the Stuart Race Track. The winds also destroyed several outbuildings and overturned several center pivot irrigational systems. The storms also produced large hail with numerous reports of damage to include all north facing windows broken out at the Stuart nursing home.

On **June 6th**, supercells produced the first tornadoes of the season. Gordon storm spotters reported a tornado briefly touched down 3 miles southeast of Gordon. A second tornado briefly touched down on a hill top then dissipated about 2 miles west northwest of Cody in Cherry County. Both tornadoes were rated an EF0 on the Enhanced Fujita Scale.

Western & North Central Nebraska - NWS North Platte, NE Con't.

Storm spotters reported the greatest number of tornadoes on the **16th** and **17th**, with six tornadoes on each day.

Enhanced Fujita Scale

EF 0	65-85 mph
EF 1	86-110 mph
EF 2	111-135 mph
EF 3	136-165 mph
EF 4	166-200 mph
EF 5	Over 200 mph

On the **16th**, the tornadoes produced the greatest damage in Garfield County. Five of the 6 tornadoes occurred in Garfield County, with the other in northeast Custer County. Three of the tornadoes were rated on the Enhanced Fujita Scale as EF2, one as an EF1 and two as EF0s.

The longest tracked tornado was 5.19 miles, when the tornado touched down 1 mile north of Burwell and traveled to 5 miles northeast of Burwell before dissipating. The maximum winds associated with the EF2 tornadoes were estimated between 120 to 130 MPH, as the tornadoes snapped several large tree trunks and wooden power poles in their path.

On **June 17th**, another round of severe storms produced 6 more tornadoes. The greatest number occurred in Cherry County, where four tornadoes were observed and two tornadoes reported in Hooker County. All 6 tornadoes were rated as an EF0 on the Enhanced Fujita Scale. Meteorologist Mike Umscheid captured photographs of 2 tornadoes with the first in south central Cherry County and the second in Hooker County about 12 miles west-southwest of Mullen. The tornadoes moved across open rangeland with no damage observed (photos below). On the 17th, one supercell produced hail up to 4.25", or the size of grapefruits, about 18 miles south-southeast of Merriman in Cherry County. The large hail fell over open range.

Cherry County - 29 WSW Brownlee

Hooker County - 12 WSW Mullen

Photos courtesy of Mike Umscheid

The June convective storms also produced 6 days where heavy rainfall produced localized flash flooding. The heavy rain led to significant street flooding in the communities of Valentine, North Platte and Ogallala, while rural areas of Hayes and Holt counties saw water rise quickly on some creeks and low lying pastureland.

The severe season ended **October 5th** when an isolated thunderstorm produced strong winds in Lincoln County.

2014 Nebraska Severe Weather Summary

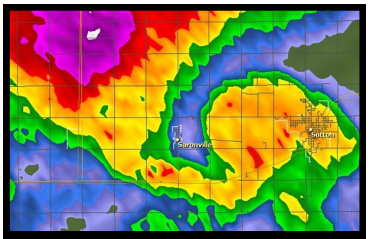
Severe Weather Awareness Week - March 23 - 27, 2015

South Central Nebraska - NWS Hastings, NE

The start of the season came **April 13th**, with several thunderstorms dropping large quantities of small hail, with one report of quarter size hail Fillmore County. Heavy snow and near blizzard conditions took over in the afternoon, with 4-7" reported in some areas. Most activity on **April 23th** was focused along a roughly 30 mile wide axis from Harlan County up through Polk County. Most hail was near quarter size, but golf ball size was reported in Franklin and 2" hail fell near Prosser. The first tornado reports of the season for the entire state occurred on **April 27th**. These 3 EF0 tornadoes touched down in Franklin County near Upland, York County north of Bradshaw and Polk County several miles west-northwest of Osceola. No damage was reported.

On **May 7th**, a supercell developed over Dawson County and shifted up through Greeley County. Dropping up to baseball size hail in the Lexington area, it continued to drop hail along the way, even spawning funnel clouds and gustnadoes. Wind damage was reported in the Lexington, Hazard, Rockville and Elba areas.

Activity started very early in the morning on **Mother's Day (May 11th)**, as a line of severe thunderstorms quickly developed near the Nebraska/Kansas border, dropping up to ping pong ball size hail in Harlan and Adams Counties. Severe thunderstorms redeveloped that afternoon, with the most intense storm of the day anchored along the warm front, starting near Hastings before sliding east across portions of Clay, Fillmore and York Counties. It produced a number of tornado reports, along with large hail, damaging winds and heavy rain. First dropping a weak tornado near Glenvil, it then produced several more tornadoes, 2 of which were rated EF3. The first started near Fairfield and lifted near Sutton, crossing both Highway 14 and 6 and traveling nearly 22 miles. A home north of Sutton was destroyed, numerous outbuildings and grain bins were destroyed, trees and power lines were downed and irrigation pivots overturned. Strong straight-line winds near 100 MPH hammered the town of Sutton. The second EF3 started north of Exeter, destroying a home before crossing into Seward County. Damage surveys, photos and video confirmed that this storm produced at least 6 other tornadoes, 3 rated EF0, 2 rated EF1 (one anticyclonic) and 1 rated EF2. Overall, damage was extensive to trees, power poles, farm buildings and a few homes. Over 200 irrigation pivots were overturned and/or twisted.



Radar image of the tornadic storm near Sutton.

Damaged home near Sutton.

Following a 3 week lull in activity, **June 1st** kicked off an active month. Although thunderstorms were widespread, there were few severe reports. Quarter size hail fell in the Johnson Lake and Cambridge areas and wind gusts near 60 MPH occurred near Cambridge. Of note, a lightning strike sparked a damaging fire in the bell tower of a church in Arapahoe not long after the conclusion of Sunday services.

Hail/tornado damaged home near Hampton.

For the area northeast of a line from Litchfield-Hastings-Geneva, **June 3rd** featured one of the most widespread events of the season. Along with 3 brief tornadoes, there were numerous reports of hail up to and near golf ball size and damaging winds of 60-80 MPH. With much of the hail accompanied by these strong winds, there were reports of tree damage as well as structures suffering window and siding damage. A very strong southward-surging outflow boundary also produced 70+ MPH winds and blowing dust in Hastings, as well as in Buffalo and Clay Counties. Considering that these outflow winds occurred several miles away from the nearest thunderstorm activity off to the north, they were unusually strong. Of the 3 confirmed tornadoes, 2 were rated EF0 and occurred in Valley and Greeley Counties, with 1 rated EF1 that occurred after dark in Hamilton County, causing damage at 2 homes north of Hampton.

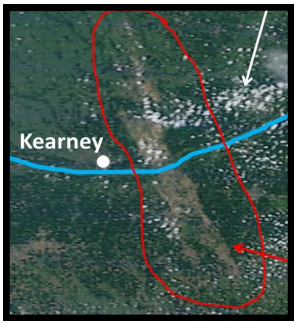
South Central Nebraska - NWS Hastings, NE Con't.

A bow echo racing across the area on **June 6th** brought damaging winds to portions of Furnas, Harlan and Franklin Counties. A peak wind gust of 78 MPH was measured south of Cambridge, while several other gusts were estimated at more than 60 MPH. A few days later, **June 11th**, thunderstorms produced up to tennis ball size hail across the area, with the largest hail falling near Red Cloud.

Tornado near Hildreth. Photo from Chris Sheen.

Although 4 brief tornadoes were reported on **June 14th**, for most places the story was straight line winds, as a line of thunderstorms raced across nearly all counties along and south of Interstate 80. This line produced widespread gusts in the 60-90 MPH range, uprooting or damaging countless trees and damaging several structures. A few of the higher wind gusts included 82 MPH near York and 79 MPH at the Hastings Airport. These storms also produced very large hail, with many ranging from golf ball to baseball size, but the largest was softball size reported just southeast of Hastings. The 4 weak tornadoes resulted in no damage and were rated EF0. The Hildreth and Inavale area saw 2 of the tornadoes during the evening hours, while the other 2 occurred after dark near Giltner.

Grand Island was pounded by hail up to baseball size on **June 20th**. There were other reports of large hail across the area, including baseball size hail near Rockville. Wind gusts of 60-80 MPH were also reported.



July 9th was the main event for July, as storms producing a nasty combination of hail and strong winds caused significant damage in the Gibbon area. Damage was done primarily to vegetation, but also to siding and windows of homes, by hail generally up to quarter size, with isolated larger hail near the size of golf balls, that were accompanied by straight line winds of 60-70 MPH. An unofficial home weather station located to the south near Norman reported a gust of 85 MPH. Crop damage from enough hail to turn the ground white extended for dozens of miles roughly along a Loup City to Gibbon to Norman line and was severe enough to leave a scar that could be seen on visible satellite imagery for the rest of the summer (see image to the right).

Hail affecting both western and eastern areas ended the month, with **July 23rd** bringing up to baseball size hail to Ragan. Golf ball size hail was reported in Shelby on **July 26th**, while a swath of up to golf ball size hail fell on **July 31st** from Stromsburg to the York Interstate 80 exit.

Kearney was the focus of attention on **August 8th**. Quick rainfall over 3" resulted in one of the worst flash flooding events in years, with street flooding stranding numerous cars. At Good Samaritan Hospital, water broke through 2-story ground to ceiling windows and flood waters also breached the basement and damage occurred in other parts of the building. There were a handful of reports of hail up to the size of golf balls and wind gusts near 60 MPH scattered across areas west of Highway 281, including in and near Kearney.

Storms on **August 9th** affected counties along and west of Highway 281, with hail up to the size of baseballs reported in the Lexington area and golf ball size hail in the Elm Creek and Franklin areas. Wind gusts of 72 MPH were recorded near Wood River and 71 MPH at the Hastings Airport. Wind gusts between 70-85 MPH were reported on **August 17th**, resulting in tree and crop damage in the Elyria and Litchfield areas. A few of the highest gusts included 83 MPH in Hastings, 71 MPH near Wood River and 70 MPH in Superior. The city of York was affected by heavy rain on **August 25th**. Reported totals exceeded 3", the highest total of 6.40" came from the southwest side of town. Street flooding temporarily stranded several motorists overnight.

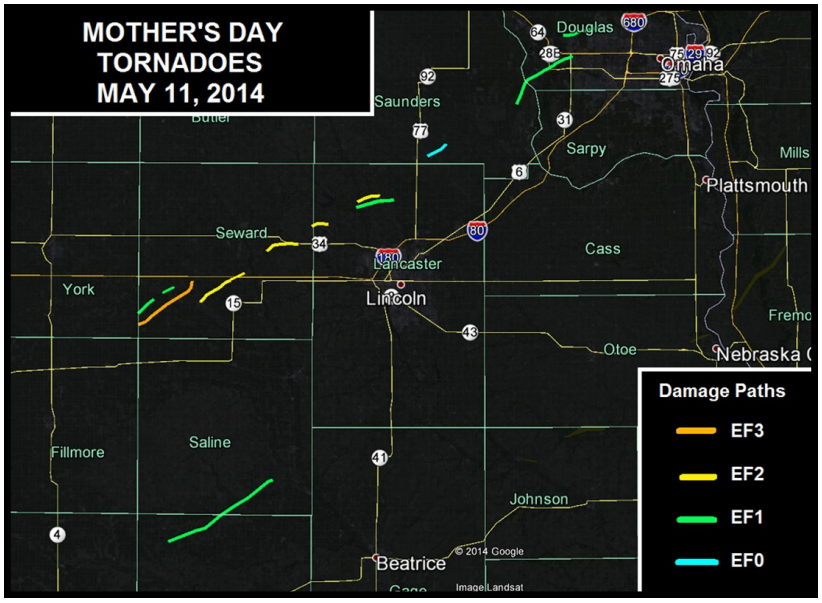
The main story of September was that the first 16 days ended up being the 2nd coolest start on record at Grand Island. The season came to a close on **October 1st**, when thunderstorms produced hail up to half dollar size and wind gusts near 65 MPH across areas west of Highway 14 and south of Highway 92.

2014 Nebraska Severe Weather Summary

Severe Weather Awareness Week - March 23 - 27, 2015

Eastern Nebraska - NWS Omaha/Valley, NE

After five seasons of below normal severe weather events across eastern Nebraska and western Iowa, the 2014 season saw several significant severe weather and flooding events. The events included violent tornadoes, giant hail, extremely damaging winds, and flooding that tragically combined for three fatalities, numerous injuries, and over a billion dollars of damage. The majority of the impacts occurred during seven events across the area. The convective season started **April 12th** as a cold front moved through eastern Nebraska and southwest Iowa. Scattered thunderstorms developed along this front, with a few of those becoming severe and large hail being reported. Some of the hail was damaging, with 3" hail occurring in Red Oak, IA. Other isolated non-significant severe weather occurred on **April 27th** and **May 7th**. These events generally produced marginally severe hail and some strong wind gusts.



The first significant severe weather event of the year occurred on **Mother's Day, May 11th**. The day started with scattered, mainly non-severe thunderstorms across the area. As these thunderstorms moved east, a warm front lifted northward into southeast Nebraska and southwest Iowa, allowing for warm and humid air to move northward. Scattered supercell thunderstorms developed along the warm front over south-central Nebraska and moved east, crossing most of east-central and southeast Nebraska and western Iowa during the late afternoon and evening. One of these storms in particular tracked across Seward, Lancaster, Saunders and Douglas counties, producing damaging winds and several tornadoes. The city of Beaver Crossing was significantly impacted by an EF3 tornado, producing widespread damage across the town. Other tornadoes occurred near Seward, Raymond, Malcolm and Elkhorn. In addition to the tornadoes, widespread damaging winds occurred in Seward County, and scattered areas of damaging winds continued northeast across Omaha and into western Iowa.

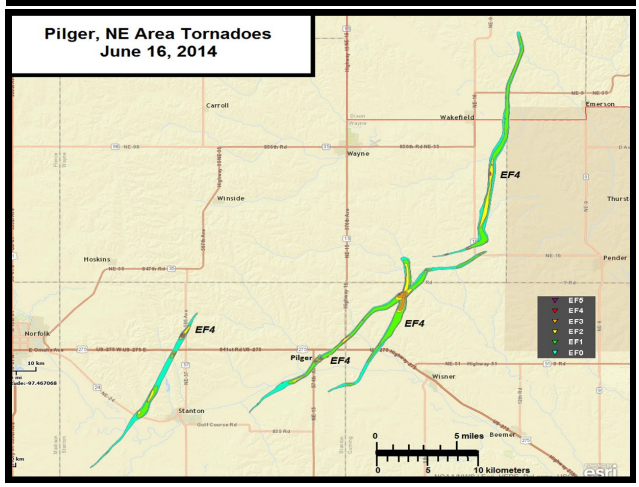
The rest of the month of May was void of significant severe weather, with isolated marginal severe events occurring on the **20th** in western Iowa, and the **27th** near Bellevue.

The severe weather season typically peaks in early June across the region, and that was the case this year. June was a very destructive month, with significant events on the 3rd, 16th, 17th and 20th. The month started off with the most widespread severe weather event of the season, which occurred on **June 3rd**. The combination of an unseasonably strong jet stream and a warm front across the area led to several waves of supercell thunderstorms moving across most of eastern Nebraska and western Iowa. The most destructive of these was a storm that moved into northeast Nebraska during the early afternoon and tracked southeast across eastern Nebraska and western Iowa. The supercell produced widespread damaging winds and giant hail. The combination of the wind and hail caused numerous injuries and over a billion dollars in damage. Particularly hard hit was Blair, where widespread hail and wind damage occurred. Other destructive supercells occurred in southeast Nebraska where widespread crop damage was observed. In addition to the severe weather, Omaha Eppley Airfield not only set their daily record for rainfall on the June 3rd with 5.30 inches, but also the daily record for the entire month.

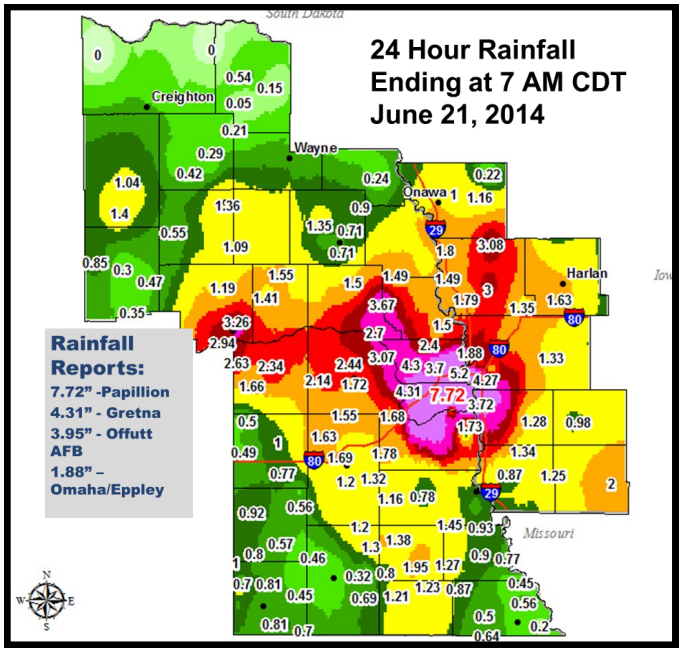
Eastern Nebraska - NWS Omaha/Valley, NE Con't.

The next two significant events occurred along a warm front in northeast Nebraska on **June 16th and 17th**. Warm and humid air once again moved northward into eastern Nebraska the morning of the **16th**, resulting in scattered thunderstorms producing large hail, some as large as 3.5" in diameter in Lancaster County. As these thunderstorms moved east by early afternoon, an additional supercell thunderstorm developed in northeast Nebraska. This lone storm went on to produce 5 tornadoes, 4 of which were violent in nature, resulting in 2 fatalities, several injuries and millions of dollars in damage. The most damaging of these tornadoes, rated EF4, moved directly through the city of Pilger and occurred simultaneously with another EF4 tornado produced by the same parent thunderstorm that affected areas north of Wisner. Other violent tornadoes occurred near Stanton and just to the east of Wakefield.

Pilger Twin Tornadoes on June 16th. Photo courtesy of Dustin Wilcox.



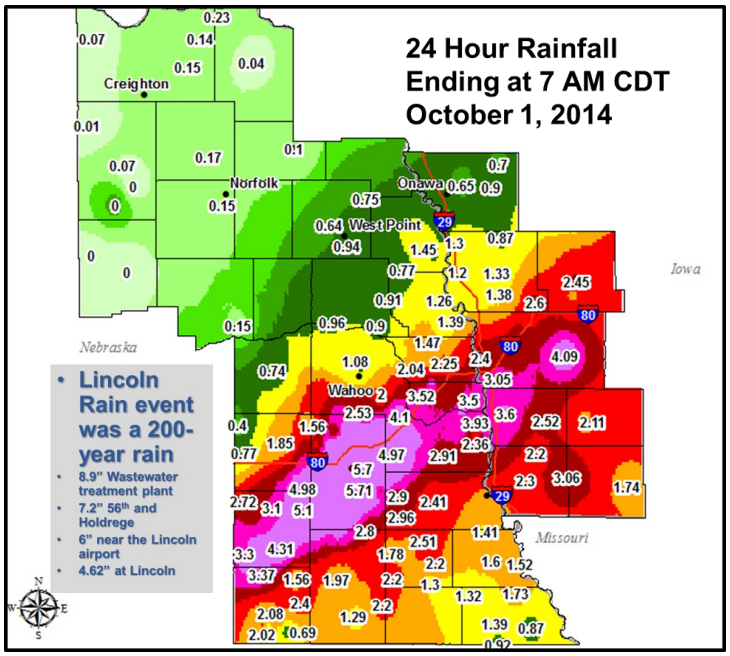
On the **17th**, the same warm front again led to one isolated supercell thunderstorm in northeast Nebraska. This storm remained nearly stationary in Cedar County and produced several tornadoes over the course of 4 hours. The most destructive of these was an EF3 wedge tornado that tracked near the edge of the town of Coleridge. This supercell destroyed several rural farmsteads, produced giant hail, and created flash flooding that destroyed several rural roads and one bridge.



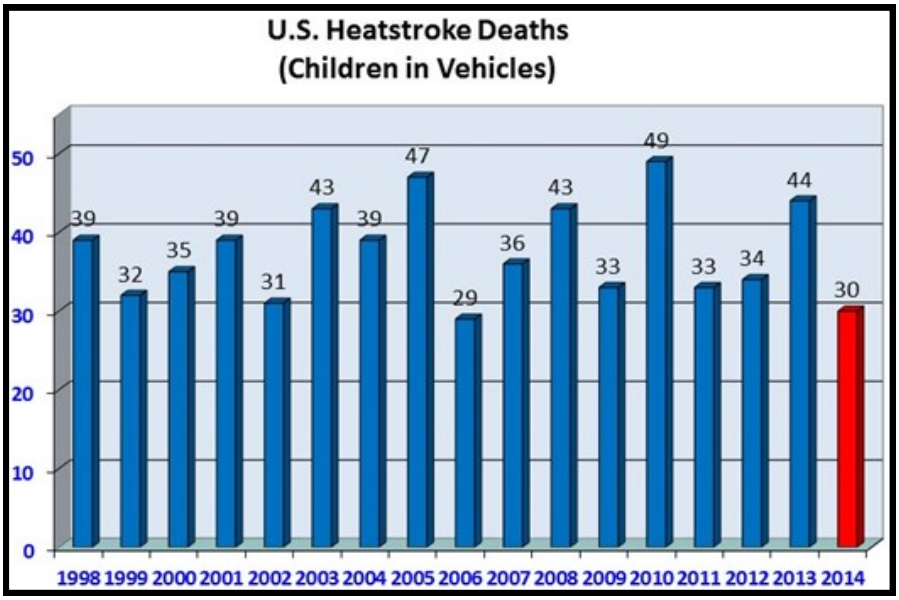
The final significant event of the month occurred **June 20th**. Scattered severe weather occurred on the 20th, including hail as large as 2" in diameter in Neligh and scattered damaging winds reports across southwest Iowa, persistent repeated thunderstorms resulted in significant flooding. See rainfall totals to the left. The most significant was observed in the southern half of the Omaha metro, specifically in Papillion and Bellevue. Here, over 7 inches of rain fell and led to widespread street flooding, as well as flash flooding along the Papio Creek system. One fatality occurred as a motorist was swept away after he exited his vehicle. Fort Crook on the Papillion Creek set a new record crest of 36.13 feet on the 21st.

Eastern Nebraska - NWS Omaha/Valley, NE Con't.

Other scattered severe thunderstorms occurred on **June 28th and 30th**, but these were less significant than earlier in the month. As typical, the severe weather occurrences decreased in the months of July and August. In July, severe weather was observed on the **7th and 26th**, as well as spotty areas of heavy rainfall that resulted in minor river flooding, especially in southwest Iowa. August was also a quiet, but wet month across the area. Isolated severe weather did occur on the 3rd, 24th, and 31st, but these events produced minor hail and gusty winds. Heavy rainfall was observed on several days in mid to late August, though, and resulted in additional minor flooding along area rivers. See the significant rainfall from the 31st at right.



The final significant event of the severe weather season occurred **September 9th**. During this event, an EF1 tornado occurred in Otoe County, affecting several farmsteads and producing damaging winds and hail as large as golf balls. Other strong to severe thunderstorms across parts of southeast Nebraska and southwest Iowa, producing large hail and damaging winds. The thunderstorms were also very effective rain producers and led to additional flash flooding in the Omaha metro area. Other isolated severe weather occurred on **September 19th**. The heavy rain at the end of September was a 200-year rain in Lincoln and finally brought to end a very active season on the first of October.



Beat The Heat!

Heat is one of the leading weather related killers in the United States, resulting in hundreds of fatalities each year even more heat-related illnesses. Unfortunately, many of these fatalities are children and elderly people.

Throughout the upcoming summer season we ask that you **Be a Force of Nature** by knowing your risk, taking action and being an example where you live by sharing your knowledge with others. Following simple tips can help keep you and your loved ones safe when a heat wave strikes.

For more information about how to be safe and "Beat The Heat", go to:

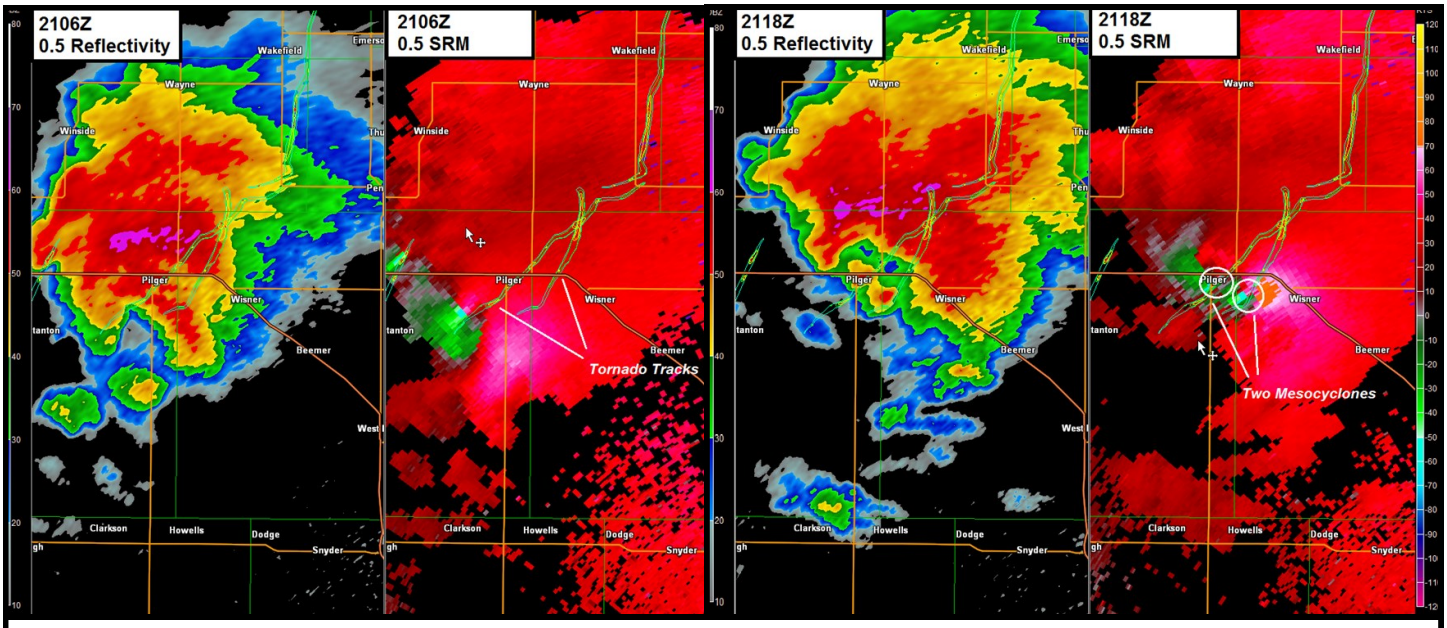
www.weather.gov/heatsafety

June 16th Pilger, NE Supercell

During the mid afternoon of June 16th, the atmosphere across northeast Nebraska had become volatile, with large amounts of instability and strong wind shear. As an outflow boundary from morning thunderstorms lifted north into northeast Nebraska, an isolated thunderstorm began to develop around 2 PM to the southwest of Norfolk. The storm moved to the northeast at around 25 MPH, becoming severe shortly after 3 PM. The first severe weather report from the thunderstorm was 1 inch hail that fell 2 miles southeast of Madison. As the storm moved into Stanton County around 3:30 PM, radar indicated developing rotation in the newly born supercell thunderstorm.

Over the next 3 hours this supercell thunderstorm would go on to produce a total of 5 tornadoes, 4 of these in the violent category of the Enhanced Fujita Scale (EF), which produced millions of dollars in damage, and tragically two fatalities, and multiple injuries.

The first of these tornadoes, rated EF0, was a brief tornado that occurred about 9 miles southwest of the city of Stanton that produced minor tree damage. After this initial tornado, the storm quickly produced a second tornado that would become the first of the 4 violent tornadoes. This EF4 tornado developed 7 miles southwest of Stanton, moving northeast for just over 12 miles. It had a maximum width of a quarter of a mile, passing 1 mile to the west of Stanton and ending 6 miles north of the city.



Reflectivity/SRM Images at 2106Z / 4:06 PM 6/16/14 Reflectivity/SRM Images at 2118Z / 4:18 PM 6/16/14

The next tornado, also a violent EF4 tornado, was the most destructive of the family of tornadoes on June 16th. This tornado developed 5.5 miles southwest of the town of Pilger and moved directly northeast, cutting a path of destruction through the heart of the town (see radar images above).

June 16th Pilger, NE Supercell

In total, this tornado traveled nearly 19 miles and at times was a quarter of a mile in width. Within Pilger, nearly 75% of the structures received some damage, while structures near the center of the tornado were completely destroyed down to the foundations.

Photo by Trent Bosler near Pilger - Mature stage of the first tornado.

As the EF4 tornado was tearing through the town of Pilger, the supercell thunderstorm produced an additional tornado that developed 3 miles south of Pilger. This tornado would travel to the northeast and then north, passing 3 miles northwest of the town of Wisner for a total distance of nearly 11 miles. This tornado, which also produced violent EF4 damage, was a quarter of a mile wide at times along the path.

Although it is not unusual for a supercell thunderstorm to produce more than one tornado, or even more than one tornado at a time, it is exceedingly rare for a supercell to produce simultaneous violent tornadoes in close proximity for over 15 minutes. As the Pilger tornado exited the town and moved to the northeast, the second tornado crossed in front of the Pilger tornado about 6 miles northwest of Wisner. At this location, a couple of farmsteads were actually struck by both violent tornadoes. After the tornadoes crossed in front of each other, both began to slowly weaken, with the original Pilger tornado last to dissipate about 10 miles northeast of Wisner.

Photo by Trent Bosler near Pilger - Twin tornadoes on each side of Hwy 275.

As the twin tornadoes were dissipating, the supercell was in the process of producing its last violent EF4 tornado. This tornado developed 10 miles south of Wakefield, NE, and briefly moved northeast before turning almost due north. The total length of the tornado was 17 miles, passing 2 miles to the east of Wakefield, and was also a quarter mile in width during parts of the path. This tornado rapidly increased in strength after developing, producing EF4 damage at the first farmstead impacted. Additional EF4 damage was observed 4 miles southeast of Wakefield, where several farmsteads destroyed down to their foundations. As this tornado dissipated 7 miles northeast of Wakefield, the supercell finally started to weaken.

Central Plains Severe Weather Symposium and Family Weatherfest

University of Nebraska - Lincoln's 15th Annual Central Plains Severe Weather Symposium and Family Weatherfest

Saturday, April 11, 2015
9 a.m. - 2 p.m.
3310 Holdrege St.
Hardin Hall - East Campus
Lincoln, Nebraska
Hosted by
UNL's School of Natural Resources

Our mission is two-fold. To provide severe weather education and preparedness information to the public through

1. an annual symposium which brings severe weather experts to our community,
2. the Family Weatherfest which provides K-12 weather and science educational exhibits

The underlying theme for all CPSWS and Family Weatherfest events is: "Surviving the Storms". Exhibitors and Severe Weather Experts are brought in to each event to touch upon this theme, and its varying aspects. One unique aspect of the CPSWS and Family Weatherfest has been its ability to bring together different organizations and agencies under one roof to promote its underlying theme.

The CPSWS, and its Family Weatherfest are both brought to the public as a Free Community educational outreach event. It is the commitment of CPSWS and Family Weatherfest to create an outlet that puts severe weather information into as many homes and businesses in the region as possible and this is accomplished by making this a "no admission charge" family activity. Recognizing that we should not charge the public when it comes to learning about severe weather safety, we have in the past and will in the future continue to bring this event to the public FREE of charge.

For more information, please visit: www.cpsws.unl.edu

School of Natural Resources
WEATHERFEST

CPSWS
Central Plains Severe Weather Symposium