Nebraska/Iowa Severe Weather Awareness Week

March 21 - 25, 2016

Spring Has Sprung! Are you Weather-Ready?

Welcome to spring and the 2016 Nebraska/Iowa 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/Iowa 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 the prepared. Look for ways to assist at work or in your community to help your family, neighbors, co-workers, and entire community prepare. #newx #iawx

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?

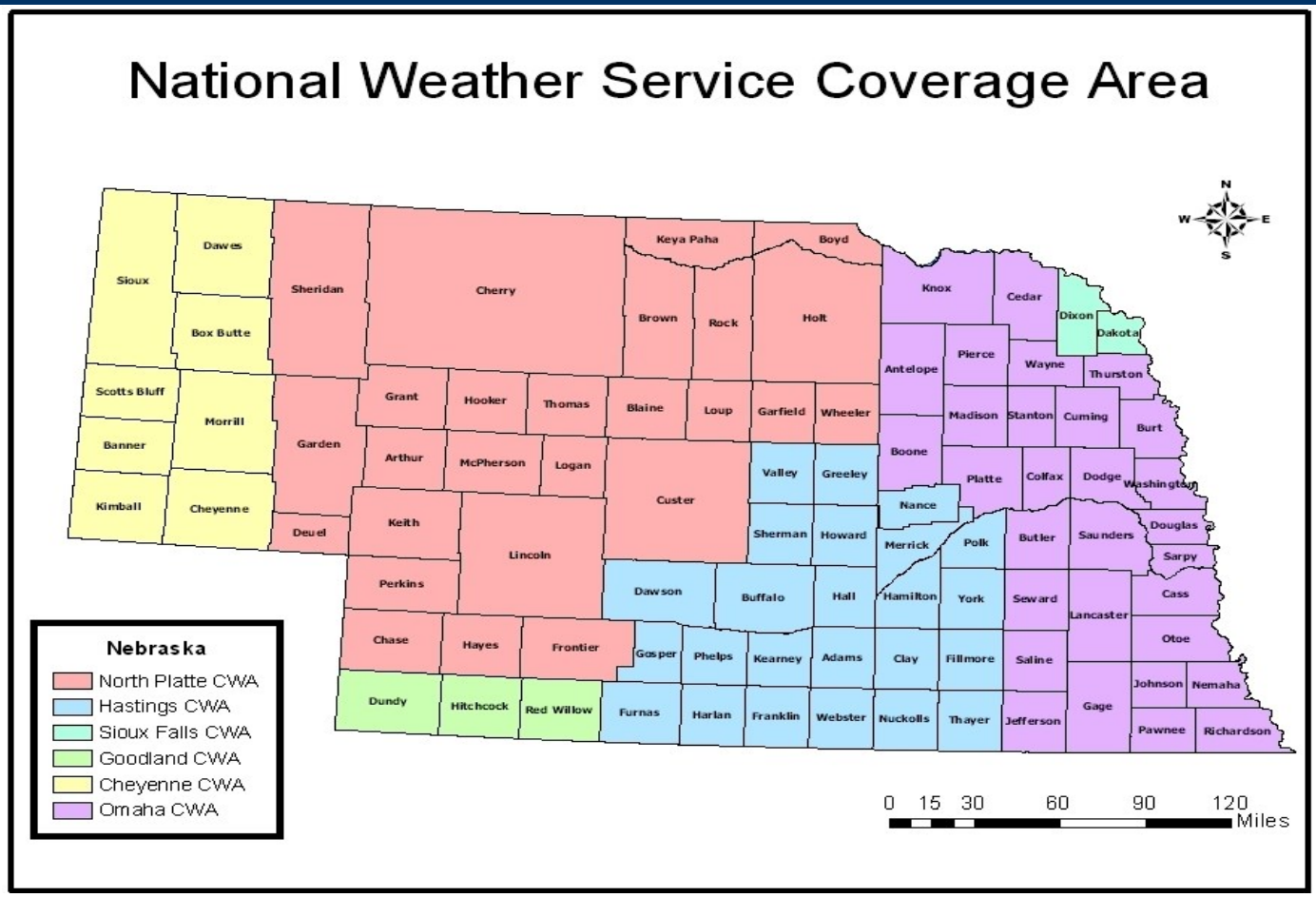
Practice your plan of action!

What's Inside?

National Weather Service Coverage Map	2
2015 State Tornado Facts	3-8
2015 State Tornado Graphical Facts	3-8
Severe Weather Terminology	9
NOAA Weather Radio All Hazards	10
Tornado Safety	11
Flash Flood Safety	12
Lightning Safety	13
Facts & Myths	14
Nebraska Panhandle 2015 Review	15
Extreme Southwestern Nebraska 2015 Review	16
Western & North Central Nebraska 2015 Review	17
South Central Nebraska 2015 Review	19
Eastern Nebraska/Western Iowa 2015 Review	21
Event of the 2015 Season	23
Central Plains Severe Weather Symposium	25

National Weather Service Offices Serving Nebraska

Severe Weather Awareness Week - March 21 - 25, 2016



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**

2015 Nebraska Tornado Facts

Severe Weather Awareness Week - March 21 - 25, 2016

Tornadoes: **26** (16 less the 1950-2015 average of 42 & 27 less the 30 year average of 53)

Deaths: **0** **Injuries**: **0**

Longest Track: **15.7 mi** (May 6th - Nuckolls/ Eastern Thayer County, Hardy - Deshler Areas)

Greatest Width: **800 yd / 0.5 mi** (Central Thayer County, Chester - Hebron Areas)

Strongest: **EF2** (2 on May 6th - 1 in Nuckolls/Eastern Thayer Counties, 1 in Central Thayer County)

Most in a county: **4** (Cherry & Thayer Counties)

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

Most in one day: **8** (May 6th)

Most in one month: **16** (May)

First tornado of the year: **May 3rd** (EF0 - Near Firth in Lancaster County)

Last tornado of the year: **November 16th** (EF1 - Rural Furnas County)

2015 Monthly Tornado Totals

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Total	0	0	0	0	16	2	3	3	1	0	1	0	26	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	2	0	0	0	0	0	0	0	2	8%
EF1	0	0	0	0	3	0	0	1	0	0	1	0	5	19%
EF0	0	0	0	0	11	2	3	2	1	0	0	0	19	73%

2015 Season Peak

Hail Size: 4.25" on May 27th (Dundy County), June 21st (Keith & Lincoln Counties), June 25th (Box Butte County)

Wind Gust: Estimated from storm survey: 100 mph on August 7th - Stratton (Hitchcock County)
Measured: 91 mph on July 5th - near Rushville (Sheridan County)

Nebraska
Tornado Facts

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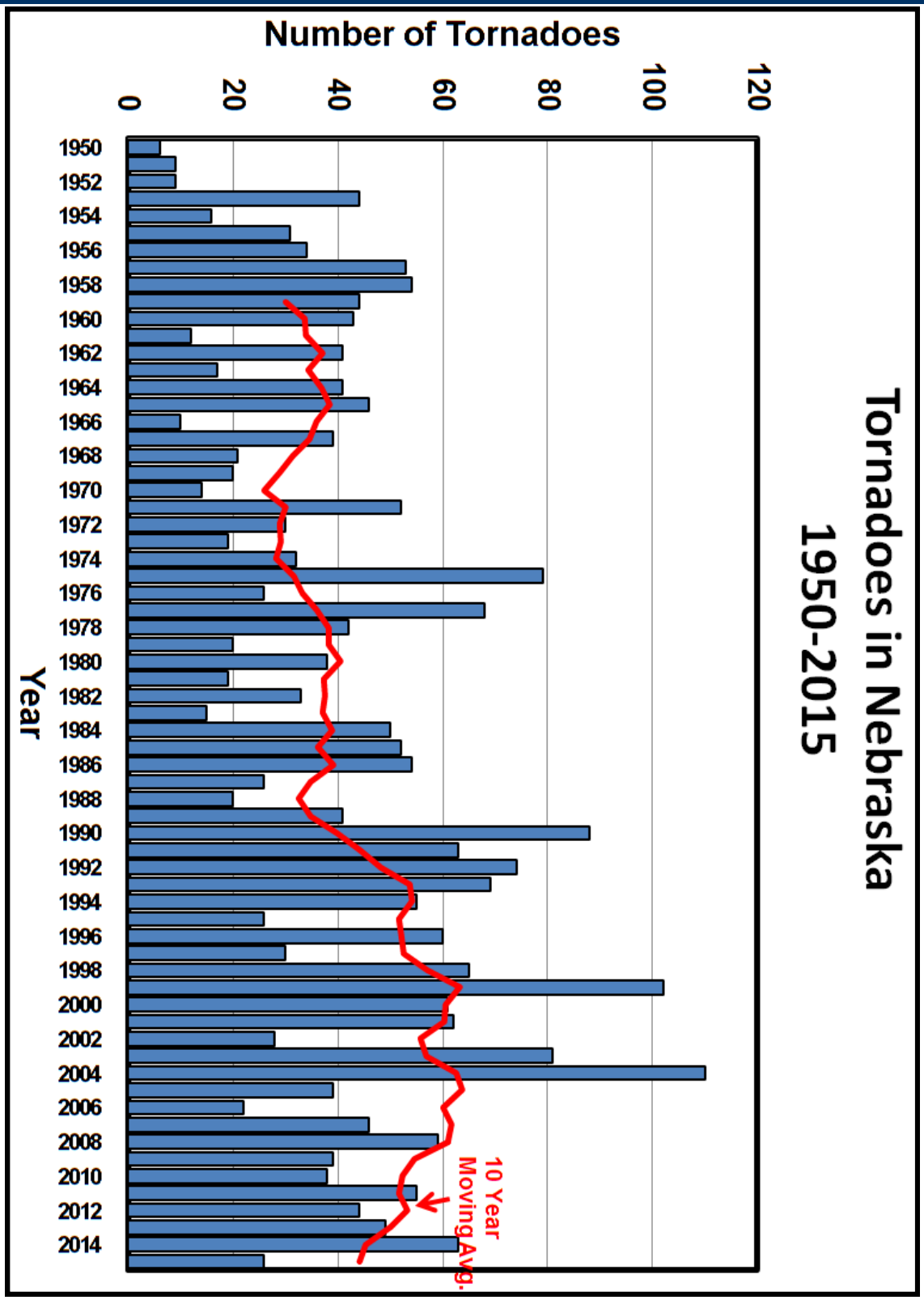

Nebraska
Tornado Facts

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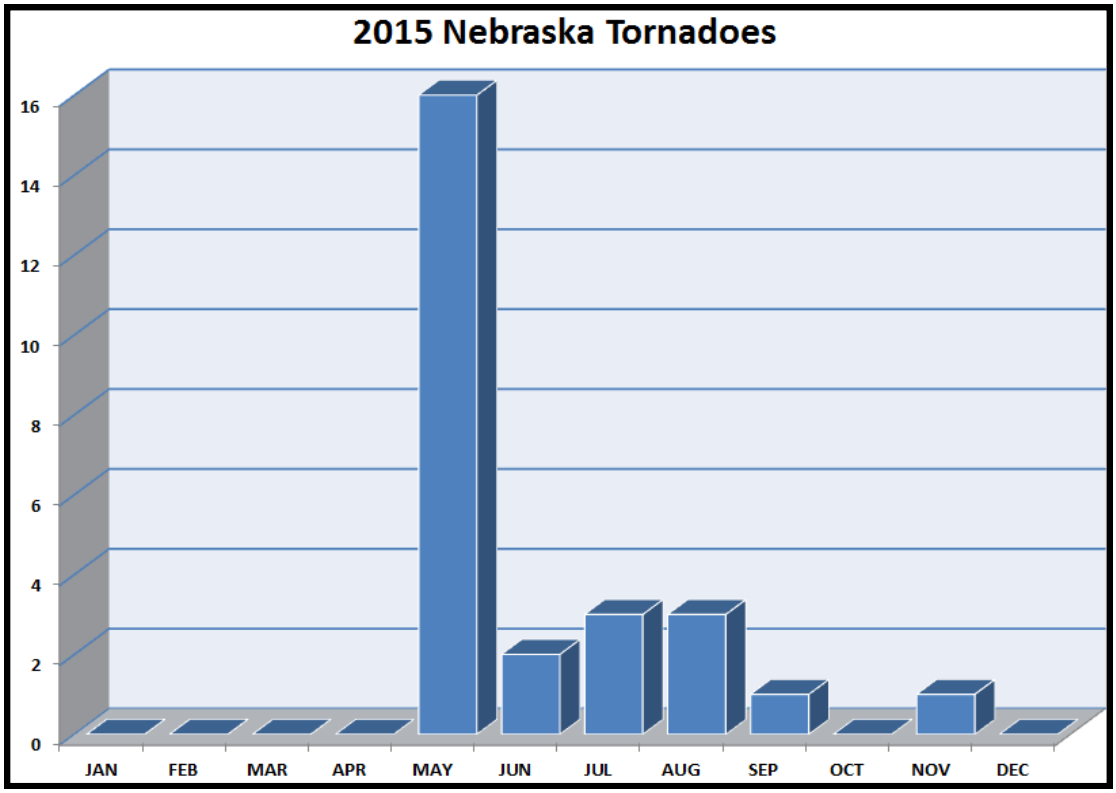

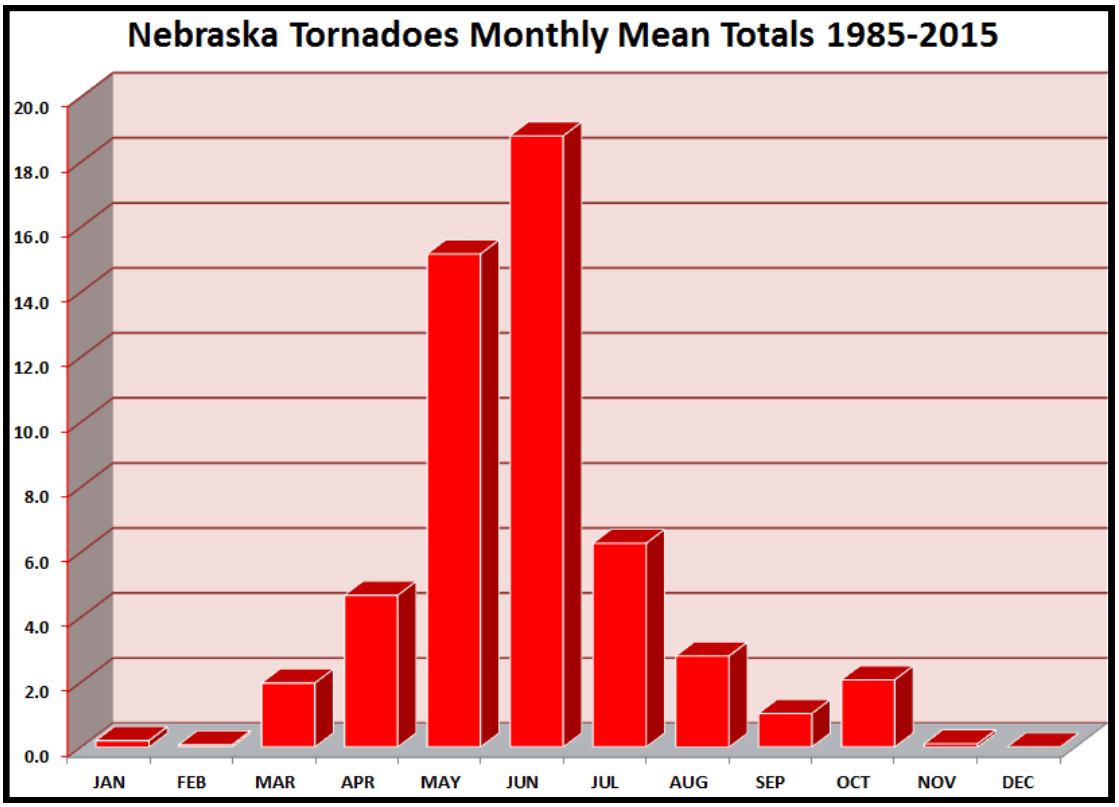

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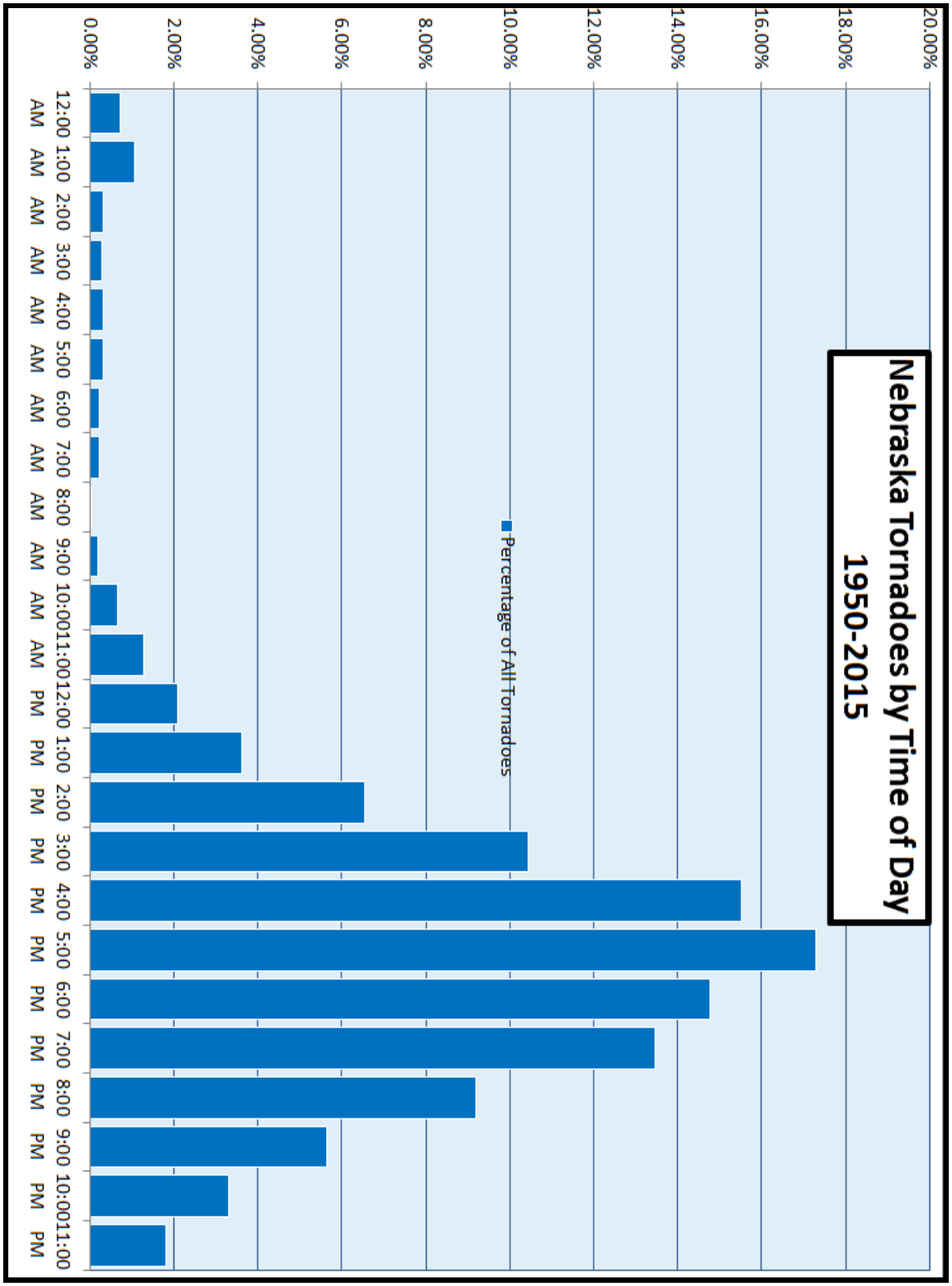


2015 Iowa Tornado Facts

Severe Weather Awareness Week - March 21 - 25, 2016

Tornadoes: **58** (8 above the 25-year average of 50)

Deaths: **0** **Injuries**: **5**

Longest Track: **24.6 mi**

Greatest Width: **700 yds (0.4 miles wide)**

Strongest: **EF3**

Number of Tornado Days: **16**

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

Most in one month: **19** (November)

First tornado of the year: **April 9th**

Last tornado of the year: **December**

2015 Monthly Tornado Totals

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Total	0	0	0	2	11	13	2	2	0	7	19	2	58	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	1	0	0	0	0	0	0	1	1.7%
EF2	0	0	0	0	0	1	0	0	0	0	2	0	3	5.2%
EF1	0	0	0	0	5	6	0	1	0	7	6	0	25	43.1%
EF0	0	0	0	2	6	5	2	1	0	0	11	2	29	50%

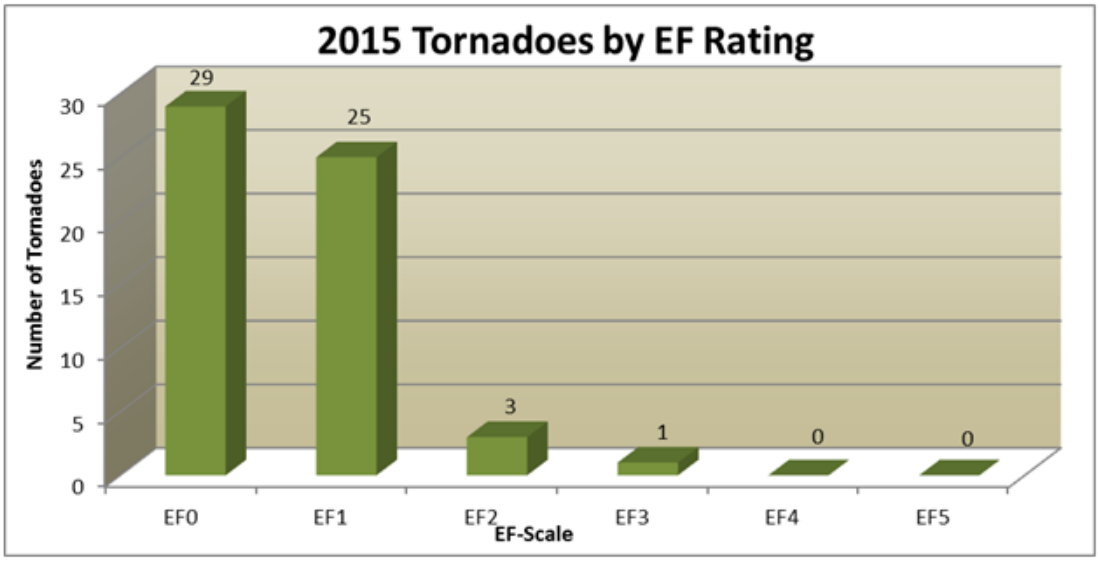
2015 Season Peak

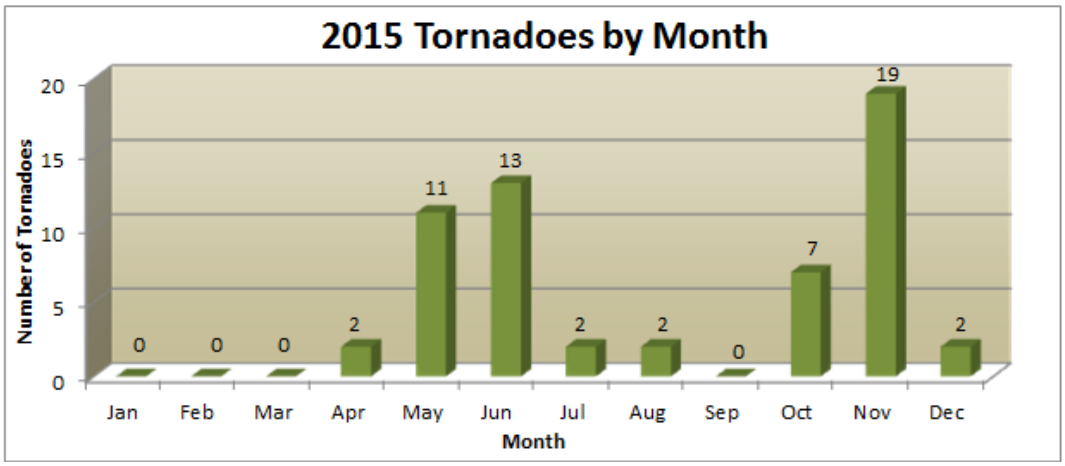
Hail Size: 4.00" on June 20nd (Marion County)

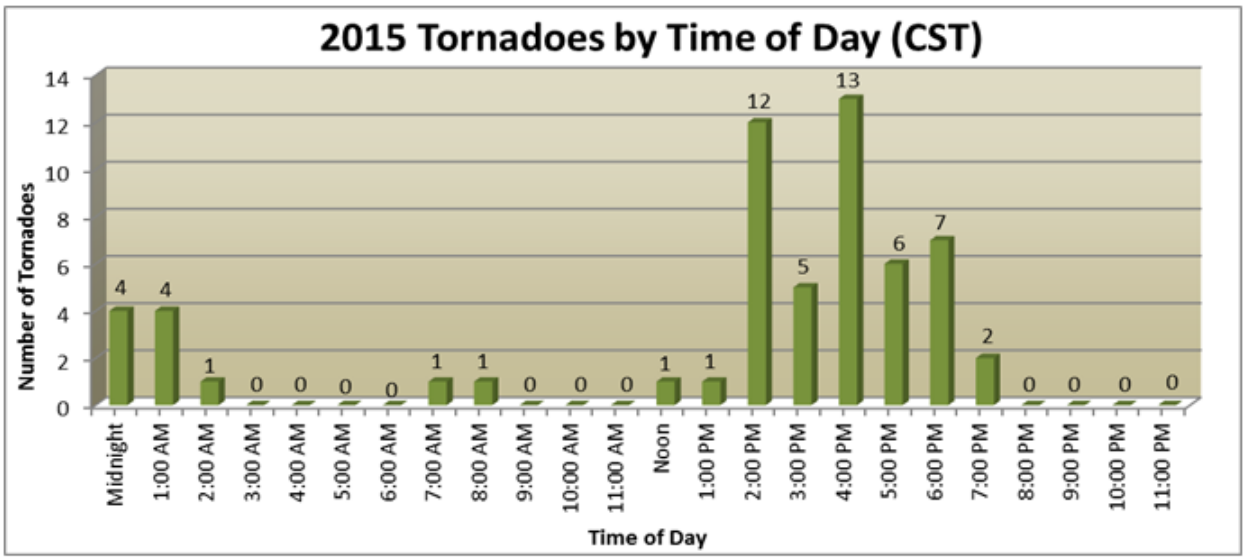
Wind Gust: Measured 96 mph on June 22nd by the Sheldon AWOS in O'Brien County

2015 Iowa Tornado Facts

Severe Weather Awareness Week - March 21 - 25, 2016







Severe Weather Terminology

Severe Weather Awareness Week - March 21 - 25, 2016

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.

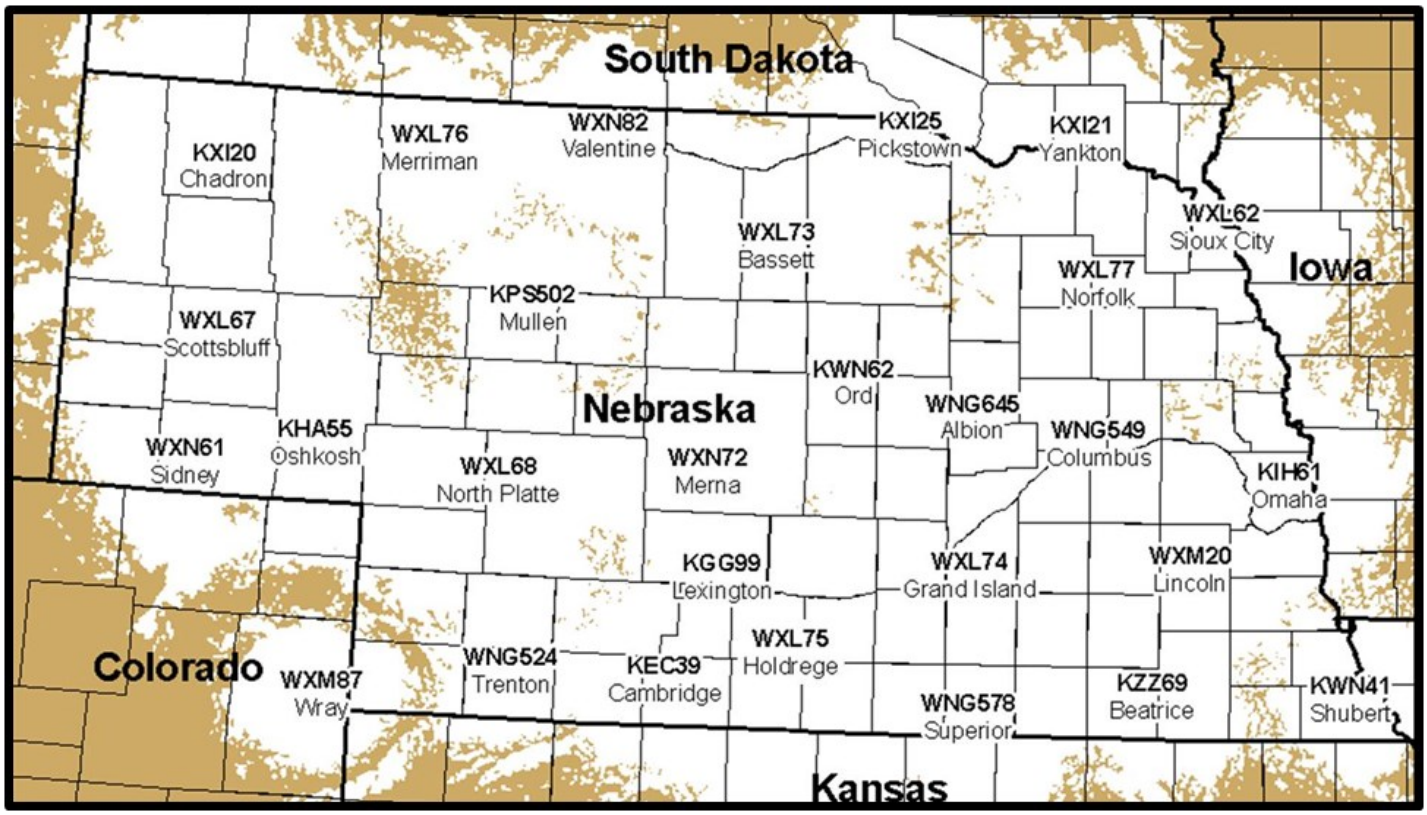
FLASH FLOOD - A rapid rise in water that occurs with little or no advanced warning, usually as the result of intense rainfall over a relatively small area in a short amount of time. Flash Floods can also be caused by dam or levee failures, ice jams, and topography.

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 21 - 25, 2016



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):

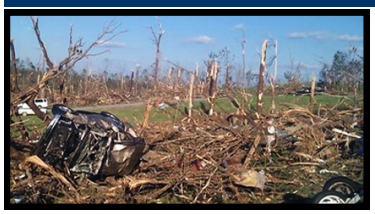
162.400	162.425	162.450	162.475	162.500	162.525	162.550

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

www.weather.gov/nwr/Maps/PHP/NE.php

Tornado Safety

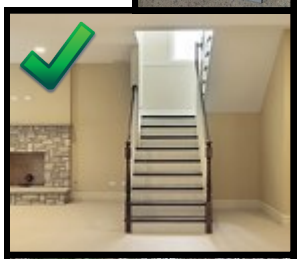
Severe Weather Awareness Week - March 21 - 25, 2016



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 70-75 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?

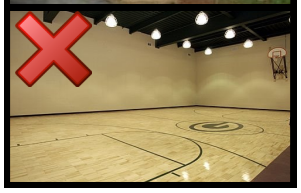
Be Ready Year Round!

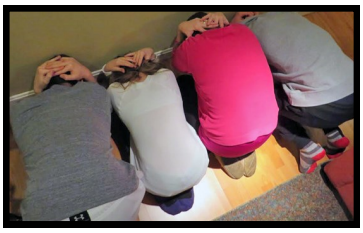
- Know the risk for your area. Tornadoes can occur at any time of day, any day of the year.
- Have a NOAA Weather Radio and battery back-up to receive warnings.
- Have a plan of action BEFORE severe weather threatens. You need to respond quickly when a warning is issued or a tornado is spotted.



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

Severe Weather Awareness Week - March 21 - 25, 2016

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

Severe Weather Awareness Week - March 21 - 25, 2016

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 49 people are killed each year by lightning.

Of the 26 killed by lightning in 2015:

- 62% were male
- 58% occurred in June & July
- 46% were between the ages of 20-39
- 30% were near trees

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 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

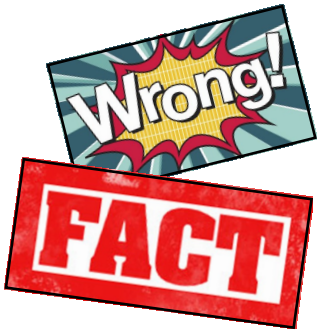
If you are caught outside with no safe shelter anywhere nearby the following actions may reduce your risk:

- 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 21 - 25, 2016



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.

Nebraska Panhandle - NWS Cheyenne, WY

On **April 15th**, late afternoon thunderstorms produced 60 MPH wind gusts four miles east-northeast of Sidney, and 1" diameter hail near the Kimball airport. Quarter size hail was observed at Sunol (Cheyenne County) on **April 18th**.

Afternoon thunderstorms on **May 15th** produced numerous reports of 1-2" diameter hail, as well as damaging wind gusts to 58 MPH, and torrential rainfall across Morrill, Cheyenne and Box Butte counties. Two inches of rain produced flooding at Bridgeport. Quarter size hail fell 6 miles south-southwest of the Box Butte Reservoir Campground on **May 24th**. On **May 28th**, afternoon thunderstorms produced quarter to half dollar size hail in Morrill and Cheyenne counties.

Quarter to ping pong ball size hail was observed across portions of Cheyenne County on **June 1st**. The next day, thunderstorms produced hail to the size of tennis balls, torrential rainfall and 60 to 65 MPH wind gusts across much of the area. Flash flooding was observed west and southwest of Hemingford. Quarter size hail was observed near Chadron and 8 miles north-northwest of Harrison. Golf ball size hail and a funnel cloud were reported 4 miles north of Alliance on **June 6th**. Thunderstorms on **June 10th** produced flash flooding and quarter size hail near Harrison. On **June 16th**, late afternoon and evening thunderstorms produced numerous reports of quarter to ping pong ball size hail, wind gusts to 65 MPH and torrential rainfall throughout Scotts Bluff, Morrill and Sioux counties. Two inches of rain in 30 to 45 minutes caused extensive flash flooding in and around Scottsbluff. The following day, evening thunderstorms over Box Butte, Sioux and Dawes counties generated quarter to hen egg size hail. On **June 25th**, thunderstorms produced widespread 1-3" diameter hail, wind gusts to 65 MPH, and torrential rainfall. Flash flooding was reported in Banner and Dawes counties. A EF0 tornado touched down in open country 2 miles north of Bayard. Quarter size hail was observed 11 miles south-southeast of Kimball on **June 28th**.

On **July 1st**, strong outflow from a thunderstorm produced wind gusts to 65 MPH 5 miles west of Chadron. **Independence Day** thunderstorms produced large hail and wind gusts to 60 MPH across portions of Box Butte, Scotts Bluff, Banner and Cheyenne counties. The next day, thunderstorms generated large hail and torrential rainfall across portions of the area. Flash flooding occurred southwest of Mitchell (Scotts Bluff County). Afternoon thunderstorms on **July 17th** produced quarter size hail in Sioux, Scotts Bluff and Box Butte counties. The following day, damaging winds up to 75 MPH blew a semi-tractor trailer off Highway 385 north of Dalton, and hen egg size hail was observed at Harrisburg. On **July 26th**, afternoon thunderstorms produced wind gusts to 60 MPH, golf ball size hail and torrential rainfall across Morrill County. Two to four inches of rain caused flash flooding 3 miles west of Broadwater. Quarter to golf ball size hail fell over portions of Scotts Bluff and Sioux counties on **July 27th**.

Damaging winds to 75 MPH and 1" hail were reported in Morrill and Cheyenne counties on **August 1st**. On **August 10st**, a couple of funnel clouds were observed northwest of Kimball. Wind gusts of 65 to 70 MPH blew a large metal shed on top of a Kimball motel. Three inches of rain caused extensive flash flooding at Kimball and Lodgepole Creek overran its banks. The next day, 3-8" of rain generated extensive flash flooding across much of Kimball and Cheyenne counties. Quarter size hail fell at Agate (Sioux County) on **August 17st**.

On **September 29th**, 1" hail fell 18 miles southwest of Agate.

2015 Nebraska/Iowa Severe Weather Summary

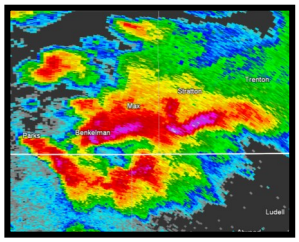
Severe Weather Awareness Week - March 21 - 25, 2016

Extreme Southwestern Nebraska - NWS Goodland, KS

Station	2015 Precip	Normal	Percent
Benkelman	24.39”	19.75”	123
Trenton Dam	18.67”	21.52”	87
McCook	26.76”	22.53”	119

Precipitation was generally above normal across Dundy, Hitchcock and Red Willow counties in 2015. Benkelman received several rounds of heavy rainfall in May, bringing the monthly total to 10.75” which helped push annual precipitation to 123% of normal. While Hitchcock county came up short (Trenton Dam received 6 to 8” less moisture than neighboring counties), the observer in McCook reported almost 27” of moisture for the year.

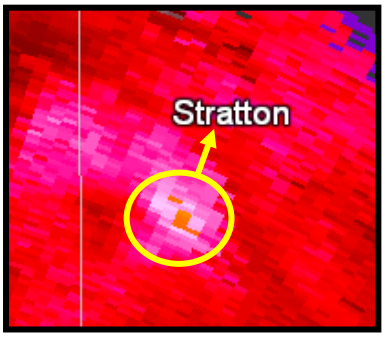
Two severe weather days stand out from the others in terms of severity and damage. On **May 27th**, extremely heavy rainfall and softball hail occurred in southeast Dundy County, and on **August 7th**, a line of storms produced a wide swath of damage across Hitchcock County resulting from estimated 100 mph winds.



On **May 27th**, a series of slow-moving thunderstorms (left) moved across southeast Dundy County during the late afternoon. The cores of extremely heavy rainfall and large hail are indicated by the red, pink and purple shades. The storms dropped 3.70” of rain in several hours which resulted in flooding in and around Benkelman (right).

In addition, the thunderstorms which initially produced hail up to golf ball size, intensified and ultimately produced baseball and softball size hail.

The next big severe weather day arrived on **August 7th** as a line of thunderstorms moved northeast out of Kansas and tracked across Hitchcock County during the evening. Several intense downbursts occurred as winds estimated at 100 mph roared through Stratton and later through Palisade. The damage produced was similar to that of an EF1 tornado.



The Doppler radar image to the left shows the core of strong winds aloft as the downburst approached Stratton (pink and orange colors).

Hundreds of trees and utility poles across the county were downed and dozens of irrigation pivots were overturned in and around Stratton and also near Palisade. Many residences suffered damage to roofs, carports, fences and windows. One fatality occurred when a trailer home was overturned. Numerous power outages occurred throughout the area as local and neighboring utility crews worked hard to restore power.

The National Weather Service and Hitchcock County Emergency Management conducted a damage survey and concluded the damage was consistent with strong, straight line winds.

Losses likely exceeded five million dollars with cleanup lasting for weeks.

2015 Nebraska/Iowa Severe Weather Summary

Severe Weather Awareness Week - March 21 - 25, 2016

Western & North Central Nebraska - NWS North Platte, NE

In 2015, the severe weather season included a lightning induced wildfire, hail needing to be removed with snowplows, hail up to grapefruit size, and a thunderstorm wind gust up to 90 mph. Regarding tornadoes, there were 10 tornadoes confirmed, 5 which were categorized as landspout tornadoes.

The first thunderstorms of the season began in March. Isolated thunderstorms formed on the evening of **March 28th** across the eastern Nebraska Panhandle. Downburst winds occurred over portions of Garden County which led to damage. As the thunderstorms moved east, they touched off a wildfire in far eastern Arthur County. Aided by strong northerly winds, the fire burned over 35,000 acres of range land in eastern Arthur, western McPherson and eastern Keith counties.

Near Brule
Photo courtesy of Brett Wright.

April 23rd, scattered thunderstorms developed across portions of southwest Nebraska into eastern portions of north central Nebraska with some large hail reported. In fact, hail covered the ground in portions of Blaine and Loup counties with snowplows deployed to remove hail from roadways.

May 15th, a warm front was the focus for supercell thunderstorm development across the western Sandhills. In addition to hail up to 2.75" and wind gusts up to 70 mph, several funnels and two tornadoes were confirmed, one in northern Sheridan County and one in northwest Cherry County.

Two landspout tornadoes touched down in open rangeland in northwest Cherry County on **May 24th**. No damage was reported.

Climatologically, June is the peak month for tornadoes. June ended the month with only one landspout tornado (right) which occurred **June 14th** near North Platte, in Lincoln County.

Landspout tornado south of WFO North Platte.
Photo taken by NWS employee.

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

Otherwise, June was highlighted by several thunderstorm events including damaging winds, large hail, and localized flash flooding. The most significant event occurred **June 20th-21st** during the evening and again during the early morning hours. Hail up to softball size fell northeast of Paxton in Keith County. The softball size hail fell at 645 a.m. MDT, which is an unusual time of day. Property damage was significant where the hail broke windows, damaged siding, vehicles, and crops in portions of eastern Keith and western Lincoln counties.

Near Thedford on July 23rd.
Photo courtesy of Wade Neben.

July was highlighted by several thunderstorm events including damaging winds, large hail and flash flooding. A severe weather event on **July 5th**, caused widespread damaging winds from the eastern Panhandle across north central Nebraska. Wind gusts of 60 to 75 mph were common. The highest wind gust measured was 90 mph south of Rushville. This was measured by a storm chaser's anemometer. On **July 23rd**, a brief tornado (left) touched down southwest of Thedford. On **July 26th**, a brief tornado touched down in an open field just south of Mullen. A second tornado briefly touched down in an open field southeast of Ainsworth. No damage occurred with either tornado. The largest hail size reported in July was three inch diameter hail, or the size of tea cups. This size of hail fell northeast of North Platte on **July 17th** and also near Wauneta on **July 25th**.

August 2nd, a landspout tornado (right) touched down near Lake Maloney south of North Platte. Ten minutes later a second landspout tornado touched down nearby. Neither tornado caused damage. August also had several thunderstorm events including damaging winds and large hail. The most significant event occurred **August 13th**, when a supercell thunderstorm which began in Thomas county tracked south through Logan County into Lincoln County. This thunderstorm tracked directly through North Platte and caused considerable property damage including downed trees and power lines, and hail damage to roofs and vehicles.

Near North Platte on August 2nd.
Photo courtesy of Jennifer Swain.

September had three thunderstorm events during the month. A thunderstorm event on **September 9th** produced large hail up to grapefruit size above Calamus Reservoir in Loup County.

The severe season ended **November 16th** when thunderstorms in southwest Nebraska produced quarter size hail southeast of Stockville in Frontier County.

2015 Nebraska/Iowa Severe Weather Summary

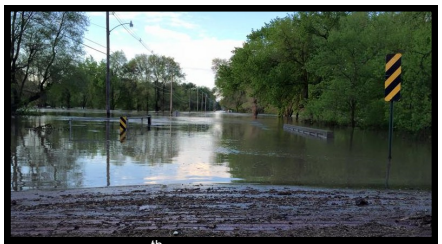
Severe Weather Awareness Week - March 21 - 25, 2016

South Central Nebraska - NWS Hastings, NE

April 1st marked the start of the 2015 season, with 1-1.25" hail and winds of 60-70 MPH reported east of a Greeley-Kearney-Alma line. A home weather station near Red Cloud recorded a gust of 73 MPH. Lightning struck a large tree in Hastings, setting it on fire and scattering limbs as far as 100 feet. Areas east of Highway 281 were impacted by storms on **April 12th**. Polk County had numerous reports of 0.88-1.75" hail. At one home, windows were broken and the roof damaged. The remainder of April was on the quiet side, though on **April 18th**, a few severe storms dropped 1-2" hail across Buffalo County, including in Kearney. Just north of town, a few vehicles slid off of Highway 10 as it became hail covered.

May 6th Tornado Damage Near Hardy.

The handful of notable thunderstorm events through May largely consisted of sub-severe to marginally severe reports. The most notable event of May (and arguably of the 2015 season) came early on, occurring **May 6th**. While significant, overall this event only affected a small portion of the area. Tornadoes and flash flooding were the main stories, with the brunt of the impact over Nuckolls and Thayer Counties, as severe, tornado producing storms moved in from Jewell and Republic Counties, KS. Outside of this area, an EF1 tornado struck part of the town of Roseland, and there was a brief tornado touchdown just west of Grand Island. A total of 11 tornadoes were confirmed across the entire NWS Hastings coverage area, with 7 of those affecting south central Nebraska. The 2 tornadoes that affected Nuckolls and Thayer Counties were rated an EF2. Homes, outbuildings, grain bins and trees were damage, numerous pivots were overturned and power poles damaged or snapped. In addition to the tornadoes, a narrow corridor of record-breaking rainfall also resulted in widespread flooding. A swath of 5-11" of rain fell over portions of Nuckolls and Thayer counties, with the highest amount of 10.91" just west of Hebron. Observers in Hebron and Superior reported 8.59" and 7.13", respectively. These were the highest 24 hour amounts on record at these locations, dating back to 1893. Flooding damaged roads, and some bridges were washed out. Highways 81 and 136 were closed for a time.


May 6th flooding in Hebron.

It was a hectic start to June, as **June 3rd-6th** saw a stationary front set up near the NE/KS line. Severe thunderstorms developed near the front each one of those days, with the most widespread activity coming on the 3rd and 4th. Most reports were of quarter to half dollar size hail and 60 MPH wind gusts. By far and away, the main story was the heavy rainfall and flooding for areas mainly south of Interstate 80 and east of Highway 281. 2 to 3 day rainfall totals over a widespread area averaged between 4 to 7". At the Hastings Airport, the total of 4.74" on the 4th marked the highest daily total on record for the month of June, and was the 3rd highest daily rainfall total for *any* day of the year! Flooding was common and numerous roads were washed out. Along the west fork of the Big Blue River in southern York and northern Fillmore counties, significant flooding peaked in intensity between the 5th-7th, with the McCool Junction area reporting the worst flooding observed in at least 50 years! Officials in McCool Junction evacuated and sandbagged several homes along the river. Water entered and cut off access to a church camp just south of town.

Early June flooding at Camp Kateri.

Another round 1-3" of rain fell over the West Fork Big Blue basin on **June 10th**. While less severe, flooding occurred again in McCool Junction. This was also the final widespread event of the month. Most hail was nickel to half dollar size, though part of Highway 21 near Lexington was covered in large hail, with a few stones up to 3" in diameter. Wind gusts near 70 MPH were reported in Arcadia, with 10-12" diameter limbs downed, and near Kenesaw, where 7 empty freight train cars were knocked over.

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

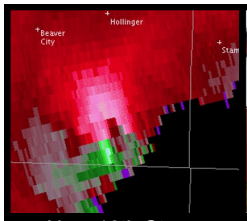
During the **last half of May into June**, a long period of minor flooding commenced along the Platte River, impacting areas from Gothenburg to near Grand Island. This event was driven by heavy May rainfall over northeast Colorado and the southern Nebraska Panhandle as well as above normal Rocky Mountains snow melt. It lingered through June thanks to heavy rainfall, especially between Kearney and Grand Island. The flooding affected pastures and lowlands immediately adjacent to the river, with little impact to infrastructure.

The month of July didn't see anything out of the ordinary in terms of severe weather, with events generally including hail 1" and marginally severe wind gusts. The few notable reports included: 1.75" hail in portions of Valley and Buffalo Counties on **July 14th**, 1.5" hail and 67 MPH wind gusts near Chester on **July 15th**, and severe damage to 2 vehicles in Ord when a tree was struck by lightning and a large limb fell on **July 17th**.

On **August 16th**, portions of Furnas County had flooding rains, wind gusts near 65 MPH and 1" hail. Rain of 3-5" were reported, falling over a roughly 90 minute span. Near Edison, part of a driveway was washed out, while the worst damage occurred at a local business, where water infiltrated much of the first floor office. Then on **August 18-19th**, flooding impacted Polk County. The worst was confined to a narrow, roughly 5-8 mile wide corridor several miles north of Osceola and Shelby, where generally 6-10" of rain accumulated over the course of roughly 36 hours. 25-30 gravel roads were under water, with a few washed out. Reports were limited, but an observer 7 N of Osceola measured 6.69", and one located 6 N of Duncan captured 8.50". Another commented that this was the worst road flooding they had observed in at least 63 years.

Hail damage near Chester. Photo courtesy of Sarah Dake.

September 9th, severe weather affected areas along and north of Interstate 80. There were two main swaths of reports as storms tracked from northwest to southeast, with numerous reports of up to golf ball size hail and a few reports of straight-line wind damage. The first swath was from Valley through Thayer Counties, and the other from eastern Dawson through central Buffalo Counties. Areas in and near Cambridge received 2-3" of rain in a short time, resulting in several inches of water flowing over Highways 6 and 34. The very next day, **September 10th**, areas south of Interstate 80 were affected. Several storms produced hail, but the largest hail occurred as tennis ball size hail fell in Furnas County and 3" hail fell in Thayer County. Damage reported was severe with the Thayer County storm. Vehicles were dented, windows were broken, vinyl siding was damaged and crops were decimated. Both days, there was so much hail with some of these storms that the ground was turned white. A 69 MPH gust was recorded near Red Cloud. The last notable event of the month came **September 18th**. Storms developed at an unusual time of 7-11 a.m., with one in particular producing the most hail as it tracked from Adams to York County. Tennis ball to baseball size hail occurred from near Hansen to Trumbull to Giltner.



Nov. 16th Storm Relative Velocity from KUEX radar.

Tornado damage in rural Furnas County.

After a quiet October, it turned out to be an interesting end to the 2015 severe weather season. An EF1 tornado was confirmed on **November 16th**, making it only the 2nd confirmed November tornado ever in the NWS Hastings coverage area since records started in 1950. This tornado touched down southeast of Beaver City and traveled north-northeast across rural areas of Furnas County. The tornado damaged mainly power poles and trees south of Highway 89. It then clipped a barn and farm storage area northeast of Hollinger. The western side roof covering was ripped from the barn and several grain carts were moved on the property causing other damage. The estimated maximum width was 400 yards, with the maximum wind speed estimated to be 95 MPH.

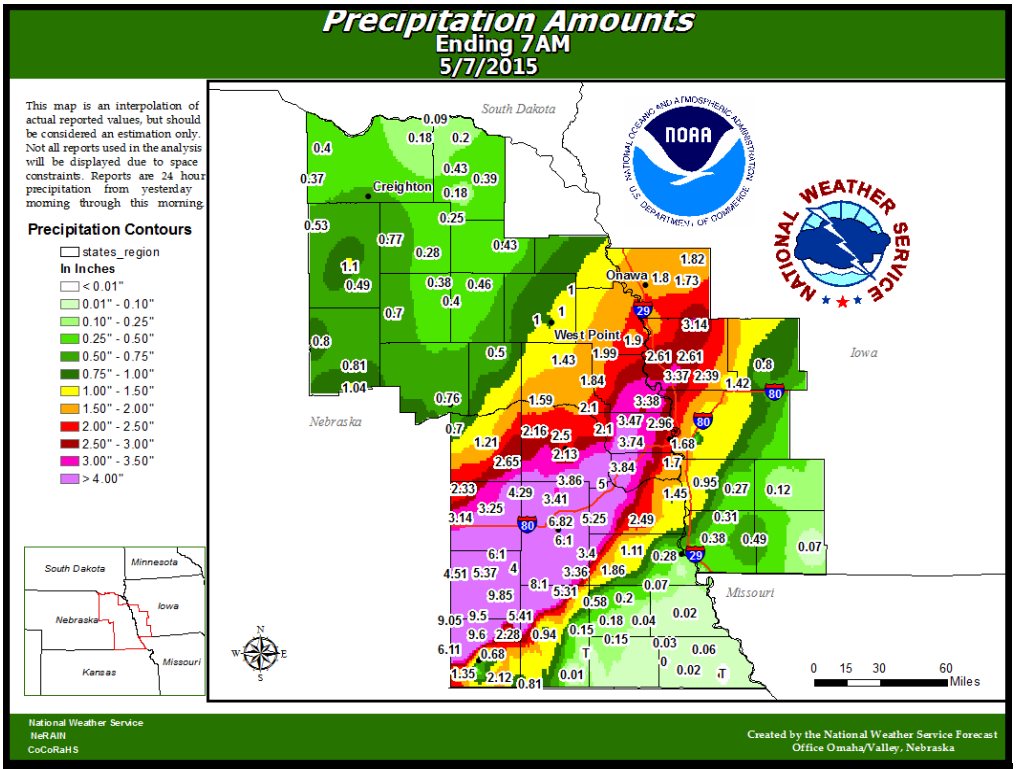
2015 Nebraska/Iowa Severe Weather Summary

Severe Weather Awareness Week - March 21 - 25, 2016

Eastern Nebraska/Western Iowa - NWS Omaha/Valley, NE

In sharp contrast to 2014, the 2015 severe weather season across eastern Nebraska and western Iowa was below normal and will most be remembered for significant river and flash flooding. Sporadic significant severe weather did occur in the area, but this was limited to hail and wind damage. A total of 6 tornadoes occurred in the Omaha/Valley, NE National Weather Service's area of responsibly.

As typical for the region the most significant severe weather occurred in May and June across the area, but came in the form of torrential rains that led to significant flash flooding, and then river flooding in the days that followed. The first event occurred on the evening of **May 6th into the early morning of the 7th**. During this time repeated storms traveled along a boundary from northern Kansas into southern and southeast Nebraska. The repeated nature, or training of the thunderstorms produced torrential rainfall with many locations receiving more than 6" rainfall with localized amounts near 10". This led to widespread flash flooding including in the Lincoln area with many streets flooded, and Salt Creek leaving its banks flooding parts of the University of Nebraska at Lincoln. Other significant flooding occurred in Saline and Jefferson County where Turkey Creek flooded nearly the entire town of De Witt. The Big Blue River reached a record stage in Fairbury and tragically led to one fatality from the river flooding. In addition to the flooding isolated severe weather did occur in the form of wind damage and a weak tornado that traveled from Gage into Lancaster County.



Heavy Rainfall of 5-10" for parts of Lancaster, Saline, Jefferson, and Gage Counties

Shelf Cloud—Lincoln, NE—May 15, 2015
Photo Courtesy of Jake Styger

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

The next bout with heavy rainfall and significant flooding came in **early June** when several rounds of thunderstorms moved across southeast Nebraska. The first occurred during the early morning on the **4th**, and this was followed by additional thunderstorms during the afternoon on the **4th**, and finally a last round overnight into the early morning on the **5th**. This repeated nature of the thunderstorms again led to flash flooding in parts of the same area that saw the flooding in early May, and then eventually river flooding as well that included Turkey Creek and the Big and Little Blue Rivers.

Although heavy rainfall and flooding were the main weather stories during 2015, other episodes of severe weather did occur. Although a bit atypical some of the more significant occurrences came late in the convective season from **August** into **November**. Likely the most significant tornado developed from a strong supercell over southeast Nebraska on **August 8th** in Pawnee and Richardson County. Although the tornado traveled through mainly rural areas damage was observed to trees and power lines. The track of the tornado was clearly visible in the well-developed late summer corn. This supercell also produced significant straight-line wind damage in southeast Nebraska as well.

A very strong storm system moved into the Central Plains on **November 11th** and this brought very late season severe weather to the region, which included an EF1 tornado that moved from northeast Pottawattamie County into Shelby County that impacted several farmsteads with mainly outbuilding and tree damage. Another weaker tornado was observed in Page County that did little damage. Otherwise wind damage and large hail were reported in parts of southeast Nebraska and southwest Iowa.

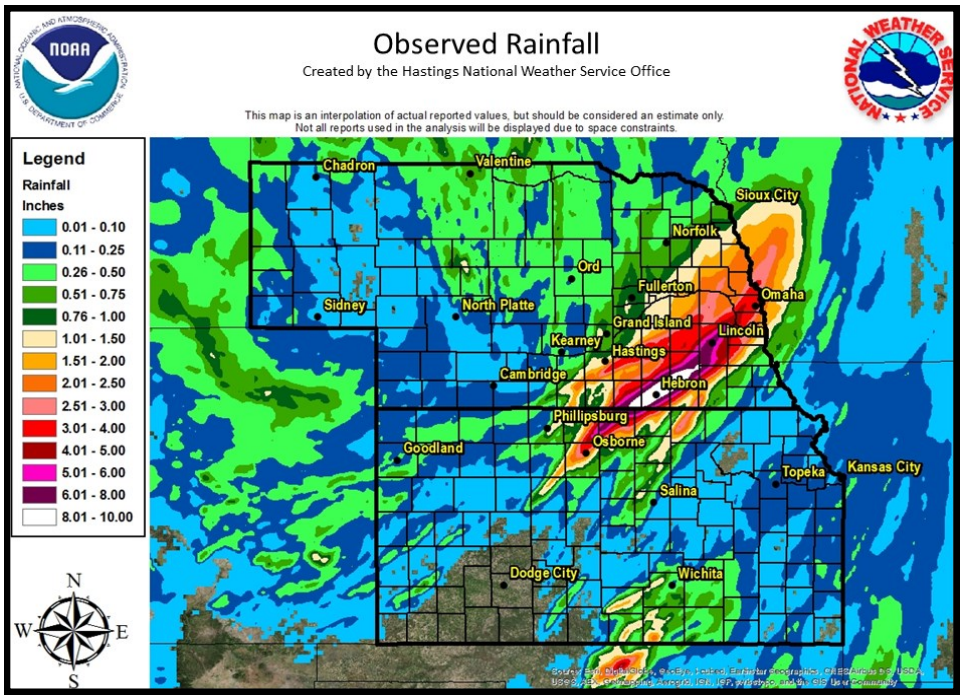
Another particularly active period occurred in **early September**. Although tornadoes were not observed from any of the storms, significant wind and hail were both reported. On **September 6th**, a supercell that developed along an advancing cold front near the Lincoln area produced tennis ball size hail over the southeast side of the city, resulting in hail damage to cars and homes. As these storms moved to the east near the Syracuse area significant wind damage occurred with winds near 80 mph blowing part of a roof off a church. The following day another intense supercell developed in southeast Nebraska and produced baseball size hail in both Jefferson and Gage Counties, which resulted in millions of dollars in crop and property damage. Finally on **September 10th** a line of nocturnal thunderstorms moving across southeast Nebraska produced significant wind damage in the Wymore area with tree and power line damage, as well as some structural damage.

Ping Pong Hail—Sterling, NE—May 4, 2015
Photo Courtesy of Randy Chamberlain

Lightning—Bennington, NE—April 21, 2015
Photo Courtesy of Cody Ervin

2015 Event Of The Season
Early May Flooding

Severe Weather Awareness Week - March 21 - 25, 2016



Beginning in the early afternoon hours of **May 6th** a complex of thunderstorms moved out of north central Kansas and into southeast Nebraska. These slow moving storms (http://goo.gl/kFVGlz) from their initial formation exhibited very dangerous weather. Weather spotters across the state reported several tornadoes as well as large hail and damaging winds. As afternoon turned to evening, the storms changed from producing tornadoes and hail to mainly producing heavy rain. By the early morning hours of **May 7th** when the storms were finally over, the rainfall amounts produced were historic. Several weather observers reported rainfall totals exceeding 8”, with one report greater than 10”. To put this into perspective, rainfall amounts of this magnitude only have a 0.1% of occurring any given year.

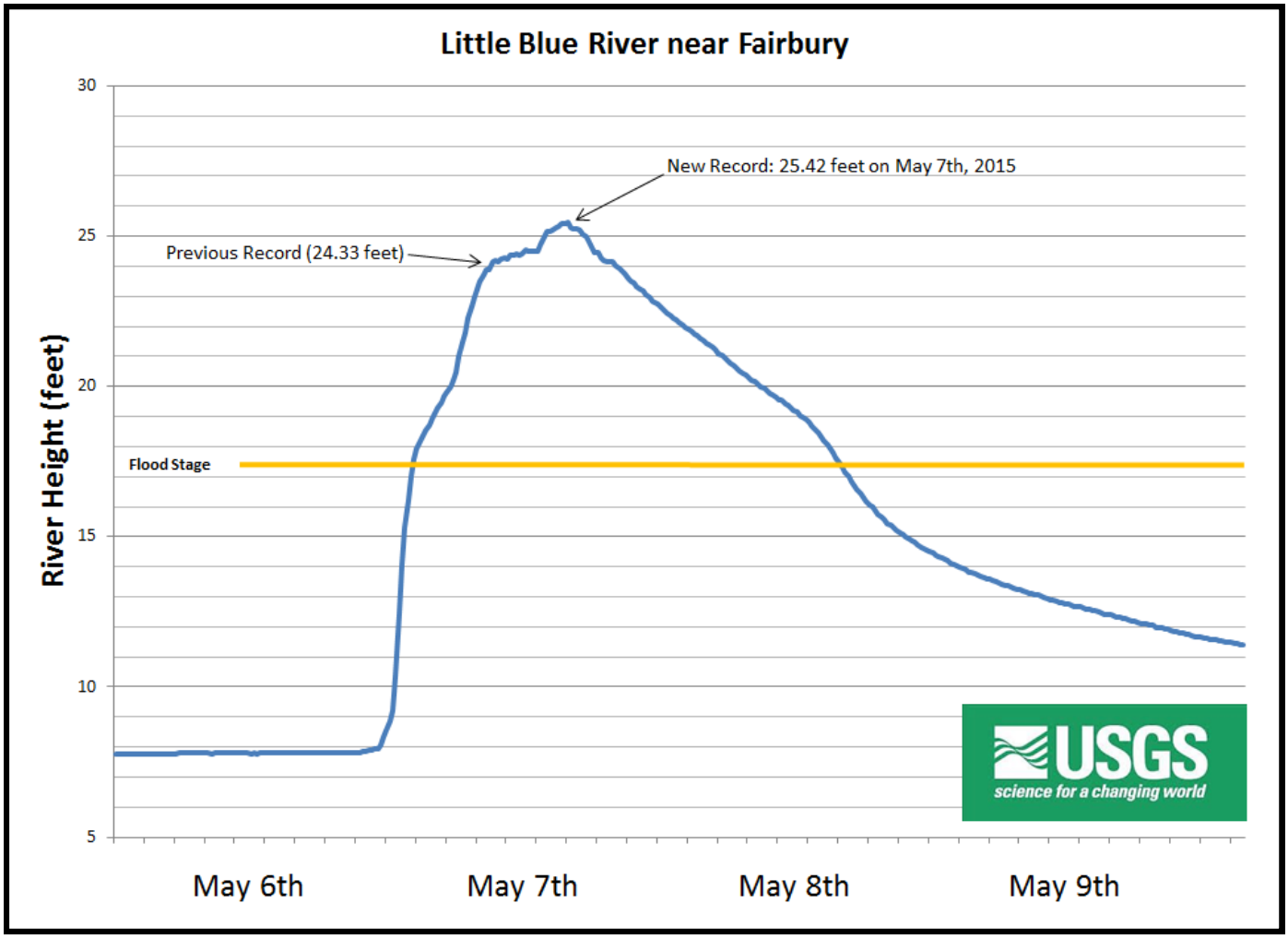
The resulting runoff from this heavy rain led to record levels along area rivers. The rivers hit the hardest were the Little Blue River and Salt Creek. The Little Blue River in Fairbury peaked at 25.42 feet, this broke a record previously set in 1992. Gage readings at the Little Blue River at Fairbury began in 1908. Flood damage along the Little Blue River and in Fairbury was substantial. Several homes were inundated and tragically the flood claimed the life of one Fairbury resident. Salt Creek rose to record levels as well. From Roca to Ashland, Salt Creek inundated the floodplain causing substantial damage from the headwaters to the mouth. In Lincoln the creek rose to 28.83 feet. While technically not a new record, this is the highest level recorded in Lincoln since 1908. According to FEMA, damage from these storms was estimated at just under $8 million dollars.

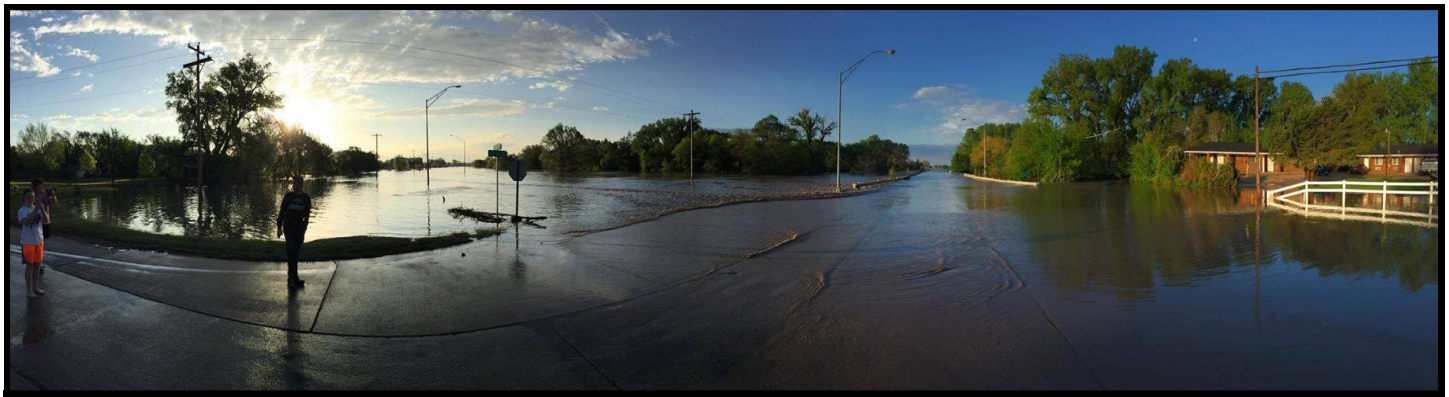
Flooded railroad tracks near Fairbury.
Photo courtesy of Jefferson County EM.

While Nebraska is more commonly known for tornadoes or large hail, floods are becoming more and more common. These floods were a stark reminder, to those in and out of the floodplain, of the power of water and for those vulnerable to flooding to take action before it happens again.

2015 Event Of The Season
Early May Flooding

Severe Weather Awareness Week - March 21 - 25, 2016





Flooding in Hebron.
Photo courtesy of Shevin Solomon.

Central Plains Severe Weather Symposium and Family Weatherfest

University of Nebraska - Lincoln's 16th Annual Central Plains Severe Weather Symposium and Family Weatherfest

Saturday, April 16, 2016
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