Spring Has Sprung! Are you Weather-Ready?

Welcome to spring and the 2019 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 severe weather season 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 is in the area or 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

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

**Test Watch:**
10 a.m. CDT (9 a.m. MDT)

**Test Warning:**
10:15 a.m. CDT (9:15 a.m. MDT)

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

Practice your plan of action!

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**What’s Inside?**

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**2018 Nebraska Tornado/Severe Weather Facts**

*Severe Weather Awareness Week - March 25 - 29, 2019*

**Tornadoes:** 33 (9 less the 1950-2018 average of 42 / 20 less the 30 year 1989-2018 average of 54)

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

**Longest Track:** 2.88 mi (May 1st - Near Chester in Thayer County)

**Greatest Width:** 200 yards (June 30th - South of Friend in Saline County)

**Strongest:** EF1 (4 - June 17th (Deuel & McPherson Counties), June 30th (Saline County) & August 6th (York County))

**Most in a county:** 4 (Fillmore County)

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

**Most in one day:** 5 (June 12th & 30th)

**Most in one month:** 24 (June)

**First tornado of the year:** May 1st (EF0 - Gage, Hamilton, Hall & Thayer Counties)

**Last tornado of the year:** September 19th (EF0 - NW of Stratton in Hitchcock County)

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**2018 Monthly Tornado Totals**

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**Total 2018 Season Peak**

**Hail Size:** 4.25" on August 6th (North of Grant - Perkins County)

**Wind Gust:**
- Estimated: 100 MPH on July 18th - Near O'Neill (Holt County)
- July 26th - Near Danbury/Lebanon (Red Willow County)

**Measured:** 91 MPH on June 7th - Northwest of Orleans (Harlan County)

Building a Weather-Ready Nation
Nebraska Tornado Facts

Severe Weather Awareness Week - March 25 - 29, 2019

2018 Nebraska Tornadoes

Nebraska Tornadoes Monthly Mean Totals 1989-2018
2018 Iowa Tornado/Severe Weather Facts
Severe Weather Awareness Week - March 25 - 29, 2019

Tornadoes: 69 (23 more than the long term average of 46)
Deaths: 0  Injuries: 36

Longest Track: 9.17 mi (July 19th - Near Pella in Marion/Mahaska County)
Greatest Width: 1200 yards (July 19th - Near Marietta in Marshall County)
Strongest: EF3 (2 - July 19th (Marion/Mahaska and Marshall Counties)

Most in a county: 5 (Jasper County)
Days of occurrence (1 or more tornadoes): 21

Most in one day: 21 (July 19th)
Most in one month: 21 (July)

First tornado of the year: May 3rd (EF0 - Near Prairie City in Jasper County)
Last tornado of the year: October 9th (EF1 - Near Greenfield in Adair County)

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2018 Monthly Tornado Totals

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2018 Season Peak

Hail Size: 3.00” on August 8th (Garner—Hancock County and Ayrshire in Palo Alto County)

Wind Gust: Estimated: 90 MPH on May 1st - Corley (Shelby County)
August 28th - Elvira (Clinton County)
Based off 30-year climatology, severe weather occurrence was slightly below normal across eastern Nebraska and southwest Iowa in 2018. A total of 273 reports were tallied; 97 of which were hail with 161 wind and 15 tornado. The largest hail was 4” in diameter, which was observed near Octavia in Butler County on May 1st. The strongest wind gust was 87 MPH, which was measured near Thurmond, Iowa in Fremont County on June 11th. The strongest tornado was an EF1 that occurred 8 miles south of Friend in Saline County on June 30th.

The first severe weather event of the year occurred on April 13th as a strong low pressure system moved through the area. Thunderstorms formed near a warm front over southwest Iowa, producing hail up to two inches in diameter and isolated occurrences of damaging winds.

The next organized severe weather event occurred on May 1st. Severe thunderstorms developed ahead of a cold front moving slowly southeast across eastern Nebraska and western Iowa. A supercell produced hail as large as 4” in Butler County, and thunderstorm winds as high as 80 MPH near Wymore, Nebraska. A tornado touched down briefly near Odell in Gage County.

On June 6th, a stationary front from central Nebraska to central Iowa served as the focus for storm development during the late afternoon and evening hours. Hail to tennis-ball size, damaging winds, and flooding were reported from Butler to Burt counties.

The most active severe-weather episode occurred on June 11th with a total of 44 reports: 6 tornadoes, 24 hail, and 14 damaging wind. A weak upper-air disturbance tracked from the central High Plains through the mid Missouri Valley, encouraging the development of a surface low from southeast South Dakota into eastern Nebraska. Meanwhile, an associated cold front progressed east into eastern Nebraska by afternoon with a stationary boundary extending from the surface low through southwest Iowa into northern Missouri. Severe thunderstorms developed during the late afternoon over eastern Nebraska and southwest Iowa along the surface boundaries with activity merging into a bow-echo complex that subsequently tracked into northwest Missouri by late evening. Brief tornadoes occurred with a supercell over Cass County with intense straight-line winds affecting the I-29 corridor in Fremont County.
On June 23rd, a weak upper-air disturbance aided in the development of isolated severe thunderstorms along a front situated over northeast Nebraska. Hail to the size of tennis balls was reported with the most intense storm.

Another severe-weather event occurred on the morning of June 28th over northeast Nebraska and west-central Iowa. Wind gusts well into the 70-mph range were recorded in Antelope, Madison, and Burt Counties with the passage of the storms. Two days later (June 30th), multiple waves of thunderstorms affected eastern Nebraska. The most intense storms occurred during the afternoon and evening hours over southeast Nebraska, where brief tornadoes were reported along with large hail, damaging winds, and locally heavy rainfall.

On July 4th, a cold front focused severe thunderstorms across parts of eastern Nebraska during the afternoon and evening. In the Omaha metro, winds gusted to 60 to 70 MPH and caused numerous tree limbs to be blown down. The storm cancelled some public fireworks displays.

An intense thunderstorm affected portions of northeast Nebraska during the evening of July 27th. The storm caused widespread wind and hail damage across parts of Madison and Platte counties.

Isolated occurrences of severe weather persisted into August with the last event of the year taking place on the 31st.

The largest rain event for the year at Omaha occurred on August 20th-21st, where a total of 8.33” fell. 11.90” fell at Woodbine, Iowa! The all-time 2-day rainfall record for Omaha occurred on August 6-7, 1999 with 10.48”. August 20th was the only day of the year that received over 3” of rainfall (6.17”). At Lincoln, there were no three inch rainfalls, however the highest occurred on September 2nd with 2.42”. Norfolk had no 3 inch rainfalls, however their highest was 2.66” on June 25th.
Conditions over the Plains have not been typical of an El Niño winter and ENSO tends to have less of an effect on the warmer months of the year and as a result focus more on local influences. Outlooks are less confident during the summer months than they are during the winter months, especially for precipitation. An El Niño advisory is currently in effect. There is great climate model spread going forward, however the general trend is toward the warm side of neutral conditions. An active storm track is forecast to continue across the southern U.S. March through May.

Colder than normal temperatures are forecast for March, although the seasonal outlook calls for equal chances of below, near, and above normal temperatures March through May and June through August.

There is no clear signal for precipitation March through May, however, the forecasts are favoring above normal precipitation from June-August.
Tuesday, May 5, 1964, a historic, damaging and deadly tornado event affected several counties within central and eastern Nebraska. Within the present-day NWS Hastings coverage area, two particularly violent tornadoes occurred, one rated F5 and the other rated F4.

This F5 tornado trekked nearly 70 miles from eastern Adams County to northwestern Butler County, and is the last time that Nebraska has recorded an F5/EF5 tornado. An F4 tornado also destroyed a major portion of Wolbach on this day.

For many folks, May 5th started out like any other day, but by sunset it would be a day of destruction. Severe thunderstorms flared up in the afternoon and quickly pushed northeast. The largest tornado touched down just southeast of Hastings around 5 p.m., developing into an F5 on the Fujita Scale. Several towns were spared a direct hit, including Hampton, Bradshaw, Benedict, Stromsburg and Shelby. It was a large and intense tornado that completely destroyed at least a dozen farms within its first 30 miles.

There were 4 fatalities, at least 50 injuries and a heavy loss of livestock. The tornado width was 1/4 – 3/4 mile and at times 2-3 separate damaging funnels extended from the same parent cloud (a multi-vortex tornado).

Learn more about this event here: [https://www.weather.gov/gid/May51964F5Tor](https://www.weather.gov/gid/May51964F5Tor)

### 40 Years Ago - March 29, 1979 - Braddyville, IA F4 Tornado

The Braddyville, IA tornado was part of an outbreak of long-lived tornadoes that stretched from Oklahoma City to Kansas City to Des Moines. Several of those tornadoes were in the strong to violent F2 to F4 range.

Tornado Damage Rating: F4  ([here is a reference for the F-Scale and what the numbers indicate](#))

- Tornado Track Length: 18.8 miles  (10.8 miles in Iowa, 8 miles in Missouri)
- Tornado Track Maximum Width: 500 yards
- Tornado Touchdown Time: Approximately 5:45 PM CST, beginning nearly 3 miles southwest of Elmo, MO.
- Injuries: 20 total. 16 in Iowa, 4 in Missouri
- Fatalities: 0 Reported  (This is noteworthy given that at least two towns were directly impacted by this violent F4 tornado).
- Property Damage: ~2.5 million dollars in Iowa

The weather observer at Clarinda, IA noted that the high temperature was 73 degrees on March 29 with a low of 39 degrees. He notes that precipitation fell between 2-3 PM, 5-6 PM, and 11 PM to 4 AM. He also makes a specific note that there was a tornado 10 miles to his south at 6:15 PM.
During the afternoon and evening of May 22, 2004, ingredients came together for an outbreak of severe thunderstorms and tornadoes across east-central and southeast Nebraska into western Iowa. Nine tornadoes were reported, including an F4 that devastated the small town of Hallam. The Hallam tornado which initially touched down at 7:30 PM just west of Daykin, tracked 52 miles across portions of Jefferson, Saline, Gage, Lancaster and Otoe counties, before lifting at around 9:10 PM CDT just west of Palmyra. In addition to the tornadoes, hail to four inches in diameter was observed, as were damaging straight-line winds.

Tornado Damage Rating: F4  
Tornado Track Length: 52 miles  
Tornado Maximum Width: 2.5 miles (Was the record largest tornado until surpassed by the 2.6 mi wide El Reno, OK tornado in 2013)  
Tornado Touchdown Time: Approximately 7:30 PM - 9:10 PM CDT  
Injuries: 38  
Fatalities: 1  
Property Damage: $160 million ($60 million agricultural -100 cattle/50 hogs lost/150,000 acres of crop land)

Learn more about this event here: https://www.weather.gov/oax/event_archive_20040522
Historical Tornado Events
Severe Weather Awareness Week - March 25 - 29, 2019

5 Years Ago - June 16, 2014 - Pilger Tornado

Morning thunderstorms reinforced a warm front across eastern Nebraska. Extreme instability developed along this warm front and allowed for isolated thunderstorm development by mid afternoon, which quickly became severe. A single supercell thunderstorm went on to produce 4 violent tornadoes over the next 2 hours.

The Pilger tornado (west) was the most intense of the family of tornadoes produced by a supercell. The tornado developed about 6 miles southwest of the town of Pilger and moved northeast directly striking the town.

Tornado Damage Rating: EF4
Tornado Track Length: 18.41 miles
Tornado Track Maximum Width: 500 yards
Tornado Touchdown Time: Approx. 4:00 PM-4:39 PM CDT
Injuries: 20
Fatalities: 1 (+1 from the Pilger east tornado)
Property Damage: $12 million

Learn more here: https://www.weather.gov/oax/event_archive_20140616
National Weather Service Offices Serving Nebraska

Severe Weather Awareness Week - March 25 - 29, 2019

National Weather Service Coverage Area

Panhandle
Cheyenne, WY
1301 Airport Parkway
Cheyenne, WY 82001
(307) 772-2468
www.weather.gov/cheyenne

West and North Central
North Platte
5250 E. Lee Bird Drive
North Platte, NE 69101
(308) 532-4936
www.weather.gov/northplatte

Extreme Southwest
Goodland, KS
920 Armory Road
Goodland, KS 67735
(785) 899-7119
www.weather.gov/goodland

South Central
Hastings
6365 N. Osborne Drive West
Hastings, NE 68901
(402) 462-4287
www.weather.gov/hastings

East
Omaha/Valley
6707 N. 288th Street
Valley, NE 68064
(402) 359-9443
www.weather.gov/omaha

Extreme Northeast
Sioux Falls, SD
26 Weather Lane
Sioux Falls, SD 57104
(605) 330-4247
www.weather.gov/siouxfalls
Severe Weather Terminology
Severe Weather Awareness Week - March 25 - 29, 2019

Do you know the difference?

**Watch**

Be Prepared...

severe weather possible

 ✓ Check for forecast updates
 ✓ Monitor sky conditions
 ✓ Know where to take shelter

**Warning**

Take Action!

severe weather imminent

 ✓ Take shelter immediately!
 ✓ Seek further information
 ✓ Check for forecast updates

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**Severe Thunderstorm**

A thunderstorm is severe when it produces:

 ✓ Quarter size hail (1”) or larger
 ✓ Winds at least 58 MPH
 ✓ A tornado

**Tornado**

A violently rotating column of air extending from a cloud and is in contact with the ground.

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

---

**Flash Flood**

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

Usually the result of intense rain over a short time.

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

**Funnel Cloud**

A funnel shaped cloud extending from a cloud.

Is associated with a violently rotating column of air extending from a convective cloud that is not in contact with the ground.
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):

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<td>162.525</td>
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Coverage information and SAME Codes for every county in Nebraska can be found at:

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

www.weather.gov/safety/tornado

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. If you know what to do before, during and after a tornado, you minimize your risk of injury and increase your chances of survival. 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 Weather-Ready!

- 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.

Before a Tornado...

- 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.
  - Your choice should be driven by your specific circumstances!
Flood Safety

www.weather.gov/safety/flood

Sometimes floods develop slowly and forecasters can anticipate where a flood will happen well in advance. More often, flash floods can occur within minutes and sometimes without any advance warning. Being prepared can save your life and give you peace of mind. Do not underestimate the power of water!

**Before a Flood…**

- Know your risk. Are you located in a floodplain? Where is water likely to collect? Where do I go if there is a flood? Have answers to these questions before flooding occurs.
- Create a communications plan for your family and friends to follow in the event of a disaster.
- Assemble an Emergency Kit with enough food, water and medicine to last you at least 3 days.

**During a Flood…**

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

**After a Flood…**

- Avoid flood waters and disaster areas! Obey road closures and other instructions.
- Stay tuned to your local news for updated information. Ensure water is safe before using or consuming. Check with utility companies about outages. Never use a portable generator indoors, carbon monoxide poisoning kills!
- Let your family and friends know you are okay.
Lightning 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 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. Lightning also 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 44 people are killed each year by lightning. Don’t become a statistic - Be Prepared!

**Lightning: What You Need to Know**

- **NO PLACE** outside is safe when thunderstorms are in the area!
- Plan ahead! Have a way to get the latest formation. Know what to do if storms develop!
- 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 for at least 30 minutes after you hear the last sound of thunder.

**Indoor Lightning Safety**

- Stay off corded phones, computers and other equipment that put you in direct contact with electricity.
- Avoid plumbing. Do not wash your hands, bathe or wash dishes.
- Stay away from windows and doors and stay off porches.
- Do not lie on concrete floors and do not lean against concrete walls.
- Protect your pets! Dog houses are not safe and animals chained to trees are vulnerable!

**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 or a cliff/rocky overhang.
- If in a group, spread out to avoid the current traveling between you.
- Immediately get out of and away from 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!
New Satellite Data To Help With Wildfire Detection

In concert with the 2019 fire season, NWS Hastings will be testing a program to notify local authorities of potential wildfires. NWS Goodland, KS has been a part of this program since October 2018. On days with extreme fire danger, meteorologists will monitor various satellite imagery (and radar data) to identify “hotspots”, or areas where a fire of some type is likely. Once identified, a text or email notification will be sent to local authorities. The notification includes exact coordinates of the fire, date and time information, current weather information from the nearest automated weather station and a link to a Google map of the hotspot location. Once a hotspot is identified, the whole notification process takes less than one minute to complete.

The process to send notifications begins with determining the fire danger for the day. If any part of the local forecast area is included in a Red Flag Warning or the Storm Prediction Center has placed part of the forecast area in critical or extreme fire danger, the local office will staff to monitor satellite and radar to identify hotspots and send notifications. The GOES-16 satellite, and soon to be available GOES-17 satellite, provides much quicker access to images, and with a higher spatial resolution. During potentially catastrophic fire weather days, images can be available every minute if needed.

For NWS Hastings, the process of “hotspot notifications” is an entirely new service. NWS offices in Oklahoma began sending notifications for potential fires in 2017. Last year, NWS offices in southern Kansas participated, and now NWS Hastings has joined the fray. Feedback from fire authorities in Oklahoma and Kansas has been overwhelmingly positive. In several cases, the notifications sent from the local NWS office preceded the initial call to 911. The NWS office in Hastings is optimistic the same “life and property saving” information can be provided in Nebraska as other parts of the country. It’s our mission to do so.

Have you found us on your favorite social media platform?
Find and follow us for the latest weather, climate facts and other interesting information!
Across Nebraska and Iowa, the winter of 2018-2019 was one of extremes. From a cold and wet November, to a dry and warm December and finally to a very cold and snowy January, February, and early March, this winter will not soon be forgotten.

Each spring the NWS provides an assessment of the flooding potential across the state. For this spring, the overall flooding threat was considered generally near-normal for the western half of the state and above-normal across the eastern half and across western Iowa. This increased flood risk has its origins before winter even began. This past summer and fall were very wet across much of the state and in November much of state also experienced above-normal precipitation. This has allowed much of the state to go into winter with higher-than-normal soil moisture and elevated river levels. These two factors alone stack the deck for an above-normal flood risk for portions of the state. Specifically the rivers that had the highest risk for flooding were: the Missouri River downstream of Omaha, the Wood River, the Elkhorn River, the Big Blue River, Wahoo Creek, Shell Creek, South Loup River, the Boyer River and the East and West Nishnabotna. The severity of the later winter and early spring flooding has already been historic in many locations due to the heavy rains falling on frozen ground, ice jams and melting local snowpack.

The larger Missouri River and Platte River systems also respond to snowmelt upstream across the central and northern Rockies through the spring and summer. Through the middle of March, mountain snowpack was near the 1981-2010 climate normal. Additional rains through the spring across Nebraska and Iowa and the deep snowpack across the Northern Plains has an overall above-normal threat for flooding through the spring, especially in the eastern half of Nebraska into Iowa.
Providing life-saving warnings to the public is at the core of the mission statement of the NWS. A key part of the warning process is the software used by NWS offices across the country. At NWS Omaha/Valley, the latest and greatest version of this software is being developed and tested.

Called “Hazard Services”, this software will usher in a new era of warning services by incorporating new data types and streamlining the way the NWS sends out warnings to the public. Developed by Raytheon, the program is expected to be field-ready by August of this year. At that time, offices across the country will be using the software to issue life-saving warnings. The National Weather Service in Omaha/Valley is excited to be a part of this project, and the hope is that future weather warnings issued for Nebraska will be improved in both timeliness and quality as our agency evolves to meet the growing needs of our partners and the public.
The 2018 severe weather season was another active season for the western Nebraska Panhandle. While there was damage from straight-line thunderstorm winds, flooding due to heavy rains and large hail had the overall highest weather impacts to the area.

Heavy thunderstorm rain and flash flooding resulted in road washouts were probably some of the most significant impacts seen in the 2018. The days with the heaviest rains and flash flooding occurred on May 19th-20th when numerous roads were reported washed out around Scottsbluff and Gering in the afternoon hours. Specifically, certified weather spotters measured 3.3” of rain that fell near Gering on May 20th. Another round of heavy thunderstorm rain and hail occurred on July 16th and 18th when flash flooding was reported in Scottsbluff and Bayard. Moreover, on July 16th, 2” of rainfall was measured within 30 minutes, producing significant flooding of streets in Scottsbluff, with water depths around 1 foot deep in some intersections.

Large Hail: The “great white combine” made unwelcomed appearances again in 2018 with hail commonly 1 inch in diameter and larger on 18 different days. The largest hail report, measured at 3 inches in diameter, from a spotter along Highway 385 near mile marker 95, which is about seven miles northeast of Angora, on August 6th.
Severe Thunderstorm Wind and Tornado: The highest thunderstorm-produced wind reported to the NWS was a 72 MPH gust at the Alliance Airport at 6:28 PM MDT on August 17th. Tornado reports in 2018 were significantly down from 2017. The only confirmed tornado report received was on July 28th, which consisted of a brief rainwrapped tornado touchdown near Kimball by law enforcement officers at 5:40 PM MDT. Thunderstorms still produced some wind damage, with trees, power lines, and irrigation pivots reported blown down in isolated areas during the months of May, June, July and August. The most significant damage to structures occurred on May 10th when severe thunderstorm winds blew the windows out of a house, tore the roof off of a barn, and blew over a semi-trailer truck northeast of Alden during the afternoon.

During the 2018 severe weather season, 113 Severe Thunderstorm Warnings, 7 Tornado Warnings, and 8 Flash Flood Warnings were issued across the western Nebraska Panhandle. The first severe weather warnings were issued on May 10th and the last for the season was issued on September 8th.

Extreme Northeast Nebraska - NWS Sioux Falls, SD

It was a pretty quiet summer across Dakota and Dixon counties. Two highlights for the year follow:

1) The peak of the "summer of rainfall" occurred during the week-long period of June 20th-26th. Five to nine inches of rainfall occurred over the period across northeast Nebraska. Specific rainfall amounts measured during the period were 8.38" at Emerson, 8.08" at Wakefield and 7.58" at Concord. Logan Creek near Wakefield crested at a record 2.5 feet above flood stage on June 26th.

2) The most notable severe weather occurred on August 27th with a couple of supercell storms which developed across northeast Nebraska during the afternoon. Golf ball size hail fell at both Allen and Martinsburg.
Extreme Southwestern Nebraska - NWS Goodland, KS

**Annual Precipitation**

Extreme Southwestern Nebraska experienced a dry period for the first half of 2018, and a surplus of moisture for the duration of the year. Abnormally dry conditions began in December of 2017, worsening to moderate drought conditions in Dundy and the western part of Hitchcock counties by early January 2018.

Two winter snowstorms helped eradicate drought conditions in Dundy County and significantly improve dry conditions in Hitchcock and Red Willow counties by mid-February. A winter storm on January 21st-22nd brought 9-13” of snow and blizzard-like conditions to the area with a total of 10” across Dundy County with this storm. Paired with a second winter storm on February 10th, the county received an additional 4-9” of snow.

In Southwestern Dundy County, the town of Benkelman had at least a one inch snow depth reported for 27 consecutive days (1-21-18 to 2-16-18). This occurrence ranked tenth longest for the site. Dry conditions were completely eradicated from Hitchcock and Red Willow counties in the first half of June.

Despite moving into the Top 10 for consecutive days of 1” snow depth, Benkelman was 5% below normal precipitation, or a little over 1” below normal for the year. To the east, Trenton Dam and McCook received above normal precipitation with Trenton Dam reporting 3.67” above normal. McCook received 24.79” of precipitation in 2018 in addition to setting two new daily rainfall records over the summer. A new record of 2.58” was set on June 19th and a new record of 2.92” was set on July 17th.

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Severe Weather

Extreme Southwestern Nebraska had a low number of severe weather events in 2018 compared to recent years. A trained spotter in Red Willow County reported the only severe hail of the season. This is down from 16 severe hail reports in 2017. Tornado activity in 2018 was also considerably quiet for the Central High Plains region covered by the Goodland National Weather Service. A total of 11 tornadoes occurred; however, only 1 tornado was reported in extreme Southwestern Nebraska.

The costliest event of 2018 in extreme Southwestern Nebraska was a wildfire in Red Willow County on March 6th, in conjunction with a high wind event. Strong winds associated with the backside of a storm system made it to the ground in Hitchcock and Red Willow counties. Wind gusts of over 50 MPH were reported in both counties, and a peak wind gust of 66 MPH was reported in McCook.

High winds in Red Willow County caused a piece of metal roofing to touch a power line, sparking a wildfire three miles northwest of McCook. The strong winds helped spread the fire which traveled south toward the town.

The fire prompted the evacuation of around 446 people from the northwestern part of McCook. An evacuation was put in place for the elementary school, with students being relocated to the high school.

One person received severe burns and 16 others were treated for burns and smoke inhalation. A total of 212 acres were burned in the fire, and a home on the north side of McCook was destroyed. Total damage from the fire was around $1,000,000.

On the afternoon of July 26th, a group of thunderstorms with a history of producing quarter size hail crossed the CO-NE state line into Dundy County. Straight-line winds estimated at 78 MPH broke multiple tree limbs up to 8” in diameter.

A second group of thunderstorms producing straight-line winds moved into Red Willow County in the evening. A trained spotter estimated a wind gust of 87 MPH. The winds blew over trees onto Highway 89, making the road impassible between Danbury and Lebanon.

The final event of the 2018 summer convective season was the first and only tornado for extreme Southwestern Nebraska for the year. On September 19th, a broken line of storms developed during the afternoon and evening. During the development of a storm, a weak landspout tornado formed to the north-northwest of Stratton. A trained spotter reported that the tornado remained stationary over an open field for about two minutes before lifting. This was the first tornado occurrence in Southwestern Nebraska since May 8, 2016.
The severe weather season across western and north central Nebraska had a late start in 2018. After blizzard conditions in mid April, the first widespread severe weather event occurred on April 30th. The season ended on September 17th. For western and north central Nebraska, a total of 6 tornadoes were reported (1 in May and 5 in June). Numerous large hail and severe thunderstorm wind events occurred during the severe season with hail up to softball sized and thunderstorm wind gusts up to 100 MPH. One storm related fatality occurred in June at Lake McConaughy.

A strong cold front initiated a line of severe thunderstorms from Frontier to Blaine counties on the evening of April 30th. Hail up to golf ball size and thunderstorm wind gusts up to 65 MPH were reported in Boyd and Holt counties.

After a couple of isolated severe storms on May 7th and May 8th, widespread severe storms occurred on May 10th. Severe storms developed in the northeastern Nebraska Panhandle and tracked into the northwestern Sandhills impacting Garden, Cherry, Arthur, Hooker and Grant counties. Hail up to 2 inches in diameter and thunderstorm wind gusts up to 70 MPH were reported. A second area of severe storms developed during the evening hours of the 10th in southwestern Nebraska and tracked northeast into portions of central Nebraska. With this round of storms, hail up to tennis ball size and thunderstorm wind gusts to 80 MPH were reported in Lincoln county. The next round of severe storms impacted the eastern panhandle and western Sandhills on May 17th. Thunderstorm wind gusts to 70 MPH and heavy rain led to flash flooding in Garden County with some county roads being washed out. Severe storms impacted Garden, Arthur, and McPherson counties on May 23rd. Winds up to 65 MPH ripped off a roof of a large commercial building in Oshkosh and hail up to ping pong ball size was reported west of Tryon. The first tornado of the season touched down in Wheeler county on the afternoon of May 25th. The tornado briefly touched down 11 miles southwest of Bartlett, was rated EF0, and produced no damage. Severe storms developed across the southeastern Nebraska Panhandle and far southwestern Nebraska on the afternoon of the 27th. Wind gusts up to 75 MPH overturned several center pivot irrigation systems in Perkins County, uprooted trees in Oshkosh, and brought large tree branches down south of Hershey.

On June 1st, severe thunderstorms developed over north central Nebraska and tracked southeast into Custer, Garfield and Loup counties. Hail up to tennis ball size and thunderstorm wind gusts to 70 MPH were reported. Severe storms developed in the southeastern Nebraska Panhandle on the evening of June 6th. As they tracked to the east and southeast, a tornado briefly touched down northwest of Grant in Perkins County. No damage was reported from the tornado, however thunderstorm wind gusts to 70 MPH, flipped over 3 center pivots In western Perkins County.

A supercell thunderstorm developed over far northeastern Colorado on the afternoon of June 17th. As this storm tracked into Deuel County, it became tornadic, producing 4 confirmed tornadoes from Deuel into Keith and McPherson counties. Two of the tornadoes in Keith county were rated EF0 and produced no damage. Each of the tornadoes in Deuel and McPherson counties were rated EF1. With these tornadoes two farmsteads were damaged in Deuel County and two homes damaged in McPherson County. Outbuildings were damaged and two center irrigation pivots were flipped over with the Deuel County tornado. With the McPherson County tornado, a house and tree line were damaged along with a flipped center pivot irrigation system. Damage with the two tornadoes, was estimated around $200,000. In addition to tornadoes, straight line winds estimated at 80 MPH flipped over a camper on Interstate 80 in Deuel County and uprooted several mature trees west of Big Springs.

A supercell thunderstorm developed over western Deuel County on the evening of June 19th. As this storm tracked into Keith County, it crossed over Lake McConaughy. Winds reached 80-90 MPH around Kingsley.
Dam. One fatality occurred at a campground when a falling tree limb crushed a person in a camper. Several campers were rolled into Lake McConaughy.

After a couple of relatively minor severe weather events on July 2nd and July 16th, severe storms developed and tracked across northern Nebraska on July 18th. Thunderstorm wind gusts estimated around 100 MPH hit O’Neill, damaging several outbuildings and garages on the east side of town. Several large trees were reported down as well with power reported out in O’Neill.

Supercell thunderstorms developed over southwestern Sheridan county on the evening of July 28th. As they tracked to the south southeast, three inch diameter hail hit Oshkosh. As the storm tracked into Deuel County, it produced baseball sized hail and 75 MPH winds west of Big Springs. The storm then crossed far northeastern Colorado into western Perkins and Chase counties. Baseball sized hail was reported near Venango and 75 MPH winds were reported near Champion.

Severe storms carried over into August with severe storms being reported on the 3rd in Lincoln county. Severe storms developed during the evening hours producing 80 MPH winds and quarter sized hail east of Hershey. Two campers and a semi trailer were blown over on Interstate 80 near mile marker 170. In addition, several outbuildings and a center pivot was flipped over 5 miles east of Hershey.

Severe thunderstorms with very large hail, developed over Garden county on the evening of August 6th. As these storms tracked to the south southeast, they produced hail up to 3.5” in diameter around Big Springs. The storms then crossed into western Keith and Perkins counties. Hail ranging in diameter from 3 to 4.25” was reported in the Grant area, as well as south of Madrid. Several fields of mature corn and soybeans were severely damaged by the hail storm.

On August 15th, a cluster of severe thunderstorms tracked from Arthur and Keith counties into Lincoln County. Hail up to baseball size was reported in Arthur county and wind gusts to 70 MPH were reported in Lincoln County. Crop damage was severe, especially south of North Platte and Hershey. The severe weather season closed out with two events on August 31st and September 17th. Golf ball size hail was reported on August 31st in Blaine and Logan counties, with hail up to half dollar size reported in Thedford on September 17th.
A cold spring (it was the 2\textsuperscript{nd} coldest April on record) held severe weather at bay across south central Nebraska until \textbf{May 1\textsuperscript{st}}, when heavy rain, hail and even tornadoes hit the area. More than a dozen reports of hail were reported, some as large as golf balls, primarily in the Hall, Hamilton, Adams and Clay counties area. Three tornadoes were confirmed. An EF-0 rated tornado caused minor damage on the south side of Doniphan as it lifted after a two mile path. Another tornado (EF-0) upset a pivot in central Hamilton county, while a third tornado (EF-0) was caught on a stationary webcam as it moved out of Republic County, KS in Thayer County near Hubbell.

On \textbf{May 10\textsuperscript{th}}, widespread severe thunderstorms produced nearly 50 reports of high winds and some hail across almost all of south central Nebraska. Speeds up to 70 MPH knocked over center irrigation pivots (pivots), some power poles and damaged trees. There were a handful of severe events reported the rest of May before things ratcheted up again in June.

Right away on \textbf{June 1\textsuperscript{st}}, a storm chaser captured video of brief tornado (EF-0) around sunset just east of Ord in Valley county. A few days later on \textbf{June 6\textsuperscript{th}}, a late night high wind event hammered a farm operation west of Orleans in Harlan county a with measured wind gust of 91 MPH around 3 AM. Trees were uprooted, pivots overturned and windows blown out of the farmhouse. A more extensive wind event blasted areas along and north of Interstate 80 on \textbf{June 9\textsuperscript{th}} with winds of 60-75 MPH. Again, pivots were blown over and trees damaged. The Central Nebraska Regional Airport ASOS near Grand Island measured a 74 MPH wind gust. Ten days later on \textbf{June 10\textsuperscript{th}}, heavy rain and large hail hammered the region mainly along and south of Interstate-80 this time. A short lived multi-vortex tornado (EF-0) was intercepted by a storm chaser southeast of Huntley in Harlan county. Tennis ball size hail also fell in the Huntley area while heavy rain of 3-5” caused flooding over Highway 8 near Chester in Thayer County.

\textbf{June 24\textsuperscript{th}} brought was an interesting evening as spotty areas of heavy rain fell across Sherman, Valley and Nance counties, while a series of landspout tornadoes occurred in Fillmore county. The tornadoes were seen by many and well documented by a local farmer who was on the scene. At least four landspout tornadoes, all rated EF-0 with winds of 60-70 MPH, drifted across Fillmore County.

June wrapped up with the first of three major summer-season wind and hail events which devastated rapidly growing crops across the area on \textbf{June 30\textsuperscript{th}}. The worst crop damage stretched from west of Holdrege to the Arapahoe area in Furnas County, where 20 to 30 minutes of wind driven golf ball to baseball size hail mowed down a wide swath of corn and soybeans. Visible on satellite imagery, crop losses were in the tens of millions of dollars. There were also two tornadoes reported, both rated EF-0, in parts of Phelps and Kearney counties.

Not to be outdone, high winds damaged 8-9 farmsteads in eastern Clay County, including two hog sheds, carports and some roof damage.
2018 Nebraska/Iowa Severe Weather Summary

Severe Weather Awareness Week - March 25 - 29, 2019

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

Turning to July, excessive rainfall due to slow-moving and re-developing storms brought an isolated flash flood on the Elm Creek northwest of Overton in Dawson County on July 5th. Several rural roads and at least two homes were damaged. One home experienced at least two feet of water inside, causing the loss of all interior contents, as well as three vehicles (left photo, courtesy of Kent Young). Later in the month on July 28th, an impressive 88 MPH wind gust was measured by the Grand Island ASOS. Minor building damage was reported at the airport along with some tree damage on the east side of town.

August was particularly destructive for two locations. On August 6th, a swath of wind-driven two inch diameter hail chopped mature crops to the ground north of Bradshaw in York County. Dozens of pivots were lost and crop damage was in the tens of millions of dollars. Embedded in the path, was an EF-1 rated tornado north of Bradshaw with peak winds of 90 MPH. The tornado damaged grain bins, trees and caused minor damage to a farmhouse on its 1.6 mile path. A major wind and hail storm came around 4 AM on August 16th in central Howard county. Golf ball size hail teamed with 75 MPH winds and effectively ended the corn and soybean crop from near Farwell to west of St. Libory. Ankle to knee high drifts of hail were reported. A dozen or more power poles were snapped, a carport destroyed and a roof ripped off a barn. Several pivots were damaged or destroyed. Sandwiched in the middle of those two major wind/hail events, was one of the more unique events of the season on morning of August 8th. A lightning strike hit an oil rig northwest of Naponee in Franklin County. Four of the five storage tanks on site were destroyed in the resulting fire.

As the severe weather season moved into September, heavy rain took more of a role. On September 1st, 3-5” of rain in the Little Blue River Basin south and east of Hastings caused flooding, with water running over Highway 4 between Carleton and Davenport. This was actually part of a multi-day event during which over 7” of rain fell in parts of Nuckolls County. In fact, 7.33” of rain fell southeast of Lawrence (Nuckolls County) and 7.04” in Davenport (Thayer County). Severe weather for the season wrapped up September 20th as 55-65 MPH winds rolled from Webster to Thayer counties, resulting in some minor damage.
Central Plains Severe Weather Symposium and Family Weatherfest

WEATHERFEST
19th Annual Family Weatherfest and Science Spectacular

SATURDAY, APRIL 6, 2019
FREE EVENT, FREE PARKING

Exhibits and Activities / 9:00 a.m.–2:00 p.m.
Severe Weather Symposium / 12:30 p.m.–4:00 p.m.

LOCATION
Nebraska Innovation Campus
N 21st St and Salt Creek Roadway / Lincoln, Nebraska

weatherfest.unl.edu

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