

Basic SKYWARN Spotter Talk

NWS Baltimore/Washington



U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service

Overview of Today's Topics

- **Situational Awareness Tools**
 - NWS Forecast Products
 - Watch vs Warning
 - Ways to Receive Warnings
 - Impact-Based Warnings and Damage Threat Tags
- **Severe Weather Spotting & Reporting**
 - Important of Spotters
 - Warning Process
 - Identifying Severe Weather
 - What and How to Report to the NWS
- **Weather Safety & Preparedness**
- **National Capital Area SKYWARN Support Group – Amateur Radio Users**

About the National Weather Service

NWS Mission:

Provide weather, water, and climate data, **forecasts, warnings, and impact-based decision support services** for the **protection of life and property** and the enhancement of the national economy.

NWS Vision:

A **Weather-Ready Nation**: Society is **prepared for and responds to** weather, water, and climate-dependent events.



Federal Government



Executive Branch



Department of Commerce



**National Oceanic and
Atmospheric Administration**



National Weather Service

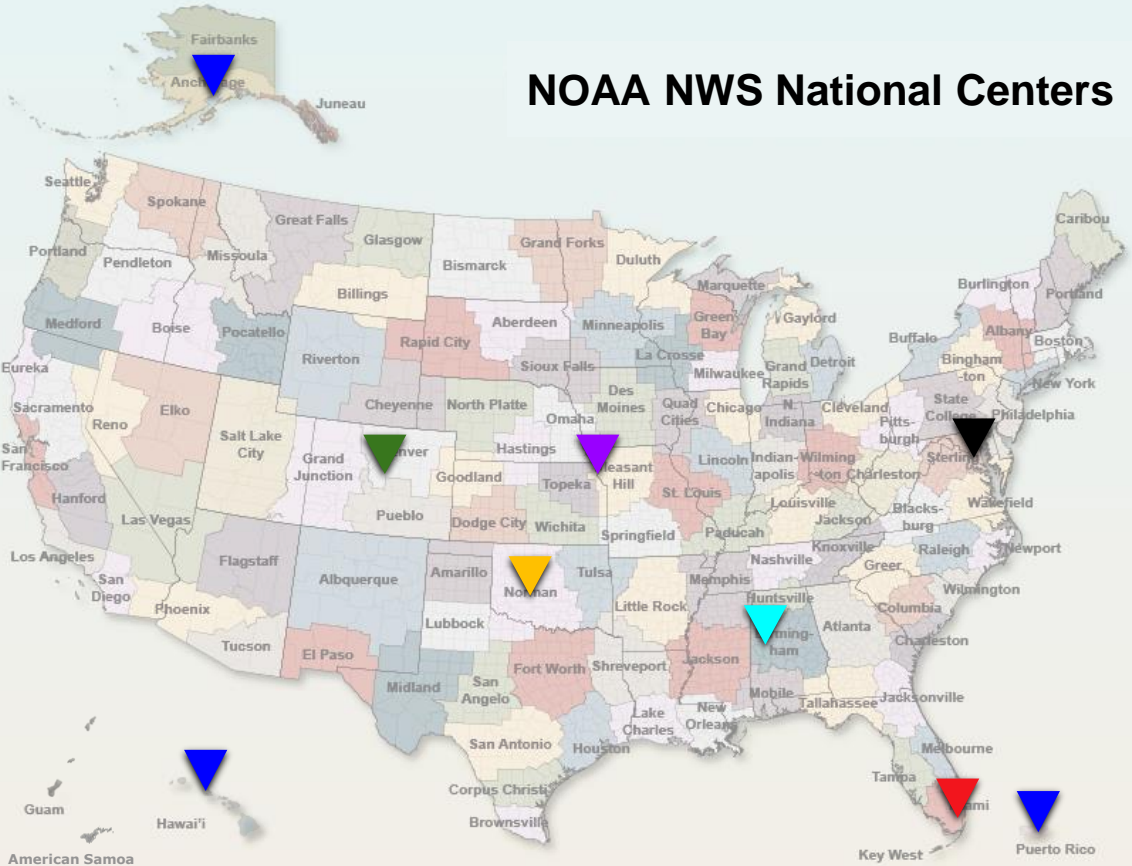
Your tax dollars at work for you!

The annual cost to the
average taxpayer to fund the
National Weather Service is
equivalent to the cost of a cup
of coffee.

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service

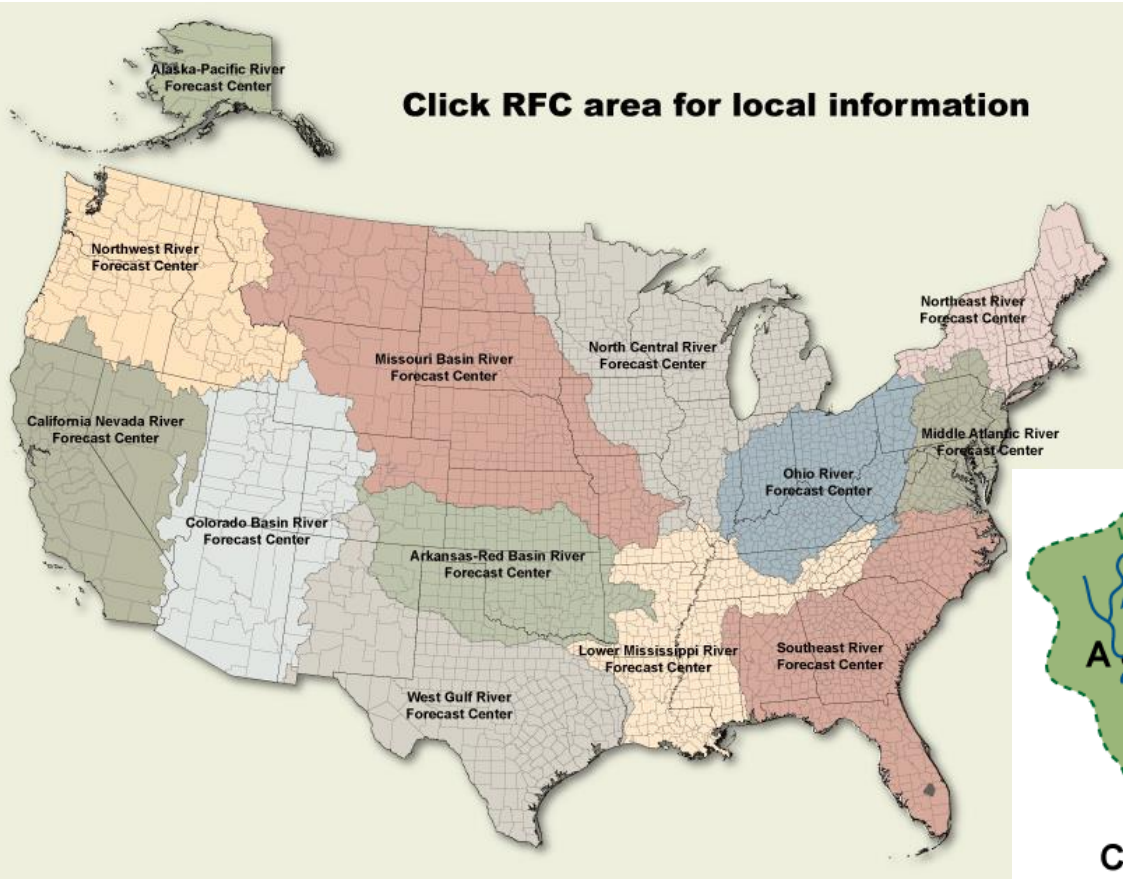
NWS National Centers

NOAA NWS National Centers

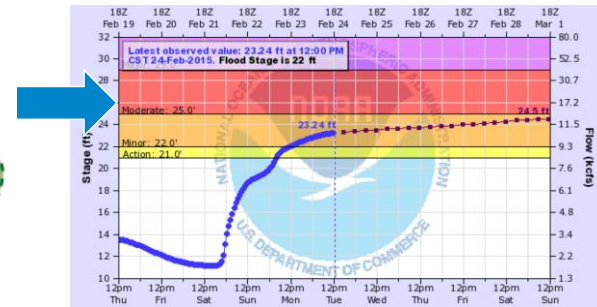


- ▼ International Tsunami Information Center
- ▼ Pacific Tsunami Warning Center
- ▼ Tsunami Warning/Information Center
- ▼ International Tsunami Information Center Caribbean Office
- ▼ Space Weather Prediction Center
- ▼ Aviation Weather Center
- ▼ Storm Prediction Center
- ▼ National Water Center
- ▼ National Hurricane Center
- ▼ Weather Prediction Center
- ▼ Climate Prediction Center
- ▼ Ocean Prediction Center
- ▼ NCEP Central Operations
- ▼ Environmental Modeling Center

NWS River Forecast Centers

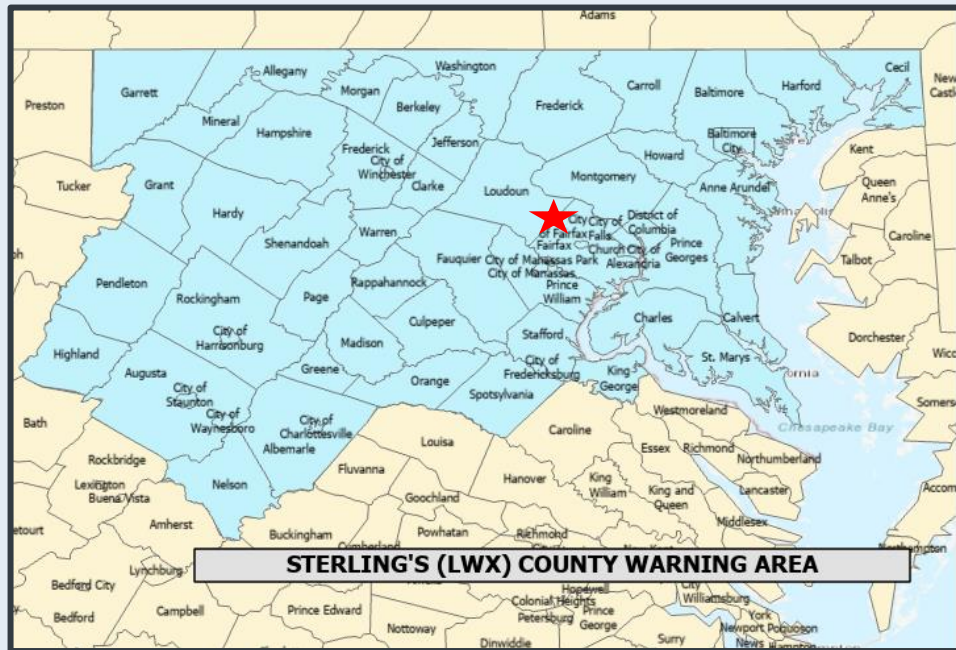


- Will water go into the soil or lead to excess runoff into local rivers?
- Review observed and forecast precipitation data that eventually go into the river forecast model
- Create daily river forecasts, flash flood guidance based on soil conditions and recent rainfall trends



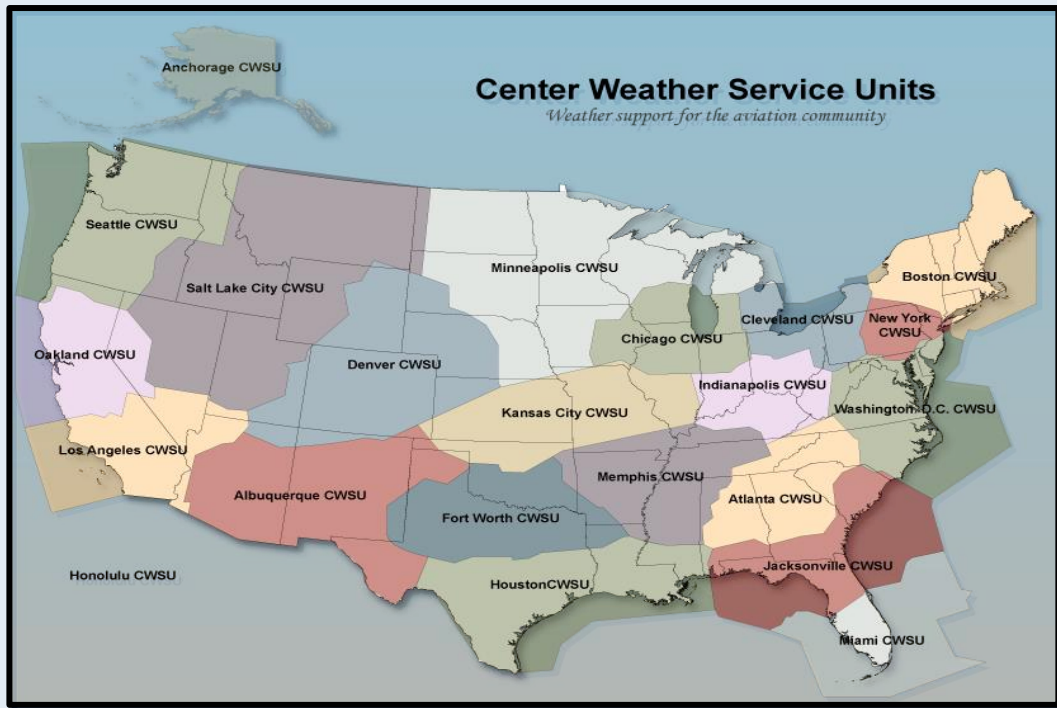
Local Area of Responsibility

- 15 MD Counties
- 8 WV Counties
- 23 VA Counties
11 Independent Cities
- District of Columbia
- The City of Baltimore



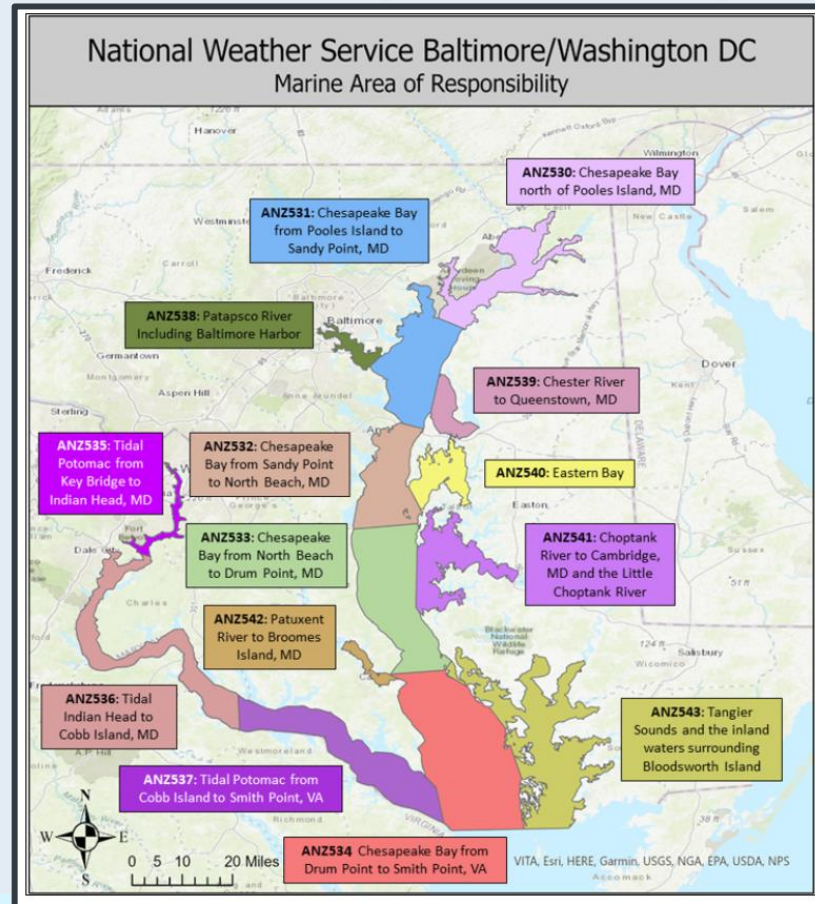
...nearly 11 million people to look out for!

Local Aviation Support



Local Marine Area of Responsibility

- Upper Chesapeake Bay
- Tidal Potomac
- Wind and Wave Forecasts & Warnings issued for these areas





DISCLAIMER!

SPOTTING SEVERE WEATHER CAN BE DANGEROUS!

Your safety is more important
than a report.

The National Weather Service does
not encourage chasing severe weather.

**The majority of our reports come in from
people reporting from their home!**

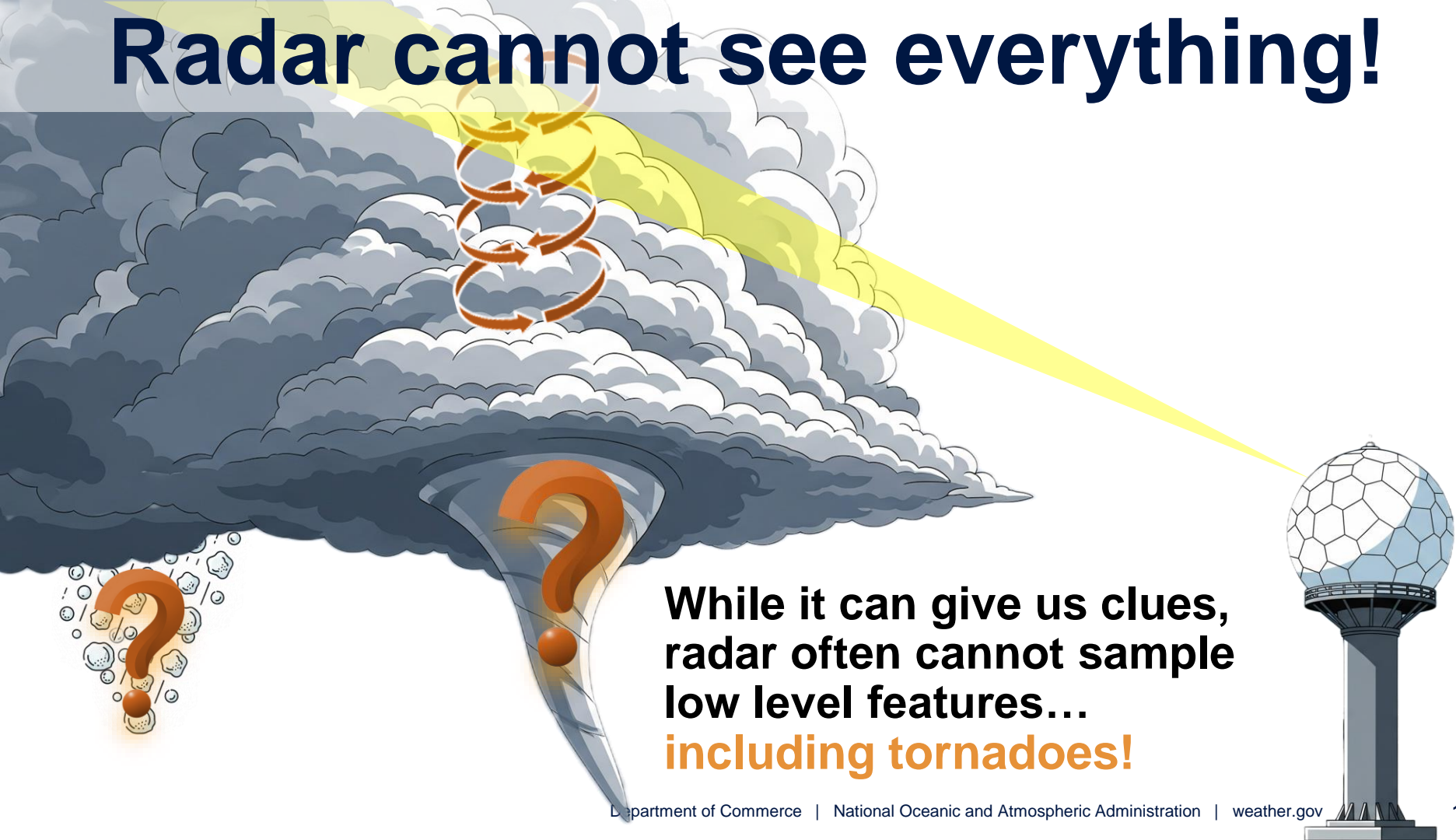
Why spotters?

They provide ground truth and timely reports!

People react when they
KNOW
a tornado is on the ground

Reports are most valuable **as the storm is happening**.
This helps us with warning decisions and adds credibility to warning information.

Radar cannot see everything!



**While it can give us clues,
radar often cannot sample
low level features...
including tornadoes!**

Situational Awareness Tools

Plan Ahead

1-5 Day Outlooks



Severe Weather Cycle

Be Prepared

Watches - Hours

Tornado Watch

Valid Until
8:00 PM CDT Thursday
May 15, 2025

Threat Information

TORNADES
A Few Tornadoes Likely

HAIL
Scattered Hail Up To
Apple Size Likely

WIND
Scattered G gusts
Up To 70 MPH Likely

Potential Exposure

Population: 5,124,283
Schools: 2683
Hospitals: 117



Take Action!

Warnings - Minutes

Tornado Warning

Valid Until
4:35 PM CDT Thursday
May 15, 2025

Threat Information

TORNADO
Radar Indicated

HAIL
Quarter
Sized Possible

Potential Exposure

Population: 25,355
Schools: 9
Hospitals: 0



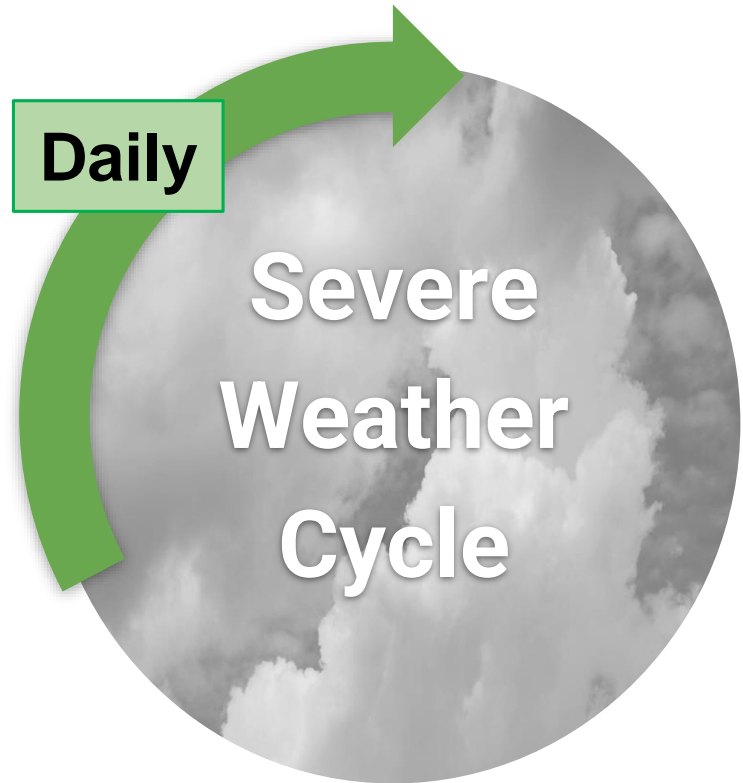
Stage 1: Outlook

Review NWS Products and Services daily.

Typically issued several days out

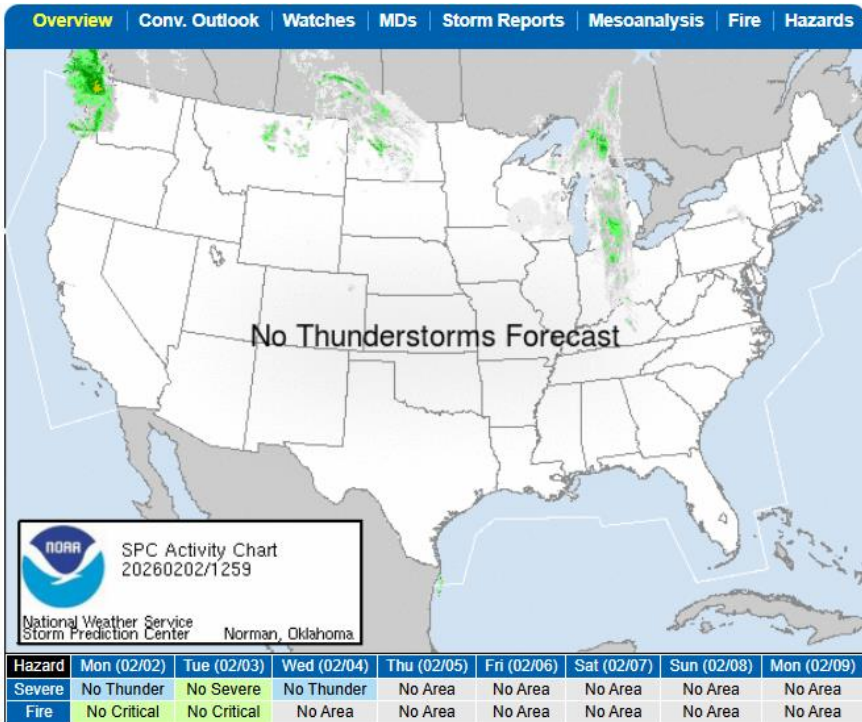
Have a plan and know where to shelter in the event severe weather strikes. Make sure you have emergency supplies.

Have a Plan!

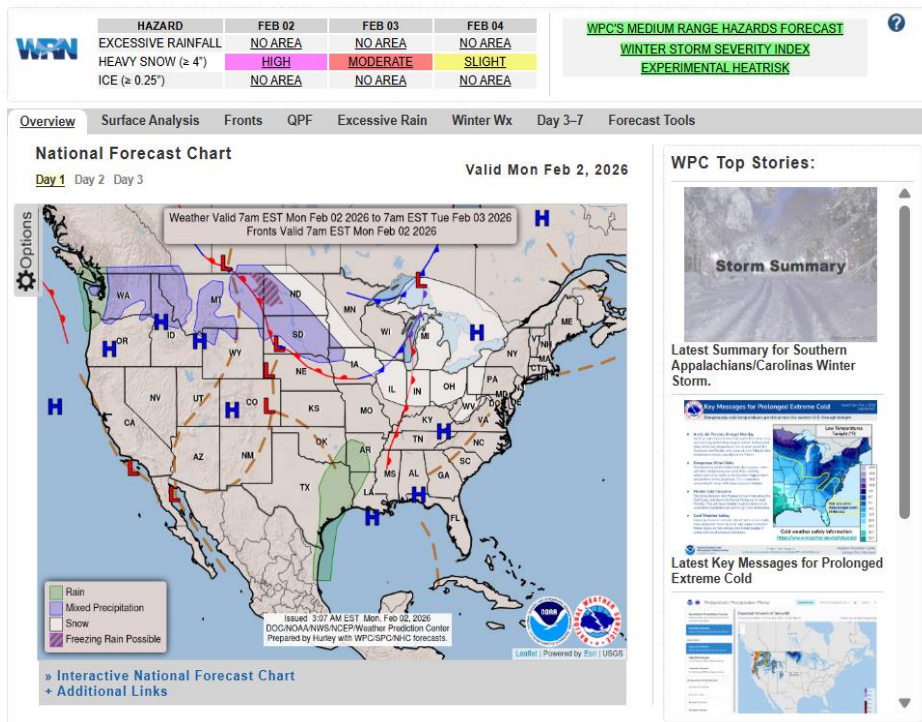


NWS National Centers

Storm Prediction Center



Weather Prediction Center



Storm Prediction Center Outlooks

THUNDERSTORM S (No Label)

No severe
thunderstorms
expected

ALL
thunderstorms
include a lightning
and flooding threat

1 - MARGINAL (MRGL)

Isolated severe
thunderstorms
possible

Often limited in
duration and/or
coverage and/or
intensity

2 - SLIGHT (SLGT)

Scattered severe
thunderstorms
possible

Short-lived and/or
not widespread,
isolated intense
storms possible

3 - ENHANCED (ENH)

Numerous severe
thunderstorms
possible

More persistent
and/or widespread,
a few intense

4 - MODERATE (MDT)

Widespread
severe
thunderstorms
likely

Long-lived,
widespread and
intense

5 - HIGH (HIGH)

Widespread
severe
thunderstorms
expected

Long-lived, very
widespread and
particularly intense

Increasing coverage and intensity of severe weather

- Winds to 40 mph
- Small hail

- Winds 40-60 mph
- Hail up to 1"
- Low tornado risk

- One/two
tornadoes
- Reports of strong
winds/damage
- Hail ~1", isolated

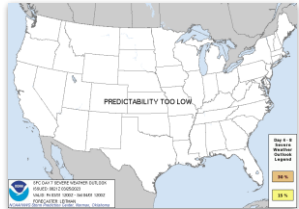
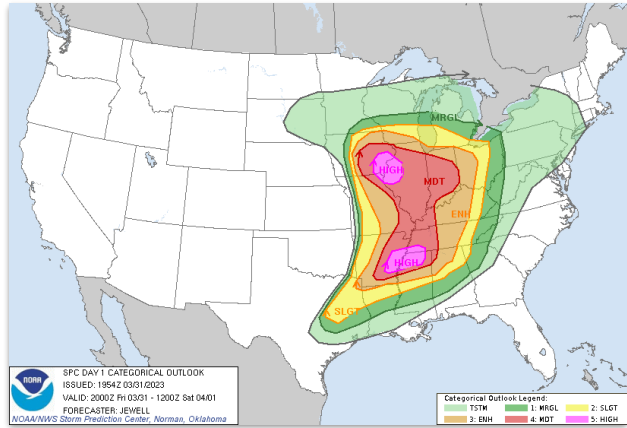
- A few tornadoes
- Several reports of
wind damage
- Damaging hail, 1-
2"

- Strong tornadoes
- Widespread wind
damage
- Destructive hail,

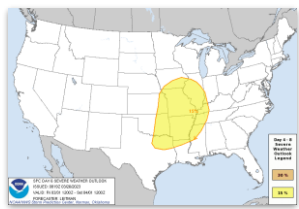
- Tornado outbreak
- Derecho

Storm Prediction Center Outlooks

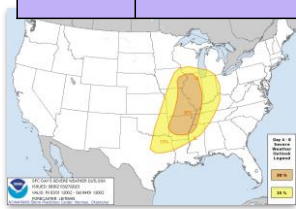
www.spc.noaa.gov



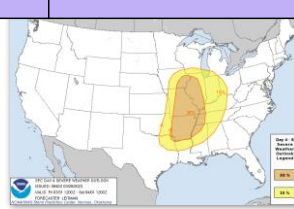
Day 7



Day 6



Day 5



Day 4



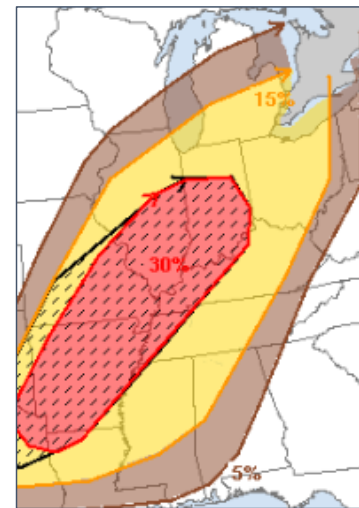
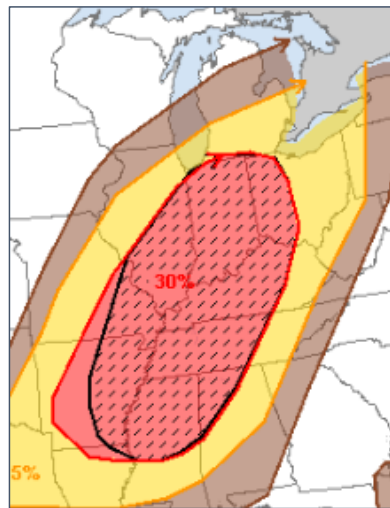
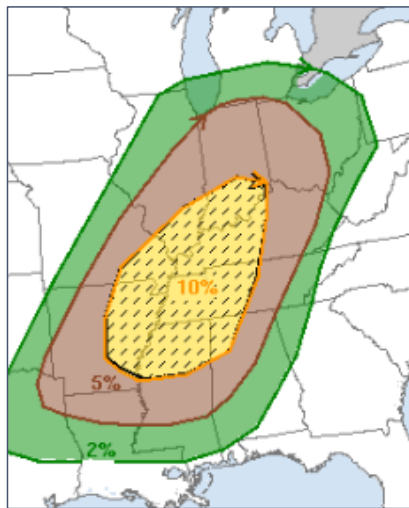
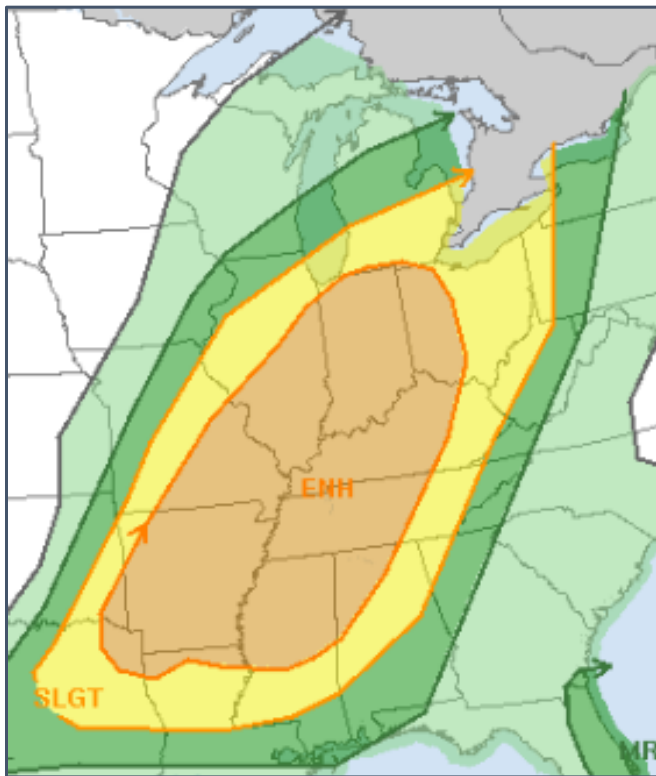
Day 3



Day 2

Level	Category Name	General Description	Frequency Across Local Area
1/5	"Marginal"	Isolated Severe Storm	~30 times a year
2/5	"Slight"	A Few Severe Storms	~15 times a year
3/5	"Enhanced"	Numerous Severe storms	~2 times a year
4/5	"Moderate"	Severe Weather Outbreak	~1 every 10 years
5/5	"High"	Deadly Tornado Outbreak or Derecho	None on Record

Day 1 & Day 2 Hazard Specific Probabilities



Probabilities for tornadoes, damaging winds, and large hail

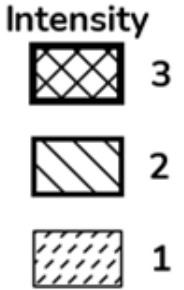
- Likelihood of the hazard to occur within 25 miles of a point
- **Hatched areas** denote higher confidence in high-end severe weather. **Change coming to hatched areas in March 2026.**

New: Conditional Intensities in SPC Outlooks

Key Change: You no longer need a 10% or greater probability area to highlight significant severe potential.

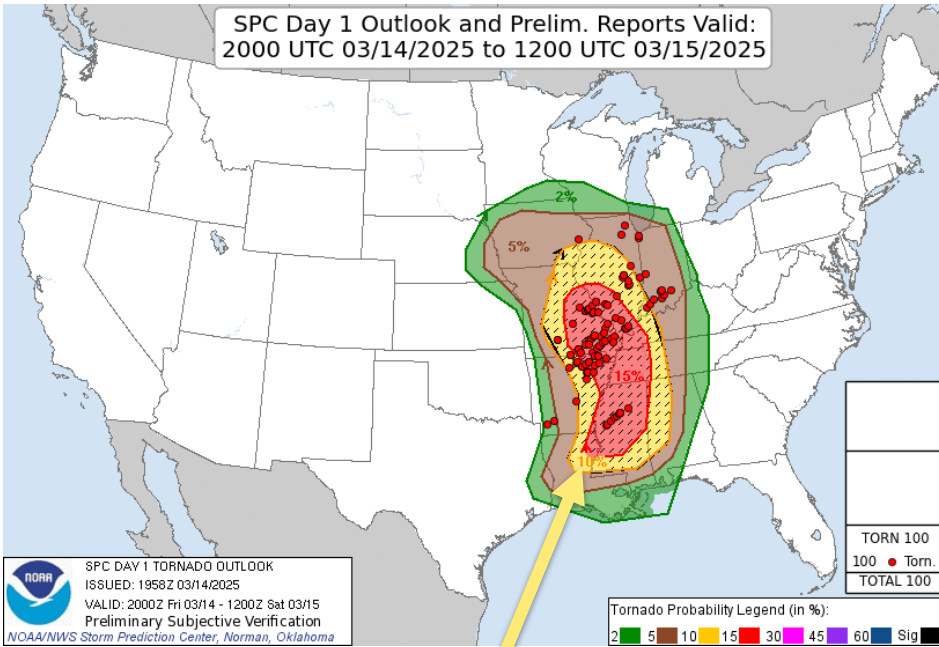
Methodology: Intensity forecasts are now based on storm environment and storm mode.

Definition: These intensities are conditional, meaning: “If a tornado occurs, what is the probability it will be EF2+/EF3+/EF4+?”

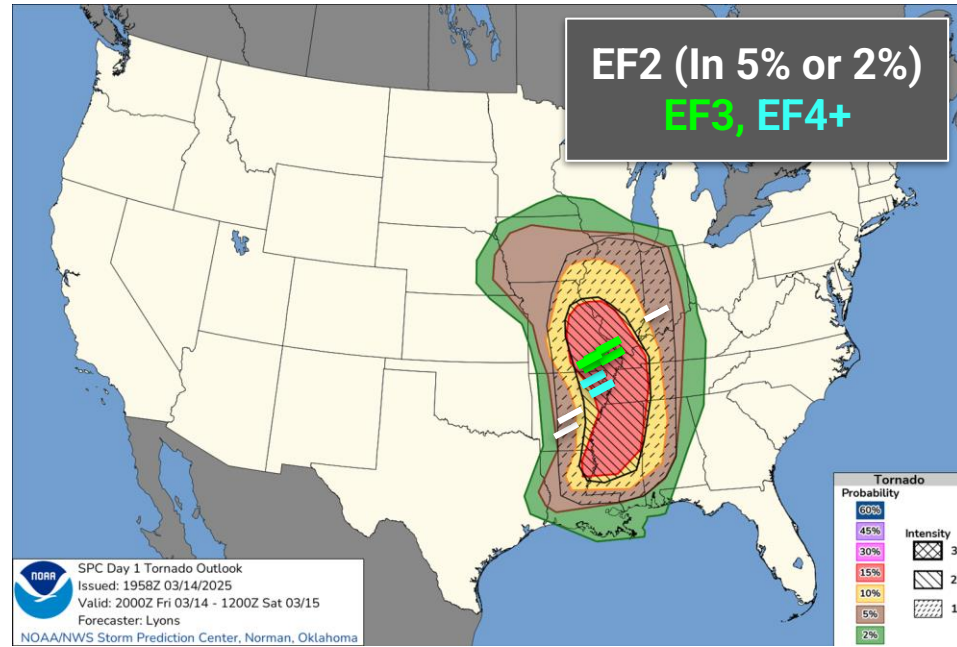


14 March 2025 - 20Z Tornado Outlook Examples

Operational, 2025

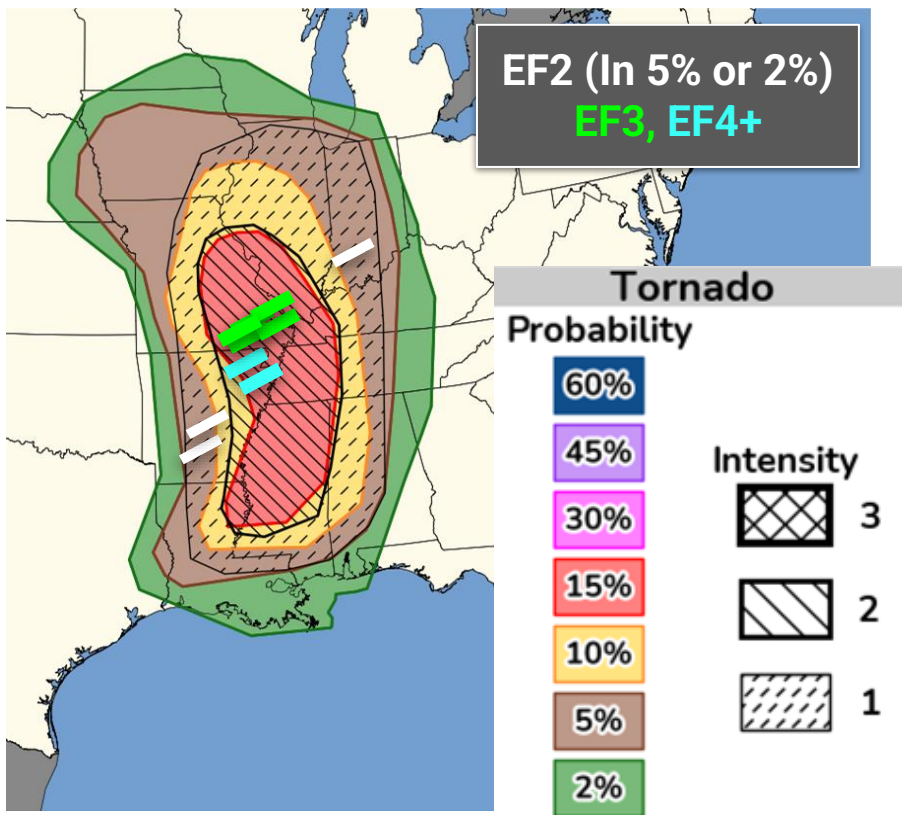


Conditional Intensity



In 2025, the probability needed to be 10% or greater to highlight significant severe potential. Limiting the communication on where significant severe weather was possible at probabilities <10%.

14 March 2025 - Conditional Intensity Example



Changes to the SPC Probability Outlooks should help better communicate areas of concern for significant severe weather.

Tornado example from 2025

Conditional Intensity Outlooks Summary

New Conditional Intensity Scheme not limited to 10% or greater coverage of unconditional probability areas:

Multiple Intensity Tiers:

Intensity Level <1: Mostly Weak Tornadoes

Intensity Level 1 : Max expected EF2+

Intensity Level 2 : Max expected EF3+

Intensity Level 3 : Max expected EF4+

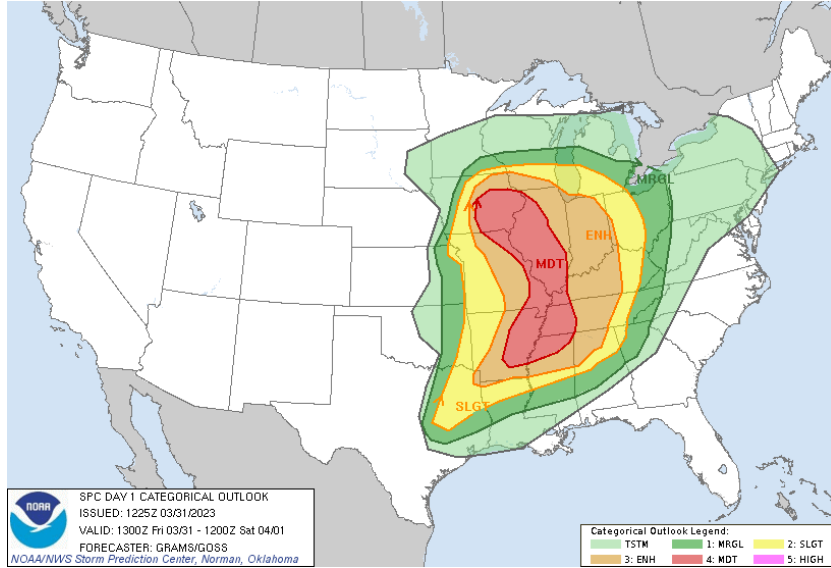
Driven by Storm Environment and Convective Mode:

Intensity Level 2+ tornado only in high-end environments with supercells

Intensity Level 2+ wind only with an organized MCS

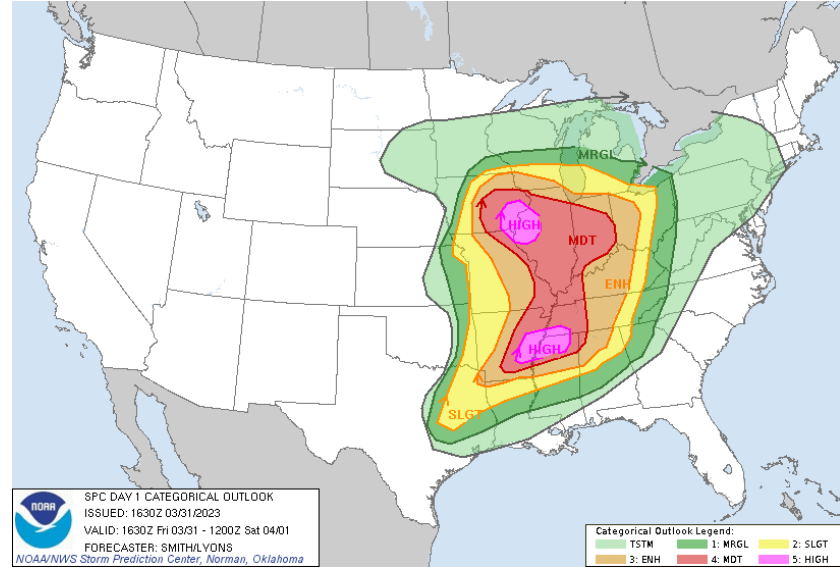
Intensity Level 2+ hail only with supercells

Outlooks CAN Change the DAY OF an Event



9 AM, March 31st, 2023

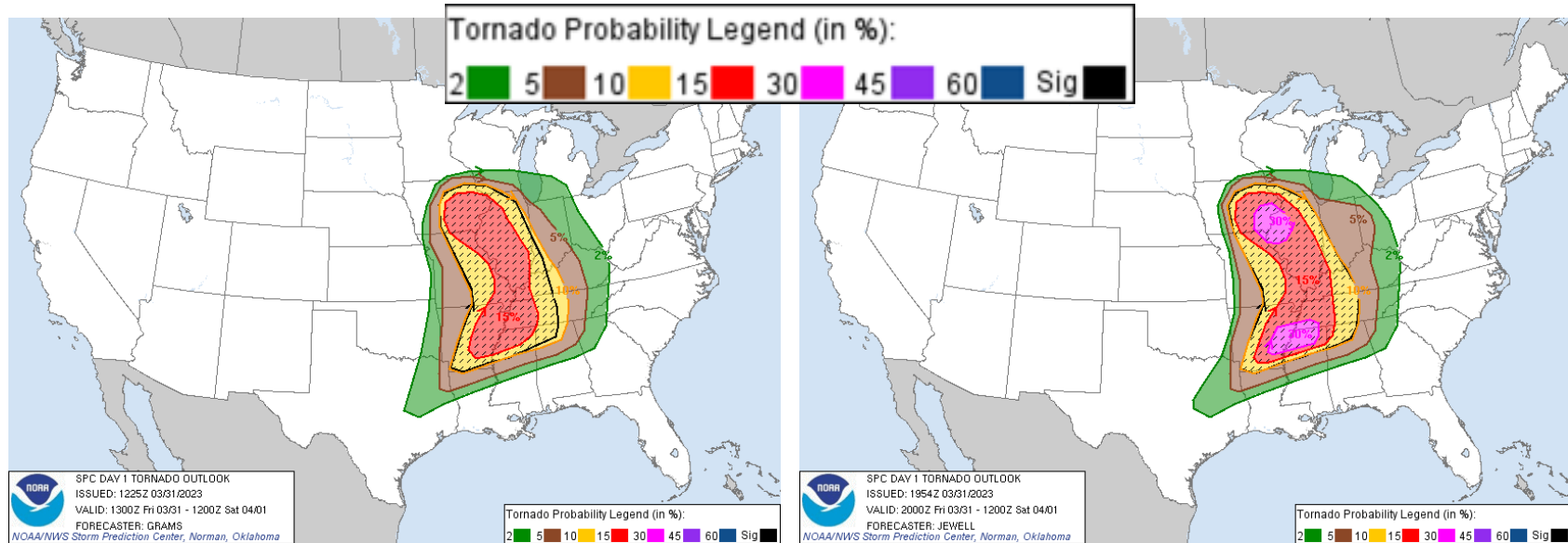
- Large area outlooks for severe weather across the Midwest and Mid-Mississippi Regions.
- Large area under Enhanced and Moderate Risks



4:30 PM, March 31st, 2023

- Moderate and Enhanced Risk expanded
- Introduction of High Risk Areas

Probabilities CAN Change the DAY OF an Event



9 AM, March 31st, 2023

- Broad area of **15% chance** of a tornado within 25 miles of a point.
- **A few strong to violent tornadoes possible.**

4:30 PM, March 31st, 2023

- **Addition of more focused areas of concern for strong to violent tornadoes, 30% chance of a tornado within 25 miles of a point.**

Weather Prediction Center Excessive Rainfall Outlooks

No Area/Label

Flash floods are generally not expected.

1 - MARGINAL (MRGL)

Isolated flash floods possible

Localized and primarily affecting places that can experience rapid runoff with heavy rainfall.

2 - SLIGHT (SLGT)

Scattered flash floods possible

Mainly localized. Most vulnerable are urban areas, roads, small streams and washes.

Isolated significant flash floods possible.

3 - MODERATE (MDT)

Numerous flash floods likely

Numerous flash flooding events with significant events possible. Many streams may flood, potentially affecting larger rivers.

4 - HIGH (HIGH)

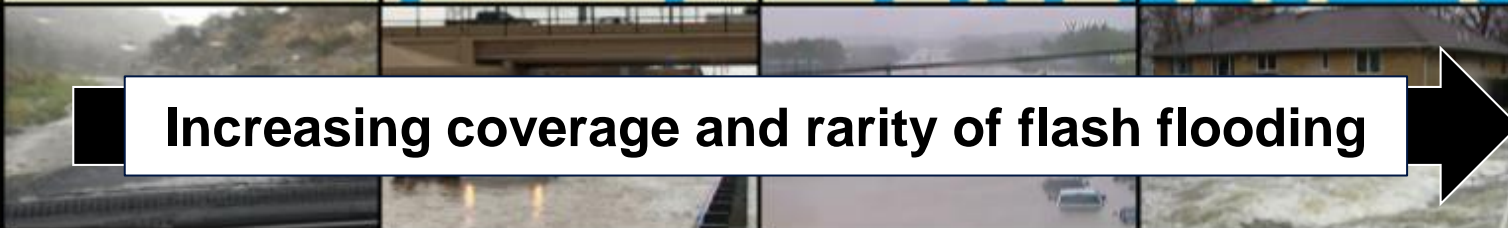
Widespread flash floods expected

Severe, widespread flash flooding. Areas that don't normally experience flash flooding, could.

Lives and property in greater danger.

Flash flooding near me?

Flash Flooding
NO Flash Flooding

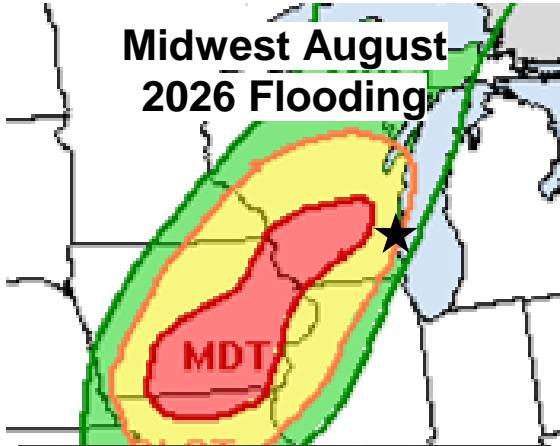


Increasing coverage and rarity of flash flooding



WEATHER PREDICTION CENTER

Excessive Rainfall Outlook Examples



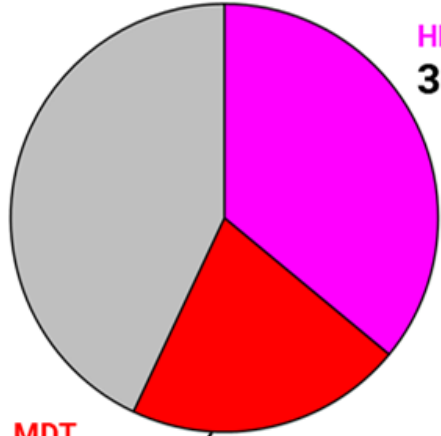
Level	Category Name	General Description	Frequency
1/4	“Marginal”	Isolated Flash Flooding	~25 times a year
2/4	“Slight”	Scattered Flash Flooding	~10 times a year
3/4	“Moderate”	Numerous Flash Floods Likely	~1 every 5 years
4/4	“High”	Deadly, Widespread Flash Flooding Expected	~1 every 10 years

www.wpc.ncep.noaa.gov

High Risk Days Are Dangerous - Fatalities

1/3 of ALL Flood-related Fatalities

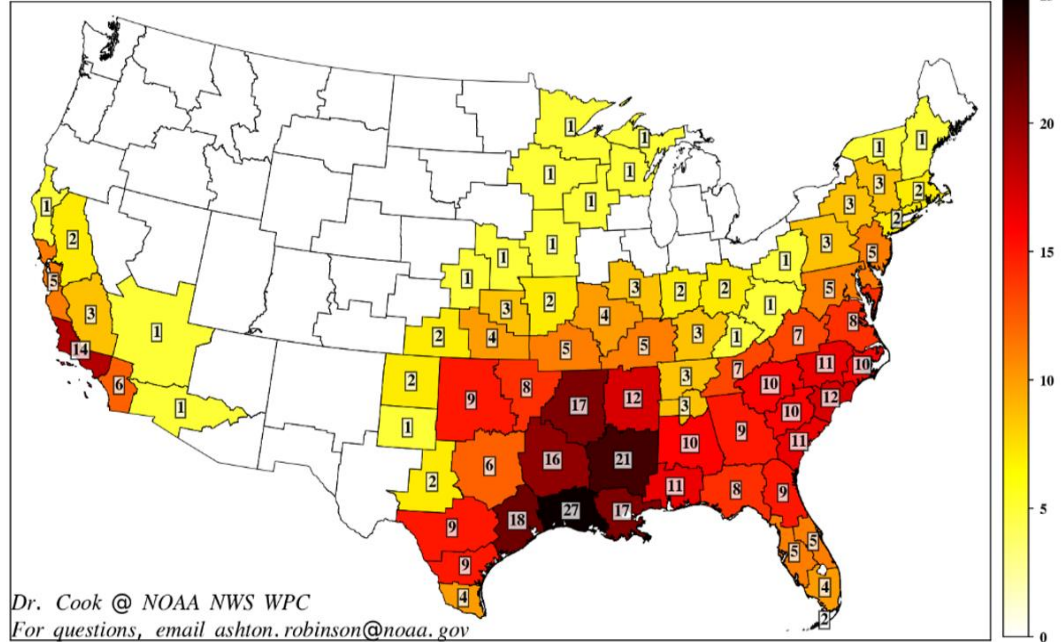
Percent of Total US Flood Fatalities



MDT
21%

HIGH
36%

NWSFO CWA Number of ERO High Risk Days: 2016 – 2024

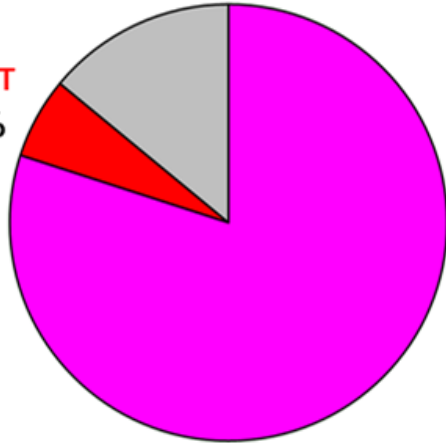


<https://www.wpc.ncep.noaa.gov/qpf/eroclimo/>

High Risk Days Are Dangerous - Damages

4/5 of ALL Flood-related Damages

MDT
6%

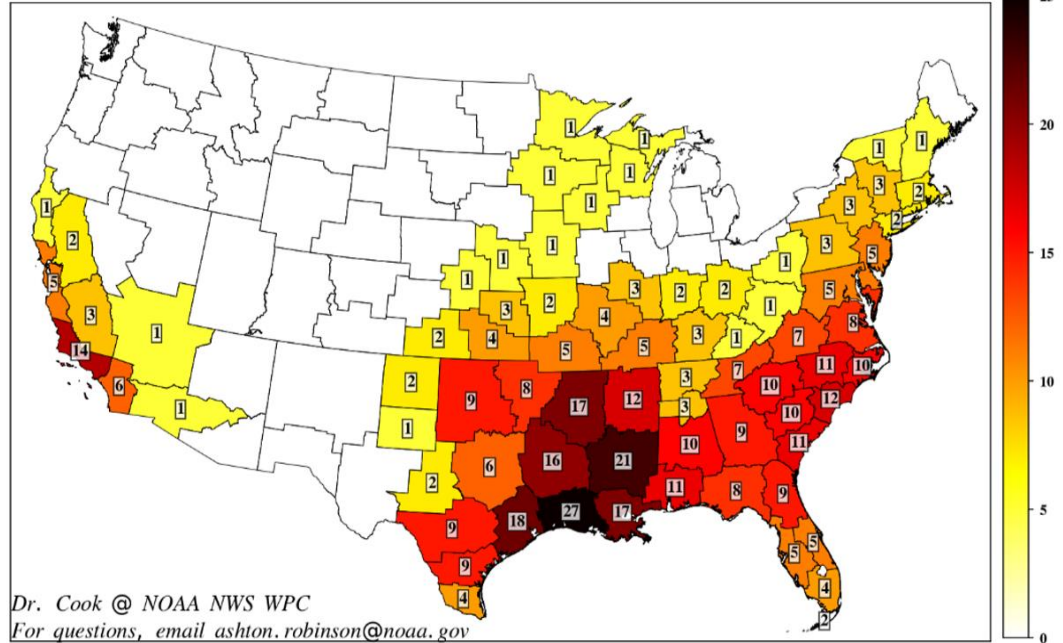


HIGH
80%

Percent of
Total US
Flood
Damages

¹ From 2010 to 2022. Includes flood, flash flood, heavy rain, and debris flow Storm Data. Excludes Oso, WA landslide which occurred well after rainfall and on a sunny day.

NWSFO CWA Number of ERO High Risk Days: 2016 – 2024



<https://www.wpc.ncep.noaa.gov/qpf/eroclimo/>

Excessive Rainfall Outlook Examples

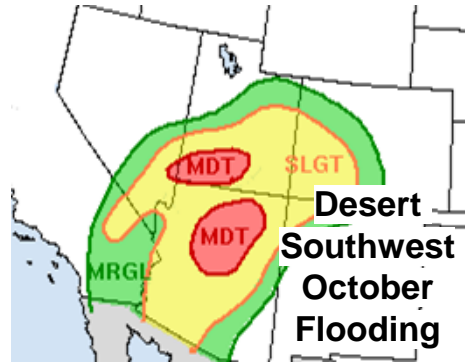
California Christmas
Flooding



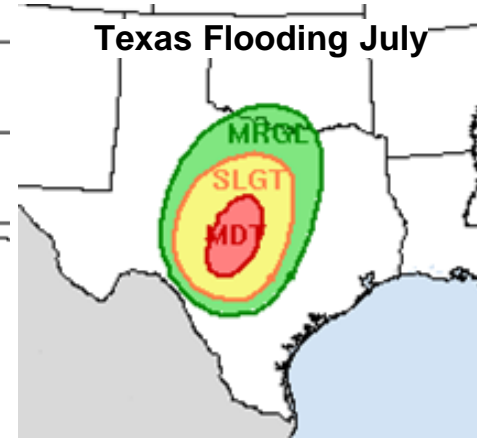
Midwest
August
Flooding



Desert
Southwest
October
Flooding



Texas Flooding July



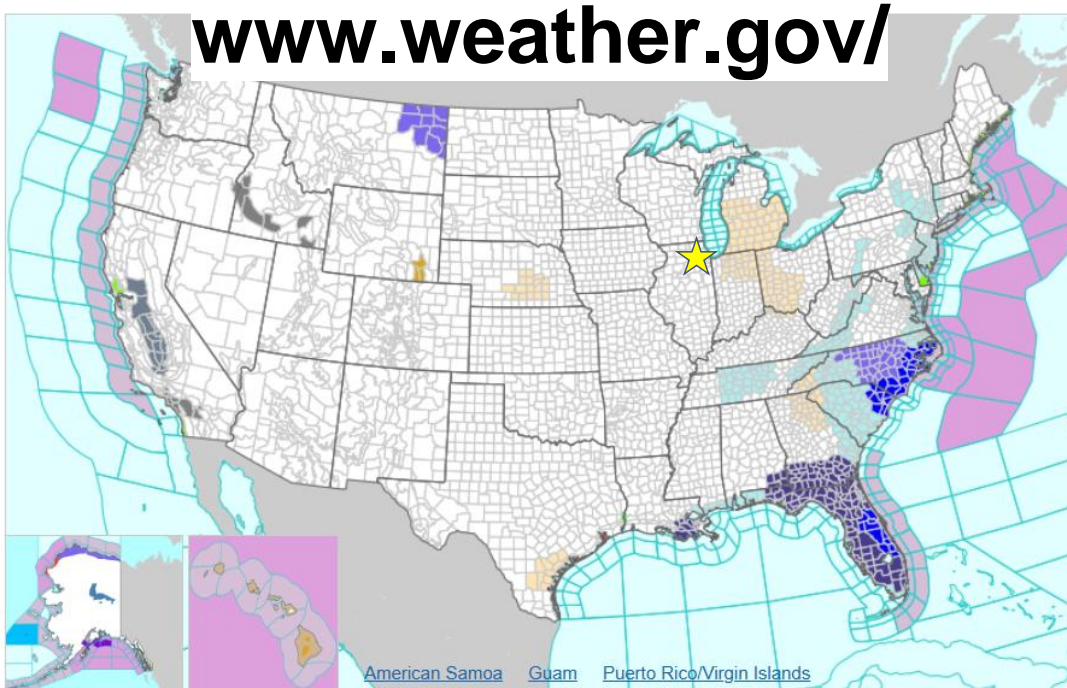
Risk of rainfall exceeding flash flood guidance
within 25 miles of a point to the right of a line

HIGH: At Least 70%	SLGT: At Least 15%
MDT: At Least 40%	MRGL: At Least 5%

www.wpc.ncep.noaa.gov

NWS Forecast Offices, Your LOCAL Resources

ACTIVE ALERTS FORECAST MAPS RADAR RIVERS, LAKES, RAINFALL AIR QUALITY SATELLITE CURRENT



- Each NWS Office has a website to get more information about the current and upcoming weather.
- Don't know what your home office is? Visit our www.weather.gov and click on the map over your location.

Local Office Example:
www.weather.gov/Chicago
or www.weather.gov/lot

Local NWS Weather Stories

NWS Forecast Office Baltimore/Washington

[Weather.gov](https://www.weather.gov/baltimore) > Baltimore/Washington

Baltimore/Washington
Weather Forecast Office

[Current Hazards](#) [Current Conditions](#) [Radar](#) [Forecasts](#) [Rivers and Lakes](#) [Climate and Past Weather](#) [Local Programs](#)

Click a location below for detailed forecast.



[Watches, Warnings & Advisories](#)



[Small Craft Advisory](#)

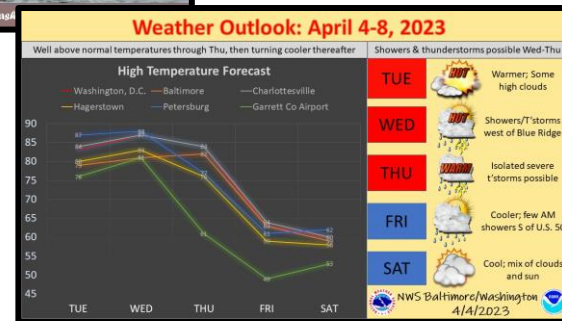
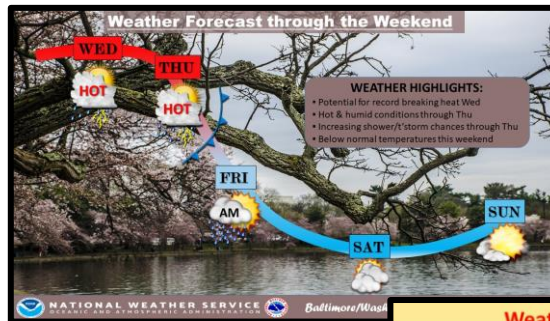
Last Map Update: Wed, Mar 18, 2026 at 10:28:30 EDT



[Weather Story](#)

[Local Radar](#)

[Satellite](#)



Forecast graphics are also available on our Facebook and X pages

Hazardous Weather Outlook

NWS Forecast Office Baltimore/Washington

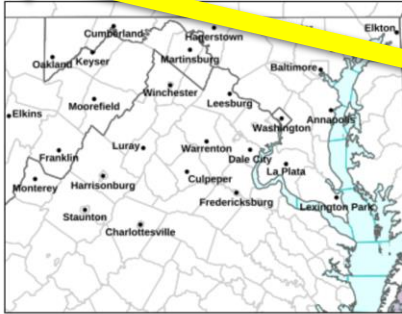
[Weather.gov](#) > Baltimore/Washington

Baltimore/Washington

Weather Forecast Office

[Current Hazards](#) [Current Conditions](#) [Radar](#) [Forecasts](#) [Rivers and Lakes](#) [Climate and Past Weather](#) [Local Programs](#)

Click on the link below for detailed forecast.



[Watches, Warnings & Advisories](#)

[Small Craft Advisory](#)

[Zoom Out](#)

Last Map Update: Wed, Mar 18, 2026 at 10:28:35 am EDT

MDZ003>006-503-505-507-VAZ025>031-036>040-050-051-501-502-505>508-526-WVZ050>053-055-260930-Washington-Frederick MD-Carroll-Northern Baltimore-Northwest Montgomery-Northwest Howard-Northwest Harford-Augusta-Rockingham-Shenandoah-Frederick VA-Page-Warren-Clarke-Nelson-Albemarle-Greene-Madison-Rappahannock-Orange-Culpeper-Northern Fauquier-Southern Fauquier-Western Loudoun-Eastern Loudoun-Northern Virginia Blue Ridge-Central Virginia Blue Ridge-Northwest Prince William-Hampshire-Morgan-Berkeley-Jefferson-Hardy-527 AM EDT Wed Mar 25 2026

This Hazardous Weather Outlook is for portions of eastern West Virginia, northern and central Virginia, and central and western Maryland.

.DAY ONE...Today and Tonight

No hazardous weather is expected at this time.

.DAYS TWO THROUGH SEVEN...Thursday through Tuesday

No hazardous weather is expected at this time.

.SPOTTER INFORMATION STATEMENT...

Spotter activation is not expected at this time.

WEDNESDAY
March 18, 2026
33°-46°
25°-34°
South-S-10 mph

THURSDAY
March 19, 2026
43°-58°
33°-41°

FRIDAY
MARCH 20, 2026
50°-66°
41°-49°

Weather Story



Local Radar



NOAA 03/18/2026 14:21Z - NOAA/STAR - NE
Satellite

NWS Forecast Discussions

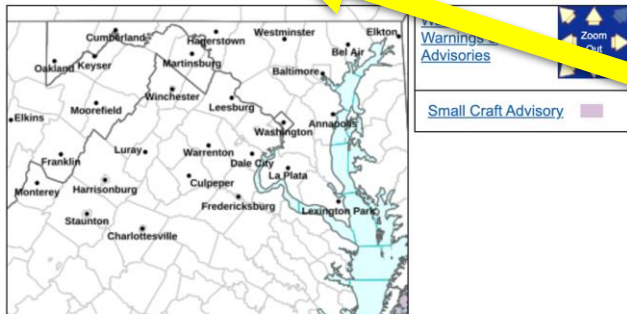
NWS Forecast Office Baltimore/Washington

[Weather.gov](https://www.weather.gov) > Baltimore/Washington

Baltimore/Washington
Weather Forecast Office

[Current Hazards](#) [Current Conditions](#) [Radar](#) [Forecasts](#) [Rivers and Lakes](#) [Climate and Past Weather](#) [Local Programs](#)

Click a location below for detailed forecast



Last Map Update: Wed, Mar 18, 2026 at 10:28:35 am EDT



Weather Story



Local Radar



Satellite

Area Forecast Discussion

National Weather Service Baltimore MD/Washington DC
1006 AM EDT Wed Mar 25 2026

.WHAT HAS CHANGED...

Coastal [Flood](#) Advisory issued for Anne Arundel County this afternoon due to higher tidal anomalies in the Chesapeake Bay. Otherwise, no changes made to the forecast this morning.

&&

.KEY MESSAGES...

- 1) A strong cold [front](#) will bring the possibility of strong to severe thunderstorms Thursday night into Friday.
- 2) Noticeable cooler conditions expected Friday night through the weekend.

&&

.DISCUSSION...

KEY MESSAGE 1..A strong cold [front](#) will bring the possibility of strong to severe thunderstorms Thursday night into Friday.

High pressure will slide offshore today. A return [flow](#) will bring increasing warmth and [moisture](#) into the region today through Thursday. Highs will reach the 50s to low 60s today. Highs will reach predominantly in the lower to middle 70s with some 60s in the mountains in the west for Thursday. Dry conditions through early Thursday.

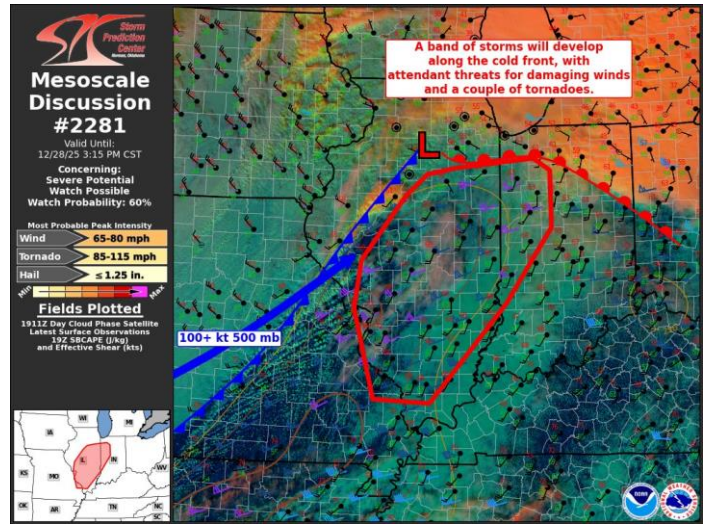
Ingredients Are Coming Into Place!

Severe Thunderstorm or Tornado Watches



spc.noaa.gov
Weather Radio, Apps

Mesoscale Discussions



spc.noaa.gov, Social Media

Stage 1: Outlook

Review NWS Products and Services.

Have a plan and know where to shelter in the event severe weather strikes.
Make sure you have emergency supplies.

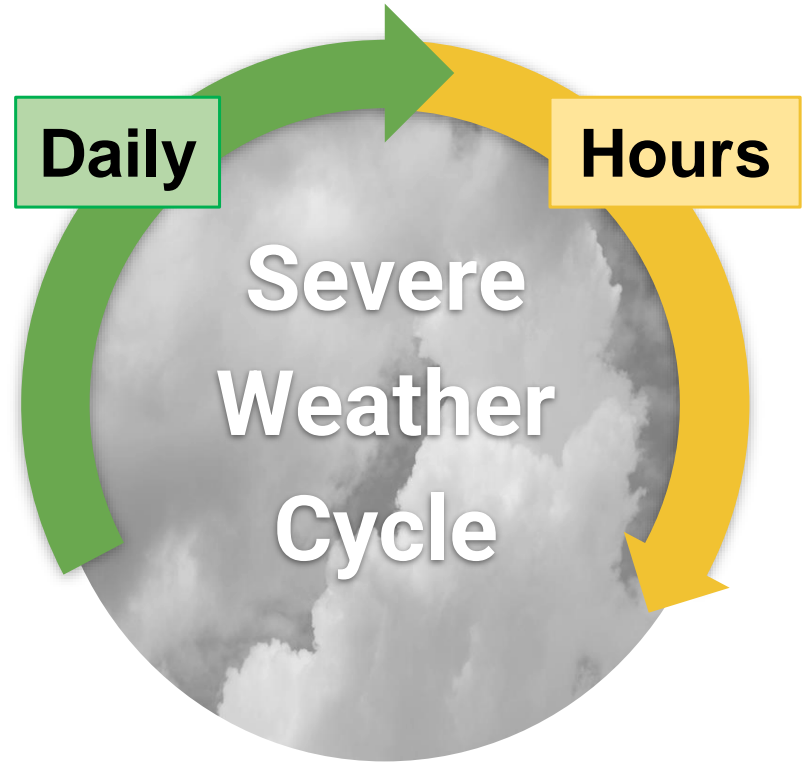
Have a Plan!

Stage 2: Watch

Monitor SPC Mesoscale Discussions and Severe Weather Watches, NWS Graphical Forecasts, Radar.

Stay informed and monitor closely for warnings

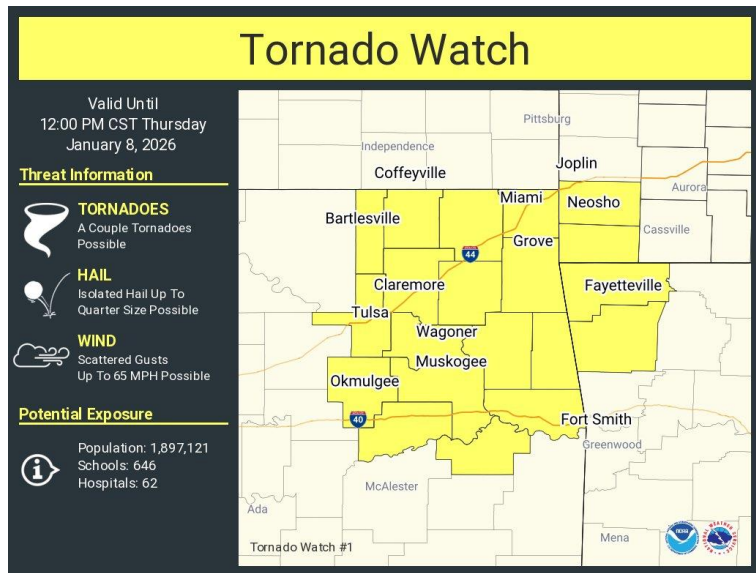
Be Prepared!



Understanding Watch vs Warning

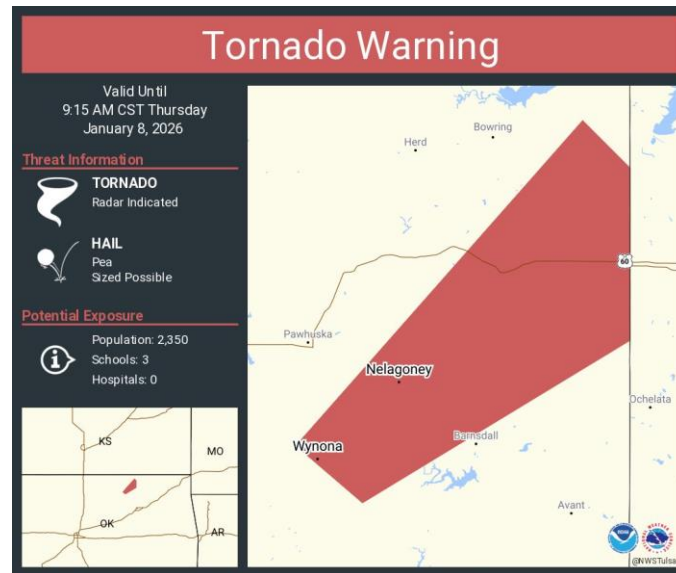
WATCH

Be Prepared. The ingredients are present for severe weather.



WARNING

Take action! Severe weather is moving into your area!



NWS Watch vs Warning: Cupcake Analogy

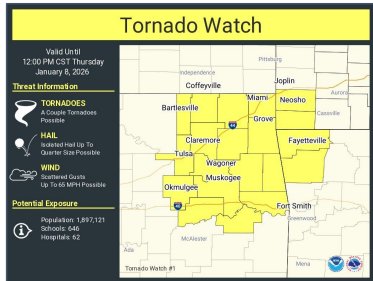


NWS Products in Cupcake Terms

Outlook



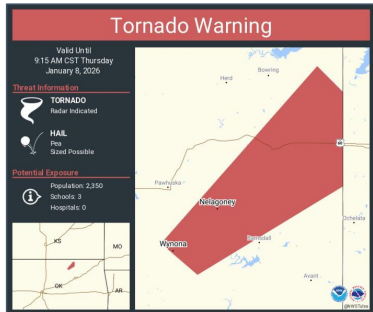
thinking about making
cupcakes...
it may happen



Watch



all the ingredients are
there for cupcakes...
it is likely



Warning



the cupcake is there...
it is here
TAKE ACTION

NWS Convective Watches

Severe Thunderstorm Watch

Primary Hazards: Damaging Wind Gusts and Large Hail
Additional Hazards: Flash Flooding, Tornadoes



Tornado Watch

Primary Hazards: Tornadoes
Additional Hazards: Damaging Wind Gusts, Large Hail, Flash Flooding



Flood Watch

Can be issued for river flooding, long-fused flooding, flash flooding
Water flowing over roadways
A rapid, life/property threatening rise in water

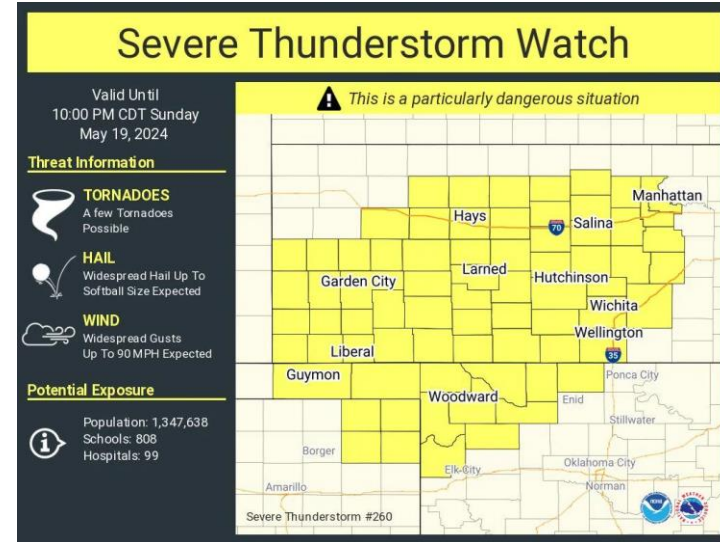


“PDS” NWS Convective Watches

Very rare situations

PDS Tornado Watch issued when long-lived and intense tornadoes are likely.

PDS Severe Thunderstorm Watch issued for widespread and exceptionally intense straight-lined wind events.

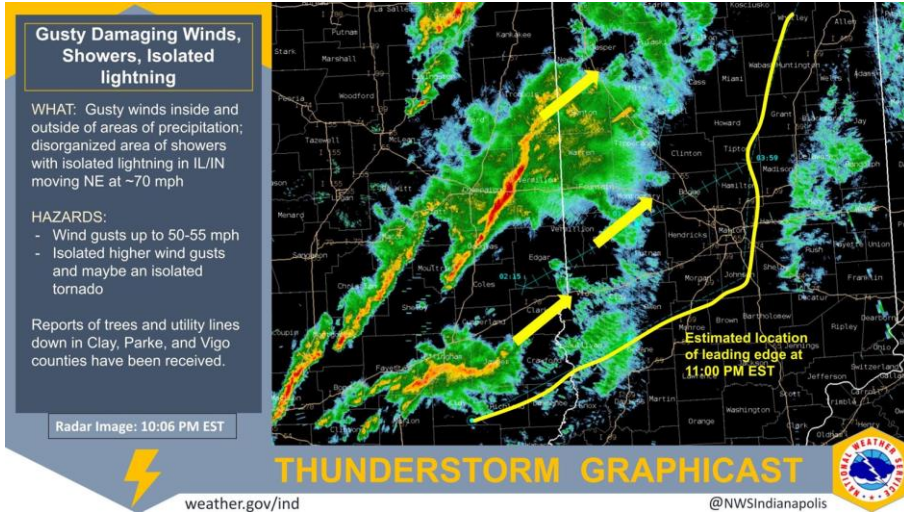


It's critical you know a safest place to seek refuge ahead of time.

Consider canceling or postponing outdoor activities.

Have multiple ways to receive a warning. Help inform others of the heightened risk!

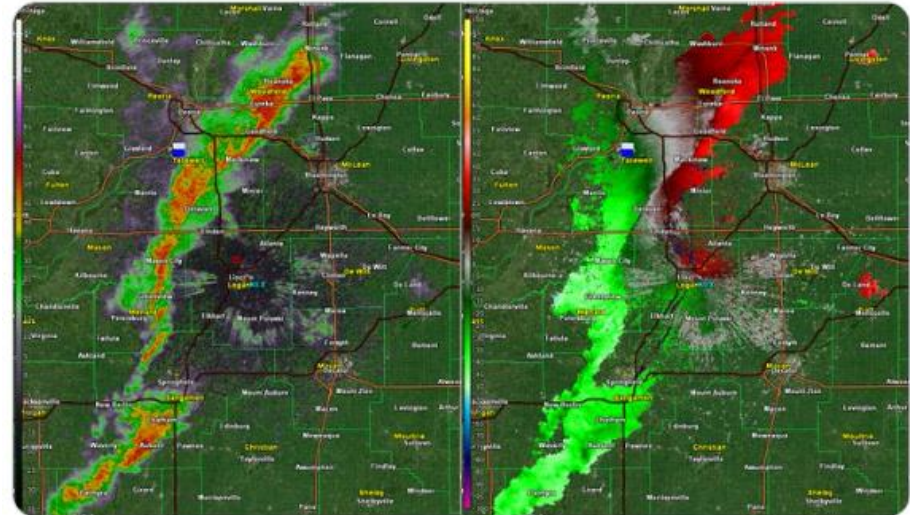
Graphical Forecasts & Social Media Updates



Local NWS Office Websites,
Facebook, X, Apps



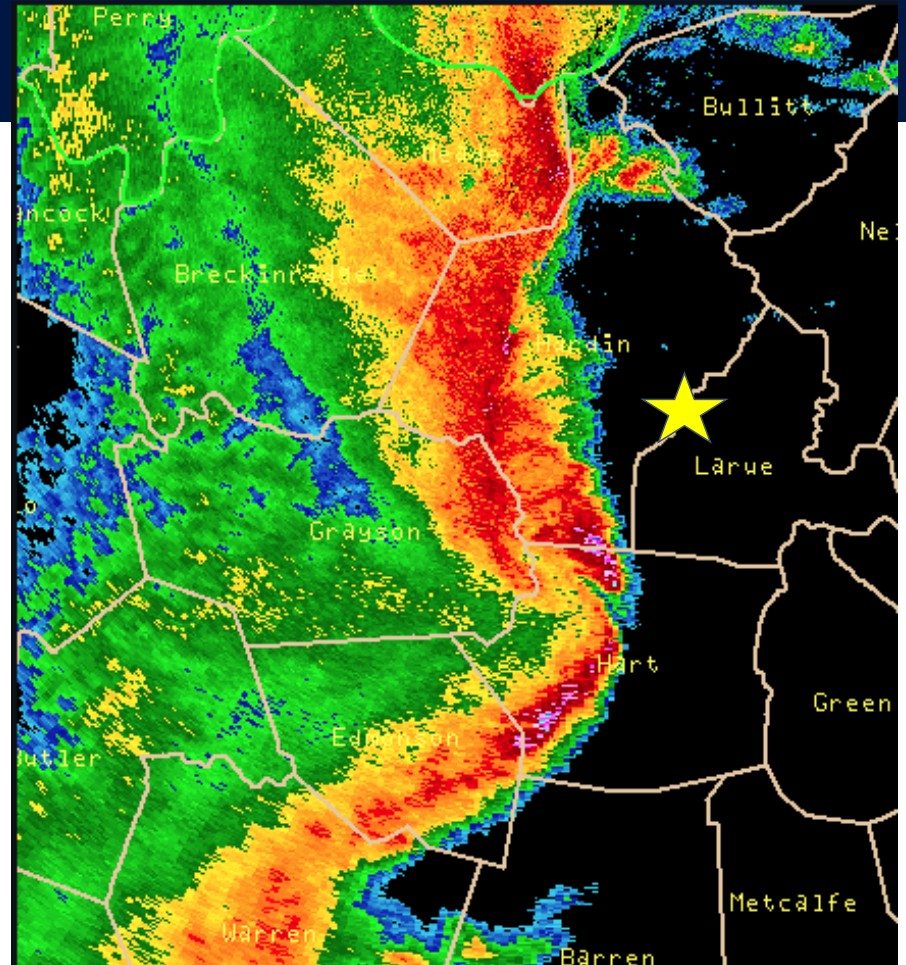
Radar time 2:11 PM CST... The line of storms is advancing east ahead of the cold front. We are monitoring for any areas of intensification and the possible need for a severe thunderstorm warning or a tornado warning. Be weather aware & know your safety plan in case of a warning!



3:14 PM · Dec 28, 2025 · 1,360 Views

Radar Data

- The majority of radar data is transmitted from NWS Offices.
- Apps and websites pull from our feed. Use what works best for your needs!
- It is ideal if you can:
 - Plot your location
 - Plot warnings
 - Animate



Stage 1: Outlook

Review NWS Products and Services.

Have a plan and know where to shelter in the event severe weather strikes. Make sure you have emergency supplies.

Have a Plan!

Stage 2: Watch

Monitor SPC Mesoscale Discussions and Severe Weather Watches, NWS Graphical Forecasts, Radar.

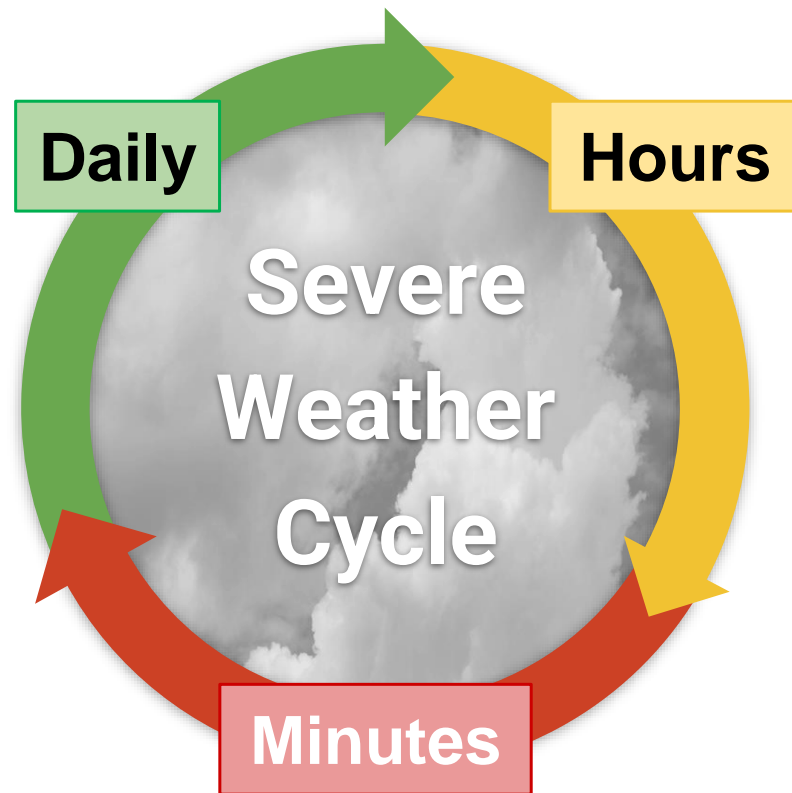
Stay informed and monitor closely for warnings

Be Prepared!

Stage 3: Warning

When a Severe Thunderstorm Warning, Tornado Warning, or Flash Flood Warning is issued for your area, take shelter!

Take action & seek shelter now!



Stage 1: Outlook

Review NWS Products and Services.

Have a plan and know where to shelter in the event severe weather strikes.
Make sure you have emergency supplies.

Have a Plan!

Stage 2: No Watch? Important to Monitor!

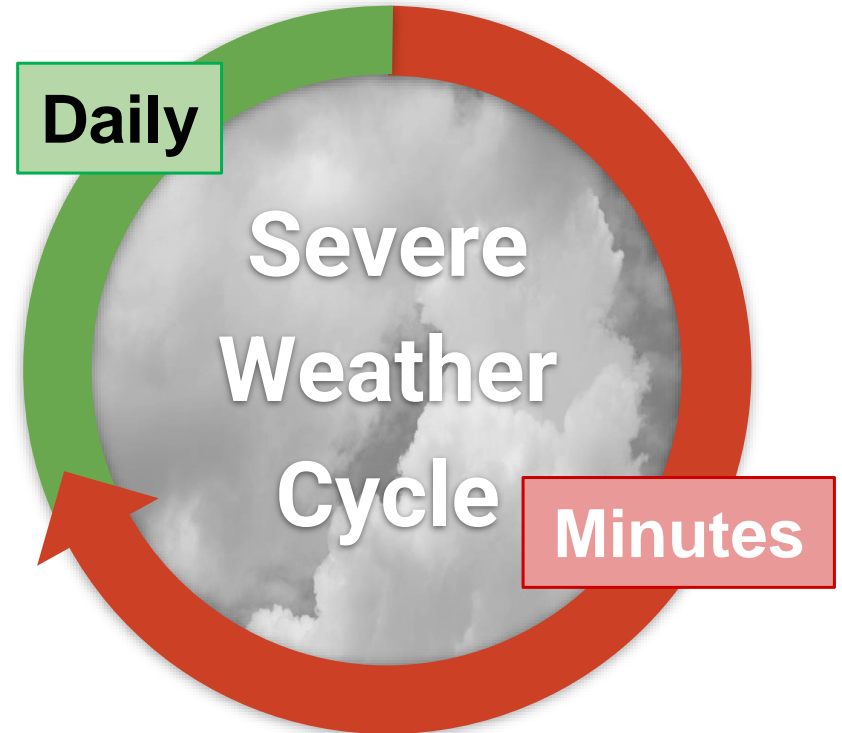
Monitor SPC Mesoscale Discussions, NWS Graphical Forecasts, and Radar.

If there are severe storms or heavy rain in the forecast -- monitor for Warnings and BE PREPARED!

Stage 3: Warning

When a Severe Thunderstorm Warning, Tornado Warning, or Flash Flood Warning is issued for your area, take shelter!

Take action and seek shelter now!



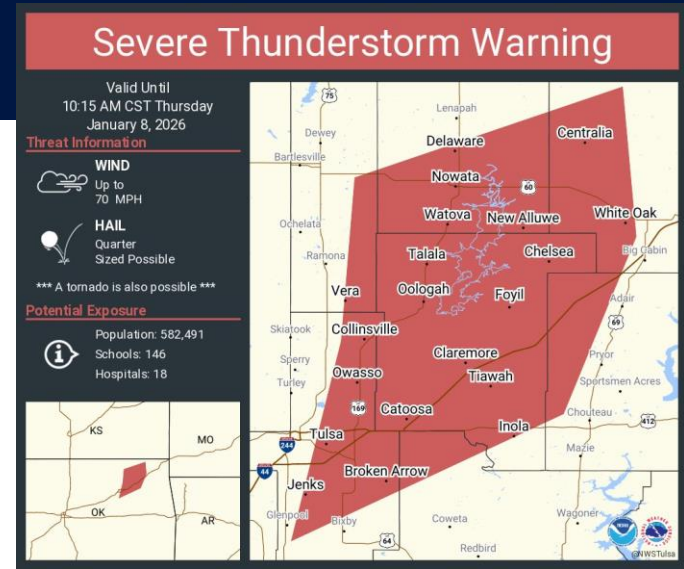
Time To Take ACTION!



When Skies Turn Threatening

Especially if you're outdoors, if you see signs of thunderstorms approaching, you hear thunder, or see lightning, seek shelter!

Don't wait until the storm is on top of you to take action!



When Warnings Are Issued

Plan **BEFORE** severe weather and have multiple ways to receive warnings!

Local NWS Office Websites
Local Media (Radio and TV)
NOAA Weather Radio, Phone Apps

Understand NWS Warnings

Severe Thunderstorm Warning

T-Storm Wind Gusts \geq 58 mph &/or
Hail \geq 1" Diameter (Quarter Size)



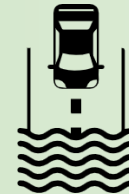
Tornado Warning

Doppler Radar Indicated Rotation
Confirmed Reports of a Tornado



Flood or Flash Flood Warning

6" or more of water over roadways (esp. flowing)
A rapid, life/property threatening rise in water



Ways To Receive Warnings

- Have **multiple ways** to receive warnings.
- Keep Wireless Emergency Alerts turned ON. You never know when getting an urgent weather alert on your phone may save your life!
- This includes having a way to wake you up in the middle of the night!

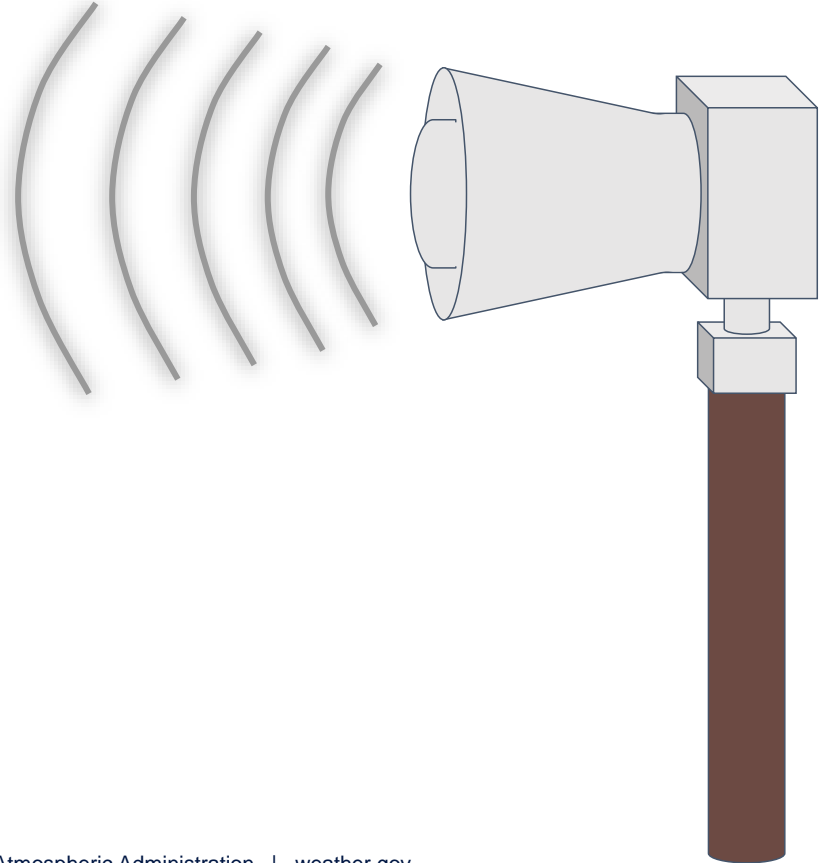
Check with Emergency Management on any local alerting apps or services you can sign up!



Outdoor Warning Sirens

- Meant to alert people who are outdoors of severe weather.
- Not intended to wake you.
- Policies for sounding sirens varies by jurisdiction.
- Check with local communities or county officials for local guidelines.

Do not rely on outdoor warning sirens as your way to get critical severe weather warnings!



More on Wireless Emergency Alerts



WEAs are emergency messages sent by authorized government alerting authorities.

Alerts are sent automatically to WEA-capable phones when storms or flash flooding reach a certain threshold.

It is important to keep these alerts enabled on your cell phone! You never know when it may save your life.



Emergency Alert

National Weather Service: TORNADO WARNING in this area until 6:30 PM CST.

Take shelter now in a basement or an interior room on the lowest floor of a sturdy building. If you are outdoors, in a mobile home, or in a vehicle, move to the closest substantial shelter and protect yourself from flying debris. Check media.

Additional Details

To repeat, a large, extremely dangerous and potentially deadly tornado is on the ground. To protect your life, TAKE COVER NOW! Move to a basement or an interior room on the lowest floor of a sturdy building. Avoid windows. If you are outdoors, in a mobile home, or in a vehicle, move to the closest substantial shelter and protect yourself from flying debris.

Damage Threat Tags

Not every severe storm, tornado, or flash flood is the same. Some situations have an increased potential to bring catastrophic threats to life and property.

How bad is this going to be?



IBWs

Tornado Warnings

Severe Thunderstorm Warnings

Flash Flood Warnings

No Damage
Threat Tag

Weak, short-lived tornado



60 mph wind and/or
1" hail (quarter)

No
WEA

Minor flash flooding

No
WEA

Considerable
Damage Threat Tag

Strong, confirmed tornado



70 mph wind and/or
1.75" hail (golf ball)

No
WEA

More significant flash flooding



Catastrophic/
Destructive
Damage Threat Tag

Strong, confirmed tornado
impacting a populated area



80 mph wind and/or
2.75" hail (baseball)



Devastating flash flooding



Where to look...

All warnings will be accompanied by a text product with information specific to the warning.

- Hazard - What is/might occur?
- Source - Who reported it?
- Impact - Expected extent of damage

Scroll to the bottom of the product:

- Has it been observed?
- What IBW category is it?
- Any additional threat?

NOTE: Red boxes will not appear in the actual text product. Boxes highlight information for presentation purposes.

```
903
WFUS53 KFSD 050022
TORFSD
IAC035-050100-
/O.NEW.KFSD.TO.W.0020.131005T0022Z-131005T0100Z/

BULLETIN - EAS ACTIVATION REQUESTED
TORNADO WARNING
NATIONAL WEATHER SERVICE SIOUX FALLS SD
722 PM CDT FRI OCT 4 2013

...TORNADO EMERGENCY FOR WASHTA...

THE NATIONAL WEATHER SERVICE IN SIOUX FALLS HAS ISSUED A

* TORNADO WARNING FOR...
  CHEROKEE COUNTY IN NORTHWEST IOWA...

* UNTIL 800 PM CDT

* AT 720 PM CDT...A LARGE AND EXTREMELY DANGEROUS TORNADO WAS
  LOCATED NEAR WASHTA...AND MOVING NORTHEAST AT 30 MPH.

THIS IS A TORNADO EMERGENCY FOR WASHTA. TAKE COVER NOW. THIS
IS A PARTICULARLY DANGEROUS SITUATION.

THIS IS A PARTICULARLY DANGEROUS SITUATION.

HAZARD...DAMAGING TORNADO.

SOURCE...EMERGENCY MANAGEMENT CONFIRMED TORNADO.

IMPACT...YOU ARE IN A LIFE THREATENING SITUATION. FLYING
  DEBRIS MAY BE DEADLY TO THOSE CAUGHT WITHOUT SHELTER.
  MOBILE HOMES WILL BE DESTROYED. CONSIDERABLE DAMAGE
  TO HOMES...BUSINESSES AND VEHICLES IS LIKELY AND
  COMPLETE DESTRUCTION IS POSSIBLE.

* THE TORNADO WILL BE NEAR...
  QUIMBY AROUND 730 PM CDT.
  CHEROKEE AROUND 745 PM CDT.
  AURELIA AROUND 750 PM CDT.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

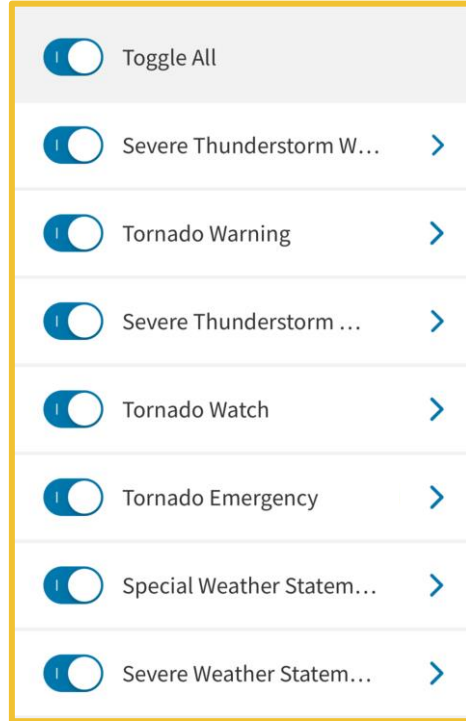
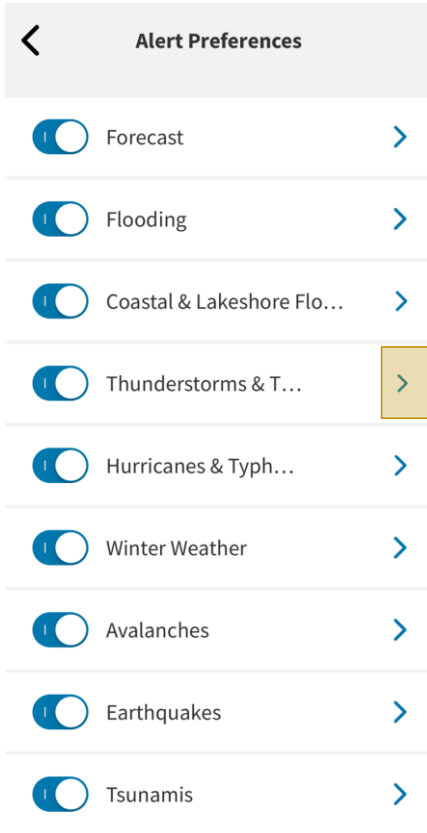
HEAVY RAINFALL MAY HIDE THIS TORNADO. DO NOT WAIT TO SEE OR HEAR
THE TORNADO. TAKE COVER NOW.

&&
LAT...LON 4259 9585 4291 9565 4291 9550 4283 9538
  4269 9539 4256 9569 4256 9577
TIME...MOT...LOC 0023Z 225DEG 27KT 4260 9567

TORNADO...OBSERVED
TORNADO DAMAGE THREAT...CATASTROPHIC
HAIL...1.50IN

$$
```

FEMA Apps

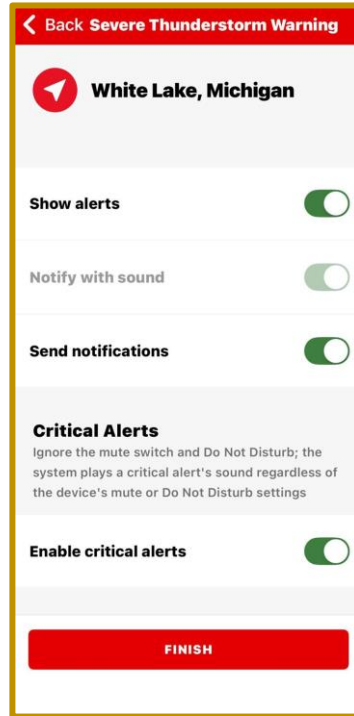
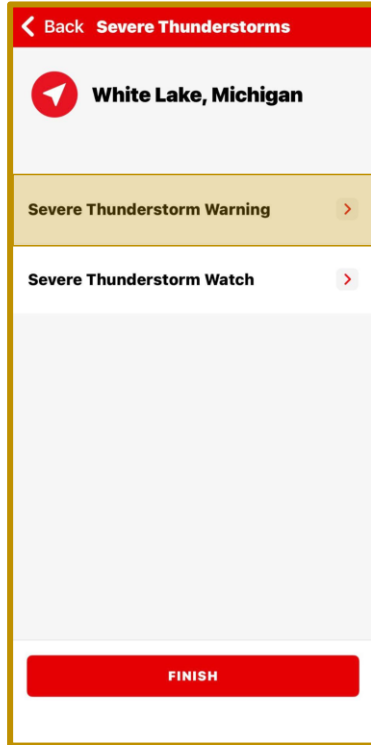
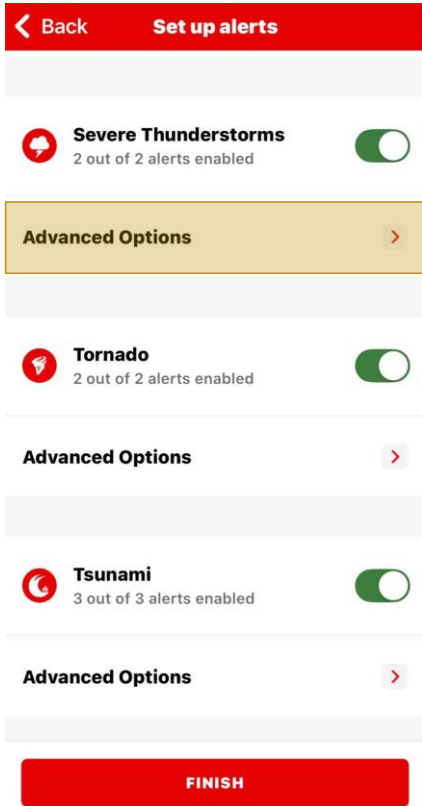


- Get Weather Alerts from the NWS
- Disaster Resources
- Preparedness Tips



FEMA

Red Cross Apps



- Get Weather Alerts from the NWS
- Disaster Resources
- Preparedness Tips

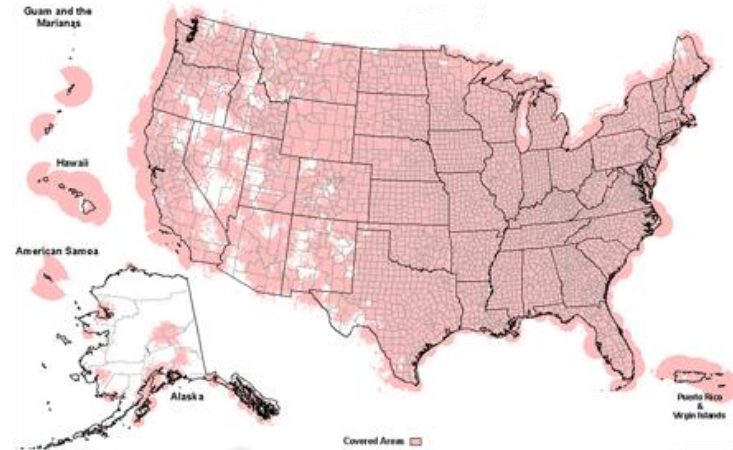


**American
Red Cross**

NOAA Weather Radio (NWR)

- Not only get warnings, but the forecast too!
- Programmable, battery backup for power outages, tone alerts for warnings when on Standby.
- Your NOAA Weather Radio must have enabled alarms and within transmitter reach.
- You can purchase your own NOAA Weather Radio online or at many retailers.

To find your local frequency, visit www.weather.gov/nwr/station_listing



Additional Resources

Broadcast Meteorologists - Break down the forecast before hazardous weather. Some go wall to wall during severe weather outbreaks. Great for very localized messaging!

Live Streams (YouTube) - Also great for localized messaging. Be sure you're following a trusted source.

Smartphone Apps - Different ways to package/present forecast data.

Social Media - Make sure you are following trusted sources!

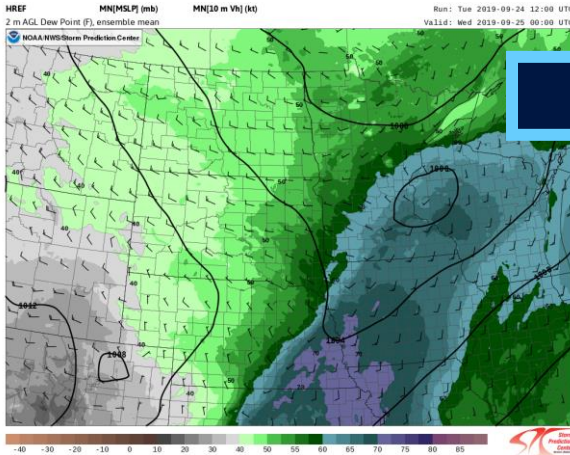
Private Meteorologists/Companies - Can provide tailored information for specific locations.

Main goal:
Stay up to date on how the forecast and storms are evolving!

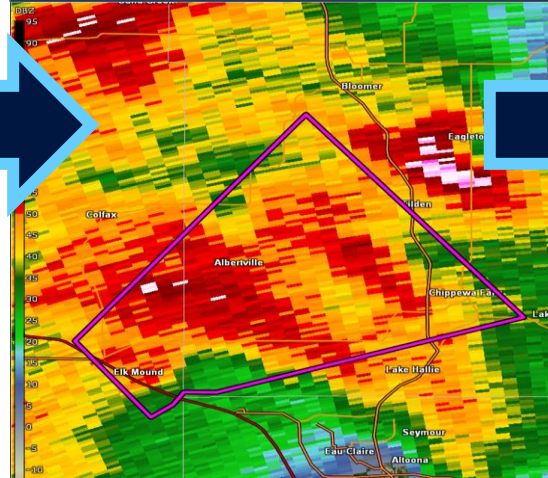
Severe Weather Spotting and Reporting

The Warning Process

Environment



Radar



Reports



Timely, Accurate Warnings

Timely, Accurate Warnings

Initial Tornado Warning 7:45pm

The National Weather Service in The Twin Cities has issued a

* Tornado Warning for...

East central Dunn County in west central Wisconsin...
Southwestern Chippewa County in west central Wisconsin...

* Until 815 PM CDT.

* At 745 PM CDT, a severe thunderstorm capable of producing a tornado was located over Elk Mound, or 10 miles west of Eau Claire, moving northeast at 30 mph.

HAZARD...Tornado and quarter size hail.

SOURCE...Radar indicated rotation.

IMPACT...Flying debris will be dangerous to those caught without shelter. Mobile homes will be damaged or destroyed. Damage to roofs, windows, and vehicles will occur. Tree damage is likely.

Updated Tornado Warning 7:52pm

...A TORNADO WARNING REMAINS IN EFFECT UNTIL 815 PM CDT FOR EAST CENTRAL DUNN AND SOUTHWESTERN CHIPPEWA COUNTIES...

At 752 PM CDT, a confirmed tornado was located near Elk Mound, or 9 miles northwest of Eau Claire, moving northeast at 30 mph.

HAZARD...Damaging tornado and quarter size hail.

SOURCE...Weather spotters confirmed tornado just east of Elk Mound at 750 PM CDT.

IMPACT...Flying debris will be dangerous to those caught without shelter. Mobile homes will be damaged or destroyed. Damage to roofs, windows, and vehicles will occur. Tree damage is likely.

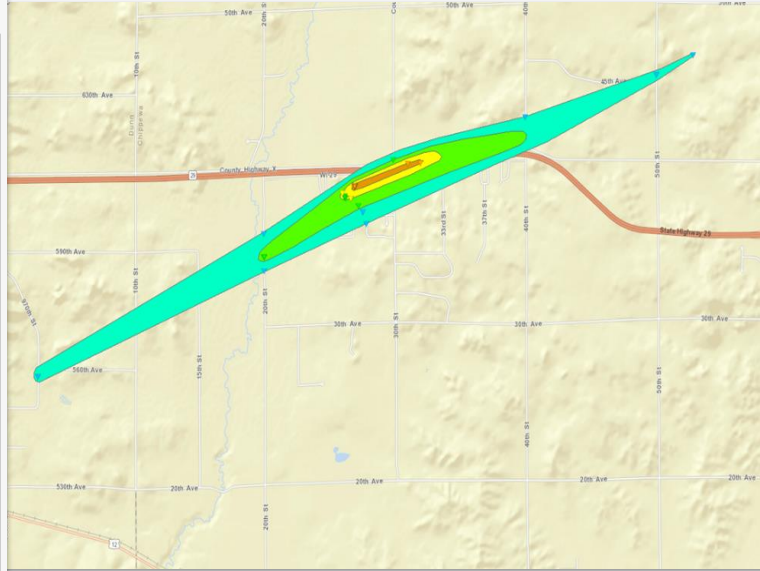
Credibility & Response

Tornado - Elk Mound/Wheaton, WI Dunn, Chippewa Counties

Date	9/24/2019
Time (Local)	7:48-7:58 PM CDT
EF Rating	EF3
Est. Peak Winds	150 MPH
Path Length	5.5 miles
Max Width	1/3 mile
Injuries/Deaths	3/0

Summary:

The most significant damage occurred in Wheaton, WI just east of Elk Mound around the intersection of CR M and WI-29. This area saw entire groves of trees leveled, some stripping of bark, and the destruction of several structures. The destruction of a metal building and two nearby homes were consistent with expected damage from winds of EF3 in strength.

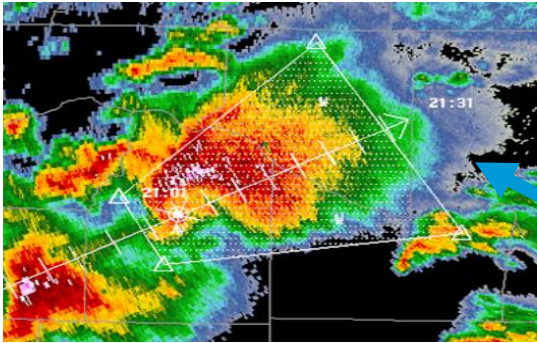


Not only are you helping the warning process, but your reports may convince someone to TAKE ACTION!

The Spotter

The spotter needs to...

- Recognize features associated with severe weather
- Report severe weather in **real time, if you can do so safely!**



What do we want to know about?



Tornadoes

- Any tornado
- Funnel clouds
- Rotating wall cloud
- Waterspouts
- Landspouts



Hail

- Any hail
- Diameter (largest) of hail



Wind

- Measured wind speed, if possible
- Estimated wind speed, if possible



Flooding

- Washed out roads
- The behavior of the water
- Any known impacts
- Rain amounts & duration

Report damage that occurs with any of these events, if you can do so SAFELY.

Is there anything you should *not* report?



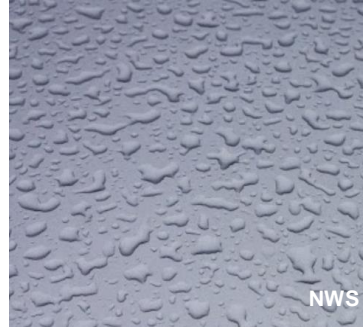
Lightning

- All thunderstorms produce lightnings, regardless of severity.



Shelf Clouds

- Not always an indicator of severe weather, often accompanied by sub-severe wind



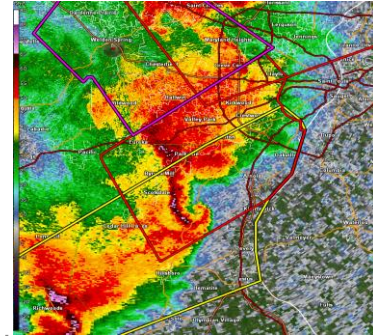
Light Rain

- Light rain is common and is not severe

I'm not home to verify, but I heard from a neighbor....

Secondhand Reports

- Only tell us what you know or can verify
- **Few exceptions***
 - 911 Dispatch
 - Amateur Radio



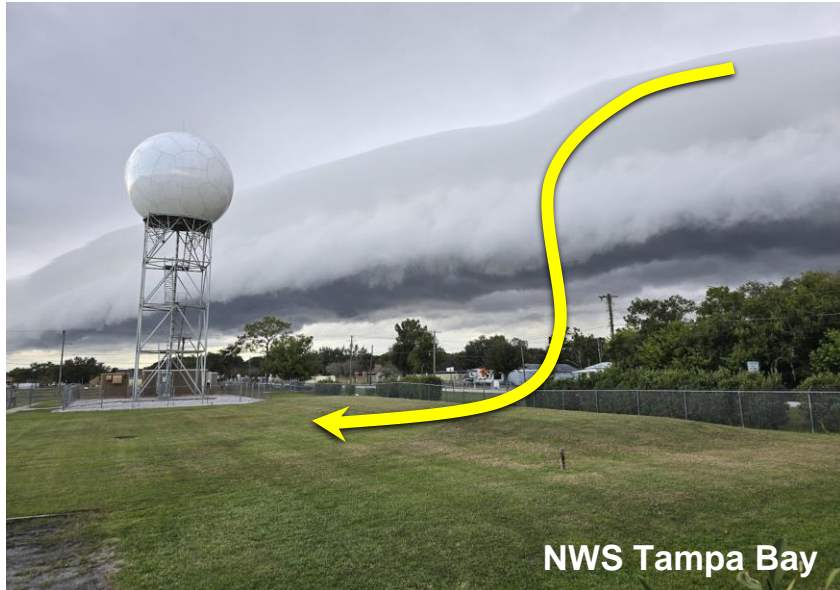
Radar Info

- **If you see it on radar, we do, too**

Shelf Cloud and Wall Cloud

Shelf Cloud

- Wind flows **OUT** of the storm
- Moves away from storm
- Often detached from storms
- Slopes down and away from rain



Wall Cloud

- Wind flows **INTO** the storm
- Attached to the storm
- Moves with the storm
- Slopes down and toward rain



Reporting Wall Clouds

What to look for

- Near the region of the updraft
- Lowering of the cloud base

What to watch for

- Is the feature persistent?
- Is it rotating?

Wall clouds do not always result in a tornado (or funnel cloud)

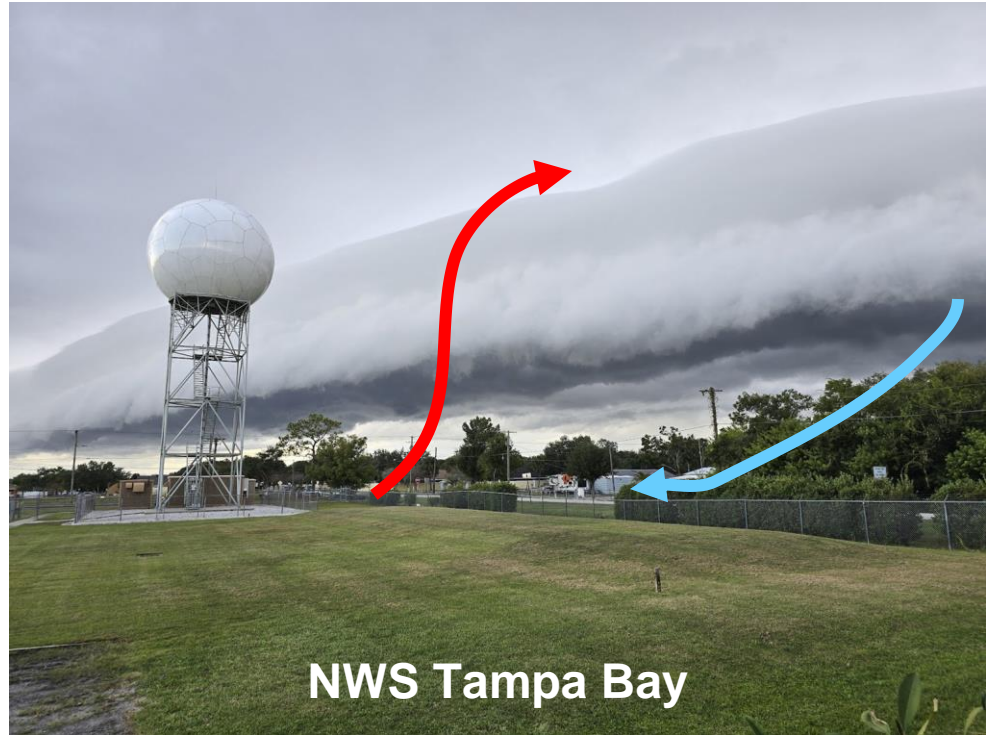


Report wall clouds and keep us posted on any changes!

Shelf Clouds

- Span the entire horizon
- Can exhibit horizontal rotation, appearing as if it's rolling towards you
- Typically a sign that wind are about to pick up, but do not provide a good indication of how strong winds will be.

No need to Report



Reporting Tornadoes

Three Questions To Ask...

1. Is the feature rotating about vertical axis?
2. Is the rotation connected to the cloud base?
3. Can you see dust or debris on the ground?

Yes

Yes

Yes

What to watch for...

- Upward motion
- Persistent rotation
- Smooth structure

Report it to the NWS!



Reporting Funnel Clouds

Three Questions To Ask...

1. Is the feature rotating about vertical axis?
2. Is the rotation connected to the cloud base?
3. Can you see dust or debris on the ground?

Yes

Yes

No

What to watch for...

- Upward motion
- Persistent rotation
- Smooth structure

Report it to the NWS!



Leia Otterstatter (NOAA/CIWRO)

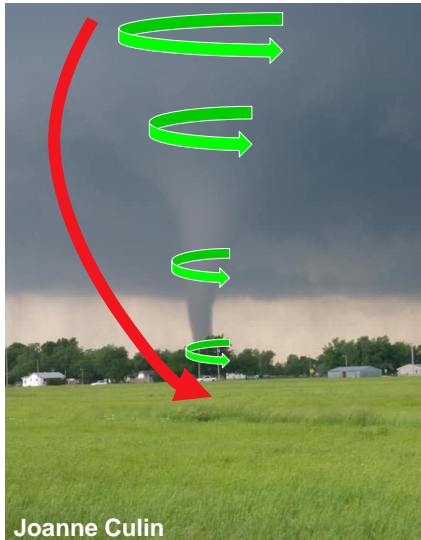
Tornado vs Landspout

Tornado

Form on severe weather days

Rotating updraft, rotation **builds down** to the surface

Often stronger,
more
destructive



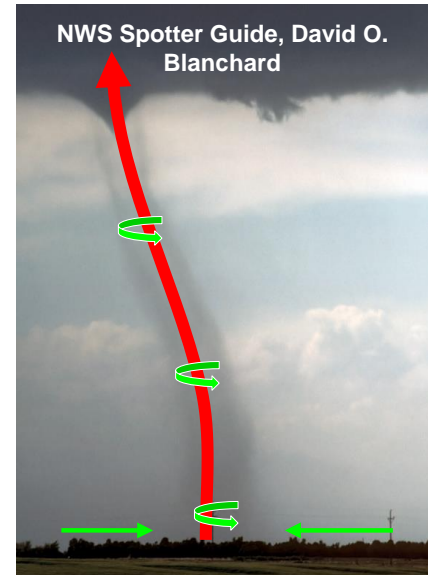
Landspout

Often form on “fair weather” days

Ground level rotation grows **vertically** towards cloud base

Not as strong,
often less
destructive

Difficult to detect
on radar



Nighttime or Rain Wrapped Tornadoes

**EXTREMELY
DANGEROUS!**

**USE EXTREME CAUTION
WHEN REPORTING AND
BE READY TO SEEK
SHELTER IMMEDIATELY.**

**YOU ARE RELYING
MOSTLY ON LIGHTNING
AND POWER FLASHES.**



Other Circulations NOT Considered Tornadoes

GUSTNADES

Gustnadoes, whirls of dust or debris at or near the ground with no condensation funnel, which form along the gust front of a storm.



DUST DEVILS

A well-developed dust whirl; usually of short duration, rendered visible by dust, sand, and debris picked up from the ground. Dust devils are best developed on a hot, calm afternoon with clear skies, when intense surface heating causes large temperature differences in the lowest couple hundred feet of the atmosphere.



FIRE WHIRLS

Much like dust devils, the extreme heat of fires create strong updrafts, near the ground that interact with circulations in the lower atmosphere. Fire whirls are usually about 1 to 3 feet wide and 50 to 100 feet tall.



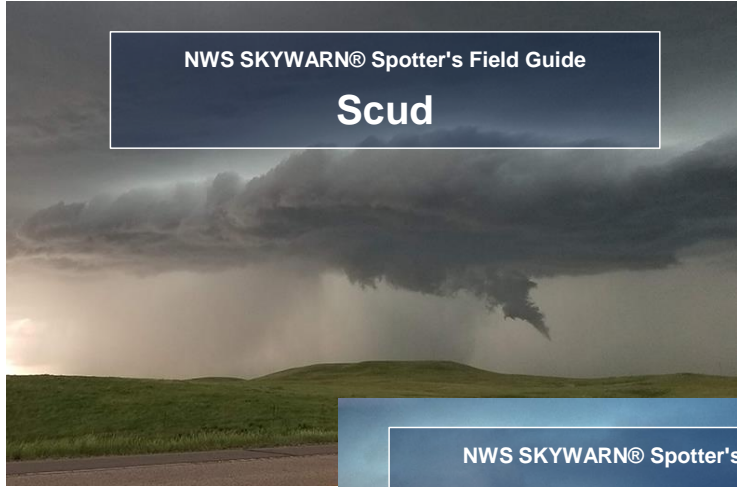
A gustnado is a circulation that *can* form at the surface along the leading edge of thunderstorm outflows.

These circulations are **NOT** attached to the cloud base but can be associated with damaging straight-line winds.

Tornado or Funnel Cloud Imposters!

NWS SKYWARN® Spotter's Field Guide

Scud



NWS SKYWARN® Spotter's Field Guide

Tail Cloud



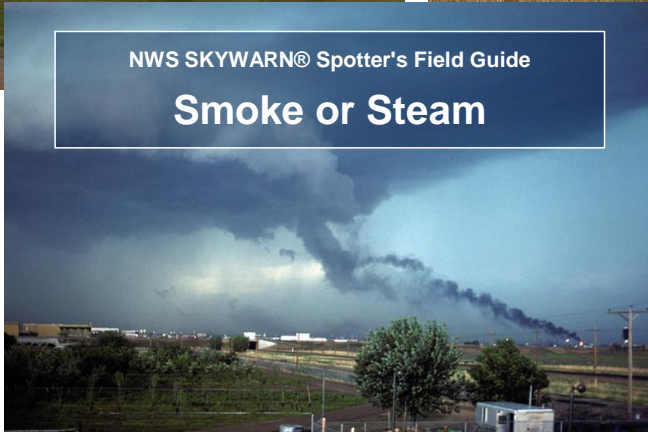
NOAA Weather in Focus Photo Contest
2015 | Jeff Stillman

Rain Shaft



NWS SKYWARN® Spotter's Field Guide

Smoke or Steam



NWS SKYWARN®
Spotter's Field Guide

**Cloud
Formations**



Reporting Wind

- Thunderstorm winds are the most common severe weather hazard, but also the most difficult to estimate.
 - If you have an wind sensor, let us know what wind gusts you measure!
 - If you do not have a wind sensor and you have wind damage, report what you see!
- Prioritize your **SAFETY**. Only report if you can do so safely.
- Damaging winds can be sporadic (a downburst) to widespread (squall line or derecho).



The Downburst

Strong, often damaging winds produced by air rapidly descending in a thunderstorm.

**Can lead to
tornado-like
damage!**

Microburst, a downburst impacts an area of less than 2.5 miles or less

Macroburst, a downburst impacts 2.5 miles or more.

Wet Microburst



Visually see the descending precipitation core

May see the descending core and a “rain foot” at the surface

Dry Microburst



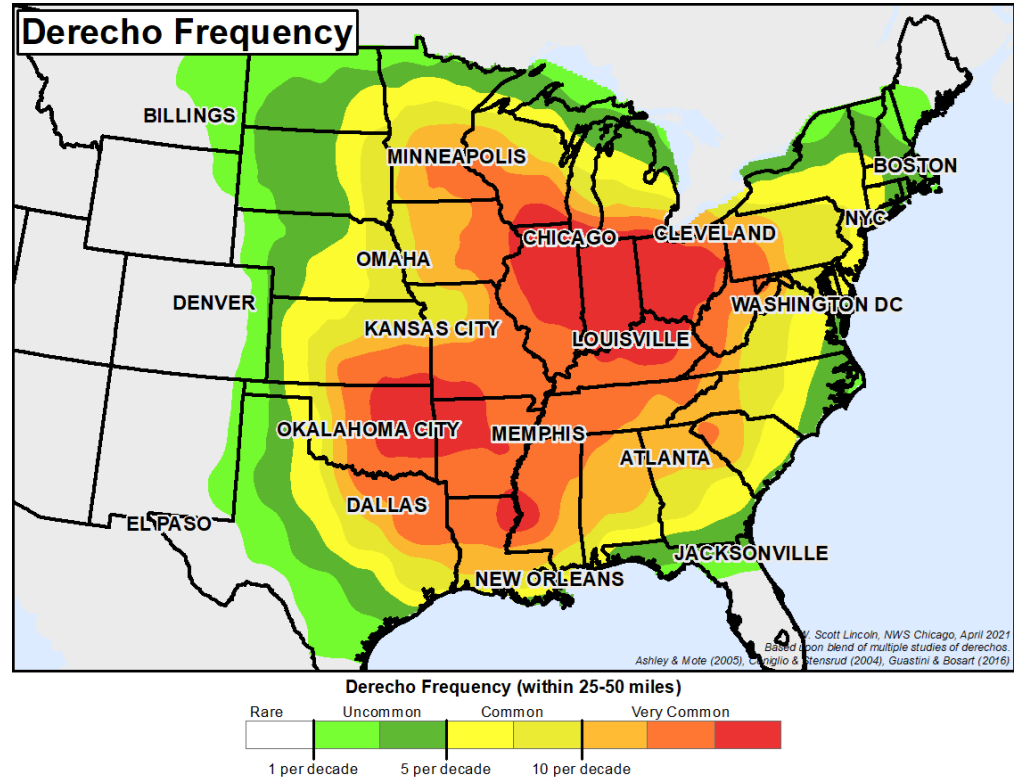
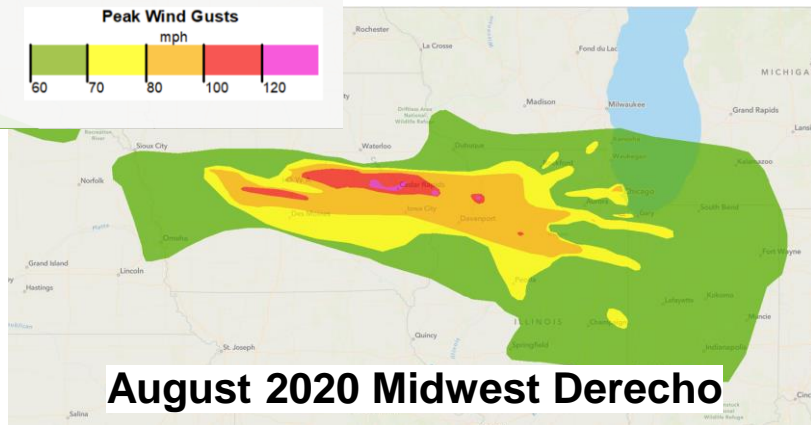
Dry air below evaporates precipitation, **likely only to see virga**

Widespread Damaging Winds

Widespread, straight-line damaging winds are produced by a complex or line of thunderstorms.

In pockets of extremely strong winds, damage can appear tornado-like!

A **Derecho** is a nearly continuous damage path of wind damage, over a swath at least ~400 mi long and ~60 mi wide.



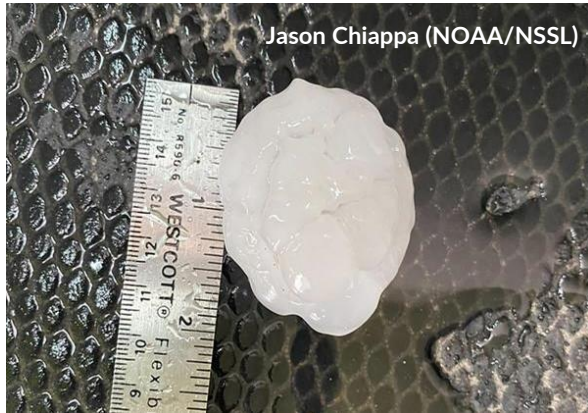
Straightline Damaging Winds Vs Tornado



Not everything is a tornado!

Straight-line damaging winds can produce more damage than weak tornadoes.

Reporting Hail Size



Measuring Hailstones

- Pick the largest hail stone
- Measure with a ruler
- Report
 - Size
 - Damage
 - Time/Duration, if possible



Estimating Hail Size

- Use objects with official sizes
- Compare the largest hail stone to an object of similar size
- Slightly larger or smaller? Tell us!
- **Never compare to marbles**

Reporting Hail Damage

- Depending on the size, hail can cause significant amounts of damage, especially when paired with strong thunderstorm winds.
- Wind-blown hail can rip siding off a home.
- **When reporting hail damage, tell us what you see.**
- **If you can safely get a picture of the damage, that is very helpful as well.**



NWS Lubbock

Reporting Flooding

- Rainfall measurements
 - Amount and duration
 - Collaborate what's on radar
- **Closed/washed out roadways**
 - **Do not go searching for them!**
- Behavior of the water
 - Standing water
 - Flowing or rushing water
 - Approximate depth
- Impacts
 - Stranded vehicles
 - Underpasses or ditches filling up
 - Ongoing water rescues



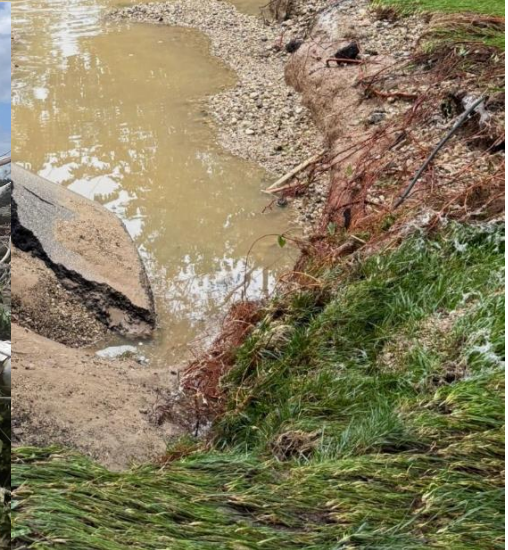
Example: Numerous vehicles and high water rushing through Ellicott City, MD.

Reporting Damage

Safety first, only report storm or flood damage if you can do so SAFELY.

Simply report what you are seeing.
Photos can help!

Example: The forest of pine trees behind my home is completely gone. Hundreds of healthy pine trees have been snapped at the base or middle of the tree.



Tree Damage - Communicate What You See

- Is the tree living?
 - Dead vegetation is weaker
- Is damage isolated?
 - Isolated damage can occur in marginally severe episodes
- Does the tree have leaves?
 - Leaves behave like an umbrella and catches more wind
- How does the soil look?
 - Saturated soils and weak root structures can lead to downed trees in certain circumstances
- Tree type (Hardwood / Softwood)



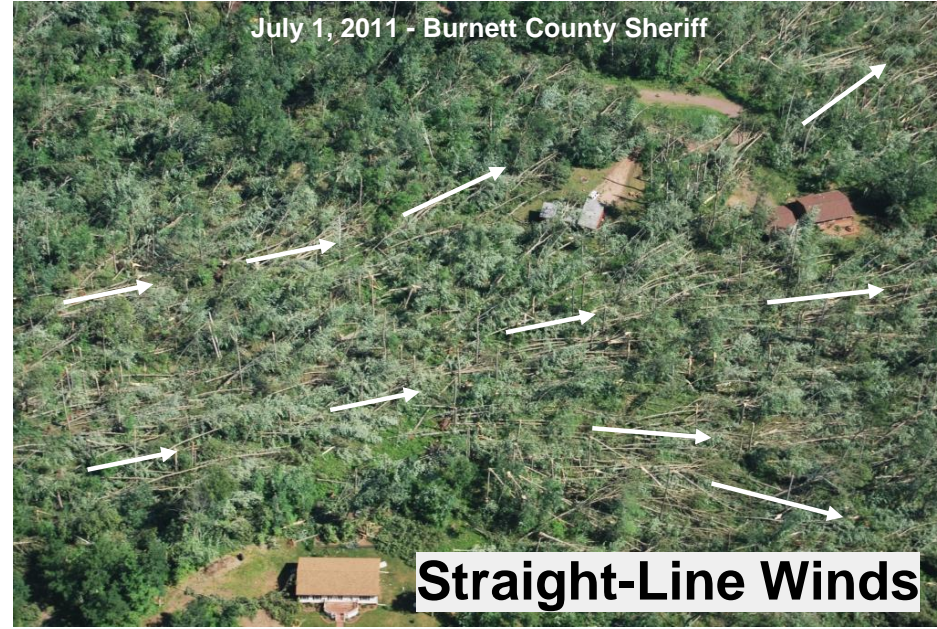
Post-Event Data Collection & Analysis

Oct 20, 2021 - Clearwater Lake/Cook County, MN (Photo: USFS)



Tornado

July 1, 2011 - Burnett County Sheriff



Straight-Line Winds

Take damaging thunderstorm winds as seriously as a tornado - **some of our fiercest thunderstorms do worse damage than most tornadoes!**

Tornado Rating - Enhanced Fujita (EF) Scale

EF0	EF1	EF2	EF3	EF4	EF5
68-85 MPH	86-110 MPH	111-135 MPH	136-165 MPH	166-200 MPH	200+ MPH
Weak Minor to Moderate Damage		Strong Considerable to Severe Damage		Violent Devastating Damage	
					
					

NWS St Louis

Sometimes, EF0/EF1 damage looks similar to straight-line winds.
Always report any damage you see!

How To Report to the NWS?

WHO

you are.

WHAT

you are reporting.

WHEN

did the event occur?

WHERE

did the event occur?

If the time and location of your report are miscommunicated, it won't match up with radar. This may lead us to discount your report!

How To Report to the NWS?

WHO

Hi, I'm a trained weather spotter.

WHAT

We just had damaging winds come through. There are two tree limbs about 12" in diameter down on my street.

WHEN

The damaging winds happened at about 3:30 PM, 5 minutes ago.

WHERE

I'm located near the intersection of US-15 and Route 7 in Leesburg, VA.

Reporting Criteria

- Tornado or Funnel
- Hail – Pea sized or larger
- Rotation within a storm
- Wind – 50 MPH or greater (sustained/gust and measured/estimated)
- Damage – Any weather related damage to trees or property. Give as many details as possible (t-storms or high winds).



Reporting Criteria

- Heavy Rain – Measured 1” or More
- Flooding – Streams, creeks or rivers out of banks of flooding of roads from poor drainage (including coastal flooding)



- Ice Accumulation – Any glaze on surfaces
- Snow Accumulation – Every 1” or any accumulation not reflected in the forecast , and final total

Setting Up for Snow Reports



Ideally, a snowboard is the best measuring surface.

- Can be as simple as a 2 ft square piece of plywood painted white
- May want to place flags/markers near the board to help locate during snowy weather
- You can measure snow on a table if you don't have a board

Snowfall/Ice Reporting & Measurement

- Measure with a ruler
- Ice Accumulation
 - Report Thickness
 - What kind of surface its on
- Snowfall Measurements
 - First two inches & every two inches
 - Total Snowfall
 - Is it measured or estimated?
 - If drifting becomes a problem, take several measurements and average them.



Snowfall/Ice Reporting & Measurement

Frequency of Measurements

- Every two to three hours is adequate
- Clean off your snowboard every six hours – cleaning more often can lead to inaccurate measurements

Please report your STORM TOTAL snowfall to the nearest tenth of an inch throughout the event through:

- Internet google form
- Email or Phone if you don't have easy internet access



Snow/Ice Reporting/Heavy Rainfall



Fill out Snow/Ice Report
Form

<http://ht.ly/gVpw305Nchl>

Reports automatically get
submitted into our database

Submit a Rainfall, Snow and/or Ice Report

* Required

  **National Weather Service
Baltimore/Washington**

Skywarn ID *
Enter your 5 or 6 character Skywarn Spotter ID (e.g., AB123 or ABC123). NO SPACE OR DASH. If your measurement was NOT taken at the location on file with us, you don't know your Spotter ID, or are have difficulty using this form, please email LWX-report@noaa.gov

Your answer _____

Observation Date and Time *
Eastern time (***) MAKE SURE TO SELECT AM or PM (***)

Date
mm/dd/yyyy
Time
: AM

Snow (and/or Sleet) Amount
To the tenth of an inch, (ex. 2.5). Enter 0 for trace (less than measurable). Leave blank for none.

Your answer _____

Freezing Rain/Glaze Amount
To the hundredth of an inch (ex. 0.25). Enter 0 for trace (less than measurable). Leave blank for

Weather Safety & Preparedness

Your Safety Is Important!



PLAN

Plan for different scenarios.
Know how you will receive
warnings.

PRACTICE!



PREPARE

Have more than one way to
receive weather and warning
information!

STAY INFORMED!



ACT

Have multiple ways to
receiving warnings.

**DON'T HESITATE
TAKE ACTION!**

Tornado Safety At Home

Know where to go!

- Basement or lowest level.
- Put as many walls between you and the outside as possible - avoid windows!
- Get under a sturdy object.
- Cover yourself with blankets, pillows and/or items that will provide a cushioned barrier between you and flying objects.



Tornado Safety - Good and Bad Options

Tornado Sheltering Guidelines

Seek the best available refuge area **immediately** when a Tornado Warning is issued.
Your chance of surviving a tornado is excellent if you follow these guidelines.

WORST OPTIONS

Mobile homes
Vehicles
Underneath a highway overpass

BAD OPTIONS

Large open rooms like gymnasiums
Manufactured housing

GOOD OPTIONS

Interior room of a well-constructed home or building
Basement

BEST OPTIONS

Above or below ground Tornado Storm Shelter (NNSA/ICC 500 compliant)*
Specifically-designed FEMA Safe Room*

Find another option



Stay in place until all clear

PHOTO: U.S. Air Force - Tech. Sgt. Bradley C. Church

*Recommended by FEMA



Places that are NOT safe
(*FIND ANOTHER OPTION*):

- ❌ Under a tree
- ❌ RVs/Campers
- ❌ Vehicles
- ❌ Camping tents
- ❌ Underneath a highway overpass
- ❌ Large open rooms
- ❌ Mobile homes, manufactured housing

Mobile Home Safety

- Mobile homes are **NOT SAFE** during a tornado or significant straight-line damaging winds!
- Seek alternate shelter and know where you will go ahead of time.
- When severe weather is expected, be ready to leave very quickly.



Tornado Safety - Driving

During a tornado, seeking refuge in a vehicle or under an overpass is **NOT** safe.

If you are outside during a tornado warning, the best option is to drive to a designated shelter, basement, or safe room.



Lightning Safety

If you can hear thunder or see lightning, you are at risk for being struck by lightning!

Take action immediately!



When Thunder Roars, Go Indoors!



STOP all activities.

Seek shelter in a substantial building or hard-topped vehicle.

Wait 30 minutes after the storm to resume activities.

www.lightningsafety.noaa.gov



Lightning

Do's and Don'ts

Do

Go Inside When You Hear Thunder or See Lightning!

Find a Sturdy House, Building, Car With A Hard-Top Roof

Stay Indoors For at Least 30 Minutes After You Last Hear Thunder



Don't

Retreat to Dugouts, Sheds, Pavilions, Picnic Shelters or Other Small Structures

Use or Touch Electronics, Outlets, or Corded Phones

Go Under or Near Tall Trees, Swim or Be Near Water, Be Near Metal Objects or Windows



weather.gov/lightning

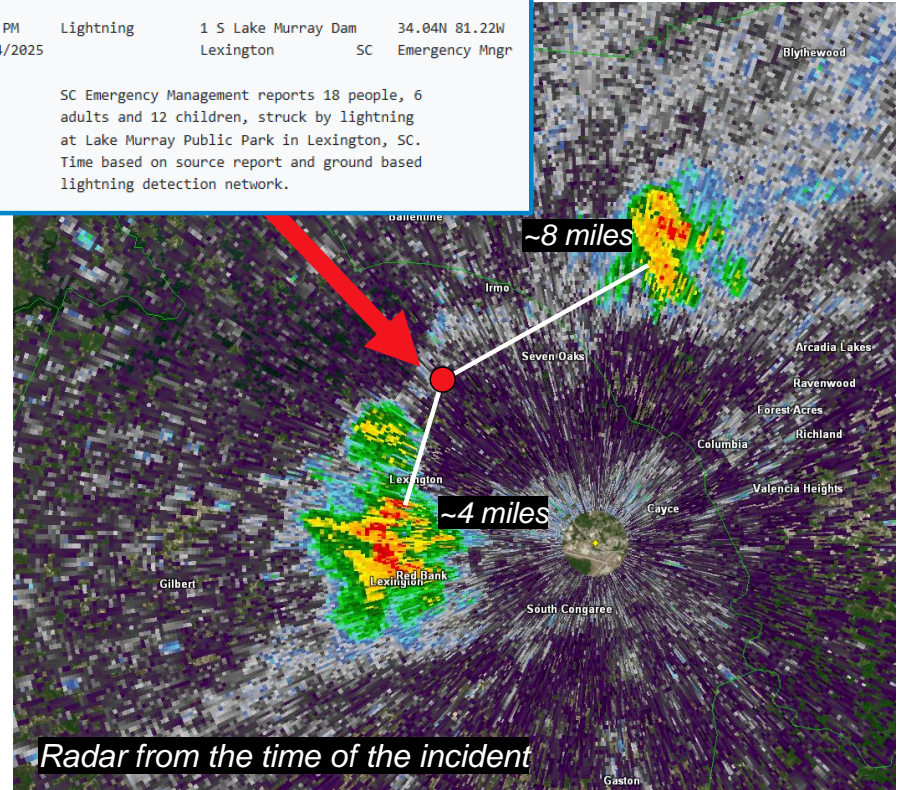
Lightning Safety

- If the sky looks threatening, find shelter!
- Lightning can strike 20+ miles away from a thunderstorm
- Wait 30 minutes after the last clap of thunder

Preliminary Local Storm Report
National Weather Service Columbia SC
608 PM EDT Tue Jun 24 2025

..TIME...	...EVENT...	...CITY LOCATION...	...LAT..LON...
..DATE...	...MAG....	...COUNTY LOCATION..ST..	...SOURCE....
..REMARKS..			
0443 PM	Lightning	1 S Lake Murray Dam	34.04N 81.22W
06/24/2025		Lexington SC	Emergency Mngr

SC Emergency Management reports 18 people, 6 adults and 12 children, struck by lightning at Lake Murray Public Park in Lexington, SC. Time based on source report and ground based lightning detection network.



No place outdoors is safe when thunderstorms are in the area!



Bad Shelters

Tents
Porches
Picnic Shelters
Soft-topped Campers
Open Garages



OK Shelter

Vehicle—metal top, windows up

Don't touch metal or lean on doors



Best Shelter

Sturdy building — has plumbing and electricity

Don't touch anything plugged into outlets or plumbing



Outdoor Recreational Safety

Boating? Hiking? Camping? Outdoor Event?

- Know **BEFORE** you go and stay weather aware. If skies start to darken, do not wait! Seek shelter!
- Have a portable weather radio or an AM/FM radio to receive weather information and warnings, especially if you are out of cell phone coverage!
- Always know where safe shelter is and how long it will take you to get there!

*Your chance of being struck by lightning **greatly increases** when remaining outdoors during a thunderstorm.*

Lightning can strike from up to 10 miles away.

When Thunder Roars, Go Indoors!

See a Flash, Dash Inside!

Some of the activities people were doing when they were recently struck by lightning include:



The infographic features a dark background with a lightning bolt on the right side. It lists nine activities with corresponding icons: Golfing (golfer), Boating (sailboat), Running (runner), Grilling (grill), Walking (walker), Construction (worker), Riding (cyclist), Gardening (garden fork), and Swimming (swimmer). The NOAA logo and weather.gov are at the bottom left.

NOAA weather.gov

Your closest safe shelter may require you to track towards a storm moving your way. This may lead to less time for you to reach shelter, build that extra time into your plan!

Flash Flood Safety

- **Turn Around, Don't Drown**
 - 12" of water can float a car
 - 18" of water can float a truck or SUV
- Flooding is difficult to see at night
 - Many flood fatalities happen at night
 - Can conceal compromised roads underneath
- Do not let pets or children play in flood water, which could be contaminated.
- If camping, move away from streams, creeks, or rivers and seek higher ground!



Severe Wind Safety

GET INSIDE AND AVOID WINDOWS!

- Assess your risk! Do you live near tall trees that are more vulnerable to strong winds?
- Are you in a structure that is more vulnerable to the wind?



Hail Safety

GET INSIDE AND AVOID WINDOWS!

- Hail can fall at speeds of over 100 mph!
- Stay away from windows.
- Wind-driven hail is especially dangerous and destructive.

