NOAA / National Weather Service

Weather Spotter Training

Outline

- **National Weather Service Overview**
- **Why are Storm Spotter Important**
- **Weather Hazards and Safety**
- **Severe Weather Reporting Procedure**
- **Outlooks/Watches/Warnings**
- **Monitoring Severe Weather**

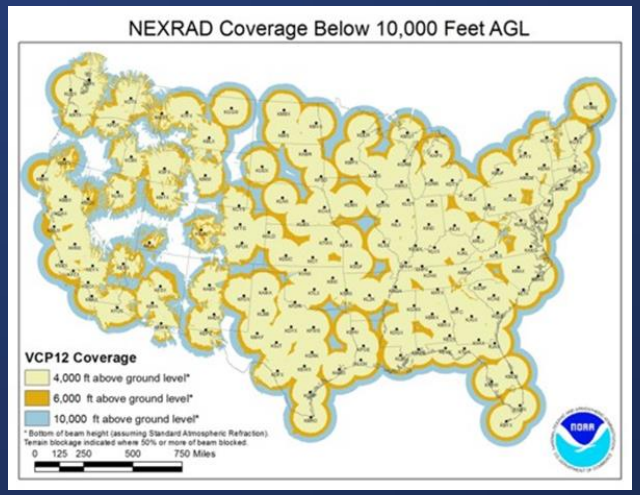
National Weather Service Overview

- **Mission: Protection of Life and Property and enhancement of the national economy.**

- **Service: We are always here!**
  - **Staffed 24 hours/day, 365 days/year**
  - **Forecasters work rotating shifts**

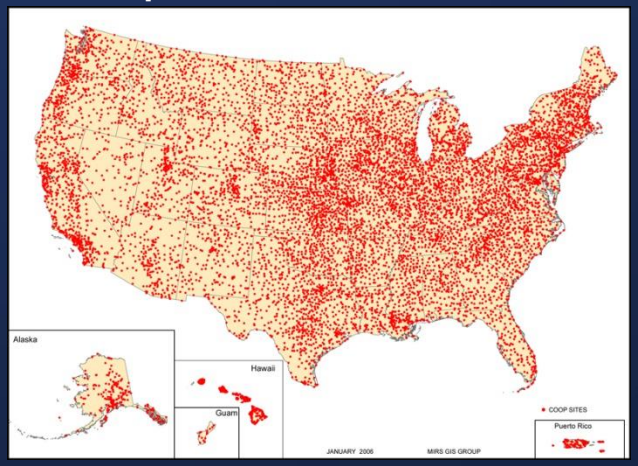
National Weather Service Overview

Doppler Radars

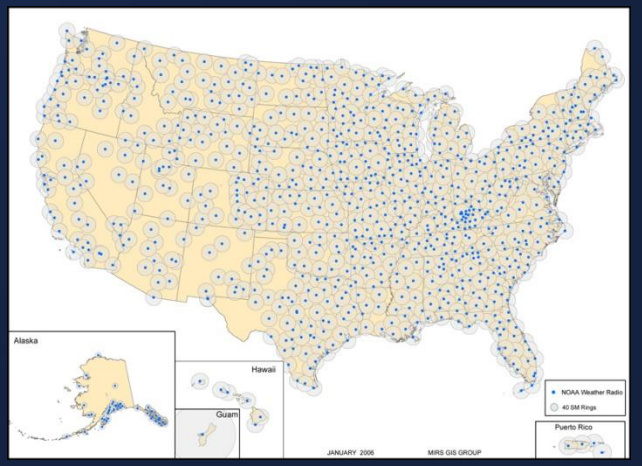


Automated Surface Observing Sites

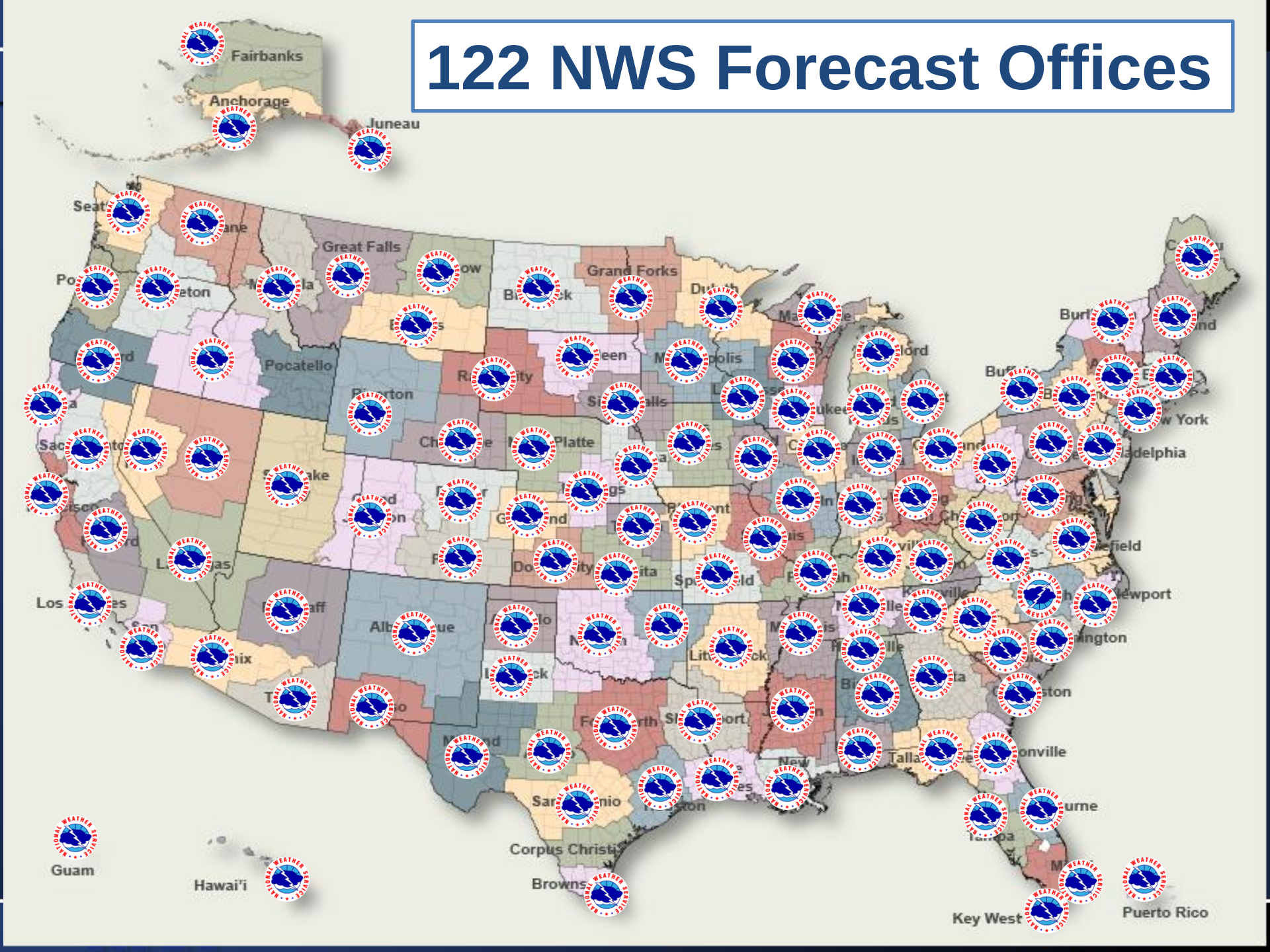
Cooperative Observer Sites



NOAA Weather Radio Transmitters



122 NWS Forecast Offices

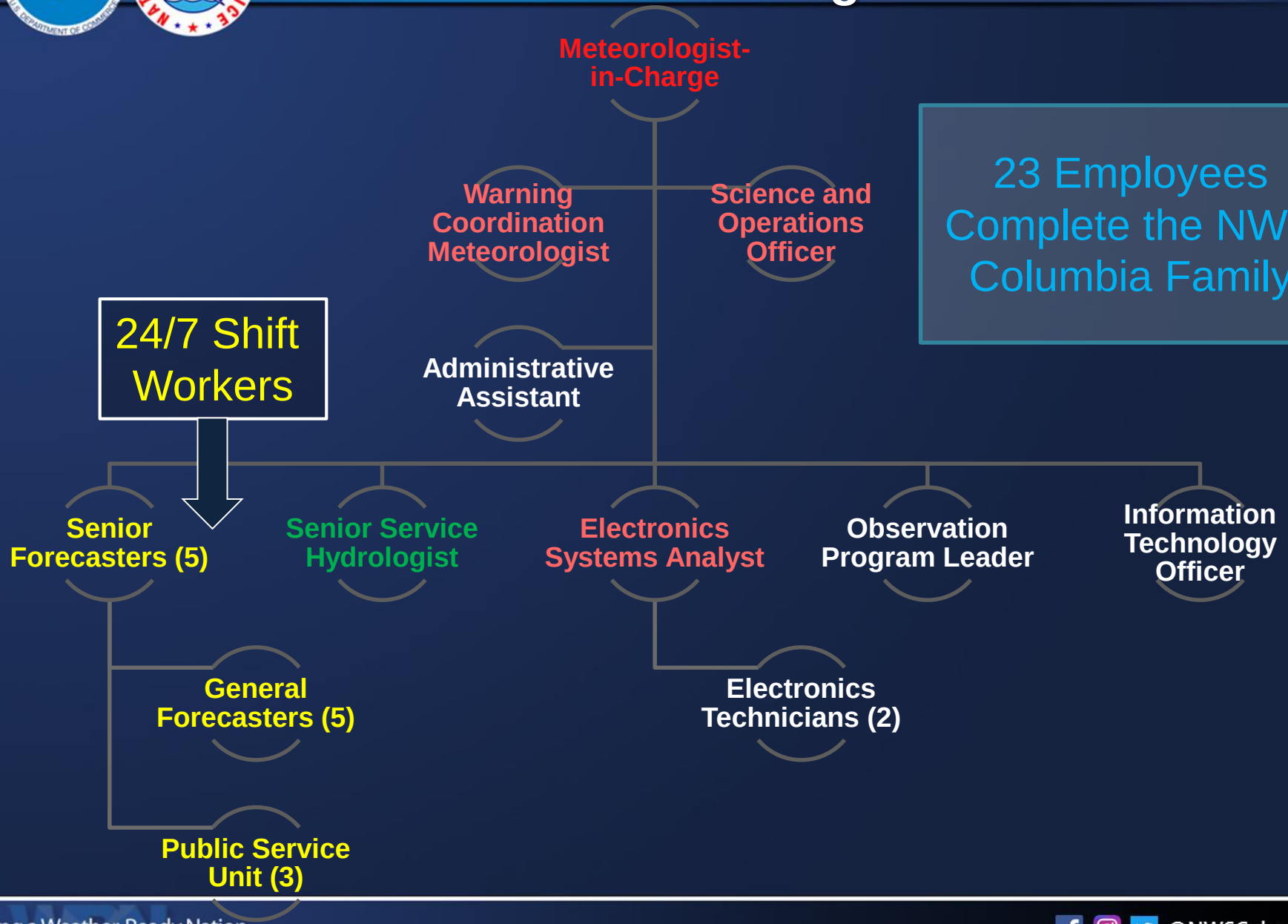


NWS Columbia Area of Responsibility

Population (2018 est.):
1,873,103

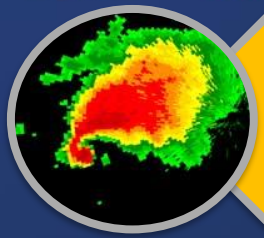
23 Counties
(18 in SC, 5 in GA)

NWS Columbia Staffing

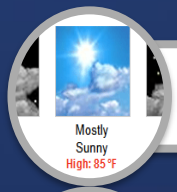


23 Employees Complete the NWS Columbia Family

NWS Columbia Responsibilities



Highest Priority:
Severe Weather Watches, Warnings, & Advisories



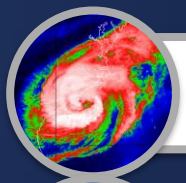
7 Day Public Forecasts

Aviation Forecasts

Fire Weather Forecasts

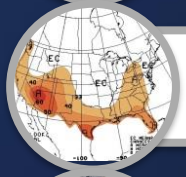
River Flood Warnings

Lake Forecasts



Tropical Support

Collect Weather Data



Climate Reports

Decision Support Services

Education/Outreach & Preparedness

Collaboration w/ Federal, State, Media, etc.

Local Research, Attend Scientific Conferences

Outline

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- Weather Hazards and Safety
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- Outlooks/Watches/Warnings
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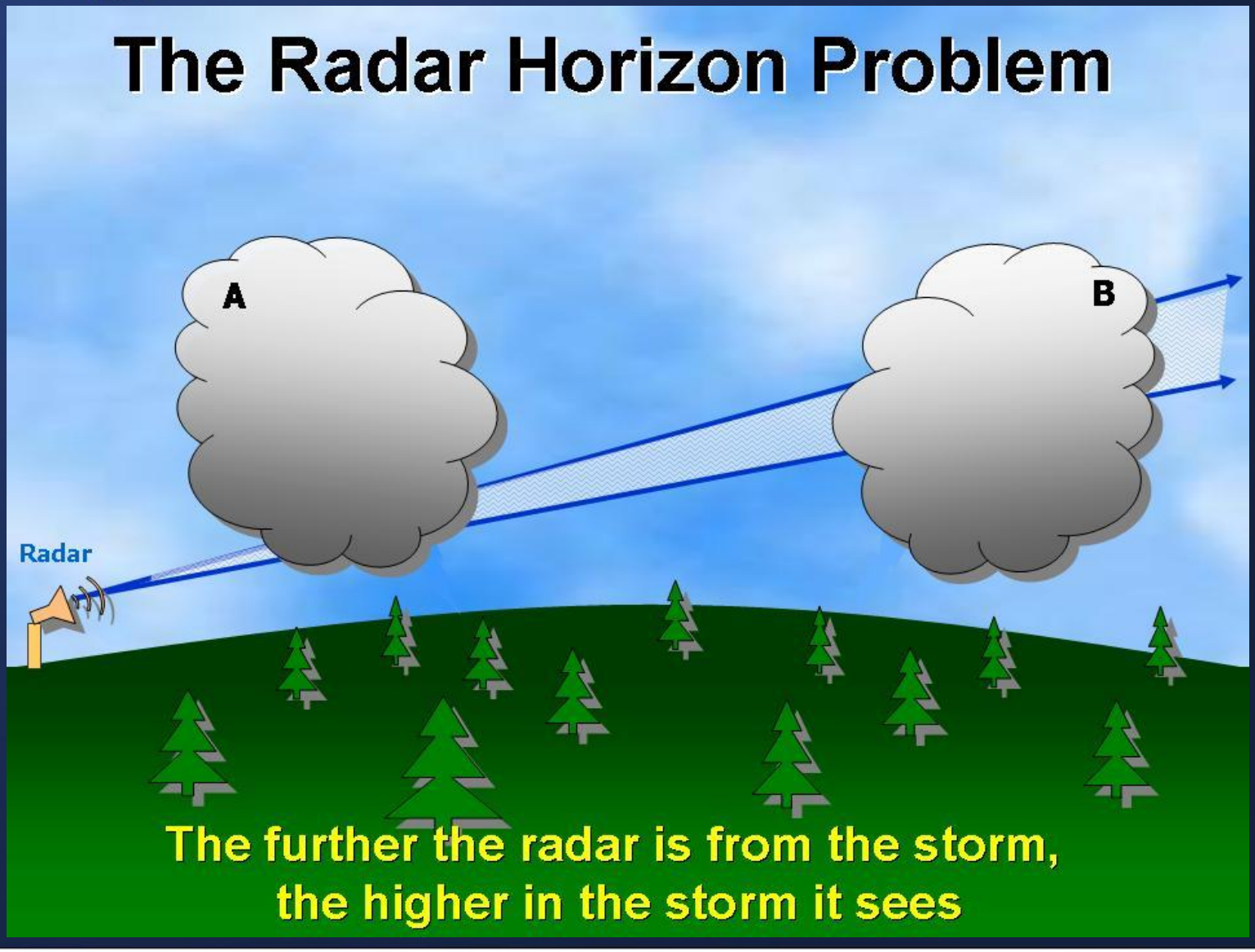
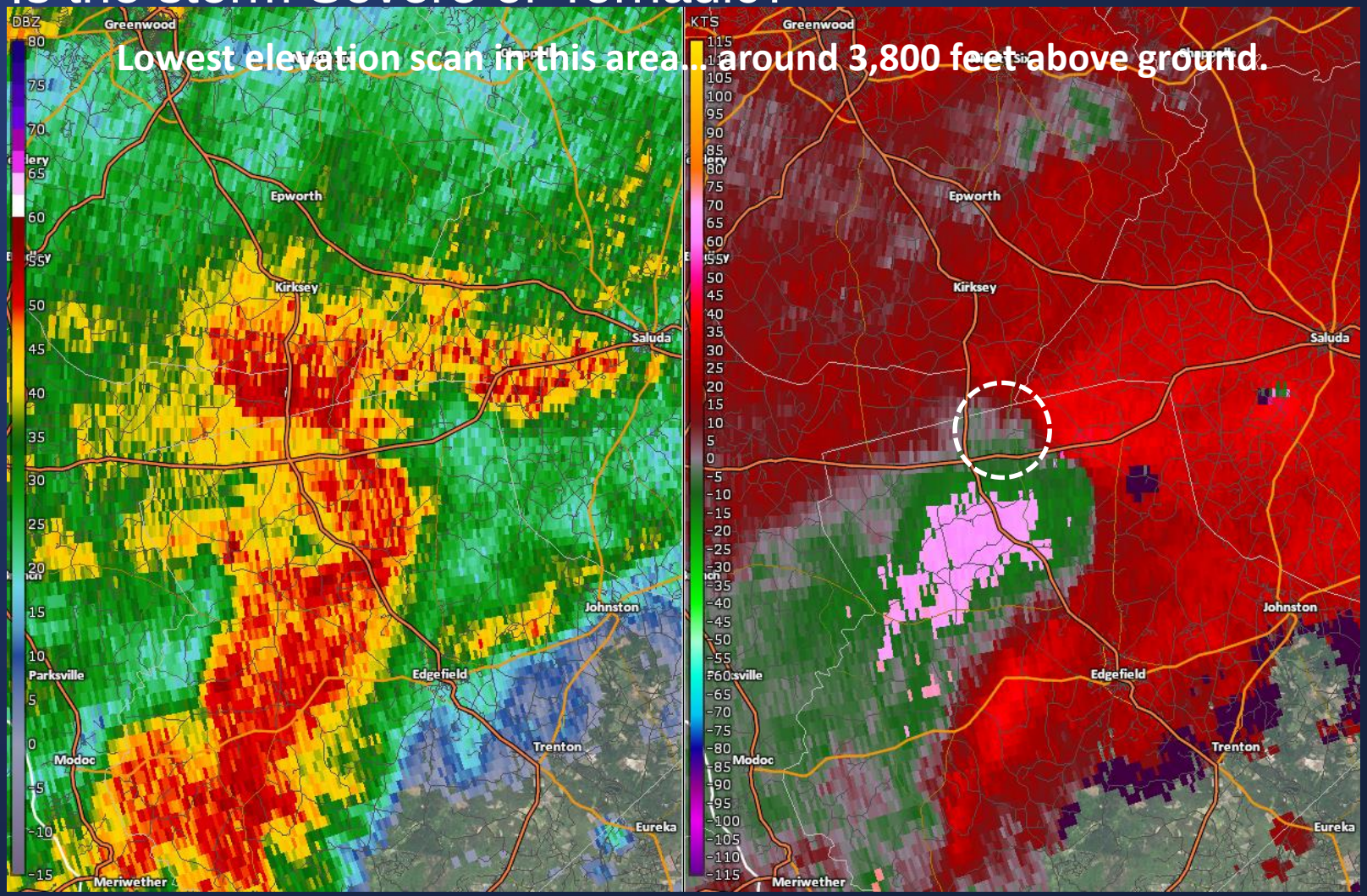
The Importance of Spotter Reports



The Importance of Spotter Reports

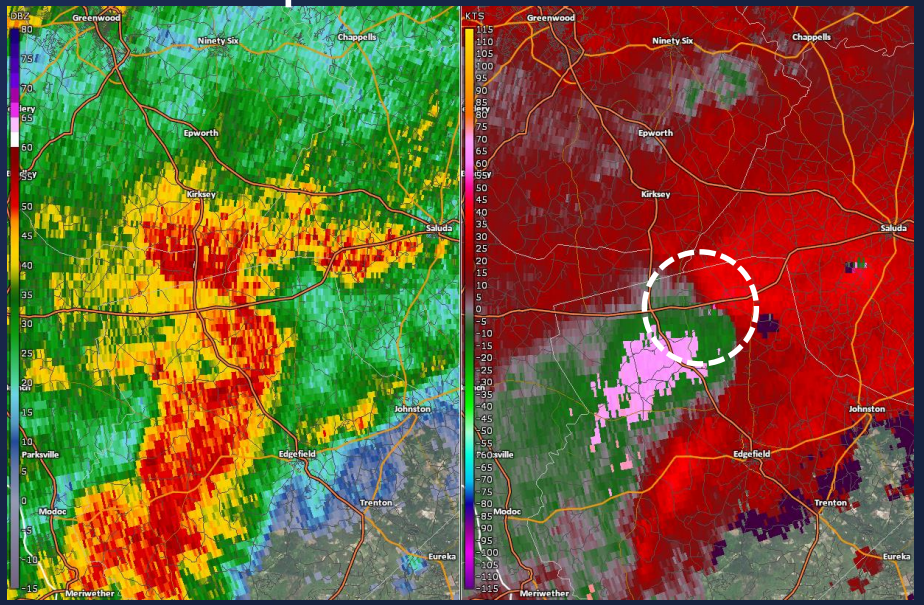
Is the storm Severe or Tornadic?



The Importance of Spotter Reports

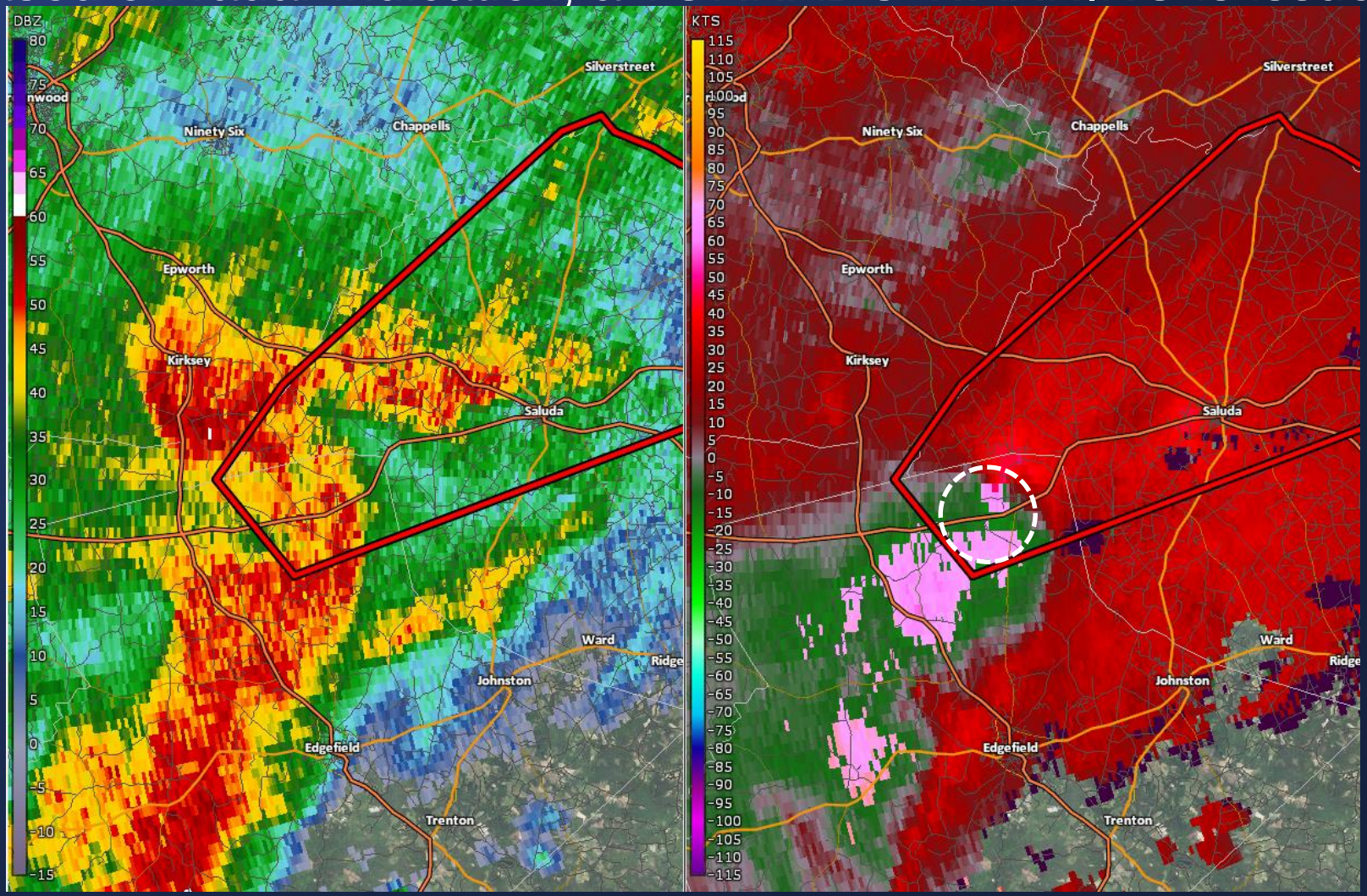
Should a Warning be issued?

Storm has good rotation, but NO reports!



The Importance of Spotter Reports

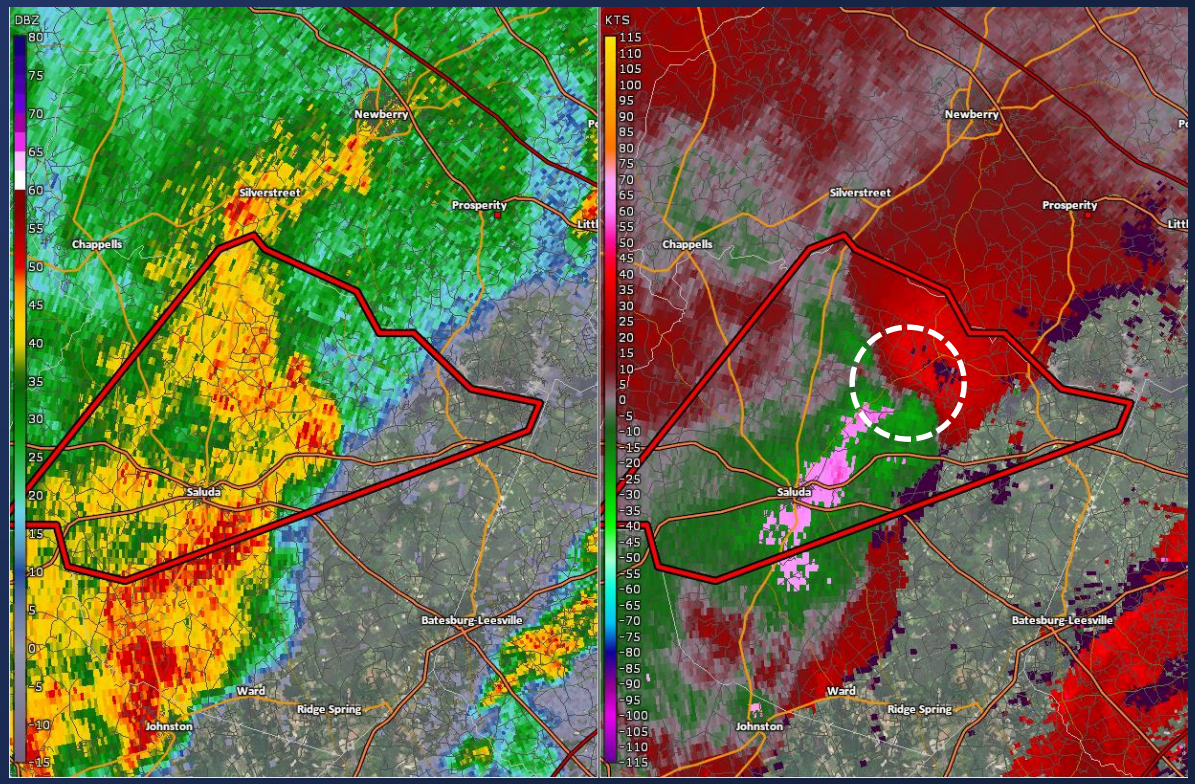
Based on radar indication, a TORNADO WARNING is issued!



The Importance of Spotter Reports

It's 20 minutes later…

- The storm is about to move out of the warned area.
- The storm has weakened, but still has strong rotation
- Still NO reports!!!



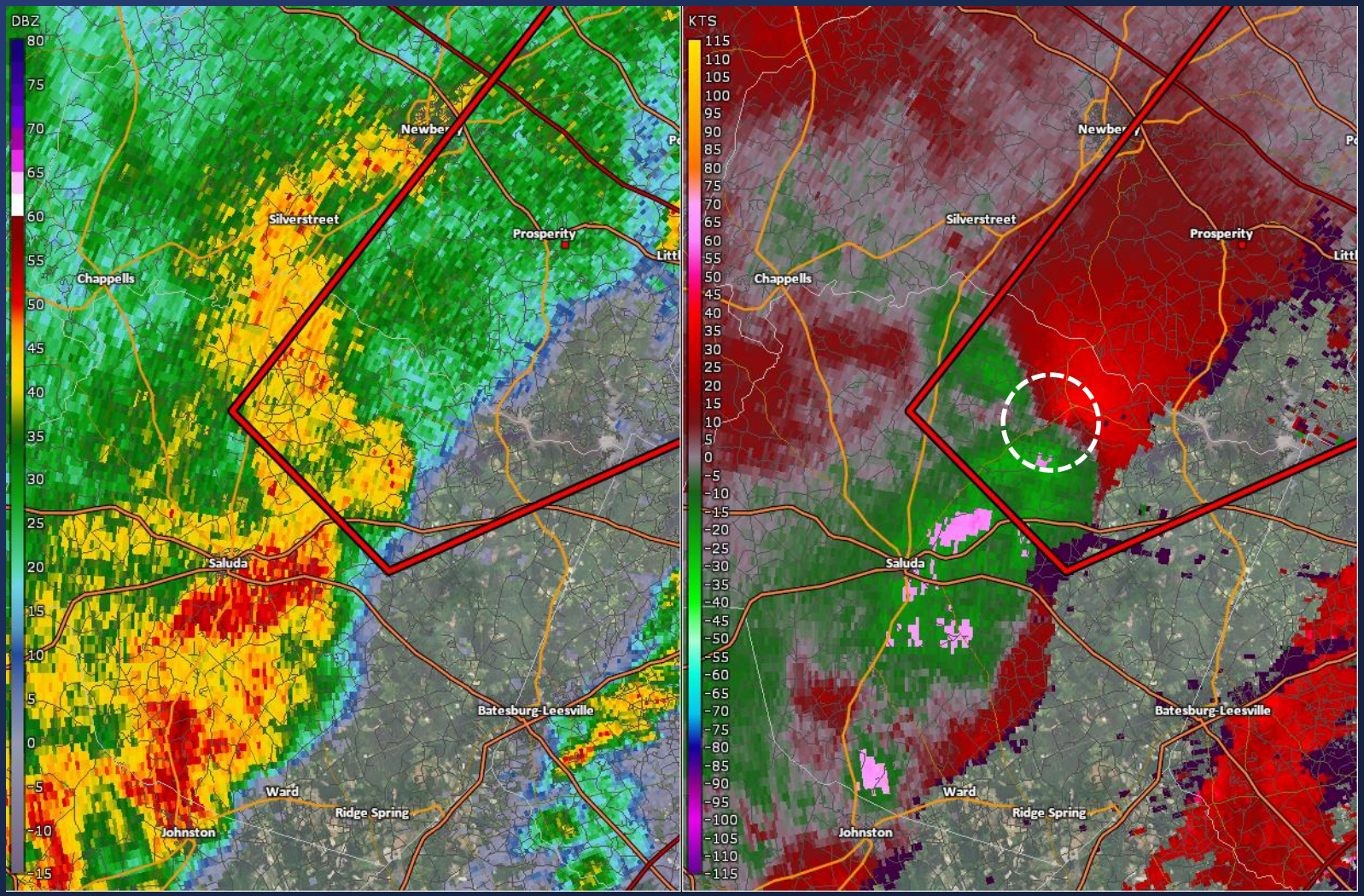
Should a new warning be issued???

The Importance of Spotter Reports

Spotter reports tornado on the ground with mobile homes damaged and numerous trees down!!!

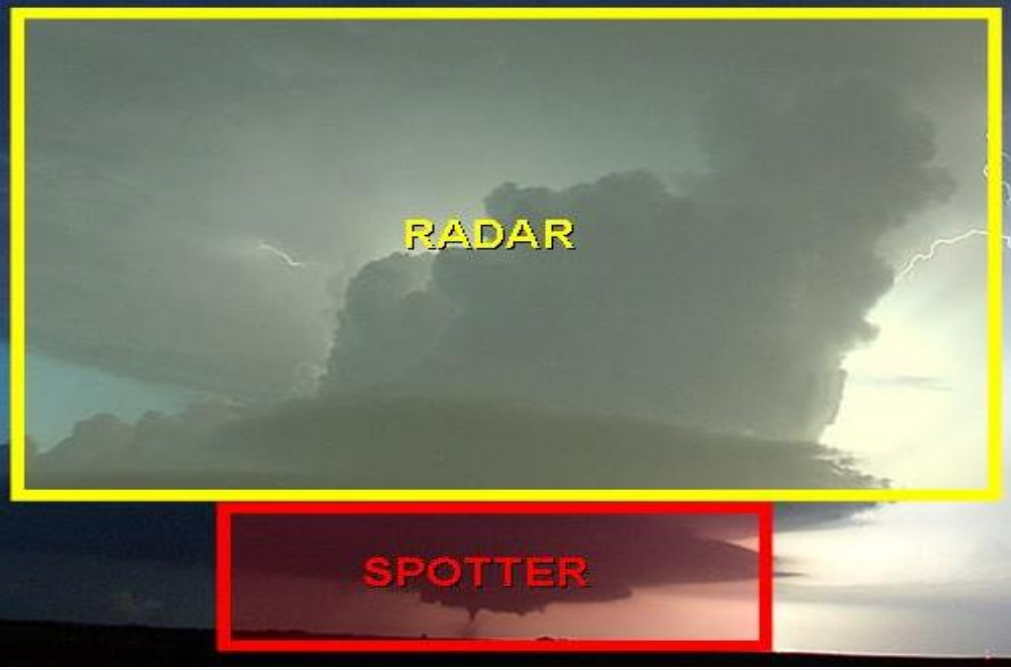
The Importance of Spotter Reports

Based on spotter report, a new TORNADO WARNING is issued!



You are our “Eyes”!

Spotters provide critical details on what’s happening at ground level.



Chris Gullikson WWW.F5HUNTER.COM

The Importance of Spotter Reports

Summary

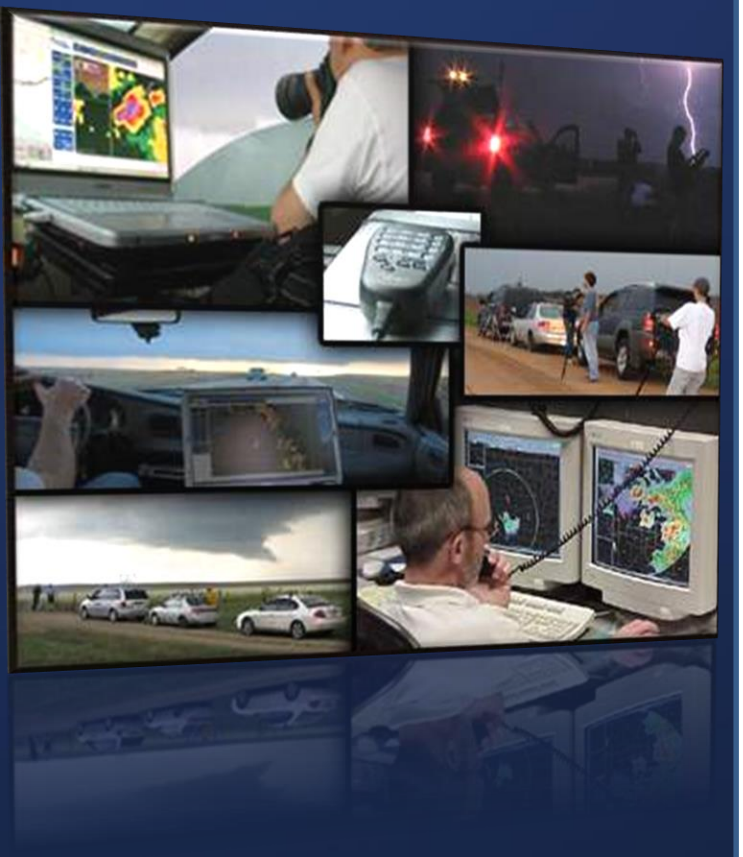
Warning text <u>without spotter report</u>…

"National Weather Service Doppler Radar <u>indicated</u> a severe thunderstorm <u>capable</u> of producing a tornado…"

Warning text <u>with spotter report</u>…

"National Weather Service <u>trained spotter reported</u> a tornado moving northeast toward Prosperity, SC…"

The Importance of Spotter Reports



Summary

- Helps NWS fulfill mission of protecting life and property!
- Gives confidence to the warning forecaster
- Adds critical details to the warning, which heightens impacts and response
- Can provide downstream communities a more timely warning (minutes make a difference!)

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- **Weather Hazards and Safety**
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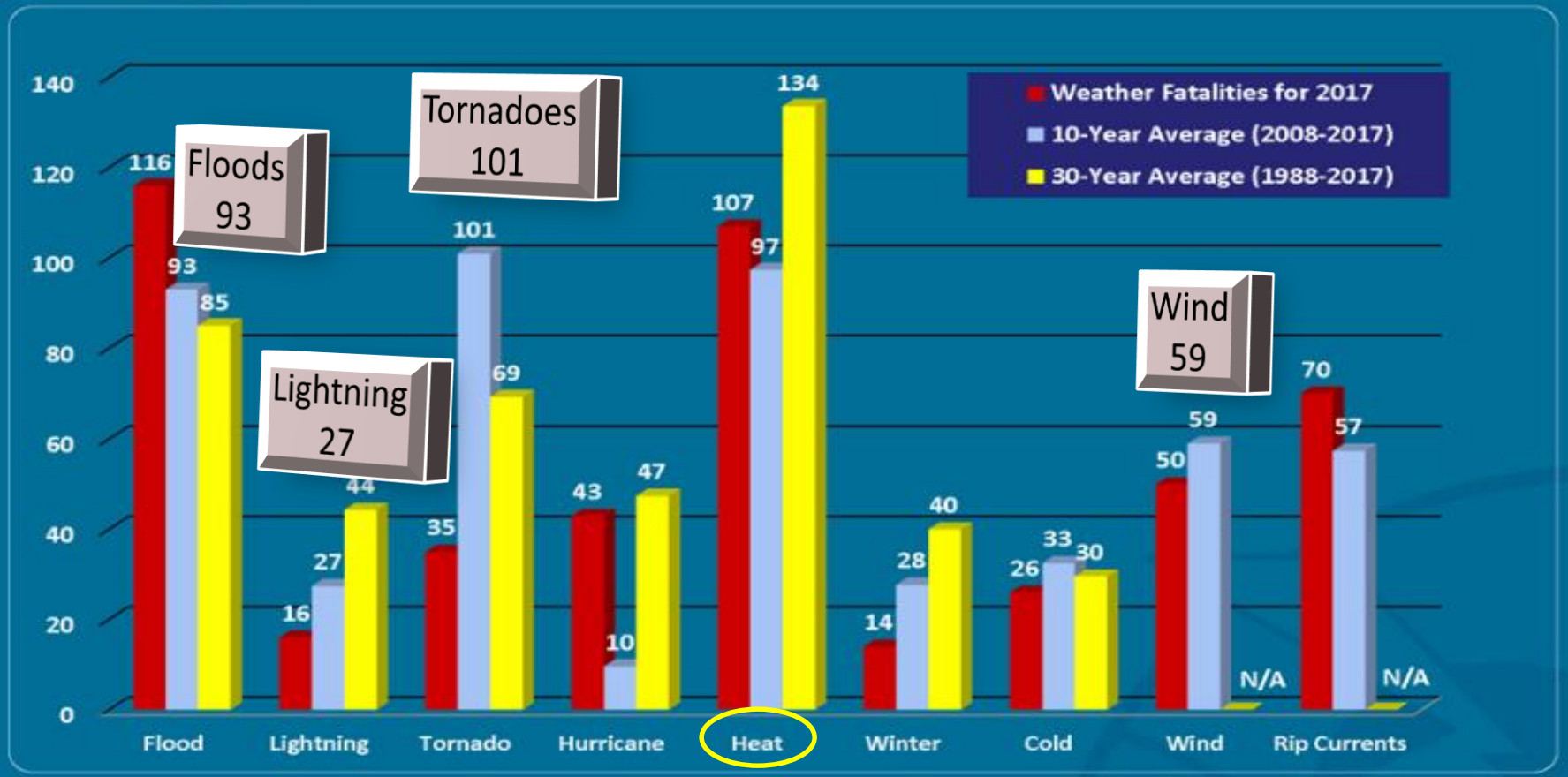
Weather Hazards and Safety

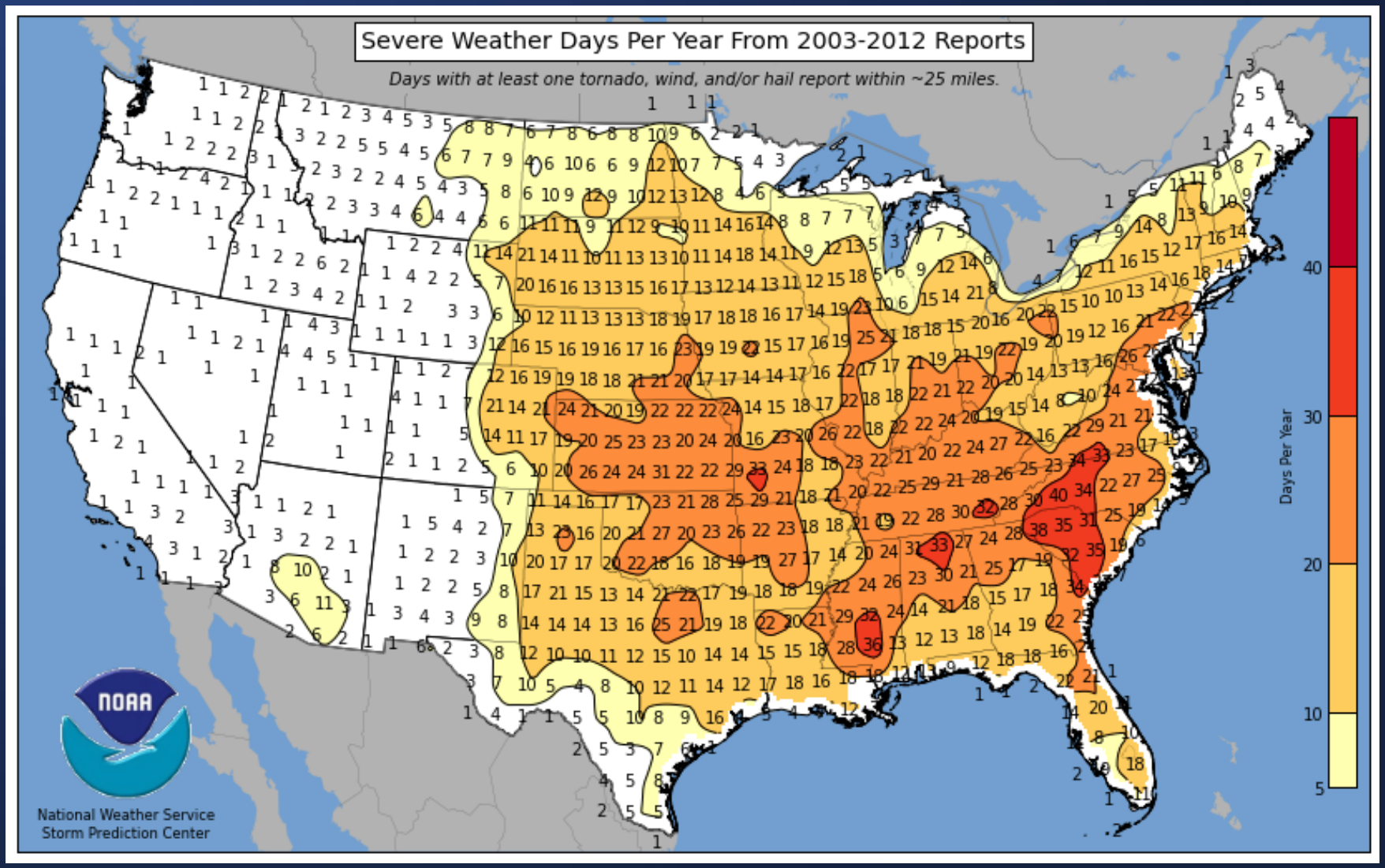
Weather Hazards and Safety

Let's Look at 10 Year Averages

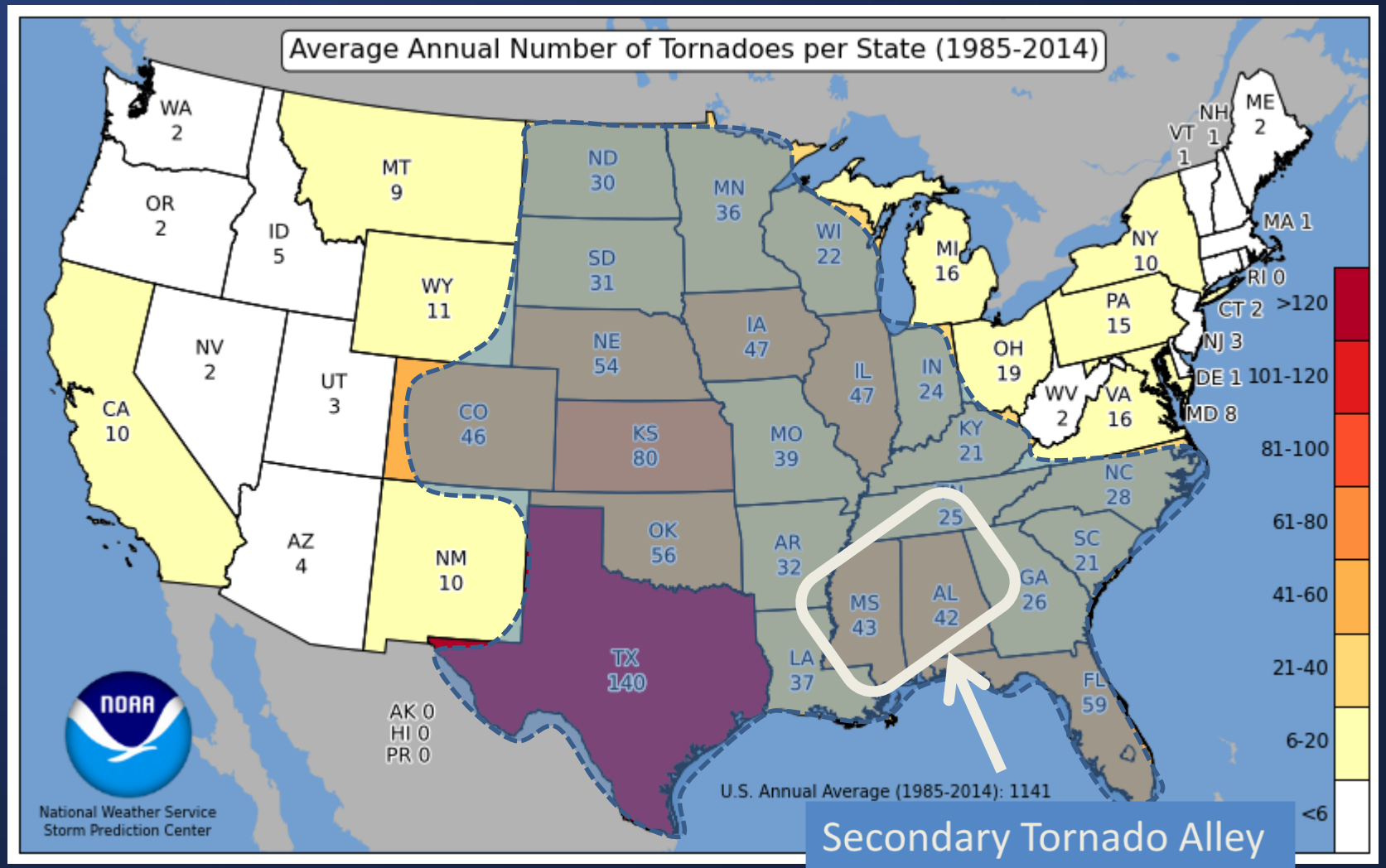
Weather Fatalities 2017



Severe Weather Days/Year

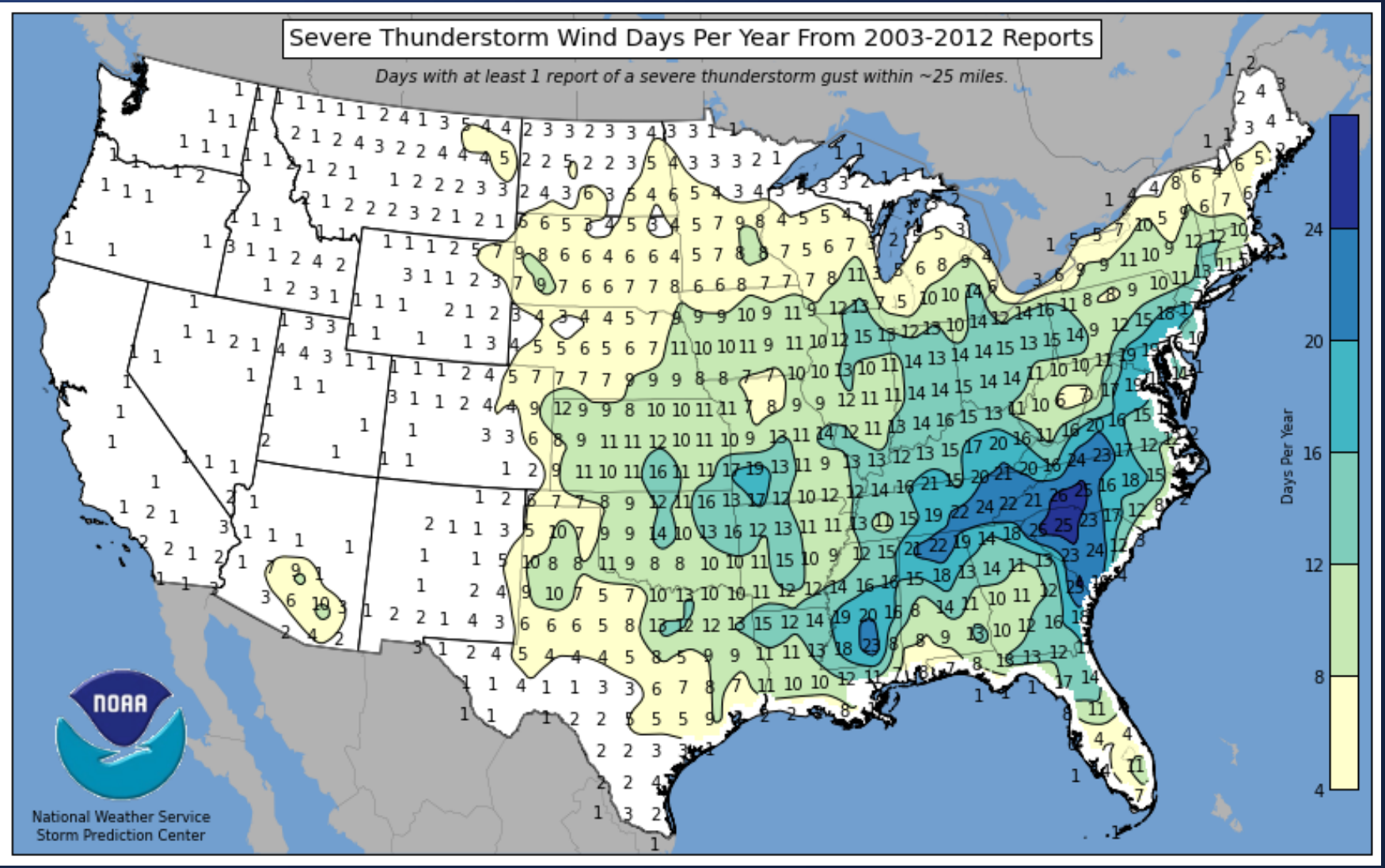


National Tornado Distribution



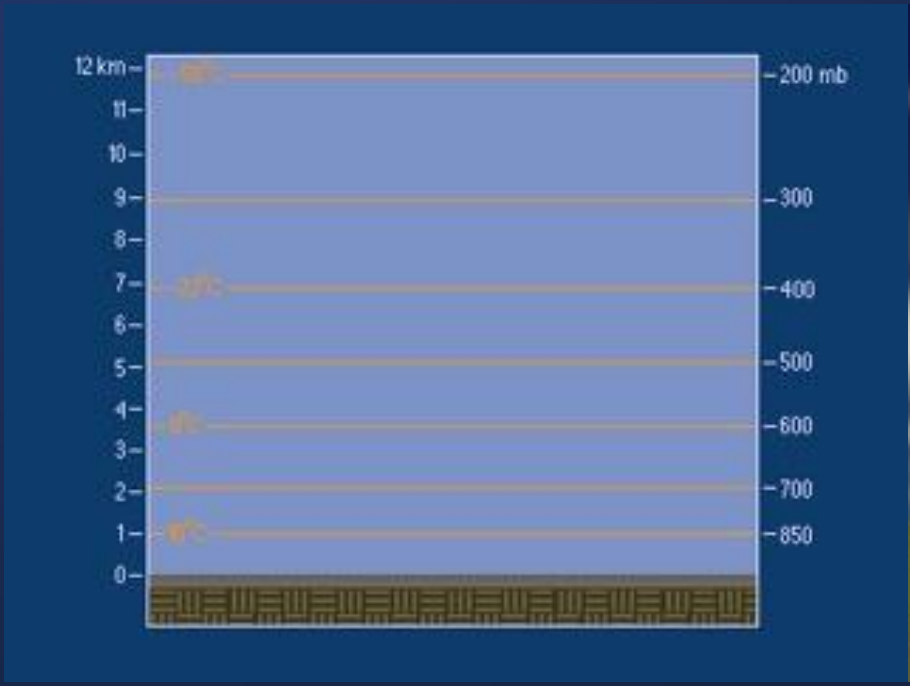
Severe Thunderstorm Winds

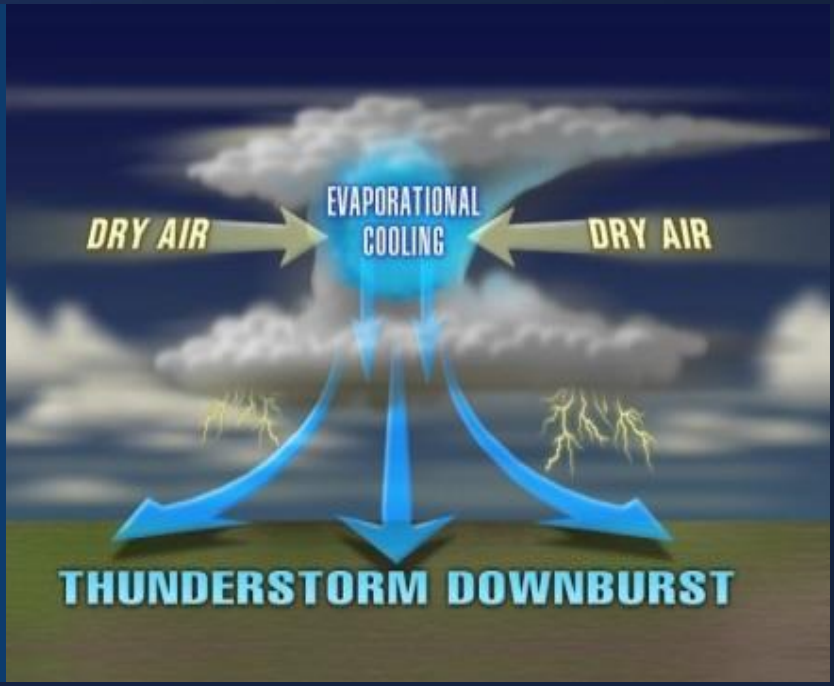
Severe Thunderstorm Wind Days/Year



Severe Thunderstorm Winds

- Clouds/Storms Form from Rising Air
- Precipitation Forms → Falls and “Drags” Air Back Down to Ground
- Drier Air Helps to Create Stronger Downward Motion, Sometimes Strong (i.e., Downburst)
- Wind Speeds of 60+ mph Start to Cause Damage





Severe Thunderstorm Winds

Microburst Example

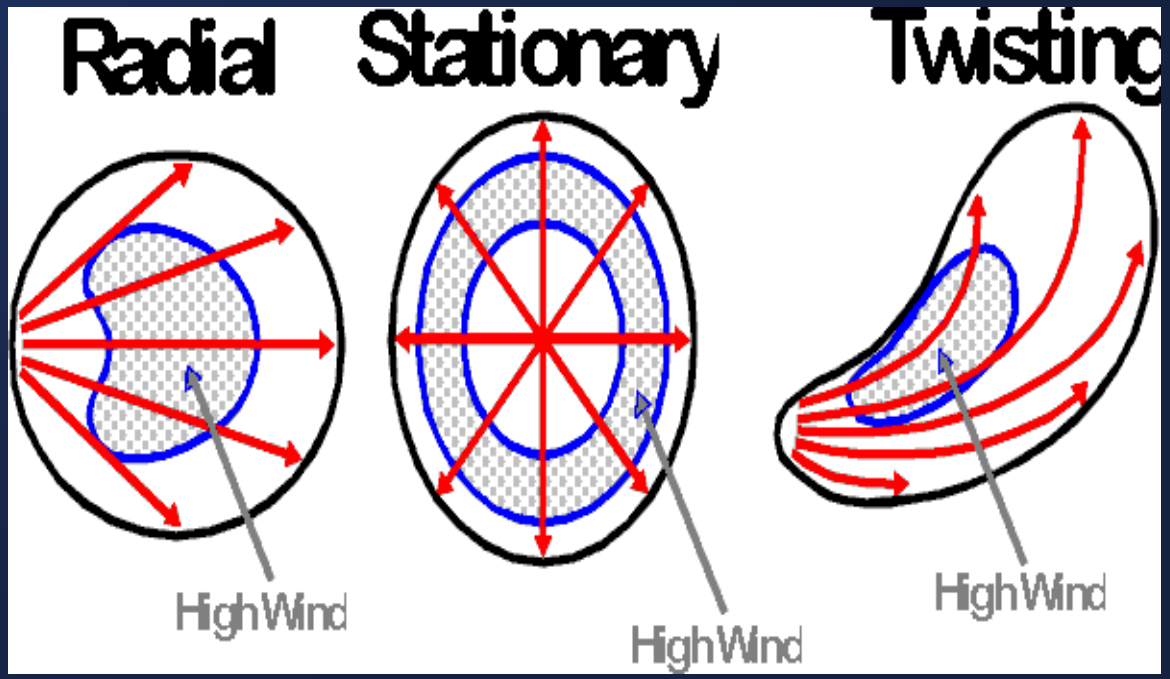
Severe Thunderstorm Winds

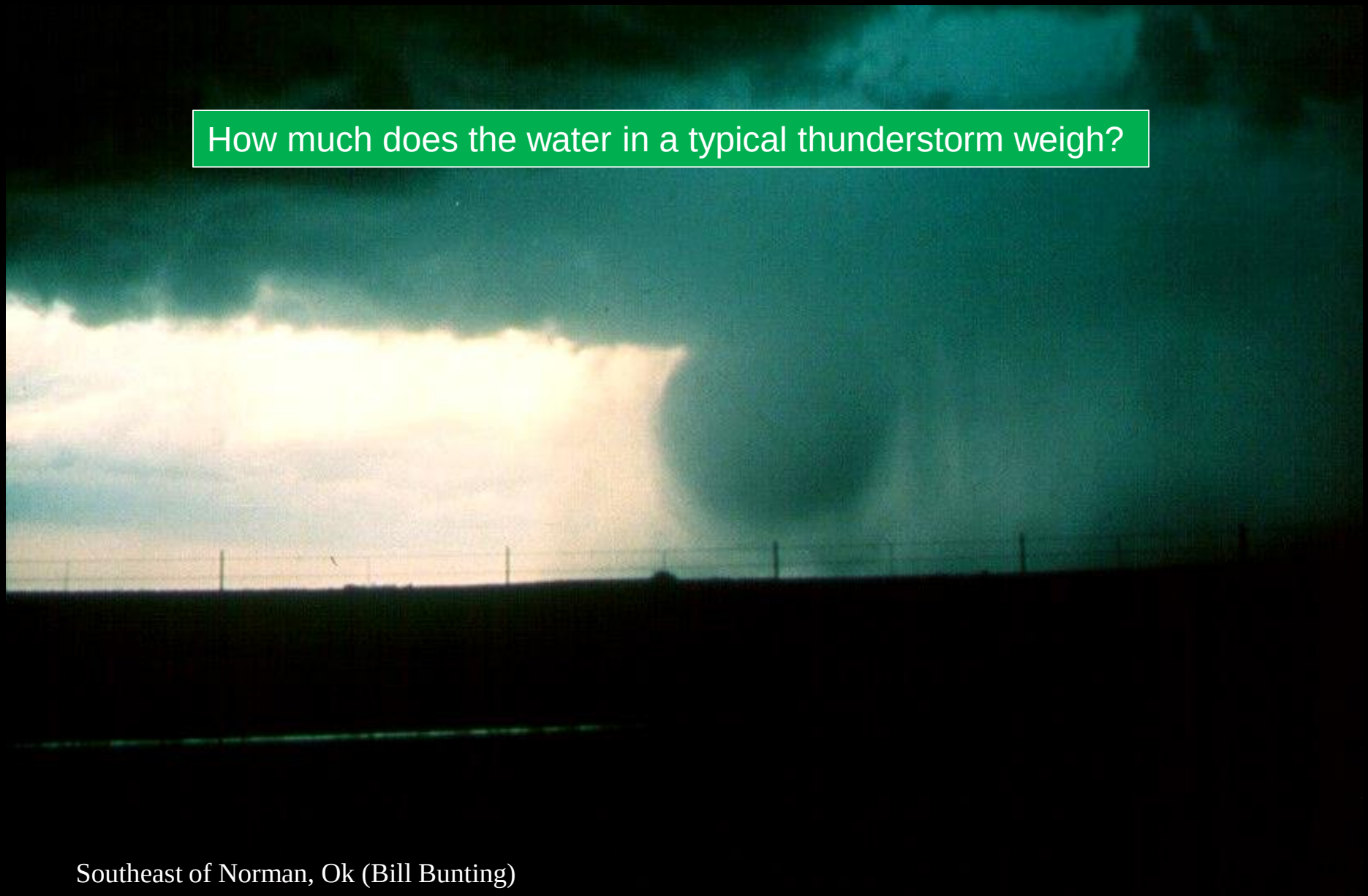
Downburst – Straight Line Winds

What do They Look Like?

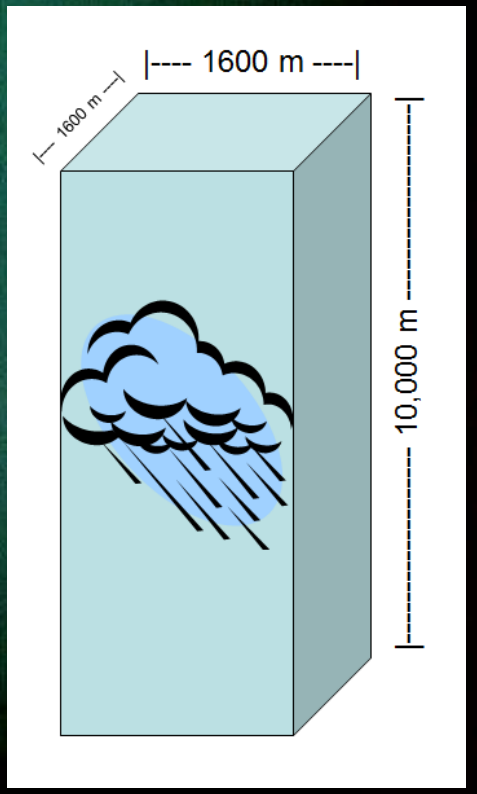
On Radar – Difficult to Detect AND Warn For!

Damage Patterns on the Ground





Southeast of Norman, Ok (Bill Bunting)



It's hard to tell, but the University of Virginia (2013) estimated:
1 cubic foot of water weighs **~ 62.31 pounds** (depending on temperature, contaminants, etc.
A thunderstorm producing 1 inch of rain over an area of 1square mile holds:
~ 2,323,200 cubic feet of water… weighing **144,758,592 pounds**!
That's equivalent to about 1,800 fully loaded 18-wheelers, 644 fully-loaded 747's,
or 68.65 Olympic-sized pools of water!

Southeast of Norman, Ok (Bill Bunting)

Severe Thunderstorm Winds

Shelf Cloud

- Leading Edge of:
  Strong Winds, Heavy Rainfall, Hail
- Slope Down and Away from Rain
- Moves Away from Storm

Severe Thunderstorm Winds

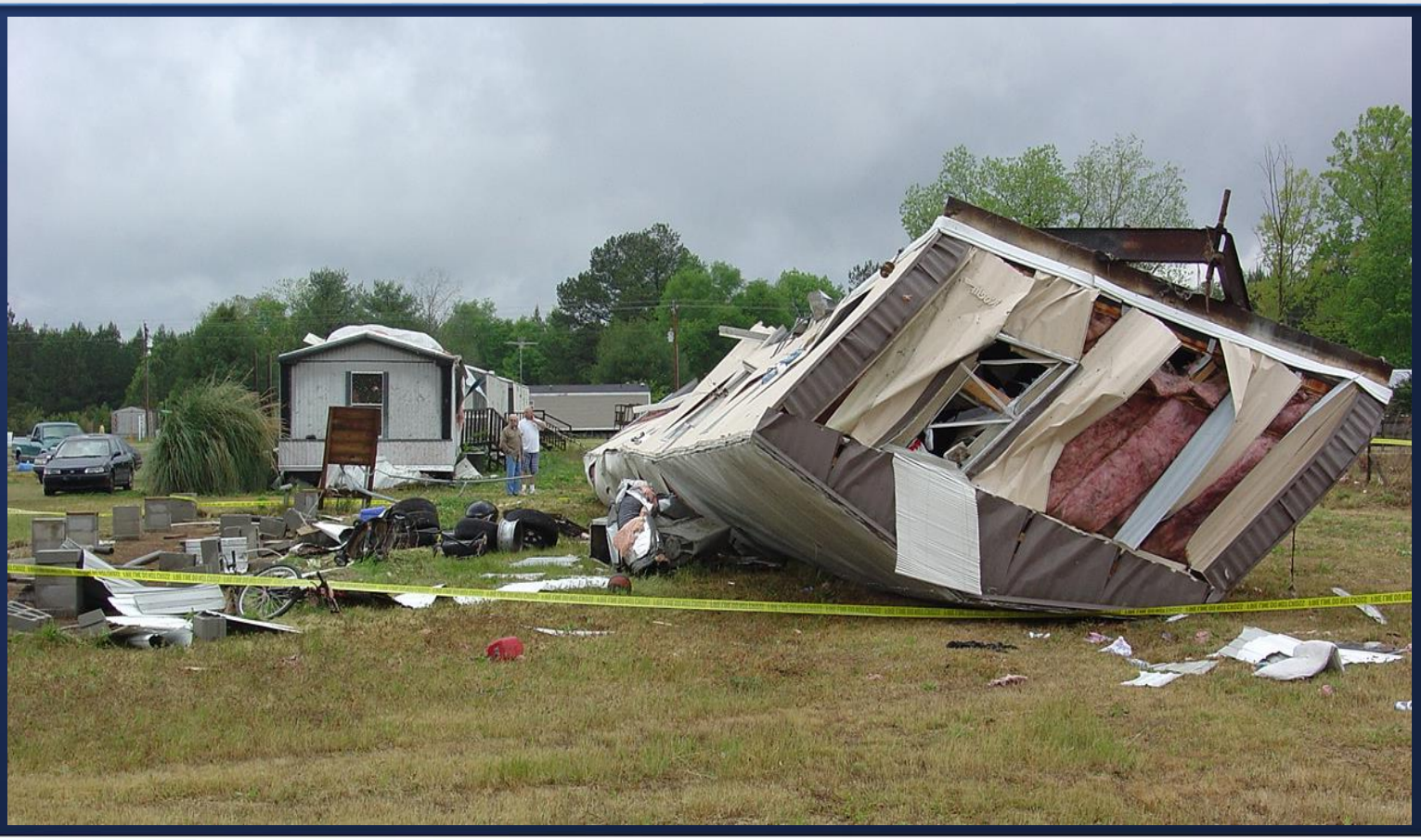
Safety

- Go Into a Sturdy Shelter
- Lowest Level, Interior Room, Away from Windows
- Protect Your Head

Severe Thunderstorm Winds

Leave Mobile Homes in Severe Weather!

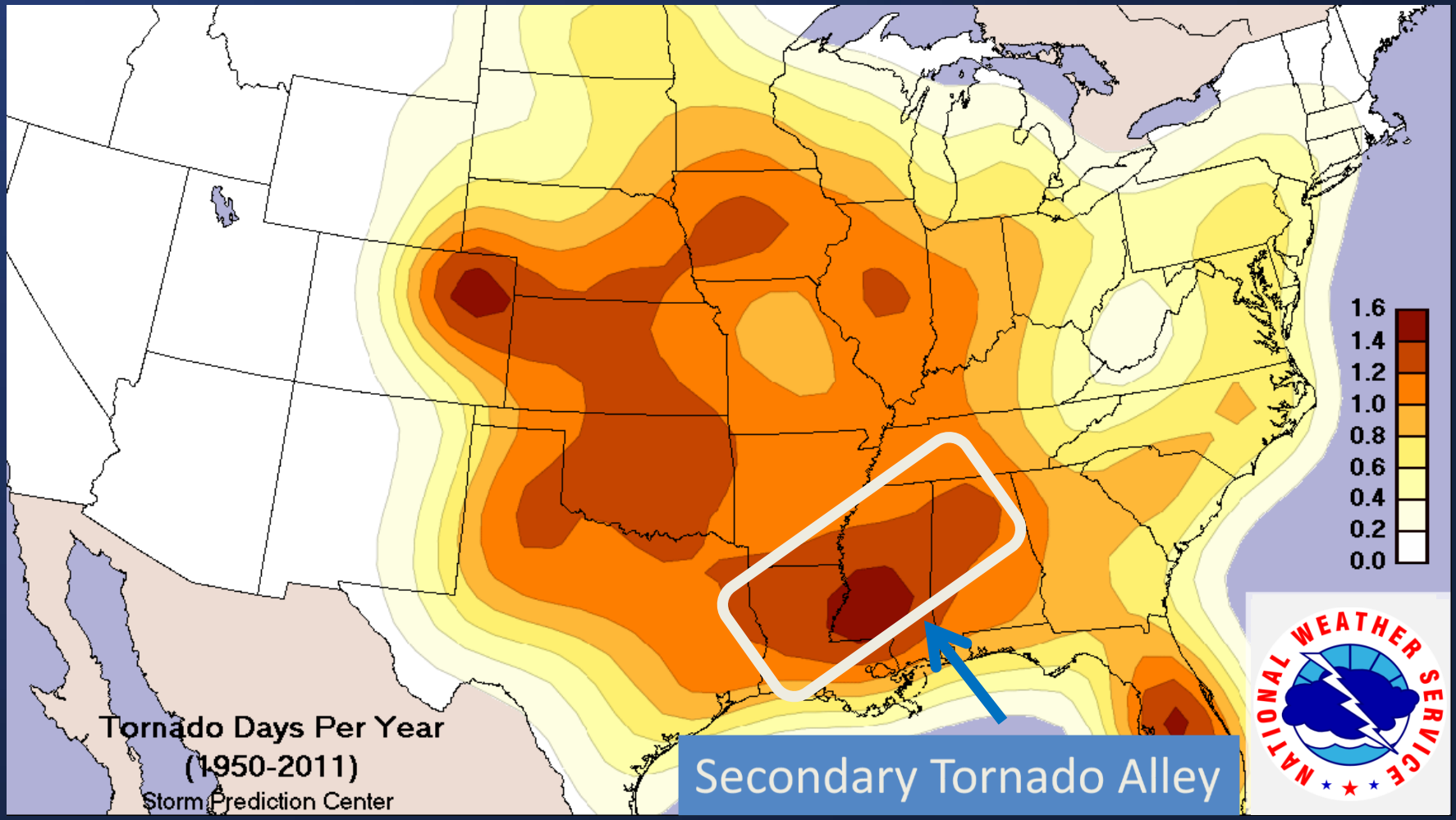
Mobile homes can roll in 80+ mph Winds



Tornadoes

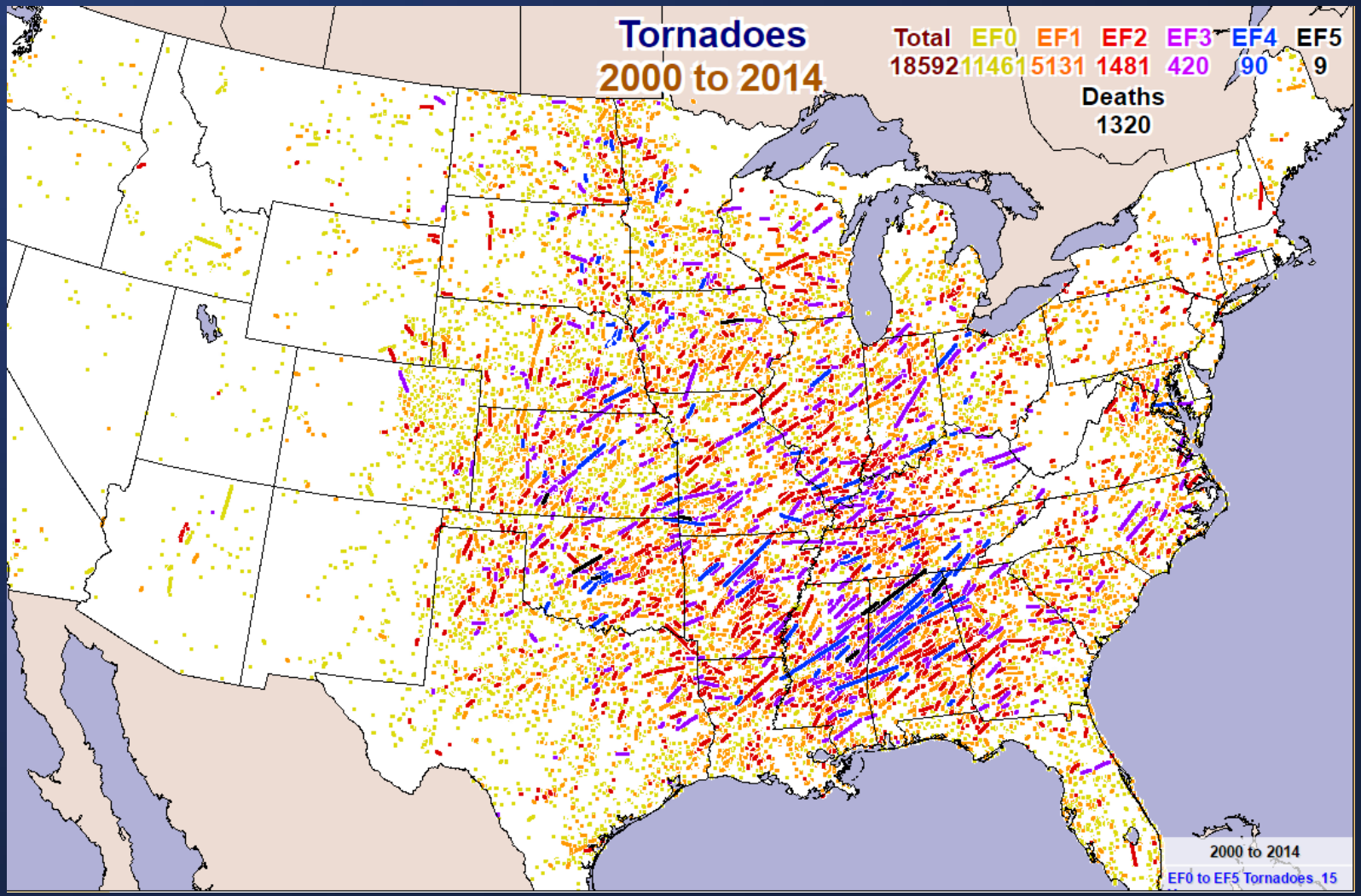
Tornado Distribution

Tornado Days Per Year



National Tornado Distribution

Tornadoes 2000 - 2014



Funnel Cloud

Funnel Cloud: *Rotating* column of air from base of cloud – *NO* contact with ground

Funnel cloud

National Weather Service Forecase Office, San Antonio, TX NOAA Central Library

Tornado

Tornado: Rapidly, violent rotating column of air from a thunderstorm *and* in contact with the ground. Funnel may not be visible.

Look for debris

Keep your eye on the sky AND the ground!

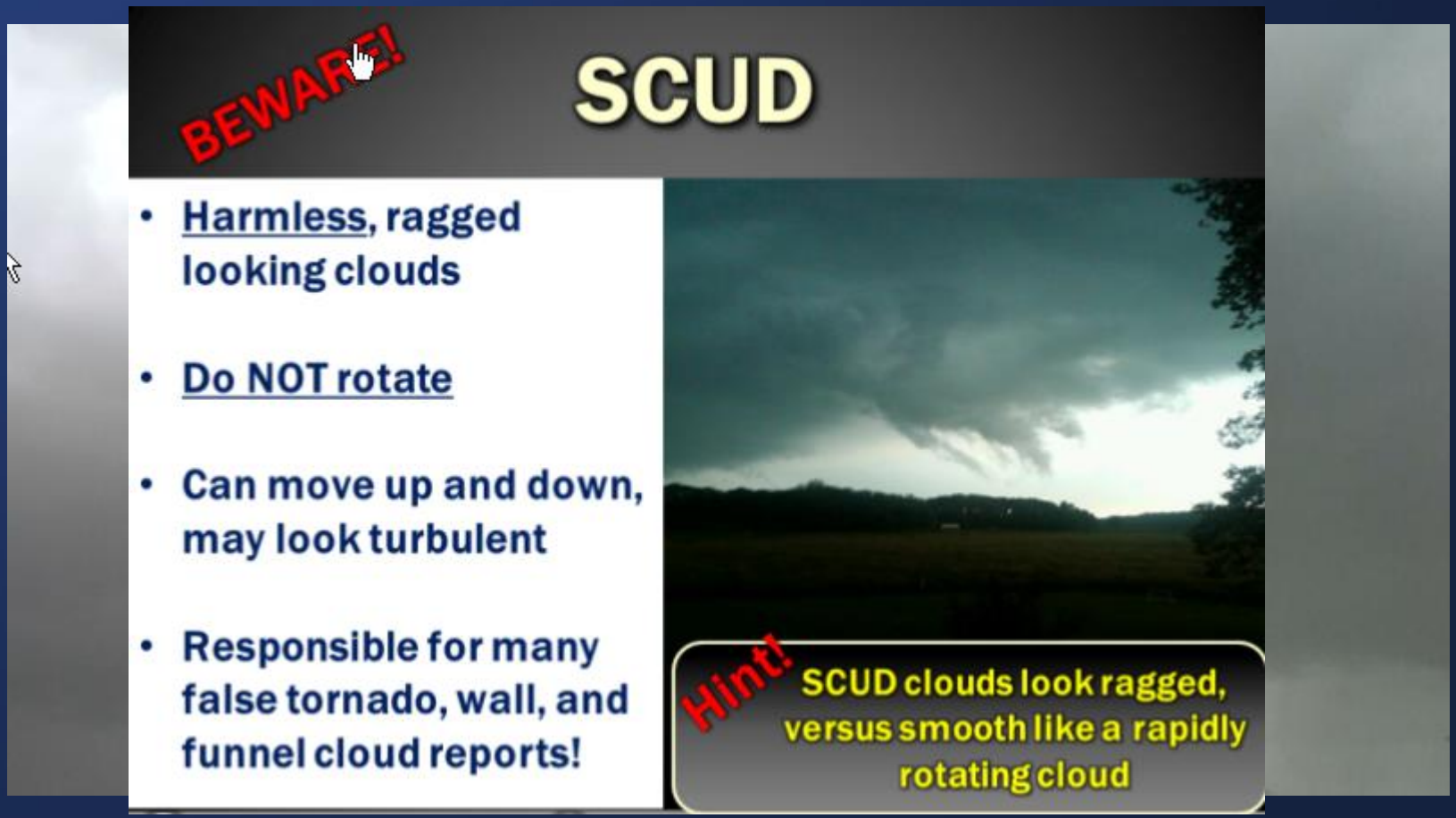
Tornado

Tornado: Rapidly, violent rotating column of air from a thunderstorm *and* in contact with the ground. Funnel may not be visible.

Again…

Keep your eye on the sky AND the ground!

Tornado/Funnel Cloud Look-Alikes



"Scud" Clouds. Leading edge of wind shear aloft…look like funnels, no rotation.

Tornado/Funnel Cloud Look-Alikes

“Scud” Clouds. Leading edge of wind shear aloft…look like funnels, no rotation.

Tornado/Funnel Cloud Look-Alikes


SevereStudios.com
Andy Gabrielson
NWS/Traning Use Only - NOT FOR BROADCAST

Categories of Tornadoes

Intensity of Tornadoes:

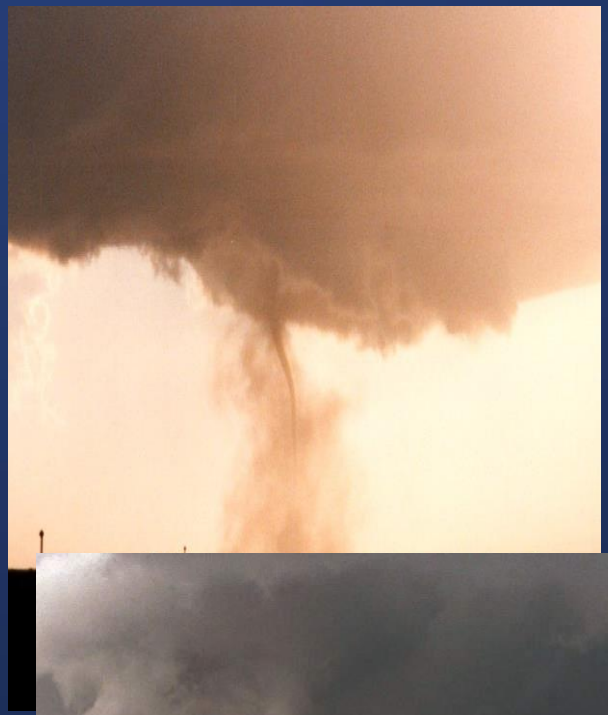
- **Based on the damage**
- **Winds NOT directly measured**

Rated from EF0 – EF5

(Enhanced Fujita Scale)

Size May Not ≠ Strength

Weak Tornadoes



- **EF0 and EF1** on the Enhanced Fujita Scale (65-110 mph)
- 88% + of All Tornadoes
- < 5% of all Tornado Deaths
- Brief Touchdowns, or Paths < Few Miles Long

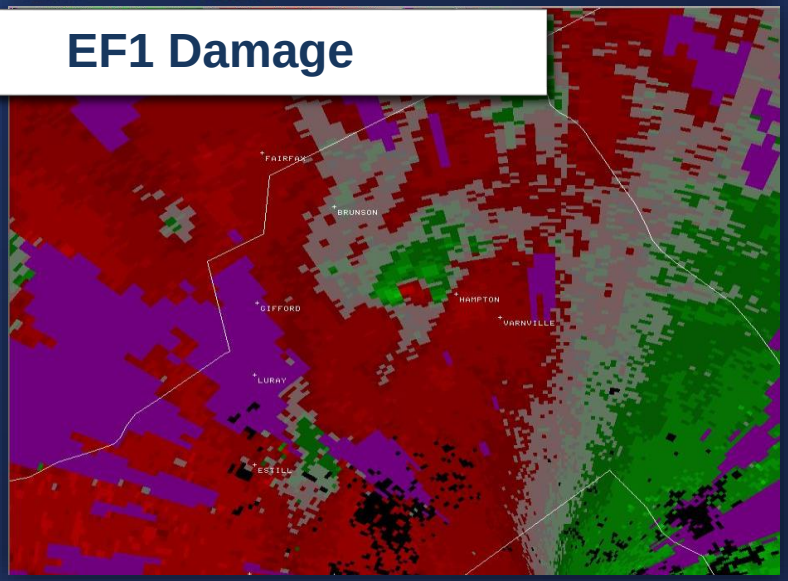
Weak Tornadoes

EF0 Damage

EF1 Damage

Weak Tornadoes

EF1 Damage

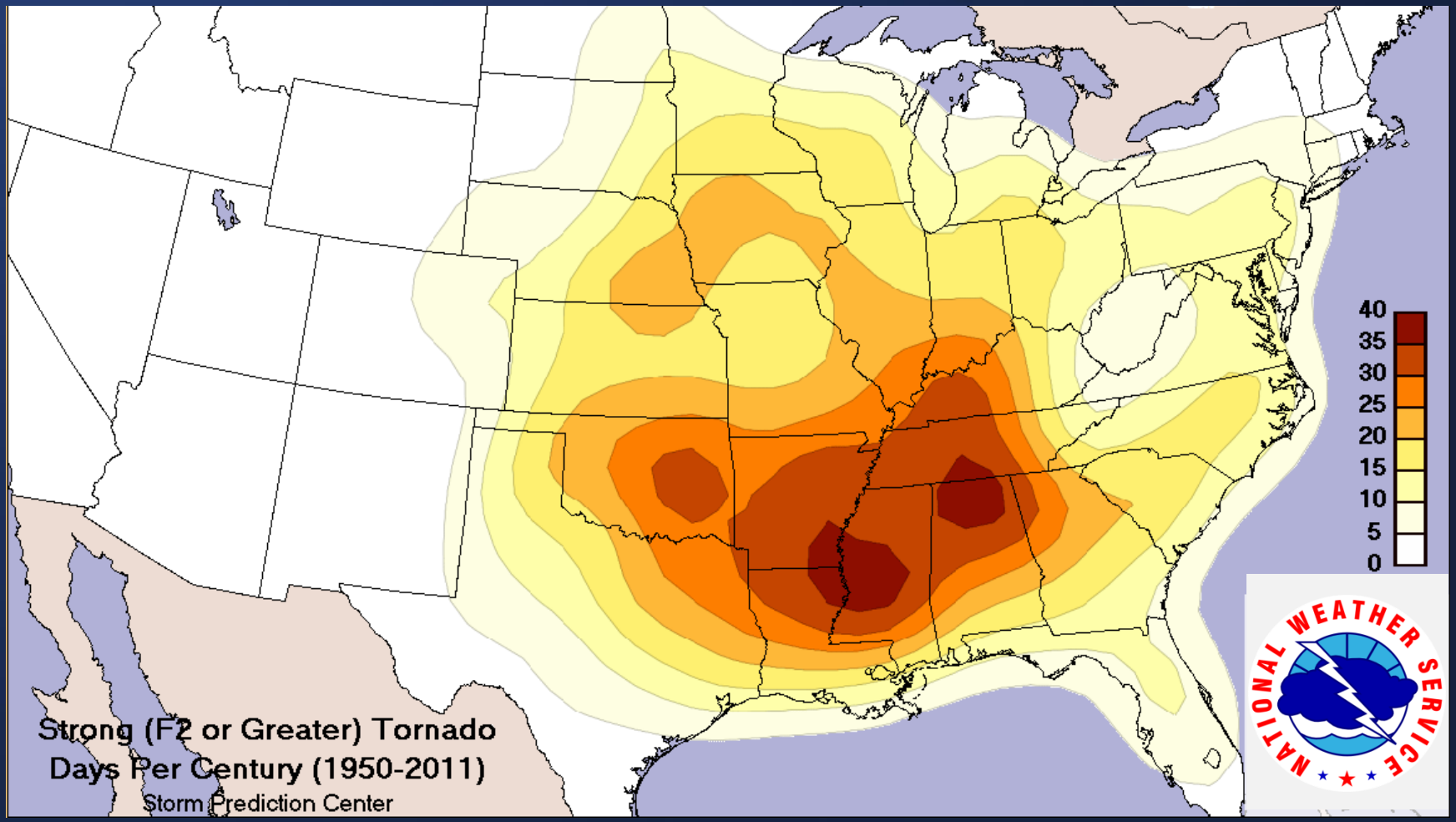


Strong Tornadoes

- **EF2 and EF3** (111-165 mph)
- 11% of All Tornadoes
- Up to 30% of Tornado Deaths
- Paths as Long as 10 - 15 Miles Long

Strong Tornadoes

Probability of EF-2 or Greater Tornado (1950-2011)



Mobile Homes, Cars… Death Traps!

Mobile Homes = 69% of 2012 Tornado Fatalities

Violent Tornadoes

Photo by Doug Berry

EF4 and EF5 (166-200+ mph)

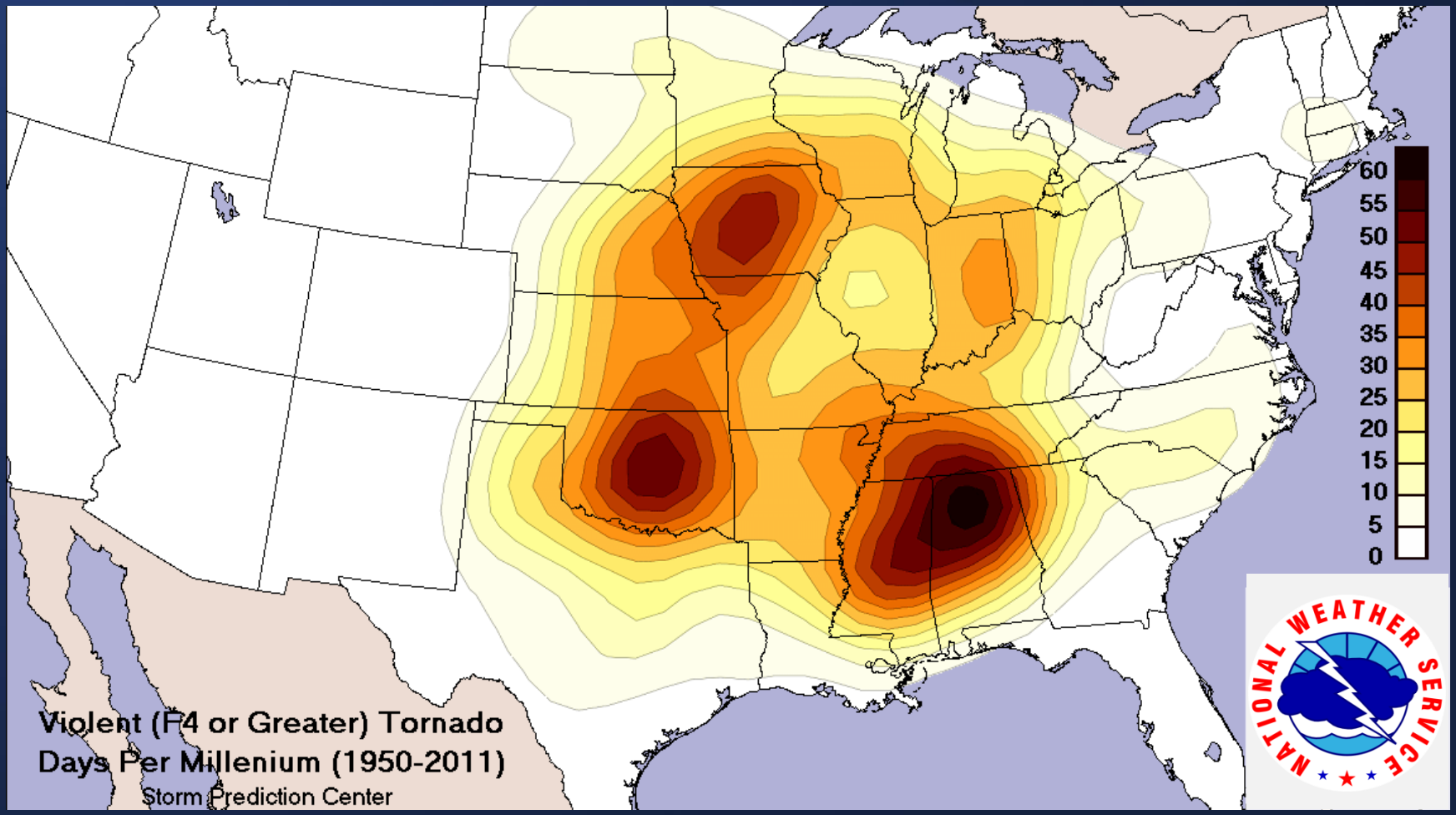
1% or Less of All Tornadoes

***~70%* of all Fatalities**

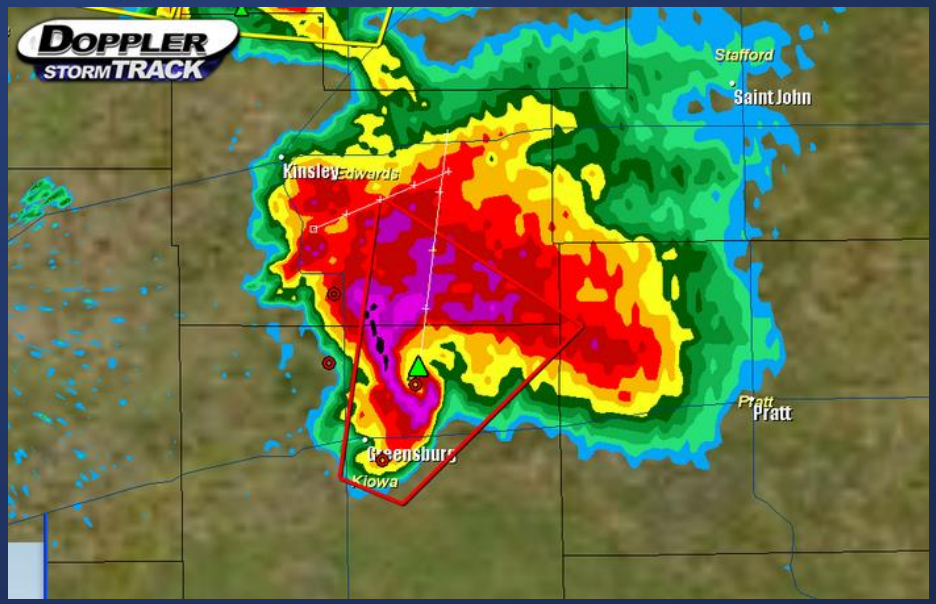
Paths May Be > 70 miles Long, up to 1 mile Wide

Violent Tornadoes

Probability of EF-4 or Greater Tornado (1950-2011)



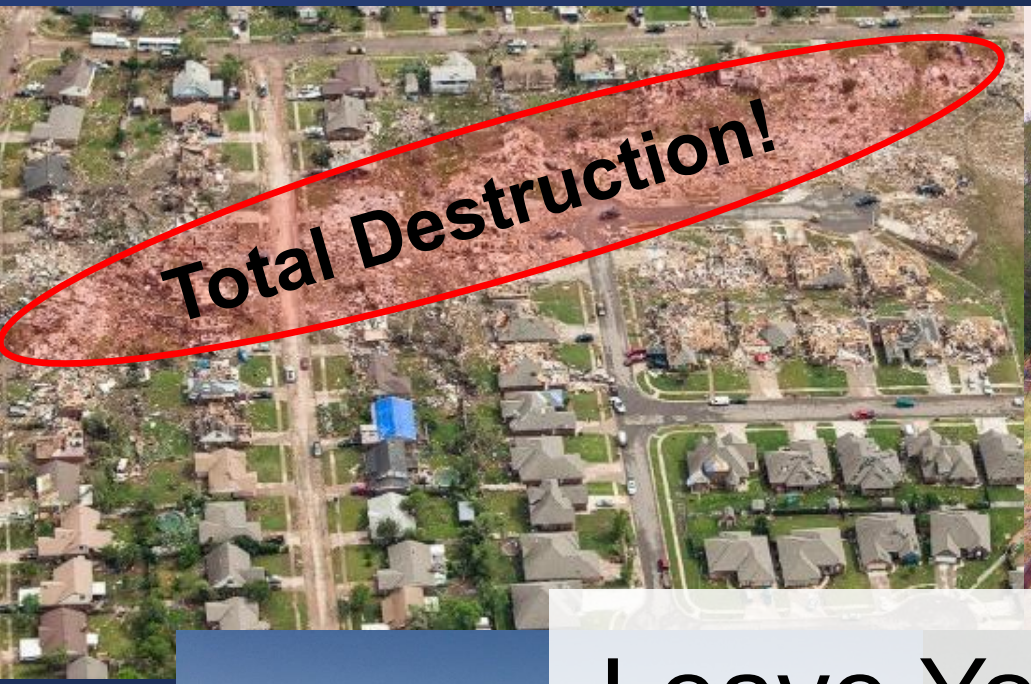
EF5 Damage

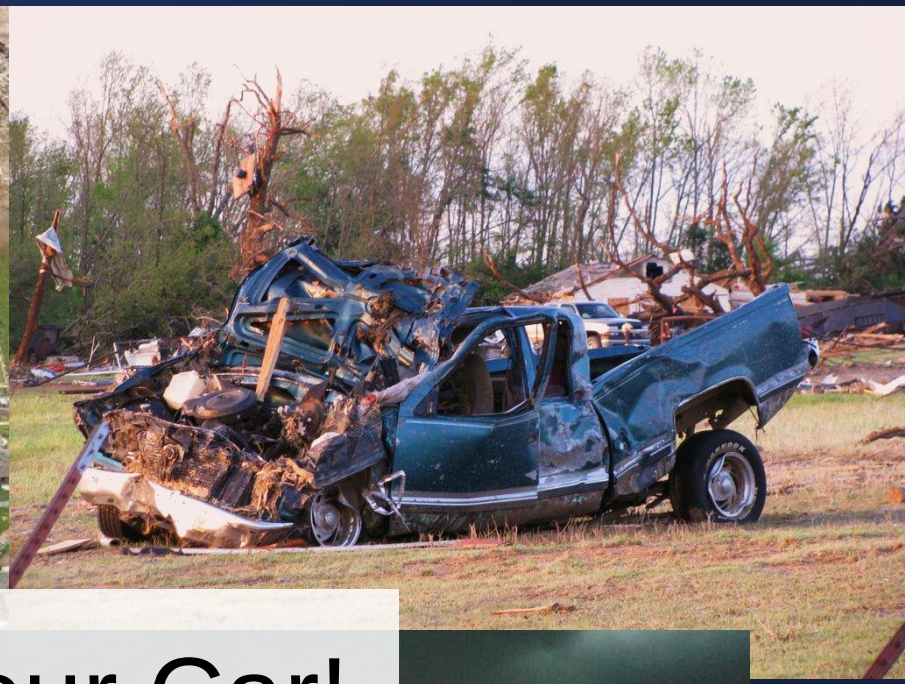

DOPPLER
STORMTRACK
Stafford
Saint John
Kinsley
Edwards
Pratt
Pratt
Kiowa


Google

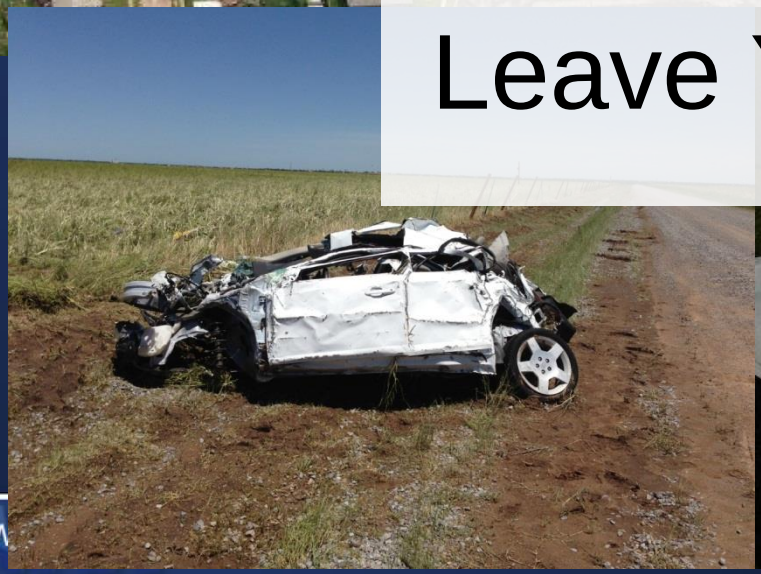

Asphalt Stripped Off Highway

EF5 Damage





Leave Your Car!



Tornado Safety

- Seek Sturdy Shelter
- Interior Room, on Lowest Level
- Away From Windows
- Protect Your Head

Tornado Safety

All Survived in <u>Interior</u> Rooms or Closets!

Tornado Safety – Last Words

BRIDGES AND OVERPASSES ARE NOT SAFE STORM SHELTERS!

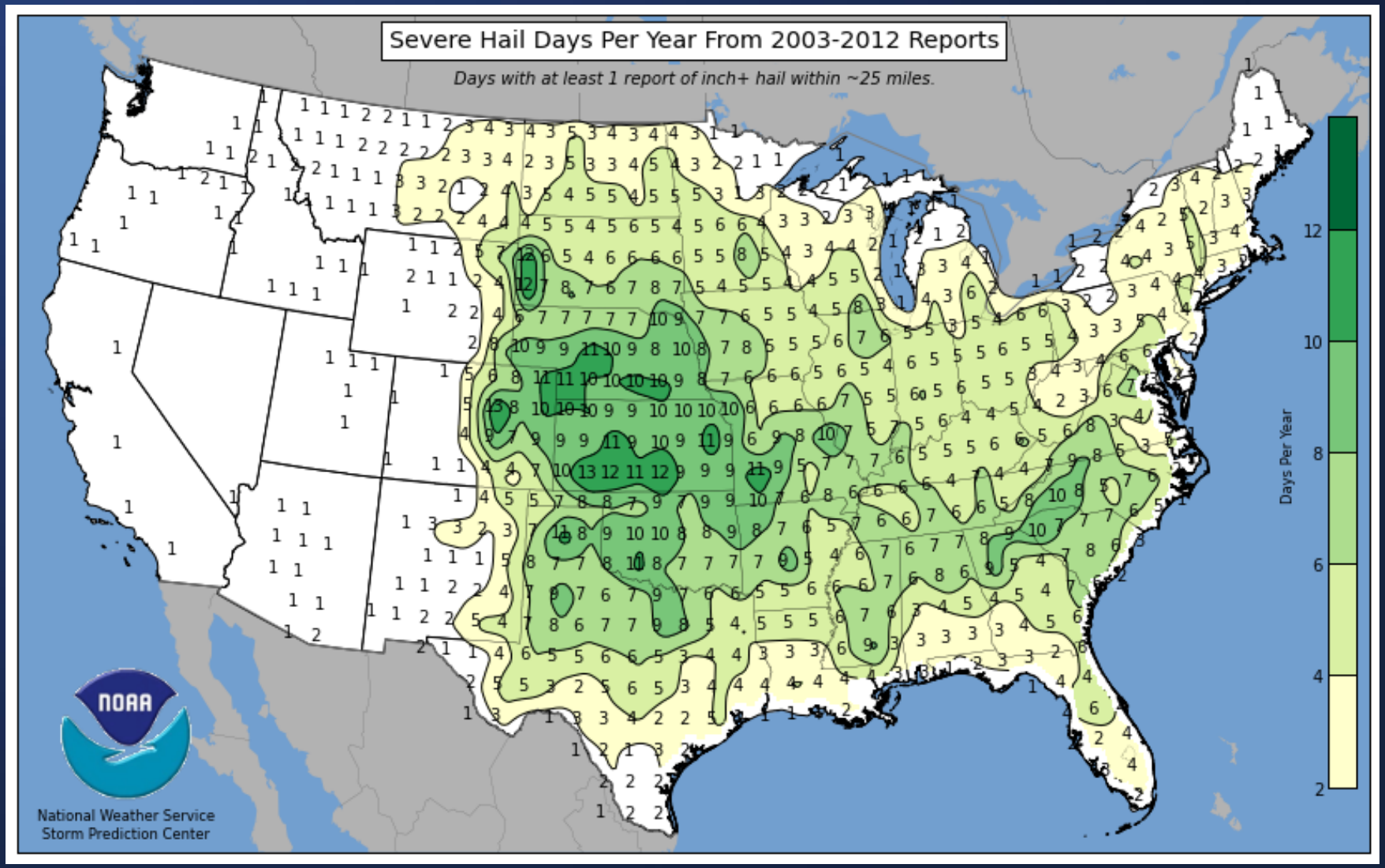
And… damaged vehicles may block First Responders from saving lives.

WHY IS TAKING SHELTER UNDER A BRIDGE OR AN OVERPASS A BAD IDEA?

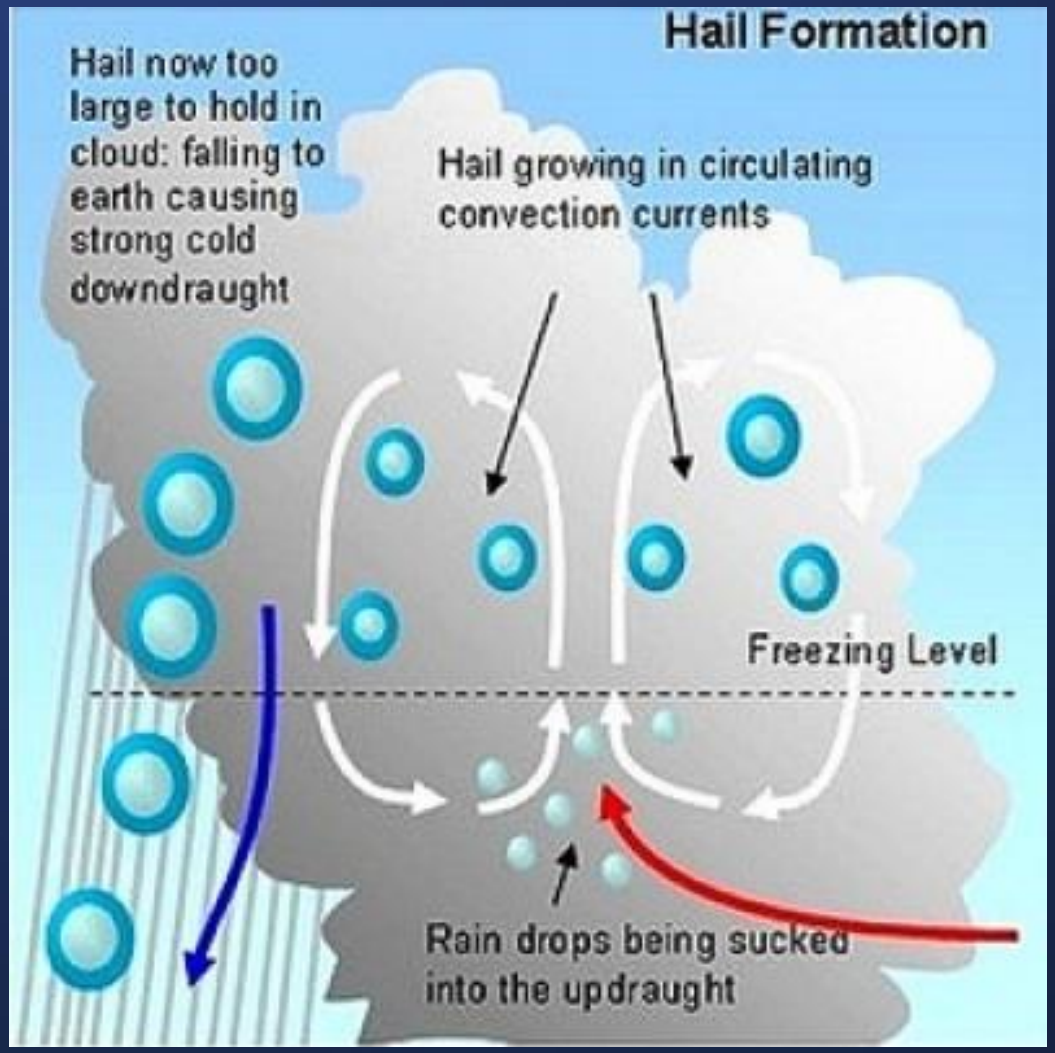
- It provides NO protection from a tornado.
- You could block the road, exposing others to damaging hail or from reaching their safe shelter.

Hail

Severe Hail Distribution



Hail Formation



- Chunks of Ice Falling From a Thunderstorm
- **Size of Hail Indicates Storm Severity.** Why's that?
  - The Stronger The Updraft, The Stronger The Storm
- Please Report All Hail, Regardless Of Size!
- If Driving, Pull Over to Minimize Window Damage

Hail: Many Shapes and Sizes

Record
Vivian, SD Jul 23, 2010

Diameter:	8”
Weight:	1.94 lbs
Circumference:	18.62”

Typical Size Spectrum
Pea to Baseball

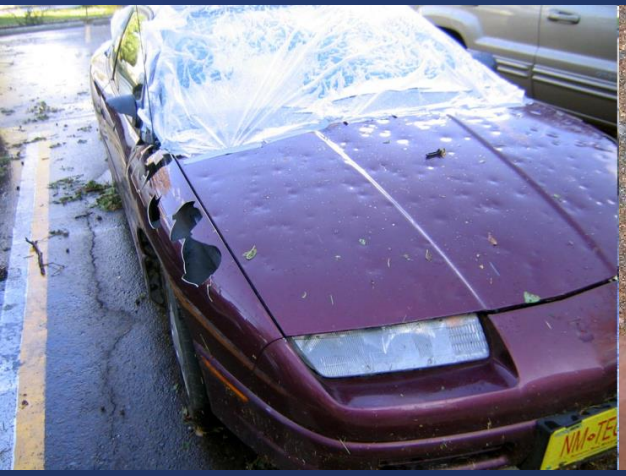
Warning Criteria for Hail

Severe Hail is 1” Diameter (Quarter Size) or Larger

Note: PLEASE Report Hail of ANY Size!

Hail Damage

Car



Roof

Plants

Airplanes

Siding on Home

Hail Damage: Trees and Shrubs

Hail Injuries and Safety

Move into a Sturdy Structure:

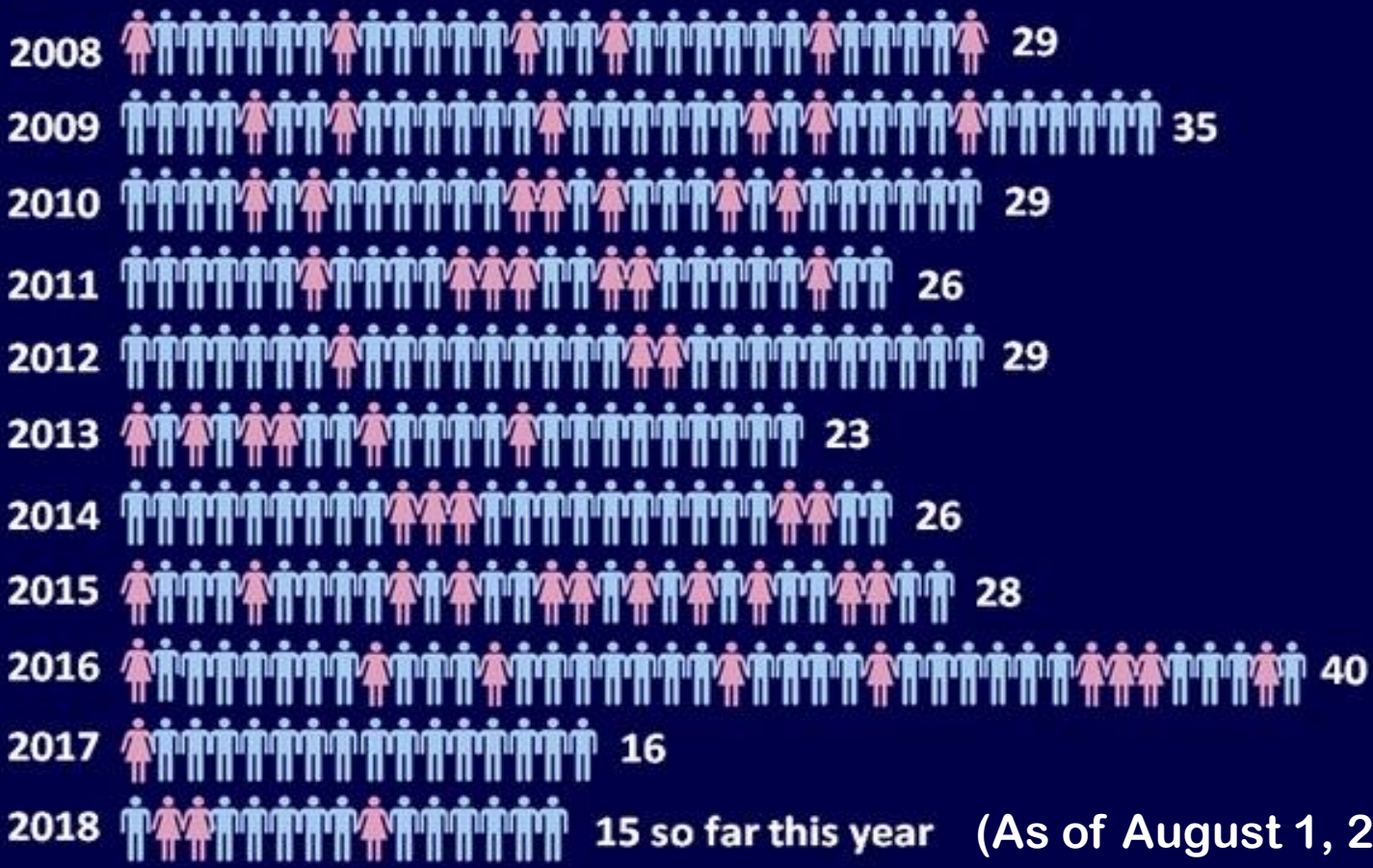
Car, House, Building

Jogger Injured by 1.5” Hail in Des Moines, IA
April 2010

Photo courtesy
KCCI 8 – Des Moines

Lightning

U.S. Lightning Fatalities 2008-2018



(As of August 1, 2018)

-232 -64

For more information:

https://www.weather.gov/safety/lightning-victims

Lightning Facts

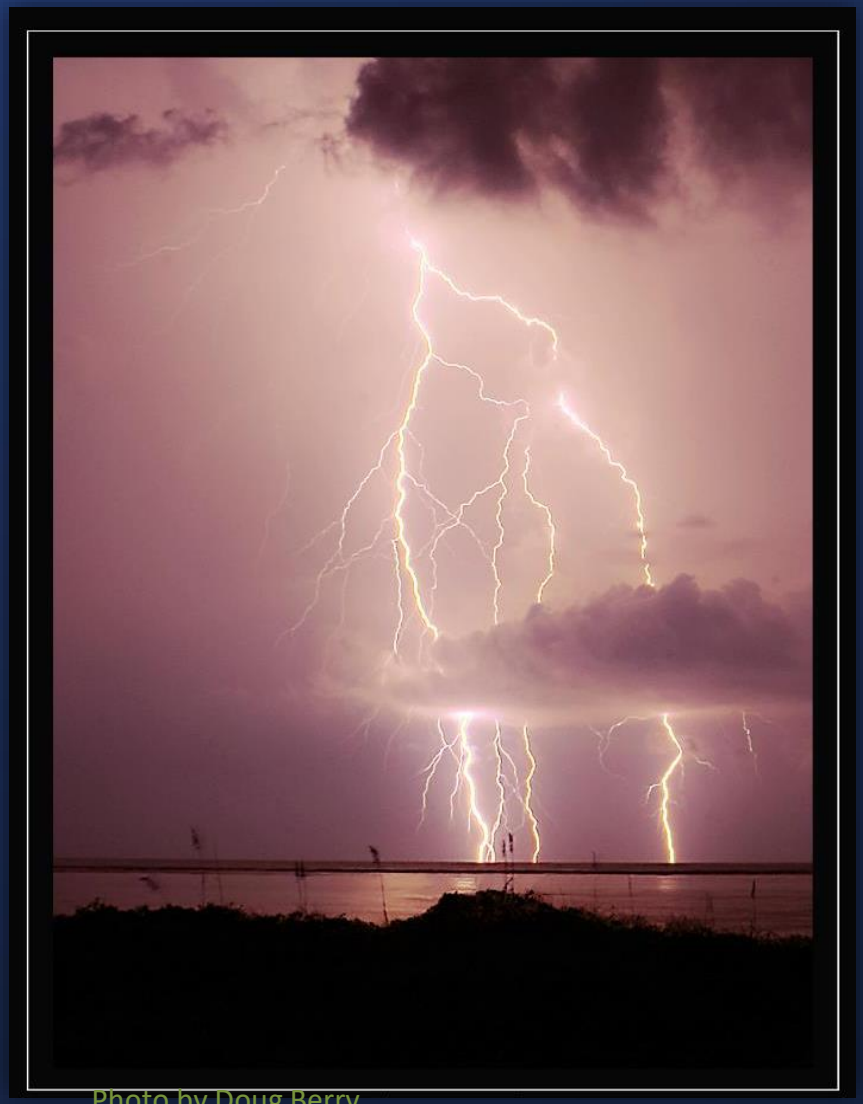


Photo by Doug Berry

- **Bolt can heat the air to 50,000° F**
- **Causes an average of 30-60 U.S. deaths/year** (70-80% male)
- **After thunder…**

  5 sec ~ 1 mile

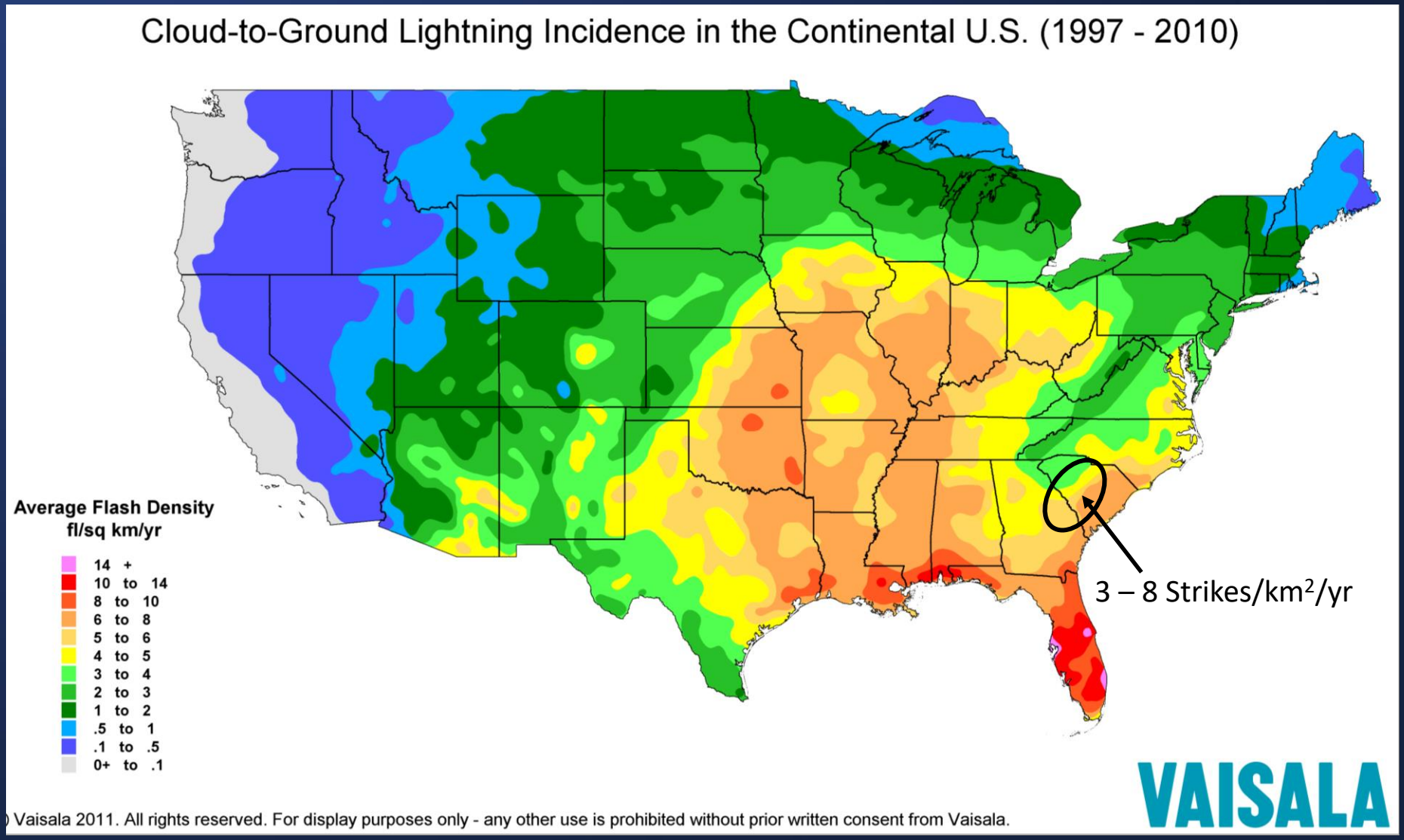
Lightning Facts

Photo by Doug Berry

Lightning can strike "Out of the Blue" miles away from the thunderstorm!

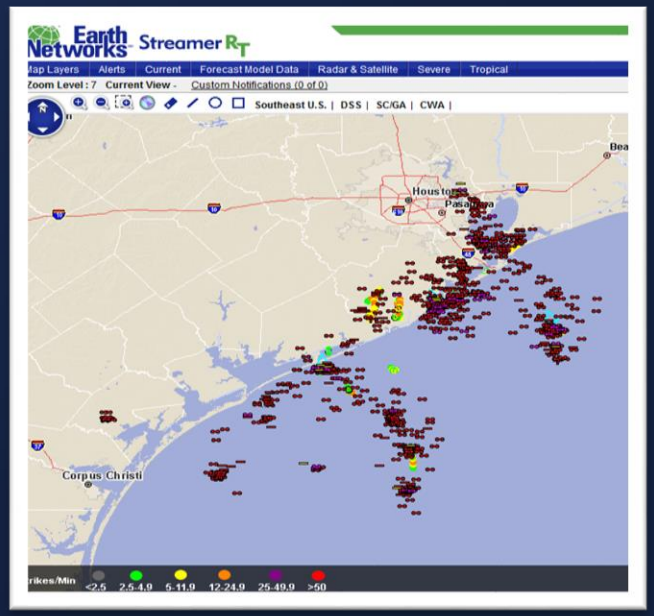
Cape Canaveral Air Force Station/Kennedy Space Center has documented lightning traveling almost 90 miles outward in the thunderstorm anvil.

Average CG Lightning Strikes (km^2/yr)



No NWS Warnings for Lightning!

- The biggest danger to the public/spotters
- Hard to Predict When/Where a CG Strike Will Occur
- Future – Lightning Warnings?



Some Signs of a Lightning Strike

BEFORE Strike

- Hair stands on end
- May hear a buzzing or crackling sound

AFTER Strike

- Bark Stripped off Tree
- Marks/Burns on Body
- Clothes/Shoes Burned
- Blown Electrical Outlets/Bulbs/Appliances

Lightning Safety Tips

- Avoid Being the Tallest Object
- Stay Away From Water and Metal
- Seek Protection in a Sturdy Structure
- Stay off Phones, Get Away from Windows & Appliances

Flooding

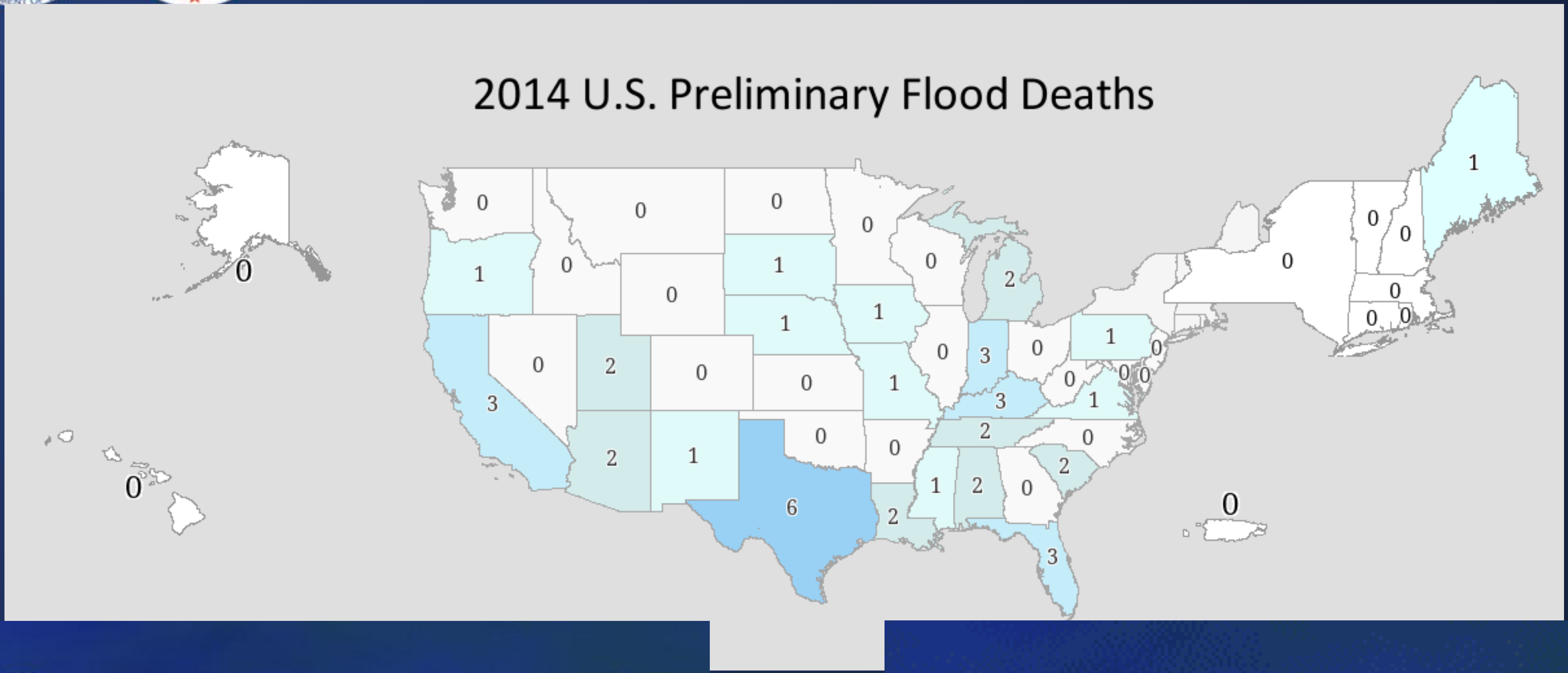
Flash Flooding

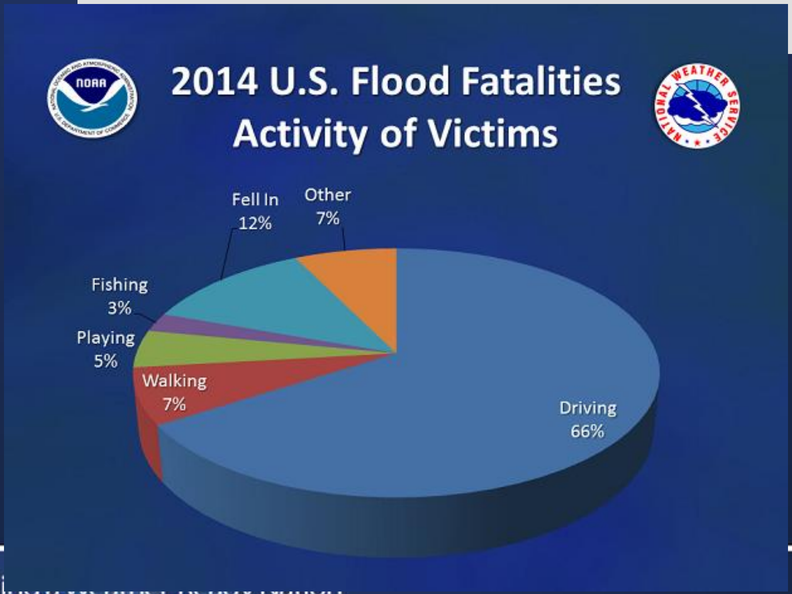
One of the Biggest Weather-Related Killers!

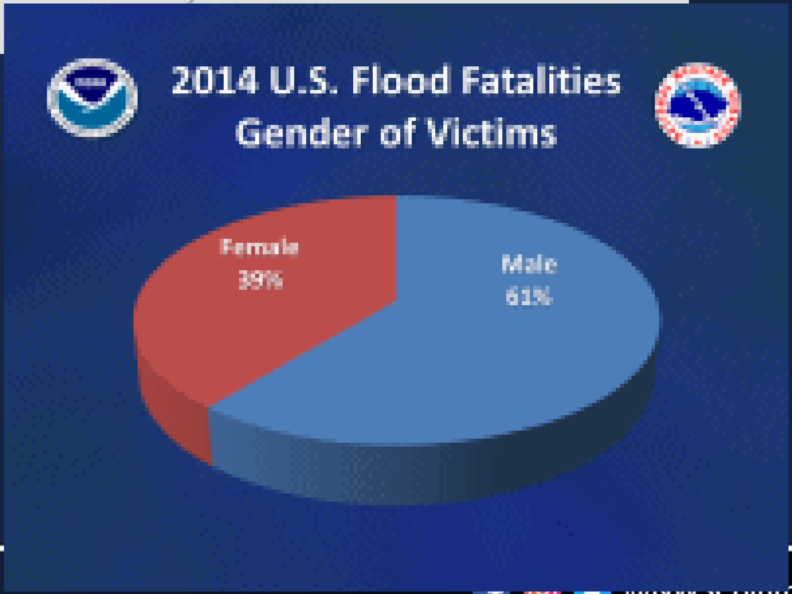
Don’t Drive Through Low Water Crossings!

Nearly *1/2* of All Flash Flood-Related Deaths Involve Automobiles

Flood Fatalities (# varies year to year)







Flooding: Hidden Dangers

- Hazardous Chemicals
- Snakes…
- Alligators…
- Drainage pipes…
- Glass…
- Sharp Objects…

Flash Flooding: Turn Around, Don't Drown

Flash Flooding: Turn Around, Don't Drown

Outline

- National Weather Service Overview
- Why are Storm Spotter Important
- Weather Hazards and Safety
- **Severe Weather Reporting Procedure**
- Outlooks/Watches/Warnings
- Monitoring Severe Weather

Severe Weather Reporting Procedures

- Measured or Estimated Winds 50+ mph
- Wind Damage (downed trees/tree limbs, power lines, cars, etc.)
- Tornadoes/Waterspouts
- Funnel Clouds
- Significant Flooding (roads impassable/closed, water into homes/businesses, etc.)
- Hail (any size)…report largest piece

Severe Weather Reporting Procedures

- Use TEL Method for Your Report:

Time - When did it happen?

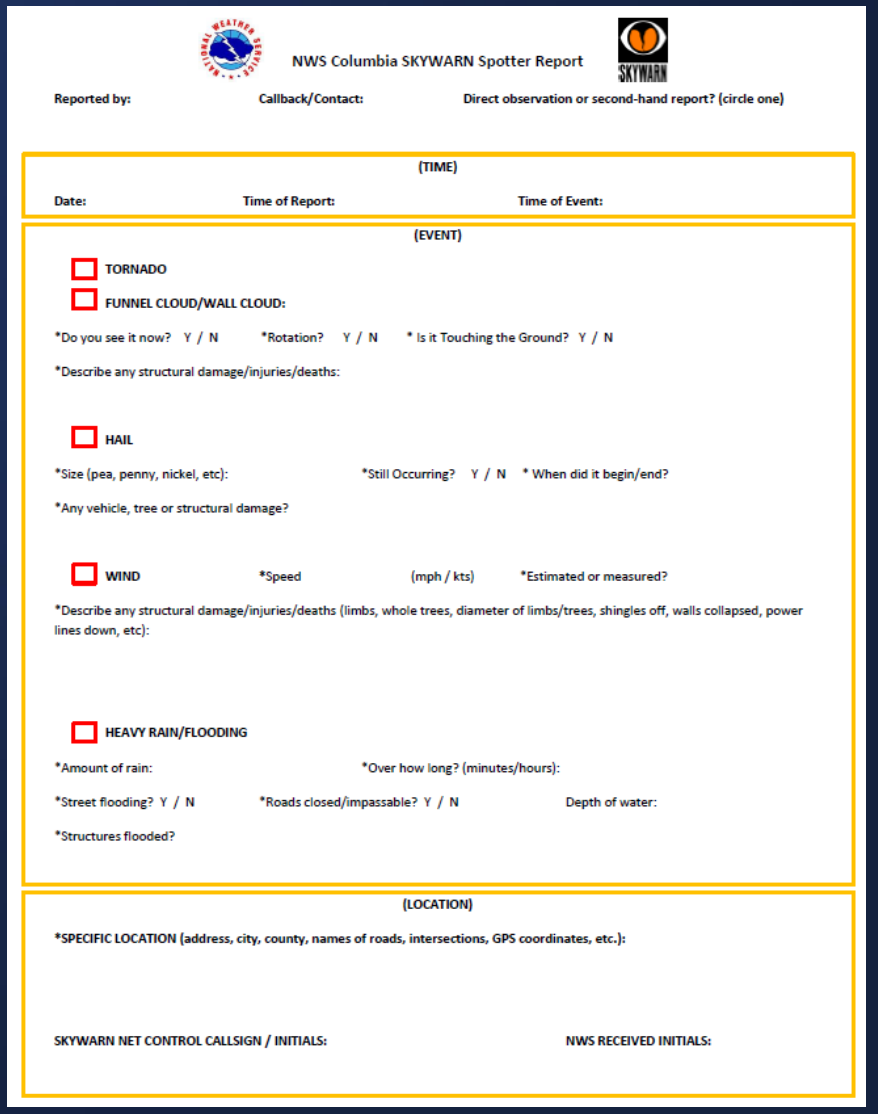
Event - What did you observe?

Location – Where did it occur?

Note: Address, nearest intersection or lat/lon for damage is VERY helpful!

Severe Weather Reporting Procedures

- *Have an organized reporting tool handy!*
  - *Spotter Report Form available for download*
  - *www.weather.gov/cae/skywarn.html*
- *Quick Reference Sheet another great tool.*



NWS Columbia SKYWARN Spotter Report

Reported by: Callback/Contact: Direct observation or second-hand report? (circle one)

(TIME)

Date: Time of Report: Time of Event:

(EVENT)

☐ TORNADO

☐ FUNNEL CLOUD/WALL CLOUD:

*Do you see it now? Y / N *Rotation? Y / N * Is it Touching the Ground? Y / N

*Describe any structural damage/injuries/deaths:

☐ HAIL

*Size (pea, penny, nickel, etc): *Still Occurring? Y / N * When did it begin/end?

*Any vehicle, tree or structural damage?

☐ WIND *Speed (mph / kts) *Estimated or measured?

*Describe any structural damage/injuries/deaths (limbs, whole trees, diameter of limbs/trees, shingles off, walls collapsed, power lines down, etc):

☐ HEAVY RAIN/FLOODING

*Amount of rain: *Over how long? (minutes/hours):

*Street flooding? Y / N *Roads closed/impassable? Y / N Depth of water:

*Structures flooded?

(LOCATION)

*SPECIFIC LOCATION (address, city, county, names of roads, intersections, GPS coordinates, etc.):

SKYWARN NET CONTROL CALLSIGN / INITIALS: NWS RECEIVED INITIALS:

Severe Weather Reporting Procedures

- **Examples of Reporting Wind Damage:**
  - If possible, measured wind gusts of 50+ mph
  - Can estimate strong winds using Beaufort Wind Scale
  - Downed power lines, trees or limbs (include diameter of tree or limbs)
  - Any structural damage, including the type of structure

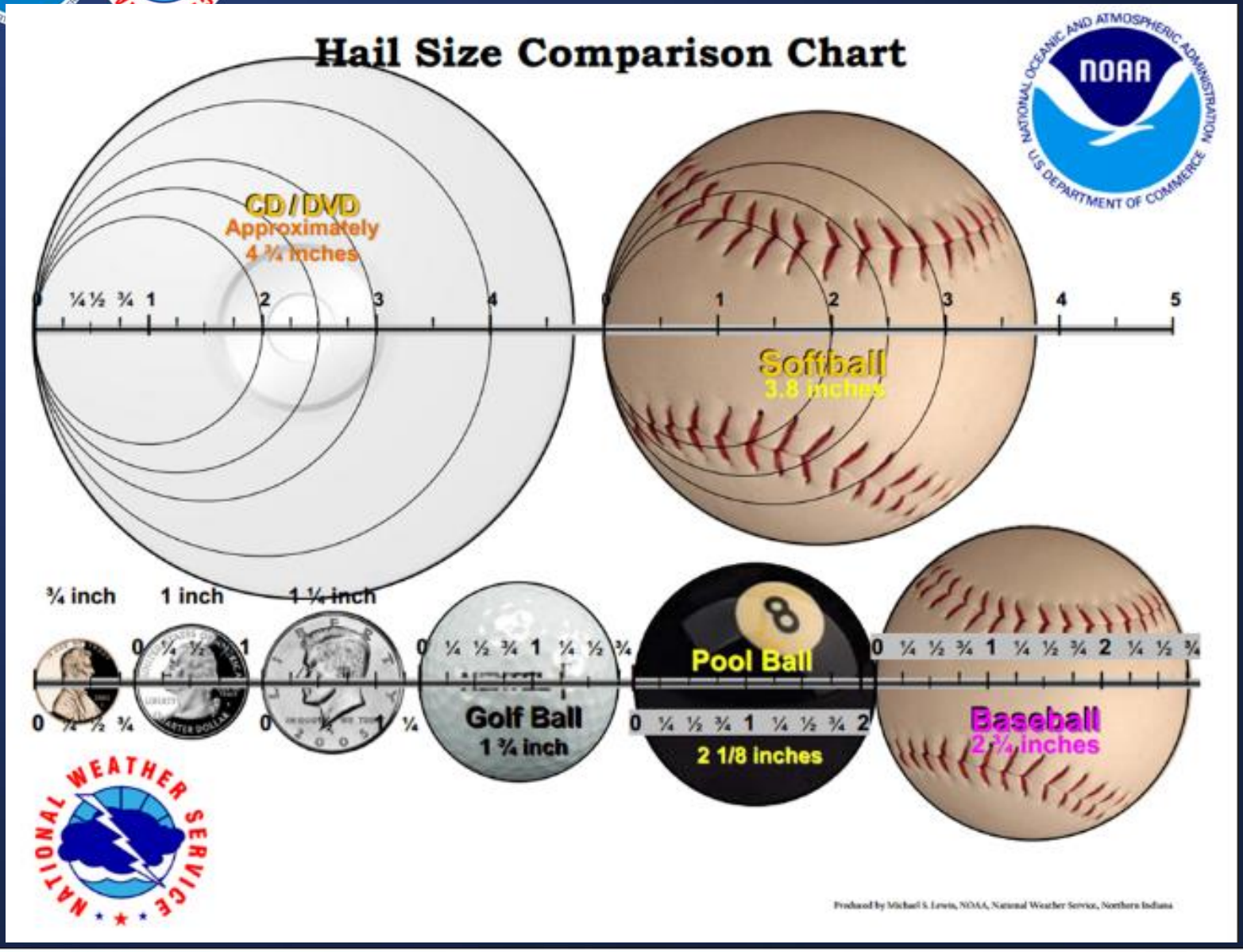
Severe Weather Reporting Procedures

Reportable Hail Sizes

¼”	Pea
¾”	Penny
0.88”	Nickel
1”	Quarter
1 ¾”	Golf ball
2 ½”	Tennis ball
2 ¾”	Baseball
4”	Grapefruit

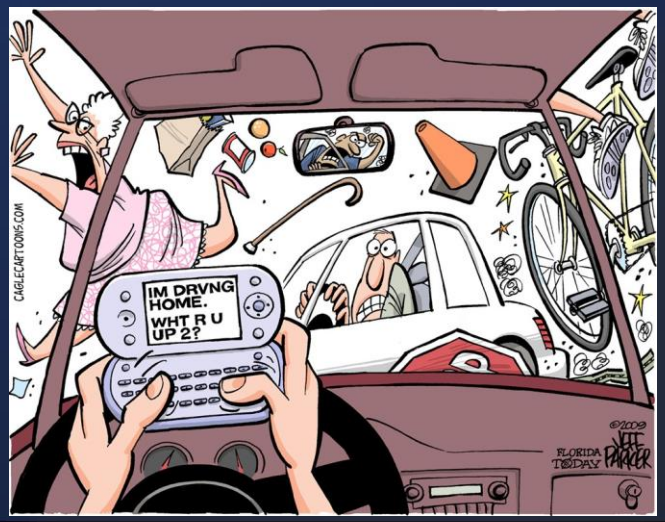
July 23, 2010
Vivian, SD
8” diameter
1.9 lbs

Severe Weather Reporting Procedures



Severe Weather Reporting Procedures

- Report Severe Weather and/or Damage from any location!
  - Home, shopping, work, vacation, etc.
- Don’t chase the weather!
- Remember…Safety First!
- If in a car – pull over before sending report
- We will relay your report to proper NWS office if needed



How to Report

Web:
http://weather.gov/cae

Phone (unlisted):

E-mail:
NWS.Columbia@noaa.gov

Facebook:
NWSColumbia

Twitter:
@NWSColumbia

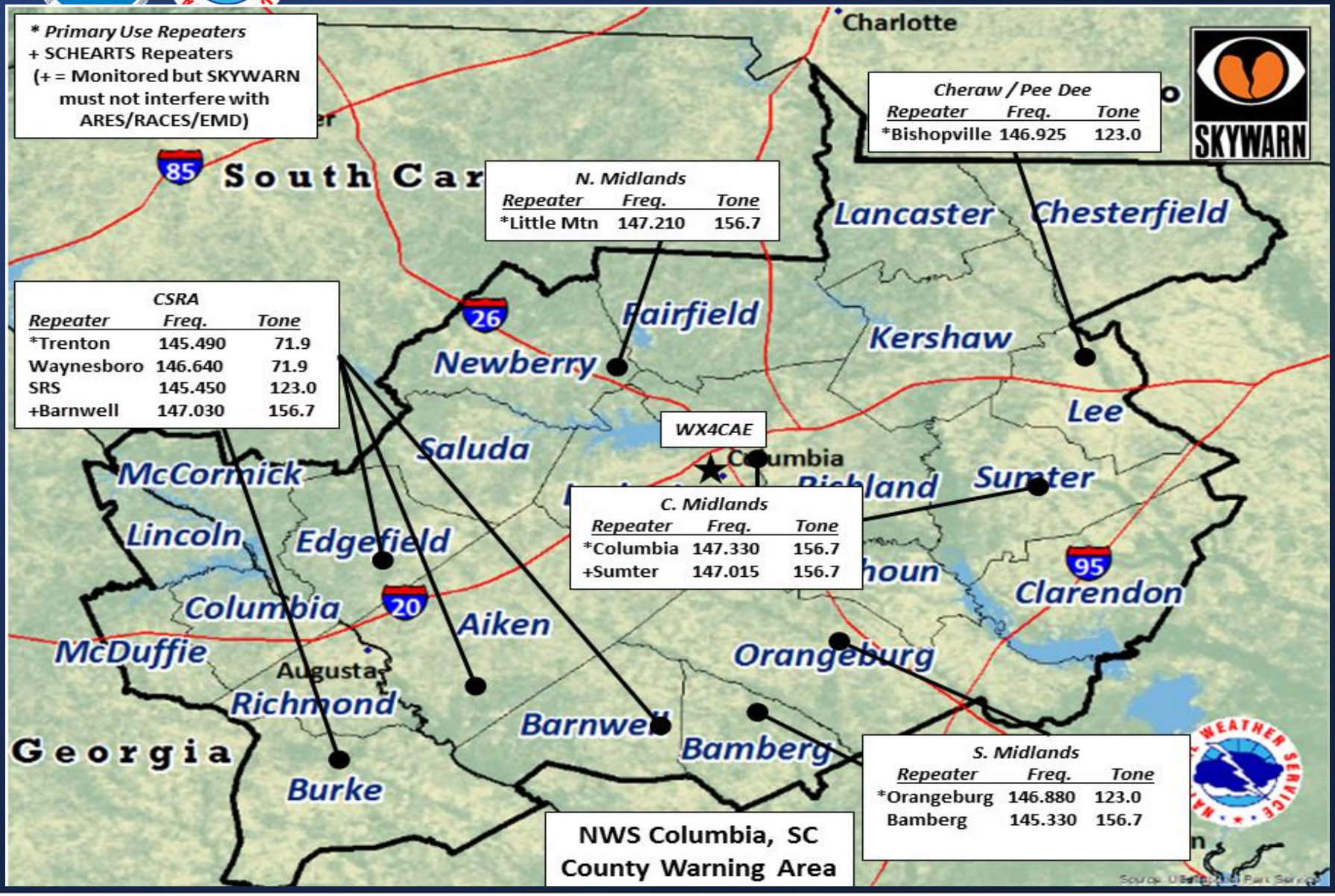
NWS Chat:
caechat chatroom

How to Report

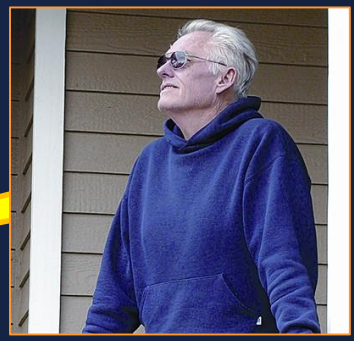
And of course… *Amateur Radio!*

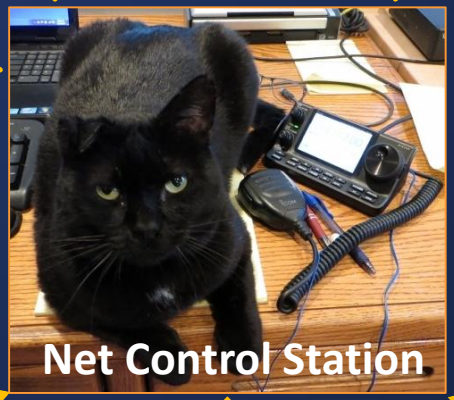
SKYWARN

How to Report



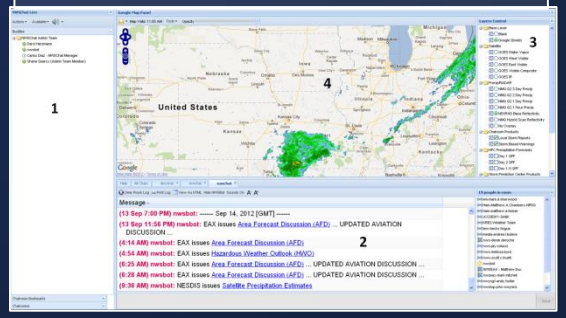
Ideal CAE SKYWARN Ham Operations





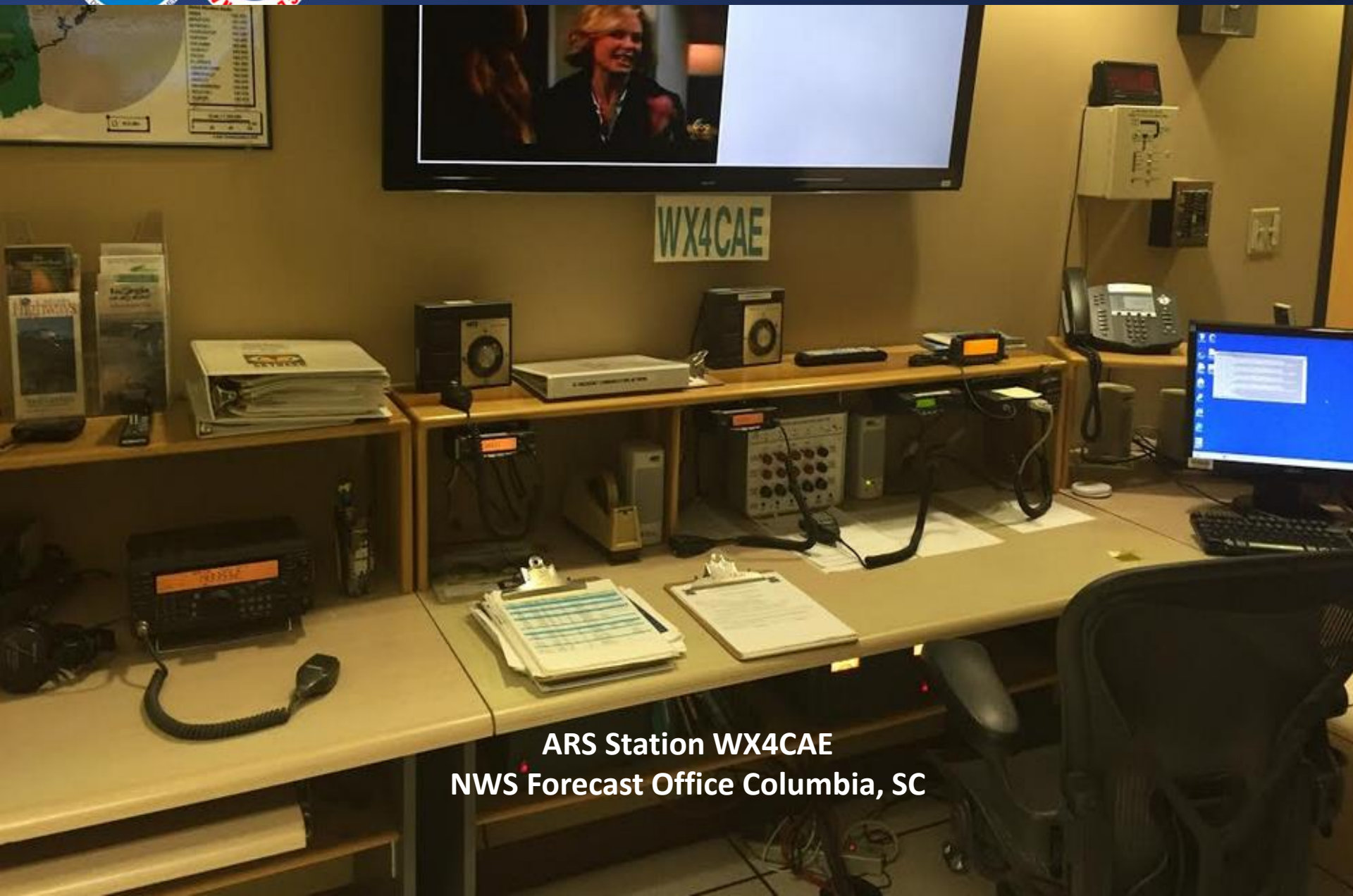
Unlisted SKYWARN Phone (Secondary)

NWS Chat (Internet – PREFERRED)



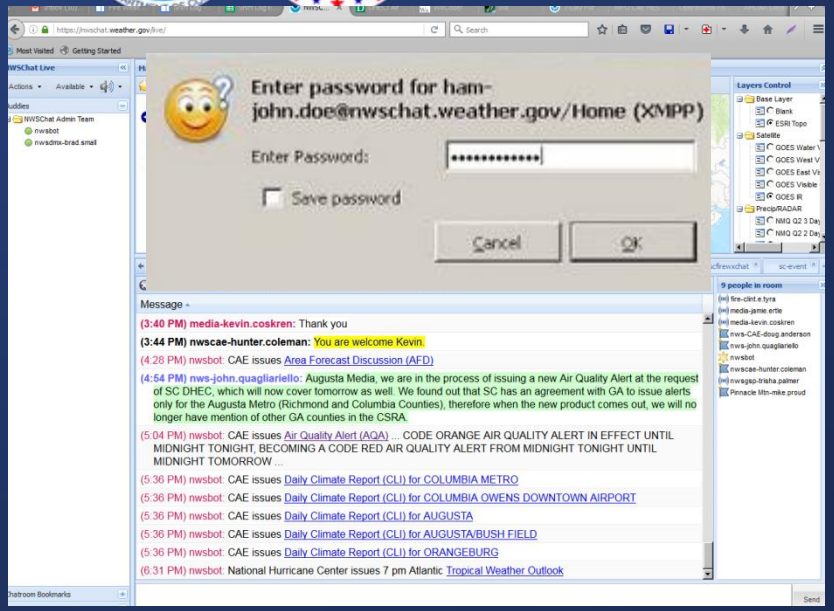
WX4CAE (rarely activated)

WX4CAE

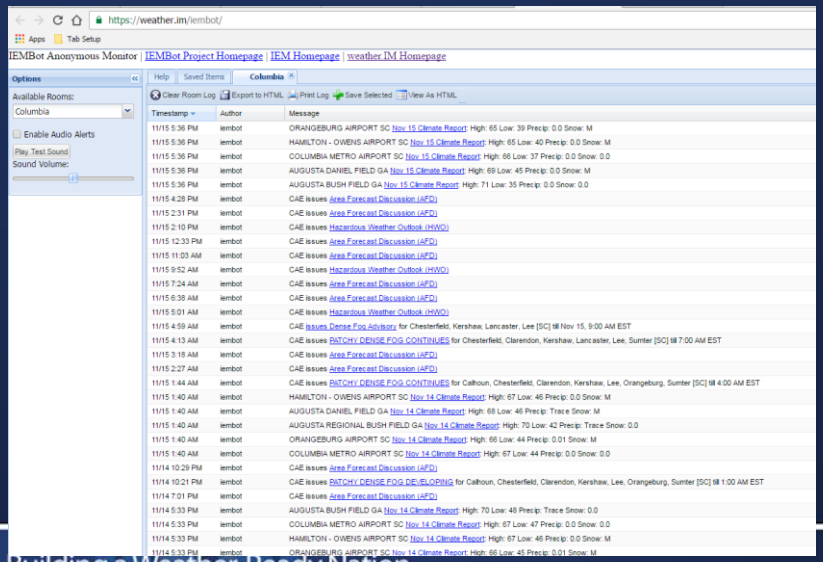


ARS Station WX4CAE
NWS Forecast Office Columbia, SC

NWSChat… A MUST for NCS Stations

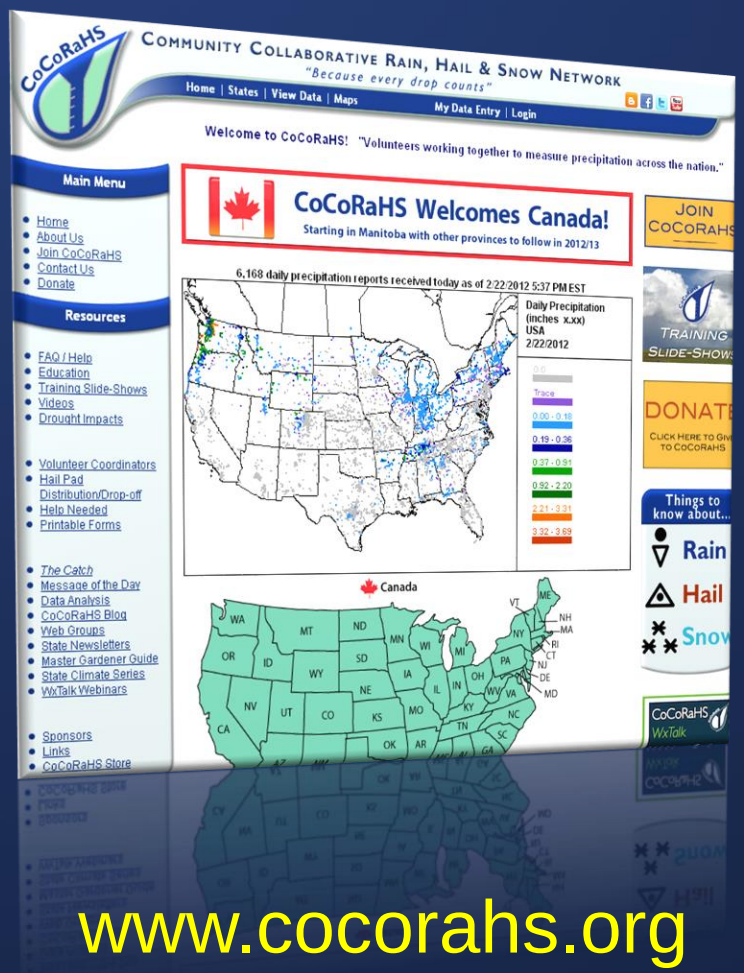


- SKYWARN Net Controllers should request an NWS Chat account.
  - Best way to pass reports directly to the NWS Office if not there.
  - **https://nwschat.weather.gov/**
  - Our chat room is caechat
  - I'm happy to help you set up an account



- IEMBot is a way for anyone to monitor any NWSChat forecast office chat room.
  - All watches/warnings/advisories along with many other products and notifications.
  - **https://weather.im/iembot/**

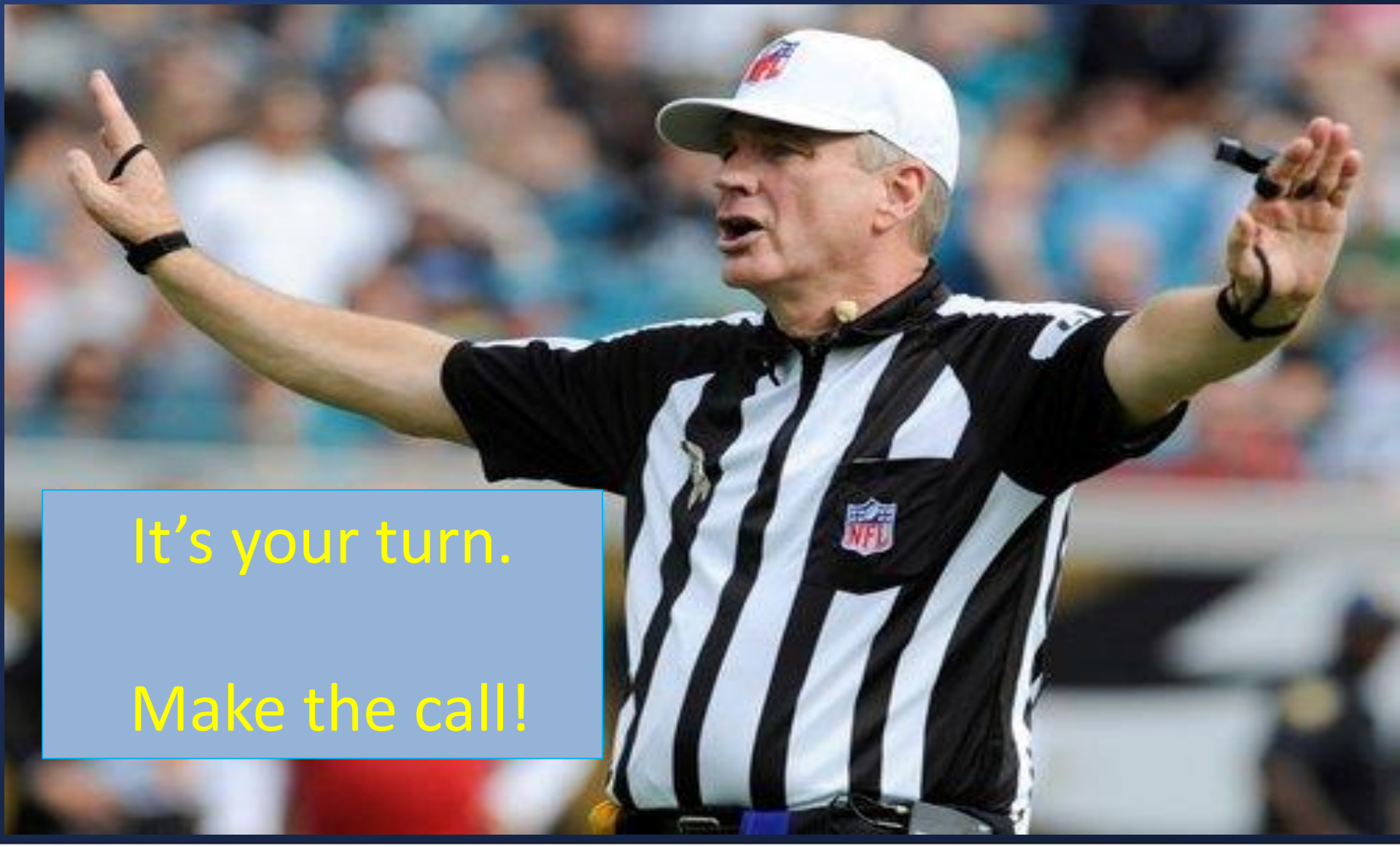
Other Ways to Help - CoCoRaHS



www.cocorahs.org

- **C**ommunity **C**ollaborative **R**ain, **H**ail & **S**now Network
- National Network of Volunteers
- All You Need is a Simple Rain Gauge to Get Started
- Report Daily Observations via Interactive Web Site

You Make the Call



What Would You Report?

Example of Severe Weather Report

- My name is John Doe
- I am a trained spotter located 2 miles N of Aiken (provide lat/lon, address or nearest intersection if possible)
- I see a Tornado 2 miles to my west, moving to the NE.
- We also had Golfball size hail at my location.
- It began at 6:35 pm and lasted for 5 minutes.
- You can call 803-555-1234 if you have any questions.

What Would You Report?

Tornado, Downburst,
Rain Shaft…?

What Would You Report?

Tornado or Updraft?

Updraft! Look for Rotation. If NOT Rotating → NOT a Tornado.

What Would You Report?

Funnel Cloud?

SCUD…NO rotation! Looks like a gust front approaching.

What Would You Report?

Tornado or Rain Shaft?

Rainshaft. You would notice NO rotation!

What Would You Report?

Shelf Cloud. HORIZONTAL rotation!
Indicator of approaching high winds.

What Would You Report?

Scud Cloud! Can be common on very warm/humid days in the SE.
Cloud bases can also be very low. Look for rotation!

What Would You Report?

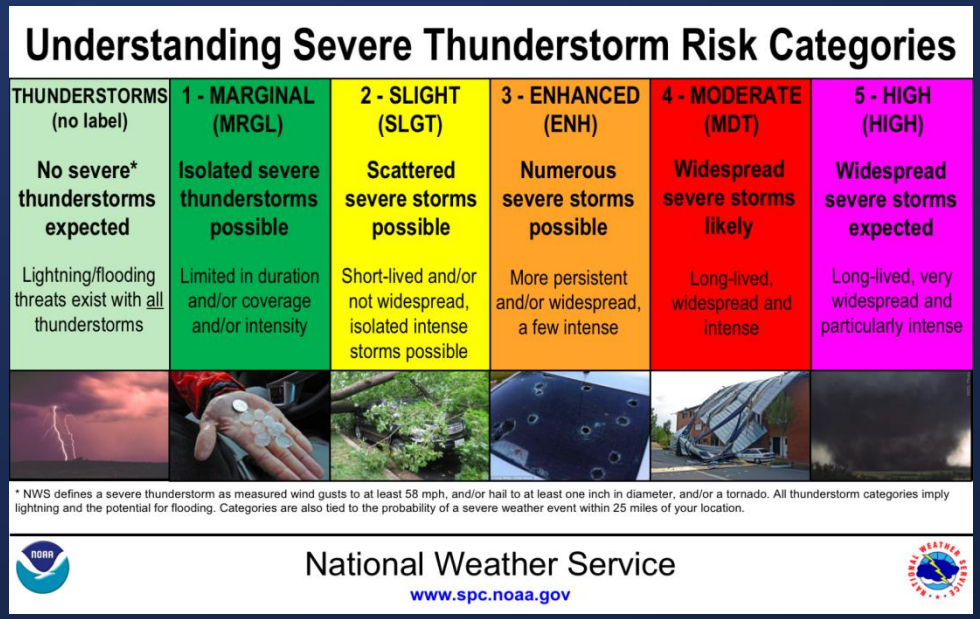
Tornado! The funnel is embedded in very heavy precipitation, but is a tornado. The observer noticed strong rotation and power flashes in the circled area, and reported the tornado.

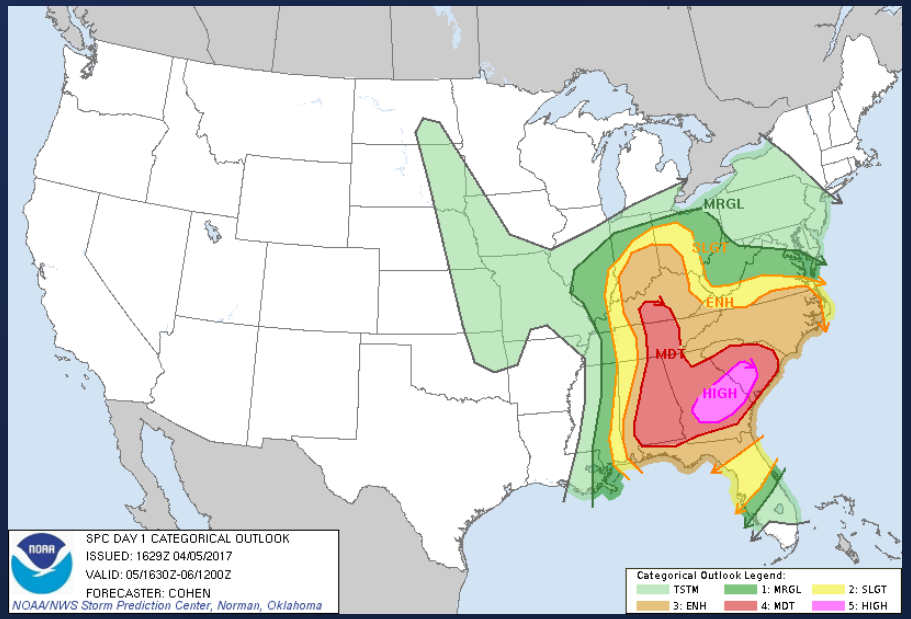
Outline

- National Weather Service Overview
- Why are Storm Spotter Important
- Weather Hazards and Safety
- Severe Weather Reporting Procedure
- **Outlooks/Watches/Warnings**
- Monitoring Severe Weather

Outlooks/Watches/Warnings

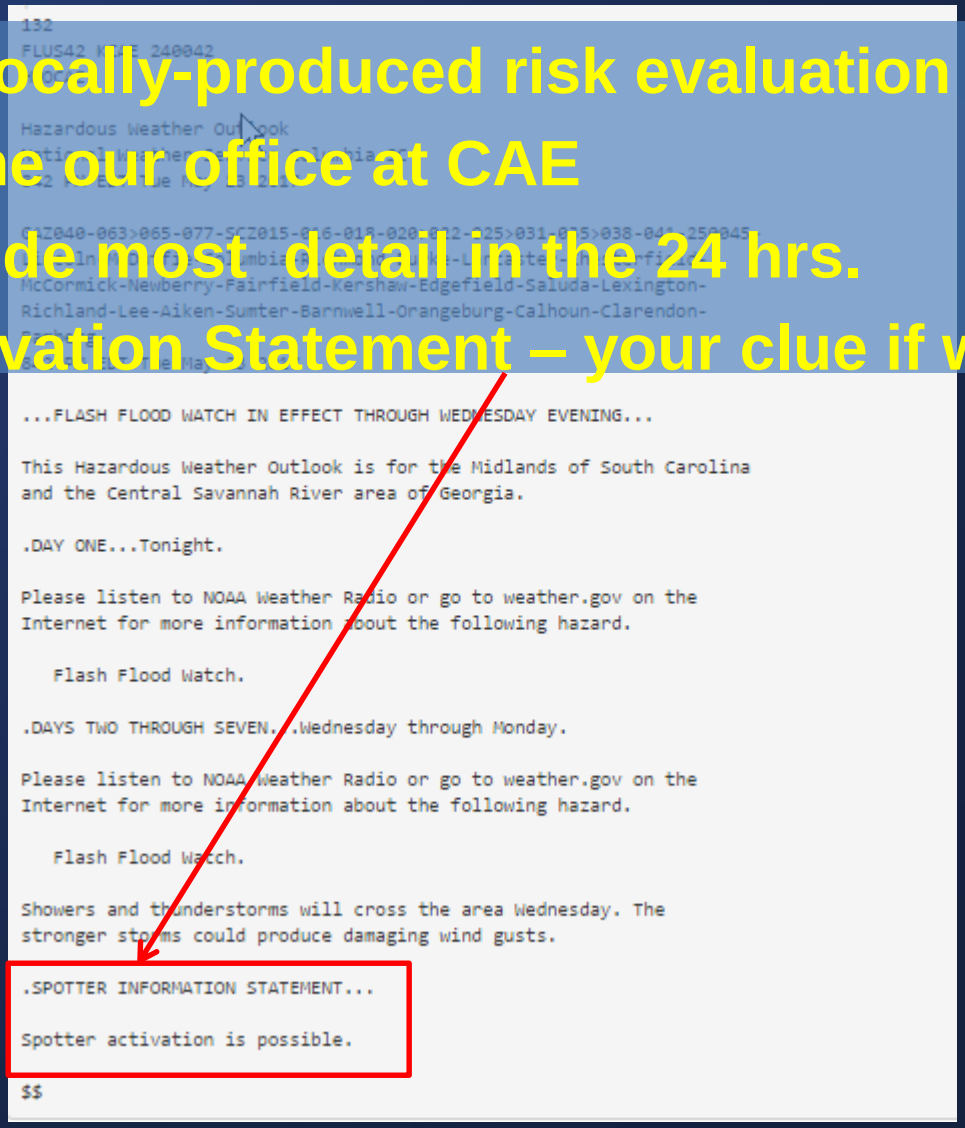
- **Outlooks:** Know Your Risk!
- Issued by the Storm Predictions Center (SPC)
- Outlooks go out 7-days, but provide more detail in the first one to three days.





Hazardous Weather Outlook

- **Outlooks: Locally-produced risk evaluation**
- **Issued by the our office at CAE**
- **HWOs provide most detail in the 24 hrs.**
- **Spotter Activation Statement – your clue if we need you!**



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Hazardous Weather Outlook

McCormick-Newberry-Fairfield-Kershaw-Edgefield-Saluda-Lexington-
Richland-Lee-Aiken-Sumter-Barnwell-Orangeburg-Calhoun-Clarendon-

...FLASH FLOOD WATCH IN EFFECT THROUGH WEDNESDAY EVENING...

This Hazardous Weather Outlook is for the Midlands of South Carolina
and the Central Savannah River area of Georgia.

.DAY ONE...Tonight.

Please listen to NOAA Weather Radio or go to weather.gov on the
Internet for more information about the following hazard.

   Flash Flood Watch.

.DAYS TWO THROUGH SEVEN...Wednesday through Monday.

Please listen to NOAA Weather Radio or go to weather.gov on the
Internet for more information about the following hazard.

   Flash Flood Watch.

Showers and thunderstorms will cross the area Wednesday. The
stronger storms could produce damaging wind gusts.

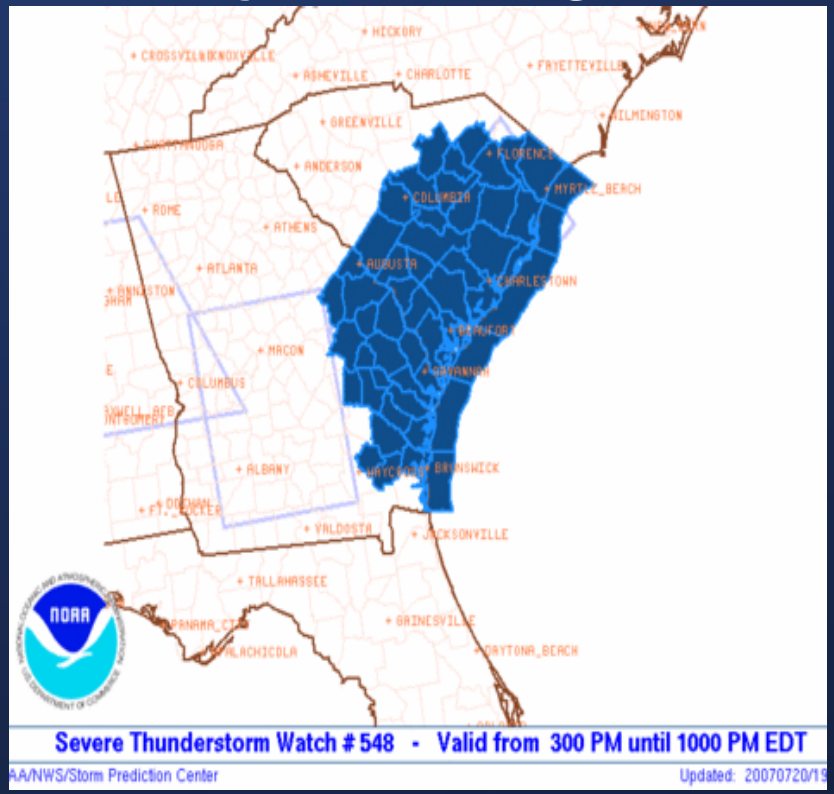
.SPOTTER INFORMATION STATEMENT...

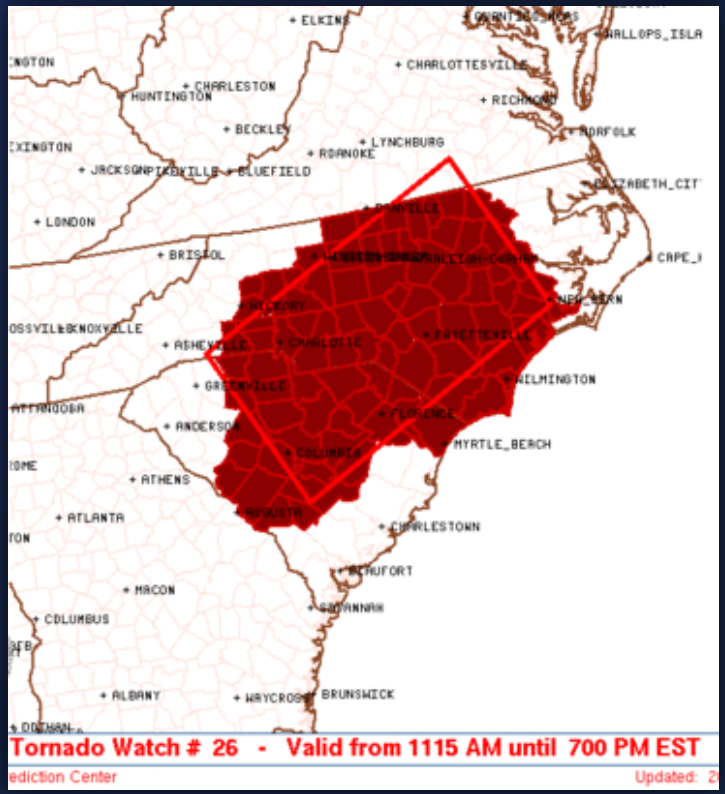
Spotter activation is possible.

$$

Outlooks/Watches/Warnings

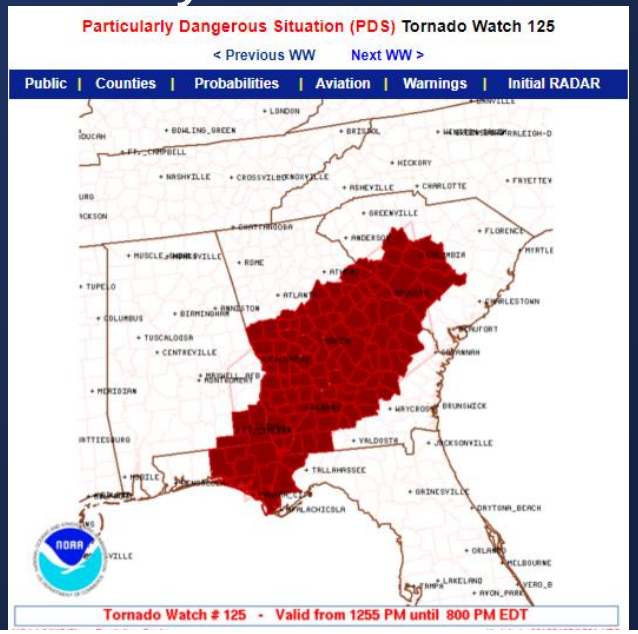
- **WATCH:** Conditions favorable for severe weather. ***Be prepared to take action!***
- Issued by the Storm Predictions Center (SPC)
- Usually cover large areas for 4-6 hours





Outlooks/Watches/Warnings

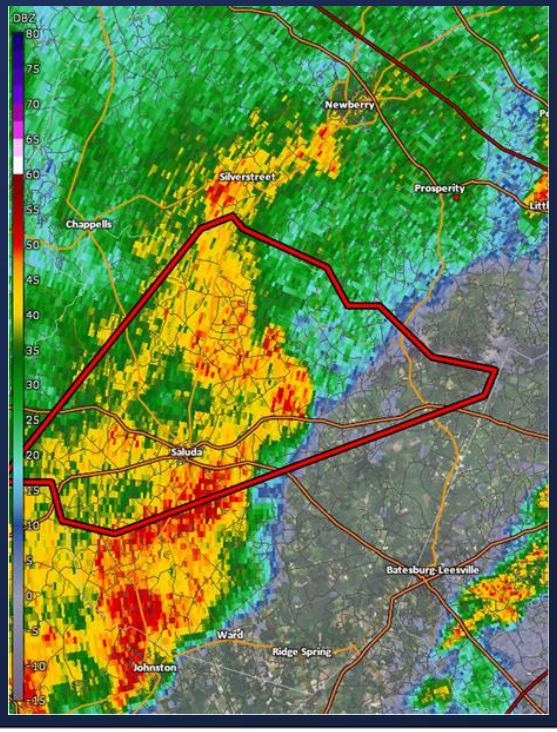
- Particularly Dangerous Situation (PDS) Watch: there is an enhanced risk of severe and life-threatening weather, usually a major tornado outbreak or a long-lived extreme derecho event.
- Very infrequent: generally about 3% of all watches issued



Hazard	Tornadoes	EF2+ Tornadoes	Severe Wind	65 kt+ Wind	Severe Hail	2"+ Hail
Likelihood	High	High	High	Moderate	High	Moderate

Outlooks/Watches/Warnings

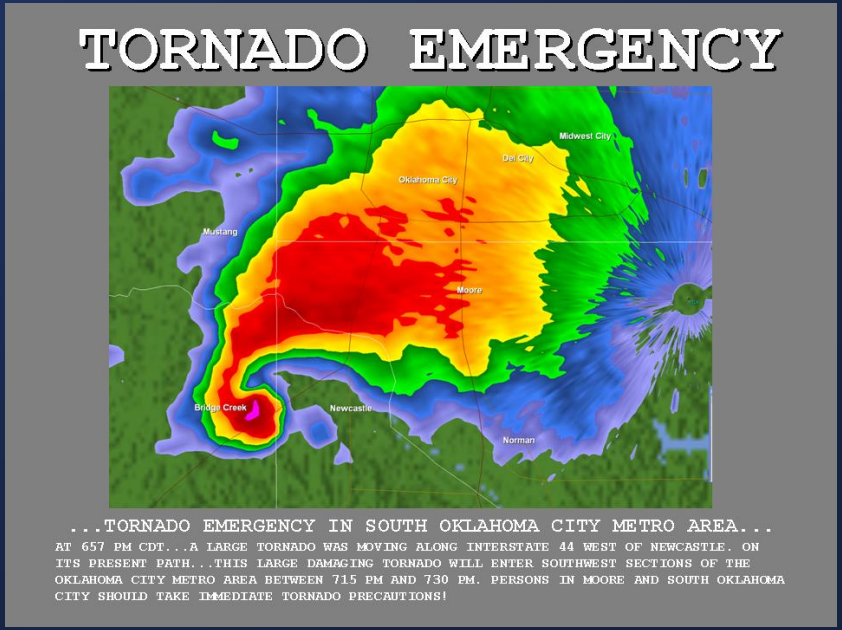
- **WARNING:** **Severe weather imminent or occurring. *Seek shelter now!***
- **Issued by the local NWS office**
- **Usually cover a portion of a county or counties and in effect for 45-60 minutes**



Outlooks/Watches/Warnings

WARNING Terms to Know…

- **Tornado Emergency:**
  - used during significant tornado occurrences in highly populated areas
  - generally means that significant, widespread damage is expected to occur and a high likelihood of numerous fatalities is expected with a large, strong to violent tornado
  - intended to convey the urgency of the weather situation

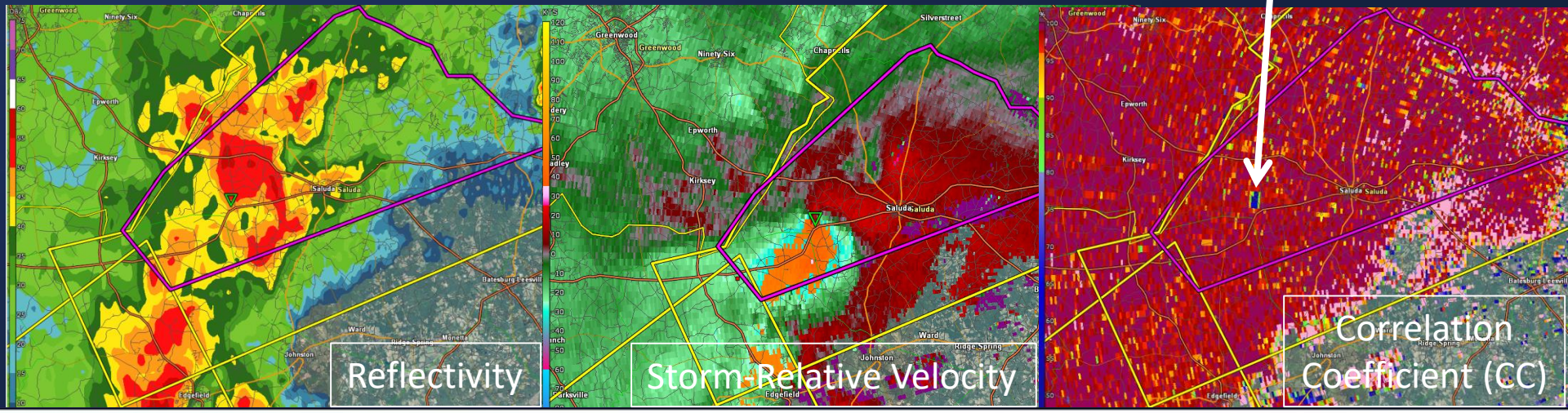


Outlooks/Watches/Warnings

WARNING Terms to Know…

- **Radar Confirmed Tornado:**
  - a tornado debris signature (TDS) or a **debris ball** on radar is caused by debris lofting into the area, usually associated with a tornado
  - with this signature on radar, NWS will use "Radar Confirmed Tornado" in warning products to confirm that a tornado is occurring

5/24/2017 2:41 PM EDT, Saluda/Edgefield Counties



Outlooks/Watches/Warnings

...A TORNADO WARNING REMAINS IN EFFECT UNTIL 330 PM EDT FOR SOUTHWESTERN FAIRFIELD...SOUTHEASTERN NEWBERRY...NORTHWESTERN LEXINGTON...NORTHEASTERN SALUDA AND NORTHWESTERN RICHLAND COUNTIES...

At 308 PM EDT, a confirmed tornado was located near Prosperity, or 9 miles south of Newberry, moving northeast at 40 mph.

HAZARD...Damaging tornado.

SOURCE...Radar confirmed tornado.

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.

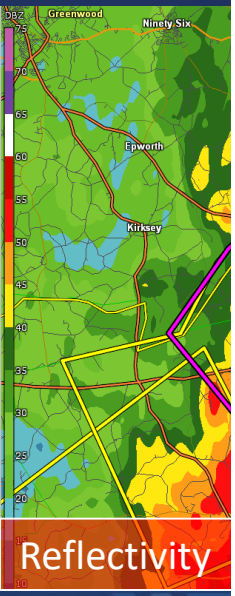
This tornado will be near...
Prosperity around 320 PM EDT.

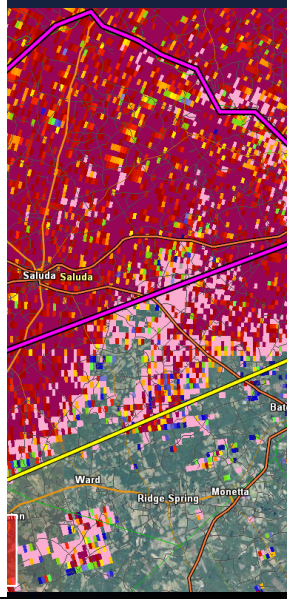
Other locations impacted by this tornadic thunderstorm include Peak, Little Mountain, Chapin, Pomaria and Lake Murray Of Richland.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

To repeat, a tornado is on the ground. 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.

5/24/2017





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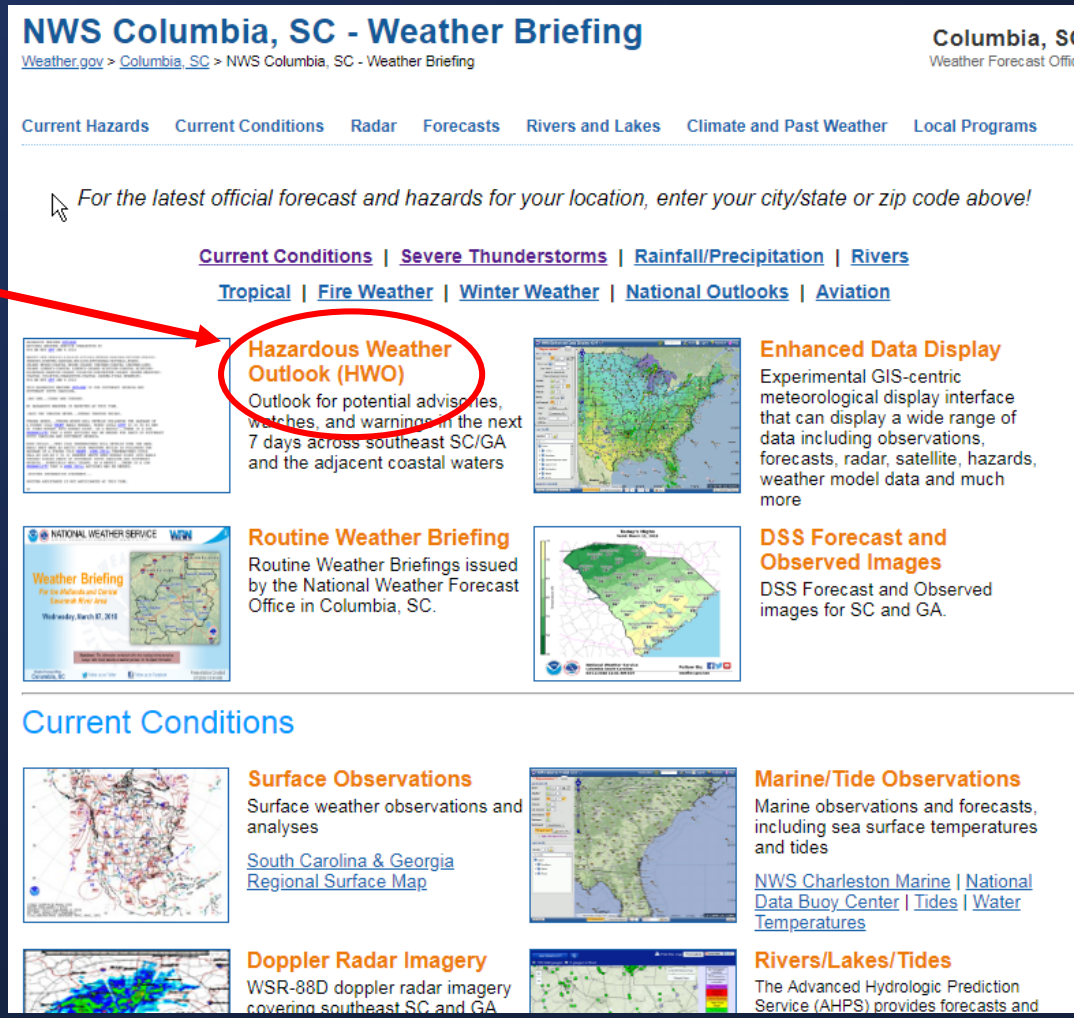
- **Monitoring Severe Weather**

Weather Briefing on the Web

https://www.weather.gov/cae/briefing.html

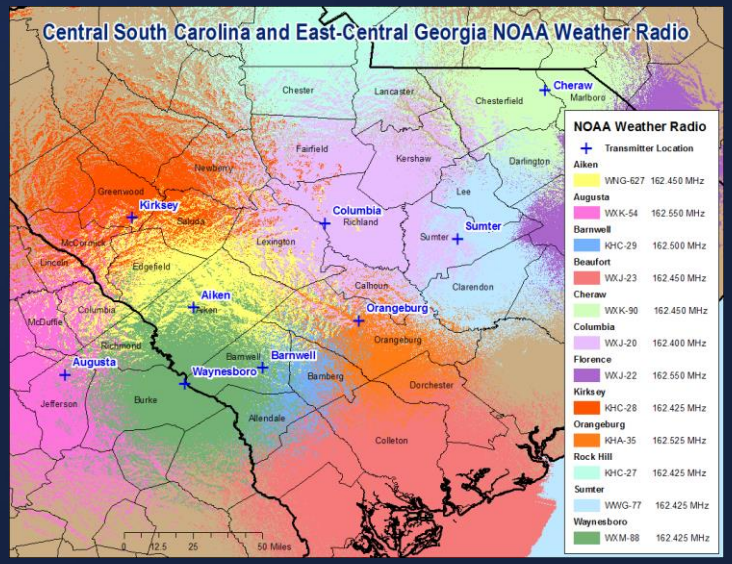
-- "The Place" for Spotters and NCS Stations

- Current Conditions
  - HWO – Spotter Activation
  - EDD Display
- Severe Thunderstorms
  - Severe Outlooks
  - Severe Watches
  - Lots more



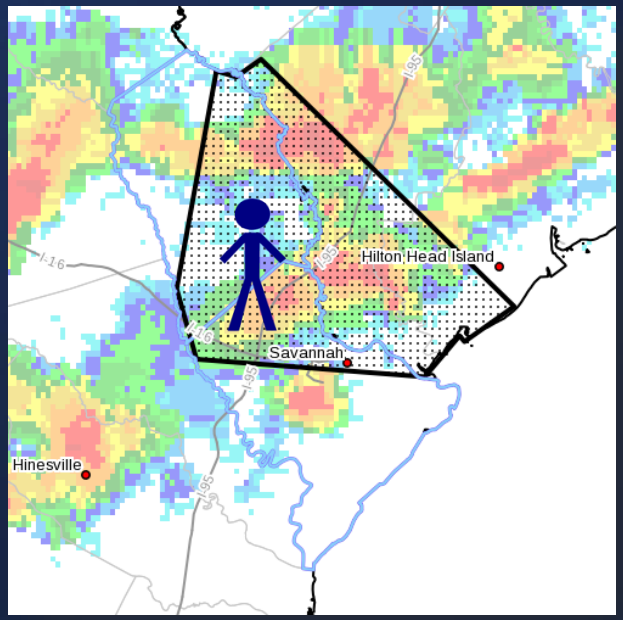
Staying Informed

- **NOAA Weather Radio All-Hazards (NWR)**
  - Nationwide network of radio stations broadcasting weather information directly from National Weather Service 24 hours a day.
  - In conjunction with Federal, State, and local EM's and other public officials, NWR broadcasts warnings and information for all types of hazards:
    - Natural (weather, earthquakes, etc.)
    - Environmental (chemical releases or oil spills)
    - Public Safety (Civil Emergency Messages, AMBER alerts, 911 telephone outages, etc.)



Staying Informed

- **Wireless Emergency Alerts:**
  - Sent by authorized government authorities (including NWS)
  - Automatically sent to mobile device (no app or subscription needed)
  - Uses radio technology to broadcast the alert from cell towers to mobile devices in the area of threat



Staying Informed

- **Wireless Emergency Alerts:**

WEA Messages Originated by NWS

	Warning Type	WEA Message
Extreme	Tsunami Warning	Tsunami danger on the coast. Go to high ground or move inland. Listen to local news. –NWS
	Tornado Warning	Tornado Warning in this area til hh:mm tzT. Take shelter now. Check local media. –NWS *-- or --* Tornado EMERGENCY til hh:mm tzT. Tornado spotted in this area. Find shelter now! -NWS
	Extreme Wind Warning	Extreme Wind Warning this area til hh:mm tzT ddd. Take shelter. –NWS
	Hurricane Warning	Hurricane Warning this area. Check local media and authorities. -NWS
	Typhoon Warning	Typhoon Warning this area til hh:mm tzT ddd. Check local media and authorities. -NWS
Severe	Storm Surge Warning**	NWS: Life-threatening storm surge danger. Check for possible evacuation orders.
	Flash Flood Warning	Flash Flood Warning this area til hh:mm tzT. Avoid flooded areas. Check local media. -NWS
	Dust Storm Warning	Dust Storm Warning til hh:mm tzT. Remember, Pull Aside, Stay Alive -NWS

Legend
tzT = timezone
ddd= three letter abbreviation for day of the week

**Availability of Storm Surge Warning varies by wireless carrier

Thank You for Attending!

weather.gov/cae/register

- Register as a Spotter to enter our database
- Receive your spotter certificate
- May be contacted for severe weather reports, especially if severe weather was in your area and we didn't hear from you.

NATIONAL WEATHER SERVICE
COLUMBIA, SC WEATHER FORECAST OFFICE

Certificate of Completion

Presented to:

First Last

For successfully completing the:

Basic SKYWARN® Spotter Training Course

September 5, 2016
Class Date

SKYWARN

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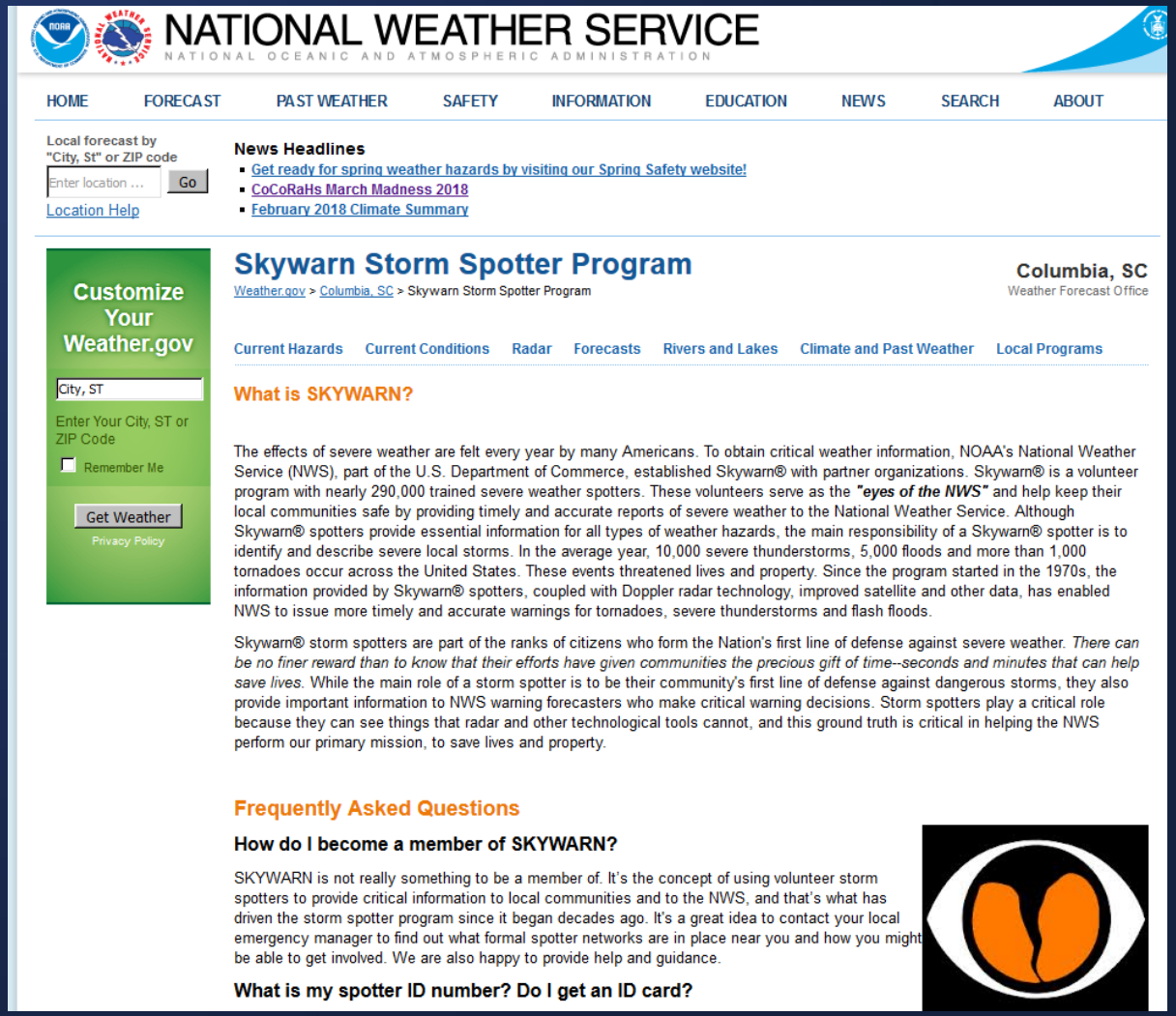
Warning Coordination Meteorologist

https://www.weather.gov/cae/skywarn.html

- Q and A's
- Net Scripts
- Request Spotter Classes
- Repeater Maps
- Quick References
- Training Page Coming!



NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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Skywarn Storm Spotter Program

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What is SKYWARN?

The effects of severe weather are felt every year by many Americans. To obtain critical weather information, NOAA's National Weather Service (NWS), part of the U.S. Department of Commerce, established Skywarn® with partner organizations. Skywarn® is a volunteer program with nearly 290,000 trained severe weather spotters. These volunteers serve as the ***"eyes of the NWS"*** and help keep their local communities safe by providing timely and accurate reports of severe weather to the National Weather Service. Although Skywarn® spotters provide essential information for all types of weather hazards, the main responsibility of a Skywarn® spotter is to identify and describe severe local storms. In the average year, 10,000 severe thunderstorms, 5,000 floods and more than 1,000 tornadoes occur across the United States. These events threatened lives and property. Since the program started in the 1970s, the information provided by Skywarn® spotters, coupled with Doppler radar technology, improved satellite and other data, has enabled NWS to issue more timely and accurate warnings for tornadoes, severe thunderstorms and flash floods.

Skywarn® storm spotters are part of the ranks of citizens who form the Nation's first line of defense against severe weather. *There can be no finer reward than to know that their efforts have given communities the precious gift of time--seconds and minutes that can help save lives.* While the main role of a storm spotter is to be their community's first line of defense against dangerous storms, they also provide important information to NWS warning forecasters who make critical warning decisions. Storm spotters play a critical role because they can see things that radar and other technological tools cannot, and this ground truth is critical in helping the NWS perform our primary mission, to save lives and property.

Frequently Asked Questions

How do I become a member of SKYWARN?

SKYWARN is not really something to be a member of. It's the concept of using volunteer storm spotters to provide critical information to local communities and to the NWS, and that's what has driven the storm spotter program since it began decades ago. It's a great idea to contact your local emergency manager to find out what formal spotter networks are in place near you and how you might be able to get involved. We are also happy to provide help and guidance.

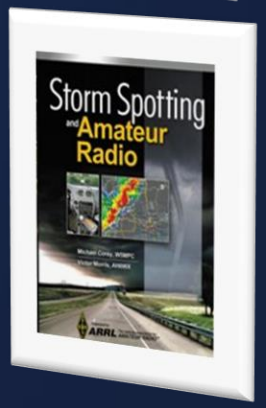
What is my spotter ID number? Do I get an ID card?

Other Great Resources

- **Weather Spotter's Field Guide**
  http://www.weather.gov/os/brochures/SGJune6-11.pdf
  We're out of stock, but feel free to download!

NEW

- **"Storm Spotting and Amateur Radio"**
  M. Corey, V. Morris
  http://www.arrl.org/shop/Storm-Spotting-and-Amateur-Radio/?page=1



- **Online Spotter and other courses from COMET**
  http://www.meted.ucar.edu
  Includes ONLINE SKYWARN Spotter, Convective Basics, Radar Interpretation and many more!

SKYWARN Recognition Day

- Every first Saturday in December
  - Planning for this year's event, Dec 1st, 2018 0000Z to 2400Z
  - National special event recognizing our SKYWARN Spotters
  - SRD 2017, Food, Classes, Fun… 50+ people, 160+ contacts @ WX4CAE
  - https://www.weather.gov/crh/skywarnrecognition
  - http://www.arrl.org/skywarn-recognition-day
  - Club and hams welcome to bring portable stations to operate our Special Event Station
  - We'd love help making it bigger and better…let us know if you'd like to get involved!

National Weather Service
SKYWARN Recognition Day

NWS Special Event

ARRL
The national association for AMATEUR RADIO

NWS Special Event

Questions?

STORM SPOTTER
SKYWARN

Your Reports Make a Difference!

Radiosonde Sighting This Morning!

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Data | Overlays | View | Configure — 1213 UTC 30 Mar 2019

PIREP B738
Obs Time: 2019-03-30T11:57:00Z
Flight level: 370
PIREP: CHS UA /OV CHS020020/TM 1157/FL370/TP B738/WX WEATHER BALLOON/RM WHITE WEATHER BALLOON REPORTED BY PILOT/ APPEARED TO STILL BE CLIMBING/ MOST LIKELY MOVING WITH THE WIND NE

370

60

Scale
100 km
50 mi

PIREP Turb: NIL LGT MOD SEV | PIREP Ice: NIL LGT MOD SEV | PIREP Other: