Introduction to SKYWARN® and Storm Spotting

National Weather Service
Baltimore MD/Washington DC

Filling Out Your Registration Form

Did anyone not register online?

The information you enter on this form WILL NOT be given out to anyone. You are protected by Federal Privacy Laws.

For those who registered online, we will upload your information after the class into our database. YOU DO NOT NEED TO FILL OUT THIS FORM.

****Please give us 3-4 weeks to input your information and email you a Spotter ID. You can still call/email us during that time****

NWS Baltimore/Washington DC
SKYWARN Registration Form
(Please Print)

Name: _____ Date: _____
Course/Location: _____ Instructor: _____

Have you taken Basic I SKYWARN training before? Yes ____ No ____
When? _____ Where? _____
Spotter ID Number? _____

Ham Call Sign: _____

Email Address: _____
Secondary Email Address: _____

If you are a new spotter OR need to update your information, please fill out the portion below.

Street Address: _____
City: _____ State: _____ Zip: _____
County (or Independent City-VA): _____

Home Phone (with area code): _____
Work Phone (with area code): _____
Cell Phone (with area code): _____

May we call you if Hazardous Weather Occurs? Yes ____ No ____
Unavailable times (i.e. 10PM-6AM): _____

Do you live near a stream or river? Yes ____ No ____
If yes, what is its name? _____

Do you have any of the following equipment?
Rain gauge? Yes ____ No ____ Thermometer? Yes ____ No ____
Anemometer? Yes ____ No ____ Weather Radio? Yes ____ No ____

Today's Topics

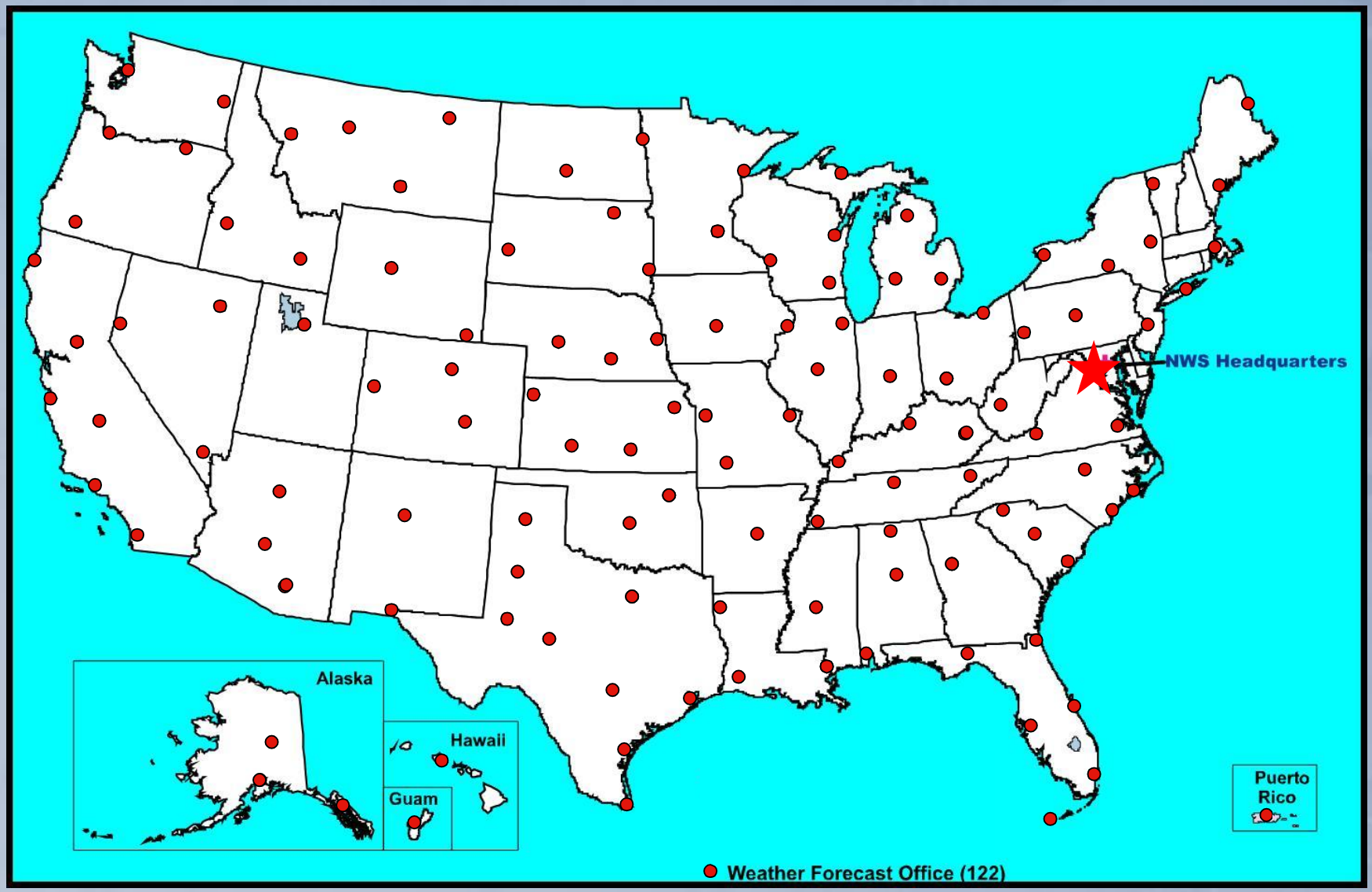
- Overview of the NWS
- Operations & Services
- What Does a Spotter Do?
- How to Report Hazardous Weather
- Weather Hazards in the Mid Atlantic
  - Convective
  - Non Convective

About the National Weather Service

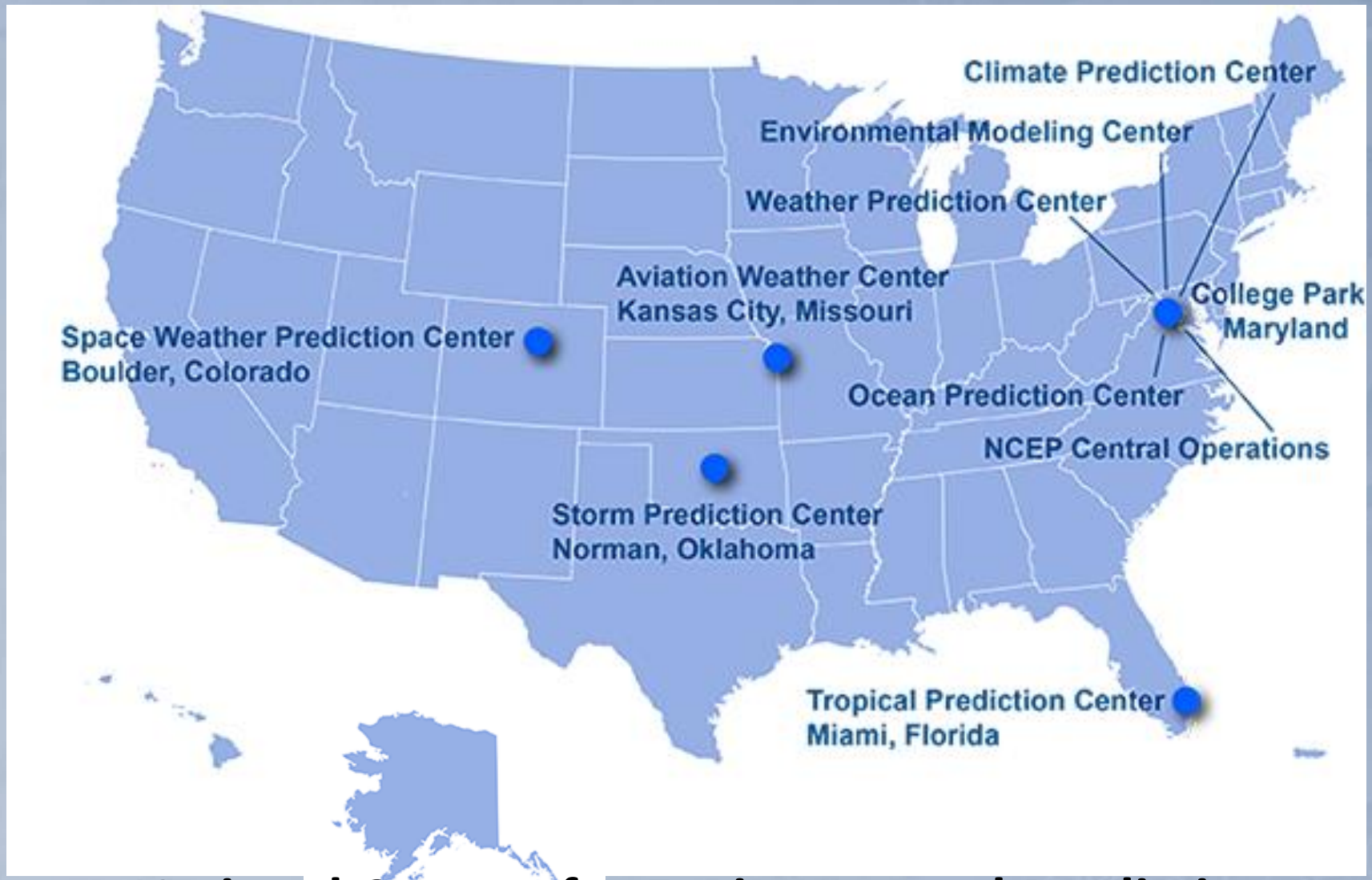
- Provide climate, water, weather forecasts and warnings to **protect life and property**

- Data and products are used by other government agencies, the private sector, the public and the global community

Overview of the NWS



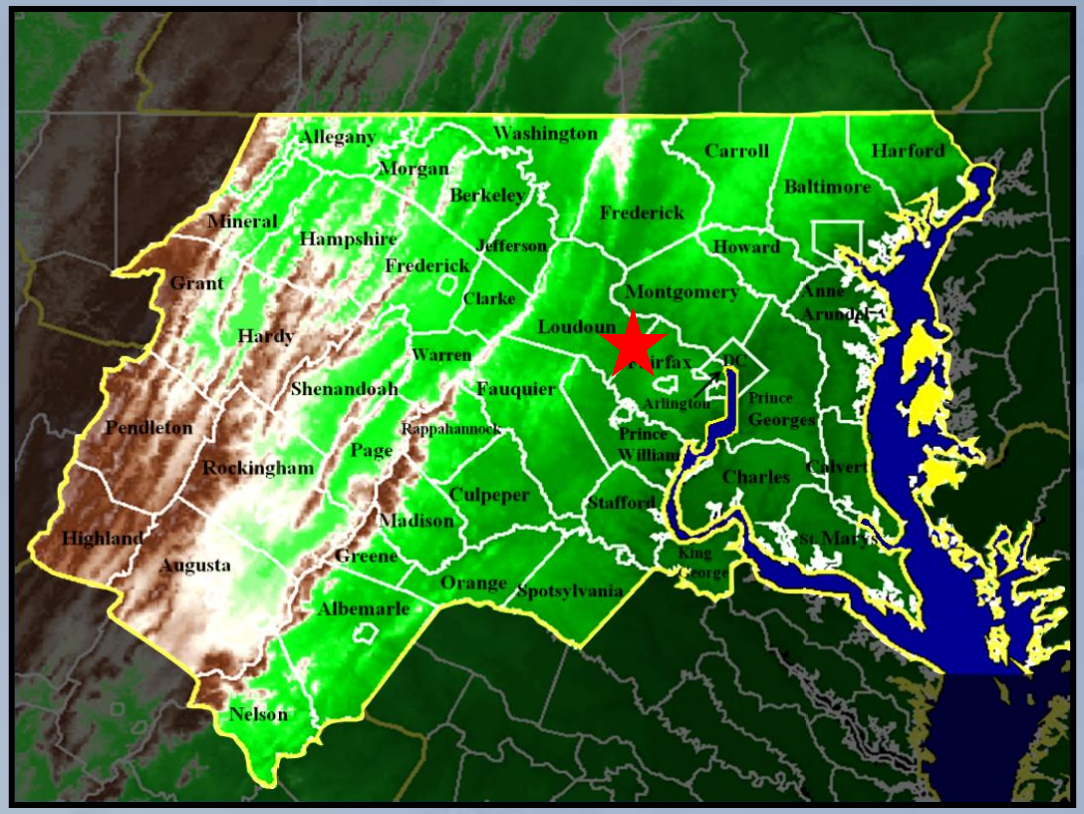
Overview of the NWS



National Centers for Environmental Prediction

Land Area of Responsibility

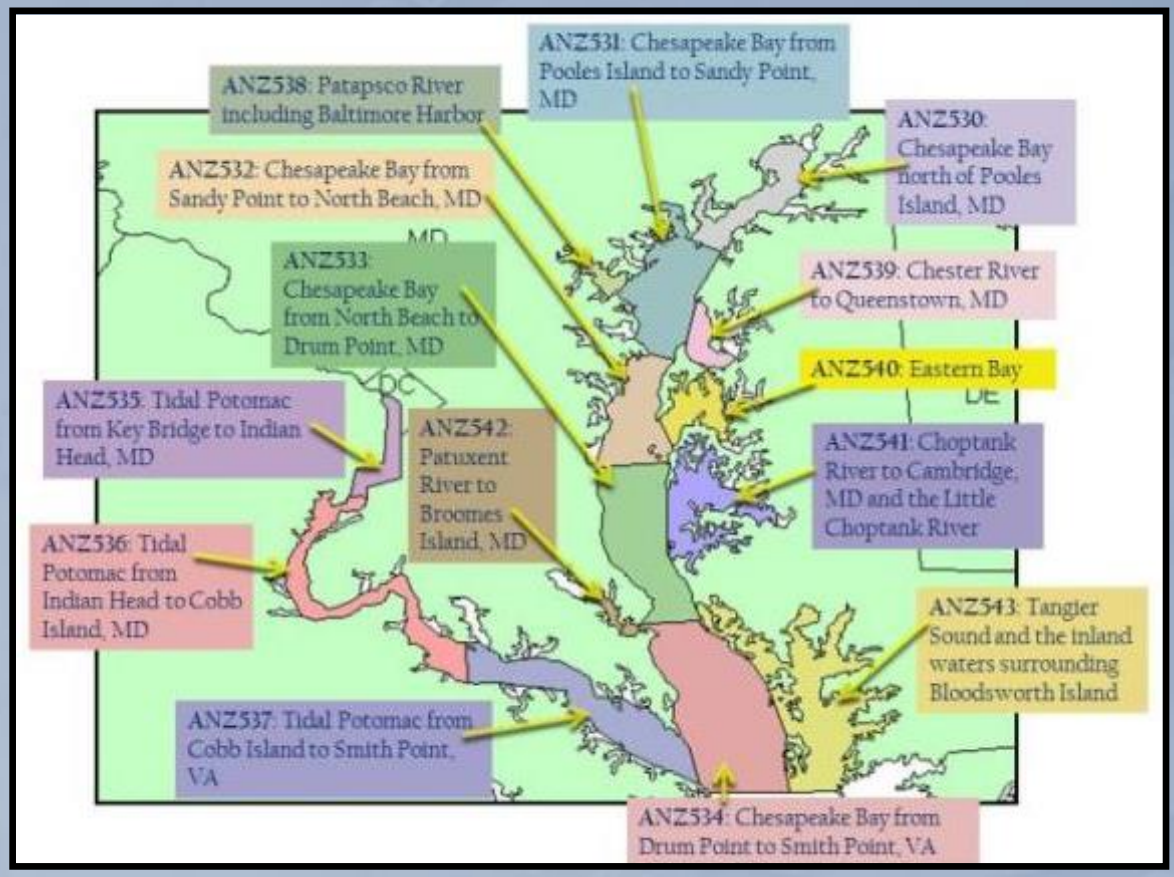
- 13 MD Counties
- 8 WV Counties
- 22 VA Counties
  - 11 Independent Cities
- District of Columbia
- The City of Baltimore



…nearly 10 million people to look out for!

Marine Area of Responsibility

- **Upper Chesapeake Bay**
- **Tidal Potomac**



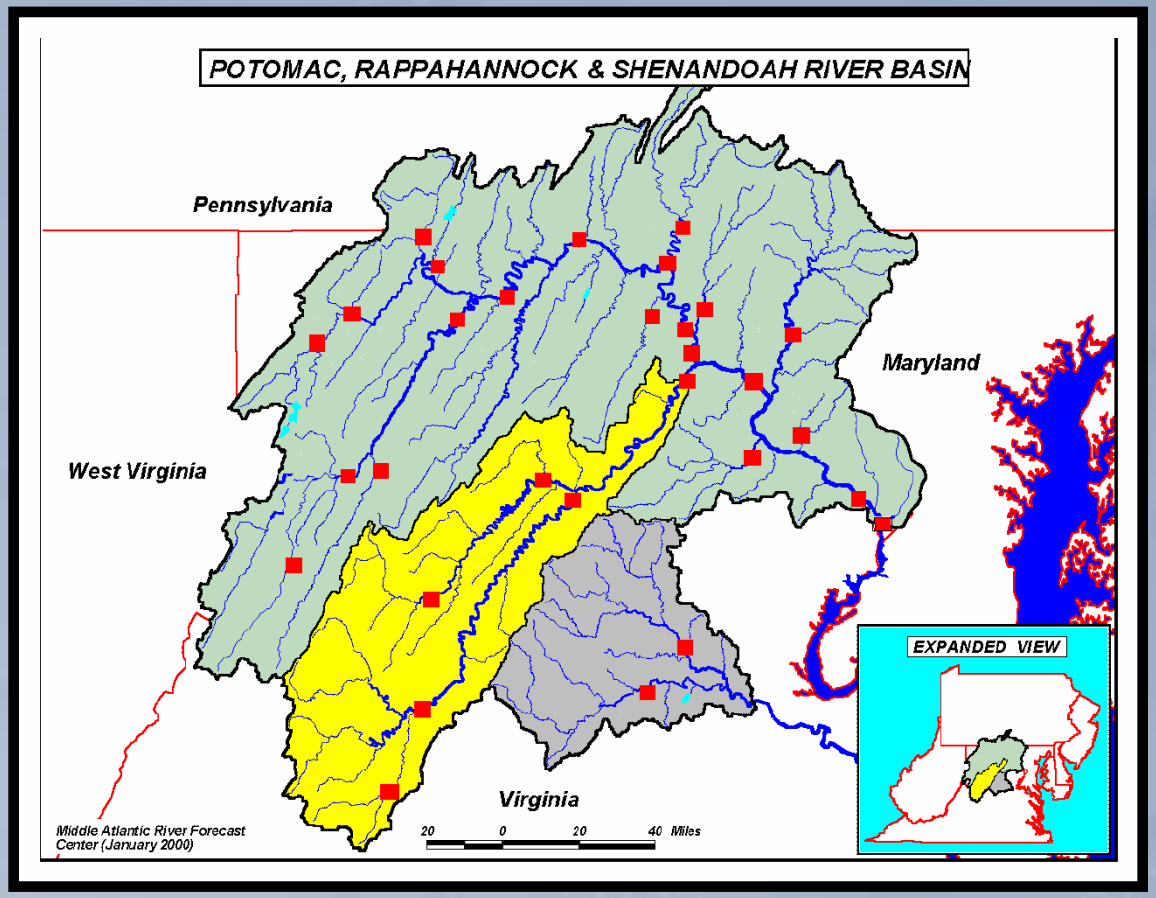
Hydrologic Area of Responsibility

River Basins

- **Potomac**
  11,600 Square Miles
  22 Forecast Points

- **Shenandoah**
  3,050 Square Miles
  6 Forecast Points

- **Rappahannock**
  1,580 Square Miles
  2 Forecast Points



Operations & Services

Forecasts

- Public
- Marine
- Aviation
- Fire Weather
- River
- Coastal

Data Collection

Climate

Cooperative Observers

Watch/Warnings/Advisories

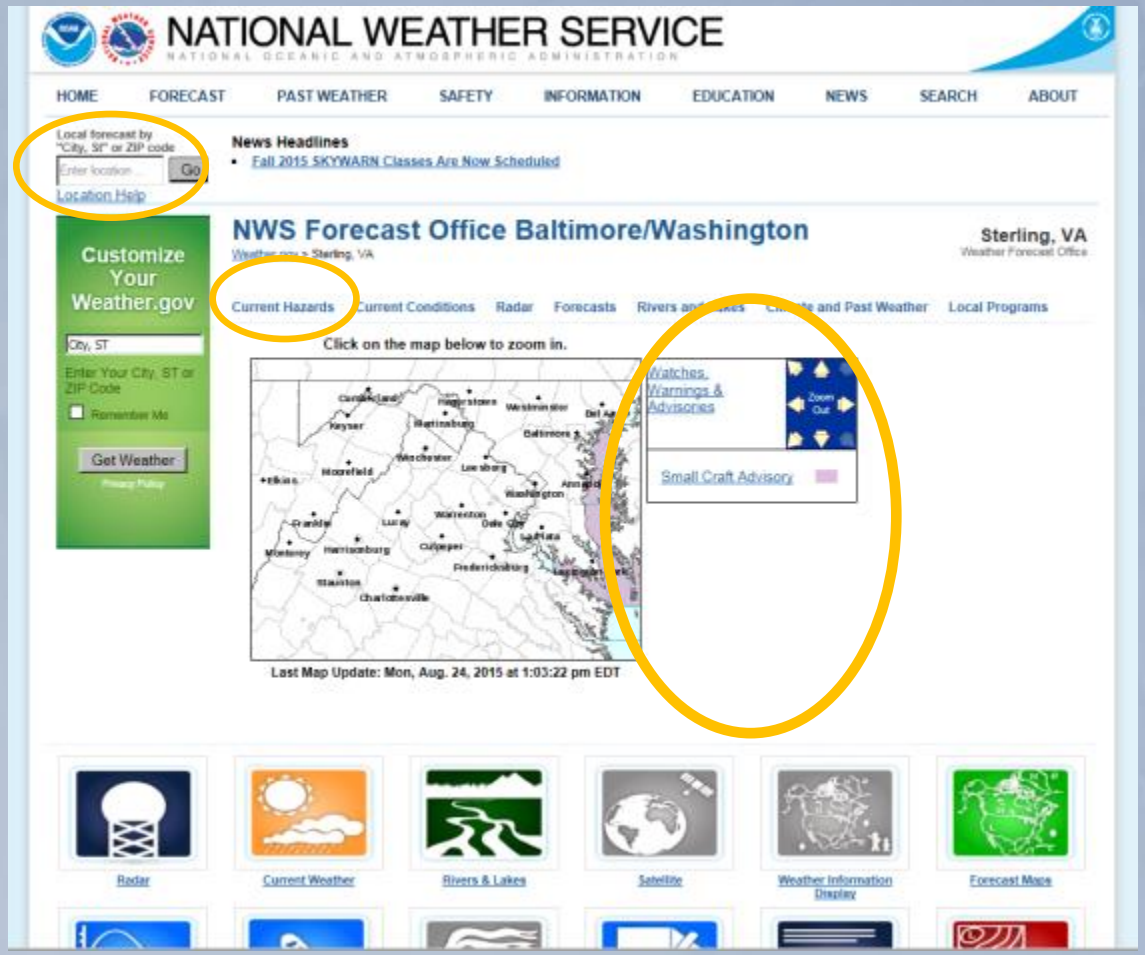
- Convective
  - Tornado
  - Severe Thunderstorm
- Tropical Systems
  - Hurricanes
  - Tropical Storms
- Non-Precipitable
  - Heat
  - High Wind
  - Wind Chill/Excessive Cold
- Hydrological
  - Flash Floods
  - River Floods
  - Small Stream & Tributaries
- Winter Storms
- Coastal Flooding
- Wildfire (Red Flag)

Operations & Services

Watch/Warnings

- **Warning**
  - Action needed!
  - Threat is imminent or occurring in warning area.
  - Advisory = low level warning
- **Watch**
  - "Watch the weather"
  - Conditions are favorable for the hazard to occur in the near future.
  - Stay tuned for updates.
  - Action may be needed soon.
- **No near term threats**
  - Check Outlook (thru 7 days)

NWS Web Page



- **Latest Watches, Warnings and Advisories**
- **Local Forecast**
- **Hazardous Weather Outlook**

weather.gov/washington or weather.gov/baltimore

Hazardous Weather Outlook (HWO)

.DAY ONE...TONIGHT

A SEVERE THUNDERSTORM WATCH IS IN EFFECT UNTIL 1 AM INCLUDING WASHINGTON DC...THE I-95 CORRIDOR...AND THE ADJACENT WATERS OF THE POTOMAC RIVER.

.DAYS TWO THROUGH SEVEN...SATURDAY THROUGH THURSDAY

AN EXCESSIVE HEAT WATCH IS IN EFFECT SATURDAY FOR MUCH OF THE BALTIMORE AND WASHINGTON METRO AREAS. A HEAT ADVISORY IS LIKELY FOR HARFORD AND NORTHERN BALTIMORE COUNTIES. REFER TO THE LATEST HAZARD MESSAGE /NPWLWX/ FOR DETAILS.

HEAT INDICES MAY EXCEED 105 DEGREES ACROSS THE OUTLOOK AREA SUNDAY AND MONDAY.

A SIGNIFICANT SEVERE WEATHER EPISODE IS EXPECTED ON SATURDAY ACROSS THE OUTLOOK AREA. STORMS WILL BE CAPABLE OF PRODUCING DAMAGING WIND GUSTS AND VERY LARGE HAIL.

SCATTERED THUNDERSTORMS ARE EXPECTED TO DEVELOP SUNDAY AND MONDAY ALONG A STALLED FRONTAL BOUNDARY. SOME STORMS COULD BECOME SEVERE AND WILL BE CAPABLE OF DAMAGING WIND GUSTS AND LARGE HAIL.

.SPOTTER INFORMATION STATEMENT...

SKYWARN HAS BEEN ACTIVATED UNTIL 1 AM LATE FRIDAY NIGHT.

SPOTTER ACTIVATION IS LIKELY ON SATURDAY. LIMITED SPOTTER ACTIVATION MAY BE NEEDED TODAY AND SUNDAY THROUGH MONDAY. PLEASE RELAY ANY REPORTS OF STRONG WIND OR HAIL TO THE NATIONAL WEATHER SERVICE.

Short Term Hazards

Long Term Hazards

Spotter Activation

weather.gov/washington or weather.gov/baltimore

SKYWARN® Page

SKYWARN® Page

What is SKYWARN®?

SKYWARN® is a national network of volunteer severe weather spotters. The spotters are trained by local National Weather Service Forecast Offices on how to spot severe thunderstorms, tornadoes, hail and flooding. In some parts of the country, spotters also report snowfall and ice accumulation.

Join SKYWARN®

Email weath t.

National Weather Service Baltimore/Washington SKYWARN® Presentations

CLASS	D
BASICS	10/
WINTER (Advanced)	10/
BASIC	11/(
BASIC	11/
WINTER (Advanced)	11/
WINTER (Advanced)	11/1

Descriptions of SKYWARN Spotter Classes

SKYWARN® Basics (pdf)
SKYWARN® Convection (pdf)
SKYWARN® Winter (pdf)
SKYWARN® Tropical (pdf)
SKYWARN® Flood (pdf)

Basic Spotter Field Guide

Online Courses Available

National SKYWARN® courses are also offered online by COMET on their MetED site (located here.) These courses can be extra value to you however they do not replace the SKYWARN® Basics course taught by one of our meteorologists from the National Weather Service Baltimore/Washington. These online courses leave out vital information on the multitude of weather threats we get in the Mid-Atlantic region.

Amateur Radio

National Capital Area Skywarn Support Group

Additional SKYWARN® Information

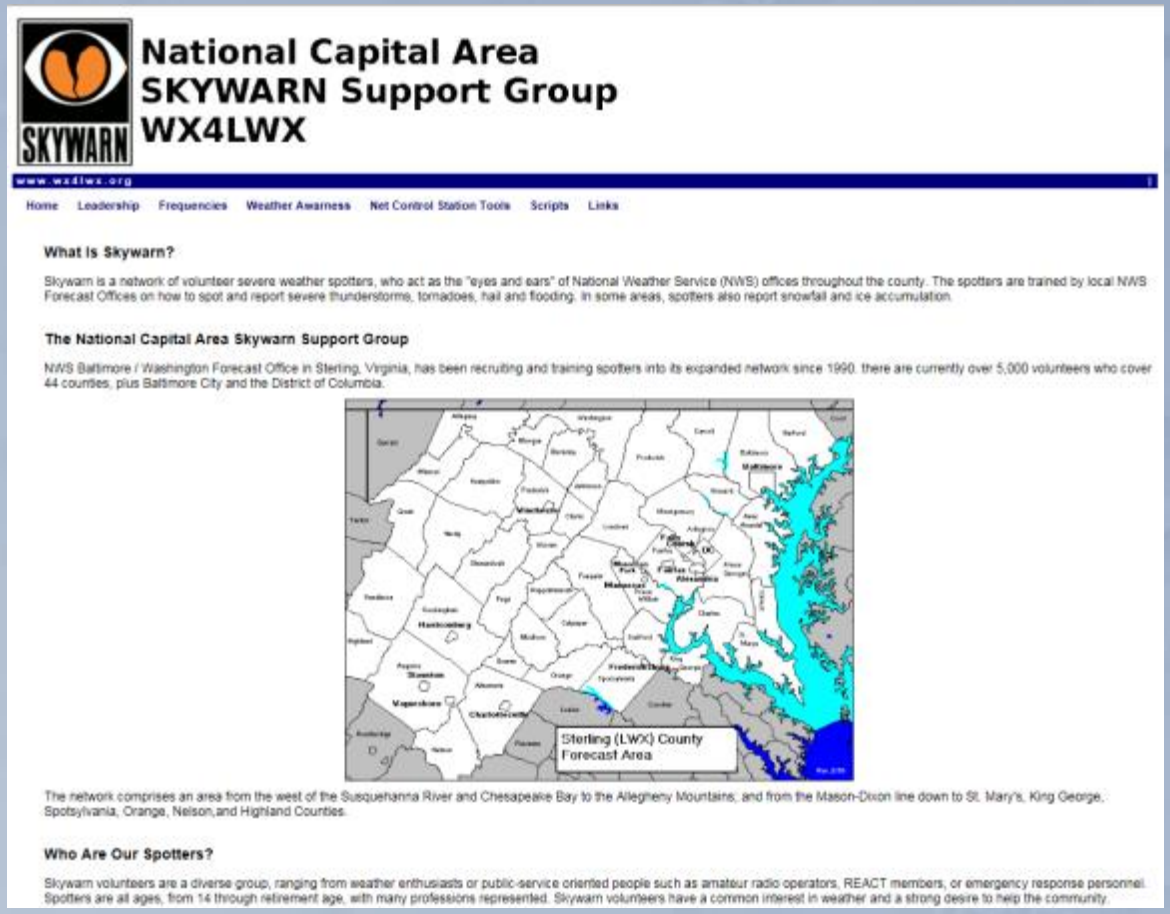
National SKYWARN Page

Print our a Spotter ID card

Note: Advanced cla Due to

Questions? Contact Heather Sheffield Kenyon, Skywarn Program Coordinator at NWS Baltimore/Washington

Capital Area SKYWARN ® Support Group Webpage



National Capital Area
SKYWARN Support Group
WX4LWX

www.wx4lwx.org

Home Leadership Frequencies Weather Awarness Net Control Station Tools Scripts Links

What is Skywarn?

Skywarn is a network of volunteer severe weather spotters, who act as the "eyes and ears" of National Weather Service (NWS) offices throughout the county. The spotters are trained by local NWS Forecast Offices on how to spot and report severe thunderstorms, tornadoes, hail and flooding. In some areas, spotters also report snowfall and ice accumulation.

The National Capital Area Skywarn Support Group

NWS Baltimore / Washington Forecast Office in Sterling, Virginia, has been recruiting and training spotters into its expanded network since 1990. there are currently over 5,000 volunteers who cover 44 counties, plus Baltimore City and the District of Columbia.

The network comprises an area from the west of the Susquehanna River and Chesapeake Bay to the Allegheny Mountains, and from the Mason-Dixon line down to St. Mary's, King George, Spotsylvania, Orange, Nelson,and Highland Counties.

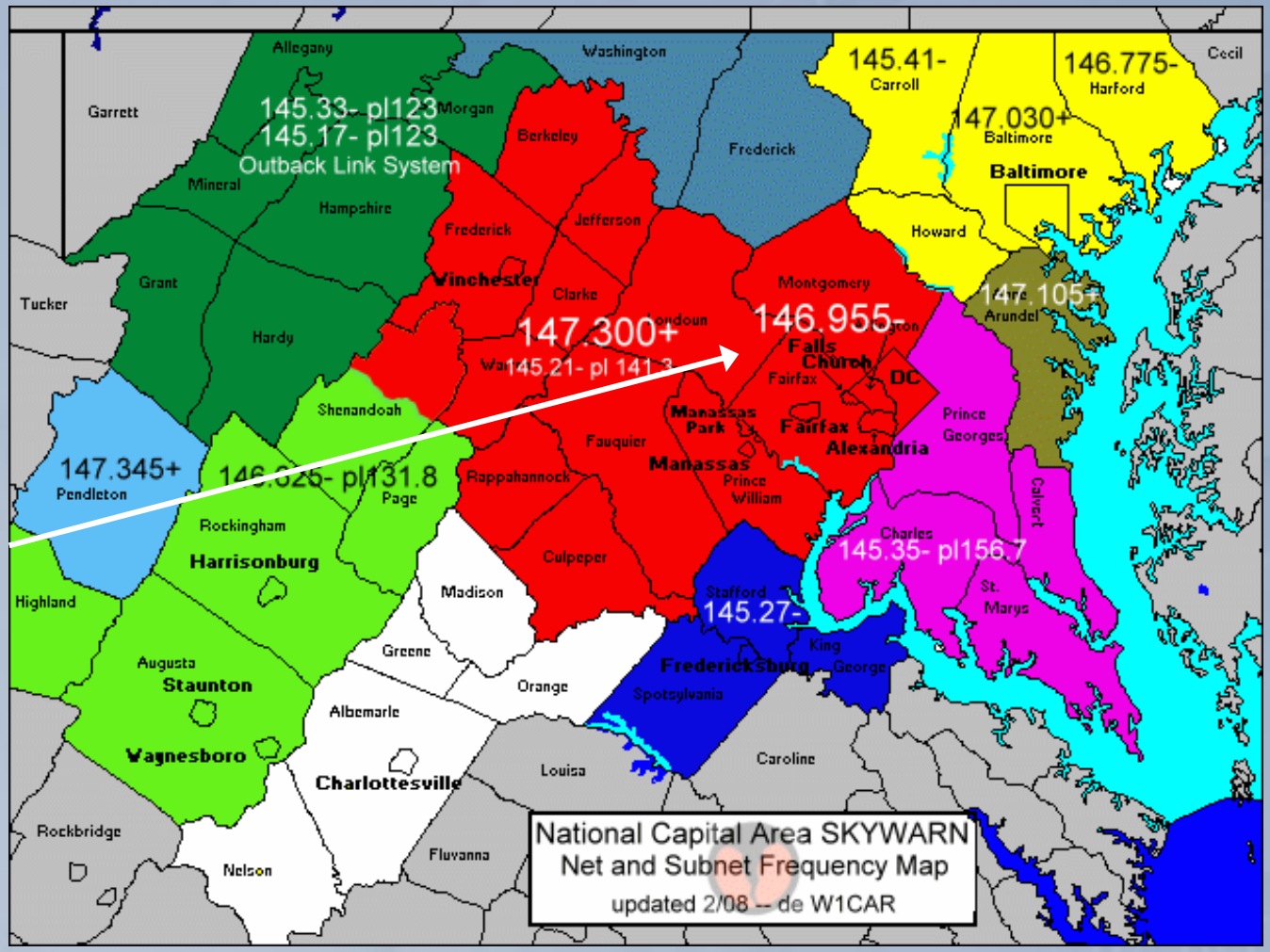
Who Are Our Spotters?

Skywarn volunteers are a diverse group, ranging from weather enthusiasts or public-service oriented people such as amateur radio operators, REACT members, or emergency response personnel. Spotters are all ages, from 14 through retirement age, with many professions represented. Skywarn volunteers have a common interest in weather and a strong desire to help the community.

www.w4lwx.org

SKYWARN Frequencies

WX4LWX



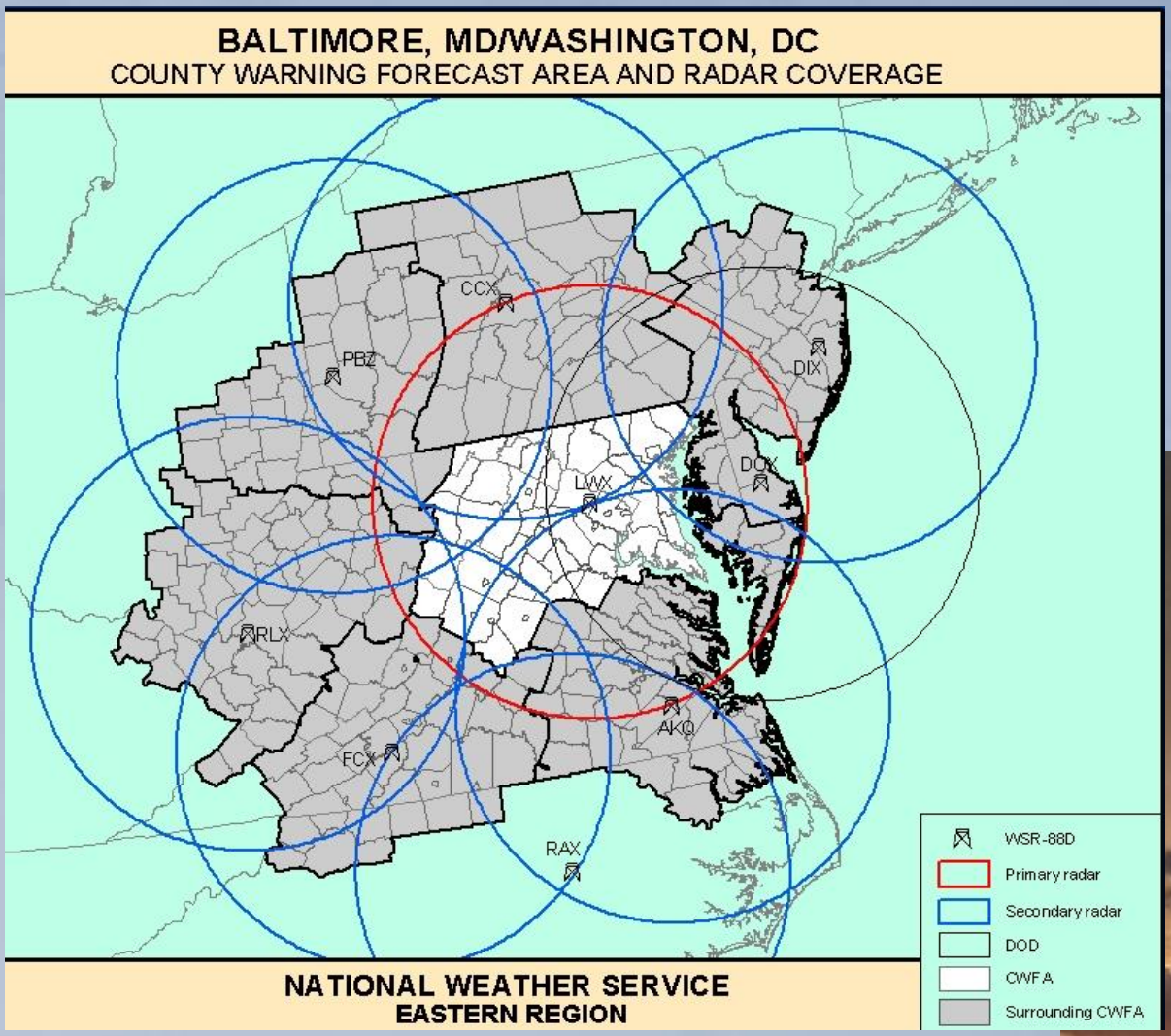
Why Do We Need Spotters?

Spotters report observed weather to the NWS during potentially severe weather events.

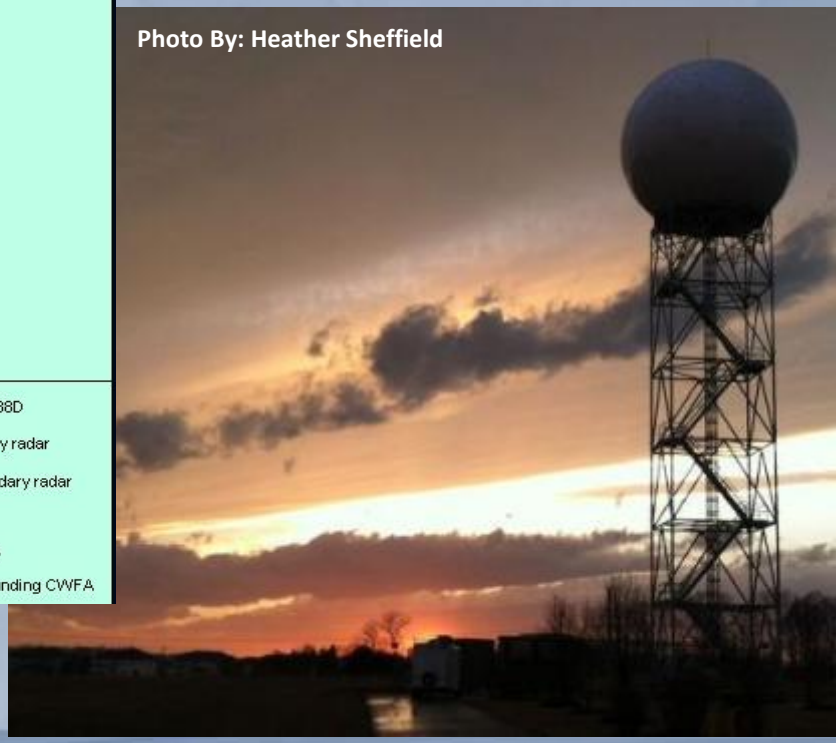
Remember our mission? The protection of lives and property. We can't do it alone. We need you, the local experts!

The information that you relay to us has the potential to save lives and property – helping us complete our mission.

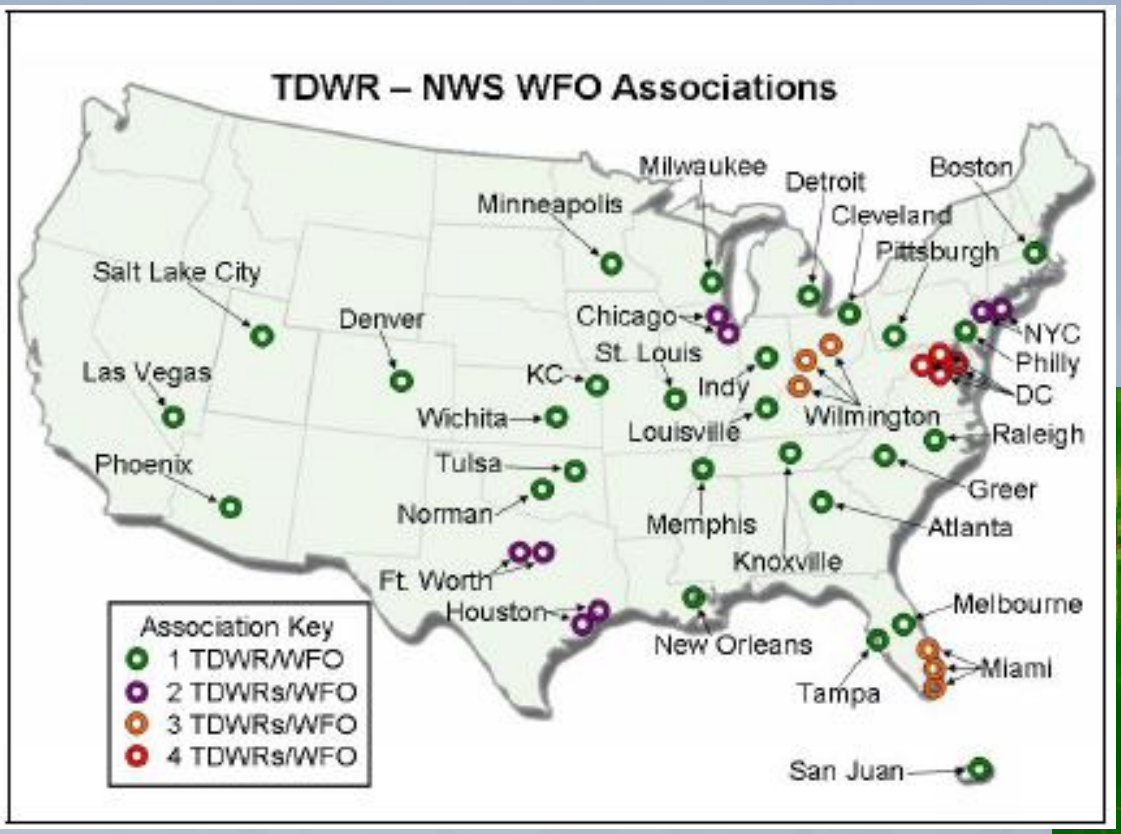
WSR-88D Coverage



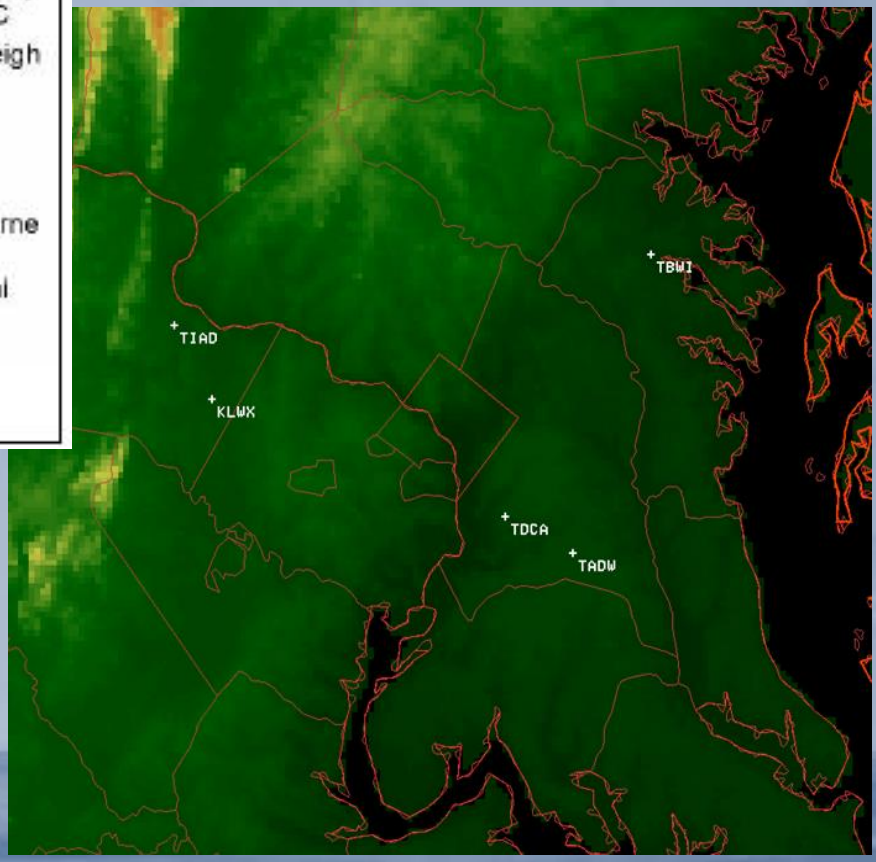
Radars are spaced so that there is good overlapping coverage in the Eastern U.S.



Terminal Doppler Radar (TDWR)



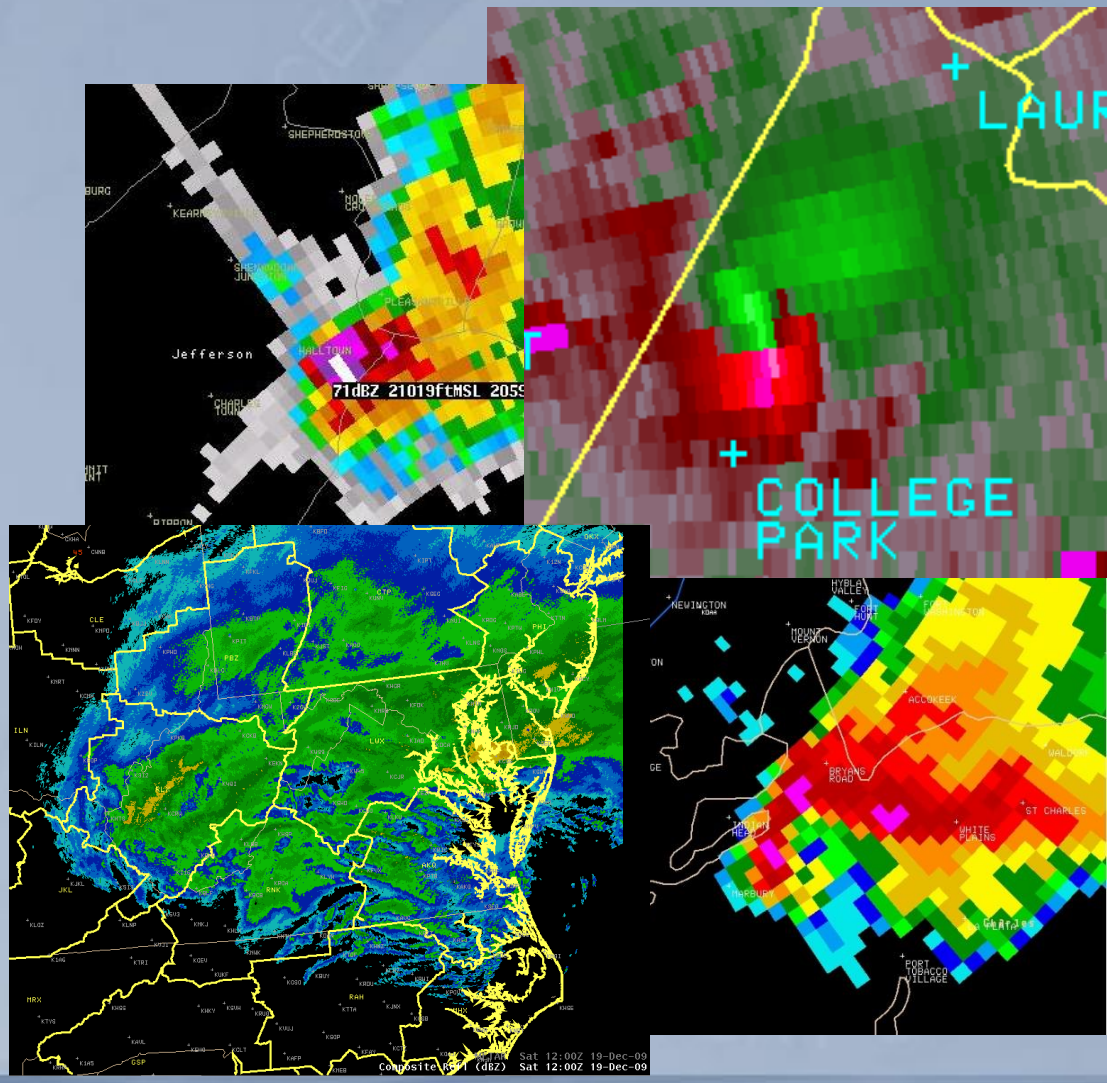
Terminal Doppler Weather Radars (TDWR) are a network of 45 FAA Doppler Radars deployed near major airports.



We have 4 TDWRs in our Forecast Area, located near IAD, DCA, BWI and Andrews Air Force Base.

What Can the Radar See?

- Rain
- Hail
- Winds
- Developing Tornadoes
- Snow
- Sleet



The radar can only see so much and that's why we need spotters

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 2” or any accumulation not reflected in the forecast , and final total

Reporting Criteria

- **Fog** – Any fog resulting in hazardous driving conditions

- **Tropical** – Flooding as a result of rain and/or storm surge, tornadoes, wind damage

- **Fire Weather** – After calling 911, report wildfires (especially during times of Red Flag conditions)

Making a Storm Report

- **Who** is making the report?
- **What** are you reporting?
- **When** did the event occur?
- **Where** is the location of the report?

Making a Storm Report

- Include your full name and Spotter Number!

- Be as specific as possible about when the event occurred.
  - We can go back and look at archived radar data.

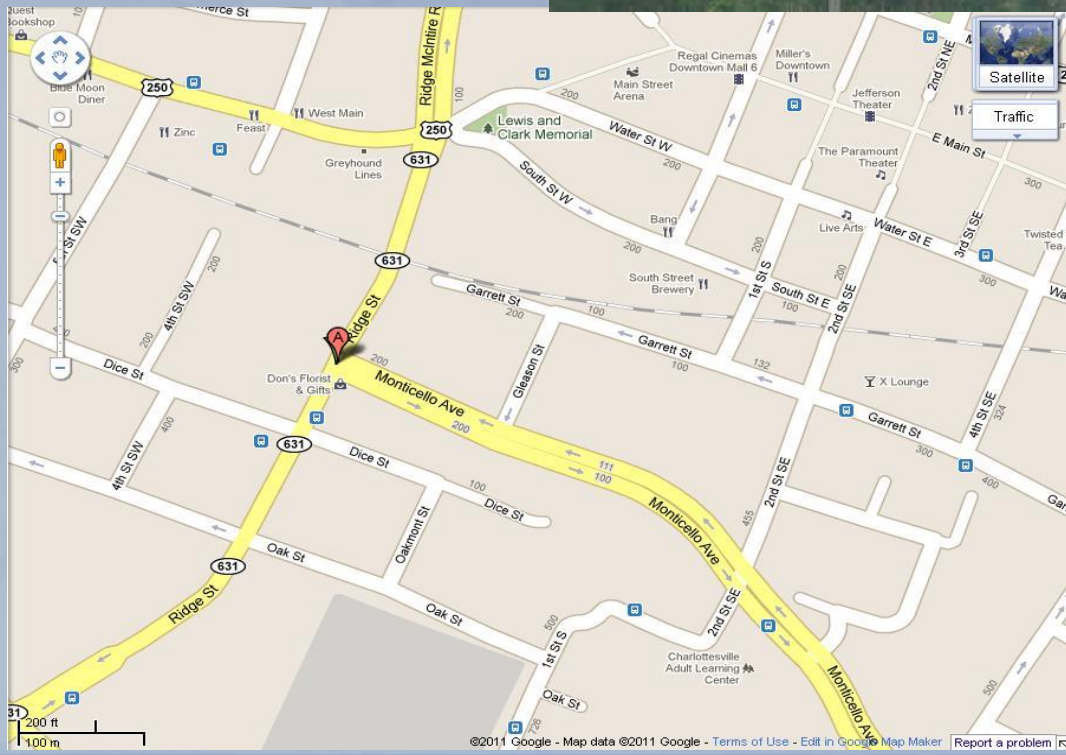
- What you are reporting (funnel, downed trees, etc).

- For location, please specify if you are at a different location than your home address.

Where Was the Report?

When Referencing Locations

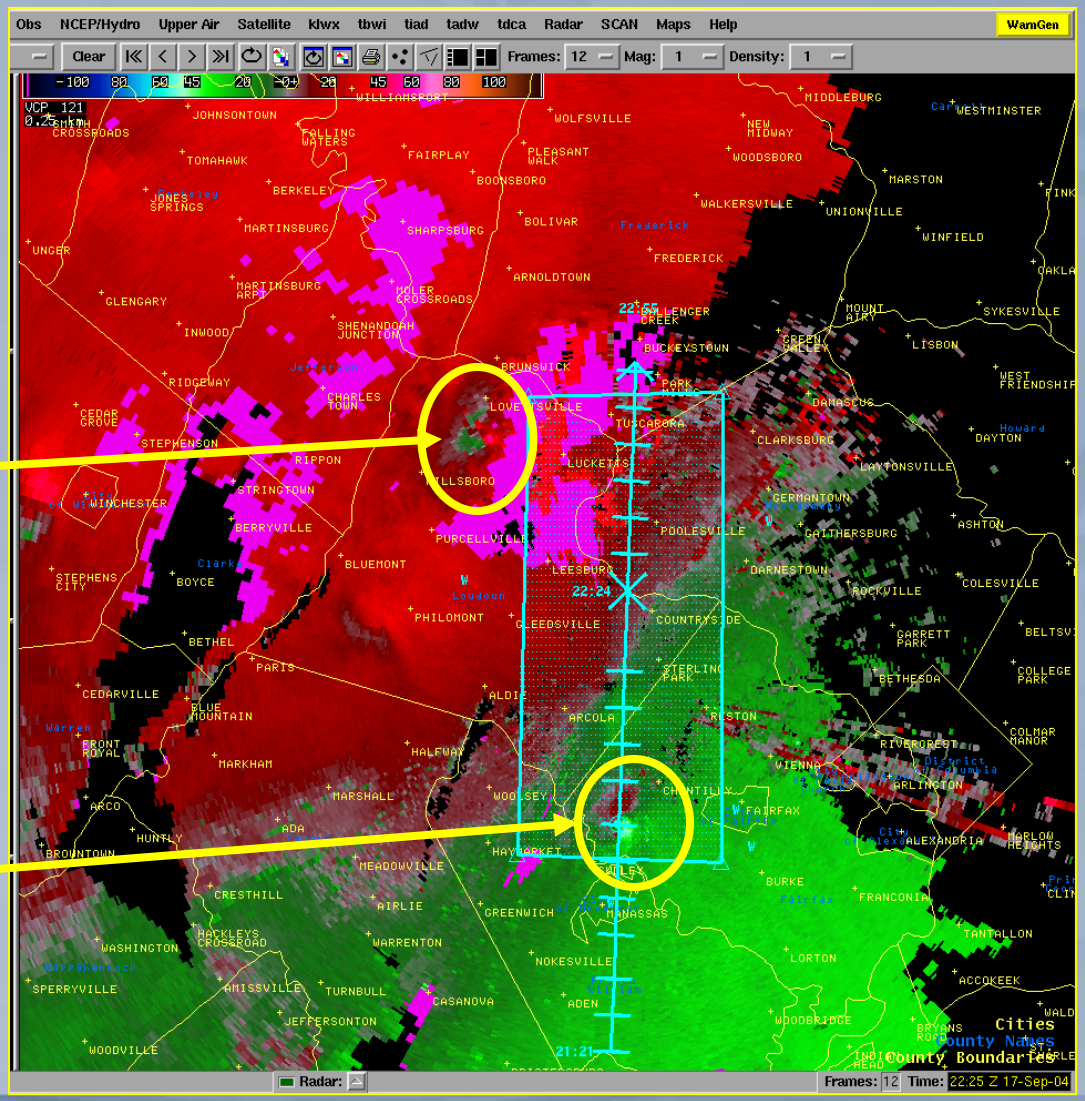
Please be as specific as possible! You are the local expert – we are not as familiar with the roads/cities in your county. Please reference the nearest intersection or block number, mile marker or even latitude/longitude.



Why is the Location So Important?

Tornado # 2

Tornado #1



How to Report Information

1. **Call NWS Baltimore/Washington if weather is imminent or occurring:**
   1.800.253.7091 OR 703.996.2201
2. **Email *delayed* weather reports to:**
   lwx-report@noaa.gov
3. **NEW! Fill out form for snow/ice**
4. **Contact local Emergency Management Officials**
5. **Relay your report through Amateur Radio when activated**

NEW! Snow/

1. NEW for this Winter
2. Fill out Snow/Ice Re

http://ht.ly/gVpw305N

3. Reports automatical
database

http://ht.ly/gVpw305Nchl

Submit a Snow and Ice Storm Report

Trained Skywarn Spotters may use this form to submit a storm report if the snow/ice measurements were taken at the address on file with NWS Baltimore/Washington Forecast Office. If measurement was NOT taken at a location on file with us, please e-mail your reports to lwx-report@noaa.gov.

* Required

Skywarn ID *
Contact lwx-report@noaa.gov if you do not know your Skywarn Spotter ID.

Your answer

Observation Date and Time *
Eastern

MM DD YYYY Time

/ / 2016 : AM

Snow Amount *
In Inches

Your answer

Ice Amount *
In inches

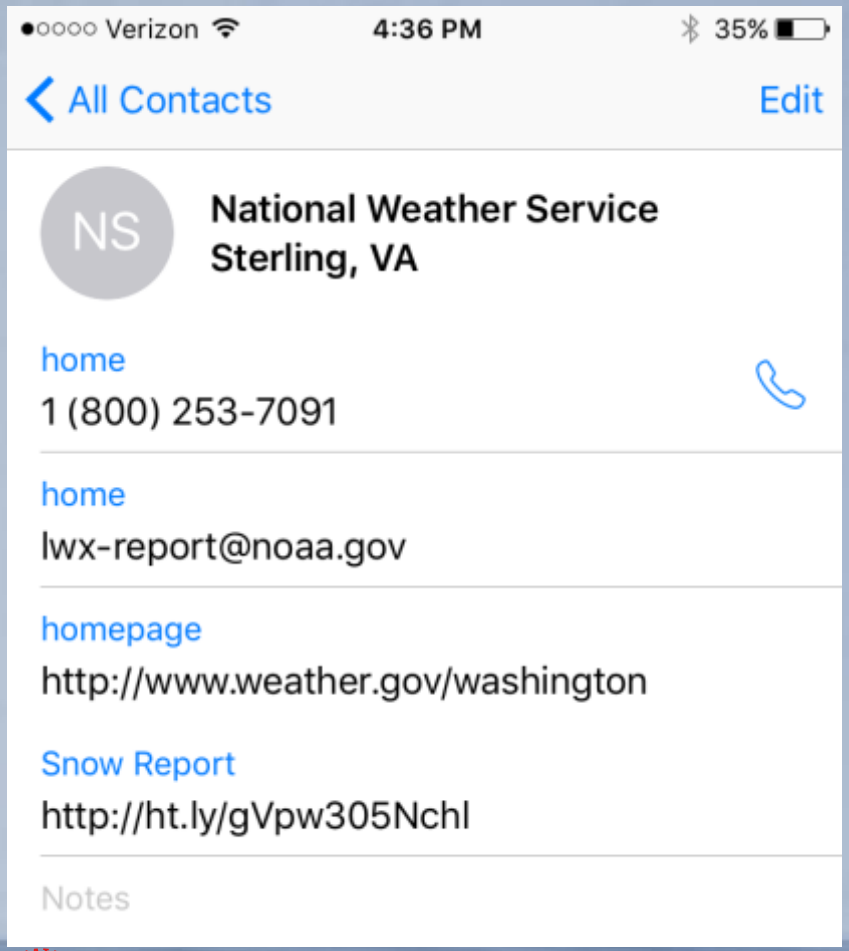
Your answer

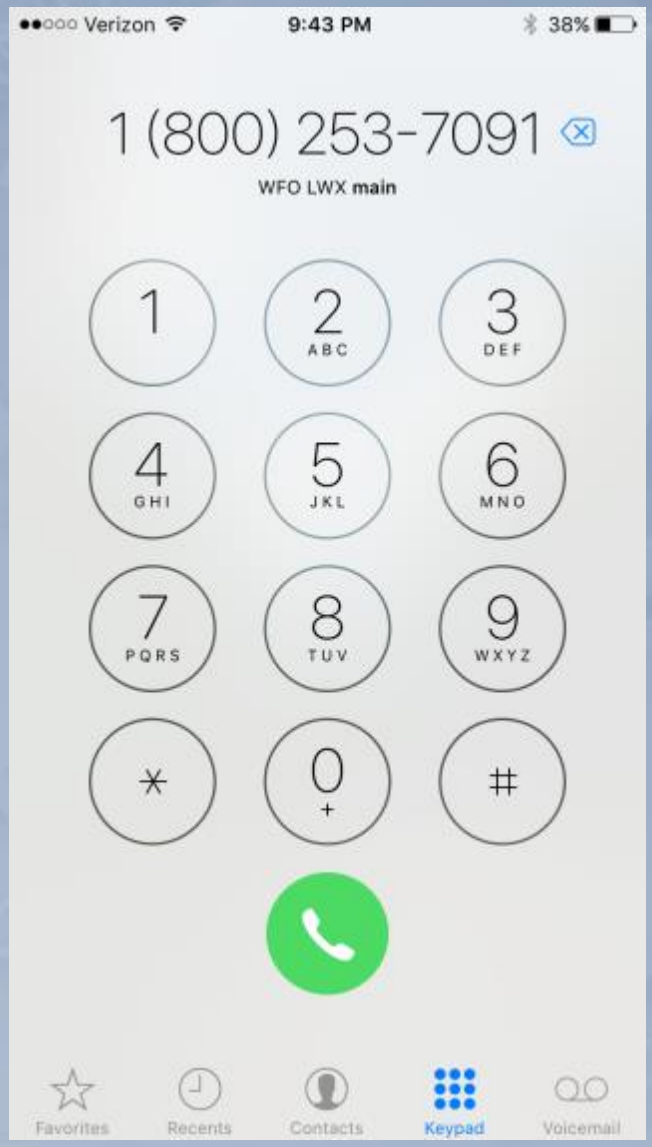
Remarks

Your answer

Contact Information

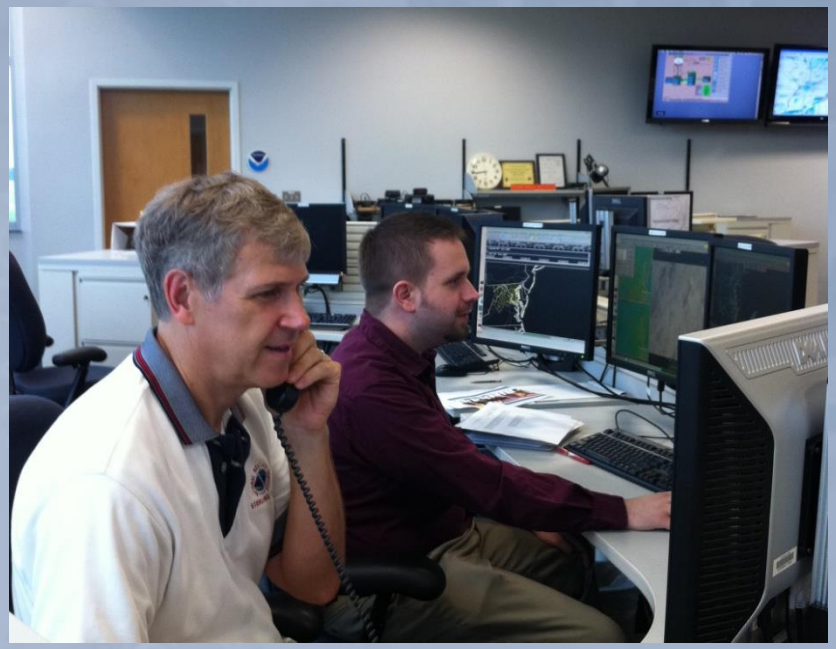
Let's take a minute and input this information into your cell phone.





What Happens to the Reports at the National Weather Service?

1. Received by the staff
2. Integrated with other information (radar, satellite, & spotters)
3. Used to “calibrate” the radar
4. Helps in warning decision
5. The information you provide can be relayed in warnings, and real time storm reports!
6. Web, NOAA Weather Radio, and the media relay the information



It’s all about getting information to the people so they can make the right decisions.

What Happens When We Issue a Warning?

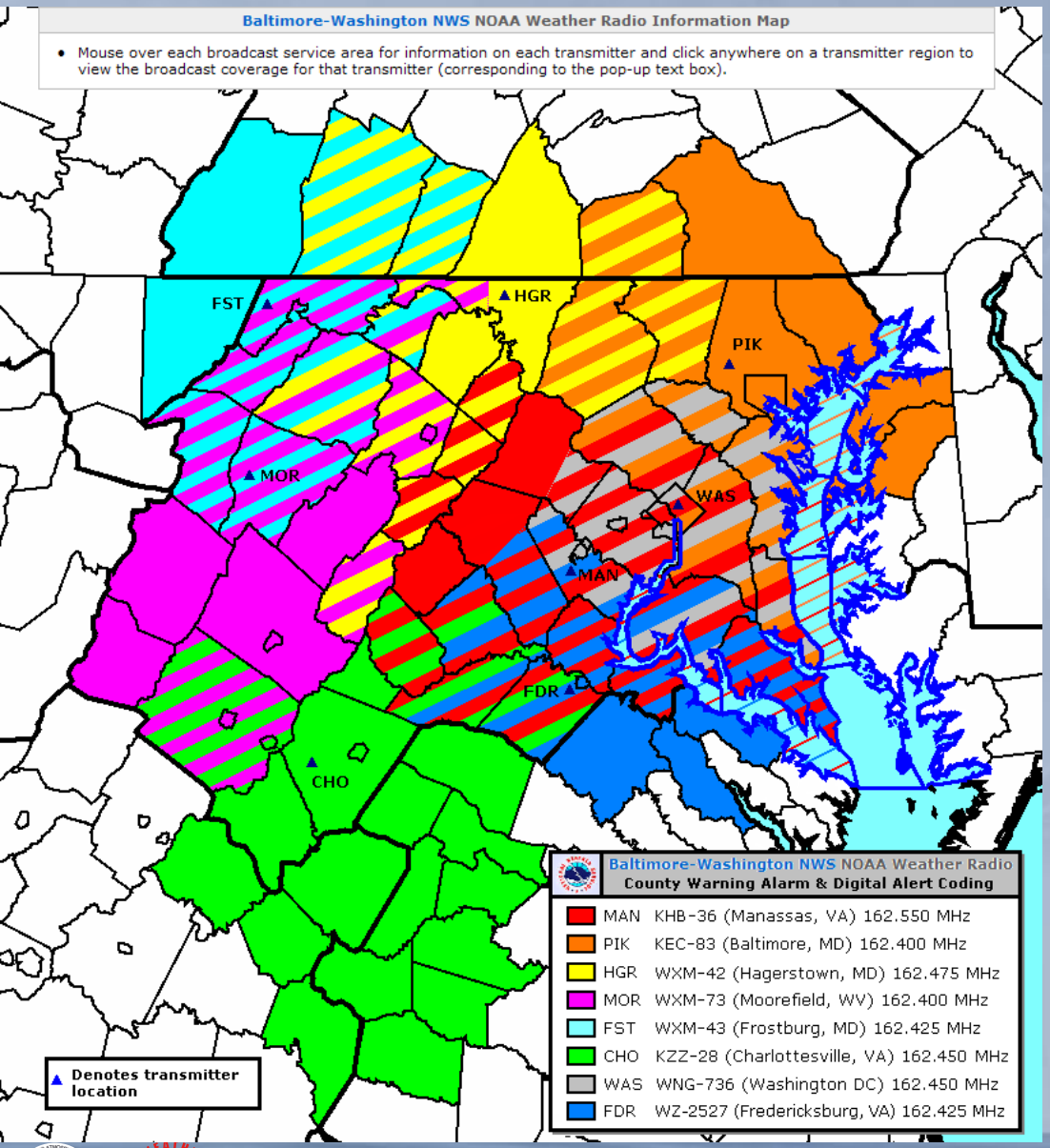
Partners

NWS

PUBLIC

National Weather Service
Baltimore MD/Washington DC

NOAA Weather Radio (NWR)



Is the best way to receive watch and warning information!

Receivers

Can be purchased in Nature and Electronic Stores and in Catalogs. They generally range in price from $15 to $75.

Lets Practice!

Were all four questions covered?

- **Who is making the report?**
- **What are you reporting?**
- **When did the event occur?**
- **Where is the location of the report?**

Weather Hazards in the Mid-Atlantic

- Severe Thunderstorms
  - -Damaging Winds/Hail
- Tornadoes/Waterspouts
- Flooding & Flash Flooding
- Tidal/Coastal Flooding
- Hurricanes
- Winter Weather
- Enhanced Fire Threat
- Dense Fog
- Non Thunderstorm Winds

Thunderstorms

Thunderstorm Ingredients

Moisture

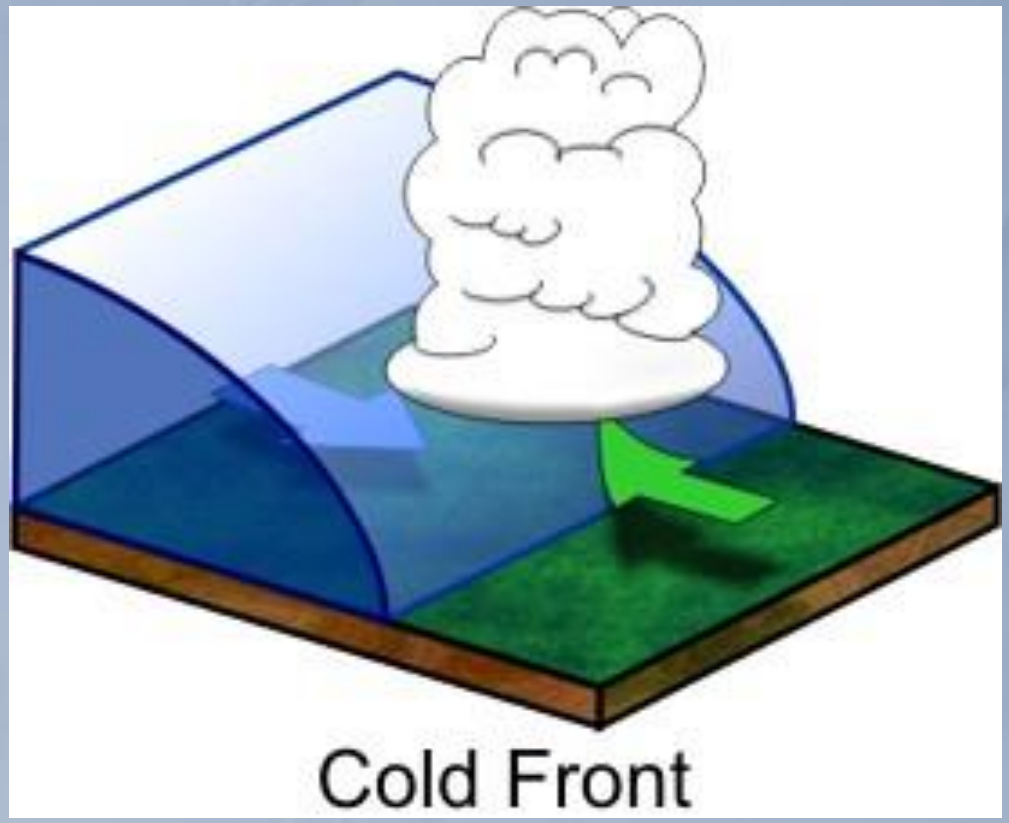
Our moisture sources are the Atlantic Ocean, Gulf of Mexico and the Chesapeake Bay.

Thunderstorm Ingredients

Lift

For lift, you need a mechanism or boundary for convergence. Cold fronts are a good source of lift.

When air is forced upward along a front, it cools/condenses and precipitation forms.



Convergence of wind along the cold front.

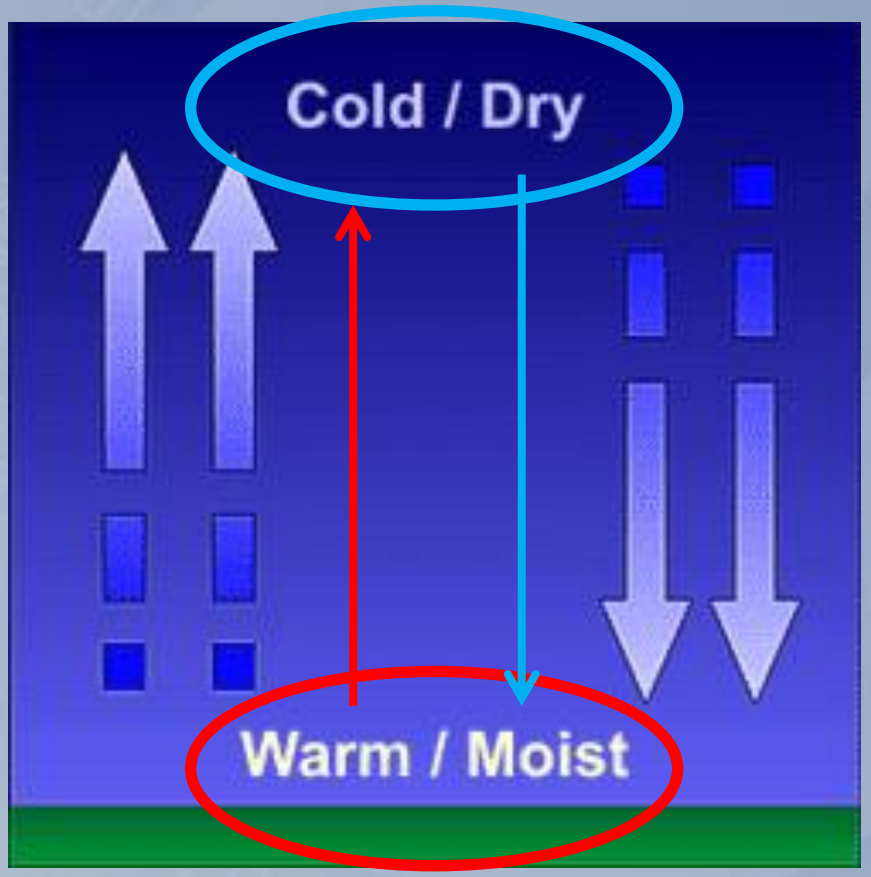
Thunderstorm Ingredients

Instability

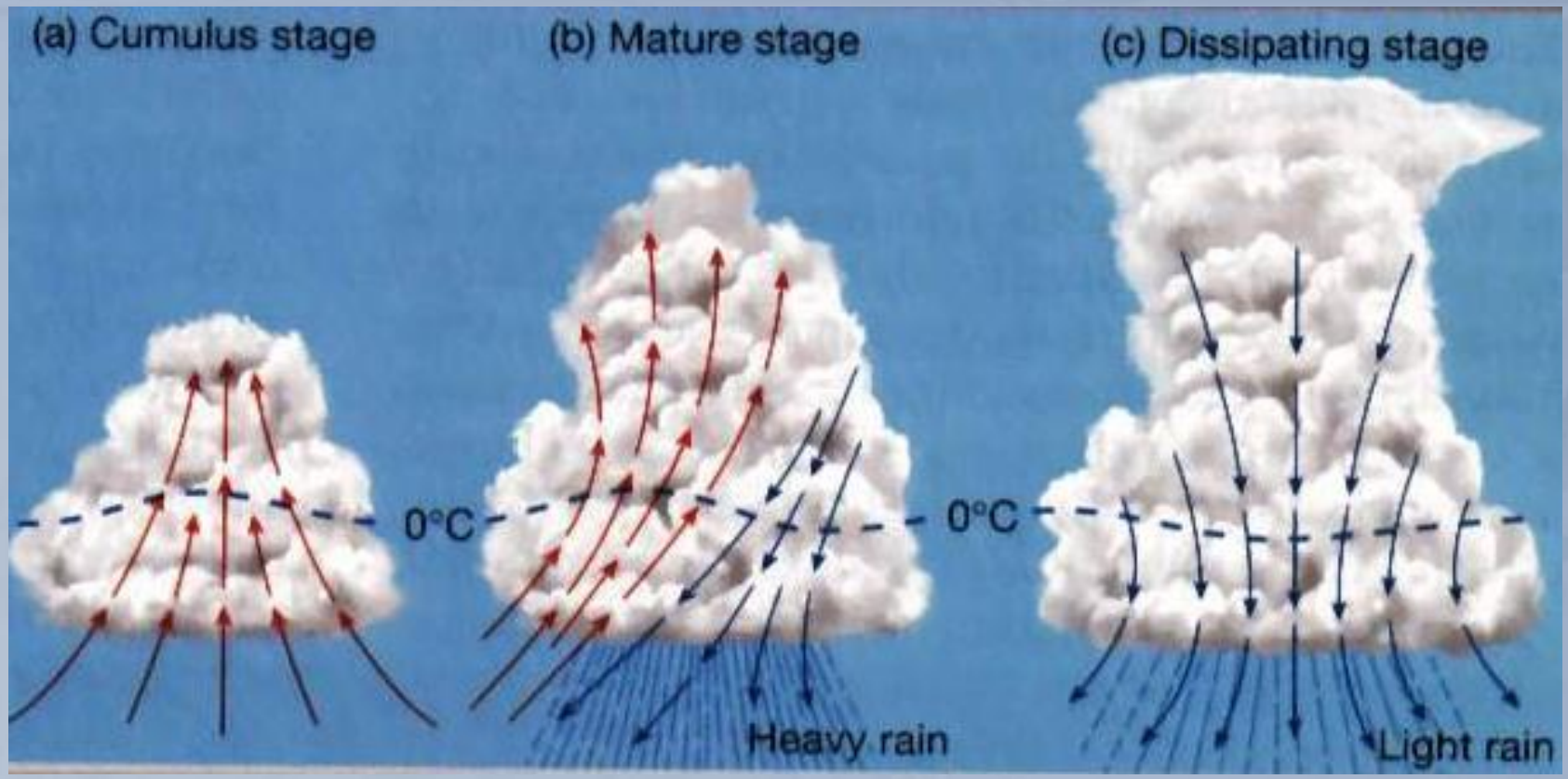
Warm & moist air is less dense than cold & dry air. The less dense air rises up while the more dense air will sink.

An airmass is considered unstable if a parcel of air continues to rise when given a nudge upward (like when a cold front ushers in cold & dry air).

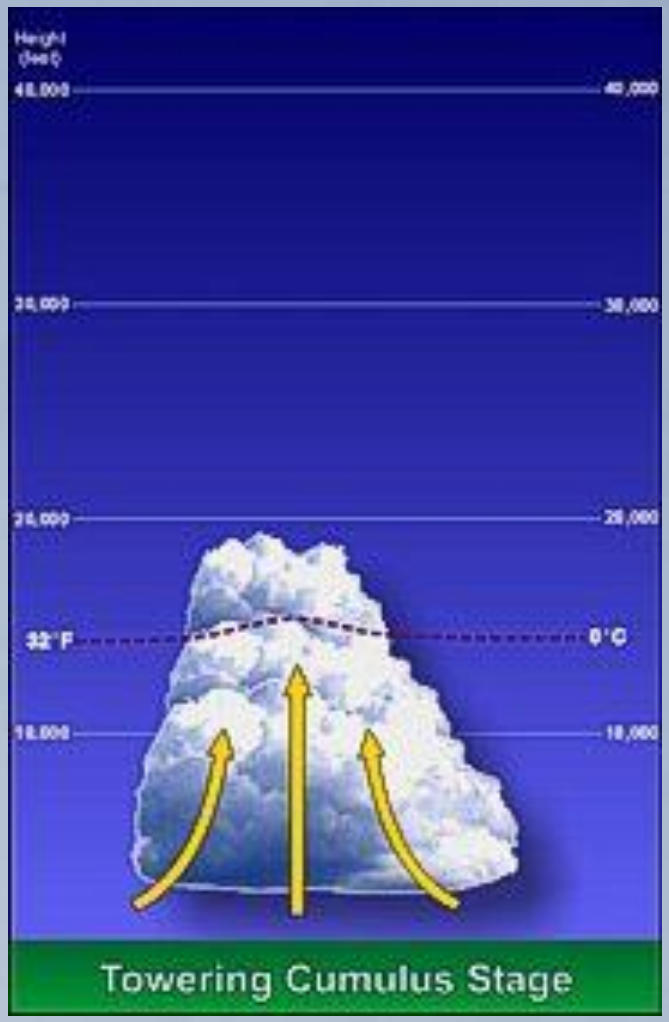
The more warm & moist the airmass is at the surface and the colder & drier the airmass is aloft, the more unstable the atmosphere is.



The Thunderstorm Life Cycle



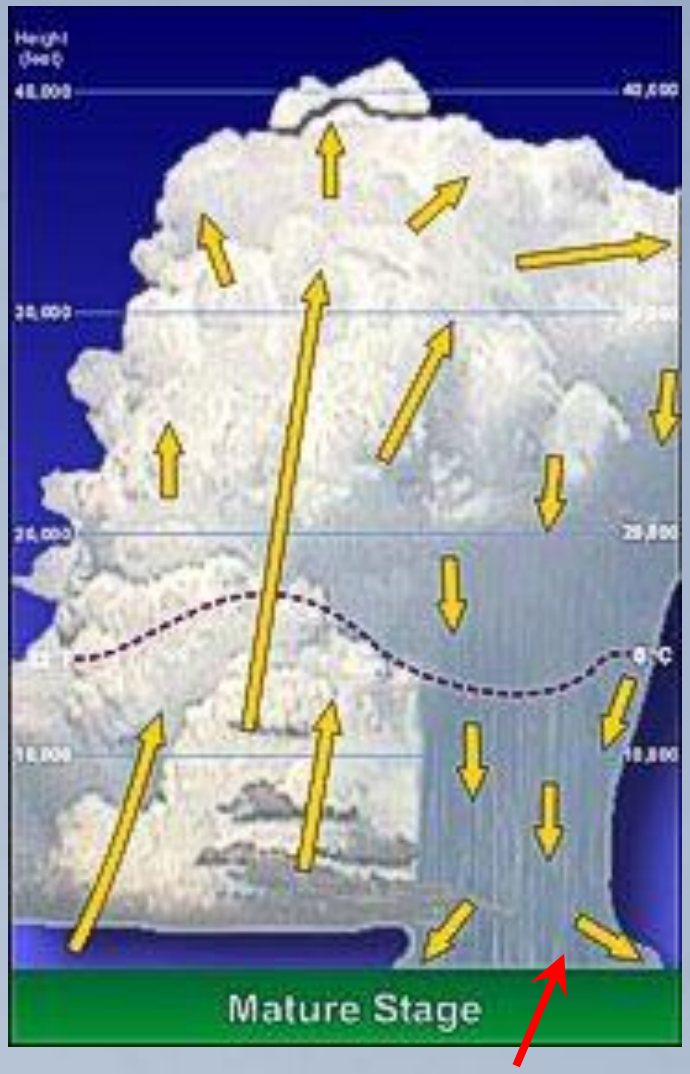
Updraft **Updraft & Downdraft** **Downdraft**



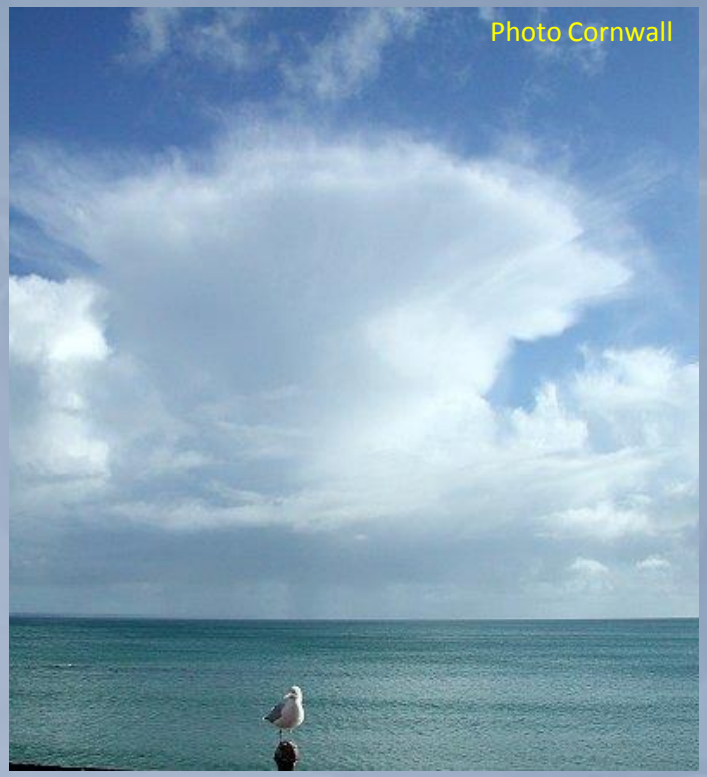
Updraft Dominant

Warm air is rising, cooling and condensing to form clouds.

Cumulus Stage: Building Clouds

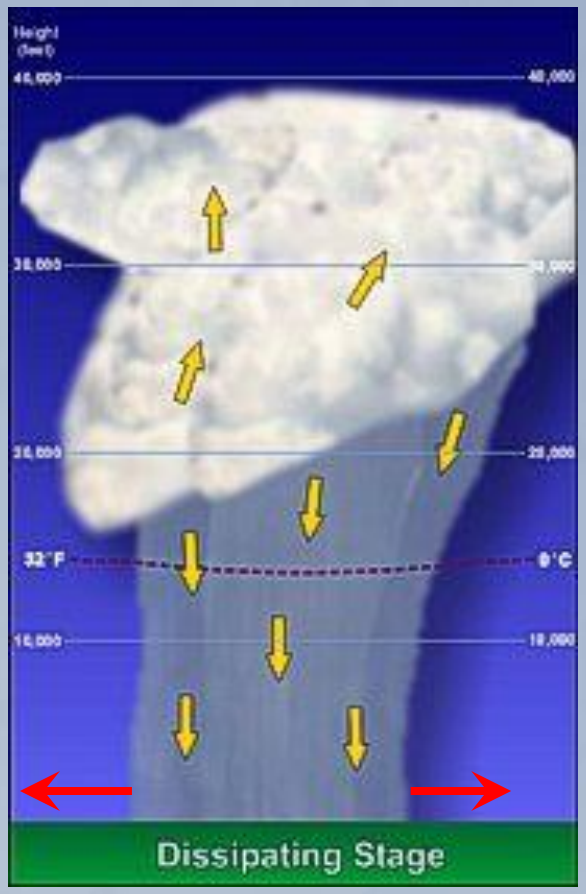


When the rain-cooled air impacts the surface and spreads out it creates a gust front. Sometimes winds can be very strong along the gust front.



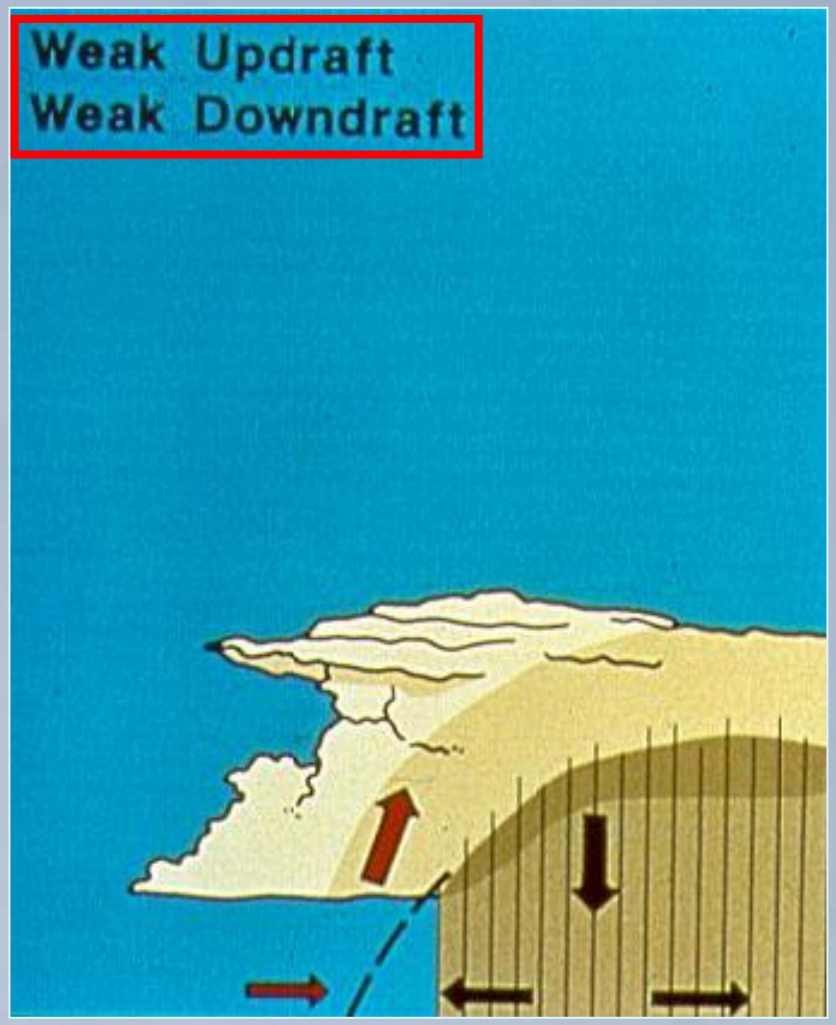
Mature Stage: Developed Thunderstorm

Dissipating Stage: Weakening Thunderstorm

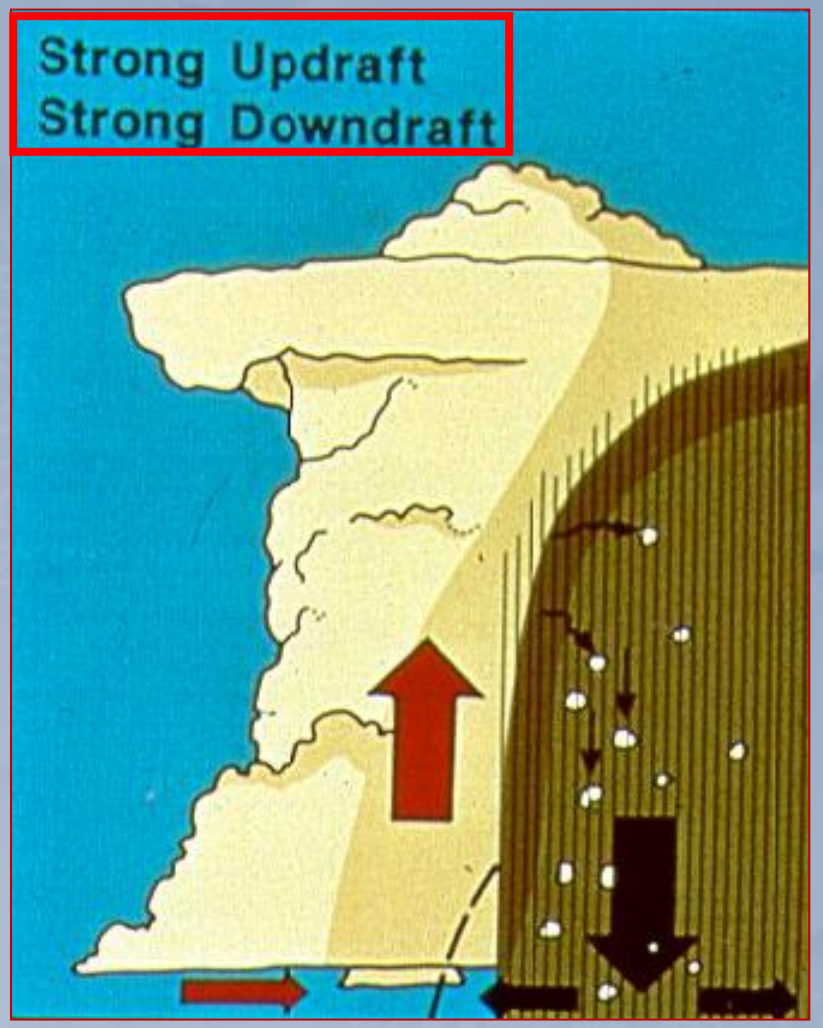


As the gust front moves away from the base of the storm, it cuts off the storms inflow and it begins to dissipate. The gust front may trigger new storms by convergence if the environment is moist and unstable.

What is the Difference Between an Ordinary Thunderstorm and a Severe Thunderstorm?



Ordinary Thunderstorm



Severe Thunderstorm

Severe Thunderstorms

Warning Criteria: 1” Hail and/or 58 MPH Winds

- Damaging straight-line winds from an intense t-storm downdraft can cause extensive damage and loss of life
- Like a targeted “punch” of wind
- Often comes with heavy rain/hail
- Often confused with tornadoes especially at night

How to Report Hail

Hail reports are the most difficult to gather. The hail shaft can be very narrow and short lived.

“Marble Size” hail is ambiguous. Do not report hail as marble sized.

How to Report Hail

Please [illegible]ns or sports [illegible]uler.

Hail should be measured along the longest dimension. It is best to use a ruler or tape measure.

More on Hail

The largest hail stone on record was 8” in diameter and weighed 1lb 15oz. The hail stone fell out of a severe thunderstorm in Vivien, SD on July 23, 2010. v

We can even get large hail stones in the Mid-Atlantic. Baltimore County reported a 4 inch stone in June 2015.

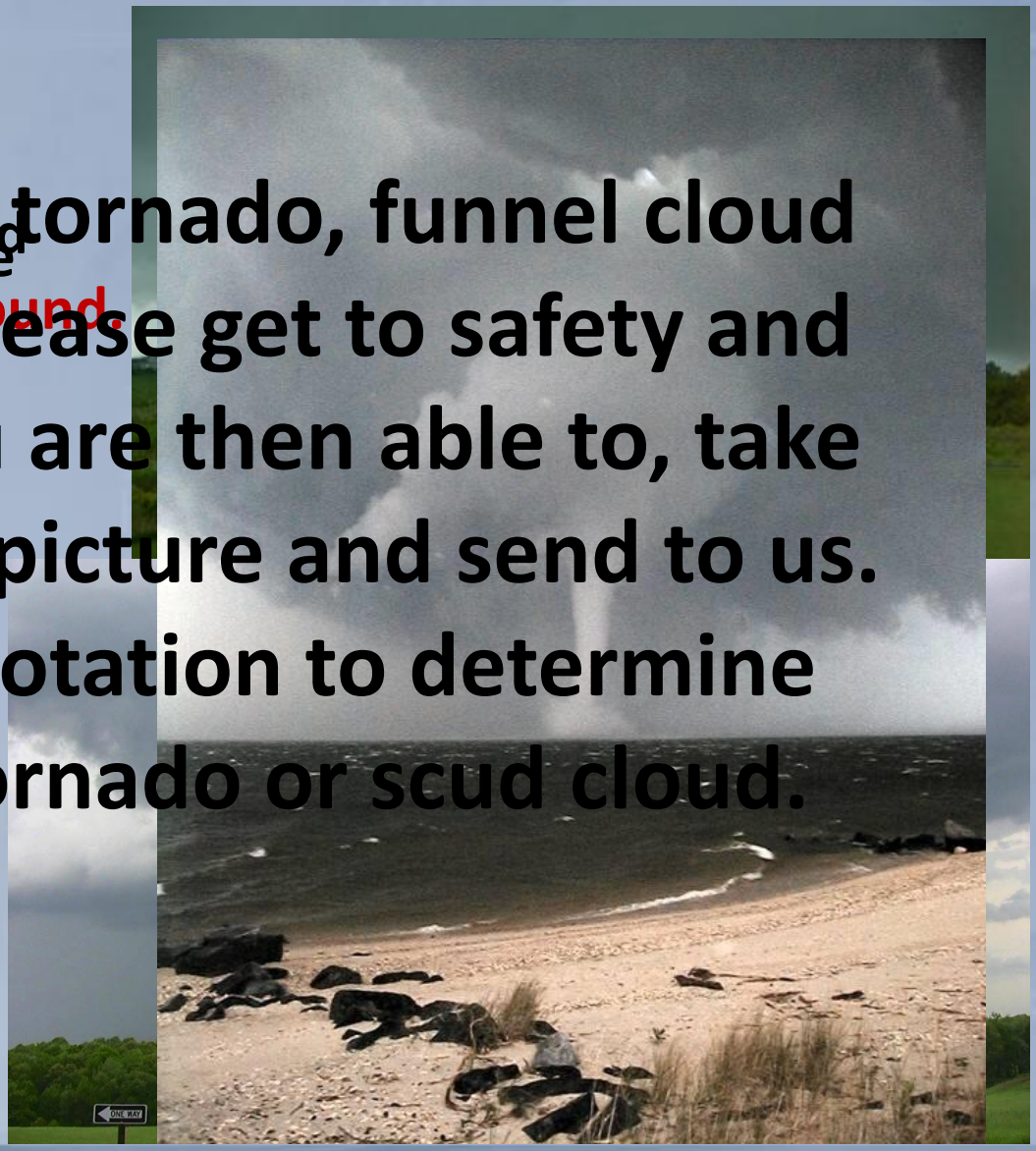
Tornadoes, Funnel Clouds & Waterspouts

Tornado: A violently rotating column of air attached to a cloud base and in contact with the ground.

Waterspout: A tornado over the water.

Funnel Cloud: A rapidly rotating column of air **NOT in contact with the ground.** Some funnel clouds go on to become tornadoes, others do not.

When reporting a tornado, funnel cloud or water spout, please get to safety and then call us. If you are then able to, take a video, not a still picture and send to us. We need to see rotation to determine whether it is a tornado or scud cloud.



Tornado Facts

Weak Tornado

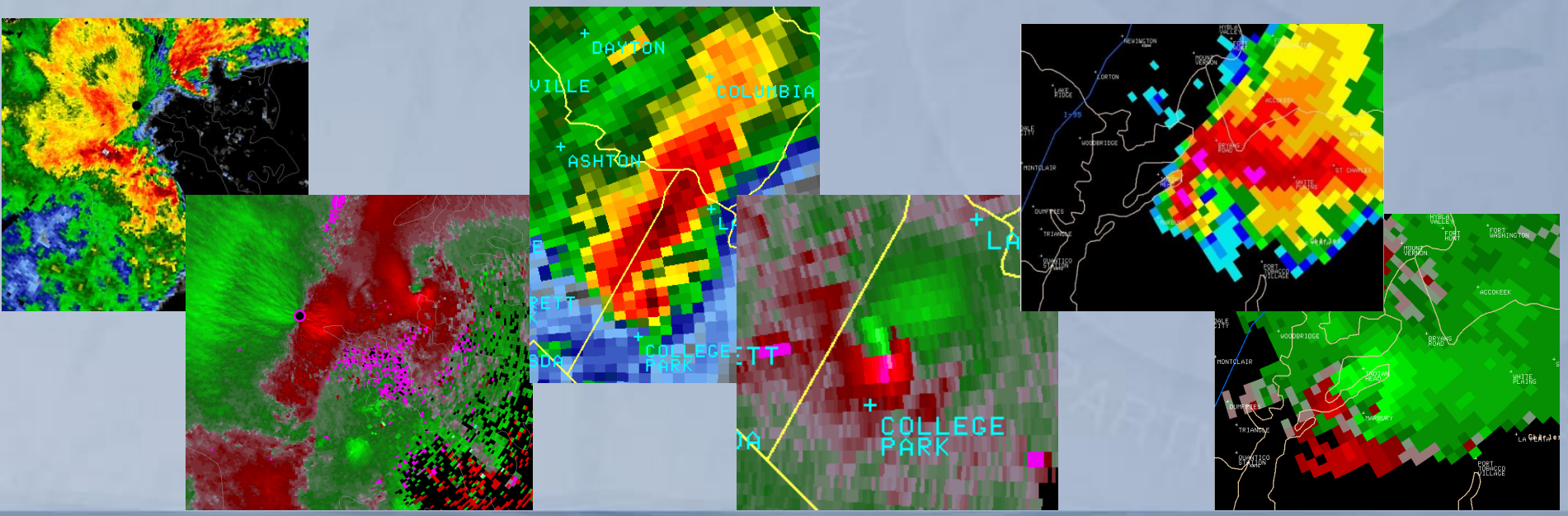
- Most frequent *(90%)*
- Brief
- EF0/EF1 Winds < 111 MPH
- Few Fatalities
- More difficult to detect

Strong Tornado

- Much less frequent
- Typically lasts longer
- EF2/EF3 Winds to 165 MPH
- Some Fatalities
- Easier to detect

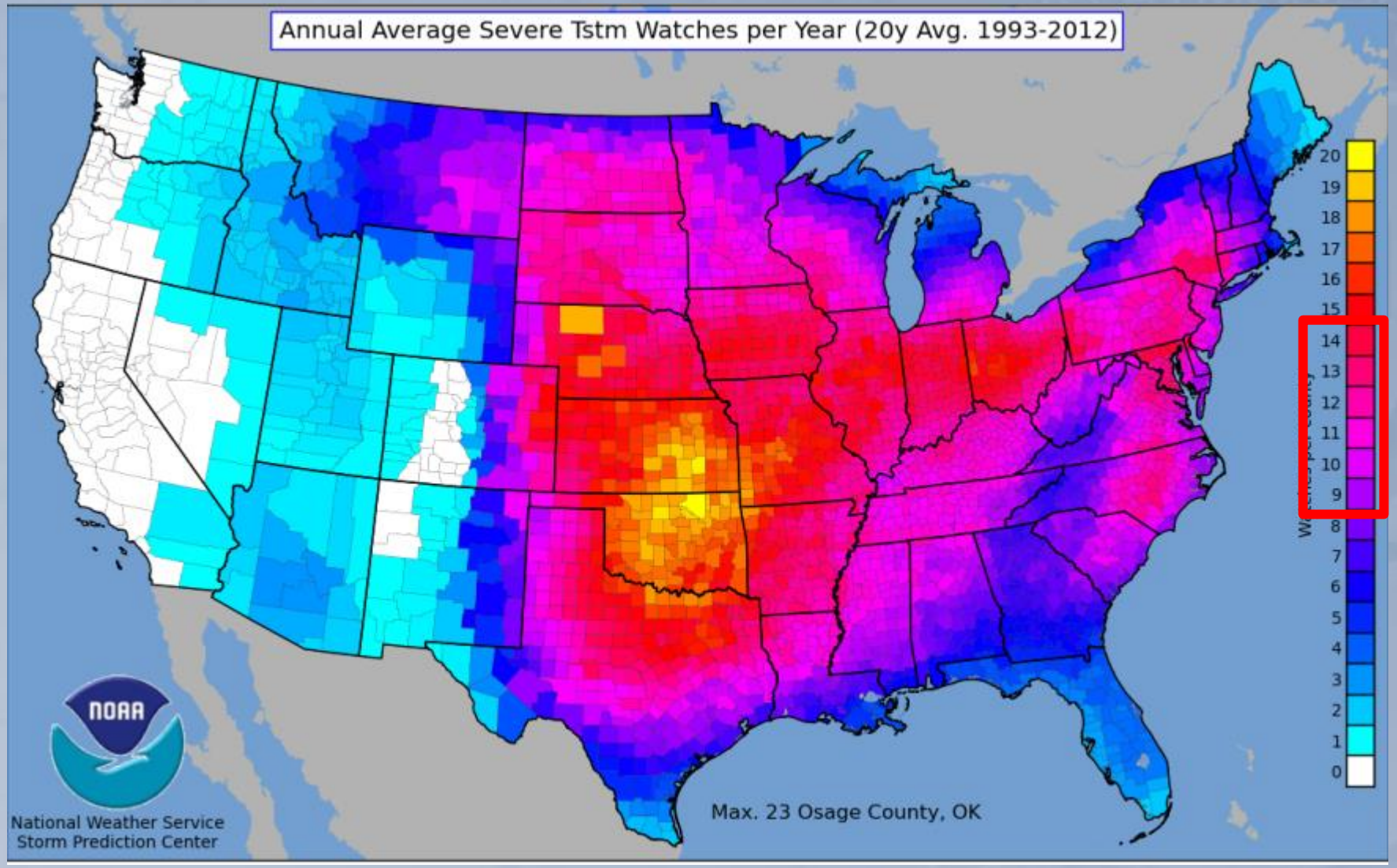
Violent Tornado

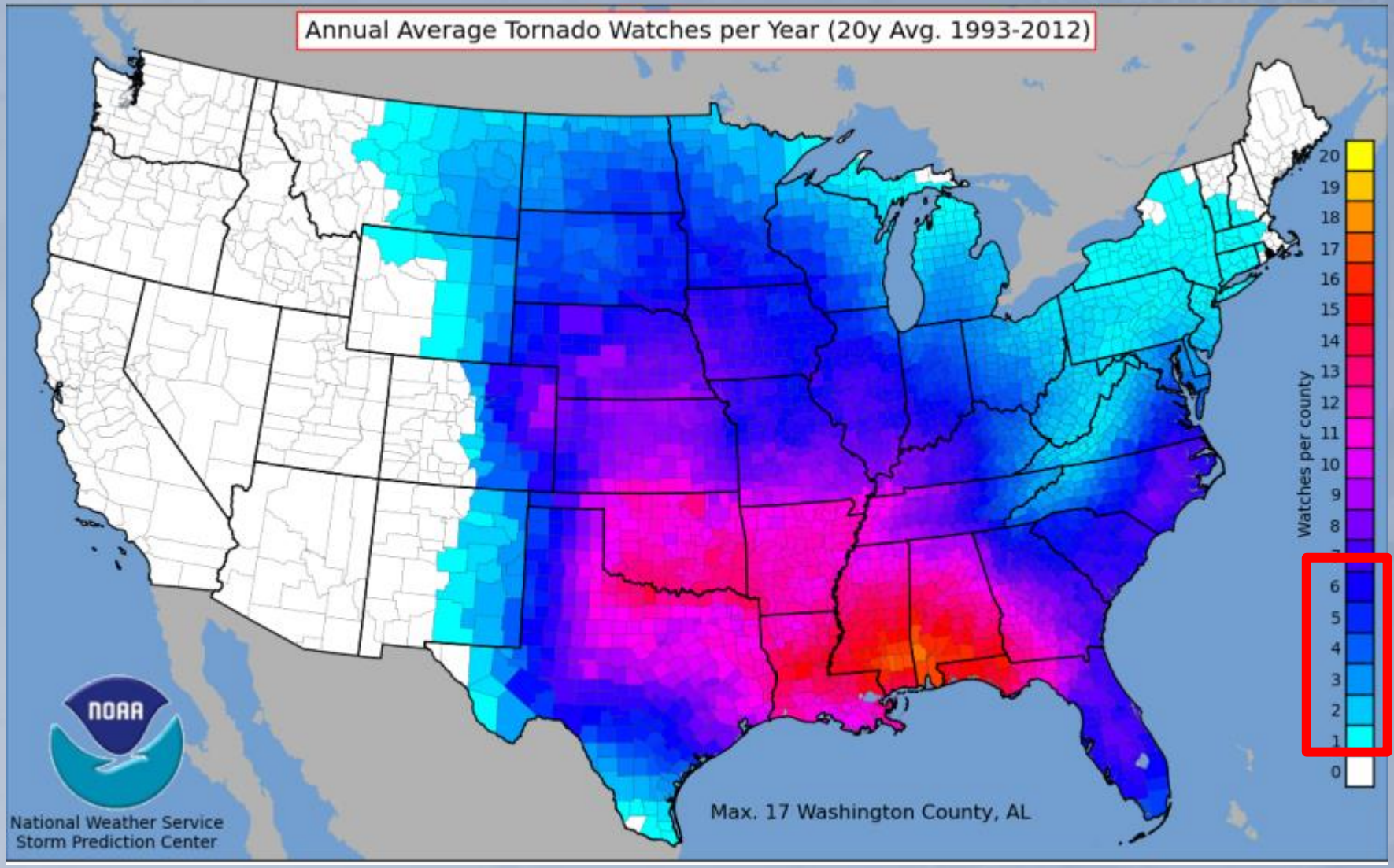
- Rare
- Long lived
- EF4/EF5 Winds > 165 MPH
- Many Fatalities
- Nearly always detected



Break Time

Preparing for Severe Weather


Annual Average Severe Tstm Watches per Year (20y Avg. 1993-2012)
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
NOAA
National Weather Service
Storm Prediction Center
Max. 23 Osage County, OK


Annual Average Tornado Watches per Year (20y Avg. 1993-2012)
Watches per county
20
19
18
17
16
15
14
13
12
11
10
9
8
6
5
4
3
2
1
0
NOAA
National Weather Service
Storm Prediction Center
Max. 17 Washington County, AL

Local Tornado Statistics & Climatology

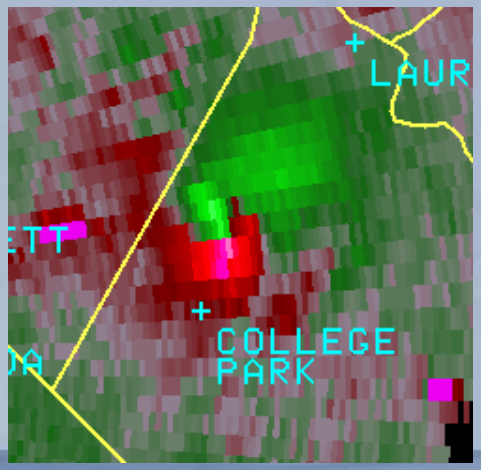
- Total of 21 deaths have occurred in our CWA due to tornadoes over the past 60 years.

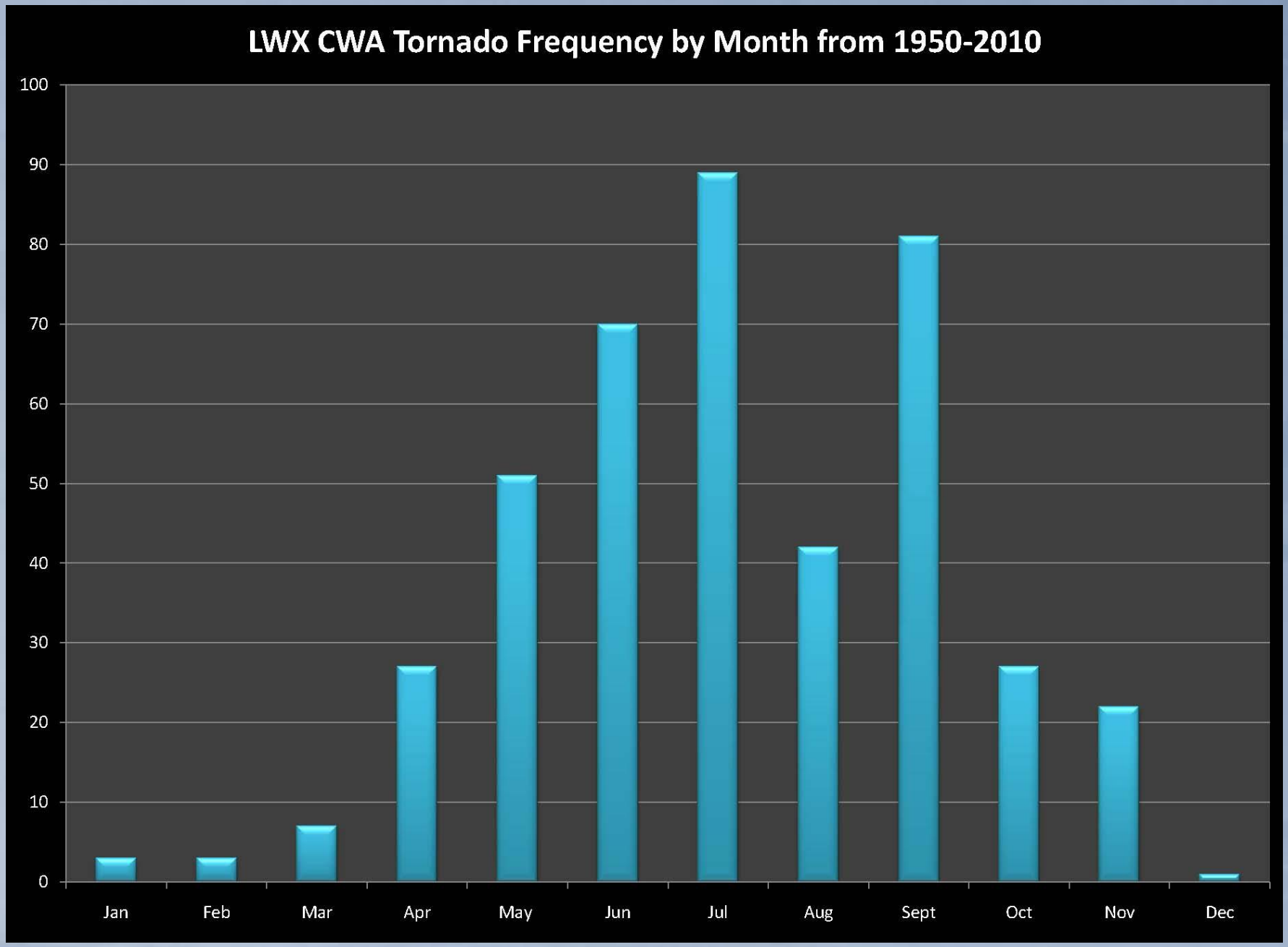
- A total of 411 tornado-related injuries have occurred within our CWA since 1950.

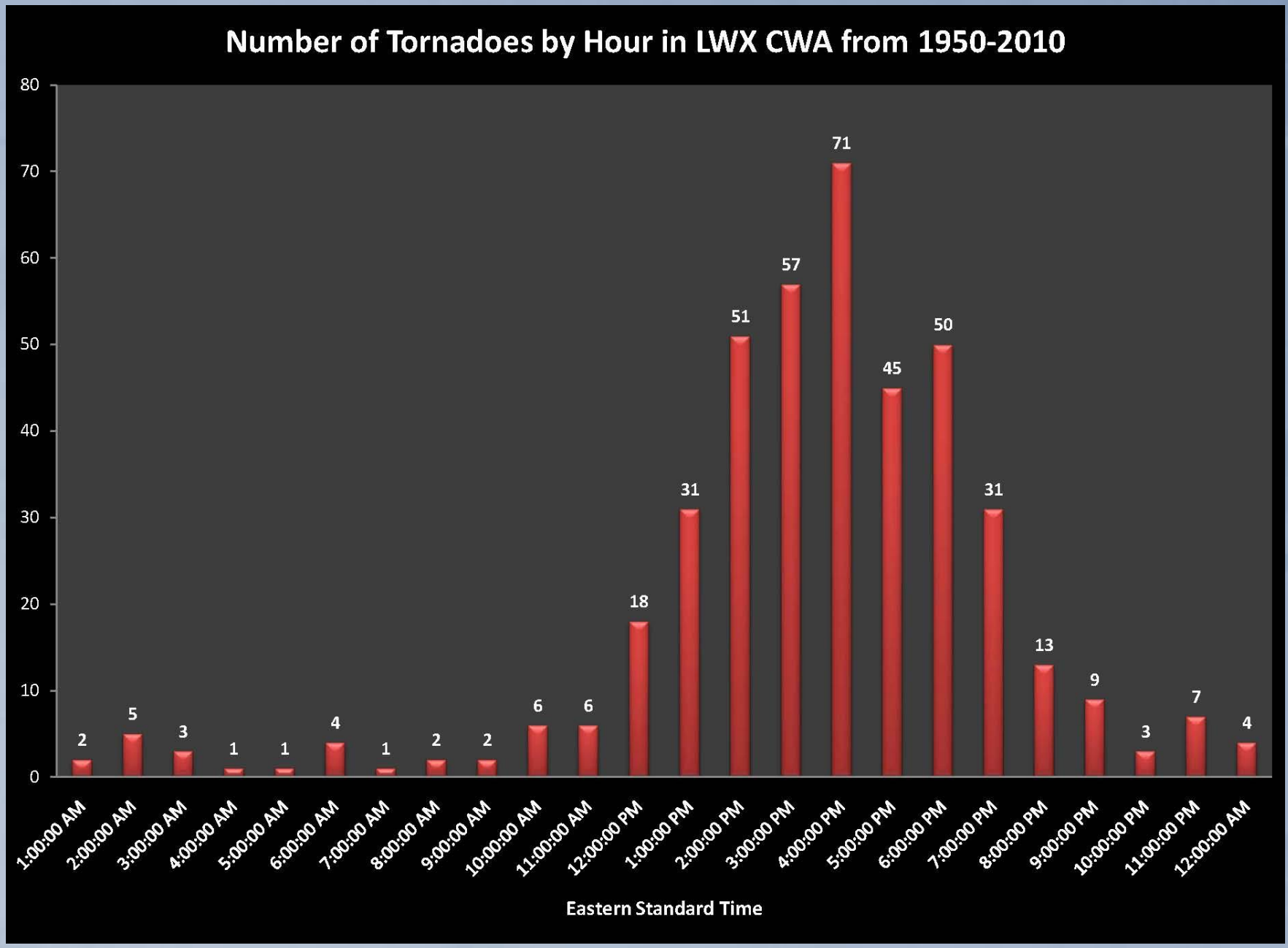
Tornadoes 1950 –Present

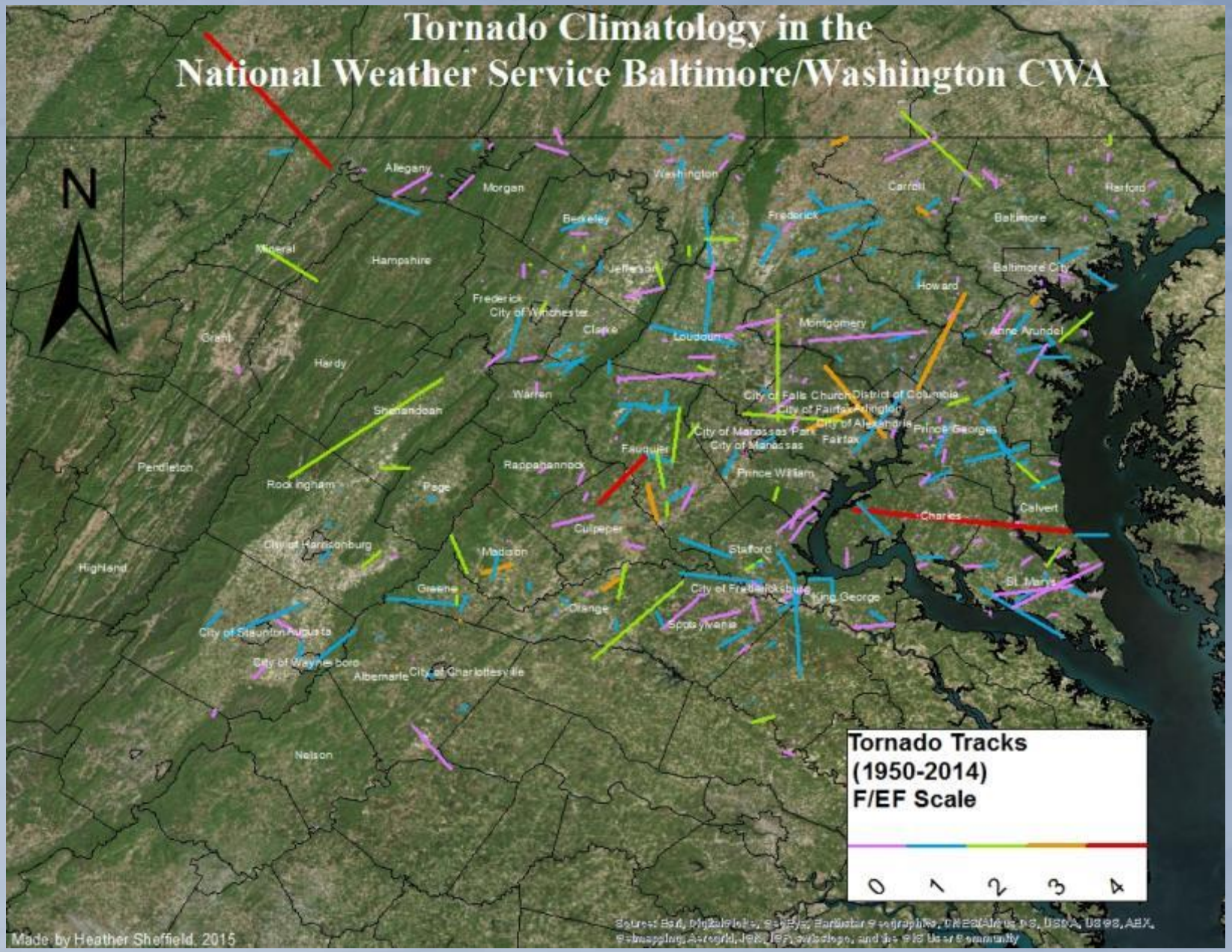
- 82% F0 & F1
- 13% F2
- 3% F3
- < .05% F4
- 0 F5

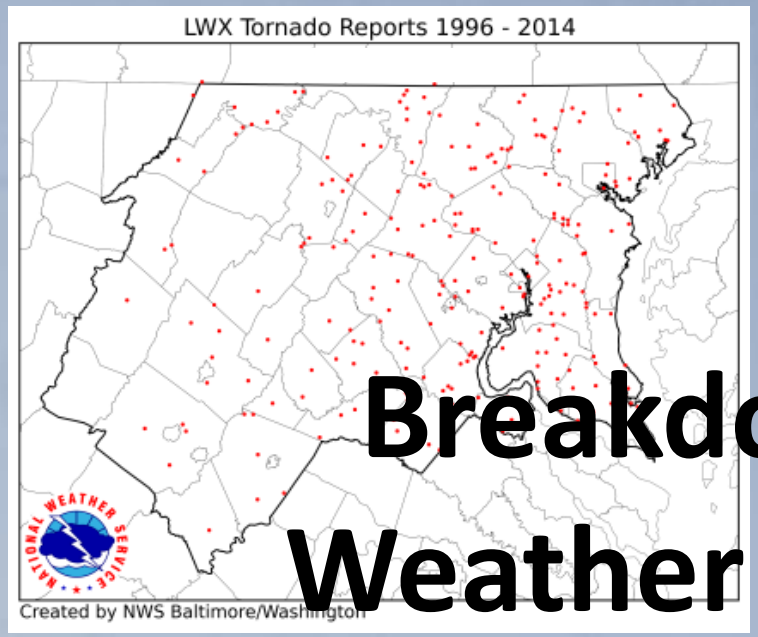
College Park Tornado (F3)
September 24, 2001

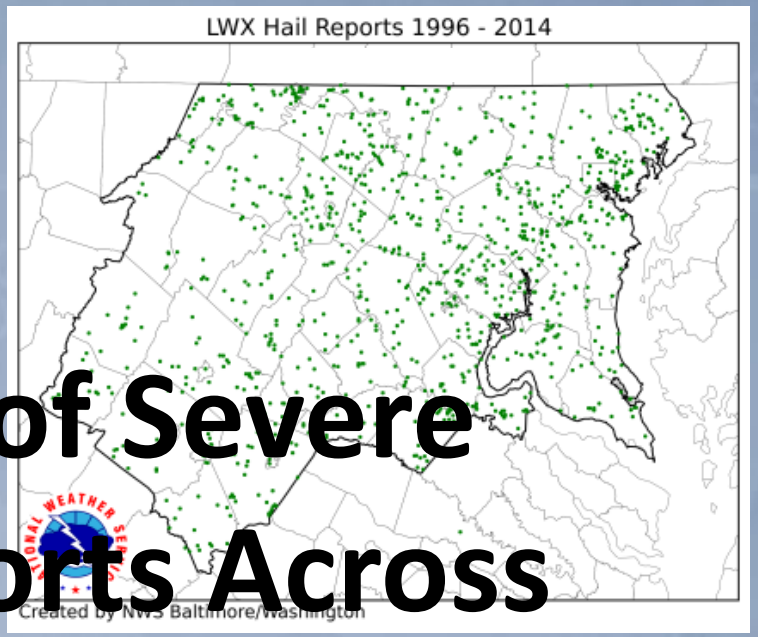



LWX CWA Tornado Frequency by Month from 1950-2010
100
90
80
70
60
50
40
30
20
10
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec

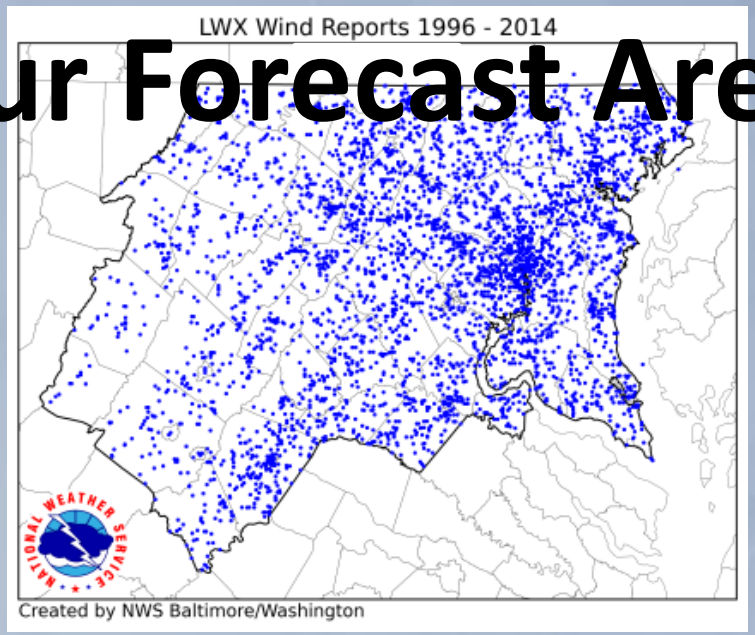

Number of Tornadoes by Hour in LWX CWA from 1950-2010
80
70
60
50
40
30
20
10
0
2
5
3
1
1
4
1
2
2
6
6
18
31
51
57
71
45
50
31
13
9
3
7
4
1:00:00 AM
2:00:00 AM
3:00:00 AM
4:00:00 AM
5:00:00 AM
6:00:00 AM
7:00:00 AM
8:00:00 AM
9:00:00 AM
10:00:00 AM
11:00:00 AM
12:00:00 PM
1:00:00 PM
2:00:00 PM
3:00:00 PM
4:00:00 PM
5:00:00 PM
6:00:00 PM
7:00:00 PM
8:00:00 PM
9:00:00 PM
10:00:00 PM
11:00:00 PM
12:00:00 AM
Eastern Standard Time


Tornado Climatology in the
National Weather Service Baltimore/Washington CWA
N
Allegany
Morgan
Washington
Carroll
Harford
Berkeley
Frederick
Baltimore
Mineral
Hampshire
Jefferson
Baltimore City
Howard
Frederick
City of Winchester
Clarke
Loudoun
Montgomery
Anne Arundel
Grant
Hardy
Warren
City of Falls Church
District of Columbia
City of Fairfax
Arlington
City of Alexandria
Shenandoah
City of Manassas Park
City of Manassas
Fairfax
Prince Georges
Fauquier
Pendleton
Rappahannock
Prince William
Rockingham
Page
Calvert
Charles
Culpeper
City of Harrisonburg
Madison
Stafford
Highland
City of Fredericksburg
St. Mary's
Greene
King George
Orange
Spotsylvania
City of Staunton
Augusta
City of Waynesboro
Albemarle
City of Charlottesville
Nelson
Tornado Tracks
(1950-2014)
F/EF Scale
0
1
2
3
4
Made by Heather Sheffield, 2015

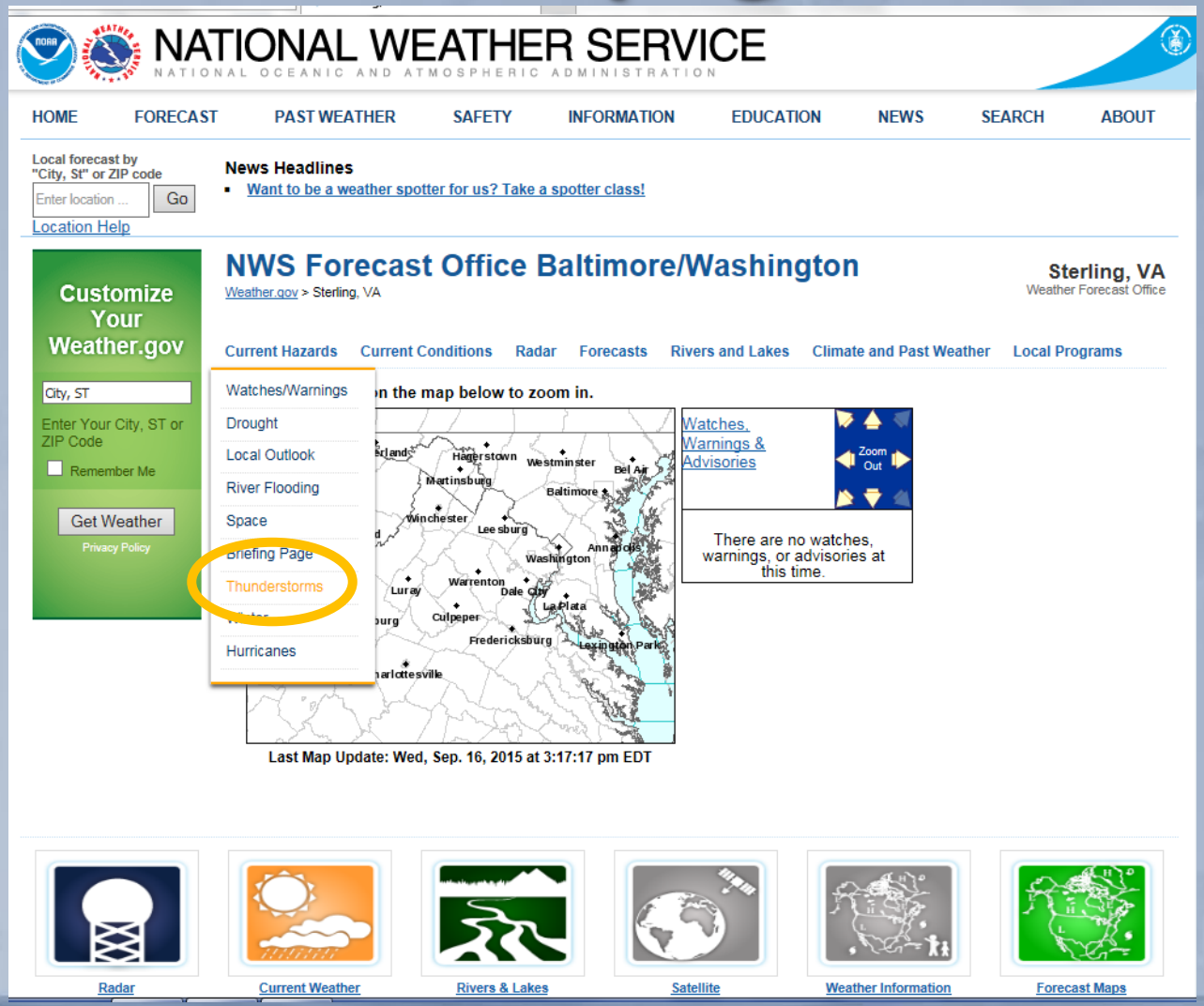




Breakdown of Severe Weather Reports Across Our Forecast Area

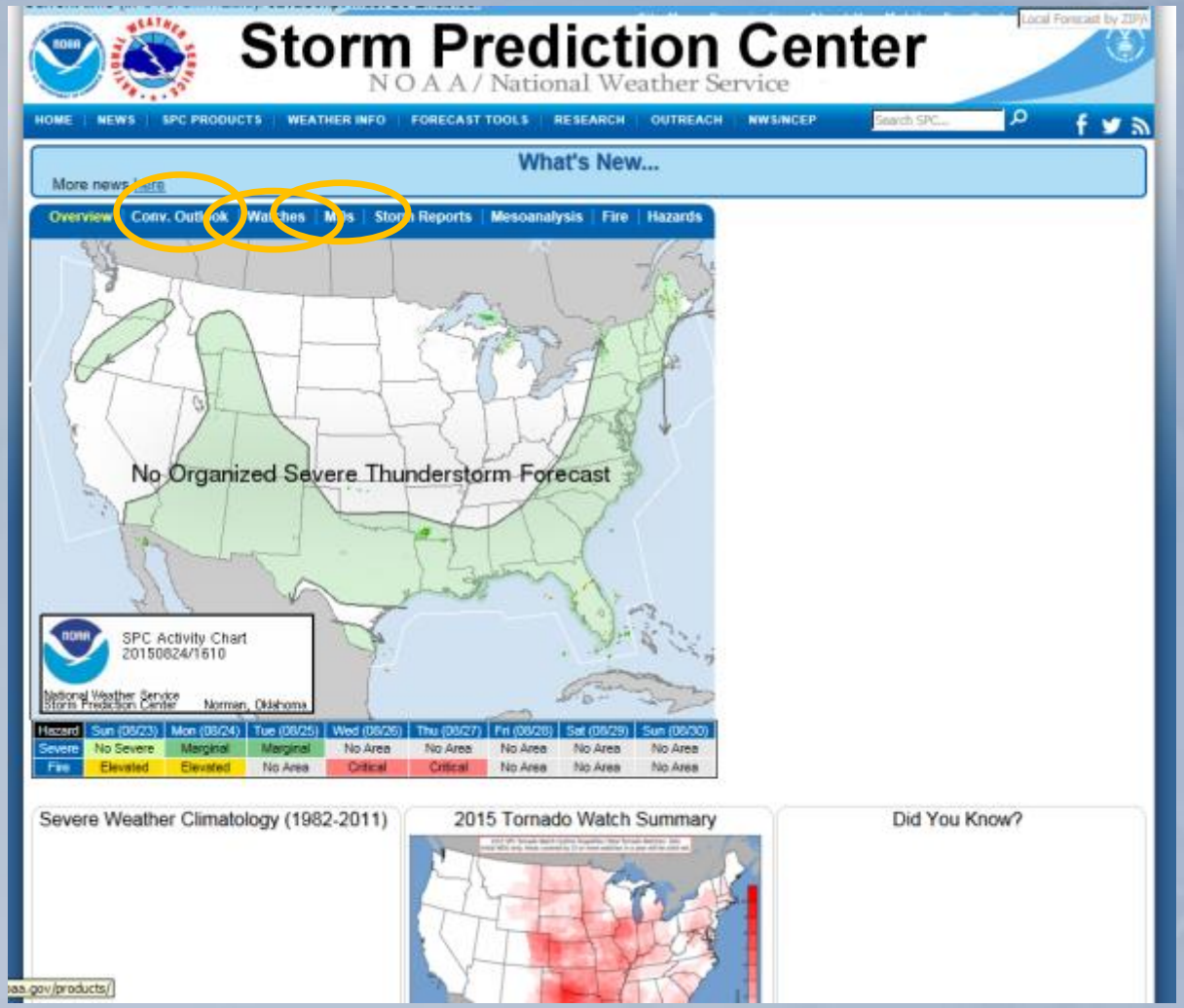


Severe Weather on our Webpage



National Weather Service
Baltimore MD/Washington DC

Storm Prediction Center



Convective Outlooks – highlights areas of possible Severe Thunderstorm or Tornado. Issued usually 1-3 hours prior to the threat

Mesoscale Discussions (MDs) – Discussion from SPC of the potential need for a watch (severe or tornado) based on the latest and forecasted conditions

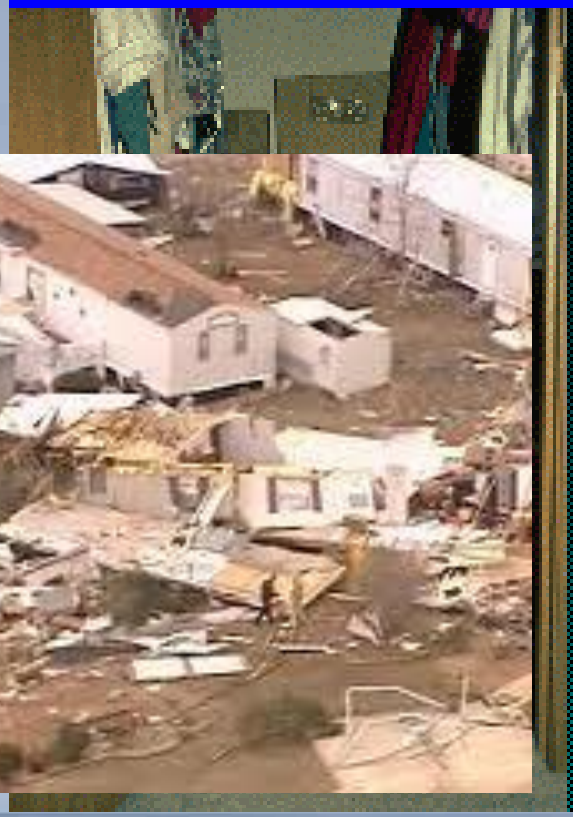
www.spc.noaa.gov

Tornado Safety

Seek sturdy shelter in an interior room if a tornado is approaching. Crouch down and cover your head.

If caught outside, seek sturdy shelter immediately!!!!

Mobile homes are NOT safe!!!!



- **Stay away from windows!!!**

, go to t

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h a thic

om debr

If you can see lightning or hear thunder, you are close enough to be struck and need to take immediate action!!!

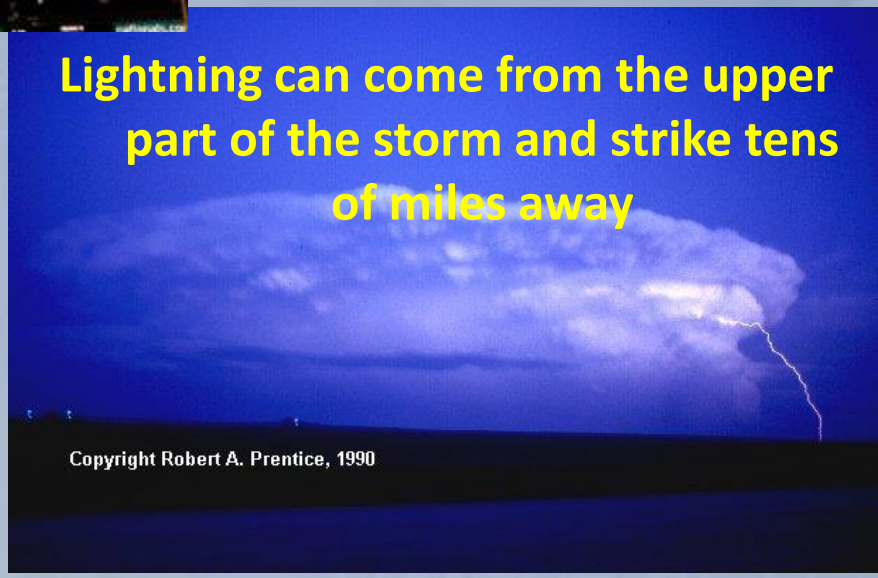
National Weather Service
Baltimore MD/Washington DC

Lightning Safety - Outdoors

Seek safe shelter when you first see dark threatening clouds developing, hear thunder or see lightning.

A safe shelter is:

- **A fully enclosed building with a roof, walls and floor.**
- **A "hard-topped" automobile.**



There is NO safe place to be outside in a thunderstorm!

Lightning Safety - Indoors

Stay Away From:

- Windows and Doors
- Electronic Equipment and Appliances
- Plumbing
- Concrete Floors & Walls

Also:

- Do not use a corded phone.
- Unplug expensive electronics or install surge protectors.

Spotter Responsibilities with Severe Weather

- **Tornado/funnel cloud/waterspout**
- **Straight line wind damage**
- **Hail**
- **Lightning (don't call to just report it is happening. Call if there is damage as a result of a lightning strike)**

Flooding

Flash Flooding

Flash Flood: A flood that follows *within 6 hours* of a heavy or excessive rainfall, dam or levee failure, or a sudden release of water impounded by an ice jam.

Flash Floods cause more deaths than tornadoes or lightning (30 year period)!

Baltimore, MD August 2014

Areal Flooding

Flood: **A flood that occurs *more than 6 hours* after the heavy or excessive rainfall event.**

Includes both river and stream flooding.

Coastal Flooding

Coastal Flooding: The inundation of land areas caused by sea waters over and above the level of normal tidal action.

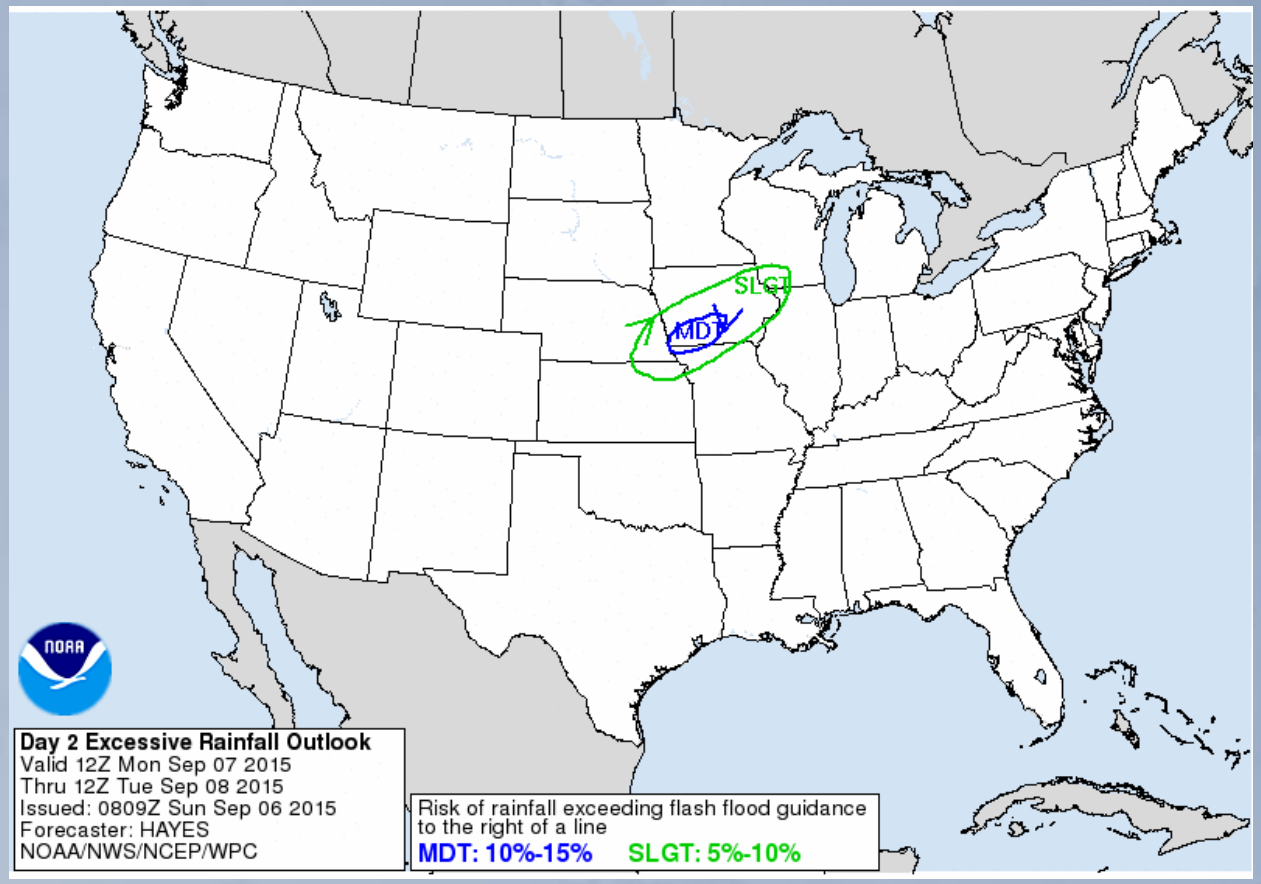
Annapolis, MD 2004

- **Prolonged onshore flow**
- **Storm Surge from Tropical Systems**
- **Spring Tides: the highest tides in a lunar month, around new and full moon when the Earth, Moon and Sun are aligned**

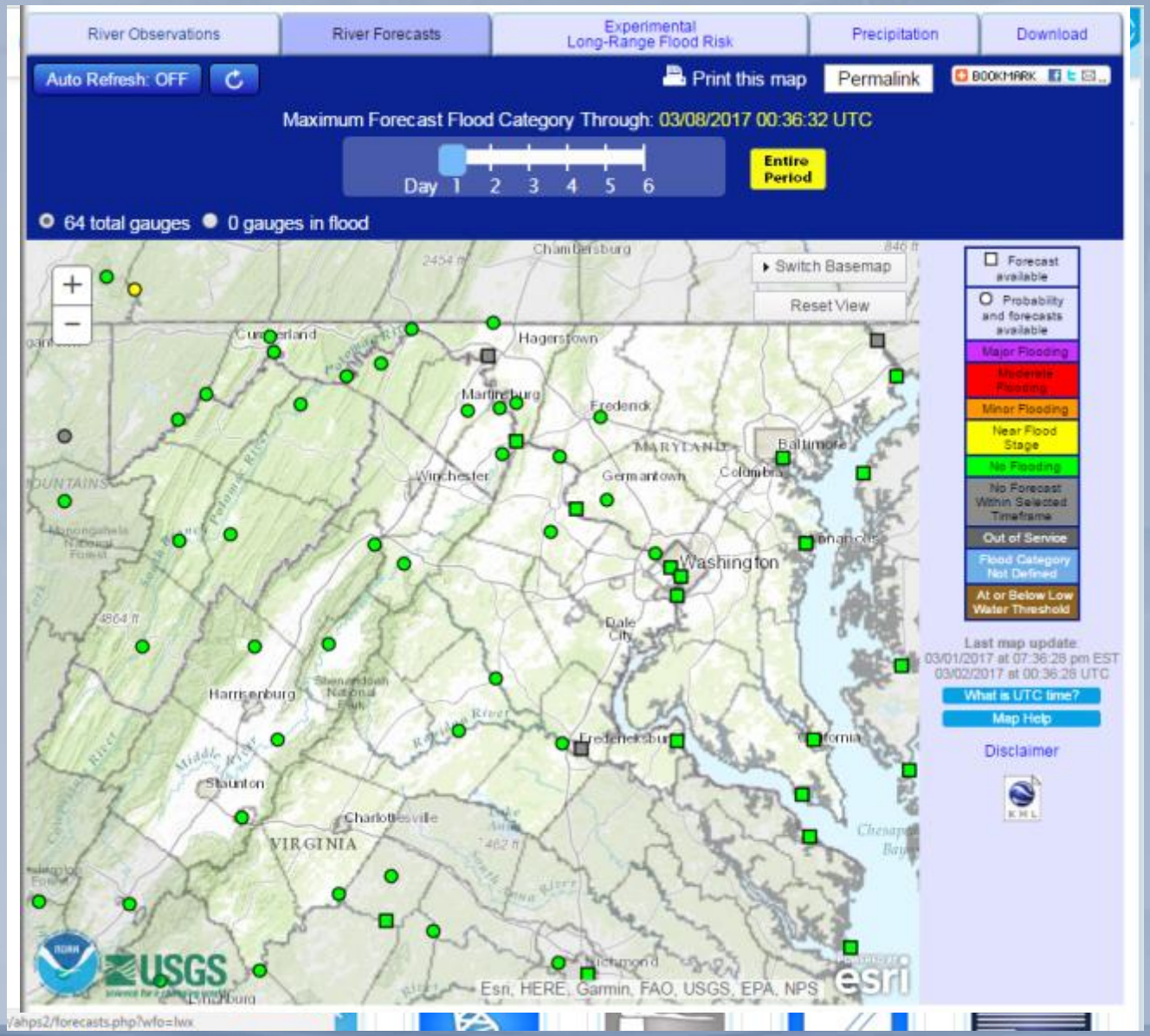
Preparing for Flooding

Weather Prediction Center

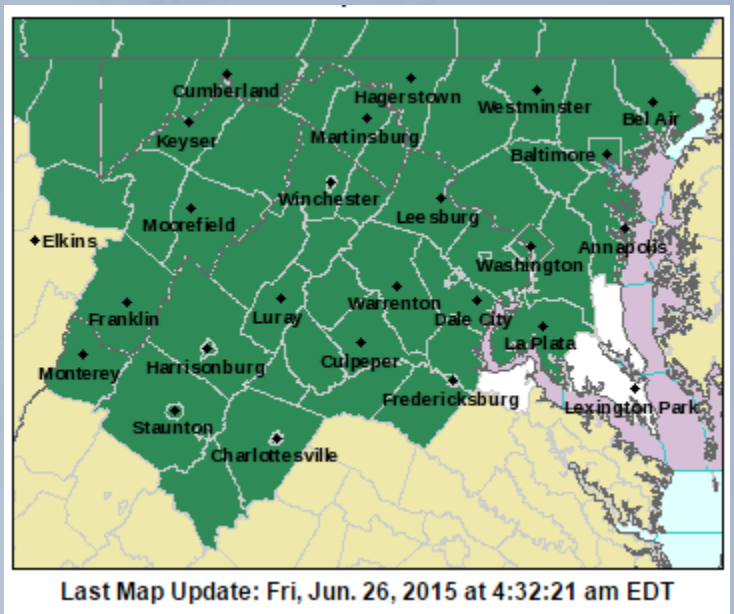
- **Provides 1,2 & 3 Outlook for Excessive Rainfall**
- **Based upon the risk of exceeding flash flood guidance**



River Forecasts



Local Products



- **Flash Flood, Flood or Coastal Flood Watch**
- **Coastal Flood Advisory**

Flooding Safety

Photo: Washington Post/Matt McClain

- 45% of the flood fatalities in the previous couple of years were the result of people attempting to drive through flooded roadways.
1 flood related death in MD in 2014

- If your vehicle stalls in unexpected high water, leave it at once and seek higher ground.

- Never enter water over a road if it is too deep to see the pavement.

- Be very careful at night. Visibility is greatly reduced and flooding is harder to recognize.

Spotter Responsibilities with Flooding

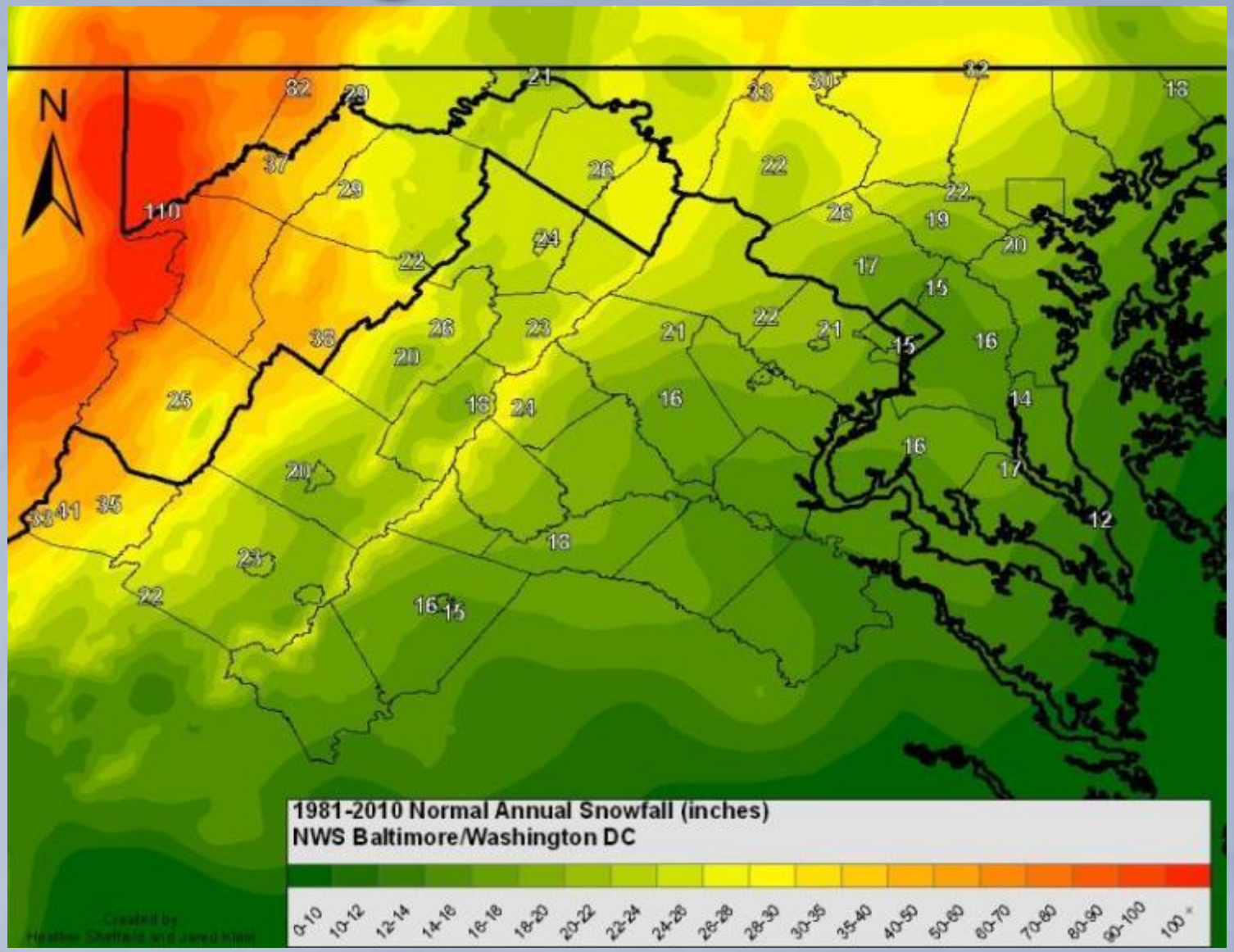
- How deep is the water (if safe to measure)
- Is the water moving or still?
- Any impacts?

Winter Weather

Winter Weather Concerns

- Heavy Snow
- Blizzard Conditions
- Icing
- Extreme Cold

Average Snowfall Totals



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

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

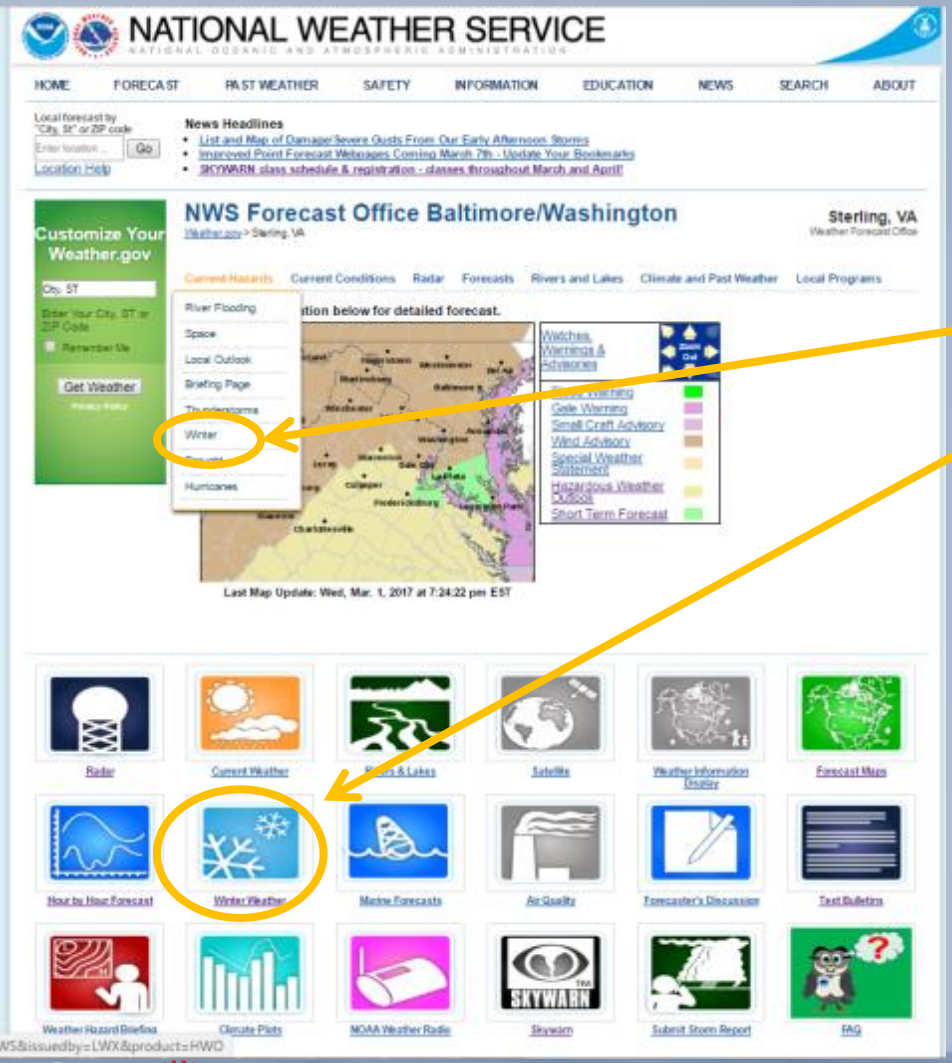
Please report your STORM TOTAL snowfall to the nearest tenth of an inch after the event is over.

- Report this as soon as possible
- Phone
- Email

- 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.

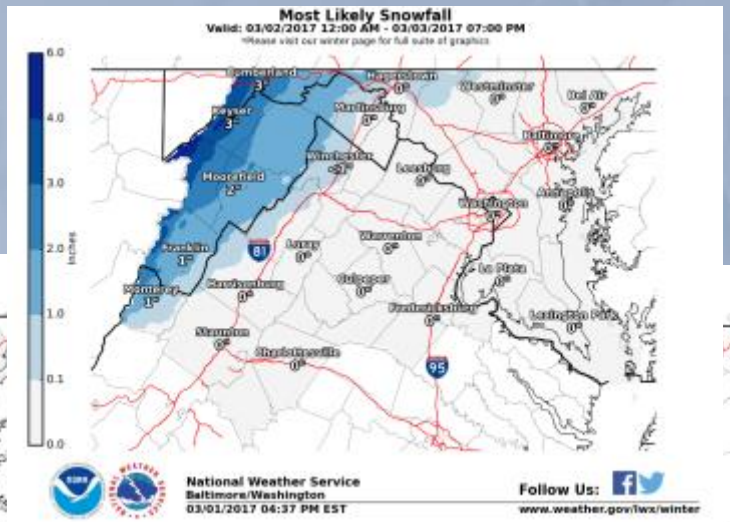
Preparing for Winter Weather

Local Winter Weather Webpage

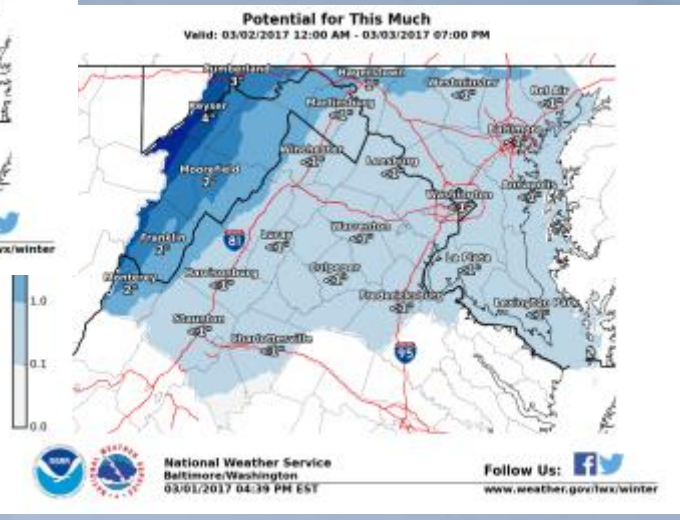


Winter Weather Page

Winter Probabilistic Graphics



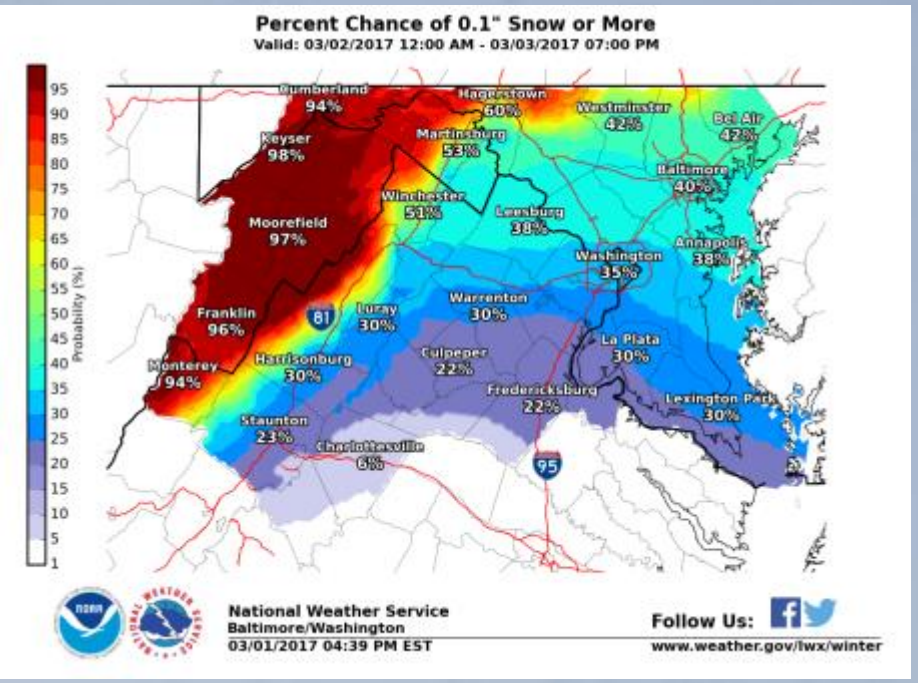
Most Likely Forecast

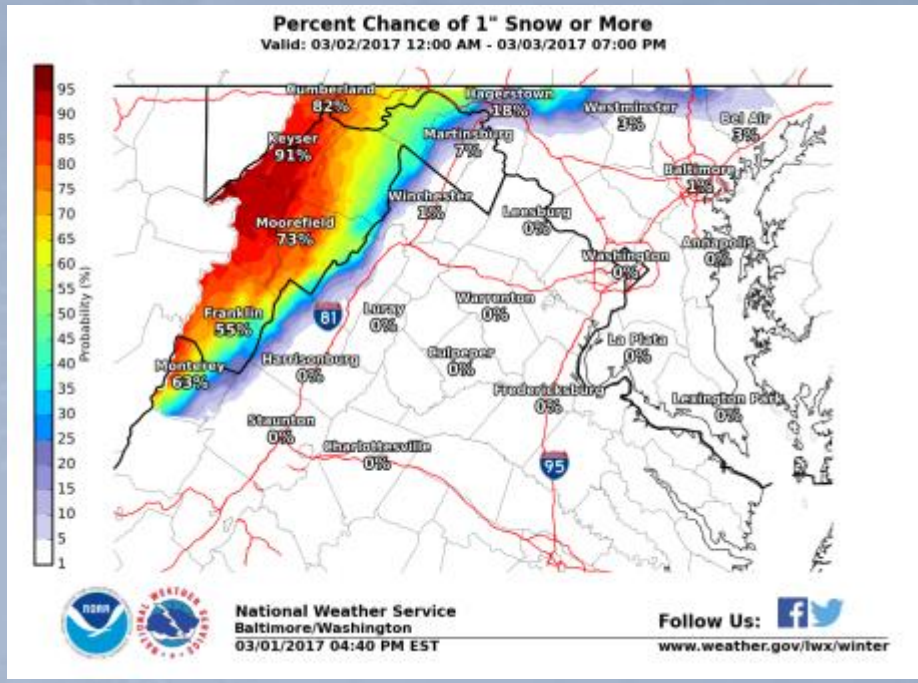


Minimum – Expect at least this much

Maximum – Potential for this much

Winter Probabilistic Graphics





Chance that Snow Accumulations Will Be Greater Than…

- **Trace, 1, 2, 4, 8, 12, 18 inches**

Spotter Responsibilities with Winter Weather

- **Snowfall amounts**
- **Ice amounts**
- **Temperatures/Wind Chills**

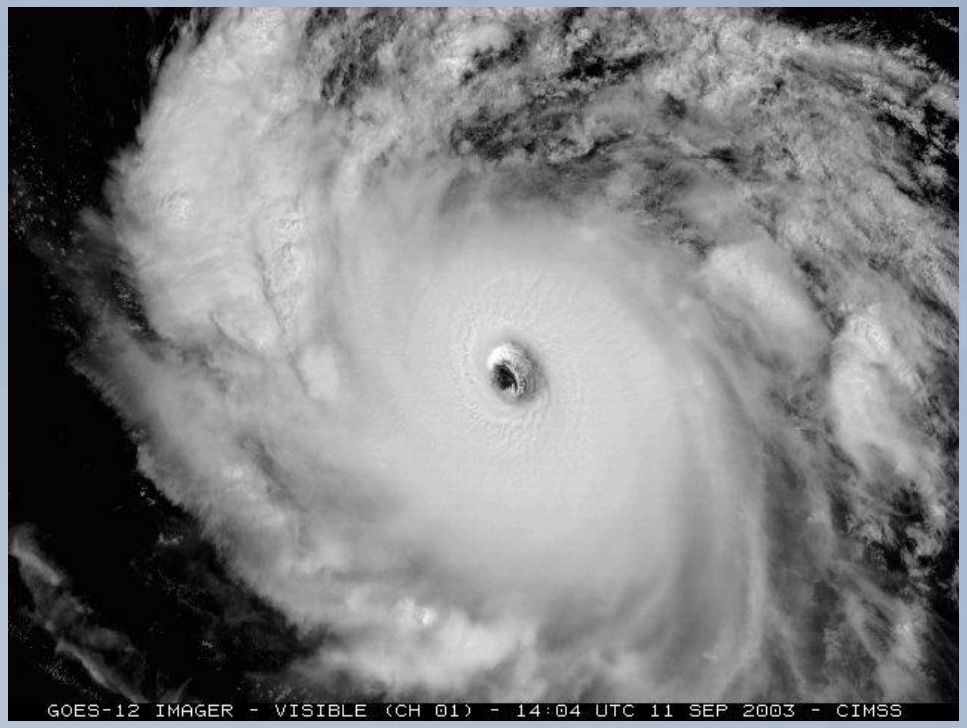

Photo By: Shawn Bennaman, Flickr


Photo By: Paul L. McCord, Jr

Tropical Weather

Tropical Weather

Hurricane Season is from June 1 –November 30



Hurricane Isabel

FOUR Threats:

- **Inland Flooding (Rain)**
- **Storm Surge (Tidal)**
- **High Wind**
- **Tornadoes**

Preparing for Tropical Weather

National Hurricane Center

- NHC provides the official forecast for the Atlantic Basin.
- If you click on the storm, you will be directed to the official forecast for that particular storm.
- You can also see either a 2 or 5 day outlook.

Spotter Responsibilities in Tropical Weather

- **Flooding**
  - **Fresh Water or Storm Surge**
- **Tornadoes**
- **Damage from winds or flooding**

Spotter Responsibilities of Non Precipitation Weather

- **How dense is the fog, is it causing hazardous driving conditions**
- **Tree or structural damage from the winds outside of storms**

Review Time

- **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.
- **Fog** – Any fog resulting in hazardous driving conditions
- **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
- **Snow Accumulation** – Every 2”, any accumulation not reflected in the forecast , storm total
- **Tropical** – Flooding as a result of rain and/or storm surge, tornadoes, wind damage

Very Important Information

If your report is severe thunderstorm hail/wind/tornado/funnel cloud or flooding related, please DO NOT send your report via email!

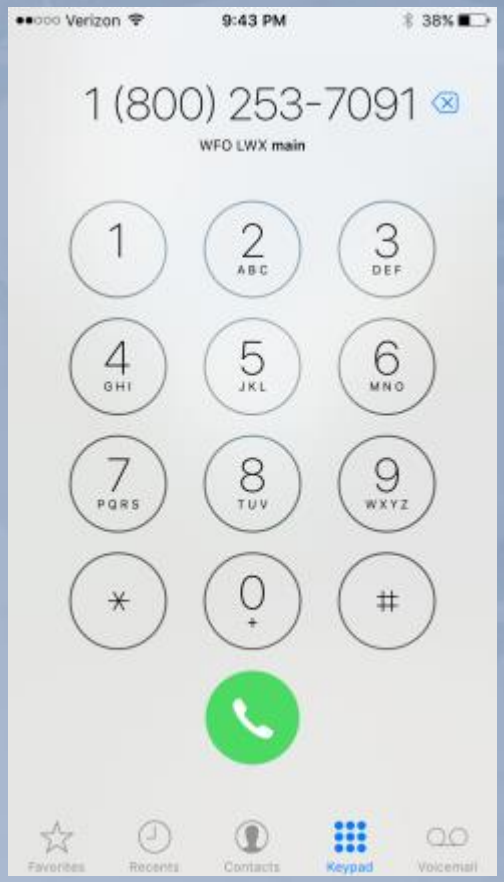
This type of information is time critical and needs to be relayed to forecasters *immediately*.

The best means to get information to the NWS quickly is by the telephone or Amateur Radio

PLEASE DON'T WAIT FOR US TO CALL YOU!

Making a Report

- Include your **full name and Spotter Number**!
- What are you reporting?
- What time was the event?
- Where did the event occur?



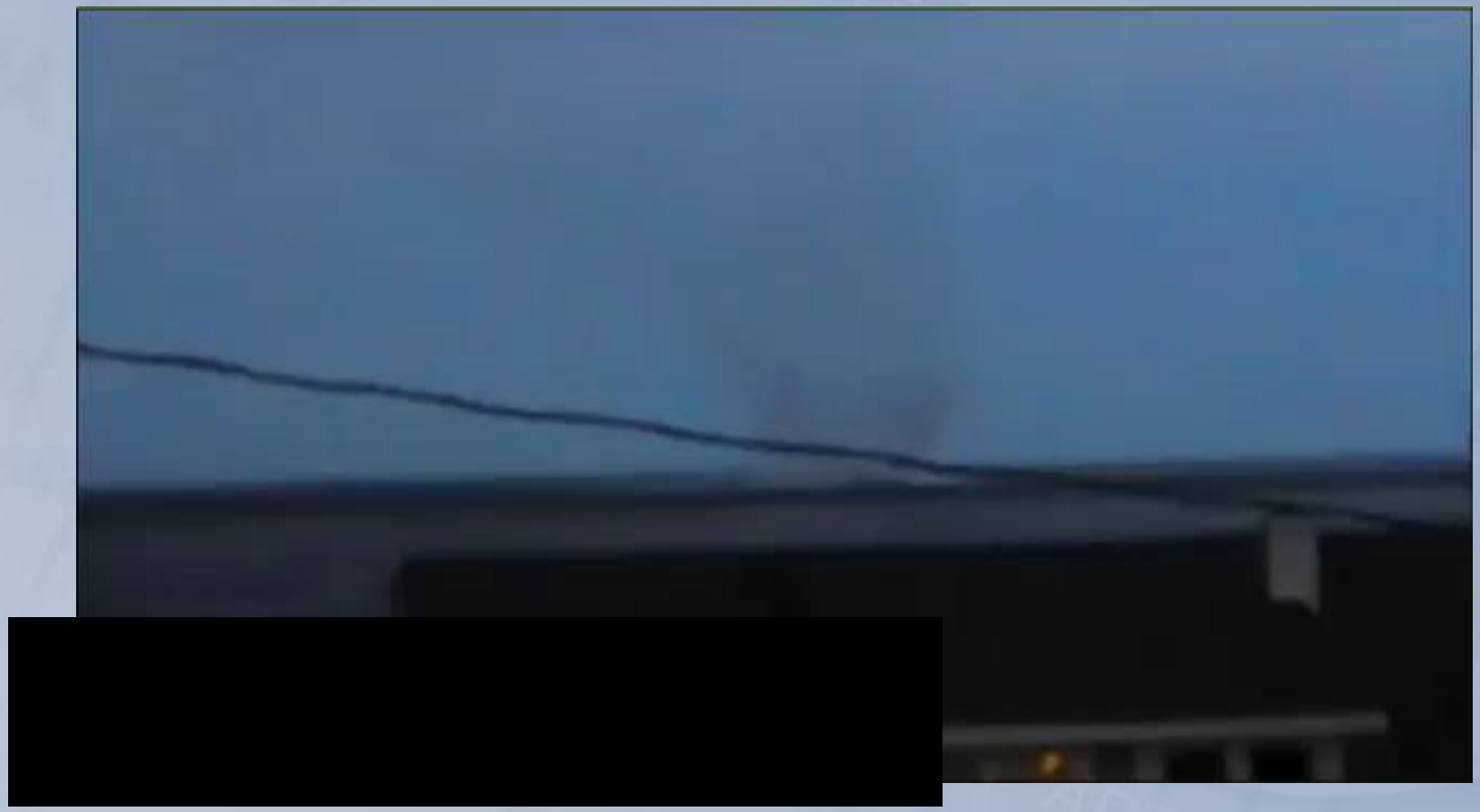
The more specific you are the better!

Email or fill out delayed reports, call in the rest!

Practice Makes Perfect

Practice Makes Perfect

Practice Makes Perfect

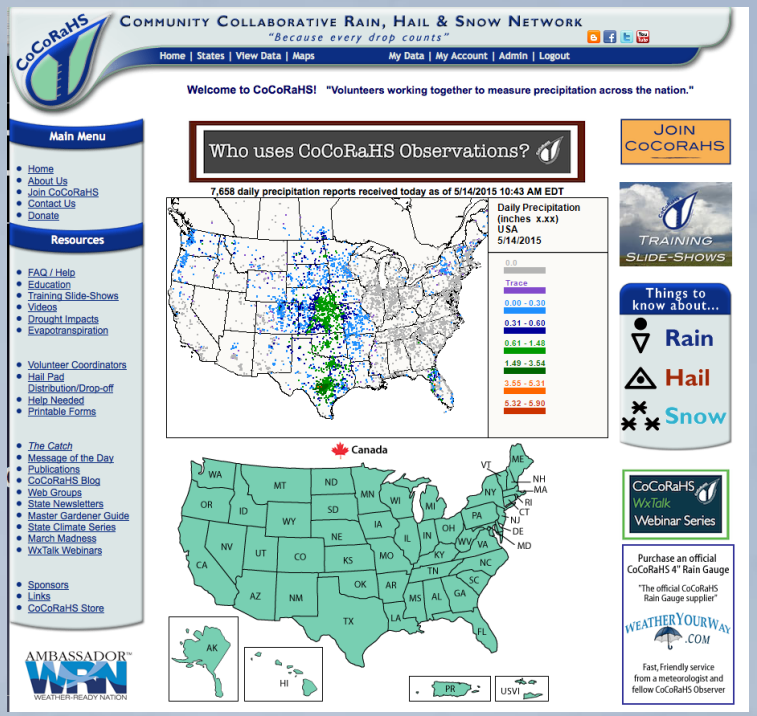


- You have now completed Basic – Introduction to Storm Spotting. **Congratulations, you are an official storm spotter now!**

- Please remember to give us 3-4 weeks to upload your information into our database and send you your spotter ID. If you don't receive it after 4 weeks, please email Heather Kenyon at heather.sheffield@noaa.gov

CoCoRaHS

In addition to being a NWS spotter, you also have to opportunity to participate in this separate volunteer program if you choose…



How can I join the network?

Five easy steps

Simply sign-up on the CoCoRaHS web page: www.cocorahs.org

Obtain a 4” plastic rain gauge

View the on-line “training slide show” or attend a training session

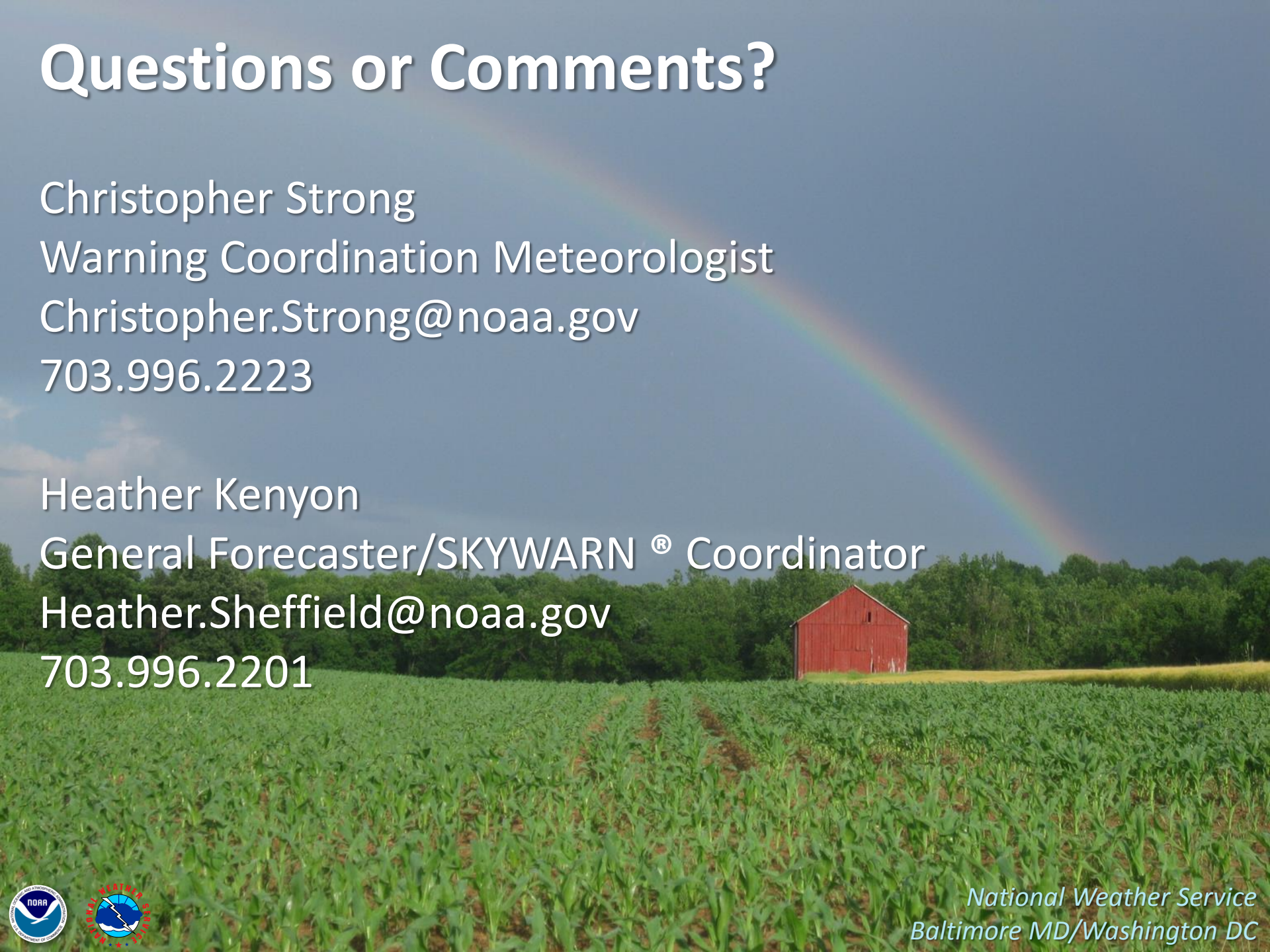
Set-up the gauge in a “good” location in your yard

Start observing precipitation and report on-line daily

Questions or Comments?

Christopher Strong
Warning Coordination Meteorologist
Christopher.Strong@noaa.gov
703.996.2223

Heather Kenyon
General Forecaster/SKYWARN ® Coordinator
Heather.Sheffield@noaa.gov
703.996.2201



National Capital Area SKYWARN Support Group

For presentation by a SKYWARN HAM if present

Amateur radio volunteers helping NWS Sterling, Virginia in its mission to protect life and property.

Amateur Radio Relay League (ARRL)
National Weather Service (NOAA-NWS)
Memorandum of Understanding

ARRL amateur radio operators (HAMS) coordinate their services, facilities and equipment with NWS in support of nationwide, state and local early weather warning and emergency communications functions … to enhance the nationwide posture of early weather warning and readiness for any conceivable weather emergency.

The Role of Amateur Radio

Our Mission

Move time-critical spotter reports to the NWS forecasters by the most expedient means possible.

Assist NWS by seeking out reports from areas where Severe Weather is occurring, or thought to have occurred.

Sterling SKYWARN Program

- **We use Amateur Radio as our primary means of reporting severe weather to the forecasters in real time.**
- **This is primarily done using:**
  - ***home based or mobile VHF FM radios through area wide repeaters***
  - ***but also use UHF, VHF Simplex, HR and APRS Packet equipment and frequencies.***

Why Amateur Radio?

- There are over 730,000 amateur radio operators in the United States, many of them trained SKYWARN spotters.
- Amateur radio doesn’t rely on commercial communications infra-structure.
- Spotters using amateur radio are able to transmit reports to the NWS, when other communication methods fail.

Amateur Radios

Hand Held UHF/VHF Transceivers

Single and Multi Band UHF/VHF Mobile Transceivers

Multi Band High Frequency Transceivers

Mobile Radios

What we do:

We work directly with the forecasters at the Sterling Weather Forecast Office (WFO) to provide *real time*, *ground truth* about severe weather events happening within the County Warning Area (CWA).

Amateur Radio Supports:

- Severe Thunderstorm and Tornado Watches and Warnings
- Hurricane and Tropical Storm Watches and Warnings, and the remnants of those systems.
- Flash Flood Watches and Warnings
- Winter Storm Watches and Warnings

Amateur Radio Does This Through:

- Operation of WX4LWX at NWS Sterling, VA
- Directed Nets on Local Repeaters
- Use of “Report Mode” to gather reports during less intense weather events

SKYWARN Desk
NWS Sterling , VA

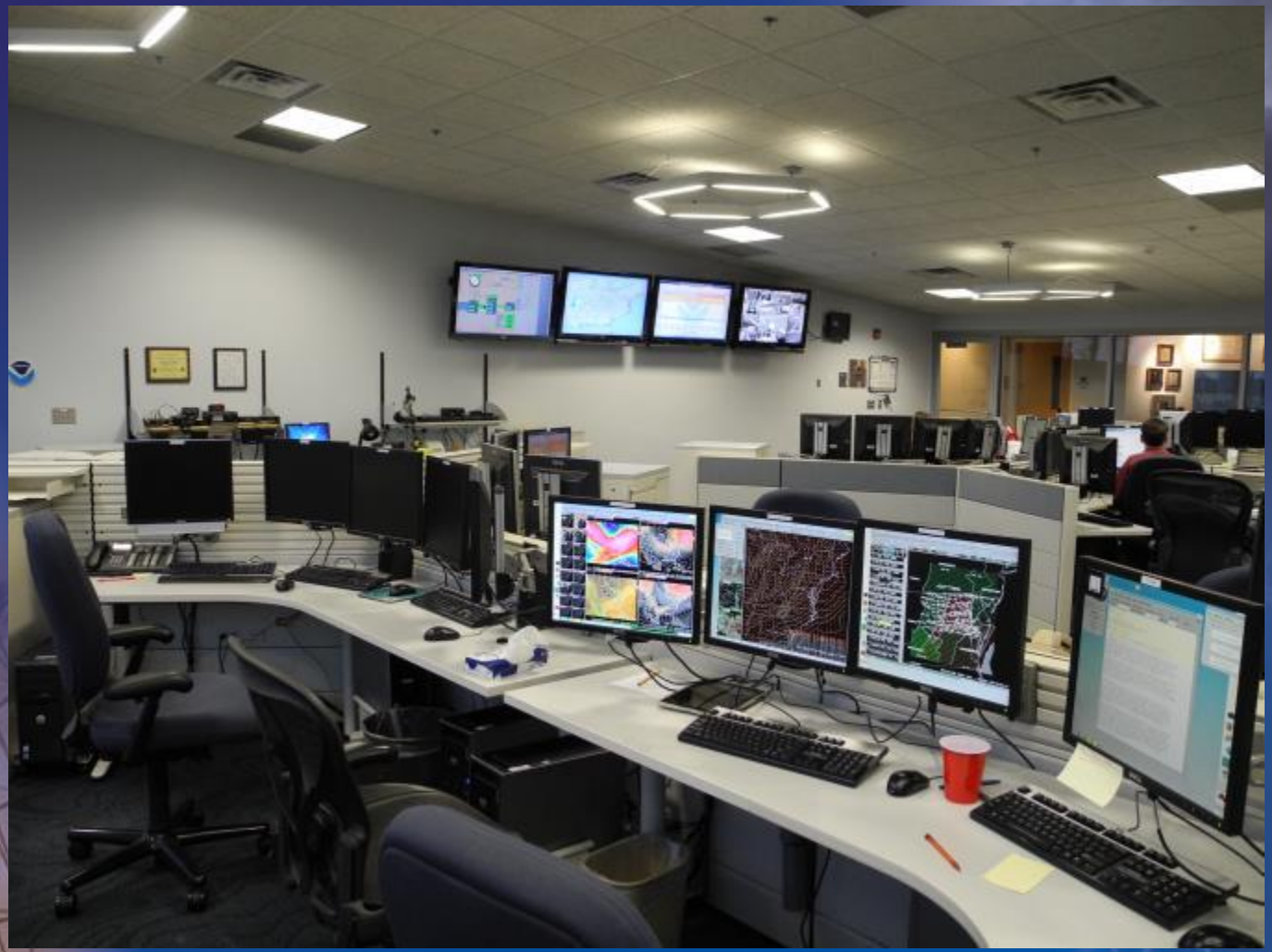
- 3 VHF Radios – 144-148 MHz
- UHF Radio – 440-450 MHz
- HF Radio – 1.8-30 MHz
- APRS on VHF at 144.390 MHz
- Multiple UHF/VHF and HF antennas

- Desktop Computer

WX4LWX

This radio station was initially funded by a grant from the National Capitol Foundation for Amateur Radio – and addition equipment has been provided by Amateur Radio Operators.

NWS Sterling, VA



Real Time Communications

- Main SKYWARN Net – 147.300 Mhz (Bluemont)
  Backup Net – 146.955 Mhz (Rockville)
  Backup Net – 145.210 Mhz (High Knob)
  Subnets – those reachable throughout the CWA
- Hurricane Watch Net – 14.325 Mhz
- Old Dominion Emergency Net – 3.947 Mhz
  Virginia Digital Emergency Net – 3.578.5 Mhz
- Local ARES/RACES/Red Cross nets and adjacent State Emergency Nets.
- Communication with adjacent SKYWARN support groups if required.

Also …

- Any licensed amateur may report severe weather through the amateur radio nets. We require that reports meet severe weather criteria.
- Many amateur radio SKYWARN spotters are also members of ARES, RACES and other emergency response groups.
- Amateur radio operators may be called on to perform emergency communications and damage assessment support in addition to our SKYWARN mission.

Movement of Information

NWS Forecasters

WX4LWX (when active, phoned in when not)

Amateur Radio Net

SKYWARN Spotters

NOAA - National Weather Service
National Capital Area
SKYWARN Support Group

Chris Patton W3CUM – Amateur Radio Coordinator

Tim Dennison AI4TD - Amateur Radio Coordinator Emeritus

Tom Horn W3TDH – Assistant Amateur Radio Coordinator
For Net Control

Richard Morani KE4AJL - Assistant Amateur Radio Coordinator
For Subnets

Paul Savidge N4PSS – Assistant Radio Coordinator
For Outreach/Education/Training

Rob Seastrom AI4UC – Assistant Amateur Radio Coordinator
For Station Management

… and a cast of thousands!!

Does it work?

Joplin, MO May 22, 2011

SKYWARN
Emergency Communications
Red Cross/Local Agencies
ARES/RACES Support
Statewide Coordination

More Information

Amateur Radio Nets

Scanner listeners are invited to monitor our Amateur Radio Nets

147.300 Bluemont – Primary Net
146.955 Rockville – Backup Net
145.210 High Knob – Backup Net

For more information about the
National Capital Area SKYWARN Support Group
www.wx4lwx.org

For more information about
Amateur Radio

www.arrl.org

More about Amateur Radio

www.arrl.org