

# Basic Skywarn Spotter Training

National Weather Service

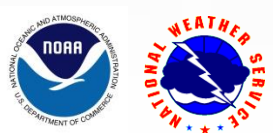
Mount Holly, NJ



National Weather Service  
Philadelphia/Mt. Holly

# Things to take away from the training:

- What we do at the office and why
- Why we need spotters
- How spotters are activated
- What weather phenomena to look for
- What and how to report
- Importance of your report
- Points of Contact



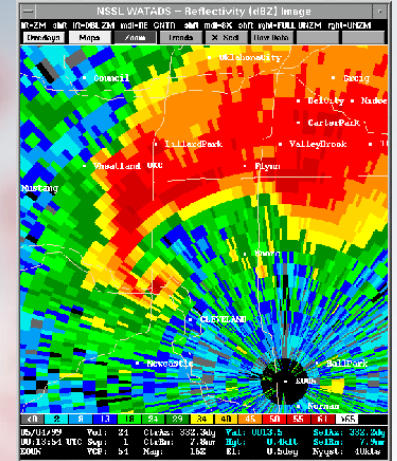
# Why we do what we do

- *The National Weather Service Produces Weather, Water, and Climate Forecasts and Warnings:*

- To Protect Life and Property for All Americans
- To Enhance the National Economy

- *Data and Products to:*

- Government Agencies
- Private Sector
- The Public
- Global Communities



# What we do

## Public Forecasts

- 34 Counties in four States
- 5 separate coastal zones

- Issue forecasts for four states with a very diverse topography.

## Hydrologic Forecasts

- 150 non-tidal observation platforms
- 50 forecast points
- Over 9000 sub-basins
- 40 Tidal gage observation platforms



## Aviation Forecasts

- 8 Terminal Forecasts

## Marine Forecasts

- Sandy Hook NJ to Fenwick Island DE
- Entire Delaware Bay
- Surf Zone forecasts

## Fire Weather Forecasts

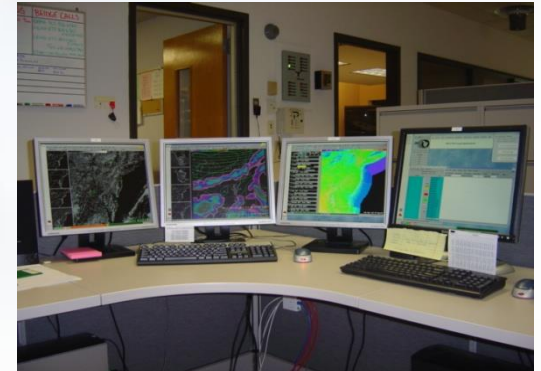
- 5 forecast zones in 4 States



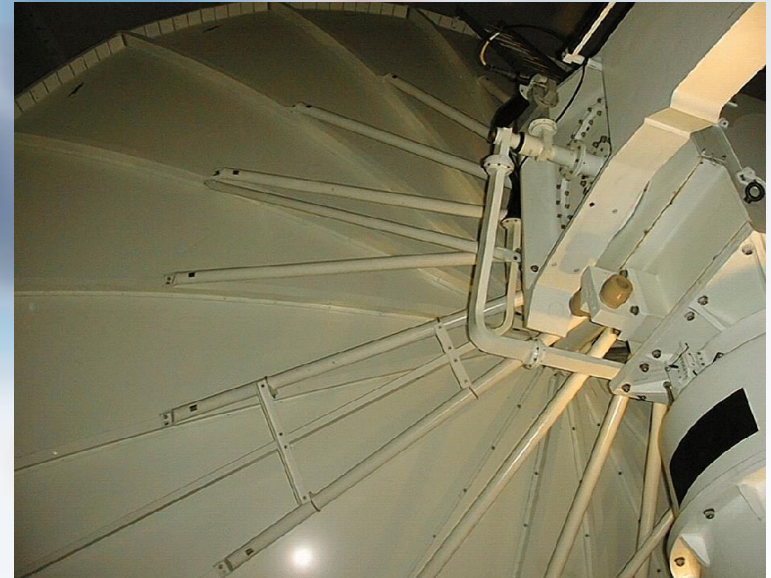


# How we do it

- Staff our office 24/7/365 as we are considered emergency personnel.
- Use a series of servers with live data stream known as AWIPS (Advanced Weather Interactive Processing System).
- Work rotating shifts that change weekly.
- Only federal agency allowed to issue weather warnings/advisories



# WSR-88D Located in Brendan Byrne State Forest (Fort Dix) Ocean County, NJ

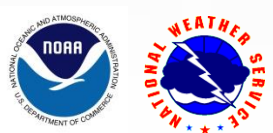


750,000 Watts of Transmitted power

Transmits power in very brief pulses (.00157 sec)

11.1 cm wavelength

28 foot diameter dish



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**WSR-88D Associated with the Dover  
Air Force Base**

**Located in Ellendale State Forest  
Sussex County DE**

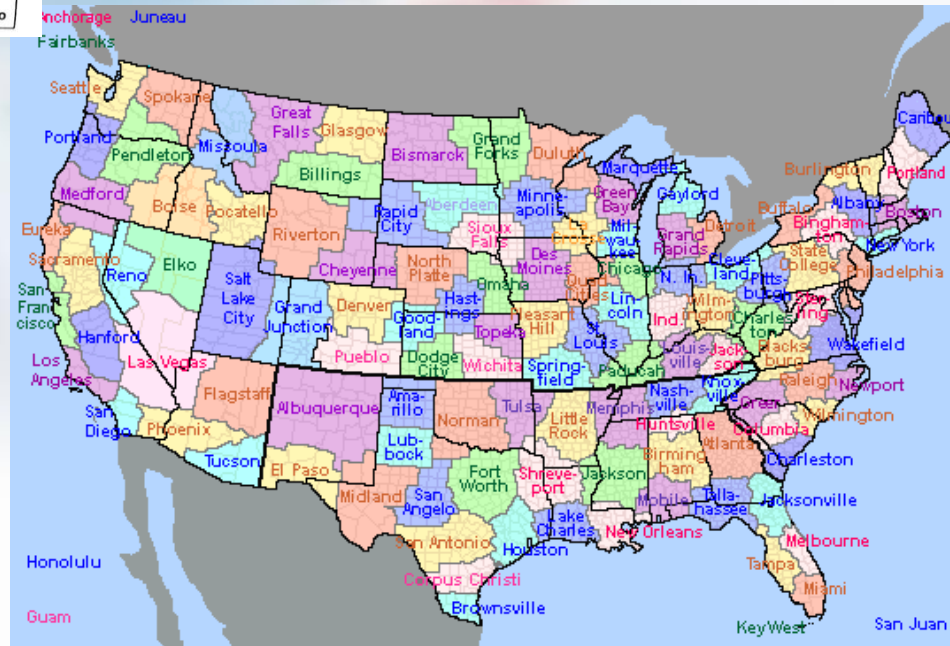


## LOCATIONS OF WEATHER FORECAST OFFICES



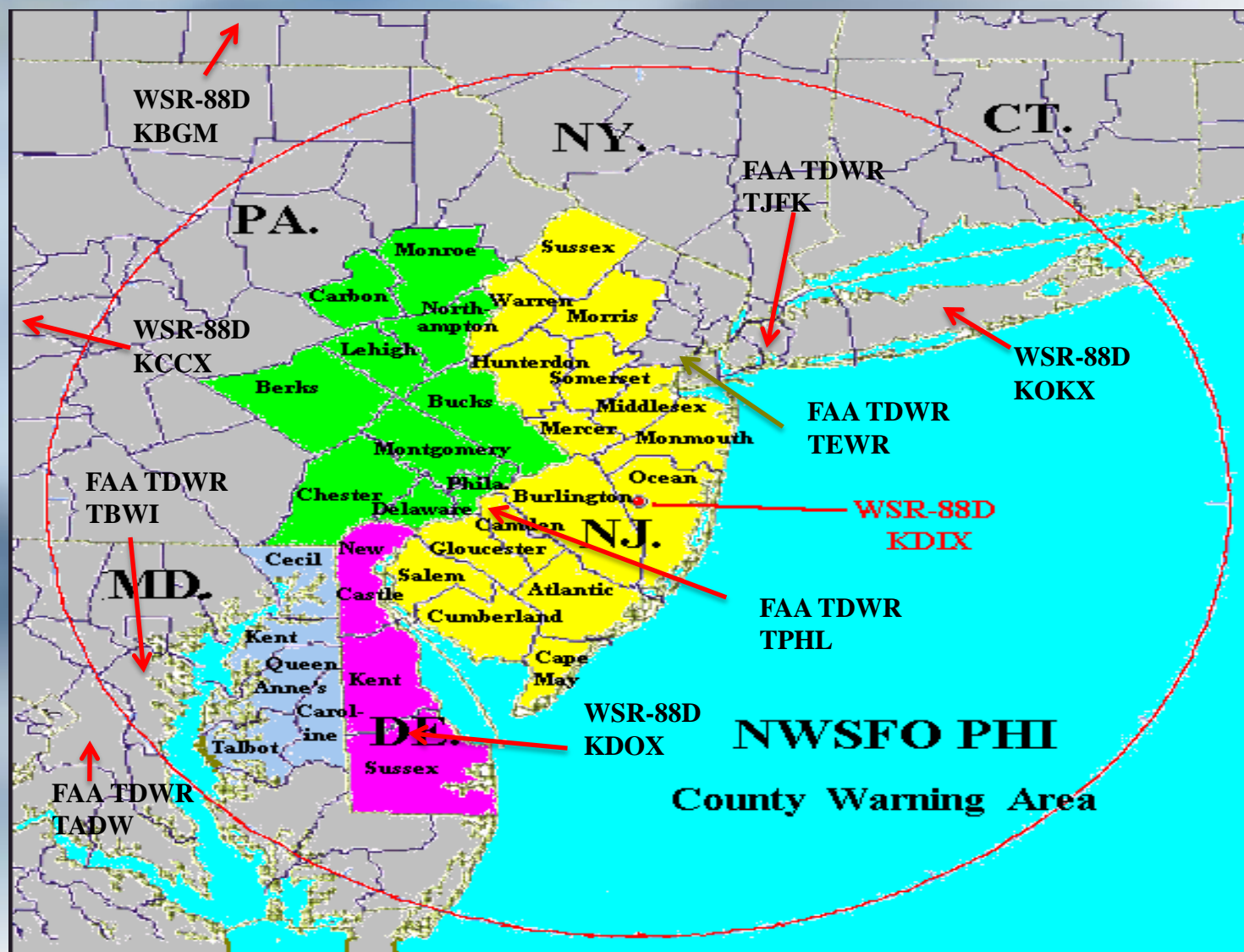
The Mount Holly Forecast Office is 1 of 122 field offices across the United States including overseas territories.

The Mount Holly County Warning Area (CWA) has the second largest population in the NWS with over 11 million people throughout four different states.



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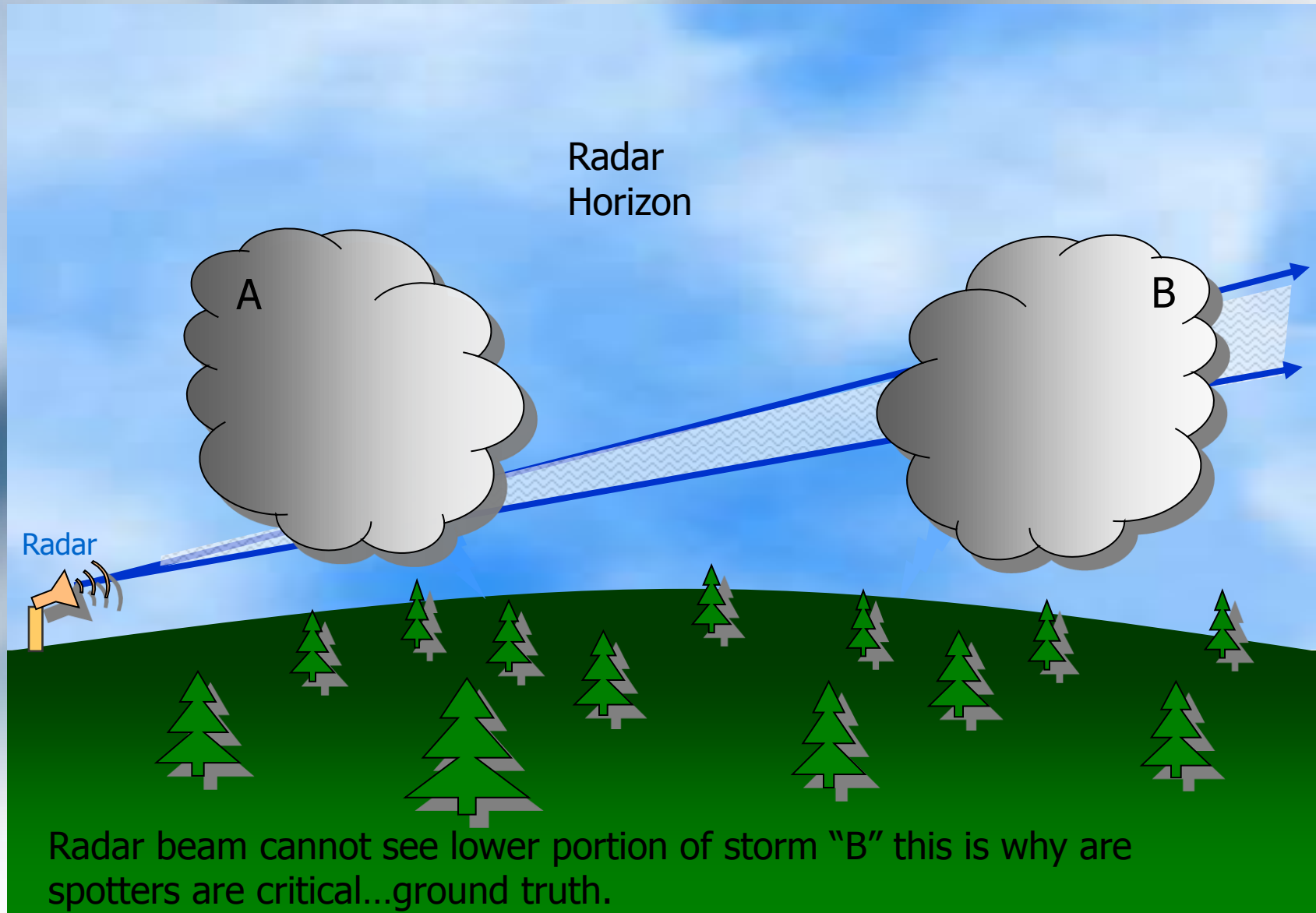
Our CWA has great radar coverage from every direction, but we still use ground truth reports during active weather... We are only as good as the information in which we receive.

# Why we need spotters

- Radar limitations (beam height & resolution...effective resolution decreases with distance...radars do not see tornadoes)
- Very high percent of weak tornadoes (radar signatures less defined)
- Real-time verification (adds credibility, enhances public response, and improves warning accuracy)
- Eyes and Ears for NWS throughout CWFA



# Why we need spotters



# Tiered Approach of NWS Products

Storm Prediction Center will issue Severe Weather outlooks; our forecast office issues a Hazardous Weather Outlook that will contain information about possible active weather.

**Outlooks**

Storm Prediction Center collaborates with our forecast office and then will issue Severe Thunderstorm/Tornado Watches...our forecast office relays then this information to the public.

**Watches**

All the Severe Thunderstorm and Tornado Warnings are issued by Mount Holly.

**Warnings /  
Advisories**

**Certainty of Event**

**Time  
until  
event**





# Watch vs. Warning

- Watch - Atmospheric conditions are favorable (or could become favorable) for the development of severe thunderstorms/tornadoes which could produce severe weather – remain alert and watch the sky.
- Warning - Severe weather is occurring or is imminent – take protective action.

## Customize Your Weather.gov

City, ST

Enter Your City, ST or ZIP Code

☐ Remember Me

Get Weather

[Privacy Policy](#)

# NWS Forecast Office Philadelphia/Mt Holly

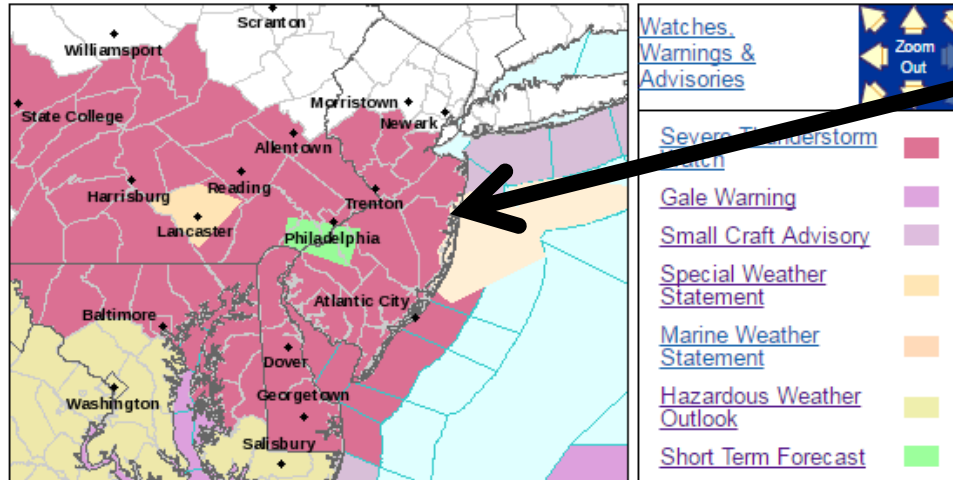
[Weather.gov](#) > Mount Holly, NJ

Mount Holly, NJ

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: Tue, Apr. 26, 2016 at 5:09:25 pm EDT



[Radar](#)



[Current Weather](#)



[Rivers & Lakes](#)



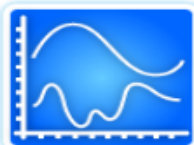
[Satellite](#)



[Weather Information Display](#)



[Forecast Maps](#)



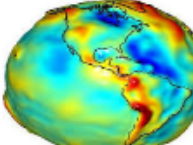
[Hour by Hour Forecast](#)



[Text Products](#)



[Marine Forecasts](#)



[Climate Information](#)



[Skywarn](#)



[Submit Storm Report](#)

Be careful where you click!



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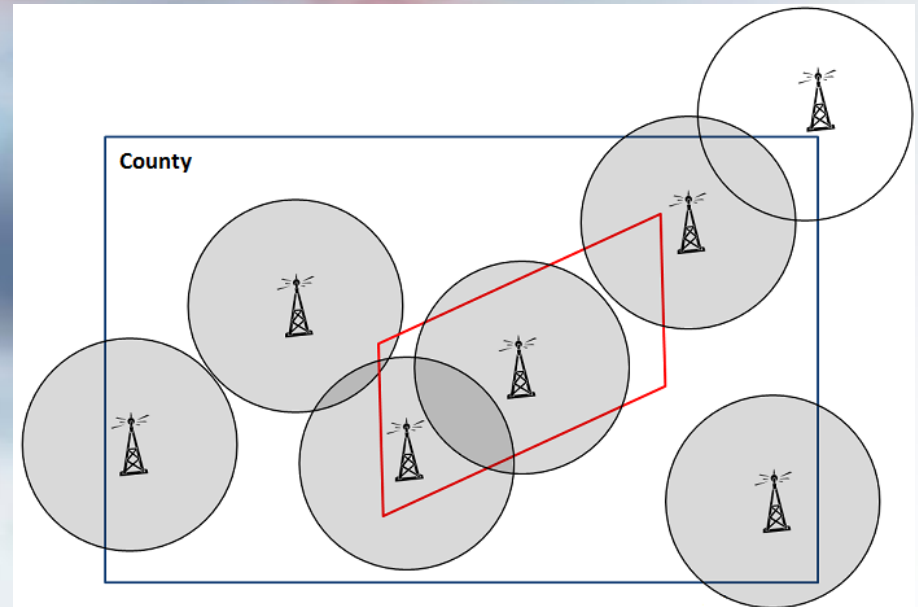
# Ways to receive activation notice

- YahooGroup.....Likely going away...will be replaced with something else...TBD...stay tuned
- Facebook and Twitter---for reports and general information as well...direct links are on our website
- Hazardous Weather Outlook



# Wireless Emergency Alerts (WEA)

- Began in 2012
- Alert You “Where You Are”
- Based on Cell Tower Coverage
- Available on most 2012 and later cell/smart phones
- More Info: [ctia.org/wea](http://ctia.org/wea)



Warning Type	WEA Message
<b>Tsunami Warning*</b>	Tsunami danger on the coast. Go to high ground or move inland. Listen to local news. -NWS
<b>Tornado Warning</b>	Tornado Warning in this area til hh:mm tzT. Take shelter now. Check local media. -NWS
<b>Extreme Wind Warning</b>	Extreme Wind Warning this area til hh:mm tzT ddd. Take shelter. -NWS
<b>Hurricane Warning</b>	Hurricane Warning this area til hh:mm tzT ddd. Check local media and authorities. -NWS
<b>Typhoon Warning</b>	Typhoon Warning this area til hh:mm tzT ddd. Check local media and authorities. -NWS
<b>Flash Flood Warning</b>	Flash Flood Warning this area til hh:mm tzT. Avoid flooded areas. Check local media. -NWS
<b>Dust Storm Warning</b>	Dust Storm Warning in this area til hh:mm tzT ddd. Avoid travel. Check local media. -NWS





# Main Weather to Watch for

- Thunderstorms (Ordinary and Severe)
- Strong Winds
- Tornadoes
- Hail
- Flash Flooding
- Lightning (Not a descriptor for severe weather)
- Winter Weather



# Thunderstorms



# Thunderstorms

## *The Thunderstorm*

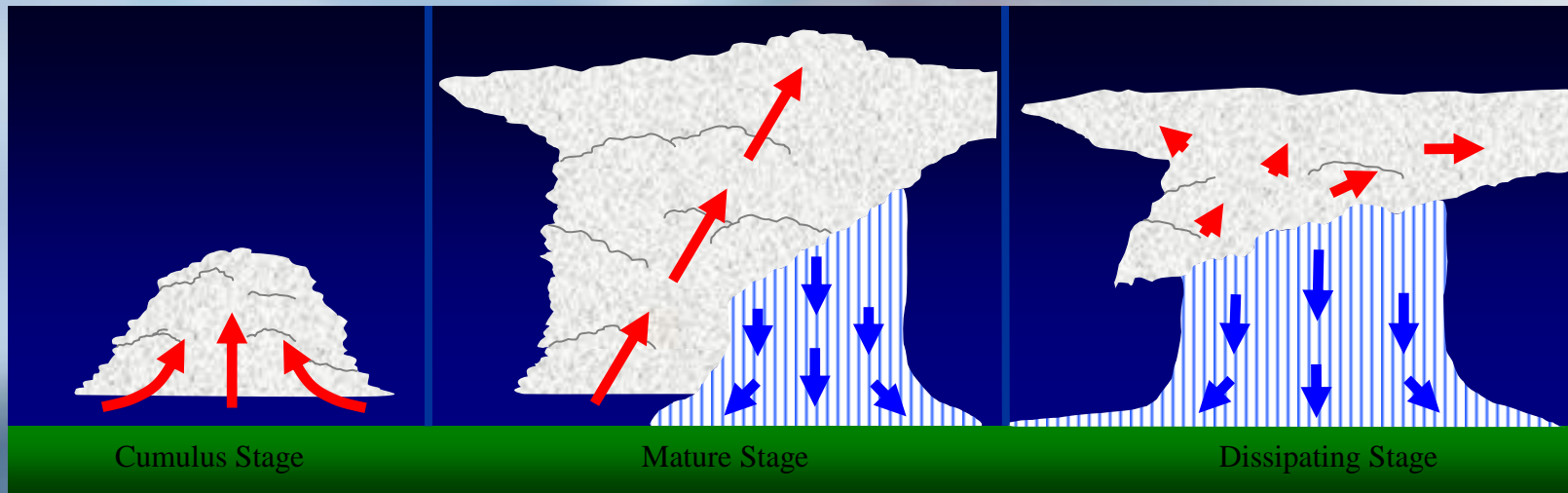
- A thunderstorm is a process which takes heat and moisture near the earth's surface and transports it into the upper levels of the atmosphere.
- At any given moment, it is estimated there are 2000 thunderstorms in progress around the world.
- Less than 1% of all thunderstorms produce hail  $\frac{3}{4}$ " in diameter or larger, and/or strong downburst winds.
- A small fraction of storms that do become severe actually produce tornadoes.
- **No place** in the United States is **completely** immune from the threats of severe weather. Severe weather can strike **at any place**, and **at any time**!

# *Thunderstorm Ingredients*

- An ample supply of *Moisture*
  - Preferably in the lower and mid levels of the atmosphere.
    - Gulf of Mexico
    - Pacific Ocean
- Sufficient *Instability*
  - When an airmass is given an initial push upwards, it will continue moving in that direction without additional force.
- A source of *Lift*
  - Differential heating
  - Orographical effects
  - Frontal boundaries
  - Drylines
  - Land/Sea breezes



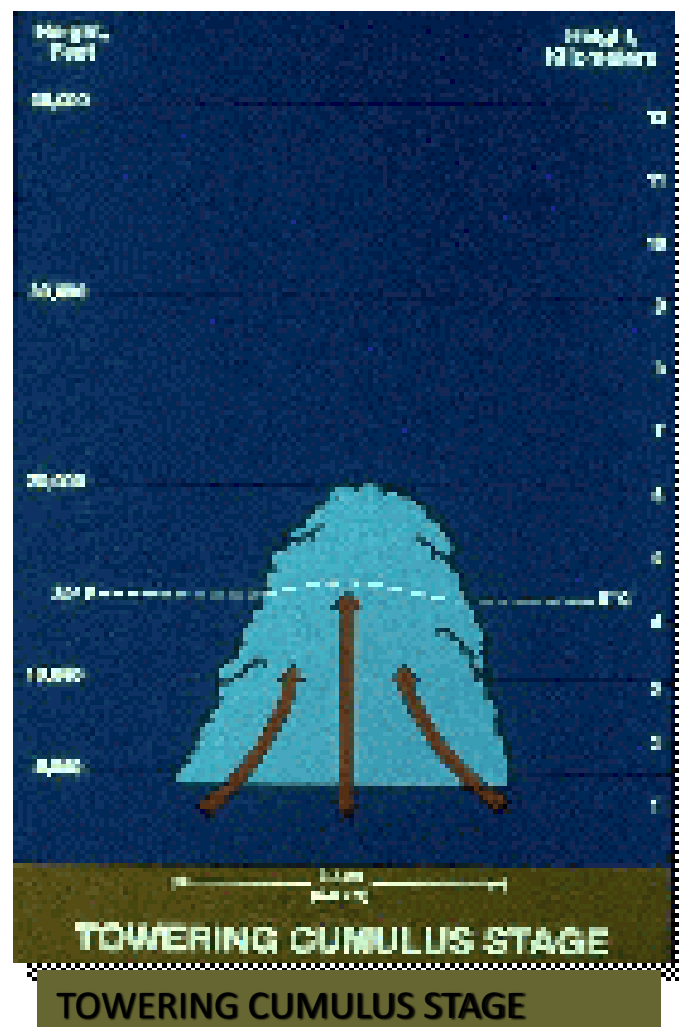
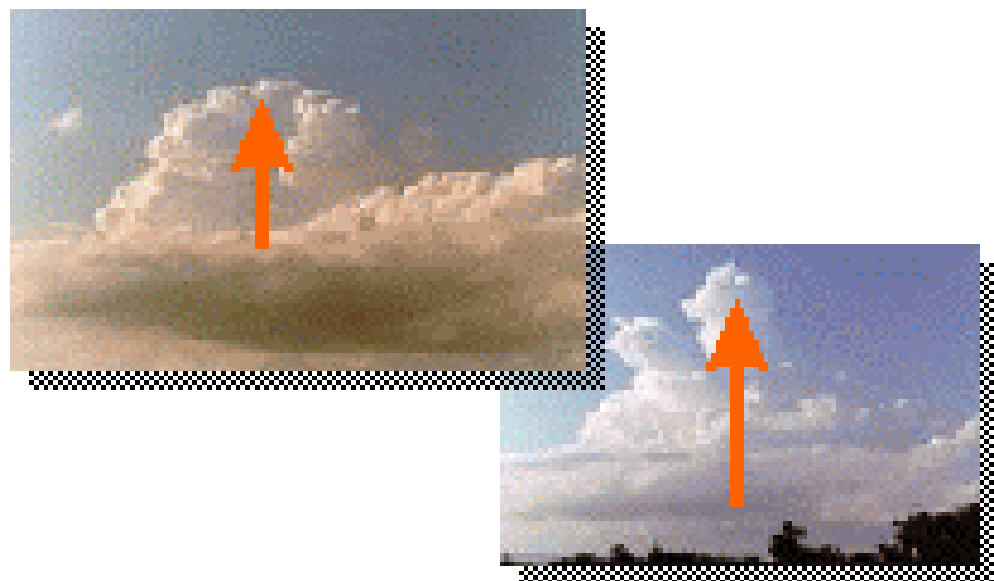
# Thunderstorm Life Cycle



We are most concerned with the mature and dissipating stages in regards to severe weather potential.

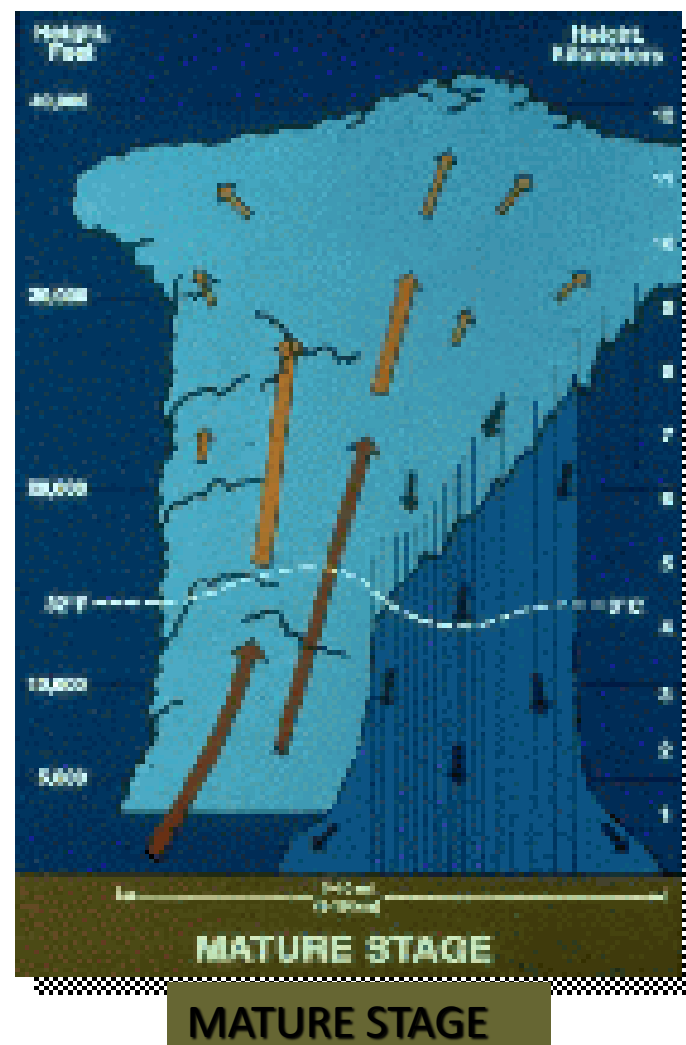
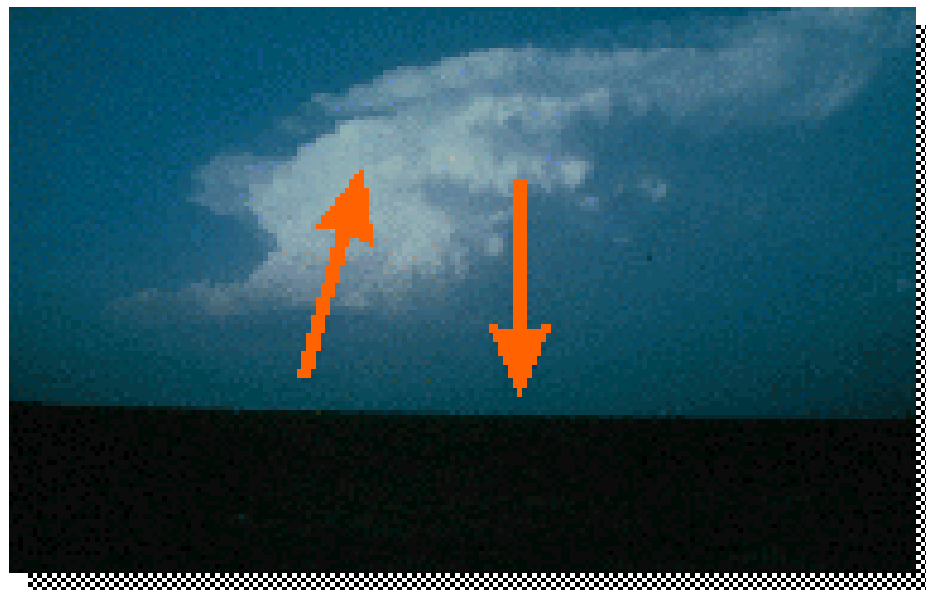
# *The Thunderstorm Life Cycle*

- The Developing Stage
  - ▶ Characterized by a single updraft within the thunderstorm.
  - ▶ As precipitation begins to fall out of the storm, a downdraft is produced.



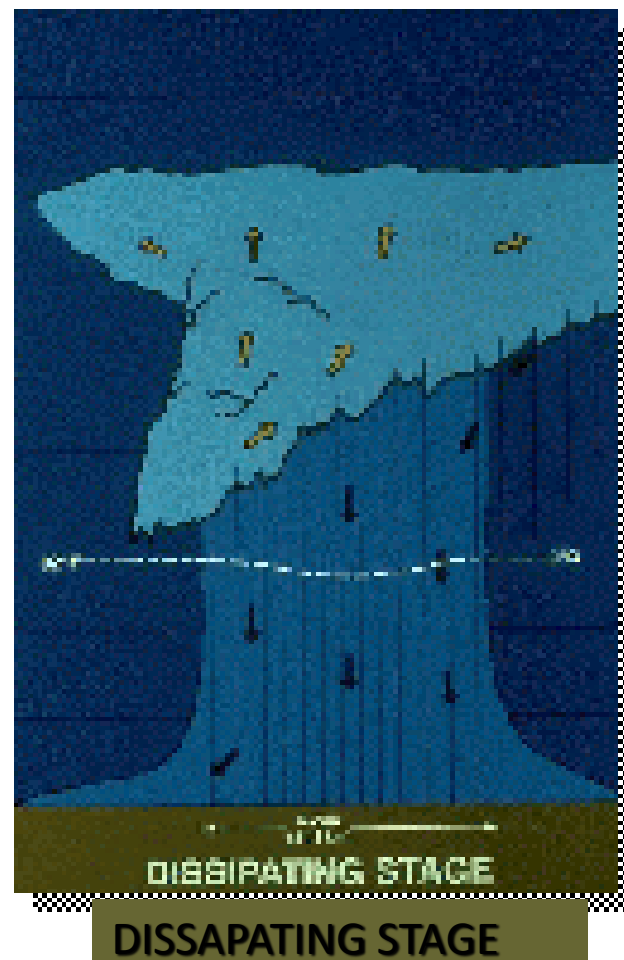
# *The Thunderstorm Life Cycle*

- The Mature Stage
  - ▶ Marked by the co-existence of an updraft and a downdraft within the thunderstorm.



# *The Thunderstorm Life Cycle*

- The Dissipation Stage
  - ▶ The storm becomes dominated by the downdraft, which moves away from the storm and cuts off its inflow.
  - ▶ The downdraft may trigger new thunderstorm development as it encounters additional warm, moist, unstable air.





# Severe Thunderstorm Criteria

- Three criteria exist:
  - Winds 58 MPH (50 KTS) or Greater
  - Hail 1 inch in Diameter Hail (Quarter Size) or Larger
  - Tornado

# Storm Prediction Center (SPC) Severe Weather Outlooks

## *Previous:*

1. See Text
2. Slight (SLGT)
3. Moderate (MDT)
4. High (HIGH)

## *Current:*

1. **Marginal (MRGL)** - replaces the previous SEE TEXT and now is described with Categorical line on the SPC Outlook.
2. Slight (SLGT)
3. **Enhanced (ENH)** - replaces upper-end SLGT risk probabilities, but is not a MDT risk
4. Moderate (MDT)
5. High (HIGH)

The examples below juxtapose the current (left) and the previous (right) outlook graphics for the all categories as opposed to the previous SLGT/MDT/HIGH.









Current 2011/04/27 1630Z Day 1 Categorical Outlook (Current Areal Outline Product Example | KMZ | SHP) (Top)



Previous 2011/04/27 1630Z Day 1 Outlook Graphics (Previous Areal Outline Product) (Top)

# SPC Risk Categories

## Understanding Severe Thunderstorm Risk Categories

THUNDERSTORMS (no label)	1 - MARGINAL (MRGL)	2 - SLIGHT (SLGT)	3 - ENHANCED (ENH)	4 - MODERATE (MDT)	5 - HIGH (HIGH)
No severe* thunderstorms expected	Isolated severe thunderstorms possible	Scattered severe storms possible	Numerous severe storms possible	Widespread severe storms likely	Widespread severe storms expected
Lightning/flooding threats exist with <u>all</u> thunderstorms	Limited in duration and/or coverage and/or intensity	Short-lived and/or not widespread, isolated intense storms possible	More persistent and/or widespread, a few intense	Long-lived, widespread and intense	Long-lived, very widespread and particularly intense
					
<ul style="list-style-type: none"> <li>• Winds to 40 mph</li> <li>• Small hail</li> </ul>	<ul style="list-style-type: none"> <li>• Winds 40-60 mph</li> <li>• Hail up to 1"</li> <li>• Low tornado risk</li> </ul>	<ul style="list-style-type: none"> <li>• One or two tornadoes</li> <li>• Reports of strong winds/wind damage</li> <li>• Hail ~1", isolated 2"</li> </ul>	<ul style="list-style-type: none"> <li>• A few tornadoes</li> <li>• Several reports of wind damage</li> <li>• Damaging hail, 1 - 2"</li> </ul>	<ul style="list-style-type: none"> <li>• Strong tornadoes</li> <li>• Widespread wind damage</li> <li>• Destructive hail, 2" +</li> </ul>	<ul style="list-style-type: none"> <li>• Tornado outbreak</li> <li>• Derecho</li> </ul>

\* NWS defines a severe thunderstorm as measured wind gusts to at least 58 mph, and/or hail to at least one inch in diameter, and/or a tornado. All thunderstorm categories imply lightning and the potential for flooding. Categories are also tied to the probability of a severe weather event within 25 miles of your location.



# Tornadoes

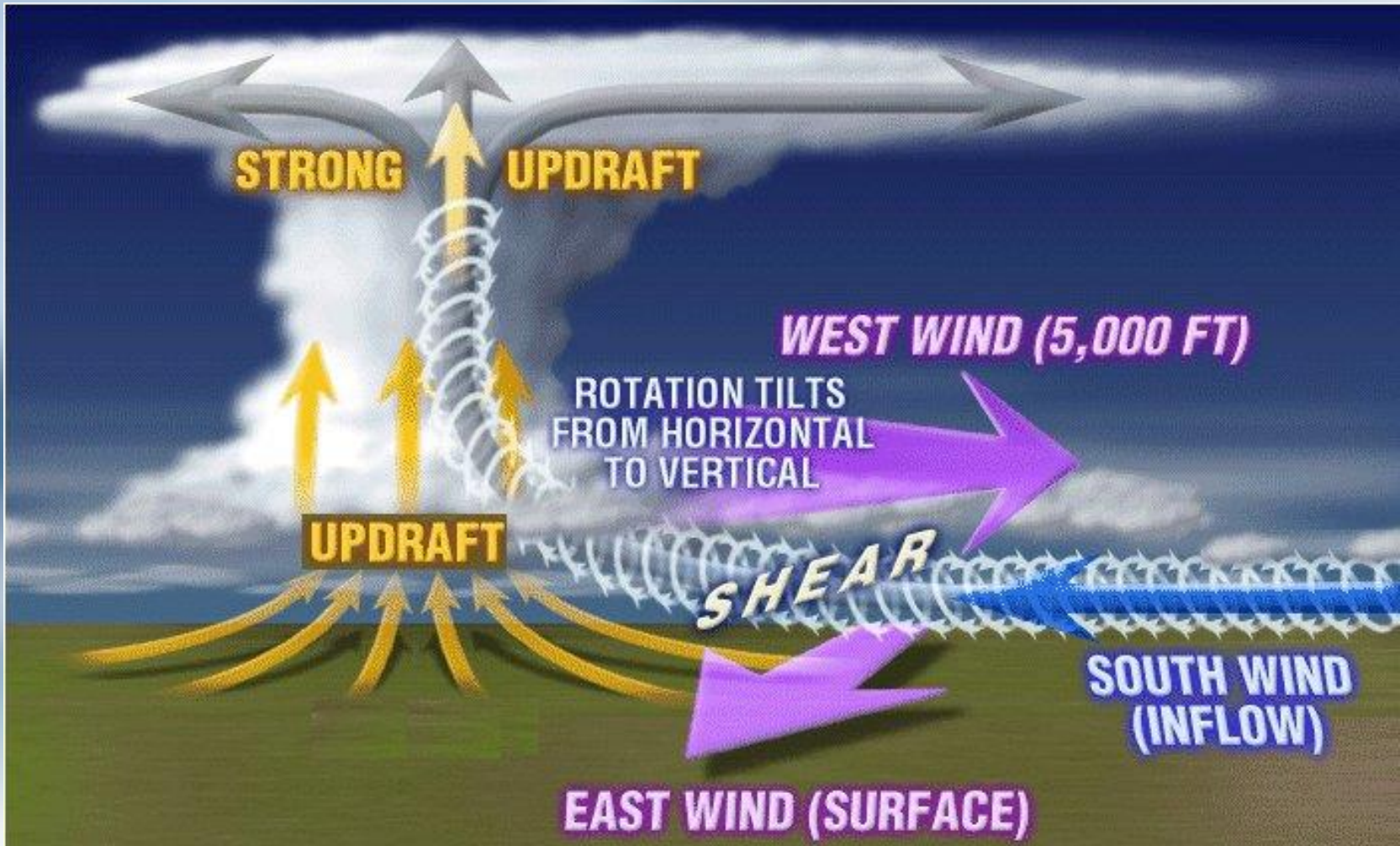




# Tornadoes

- A violently turning column of air pendant from a thunderstorm cloud and in contact with the ground
- In Mid-Atlantic region, more common in spring and summer months, but can occur anytime of year
- Rated by estimated wind speed (Enhanced Fujita scale) with EF0 the weakest, EF5 the strongest. Most common tornadoes in Mid-Atlantic region: EF0, EF1

# How they form



Supercell Thunderstorms – Strong Instability and Shear

# Tornadoes, what to look for



Look for swirling of clouds, with the approach of thunderstorm



Lowering of cloud base...wall cloud



Funnel cloud...does not touch the ground



Depending on line of vision, could see a moving debris cloud on the ground



## ***EF0 and EF1 Tornadoes***

- Weak Tornadoes

- ▶ 80% of all tornadoes
- ▶ Less than 5% of tornado deaths.
- ▶ Lifetime 1-10 minutes.
- ▶ Path length up to 3 miles
- ▶ Wind speed 60 to 115 mph.





# ***EF2 and EF3 Tornadoes***

- Strong Tornadoes

- ▶ 19% of all tornadoes
- ▶ Less than 30% of tornado deaths.
- ▶ Last 20 minutes or longer
- ▶ Path length 15+ miles.
- ▶ Wind speed 110 to 205 mph.



## ***EF4 and EF5 Tornadoes***

- Violent Tornadoes
  - ▶ Account for only 2% of all tornadoes but result in 70% of all tornado deaths.
  - ▶ Path length 50+ miles.
  - ▶ Wind speed over 205 mph
  - ▶ Lifetimes can exceed one hour.



# F-Scale Converted to EF-Scale

<i>F Scale</i>	<i>Wind Speed</i>	<i>EF-Scale</i>	<i>Wind Speed</i>
<b><i>F0</i></b>	<b><i>45-78</i></b>	<b><i>EF0</i></b>	<b><i>65-85</i></b>
<b><i>F1</i></b>	<b><i>79-117</i></b>	<b><i>EF1</i></b>	<b><i>86-109</i></b>
<b><i>F2</i></b>	<b><i>118-161</i></b>	<b><i>EF2</i></b>	<b><i>110-137</i></b>
<b><i>F3</i></b>	<b><i>162-209</i></b>	<b><i>EF3</i></b>	<b><i>138-167</i></b>
<b><i>F4</i></b>	<b><i>210-261</i></b>	<b><i>EF4</i></b>	<b><i>168-199</i></b>
<b><i>F5</i></b>	<b><i>262-317</i></b>	<b><i>EF5</i></b>	<b><i>200-234</i></b>

Wind speeds in mph, 3-second gust





# Tornado Damage



Rising Sun, MD 2003



Lyons, PA 1998



Wilmington, DE 2004

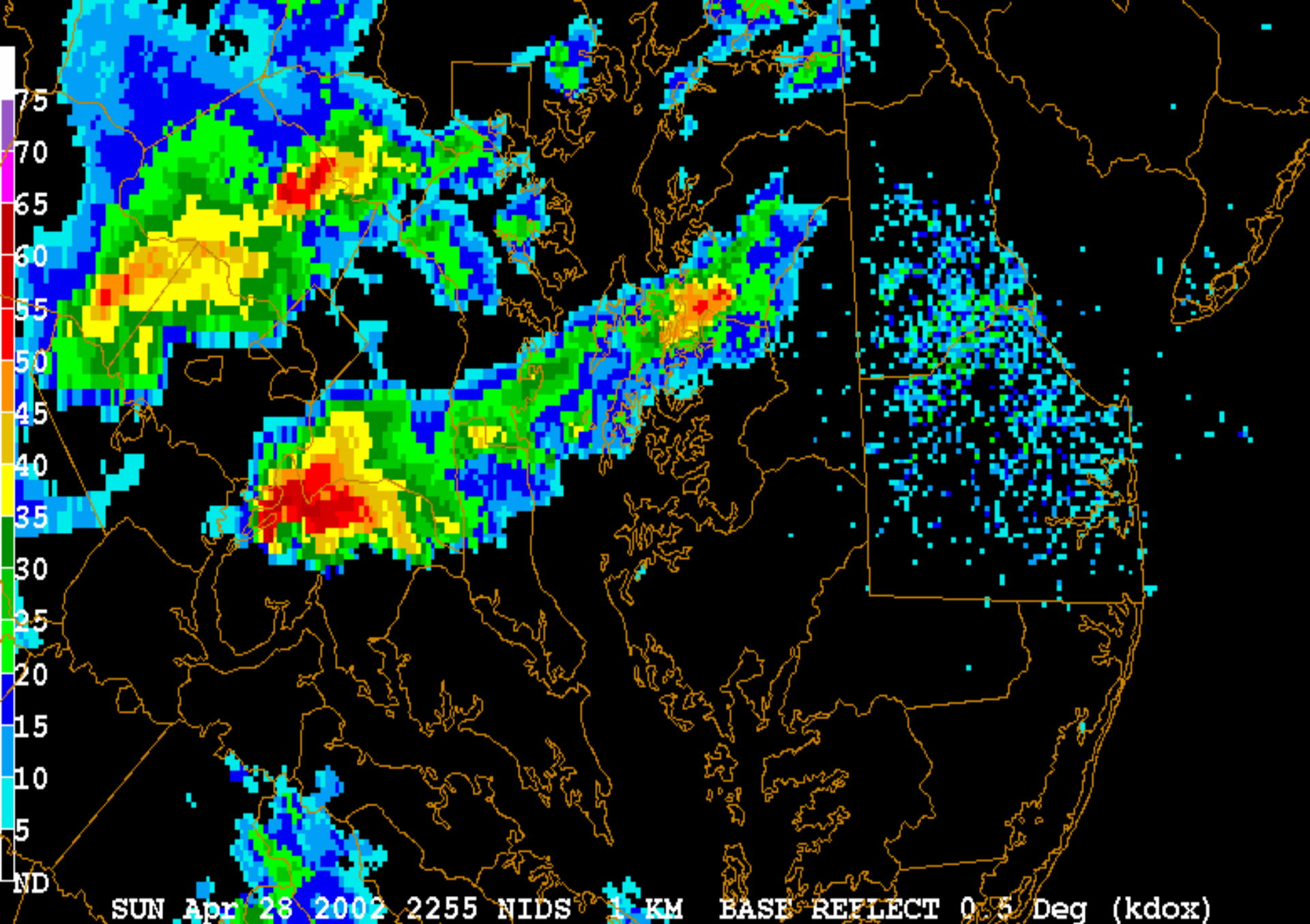


Wantage, NJ 2009



# July 9, 2015 Tilden Township

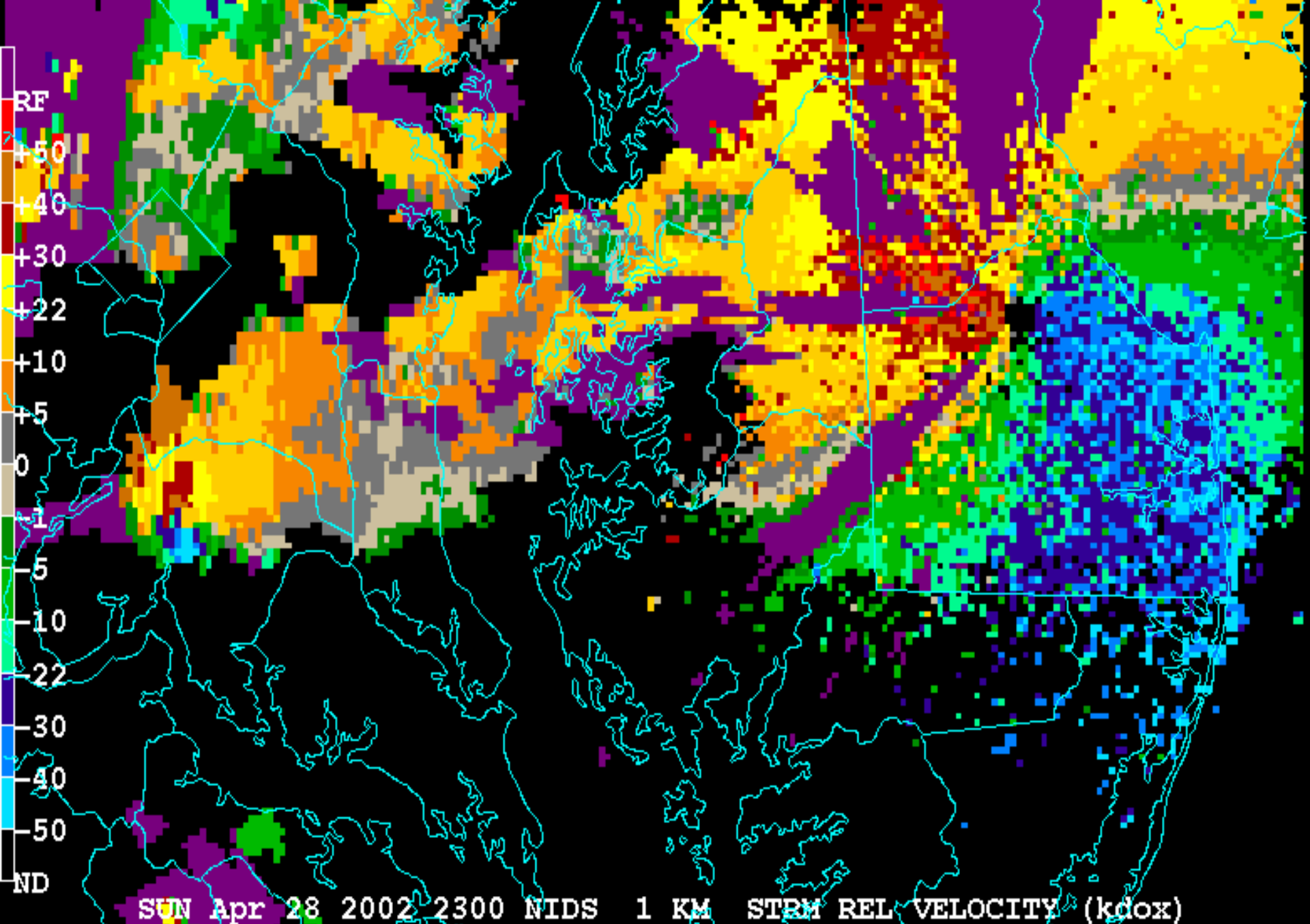




SUN Apr 28 2002 2255 NIDS 1 KM BASE REFLECT 0.5 Deg (kdox)



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RF  
+50  
+40  
+30  
+22  
+10  
+5  
0  
-1  
-5  
-10  
-22  
-30  
-40  
-50  
ND

SUN Apr 28 2002 2300 NIDS 1 KM STRM REL VELOCITY (knots)



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# Tornado Myths

❖ Myth - I heard a loud noise and it sounded like a train...it had to be a tornado.

Truth - Any very strong wind will make a “roaring” noise or sound like a train – the sound depends on the wind speed, local terrain, obstructions to flow, and atmospheric conditions.

❖ Myth - The wind twisted the metal on my shed...the trees that were blown down are twisted...it had to be a tornado.

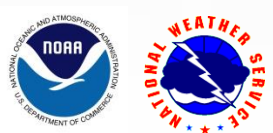
Truth - One generally cannot look at any individual object to determine if the damage was caused by a tornado or straight-line wind. The total damage pattern and how the debris is strewn in relation to other debris is a better indicator of the causative effect. A straight-line wind can cause an object to twist as the destructive force of the wind on an object can cause uneven stress loads with different failure points.

❖ Myth – It is safe to seek shelter from a tornado under an overpass.

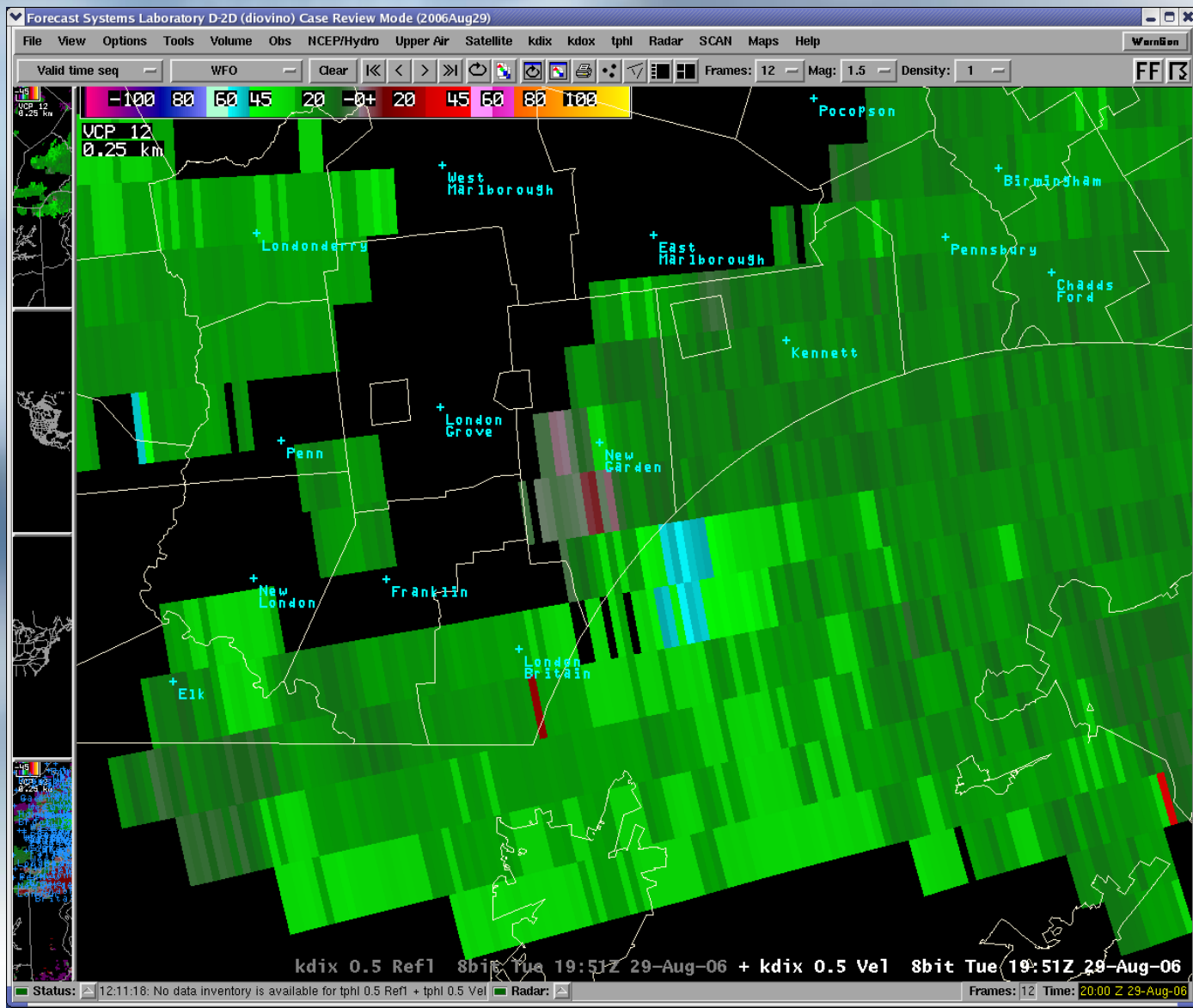
Truth – Overpasses are not a safe place to take shelter. They can funnel the wind flow and increase the strength of the wind. They do not provide protection from flying debris. In addition, parking your car under or near an overpass creates a hazard to other motorists trying to pass through the area. Virtual traffic jams have been created by motorists gathering under an overpass.

❖ Myth – We should open our windows if a tornado approaches.

Truth – Stay away from windows if a tornado approaches. If your windows are closed, leave them closed. Your house will not explode due to the decrease in pressure within the tornado. If the tornado is close enough to your house that it experiences a significant and rapid drop in pressure, chances are the wind and debris will have damaged or destroyed your house before the minimum drop in pressure occurred.



# Chester County Tornado August 29, 2006



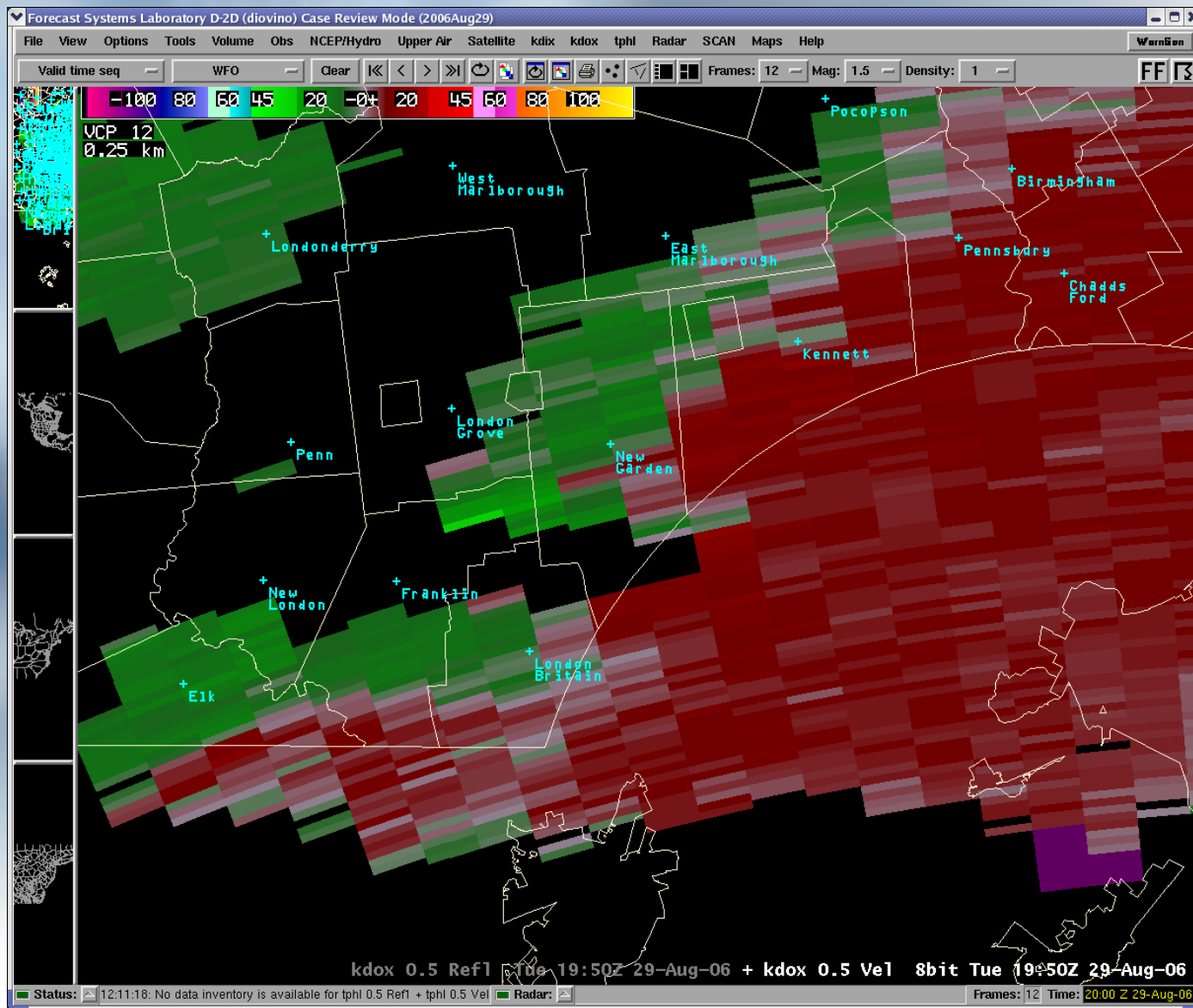
Fort Dix, NJ WSR 88D



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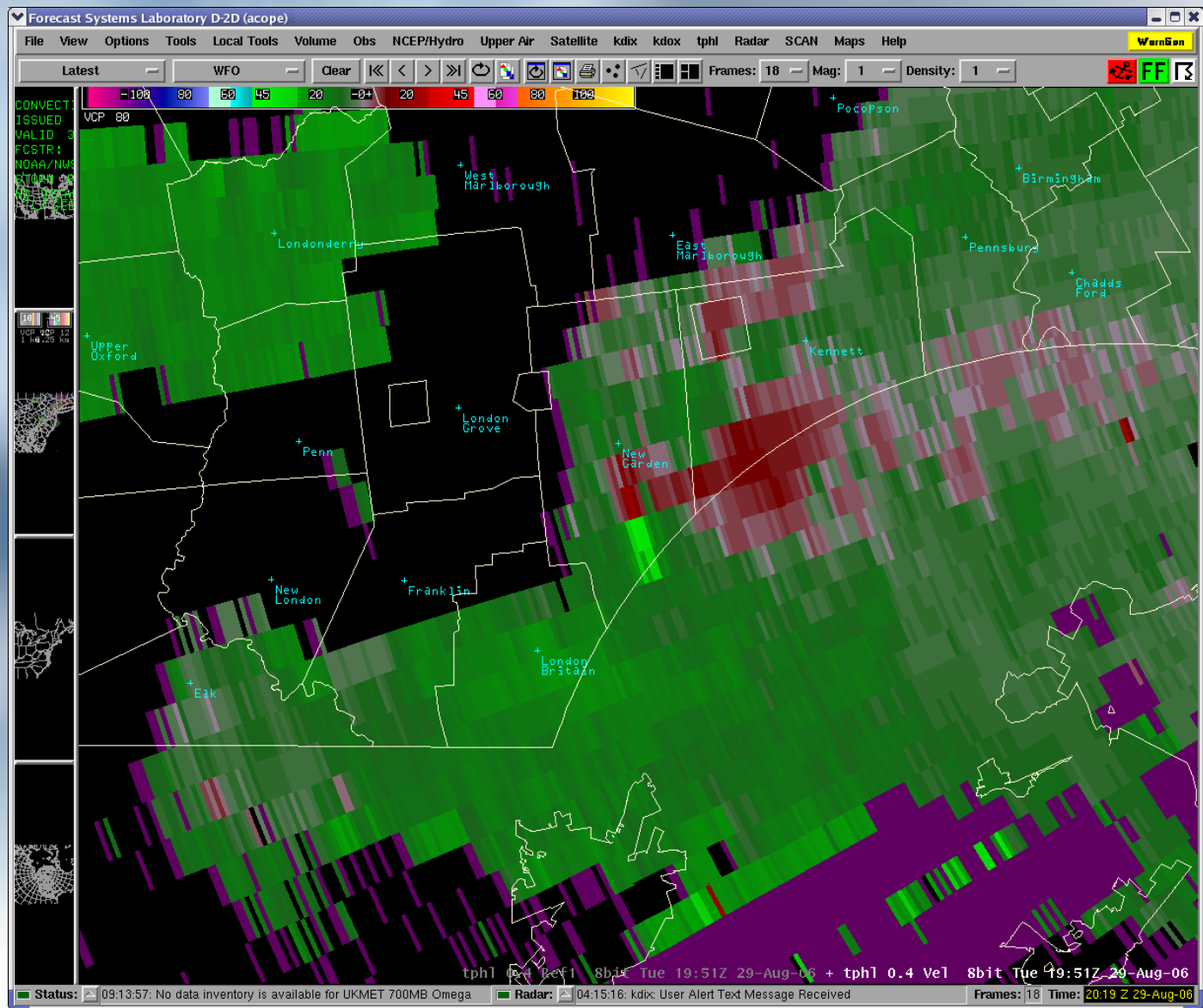
# Chester County Tornado August 29, 2006



Dover Air Force Base WSR-88D



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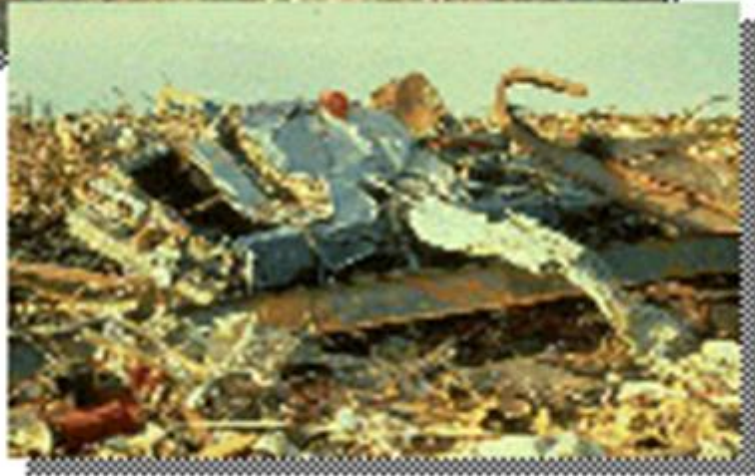


Philadelphia International Airport Terminal Doppler Radar



National Weather Service  
Philadelphia/Mt. Holly

# *Tornado Safety in Your Vehicle*



- Do not try to outrun a tornado.
- Abandon your vehicle immediately and seek shelter in a nearby ditch or low area, but be cautious of flood-prone areas.
- Protect your head from flying debris.





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Courtesy S&M Equipment Leighton, AL & WHNT-TV Huntsville, AL



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# Straight-line Winds (Downburst)



Leading edge of gust front is found underneath the shelf cloud.

# Straight-line Winds (Downburst)

- Severe winds are usually generated by the thunderstorm's downdraft.
- These strong winds often are confused for a tornado.
- These winds blow from one direction and do not swirl.
- Damage caused by these winds falls in one direction.
- Winds can gust upwards of 100 mph.

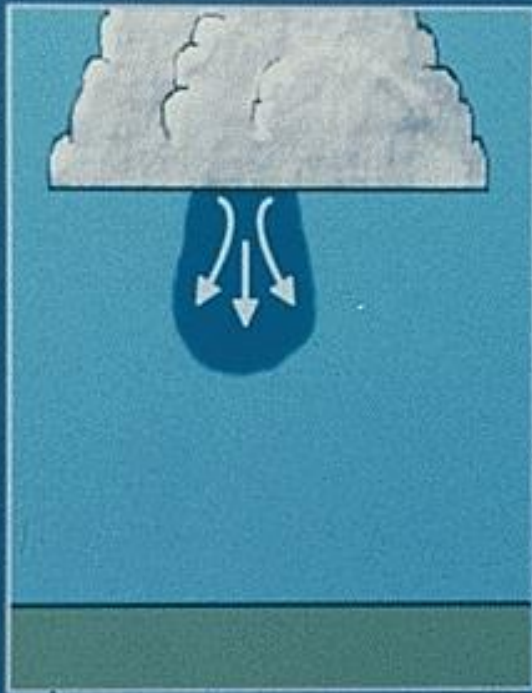


Wet Microburst

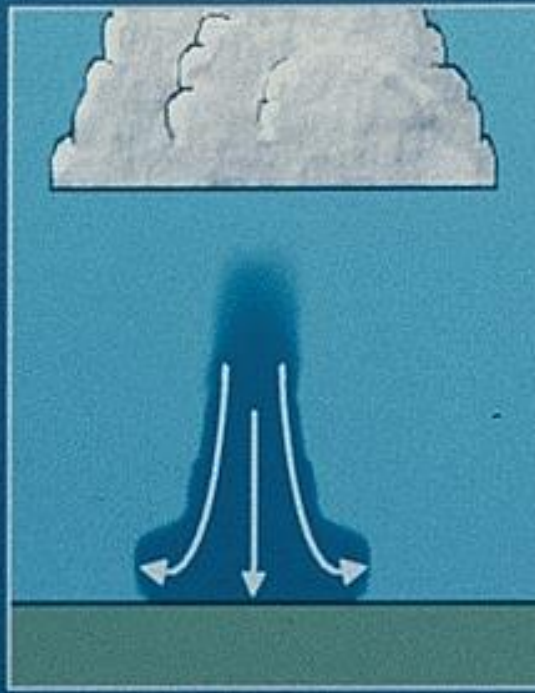
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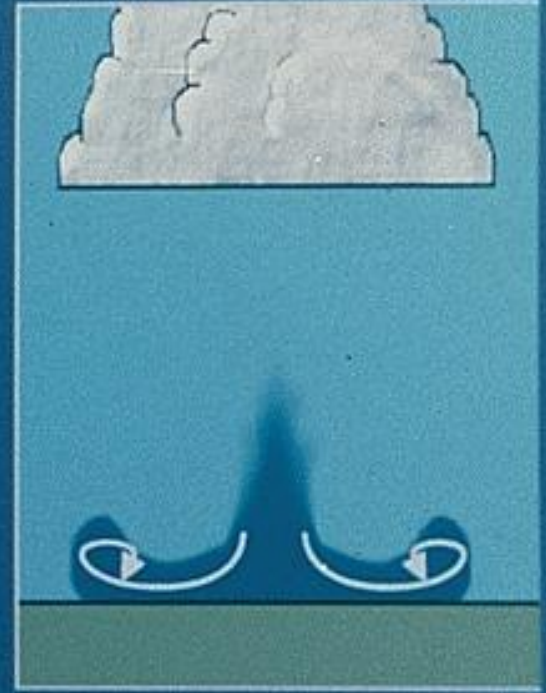
# Downburst Life Cycle



**FORMATION -**  
Evaporation and  
precip. drag  
forms downdraft



**IMPACT -**  
Downdraft quickly  
accelerates and  
strikes ground



**DISSIPATION -**  
Downburst moves  
away from point  
of impact

# Dallas Cowboys Training Facility Roof Collapse-May 2009



# In case you don't have an anemometer

## *Wind Speeds*

- 25 - 31 mph
  - ▶ Large Branches in motion; whistling in telephone wires
- 32 - 38 mph
  - ▶ Whole trees in motion
- 39 - 54 mph
  - ▶ Twigs break off of trees; wind impedes walking
- 55 - 72 mph
  - ▶ Damage to chimneys and TV antennas; pushes over shallow-rooted trees
- 73 - 112 mph
  - ▶ Peels surface off roofs; windows broken; mobile homes overturned
- 113+ mph
  - ▶ Roofs torn off homes; weak buildings and mobile homes destroyed; large trees uprooted



# Derecho

A derecho is a complex of thunderstorms or a mesoscale convective system (MCS) that produces large swaths of severe, straight-line wind damage. Specifically, for an MCS to be classified as a derecho, the following conditions must be met:

- There must be a concentrated area of convectively induced wind damage or gusts equal to or greater than 58 mph occurring over a path length of at least 250 miles.
- Wind reports must show a pattern of chronological progression in either a singular swath, or a series of swaths.
- There must be at least three reports of EF-1 equivalent damage separated by 64 kilometers or more, and/or measured convective wind gusts of 74 mph or greater.
- No more than 3 hours can elapse between successive wind damage/gust events.

Derechos occur year-round but are most common from May to August. Derechos form in a wide spectrum of large-scale weather patterns and occur in a broad range of air mass instability and low to mid-level winds shear environments. The majority of events fall into three jet stream patterns:

- Well-defined approaching upper level disturbance
- Upper-level ridge of high pressure
- Zonal west to east flow

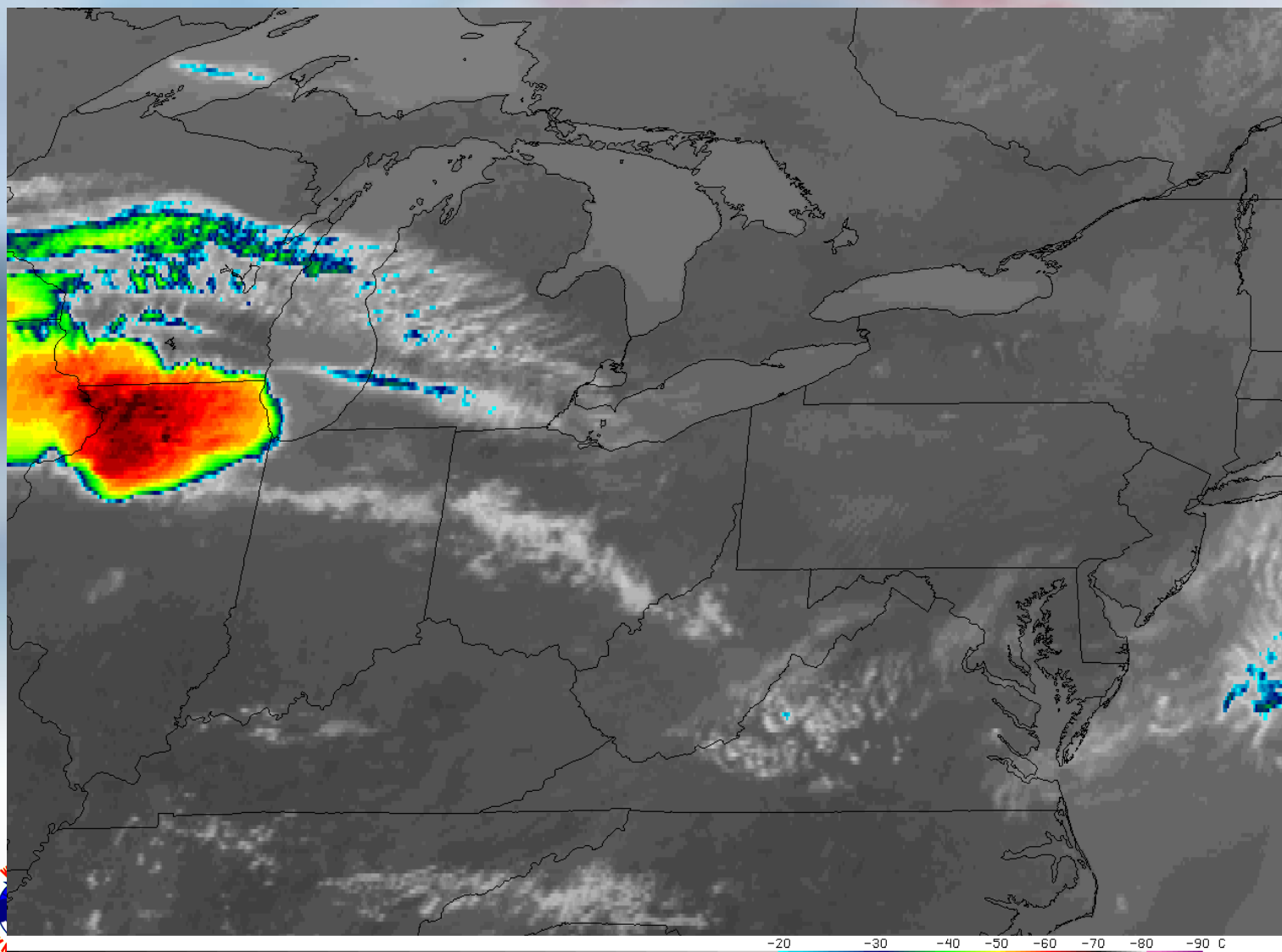
In the last two patterns, the forcing mechanism for the development of a derecho can be subtle and difficult to forecast.





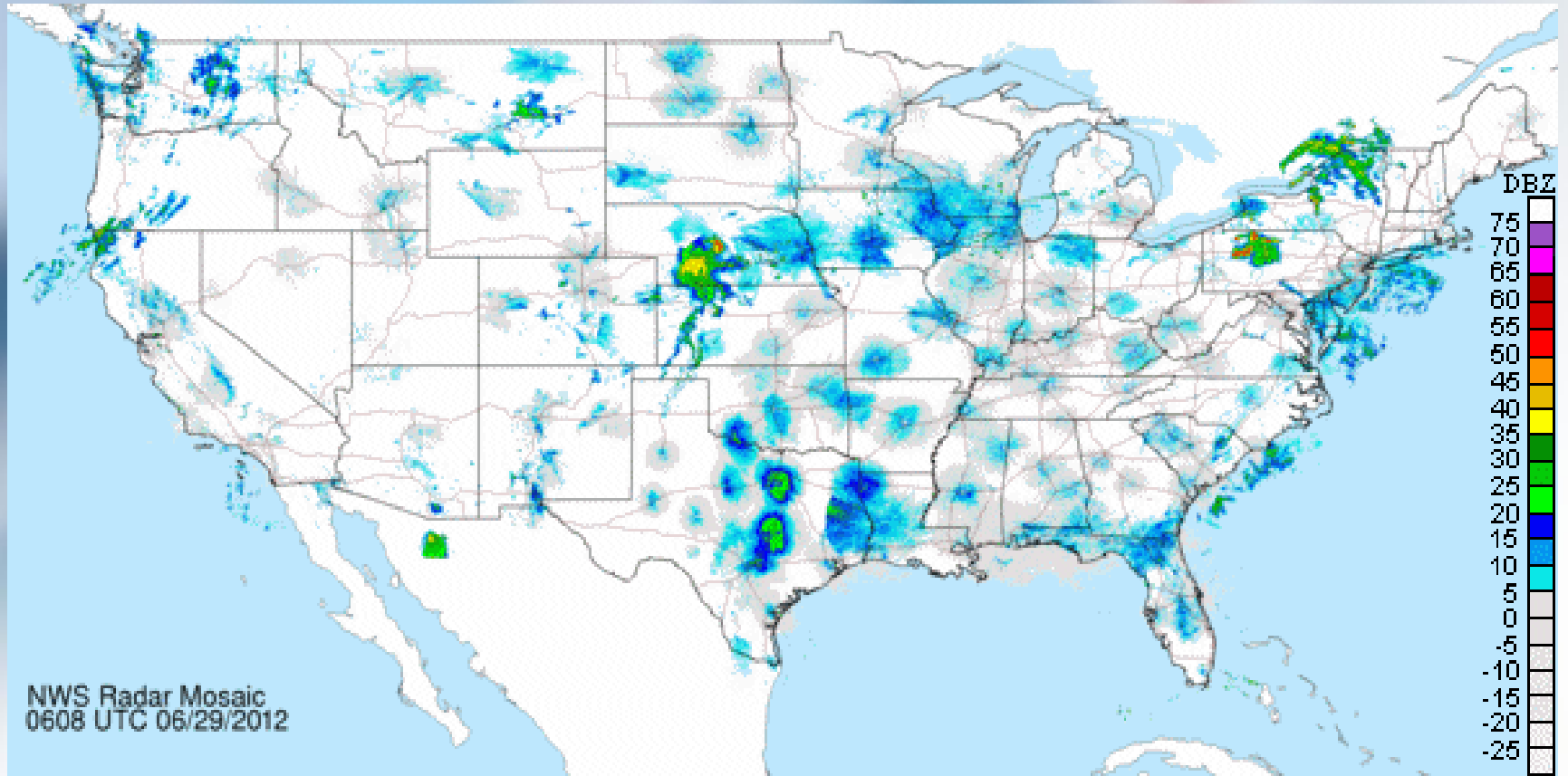
## Derecho Event – June 30, 2012

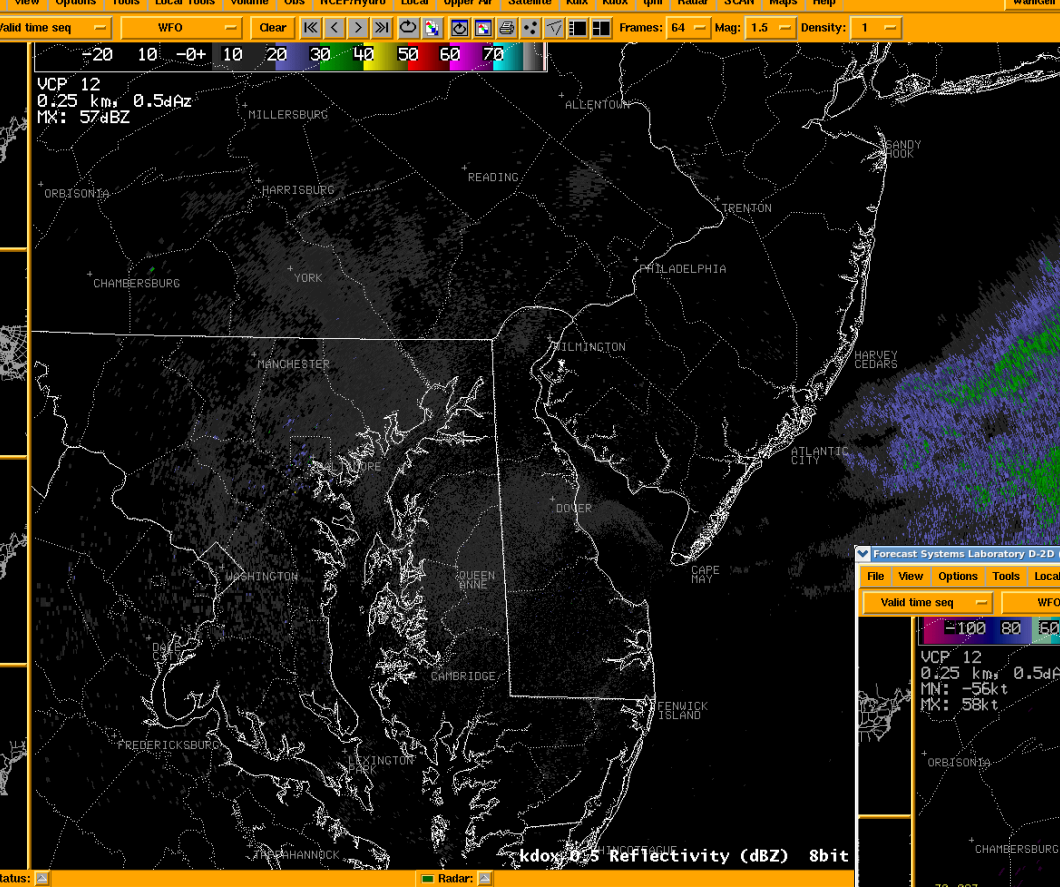
This is a full length IR satellite animation of the derechos progression from the Mid-West through the Mid-Atlantic states. The orange colors represent cloud top temperatures near -60C while the dark brown and grey colors represent temperatures below -80C. The colder the temperatures the taller the storms are and the more powerful they become.



## Derecho Event – June 30, 2012

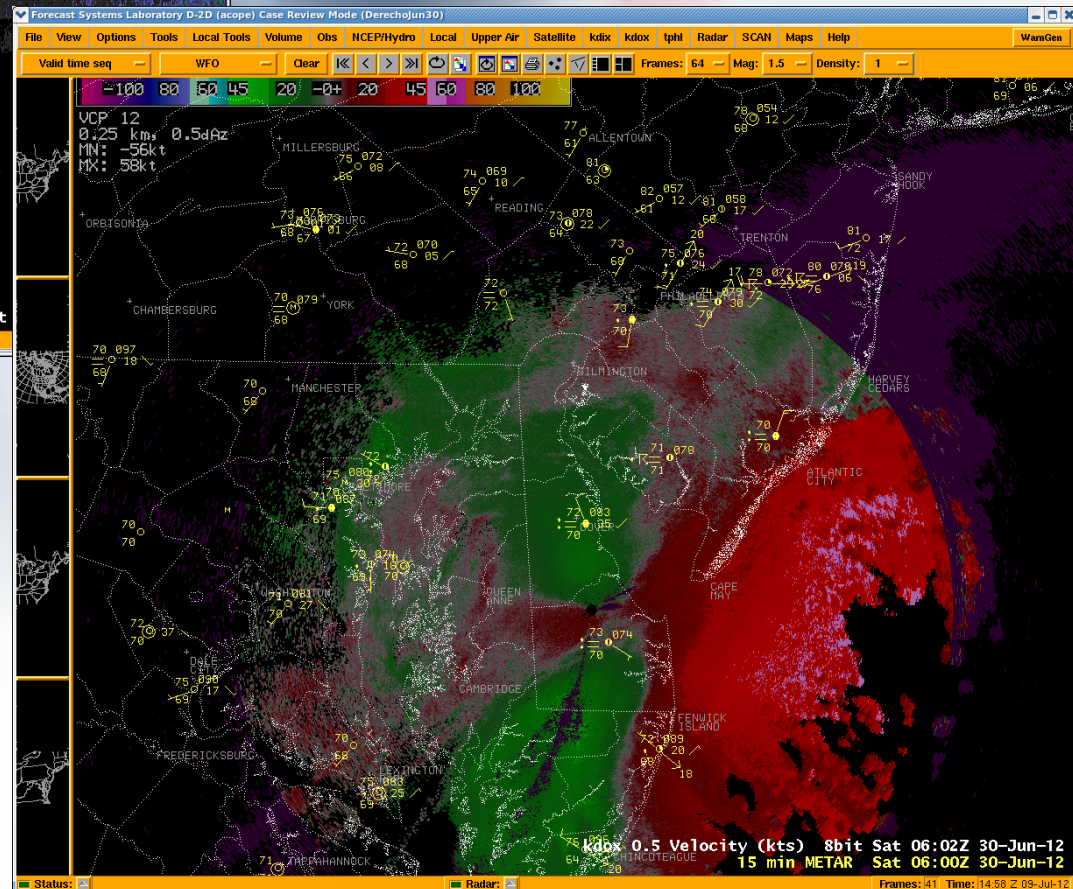
An animated radar mosaic of National Weather Service and Department of Defense radars for the continental United States. The loop runs from 2:08 AM EDT (0608Z) June 29, 2012 to 2:48 AM EDT (0648Z) on June 30th with a 10 minute interval.

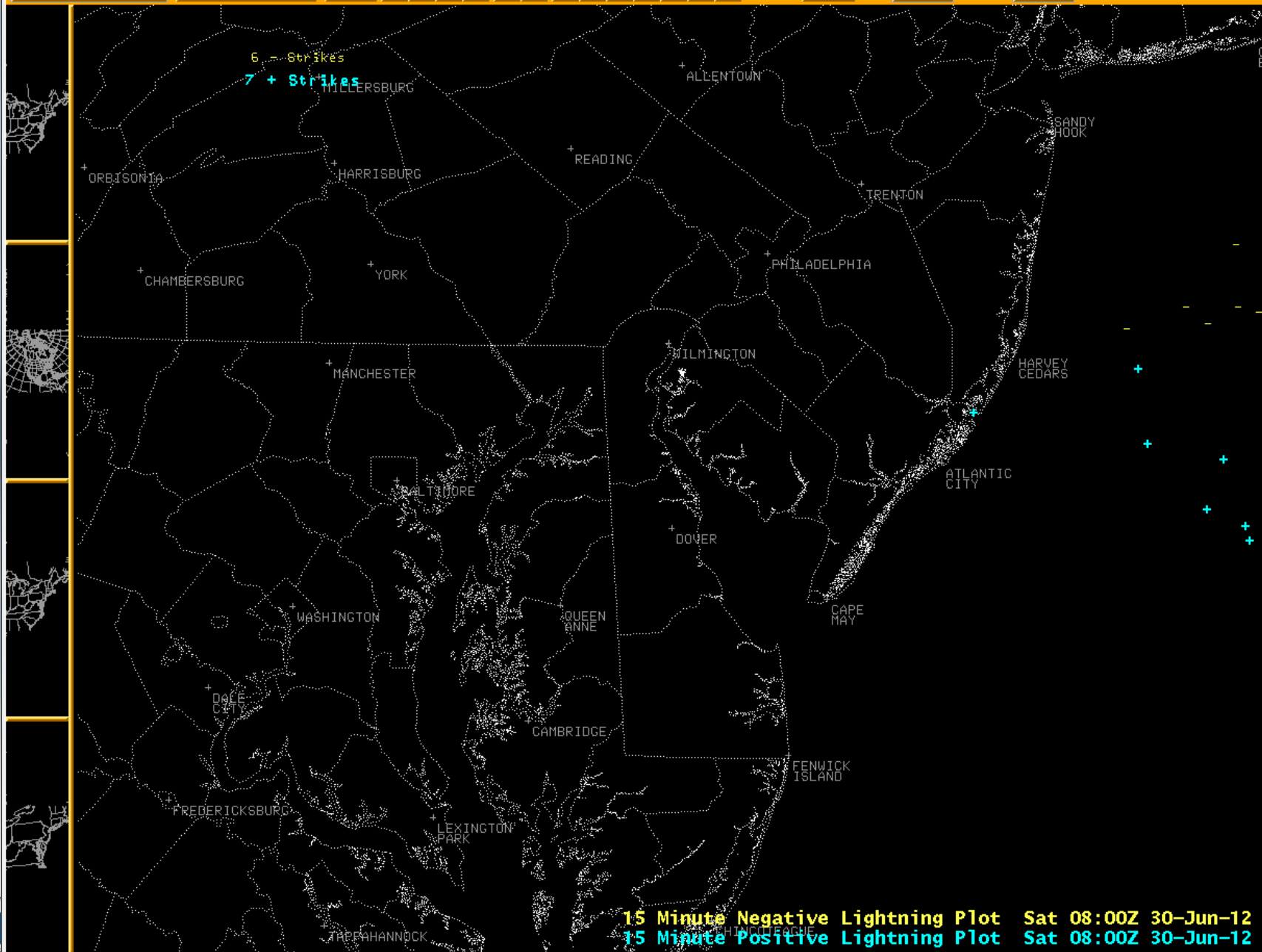




This is a 6-hour loop from the KDOX Doppler Radar (located in northern Sussex County, DE). This shows the intense derecho approaching from the west, then quickly moving across Maryland, Delaware and southern New Jersey. Note the brighter colors especially across southern New Jersey, where the intense storms caused the widespread damage.

This is a 5-hour loop from the KDOX Doppler Radar (located in northern Sussex County, DE). The red (brighter) color is wind moving away from the radar and greens/blues is wind moving toward the radar. The velocities are in knots.







# Hail



# Hail

- Frozen water droplets that congeal together.
- Severe hail is 1” in diameter or larger (size of a quarter)
- Form within a very strong thunderstorm updraft.
- Large hail stones can fall at speeds 100 mph or faster.
- Causes more than a BILLION dollars in damage to property and crops every year.

# Hail

- Try to estimate size or use a ruler to measure .
- Can make your own hail pad.
- Do NOT relate hail size to marbles since they come in different sizes.







Hail from LaPlata, MD Tornado (F4): April 28, 2002



Hail Damage to Field Corn – Lebanon County PA –  
July 1, 2004



Muncy, PA



## *Hail Size Estimates*

Pea Size

✓ 0.25"

Penny/Dime

✓ 0.75"

Nickel

✓ 0.88"

Quarter (Severe)

✓ 1.00"

Half Dollar

✓ 1.50"

Golfball

✓ 1.75"

Hen Egg

✓ 2.00"

Tennis Ball

✓ 2.50"

Baseball

✓ 2.75"

Grapefruit

✓ 4.00"

# Hurts like Hail







Hail from a Storm in  
Aurora, NE 2003



6.5 IN, 17 3/8 IN  
circumference,  
weight 1.33 lbs



Vivian, SD  
July 2010





# Flash Flood





# Flash Flooding

- Number ONE weather related killer
- Rapid rise of water levels to flooding conditions within six hours of the causative event
- Causative events
  - Heavy Rain
  - Ice Jam (formation or break)
  - Dam Break
- Can be highly localized
- Significant amount of rainfall in a short period of time...threshold amounts vary across region
- Cause rivers and streams to swell above their banks
- Inundate low lying areas
- Can completely wash roads out
- Can affect downstream locations miles away from where rainfall actually occurred



# *Flash Flood Safety*

- Do not drive into or through flooded roads, underpasses, or low spots, or over bridges covered by water. The water may be too deep to allow safe passage of your vehicle.
- Abandon your car immediately if your vehicle becomes caught in rising water. A water depth of only one foot is enough to cause cars to become buoyant and be swept away. Most flash flood deaths occur in automobiles.
- Do not attempt to outrun a flash flood on car or on foot.
- If water threatens, move to higher ground immediately.
- Evacuate your home or business if necessary.
- Flash floods can occur at night...be extra cautious.
- Flash floods are especially rapid in hilly or mountainous terrain.



Do you really know  
how deep and fast  
the water is?



Turn Around  
Don't Drown®

For important, life-saving information please visit  
<http://tadd.weather.gov>



U.S. Department  
of Transportation  
Federal Highway  
Administration



American Association of  
Motor Vehicle Administrators



National Weather Service  
Philadelphia/Mt. Holly









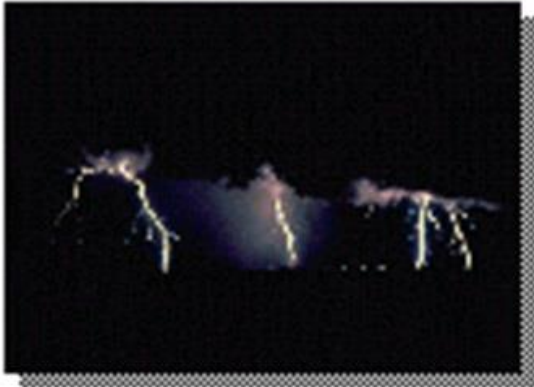
# Lightning





# Lightning

## *Lightning*



- Second Leading Weather-Related Killer
  - ▶ Although, most people struck by lightning live, but may have recurring health problems!
- Lightning Can Strike Many Miles from the Storm
  - ▶ Often known as the "Bolt from the Blue"
- If You Can Hear the Thunder, you are Close Enough to be Struck!



# Lightning Continued

## Lightning Deaths by Location

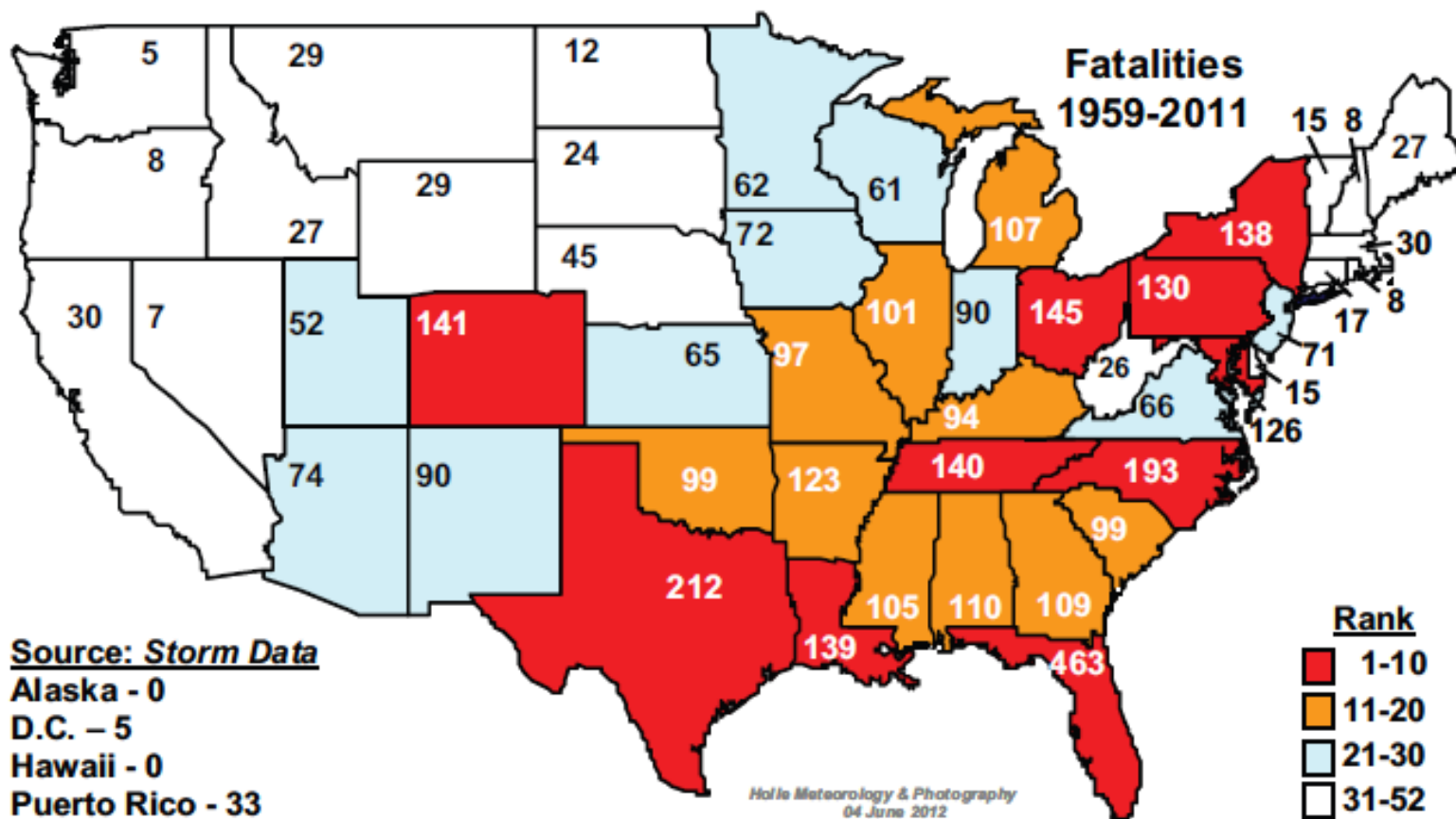


- Under Trees
- Water Related (Fishing, Boating, Swimming)
- Open Fields (Ball park, playground)
- Farm and Road Equipment
- Radios & Telephones
- Other or unknown locations



- Four times hotter than the surface of the sun
  - ▶ 50,000 °F
- 100 million to one billion volts

# Lightning Fatalities by State, 1959-2011



# How far away was that lightning strike?

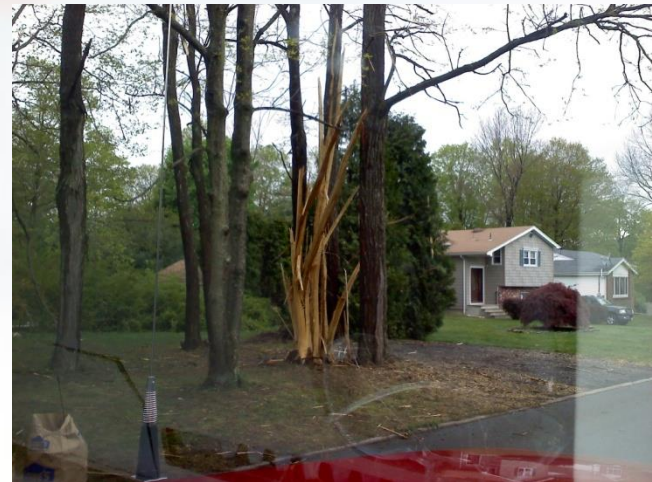
The sound of thunder travels about one mile every 5 seconds. If you count the seconds between the flash of lightning and the crack of thunder and divide by 5, you get the number of miles away from you.

For instance, 10 seconds between the lightning flash and the crack of thunder would indicate a distance of 2 miles.





Go and stay inside for at least 30 minutes before venturing outside after the last flash or clap of thunder.







**National Weather Service  
Philadelphia/Mt. Holly**

# WINTER WEATHER



National Weather Service  
Philadelphia/Mt. Holly



# Winter Storm

- Watch/Warning for Snow:
  - Average of 6 inches in northern NJ and most of PA
  - 5 inches in southern NJ and Southeastern PA and on the Delmarva
- Advisory for Snow:
  - Average of 4 inches in Northern NJ and most of PA
  - 3 inches elsewhere
- Blizzard Warning:
  - Winds 35 mph or higher and
  - Visibilities less than 1/4 mile



# Winter Storm (continued)

- Watch/Warning for Ice:
  - 1/4 inch accumulation or greater anywhere in the Mount Holly CWFA.
- Advisory criteria:
  - Any accumulation up to 1/4 inch.

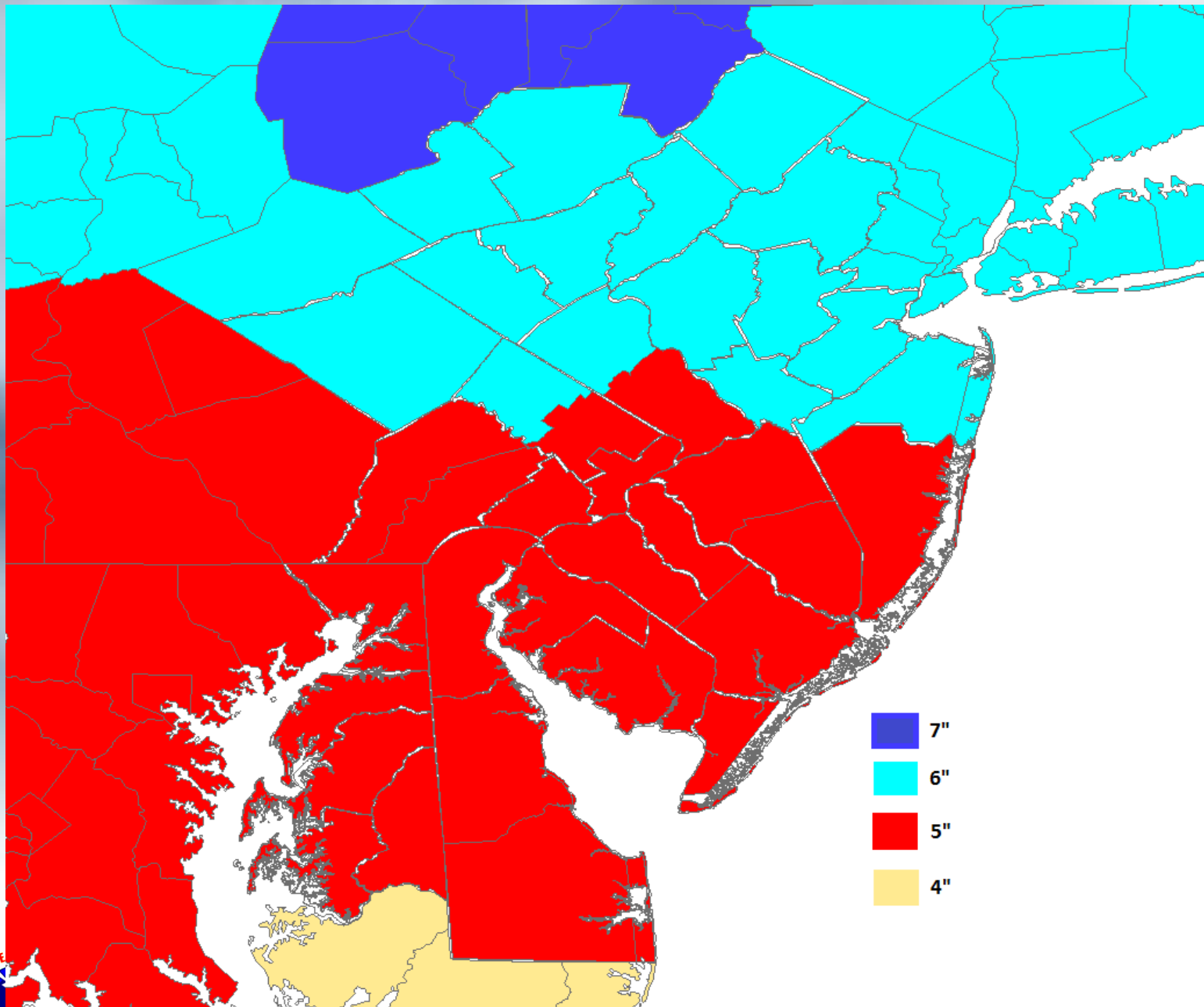


# Winter Storm (continued)

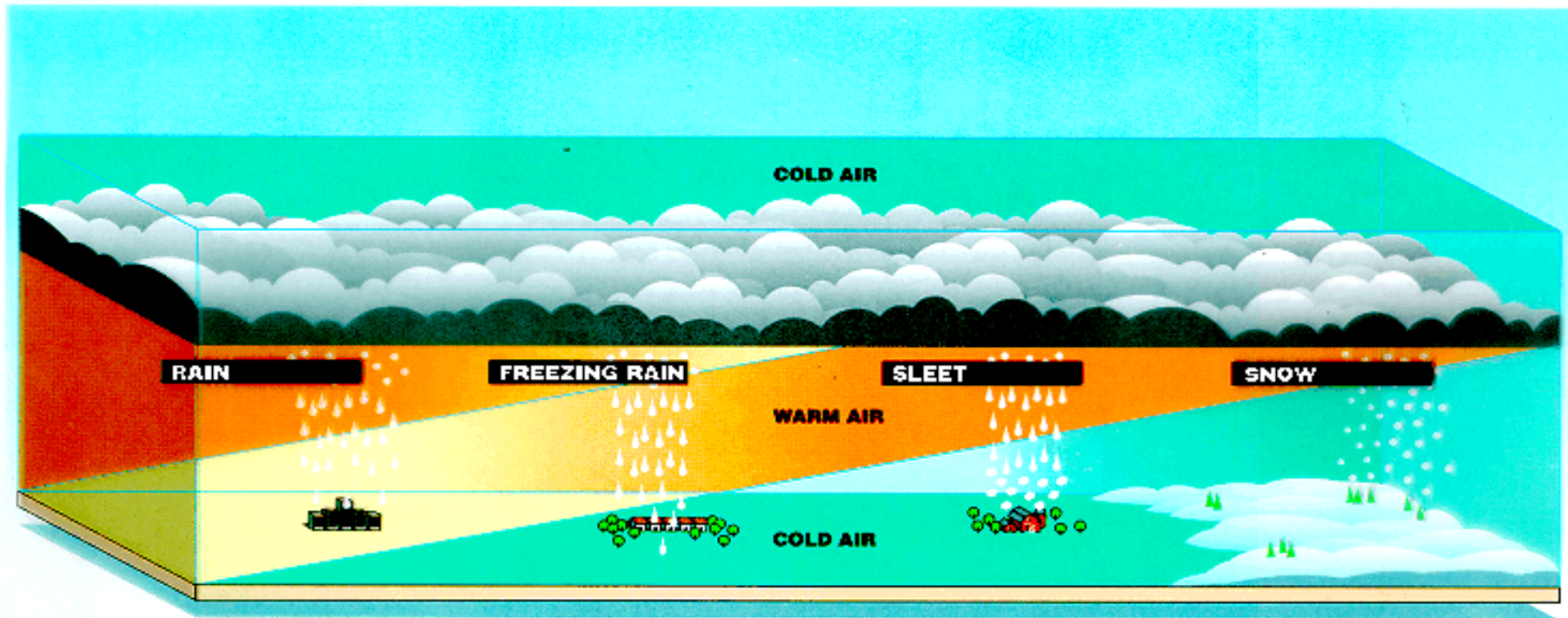
- High Wind Watch/Warning Criteria:
  - 40 mph or higher sustained winds or
  - wind gust 58 mph or greater for one hour or longer
- High Wind Advisory Criteria:
  - 31 to 39 mph or higher sustained winds or
  - wind gust 46 to 57 mph for one hour or longer
- Wind Chill Advisory Criteria:
  - -10 (-15) to -25 deg F depending on location



# New 12 Hour Snowfall Criteria



# Winter Precipitation



**Project ATMOSPHERE**  
AMERICAN METEOROLOGICAL SOCIETY

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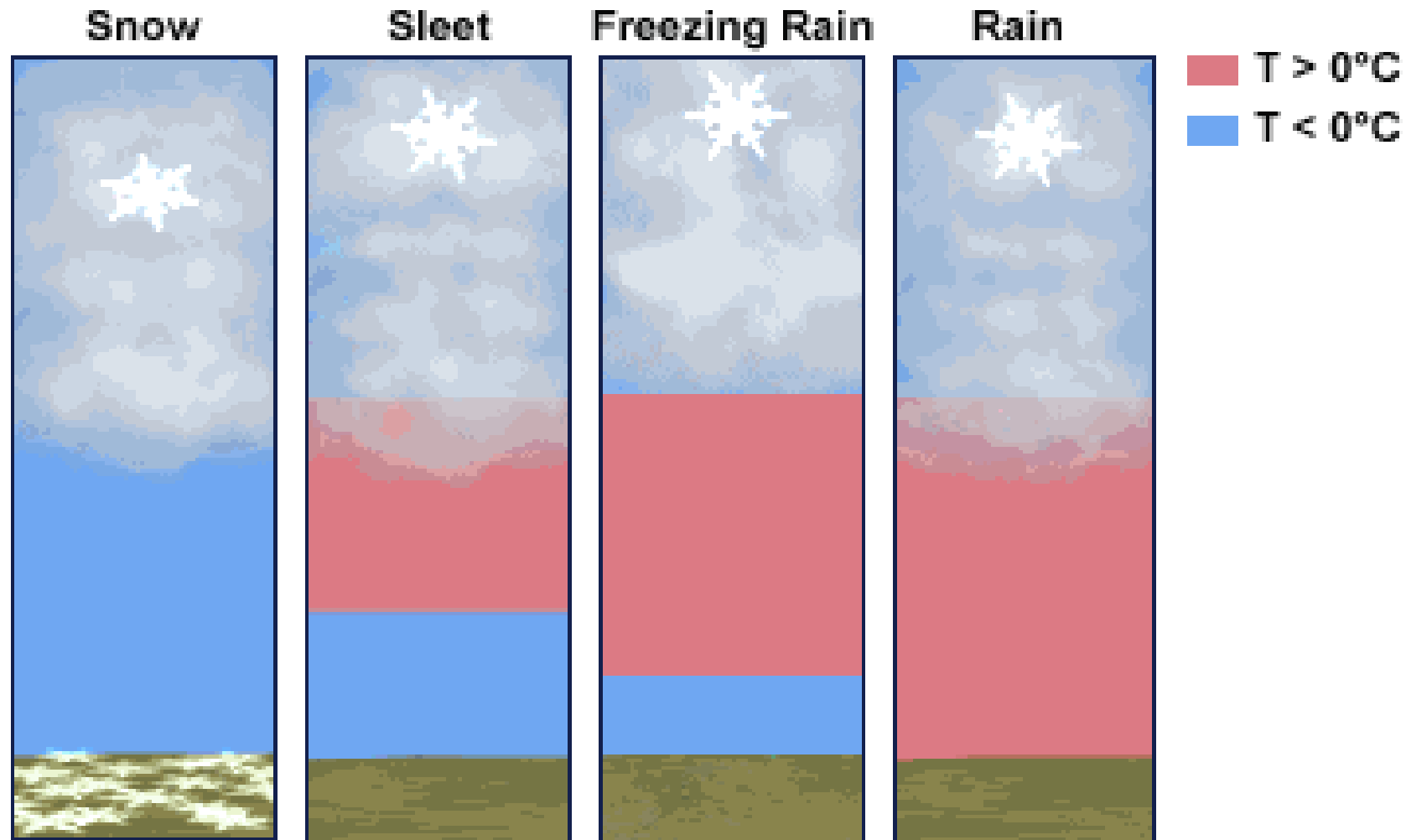
**USA  
TODAY**

**The Weather Book**

National Weather Service  
Philadelphia/Mt. Holly



# Winter Precipitation

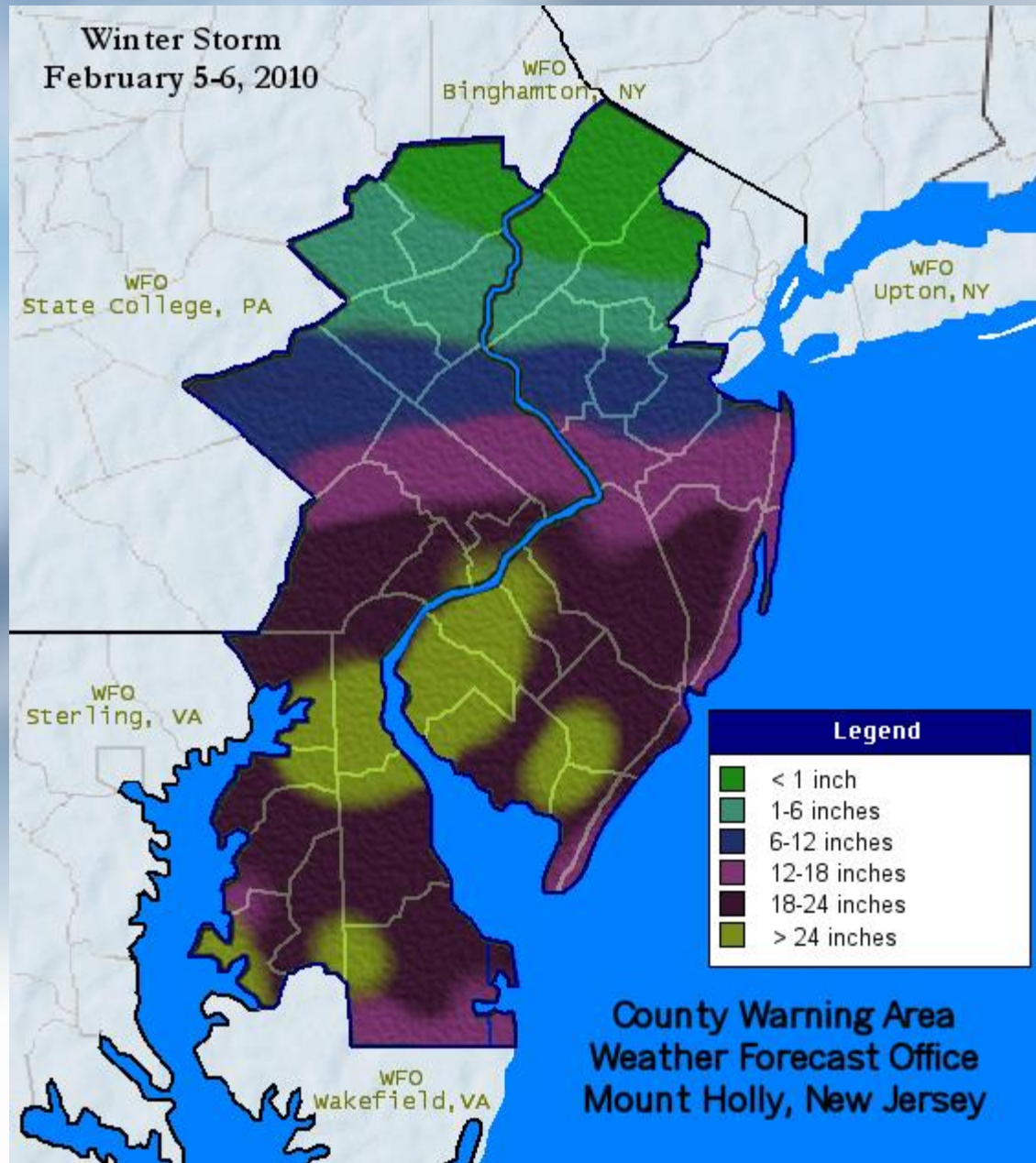


The COMET Program

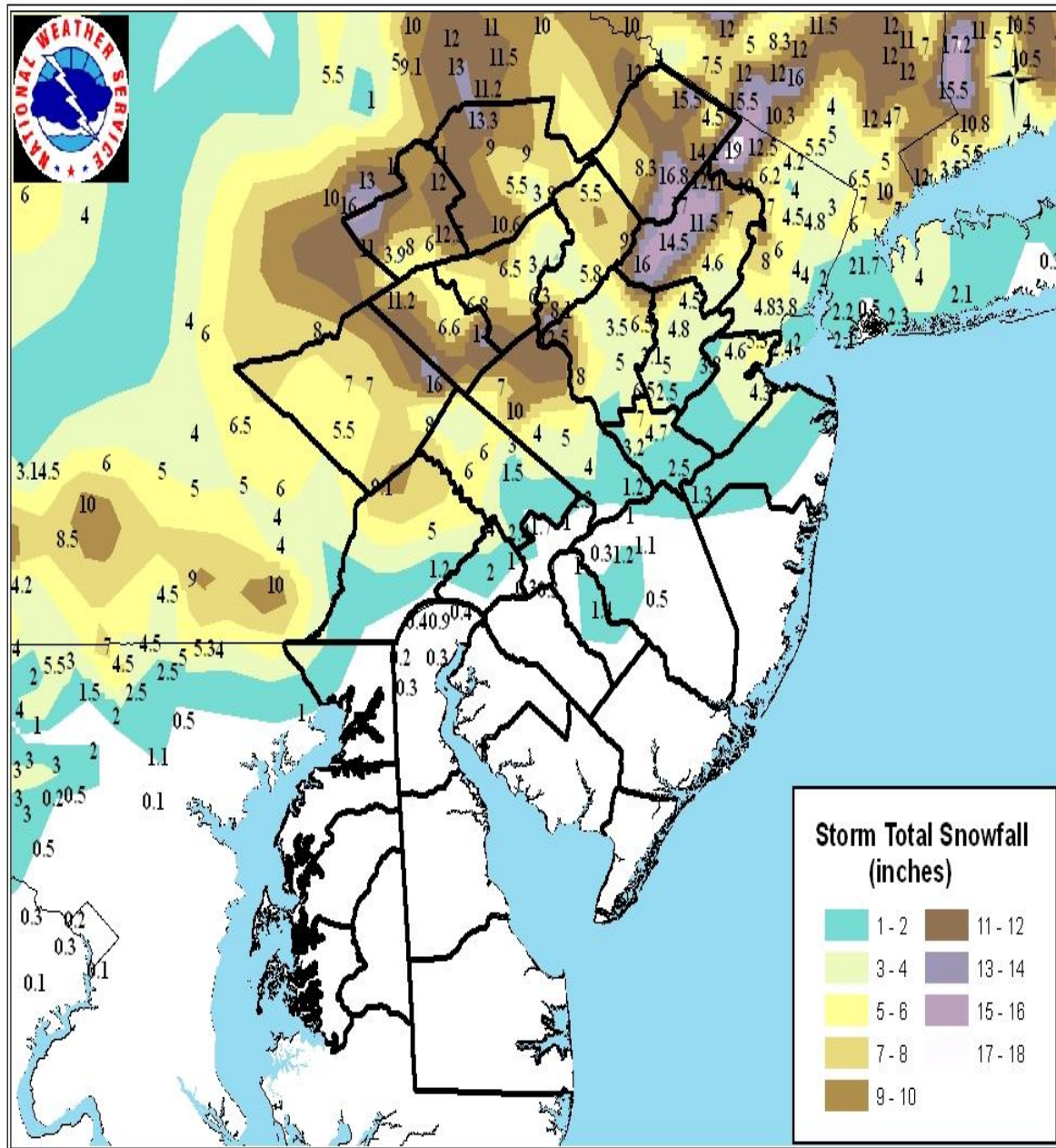
National Weather Service  
Philadelphia/Mt. Holly



Winter Storm  
February 5-6, 2010



# Storm Total Snowfall - October 29th 2011



# Top Ten Snowstorms in Philadelphia

1. 30.7" – Jan 7-8, 1996
2. 28.5" – Feb 5-6, 2010
3. 23.2" – Dec 19-20, 2009
4. 22.4" – Jan 22-24, 2016
5. 21.3" – Feb 11-12, 1983
6. 21.0" – Dec 25-26, 1909
7. 19.4" – April 3-4, 1915
8. 18.9" – Feb 12-14, 1899
9. 18.7" – Feb 15-18, 2003
10. 16.7" – Jan 22-24, 1935





# Measuring Snow

Get a snow board (2' X 2' to 3' X 3')...Plywood or something similar

Find a clear spot in your yard not too close to your home. Not under trees, etc

Before the storm, place snow board outside.

When snow begins, measure approximately every 6 hours. Report to nearest 0.1 inches.

Now you may be wondering, why only every 6 hours. Well, studies have been done that show the human error introduced in more frequent measurement negates the more frequent measurement. At our office, we do not measure hourly!

If it's windy, the snow could blow away, at that point, use your best estimate.

After snow has stopped, take 4-5 representative measurements of the depth, average them together and report the snow depth...to the nearest **WHOLE INCH. Round up**. Do NOT include the 6 foot snow drift in the measurement! Use your judgement whether to include a zero in the measurement. If your lawn has 1 or 2 bare spots, then probably not. If your lawn has a lot of bare areas, then a zero value would be representative.



# What to report

- Winds estimated or measured to meet severe criteria...you can give us your peak wind gust too.
- Downed trees or wires
- Structural damage
- Injuries caused by the weather.
- Funnel clouds, wall clouds, tornadoes!
- Any hail that is falling or has fallen...especially an inch or larger.
- Any road flooding caused by heavy rains.
- Any rivers cresting their banks.



# How to report

- **Call our office: 1-800-523-4129**  
*Only to report severe weather...Do not give to friends etc/post online.*
- Give us your spotter ID
- Give us your location; try to be as detailed as possible (road address, town, county, state) AND Give us time of event
- Report type of weather experienced...hail/wind/tornado, etc
- Amateur radio net controller using normal reporting protocols
- Email at [Phi.skywarn@noaa.gov](mailto:Phi.skywarn@noaa.gov)
- Facebook and Twitter
- “Submit Storm Report” Lower Right of our Website





# How we use your report

- Helps to verify Warnings we have issued.
- Notify forecasters that a Warning needs to be issued if not already in effect.
- Help downstream residents that the storm may affect.
- Provide weather information to the general public



# Downburst or Tornado?





# Downburst or Tornado?



NWS BMX



# Downburst or Tornado?





# Downburst or Tornado?



# Who to Contact for assistance

- National Weather Service Coordinator:
  - Larry Nierenberg [Larry.Nierenberg@noaa.gov](mailto:Larry.Nierenberg@noaa.gov)
  - (609) 261 - 6602
- County Skywarn Coordinator:



## NEW JERSEY

## ...BURLINGTON COUNTY...

MOUNT LAUREL	1.2	1036 PM 10/29
FLORENCE	1.2	1138 PM 10/29
MOUNT HOLLY WFO	1.1	100 AM 10/30
TABERNACLE	0.5	954 PM 10/29

## ...CAMDEN COUNTY...

CHERRY HILL	1.0	713 PM 10/29
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## ...GLOUCESTER COUNTY...

NATIONAL PARK	0.3	800 PM 10/29	SLEET SNOW MIX
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## ...HUNTERDON COUNTY...

HOLLAND TWP	12.5	700 AM 10/30
2 SE WARREN GLEN	12.5	614 PM 10/29
KINGWOOD	8.0	924 PM 10/29
WHITEHOUSE STATION	6.5	642 PM 10/29
FLEMINGTON	5.0	700 AM 10/30

## ...MERCER COUNTY...

HOPEWELL TWP	7.0	700 AM 10/30
PENNINGTON	7.0	700 AM 10/30
HOPEWELL	6.5	903 PM 10/29
EWING	3.2	1106 PM 10/29

## ...MIDDLESEX COUNTY...

WOODBIDGE	5.6	1149 PM 10/29
WOODBIDGE TWP	5.3	821 PM 10/29
METUCHEN	4.6	1154 PM 10/29
CHEESEQUAKE	4.3	138 AM 10/30

## ...MONMOUTH COUNTY...

CREAM RIDGE	1.3	700 AM 10/30
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## ...MORRIS COUNTY...

LAKE HOPATCONG	17.0	700 AM 10/30
MARCELLA	16.6	917 AM 10/30
ROCKAWAY	16.4	1225 AM 10/30
LONG VALLEY	16.0	1137 PM 10/29

