

50th Anniversary of the Oak Lawn Tornado

**2017 DuPage County Advanced
Severe Weather Seminar**

National Weather Service Chicago

Mike Bardou

Stephen Rodriguez

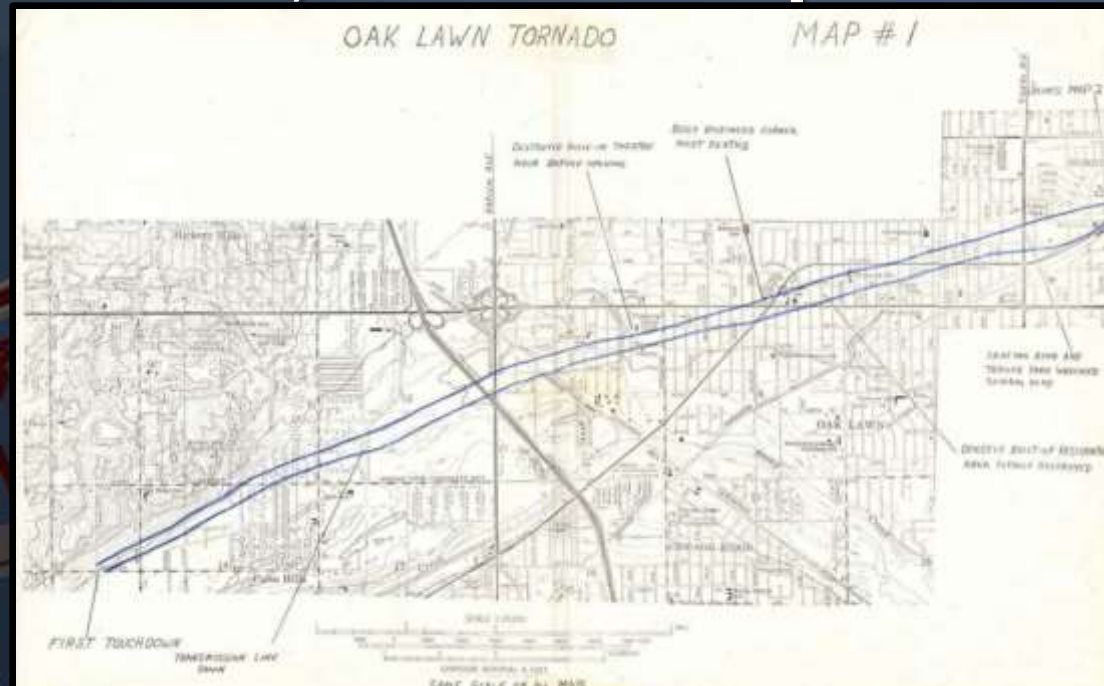


Outline

- **1967 Belvidere, Lake Zurich, and Oak Lawn Tornado Outbreak**
- **Period of Change – Today's NWS**
 - Initial Work
 - Recent Focus
- **Plan, Practice, Monitor, Act (PPMA)**
 - 1967 Oak Lawn Tornado
 - February 28, 2017

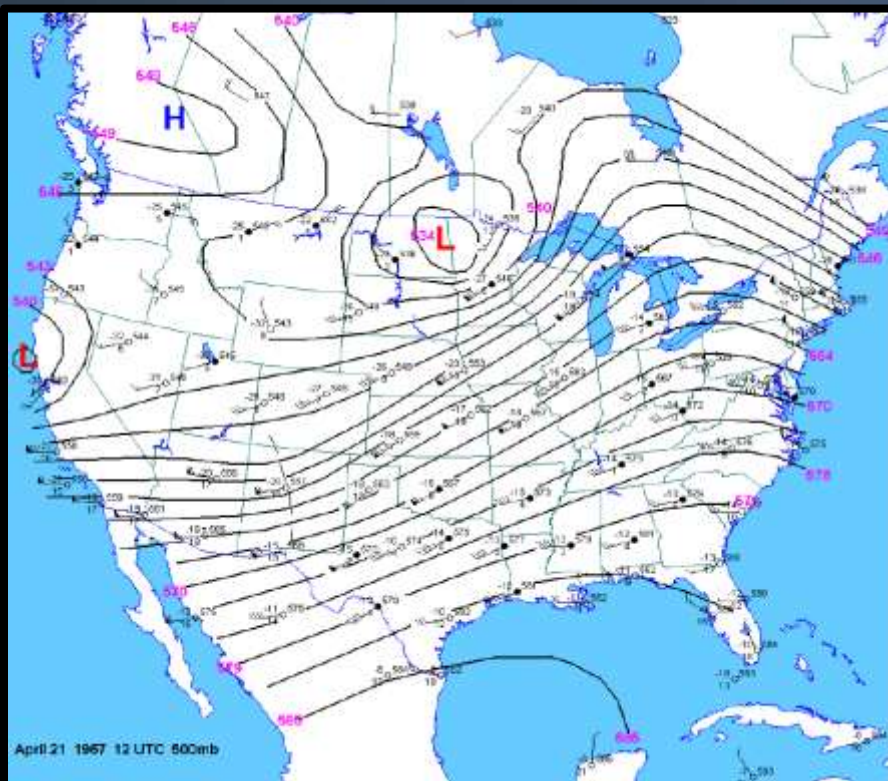
1967 Belvidere, Lake Zurich, & Oak Lawn Tornado Outbreak

- 10+ Tornadoes late afternoon
- 3 F4 Tornadoes
- 58 Killed, 1000+ injured
- 100,000 without power



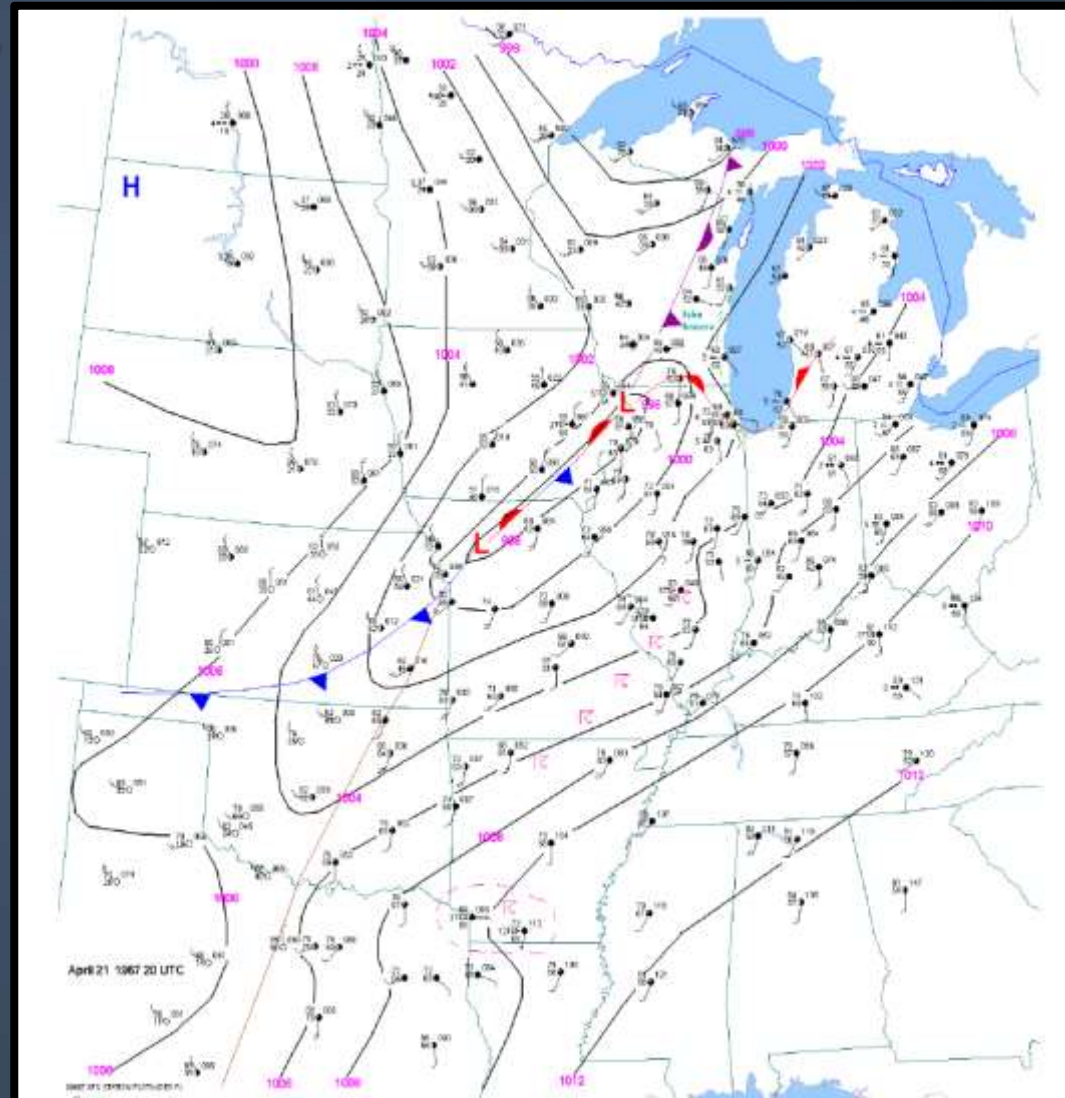
Meteorological Setup

- **Strong west-southwest upper level jet streak**
 - 100-120 KT
- **Upper level low (negatively tilted) over N CONUS**
 - **Strong/Defined short wave trough**



Meteorological Setup

- **Stationary boundary central Plains NE to Great Lakes**
- **Lifting warm front**
 - Warm/Moist air in place
 - Low/Mid 60s dew points
- **Backed surface winds**
 - High shear/helicity



Northern Illinois' Worst Tornado Disaster



1967 Oak Lawn IL Tornado



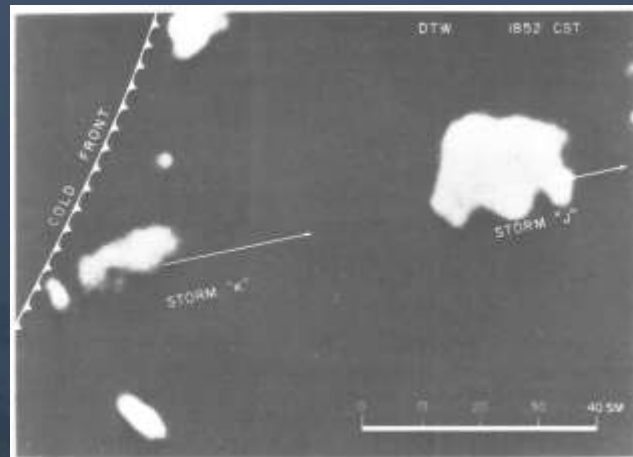
1967 Belvidere IL Tornado



Resultant Efforts - Period of Change

- Tornado watch and warning system
- SKYWARN and Amateur Radio
- NOAA Weather Radio
- NOAA Weather Wire
- Collaboration within weather enterprise
- Public preparedness and education

This radar image is from the Detroit radar of storms in northeast Michigan – just to show the quality of radar imagery that was available in the late 1960s.

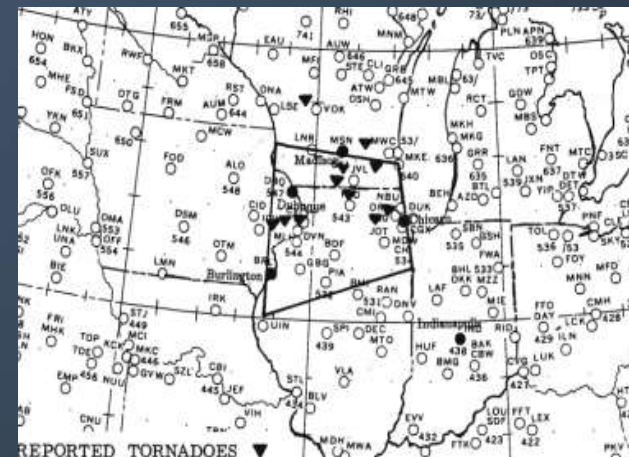


Fujita et al. 1970 - MWR



Transforming the Warning Process

- Integrated Warning System
- Current Tornado Watch and Tornado Warning Program
 - “Tornado forecast” was changed to tornado “watch”
- Tornado sirens - repurposed Civil Defense sirens
- Improved access to weather radar



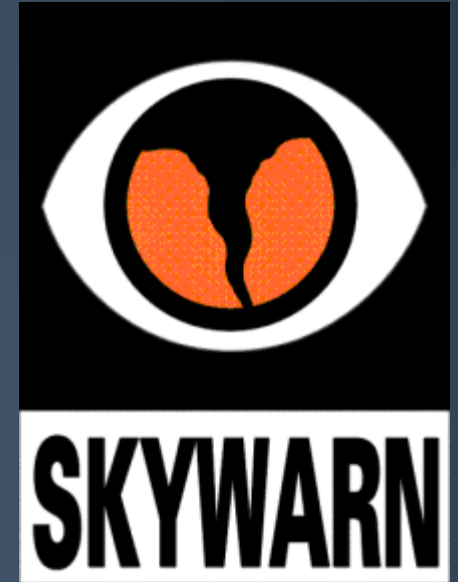
Emphasis on Spotters

- **Storm spotters existed in the 1960s**
 - **Were unorganized and scattered sporadically**
- **NWS survey called for greater emphasis on creating a spotter network**
 - **Natural Disaster Warning system**
 - **(NADWARN)**
 - **Eventually known as SKYWARN**
 - **Continually educate**



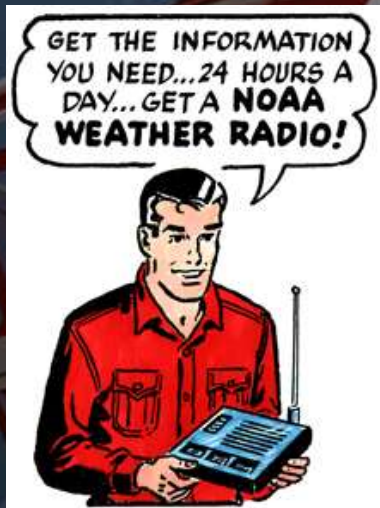
Amateur Radio Communications

- By end of the 1960s many networks sprung up across the country
 - Supported by Civil Defense and Weather Bureau offices
 - Merle nicknamed the network “Skywarn”



NOAA Weather Radio

- Only 50-60 stations in the 1960s
 - 125 by 1974 outbreak
- Today – 1025 stations covering 97% of the U.S.
- All hazards network



NOAA Weather Wire

- Timely communication of warnings is vital
- NWS stressed need for improved infrastructure
 - National Weather Wire Service was born
 - NOAA Weather Wire
- Allows for quick dissemination of weather information and storm warnings
 - Media, emergency managers, etc.

Coleman et al. 2011 - BAMS



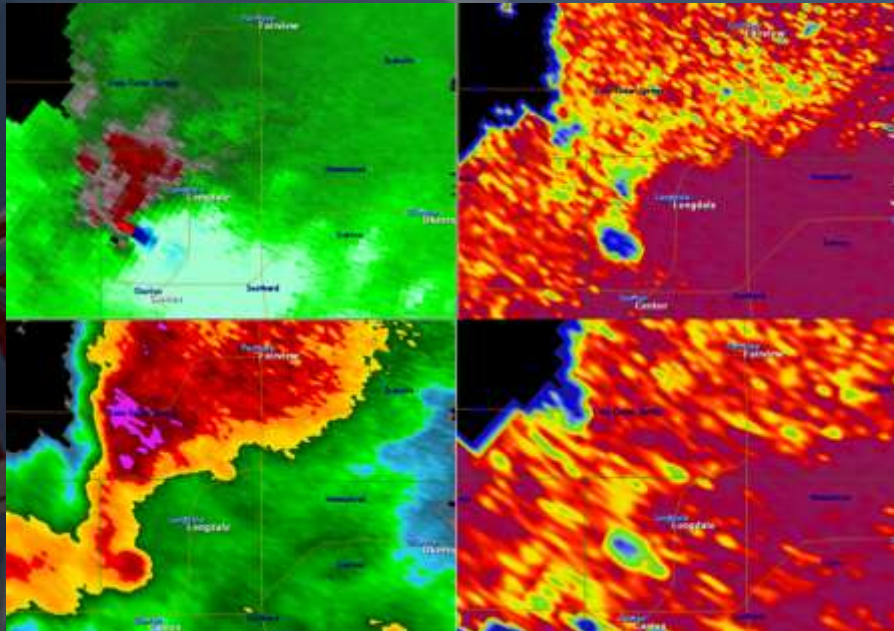
Meteorology – State of the Science

- Increased understanding of t-storm development, evolution, Near Storm Environment & tornadogenesis
- “Storm based” warnings
- Extensive forecaster training
- Shared research (yearly conference)
- Looking beyond Meteorology
 - Social Science
 - Communication/Awareness



Advances in Radar Meteorology

- Doppler
- TDWR
- Dual Pol
- SAILS
- Public Access



Satellite -> GOES R/16

“A whole new world!”



GOES-13



GOES-16

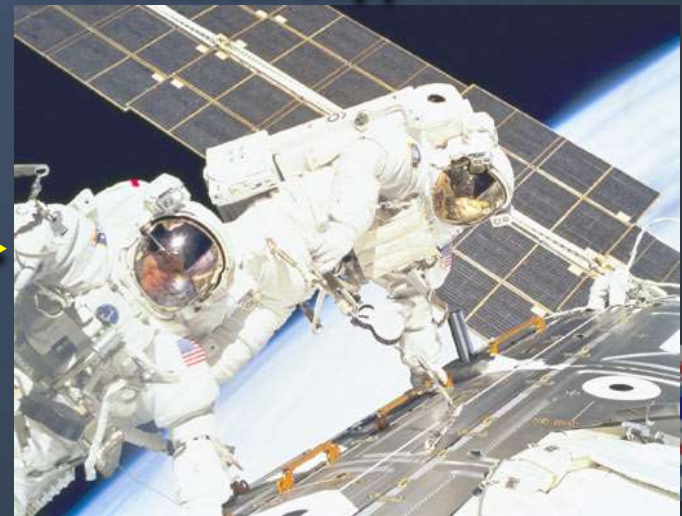
Decision Support - NWS Yesterday To Today

- **NWS Future – “Improving forecaster-provided interpretive services for decision makers”**
- **NWS is decision support**
- **Our mission (goal) has not changed, the environment in which we deliver our mission and the way we approach it has.**

Traditional NWS



Decision Support NWS



Decision Support - NWS Yesterday To Today

The New NWS



Social Media



Recorded Briefing



Live Virtual Briefing



IC Center On-site



IC Incident On-site



Info → Forecaster → Services

Communications

- **Close relationships & regular communication between NWS and EMs/Broadcast Media**
 - Multiple meetings throughout the year
 - Weather Watcher/Outdoor Training
- **Increased outreach**
 - Yearly Spotter Training
 - Preparedness Weeks
- **StormReady**
 - 131 Sites in Illinois
- **Weather-Ready Nation Ambassadors (4600+ across U.S.)**
 - Force Multipliers to help build a Weather-Ready Nation!



Communications -> Messaging

- Enhanced information on magnitude of event
- Cell phones/mobile devices
- Warning information disseminated via radio, TV, internet
- Various product Apps and messaging services
- Ability to monitor weather via TV, YouTube, or Apps
 - mPING

TORNADO...OBSERVED
DAMAGE THREAT...**CONSIDERABLE**
HAIL...2.50IN



The mPING App



Communications -> Social Media

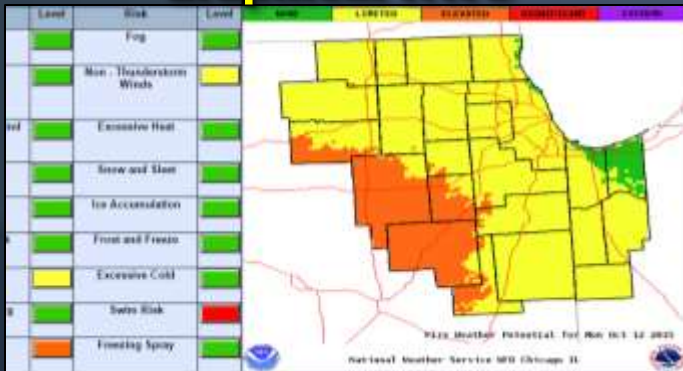
- Ability to reach thousands with push of a button
- Increased collaboration efforts
 - Public & Partners
 - **Force Multiplier**
- “Message” easily spread
- Ability for public to “see” the NWS



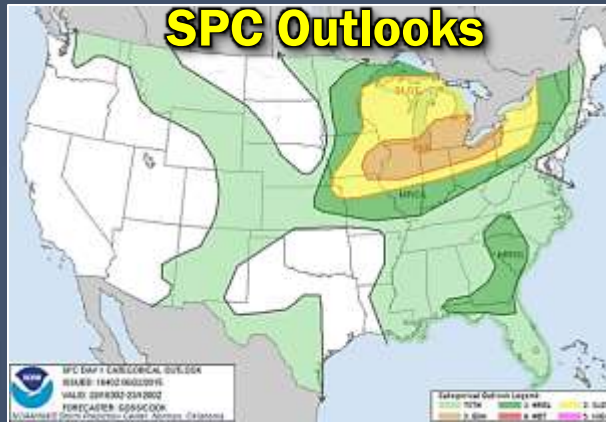
Communications -> Graphics

- Even Just Ten+ Years Ago...
 - Graphical threat depictions rarely available
- Now...

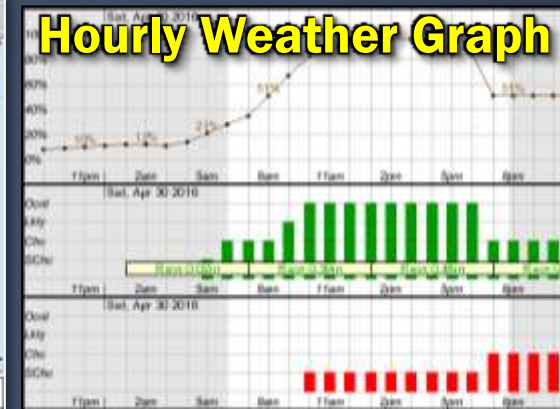
Graphical HWO



SPC Outlooks



Hourly Weather Graph



Watches & Warnings

Weather Story

ALERT: Severe Weather Likely Late This Afternoon and Evening

Severe Weather Risk



Potential Hazards: Threat Level



Important Note: Ingredients "cook" come together for significant severe weather event. Small scale details will alter magnitude & area of greatest impacts.

When: Late afternoon & evening, significant damaging winds, tornadoes, hail all possible

Graphical NOWcasts

Storms Increasing in Coverage; Some Severe

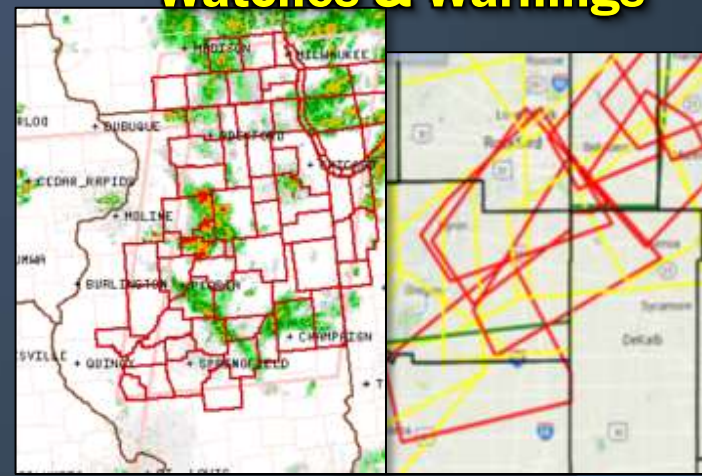


Winds from Severe Storms

- Large hail & strong winds
- Tornado potential

Stay informed on the weather and leave enough time to leave your home if needed.

FORECAST:
weather.gov/chicago
@NWSChicago
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Why Look Back?

- **Self-evaluation benefits all**
 - NWS
 - EMS/Broadcast Media
 - Public
- **Allows us to recognize and utilize all tools available to remain weather-aware**
- **Expand, or create new, safety and preparedness themes or messaging**



Why Look Back?

- **Tornadoes can occur anywhere in northern Illinois or northwest Indiana – rural areas, suburbs, and highly urbanized areas**
- **Tornadoes can impact the north, west, or south suburbs, or the city**
- **Tornadoes can occur at the “worst” possible times**
 - Anytime throughout the year
 - School dismissal or afternoon rush hour
- **Violent tornadoes have struck this area, and they will likely strike again**



Weather-Ready Nation

National Oceanic and Atmospheric Administration



Building a Weather-Ready Nation

- **Preparedness is key!**
- **Ask yourself these questions:**
 - **Do you have a preparedness plan for your home, workplace or school?**
 - **Do you have means to monitor the weather?**
 - **Do you have multiple ways to receive warnings?**
 - **What actions would you take if hazardous weather impacts you?**



Weather-Ready Nation

National Oceanic and Atmospheric Administration



Plan, Practice, Monitor, Act!

Severe Weather Preparedness Framework

PPMA

- **Plan**
 - Home, work, school, outdoor activities
 - Identify safe areas
 - Have a disaster kit
 - Know how to stay weather aware
- **Practice! Practice! Practice!**
- **Monitor**
 - Weather Watcher
 - Multiple ways to receive warnings
- **Act**
 - When severe weather threatens
 - Activate your plan!



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 f t v
 weather.gov/Chicago

MAKE SURE YOU KNOW

Severe Weather Safety

This is a checklist of five basic things you should know about severe weather safety. Knowing this information and utilizing these tips should improve your chances of being safe if severe weather threatens. Be sure that you, and your family or coworkers, are familiar with everything on this list.

- ☐ **Three Basic Things to Include in Your Severe Weather Safety Plan**
 - Where to Shelter
 - How to Reach Each Other (communication)
 - Meet-up spot if You Get Separated
- ☐ **Knowing Important Sources of Weather Information**
 - NWS Chicago Weather Watcher Page
 - Watches and Warnings
- ☐ **Have Multiple Ways to Get Weather Information**
- ☐ **Ensure Wireless Emergency Alerts are Enabled on Smartphone**
- ☐ **"Get In, Get Down, Cover Up"**

★ **Self-Assessment: Can you check all five boxes?**

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SEVERE WEATHER SAFETY PLAN

Three basic things everyone in your home or business should know...

- 1. Pick A Spot**

 Find a safe normal sheltering location, and let everyone know that's where they should go during severe weather.
- 2. How To Get In Touch**

 Everyone should know how to reach one another afterwards. In disasters, texting is often better than calling.
- 3. Choose a "Meet Up Spot"**

 It's a good idea to have a standard meet up spot that everyone knows.

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HAVE MULTIPLE WAYS TO GET WEATHER INFO



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When a TORNADO WARNING is Issued "Get In, Get Down, Cover Up"

- 1. Get In**
 Get into a sturdy building and put as many walls between you and the outside as possible.
- 2. Get Down**
 Get as low in the building as possible – the basement or the lowest floor.
- 3. Cover Up**
 Flying and falling debris are a storm's number one killer. Use pillows, blankets, helmets, etc. to cover up and protect yourself.

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WATCH VS. WARNING

Do YOU know the difference?

You should be...

WATCH

BE ALERT! Severe storms or tornadoes MIGHT form and affect your area.



WARNING

TAKE ACTION! A severe storm or tornado is expected in your area.



ACT IMMEDIATELY. GET IN, GET DOWN, AND COVER UP.

f t v @NWSChicago Web: weather.gov/Chicago

<http://www.weather.gov/lot/severeprepare>



PPMA -> 1967 Oak lawn Tornado

- “That an automobile is one of the most unsafe places to be in a tornado was proven by the large number of deaths to motorists.”
- “But it was those persons who were not at home, who were coming home from work, who were out to Friday night dinner, who were out to the store to cash their Friday pay check;
– here was where the high death toll resulted.”

PPMA -> 1967 Oak Lawn Tornado

- “Most of those killed were people who were not in a position to hear the warnings because they were away from home.”
- “Actually, the tornado could hardly have hit at a worst time of the day or week to catch the greatest number of people out in the open.”

PPMA -> 1967 Oak Lawn Tornado

- **Goal is to not put yourself in a vulnerable situation**
 - Important for rush hour commuters (Bus drivers)
 - Plan ahead to adjust plans if possible
- **If you do...**
 - **Planning ahead is important**
 - Identify shelters on route
 - **Be aware of threats**
 - **Remain weather aware**
 - Weather Watcher

PPMA -> February 28, 2017

- “Out of season” severe weather event
- Afternoon/early evening occurrence
- High impact weather anticipated
 - Damaging Winds
 - Large Hail
 - Tornadoes



Northeast of Washburn,
IL: February 28, 2017
Photo courtesy of
Cameron Nixon

Conclusions

- Public preparedness/education will continue to be a high priority
 - Crucial to saving lives
- We want you to not only prepare & plan, but be a “Force Multiplier”
 - How about your family or friends?
- Use your knowledge & the tools discussed today to help friends & family be Weather-Ready!



Illinois Severe Weather Preparedness Week
March 5th - March 11th, 2017

- Increase awareness of severe weather.
- Review weather safety procedures at home, work, school, place of worship, on the road, and elsewhere.
- Thursday, March 9th at 10am: Statewide tornado drill
- Allow decision makers to review preparedness plans and ensure they have adequate means to monitor the weather and shelter individuals.

Logos: FEMA, WRN, National Weather Service, Illinois State Emergency Management Agency



Tornado Safety

- Have a preparedness plan. Know your tornado shelter!
- Home: Basement and under the stairwell or heavy piece of furniture. If no basement, then an interior closet, hall, or bathroom on lowest floor.
- Schools, hospitals, and office buildings: Small interior rooms or interior halls on lowest floor, and avoid long corridors with windows and large open areas with free span roofs such as gymnasiums.
- Steel and concrete high rise buildings: Interior halls, bathrooms or closets and stay away from windows.
- Shopping centers: Bathrooms and small interior spaces and avoid ramps, open areas and glass.
- Abandon mobile homes and vehicles for a nearby multistory building. Lie flat in a ditch as a last resort.
- DO NOT seek shelter under an overpass or attempt to outrun a tornado in your vehicle!

Illinois and Indiana Severe Weather Preparedness - NWSChicago
National Weather Service Chicago: weather.gov/chicago



Severe Thunderstorm Safety

- Take Severe Thunderstorm Warnings seriously as they pose threats to life and property.
- June 30th, 2014 was an example why, with destructive winds and tornadoes across northern IL & IN.
- Go into a sturdy shelter and stay away from windows.
- Have a means to hear additional warning info.

Images: Destructive Winds, Grand Fall

Outdoor large venues can be particularly vulnerable to severe storms
National Weather Service Chicago: weather.gov/chicago



Conclusions

- This is a partnership...plain and simple
- The NWS needs to be effective
- For the NWS to be effective, we need you!
- We are here for you!



<http://www.nws.noaa.gov/com/weatherreadynation/ambassadors.html>



<http://www.weather.gov/stormready/>

