WHEN THE WEATHER TURNS SEVERE:

A GUIDE TO DEVELOPING A SEVERE WEATHER EMERGENCY PLAN FOR SCHOOLS

Originally Written by
Barbara Watson
Warning Coordination Meteorologist
NOAA/National Weather Service
Washington, DC Forecast Office
Sterling, Virginia
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Adapted for Central New York and Northeast Pennsylvania by
Stephan Kuhl, Former Warning Coordination Meteorologist
NOAA/National Weather Service
Binghamton Forecast Office
Johnson City, New York
August 1997

Updated January 2003, by Dave Nicosia,
Current Warning Coordination Meteorologist
NOAA/National Weather Service
Binghamton Forecast Office
Johnson City, New York

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Version 11/02

THE MISSION STATEMENT

National Weather Service

The National Weather Service (NWS), under the National Oceanic and Atmospheric Administration (NOAA) and the Department of Commerce (DOC), is responsible for providing weather services to the nation. It is charged with the responsibility of observing and reporting the weather and with issuing forecasts and warnings of weather and floods in the interest of national safety and our economy.

Briefly, the priorities for the weather service to the nation are:

1. protection of life,
2. protection of property, and
3. promotion of the nation's welfare and economy.

To provide the above services, the National Weather Service must develop cooperative relationships with a variety of users. These users include the general public, the aviation community, and mariners to name a few.

A strong cooperative arrangement between the NWS and local school districts is *essential* to ensure that students and teachers are informed and prepared to take action when severe weather threatens. The information in this guide will assist you in using NWS products and resources to develop a severe weather emergency plan for your school.

WHAT TO EXPECT FROM THIS GUIDE

The purpose of this guide is to provide assistance to school administrators and teachers in designing a severe weather emergency plan for their school. While not every possible situation is covered by this guide, it will provide enough information to serve as a starting point and a general outline of actions to take. The majority of material focuses on thunderstorms and the hazards these storms produce – damaging winds, lightning, hail, tornadoes, and flash floods. We have also included a section on the risks of winter weather. To ensure safety, actions must be taken quickly. This will become more apparent in Section 1, "Severe Weather: Understanding Your Risks and the Importance of a Plan".

Once you comprehend the scope of the problem, you can begin to address how to reduce the potential hazard. Sections 2 and 3 of this guide, "Designing Your Severe Weather Emergency Plan" and "Designing Your Winter Weather Emergency Plan", detail more specifically how to get weather information, how teachers and students can be alerted to the emergency, and what actions under what circumstances should be taken to reduce the danger. Safety is always the foremost concern. The ultimate goal is to quickly inform teachers and students anywhere on the school grounds of the threat of severe weather and to move them as quickly as possible to pre-designated shelters. These sections also discuss school bus driver actions in severe weather.

For any plan to work efficiently, it must be practiced!! Schools should conduct semi-annual exercises and severe weather safety instruction should be a part of these exercises. It is important to understand why certain actions are being taken, to know the weather terms that are being used, and to know what visual clues can signal you to potential dangers ahead.

The appendices in this guide are loaded with reference materials to assist you in both designing your plan and gathering educational materials for severe and winter weather instruction. There is a NWS products list, a glossary of weather terms, a listing of safety tips for the various types of weather hazards (not just thunderstorms) and a listing of NOAA Weather Radio stations, which broadcast for central New York and northeast Pennsylvania. Also included are NWS and county emergency management contacts who can provide additional assistance.

CHOOSING A SEVERE WEATHER COORDINATOR

Before you begin, it is recommended that one person be designated as the "Severe Weather Coordinator". This person may be a teacher or administrator with an interest in weather, who is willing to attend local NWS spotter training programs (no fees). The coordinator will be responsible for developing the plan and working with the local school board, administrators, and teachers to implement the plan. To ensure a successful plan, it is imperative that the coordinator has the support and active involvement of both the school board and the school administration.

To find out more about NWS spotter training, contact Dave Nicosia, National Weather Service Binghamton NY at 607-770-9531 x 223 or by e-mail at david.nicosia@noaa.gov
More NWS contacts in New York and Pennsylvania are shown in Appendix F.

SECTION 1:
SEVERE WEATHER: UNDERSTANDING YOUR RISKS AND THE IMPORTANCE OF A PLAN

A. Tornadoes CAN Happen Here!

While common thinking is that severe weather is a problem of the distant prairie dwellers in Kansas and Oklahoma, the truth of the matter is that all fifty states experience severe weather. Pennsylvania and New York State have a long history of severe weather. From the period of 1950 through 2001, a total of 130 tornadoes have occurred in central New York State and northeast Pennsylvania with 7 deaths and 74 injuries reported from these storms. On average, 2.5 tornadoes and .13 tornado fatalities occur across New York State and Pennsylvania each year. On average 1.4 injuries occur per year.

Pennsylvania and New York have been visited by large and very destructive tornadoes in the past. The hills and mountains offer no protection from tornadoes, this is a common myth which is FALSE!! A noteworthy example was the May 31st, 1985 outbreak of tornadoes that ripped through portions of New York and Pennsylvania. As many as 41 tornadoes tracked across Ohio, Pennsylvania and New York that day. Several of these tornadoes were rated at F4 or F5 strength, which includes wind speeds over 250 mph!! Damage from the event was estimated at 450 million dollars. Sadly, 75 people were killed in the U.S from this outbreak. On May 31st and June 2nd 1998, at least 20 tornadoes touched down in northeast Pennsylvania and central New York. Four of these tornadoes were rated F3, with estimated wind speeds of over 200 mph! Damage was estimated in the millions of dollars. This outbreak claimed two lives. More recently, on May 31, 2002 central New York was hit by several tornadoes including one that had winds around 110 mph!! This tornado unfortunately injured 6 people.

The above events prove that big tornadoes *can* hit central New York and northeast Pennsylvania. However, many relatively smaller events occur in central New York and northeast Pennsylvania each year. Would your school be prepared to take action if a tornado warning were issued? Section 2 of this manual will help you develop your plans.

While tornadoes grab headlines due to their swift and destructive nature, flash floods, lightning, straight-line winds, and hail are more common by-products of thunderstorms and result in many more deaths and millions of dollars in damage each year. These events, like tornadoes, should also be taken very seriously.

B. Flash Flooding/Flooding

The ***number one*** weather related killer is flooding. Flooding deaths often occur as people try to drive through flooded roads and become trapped or swept away in the rushing waters. Flash floods can occur year-round in our region. In winter and spring, heavy rain combined with rapid snowmelt and ice jams are the primary causes of flash flooding. In summer, slow-moving thunderstorms are the primary cause of flash floods. In late summer and fall, remnants of tropical systems are the focus of flash flooding.

On January 19-20, 1996, disastrous flooding occurred across New York State, Pennsylvania and much of the northeastern United States due to rapidly melting snow that was on the ground and almost 3 inches of rain that fell in a very short period of time. Six people were killed in Delaware County New York and one person died in Cayuga County New York due to this flooding. A school bus became stranded in rapidly rising water in Steuben County, forcing a swift water rescue of several children out of the school bus. Fortunately, no lives were lost! The January 1996 flood caused property damage estimated to be in the millions.

On May 28, 2002, flash floods occurred in Bear Creek Township in Luzerne County, PA. Several school buses were stranded for the night, and at least a dozen children were forced to remain at school through the night because of this flash flood.

C. Lightning

Lightning causes, on average, 73 fatalities each year across the nation. In May 2000, a student was caught in a severe lightning storm in Steuben County, NY. While walking home from school, he accidentally touched a downed power line from the storm and was electrocuted. Fortunately, he survived the incident! It is very important that school dismissals are timed in a way that does not put our children in danger. If storms threaten your area near dismal time, plans should be in place to hold the children at school until the threatening weather passes.

As a rule, if you hear thunder, you are close enough to be struck by lightning. Lightning has been known to strike up to fifteen miles away from the parent cloud. Lightning dangers need to be addressed in your emergency plan. Coaches of outdoor sporting events and recess monitors need to be particularly aware of the dangers of lightning and act accordingly to protect our children when a lightning storm threatens. Methods to protect teachers and children in the schoolyard will be stressed in Section 2.

D. Straight-Line Winds from Thunderstorms

Straight-line thunderstorm winds, occasionally in excess of 100 miles an hour, can uproot trees and destroy buildings. Often, the damage from straight-line wind events is blamed on tornadoes. Similar to tornado preparedness, it is important that you designate safe areas in your school to shelter students and teachers from straight-line winds produced by thunderstorms. Our region has a history of severe straight-line winds from thunderstorms. The Syracuse region was struck by very severe winds from a thunderstorm on Labor Day, 1998. It is estimated that this storm produced winds of around 110 mph! Unfortunately, two people were killed by this storm. Similarly, a severe thunderstorm produced winds estimated at 110 mph at Coldenham, NY in November 1989. The strong winds collapsed a cafeteria wall at Coldenham Elementary School unfortunately killing 9 children and injuring 18.

E. Hail

Thunderstorms occasionally produce damaging hail. While fatalities from hail are few, hail injures many and causes millions of dollars in damage each year. A large hailstone can fall as fast as 100 mph and could pose a devastating blow to a person! You should consider hail when developing your severe weather plan. Information will be provided in Section 2.

F. Winter Weather

Extreme winter weather takes a toll on lives and property throughout many portions of the United States. Heavy snow and freezing rain are responsible for numerous traffic fatalities each year. Moreover, hundreds of deaths and injuries from hypothermia, exposure, and frostbite are reported each year as bitter cold air masses plunge into the United States during the winter. Although the above weather conditions are often accepted as facts of life in central New York and northeast Pennsylvania, many people are still injured or killed despite a long history of extreme winter weather activity in our region.

Heavy Snow Storms - Remember the blizzard of 1993? We all know that heavy snow can immobilize a region and paralyze a city, stranding commuters, stopping the flow of supplies, and disrupting emergency and medical services. Accumulations of snow can collapse buildings and knock down trees and power

lines. When snow is accompanied by wind, travel becomes even more hazardous. School bus routes may be blocked by drifting snow and travel may be hindered by near whiteout conditions. Often times, bus service is delayed or unavailable.

Lake Effect Snow - Lake effect snow is one particular type of winter storm common to the snow belt regions of central New York. Sometimes lake effect snow occurs farther south into the southern tier of New York as well as northeast Pennsylvania. Lake effect snow occurs when cold air rushes across the warm waters of the Great Lakes, initiating snow showers and squalls. In the primary snow belt, seasonal accumulations are often well over 100 inches.

Ice Storms - Heavy accumulations of ice can bring down trees, utility lines, and communication towers. Roadways become a glaze of ice and nearly impassable. Again, school buses may be delayed or unavailable. Of all winter deaths related to ice and snow, 70 percent occur in motor vehicle accidents and 25 percent are people caught out in the storm.

Extreme Cold - Extremely cold temperatures often accompany a winter storm or are left in its wake. Prolonged exposure can cause frostbite or hypothermia and can become life threatening. This is a problem especially for children waiting at bus stops or at outdoor recess. When extremely cold temperatures are accompanied by wind, an especially dangerous situation exists.

The **Wind Chill** is based on the rate of heat loss from exposed skin caused by the combined effects of wind and cold. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the body temperature, leading to hypothermia. A wind chill chart is located in Appendix E for your reference.

G. Conclusion

The goal of this publication is to ensure that every student's safety is adequately accounted for when the weather turns severe. It has been well documented that severe thunderstorms and dangerous winter weather occur in central New York and northeast Pennsylvania. If your school has never experienced severe weather, ***do not*** conclude that severe weather will never place your school in danger. A delay in developing a severe weather emergency plan could be a painful lesson. Only through preparedness ***before*** the storm, can the safety of all school children and personnel be assured. Please get prepared now and use this guide to help you develop a severe weather emergency plan for your school. If you need any assistance or have questions, please contact Dave Nicosia, WCM, NWS Binghamton NY at 607-770-9531 x 223 or through e-mail at david.nicosia@noaa.gov

SECTION 2:
DESIGNING YOUR SEVERE WEATHER EMERGENCY PLAN

A. How to Get Emergency Weather Information:

Because severe weather can occur with little, if any, warning, minutes and even seconds can mean lives saved. In just five minutes, a tornado may travel two to four miles on the ground. From the time the National Weather Service (NWS) issues a warning, to the time you receive that warning via radio or television, ten minutes may have elapsed. Also, you must be listening at the critical moment that the warning is announced or an even greater amount of time will pass!

NOAA Weather Radio

The fastest, most accurate and reliable means of receiving critical weather information at your school is through a NOAA Weather Radio with a ***"tone alert***" feature. Make sure your NOAA Weather Radio has a battery back-up. NOAA Weather Radio is operated directly from NWS offices and is part of our country's National Warning System. When the NWS issues a warning, a Specific Area Message Encoder (SAME) unit triggers a ***"tone alert"*** (1050 Hertz). This alert is immediately followed by warning information.

The NOAA Weather Radio ***"tone alert"*** feature is used for the issuance of all short-fused weather information such as severe thunderstorm, flash flood, and tornado watches and warnings. A list of watch and warning definitions is provided in Appendix A. NOAA Weather Radio broadcasts 24 hours a day, seven days a week with the latest weather information, from daily forecasts to special weather statements about sudden shifts in the weather patterns or the development of potentially hazardous weather. For more information on NOAA Weather Radio, including which transmitter is in your area, reference Appendix D.

If your school is not in a reliable NOAA Weather Radio listening area (due to interference from mountains or other sources), then below are some suggested alternatives:

- The Weather Channel

If you have cable television access, The Weather Channel uses NWS products and broadcasts warnings and statements immediately upon receipt from the NWS via a satellite link. They also display local radar pictures throughout the day.

- Primary Emergency Alert System (EAS) Station

Monitor your primary (EAS) radio station (Appendix G). EAS operates on a cooperative agreement between broadcasters and federal, state, and local government agencies. In central New York and northeast Pennsylvania, most broadcasters activate EAS for tornado, severe thunderstorm, and flash flood warnings.

- Local or Cable Television

Monitor your local or cable television stations. Many television stations have access to NWS products and will immediately post (i.e., scroll) a watch or warning when it is issued.

Phone call-down systems used in some counties ***are not advised*** for receipt of warning information due to: 1) time elapsed in relaying information; 2) chance of incorrect or incomplete information being passed; 3) lack of reliability of phone systems during storms; and, 4) the NWS advises people not to use telephones during an electrical storm due to the lightning hazard.

Your radio or television should be located in the main office or near the person(s) responsible for enacting the plan. Main offices are good because there are generally a number of people around who could hear the alert, and in an emergency, the public address (PA) system is usually close. If using a NOAA Weather Radio, the radio should be set at all times in ***"Alert"*** mode. Some radios will automatically turn on when an alert sounds, while others must be manually turned on. It is better to have the type that automatically turns on in case you are out of the room when the tone is activated. If using NOAA Weather Radio, the information cycles every few minutes, so if you don't hear all the information you need the first time through, it will repeat shortly.

Listen for the type of watch or warning and where it is in effect. The person(s) monitoring must know what action they should take based on this information. Have a map nearby for easy reference to counties and towns to locate storms and their movement in reference to your school. There is no need to take emergency action if the warning is not for your location. It should, however, heighten your awareness to the potential for severe weather in your school district, especially if the warning is for a county next to you and the storms are moving in your direction!

B. Getting the Message Out to Students and Staff

Most schools utilize a public address (PA) system to talk directly to students and teachers. In some cases, electricity may be lost during a storm before you have activated your plan. Therefore, it is critical to have a back-up alerting device such as a megaphone.

If your school has mobile classrooms or detached gymnasiums that are not part of a PA or intercom system, then special arrangements should be made to notify students and staff in these areas. Sending "runners" outside to mobile classrooms is ***not advisable*** due to the danger posed by lightning and the approaching storm. Wireless communication devices are an effective means for such communication. ***"Walkie-talkies"*** may be the least expensive.

Persons with disabilities may require special attention. You may want to assign a staff member to each person requiring special attention to see that the student moves to the appropriate place of safety. Students or staff that may not hear the warning must be taken into account. To ensure appropriate action and understanding of your ***"call to action,"*** you must exercise your plan.

C. Determining Severe Weather Safety Zones in Your School:

This may be the most time consuming and complex phase of designing your plan. Schools are sufficiently complex and diverse in design that it is impossible to describe an exact plan here that will apply to every school. Due to this complexity, it is recommended that this phase of the plan be accomplished with the help of an engineer or architect familiar with the school's design. There are, however, general guidelines and basic concepts that can be discussed.

The greatest dangers from high winds (e.g., tornado, thunderstorm downburst, etc.) are:

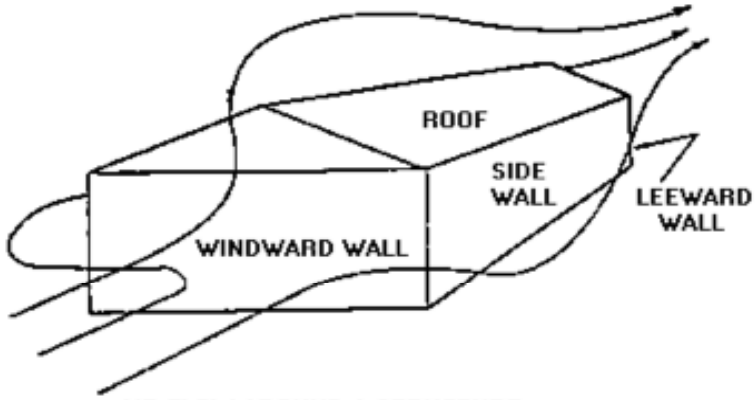
1) roof failure;
2) breaking glass; and,
3) flying debris (airborne missiles).

The ***most dangerous locations*** are generally large rooms with big expansive roofs such as cafeterias, gymnasiums, and auditoriums. The collapse of the room's load-bearing walls may lead to the failure of the entire roof. Roofs tend to rely on gravity to keep them attached. When strong winds act on a structure, pressure differences are created, causing outward pressure forces, acting to lift the roof (see diagram on next page). Rooms with large windows that may shatter from being struck by airborne missiles or from pressure stresses are extremely dangerous. While windows on the side of the school facing the storm are ***most*** susceptible, any window could potentially shatter as the storm passes. Once winds enter a building, additional damage can create a domino effect. This is one of the reasons that ***"IT IS NO LONGER ADVISED THAT WINDOWS BE OPENED!!! Greater damage may occur from this action and valuable time that should be used getting to safety is often lost."***

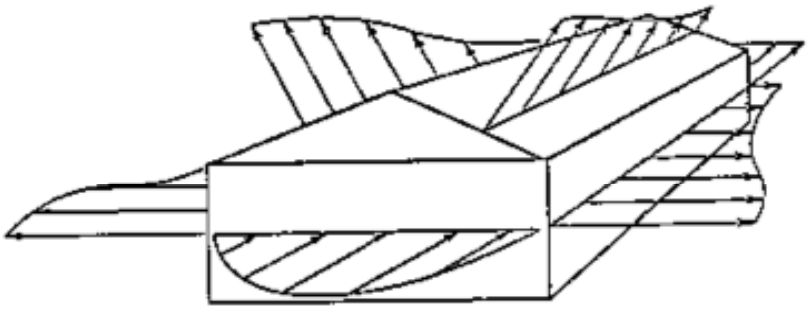
Small interior rooms, bathrooms, and windowless, interior hallways that are away from exterior doors offer the best protection. Interior load-bearing walls (with short roof spans) provide better protection than temporary or non-load-bearing walls and structures. If your school has more than one story, evacuate the upper level of your school. The lowest level is always the safest.

Top diagram - Airflow around a structure.

Bottom diagram - Airflow induces pressure on building components. Lengths of arrows are proportional to the magnitude of the force in the direction indicated.



AIR FLOW AROUND A STRUCTURE



OVERALL PRESSURES ACT OUTWARD ON ROOF, SIDEWALLS, AND LEEWARD WALL

Schools designed for the ***"open classroom"*** concept often lack safe areas due to a lack of interior load-bearing walls, large spanning roofs, and the abundant use of glass. You may not be able to find enough ***"ideal"*** space to protect your students and staff. It may be a matter of determining the lesser of evils. Below is a list beginning with the ***lowest*** probability of failure:

1) Interior, lower level, load-bearing walls (i.e., interior bathrooms or closets);
2) Interior walls of upper level - exterior walls of lower level;
3) Exterior walls of upper level - roof;
4) Rooms with large roof spans - mobile classrooms; and,
5) Windows on exterior walls.

Fortunately, the majority of tornadoes will not destroy well-constructed buildings and damage in about 70% of cases should not go beyond #2 listed above. With these considerations, you may want to rank areas according to safety. Then begin by filling the safest areas first with students and continue until you have found space for everyone.

Again, it is best to have an engineer or architect advise your school on the safest areas since schools are built with varied designs and purposes. The priorities listed above are based on broad generalities.

D. When to Activate Your Plan and When to Return to Normal Activities:

When activating a plan, you need as much information as possible about the type of storms, expected impact, and time of impact on your school district to assess the risk. A plan may work best with phases of activation. For instance, outdoor activities will be the most susceptible to weather hazards, with lightning being the greatest threat. ***As soon as thunder is heard,*** not when the rain begins, outdoor activities should be stopped. Outdoor activities should not be resumed until the storm has passed. It is important not to resume activities simply because the rain has stopped or you no longer hear thunder. Since lightning can strike far from the parent cloud, do not resume outdoor activities until 20 to 30 minutes after thunder is last heard. For more information on lightning dangers and lightning safety, see Section 1.C and Appendix C.

Tornado or Severe Thunderstorm Watch
In a tornado or severe thunderstorm watch, outdoor activities may need to be postponed. As a storm approaches, you may want to move students from the most susceptible areas such as mobile classrooms and gymnasiums as a precaution, even though a warning has yet to be issued. You may want to post a school official trained in spotting severe weather to watch the storm as it approaches. This person can then advise when to take special actions. For severe weather spotter training, contact the NWS Binghamton WCM, Dave Nicosia at 607-770-9531 x 223 or through e-mail at david.nicosia@noaa.gov or your county EM director (Appendix H).

Severe Thunderstorm Warning
If a severe thunderstorm warning is issued and your school is in the path of the storm, all of the above actions are warranted. It is important to note that even though severe thunderstorm warnings are issued for a county, at times only a small part of a county is affected. That is why the NWS provides a storm path in the text of the warning (see example below). Action is only recommended if your school is in the path of the storm. In addition to strong damaging winds, severe thunderstorms may contain large hail and students should be moved out of areas with skylights (Section 1.D). If you have areas where large exterior windows may be exposed to the storm's winds, keep students out of these areas until the storm passes. Below is an example of a severe thunderstorm warning from the NWS in Binghamton. Note the projected storm path in the example.

ZCZC ALBSVRBGM
WUUS51 KBGM 312207
PAC069-127-312245-

BULLETIN - EAS ACTIVATION REQUESTED
SEVERE THUNDERSTORM WARNING
NATIONAL WEATHER SERVICE BINGHAMTON NY
607 PM EDT FRI MAY 31 2002

THE NATIONAL WEATHER SERVICE IN BINGHAMTON HAS ISSUED A

*** SEVERE THUNDERSTORM WARNING FOR...**
LACKAWANNA COUNTY IN NORTHEAST PENNSYLVANIA.
WAYNE COUNTY IN NORTHEAST PENNSYLVANIA.

*** UNTIL 645 PM EDT.**

*** AT 602 PM EDT...NATIONAL WEATHER SERVICE DOPPLER RADAR INDICATED A SEVERE THUNDERSTORM OVER TOMPKINSVILLE...MOVING EAST AT 45 MPH.**

*** THE SEVERE THUNDERSTORM WILL BE NEAR...**
WAYMART AND MOUNT COBB AT 615 PM EDT.
LAKE ARIEL AND TRESSLARVILLE AT 620 PM EDT.
ARLINGTON AT 625 PM EDT.
HAWLEY AT 635 PM EDT.

IF SEVERE WEATHER APPROACHES YOUR AREA...GO INSIDE A STURDY SHELTER AWAY FROM CREEK BEDS AND OTHER FLOOD-PRONE AREAS. REMEMBER...A SEVERE THUNDERSTORM CAN PRODUCE LARGE DAMAGING HAIL...DAMAGING WINDS IN EXCESS OF 55 MPH...DEADLY LIGHTNING...AND VERY HEAVY RAIN.

REPORT SEVERE WEATHER TO THE NEAREST LAW ENFORCEMENT AGENCY. THEY WILL RELAY YOUR REPORT TO THE NATIONAL WEATHER SERVICE FORECAST OFFICE IN BINGHAMTON.

Tornado Warning

When a tornado warning is issued for your county and you have determined that your school is in the path of this storm, an ***"immediate and complete call to action"*** is needed (see Tornado Warning example below). If the storm has not yet reached your school, begin moving students and staff from unsafe areas and post a trained teacher or school employee to keep an eye on the storm's approach. From your exercises, you should know approximately how long it will take to move students into ***"tornado safe areas".*** During the storm, ensure all students and staff are in designated areas. If winds begin to pick-up outside the school (or if a roar is heard or large hail is falling), have students and teachers drop immediately into the "tornado safe" position (see diagram). Winds may increase at the onset of the storm and may or may not drop off prior to the tornado. Rain may or may not be occurring. Large hail is a signal that you are near the part of the storm in which the tornado would most likely occur. Once the storm has passed, students may return to classrooms. Stay alert for the potential for additional storms.

One special consideration would be the complication of activating a full emergency plan during class changes, when the halls are crowded and students may not know where to go. It may be best to hold classes beyond regular dismissal time until the severe weather threat has passed. Likewise, at the end of the school day, students may need to be held from boarding buses until the danger has passed.

You should have at least a couple of people who know how to shut off the main power (electricity) and gas (if applicable). After a tornado or severe thunderstorm, it may be necessary to shut off the gas and electric supply to the building.

Tornado Safe Position

NYC007-107-312015-

BULLETIN - EAS ACTIVATION REQUESTED
TORNADO WARNING
NATIONAL WEATHER SERVICE BINGHAMTON NY
336 PM EDT FRI MAY 31 2002

THE NATIONAL WEATHER SERVICE IN BINGHAMTON HAS ISSUED A

*** TORNADO WARNING FOR...**
BROOME COUNTY IN CENTRAL NEW YORK
TIOGA COUNTY IN CENTRAL NEW YORK

*** UNTIL 415 PM EDT.**

*** AT 331 PM...NATIONAL WEATHER SERVICE DOPPLER RADAR INDICATED A SEVERE THUNDERSTORM WITH A DEVELOPING TORNADO NORTH OF OWEGO...MOVING EAST AT 50 MPH.**

*** THE SEVERE THUNDERSTORM WITH THE DEVELOPING TORNADO IS EXPECTED TO BE NEAR...**
ENDWELL AND ENDICOTT AT 340 PM.

JOHNSON CITY AND BINGHAMTON AT 345 PM.
CHENANGO BRIDGE AND CHENANGO FORKS AT 350 PM.
SANITARIA SPGS AT 355 PM.
WINDSOR AT 400 PM.
HARPURSVILLE AT 405 PM.

FOR YOUR PROTECTION FROM THE DAMAGING WINDS OF A TORNADO...GO TO A BASEMENT OR A SMALL INTERIOR ROOM ON THE LOWEST FLOOR OF YOUR HOME OR BUSINESS.

$$

E. Determining When to Delay Departure of Students:

You should consider holding the departure of students to buses whenever watches or warnings are in effect. There are two primary considerations:

1) Upon departure, determine the amount of time it will take students to get safely home. Include time for the students to walk from their bus stop to their home; and,

2) How much time do you have before the storms are expected to impact your district? Severe thunderstorm and tornado watches are often issued several hours in advance of thunderstorm development. Watches are generally issued for large areas, so it may be a couple of hours before the storms reach you. On the other hand, it may be a rapidly developing situation with less than an hour before the storms impact.

If there is a possibility that students will be traveling during the storm, delay their departure until after the storm has passed. Buses ***"do not provide protection"*** from severe storms, so you should provide adequate time for students to get home.

It is not advisable for parents to go to the school to pick up their children in severe weather. Children are far safer at the school with the severe weather plan in place than on the road when a storm strikes.

F. School Bus Driver Actions:

All school bus drivers should be trained on how to handle severe weather situations. Two primary concerns are flash floods and tornadoes. Additional thought should be given to high wind situations (thunderstorm or other), unexpected heavy snow or ice, and extreme heat or cold. Heavy snow and extreme cold are covered in Section 3. In most situations, these events are forecast in advance, but there are times when they may catch you by surprise.

1) **TORNADOES - NEVER ATTEMPT TO OUTRUN A TORNADO!**
If a bus driver has reason to believe a tornado is approaching, the following steps should be taken.

1. If you have the time to get the students to a well-constructed building, then certainly do so as fast as possible. Move them into the interior or basement of the building away from windows and doors.

2.If no well-constructed building is available for shelter, then look for a ditch or low lying area (preferably without water). Stop the bus downwind from the location you have selected. You do not want the wind to roll the bus toward where the students will be. Unload the students and move them to the ditch or low-lying area and have them get in the protective position with their hands over the head.

2) **FLOODING** -

NEVER ATTEMPT TO DRIVE THROUGH FLOOD WATERS! If your bus route takes you across small streams and creeks or along a river, you need to have either an alternate route to travel or a contingency plan to return to the school, should flood-waters be encountered. Major river flooding generally is well forecast with warnings issued early enough that school officials can plan their strategy prior to placing the students on the bus. ***Flash flooding*** (a sudden and dramatic rise in water levels leading to flood conditions) does not lend much warning time (by definition). ***Drivers need to understand what to do and what not to do.***

A shallow ponding of water on the roadway is usually not a problem, but as soon as the depth of the water comes into question, particularly in cases where the road may have been undermined, drivers should not enter. Do not enter underpasses that are filling with water. If the water appears to be flowing (moving across the road), do not enter the water. For more information on flood dangers and flood safety, reference Section 1.B and Appendix C.

Water levels can rise rapidly, and the force of that water against an automobile, even a bus, can be amazingly powerful. If the driver is caught in an unavoidable situation, seek higher ground immediately. ***If the bus stalls, and water is rising, abandon the bus and seek higher ground before the situation worsens.***

3) **EXPOSURE TO EXCESSIVE HEAT-**

While most heat waves hit when school is not in session, temperatures can occasionally soar into the 90s in May, June, and September. Like wind to cold, humidity adds to the effects of heat. A ***"heat index"*** is used to combine these effects (Appendix E). The National Weather Service will issue a heat advisory when the ***"heat index"*** is expected to reach 105F and an excessive heat warning when it is expected to reach or exceed 115F. At temperatures of 105F and greater, heat disorders such as cramps, heat exhaustion, and heatstroke are possible. Students should be kept out of the sun and strenuous activities should be eliminated. Encourage students to drink plenty of water and wear light-colored, lightweight clothing. School staff should familiarize themselves with the symptoms of heat disorders and first aid procedures (Appendix C).

On hot, humid days, some children may have difficulty handling the heat. They may be boarding the bus from an athletic event or coming from a hot classroom. Also special attention should be given to outdoor practices and athletic events during the heat. This is especially true for football, which requires children to practice in pads during the heat of late summer. This could become deadly if the children aren't properly supervised and attended to. A child may be dehydrated and starting to show signs of heat exhaustion. Drivers, coaches and monitors should be taught to recognize symptoms of heat stress (Appendix C).

G. Need for Periodic Exercises and Severe Weather Safety Instruction:

In order to have an effective severe weather emergency plan, you must have periodic severe weather exercises and severe weather safety training. Exercises not only teach students and school personnel the actions they need to take, they allow you to evaluate your plan's effectiveness. Did everyone hear the message? Did they understand what to do? Were they able to get to the designated areas of safety in a reasonable amount of time? It is suggested that you conduct such exercises in conjunction with a severe weather education and awareness program, so that students and teachers understand the dangers of severe weather and better comprehend the actions that they are asked to take.

The New York State Emergency Management Office (SEMO), and the Pennsylvania Emergency Management Agency (PEMA) in conjunction with the NWS, hold statewide **"Severe Weather Awareness Week"** and ***"Weather Emergency Preparedness Week"*** campaigns respectively each March. These campaigns educate the public about tornado and flood safety. State and county emergency management offices, the NWS, and the news media participate in both campaigns. This may be an opportune time for your school to conduct an exercise. Contact Dave Nicosia at NWS Binghamton at 607-770-9531 x 223 or david.nicosia@noaa.gov if you would like more information on these awareness campaigns and how your school can participate in a severe weather safety drill. In addition, we also can arrange to have a severe weather safety presentation at your school. These presentations are an excellent way to educate students and staff alike on the dangers of severe weather and are a *free* public service offered by the NWS.

It is also suggested that your school conduct an exercise each September. This will instruct new students on procedures and act as a refresher for returning students. While severe thunderstorms and tornadoes are often perceived as an uniquely ***"springtime"*** event, outbreaks of severe thunderstorms and tornadoes in October and November are not uncommon.

SECTION 3:
DESIGNING YOUR WINTER WEATHER EMERGENCY PLAN

Winter weather claims nearly 100 lives annually, more than lightning, hurricanes, or tornadoes. Winter storms are considered to be deceptive killers because most deaths are indirectly related to the storm. People die in traffic accidents on snow or ice covered roads, from hypothermia due to prolonged exposure to cold, and from heart attacks due to overexertion. About 70% of the deaths occur in motor vehicles accidents, and nearly 25% are from exposure to snow and cold. These statistics indicate the need for a winter weather preparedness plan for schools. This section provides the framework for organizing such a plan.

A. How to Get Winter Weather Information:

Unlike severe thunderstorms, winter storms are generally slow in developing, often taking one to three days to mature. This does not in any way diminish their importance, nor their potential for causing loss of life and destruction. What it does mean is that the NWS is often able to provide advance notice of winter storms, in some cases, lead times of one to two days.

As with severe weather information, the fastest, most accurate and reliable means of receiving critical weather information at your school is through a NOAA Weather Radio with a ***"tone alert"*** feature. For more information on NOAA Weather Radio, see reference Section 2.A and Appendix D.

The internet is also an excellent way to receive longer fused winter weather watches, warnings, advisories and outlooks. The following are some important recommended web sites:

http://weather.gov National Weather Service nationwide web site.

http://www.nws.noaa.gov/er/bgm National Weather Service Binghamton

In winter weather situations, listen or look for the following:

1) WINTER STORM OUTLOOK

This is a statement issued when there is a chance of a major winter storm from 2 to 4 days in the future. The purpose of the outlook is to assist people with their long range plans. However, since the outlook is issued so far in advance, the accuracy of the prediction may be limited.

2) WINTER STORM WATCH

This means that hazardous winter weather due to various elements such as heavy snow, sleet, or ice accumulation from freezing rain are a possibility, NOT a certainty. In our region, heavy snow means an average of 7 inches or more of accumulation in 12 hours or less (or 9 inches in 24 hours). A "WATCH" is a long range prediction and is typically issued 24 to 72 hours before the hazardous winter weather is expected to begin. If the storm becomes imminent, the watch will be upgraded to a "WARNING".

3) WINTER STORM WARNING for heavy snow

An average of seven inches or more of snow is expected to fall within a 12 hour period (or 9 inches in 24 hours).

4) WINTER STORM WARNING for severe icing

Heavy accumulation of ice due to freezing rain will down trees and power lines. Electricity, or telephone

communications may be out for a long period of time. Roads may become impassable for most vehicles.

5) WINTER STORM WARNING

This is issued when a dangerous combination of heavy snow, mixed with sleet and/or freezing rain, is expected to occur. In addition, winter storm warnings are issued for a combination of heavy snow, dangerously cold wind chills and/or considerable blowing and drifting snow.

6) BLIZZARD WATCH

This means that hazardous winter weather due to a combination of snow and wind are a possibility, NOT a certainty. A "WATCH" is a long range prediction and is typically issued 24 to 72 hours before the hazardous winter weather is expected to begin. If the storm becomes imminent, the watch will be upgraded to a "WARNING".

7) BLIZZARD WARNING

This is issued for a combination of strong winds averaging or frequently gusting to, or above, 35 miles an hour and very low visibility due to blowing or falling snow. These are the most dangerous winter storms and can be especially severe when combined with temperatures below 10 degrees.

8) HIGH WIND WARNING

This means the expected winds will average 40 miles an hour or more for at least 1 hour or wind gusts will be greater than 58 miles an hour. Trees and power lines can be blown down. A High Wind Warning may be preceded by a HIGH WIND WATCH if the strong winds are only a possibility and at least 12 hours away.

9) WIND CHILL WARNING

This means life threatening cold with wind chill temperatures computed to be -25 degrees or less for at least 3 hours. Exposure to this combination of strong winds and low temperatures without protective clothing will quickly lead to frostbite, hypothermia and even death.

10) WIND CHILL ADVISORY

This is issued for cold temperatures and winds, with wind chill temperatures computed to be -15 degrees or less for at least 3 hours. Exposure to this combination of strong winds and low temperatures without protective clothing can lead to frostbite, hypothermia, or even death.

11) WINTER WEATHER ADVISORY for snow

An average of four to seven inches of snow will fall within a 12 hour period.

12) WINTER WEATHER ADVISORY for freezing rain/freezing drizzle

Small accumulations of ice due to freezing rain and freezing drizzle will cause roads to become slippery creating significant inconveniences. All it takes is a small amount of ice to make roads hazardous.

13) WINTER WEATHER ADVISORY

This is issued for a combination of snow, sleet and/or freezing rain. Winter weather advisories are also issued for a hazardous combination of falling snow and/or blowing and drifting snow.

14) WIND ADVISORY

This is issued for average wind speeds between 31 and 39 miles an hour, or for frequent wind gusts between 46 and 57 miles an hour.

THERE ARE OTHER WINTER WEATHER HAZARDS UNIQUE TO SPECIFIC PORTIONS OF OUR REGION :

15) LAKE EFFECT SNOW WARNING

This is issued when snow squalls/snow showers originating from the Great Lakes are expected to accumulate an average of 7 inches or more in a 12 hour period. This is similar to a Winter Storm Warning for Heavy Snow, except Great Lakes induced squalls/showers occur in narrow bands and over limited areas. Lake effect snow squalls/showers can occur quite suddenly and cause blizzard-like conditions. A

LAKE EFFECT SNOW WATCH may precede a lake effect snow warning when the possibility of heavy lake effect snow exists and is more than 12 hours away.

16) LAKE EFFECT SNOW ADVISORY

A Lake Effect Snow Advisory is issued for Great Lakes' induced snowfall in western and central New York averaging 4 to 7 inches in a 12 hour period. Blowing and drifting snow is also common in relatively limited areas and in narrow bands.

17) SPECIAL WEATHER STATEMENT

A Special Weather Statement (SPS) is issued for short-fused hazardous winter weather situations. These could include times when snow is falling at intense rates (greater than 1 inch per hour), such as during lake effect snow storms.

THE NATIONAL WEATHER SERVICE ALSO ISSUES SHORT TERM FORECASTS WHICH PROVIDE UP-TO-THE MINUTE FORECAST INFORMATION ON ALL WINTER WEATHER:

The National Weather Service issues SHORT-TERM FORECASTS which keeps you abreast of the latest information on winter storms. The SHORT-TERM FORECAST provides you with detailed up-to-the-minute information on snow and ice storms as well as lake effect snow squalls. When conditions are changing rapidly, the SHORT-TERM FORECAST will have the most up-to-date weather forecast information.

The NOAA Weather Radio ***"tone alert"*** feature will always be used for blizzard warnings, but may or may not be used for the other warnings listed above, so do not forget to periodically monitor the NOAA Weather Radio broadcast for winter weather information which may not be tone alerted.

If your school is not in a reliable NOAA Weather Radio listening area (due to interference from mountains or other sources), reference Section 2.A for some suggested alternatives.

B. Alerting Students and Staff to Take Action:

For information on alerting students and staff to take action, reference Section 2.B.

C. Determining When to Activate Your Plan:

When deciding to activate a plan, you must use as much information as possible about the type of winter storm, the expected impact, and the time of impact on your school district.

For most winter storms, the primary decision will be whether to cancel, delay, or hold classes as usual. In ***watch*** situations, immediate action will usually not be required. When a ***warning or advisory*** is issued, however, NWS products and weather conditions should be monitored closely.

When a warning or advisory is issued, the current weather situation must be assessed. The forecast in effect, current weather conditions, and road conditions all need to be considered. One way to gauge road conditions is to find out if a snow emergency has been declared by the county EM office.

Current and forecast weather, as discussed above, can be received via NOAA Weather Radio, local television and radio stations, and cable television. Road condition information can be obtained from local law enforcement officials, city transportation officials, and the State Department of Transportation offices. Additionally, some school districts will send out ***"drivers"*** or have ***"security teams"*** to check road conditions.

D. Determining When to Cancel or Delay Classes:

You will want to consider canceling or delaying classes whenever a warning or advisory has been issued. There are two primary considerations:

1) How much time do you have before the storm impacts the area? Not only must students be transported to school safely, but also back home. If, for example, a major ice storm will hit around noon, then is it worthwhile to hold classes as scheduled, only to have to dismiss early? In such a case, not only would the buses have to run on icy roads, but some children would have to be picked up by car or walk to their home; and,

2) What kind of an impact will the storm make? A major ice storm or blizzard could make roads nearly impassable, while a snow of just a couple of inches might have only a minimal effect on transportation of students to and from school, likely causing only small delays.

In all cases, it is the ***safety*** of the students that is of paramount importance. All decisions must be based on protecting each student.

E. School Bus Actions:

All school bus drivers should be trained on how to handle winter weather conditions. Most winter storms are forecast well in advance, but there will be times when travel will be required during severe winter storms.

Heavy Snow
Heavy snow can leave roads nearly impassable, especially when combined with strong winds (i.e., blizzard conditions).

<u>School bus drivers should:</u>

- Be familiar with alternate routes.
- Stay up to date on the latest forecast.
- Maintain communication with proper school officials.

Ice Storms
Freezing rain can make travel nearly impossible. In addition, heavy accumulations of ice can bring down trees and utility lines, creating additional hazards.

<u>School bus drivers should:</u>

- Remain alert for downed trees, utility lines, and other road hazards.
- Be familiar with alternate routes.
- Stay up to date on the latest forecast.
- Maintain communication with proper school officials

Extreme Cold
Like humidity to heat, wind adds to the effects of cold. A ***"wind chill chart"*** is used to show these combined effects (Appendix E). The National Weather Service will issue a wind chill advisory (potentially dangerous if proper precautions are not observed) for ***"wind chills"*** of –15F to –24F. A wind chill warning

(unusual and significant danger) will be issued for ***"wind chills"*** of –25F and below. The wind chill is meant as a precautionary guide as to how warmly you need to dress when going outside. The goal of this precaution is to prevent frostbite and hypothermia. Wearing proper layered clothing including hats, boots, and mittens can reduce the risk substantially even at very cold wind chills. During cold wind chill days, it is not advisable to wait for the Advisory and Warning levels before employing safety precautions such as opting to keep children indoors during the school day. If children are taken outdoors, even for short periods, they should be closely monitored by adults trained to recognize early signs of frostnip, frostbite, or hypothermia. If children develop symptoms, they should be properly treated and all children brought indoors immediately. Additional information on wind chill can be found at:

http://www.nws.noaa.gov/om/windchill/index.shtml

Children awaiting the school bus in the morning, standing exposed to the cold and wind at recess or during an outdoor athletic event or practice may develop hypothermia if not properly clothed. ***School bus drivers, coaches and monitors as well as teachers should be taught to recognize symptoms of hypothermia and frostbite*** as described in Appendix C. Also detailed in Appendix C is how to treat hypothermia and frostbite.

F. Need for Winter Weather Safety Instruction:

In order to have an effective winter weather emergency plan, you must have winter weather safety training. Both school staff and students need to be educated. This education will help students and staff understand the dangers of winter weather and better comprehend the actions that should be taken. Winter weather presentations are available from NWS Binghamton (no fee). Contact Dave Nicosia at 607-770-9531 x 223 or david.nicosia@noaa.gov

APPENDIX A:
NATIONAL WEATHER SERVICE TERMS
(What to Listen For)

1. ***WARNINGS*** The hazard (tornado, flash flood, winter storm etc) is imminent. The probability of occurrence is extremely high. Warnings are issued based on eyewitness reports or clear signatures from remote sensing devices such as doppler radar and satellite. Lead-times for thunderstorm type events are generally 30 minutes or less. Lead-times for winter storms and river floods, may be 12 to 24 hours.

2. ***WATCHES*** Meteorologists have determined that conditions appear right for the development of the hazard. The probability of occurrence is greater than 40% in the watch area. Watches generally cover larger areas than warnings. In the case of thunderstorms, less than 30% of the watch area may experience the hazard. However, with larger storms, such as winter storms, the entire watch area may be affected. Severe thunderstorm and tornado watches are usually issued 1 to 3 hours before the event begins. With flash floods, lead-times may be 3 to 12 hours. For winter storm watches, lead-times are usually 24 to 72 hours.

3. ***ADVISORIES*** **-** An advisory is issued for weather that is expected to be a disruption to the normal routine and an inconvenience, but it is not expected to be life-threatening if the proper pre-cautions are taken. Advisories may be issued for wind, snow, sleet and freezing rain, among other things. Lead-times are generally 0 to 24 hours.

4. ***STATEMENTS*** **-** Statements are issued to update current weather situations or to highlight significant changes to come. Statements are also used to explain why watches, advisories, and/or warnings have been issued. Three special types of statements are;

a) **"Outlooks"** or **"Potential" Statements** - During the warm season, NWS forecast offices issue Severe Weather Outlooks when severe thunderstorms are possible within the next 24 hours. When a winter storm may develop in the next 2 to 5 days, Winter Storm Outlooks are issued. Flood potential statements may also be issued.

b) **The Daily Hazardous Weather Outlook**- issued daily by NWS Binghamton. This product highlights all the potential hazardous weather that could affect the region in the next 7 days. The content is general with references to other watch, warning, advisory and outlook products that are in effect.

c) **Special Weather Statements**- issued for hazardous weather (strong thunderstorms, localized heavy snow, heavy rain, gusty winds, fog etc).

d) **"NOWCASTS"** or **"Short Term Forecasts" -** These statements are issued for the 0-6 hour period and enhance the first period forecast. During active weather, these statements are issued as weather dictates, sometimes at only 30-minute intervals or less.

e) **Public Information Statements -** These statements provide information of special interest such as a summary of recent records set, weather safety information or special activities (weather related) that may be occurring, etc.

5. ***FORECASTS*** - general weather information provided daily.

a) 1 to 2 day forecasts are issued two times per day, roughly at 4 AM, and 4 PM. Updates to the forecast are also issued as needed. Special weather events are highlighted with headlines such as:

...severe thunderstorm watch until 10 PM...
...winter storm warning tonight for heavy snow...

b) 4 to 7 day extended forecasts are issued twice a day (around 4 AM and again near 4 PM).
c) 8 to 14 day, 30 day, and 90 day outlooks are also available.

Note: The forecast outlooks (from day 8 on) are not detailed forecasts. They state whether conditions are expected to be colder or warmer than normal and drier or wetter than normal for that period of time.

APPENDIX B:
GLOSSARY OF WEATHER TERMS

Thunderstorm Terms:

Cumulus Cloud -A cauliflower shaped cloud with a flat base and sharp edges. This cloud is a rising column of condensing air. As the cloud and cloud droplets grow in size, the base will begin to gray.

Towering Cumulus Cloud -A cumulus cloud that continues to grow so that its height is taller than, or equal to its width. It is the first stage of growth into a thunderstorm. It may produce a shower.

Thunderstorm (Cumulonimbus) -A towering cumulus cloud that has continued to grow in height and width and now lightning is occurring. The storm may extend 5 to 10 miles high into the atmosphere and 5 to 25 miles across. Heavy rain and gusty winds often accompany the storm.

Precipitation Shaft - A visible column of rain or hail falling from the base of the cloud.

Hail -Precipitation in the form of balls or clumps of ice.

Squall Line -A solid line or band of active thunderstorms.

Anvil -An extension of the upper part of the thunderstorm created by strong winds within the upper portion of the atmosphere. It usually has a smooth appearance. With long lasting thunderstorms, the anvil may spread 100 miles downwind.

Mammatus (or Mamma Cloud) -This cloud appears to be hanging, with rounded protuberances or pouches on the underside of the cloud. With thunderstorms, this cloud is usually seen under the anvil. Mammatus is associated with severe thunderstorms.

Gust Front - The leading edge of the thunderstorm's downdraft of air as it spreads out away from the storm. It is associated with gusty cool winds and often precedes the thunderstorm's rain by several minutes.

Shelf Cloud -A low-level, wedge-shaped cloud attached to the thunderstorm. It forms above the gust front, as warm air ahead of the storm rides over the cool outflow from the thunderstorm.

Roll Cloud -On rare occasions, a shelf cloud may turn into a roll cloud. The motion of the warm air riding up and over the cool air moving down and under creates a swirling of air or an eddy. The cloud takes on the shape of a horizontal tube that appears to be rolling. It is detached from the thunderstorm on its leading edge.

Rain-Free Base -The dark underside of a cloud (its base) that has no visible precipitation falling from it. This marks the updraft of a thunderstorm.

Wall Cloud -This cloud appears as an abrupt lowering of the cloud base from the relatively flat rain-free base. It is attached to a thunderstorm and may be rotating. This is the portion of the thunderstorm from which the tornado often descends.

Funnel Cloud -A funnel-shaped cloud extending from a towering cumulus or thunderstorm. It is associated with a rotating column of air that has condensed to form a cloud.

Tornado -A violently rotating column of air in contact with the ground and extending to the thunderstorm base, often seen extending from near the wall cloud. Its size may range from a few yards across to a mile wide.

Flanking Line -A line of cumulus clouds connected to and extending outward from the most active portion of a parent cumulonimbus, usually found on the southwest (right, rear) side of a storm. The cloud line has roughly a stair step appearance with the taller clouds adjacent to the parent cumulonimbus. It is most frequently associated with strong or severe thunderstorms.

Hook Echo -A radar pattern sometimes observed in the southwest (right, rear) quadrant of a tornadic thunderstorm. The rain echo forms the hook pattern as air rotates around the strong updraft. The updraft is represented by the hollow portion of the hook (looks like a backwards "J" or a 6) and is where the tornado would most likely be found (if the storm were to produce one).

Scud Cloud -Fragmented low cloud often seen in association with and behind thunderstorm gust fronts. This cloud is ragged and wind torn and is not usually attached to the thunderstorm.

Updraft -An area of warm and moist rising air. As the air rises, it condenses into a visible cumulus or cumulonimbus cloud. The updraft fuels the storm. In an ordinary thunderstorm, air rises at 40 mph and in a severe thunderstorm, speeds may reach over 100 mph.

Downdraft -A column of cool air that sinks toward the ground. It is most often accompanied by rain.

Downburst -A sudden rush of cool air toward ground that can impact with speeds over 70 mph and produce damage similar to that of a tornado. It usually occurs near the leading edge of the storm and may occur in heavy rain.

Microburst -A small downburst affecting an area less than 2.5 km (approximately 1.5 mi) in diameter.

Macroburst -A downburst effecting an area greater than 2.5 km (approximately 1.5 mi) in diameter.

Severe Thunderstorm -A thunderstorm producing damaging winds or winds greater than 58 mph and/or hail three-quarters of an inch or greater in diameter.

Flood Terms:

Flash Flood -A flood that occurs suddenly during or shortly following heavy rain or from a sudden release of water as in a dam break. Small streams and creeks usually react the fastest to heavy rain and rise several feet in hours or even minutes.

River Flood -A flood on a large river such as the Susquehanna River, which takes a tremendous amount of rain and usually develops over a period of one to two days. Rainwater first runs into the small streams, which flow into the larger branches, which then flow into the main stem of the river.

Urban Flood -Flooding due to rapid runoff of rain off of pavement (rain can't soak into the ground so it runs downhill) and poor drainage areas, which can be deadly.

Bankfull -The maximum height of the river before it overflows its banks.

Flood Stage -The stage of the river at which property damage begins to occur. Flood stage often differs from bankfull. The river may overflow its banks into a flood plain without reaching flood stage.

Flood Crest -The highest stage that a river reaches during a flood event.

Winter Weather Terms:

Snow -A prediction of snow indicates a steady fall of snow for several hours or more. It may be modified by terms such as "light," "intermittent," or "occasional" to indicate lesser intensity or periodic snow.

Snow Flurries - Light snow falling for short durations, producing no accumulation to a dusting.

Snow Showers -Snow falling at varying intensities for brief time periods. Some accumulation is possible.

Snow Squalls -Brief, intense snow showers, accompanied by strong, gusty winds. Accumulations may be significant.

Drifting Snow -Falling snow or loose snow on the ground, being blown into mounds, causing uneven snow depths. The wind carries the snow near the ground, causing little or no restriction to visibility.

Blowing Snow -Wind-driven snow that causes reduced visibility and sometimes significant drifting. Blowing snow may be snow that is falling or snow that was once loose on the ground and has been picked up by the wind.

Heavy Snow -Snow accumulating 7 inches or more in 12 hours or less or 9 inches in 24 hours or less.

Lake Effect Snow -Snow, often heavy, produced by cold air moving across the warmer waters of the Great Lakes.

Blizzard -Sustained winds or frequent wind gusts of 35 mph or more, considerable snow or blowing snow (visibility less than 1/4 of a mile), and usually cold temperatures (generally below 20F).

Sleet -Ice pellets or granules of frozen rain. Sleet occurs when rain falls into a layer of air with temperatures below freezing. Sleet usually bounces when hitting a surface and does not stick, but can accumulate on roadways, creating a hazard to motorists.

Freezing Rain -Rain that falls onto a surface with a temperature at or below freezing, causing it to freeze to the surface, forming a coating of ice or glaze.

Freezing Drizzle -Drizzle that falls onto a surface with a temperature at or below freezing, causing it to freeze to the surface, forming a thin coating of ice or rime. Drizzle is a very light precipitation with little accumulation, but even a small amount of ice can cause a problem.

Ice Storm -A significant and sometimes damaging accumulation of ice due to freezing rain. Significant ice accumulations are usually accumulations of 0.50 inches or greater.

Wind Chill (Wind chill factor) -Is based on the rate of heat loss from exposed skin, caused by the combined effects of wind and cold. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the body temperature.

Freeze -Used when temperatures at or near the surface (ground) are expected to be 32F or below. A freeze may or may not be accompanied by frost.

Frost -The formation of ice crystals in the forms of scales, needles, feathers, or fans, which develop under conditions similar to dew, except that the minimum temperature has dropped to 32F or colder.

Hypothermia -When the body temperature drops below 95F.

Frostbite -Damage to body tissue caused by that tissue being frozen.

APPENDIX C:
GENERAL SEVERE WEATHER SAFETY

TORNADOES AND SEVERE (DAMAGING) WINDS

The greatest danger is from flying debris (airborne missiles) and the collapse of a building's roof and/or wall structure. The following actions are designed for protection from these dangers.

In a building (home, school, etc.):

I. Move to a pre-designated shelter such as a basement.
II. If an underground shelter is not available, move to an interior room or hallway on the lowest floor - stay away from windows.
III. If at all possible, get under something, such as a table, and place something over your head like a blanket or a coat.

In a mobile home or other temporary shelter:

I. If possible, move to a pre-designated safe shelter.
II. If no shelter is accessible, abandon mobile home immediately and get into a low area, preferably a ditch or ravine if nearby, and lie flat.

In a vehicle (car, bus, truck, etc.):

I. If possible, get into a well-constructed building.
II. Otherwise, abandon vehicle immediately and seek shelter in a low area, preferably a ditch or ravine if nearby, and lie flat.
III. Do not try to outrun a tornado in your vehicle.

On foot with no well constructed shelter nearby:

I. Seek shelter in a low area, preferably a ditch or ravine if nearby, and lie flat.

After the storm (if a tornado has damaged your residence):

I. Turn off gas at the main switch to your home or building.
II. If live electrical wires are down, turn off power at the main switch.
III. Instruct people not to touch loose electrical wires or broken utility lines.
IV. Do not touch electrical equipment in wet areas until it has been dried and tested.
V. Food, clothing, shelter, and first aid will be available at Red Cross shelters.

HAIL

The greatest danger comes from the high velocities with which large hail can impact a surface (speeds greater than 100 mph).

I. Seek inside shelter.
II. Stay away from skylights and windows.

One final consideration is that large hail is a sign that this is a powerful and potentially dangerous storm. Hail often falls from the same area of a thunderstorm where a tornado is found. Large hail does not always imply a tornado, but if a tornado is associated with that storm and you are currently experiencing hail, then you may be very close to the tornado.

LIGHTNING

All thunderstorms produce lightning, by definition. If you can hear thunder, you are close enough to the storm to be struck. It need not be raining! Lightning can strike 10 to 15 miles away from the rain portion of the storm! These lightning strikes come out of the upper portions of the thunderstorm cloud which extends 5 to 10 miles into the atmosphere. In general, lightning will travel the easiest route from the cloud to the ground which means that it often strikes the highest object. Therefore, a simple rule is ***do not make yourself the tallest object or stand near the tallest object in your immediate area***. When lightning strikes, the current will travel through the object, along the ground, along wire, metal, and water. Most lightning related injuries occur in this manner.

If inside:

- Avoid using the telephone, except for emergencies.
- Stay away from other electrical appliances (televisions, hair dryers etc.).

If outside:

- Get inside a home or building.
- If a building is not available, get inside a car (hardtop) and keep the windows rolled up.

If inside shelter is not available:

Do not stand underneath a natural lightning rod such as a tall, isolated tree.

- Avoid projecting above the surrounding landscape as you would do if you were standing on a hilltop, in an open field, on the beach or in a small boat.
- Get out of and away from open water.
- Get away from tractors and other metal farm equipment.
- Get off and away from motorcycles, golf carts, and bicycles.
- Put down golf clubs and baseball bats.
- Stay away from wire fences, clotheslines, metal pipes, rails, and other metallic paths which could carry lightning to you from some distance away.
- Avoid standing in small isolated sheds or other small structures in open areas.
- In a forest, seek shelter in a low area under a thick growth of small trees. In open areas, go to a low place such as a ravine or valley.
- If in a group of people, spread out, keeping several yards apart from each other.

If you feel your hair stand on end, you are in immediate danger of being struck - Unless you can instantly jump inside a shelter, drop to a crouching position bending forward and keeping your feet close together with your hands on your knees. The object is to be as low to the ground as possible and yet have as little of your body surface as possible touching the ground.

First Aid:

- If a person is struck by lightning, check to see if that person is breathing. If not, begin mouth-to-mouth resuscitation. Administer one breath every five seconds to adults and every three seconds to small children.
- If the victim is not breathing and has no pulse, cardiopulmonary resuscitation is necessary. This is a combination of mouth-to-mouth resuscitation and external cardiac compression. It should be administered by a person with proper training.
- Lightning often has a paralyzing effect that is temporary. Even though a person appears dead, they may be resuscitated. Victims may experience temporary paralysis of legs, be stunned, be disoriented or have burns on their body. Give first aid for shock and stay with the victim until help arrives.

After the storm:

- Instruct people not to touch loose electrical wires or broken utility lines.
- Do not touch electrical equipment in wet areas until it has been dried and tested.

FLOODING

Flash floods are the most dangerous. A flash flood is a rapid rise of flood waters, allowing little time for action. Flash floods can move at tremendous speeds, tearing out trees and moving boulders. This debris can move with the flood wave and sometimes destroys buildings and bridges in its path. Debris may cause a temporary dam and when broken, a wall of water moves downstream. Almost half of all flood deaths occur in automobiles. Water depths can be very deceptive, the road beneath may even be undermined. The force of flowing water on a vehicle is very powerful and a foot of water may be all it takes to drag a car into deeper water or flip it over. Many cars stall once entering the water. Electrical systems in the car may fail causing electrical windows and doors to not operate, trapping the victim inside as water continues to rise.

When a flood warning is issued or the moment you first realize that a flash flood is coming, act quickly to save yourself. You may only have seconds.

Get out of areas subject to flooding:

- Stay away from streams, creeks, and low areas.
- In urban areas, stay away from underpasses.

Do not attempt to cross flooded areas in a car or truck:

- If the vehicle stalls, abandon it immediately and seek higher ground.

After the storm (If a flood has struck your neighborhood):

- Turn off gas at the main switch to your building.
- If live electrical wires are down, turn off power at the main switch.
- Instruct people not to touch loose electrical wires or broken utility lines.
- Do not touch electrical equipment in wet areas until it has been dried and tested.
- Do not touch fresh food that has come in contact with flood waters.
- Boil drinking water before using until water has been tested for purity.
- Food, clothing, shelter, and first aid will be available at Red Cross shelters.

WINTER STORMS

The most severe winter storm is generally considered to be a blizzard (strong winds and blinding snow), but any heavy snow or ice storm can become life threatening. Most winter storm related deaths (about 70%) occur in motor vehicles. Some occur from exposure to cold (see extreme cold section), heart attacks from overexertion, fires from improper use of heaters, and other types of accidents.

Be prepared for the storm before it strikes!!!

At home, work, and school have available:

- Flashlight and extra batteries
- Battery powered NOAA Weather Radio and a portable radio
- Extra food and water
- First Aid supplies and extra medicine
- Emergency heating source (fireplace, wood stove, space heater, etc.)
- Matches and candles
- A supply of baby items such as formula and diapers.

In cars and trucks have available:

- A winter storm survival kit: blankets/sleeping bags; flashlight with extra batteries; first-aid kit; knife; high calorie, non-perishable food; extra clothing; a large empty can and plastic cover with tissues and paper towels for sanitary purposes; a smaller can and water; matches and candles to melt snow for drinking water; shovel; windshield scraper; tool kit; tow rope; booster cables; water container; compass; and road maps.
- Keep your gas tank near full to avoid ice in the tank and fuel lines.
- Try not to travel alone.
- Let someone know your timetable and primary and alternate routes.

Maintain a weather watch:

- Listen to NOAA Weather Radio, local radio or television or cable television for the latest winter storm watches, warnings, and advisories.

When caught in a winter storm:

If outside:

- Find shelter.
- If no shelter is available, prepare a lean-to, windbreak or snow cave for protection.
- Try to stay dry.
- Cover all exposed parts of the body.
- If possible, build a fire for heat and to attract attention.
- Exercise from time to time by vigorously moving arms, legs, fingers, and toes to keep blood circulating and to keep warm.
- Do not eat snow - melt it into water.

If in a car or truck:

- Stay in your vehicle unless shelter can be seen just yards away - Disorientation occurs quickly in wind-driven snow and cold.
- Run the motor about 10 minutes each hour for heat.
- Make sure the exhaust pipe is not blocked.
- Keep a window cracked to avoid carbon monoxide poisoning.
- Make yourself visible to rescuers.
- Turn on the dome light at night when running the engine.
- Tie a colored cloth (preferably red) to your antenna or door.
- Raise the hood indicating trouble after snow stops falling.
- Exercise from time to time by vigorously moving arms, legs, fingers, and toes to keep blood circulating and to keep warm.

At home or in a building:

- Stay inside.
- When using an alternative heat source, use fire safeguards and properly ventilate.

If no heat:

- Close off unneeded rooms.
- Stuff towels or rags into cracks under doors.
- Cover windows at night.
- Wear layers of loose-fitting, lightweight clothing.

EXTREME COLD

The people most often affected by the cold are elderly people and infants. However, if proper precautions are not taken, anyone can find themselves suffering from hypothermia or frostbite.

The wind chill is based on the rate of heat loss from exposed skin caused by the combined effects of wind and cold. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the body temperature.

Hypothermia occurs when the body temperature drops. Warning signs are: uncontrollable shivering; loss of memory; disorientation; incoherence; slurred speech; drowsiness; and apparent exhaustion. If a person's body temperature drops below 95 F, seek medical help immediately.

If unable to get medical help:

- Warm the person slowly.
- Warm the body core first. Do not warm extremities first as this drives the cold blood toward the heart and can lead to heart failure
- Get the person into dry clothing and wrapped in a warm blanket, covering the head and neck.
- ***Do not*** give the person alcohol, drugs, coffee, or any hot beverage or food. Warm soup is best.

Frostbite is when the body tissue freezes, damaging the tissue. Frostbite causes a loss of feeling and a white or pale appearance in extremities, such as cheeks, fingers, toes, ear lobes, or the tip of the nose. If symptoms are detected, get medical help immediately!!! If you must wait for help, slowly warm affected areas.

To prevent hypothermia and frost bite:

- Stay inside during extreme cold spells or heavy snowstorms.
- If you must go out, dress appropriately. Wear loose-fitting, lightweight, warm clothing in several layers.
- Avoid overexertion - the strain from the cold and hard labor may lead to a heart attack and sweating can lead to a chill and hypothermia.

Other clothing tips:

- Outer garments should be tightly woven, water repellent, and hooded.
- Wear a hat - over half of your body heat loss can be from your head.
- Cover your mouth (using a scarf, etc.) to protect your lungs from the extreme cold.
- Mittens, snug at the wrist, are better than gloves for protecting the hands.

EXTREME HEAT

Heat kills by taxing the human body beyond its abilities. In the disastrous heat wave of 1980, more than 1,250 people died. On hot days (temperature above 90 F), when the relative humidity is high, evaporation is retarded. The body attempts to do everything it can to maintain a constant 98.6 F.

Heat disorders generally have to do with either a reduction or collapse in the body's ability to shed heat by circulatory changes and sweating, or a chemical (salt) imbalance caused by too much sweating. When heat gain exceeds the level the body can remove, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise and heat-related illness may develop.

Other factors:

- Cities can add to the hazard. Stagnant air conditions trap pollutants in urban areas and add the stress of severe pollution to the already dangerous stresses of hot weather.
- Sunburn can significantly retard the skin's ability to shed excess heat. People on certain medications or drugs (such as tranquilizers and anticholinergics) and people overweight or with an alcohol problem are particularly susceptible.

Actions to prevent heat disorders:

- Drink plenty of water
- Slow down - reduce, reschedule, or eliminate strenuous activity.
- Dress for the heat - Wear lightweight, light-colored clothing.
- Do not get too much sun.

The Heat Index combines the effects of high temperature and relative humidity. Exposure to full sun can increase these values by up to 15F. When the NWS is expecting the heat index to reach 105F, a ***Heat Advisory*** will be headlined in the forecast. When the heat index is expected to equal or exceed 115F, an ***Excessive Heat Warning*** will be issued. Possible problems begin to occur when the Heat Index goes above 105F. Some heat disorders include heat cramps and heat exhaustion. Heatstroke is possible with prolonged exposure and/or physical activity.

First Aid:

1) **Heat Cramps** are painful spasms of the muscles, usually in the legs or abdomen.

Actions:

- Use firm pressure on cramping muscles, or gentle massage to relieve spasm.
- Give sips of water unless nausea occurs.

2) **Heat Exhaustion** symptoms include heavy sweating; weakness; cold, pale, and clammy skin, and/or thready pulse. Fainting or vomiting may occur.

Actions:

- Get the victim out of the sun **immediately!!!**
- Lay them down and loosen clothing.
- Apply cool wet cloths.
- Give sips of water unless nausea occurs.
- If vomiting continues, seek immediate medical attention.

3) **Heat Stroke** (sunstroke) is when the body temperature reaches 106F. Symptoms are hot, dry skin and a rapid and strong pulse. The victim may become unconscious.

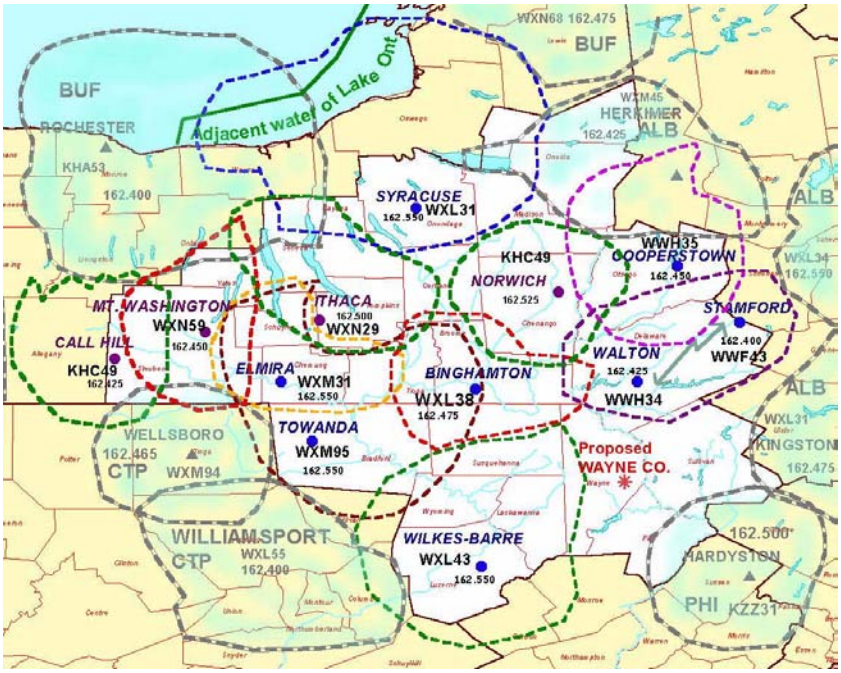
Actions:

- Heat stroke is a severe medical emergency; summon medical help immediately or take to a hospital.
- While awaiting medical help, move the victim to a cooler environment.
- Reduce the body temperature with a cold bath or sponging.
- Do not give fluids.

APPENDIX D:
NOAA WEATHER RADIO STATIONS

Location	Station	Frequency
Binghamton	WXL-38	162.475 Mhz
Syracuse	WXL-31	162.550 Mhz
Scranton	WXL-43	162.550 Mhz
Elmira	WXM-31	162.400 Mhz
Towanda	WXM-95	162.550 Mhz
Cooperstown	WWH-35	162.450 Mhz
Walton	WWH-34	162.425 Mhz
Stamford	WWF-43	162.400 Mhz
Call Hill (Steuben Co)	WXN-29	162.425 Mhz
Mt Washington, Bath	WXN-55	162.450 Mhz
Ithaca	WXN-59	162.500 Mhz
Norwich	KHC-49	162.525 Mhz

Note: NOAA Weather Radio consoles have been equipped with Specific Area Message Encoder (SAME) units. The SAME unit sends out a signal which will alarm only designated counties instead of the entire broadcast area. In order to receive the signal, a ***special*** NOAA Weather Radio receiver must be used.



WIND CHILL AND HEAT INDEX CHARTS
APPENDIX E:

Wind Chill Chart

Wind (mph)	Temperature (°F)																	
Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Heat Index Chart

Relative Humidity (%)

Air Temperature

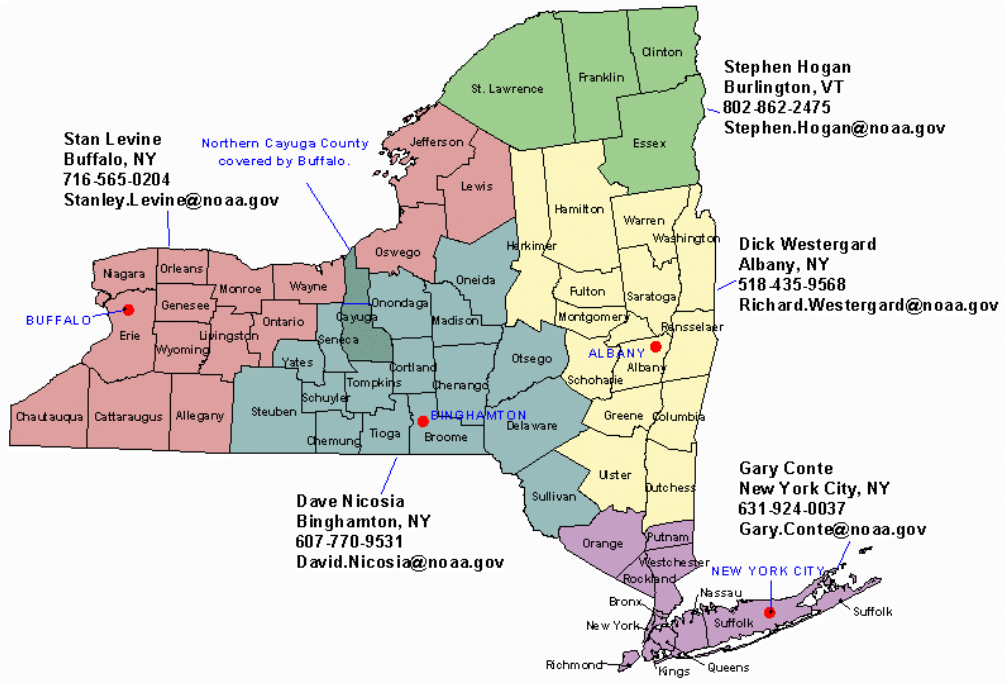
°F	40	45	50	55	60	65	70	75	80	85	90	95	100
110	136												
108	130	137											
106	124	130	137										
104	119	124	131	137									
102	114	119	124	130	137								
100	109	114	118	124	129	136							
98	105	109	113	117	123	128	134						
96	101	104	108	112	116	121	126	132					
94	97	100	103	106	110	114	119	124	129	135			
92	94	96	99	101	105	108	112	116	121	126	131		
90	91	93	95	97	100	103	106	109	113	117	122	127	132
88	88	89	91	93	95	98	100	103	106	110	113	117	121
86	85	87	88	89	91	93	95	97	100	102	105	108	112
84	83	84	85	86	88	89	90	92	94	96	98	100	103
82	81	82	83	84	84	85	86	88	89	90	91	93	95
80	80	80	81	81	82	82	83	84	84	85	86	86	87

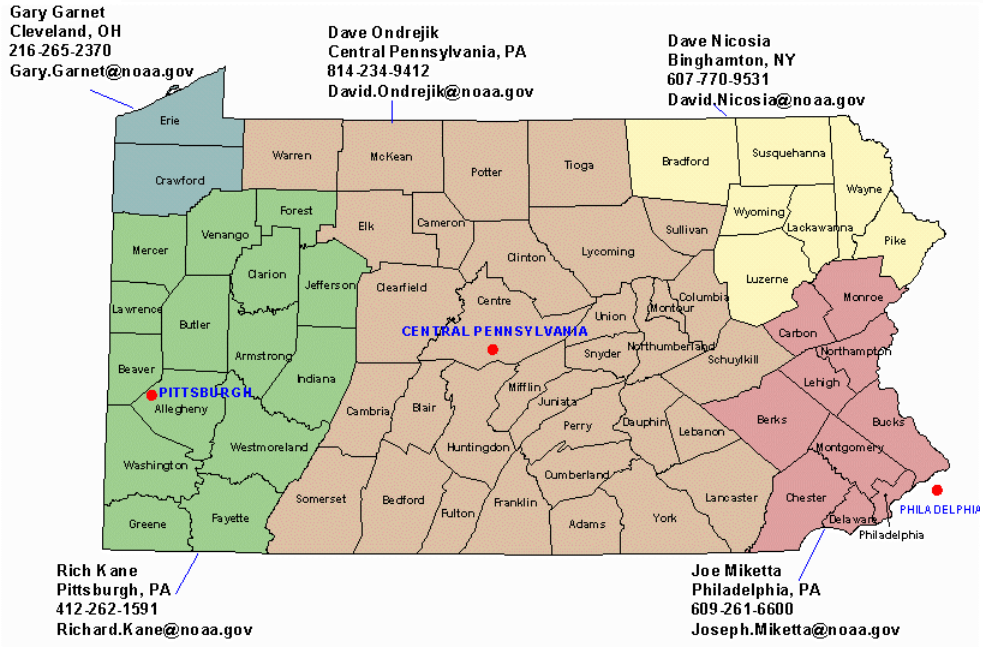
Heat Index (Apparent Temperature)

With Prolonged Exposure and/or Physical Activity

Extreme Danger	Heat stroke or sunstroke highly likely
Danger	Sunstroke, muscle cramps, and/or heat exhaustion likely
Extreme Caution	Sunstroke, muscle cramps, and/or heat exhaustion possible
Caution	Fatigue possible

NATIONAL WEATHER SERVICE CONTACTS
APPENDIX F:





APPENDIX G:
EMERGENCY ALERT SYSTEM

On January 1, 1997, the familiar tone and message that signaled the activation of the Emergency Broadcast System was replaced with the Emergency Alert System or EAS. EAS uses digital encoded signaling to quickly inform the public of the who, what, when and where of an emergency message. EAS allows emergency managers to deliver messages faster, more reliably and with greater geographic accuracy.

This digital system works with both new and established communications technologies, including broadcast and cable systems, to make the disaster warning system more effective. In addition to the digital system, which is computer and pager compatible, EAS offers a shortened alert tone (eight second minimum), automated and remote-control operations (including capability to turn on specially-equipped radios and televisions), and provisions for hearing and visually impaired persons. This alerting system is a powerful tool for emergency managers. It allows them to immediately notify the public of dangerous situations.

Listen to your local radio, television or cable station for weather alerts or Emergency Alert System messages. See table below to find your local EAS radio station(s).

County	Local Primary Stations	Frequency
Broome and Tioga	WHWK FM WAAL FM	FM 98.1 FM 99.1
Chenango	WCHN WKXZ	AM 970 FM 93.9
Delaware	WDLA AM/FM	AM 1270, FM 92.1
Cortland	WKRT/AM	AM 920
Tompkins	WHCU/AM	AM 870
Steuben	WVIN/FM- WABH/AM	FM 98.3 AM 1380
Yates	WHAM/AM	AM 1180
Schuyler and Chemung	WENY	AM 1230 FM 92.7
Seneca	WSFW/AM	AM 1110
Cayuga and Onondaga	WSYR/AM	AM 570
Madison	WIBX/AM WFRG/FM WSYR/AM	AM 950 FM 104.3 AM 570
Oneida	WIBX/AM WFRG/FM	AM 950 FM 104.3
Otsego	WDOS AM	AM 730
Sullivan	WVOS AM/FM WSRK	AM 1240, FM 95.9 FM 103.9
Bradford, Wayne, Wyoming, Lackawanna, and Pike	WARM/AM WMGS-FM	AM 590 FM 92.9
Susquehanna	WPEL AM/FM WARM/AM WMGS-FM	AM 1250, FM 96.5 AM 590 FM 92.9
Luzerne	WILK/AM	AM 980

APPENDIX H:
EMERGENCY MANAGEMENT CONTACTS
New York State

Broome County
Director: Mike Aswad
Public Safety Facility
897 Upper Front Street
Binghamton, NY 13905
607-778-1208

Cayuga County
Director: Pat Dinono
County Office Building
160 Genesee Street
Auburn, NY 13012
315-255-1161

Chemung County
Director: Mike Smith
406 E. Church Street
Elmira, NY 14902
607-737-2096

Chenango County
Director:
Sheriff's Building
14 West Park Place
Norwich, NY 13815
607-334-3728

Cortland County
Dir: Brenda DeRusso
Public Safety Building
Room 201A & 201B
52 Greenbush Ave
PO Box 5590
Cortland, NY 13045-5590
607-753-5065

Delaware County
Director: Nelson Delameter
Box 85D, Route 1
Hamden, NY 13782-9756
607-865-7736

Madison County
Dir: Joe DeFrancisco
Public Safety Building
North Court Street
Wampsville, NY 13163
315-366-2258

Oneida County
Dir: Fred VanNamee
County Office Building
800 Park Avenue
Utica, NY 13501
315-798-5604

Onondaga County
Director: Peter Alberti
J.H. Mulroy Civic Center
421 Montgomery Street
Syracuse, NY 13202
315-435-2525

Otsego County
Director: Lyle Jones
County Office Building
197 Main Street
Cooperstown, NY 13326
607-547-4227

Schulyer County
Director: Bill Randolph
County Jail Building
106 Tenth Street
Watkins Glen, NY 14891
607-535-8200

Seneca County
Director: Chuck McCann
1 PiPronio Drive
Waterloo, NY 13165
315-539-1756

Steuben County
Director: Mike Sprague
3 East Pulteney Square
Bath, NY 14810
607-776-4099

Sullivan County
Dir: Harold Kronenberg
County Emer Control
Sullivan County Airport
PO Box 109
White Lake, NY 12786
914-583-7127

Tioga County
Director: Dick LeCount
130 Corporate Street
Owego, NY 13827
607-687-2023

Tompkins County
Director: John Miller
Tompkins County Arpt
72 Brown Road
Ithaca, NY 14850
607-257-3888

Yates County
Director: Glen Miller
County Office Building
110 Court Street
Penn Yan, NY 14527
315-536-3000

Pennsylvania Emergency Managers

Bradford County
James Vayda, Coordinator
RD 1, Box 179-C
Towanda, PA 18848
570-265-5022

Lackawanna County
Robert Flanagan, Coordinator
200 Adams Ave.
Scranton, PA 18503
(570) 961-5511

Al Bardar, Coordinator
Luzerne County Emerg. Mgmt. Agency
200 N. River St.
Wilkes-Barre, PA 18711-1001
(570) 820-4400

Roger Maltby, Coordinator
Pike County Civil Defense
506 Broad St.
Milford, PA 18337
(570) 296-6714

Dawn Watson, Coordinator
Susquehanna County Emerg. Mgmt. Agency
31 Public Avenue
Montrose, PA 18801
(570) 278-4600 x250

Glen E. Gunuskey, Coordinator
Wayne County Emerg. Mgmt. Agency
925 Court Street
Honesdale, PA 18431-1996
(570) 253-1622/1632

Martha Decker, Coordinator
Wyoming County EM Agency
1 Courthouse Square
Tunkhannock, PA 18657
(570) 836-2828