



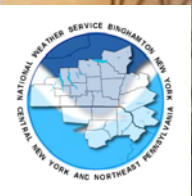
National Weather Service Binghamton

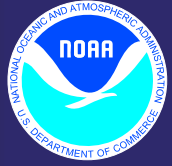


Winter SKYWARN Presentation



**National Weather Service
Binghamton NY Forecast Office**

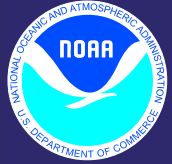




National Weather Service

Working Together to Save Lives





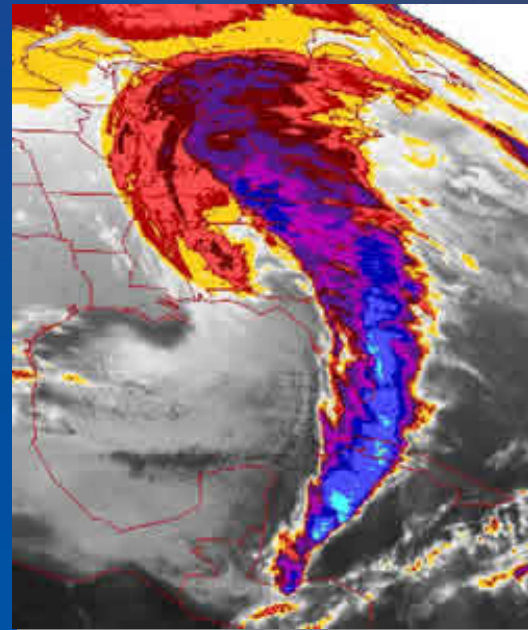
Forecasting Hazardous Weather

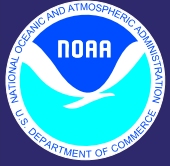


- An important job tied to public safety!!
- Issue warnings to alert public of severe weather, floods, blizzards, ice storms, high winds, hurricanes and coastal storms.



Mill Stream in Hawley below Lake Wallenpaupack Dam





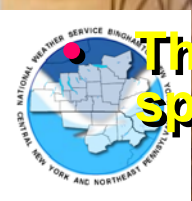
How do Weather Spotters help the NWS?

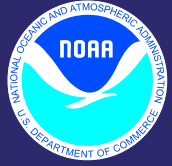


- Real time reports **assist** the National Weather Service in our warning decisions.
- Helps forecasters **gauge** how severe a storm is.
- Your information may be the reason a warning is issued, and/or provides **credibility** to a warning.
- You could help provide the citizens of your community with potentially **life-saving** information.
- SKYWARN provides a backbone of emergency communications.



The trained eye of the storm spotter is still our greatest asset!



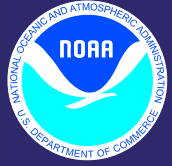


Winter Storms



The Deceptive Killers



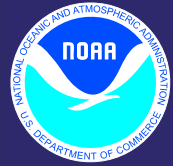


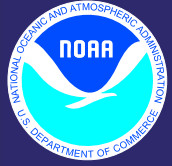
Winter Storms Can Kill!!

- **Related to ice and snow:**
 - *About 70% occur in automobiles.*
 - *About 25% are people caught out in the storm.*
 - *Majority are males over 40 years old.*
- **Related to exposure to cold:**
 - *50% are people over 60 years old.*
 - *Over 75% are males.*
 - *About 20% occur in the home.*

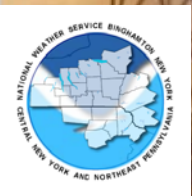


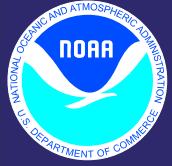
Increased Frequency of Accidents: Number 1 Cause of Death and Injury





Motorists typically unprepared for sudden changes in road conditions and visibility





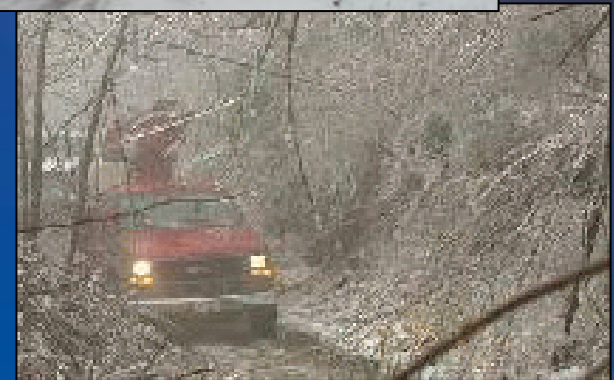
Winter Hazards



- Heavy Snow
- Ice
- Cold Outbreaks
- Wind
- Flooding



Great Falls – Photo by N3PRZ



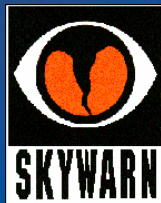
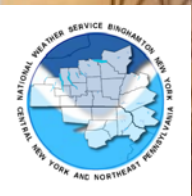
February 1998

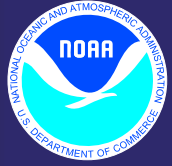


Point of Rocks 1996



March 1962





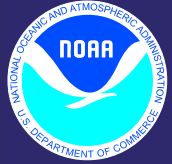
Hazardous Weather Outlook



- **1 to 7 Day Outlook**
- **Text Product**
- **Includes potential for Skywarn Activation**
- **Issued daily at 5 am and 11 am and updated as needed**

For more information and updates go to <http://weather.gov/bgm>





Go to <http://weather.gov/bgm>



ZCZC ALBHWOBGM
FLUS41 KBGM 120954
HAZARDOUS WEATHER OUTLOOK
NATIONAL WEATHER SERVICE BINGHAMTON NY
444 AM EST FRI DEC 12 2003

NYZ009-018-036-037-121141-
MADISON NY-NORTHERN ONEIDA NY-ONONDAGA NY-SOUTHERN ONEIDA NY-
444 AM EST FRI DEC 12 2003

THIS HAZARDOUS WEATHER OUTLOOK IS FOR CENTRAL NEW YORK AND NORTHEAST PENNSYLVANIA.

.DAY ONE...TODAY...

LAKE EFFECT SNOW SHOWERS AND SQUALLS WILL PREVAIL THROUGH MUCH OF TONIGHT. EXPECT A GENERAL 3 TO 8 INCH SNOWFALL ACROSS THE REGION BY DAYBREAK SATURDAY. FOR FURTHER DETAILS...PLEASE REFER TO THE LATEST VERSION OF THE PRODUCT ALBWSWOBGM.

.DAYS TWO THROUGH SEVEN...

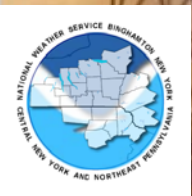
A SIGNIFICANT SNOWFALL EVENT FROM A STORM MOVING UP THE EAST COAST IS POSSIBLE FROM SUNDAY INTO EARLY MONDAY. FOR MORE DETAILS...PLEASE REFER TO THE LATEST VERSION OF THE PRODUCT ALBSPSBGM.

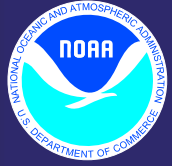
ANOTHER STORM SYSTEM COULD BRING MORE SNOW...OR A MIXED BAG OF PRECIPITATION FROM WEDNESDAY INTO THURSDAY. MUCH UNCERTAINTY EXISTS AT THIS TIME RANGE.

.SPOTTER CALL TO ACTION STATEMENT...

FORMAL SKYWARN ACTIVATION IS NOT ANTICIPATED TODAY OR TONIGHT. HOWEVER...SNOW SPOTTERS ARE ENCOURAGED TO CALL IN THEIR REPORTS TO THE NATIONAL WEATHER SERVICE IN BINGHAMTON.

\$\$





Winter Storm Outlook

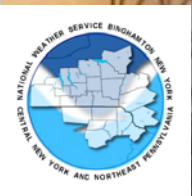


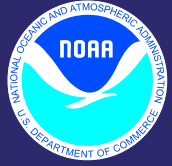
A Winter Storm Outlook is issued when there is the potential (30% chance or more) of a winter storm within the next several days. It is used to alert the public of the potential and allow for some early planning and preparations.



NWS will issue a Winter Storm Outlook 2 to 5 days prior to the event.

For more information and updates go to <http://weather.gov/bgm>





Winter Storm Watch



A Winter Storm Watch is issued when there is the potential (50% chance or more) for a winter storm. A winter storm watch is used to cover all of the potential hazards from snow to ice to wind and extreme cold.

Potential exists for 7 inches of snow or more in 12 hours

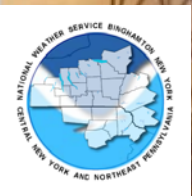
Potential exists for ½ inch or more of ice

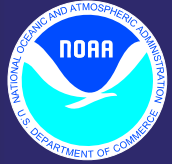
NWS will issue a Winter Storm Watch 24 to 60 hours in advance of the event.



Photo by K3CSX

For more information and updates go to <http://weather.gov/bgm>





Winter Weather Advisory



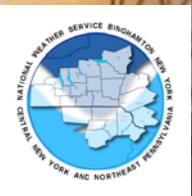
A Winter Weather Advisory is issued when snow, sleet, and/or freezing rain are expected to produce conditions which are a nuisance, but not life threatening.

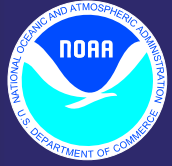


NWS Binghamton issues Winter Weather Advisories for four inches of snow and/or sleet or any accumulation of ice from freezing rain or drizzle.

A Winter Weather Advisory is issued 0 to 24 hours prior to the event.

For more information and updates go to <http://weather.gov/bgm>





Winter Storm Warning



A Winter Storm Warning is issued when a winter storm (meeting the NWS criteria listed before) has a high probability of occurrence (80% or more), is already occurring or is imminent.

7 inches of snow or more expected in 12 hours

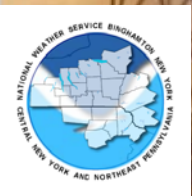
1/2 inch or more of ice expected.

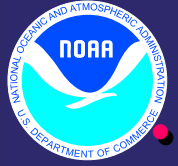
NWS issues a Winter Storm Warning 0 to 24 hours in advance of the event.



Photo by N3PRZ

For more information and updates go to <http://weather.gov/bgm>





Definitions



Blizzard Warning:

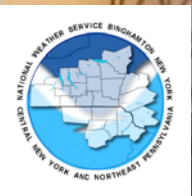
- *Heavy snow, high winds, huge drifts, prolonged white-out conditions*
- *Most Dangerous and Life-threatening winter storm!!*

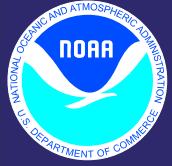
Winter Storm Warnings:

- *More than 6 inches/12 hours: **Heavy Snow Warning** or **Lake Effect Snow Warning***
- *1/2 inch or more of ice: **Ice Storm Warning***
- *Dangerous combination of snow, ice, low wind chill, and/or blowing/drifting snow. **Generic Winter Storm Warning***

Winter Weather Advisories:

- *4 to 6 inches/12 hours: **Snow or Lake Effect Snow Advisory***
- *Any accumulation of ice: **Freezing Rain Advisory***
- *Hazardous combination of snow, ice, low wind chill, and/or blowing/drifting snow. **Generic Winter Weather Advisory***

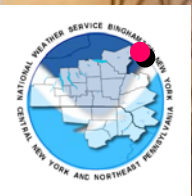




More Definitions



- **Heavy Snow:** more than 6 inches/12 hours.
- **Blizzard:** the most severe winter storm. Wind or wind gusts exceeding 35 mph for 3 hours or more combined with blowing and/or falling snow. Visibilities near zero. Widespread whiteout conditions.
- Blizzards are a serious life-threatening weather hazard!!!!
- **Snow Squall:** intense periods of snow with near blizzard or blizzard conditions at times.
- **Snow Shower:** intermittent accumulating snow
- **Snow Flurries:** very light snow with little or no accumulation.

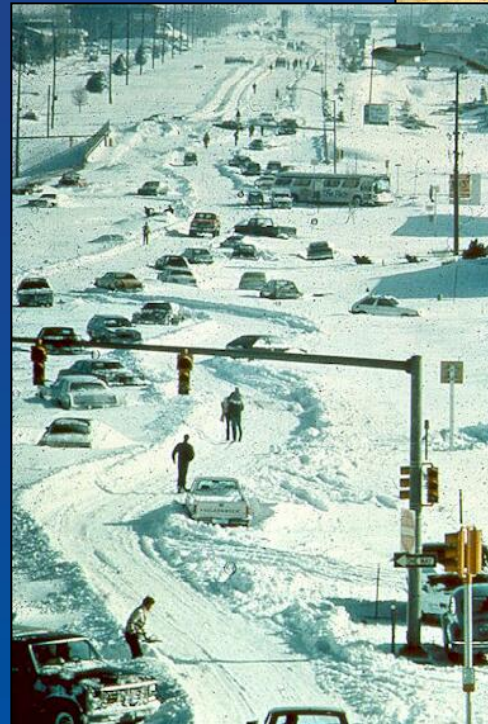
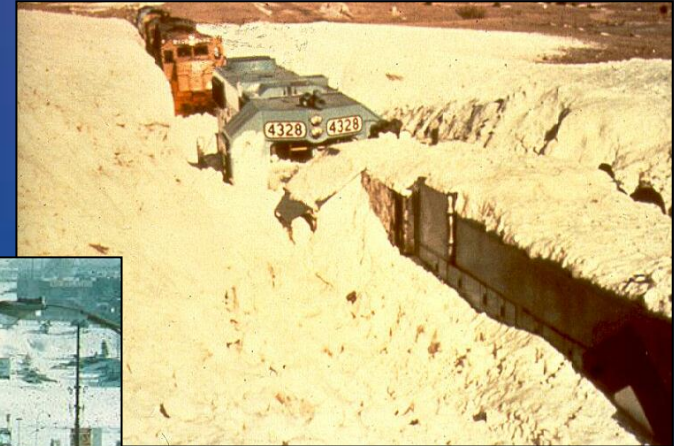




Heavy Snow Impacts

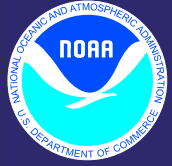


- **Disrupts Transportation**



Silver Spring, January 2000





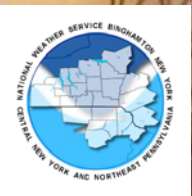
Heavy Snow Impacts



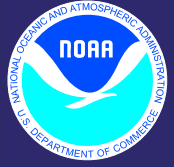
- **Traffic Accidents**
 - *Driving too fast for conditions*
 - *Suddenly driving into it*
 - **125 cars on I-95 in January 2001 when vehicles hit blinding snow at 45 mph**
 - **Hitting a snow drift at speed**
 - **Hitting a snow patch at speed**



Beltway - 1996



SKYWARN



Heavy Snow Impacts

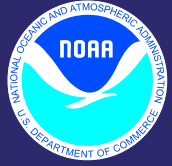


- Closes Schools and Businesses

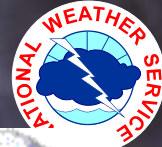


Bethesda- photo by N3PRZ



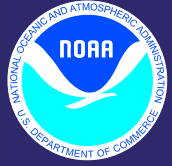


Heavy Snow Impacts

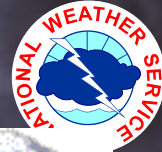


- **Cost of Plowing and Snow Removal**



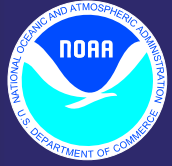


Heavy Snow Impacts



- **Weight of heavy snow can cause roof collapse**
- **Break tree limbs and utility lines**

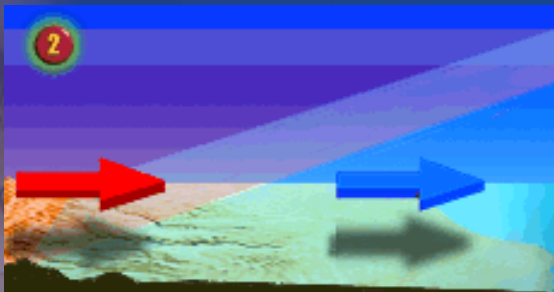
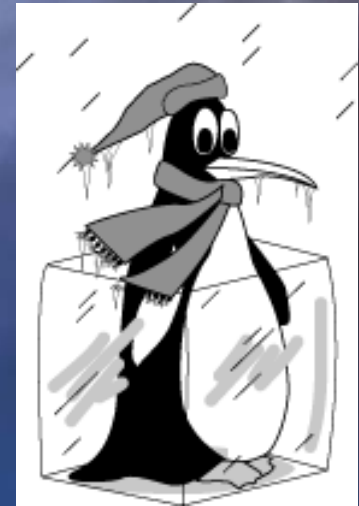




What Makes a Winter Storm

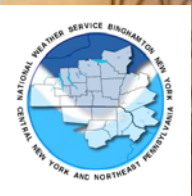


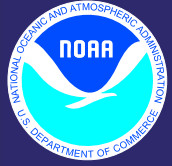
- Cold
- Moisture
- Lift



Lift refers to a mechanism to make the air rise. Rising air cools and condenses forming clouds and precipitation.

Source: USA Today

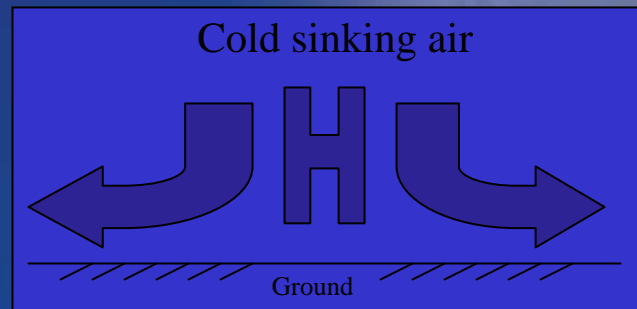


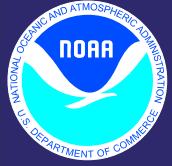


Sources of Cold Air



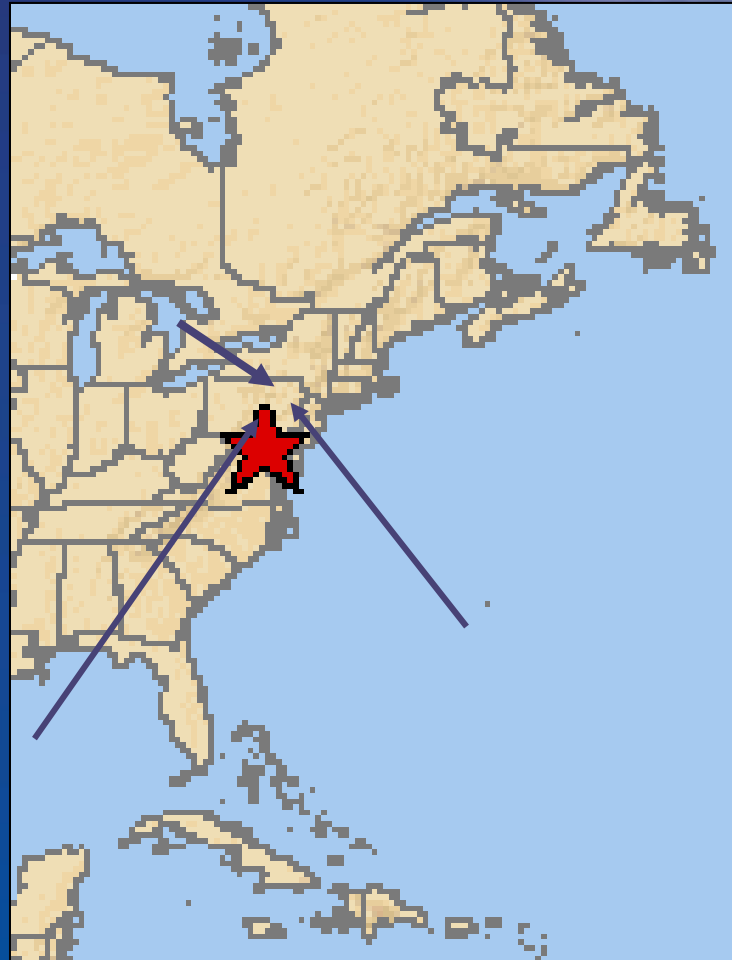
- Arctic
- High Pressure

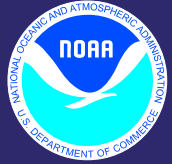




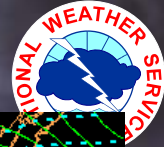
Sources for Moisture

- Great Lakes
- Gulf of Mexico
- Gulf Stream
- Atlantic Ocean

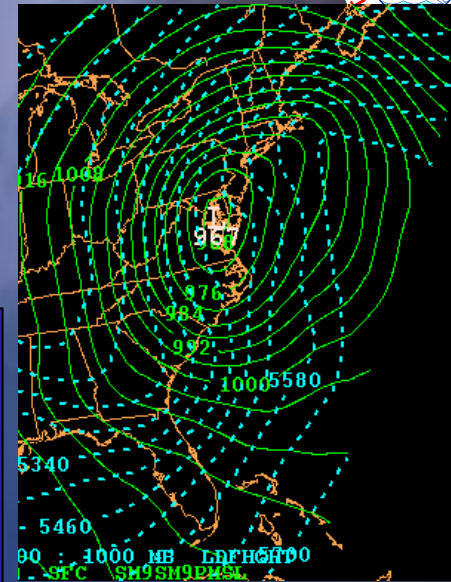




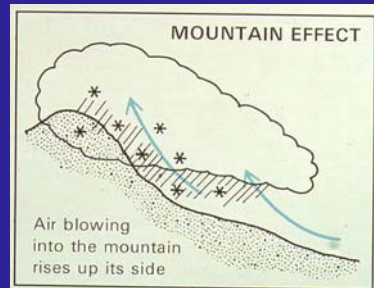
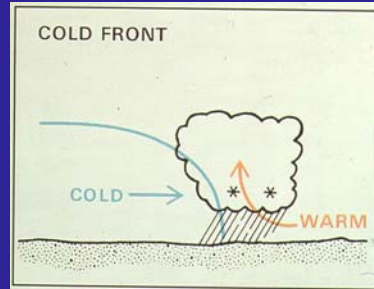
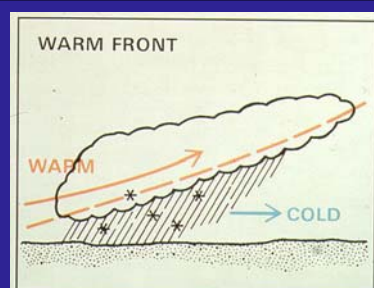
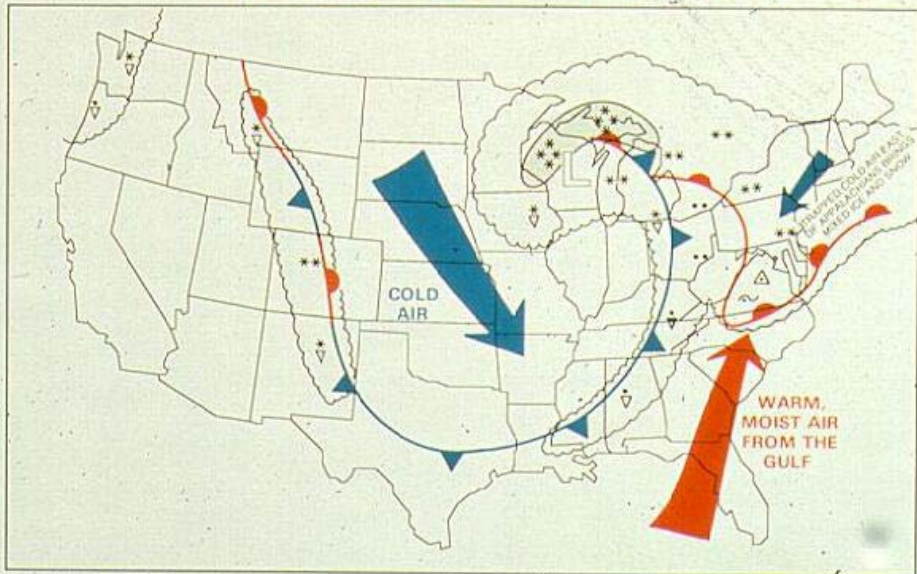
Sources of Lift



- Lows and Fronts
- Mountains

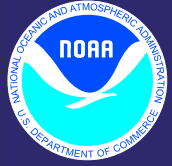


Winter Storm



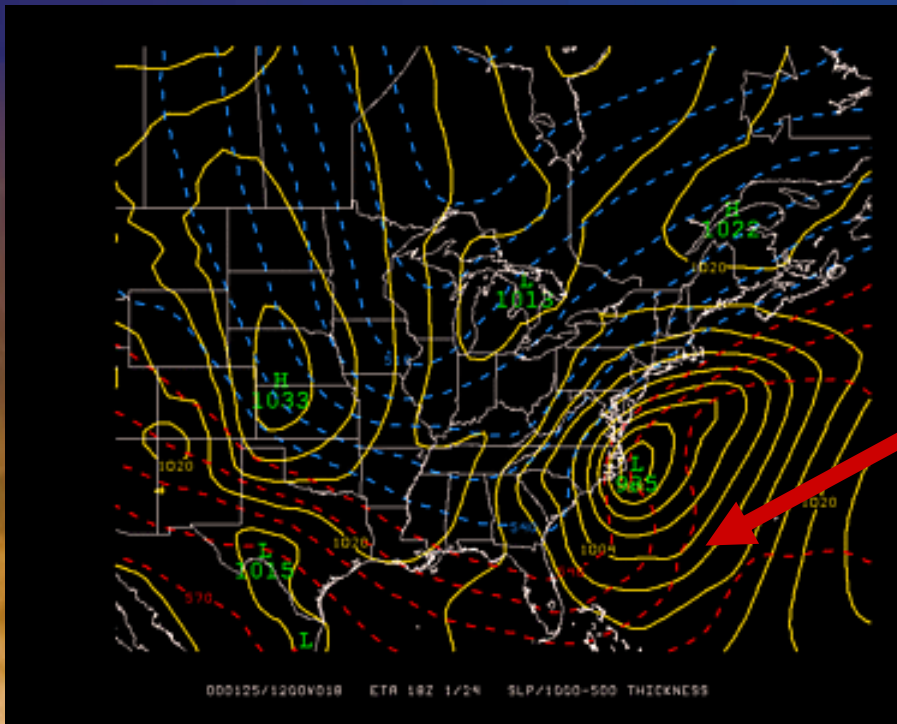
Source: USA Today



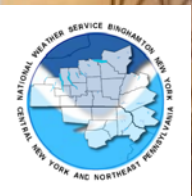
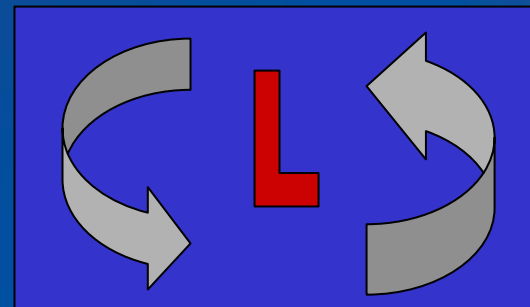


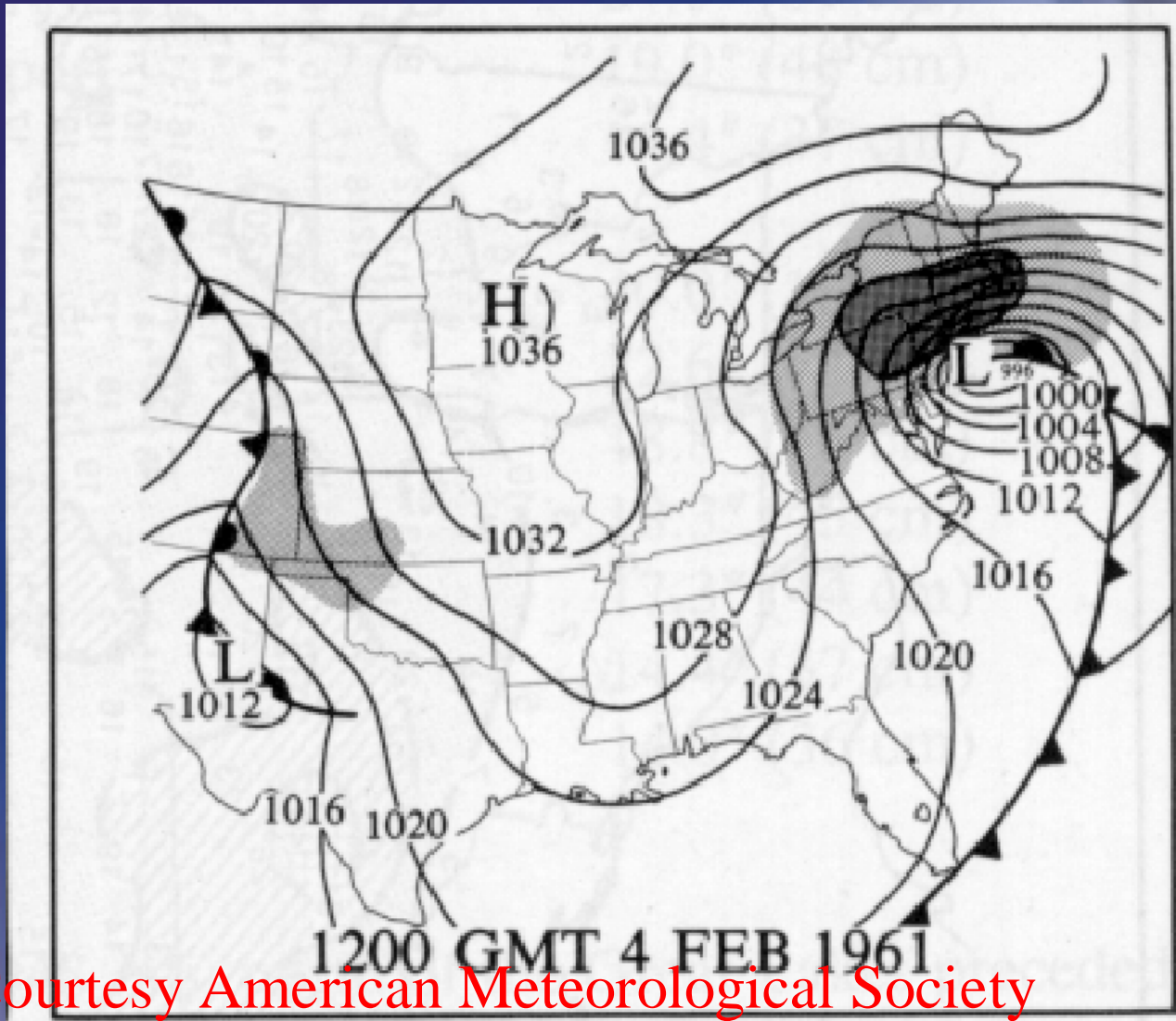
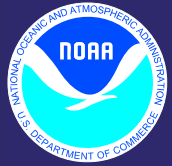
What is a Nor'easter?

- Named for the strong winds blowing out of the northeast ahead of a coastal low



These storms produce the greatest snowfall in the Mid-Atlantic Coastal areas.

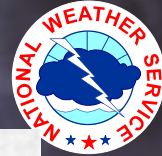




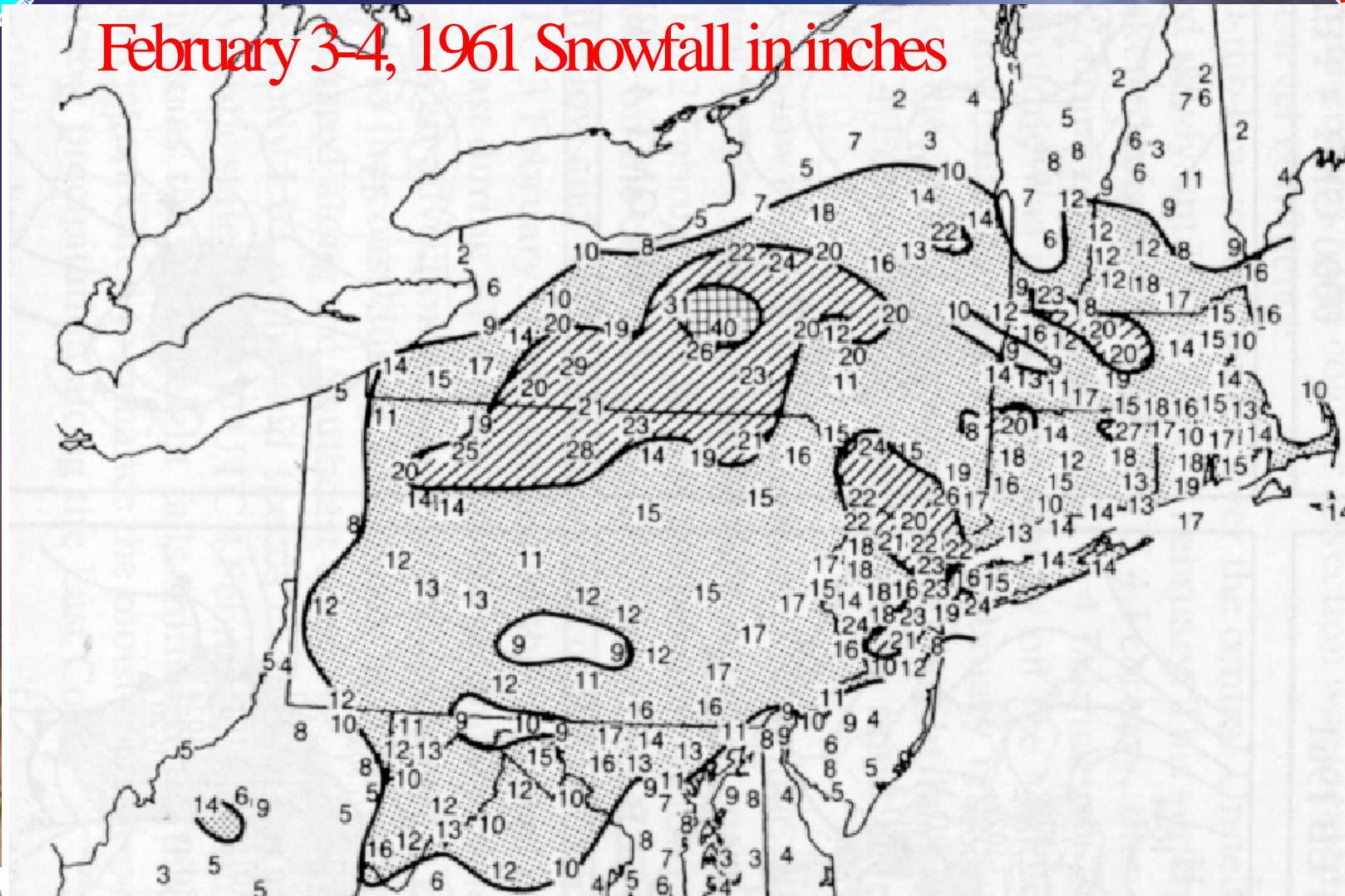
Courtesy American Meteorological Society

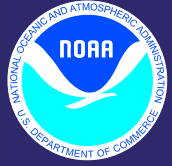


Courtesy American Meteorological Society



February 3-4, 1961 Snowfall in inches





What is a Blizzard?



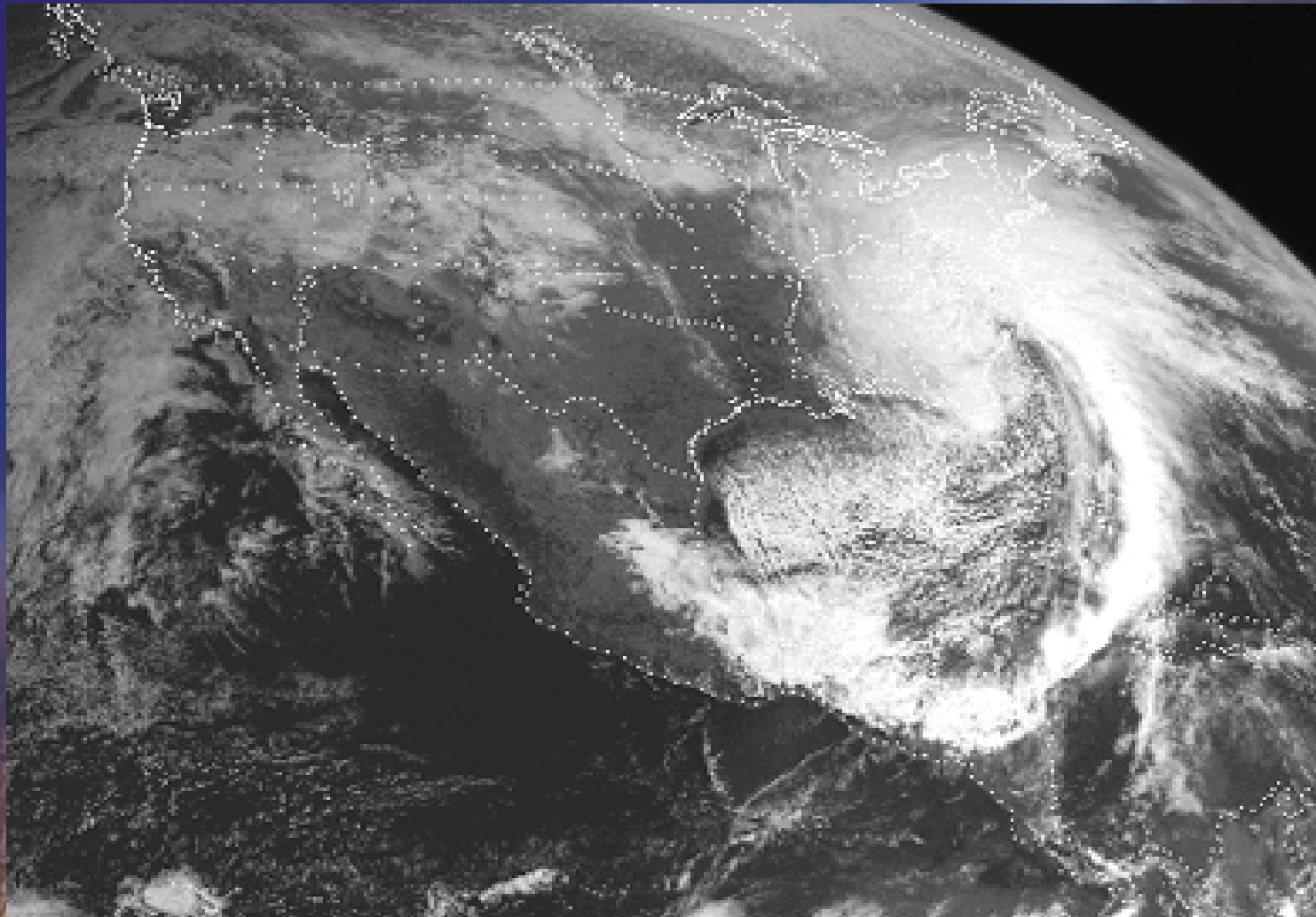
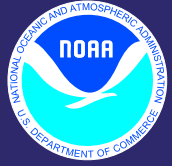
- **Wind**
 - *Gusts to 35 mph or higher*
- **Visibility**
 - *Near zero*
- **Temperatures**
 - *Below 20 degrees*
 - *Wind chill in the single digits or colder*



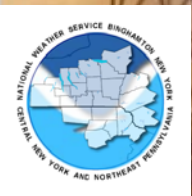
BLIZZARD WARNING:
High winds, heavy snow,
low visibility.

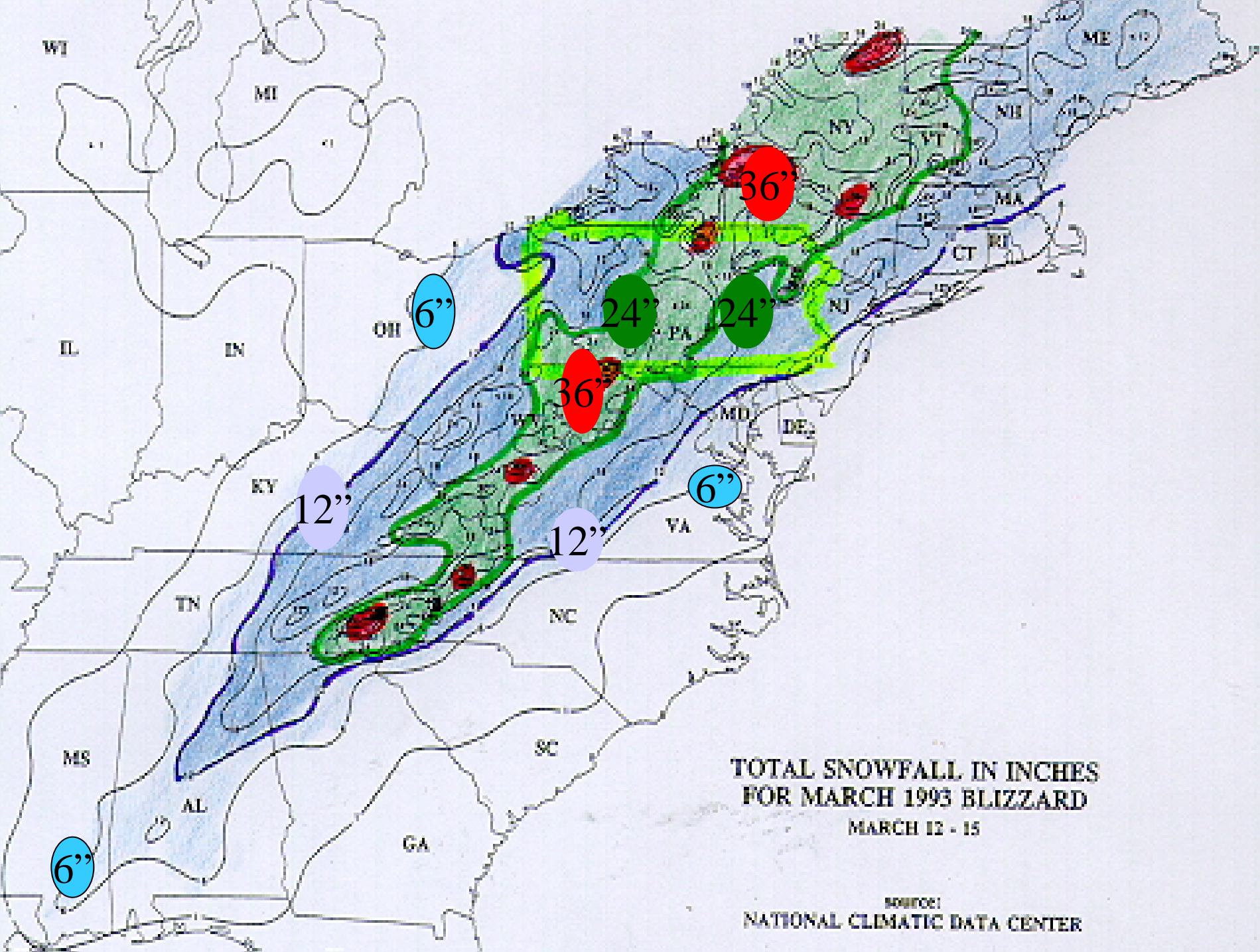


1993 Storm of the Century



NOAA Satellite Image

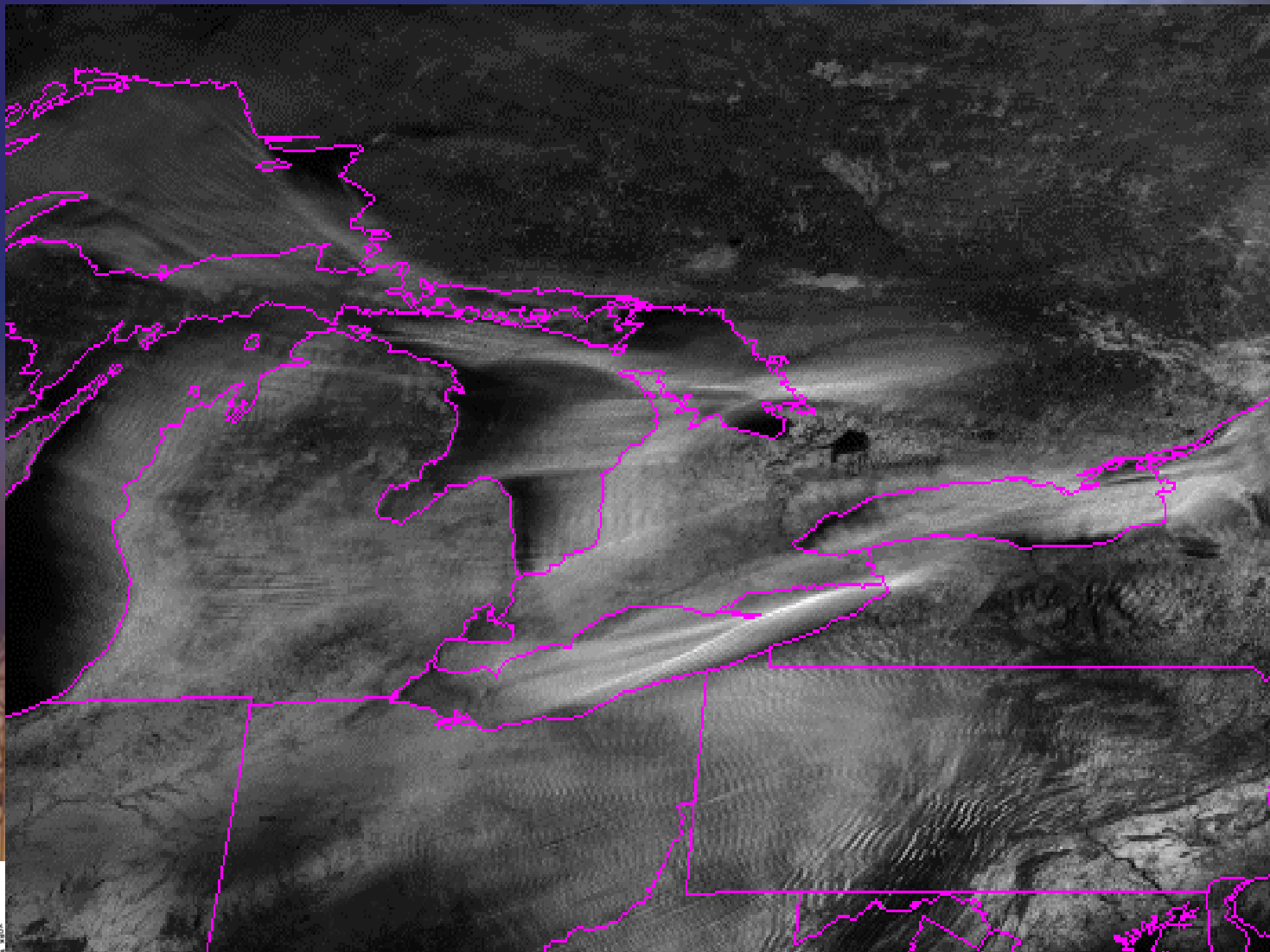


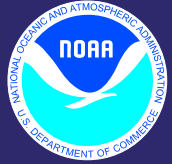


**TOTAL SNOWFALL IN INCHES
FOR MARCH 1993 BLIZZARD
MARCH 12 - 15**

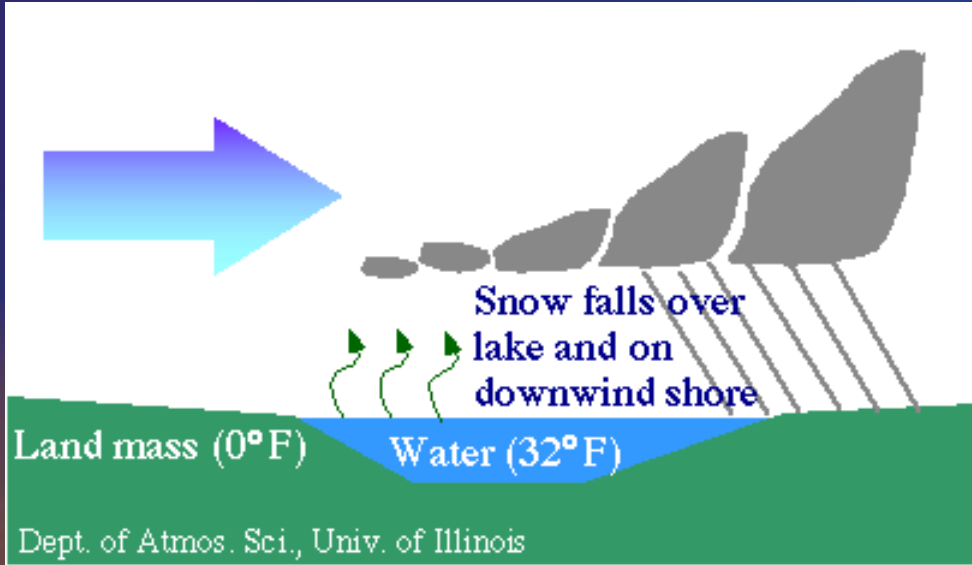
**SOURCE:
NATIONAL CLIMATIC DATA CENTER**

Daytime Visible Satellite Imagery of Lake Effect Snow Event

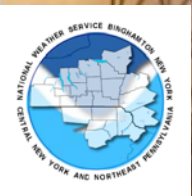
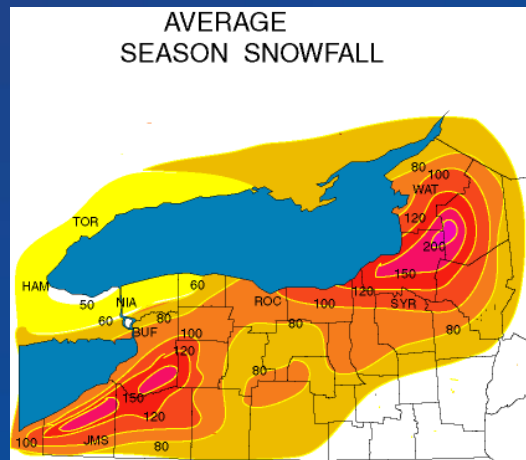


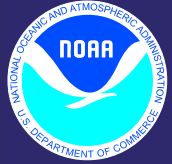


Lake Effect Snow

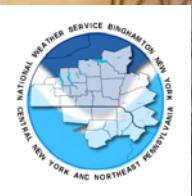
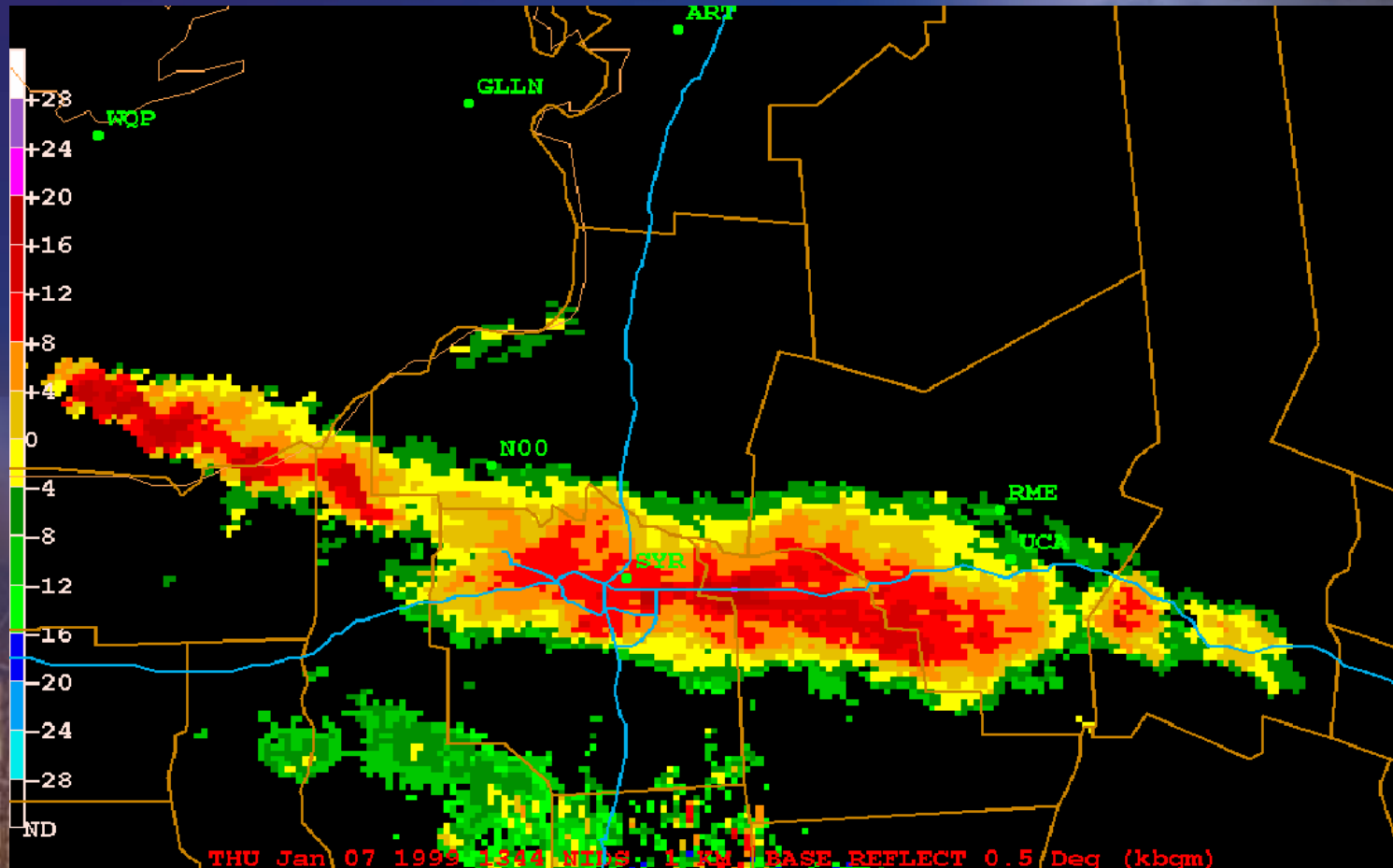


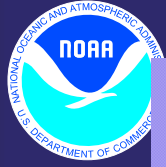
- Warm water heats air above
- Warm air is unstable and rises
- Snow bands form
- Mountains add additional lift

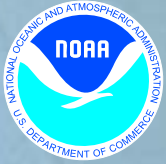




Lake Effect Snow Event January 7, 1999

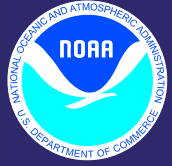






Ice Storms: Winter's Menace



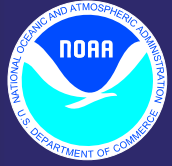


Ice Storms



- **Freezing rain:** rain that freezes on contact with all exposed surfaces. Objects become encased in ice, can damage trees and power lines.
- **Sleet:** Frozen raindrops that bounce on impact with the ground. Does NOT glaze over or encase objects with ice.





Ice Impacts

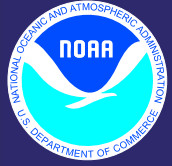


- **Heavy weight brings down trees**



January 1998

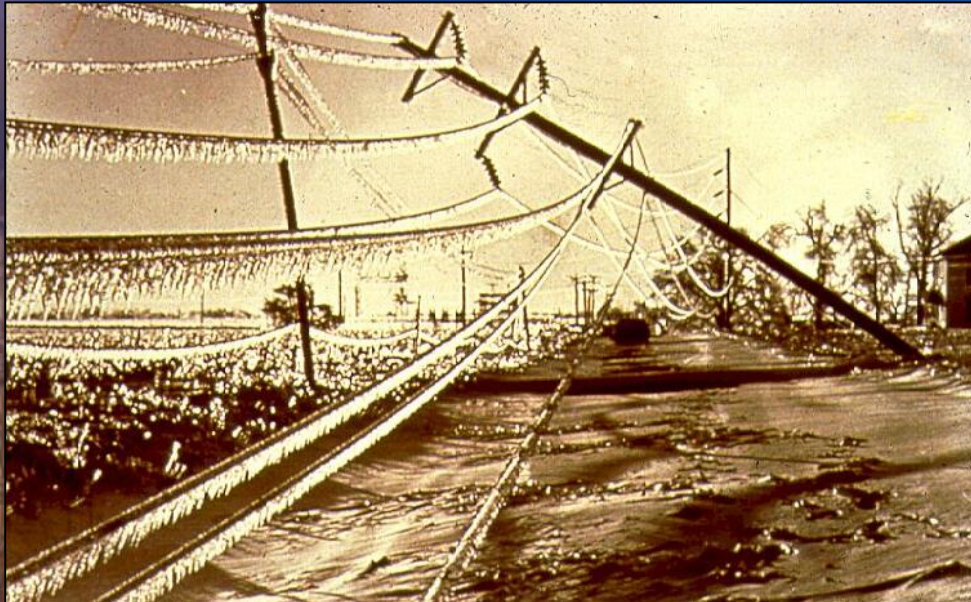


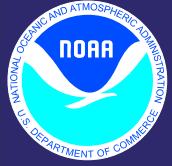


Ice Impacts



- **Power and Communication lines come down**

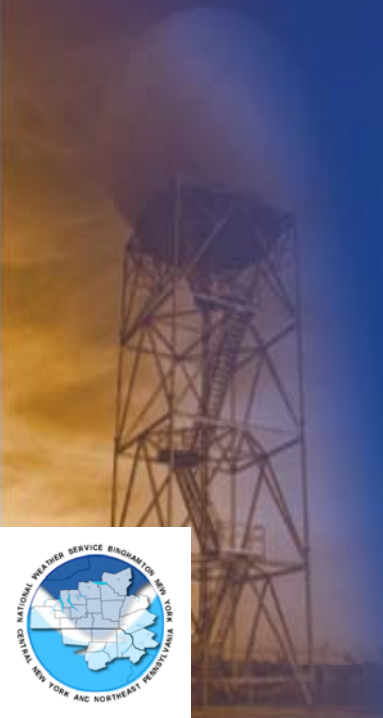




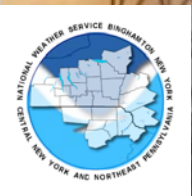
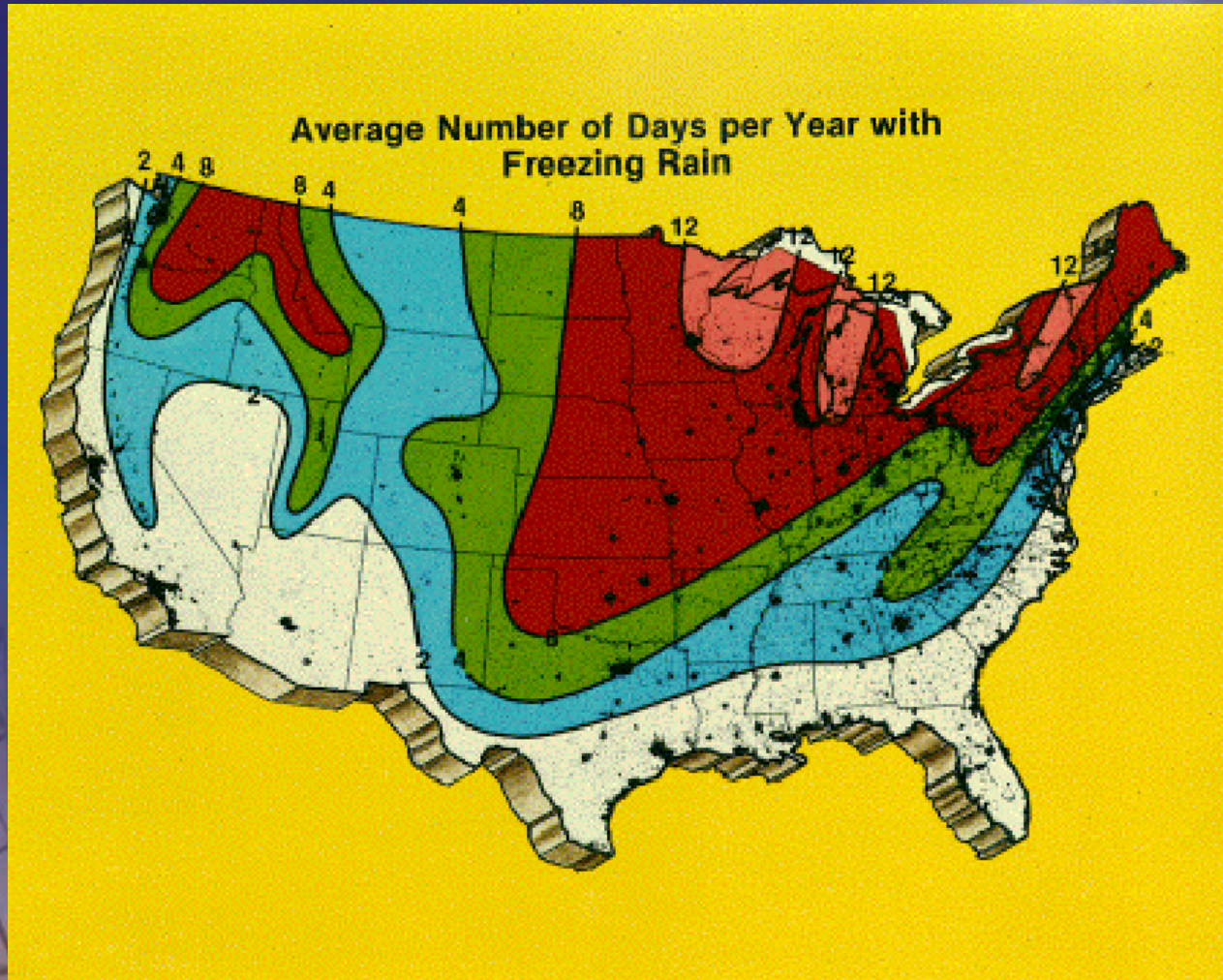
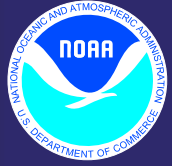
Ice Impacts

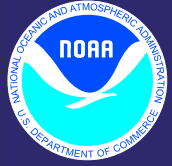


- Traffic accidents
- Pedestrian falls

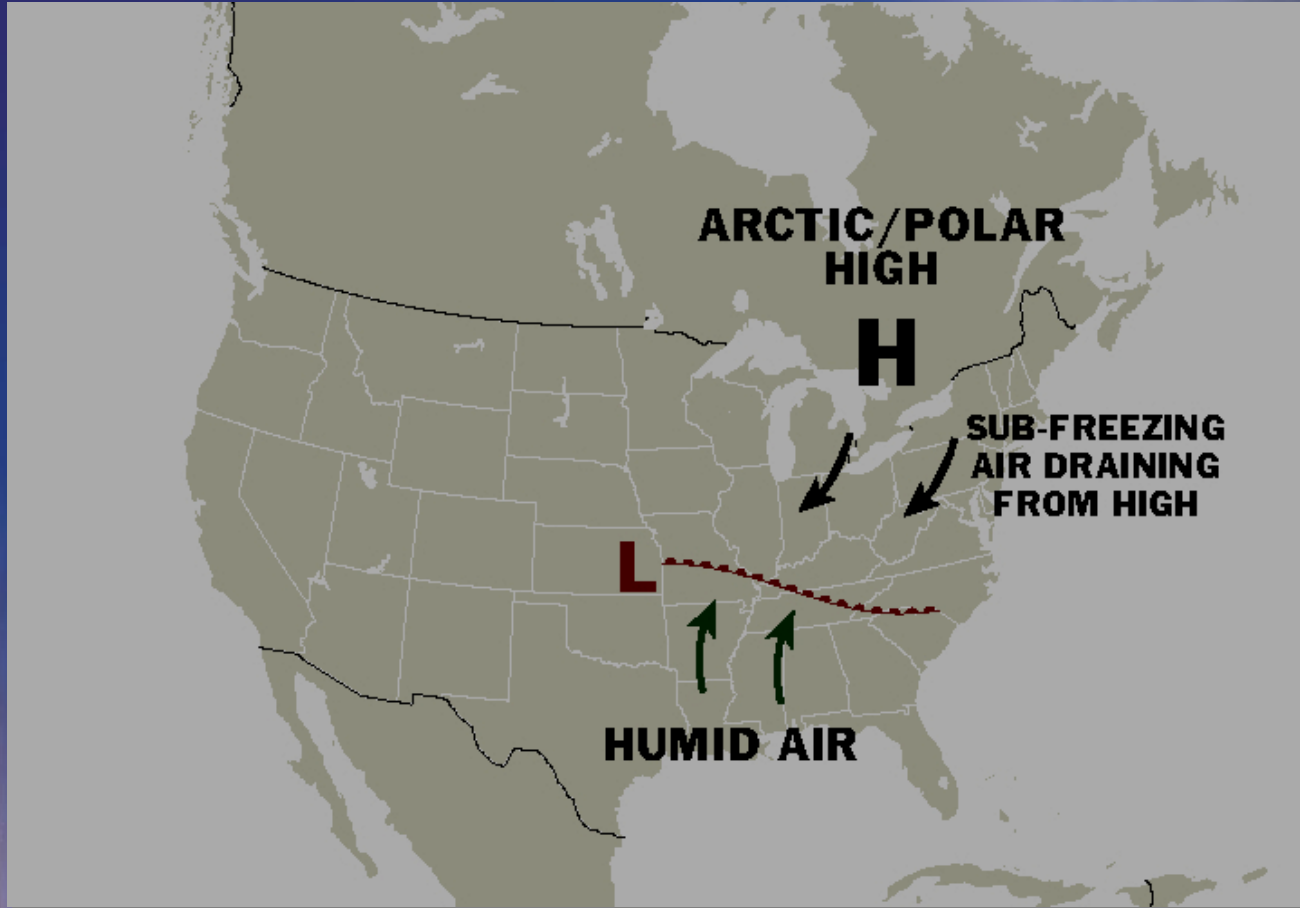


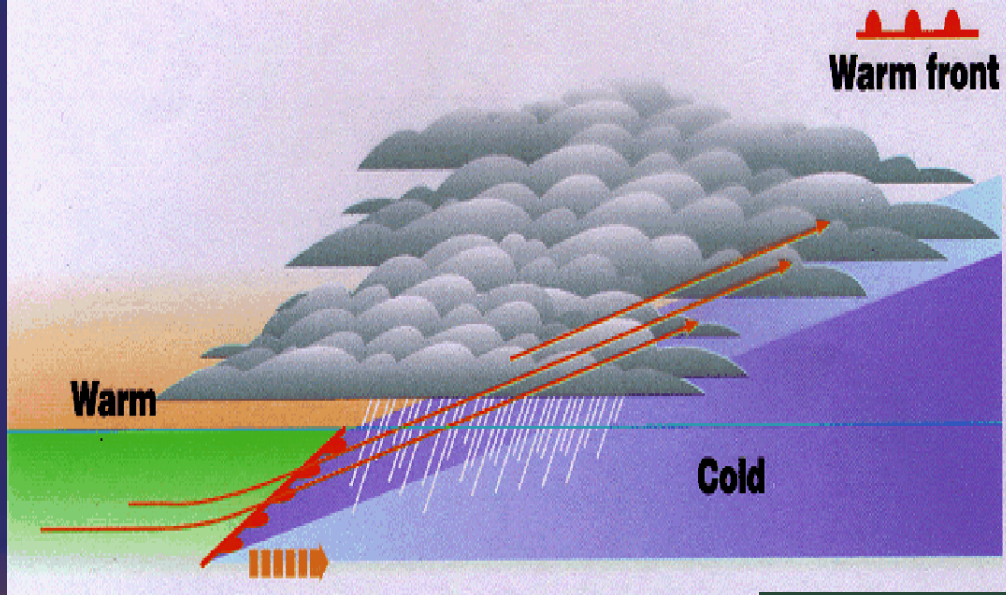
Central New York has one of the highest incidences of ice storms in the U.S.





WINTER WEATHER

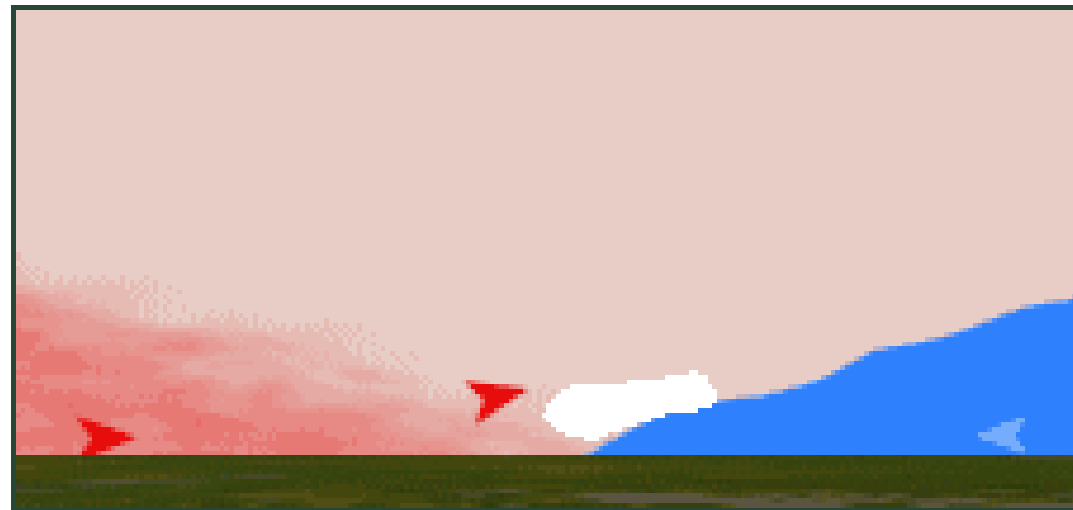




Common way that freezing rain and sleet Forms.

Cold air is more dense, heavier, than warm air.

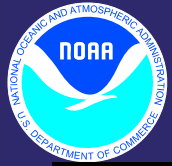
Warm air rises over the cold air because It is less dense, lighter



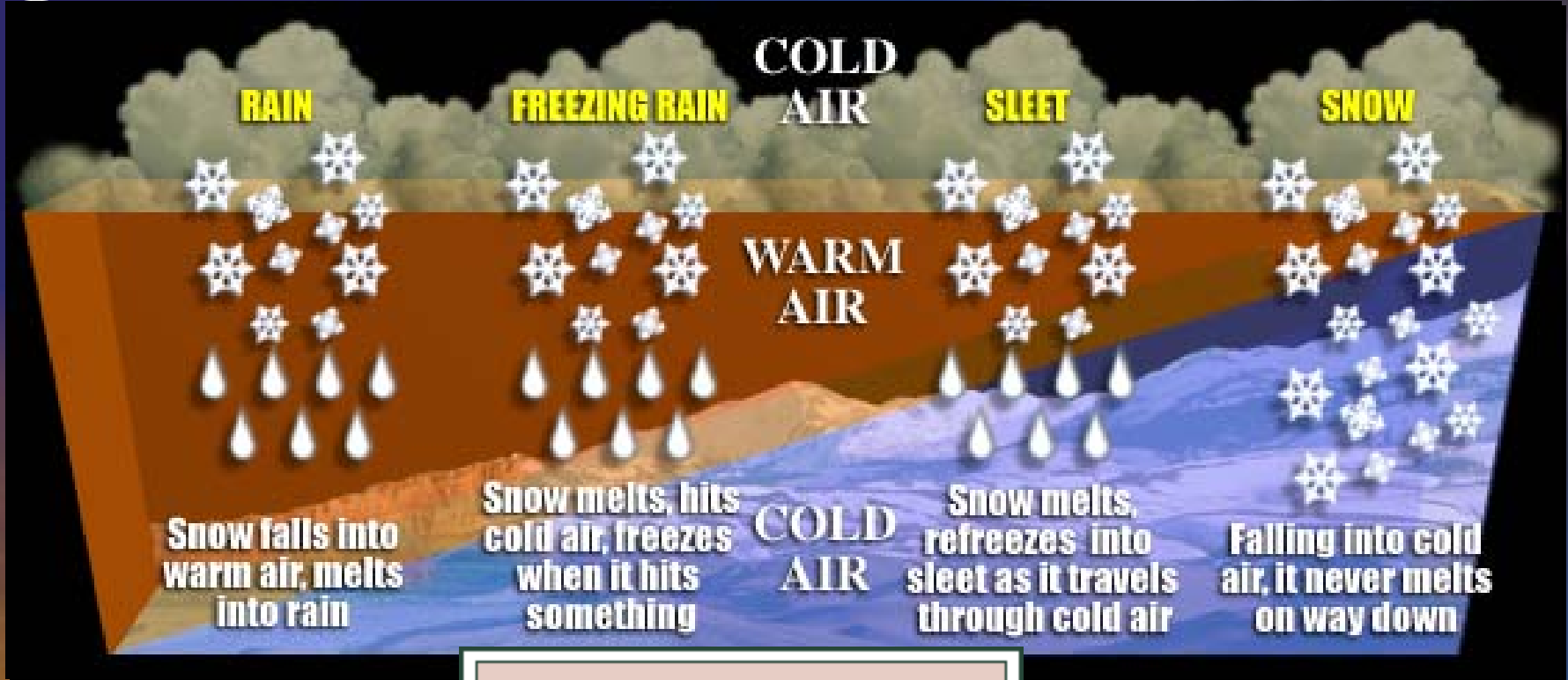
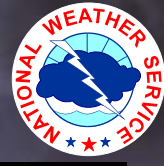
Warm Front

- Cold Air
- Warm Air
- Warmer Air





Precipitation Types

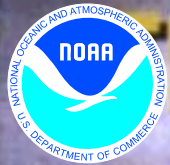


Warm Front

- Cold Air
- Warm Air
- Warmer Air

The COMET Program



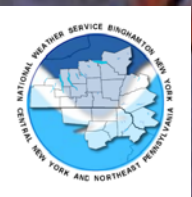


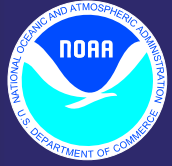
Flash Floods and Floods . . .



The

Awesome Power!

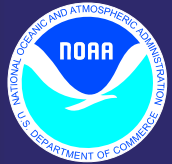




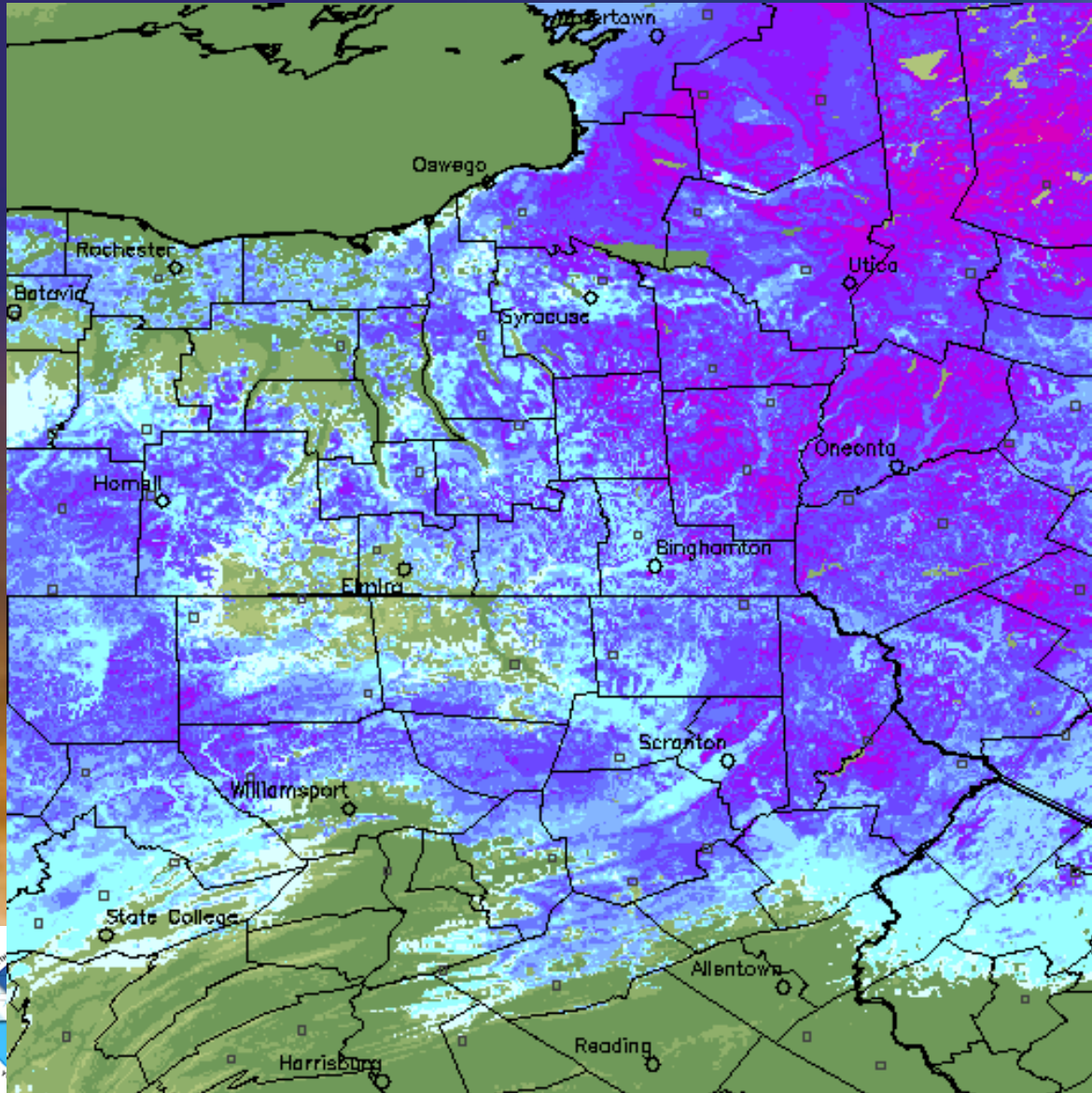
Winter and Spring Flooding

- **Typical snowpack water equivalents can exceed 6 inches some winters!**
- **Many places typically have 2 to 6 inches of water locked up in the snowpack by late winter**
- **And...**
- **We know it is going to melt eventually.**
- **With heavy rain and warm temperatures, which can happen in late winter/early spring....big flooding can result!**

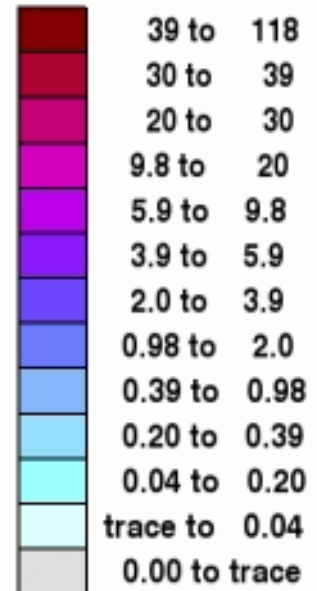




Mid March 2005



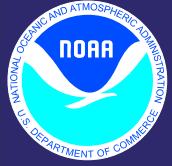
Inches of snow water equivalent



Not Estimated

Elevation in feet (Not Estimated)



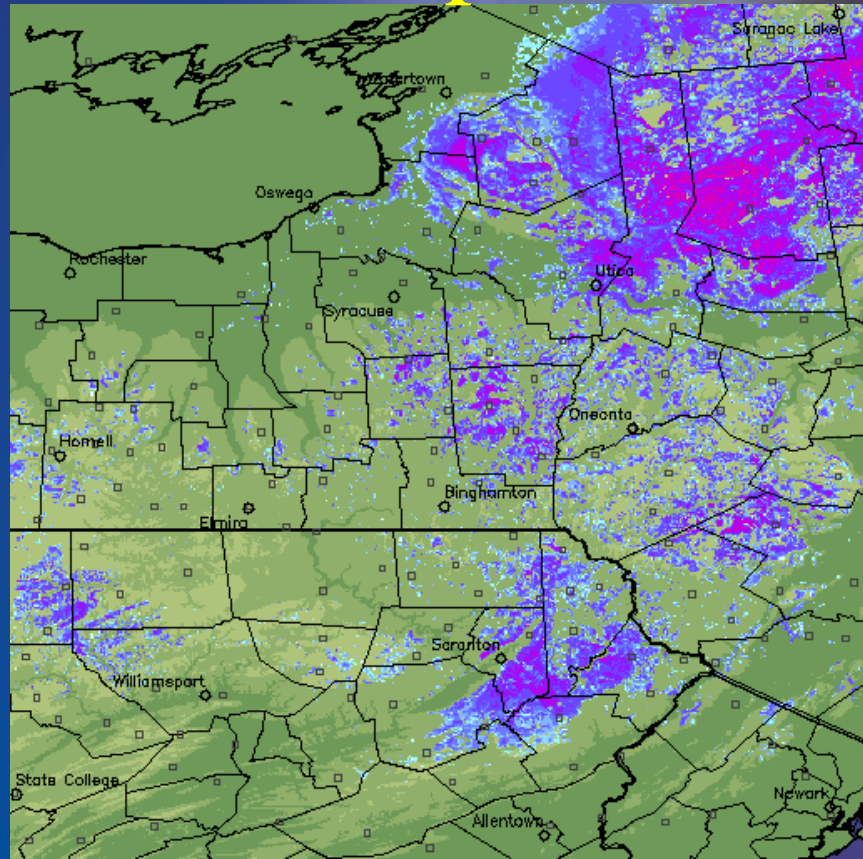
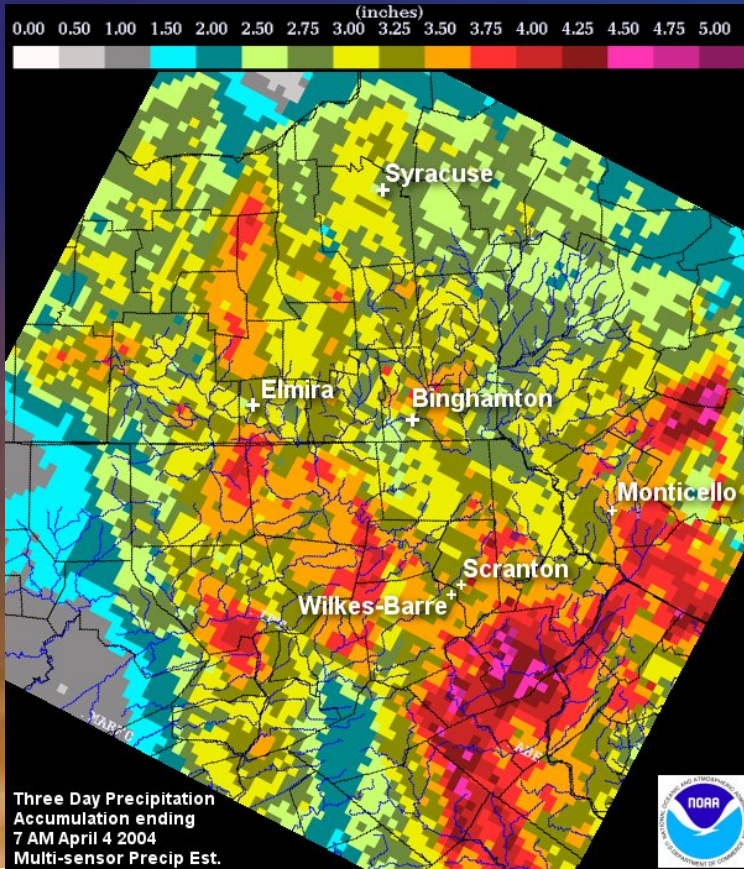


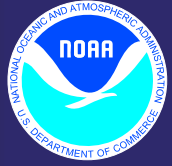
April 2-4, 2005 Flood



Rainfall

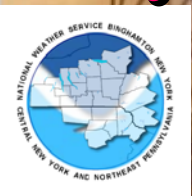
Snowpack

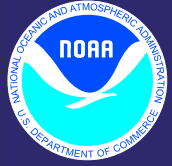




The April 2-4, 2005 Flood

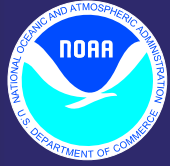
- **Approaching 100 Million Dollars**
- **2 deaths**
- **0 injuries**
- **265 Businesses affected**
- **Roads flooded/damaged- about 600**
- **Bridges flooded/damaged- about 115**
- **Evacuations- about 1350**





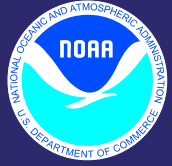
Vestal NY



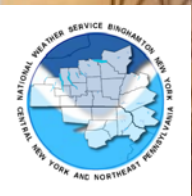


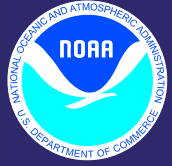
More Binghamton area flood photos.





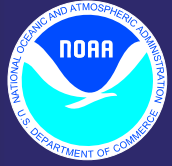
Pennsylvania Avenue Bridge



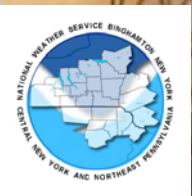


Chenango River Binghamton



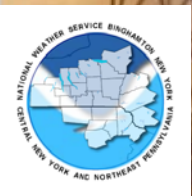


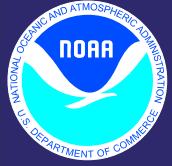
Chenango River Binghamton





Marathon, NY





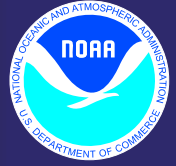
Marathon, NY





Tioga Terrace, NY





What to Report about Floods



Exact location and time of flooding

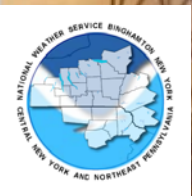
- Give Creek/Stream name if known

Flooding conditions

- Seeping into fields?
- Running across roads?
- Through a town?
- Fast?
- Slow?

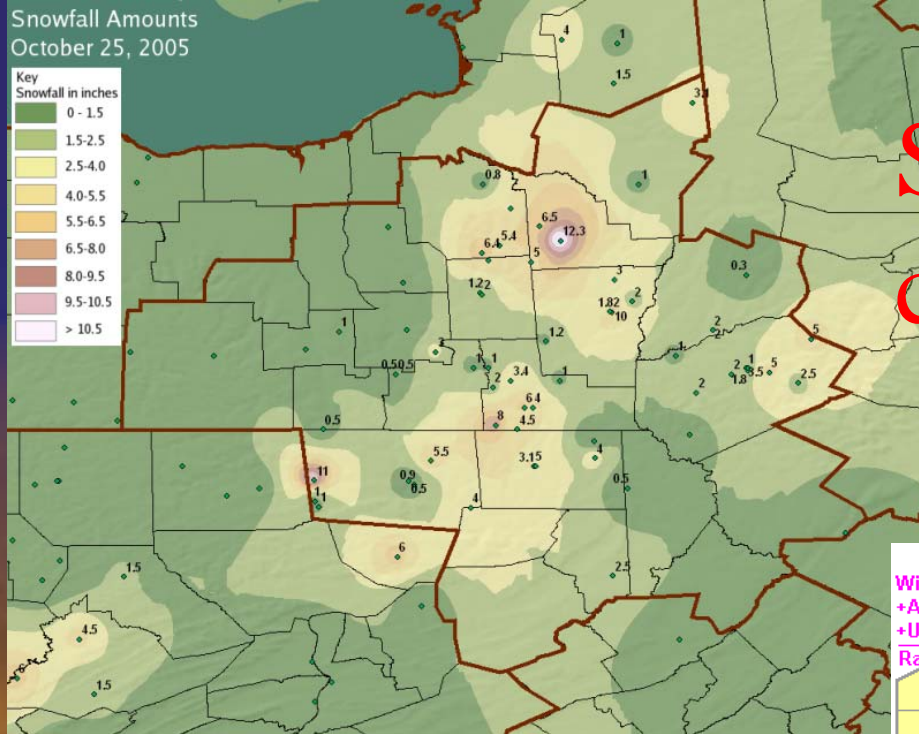
Be very specific

- Use the toll free number





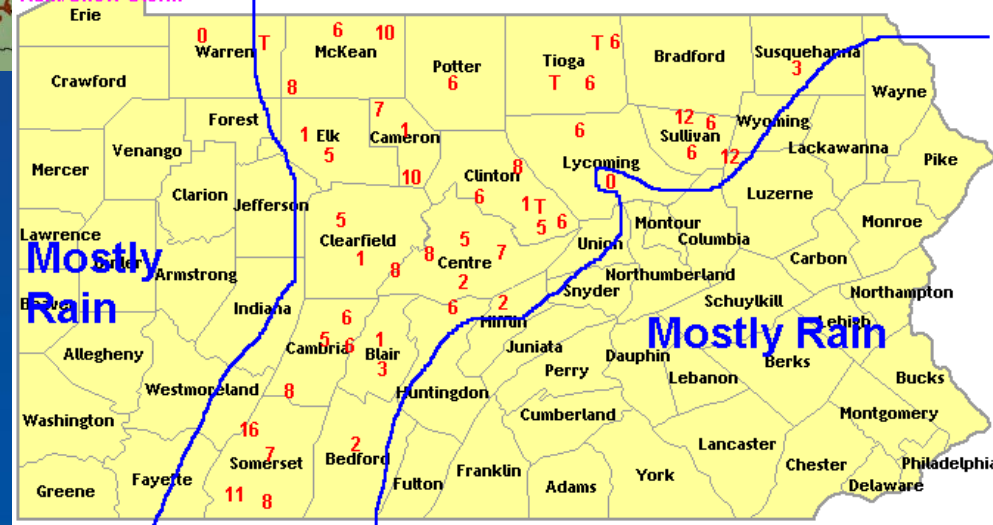
October 25th, 2005 Nor'easter



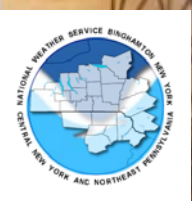
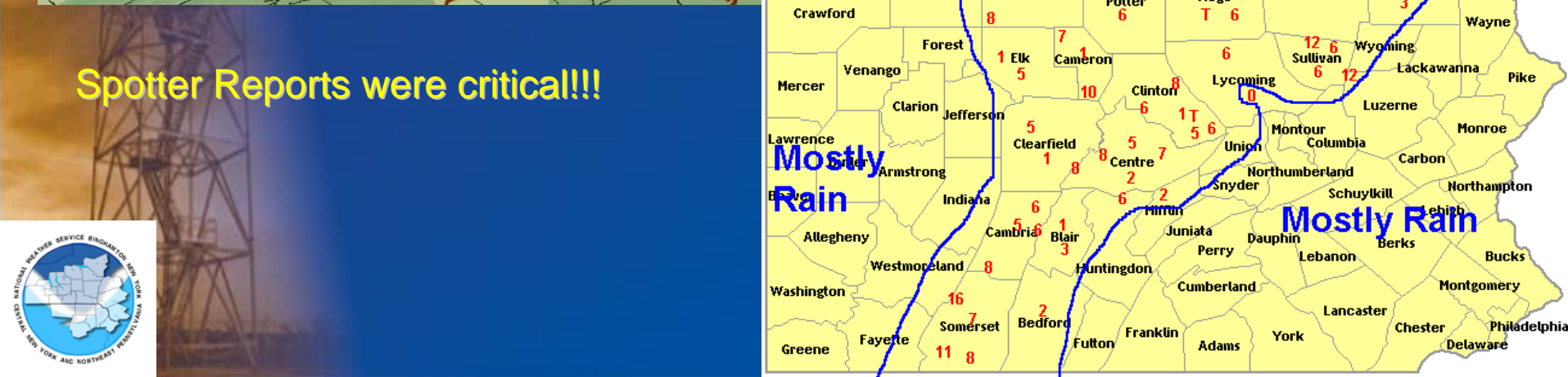
Signs of things to come?

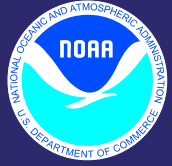
Wilma + Alpha + Upper Low Rain/Snow Storm

Another Pre-Halloween Snow Event
A very elevation-specific storm. **October 25th, 2005** Many downed trees/power lines in the elevations.
(two-day 10/25-10/26 totals below)

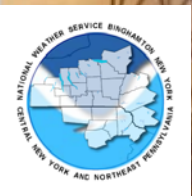


Spotter Reports were critical!!!





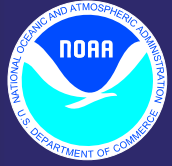
October 25, 2005 Snowstorm





Trees and wires down
all over the higher
terrain



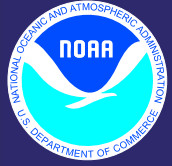


Mount Washington, NH



- **Snowiest October on Record!!**
 - *44 inches*



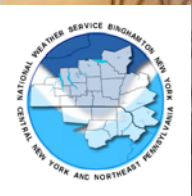


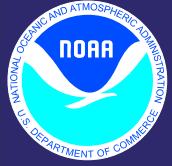
Skywarn



- Skywarn Amateur Radio activation
- Measuring snow and ice
- Reporting procedures
- Contact Information

For more information and updates go to <http://weather.gov/bgm/skywarn>





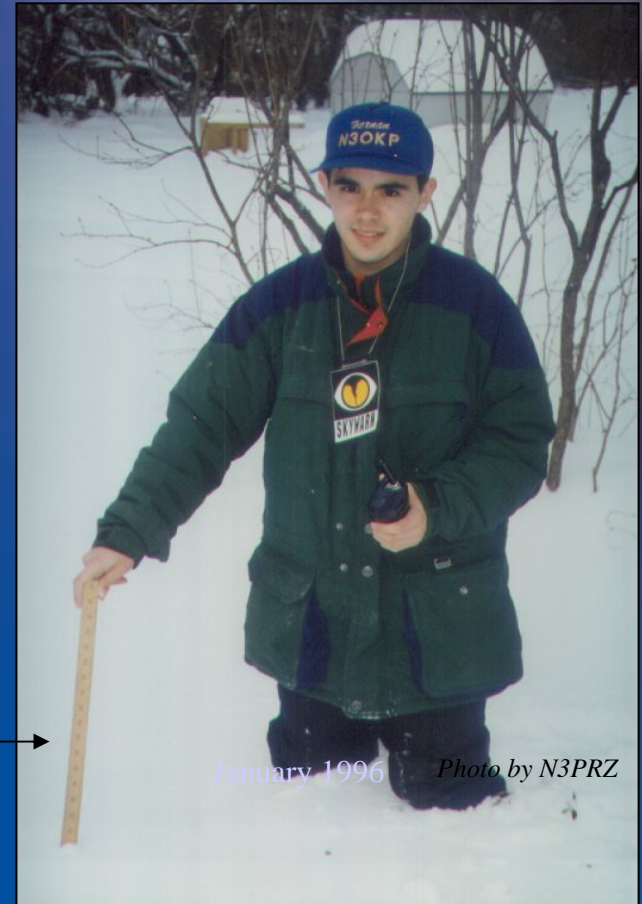
Snowfall Measurement



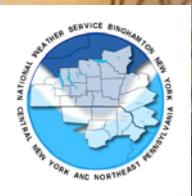
- Snow Board
- Ruler

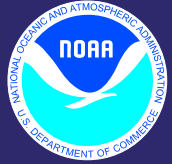


22 inches →

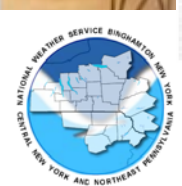
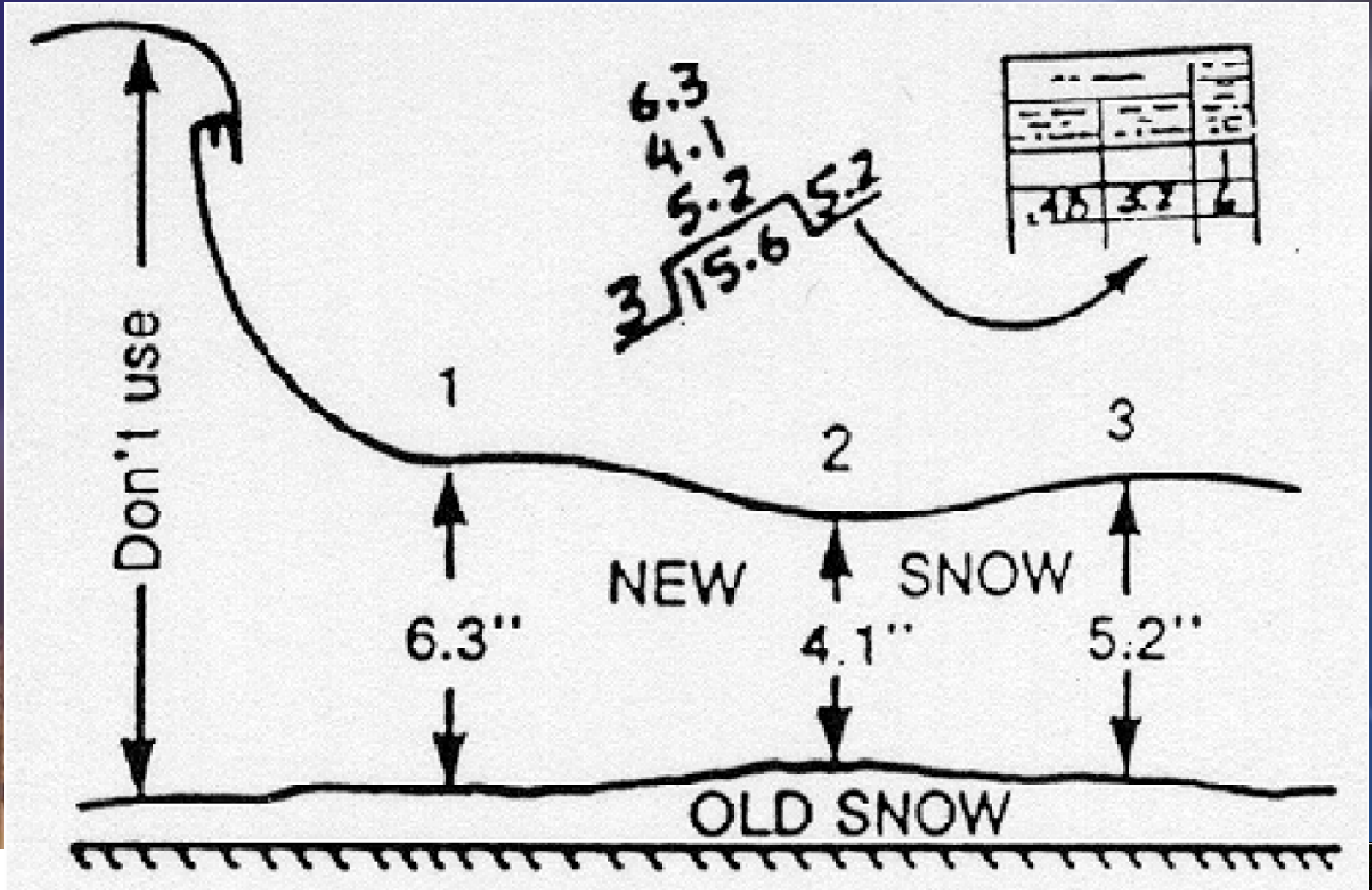


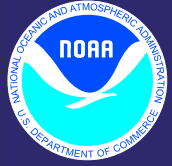
January 1996 Photo by N3PRZ





Measuring Snow





Skywarn Reporting



- **Snowfall**

- *First couple inches*
- *Every two inches or so*
- **TOTAL SNOWFALL (most important)**
- *Really bad road conditions and poor visibility*

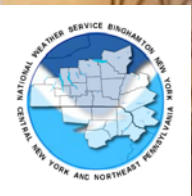


- **Ice Accumulation – any!**

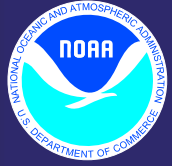
- *Surface its accumulating on*
- *Thickness*
- *Temperature*



Photo by K3CSX



SKYWARN

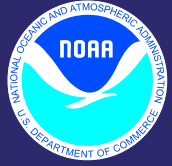


Other Skywarn Reporting



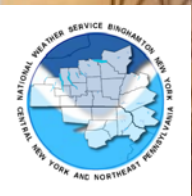
- **Drifts (snow depths)**
- **Winds**
- **Flooding**
- **Ice Jams**





Skywarn Amateur Radio Activation

- **Emergency Coordinator is alerted to Watches, Warnings and Advisories**
- **Net is scheduled to come up near the start of the precipitation.**
- **Reports collected once an hour or two with net in standby in between?**



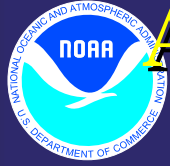


Snow Spotter Reports



- How can we get snowfall information from you?
- Public Number: (607) 729-1597 press 4
 - *Call with snowfall reports.*
 - *Email: bgm.stormreport@noaa.gov*
- Can call us anytime.

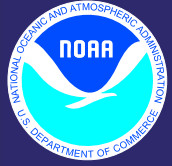




Are You Prepared for Winter? Winter Safety

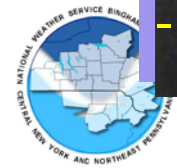
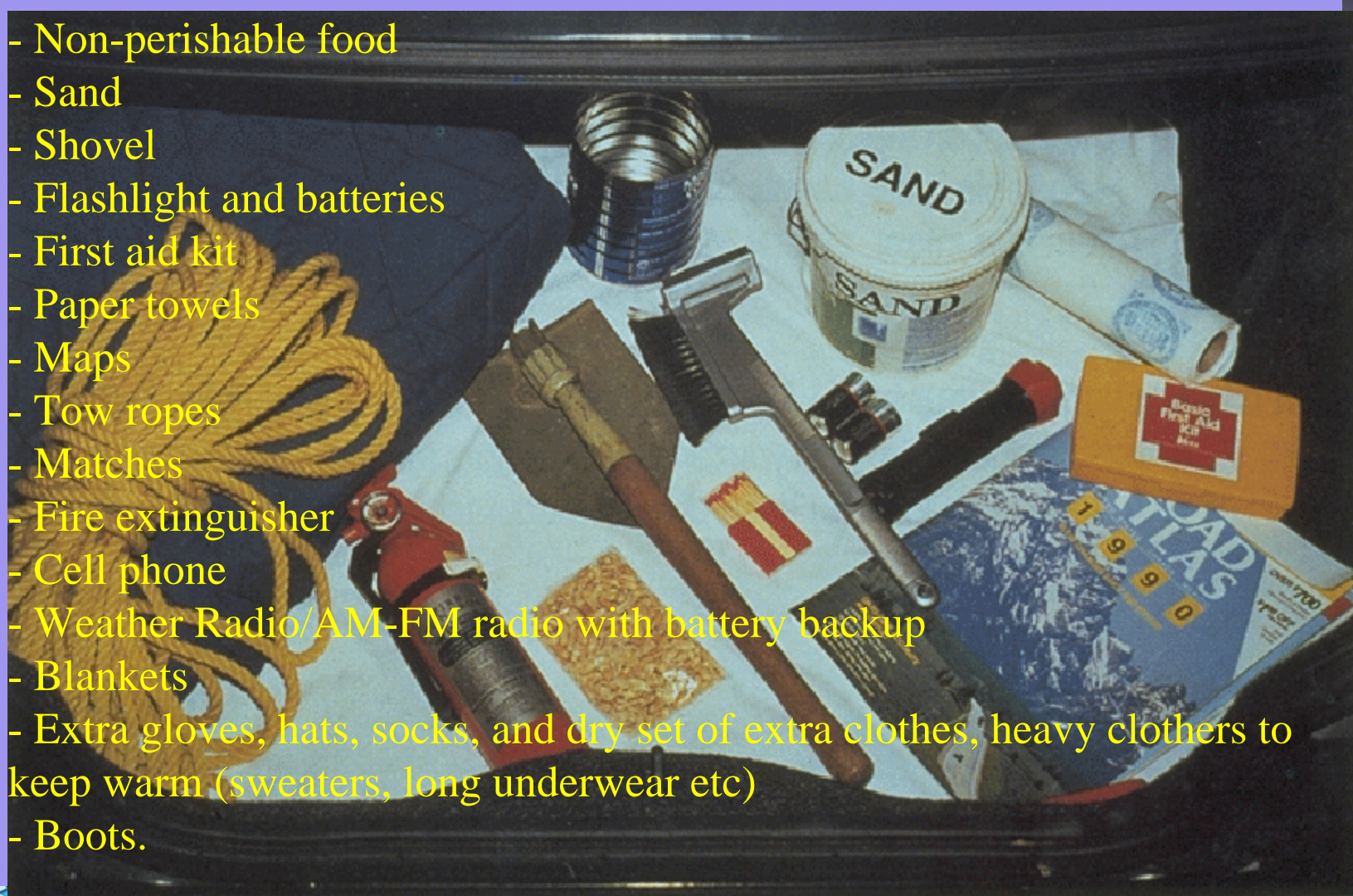
- **Slow down when driving! Automobile accidents claim more lives in snow and ice storms than any other storm.**
- **Carry a winter storm survival kit in your car**
- **Have a family disaster plan so you can survive on your own for several days in case of long term power outages and poor road conditions.**



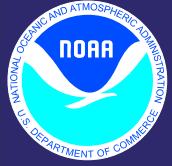


In A Vehicle

- Non-perishable food
- Sand
- Shovel
- Flashlight and batteries
- First aid kit
- Paper towels
- Maps
- Tow ropes
- Matches
- Fire extinguisher
- Cell phone
- Weather Radio/AM-FM radio with battery backup
- Blankets
- Extra gloves, hats, socks, and dry set of extra clothes, heavy clothes to keep warm (sweaters, long underwear etc)
- Boots.



SKYWARN



At Home





Winter Safety



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

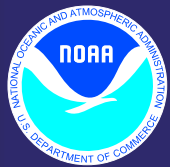
Frostbite Times 30 minutes 10 minutes 5 minutes

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

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

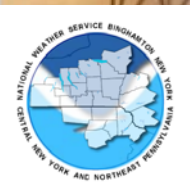
Effective 11/01/01

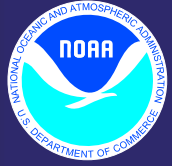




Internet

- **Main NWS Web Site- <http://weather.gov>**
 - *Click on part of the state that you are interested in and you will be directly to the office that serves that area.*
- **NWS Binghamton- <http://weather.gov/bgm>**





New for Winter 2005-2006

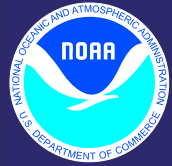


- **Snow Intensity Outlook**

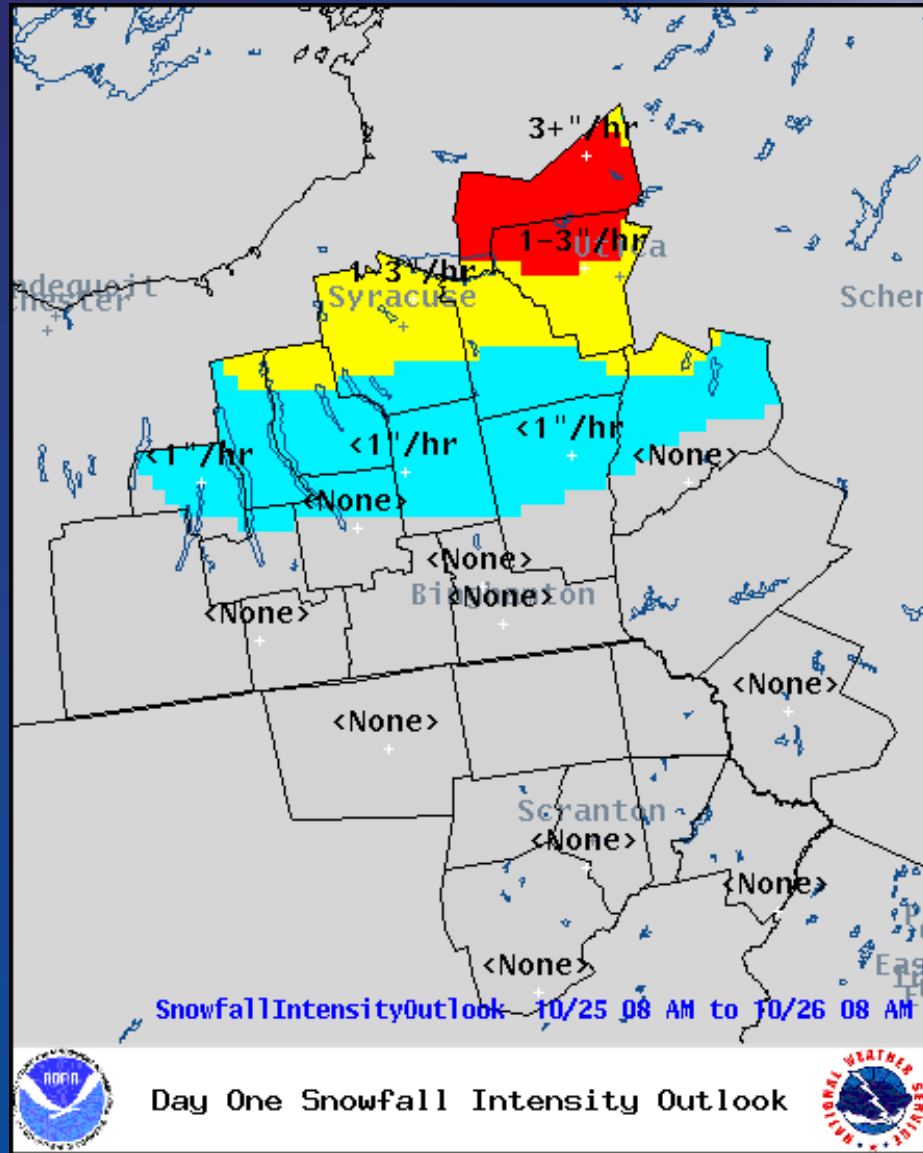
- *Provide a map depicting areas of:*

- **< 1 inch per hour**
 - **1-3 inches per hour**
 - **More than 3 inches per hour**

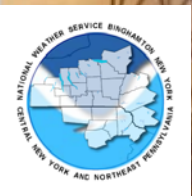




Snow Intensity Outlook (24 hrs)



Day One Snowfall Intensity Outlook





NOAA/NWS Office

Greater Binghamton Airport

32 Dawes Drive

Johnson City, NY 13790

