NORTHEASTERN

STORMBUSTER

A Newsletter for Emergency Managers & Storm Spotters

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IN THIS ISSUE!

WARREN COUNTY, NY FLASH FLOOD EVENT OF JUNE 13, 2005

Ray O'Keefe, Warning Coordination Meteorologist, NWS Albany
and
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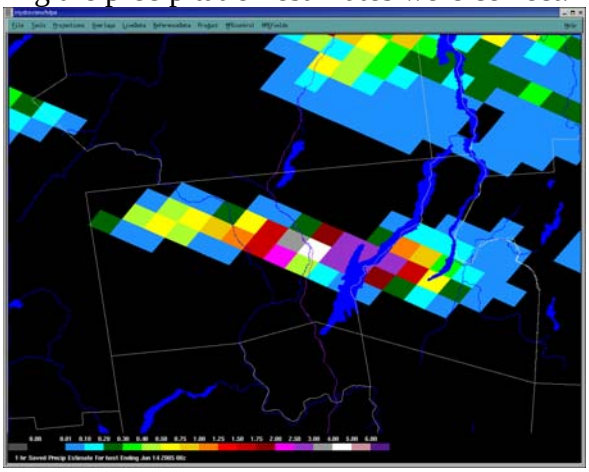
Thunderstorms trained across Warren County, NY during the late afternoon and early evening hours of Monday, June 13, 2005. These storms developed in an abnormally warm, moist environment that had been in place across Weather Forecast Office (WFO) Albany's forecast area for nearly a week. It was the third day in four that diurnal thunderstorm activity in an excessively moist environment resulted in Flash Flood Warnings being issued by the office.

The WFO Albany Multi-sensor Precipitation Estimator (MPE) indicated hourly rainfall totals from four to five inches (white pixel in photo to the right) in Warren County between 7 and 8 p.m. Albany's Doppler radar Storm Total Precipitation estimate yielded six to eight inches across the county. A review of the MPE data showed that the area receiving four or more inches of rainfall was roughly 6 by 10 miles, or 60 square miles. Flooding was reported on the Schroon River, as well as on numerous small creeks and streams. Reports from Lake George indicated an unprecedented rise of eight inches in the lake level Monday night. A spotter in the Town of Bolton, within the swath of heaviest MPE precipitation, reported 6.34" during the event. This real-time feedback by the spotter provided forecasters with valuable ground truth confirming the precipitation estimates were correct.



A mudslide on the Northway (I-87) just south of Exit 24 had closed the highway from exits 23 to 25, a ten mile stretch, in both directions. A 150-foot section of the Northway was washed out by run-off from the storms, with both the north- and

south-bound lanes heavily damaged. Transportation officials indicated the road would be closed for at least several days, if not weeks. Additionally, a dozen other roads were closed in Warren County. Town of Queensbury Highway Superintendent Richard Missita, speaking to a *Glens Falls Post Star* reporter described the damage to Route 11 as, "just devastating". A couple dozen Warren County residents were sheltered by the Red Cross Monday night. A State of Emergency was declared in the Towns of Bolton, Chestertown, Warrensburg and Horican. Preliminary Warren County damage estimates were $3 to 5 million. About a dozen injuries were reported, mostly minor.

Based on Doppler radar estimated rainfall and Flash Flood Monitoring Program analysis, WFO Albany staff issued a Flash Flood Warning for Warren County at 5:20 p.m., valid until 8:15 p.m. At 7:34 p.m., WFO Albany issued a Flash Flood Statement, noting that additional training thunderstorms were impacting the Chestertown/Warrensburg area, where the mudslide occurred. A Flash Flood Warning was issued at 8:13 p.m. to replace the expiring 5:20 p.m. warning. At 8:36 p.m., a report from the New York State Police Information Network (NYSPIN) indicated that the Northway was closed due to a mudslide at Exit 24. Based on the initial 5:20 p.m. issuance of the first Flash Flood Warning (and its subsequent continuation with the 8:13 p.m. issuance of the follow-up warning), there was over three hours lead time before the mudslide occurred. In response to the 8:36 p.m. State Police report, WFO Albany staff posted a Local Storm Report with this information at 8:48 p.m. An updated Flash Flood Statement was issued at 8:57 p.m., stating that 'Flash Flooding was occurring in Warren County...[and a] mudslide had closed the Northway between Exits 23 and 25'. Follow-up Flash Flood Statements were issued at 9:19 p.m. (Headline: 'Serious Flash Flooding was Occurring in Warren County'), 10:45 p.m. (Headline: 'Serious Flash Flooding was Occurring in Warren County...More Heavy Rain Moving Into the County'), and 11:25 p.m. (Headline: 'A State of Emergency Has Been Declared in the Warren County Towns of...'). A third and final Flash Flood Warning was issued at 12:05 a.m. to replace the expiring 8:13 p.m. warning. All Flash Flood Warnings verified in Warren County with an average lead time of 68 minutes. There were no missed Flash Flood events.

In addition to the flooding events, a Severe Thunderstorm Warning was issued for Saratoga County at 9:11 pm. This warning verified with trees down in the Town of Galway, and with a 29 minute lead time. A Flash Flood Watch was issued at 10:16 p.m., effective until 5:00 a.m., for the northwestern third of the Albany forecast area. As the diurnal thunderstorm threat was subsiding, NWS radar showed the remnants of Tropical Storm Arlene approaching the area identified in the Watch. The Flash Flood Watch verified in Warren County; it did not verify elsewhere.

The average lead time of 68 minutes on the Flash Flood Warnings was 42% better than the 48 minute 2005 national goal. The warning accuracy on this event was 100%, exceeding the 2005 national goal of 89% to perfection. The 3 hour 10 minute lead time for the Northway washout provided critical time for Warren County officials to take protective action. John Farrell, Warren County Emergency Manager said, "With the issuance of the first warning, the county ramped up emergency operations. The warnings absolutely helped the County prepare for the flooding. The warnings were a big help."

Private campgrounds in the warned area also acted quickly. American Campground, at Exit 24 of the Northway, very near the site of the washout, evacuated 70 motor homes, travel trailers and campers from the beach area of the Schroon River to higher ground immediately upon receiving the 5:20 p.m. Flash Flood Warning. According to the camp manager, "When we heard the NOAA Weather Radio tone alert for the Flash Flood Warning, we had all the beachfront units move to higher ground". The beach and campsites were all washed out by the Schroon River flooding.

RIVERS CAN FLOOD IN THE SUMMERTIME, TOO

Bob Kilpatrick, Hydrologist/Meteorologist, NWS Albany

In the Northeast, especially in our region, 'river' flooding (as opposed to the quick flash flooding of roads, ditches and small streams) has become fairly uncommon by the time summer rolls around, but it still isn't unheard of. Most summertime (June-August) river flooding is associated with the remnants of tropical storms, but the recent significant flooding of the Schroon River is one of the rare exceptions. This flooding wasn't caused by a tropical system.

Stationary, 'closed' upper lows occur most often in late fall, winter and early spring, as opposed to warmer times of the year. They typically bring cool, damp weather with a lead-gray overcast, along with spits of rain or snow. Because these lows are embedded so high in the upper levels of the atmosphere, they affect the pattern of movement of systems, typically controlled at these levels. They are usually not in any hurry to move on, especially when there is a 'blocking' area of high pressure off to the east. Thus, the air around the closed low just swirls around in one general area, and everything stagnates.

Depending upon the location during late spring and summer, a closed low is capable of taking up large amounts of moisture from areas to the south and east. This is especially true if a 'Bermuda high' is parked out over the Atlantic, off the southeast coast. The circulation around the two systems results in southerly winds around the west, or 'back' side of the Bermuda high, off the Atlantic and/or Gulf of Mexico, which then turn to the right as they merge with the cool counterclockwise northerly flow around the west side of the low. Often, the 'tropical' air from the south is forced up and over the cooler 'marine' air from the north, which gets its character by traveling over the icy cold waters off the coast of Labrador, and across Hudson's Bay. As the mild tropical air rises, it often fires up nasty thunderstorms, which tend to travel up along lines within the air flow, one after another, like a conveyor belt. This type of a situation can produce a band of very heavy rainfall totals about 10 to 20 miles wide, and more than 20 miles long, with smaller bands of even heavier rain amounts within. This was what occurred in Warren and Essex counties with the June 13th flood.

During the summer, the ground has the ability to soak up large quantities of rainwater. But once the ground has absorbed to its capacity, the remainder will run off into nearby rivers and streams. This is what took place in the Schroon River Valley. First, there were storms in the northern part of the valley, over both Essex and northern Warren Counties, that caused the Schroon River to rise a foot and a half. Then, the storms that washed out the Northway on the 13th brought the river up an additional foot. Another three inches fell on the Schroon River watershed Thursday, June 16th that brought the river up yet another three feet…enough for it to finally overflow its banks.

Unfortunately, it's nearly impossible to predict well ahead of time exactly where lines of thunderstorms will form. But once they do form, we can track the movements of the cells and lines using Doppler radar, as well as visible and infrared satellite images. With a few measured rainfall observations, we can get a fairly accurate estimate of how much rain has fallen at a given point within our area. Just one or two of those measurements of rain are vital, as are any observations of hail, which greatly exaggerates radar reflectivities. The radar doesn't actually measure rainfall but, instead, how much of the radar beam is reflected, or bounced back. These values are then translated to estimated water equivalent amounts. Hail and melting snow flakes, however, have exaggerated, very high reflectivities—so if there is hail or melting snow in a storm, the radar will not be able to get a good handle on the actual rainfall amounts. That's why we need both rain gage readings ***and*** reports of hail including size.

SPRING 2005: COOL AND DRY

Evan L. Heller, Meteorologist/Climatologist, NWS Albany

Climatological Spring 2005 was quite varying in Albany, and March kicked it off on a snowy note, indeed. In fact, the very first day of March was the snowiest day of the entire snow season (October-May). 10.7" of the white stuff fell at Albany. There were some big swings in temperatures during March, most notably after the first week. The high temperature on the 8th was 48°. The very next day it was just 19°. This reading was the lowest daily maximum temperature for the month, beating the 1996 record for the day by just one degree. The low temperature for that morning, as well as the following morning, were the lowest readings for the month…just 6°, but these readings were far from breaking daily minimum records. The low daily mean temperature for the month also occurred on the 9th. It was just 12.5°. On the warm side of the spectrum, the last day of March was the first day to climb out of the 50s, with a high temperature of 60°. It was also the day with the month's highest daily mean temperature, 46.0°. Temperatures on all but one day dipped to freezing or lower, the outlier being the 28th, which still managed to get down to an only slightly above normal 33°, for the month's high minimum temperature. The mercury stayed below freezing 7 days out of the month. The average high temperature for March was 40.1°, 4.4° below normal. The average low, 22.2°, was 3.2° below normal. The overall result was a monthly mean of 31.1°, 3.9° below normal.

Precipitation for March totaled 3.99", 0.82" above normal. Nearly half of this amount fell on just one day…the 28th, with 1.64". This was close to, but short of, a daily record. The next highest amount, 0.69", occurred on the 1st, and this was all part of the season's biggest snowstorm. In third place was the 8th, with 0.50" that fell mostly as snow. Precipitation occurred during 18 days in March, on 13 of which it was measurable. It totaled 0.10" or more on six of those days, and 0.25" or more on four of these.

Snowfall totaled 25.9", 15.0" above normal, with just the one major event (greater than 6") that kicked off the month, and one minor event (greater than 3"), 6.2" on the 8th. Snow fell during 13 days in March, on ten of which it was measurable. 0.6" on the 24th was the season's last snowfall, occurring much earlier than normal. The 25.9" total for the month put March 2005 in the record books for Albany's 10th snowiest March, and 49th snowiest month, since the beginning of daily snow records, in 1885.

The peak wind for March was 45 mph, from the west northwest on the 8th, and the northwest on the 9th. There were 18 clear, 9 partly cloudy and 4 cloudy days, and the 11,711 total minutes of sunshine was 53% of possible, just 1% below normal.

April, with its 50.2° mean, was 3.6° above normal temperature-wise, yet free of any new daily temperature records, in fact, any new daily records of any kind for Albany. While 9 days were below normal, these were all 5 degrees or less below normal. Three days during the month were greater than 10 degrees above normal. The month's warm reading of 83° occurred on the 20th, the only day during the month that the mercury climbed into the 80s. The high daily mean temperature, 62.5°, also occurred on this date. There were 7 days during which the mercury dipped to freezing or lower, the coldest of these being both the 15th and 16th, when the mercury dipped to a low of 30°. The high minimum for the month was 51°, on the 31st, while the low maximum was 43°, on the 4th. This was also the date of the low daily mean temperature, 40.5°. The average high temperature for April was 62.4°, 5.1° above normal, while the average low was 37.9°, 2.0° above normal.

Rainfall totaled 2.36" for April, 0.89" below normal, with occurrences during 13 days of the month, 11 of them measurable. 0.10" or more fell on 8 days, with 0.25" or more on 3 of these, and 0.50" or more just once, on the 2nd, with a total of 0.76".

The peak wind for April was 40 mph, from the southeast, on both the 2nd and 3rd. The 14,219 minute sunshine total was 59% of possible, 5% above normal. There were 17 clear, 6 partly cloudy and 7 cloudy days.

May was noticeably gloomier than April, in that it was cloudier and cooler than normal, yet precipitation was significantly below normal. The average high temperature for May was 65.1°, 4.7° below normal; the average low, 44.0°, 2.5° below normal. This resulted in a monthly mean of 54.5°, 3.6° below normal. There were two daily records in May, a low temperature, and a low maximum temperature. The daily low temperature record tied a 1976 record for Albany, when the mercury dipped to a low of 30° on the 13th. This was also the lowest temperature for the month. The low maximum record occurred on the 22nd, and broke the 1909 record for the date, when the mercury climbed to just 52° for the day. The previous record low maximum was 54°. There were two additional 30° low temperatures in May, on the 3rd and 5th. The former was also the cold day of the month, with a mean temperature of 41.5°. A total of four days in May dipped to freezing or below, the last of these being the record date of the 13th, as previously discussed. The high temperature for May was 83°, recorded on the 11th, and this helped to make the 11th the warmest day overall, with an average mean temperature of 68.5°. The high minimum temperature was 57°, on the 15th.

Precipitation totaled only 1.44" in May, and this was well under half of (2.23" below) normal. Rain fell on 17 days during May, on 11 of which it was measurable. 0.10" or more fell on 6 days, with 0.25" or more on just one of these, the 15th, when 0.44" fell. Despite the lack of precipitation, May 2005 failed to make either Albany's 10 Driest May or 100 Driest Month lists.

Sunshine for May totaled only 12,430 minutes, just 46% of possible, and 10% below where it's supposed to be. There were just 12 clear days during the month. Eleven days were partly cloudy, and 8 were cloudy. The peak wind was 41 mph, from the west northwest on the 1st.

Summarizing Spring, 2005, the average high temperature was 55.9°, 1.3° below normal, and the average low was 34.7°, 1.2° below normal. This resulted in a mean temperature for the season of 45.3°, 1.3° below normal. Precipitation totaled just 7.79", which was 2.30" below normal, and total snowfall was 25.9", 12.0" above normal.

NEW POINT AND CLICK FORECAST

Vasil T. Koleci, Information Technology Officer, NWS Albany

During the past few years, the National Weather Service has been producing new-generation graphical weather forecasts. During the typical forecast process at our office, local weather elements are created by our meteorologists, and sent to the National Digital Forecast Database at various times throughout the day. This database contains each NWS Forecast Office's continually updated data. By having all office's data stored within a centralized database, National Weather Service meteorologists are now able to provide various graphic and tabular text products to the public.

One of our newest products is the Point-Click Gridpoint Forecast. This forecast is available on our webpage at: http://www.weather.gov/albany. When a location is mouse-clicked (figure 1), three pages are dynamically created with the latest data retrieved from the National Digital Forecast Database. The three pages are: The main forecast summary page, which opens up when you mouse-click on a map location, and two of the 'Additional Forecasts & Information' menu products listed in the lower right-hand portion of the page. These are the 'Hourly Weather Graph' and 'Tabular (Digital) Forecast'. All three products are point-based on the specific region that is mouse-clicked on the map. On the map, each forecast point is based on that specific location's latitude and longitude.

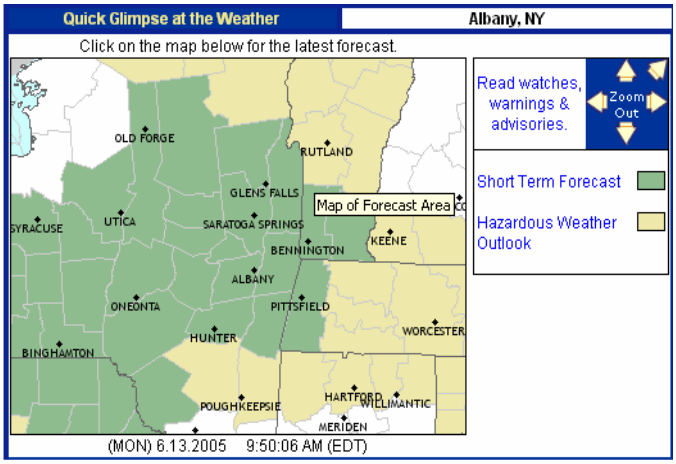


Figure 1

The main page provides both a graphical and a text version of the 7-day forecast period. Across the top of the page, there is a quick overview of the expected weather for the first seven days, in a graphical format (Figure 2), called 'Forecast at a Glance'. Below that, along the left-hand side of the page, is a more 'Detailed 7-day Forecast'. Also on this page are the 'Current (weather) Conditions', 'Radar and Satellite Images', and the 'Additional Forecasts & Information'.

Figure 2

The second of the dynamically generated products, the Hourly Weather Graph, can be obtained by mouse-clicking on Hourly Weather Graph within the 'Additional Forecasts & Information' menu. The following weather parameters are available on an hourly weather forecast graph: temperature, dewpoint, heat index, wind, relative humidity, sky cover, rain, thunder, and precipitation potential. The graph displays the weather conditions over a 48-hour span, and the time period can be defined by the user (Figure 3).

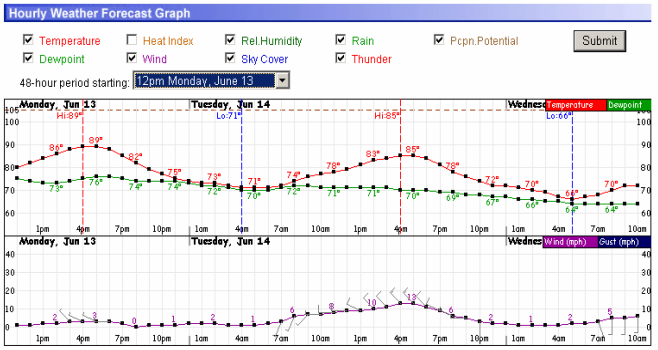
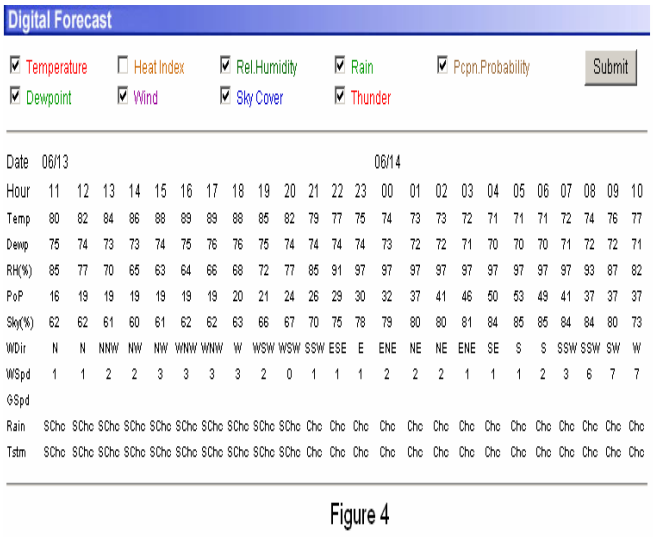


Figure 3

The third product generated from the point and click graphic, the Tabular (Digital) Forecast, can be obtained by clicking on Tabular Forecast, also located within the 'Additional Forecasts & Information' menu. Weather conditions are displayed in a tabular format over the first 120 hours. The following weather elements can be displayed on an hour-by-hour basis: temperature, dewpoint, relative humidity, probability of precipitation, sky cover, wind direction, wind speed, wind gusts, chance of rain, chance of thunderstorm, and chance of frozen precipitation (Figure 4).



Date	06/13													06/14									
Hour	11	12	13	14	15	16	17	18	19	20	21	22	23	00	01	02	03	04	05	06	07	08	09	10
Temp	80	82	84	86	88	89	89	88	85	82	79	77	75	74	73	73	72	71	71	71	72	74	76	77
Dewp	75	74	73	73	74	75	76	76	75	74	74	74	74	73	72	72	71	70	70	70	71	72	72	71
RH(%)	85	77	70	65	63	64	66	68	72	77	85	91	97	97	97	97	97	97	97	97	97	93	87	82
PoP	16	19	19	19	19	19	19	20	21	24	26	29	30	32	37	41	46	50	53	49	41	37	37	37
Sky(%)	62	62	61	60	61	62	62	63	66	67	70	75	78	79	80	80	81	84	85	85	84	84	80	73
WDir	N	N	NNW	NW	NW	WNW	WNW	W	WSW	WSW	SSW	ESE	E	ENE	NE	NE	ENE	SE	S	S	SSW	SSW	SW	W
WSpd	1	1	2	2	3	3	3	3	2	0	1	1	1	2	2	2	1	1	1	2	3	6	7	7
GSpd																								
Rain	SChc	SChc	SChc	SChc	SChc	SChc	SChc	SChc	SChc	SChc	SChc	Chc	Chc	Chc	Chc	Chc	Chc	Chc	Chc	Chc	Chc	Chc	Chc	Chc
Tstm	SChc	SChc	SChc	SChc	SChc	SChc	SChc	SChc	SChc	SChc	SChc	Chc	Chc	Chc	Chc	Chc	Chc	Chc	Chc	Chc	Chc	Chc	Chc	Chc

Figure 4

By utilizing the National Digital Forecast Database, more graphic and text-based forecast products can be produced. For further information on the Point-Click Gridpoint Forecast, please visit: About Point Forecasts.

BEATING THE SUMMERTIME HEAT

Bob Kilpatrick, Hydrologist/Meteorologist, NWS Albany
and
Evan L. Heller, Meteorologist/Climatologist, NWS Albany

Heat waves, especially the sultry ones caused by Bermuda high pressure systems, are not terribly common this far north, but we can usually count on one or two good periods of 'dog days' each summer. The discomfort is accentuated by the high humidity, which prevents the sweat which would otherwise help to cool us, from evaporating off our bodies. Here are a number of ways for you to help beat the heat:

1. Close shades and drapes of windows that will receive direct sunlight. This would be south-facing windows for most of the day, east-facing windows in the early morning, and west-facing windows in the late afternoon. In early summer, eaves can help keep the sun out of south-facing windows, and you can then leave the shades open for light.

2. Install an exhaust fan in the attic to vent out the air that heats up under the roof. Place it in a cool north- or east-facing window.

3. Turn off gold incandescent lights whenever they are not needed. They generate a great amount of heat. Fluorescent tubes use less energy, and their ballasts generate less heat. Better yet, turn off all lights, and open shades where indirect sunlight will provide enough light for performing your normal daily routine.

4. Plan your family's meals to avoid using the oven during very hot weather. Cook a quick meal on the stove top, serve cold platters, have a shaded outdoor barbecue, or take the family in an air-conditioned car out to an air-conditioned restaurant.

5. If you use a clothes dryer, make sure its vent and lint filters are clean, so it will use less power and create less heat. Accumulated dryer lint is also a fire hazard.

6. If no room in your house has air conditioning, consider going someplace else, such as an air-conditioned library, supermarket or mall, for relief during especially oppressive afternoons and evenings.

7. Turn off all computer monitors and TVs when not in use. They use power and generate heat.
8. Consider running appliances (such as the washing machine, dryer, dishwasher, etc.) either before or after, not during, the peak power demand period of 11 a.m. to 6 p.m.

9. If you have an air conditioner, frequently check the cooling fins and filter. Leaves, and cottonwood and dandelion fluff, often clog the fins on the outside unit of central a/c systems. Dirty fins and filters will reduce air-cooling efficiency, increasing the amount of energy required to cool.

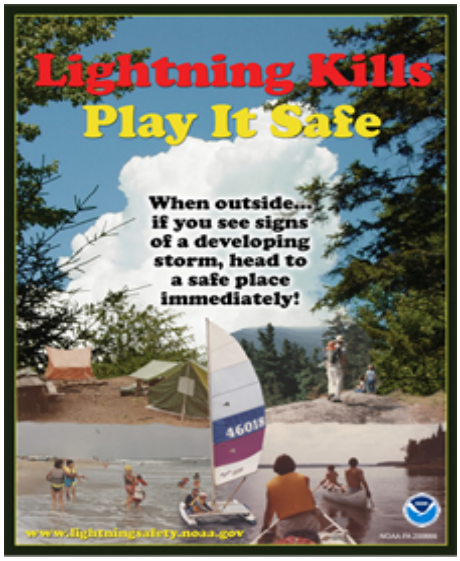
10. Reduce your hot water usage as much as possible. Hot water can further add heat and humidity to the air inside the house.

11. Avoid strenuous work during the heat of the day–do it first thing in the morning, or during the hour or two before it gets dark.

12. Wear loose, light-weight, light-colored clothing.

13. Avoid driving your car in heavy traffic during extreme heat and humidity. The extra stress can cause your car's engine…and you…to overheat.

14. Relax and drink plenty of cold, non-alcoholic drinks, and take a cool shower late in the evening to stay cool and remove sweat and dirt buildup.



WCM Words

Ray O'Keefe
NWS Albany Warning Coordination Meteorologist

Lots of great articles in this edition! Be sure to read them all.

As I began my second year, I'm struck by how frequently one weather phenomena constantly threatens our area – flooding. Whether winter ice jam, spring snowmelt, summer thunderstorms, or autumn tropical systems, flooding is a persistent threat to those of us in Eastern New York and Western New England. Our lead article reinforces this fact. As you're out and about this summer, keep all our weather safety rules in mind, particularly our flood rule: **Turn around; don't drown.**

Keep your spotter guides handy during the summer. And don't forget to **CALL** us if you witness reportable weather phenomena.

Finally, July 15 marks the 10th Anniversary of the Adirondack Derecho. Be sure to check out our web site at weather.gov/aly for a review of this event.

From the Editor's Desk

Send in your favorite Northeastern StormBuster articles. We will be putting together a special winter issue, celebrating the best of our first ten years. These will be editor's choice, but we would like to base it on input from you, our readers. If you have a personal favorite which you would like to see in our special issue, please send us the title, and indicate which edition of StormBuster it is from. If possible, please also include a copy of the article itself. Send your requests to: Raymond.Okeefe@noaa.gov. We here at Northeastern StormBuster wish you a joyous summer!