STORMBUSTER

A Newsletter for Emergency Managers & Storm Spotters

Summer, 2004 Edition-*VOL. 9, NO. 3*
Evan L. Heller, Editor

SPRING 2004: PLENTY OF SEVERE WEATHER

by Hugh W. Johnson IV, Meteorologist, NWS Albany

It was not a long wait for severe weather to first erupt across our region this spring within our 19 county warning area.

On April 18, the remnants of a thunderstorm complex managed to pack enough of a punch to officially produce the first severe weather events of the season, with blown-down power lines in Richmondville, Schoharie County, and nickel-size hail in Big Indian, Ulster County. The following day, temperatures soared to around 90 degrees, and with the heat came more severe weather. Thunderstorms produced extensive wind damage across Saratoga County, with a roof blown off of a house in Greenfield. Normally, our first episode of severe weather does not take place until May. During the morning hours of April 29th, thunderstorms deposited nickel- to quarter-size hail across portions of Herkimer County.

This past May will be remembered as a particularly active one for severe weather. Even though we had no catastrophic events like the ones during May 31,1998, severe weather still peppered a good portion of our County Warning Area during several days of the month. The first day of severe weather in May was on the 13th. A line of thunderstorms produced wind damage in Ulster and Dutchess Counties, in the form of blown-down trees and power lines. The storms also produced large hail and flash flooding. Nickel-size hail fell in Glens Falls, Warren County, with penny-size hail reported at many other locations across eastern New York. Torrential rains swelled Birch Creek in the town of Pine Hill, Ulster County, which then overflowed its banks, and forced the closure of many roads. Two days later, Berkshire County bore the brunt of the severe weather, with trees blown down in the cities of Pittsfield and North Adams. On the 18th, a severe thunderstorm hit Salisbury in Litchfield County, knocking 4 trees down.

A complex weather system, firing off many clusters of organized thunderstorms, settled into our area during the weekend of May 22-23. Our region escaped the first round of storms Friday night, which formed to the west and started out moving east, but then turned more south. However, a lone thunderstorm rocked many folks out of bed during the early morning hours Sunday, with an incredibly intense cloud-to-ground lightning display. Strong winds blew down wires in the town of Colonie, Albany County, as well as in Middleburgh, Schoharie County. Penny-size hail fell in the city of Schenectady.

This nocturnal event was just a precursor for what was to occur later on Sunday, and into Monday, the 24th. A stalled-out front, a strong jet stream aloft, and a secondary cold front plowing into an earlier one, combined to set the stage for our biggest event of the year thus far. The weather had settled down late Sunday morning, but dangerous storms encroached the area during the evening, with severe weather activity continuing off an on for more than 24 hours! The first round of the big event hammered the Mid-Hudson and Mohawk Valleys, as well as Litchfield County, Connecticut. Thunderstorms continued firing up throughout the night around the region, and a few more reached severe limits. An organized line of storms raced through the Mohawk Valley shortly after sunrise, and propagated southeast into the Mid-Hudson Valley and Litchfield County, Connecticut through midday Monday. These storms brought severe hail to one inch in diameter, along with more destructive winds and flash flooding.

The "grand finale" came during the afternoon of Monday, the 24th. After the morning storms had moved through, skies cleared, and temperatures began to climb. This only served to re-charge the atmosphere, so that when the strong cold front finally plowed through, the strongest storms of the month resulted. No less than 45 reports of severe weather were received, starting around 4:00 Monday afternoon, and continuing through to about 9:00 in the evening. Most of the reports included large hail and very heavy rain resulting in flooding. Flash flooding washed out roads in the city of Bennington, Vermont. The most noteworthy event involved Washington and Saratoga Counties of New York, where hail of up to one inch in diameter fell. A road in Stillwater, Saratoga County, appropriately named Blizzard, was covered with up to 3 inches of the hail! Hail of over one-inch diameter damaged buildings in the town of Greenwich, in Washington County. Hail covered the ground to nearly a foot deep, and was still on the ground a day later, when the official National Weather Service storm damage assessment was undertaken. One more storm, producing penny-size hail, affected Jefferson, Schoharie County on the 26th. While no tornadoes were reported during this entire event, many spotters did report wall and funnel clouds. (See the article in this issue of StormBuster entitled *Severe Weather and Flash Flooding of May 22-24, 2004*, by Eugene P. Auciello, for more detailed information on this period event.)

An unusually strong and active northern jet stream, and unseasonably warm, humid air to the south, were the combined cause of the start of this unusually early severe weather season. Even though the pattern had settled down just a little during early June, the northern jet stream had remained quite active, and more severe weather had taken place. If this northern jet stream should remain energetic, a tornado outbreak or derecho is quite possible during the summer months. Remember…if you are out camping or boating this summer…bring along your weather radio, and keep a watchful eye to the sky. And of course, as always, if a road is flooded, "turn around, don't drown!"

A WARM SPRING IN ALBANY

by Evan L. Heller, Meteorologist, NWS Albany

March kicked off the Spring 2004 season with warmer than normal temperatures, especially the first ten days of the month, during which time the mean daily temperatures averaged about 9 degrees above normal. Temperatures had dropped to a daily mean averaging several degrees below normal by the middle of the month, staying there until about the last week of the month, but they returned to well above normal once again to round out the month, resulting in an average monthly temperature of 37.9°, which was 2.9° above normal. A total of 21 days were above normal, 10, below. The highest temperature for the month recorded at Albany was a sultry 73° on the 26th, although this was not a daily record. The average temperature for the day of 59.5° also made this the warmest day of the month. The lowest temperature, 13°, occurred on the 23rd. This, too, was shy of a record. In fact, there were no temperature, precipitation or snowfall records of any kind established during the month. The coldest day was the 22nd, with a mean temperature of only 21.0°. The high temperature for the day of just 27°, the lowest daily maximum temperature for the month, helped achieve this cold mean. The highest minimum temperature for the month was 46°, on both the 26th and 27th. Precipitation during March totaled 2.43", not too far below the 3.17" normal. The 31st was the rainiest day of the month at Albany, with 0.58" realized. There was at least a trace of precipitation during all but 7 days of the month, with measurable precipitation occurring on 18 of them. There was 0.10" or more during 9 of these days, 0.25" or more during 3 of those. Snowfall totaled 14.6", 3.7" above normal for March. The most in one day fell on the 16th, when the total received at Albany was 7.0".

April was another month of above normal temperatures. The average for the month was 49.1°, which was 2.5° above normal. A total of 17 days were above normal, 13, below. The below normal stretches were scattered about during the month. The highest temperature for the month was 91°, on the 19th. Even this fell just shy of a record. In fact, April was the 2nd month in a row without any new records of any kind. The warmest day, overall, was the 19th, with a mean temperature of 71.0°. The coldest reading was 24°, on the 5th. The 5th was also the coldest day, with a mean temperature of 28.5°. The growing season officially began in Albany on the 16th. The 30° low temperature that morning was the last sub-freezing temperature event of the season. The lowest maximum temperature for the month was 33°, on the 5th, and the highest minimum temperature, 60°, on the 30th. Precipitation fell during 17 days in April, 15 days during which it was measurable. 0.10" or more fell during 6 of these days, with 0.25" or more during 5 of those. There was 0.52" on the 13th, the month's 2nd heaviest rainfall day. The greatest one-day amount, 1.16", fell on the 1st. The 3.08" total for the month was a scant 0.17" below the 3.25" normal. The last measurable snowfall, 0.1", occurred on the 5th, but the snow season didn't officially end until 2 days later, after the season's last few flurries fell at Albany. The 0.1" monthly total was 2.8" below normal.

May marked a continuation of the pattern of above normal temperatures and slightly below normal precipitation. Temperature-wise, May was the most above normal of all the spring months. The average monthly temperature was 61.5°, and this was 3.4° above normal. The highest reading for the month was 86°, occurring 2 days in a row, on the 12th and 13th. For the latter date, this tied a record, the only new record of any kind during the spring months. The lowest temperature recorded was 36°, also occurring 2 days in a row, on the 4th and 5th. The warmest day was the 13th, with a mean temperature of 72.5°, the coolest, the 4th, with a mean of just 44.5°. The lowest maximum temperature, 53°, also occurred 2 days in a row, on the 3rd and 4th. Breaking the pattern, the highest minimum temperature, 61°, occurred only on the 18th. May precipitation was still closer to normal, but it still ended up falling short. The 3.67" normal for May was missed by just 0.13". Rain occurred during all but 9 days of the month. It was measurable during 19 of these. 0.10" or more occurred during 10 of these days, 0.25" or more during 6 of those 10, and 0.50" or more during 2 of these 6. The 24th was the wettest day, with a rainfall total of 0.91". The complete lack of snowfall during May was actually 0.1" shy of normal.

Summing up Spring 2004 in Albany, the average high temperature was 59.2°, the average low, 39.8°, and the average mean, 49.5°. This was 2.0° above, 3.9° above, and 2.9° above normal, respectively. The 9.05" precipitation total was 1.04" below the 10.09" normal for spring, and snowfall totaled 14.7", 0.8" above normal.

SUMMERTIME WATER WORRIES… TOO LITTLE…OR TOO MUCH!!!

by Bob Kilpatrick, Hydrometeorologist, NWS Albany

In summertime, water is a big issue in our area. Since we are in a "wet" area, we tend to take water for granted! We drink it, bathe in it, shower with it, run the washing machine and dishwasher with it, flush the toilet with it, fill our backyard pools with it, and splash in it. If we live on or close to a river or lake, we swim, boat, fish, and otherwise enjoy it. And, of course, from time to time, most of us will drag out that hose and sprinkler when our greenery yellows or shrivels up during a dry spell. And this usage can sometimes be the cause of some of our water problems.

Running a sprinkler or two may not seem like much of a problem. It becomes a problem when <u>everyone</u> runs their sprinkler, especially in the fast-growing neighborhoods on the outer edges of our major cities, where water systems often have

not kept up with the population growth. All those new homes that go up have their surrounding green carpets, and of course, their bathtubs, kitchen sinks and toilets. Many have backyard pools as well.

In many cases, it's not a water supply problem, per se. The reservoirs, aquifers and rivers may have plenty of supply, but a water treatment plant, and most of all, the distribution system, can handle only so many millions of gallons per minute. It's when everyone turns on a sprinkler or two, and performs the ordinary routines of doing the laundry, using the bathroom, and doing kitchen work, that we can easily use more water than the system can deliver. That's where the problems begin.

When the water system is overtaxed, those who are most distant from the water plant, and up on the hilltops, will be the first to notice the pressure drop...sometimes to zero. It's these folks who will be the first to stop getting water. Continual water pressure changes can overstress the pumps and pipes, so that while freezing is the primary cause of water main breaks in wintertime, overstress is the other major cause, particularly during the summer months. And then, God forbid there is a fire on top of it all!

When there is a fire in a built-up area, firefighters count on finding ample pressure at the hydrants so they can fight the fire. If there is no pressure, they will have to truck in water, or pump it out of a swimming pool or creek.

For this reason, water suppliers have set up conservation plans to ensure the water systems can operate properly, and everyone can get their share, with some left over for emergencies. In some areas, there are water restrictions based on time of day, while other areas have odd/even day restrictions. Some of the older and more established service areas may get by with having fewer restrictions applied.

Summertime water shortages are very much weather-dependent. A number of factors affect the demand for tap water:

HEAT drastically increases the demand for water. When the temperature goes above 85 degrees, and especially into the 90s, people use more water. They drink and shower more. If they have a pool, water will evaporate more quickly. The heat is also stressful on plants, so they will require more water. If the weather is dry, demand for lawn sprinkling will increase. However, hot, humid weather is oftentimes associated with thunderstorms, which can supply beneficial rain and cool outflow winds, breaking the heat, and replenishing your lawn and garden.

SUNSHINE is also a big factor. People are more likely to venture outside to swim, or engage in sports or other activities on sunny days. And, of course, plants will need more water when the sun is out, due to increased evaporation and transpiration rates. The sun's stress is most notable during June and early July, when the sun peaks at its highest angles in the sky. On dry days, the air absorbs less of the sun's energy, so more of it reaches ground vegetation, increasing heat build-up, and in turn, plant transpiration. Plants also transpire more under conditions of low humidity.

WIND can make us feel cool, but it, too, increases plant transpiration and soil evaporation, and vegetation will need to tap even more of the ground water.

The DAY OF THE WEEK! You don't think so? During a summer drought, the New York City Department of Environmental Protection noticed a very striking pattern. When weekends were sunny and hot, water use increased drastically. On the other hand, when weekends were cool, and cloudy or rainy, much less water was used. This difference was much less pronounced during weekdays. Bottom line: Most of us can't play a lot on work days!

For tips on conserving water, visit www.dec.state.ny.us/website/dow or www.awwa.org

But summertime is a season of contrasts, and sometimes we have to deal with TOO MUCH

water! During the summertime, our region is often in or close to a battleground of air masses! Cool and pleasant air from Canada bumps up against that hot and sultry stuff that comes out of the Deep South–often around the back side of a Bermuda high pressure system. Bermuda highs are a common summertime feature on the weather map, and they result in hot and very humid air from the Gulf being carried from the southern states to the Northeast. Oftentimes, at the same time, much cooler air is brought in aloft via the "westerlies", which makes this hot, sultry air very unstable. Then the stage is set for the development of explosive, heavy-precipitation thunderstorms. These can bring all kinds of nasty weather with them...hail that breaks windows and puts dents in cars, strong winds that blow down trees and power lines, and torrential downpours that cause sudden floods that sweep away everything in their paths.

We use several measurements to determine when there is a reasonable potential for flash flooding. Some of the measurements and features we use include:

Precipitable Water-The amount of water in the atmosphere at a given moment that can be potentially rained out. This parameter is measured with upper-air soundings, like those that are performed twice daily at the National Weather Service office in Albany. High precipitable water values are indicative of there being plenty of moisture available for potentially heavy rainfall.

CAPE-Convective Area Potential Energy. This measures how unstable the air is, or how much potential there is for thunderstorms to generate. The higher the CAPE value, the more likely there will be thunderstorms, and the stronger they should be.

Winds Aloft-From about 10,000 to 20,000 feet, these are known as the steering winds. If their speeds are high, it means the storms will move along at a good clip. There is potential for wind damage, but flooding is not usually a problem. It will rain very hard, but only for a short while. On the other hand, if these mid-level winds are low, it means the storms will move very slowly. In this case, the heavy rain will persist, sometimes for an hour or longer. That may result in flooding, especially if the area is mostly paved!

Storms moving along a line-Sometimes the thunderstorms will form along a line, such as with a frontal boundary, and then move with it while the line itself moves very slowly. We call this **training**. As a result, the same areas get hit again and again. This often results in a band with several inches of rain, and little or no rain outside this band. Severe floods can occur if this band covers a stream basin. Outside the band, conditions may be bone dry.

Tropical Storms-Hurricanes are not frequent visitors to upstate New York, but from time to time, they pay us a visit at some stage in their lives, usually delivering large quantities of rain. Hurricane Floyd was our most recent significant tropical storm. Floyd caused the Normans Kill's (in the Albany area) 2nd most severe flood event of record. The Normans Kill's most severe flood occurred in October of 1955.

For help in determining if your area will have 'water worries', visit our website at www.erh.noaa.gov/er/aly, and refer to the following:

Area Discussions
Current Hazards: Local Outlook
Local Hydrology Page

Other useful information can be found at the National Drought Mitigation Center, at www.drought.unl.edu.

SEVERE WEATHER AND FLASH FLOODING OF MAY 22-24, 2004

by Eugene P. Auciello, Meteorologist In Charge, NWS Albany

From May 22 to 24, 2004, severe weather and flash flooding persisted across eastern New York and western New England. The series of events began May 22, when a front edged into southern New York, and remained nearly stationary

for two days. A series of mesoscale convective systems (MCSs) developed over the Great Lakes, and moved east along the front. One MCS produced thunderstorms, several severe, on the night of May 22, and into the early part of May 23. During the afternoon of the 23rd, several severe storms developed over southeast New York and northwest Connecticut. As these storms abated during the evening, another round of severe storms moved into the Mohawk Valley. In addition to severe weather, there was flash flooding in parts of the western Mohawk Valley and the Adirondacks. On May 24, three waves of severe thunderstorms, each more intense and widespread than those of the previous days, moved across eastern New York and western New England. The first wave produced isolated severe weather around sunrise. During the late morning, the second wave, in the form of an organized line of thunderstorms, raced across the region. Then, after 3:00 p.m. EDT, the last wave of severe storms erupted. Some supercells formed, with radar indications of possible tornadoes. In fact, tornadoes were confirmed in Delaware and Broome Counties of central New York.

The storms were prolific hail producers, with numerous reports of widespread hail (nickel- to golf-ball size). Large hail caused significant defoliation of trees; flattened thousands of acres of crops; dented numerous automobiles; and, caused window, roof, and siding damage to homes. Worst hit were the Towns of Easton, Cambridge and White Creek, in southern Washington County, New York. Heavy rain also caused significant road washouts in these areas, resulting in infrastructure problems and costly repairs. National Weather Service Doppler Radar estimated rainfall amounts to be around 6 inches during the last wave of storms. A National Weather Service cooperative observer in the Town of Buskirk, Rensselaer County, just over the county line from Washington County, reported 4.17 inches of rain. Evidence of straight-line wind damage, caused by wind with speeds estimated between 70 and 90 mph, was found in the Town of Cambridge, where 75 to 100 pine trees were either uprooted or snapped, and all facing the same direction.

No injuries or deaths were reported during the three days of nearly continuous severe weather and flash flooding. During the event, the staff at the NWS Forecast Office at Albany, New York issued a record number of warnings for eastern New York and western New England. Between May 22 and 24, Albany issued 80 severe weather warnings, including 7 Tornado Warnings, 64 Severe Thunderstorm Warnings and 9 Flash Flood Warnings. Of the 9 Flash Flood Warnings issued, 8 verified, with an average lead-time of 2 hours, 36 minutes. Of the 64 Severe Thunderstorm Warnings issued, 41 verified, with an average lead-time of 17 minutes. Although funnel clouds and cloud rotation were reported by trained NWS SKYWARN Spotters, and NWS Doppler radar indicated hook echoes with several supercells, no tornadoes were reported with these storms.

The Albany staff demonstrated teamwork, dedication, hard work, and service above self during this three-day period that contributed to excellent lead-times and enhanced public safety.

WCM Words

by Ray O'Keefe, Warning Coordination Meteorologist, NWS Albany

I'm the new Warning Coordination Meteorologist here at the Albany National Weather Service Forecast Office. If you want to know more about me, check the Spring 2004 issue of StormBuster. I'm delighted to be here in Albany. I've received a warm welcome from the staff here, and have had a chance to meet with some Spotters as well. Thanks to our active spring weather, I've had the opportunity of talking with many of you over the telephone in the midst of tracking down severe weather reports.

Spring SkyWarn classes were a great success, with a record 435 spotters trained. My thanks to those of you who attended, and to our

staff for the time and effort they put into the presentations.

The usual reminder of what we'd like you to call us about during the May through October convective season: 1) Tornadoes, waterspouts, funnel clouds and wall clouds; 2) Damaging winds (58 mph or more); 3) Any hail; 4) Damaging lightning; 5) Flooding, including bankfull or near bankfull streams; 6) Measured rainfall - 1.5 inches or more in 4 hours. Your reports are critical to our warning and verification programs. So, please get your reports to the National Weather Service as quickly as possible. Communications links include: Amateur Radio; the 800 number you were given at your training; and the "Severe Weather Report" form on the internet at:
http://cstar.cestm.albany.edu:7775/Severe_WX

StormBuster is a newsletter primarily for our trained SkyWarn spotters and emergency managers. Reader articles, or suggested topics, are always welcome. Do you have any ideas? Drop me an e-mail or a snail mail note. StormBuster is an exclusively web-based newsletter (as of Fall, 2004). If you do not have home access to the web, let me know. I will try to find a local public access point where you can view StormBuster. If you are not receiving e-mail notifications when StormBuster is posted, please drop me an e-mail. I'll be happy to add more names
to my e-mail list of spotters. E-Mail:
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From the Editor's Desk

This issue of StormBuster will be the final one to be mass-mailed to our subscribers. There are several reasons for this change. First of all, StormBuster is now available on-line at our website. All that is needed is access to a computer with an internet connection. If you do not have internet access from your home or business, most public libraries provide free access. Secondly, it has become very time-consuming e-mailing the large files to our now hundreds of subscribers. Many e-mails are returned undelivered due to too large a sent file. We've also run into the problem of people using all different word processors, and we have received numerous complaints about an inability to open up StormBuster for viewing. As we had done with the spring issue StormBuster, we have again sent you both a Microsoft Word document version and an Acrobat reader version in .pdf format. After this, you will be receiving only a quarterly notification that the latest issue of StormBuster has been posted to our
website. Access to it is at:
www.erh.noaa.gov/er/aly/StormBuster.htm.
In here, you will also find past issues of StormBuster. You will probably want to bookmark it. Until next fall, enjoy your summer!