# SKYWARNEWS

National Weather Service State College, PA Spring/Summer 2008

***"Working Together To Save Lives"***

## The Cooperative Observers – Creators of Our Country's Weather History

**By Victor Cruz, Observation Program Leader**

And so, my fellow Americans: ask not what your country can do for you—ask what you can do for your country. The aforementioned sentence was uttered by President John F. Kennedy during his Inaugural Address on January 20, 1961. However, long before President Kennedy had spoken those words, the Cooperative Weather Observer Program had been in full swing, since its creation in 1890 under the Organic Act.

Everyday more than 12,000 weather volunteers take cooperative observations on farms, at homes in urban and suburban areas, National Parks, seashores, and mountaintops. The data they collect are an invaluable measurement of atmospheric conditions where people live, work and play. The Cooperative Observer Program's mission is to provide observational meteorological data, usually consisting of daily maximum and minimum temperatures, snowfall, and 24-hour precipitation totals, required to define the climate of the United States and to help measure long term climate changes. It is also meant to provide observational meteorological data in near real-time, to support forecast, warning and other public service programs of the National Weather Service.

Volunteers in the Cooperative Program are trained by National Weather Service personnel and receive the equipment to perform their duties. In Central Pennsylvania, the oldest and longest continuous Cooperative Program is located in Lancaster County. The City of Lancaster Filter Plant has been a cooperative weather site since May 01, 1887. Our newest Cooperative Observer is in Chandler's Valley, which was established on June 19, 2004. Approximately 115 cooperative observers help to maintain the Cooperative Observer Program in Central Pennsylvania. The National Weather Service (NWS) Cooperative Observer Program (COOP) is truly the Nation's weather and climate observing network of, by and for the people.

The basic equipment for most new Coop Stations is a Standard Rain Gage, Maximum Minimum Temperature System, and a Snow Board. Typical locations range from a typical back yard to behind barns or farm houses. People who grow gardens or crops as a hobby or for a livelihood need to know how much rain has fallen. The Coop data collected provides this knowledge and helps with watering and fertilizing decisions.

People who have farms or run institutions and businesses tend to stay in one place longer and generally do not change locations often. While such long term stability is desirable, the COOP network is not restricted to just farmers and established businesses. Almost anyone can become a Cooperative Observer. All it requires is dedication to public service, attention to detail, ability to learn and perform daily duties, a suitable location, a willingness to allow NWS to place measuring instruments on your property, and willingness to allow at least one visit per year from a NWS representative. Additionally, ownership of a personal computer with modem and familiarity with its basic uses and an established internet access is desired.

At present, the National Weather Service Office in State College is seeking two citizens or institutions who want to give something back to their community, to volunteer as cooperative observers in Adams, Columbia, Fulton, Montour, and Perry Counties. If you are that person or business, please call 814-231-2405 and ask for Paul Head the Cooperative Program Manager for more information.

# Another Warmer than Normal Winter for the Region

**By John La Corte, Senior Forecaster**

For the fourth straight winter, seasonal temperatures in central Pennsylvania averaged above normal. For ease of keeping weather records, the "meteorological" winter extends from the first day of December through the end of February. This year, while not quite as warm as some recent years, still averaged about a degree warmer than normal over the central part of the state. Figure 1 illustrates the average temperature departures over the region since 2001. As we moved into the winter months many areas were still under a drought watch or warning. However above normal precipitation aided in easing the dry conditions and as of late March all drought conditions had been dropped by the state. The last measure of a winter's severity is often the amount of snow that fell. As with

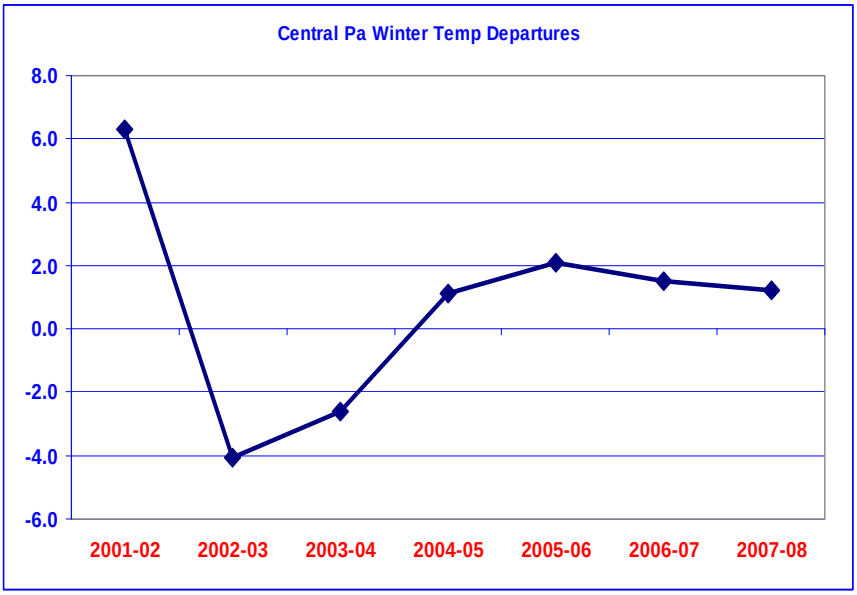



**Figure 1. Temperature Departures Winter 2007-08**

the temperatures, this was the fourth winter in a row of that most of the area experienced below normal snowfall. While we were wetter than normal, the winter was marked by a distinct lack of many large widespread heavy snows. In fact it seemed we saw an almost endless string of messy complicated storms that brought mixed bags of weather types from snow to sleet, freezing rain and rain. This posed quite a challenge to forecasters as sleet and freezing rain are some of the hardest elements to forecast and can cause some of the most significant hazards to travelers. Figure 2 shows precipitation and snowfall departures for several stations in central Pennsylvania during the winter.

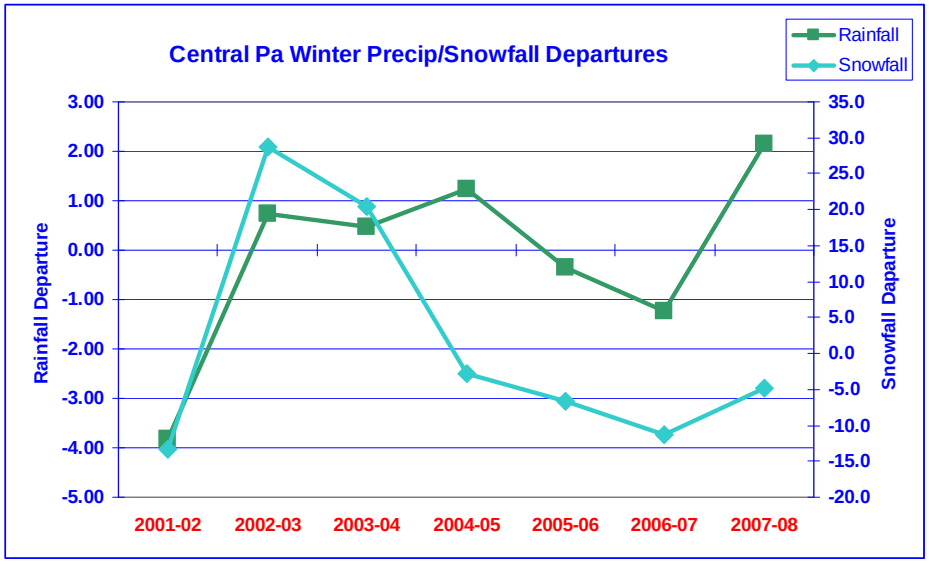



**Figure 2. Preciptation and Snowfall Departures 2007-08**

While the winter will go in the books as mild, wet and relatively snow-less, it will also be pretty non note worthy. With the cost of heating fuel being what it is these days, I doubt there are many who will complain that this will not be one of the winters to remember.

# Obtaining Extra Meteorological Data Sets for the Forecast Process

**By Ron Holmes, Information Technology Officer**

National Weather Service forecasters need to know the current state of the atmosphere before attempting to predict some future state. In the old days they had a smattering of observations based at large airports spaced hundreds of miles apart. This rather course network also had a limitation of reporting at hourly intervals. The frequency of observations improved during the 1990's when the Automated Surface Observing Systems (ASOS) were deployed. Now forecasters had observations recorded at 5 minute intervals. The spatial network also improved somewhat because the NWS could install an ASOS unit just about anywhere. However, ASOS units are costly so deployment of these extra observing sites was still rather limited. We needed to fill in the gaps left behind by ASOS and get a denser network of observations. We didn't have to wait long. In the mid 90's the internet exploded.

The internet gave everyone the infrastructure to share information and data. Spotters and the general public could

now take part in the forecasting process by sharing their personal weather station observations with NWS meteorologists. Web sites came on-line that enabled methods for the general public to share their observations. If you have a personal weather station hooked up to your computer you can sign up with these web sites and join a vast community that participates in the weather enterprise. These web sites provide helpful articles on what meteorological observation systems to purchase and how to configure your PC to send the information to their site.

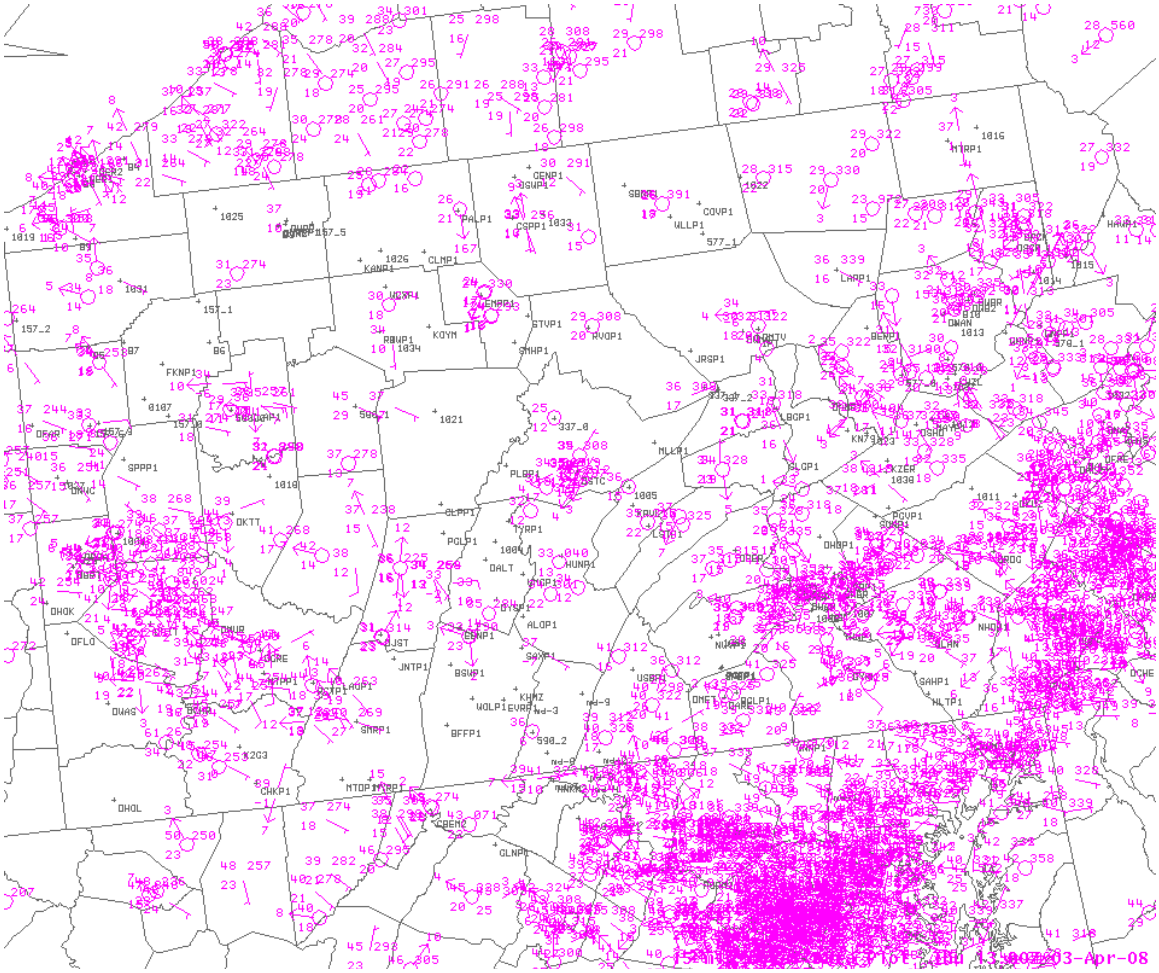


**Figure 1. Observing Sites**

These web sites are a prime example of the positive private/public relationships the government has fostered with private sector weather companies. Through communication and cooperation they have made it easy for NWS offices to obtain this rich dataset. In return the NWS provides them with an easy to use National Digital Forecast Database (NDFD) data set and real-time NWS NEXRAD radar data set so they can produce detailed forecasts for your location. Everyone wins because better observations allow forecasters to produce better forecasts and warnings.

The State College NWS Office processes weather observations from various external

web sites and other sources in addition to our normal data stream. These observations are downloaded every hour and plotted on our AWIPS computers. They help fill in the gaps from the ASOS observing network. NWS offices, through a Memorandum of Understanding (MOU), also cooperates with AWS Convergence Technologies (http://www.aws.com/aws_2005/partners.asp ) to obtain hundreds of observations from schools, TV stations, and Emergency managers for the sole purpose of plotting these observations on our AWIPS computers. The MOU states that we may not redistribute this data but it is invaluable in giving the forecasters a dense network of observations on which to base their forecasts. Another source of extra observing data comes from Roadway Weather Information Systems (RWIS) scattered along Interstate highways (http://www.rwis.state.pa.us/site/site.nsf/mainpage). There are about 80 RWIS observing platforms across Pennsylvania.

Figure 1.is an example of all of the extra meteorological data sets being plotted on our displays. You can see how dense the network is especially around populated areas. We are able to zoom in to these denser areas and obtain a spatially detailed view of temperature, dew point, wind speed and direction. If you have a personal weather station and see from the image below how your observation could help fill in existing gaps or you just want to participate in the forecast process with your observation please contact me at Ron.Holmes@noaa.gov.

## Climate Data Now Easier to Access on the Web

**By Michael Dangelo, WFO CTP Webmaster**

The daily records and normals for our two First-Order Climatological Stations (Harrisburg and Williamsport) are now a bit easier to find on the NWS State College webpage. To access the daily normals (sometimes called averages), or the daily record maximums, minimums, or extreme highest precipitation or snowfall for any day, month, or for the whole year, go to our local Climate Info Page: http://www.erh.noaa.gov/ctp/climate.php and make your selections on the checkboxes and drop-down lists located on that page to pull up the data you wish to see.

The on-line records are updated every night, after the daily climate program has run (normally by 4 am). Updating the file every night ensures that the data is always the very latest available, and that it is consistent, and accurate. The data file for the daily normals is also updated every night, but the normal values themselves are usually only updated every ten years, using data for the past 30 years. The current period of record for normal data is from 1970 through 2000.

A continuous weather record for Harrisburg has been kept since 1888, and since 1895 for Williamsport.

Graphical plots of the recent past weather conditions (compared conveniently against the normal conditions) can be found on our local Climate Graphs page: http://www.erh.noaa.gov/ctp/climate/cligraphs.php

A recent effort by the National Weather Service's Climate Services group has resulted in a great deal more climate information (especially co-operative climate data) available on the web. The "NOWData" tab on the following page has

a wealth of information for many smaller towns. However, all data on our web pages is preliminary, and not immediately thoroughly quality-checked, nor is it certified for use in court or legal proceedings. This preliminary past data can be found at our office's Climate Data page: http://www.nws.noaa.gov/climate/index.php?wfo=ctp

NOAA stores all the weather data collected by government sources at the National Climatic Data Center (NCDC) in Ashville, North Carolina. If you only need weather data for casual use, you should check our local climate pages first. But, if you need further (more detailed) information, or if you need certified data for use in legal proceedings or research, then you should call the NCDC at (828) 271-4800. NCDC has a web site as well: http://www.ncdc.noaa.gov

Certified Climate Data can also be obtained through the North East Regional Climate Center (at Cornell University in Ithaca, NY). NERCC web address: http://www.nrcc.cornell.edu/

The Pennsylvania State Climatologist (Paul Knight) is located in State College, is another excellent source of Climate information for the Commonwealth. Paul is also an instructor of Meteorology at Penn State, and host of the Weather World program on the Pennsylvania Cable Network (PCN). Paul can be reached at (814) 865-8732, or on the web at: http://climate.psu.edu/

## 2007 PUBLIC VERIFICATION RESULTS

**By David Martin, General Forecaster**

One of the most important aspects to forecasting is constantly evaluating how well we are actually doing. Anyone can predict things, but if those predictions are inaccurate, they aren't worth very much.

I have served as public verification focal point at State College since September 2005. My duties include verifying temperature and precipitation forecasts, scoring them against various computer model forecasts in order to give us and the public an idea of just how accurate we really are.

As noted in the spring newsletter last year, these forecasts are scored against guidance from 3 models. These are the NAM (MET output), the NGM (FWC output), and the GFS model (MAV output). The alphabet soup of acronyms may not mean very much to the average reader, just know these are highly complicated computer programs that give us an idea of what the atmosphere will look like day to day. Our main job is to evaluate the output and improve (hopefully) upon it in the form of the forecasts you use.

Verification temperature scores are simply the difference between the forecast temperature and the observed temperature at a site. For example, a high temperature forecast of 70, where the observed temperature is 68, results in a 2 degree error. The forecaster wants that score to be as close to zero as possible. The sign of the forecast error also can yield whether a forecaster has a cold or warm "bias" or perhaps is forecasting too warm or cold on a seasonal basis.

For precipitation, the scoring method is a little more complicated considering "probability of precipitation" (POP) and whether or not measurable precipitation

(.01 inches or more) was actually observed. A “Brier Score” is then calculated by noting if measurable precipitation is observed and comparing it to the forecast POP. If the forecaster thinks the POP on a given day will be low and precipitation occurs, the result will be a high Brier Score. Likewise, if the forecast is for high POPS and no precipitation occurs, the resultant Brier Score will once again be high. The actual Brier Score is calculated by difference in the POP and 0 if no measurable precipitation occurs or the POP and 100 if measurable precipitation occurs. The result is then squared. Sound complicated? It is. That’s why it all done by computers and hopefully the forecasters score as close to zero as possible.

RESULTS

Results generally vary from site to site, and month to month. In addition, there is a lot of variation from one season to another. 2007 started off on the cool and wet side, but by late April the pattern changed. Most of the remainder of the year was abnormally warm, dry, and sunny, with December capping off the year colder than normal.

Overall we tend to do a little better at forecasting temperatures in the warm season. In order to get a better idea at how we do, monthly results were grouped by seasons. Winter is represented by the months of January through March. Spring extends from April through June. Summer runs from July through September while the Fall goes from October through December. These groups are chosen for ease of scoring and record keeping and the forecast verification is done for both temperature and precipitation.

For the winter months, we excelled in the temperature department but fell short when scored against the models for precipitation. For the spring season we faired well in both the temperature and precipitation forecasts. The exception was our ability to “beat” the MAV guidance which was a little better than the human forecasts over most of central Pennsylvania. For the summer season we once again did a good job forecasting temperatures and precipitation, despite summer traditionally being the hardest season to forecast rainfall. The nature of the kind of hit and miss showers and thunderstorms we get in the warm season can make beating the machines very tough, but we managed to hold our own. The Fall months saw a repeat of Winter when we did well in the temperature forecasts but suffered a bit with our precipitation scores. However, we still did better with precipitation in the Fall compared to the Winter months.

So while we have not yet achieved perfection, and there is a considerable percentage of our profession who maintain we will never be able to do so, we continue to do our utmost to put the best forecast out each and every day.

## Rip Currents
## What They Are…The Dangers… How to Escape

**By Matthew Steinbugl, Forecaster**

Headed to the beach this summer? Looking forward to going swimming in the ocean? If so, that’s great, but have you ever considered what you would do if suddenly dragged out to sea by a rip current? Don’t panic – the following information about rip currents including safety tips will help to ease any fears you may have as well as educate you about why rip currents form

and the potential dangers associated with them.

**What are rip currents and why are they dangerous?**

*Rip currents* are powerful, channeled currents of water flowing away from shore. They typically extend from the shoreline, through the surf zone, and past the line of breaking waves. Rip currents can occur at any beach with breaking waves, including the Great Lakes.

*Rip currents* are the leading surf hazard for all beachgoers. Rip current speeds are typically 1-2 feet per second. However, speeds as high as 8 feet per second have been measured--this is faster than an Olympic swimmer! Thus, rip currents can sweep even the strongest swimmer out to sea. *Rip currents can be killers*. On average, more people die every year from rip currents than from shark attacks, tornadoes or lightning. According to the United States Lifesaving Association, 80 percent of surf beach rescues are attributed to rip currents, and more than 100 people die annually from drowning in rip currents.

**When and where do rip currents form? Can they be identified?**

*Rip currents* can be found on many surf beaches every day. Under most tide and sea conditions the speeds are relatively slow. However, under certain wave, tide, and beach profile conditions the speeds can quickly increase to become dangerous to anyone entering the surf. The strength and speed of a rip current will likely increase as wave height and wave period increase. They are most likely to be dangerous during high surf conditions as the wave height and wave period increase.

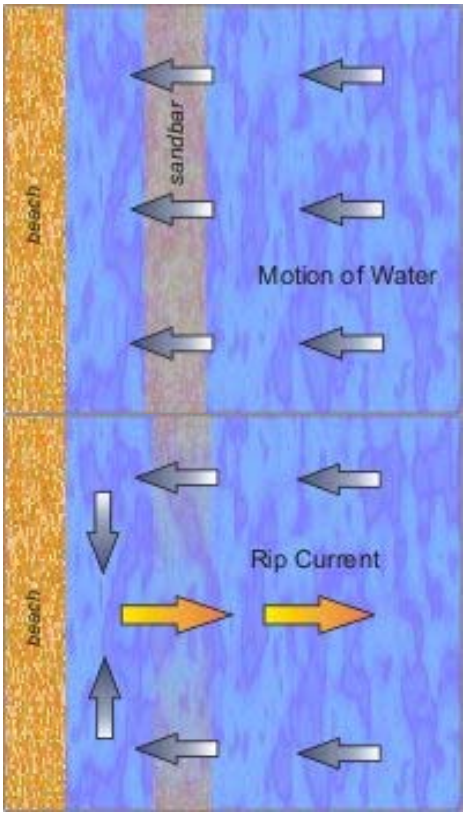



**Figure 1. Typical Rip Current**

*Rip currents* most typically form at low spots or breaks in sandbars, and also near structures such as groins, jetties and piers. Rip currents can be very narrow or extend in widths to hundreds of yards. The seaward pull of rip currents varies: sometimes the rip current ends just beyond the line of breaking waves, but sometimes rip currents continue to push hundreds of yards offshore.

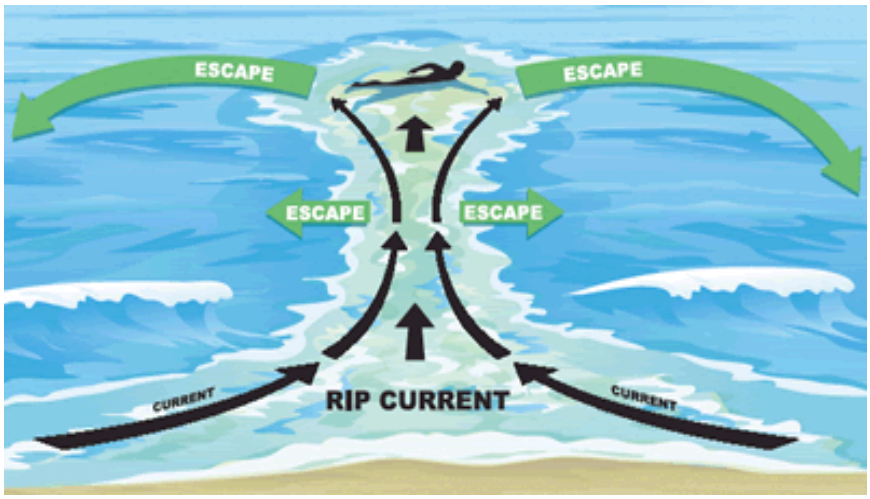
*Rip* currents are often not readily or easily identifiable to the average beachgoer. For your safety, be aware of this major surf zone hazard. Polarized sunglasses make it easier to see the rip current clues provided above**. The following clues will help you identify rip currents. Look for:**

- a channel of churning, choppy water

- an area having a notable difference in water color
- a line of foam, seaweed, or debris moving steadily seaward
- a break in the incoming wave pattern

None, one, or more of the above clues may indicate the presence of rip currents.

**How do I avoid and survive a rip current?**




**Learn how to swim!**

- Never swim alone.
- Be cautious at all times, especially when swimming at unguarded beaches. If in doubt, don't go out!
- Whenever possible, swim at a lifeguard protected beach.
- Obey all instructions and orders from lifeguards.
- If caught in a rip current, remain calm to conserve energy and think clearly.
- Don't fight the current. Swim out of the current in a direction following the shoreline. When out of the current, swim towards shore.
- If you are unable to swim out of the rip current, float or calmly tread water. When out of the current, swim towards shore.
- If you are still unable to reach shore, draw attention to yourself: face the shore, wave your arms, and yell for help.
- If you see someone in trouble, get help from a lifeguard. If a lifeguard is not available, have someone call 9-1-1 . Throw the rip current victim something that floats and yell instructions on how to escape.

**Remember, many people drown while trying to save someone else from a rip current.**

**Rip Current Myths**

A rip current is a horizontal current. Rip currents do not pull people under the water–-they pull people away from shore. Drowning deaths occur when people pulled offshore are unable to keep themselves afloat and swim to shore. This may be due to any combination of fear, panic, exhaustion, or lack of swimming skills.

In some regions rip currents are referred to by other, incorrect terms such as rip tides and undertow. Rip currents are not rip tides. A specific type of current associated with tides may include both the ebb and flood tidal currents that are caused by egress and ingress of the tide through inlets and the mouths of estuaries, embayments, and harbors. These currents may cause drowning deaths, but these tidal currents or tidal jets are separate and distinct phenomena from rip currents. Undertow,

an often misunderstood term, refers to the backwash of a wave along the sandy bottom. After a wave breaks and runs up the beach face, some of the water percolates into the sand, but much of it flows back down the beach face creating a thin layer of offshore-moving water with a relatively high velocity. This backwash can trip small children and carry them seaward. However, the next incoming wave causes higher landward velocities, pushing them back up on the beach. Undertow does not pull you under water or out to sea.

## Rip Currents: Break The Grip of The Rip!® Awareness Week: June 1 - 7, 2008


The greatest safety precaution that can be taken is to recognize the danger of rip currents and always remember to swim at beaches with lifeguards. The United States Lifesaving Association has calculated the chance that a person will drown while attending a beach protected by USLA affiliated lifeguards at 1 in 18 million. If caught in a rip current at an unguarded beach, ***how you respond could make the difference between life and death***.

NOAA's National Weather Service and National Sea Grant Program, in partnership with the United States Lifesaving Association, are working together to raise awareness about the dangers of rip currents. Research is also being conducted in order to develop and improve the ability to predict the occurrence and strength of rip currents. The goal of the awareness campaign and research is to reduce the number of rip current related fatalities.

A daily rip current outlook is included in the Surf Zone Forecast, which is issued by many National Weather Service offices. A three-tiered structure of low, moderate, high is used to describe the rip current risk. This outlook is communicated to lifeguards, emergency management, media and the general public. See this website for the latest rip current forecasts and information http://www.ripcurrents.noaa.gov/forecasts.shtml

With increasing coastal populations, rip currents will continue to be a serious hazard at surf beaches. Understanding rip currents can help you protect yourself and your loved ones when visiting the beaches.

## The Great New England Hurricane of 1938

*Many of us believe the great New England hurricane of 1938 was a natural*

*disaster, but in nature's reckoning, a hurricane, far from being a disaster, is a natural invigoration of the forest. For a forest in its long cycle of growing is nourished chiefly by its fallen leaves and limbs and the death at last of great trees.*

*After the hurricane, and at considerable expense, we sawed and chopped and carted logs to the mill. Fortunately our tidy intrusion was not complete enough for we left much slash – limbs and tops – to provide new shelter for the increasing number of birds and animals and, in the now sunny forest openings, constant new young growths to feed on.*

*A forest fire, like a hurricane, is beneficial (unless deep, and long lasting) for it releases young seeds to grow and its ash invigorates their growing, just as does the new soil and trace elements lifted by the roots of fallen trees. Ice storms, too are beneficial, for with their breaking of limbs and tops they return to the forest what grows the forest.*

*Floods, while not often affecting forests except by erosion of forest soil, are disasters to man, who too often builds on flood plains. Floods distribute new soils to tired lands, and many of our richest crops are grown on river deltas.*

**Excerpt taken from The Old Farmers Almanac 1975**

## NWS Expands Efforts to Mitigate Effects of High Impact Sub-Advisory (HISA) Snowfall in Central Pennsylvania

**By Greg DeVoir, Senior Forecaster and David Ondrejik, Warning Coordination Meteorologist**

***Introduction***

In the winter of 2004-2005, NWS State College, PA began an experimental partner project with the Pennsylvania Department of Transportation (PENNDOT) and the Pennsylvania State Police (PSP) to mitigate the devastating effects of High Impact Sub-Advisory (HISA) snow events along the Interstate 80 corridor (I-80) in central Pennsylvania. In recent years, this stretch of I-80 has experienced a series of tragic multi-vehicle accidents during snow squalls (Loganton, PA in 2001, Milesburg, PA in 2004), resulting in numerous deaths and injuries, as well as millions of dollars in economic loss. This article details the success of this important project, as well as the need to expand these efforts, both regionally and nationally. This project and all future efforts to mitigate HISA snow events support the NOAA/NWS 2006-2011 Strategic Goal mandates to *"Serve Society's Needs for Weather and Water Information" and "Support the Nation's Commerce with Information for Safe, Efficient, Environmentally Sound transportation."*

***High Impact Sub-Advisory (HISA) Snow Events***

The NWS's multi-tiered approach to warn of the likelihood, potential severity and impact of impending winter weather events relies on the timely issuance of specific, event-driven Watches, Warnings, Advisories or Special Weather Statements

(SPSs). These products discuss the likelihood and potential impact of various events, while advising customers on appropriate actions to be taken to protect life and property. While this approach works well for the majority of longer-fused scenarios involving snow accumulation and various precipitation types, a number of winter events occur each year when the event (e.g., total snow accumulation) falls short of meeting Advisory and Warning criteria, yet still poses a substantial hazard to the public.

| Date | Time | State/ Province | Character | Impacts |
|---|---|---|---|---|
| 12-Mar-98 | 1235 LST | MA,NH | Snow squall | Fatal 30-35 vehicle pileup on I-495 near Rt2 (Boxboro, MA). Two fatalities including a 3-month-old girl |
| 12-Feb-99 | 0900 LST | WI | Snow squall (1 day after record warmth) | Pileups involving 80 cars on 2 freeways - U.S. 41/45 nr. Menomonee Falls, WI - Waukesha County, 18 Injured |
| 28-Dec-01 | 1600 LST | PA | Snow squall | I-80 pileups near Loganton involving more than 100 vehicles. 8 Dead, 45 injured |
| 28-Dec-01 | 1600 LST | PA | Snow squall | Series of chain reaction pileups, including a fatal 30-car pileup near Hazleton that killed a 13-y/o girl |
| 6-Jan-04 | 1215 LST | PA | Snow squall | Fatal I-80 pileups. 6 dead, 17 injured, Portions of I-80 closed for more than 2 days |
| 13-Feb-06 | 1130 LST | MI | Snow squall | 86-vehicle chain reaction pileup on US 31, 25 injured |
| 26-Feb-06 | 0920 LST | PA | Snow squall | 25 separate accidents over a quarter mile stretch of I-81. Highway closed for 5 hours |
| 7-Dec-06 | 1535 LST | PA | Snow squall | 15-vehicle pileup incl. 7 tractor trailers, no inj/fatalities despite conditions similar to Jan. 6, 2004 |
| 16-Jan-08 | 1045 LST | WV | Snow squall | Numerous accidents, including a fatal 8-vehicle pileup on I-81. 2 fatalities |
| 20-Jan-08 | 1300 LST | ON | Snow squall | Up to 100 vehicles involved in several pileups, 1 dead, 29 injured. Highway closed ~10 hours |
| 10-Feb-08 | 1400 LST | PA | Snow Squall | 68-car pileup on I-81 killed 1 and injured 36. Northbound lane closed for 5 hours |
| 10-Feb-08 | 1230 LST | NY | Blowing Snow/ Whiteout Conditions | 1 Dead, 24 injured in I-390 pileup near Rochester, NY. 37 mph gusts created near zero visibility |

**Table 1. A sampling of recent high impact snow squall events across the northeastern United States, Great Lakes and southeast Canada.**

Sub-criteria events characterized by short-lived but extremely heavy snow bursts or squalls, often compounded by rapid wind and temperature fluctuations, can quickly create life-threatening conditions on highways, including near-zero visibility, rapidly deteriorating road conditions, and increasing driver anxiety and confusion. The resulting impact of such events can be greatly disproportionate to overall observed snow amounts (Table 1), thus earning the name "High Impact Sub-Advisory" or HISA (DeVoir, 2004).

## NWS Partner Project with PENNDOT and PSP

In 2004, NWS State College, PA began an experimental partner project with PENNDOT and PSP to reduce the severe impact of HISA events along I-80 in central Pennsylvania. Among other events, the Loganton, PA pileup in December 2001 was a primary motivating factor behind this work, while another (the Milesburg, PA pileups of January 2004) served to promote greater awareness of the problem and the urgent need for agencies to work together with the NWS in State College, PA to prevent future reoccurrences.

This partnership culminated in the development of a notification plan to facilitate pretreatment of roads by PENNDOT prior to an event, and real time mitigation during the event by PSP by dispatching cruisers running lights on either side of an affected area to slow the stream of automobile and truck traffic headed into an intense snow squall. Whenever possible, advanced PENNDOT pretreatment of roads is accomplished via email notification list, whereby forecasters compose and send a short email when potential HISA events are diagnosed more than a day or two in advance. On the day of an event, short term notifications are accomplished through the issuance of Special Weather Statements (SPSs) and a cooperative call chain which is initiated by a single phone call to the PSP from NWS State College, PA. All subsequent PENNDOT and PSP offices receive phone calls from their neighboring PENNDOT/PSP office that an SPS has been issued, which contains specific highway mile-marker information, as well as snow squall path timing similar to NWS pathcasts contained in Severe Thunderstorm Warnings, (SVRs).

In the 3 ½ years since the I-80 experimental notification project's implementation, no significant HISA incidents have occurred on this stretch of I-80 across central Pennsylvania; This can be attributed at least in part to the notification plan and cooperation between NWS State College, PA with PENNDOT and PSP, but also through good fortune. In contrast, severe HISA impacts have continued to occur outside of the experimental notification area, and work is underway to expand notifications, perhaps through the development and issuance of a new short-fused cold season convective warning or advisory product, while remaining cognizant of workload constraints and verification issues related to the longer fused winter storm events and associated metrics.

### *Conclusion*

HISA snow events are a significant threat to life and property on our nation's highways. Resulting impacts are greatly disproportionate to observed snowfall amounts, killing and injuring a substantial number of people each year. A proof of concept partner project by NWS State College, PA has shown so far that

notifications of these events by phone and SPS can be effective in mitigating the impacts of such events. However, a more efficient and automated method of disseminating this information is needed (due to workload constraints) in order to expand this critical service to all locations.

Current and future work to expand the notification system and perhaps a new NWS warning or advisory text product is involving NWS Binghamton, NY, which has forecast responsibility for Interstate 81 in northeastern Pennsylvania. Given the life-threatening impact of HISA events, a short-fused winter weather warning product seems justified. At the least, a more efficient method of dissemination that takes advantage of the Emergency Alert System to immediately notify law enforcement and emergency management officials, while containing pertinent mile-marker and path-cast information is highly recommended.

Human error dictates that weather-related accidents will continue to occur regardless of the notification system in place or NWS warning or advisory product that is implemented or issued. The goal is to minimize the threat and reduce the loss of life and property through efficient dissemination of critical short term information, which when partnered with local and state law enforcement and department of transportation road crews can prompt life-saving mitigation and lessen the severity of HISA-related accidents.

For more information on HISA research including workshop presentations and conference papers, visit our website at: http://www.erh.noaa.gov/ctp/HISA/HISA.php

## SKYWARNEWS available on the Internet

**By Bill Gartner, General Forecaster**

An 'electronic' version of *SKYWARNEWS* is available on the internet. To view *SKYWARNEWS* online, point your browser to our office's homepage www.weather.gov/statecollege. About two thirds of the way down along the left hand column you will see the section heading **Weather Safety**. Clicking on the last entry in that section, **SkyWarn Spotters**, will take you to our Spotter page. The latest newsletter (this one!) is listed at the very top. Just click on it to download it. Below the current issue are links to every issue since Spring of 2000. If you are a new spotter, here you will find back issues that are full of interesting articles on many different aspects of weather and weather related topics.

We encourage all of our spotters with internet access to sign up for internet 'delivery' of the newsletter. We will send you an email letting you know when the latest issue of SKYWARNEWS has been posted to our web site. This will help to save us printing costs…your tax dollars…and a few trees in the process. Plus, you will get to see the graphics in color!

To sign up for internet notification, please send an email with '*SKYWARNEWS* ' in the subject line to william.gartner@noaa.gov. Thank you!

## Update your spotter contact information

**By Bill Gartner, General Forecaster**

Have you moved recently? Gotten a new phone number? Please help us to keep your contact information up to date. From time to time we call our spotters when significant weather is in their area to provide us additional 'ground truth'. Thus it is important to keep your contact information current. If any of your contact information (name, phone numbers, addresses, etc) has recently changed, please let us know.

Also, if you *no longer wish to be a spotter* or *no longer wish to receive SKYWARNEWS*, please drop us a note.

Thank you!

email: william.gartner@noaa.gov

U.S. mail:
William Gartner/Skywarn spotter update
NWS/WFO State College
328 Innovation Blvd, Rm #330
State College, PA 16803

## Gazing the Spring and Summer Skies for Meteor Showers

**By Barry Lambert, Senior Forecaster**

We look forward to some clear nighttime skies and low humidity this 2008 to view some of nature's most fascinating light displays, namely meteor showers. Most months of the year contain one or more meteor shower(s), which occur as a result

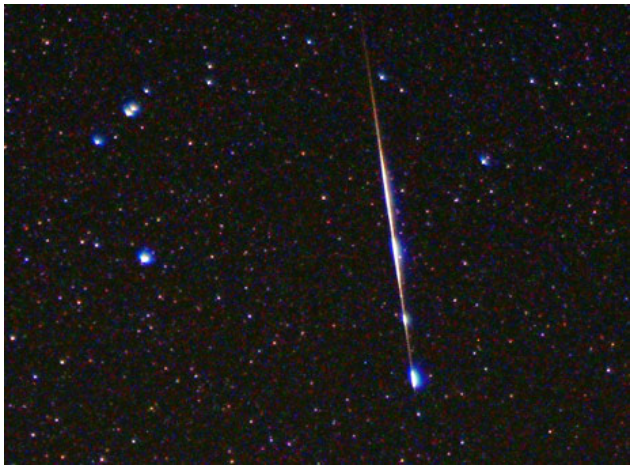


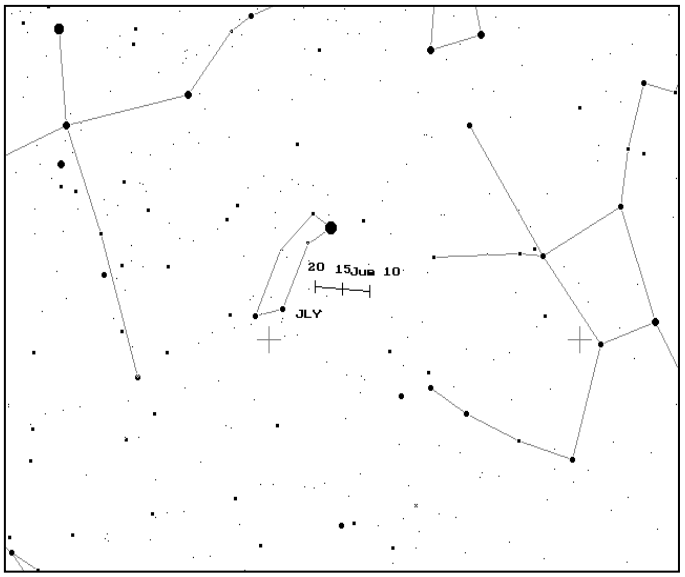
**Figure 1. Perseid Meteor**

of the earth passing through the debris trail left behind by comets. Some comets (such as 1P/Halley – whose location is now at the orbital distance of and opposite to Neptune) have taken a path through the solar system that leads to the earth intersecting its debris trail twice in a year.

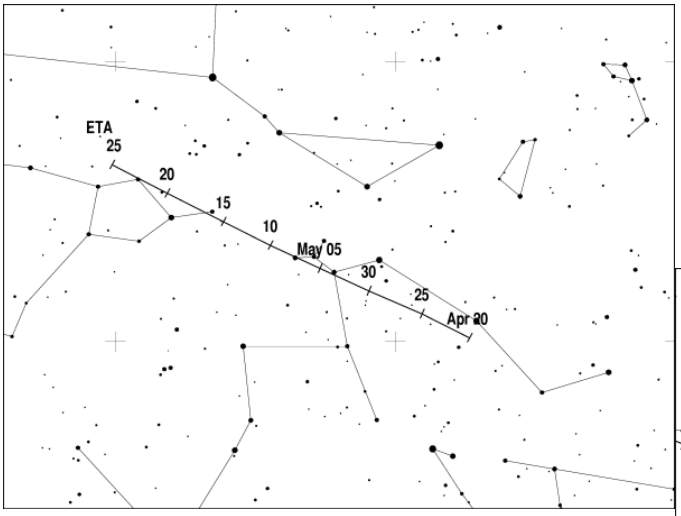
The meteor showers derive their names from the constellation where most of the fleeting and faint flashes of light are seen. Occasionally, a slightly larger piece of debris (ice or dust particles) can lead to a more pronounced "fireball" leaving a thin, glowing trail across a long arc in the sky. Figure 1 is a photo of a Perseid meteor as it blazed across the Colorado sky on August 8, 2007.

Although a few meteor showers occur in the period January through April (most notably the Quadrantids in January and Lyrids in April), we'll focus on the May through December period which contains the some of the more "brilliant" and "reliable" meteor showers. Following the description of the more prominent celestial displays (below) is a map of the radiants where the meteor showers will occur.

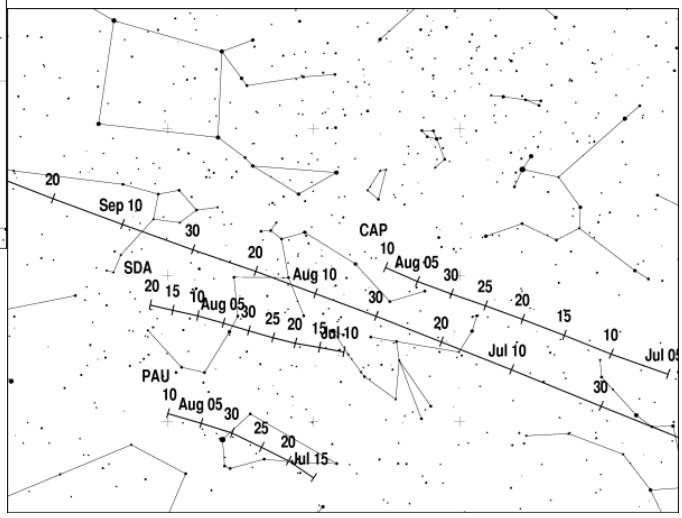
Coming to your local sky in May is the ETA Aquarids, from the debris of comet 1P/Halley. The maximum to this shower will be over the 3-day period from Sunday, May 4th to Wednesday May 7th with its peak on Monday May 5th, It will be a rather "lackluster warm-up" for what we can expect during some events in the Summer and Fall. There will be a rather low frequency of meteors (just 5 to 10 per hour in the northern hemisphere and 20 to 60 in the southern hemisphere), and lunar interference could further decrease the numbers viewed. The meteor shower will be found looking east and fairly low on the horizon within the constellation Aquarius, and just east of Pegasus. Because of the low viewing angle, some of the meteors could be the so-called, slower and dramatic "earthgrazers".




Dvorak (who viewed 16 meteors over a 90 minute period) while camping in California's San Bernardino Mountains.



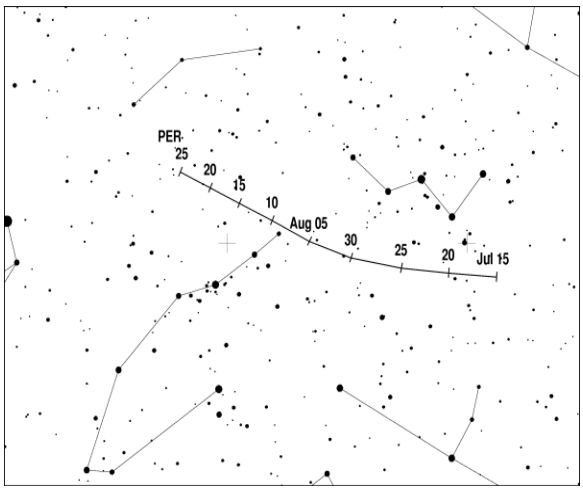

The South Delta Aquarids (Monday July 28th – Wednesday July 30th ) normally produces between 5 and 10 meteors per hour, with as many as 30 per hour. This shower will be seen during the early morning hours (1 am to 4 am) and will be low on the southern horizon.




Our second show will feature the Lyrids during the period June 14-16. The broad viewing period, however, is June 10-21. This is a rather low-rate shower with around 10 meteors per hour at its peak. The color of these meteors are mainly *blue* and *white* (Go Penn State!). This meteor shower was first discovered in 1966 by S.

The Perseid Meteor Shower has a very long duration from about July 15 to August 25, with its peak Tuesday or

Wednesday morning August 12th and 13th just before dawn. The Perseids are probably the most widely viewed annual meteor shower. The meteors may fall at a rate of up 100 per hour, and an occasional longer lasting “fireball” is also seen. You can view this display the entire night as the radiant is above the horizon all night at latitudes above 32 deg N. The best of the show occurs during the predawn hours




when the moon is low, and the radiant relatively high in the mid summer sky.

Below is a listing of all meteor showers that you may be able to observe from about the time of this publication through the end of 2008

| Date | Description | Duration |
|---|---|---|
| May 4 | Eta Aquarids: Radiant-- near Water Jar. From Apr. 21 to May 12. 21 per hour, yellow with bright trails. Comet Halley debris. | |
| June 3 | Tau Herculids: Radiant--near Corona Borealis. About a month long, 15 per hour max, most quite faint. | |
| June 5 | Scorpiids: Radiant--near Ophiuchus. 20 per hour with some fireballs. | |
| June 7 | Arietids: About 30 per hour. Slow moving with some fireballs. | |
| June 13 | Ophiuchids: Radiant-- near Scorpius. Only 3 per hour but fast moving bolides are common. | 25 days |
| June 16 | June Lyrids: Radiant--near Vega. Another part of May Lyrid meteor stream. 15 per hour, faint blue meteors. | |
| June 20 | Ophiuchids: Radiant-- near Sagitarrius. Rate varies from 8 to 20, with occaisionally many more. | |
| June 30 | June Draconids: Radiant--near handle of Big Dipper. Rate varies from 10 to 100 per hour. Pons-Winnecke Comet is parent. | |
| July 28 | Delta Aquarids: Radiant--near Capricornus. 25 per hour, slow (24 kps) with yellow trails. | 40 days |
| July 30 | Capricornids: Radiant--near Aquarius. Tough to tell these from Delta Aquarids. 10 to 35 per hour with bolides. | |
| August 10 | Perseids: Radiant--near Double cluster. 50 to 100 per hour, yellow with trails and bolides. The best modern dependable shower. | 5 days. |
| August 20 | Kappa Cygnids: Radiant--near Deneb. 12 per hour with many fireballs. Duration--15 days. | |
| August 31 | Andromedids: Radiant-- near Cassiopeia. Occaisionally spectacular, usually 20 per hour. Some red fireballs with trails. Biela's Comet parent. | |
| September 23 | Alpha Aurigids: Radiant--near Capella. 12 per hour, fast with trails. | |
| October 7 | Piscids: Radiant--near Aries. 15 per hour at 28 kps. | |
| October 9 | Draconids: Raidiant--near Hercules. Spectacular when comet Giacobinni-Zinner passes near Earth. 200 per hour when comet is close is not uncommon, 1000 per hour sometimes. | |
| October 20 | Orionids: Radiant--near Taurus. 30 per hour, fast (67 kps) often in colors with long trails. | 8 days. |
| November 5 | Taurids: Radiant--near Pleaides. 10 per hour with many fireballs. Debris from comet Encke. | 45 days. |
| November 12 | Pegasids: Radiant--Near Square. from Oct. 10 to late | |

| | | |
|---|---|---|
| | **Nov., 10 per hour, used to be spectacular.** | |
| **November 17** | **Leonids: Radiant--near Sickle. Most spectacular of modern showers. 1966 saw 500,000 per hour-- 140 per second. Comet Temple--Tuttle is parent. 20 per hour between 33 year shows, fastest known at 71 kps.** | **4 days.** |
| **Decmeber 10** | **Monocerids: Radiant-- near Gemini. 12 per hour.** | |
| **Decmeber 11** | **Sigma Hydrids: Radiant--near Head. 12 per hour, fast.** | |
| **Decmeber 14** | **Geminids: Radiant--near Castor. 60 per hour, many bright, white but few trails. Icarus, the Earth-crossing astroid seems to be the parent.** | **6 days.** |
| **Decmeber 14** | **Leo Minorids: 10 per hour, somewhat faint. Discovered by amateurs in 1971.** | |
| **Decmeber 20** | **Delta Arietids: 12 per hour, must view in early evening, before radiant sets.** | |
| **Dec. 22** | **Ursids: Radiant--Little Dipper Bowl. Medium speed, 20 per hour, many with bright trails.** | **2 days** |

Here are some links to explore the fascinating world of meteors. A few of the links have a comprehensive listing of all meteor shower occurrences during 2008, along with where in the sky to locate them.

http://www.amsmeteors.org/

http://skytour.homestead.com/met2008.html

http://www.space.com/spacewatch/meteor_showers_2008.html

http://en.wikipedia.org/wiki/List_of_meteor_showers

http://www.theskyscrapers.org/meteors/

http://www.amsmeteors.org/showers.html#2008

http://www.amsmeteors.org/fireball/fireball_log2008.html#pennfb

This final link has a comprehensive listing of the many fireball sightings already reported in 2008. It also contains a dramatic photo and maps of the trajectory of the Pennsylvania Fireball or “Bolide” during the early evening hours (about 6:18 pm) on July 23, 2001.

## Fire Weather Forecasting and Wildfires in Pennsylvania

**Bill Gartner, General Forecaster and Fire Weather Program Leader**

This time of year highlights another important forecast program of the National Weather Service (NWS)…Fire Weather. Spring is the most active time for wildfires in Pennsylvania. More than 800 fires in the Spring of 2006 (the most recent data) burned over 7000 acres across the state.

While forest fires in Pennsylvania fortunately do not usually get as big as those that occur in the western United States, they are still costly and present a danger to firefighters and the public. As part of its mission to protect life and property, the NWS produces daily forecasts of weather conditions that are used by those responsible for extinguishing wildfires. Among these wild land firefighters are personnel with the Pennsylvania Bureau of Forestry, Allegheny National Forest in northwest Pennsylvania, and your local fire department.

Spring is the most active time for wildfires for a multitude of reasons and all are related in some way to the weather. Most

fires start in what are called fine fuels; grasses, dead leaves and small plants that died or were dormant over the winter. As temperatures warm during March and April, snow cover melts and these fine fuels dry out quickly. The combination of dry fuels with low humidity and strong winds, which cause fuels to dry even faster, can cause fires to grow and spread rapidly. During periods of extreme weather conditions, the NWS may issue a Fire Weather Watch or Red Flag Warning to alert firefighters to the potentially dangerous weather conditions. These are equivalent to the watches and warnings that we issue for severe thunderstorms. Once trees and plants bloom, a process called 'green-up', their moisture content increases and wildfire activity decreases by mid to late May.

One last factor that makes Spring the primary wildfire season in Pennsylvania is burning of debris. This time of year coincides with outdoor cleanup and the burning of dead leaves, branches, and other household debris. Burning of debris that gets out of control is the leading cause of wildfires in Pennsylvania. When possible, it is best to recycle lawn and household refuse instead of burning it. If you must burn, please be aware of local burning ordinances and possible burn bans. The Pennsylvania Bureau of Forestry provides these safety tips that are good to follow:

- Do not burn on windy days.
- Never leave fire unattended.
- Always have a water source and rake or shovel nearby
- Utilize a proper burn barrel.
- Ensure completed fires are out cold.

And remember…only YOU can prevent wildfires.

## Shocking news about Lightning Awareness Week in PA (June 22-28, 2008)

**Dave Ondrejik, Warning Coordination Meteorologist**

Ok, so I went for the cheap joke in the title…but there is no joking around when it comes to lightning.

The science around lightning is quite fascinating. Can anyone guess what ingredient is needed in a thunderstorm to produce lighting???? That's right – ice or as we call it – hail!

In a storm, the ice particles vary in size from small ice crystals to larger hailstones, but in the rising and sinking motions within the storm there are a lot of collisions between the particles. This causes a separation of electrical charges. Positively charged ice crystals rise to the top of the thunderstorm, and negatively charged ice particles and hailstones drop to the middle and lower parts of the storm. This produces a large difference between positive and negative electrons in the cloud and thus we can get in cloud lightning.

For argument sake, lets say that the earth is generally positively charged. And thunderstorm gathers pools of positively charged particles along the ground.

Positive charge particles tend to rise in the air through tall objects such as houses, trees and yes, even you. You will feel a specific pattern if these electrons are moving through you. You will feel a tingling sensation in your feet, and that will rise through your legs, back, neck and head…and could actually make your hair stand on end. If this happens to you, it is

not a fun game, it means that in a matter of seconds you could be struck by lightning.

The negatively charged area in the storm will send out a charge toward the ground called a **stepped leader**. It is invisible to the human eye, and moves in steps in less than a second toward the ground. When it gets close to the ground, it is attracted by all these positively charged objects, and a channel develops. You see the electrical transfer in this channel as lightning.

If you feel this electronic sensation, the first thing you need to do is break the flow of electrons from the spot where you are standing. Run as fast as you can to the nearest house or shelter. If there is no shelter around, the next best thing to do is get into the lightning position.

**Figure 1**: **Recommended Lightning Position**

Note in this position, the person is on the balls of his feet, which minimizes his contact with the ground. Also he is facing down with his eyes closed and his hands covering his ears. Why cover your ears? Well, the thunder will produce a loud concussion wave that quite frequently can cause people to lose all or partial hearing. Our findings show this is the best position. One may ask the question…if you are wearing rings and a metal watch, will that attract the lightning. The answer is no, however if you are struck wearing that jewelry, you will receive burns, some could be serious.

The National Weather Service is holding a Lightning Awareness Week on June 22-28, 2008. This is an important topic as Pennsylvania ranks in the top 10 in lightning deaths.

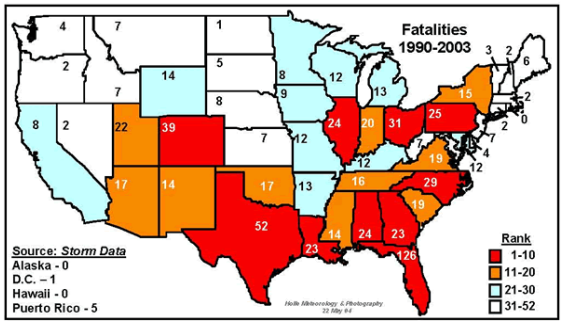



**Figure 2: PA ranks in the top 10 with 25 lightning fatalities. PA also ranks in the top 10 for number of people struck by lightning (not shown in this image)**

So, the question remains…why does Pennsylvania have so many people struck by lightning and so many lighting fatalities? If you look at a map of how many lighting strike occurred between 1989 and 1999, there are at least 22 states above Pennsylvania in lighting strikes.

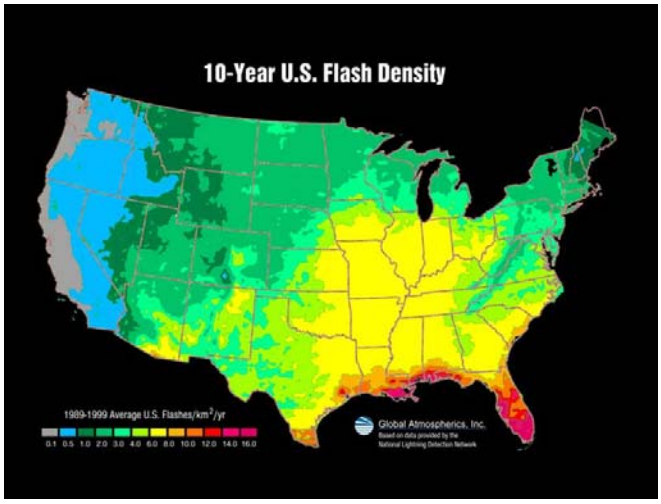


**Figure 3: Shows the 10 year U.S. Flash Density over the U. S. There are at least 22 states above PA in number of lightning strikes.**

So, again with the question….why do we have a high death rate and strike rate? This is one answer where I cannot completely fill in the blanks. It is apparent that some Pennsylvanians are not paying attention to the lighting rules.

Remember, if you are close enough to hear thunder, you are close enough to be struck by lightning. Lightning can strike out ahead or behind the storm by 10 miles.

**Figure 4: Shows a bolt of lightning striking miles ahead of the core of the thunderstorm.**

And finally, the GOLDEN RULE when it comes to lightning safety. If you follow this rule, you will give yourself the best chance to survive any storm that passes through your area this summer.

## Use the 30/30 Rule

30 seconds flash-to-bang - time to take shelter!

30 minutes after the last thunder is heard - safe to resume activities.

I could go on further about lightning awareness, like each spark of lightning can reach over five miles in length, soar to temperatures of approximately 50,000 degrees Fahrenheit, and contain 100 million electrical volts.

Or Thunder is caused by the lightning channel heating up rapidly to 50,000 degrees. The is rapid expansion of heated air causes the thunder. Since light travels faster than sound in the atmosphere, the sound will be heard after the lightning. If you see lightning and hear thunder at the same time, that lightning is in your neighborhood.

Did you know that there is **Positive** and **Negative** lightning????

Not all lightning forms in the negatively charged area low in the thunderstorm cloud. Some lightning originates in the top of the thunderstorm. This area carries a large positive charge. Lightning from this area is called positive lightning. This type is particularly dangerous for several reasons. It frequently strikes away from the rain core, either ahead or behind the thunderstorm. It can strike as far as 5 or 10 miles from the storm, in areas that most people do not consider to be a lightning risk area. The other problem with positive lightning is it typically has a longer duration, so fires are more easily ignited. Positive lightning usually carries a high peak electrical current, which increases the lightning risk to an individual. This is the type of lightning that people see “out of a clear blue sky”!

To help improve our safety around thunderstorms and lightning, the National

Weather Service is conducting a Lightning Safety Week. This year the dates are June 22 – 28, 2008.

If you have internet access, please go to:

http://www.lightningsafety.noaa.gov/week.htm

Below is a list of topics that will be covered during the week. If you don't have internet access, portions of theses text products will air on NOAA Weather Radio during Lightning Safety Week.

| Day | Topic | Factsheet | Text of Video |
|---|---|---|---|
| Monday | Lightning Overview | Lightning & Lightning Safety- An Introduction | Text Equivalent |
| Tuesday | The Science of Lightning | Why do some clouds produce lightning and others don't? | Text Equivalent |
| Wednesday | Lightning Safety Outdoors | Lightning Safety Outdoors | Text Equivalent |
| Thursday | Lightning Safety Indoors | Safe Shelters & Indoor Safety | Text Equivalent |
| Friday | Medical Aspects | The Medical Aspects of Lightning | Text Equivalent |

You can find more information for your children on lightning at our Owlie Lightning Ahead weather book at:

http://www.nws.noaa.gov/om/brochures/owlie-lightning.pdf

If someone is struck by lightning, it is important that they receive the appropriate medical attention immediately. Some deaths can be prevented if the victims are attended to promptly. Lightning victims do not carry an electrical charge and are safe to handle. First, you should have someone call 9-1-1 or your local ambulance service. Then check to see that the victim is breathing and has a pulse, and continue to monitor the victim until help arrives. Cardiac arrest is the immediate cause of death in lightning fatalities. If necessary, you should begin cardio-pulmonary Resuscitation (CPR). **Also, if possible, move the victim to a safer place. Don't let the rescuers become lightning victims. Lightning can strike the same place twice.**

Hopefully you have learned something new and interesting about lightning. If you still have questions, please use the websites listed throughout the article, they provide a wealth of information about this topic.

Until the Fall…STAY SAFE, and KEEP AN EYE TO THE SKY!!

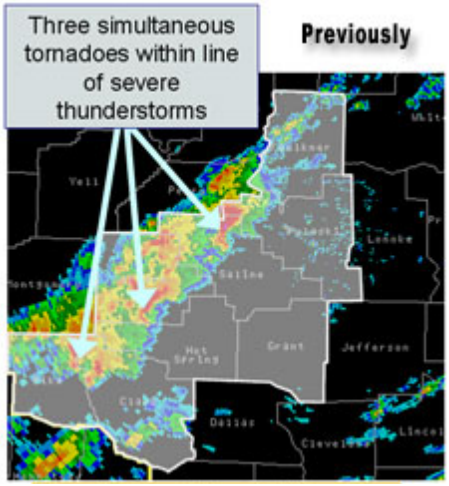
## Storm-Based Polygon Warnings are here!

**Pete Jung, Senior Service Hydrologist**

A long awaited change in warning methodology has arrived at the National Weather Service. Beginning in the Fall of 2007, a transition was made from a "county-based" warning system to a polygon or "storm-based" warning system. Let's take a moment and compare the old and new warning strategies, and see what the impacts will be on you and on National Weather Service (NWS) Products.

Old County-based Warning Methodology: For many years, the NWS has issued Severe Thunderstorm, Tornado and Flash Flood Warnings for entire counties. This was done without respect for exactly how much of the county would actually be impacted by a storm. Let's look at an

example to illustrate the point. If a tornado was going to cross only the far southern portion of Dauphin County, the NWS would, in the past, issue a Tornado Warning for ALL of Dauphin County. The impacts of this type of warning philosophy can be easily seen; a large portion of the county (and also most of the population) would be under a "tornado warning" but actually see no severe weather. With most of the population seeing no effects of the storm, this lead to a perception of over-warning, even though, in this example, there actually was a tornado in southern Dauphin County.




In this real-life example depicted above, under the "county-based" warning system, warnings for the three tornadoes depicted would cover 8 counties and over one million people.

New Storm-based Warning Methodology: The NWS now issues warnings based on the actual storm track, and the areas to be impacted by Severe Thunderstorms, Tornadoes and Flash Floods. Using the same example as earlier, the NWS would issue a warning only for the southern portion of Dauphin County, instead of the entire county. Various methods of disseminating the warning, (for example via the internet of on TV) could then focus the warning to those people only in harms way, and not interrupt the lives of those people not at all affected by the storm, say in the northern part of the county.


In this revised example now using the "storm-based" warning system, the three tornadoes are warned for based on their track. As a result, 70% less area, and 600,000 fewer people are covered by the warning. Those people not in the path of the tornadoes do not get lumped in to the warnings.

By focusing on the true threat area, storm based warnings will improve NWS warnings will improve NWS warning accuracy and quality. They will promote improved graphical warning displays and support a wider warning distribution. NOAA Weather Radios will work as before and continue to alert entire counties.

## Internet reports of Severe Weather

**Dave Ondrejik, Warning Coordination Meteorologist**

As of April 30, 2008 we no longer accept internet reports of severe weather. To report your severe weather, please call our

spotter line at 1-800-697-0010. Additionally, there is a new National-wide automated system that you can call to report your severe weather. That phone number is 1- 877- 633-6772. This automated system will ask you for your location and report. It will then automatically format it in a special context and send it directly to our office.

We found that the Internet page data entry system provided us very few reports and was not cost effective to maintain. Hopefully you can program these two numbers into your home and cell phones for easy access when severe weather strikes.

But again, please be safe when reporting severe weather. Your safety is our #1 concern!!

SKYWARNEWS

National Weather Service
328 Innovation Blvd
Suite #330
State College, PA 16803

**TO:**