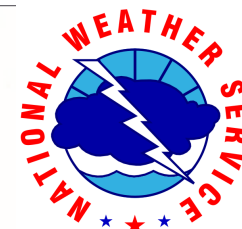


# Steel City Newsletter

National Weather Service in Pittsburgh, PA

National Oceanic and Atmospheric Administration (NOAA) – US Department of Commerce (DOC)

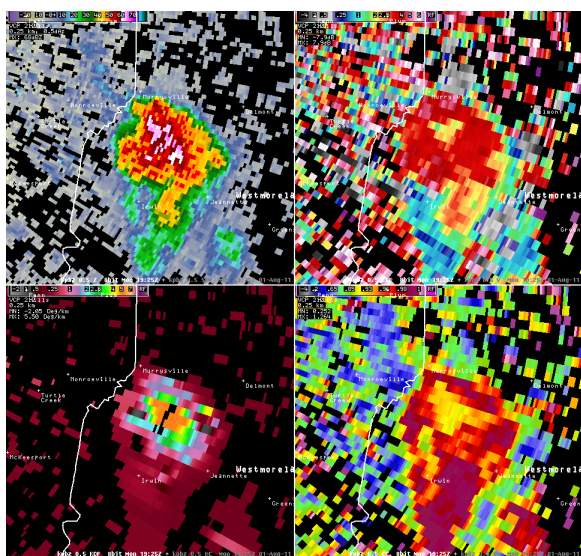


ISSUE I

FALL 2011

## Dual-Polarization Radar is Here!

Charlie Woodrum and Tom Green



Radar reflectivity (upper left), differential reflectivity (upper right), correlation coefficient (lower right), and specific differential phase (lower left) of a one inch hail producing storm near Irwin in Westmoreland County, PA.

On July 15th, the National Weather Service in Pittsburgh was able to view the first local images of Dual-Polarization (Dual-Pol) radar. The Pittsburgh Doppler Radar (KPBZ) was out of service for the upgrade from July 6th through the 15th. During this time, forecasters used the Pittsburgh Terminal Doppler Weather Radar (TPIT) and neighboring Weather Surveillance Radars (WSR-88Ds) to monitor showers and thunderstorms in the area. The Pittsburgh office is a beta test site for this new technology, one of the first in the nation! This is all part of the upgrade to Dual-Pol for all radars (approximately 150) across the entire National Weather Service network.

So what does it mean to have Dual-Polarization radar? Before, the radar transmitted and received only horizontal polarized radio wave pulses. Now, the radar transmits and receives both horizontally and vertically polarized pulses. This allows the radar to measure the horizontal and vertical dimensions of cloud precipitation particles, which provide information on the size, shape, and ice density of cloud precipitation particles that meteorologists didn't have before. This new data will help forecasters discern new radar-based signatures. This includes new ways to detect hail, updrafts, tornadic debris signatures on weaker tornadoes, and non-meteorological phenomena.

supplementary information. The new products are: Differential Reflectivity (ZDR), Correlation Coefficient (CC), Specific Differential Phase (KDP), Hydrometeor Classification Algorithm (HCA), One Hour Precipitation Accumulation (OHA), Storm Total Precipitation Accumulation (SHA), Digital Storm Total Accumulation (DSA), Hybrid Hydroclass (HHC), Digital Accumulation Array (DAA), Digital Precipitation Rate (DPR), Digital One-hour Difference (DOD), Digital Storm Total Difference (DSD), Digital User-Selectable Accumulation (DUA), and Melting Layer (ML). With the abundance of new radar data available, there are many forecast applications.

Already this summer, staff members have observed the ability for Dual-Pol radar precipitation estimates to filter out hail contamination. In the past, the highly reflective nature of hail in thunderstorms would cause overestimation in precipitation products. Now, Dual-Pol has the ability to automatically detect hail and give more accurate precipitation estimates for hail producing storms. In addition, the new

*(Continued on page 4)*

Dual-Pol offers 14 new products for forecasters to use as

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NWS Pittsburgh online: <http://www.weather.gov/pbz> -- Email: [pit-comments@noaa.gov](mailto:pit-comments@noaa.gov)

## Social Media Update

Alicia Smith

As part of a national roll-out, the National Weather Service office in Pittsburgh has joined the online social media community of Facebook. With the success of the original nine prototype office and a national page, the NWS decided to explore the development of local Facebook pages. Since the page started on August 16th, our local office page already has garnered nearly 500 likes (as of this printing).

The purpose for the page will be to create a supplemental channel to increase the reach and visibility of the NWS message and expand dissemination of environmental information. We believe it could be a powerful tool to promote weather awareness activities such as outreach and educational efforts, help disseminate life saving information, and to draw users to our official site. As an example, the NWS offices located at or near the east coast, in areas that were expected to be impacted by Hurricane Irene, used Facebook to keep the public aware of the forecast track, forecast precipitation, flooding information, and how to prepare for the storm. We also encourage users to post reports of hail, wind damage, wind gusts, flooding, and soon snow amounts to the page. In addition, photos and videos are greatly appreciated. In just a few short weeks, we've already had users post photos and reports to the page during severe weather. While our office hopes to monitor and post regularly, please keep in mind that responses to posts will be made on a time-available basis, and may be very difficult during a weather event.

In addition to Facebook, the NWS has begun to explore the development of specific office twitter feeds. While the Pittsburgh office is not one of the initial prototype offices, we still encourage users to tweet their storm reports to us via the #wxreport hashtag.



Please 'Like' our page at: <https://www.facebook.com/US.NationalWeatherService.Pittsburgh.gov>  
More information on reporting via twitter can be found here: <http://www.weather.gov/stormreports/>

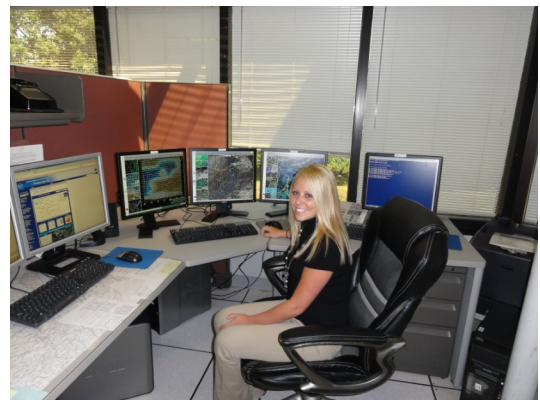
## Student Volunteer Program

Tom Green

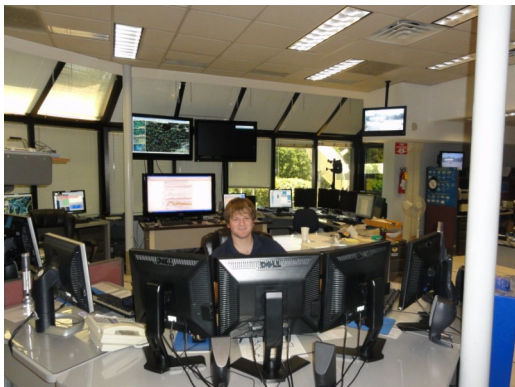
Many years the NWS in Pittsburgh has run a student intern program during the summer months. This allows students currently enrolled in a meteorology program to take the lessons that they have learned in the classroom and apply them in an operational forecast setting. During the summer of 2011, James Festa, a rising senior at Penn State University, and Karly Bitsura, a rising senior at California University of Pennsylvania, were chosen to participate in the program.

During the first half of the program, these students launched upper air balloons and were supervised while performing many of the job duties that a full-time paid intern would complete. The second half of the program allowed the students to shadow forecasters who were doing the public and aviation forecasts.

During severe weather, James and Karly had a chance to sit with forecasters to learn the process of how storms are examined and the determining factors in issuing severe thunderstorm and tornado warnings. Later on, the students were able to try their hand at issuing warnings themselves from a previous event on the office's Weather Event Simulator.



2011 summer student volunteer Karly Bitsura



2011 summer student volunteer James Festa

In addition, a 2010 NWS Pittsburgh summer student intern, Elyse Colbert from Penn State University, recently earned a Student Career Employment Program (SCEP) position with the NWS State College office. This will give Elyse a chance at a non-competitive promotion to a full-time intern position with the NWS after completing 640 hours of work and graduating with her meteorology degree.

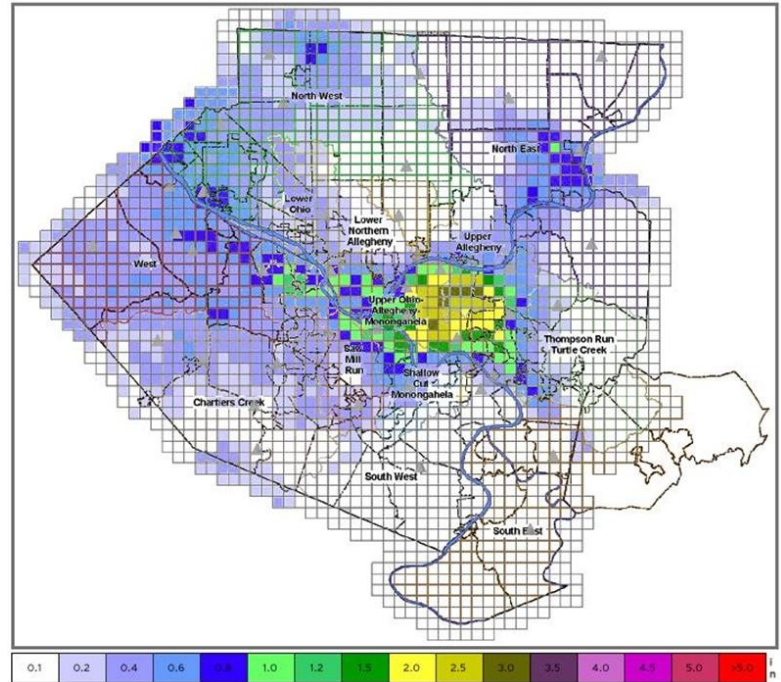
# Fatal Flash Flooding in Pittsburgh

Bill Drzal

On August 19, approximately 2.5 inches of rain fell in a very urbanized 4.8 square mile watershed during the Friday evening commute just east of downtown Pittsburgh. Severe flash flooding developed on Washington Boulevard in just under an hour, resulting in four fatalities and approximately 15 water rescues. A mother and two daughters drowned inside a van when it became submerged in approximately 9-10 feet of water. An elderly lady who abandoned her car was apparently swept or fell into an open manhole or catch basin.

What led to such extreme flash flooding was a combination of a few urbanized features along with the rapid rainfall which mostly occurred between 3:35 p.m. and 4:35 p.m.. There are no surface streams in the watershed, as all of the water is channeled underground through drainage pipes. Washington Blvd actually lies in the natural creek bed of Negley Run. Thus, when the drainage pipes cannot handle excessive water flow, it comes up onto the surface and runs down Washington Boulevard. Evidence of the water erupting out of the drainage could be found as every manhole cover was blown off within the first half mile of Washington Blvd. In this event the sewer system was simply over-

Cumulative Rainfall Data from 2011/08/19 16:00:00 to 2011/08/19 16:45:00



Rainfall estimate from 3 Rivers Wet Weather.



Motorists were forced to abandon their vehicles on Washington Boulevard as flash flood waters quickly submerged their vehicles. Photo Courtesy of Chris Langer / Pittsburgh Tribune-Review

whelmed. Exacerbating the situation is the fact that higher terrain near the intersection of Washington Blvd and Allegheny River Blvd acts like a dam which impounds the water resulting in a potential to create a small lake. The reality is that if rainfall rates were higher, this urbanized lake could have become as deep as 15 feet in places before over spilling would occur.

This flash flooding event led to the first flood-related fatalities in Allegheny county since the remnants of Hurricane Ivan caused a death in 2004. The fatalities occurred just 2.5 miles away from East Little Pine Creek, where nine people perished in 1986. In that event, 5.5 inches of rain fell in just 90 minutes. This was the deadliest flash flood event in the Pittsburgh County Warning Area (CWA) since the 1990 Shadyside Flood in Belmont County, OH when 26 fatalities occurred.

## Send us your weather pictures and photos!

The National Weather Service in Pittsburgh wants to make it possible for weather spotters across the region to showcase their photos to the world! Pictures may be used in future editions of this newsletter, for spotter training, and in the photo gallery on our website. To participate, send your photos or any other questions to [PBZ-Public@noaa.gov](mailto:PBZ-Public@noaa.gov). Remember to express your permission for your credited work to be displayed on our website, used in this publication, or featured in a spotter training presentation.

*Please be careful! Lightning, flooding, tornadoes, and ice storms make for great photography -- but great danger as well. The staff of the National Weather Service urges everyone to respect the weather and take photographs only when it is safe to do so.*

## Summer Brings on the Heat

Rihaan Gangat



**Donald Folks, a school crossing guard for the Steel Valley School district, tries to keep cool at 10th Avenue and West Street in Homestead.**

*Photo courtesy of John Heller. Copyright ©, Pittsburgh Post-Gazette, 2011, all rights reserved. Reprinted with permission.*

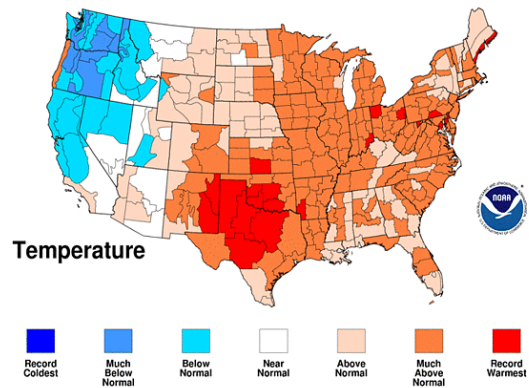
What a hot, hot summer it has been! A very large high pressure system associated with an upper level ridge dominated the Midwestern and Southern states in early July. Propagating east, the high pressure brought along with it very hot temperatures and high humidity to bring heat index values to dangerous situations in much of the region. Heat advisories, excessive heat watches, and even excessive heat warnings were issued by the National Weather Service towards the latter half of July. Fortunately, no directly related deaths occurred due to hyperthermia, heat exhaustion, or heat strokes in the Pittsburgh area.

The month of July 2011, was the warmest month since 1988 in Pittsburgh. The average temperature was 76.9 degrees. Pittsburgh records began in 1871 and since then, July 2011 tied for Pittsburgh's 12<sup>th</sup> warmest July and 15<sup>th</sup> warmest month overall. On Friday, July 22, 2011, the Pittsburgh International Airport reached a high temperature of 96 degrees, which tied the high temperature of 96 degrees back in 1933. With a very high humidity value, the heat index reached 104 degrees! The National Weather Service climate records show that the Pittsburgh International Airport had not reached a temperature as hot at 96 degrees since August 15, 1995. A total of nine days in July reached a maximum temperature of 90 degrees or above.

Relief from the heat came in the month of August when the weather pattern finally began to change. The month of August was relatively cool compared to the rest of summer. Three days in August reached a maximum temperature of 90 degrees or above. For now, we can finally say goodbye to the real summer heat!

### Jul 2011 Divisional Ranks

National Climatic Data Center/NESDIS/NOAA



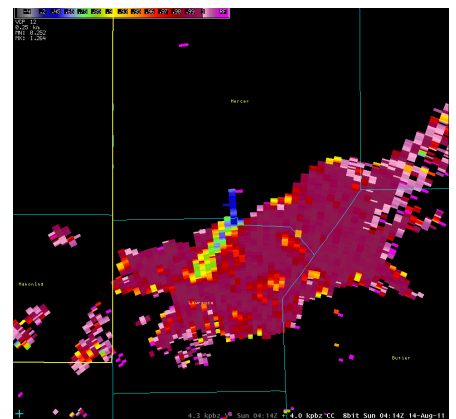
## Dual-Polarization Radar is Here!

(continued from page 1)

precipitation products provide forecasters another source for estimation of rainfall amounts. Meteorologists at the office now can compare Dual-Pol estimates with legacy precipitation, the Areal Mean Basin Estimated Rainfall (AMBER) program, TDWR data, and local gauges to help make decisions on flood products.

In the winter, Dual-Pol will provide new data to help forecasters identify the melting layer and discriminate different precipitation types. Particularly of local interest is utilizing the CC product paired with the HCA to more easily identify precipitation types during warm wedge overrunning events that occur yearly. An accurate assessment of the observed environment in the winter is crucial to forecast operations, and Dual-Pol will provide an opportunity for improvement in this area.

In just a month and a half, the KPBZ radar has already displayed new features with Dual-Polarization. For the first time, the office is detecting hail spikes for some small hail events, getting improved precipitation estimates, detecting wind turbines, and observing roosting birds. There is no doubt that the new and exciting products that Dual-Pol offers will continue to bring more opportunities to help forecasters make public product decisions in the months to come.



Correlation coefficient indicating decreased values (blue) down radial of the hail core of a thunderstorm. These lower correlation coefficient values allow for another way to identify a three body scatter spike (TBSS) in hail producing thunderstorms.

# EF-2 Tornado hits Hempfield Township

Charlie Woodrum

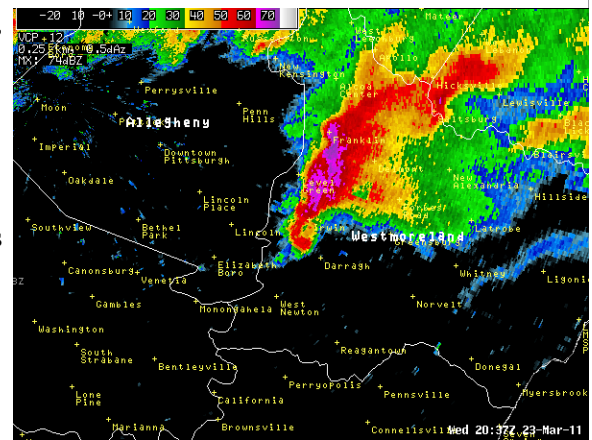


A shot of the funnel cloud on Route 30 heading westbound near Fort Allen. This funnel eventually touched down as a tornado near Hempfield Township, PA.

On March 23, 2011 a low pressure system moved from Indiana along a warm front into western Pennsylvania. A series of storms developed along this frontal boundary in eastern Ohio, western Pennsylvania, and the northern panhandle of West Virginia. Strong shear and forcing along with moderate instability and cooler temperatures aloft led to a number of large hail producing storms across the area. Hail reports from trained SkyWarn™ spotters came in as large as billiard ball size (2.25 inches in diameter). Several reports came in with hail damaging roofs of homes and breaking the windows of vehicles. One storm became super-cellular as it crossed the Pittsburgh metro and developed a hook echo as it entered western Westmoreland county. This storm produced a tornado along its southern flank as it crossed the county.

The tornado initially touched down in the Sewickley Township area. It then moved along Route 136 in Hempfield Township. The next day, meteorologists conducted a storm survey of the damage and determined it to be from an EF-2 tornado. Winds with the storm were estimated to be 120 mph. The path of the storm was 6-7 miles long with sporadic damage along its track. In some locations, the damage path in association with the tornado was as wide as 300 yards. Light polls were snapped and the scoreboard was partially damaged at Hempfield High School. In addition, multiple single family homes in the Rilton area were damaged. In Fort Allen, several homes sustained roof damage with one home losing an exterior wall with its roof thrown several hundred yards.

This tornadic event was noteworthy for several reasons. This has been the only tornado to hit the Pittsburgh County Warning Area in 2011 and the first in Westmoreland County since December 1, 2006. The increased usage of social media by the public and trained spotters became more evident, with the tornado highly documented on Twitter and Facebook. In addition, several videos of the tornado were already on YouTube just hours after the tornado touched down. One video by a local student named Tyler Tubbs, quickly went viral on YouTube, leading to its playing on national television where he was dubbed the name "Tornado Boy". Despite his yelling in the video "We don't get tornadoes," this event served as a reminder that tornadoes can hit western Pennsylvania.



KPBZ 2037Z (4:37p.m.) radar reflectivity indicating a hook echo signature as the storm enters western portions of Westmoreland county.



A mobile home is flipped over off Route 136 in Sewickley Township.



2" diameter hail in Latrobe, PA from the same storm that produced the Hempfield Township tornado.

*Photo courtesy of Grey Arrigonia*



Damage from the EF-2 tornado off of Route 136 in Sewickley Township.

## Pittsburgh Pirates Weather Day is a Hit!

Charlie Woodrum and Fred McMullen

This spring, the National Weather Service in Pittsburgh teamed up with the Pittsburgh Pirates to educate nearly 5,000 elementary and middle school students about the weather. Annually, the Pirates host “Education Days” at PNC Park where students not only come to watch a game, but also have the opportunity to learn outside of the classroom. This year, the Pirates utilized a weather theme for their “Education Days” held on April 28<sup>th</sup> and May 25<sup>th</sup>. The first event date was designated “Weather Day” at the ballpark, and the Weather Forecast Office in Pittsburgh coordinated the event’s local involvement with the media, the Carnegie Science Center, the American Red Cross, and the Southwest Pennsylvania Chapter of the American Meteorological Society.

The event was kicked off with a presentation co-hosted by Jeff Verzyla, Chief Meteorologist, KDKA-TV, and Charlie Woodrum, General Forecaster. The video board was used to display the presentation as Jeff and Charlie led the show standing atop the third base dugout. Students were quizzed on their knowledge of the atmosphere during this presentation.



The “When Thunder Roars, Go Indoors” sign is displayed on PNC Park’s video display board



California University (PA) students (left to right) Amber Hill, Karly Bitsura, Chad Philistine, Lindsay Rice, David Fischer, and Jim Nieder at the Southwest Pennsylvania AMS activity booth outside of PNC Park.

led by students from California University (PA), demonstrated how to make weather maps and the tornado-in-a-jar experiment.

With the outstanding education opportunity and interest drawn during this event, the Pirates have asked that Weather Day becomes an annual event at PNC Park. *“I would just like to take a moment to thank you for your help in putting together our first Weather Day at PNC Park! The event was great. We look forward to growing this program for the 2012 season!”* – Brittany Ryce, Pittsburgh Pirates

With the amount of weather related fatalities this year, the National Weather Service in Pittsburgh utilized this event to educate kids and teachers of the proper safety procedures when hazardous weather strikes.

Those in attendance for the kickoff were reminded that tornadoes can occur in western Pennsylvania as video played from the EF-2 tornado that struck Hempfield Township, PA on March 23, 2011. Students also recited the weather safety slogans “When Thunder Roars, Go Indoors” and “Turn Around, Don’t Drown”. The Pirate Parrot mascot, donning a rain coat and holding a weather radio, also entertained students as they were educated on how NOAA weather radios save lives.

Following the presentation, students dispersed to weather-themed booths hosted by local organizations. Bob Coblentz, Observation Program Leader, and Fred McMullen, Warning Coordination Meteorologist, led efforts at the National Weather Service booth, where students were quizzed on lightning safety and educated on clouds, precipitation types, and the difference between watches and warnings. The American Red Cross conducted emergency preparedness education while the Carnegie Science Center provided hands-on activities for the students.

In addition, the local AMS chapter,



Students from Martin Luther King School sporting the “When Thunder Roars, Go Indoors!” visors at the office outreach booth.

# Recent Weather Photos - Thank You Spotters!



*Photos courtesy of (from top left): Mike Jones, Richard Withee, Jessie Langer Camilli Lou Giordano (NWS Employee), Stan Broadway/Vicki Shuler, Kelly Ann, Joshua Binkley/Marc Worden Polly Zarichnak, WBOY-TV, Martin Christ, Polly Zarichnak*



**The office entrance sign in a clash of seasons. Left– August 28, 2011, Right– February 7, 2010 (21 inches of snow).**  
*Photos courtesy of Charlie Woodrum (NWS Employee).*

# Winter is Right Around the Corner!

Rodney Smith



With winter quickly approaching, here's a reminder of our winter weather products, their criteria, and spotter guidelines.

## Winter Headlines and Criteria

Winter Storm Watch	6 inches/12 hours or 8 inches/24 hours possible
Winter Storm Warning	6 inches/12 hours or 8 inches/24 hours imminent
Blizzard Watch	Heavy snow / Winds >35 kts (3 hrs) / Vis < 1/4 mile (3 hrs)
Blizzard Warning	Heavy snow / Winds > 35kts (3h rs) / Vis < 1/4 mile (3 hrs)
Winter Weather Advisory	3 inches/12 hours / Blowing & Drifting snow
Ice Storm Warning	Ice accumulation $\geq$ 0.25 inches
Freezing Rain Advisory	Any ice accumulation < 0.25 inches
Wind Chill Watch	Indices $\leq$ -25F possible
Wind Chill Warning	Indices $\leq$ -25F imminent
Wind Chill Advisory	Indices -10F to -24F
Lake Effect Snow Watch	(3 counties) 6 inches/12 hours or 8 inches/24 hours possible
Lake Effect Snow Warning	(3 counties) 6 inches/12 hours or 8 inches/24 hours imminent
Lake Effect Snow Advisory	(3 counties) 3 inches/12 hours

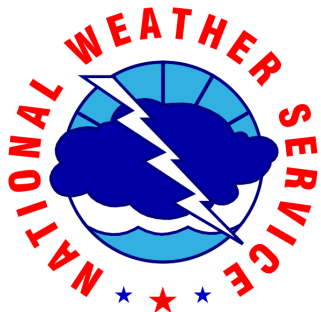
## Winter Spotter Guidelines—What to Report

When you report, please give your SKYWARN number, your location (including your county), and the time of the observation. Try to report as soon as possible after observing the event and, *remember to be careful!* Please concentrate on the following phenomena:

<b>SNOWFALL</b>	After 2 inches of new snow, and then at 4 inches, 6 inches, and every 3 inches thereafter (e.g., 2, 4, 6, 9, 12, etc.)
<b>FREEZING RAIN</b>	As soon as you observe the occurrence of freezing rain or freezing drizzle, especially if it starts to collect on objects. Call again if the glaze/ice accumulation exceeds 1/4 inch
<b>THUNDER SNOW</b>	Location and time of occurrence
<b>WIND SPEEDS</b>	Report wind speeds greater than 40 mph



**SKYWARN**  
**WEATHER.GOV**



**National Weather Service**  
**192 Shafer Road**  
**Moon Township, PA 15108**

[www.weather.gov/pbz](http://www.weather.gov/pbz)