



# Sterling Reporter



Newsletter of NOAA's National Weather Service Baltimore/Washington Forecast Office

Volume 5, Issue 3

Fall 2006

## NWS Baltimore/Washington Receives High Honors at NWA Conference

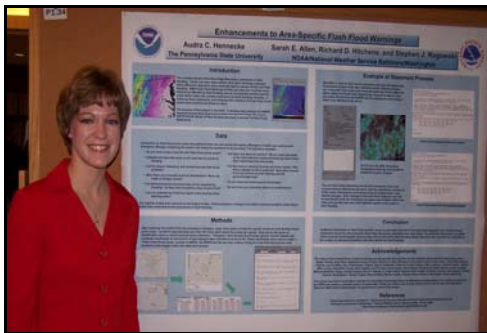
*Sarah Rogowski*

The National Weather Association (NWA) held its Annual Conference in Cleveland, OH, in October. Several members of the NWS Baltimore/Washington attended this conference. By the end of the meeting, two individuals were awarded for their work this year, Steve Listemaa and Audra Hennecke.



Pictured is Steve Listemaa (left) with David Knapp, President of NWA.

Picture to the right is Audra Hennecke.



More information on the NWA Conference can be found on Page 2...

## MIC's Corner

*James E. Lee, Meteorologist-In-Charge*

At October's National Weather Association Annual Conference in Cleveland, the NWS Baltimore/Washington Weather Forecast Office was well represented -- and well awarded too! Steve Listemaa, our Information Technology Officer, was named NWA "Member of the Year" for 2006. Additionally, one of our summer 2006 Student Volunteers, Audra Hennecke, was awarded "Best Poster by an Undergraduate Student." These two awards, coupled with our two NWS Eastern Region Employee-of-the-Month Awards earlier this year, are additional testaments to the type of workers we have at this office, and the work that has been accomplished over this past year.

We are now in our final phases of planning for fiscal year 2007, and we are looking forward to similar achievements in the coming year. In addition to providing the best weather and water forecasts for the region, our office plans to focus on the emergency management community this year. We are hoping to meet with each of our county-level emergency managers, plus host a weather conference in spring 2007 specifically for the local emergency management community. We will also be hosting a stop on the east coast Hurricane Awareness Tour, with the likely location for the Hurricane Hunters to stop this year will be in southern Maryland for one day during the first week of May. Check back to our website in December for more details on this exciting event.

*Continued on Page 3...*

## Welcome Brian LaSorsa!

In October of 2006 Brian LaSorsa was hired as a Meteorologist Intern at NWS Baltimore/Washington. Brian is very happy to be in this area since it is close to family and friends. He is also excited about dealing with the diverse weather that accompanies this area.



Brian was born in the Philadelphia area and earned his B.S. in Meteorology from The Pennsylvania State University before working at AccuWeather. Brian worked as a meteorologist at AccuWeather for over five years before coming to Sterling. Brian enjoys watching and attempting to play sports in his spare time. However, he feels he is much better at watching instead of playing sports.

## INSIDE THIS ISSUE

- 1 Honors from NWA Conference / MIC's Corner / New Employee
- 2 NWA Conference / Storm Data
- 3 MIC's Corner / Student Volunteer News / StormReady News
- 4 Outreach / New Forecast Zones
- 5 Winter Weather Workshop / Climate
- 6 Hurricane Ernesto / Marine User Committee
- 7 Winter Product Criteria / Winter Outlook / SKYWARN Classes

## NWS Baltimore/Washington Receives High Honors at NWA Conference

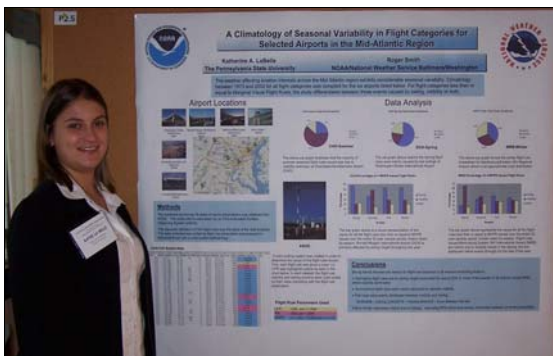
*Continued from Page 1...*

Steve Listemaa, Information Technology Officer at the NWS Baltimore/Washington Weather Forecast Office, was named National Weather Association "Member of the Year." He serves as the Webmaster for the National Weather Association. Steve earned this honor for untiring dedication in voluntarily maintaining the NWA web site since 1999 and for continually upgrading the site capabilities moving all pages to a new host server in 2006 with no downtime.

Both students from the summer 2006 Student Volunteer Program represented NWS Baltimore/Washington by presenting their research at the conference through posters.

Audra Hennecke was awarded the "Best Poster by an Undergraduate Student" at the NWA conference. She presented a poster involving the enhancement of area-specific flash flood warnings. Audra worked with several forecasters as well as area Emergency Managers to locate specific areas prone to flash flooding. This information will serve as a supplement to flash flood statements issued by the NWS Baltimore/ Washington Forecast Office. Audra is a junior at the Pennsylvania State University.

Katie LaBelle presented two aviation climatology posters at the meeting. She worked with general forecast Roger Smith through the summer to gather surface observations from selected airports across the mid-Atlantic and created a seasonal climatology of ceilings and visibilities. Her second poster involved the climatology of Cold Air Damming events and their impacts on aviation weather. Cold Air Damming most often affects the Mid-Atlantic during the winter months when easterly and northeasterly winds off the Atlantic Ocean trap moisture east of the mountain, causing aviation weather conditions to deteriorate. Her research will be used to improve aviation forecasts for local airports. Katie is a senior at the Pennsylvania State University.



*Pictured above is Katie LaBelle with one of her posters.*

**Congratulations Steve, Audra and Katie!**

## Storm Data: July & August

*James Brotherton*

July was an extremely active month with severe weather events practically every other day. On the 2nd, severe weather was concentrated in the Washington/Baltimore area, where a frontal boundary sagged into the region and spawned many severe thunderstorms. Nearly all of the reports came from communities within the metropolitan corridor. Particularly hard hit during this episode where the communities of Wheaton and Cape St. Claire. NWS site surveys in the two communities confirmed damages to be from straight-line thunderstorm wind gusts. A marine buoy located just five miles from Annapolis, in the Chesapeake Bay, measured 69 mph winds with the same storms. PEPCO reported 18,000 customers without power in Montgomery County alone during the severe.

On the 4th of July, a widespread severe weather event lashed areas from the Appalachian Mountains to the Chesapeake Bay, where widespread damages occurred from severe thunderstorms. This event was also detailed in the previous issue of the "Sterling Reporter".

Severe thunderstorms renewed once again on July 5th due to humid summertime air with scattered damages reported. Numerous flash floods hit the Baltimore area on the evening of the 5th. Additional severe weather episodes occurred on the 12th, 18th-21st, 27th-28th, and 30th of the month.

Numerous reports of heat illness were received on the 17th and 18th when the heat index rose to 100 to 115 degrees in the metropolitan corridor. Three deaths were directly related to the heat, all occurring in the Maryland suburbs of Washington. A very intense heat wave occurred between July 30<sup>th</sup> and August 3rd. On July 30th, 50 people were treated for heat injuries during a Boy Scouts event in Darlington, MD. Eight people lost their lives to heat related illnesses in the Washington DC area. Many more heat injuries were reported.

The rest of August was notably quieter compared to July. On the 7th, a passing upper-level disturbance combined with a hot and humid air mass to spawn scattered severe thunderstorms. Numerous wind gusts between 40 to 50 knots occurred across the Chesapeake Bay. Damage also occurred in Prince Georges and Anne Arundel Counties. A utility worker was struck by lightning at the Patapsco State Park due to the thunderstorms of the 7th. Luckily, the individual lived to tell of the lightning strike. Damages also occurred near Centreville on the 7th. Significant severe weather episodes also occurred on the 26th and again on the 28th and 29th. On the 26th, the storms pummeled the 2-State area around Martinsburg, WV, and Winchester, VA. Damages occurred in Shenandoah, Frederick, and Clarke Counties in Virginia, and in Berkeley and Jefferson Counties in West Virginia. In Jefferson County, several house fires were ignited between Charles Town and Harpers Ferry by the intense lightning from the thunderstorms. Damage on the 28th and 29th were confined to the Central Foothills near Charlottesville and the Northern Piedmont near Orange County and in Lower Southern Maryland.

## MIC's Corner

*Continued from Page 1...*

Finally, as the calendar changes to winter, our recent focus has been on preparing for hazards that we see in wintertime, such as snow/sleet/freezing rain, high winds, and coastal flooding. Our annual Winter Weather Workshop was held last month, and you can read about the workshop details on page 5. Our customers and partners attended the morning session, with the afternoon session more of a technical exchange. All-in-all, we had over 40 people attend either the morning or afternoon session. This preparation is an example of our commitment to provide the best forecasts and services to the region.

As usual, if you have any questions or comments about the NWS Baltimore/Washington Weather Forecast Office, please email me at [James.E.Lee@noaa.gov](mailto:James.E.Lee@noaa.gov), or phone me 703-260-0107x222.

## Student Volunteer News

*Sarah Rogowski and Isha M. Renta*

The Student Volunteer Program is designed to allow selected college students to gain first-hand knowledge and experience of operations and research. One student was selected through a competitive application process to participate in this program.



Isha M. Renta is finishing her Masters Degree in Atmospheric Science at Howard University. She holds a Bachelors Degree in Mathematics from the University of Puerto Rico at Mayagüez. Isha is working with Steven Zubrick, Science and Operations Office, and Steve Listemaa, Information Technology Officer, with the DC-Lightning Mapping Array (LMA).

This project integrates data from the DC-LMA and Radar data into the Warning Decision Support System - Integrated Information (WDSS-II) to analyze the tornado that occurred over Severna Park, MD, on September 28th, 2006. Isha is studying lightning and radar characteristics and signatures during the lifetime of the supercell. The final goal of this study is to enhance forecasts by improving warning and decision making, increasing lead time, reducing false alarms, and increasing confidence and situational awareness.

## StormReady News

*David Manning, Warning Coordination Meteorologist*

StormReady is a nationwide community preparedness program uses a grassroots approach to help communities develop plans to handle local severe weather and flooding threats. The program is voluntary and provides communities with clear-cut advice from a partnership between local NWS forecast offices and state and local emergency managers. StormReady started in 1999 with seven communities in the Tulsa, OK, area. There are now more than 1,100 StormReady communities across the country.

To be recognized as StormReady, a community must:

- Establish a 24-hour warning point and emergency operations center;
- Have more than one way to receive severe weather forecasts and warnings and to alert the public;
- Create a system that monitors local weather conditions;
- Promote the importance of public readiness through community seminars;
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

After the tireless work of emergency services officials, several of our counties have joined the ranks of StormReady communities in the last few months. This past summer Greene County, VA was recognized as the first county in central Virginia to become StormReady. In September, both Montgomery and Washington Counties in Maryland were recognized as StormReady. The StormReady recognition will be in effect for three years when the counties will go through a renewal process.



*Pictured above is the StormReady Presentation in Montgomery County, MD, in September 2006. From left, NWS Baltimore-Washington MIC James Lee; David Manning, WCM; County Homeland Security Director Gordon Aoyagi; County Chief Administrative Officer Bruce Romer.*

No community is storm proof, but StormReady can help emergency services officials to save lives. StormReady communities are better prepared to save lives from the onslaught of severe weather through better planning, education, and awareness.

## **Outreach of Note: August – October**

*Sarah Rogowski*

On August 3<sup>rd</sup>, Sarah Rogowski conducted a tour for a group of Hollings Scholarship recipients. This group of college juniors interested in earth sciences and mathematics had participated in various research internships with NOAA across the county through the year.

On August 4<sup>th</sup>, Nikole Listemaa conducted an office tour for a group of students participating in a Summer Weather Camp.

On August 8<sup>th</sup>, John Darnley visited with the Maryland Saltwater Sport Fisherman's Association in New market, MD. He discussed the office marine weather program and the various forecasts and warnings issued.

Service Hydrologist Rich Hitchens visited with several Emergency Operation and 911 Centers in the eastern panhandle of West Virginia in August.

On October 7<sup>th</sup>, Andrew Woodcock spent a cold and rainy day at the Boy Scout Camporee in Bealeton, VA. He conducted a weather seminar to help the scouts earn their weather badge. By the end of the day, the scouts were ready to teach their own lesson in weather.



*Above is Andrew Woodcock at the Boy Scout Camporee.*

On October 11<sup>th</sup>, Chris Strong made his annual visit to the 4<sup>th</sup> grade class at Meadowland Elementary School in Sterling, VA. Chris discussed the different types of hazardous weather and showed the students a weather balloon.

On October 17<sup>th</sup>, Luis Rosa and Calvin Meadows participated in the Prince William Squadron of Civil Air Patrol Career Fair. Luis and Calvin discussed various careers in meteorology with the cadets.

On October 18<sup>th</sup>, Luis Rosa and John Darnley conducted a tour for home schooled junior high and high school students.

On October 21<sup>st</sup>, Rich Hitchens met with the Occoquan Yacht Club in Woodbridge, VA.

## **NWS Creates New Forecast Zones for Portions of Maryland and West Virginia**

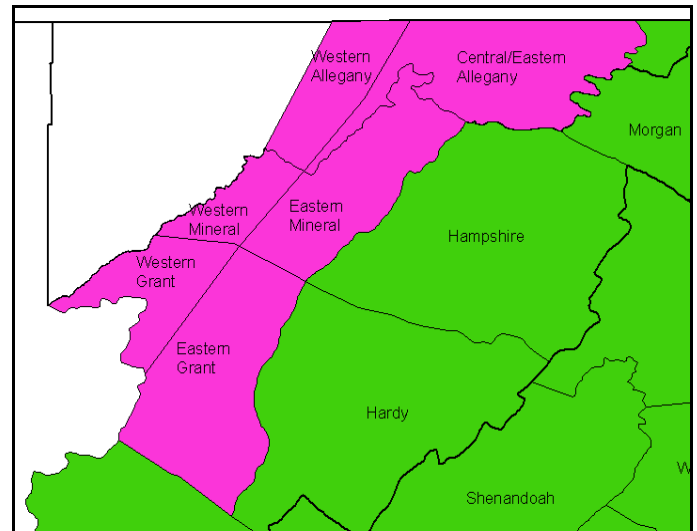
*David Manning and Andrew Woodcock*

NOAA's National Weather Service has created new forecast zones for the Allegheny Front, which will offer more accurate and specific weather forecasts, watches, and warnings for Allegany County, Maryland, and Mineral and Grant counties in West Virginia, by dividing the counties into their respective climate areas. The enhanced services began November 15, 2006.

Very different climate patterns exist on either side of the Allegheny Front, a ridgeline that runs north-south along the Appalachian Mountains. The western side is exceptionally wetter than the more populated eastern side. The prevailing winds from the west and northwest drop moisture on the west side of this ridge as the winds move across the Appalachians.

For example, Bayard, WV, on the far northwest edge of Grant County, averages 95 inches of snow every winter, whereas Moorefield, WV, Romney, WV, and Cumberland, Md.—all on the east side of the Allegheny Front—only average between 20 and 30 inches of snow.

Another major difference is that elevations are markedly higher on the western side of the Allegheny Front, ranging from 2,500 to 3,500 feet. The elevation east of the Allegheny Front is generally 700 to 1,500 feet. This elevation difference is responsible for the much cooler and windier weather conditions west of the Allegheny Front.



*New Zone Configurations are in Pink*

“Residents in the more populated central and eastern sections of these counties will be able to receive a more accurate forecast for their area, while we will be able to warn the more sparsely populated western fringes of these counties when extreme winter weather threatens,” said James E. Lee, Meteorologist-in-Charge of NOAA’s Baltimore/Washington Weather Forecast Office. “This will also provide more precise forecasts for major highways in these counties, including Interstate 68 and U.S. highways 50 and 220.”

## Winter Weather Workshop

*Andrew Woodcock*

Before the flakes fly in the latter part of autumn each year, the Sterling Forecast Office spends a day in training going over the many aspects of winter weather forecasting. For some this is review, for newcomers it is an opportunity to learn the complexities that await mid Atlantic meteorologist as the days grow shorter.

For this years workshop we invited various customers to attend and explain to us their preparations once we forecast the “s-word”. The attendees included representatives of Dulles Airport, DC Emergency Management, the Council of Governments, Virginia Department of Transportation, the director of transportation for Loudoun County Schools, PEPCO and Channel 5’s Sue Palka.



*Pictured above are the participants of the workshop.*

Being the forecast office for the Washington DC and Baltimore metro areas has special responsibilities that no other forecast office has, and this was a message echoed by several of the customers. We learned about different road and runway treatments, and the costs involved in using safe-for-the-environment chemicals. Sue Palka gave an overview of what happens at Channel 5 before the snow flies, and interviewed various behind-the-scenes-people on a video. Customers unanimously offered praise on the Sterling office for past work done, acknowledging that is not an exact science.

In the afternoon, the staff concentrated more on the science involved in forecasting winter weather. We examined new radar technology and best practices. We also discussed the new zones created within the forecast area. The new zones are further discussed earlier in this issue of the Sterling Reporter. We also discussed El Nino and La Nina and their impacts on winter weather across the Mid Atlantic. Another concern during the winter months is high wind. Jim Lee presented several cases of high wind events and suggested methods to use in order to forecast these events. Because coastal flooding is also a concern during winter, we discussed ways to best monitor tidal anomalies and methods in which to forecast above normal tidal departures.

## Climate Summary

*Brian LaSorsa and Christopher Strong*

Temperatures for the period of August through October averaged near normal, while the amount of precipitation was above normal.

The period started off quite toasty with record breaking temperatures. On August 1<sup>st</sup>, Washington at Reagan National soared to a sultry 101 degrees. This broke the old record of 100 set way back in 1930. Baltimore/Washington International Airport topped off at 100 both on August 1<sup>st</sup> and August 3<sup>rd</sup>. The century mark at Baltimore/Washington International was enough to break the old record of 99 set in 1933 for August 1<sup>st</sup>, and it tied the old record of 100 for August 3<sup>rd</sup> set back in 1931. The first 8 days of August were at or above 90 degrees at Reagan National while the first 7 days were at or above 90 at Baltimore/Washington International. Temperatures for the month of August were a couple degrees above normal for most places, but September turned out to be cooler and much wetter across all locations.

Although rainfall got off to a slow start in August, it more than made up for itself during the months of September and October. The month of September began with a bang. The remains of Hurricane Ernesto came up the coast and dumped rain across the whole region, making it a soggy barbeque for Labor Day Weekend. Many places picked up over 3 inches of rain from this system. Although it lost most of its tropical characteristics by the time the storm was over our region, there was plenty of warm and moist air from the Atlantic overrunning the cool air in place. Despite this being the end of any tropical activity across our region, a progressive pattern would lead to several storm systems for the rest of September as well as October. Most of these storm systems were able to tap into the Gulf of Mexico for moisture as well as the Atlantic bringing several shots of rain, but the good news is that dry and seasonably mild conditions did fall in between these systems, so it was not a washout by any stretch. Precipitation for the months of September and October combined were +4.36 inches compared to normal for Regan National and +6.17 inches compared to normal at Baltimore/Washington International.

With seasonable temperatures in place for much of the period, the first bout of sub freezing temperatures did not take place until the middle of October. Martinsburg was below freezing for the first time this season on October 13<sup>th</sup>. Further east, Baltimore/Washington International and most of the area east of the Blue Ridge waited until October 30<sup>th</sup>. A low of 33 degrees was reported at BWI early that morning, and most places around this area put an official end to the growing season.

As for Halloween, it was a pretty uneventful weather-wise for trick-or-treaters. In fact, under plenty of sunshine, temperatures soared into the lower to middle 70s across most locations, which is about 10 degrees above normal for that time of year. Temperatures did cool off to seasonable levels at night with lows generally ranging from the middle to upper 30s in outlying areas to the middle 40s across urban locations.

## Hurricane Ernesto

*James Brotherton and Sarah Rogowski*

The remnants of Hurricane Ernesto moved across Lower Southern Maryland and Northern Virginia on September 1<sup>st</sup> and 2<sup>nd</sup>. Catastrophic damage was sustained in extreme Lower Southern Maryland along the Chesapeake Bay and portions of Northern Virginia along the Tidal Potomac River from both high winds and storm surge.

Ernesto made landfall in North Carolina at the end of August. It weakened inland and became a Tropical Depression over eastern Virginia on September 1<sup>st</sup>. However, the combination of the depression and a large high pressure system to its north produced Gale force winds over many areas along the Mid-Atlantic and Northeast coasts. Ernesto lost its tropical characteristics early on September 2<sup>nd</sup> as it moved north.



*Pictured above is a house surrounded by water in southern St. Mary's County. Photo courtesy of St. Mary's County Emergency Management.*

Heavy surf caused extensive beach erosion and subsequent damage to piers, docks and bulkheads at Fairview Beach in King George County. Storm surge tidal flooding was also observed in Old Town Alexandria, causing minor damage to some stores located near the waterfront. Heavy surf caused extensive beach erosion and subsequent damage to beach areas and the boardwalk at Colonial Beach. A tide crest was measured of 5.54 ft. (NAVD88-MSL) on the Tidal Potomac at Alexandria, which was well above the flood stage of 4.0 ft. The Neabsco Creek, in southeast Prince William County, flooded and closed a roadway due to the storm surge.



*Pictured above is high surf at Cobb Island, MD. Picture courtesy of St. Mary's County Emergency Management.*

*(Continued Right...)*

## Hurricane Ernesto

*Continued...*

High winds, with gusts as high as 60 mph, persisted for much of the day and evening on September 1<sup>st</sup> across Lower Southern Maryland. These winds, coupled with heavy rains, caused extensive tree and power line. The most extensive damages occurred along Murray Road in the town of Ridge, MD. The damage to trees and power lines were explained by local residents as more extensive than during Hurricane Isabel in 2003. St. Mary's County Government reported the total cost of direct weather related damages, including the cost of manpower to respond to damage and debris removal, at \$4.4M.

In Anne Arundel County, the tide crest at Annapolis, Maryland, was 3.56 Mean Low Lower Water (MLLW), causing moderate coastal flooding. High winds also occurred in Calvert County, causing downed trees and power lines and subsequent power outages. The most extensive damage in Calvert County occurred along the western shore of the Chesapeake Bay in the communities of Cove Point and Solomon's Island. In Charles County, mandatory evacuations were ordered due to the flooding. Tide crest was 4.45 MLLW in the upper Tidal Patuxent River at Bristol, Maryland.

## NWS Baltimore/Washington Hosts

### Marine Users Committee

*Brandon Peloquin, Marine Program Leader*

On November 16<sup>th</sup>, the Baltimore/Washington Weather Forecast Office hosted its bi-annual Marine Users Committee Meeting.

The Marine Users Committee was formed last year in an effort to acquire feedback from local marine users on the Maryland Chesapeake Bay and Tidal Potomac River to improve marine products, forecasts and warnings. The committee consists of users from the US Coast Guard, the Coast Guard Auxiliary, the Chesapeake Area Professional Captain's Association, local Power Squadrons and Sailing Clubs in addition to partners at NOAA's Chesapeake Bay Office and the Chesapeake Bay Observing System. Three meetings have been held since the committee's inception last year and have lead to significant improvements within the local Marine Program.

At this third meeting, the committee reviewed some of the improvements which have resulted over the past year, including more timely marine hazard dissemination and more accurate wind and wave forecasts. The committee also discussed the benefits of reconfiguring our office's marine forecast zones where the main channel of the Bay would stand separate from smaller rivers and tributaries. A lengthy brainstorming session lead to the possibility of developing a network where active vessels and boats would regularly transmit marine observations to the Coast Guard which the Coast Guard would in turn relay to our Weather Forecast Office. These reports would greatly augment the available data from buoys and near shore sensors which help us to forecast wind and wave conditions over the marine waters.

## NWS Winter Related Weather Product Criteria

**Winter Storm Outlook:** Issued as a Special Weather Statement, this outlook provides a generalized progression of expected conditions from a developing winter storm in the 3 to 5 day range.

**Winter Storm Watch:** Issued 24 to 48 hours prior to the following forecasted conditions: an average of 5 inches of snow/sleet within a 12 hour period, glaze accumulation of one quarter inch or more, or enough ice to cause damage to trees and power lines in a 12 hour period, or a life threatening or damaging combination of snow and/or ice accumulation with wind in a 12 hour period.

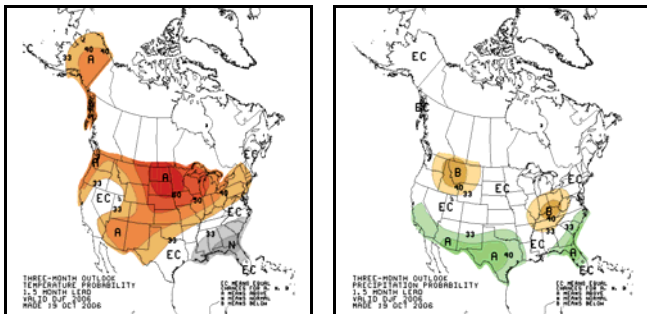
**Winter Storm Warning:** Same criteria as Winter Storm Watch, when currently occurring or forecasted to occur during the current day.

**Blizzard Warning:** Snow or blowing snow reducing visibilities to a quarter mile or less for 3 hours or longer with 35 mph winds or higher.

**Winter Weather Advisory:** Issued when the following are currently occurring or forecasted to occur during the day: an average of 2 inches of snow accumulation, any ice accumulation, or blowing snow significantly reducing visibilities.

## December–January–February Outlook

NOAA's National Weather Service Climate Prediction Center created these December–January–February temperature and precipitation outlooks during mid October. 'EC' means Equal Chance, 'A' stands for Above Normal, while 'B' is Below Normal. These are probabilistic forecasts; the forecast probability anomaly is the difference between the actual forecast probability of the verifying observation falling in a given category and its climatological value.



Climate Prediction Center outlooks, discussions and explanations are available at:  
<http://www.cpc.noaa.gov/products/predictions/90day/>

## Upcoming SKYWARN Classes

For more information check out the SKYWARN website:  
<http://www.erh.noaa.gov/er/lwx/skywarn/classes.html>.

The class schedule is updated as needed.

### BASICS I SKYWARN CLASS

This class is essential for becoming a SKYWARN Spotter. It is a 3-hour class that covers the basics of how SKYWARN and the National Weather Service operate, what you need to report and how, and how to spot severe thunderstorms and tornadoes.

**This class is a pre-requisite for all other classes.**

### BASICS II SKYWARN CLASS

This class is an optional sequel to the Basics I class. It is 2 1/2 hours long. It is good for spotters who need a refresher or feel they want additional information and training. It reviews the basic spotting techniques and covers more information about thunderstorms and Doppler radar.

**You must have taken Basics 1 to attend this class.**

### WINTER STORM CLASS

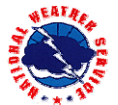
This is an optional 2 1/2 hour class that is occasionally offered seasonally (November - January). Its focus is on the Mid-Atlantic snow storms and nor'easters. It looks at the frequency and history of the storms, how they form and the difficulties in forecasting them, how to be prepared, how to measure snow and ice, and how SKYWARN operates during a winter event.

**You must have taken Basics I to attend.**



## *Sterling Reporter*

Fall 2006 Edition



Newsletter of the National Weather Service  
Forecast Office in Sterling, Virginia  
<http://www.weather.gov/washington>

Published quarterly. Available on the web at  
<http://www.erh.noaa.gov/lwx/reporter/>

National Weather Service  
44087 Weather Service Rd.  
Sterling, VA 20166  
703-260-0107

Editor:

Sarah Rogowski

[Sarah.Rogowski@noaa.gov](mailto:Sarah.Rogowski@noaa.gov)