Sterling Reporter

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

Volume 3, Issue 2 Summer 2004

Sterling Staff Shuffle

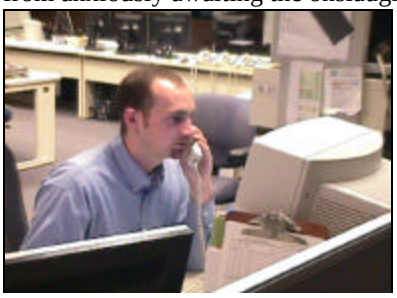
Steve Rogowski

The spring offered quite a change of staff at your local National Weather Service Office. There were several promotions on station, while our office also welcomed new staff from diverse locations.

Rich Hitchens lateraled to Senior Service Hydrologist from Lead Forecaster several months ago. This is not new territory for Rich though, as he was the Service Hydrologist at the Sterling forecast office during the 1990s. Rich left the Sterling office to become a lead forecaster in Houston, before returning a few years ago.

David Manning was promoted to Warning Coordination Meteorologist early this spring. Dave is quite familiar with the position after serving as Barbara Watson's assistant for 2 years. Dave previously has worked at National Weather Service Headquarters, along with the Portland (Maine), Goodland (Kansas), and Tulsa offices.

Brian Guyer became our Meteorological Intern during the spring. Growing up in Western Massachusetts, he lived by the New England motto, "if you don't like weather, wait up a minute, it'll change." Brian's interest in weather is "rooted from anxiously awaiting the onslaught of a 24 inch snowstorm,



eagerly anticipating the outer rainbands of Hurricane Bob, or just enjoying the arrival of the cool season while foliage in the Berkshires sparkled against a shortening afternoon."

(*Continues on page 2*)

A Warm Spring for 2004

Chris Strong

Spring 2004 was all over the board with cold days, wet days, hot days, and dry days. But that's typical for a Mid-Atlantic spring. In the end though there were many more warm days than cold days, and this spring ended up being one of our hottest springs on record. Precipitation was near normal, while there were only a few flakes of snow early on, with nothing measurable.

After last spring of 2003, the warm temperatures and more typical rainfall were even more noticeable. Last spring was cool, cloudy, dreary and wet, a trend that continued well into the summer months. This spring, rainfall was actually close to the 30 year average for the season. Washington was a little drier than normal, while Baltimore was a little wetter than normal.

May carried the season to one of its warmest levels on record. May was the 2nd warmest ever on record for Washington and the fourth warmest on record for Baltimore. With March and April also ending up warmer than normal, that allowed Washington to have its second warmest spring and Baltimore had its eighth warmest. Records stretch back to the late 1800s.

The farmers and agriculture were fortunate this year in that there was not a late season heavy frost or deep freeze. The last day of freezing temperatures was April 5th in Washington, April 6th at Baltimore-Washington International airport, and April 16th at Dulles airport in more rural northern Virginia.

The Memorial Day holiday weekend even lucked out this year. Memorial Day weekend has a bad habit of being dreary many times. This is largely due to a cool Atlantic ocean in late May and a tendency for high pressure centers to occupy New England, which draws an east wind off the ocean. This year with southwest winds however, it was rather sunny with near normal temperatures.

Inside This Issue

(Sterling Staff Shuffle…continued from page 1)
Brian earned his Bachelor's of Mathematics in the spring of 2001 at Texas Tech University and a Master's of Meteorology from the University of Maryland in 2004.

Roger Smith was hired to a forecaster position in Sterling during the late spring. Roger had previously worked at the Elko, Nevada office. He recalls his interest in meteorology dating back to his childhood: "I was 6 years old during a very harsh winter with several powerful snowstorms. Although I enjoy thunderstorms, heavy rain events and high winds, snowstorms have always been my favorite weather event." Roger, a graduate of State University of NY at Brockport, is a true winter weather fan describing his favorite events as the "Blizzard of 1978 and the Blizzard of 1993. They are tied for my most memorable event. The snowfall rates and wind in both storms were terrific!"

Nikole Listemaa joined our staff in May. She grew up in Mississippi and Georgia and graduated from Florida State University. Having worked at both the Miami and Jackson (Mississippi) offices, she has experienced several hurricanes, as well as the May 12, 1997 Downtown Miami tornado. Nikole's favorite season is fall.

Steve Listemaa became our new Information Technology Officer (Computer Guru) in May. He was born in Colorado, but grew up in Louisiana, and is appropriately a fan of hurricanes. His "most memorable (weather event) was probably my first tropical system - I believe it was Hurricane Bob in 1979. I also have memories of staying up all night at Northeast Louisiana University tracking Hurricane Andrew as it made landfall in Louisiana." Steve's favorite hobbies are computers, listening to music, and watching movies.

Brandon Peloquin was hired as a forecaster from the Elko, Nevada office (no typo, two Elko hires in a several month timespan!) in late June. Brandon grew up in "Circleville, Ohio...which is a smaller town just south of Columbus, Ohio. Circleville is most well known for its annual Pumpkin Show Festival in October, where thousands and thousands of people from the state, from the region and even the country gather during the 3rd week of October for a celebration of autumn." A graduate of Ohio State University, Brandon agrees with Nikole that Fall is the best season, although he added summer isn't too bad either.

John Darnley joined our staff during early July as a meteorological technician. John earned his meteorology degree from the California University of Pennsylvania. John's sailing hobby sparked his interest in meteorology. His favorite season is Fall. John has an extensive history of forecasting for the military before his experience at the Pittsburgh and Goodland, Kansas National Weather Service Offices.

Fire Weather Forecasts Aid Front Lines

Chris Strong

Our Fire Weather program is often lost within our other forecasts, but it continues to be a very important facet of our forecast responsibility. While the public forecast is widely distributed, and the marine forecast is routinely heard, the fire weather forecast is distributed mainly among the fire managers within the National Park Service, the National Forest Service, and their complementing state agencies. The fire weather forecasts are forecasts for smoke dispersal and other weather parameters which affect fires and firefighting. The two most important weather elements to the fire managers are winds and humidity. Low humidities and strong winds can make a fire quickly go out of control.

The fire managers are the leaders of the front line of fire fighters and fire suppression specialists that fight wildfires and keep them from forming. Part of that effort is actually to start small controlled fires, called 'prescribed burns' from time to time, to burn dead vegetation off the forest floor. This build up of dead trees, branches, and leaves is fuel for fires to develop. After severe winter storms or summertime tropical storms, large amounts of downed trees present significant problems in added fuel for forest fires.

Elk seek refuge from a fire in Montana during the summer of 2000

If wildfires do develop, it is up to a large regional and national organization of forest fire fighters to pull the resources and expertise necessary to quell the blaze. Part of that expertise is our fire weather forecasts. This office produces a daily forecast to help with normal operations. Also, a series of point forecasts for a few sites that are specific to a particular location are produced every afternoon. Lastly, when prescribed burns are scheduled or wildfires are ongoing, spot forecasts are issued for the location where the fire is located.

All of these forecasts include elements that are very important to the fire managers, but may not be important to the general public. The most important weather elements for the fire community are winds through the lower atmosphere, the humidity and its variation during the day, the height to which smoke will loft into the atmosphere, the amount and duration of precipitation, the amount of lightning expected, and temperatures. Any big changes to any of these elements during the day are of particular importance.

With all of these elements in hand, the fire managers can make assumptions of how fire will behave that day, what amount of resources they will need to contain or prevent it, and the restrictions that need to be enforced to keep fires from developing.

Hurricanes and Tropical Storms

Rich Hitchens

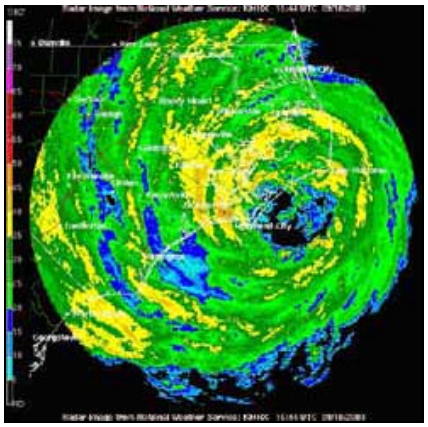
June 1st marked the beginning of the Atlantic basin tropical weather season. As we saw last year, the Sterling forecast area is no stranger to tropical weather. Isabel slammed the region hard, especially spots near the Chesapeake Bay and tidal Potomac River. Record tide levels were reached at Annapolis and Baltimore, producing major inundation due to Isabel's storm surge.
Even though Isabel weakened to a tropical storm as she moved through the area, the winds were still strong enough to bring down trees and power lines. Millions of customers were without electricity, some for many days. Can you imagine the damage that would have resulted had Isabel still been a hurricane over our area?

Tropical storms and hurricanes can be destructive in several ways:

WINDS

High winds, in some cases over 150 mph, can produce widespread damage to trees, houses, buildings and other structures. A tropical system becomes named when sustained winds reach 39 mph. They are called hurricanes when their sustained winds reach 74 mph.

Hurricanes are categorized based on their estimated wind speed. This is referred to as the Saffir-Simpson scale.



Category	Sustained Wind Speed
Category 1	74-95 mph
Category 2	96-110 mph
Category 3	111-130 mph
Category 4	131-155 mph
Category 5	over 155 mph

Only three category 5 storms made landfall in the United States during the 20th century: The 1935 Florida Keys hurricane, Camille in 1969, and Andrew in 1993. The most destructive storm in terms of loss of life in the United States was a category 4 storm that made landfall on Galveston Island, Texas in 1900. Over 8,000 people died as a result of that hurricane.

STORM SURGE

The second destructive element of a tropical system is the storm surge that it produces. The strong onshore winds preceding a tropical storm or hurricane cause water levels near the coast to elevate. The height of the water peaks as the storm makes landfall along a coastline, due to the persistent onshore flow reaching its maximum, and because the lowered pressure inside a hurricane pulls water upward. The contribution of low pressure is not unlike how an eye dropper pulls water into the dropper tube. Lowered pressure inside the eye dropper tube causes the fluid to rise inside.

Because of complexity of inland waterways, storm surge maximums might not correspond to time of landfall. Such was the case with Isabel. Peak tide levels in the Chesapeake Bay and Potomac occurred when the center of Isabel's remnants were over western Pennsylvania.

FLASH FLOODING

Another very destructive element of tropical systems is the heavy rain and flash flooding they produce. Two of the most deadly heavy rain producing storms to affect our area in the last 20 years occurred in 1985 and 1996.

During the first week of November 1985, a strong low pressure system produced very heavy rain across the region. This was quickly followed by the remnants of Hurricane Juan. The combination of these two heavy rain producing storms caused major flooding, and

(*Continues on page 5*)

Weather Review – Mar/Apr/May 2004

Cindy Woods, Storm Data Focal Point

For the detailed report on these weather events, see the Storm Data monthly reports on our website at:
http://www.erh.noaa.gov/lwx/Storms/Strmdata/index.htm

March

7th: Thunderstorms produced strong winds on the Tidal Potomac and the Chesapeake Bay. Wind gusts of 40 mph were recorded.

8th: Strong winds downed trees in Fauquier County. Scattered snow showers deposited four inches of snow in Allegany County and two inches in Grant County.

16th: Scattered snow showers produced six inches of snow in Allegany and five inches in Mineral County.

April

1st and 2nd: Isolated snow showers produced five inches of snow in Allegany County. Lesser amounts fell across the rest of Western Maryland.

4th: Two inches of snow fell in Grant County.

12th and 13th: Heavy rainfall produced minor nuisance flooding in Allegany and Jefferson Counties. The one to two inches of rain also lead to rises along streams and rivers.

14th and 15th: The Potomac River at Shepherdstown exceeded flood stage on the 14th and crested on the 15th. The rises were the result of rain from the 12th and 13th.

23rd: A thunderstorm produced penny size hail in Frederick County (MD).

26th: Heavy rainfall produced some localized flooding in Washington and Hampshire Counties.

27th: Thunderstorms produced wind gusts around 35 knots on the Lower Tidal Potomac River and the Chesapeake Bay.

28th: Low temperatures near the freezing mark damaged plants in Grant, Hampshire, Berkeley, Jefferson, Hardy, Allegany, Washington, Augusta, Rockingham, Shenandoah, Page and Loudoun Counties.

May

2nd: A weak tornado touched down in Madison County. Strong to severe thunderstorms downed numerous trees and power lines across Northern Virginia and much of Maryland. The winds knocked down a wall at a sports area in Carroll County. Strong winds also occurred across the Tidal Potomac River and portions of the Chesapeake Bay.

5th: Thunderstorms produced penny to half dollar size hail in the District of Columbia, Fairfax, Arlington, Prince Georges, and Calvert Counties.

7th: A tornado touched down in southeast King George County. At least a dozen dwellings and 10 boats were damaged. Thunderstorm winds downed trees and power lines across much of Northern Virginia, Charles, St Mary's, Grant, Hampshire, and Mineral Counties. A stage collapsed at an outdoor festival in Spotsylvania County. A lightning strike started a house fire in Fauquier County.

14th: Strong thunderstorms produced hail, flash flooding, and downed trees and some power lines in Berkeley and Washington Counties.

15th: Thunderstorm winds downed trees and power lines in Frederick (MD) and Baltimore Counties. A lightning strike sparked a fire in Frederick County (VA), one home was destroyed and two others severely damaged. Strong winds also passed over the Chesapeake Bay.

16th: A thunderstorm downed trees in Loudoun County.

17th: Thunderstorm winds downed several trees and produced penny to quarter size hail across northeast Maryland and Lower Southern Maryland. Hail also fell in King George County, Virginia. Flash flooding occurred in Hampshire County, West Virginia. Several lightning fires occurred in Northeast Maryland. Strong winds passed over the Tidal Potomac River and the Chesapeake Bay.

18th: Thunderstorms produced penny to nickel size hail and downed trees in Morgan, Berkeley, Madison, Albemarle, Montgomery, Prince George's, Anne Arundel, Washington, and Frederick (MD) Counties. Flash flooding occurred in Madison County. Lightning damaged two dwellings in Hampshire County.

21st: A weak tornado developed over Berkeley County. Thunderstorms downed trees in the District of Columbia, the West Virginia Panhandle, across much of Northern Virginia, and Allegany, Montgomery and Baltimore Counties in Maryland.

23rd: Thunderstorms downed trees in Shenandoah, Page and Rappahannock Counties. Penny sized fell in Jefferson, Culpeper and Orange Counties.

25th: Weak tornadoes developed over Frederick (MD), Washington and Loudoun Counties. Thunderstorms downed trees and power lines in Washington, Carroll, Baltimore, Anne Arundel, Harford, Montgomery, Calvert, Page, Loudoun, Culpeper and Berkeley Counties. Penny to Golf ball size hail caused damage in Washington, Frederick (MD), Prince George's, Fairfax, Berkeley and Jefferson Counties. Thunderstorms also produced strong winds along the Tidal Potomac River and over the Chesapeake Bay.

26th: Thunderstorm winds knocked down trees in Howard, Highland, Nelson, and Albemarle Counties. Half dollar size hail fell in Highland Counties.

28th: Strong thunderstorms winds swept across the Tidal Potomac River and Chesapeake Bay.

(Hurricanes…continued from page 3)
in some cases record flooding, across Virginia, Maryland and West Virginia. The South Branch Potomac basin in eastern West Virginia was the hardest hit. Record water levels were reached at gauging stations located at Franklin, Petersburg, Moorefield, and Springfield. The main stem Potomac River at Paw Paw, West Virginia also reached a record level of 53.58 feet. This is more than 45 feet higher than an average day on the Potomac at this site.

54 people lost their lives in Virginia, West Virginia and Pennsylvania as a result of the 1985 floods. Total damage was estimated at $850 million.

In September of 1996, a lady named Fran paid our area a little visit. Fran produced a storm surge of 5 to 6 feet, causing inundation along the Chesapeake Bay and tidal Potomac River. States from South Carolina to Maryland were hard hit by the heavy rain produced by Fran. 22 people lost their lives during Fran, mostly from flash flooding. Record flood levels were reached on the following waterways: Georges Creek near Westernport, Maryland, the North Fork Shenandoah at Cootes Store and Strasburg, Virginia, and the South Fork Shenandoah at Lynnwood, Virginia. Total damage was estimated at $2 billion across the U.S.

TORNADOES

Tropical systems can also spawn tornadoes. The remnants of Hurricane David spawned tornadoes in Charles County, Maryland and four counties in northern Virginia on September 5, 1979. The strongest tornado, with winds estimated at 160 to 200 mph, moved across Fairfax County. The tornado produced major damage to Woodson High School in Fairfax. More recently, the remnants of Opal produced 5 tornadoes in Maryland in October of 1995. The strongest, with winds estimated at 125 to 150 mph, struck Temple Hills in Prince Georges County, Maryland, injuring 3 people. Luckily, there were no deaths.

PREPARING

Now is a good time to prepare for tropical weather and its hazards. It is a good idea to have a plan in place and supplies on hand BEFORE the storm hits.

Keep trees trimmed around your home. Limbs can become projectiles during high winds. Remember to have extra non-perishable food and drinks, and a manual can opener, on hand prior to the storm affecting you. Consider filling your bathtub and sinks with water in case the supply becomes contaminated. Stock up on your prescriptions if you are on medication. Turn off the gas supply to your home or business if high winds are forecast. Battery operated appliances, such as radios and flashlights, will come in handy in case power is interrupted. Keep a NOAA Weather Radio around for the latest weather information. You may also wish to withdraw extra money before the storm hits in case ATM machines become inoperable due to damage or power outages. Check on your insurance coverage now. Companies will not issue new policies or make adjustments with active tropical systems threatening the area.

Always follow the advice of your local officials. If they order you to evacuate - go! Have a destination in mind beforehand if you don't wish to stay in a storm shelter. If you do stay in a shelter, remember that they do not allow pets.

Was it a Tornado?
The Science Behind Damage Surveys

Steve Rogowski

It's the day after a severe weather outbreak, and time to formulate a complete picture of what occurred. National Weather Service Meteorologists begin assessing the situation by studying signatures from our Doppler Radar, and compiling eye witness reports of storm damage that have been called in.

Before leaving the office, we assemble printouts of storm reports, maps, a compass, a camera to document the damage, and reference materials.

Often times we begin where the reported damage was. Emergency Managers, Departments of Transportation, and local media are good sources of damage information. As we get closer to the damage, we keep an eye out for downed trees and wires.

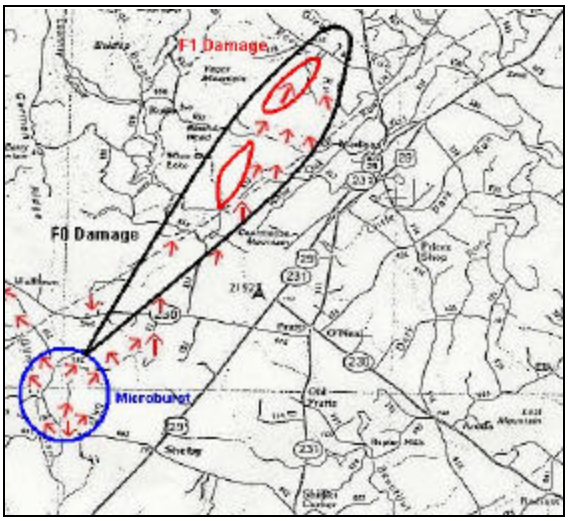
A F1 tornado damaged a barn in Madison County

It's important to note that not all downed trees are equal. Some are old (freshly downed trees still have green leaves), others are rotted or have burn marks indicative of a lightning strike. The size of the tree and root structure can help us identify the minimum wind speed that occurred. Similarly, meteorologists use information on the type of construction of a building before rating wind speeds.

Determining wind speed is only half of the objective. The orientation of damage normally reveals the cause.

(*Storm Survey continues on page 6*)

(*Storm Survey…continued from page 5*)
Downed trees which point toward each other (convergent damage) within a narrow but long path most likely was caused by a tornado. Meanwhile, damage which is oriented in a similar direction, or spreads apart indicates straight-line winds (not a tornado) was the cause. Oftentimes, if there was tornado damage, there is also straight-line wind damage nearby, complicating the survey efforts.



Graphical reproduction of the Madison County survey

When you consider that damage swaths can span a good portion of a county or even several counties, you can begin to understand the complexities of storm surveys. This is why mapping the location and orientation of damage is vital. Some of us even number the arrows by photo number to link the pictures that we take to a location on the map.

The National Weather Service Survey Team can also spot other types of storm damage. Trees stripped of their leaves is often an indication of large hail or very strong winds, while flattened vegetation or debris across roadways leading to creeks is evidence of flash flooding.

NWS Sterling Heat Related Product Criteria

Heat Advisory: Heat indices between 100 and 105 degrees currently occurring or forecasted to occur during the current day.

Excessive Heat Watch: Issued 24 to 48 hours prior to the following forecasted conditions: Heat indices greater than 105 degrees for 3 hours during two or more consecutive days and minimum temperatures 80 degrees or above **OR** heat indices greater than 115 degrees for any duration.

Excessive Heat Warning: Same criteria as Excessive Heat Watch, when currently occurring or forecasted to occur during the current day.

Upcoming SKYWARN Classes

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

SKYWARN Picnic August 29th, see webpage for details!

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 what 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 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.

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