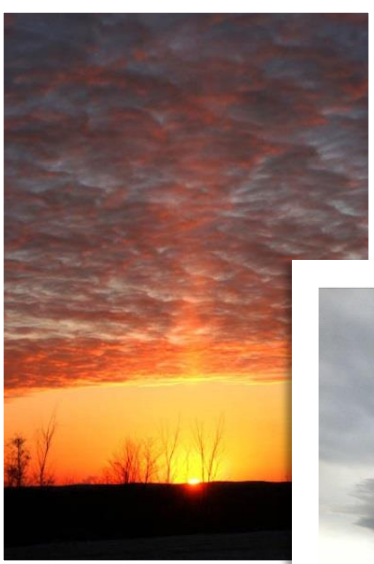
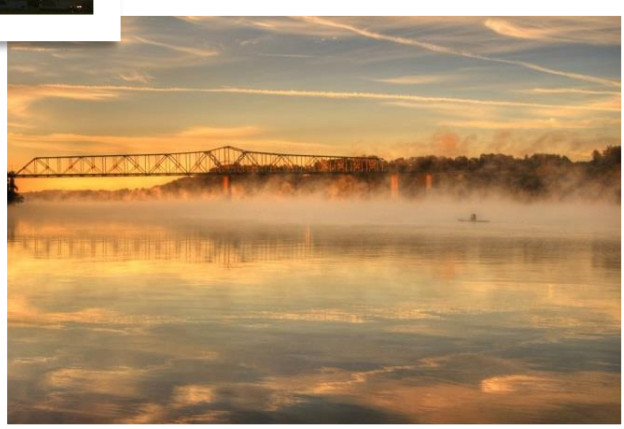
2014 Shareholders Report





National Weather Service
6201 Theiler Lane
Louisville, Kentucky 40229

NWS Louisville
@NWSLouisville

National Weather Service Louisville

Welcome to the tenth edition of National Weather Service (NWS) Louisville's Shareholders Report. You are a shareholder in the NWS! This report details the activities of NWS Louisville and events in its area of responsibility in southern Indiana and central Kentucky during 2014. The year started with a long drawn-out winter, but did not make the top 10 for coldest or snowiest at any of the region's larger cities. Thankfully, spring had only one small tornado, and all the rest of the year's tornadoes, eight of them, occurred on October 6-7.

NWS Louisville accomplished many innovative projects and proactive customer service during the year which benefited our shareholders. Our top five accomplishments were:

- Repairing lightning strike damage to our Doppler radar, restoring service within 29 hours
- Outreach events marking the 40th anniversary of the April 1974 Super Outbreak
- Hosting two NOAA Ernest F. Hollings Scholarship students for the summer
- Great decision support services (DSS) during a tire fire in Louisville
- Developing online severe weather spotter training

These topics and many others are included in this report. I hope you find that our activities demonstrate the sort of stewardship you expect from your public servants. The NWS was appropriated $1.06 billion for Fiscal Year 2014, which is an investment of $3.32 per American. As the leader of NWS Louisville, I feel it is my duty to report to you how your holdings have fared.

I am grateful to Lead Forecaster and Shareholders Report Editor Tom Reaugh for assembling another excellent report, and Science and Operations Officer Ted Funk for his thorough review of the document. I welcome your suggestions as to how the NWS can be an even better investment for you.

Sincerely,
John Gordon, Meteorologist-in-Charge

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Technicians Rush to Restore Radar

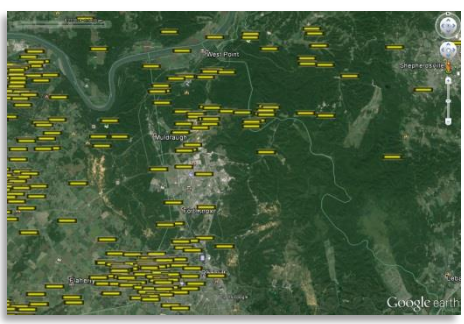
by Todd Adkins, Electronics Technician

At 6:35 pm EDT on August 27, the NWS Doppler radar at Ft. Knox, KY took a direct lightning strike. The strike was significant enough to burn a large tower ground wire and cut it in two. The strike left the radar inoperable with all major subsystems sustaining damage. This occurred as widespread thunderstorms moved through the Louisville metro where several trees were blown down. Fortunately, the meteorologists on shift at the time were able to use the FAA radar located in Mount Washington, and other nearby NWS radars, to track the storms.

NWS radar tower at Fort Knox. The antenna spins inside the white ball at the top.

NWS technicians were promptly notified of the outage and deployed to the radar site. Technicians troubleshot each of the subsystems and compiled a list of parts that were damaged. In the early morning of August 28, six major components with a value of nearly $80,000 were ordered and shipped on the first available fight from the NWS's National Logistics Center in Kansas City, MO. Technicians received the last part around 6:40 pm. After installing all parts and performing calibrations, the radar was operational again by 10:45 pm.

The lightning strike caused major damage to the radar, but NWS technicians displayed their expertise by quickly restoring this valuable source of data within only 29 hours. This event demonstrated the dedication that NWS Louisville employees have for the well-being of our shareholders.



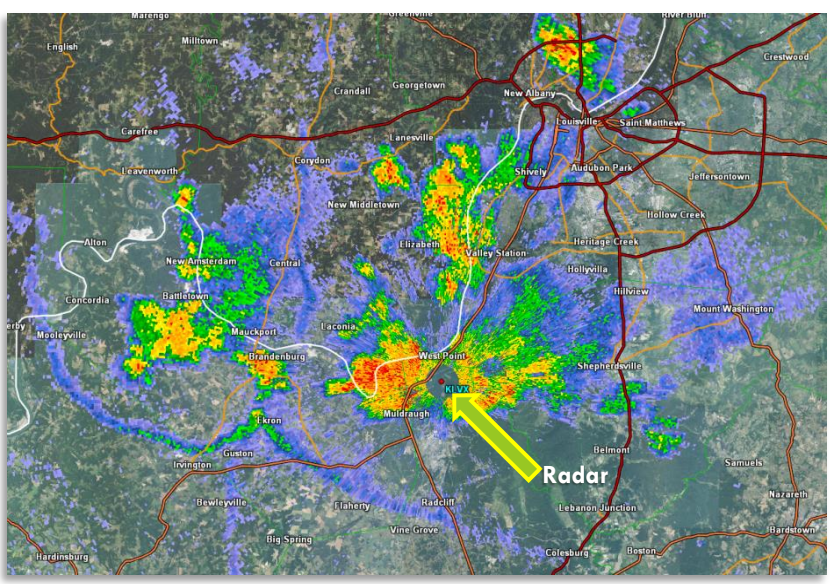
Yellow marks on this map show impressive lightning activity around Fort Knox (the gray area in the middle of the map) at the time of the strike.

Our Electronics Staff

Bill Whitlock
Electronic Systems Analyst

Todd Adkins
Electronics Technician

Ben Read
Electronics Technician



This is the last picture the radar took before the lightning strike. A thunderstorm is directly over the radar site (indicated by a small red dot), with other cells in the vicinity.

Decision Support Services (DSS)

by Joe Sullivan, Warning Coordination Meteorologist

Through our DSS program, NWS Louisville helps non-meteorologists determine how weather will impact them. In a nutshell, we decipher the jargon weather folks like to toss around, assisting officials who make decisions that are affected by the weather.

DSS can be critical during potentially life-threatening situations. Words and phrases like WATCH, WARNING, ADVISORY, PROBABILITY OF PRECIPITATION, etc. all have a specific meaning to meteorologists, but may mean something different to others. Regardless of what causes a threat to public safety – be it a flood, ice storm, train derailment, or 700,000 people gathered along the Ohio River waterfront for fireworks – NWS Louisville is committed to helping our partners protect lives and property when hazardous weather could heighten risk to a large sector of the public.

In 2014, NWS Louisville staff provided weather support via location-specific forecasts, heightened weather monitoring, and, on some occasions, onsite support to public safety officials during a number of situations, including:

- Thunder over Louisville
- Pegasus Parade
- Kentucky Oaks and Derby
- A large tire fire in southwest Louisville
- An overturned semi-trailer releasing hazardous chemicals on I-75 in Lexington
- Final weekend of the PGA Championship at Valhalla Golf Course when thunderstorms threatened
- Kentucky State Fair when lightning caused cancellation of the Joan Jett concert

Below: A large tire fire on the far southwest side of Louisville.
Right: Torrential downpours caused minor flooding at Valhalla Golf Course during the PGA Championship.

Below: Forecaster Kevin Deitsch with the mobile weather unit we use, the HAZMAT 6 Weatherpak, during the Kentucky Derby.

In 2015, forecasters at NWS Louisville will continue to be available to provide emergency management and public safety officials with this critical service whenever weather conditions play a role in the protection of lives and property.

40th Anniversary of the Super Outbreak

by Joe Sullivan, Warning Coordination Meteorologist

For many people of a certain age who are fascinated by weather, one 24-hour period may be the reason for their interest: April 3-4, 1974. From just after noon on the 3rd until mid-morning on the 4th, nearly 148 documented tornadoes struck in 12 states east of the Mississippi River, as well as one Canadian province, killing more than 300 people. In Kentucky, 26 tornadoes were recorded, claiming 77 lives. In Indiana, 20 tornadoes took the lives of 47. Ask anyone who lived through the day in central Kentucky or southern Indiana, and it will evoke memories as clear as if it had happened yesterday. For some, the events of the day piqued their interest in weather, spurring them to learn more; for others, the fear they felt that day is revived every time they hear a siren.

While that day left much sadness in its wake, it also served as a catalyst for many improvements to the NWS that continue to help us today in our mission to protect lives and property. In addition to a large expansion of the NOAA Weather Radio network that now covers 95% of the U.S. population, the destruction caused by the Super Outbreak drove scientists to develop more powerful weather radars to look inside the storms that produce nature's deadliest weather. The Doppler radars that now serve as the backbone of the NWS convective warning system are a direct result of the storms of April 3-4, 1974.

To remember the victims from 1974, NWS Louisville, in conjunction with emergency managers and local media, co-hosted four commemorative ceremonies in locations where lives were lost. In Brandenburg, KY, which saw the greatest loss of life of any city in the Commonwealth, a wreath was placed on a memorial in the town for the 31who died, accompanied by a reading of the victims' names. The names of those who perished were also read at ceremonies in Madison, IN; Frankfort, KY; and Simpson County, KY. In Frankfort and Simpson County, emergency managers arranged for a free screening of "Day of the Killer Tornadoes," a documentary about the outbreak, and "Twister" to show how much the science of meteorology was changed by the Super Outbreak.

While other tornado outbreaks in recent years have produced more tornadoes over a longer time frame, the Super Outbreak will continue to be the standard by which all outbreaks are measured.

Left: Citizens gather for the commemoration in Brandenburg. A bell was salvaged from the county courthouse after the storm and was rung during the ceremony in memory of the dead. Right: Posters in Simpson County windows before the anniversary.

Left: The audience gathers at the historic Grand Theatre in Frankfort, remembering those who were lost. Right: NWS Louisville's John Gordon discusses the event in Madison at the Jefferson County Courthouse.

Weather Spotter Training Online

by Ron Steve, Lead Forecaster

In our continued effort to make the most efficient use of taxpayer dollars, NWS Louisville has developed an online version of our Skywarn spotter training. With voice-over help from retired local TV meteorologists Ken Schulz and T.G. Shuck, we have converted the Skywarn class to four videos available on our NWS Louisville YouTube channel. After viewing each video, users must complete a series of quizzes online to become certified as Skywarn spotters.

The online training will improve our Skywarn program by helping us reach additional spotters who cannot make it to our classes due to scheduling conflicts, or if we are unable to conduct training in their area in any given year. Also, by covering basic information online, we can spend more time at our in-person Skywarn classes discussing scientific details and more advanced storm spotting.

Take our online Skywarn training at ***w2.weather.gov/lmk/onlineskywarn*** and check our webpage for a class near you this spring.

Screenshot of one of our Skywarn spotter training videos.

StormReady

by Erin Rau, Forecaster

The NWS Louisville StormReady program continued to be active in 2014. The program is designed to help communities be more prepared for severe weather, and to save lives through better planning, education, and awareness. The program is part of the NWS's overall goal of creating a Weather-Ready Nation. Three new counties in the Louisville forecast area were certified as StormReady in 2014: Hardin and Bullitt in Kentucky and Clark in Indiana. In addition, Perry County, IN and Warren County, KY renewed their certifications.

In Bullitt County, L to R: EMA Deputy Director Marke Richardson, Judge-Executive Melanie Roberts, John Gordon, Hollings student Jessica Tomaszewski, and Joe Sullivan.

Determining the Likelihood of Tornadoes

by Kevin Deitsch, Forecaster

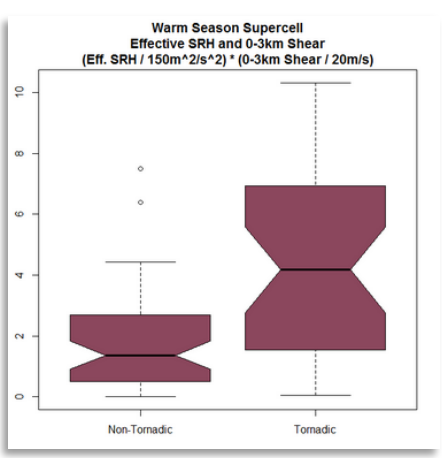
During the summer of 2014, NWS Louisville was privileged to host two Ernest F. Hollings Scholars. The Hollings Scholarship is awarded to top sophomore college students enrolled within disciplines specific to the National Oceanic and Atmospheric Administration (NOAA) mission. Two meteorology students were selected to come to NWS Louisville and work full-time on projects for the entire summer.

Jessica presenting her and Kevin's research at the annual meeting of the National Weather Association in Salt Lake City

One of the students, Jessica Tomaszewski from the University of Oklahoma, worked with Kevin Deitsch on a research project intended to help reduce the false-alarm ratio (FAR) of tornado warnings. To lower FAR, increase the probability of detection, and increase public responsiveness to warnings, the project examined the difference in types of environments between the verified and unverified warnings.

The study examined 1,185 cases that took place from 2010 through August 2014. Archived environmental data on dozens of meteorological parameters were taken from the Storm Prediction Center's (SPC) website and recorded in a spreadsheet for each case. Graphs comparing these environmental parameters in tornadic cases versus non-tornadic cases were then created to determine results of the study. The results showed that only a few meteorological parameters do well on their own in determining non-tornadic versus tornadic environments. However, when some of the elements are combined, the resultant composite parameters did a much better job deciphering between the two environments. Overall, combined parameters measuring winds changing speed or direction with height (shear) in the lowest 1 to 3 kilometers of the atmosphere tended to be the best discriminators between tornadic and non-tornadic environments. Several instability parameters were also tested, none of which provided much reliability in delineating between the two environments.

These results will significantly help NWS Louisville forecasters with their tornado warning decisions. When potentially tornadic storms threaten, forecasters will have the ability to see if the storm is in an environment which matches the tornadic environments studied in this research. If so, then a tornado warning can be issued with higher confidence, hopefully leading to a lower FAR and a greater response from the public.



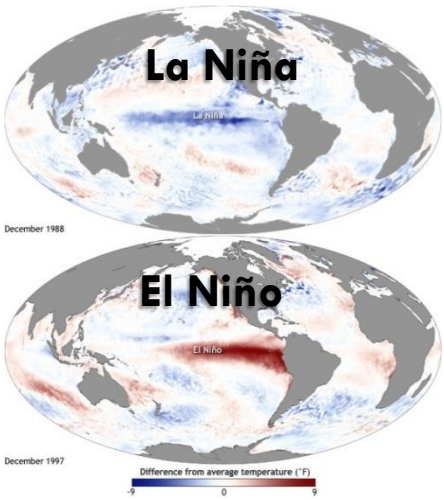
Forecasters can monitor the atmosphere and compare charts like this with real-time observations.

How Do Climate Patterns Affect Us?

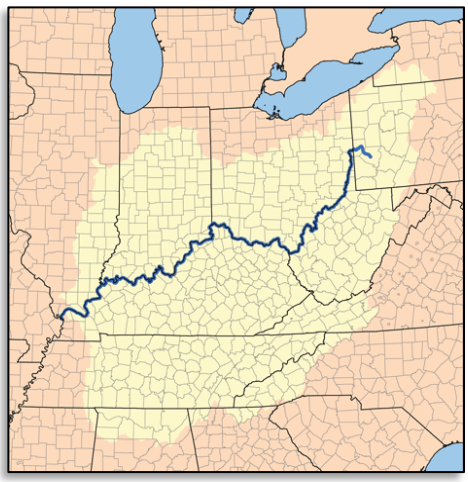
by Allison Young, Student, and Tom Reaugh, Lead Forecaster

Allison Young, from Valparaiso University, was one of two NOAA Ernest F. Hollings Scholars to work at NWS Louisville during the summer. Allison's study investigated the El Niño Southern Oscillation (ENSO) and the North Atlantic Oscillation (NAO), and their effects on weather in the Ohio and Tennessee Valleys. Her study was particularly focused on how the two work in synergy to modulate winter weather in the area. In an effort to develop a climatology-based forecasting tool for the area of study, historical temperature and precipitation data since 1950 were analyzed in relation to different scenarios of positive and negative ENSO and NAO phases. The analysis was done for 123 Local Climatological Data (LCD) and Cooperative Observer Program (COOP) sites within the study area.

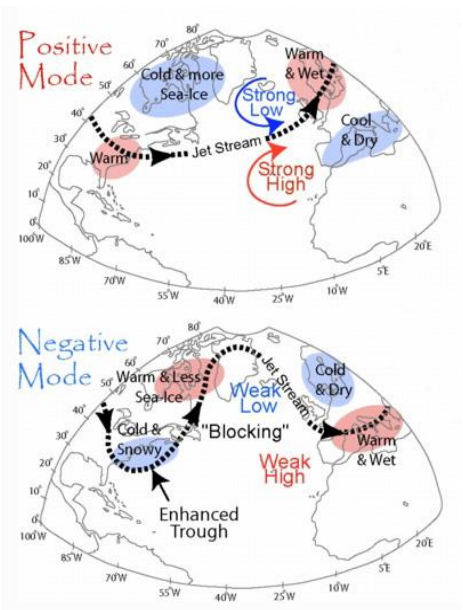
The primary goal of the work was to aid forecasters in identifying what an upcoming winter season will bring, and in anticipating near-future weather patterns and storm behavior on a day-to-day basis. The results from this project will enhance forecasters' ability to answer customer questions about upcoming weather based on the expected ENSO and NAO phases.



Left top: ENSO is divided into three phases: La Niña (negative), Neutral, and El Niño (positive). ENSO is characterized by changes in the water temperatures of the central Pacific (shown here), which alters circulation patterns of the air above the water, which then has a domino effect that changes weather patterns around the globe.
Left bottom: NAO causes significant changes in the jet stream and pressure patterns over the northern Atlantic.



The study area, in yellow.



Results of the study for the Ohio Valley:

ENSO Category	Old Description	NAO Category	Old Description	ENSO/NAO Category	New OHV Description	New TNV Description
Neg	wetter and warmer	**Neg**	cold and snowy	**Neg/Neg**	slightly wetter and snowier	slightly wetter and snowier
Neutral		**Neg**	cold and snowy	**Neutral/Neg**	drier, slightly snowier, colder	drier, slightly snowier, colder
Pos	dry weather	**Neg**	cold and snowy	**Pos/Neg**	drier, slightly snowier in E, cooler	drier, slightly snowier in E, colder
Neg	wetter and warmer	**Pos**	warm weather	**Neg/Pos**	wetter, much less snowy, much warmer	wetter, much less snowy, much warmer
Neutral		**Pos**	warm weather	**Neutral/Pos**	slightly wetter, less snowy, slightly warmer	wetter, much less snowy, much warmer
Pos	dry weather	**Pos**	warm weather	**Pos/Pos**	slightly wetter, slightly snowier E and slightly less snow W, slightly warmer	slightly drier, slightly snowier E and slightly less snow W, slightly warmer

Social Media Presence Expands

by Ron Steve, Lead Forecaster

After approximately two years on Twitter in an experimental capacity, the NWS has made Twitter another official venue by which we deliver weather information. The "official" designation means our Twitter feed will not go away any time soon. What and when we post will continue to evolve as we learn more about how you use our information on both Facebook and Twitter.

What has not changed in social media is the interactive aspect. We use Facebook and Twitter not only to deliver weather information to our 15,000 Facebook fans and 7,000 Twitter followers, but also to seek out ground truth information that is being shared by the general public and by our partners in the media and emergency management. We encourage you to interact with us on Twitter by mentioning us, @NWSLouisville, or by using the hashtags #LMKSpotter and #kywx or #inwx depending on whether you are in Kentucky or Indiana.

A successful new project in social media in 2014 was our live Q&A sessions before significant weather events. We held Q&A sessions via Facebook before winter weather and severe weather events early in the year, and before the winter storm on November 16-17 via Twitter. Four NWS Louisville staff members spent an hour answering questions from over 40 Facebook users and 30 Twitter users.

In 2015 we plan to host Q&A sessions via Facebook and/or Twitter whenever we are under a Winter Storm Warning or a moderate or high risk for severe weather. These sessions will be about an hour long, and will take place the evening before we expect the local area to be affected. By answering your questions, we hope to help you better prepare for the expected hazardous weather.

NWS Louisville Goes to the Fair

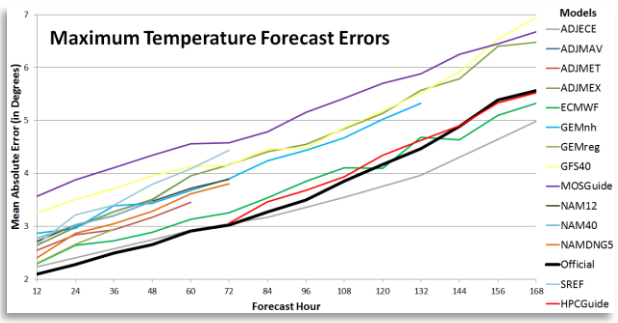
by John Gordon, Meteorologist-in-Charge

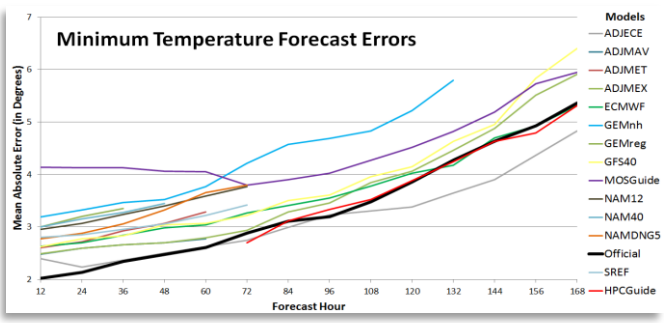
Thanks to the work of Joe Sullivan, NWS Louisville was once again at the Kentucky State Fair in the south wing of Freedom Hall. We spoke to thousands of people at our booth and provided decision support services for state fair personnel. There were several days during which thunderstorms threatened the Kentucky State Fairgrounds, so NWS staff members went to an onsite command post to help protect lives and property. The storms unfortunately led to the cancellation of several outdoor events, especially on August 23 when authorities were forced to call off the Joan Jett concert. NWS Louisville will be doing much more onsite support in 2015 for major events for public safety purposes.

Forecast Verification in 2014

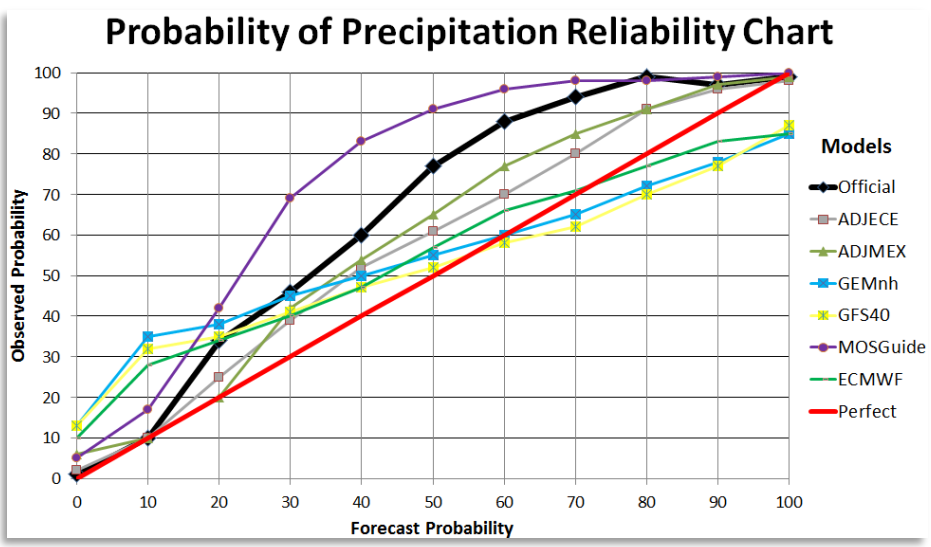
by Ryan Sharp, Lead Forecaster

As forecasters, we regularly compare our forecasts to what actually happened. NWS Louisville does well against computer guidance for forecasts of high and low temperatures. The charts below indicate our forecast temperature errors, labeled "Official" and shown in black, for both elements for the short term (12 hours) out to the end of the forecast period (7 days, or 168 hours). Several of our computer forecast models are listed (e.g., GEMreg is the Canadian forecast model on a regional scale), as well as ensemble model forecasts (e.g., SREF stands for Short Range Ensemble Forecast) and statistical computer guidance (e.g., MAV, which is based off the Global Forecast System, or GFS). The lower the line on the chart, the less error in the forecast. As you can see, the bold black line (NWS Louisville forecast) remains consistently lower than most computer model forecasts, showing an overall improvement of 19% over these models. The lines slope up to the right because forecast error increases farther out in time.





When we issue a certain percentage chance of precipitation, how often does it actually rain or snow at each of our forecast points in southern Indiana and central Kentucky? We can answer this by verifying our Probability of Precipitation forecasts. The chart below shows our verification, as well as several computer models' verification, by forecast percentage. The red line on the chart indicates a perfect forecast, i.e., when a forecast of a 50% chance of precipitation verifies exactly 50% of the time, an 80% forecast verifies 80% of the time, and so on. The bold black line represents the NWS Louisville forecast. What we have learned this year is that we tend to have a dry bias. For example, when we forecasted a 40% chance of precipitation, on average rain or snow was observed 60% of the time. Knowing the biases, we can adjust our forecast thinking and improve our forecasts.

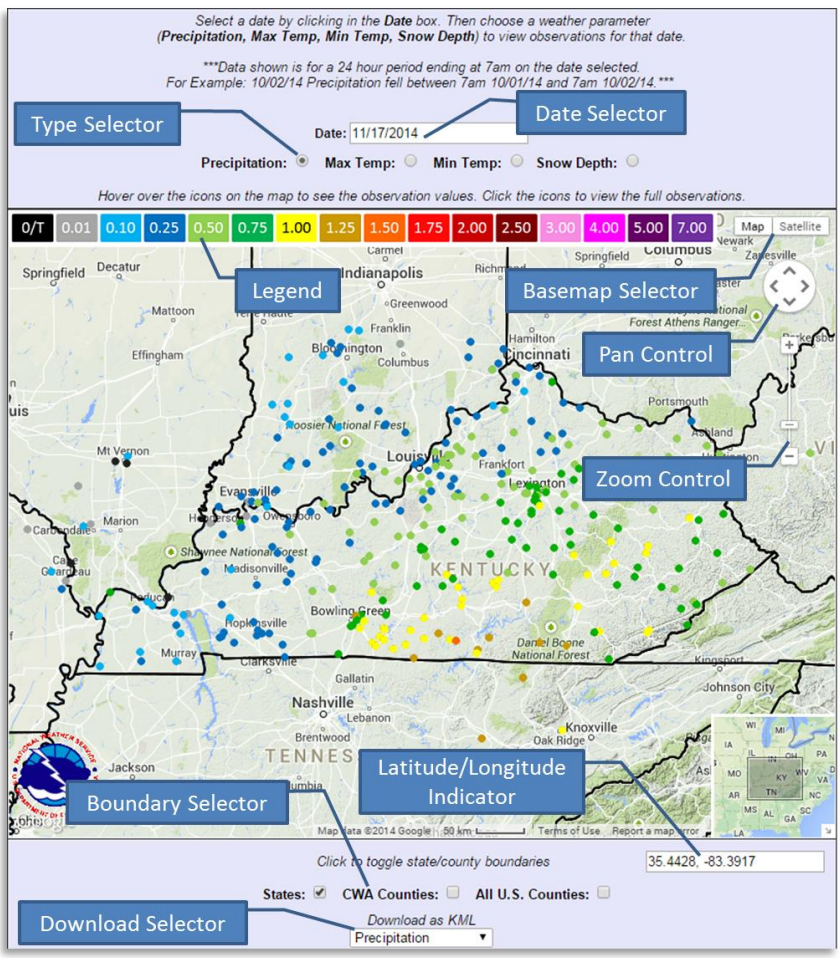


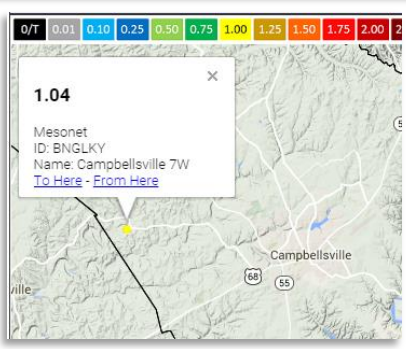
Precipitation and Temperature Maps

by Mike Callahan, Hydrologist

In 2014, NWS Louisville introduced a new daily precipitation and temperature map archive on our website. The data on the maps come from local airports, Kentucky Mesonet stations, United States Geological Survey (USGS) and United States Army Corps of Engineers (USACE) satellites, cooperative observers, and Community Collaborative Rain Hail and Snow Network (CoCoRaHS) observers.

The maps show 24-hour precipitation, maximum temperature, and minimum temperature from around 7am the previous morning to 7am on the current morning. Snow depth at 7am is also included. The map below is an example of what we offer, found at *w2.weather.gov/lmk/dailyprecipitation_temps*.





The observation points are colored according to the legend at the top of the image. For example, points colored dark green will have precipitation values between 0.75 and 0.99 inches. Clicking on the date selection pops up a calendar where a date of interest can be selected. The archive begins in November 2014.

Because the 24-hour observation period begins at 7am, usually it is necessary to click on the date *after* the day you actually want to see. For example, if heavy rain fell on the afternoon of November 16, select November 17 to view it, since the rain fell after 7am the previous day. The map will then display the precipitation for that 24-hour period. Once a map is displayed, hover the mouse over any location to determine its value. Clicking on the location will give more information. In the example on the left, 1.04 inches was recorded by a gauge near Campbellsville. Temperatures and snow data are acquired and displayed in a similar way.

Cooperative Observer Milestones

by Mike Crow, Observation Program Leader

The staff at Barren River Lake has been providing temperature, precipitation, and lake level data to the NWS since July 1, 1963. Park Manager Carlos Lopez accepted a 50-year service award on May 28, 2014. Mike Callahan presented the award to Mr. Lopez (right).

While at Barren River Lake, Mike and other NWS Louisville staff members participated in a dam break tabletop exercise that gave Corps personnel, emergency responders, and the NWS a chance to think over and plan their responses in the unlikely event of a dam failure.

The maintenance staff at Nolin River Lake has been providing temperature, precipitation, and hydrologic observations to the NWS since January 1, 1964. On December 11, 2014, Mark West (left) of the USACE accepted a 50-year service award on behalf of the staff at Nolin River Lake. Mike Crow presented Mark with the award.

In 2015, we are looking forward to presenting a 20-year service award to our observer in Taylorsville, and a 25-year service award to the observing staff at the Russellville Waste Water Treatment Plant. NWS Louisville oversees 55 cooperative observer sites in central Kentucky and southern Indiana.

More Observations Available

by Toby TenHarmsel, Information Technology Officer

Information Technology Officers from NWS Louisville and NWS Jackson worked together to increase the number of weather observation sites available to forecasters. Previously, data from some automated weather observing sites were not available in the computer system used by NWS forecasters. A method was devised to acquire data from those sites by running software that dials the automated sites every hour and puts the information into the forecasters' computers. As a result, 10 additional weather observations are now available, filling in data-sparse regions.

Sites Now Available to NWS

Bardstown, Kentucky
Bedford, Indiana
Campbellsville, Kentucky
French Lick, Indiana
Greenville, Kentucky
Jamestown, Kentucky
Madison, Indiana
Madisonville, Kentucky
Sellersburg, Indiana
Seymour, Indiana

Exploring the Latest Technology

by Ryan Sharp, Lead Forecaster, and Kevin Deitsch, Forecaster

Ryan Sharp, Kevin Deitsch, and Intern Linda Gilbert traveled to the National Weather Center on the campus of the University of Oklahoma where they joined other meteorologists at the Hazardous Weather Testbed (HWT). The HWT merges cutting-edge research with operational meteorology by exploring new tools and technologies to assist meteorologists during dangerous weather events.

Check out the latest operational meteorology activities at the HWT:

hwt.nssl.noaa.gov

NWS Louisville forecasters sampled new tools that will help detect severe thunderstorms quicker and more accurately. One of the tools included an algorithm that combined radar data with satellite imagery to determine the probability of a storm being severe.

Another tool assessed the increase or decrease in lightning activity within a thunderstorm, suggesting either a strengthening storm that may become severe, or a weakening storm. In an experiment to test this tool, three forecasters worked with the same past weather scenarios, but with access to different amounts of data. Six different case studies were examined, with weather regimes varying from a line of thunderstorms crossing the DC Metro, to supercell thunderstorms that produced strong tornadoes near Paducah, to non-severe thunderstorms over northern Alabama that were initially thought to become severe.

Two new forecast models of very high resolution were also evaluated. The models have the ability to predict not just large-scale patterns, but specific locations of individual storms! The forecasters at the HWT tested these tools for a week, providing specific and detailed feedback to the tools' developers on how to improve them before they are released to all NWS offices for daily use. The results of the experiments are still being examined, but the experience the forecasters gained by working real world cases was invaluable.

The Hazardous Weather Testbed in Norman, OK.

Surveying Tree Damage

by Ron Steve, Lead Forecaster

On December 12, NWS Louisville hosted a webinar on assessing tree damage from storms. Dr. Bill Fountain from the Horticulture Department at the University of Kentucky discussed the failure potential of different species of trees common to the Ohio Valley. The webinar was attended by most of the NWS Louisville forecast staff as well as forecasters from NWS offices in Paducah and Wilmington, OH, as well as officials from Kentucky Emergency Management. The information presented will help the NWS make more accurate estimates of wind speeds in severe storms based on observed damage to trees.

Georgetown, KY on Oct. 7.

NWS Louisville Shares Research

by Ted Funk, Science and Operations Officer

The National Weather Association's (NWA) 39th Annual Meeting was held in Salt Lake City, UT on October 19-23. The NWA is an operationally-oriented organization of meteorologists from the NWS, media, universities, private companies, and others across the country. The NWA's motto is "*connecting operational meteorologists in pursuit of excellence in weather forecasting, communication, and service*."

Ted Funk presenting at the annual NWA conference.

The theme for the meeting was "*Building a 21st Century Weather Enterprise: Facilitating Research to Operations - Optimizing Communications and Response*." Several hundred people attended all or part of the conference, and gave a wide variety of oral and poster presentations. Notable topics included the concept of Weather-Ready Nation, the Atlanta, GA 2013 winter storm ("snowjam"), communicating hazards from a social science perspective, communication strategies, NWS product and impact evolution, improving NWS decision support services, aviation impacts, severe storm environments, Doppler radar trends, climate, and much more.

Ted Funk attended the conference and gave a presentation titled, "*A Procedural, Philosophical, and Scientific Look at NWS Warning Services for Serial-Type QLCSs in the Ohio, Tennessee, and Mid-Mississippi Valleys*." His talk summarized scientific challenges associated with lines of severe storms, and severe weather warning operations and services at a dozen NWS offices in and around the Ohio Valley. Upon his return to Louisville, Ted briefed the NWS staff on many applicable topics from the meeting.

The 40th Annual NWA Meeting will be held in Oklahoma City, OK in October 2015. NWS Louisville will likely send another staff member to this informative and interactive conference.

National Hazards Map Simplified

by Tom Reaugh, Lead Forecaster

On October 21 the NWS stopped displaying the Hazardous Weather Outlook (HWO) on the national hazards map shown on the NWS homepage *weather.gov*. Previously, when an HWO was issued it was indicated by a light tan color on the hazard map. This color often occupied large areas of the map and was a distraction from concurrent, and more important, watch, warning, and/or advisory products also indicated on the map.

The HWO is still available on individual local NWS pages. Clicking on the geographical location of interest from the national hazards map will take the user to the local NWS homepage.

KET Call-In Show

by John Gordon, Meteorologist-in-Charge

On February 17, John Gordon joined Buddy Rogers of Kentucky Emergency Management Public Affairs, WBKO Weather Director Chris Allen, and Jon Akers, Executive Director of the Kentucky Center for School Safety, as panelists on the annual Kentucky Educational Television (KET) show: "Severe Weather – Staying Safe!"

Host Bill Goodman led the discussion among the panelists discussing severe weather, historic weather events, and weather safety tips. Viewers' questions were answered on the air and by NWS Louisville phone screeners Joe Sullivan, Ted Funk, and retired Lead Forecaster Joe Ammerman.

John discussed the Weather-Ready Nation concept and preparedness slogans such as "When Thunder Roars, Move Indoors," "Turn Around, Don't Drown," and "Beat the Heat, Check the Back Seat." Kentuckians were urged to identify storm shelter locations, both at work and at home. NOAA Weather Radios were given away to five lucky viewers.

Weather-Ready Nation

Weather-Ready Nation (WRN) is about building community resilience in the face of increasing vulnerability to extreme weather. The initiative includes improvements to support management of the nation's water supply and understanding of climate-related risks, economic productivity, healthy communities, and ecosystems. The goal is to support the NWS mission by reducing risk and increasing community resilience to extreme events.

WRN Ambassadors are NWS partners who are improving the nation's readiness, responsiveness, and resilience against extreme weather, water, and climate events. The WRN Ambassador initiative helps unify the efforts across government, non-profits, academia, and private industry toward making the nation more ready, responsive, and resilient. If you are interested in becoming a WRN Ambassador please see *www.nws.noaa.gov/com/weatherreadynation*.

Staff Changes at NWS Louisville

by John Gordon, Meteorologist-in-Charge

In June, Dr. Mike Paddock was promoted to Lead Forecaster at NWS Las Vegas. Mike was a Forecaster at NWS Louisville since 2009. Mike overhauled the storm spotter database, led the severe weather program, created a well-organized student volunteer program, and was an excellent meteorologist.

Linda Gilbert departed in November and was promoted to a Forecaster position at NWS Kansas City. Linda was at NWS Louisville since 2010 and had an exceptional work ethic and provided great customer service. Linda developed our social media presence from its infancy to a vibrant program with our Facebook page climbing to 15,000 likes.

Zack Taylor was selected from NWS La Crosse to replace Mike Paddock in November. Zack beat out over 70 candidates competing for the position. Zack had the best science and people skills of the candidates. Besides his normal operational forecasting shifts, Zack will be working to develop an impact hazards catalog that will list weather-related hazards to local infrastructures.

Biggest Weather Events of 2014

by Tom Reaugh, Lead Forecaster

The Long, Cold Winter

Repeated intrusions of frigid arctic air and several moderate snowfalls kept southern Indiana and central Kentucky cold for much of the 2013-14 winter. About 60% of the days from December through February had a daily average temperature that was colder than normal, though the season as a whole was not in the top 30 coldest winters.

Air temperatures tumbled below zero on January 6 and 7. Those chilly readings were accompanied by winds that took wind chills to -26° at Lexington.

The season's longest stretch of unusually cold weather took place February 3-17, which coincided with the longest stretch of continuous snow cover on the ground. Daily average temperatures were occasionally as much as 20 degrees below normal!

Cold lingered into March, with single digit temperatures during the first week and daily average temperatures 10° to 20° colder than normal during the final week.

Significant snow or ice struck on December 6, January 21, January 25, February 2-5, February 14, March 2-3, and March 16. The December storm dropped 5 to 9 inches of snow on southern Indiana. Complex storm systems on February 4-5 and March 2-3 brought messy mixes of snow, sleet, and ice.

Trees coated in ice at NWS Louisville on February 5.

October Tornadoes

A warm front brought thunderstorms to southern Kentucky during the afternoon of October 6. One supercell in particular moved eastward just north of the Tennessee border and produced two short-lived EF-1 tornadoes. One touched down north of Burkesville and the other was near Wolf Lake Dam. Almost all of the damage done by the twisters was to trees. A couple in a vehicle on Route 127 in Clinton County was trapped when trees fell across the highway both north and south of them.

Clinton County tornado on October 6.

The following morning, thunderstorms over southern Indiana generated a gust front that advanced into northern Kentucky by afternoon. Thunderstorms erupted along the boundary and generated six tornadoes over a 90-minute period. All of the twisters were of EF-1 strength and fortunately there was only one injury. It was the region's largest tornado outbreak since January 30, 2013.

EF-1 damage to a home found during a storm survey in Paris, KY after the October 7 tornado.

Office Goals for 2015

- Decision support services
  - NWS Louisville will continue to expand our response to hazardous material releases and other events that require weather support.
  - All forecasters will be trained in providing emergency weather support.
- Successfully install AWIPS2
  - The Advanced Weather Information Processing System, AWIPS, is the computer system forecasters use to perform most of their daily tasks and to issue warnings, watches, and advisories. AWIPS2 will be the largest upgrade to the system in over a decade.
- Hazardous weather operations
  - Improve Tornado Warnings to improve Probability of Detection and reduce False Alarm Ratio.
  - Implement statewide graphical Hazardous Weather Outlook program for Kentucky.
- Develop a template for storm surveyors to use when assessing damage.
- Take local forecasters to visit weather observation sites in Mammoth Cave National Park and Frankfort.
- Create and publish several informational YouTube videos for NWS Louisville's YouTube Channel at *youtube.com/user/NWSLouisville*.
- Outreach
  - Work with Mammoth Cave National Park and Eastern Kentucky University to acquire StormReady status.
  - Continue our presence at the Kentucky State Fair.
  - Increase participation from the HAM radio community during severe weather.
- Improve forecast consistency and collaboration among neighboring NWS offices.

NWS Louisville Office Description

The mission of the NWS is to protect the life and property of our citizens from natural disasters by issuing warnings and forecasts for all manners of severe or extreme weather, and to enhance the national economy. This mission is carried out by highly trained staff at weather offices and national centers located throughout the U.S. and its territories.

From day-to-day weather forecasts to warnings of potentially dangerous storms, the NWS operates 24 hours a day, 7 days a week, every day of the year. NWS Louisville issues public forecasts and severe weather warnings for 49 counties in central Kentucky and 10 counties in south-central Indiana. This includes Louisville, Lexington, Bowling Green, Frankfort, Elizabethtown, and Madison.

NWS Louisville has a staff of 23, including forecasters, hydrometeorological technicians, a hydrologist, an information technology officer, electronics technicians, an administrative support assistant, and management.

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Cover Photo Credits
Front, top row: top left Nick Pope, center and top right NWS Louisville
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Front, bottom row: Wayne Little, Scott Taylor
Back: Harmless but dramatic low clouds near Lexington on June 20. Photo by Dave Buttery