Central Illinois Lincoln Logs

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Lincoln NWS 20th Anniversary Retrospective

By: Chris Geelhart, Meteorologist

Editor's Note: This is Part 3 of a 3-part series on the history of the National Weather Service in Lincoln, which marks its 20th year of operation in 2015.

What We Do Today

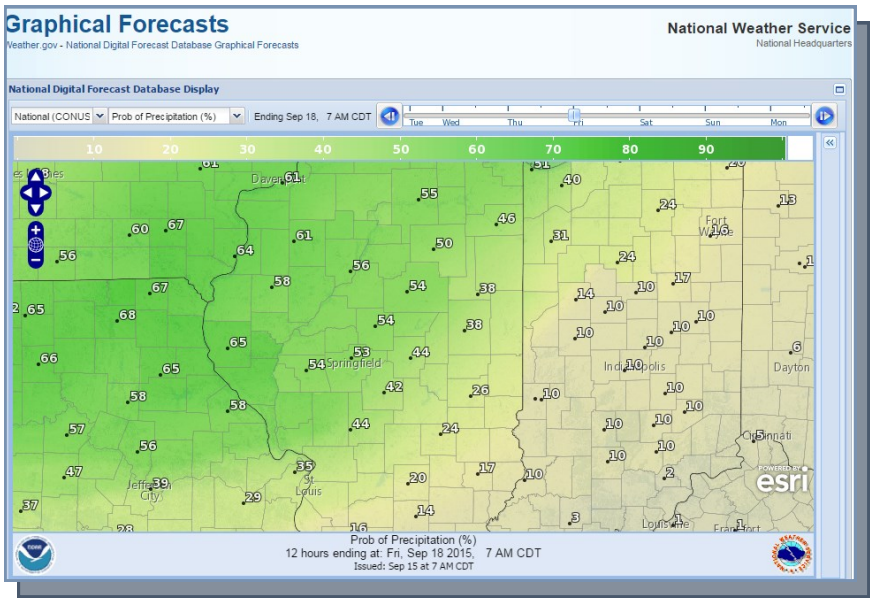
During the 20 years our office has been in Lincoln, our staffing and roles have changed. The only real constant is the twice-daily balloon launches.

Forecasting:

Computer systems, additional model guidance, and improved satellite and radar data have greatly changed our operations. Early on, our 7-day weather forecast was typed out by hand. This gradually changed to a gridded forecast process, in which we "draw" the forecast; various computer tools help us to calculate many parameters down to an hour-by-hour forecast, which is then used to create several different products. The forecast that is available on our web site uses this "gridded" forecast, which allows for additional details not in the typical forecast (e.g. instead of just saying "chance of afternoon showers", the gridded forecast may say "chance of showers between 11 am and 2 pm"). These gridded forecasts are also used by other public and private sector entities, which can provide more specialized forecasts for their clients.

Inside this issue:

Example of a gridded forecast of precipitation chances, prepared by the Lincoln NWS and its neighboring offices.



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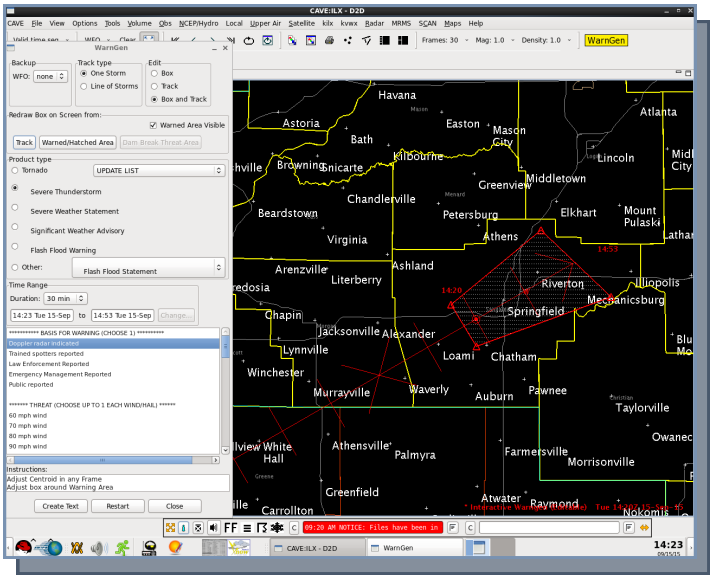
Lincoln NWS 20th Anniversary Retrospective (cont.)

Our office also issues aviation forecasts for the airports in Peoria, Bloomington, Springfield, Decatur, and Champaign. These types of forecast go beyond what normally is seen in a public forecast. For example, aviation forecasts will include the specific heights of the clouds (instead of just saying "cloudy"), expected visibility, timing of wind shifts, and specific weather types. Such forecasts are required by the aviation industry to help plan aircraft arrivals and departures, as well as alternate landing locations, and accurate forecasts can save airlines significant expenses.

In the last several years, we have also been issuing fire weather forecasts. Specific data that can be used to predict fire behavior is sent out by our office twice a day in season. Agencies that are responsible for prescribed burns (e.g. Department of Natural Resources) can also request a forecast for a specific burn site, and will receive a highly detailed forecast to assist with planning.

Severe Weather Warnings:

As with forecasting, severe weather warnings were largely typed out by hand when we first opened. A computer program did help automate some of it, but there were large sections that needed to be filled in by the warning forecaster. Today, a tornado or severe thunderstorm warning area is "drawn", and a few mouse clicks on a menu (used to indicate what is expected) allows a fully formatted warning to be issued in around a minute. The ability to issue these warnings with longer lead times over the years has occurred with improvements in radar technology, as well as advancements in the field of meteorology, as research in severe weather detection and forecasting continues.



Example of WarnGen software, used to create warnings for tornadoes, severe thunderstorms, and flash floods

Decision Support:

A fairly new aspect of our operations is referred to as "Decision Support Services" or DSS for short. We will work with local and state emergency management agencies to help provide specific localized forecasts for special events that have a significant public impact (e.g. may have thousands of people at risk, such as at the State Fair) or that are dangerous to people in the local area, such as a hazardous materials explosion.

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The State Emergency Operations Center in Springfield. Lincoln NWS staff are occasionally brought in to provide weather briefings to support the state in their efforts to prepare for flooding, winter storms, or severe weather.

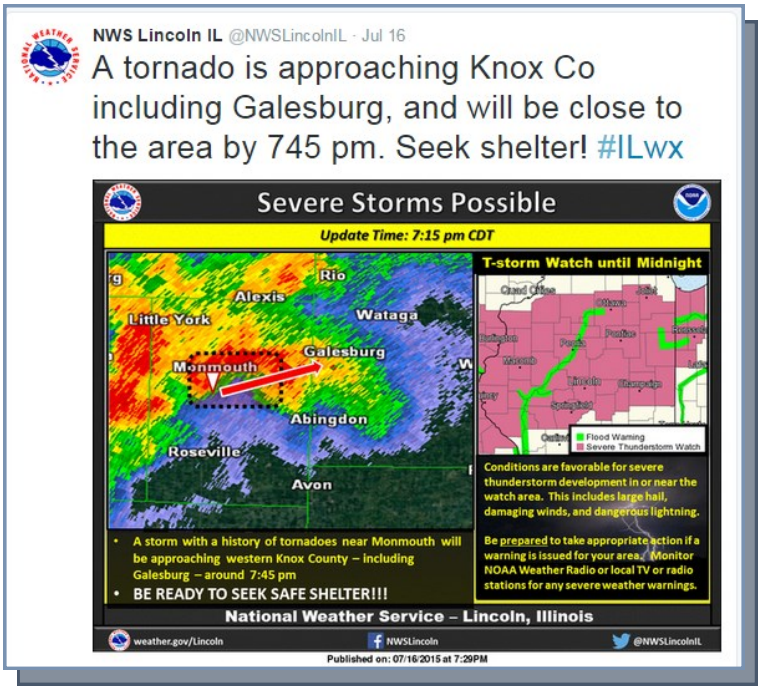
Lincoln NWS 20th Anniversary Retrospective (cont.)

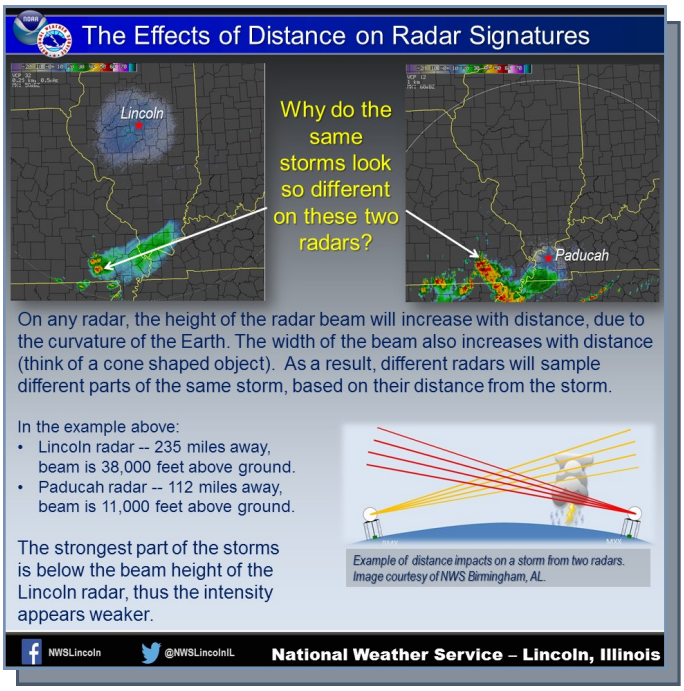
Daily, we will send a summary of expected weather hazards to a large mailing list consisting of emergency managers, transportation officials, school superintendents, and others. When a significant severe weather or winter weather episode is forecast, we will do conference calls with emergency managers and the broadcast media to explain what is expected and to answer any questions, to make sure everyone is on the same page. We have also had personnel that have been deployed to the state Emergency Operations Center in Springfield to provide on-site support to state officials during or after major events (a recent example was after the EF-4 tornado that affected northern Illinois in early April).

DSS activities will continue to grow over the coming years, as the National Weather Service in general further expands into this area.

Social Media:

Social media has become a significant aspect of our operations. It has allowed us to more directly interact with the public. This has largely been a win-win situation; we can better distribute our forecasts and warnings to the public, and the public can interact with us to answer their questions and also to provide us weather reports. These reports have greatly assisted our operations, as we can receive many more real-time reports which can help our forecast and warning decisions. We create a daily Weather Story graphic that summarizes what's expected in the near future, and will create more detailed graphics to better explain expected evolution of precipitation, thunderstorms, and winter weather. We have also posted informational and educational items as well. Our office currently has access to Facebook, Twitter, and YouTube, and the NWS is also looking into several other social media platforms.





(top) Example of a short term graphical forecast that was posted on Twitter.

(left) Example of an educational graphic.

How Our Operations Have Changed in 20 Years

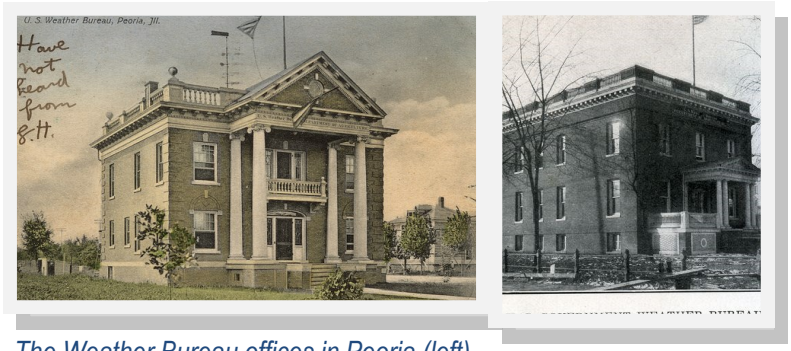
Item	How it was done in 1995	How it is done in 2015
Issuing forecasts	Computer models were analyzed on separate computers. Once the forecaster came up with a solution, the forecasts were typed out. Several counties were included in each forecast "zone".	While many computer models are analyzed in a single computer system, other models are analyzed off the Internet. Model guidance is imported into a graphical program that allows the forecast to be "drawn". A formatter is used to extract this forecast data to automatically create a worded forecast, and the "gridded" (i.e. drawn) forecast is also distributed. This allows forecast areas to be as small as 2.5 km.
Issuing severe weather warnings	Radar data was analyzed on two large monitors using a tablet and mouse. When a warning was needed, the forecaster went to a separate workstation to create the warning. The computer program filled in some of the warning, but large parts of it had to be manually inserted.	Radar data is analyzed on the same workstation that is used to review other weather data. When a warning is needed, the warning creation software (which is also on the same workstation) is used to "draw" the area in danger. A few mouse clicks are used to select the hazards (e.g. 70 mph winds, golfball size hail). With this, a fully formatted warning is assembled in a minute or less.
Detecting the weather in the upper atmosphere	A weather balloon was inflated, and carried an instrument package aloft. The package measured temperature, relative humidity, and barometric pressure, and was relayed back to the office via radio signals. Winds aloft were calculated based on the position of the balloon vs. the office location, using the tracking antenna. The data was processed using an IBM-XT computer.	A weather balloon is inflated, and carries an instrument package aloft. The package measures temperature, relative humidity, and barometric pressure, and is relayed back to the office via radio signals. Winds aloft were calculated based on the position of the balloon vs. the office location, based on the GPS position of the balloon. The data is processed using a modern PC running Windows.
NOAA Weather Radio operations	NWS staff manually recorded each message, utilizing 8-track tapes. As there were 3 separate stations, updates could be delayed a bit as separate messages would be created for each station. Up to 8 messages could be included in each broadcast.	A PC automatically processes forecasts, weather bulletins, and observations, and uses a synthesized voice to create broadcasts for all 9 stations operated by the office, with room to expand to 13. There is no limit to the number of messages included in each broadcast.

Long History of Federal Weather Services in Central Illinois

While the National Weather Service has had a facility in Lincoln for 20 years, the federal government has had weather facilities in central Illinois dating back to the late 1800's.

In February 1870, Congress authorized the War Department to take weather observations at key marine ports, assigning the duty to the Army Signal Service. Eventually the station network was expanded to inland locations.

On July 1, 1879, the Signal Service opened a weather observation station in downtown Springfield, at the top of the Springer Building at 6th and Monroe Streets. Operations were transferred to the newly formed, civilian Weather Bureau in October 1890.

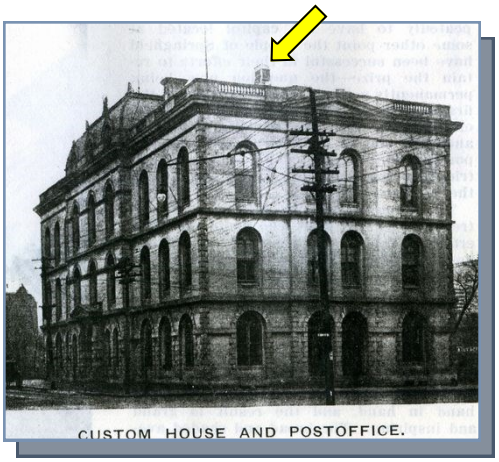


The Weather Bureau offices in Peoria (left) and Springfield (right) in the early 1900's. In those days, the meteorologist in charge lived at the facility, with the family on one floor and office operations on the other floor.

On September 7, 1904, ground was broken on the campus of Bradley Polytechnic Institute (now Bradley University) in Peoria, for a new Weather Bureau station, which began operations the following February 1. In 1906, the Peoria facility received a telegraph to transmit its weather observations. Around the same time, Weather Bureau headquarters announced that Peoria would become home to one of the first upper air stations to take observations using weather balloons (similar stations had been using tethered kites up until this point); however, no evidence exists that this equipment was installed before the 1950's.

In the fall of 1906, the Springfield office relocated its operations to the new Weather Bureau building at 7th and Monroe Streets. It remained at this location until late 1928, when the site was demolished to make way for the new Federal courthouse. At this time, the office was temporarily moved to the Abe Lincoln Hotel at 5th and Capitol Streets, until the new Federal Building was opened in November 1930.

In the 1930's, the growing aviation industry prompted the Weather Bureau to establish separate observation facilities at airports across the country. In March 1935, a Weather Bureau Airways Station was established at the Peoria Municipal Airport, with another opened at



The Federal Building in Springfield in the early 1930's. Note the white box on the roof (top center of the image); this housed the temperature thermometers.

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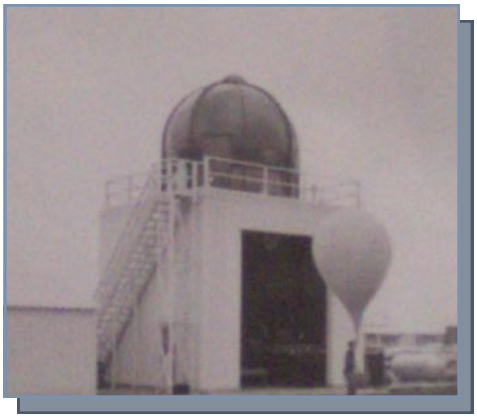
Long History of Federal Weather Services in Central Illinois (cont.)

Springfield's Southwest Airport (near the current intersection of Chatham Rd. and Westchester Blvd.) in November of that year. Another station was opened at the Effingham Airport in January 1944, but closed in 1947 with its operations transferred to the forerunner of the FAA. Split operations continued in Peoria and Springfield for several years. Eventually, the Peoria office downtown closed in August 1944 after moving its operations to the airport, but the Springfield downtown office remained operational until spring 1954.

In November 1947, the Springfield airport office was relocated to the newly opened Capital Airport on the northwest side of town.



Weather balloon launch at the Peoria airport in the 1950's.

Upper air (weather balloon) observations began in central Illinois in September 1944. They initially were conducted by the U.S. Army (later by the Air Force) at Chanute Field in Rantoul, and were taken 4 times a day. This function was transferred to the Peoria Weather Bureau office in September 1956. At the time, the Peoria office had only been staffing a single shift per day, but it was expanded back to 24 hour operations to support the new observations. Balloon flights remained 4 times a day until September 1957, when they were reduced to twice daily (which remains the current standard).

In 1970, the Weather Bureau changed its name to the National Weather Service. However, operations in central Illinois did not change at that time. The main forecasts originated at the NWS office in Chicago, with the satellite offices in Springfield and Peoria responsible for severe weather warnings, and local adaptive forecasts. These warnings were issued using radars at neighboring offices through the 1970's. Finally, in 1980, a radar was installed at the Springfield office, which remained in operation through the mid 1990s.

Plans began to take shape in the 1980's and 1990's to modernize the network of NWS offices. As part of this plan, it was determined that the two offices in Springfield and Peoria would be merged in Lincoln (about an equal distance between each city). The new facility would receive expanded duties and staffing.

The Lincoln NWS office as seen from the radar tower, June 2014.

The merged facility began full-time operations on September 27, 1995, and the offices in Springfield and Peoria were closed on October 1.

Central Illinois Lincoln Logs

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Lincoln NWS Staff

The National Weather Service office in Lincoln is currently staffed by 22 people:

- **Meteorologist in Charge:** Ernie Goetsch
- **Warning Coordination Meteorologist:** Chris Miller
- **Science and Operations Officer:** Llyle Barker
- **Data Acquisition Program Manager:** Billy Ousley
- **Service Hydrologist:** Darrin Hansing
- **Electronics Systems Analyst:** Ed Martin
- **Information Technology Officer:** Bryan Schuknecht
- **Administrative Support Assistant:** Debbie Johnson
- **Senior Meteorologists:** James Auten, Patrick Bak, Daryl Onton, Dan Smith, Ed Shimon
- **General Meteorologists:** Matt Barnes, Chris Geelhart, Kirk Huettl, Heather Stanley
- **Hydrometeorological Technician:** John Parr
- **Meteorologist Interns:** Eric Laufenberg, Chuck Schaffer
- **Electronics Technicians:** Kyle Clark, Mark Stacey

Of the above, 7 people have been here the entire 20 years (Ernie, Chris Miller, Billy, Ed Martin, James, Chris Geelhart, and John).

Take a virtual tour of our office!

http://weather.gov/media/ilx/office_tour.pdf