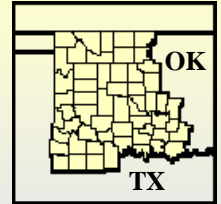




The Southern Plains Cyclone

A Weather Newsletter from your Norman Forecast Office for the Residents of western and central Oklahoma and western north Texas



We Make the Difference When it Matters Most!

Volume 5

Autumn 2007

Issue 4



Kingfisher, OK, 19 August 2007

Meet Your Weatherman Kevin Brown



Hello! My name is Kevin Brown and I am a Senior Forecaster here at the Norman Forecast Office. I am part of the rotating-shift workforce, and act as the shift

See **Weatherman** on page 3

Erin Intensifies over Oklahoma

By Patrick Burke, General Forecaster

Any time tropical cyclones come onshore, meteorologists are wary of their potential to produce life threatening weather. Since Oklahoma and north Texas are several hundred miles inland, this usually means guarding against flooding and tornadoes. The widespread damaging winds of tropical cyclones are invariably strongest at the coast, and quickly diminish inland as the circulation encounters greater friction and leaves its primary energy source, the ocean. The events of August 19, 2007, however, went against those rules in such dramatic fashion, that forecasters will long be studying - and many residents will not soon forget - the night that Tropical Depression Erin intensified over Oklahoma.

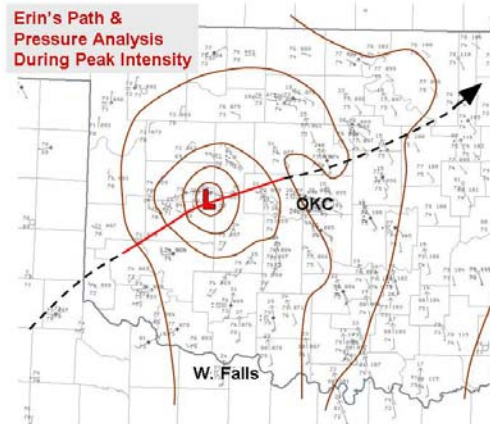
Erin formed over the Gulf of Mexico to the southeast of Brownsville, Texas, on August 15th, and attained Tropical Storm status, with sustained winds of 40 mph, as it tracked northwest toward the coast. The storm remained small in diameter, and never exceeded minimal strength (Tropical Storm designation begins at

39 mph) before making landfall near Lamar, Texas, the morning of August 16th. Nonetheless, the tropical moisture Erin brought inland did result in heavy, 7 to 11 inch, rain totals along its path through south Texas.

Water was the main story all along Erin's path, as 3 to 6 inches of rain continued to fall at many locations well inland. Downgraded to a Tropical Depression, the cyclone moved northwest to near

Midland, Texas, before curving north and finally northeast into Oklahoma.

By all accounts, and until the late evening of August 18th, Erin followed the expected behavior for a tropical cyclone moving inland. Early evening surface observations depicted a weak low pressure center. Scattered thunderstorms east of the low produced heavy rain, and three tornadoes affected southwest Oklahoma; one tornado also affected Clay County, Texas. These events are common, given the increased moisture, low cloud bases, and enhanced low level wind shear associated with tropical cyclones. During the late evening and early morning hours, however, Erin underwent a very



See **Erin** on page 4

Storm-Based Warnings

By Rick Smith, Warning Coordination Meteorologist

You may have heard that the National Weather Service (NWS) is changing the way it issues severe weather warnings. Well, it's true. On October 1, 2007, the National Weather Service began issuing more geographically specific warnings for tornadoes, severe thunderstorms and flash floods. The new warnings are called Storm- Based Warnings, but the concept is not brand new. In fact, forecasters at the NWS in Norman have been issuing warnings this way for more than ten years now. Instead of selecting whole counties to be warned, forecasters outline a warning polygon that encompasses the local areas and cities that are threatened by a severe storm. Until October 1st, however, the resulting warnings still included entire counties, even if only a small part of the county was included in the warning polygon.

In turn, particular locations will come under fewer warnings, and hopefully, fewer false alarms. This, in turn, builds confidence in the warnings, and increases the likelihood that people will take appropriate action when their area does come under a warning.

So you may be asking – what does this mean for me? What differences will I notice with the new Storm- Based Warnings?

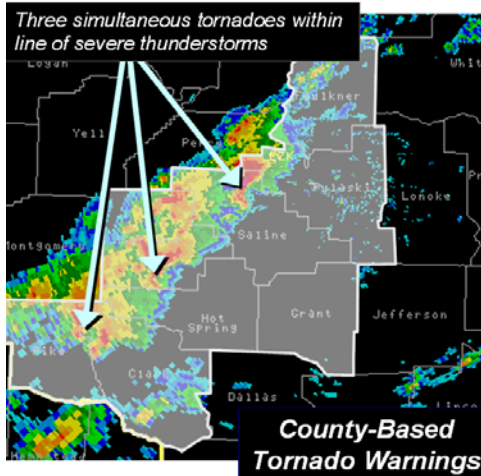
First, you will notice the NWS using more words to describe what part of the county is affected by the warning. For example, instead of a severe thunderstorm warning for Comanche County, we might specify that the warning is for northwest Comanche County.

You may also notice warnings inside of or overlapping with other warnings, and maybe even multiple warnings for a single county at the same time. The latter may be necessary when there are distinct differences in storm locations, movement, or specific threats. A good example is when a severe thunderstorm warning is in effect, and then a tornado warning is issued for a smaller portion of the same area.

What will not change – at least not immediately – is how the warnings are disseminated. In most cases, the warnings you see on your television screen will still be county based, especially the small maps in the corner of the TV screen. Your weather radio will work the same way it always has – by alarming for warnings in any part of a county for which you have programmed it to alarm. The radio broadcast, however, will tell you what portion of the county is affected, and you can see the actual warning polygon overlaid on radar and other imagery on our website, <http://weather.gov/norman>.

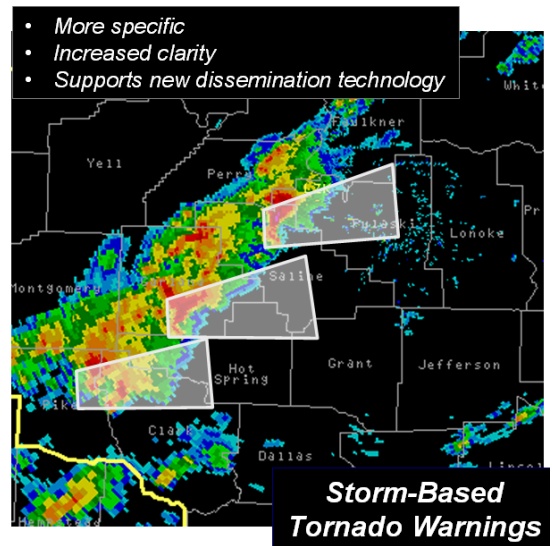
Some of the biggest

advantages of Storm-Based Warnings will come as technology allows manufacturers to receive and display the graphical Storm-Based Warnings on Global Positioning System (GPS) navigation devices, cell phones and Personal Digital Assistants (PDAs), etc. Also, at some point in the future, the NWS may be able to subdivide counties into smaller sections, allowing your weather radio to be programmed to



Three simultaneous tornadoes within line of severe thunderstorms
8 counties under warning
Almost 1 million people warned

With Storm-Based Warnings, the area warned will be defined by the *warning polygon*, instead of the county. The goal of Storm-Based Warnings is to provide more specific information about the location of severe weather and the direction it is expected to move. This will reduce the likelihood of needlessly alarming people outside the threat area.



- More specific
- Increased clarity
- Supports new dissemination technology

70% less area covered
~600,000 fewer people warned

receive warnings for just your section of the county.

The bottom line is this – most people will see no significant changes to their severe weather warnings. Your local severe weather experts at the NWS in Norman will continue to use all the tools at our disposal to issue the most accurate, detailed and timely warnings possible. But for any kind of warning to be useful, you must be able to hear it, understand it and take the appropriate precautions. It is a good idea to periodically review severe weather safety tips, so that you are prepared when the next Storm-Based Warning is issued for your area. Once the warning leaves the NWS Norman Forecast Office, the rest is up to you!

Rare Flash Flood on Main Stem Rivers

By Steve Kruckenberg, Service Hydrologist

Meteorologists draw a distinction between areal floods and flash flood. Here are some helpful definitions:

Flood - The inundation of a normally dry area caused by an *increased water level in an established watercourse, such as a river*, stream or drainage ditch; or may also be the ponding of water at or near the point where the rain fell.

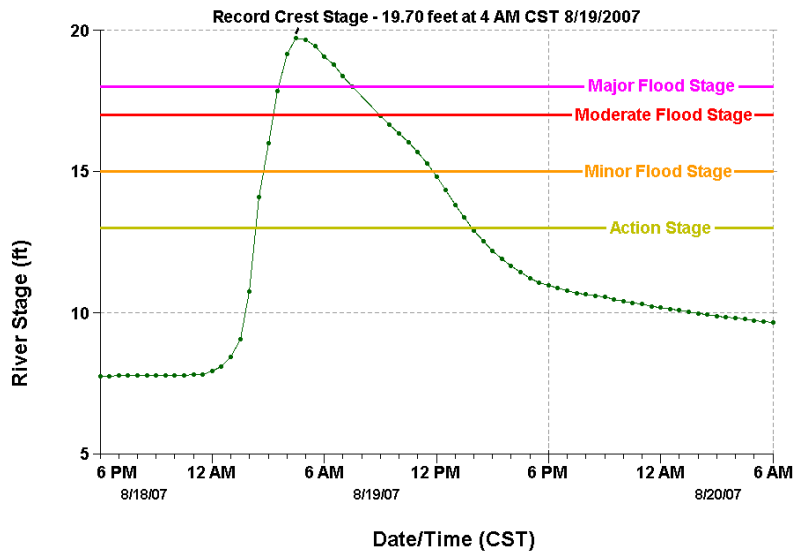
Flash Flood - A flood which is caused by heavy or *excessive rainfall* in a *short period of time*, and occurring generally *less than 6 hours* after the causative event. A dam failure may also cause a flash flood depending on the time period.

We tend to associated rivers with a flood, as the wide channels respond

gradually (usually much longer than 6 hours) to the accumulation of rain upstream. Flash flooding, on the other

hand, develops much faster, usually because an intense rain falls over a small area. Flash floods typically occur where

See **Rivers** on page 5



North Canadian River at Watonga

Weatherman: From page 1

supervisor, overseeing forecast and warning operations, public service, and information quality control. The Norman Forecast Office is known across the country as one of the most efficient offices at providing timely and accurate forecasts and warnings. Whether we are answering a simple call from the public, collecting weather observations, or issuing life-saving hazardous weather warnings, our meteorologists and technicians use teamwork to get the job done right.

Although I was born a Sooner in Buffalo, Oklahoma, I was raised in the small town of Perryton, Texas, located in the far northeast-portion of the Texas Panhandle. Like many people growing up across Oklahoma and North Texas, I had close ties to the agriculture and oil industries. Although I had an interest in weather starting at a young age,

my interest increased during my high school years, when I worked small farming and oilfield jobs. When most were wishing that adverse weather would move around our location, I would find myself wanting the worst of the weather to hit. It became commonplace (and many times comic relief!) for fellow roughnecks and farmhands to radio me for an update on what the weather was about to do. These experiences, combined with my incompatibility with heavy machinery, lead me to pursue a meteorology degree at The University of Oklahoma (OU). I graduated OU in 1992 with a Bachelor of Science degree in Meteorology.

While in school at OU, I was fortunate enough to become involved in research projects that allowed me to spend time at the Norman Forecast Office. This opportunity opened my eyes to the

mission and dedication of NWS workforce, and I knew immediately that the NWS was the place for me. I began my journey fresh out of college at the NWS Forecast Office in Birmingham, Alabama, before moving back to Norman in 1995. I was promoted to my current Senior Forecaster position in the summer of 1998. Being able to work in Norman, under the umbrella of the National Weather Center, is truly a blessing. The quality of forecasters, researchers, technicians, students, and administrative personnel truly make the Norman weather community "one of a kind".

Outside of work and weather, I am a big sports fan who follows all of the Oklahoma Sooner teams and many professional sports. I also try to keep pace with my wife and two young daughters, and travel to the Rocky Mountains as often as possible.

Erin: From page 1



unique period of intensification that set it apart from most inland tropical systems.

The center of low pressure consistently strengthened over a period of 6 to 8 hours, while moving slowly northeast. At the same time, individual thunderstorm cells became more intense, and precipitation wrapped around the low pressure circulation as it tracked near Mangum, Hinton, and Okarche. By morning, radar imagery depicted a well formed "eye" and spiral precipitation bands which are trademarks of tropical cyclones. These features were better defined than any that Erin had shown when the storm first came onshore.

Along the path of the storm throughout central and southwest Oklahoma, storm impacts included widespread wind damage, tornadoes, and record flooding. Severe and damaging winds developed within roughly a sixty mile radius of the center. This included wind gusts measured between 55 and 82 mph at a dozen National Weather Service and Oklahoma Mesonet sites. High winds lasted more than three hours at Watonga, resulting in widespread damage. The 82

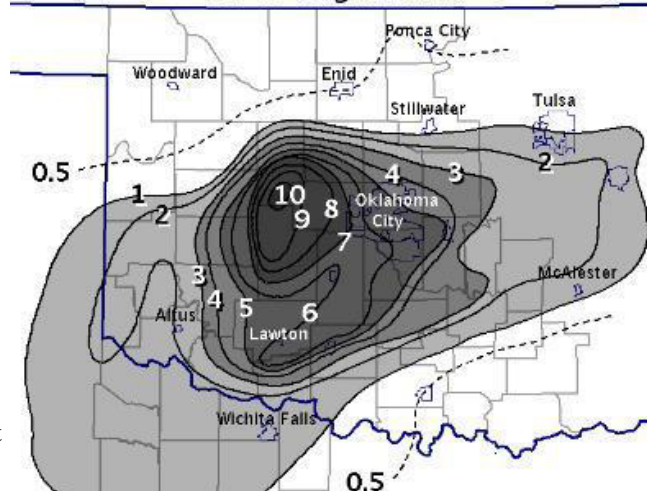
mph gust occurred there just before the anemometer stopped working. Tornadoes struck near Cogar and Union City, and rainfall rates were extreme. For example, El Reno recorded nearly 7 inches in three hours. Numerous locations received between 7 and 9 inches of rain during the night, led by 11.03 inches at a gauge located 10 miles northwest of Geary in Blaine County. Flooding alone caused an estimated 4.3 million dollars in damage, with storm total damages estimated at 5.1 million.

Although the cyclone weakened

and moved out of central Oklahoma, flooding continued for hours after sunrise. Some of the hardest hit areas were nearest the path of the cyclone, and included Mountain View, Fort Cobb, Chickasha, and Kingfisher. Four to five feet of water was reported over many roads, and portions of some were completely washed away. Unfortunately, six people in four different locations were drowned by flood waters.

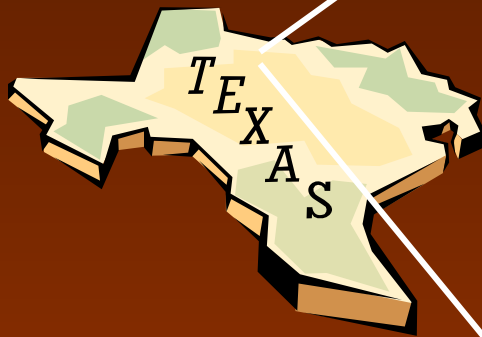
While forecasters had anticipated tornadoes and flash flooding from individual thunderstorms, the sudden intensification of the larger scale cyclone created a wind and flood event that was more severe and affected more people than an average tropical cyclone in our region. Such intensification of a very tropical-like storm process this far inland had not been documented prior to Erin. That it happened here was both a curse for those people affected, but also a blessing that could lead to better predictions of these storms in the future. Central Oklahoma is home to one of the most diverse sets of meteorological observing platforms in the world, including a dense network of surface observations, vertical wind profilers, and experimental radars. Data collected during Erin's intensification will undoubtedly fuel much research, as we attempt to better understand and prepare for remarkable weather events like those of August 19, 2007.

**STORM-TOTAL RAINFALL (INCHES)
18-19 August 2007**



The 82

Fall Temperatures Well Above Normal at Wichita Falls



This Fall at the Falls

How did the early fall months stack up at Wichita Falls?

AVERAGE TEMPERATURE

(Days averaged with nights to obtain the average temperature at any given time during the month—Degrees F):

	<u>2007</u>	<u>Compared to Normal</u>
September	79.5	+4.0
October	69.7	+5.0
November	57.0	+5.1

PRECIPITATION

(Inches)

	<u>2007</u>	<u>Compared to Normal</u>
September	4.20	+1.01
October	0.66	- 2.45
November	0.60	- 1.08

Record Daily Rainfall of 2.96 inches on September 9th

Rivers: From page 3

water cannot penetrate the earth's surface such as urban areas and deserts - or in the mountains where gravity and terrain influence the behavior of flood waters. If flash floods occur in an established watercourse, it is typically a smaller, narrow tributary rather than a main stem river. Along the much wider main stem rivers such as the Washita, Canadian, and North Canadian in Oklahoma, to produce a flash flood requires a tremendous volume of water. This makes the events of August 19, 2007, when all three of these main stem rivers rose to record or near record levels in a matter of hours, nothing less than astounding.

During the early morning hours of August 19th the remnants of Tropical Storm Erin tracked from

southwest into central Oklahoma (see page 1). Extremely heavy rain occurred and was nearly continuous over much of the area west of Oklahoma City toward Watonga, Hydro, and Anadarko. Rain totals of 8 to 11 inches were observed. Soil conditions were already abnormally wet from heavy flood events during the spring and early summer, resulting in unusually rapid and high volume runoff.

While most of the flash flooding occurred along smaller creeks, streams and low-lying locations, some of the flash flooding actually occurred along main stem rivers. The flash flooding produced rapid, sharp rises which took these rivers from several feet below flood stage into major and

even all-time record flood stages in less than six hours! The Washita River measured near Clinton rose from 6.61 to 21.66 feet in five and a half hours. Major flood stage at Clinton begins at 24 feet. The Canadian River at Bridgeport rose from 9.97 to 18.75 in six hours, and eventually reached 21.03 feet after twelve hours. The instrument at Bridgeport then failed, but 21.03 feet will stand as the new all-time record stage at that location. Similarly, a new all-time record was set at along the North Canadian River measured at Watonga, where the stage rose from 7.95 to 19.70 feet in only four and a half hours! The volume of water that accumulated along these three rivers in such a short time is truly remarkable.

2007 is the Wettest Year on Record at Oklahoma City!

All-time Record Set Early

By Ty Judd, Meteorologist Intern

Wow! What a year we have had here in Oklahoma and western north Texas. Everything from crippling January ice storms to March flooding, late season freezes that damaged crops, May flooding, severe weather of all types, June flooding, tropical weather, August flooding. Did I mention the flooding? This has been a year where the headlines are not for record tornado outbreaks or record high temperatures (although there were a few). No, in Oklahoma City 2007 will go down as the wettest year since records began back in 1890. In fact, it was already the wettest year as of October 17th. That is when 0.27 inches of rain pushed the annual total to an unprecedented amount. As of the early December release of this newsletter, the annual precipitation at Oklahoma City stood at 53.62 inches. The previous record of 52.03 inches was set back in 1908. That was the only other year in which precipitation totaled more than 50 inches. In 2007, numerous unofficial weather stations in central Oklahoma have reported over 55 inches of precipitation since January 1st; we are in rare territory.

Despite all this, we have seen a relatively dry autumn. Here are some numbers which put the early fall months in perspective:

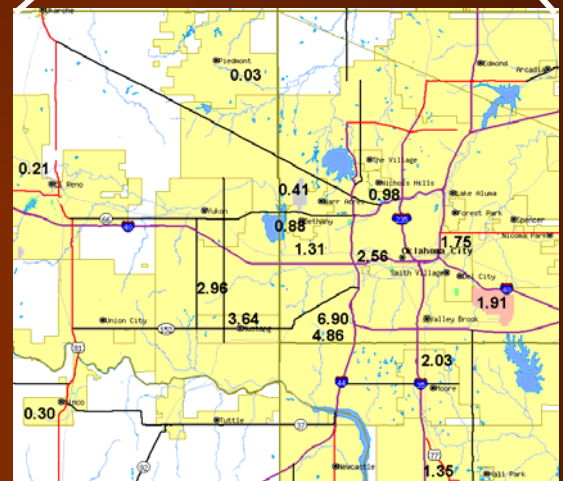
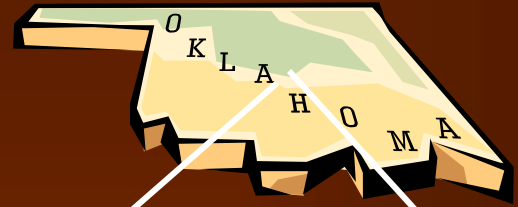
Oklahoma City:

September Precipitation: 5.73 inches (Rank: 14th wettest)

October Precipitation: 3.72 inches (Rank: 32nd wettest)

November Precipitation: 0.49 (Rank: 96th wettest)

Record Daily Rainfall of 4.86 inches on September 10th
(11th Greatest Daily Rainfall Total on Record)



Oklahoma City Rainfall (inches)
September 10, 2007

September 10th Record Setting Rain

On September 10th, you had to look hard at the radar imagery to find the thunderstorms that dumped intense rainfall over southwest Oklahoma City. Small cells, with a precipitation swath only 2 or 3 miles wide, developed from near Mustang to Will Rogers World Airport around midnight. Weak instability was maximized just north of a stationary front located along Interstate 44. One after another, cells popped up near the airport, tracked north, and then dissipated near Bethany. There was little lightning, and the radar reflectivity did not appear particularly high. Other evidence, however, suggested the environment was ripe for locally heavy rainfall. The thunderstorms were tall, reaching heights near forty thousand feet, and the atmosphere was saturated with tropical moisture all the way up. This increased what meteorologists call the "precipitation efficiency" of the storms, as very little of their moisture was lost to mixing with dry air. The result was a narrow band of between four and seven inches of rain.

* The official automated observation site recorded 4.86 inches of rain. A manual rain gauge located nearby at the airport recorded 6.28 inches. This difference may in part be due to different equipment at each site, but it is also likely that rainfall varied greatly over small distances with these particular thunderstorms. Other nearby rain gauges (see Figure above) help illustrate what a difference a few miles can make.

Midnight - 1 AM: Trace

1 - 2 AM: 0.49"

2 - 3 AM: 1.00"

3 - 4 AM: 2.73"

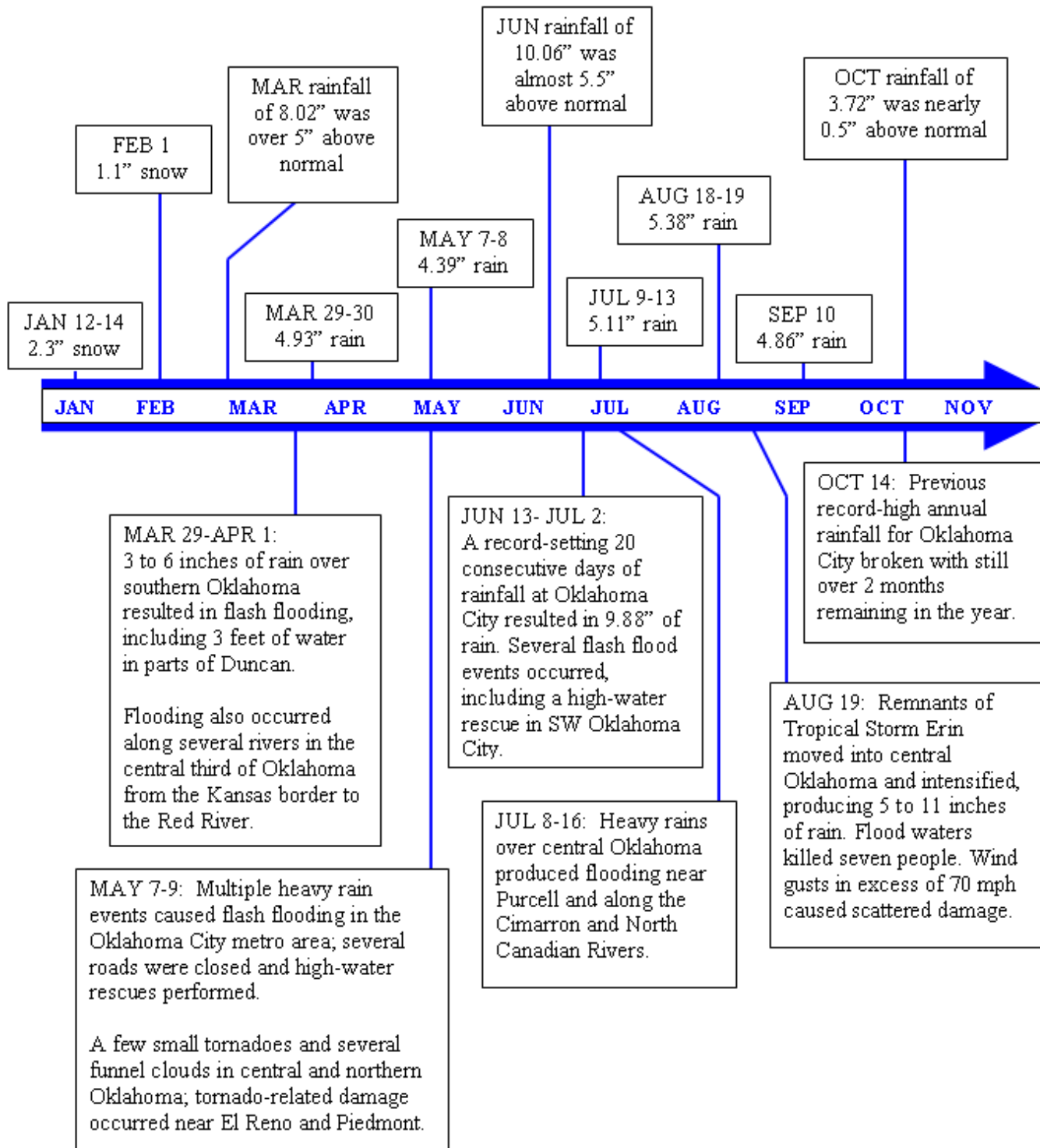
4 - 5 AM: 0.29"

5 - 6 AM: 0.02"

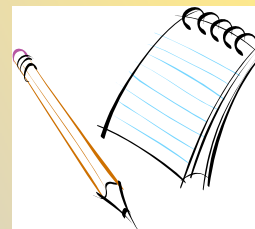
6 - 7 AM: 0.37"

Total Precipitation - 4.86 inches*

Timeline of Significant Oklahoma City Rainfall and Area Weather Events in 2007



Norman Office Forecast Notebook - A Complete Look at Events and Happenings



Centennial Weather Wrap-Up

Happy Birthday Oklahoma! As the state's Centennial year comes to a close, so does WFO Norman's 100 Years of Oklahoma Weather project. For the past year, daily weather facts from 1907, and summaries of the most important weather events to affect Oklahoma during the past 100 years have been broadcast on weather radio and made available on a special web site. The Oklahoma Centennial Commission officially recognized 100 Years of Oklahoma Weather as an Oklahoma Centennial Project. The celebration culminated November 16, 2007, Statehood Day. WFO Norman's 100 Years of Oklahoma Weather project will remain on our website for some time to come. To learn more, visit <http://www.srh.noaa.gov/oun/centennial/>.



NOAA/NWS Leaders Visit Norman

Because of our location and reputation for being on the cutting edge of National Weather Service, WFO Norman frequently hosts high ranking NOAA and NWS officials. In October, Dr. Jack Hayes, the newly appointed director of the National Weather Service visited the National Weather Center and WFO Norman to meet the staff and discuss important issues. In November, Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator, Vice Admiral Conrad Lautenbacher, Jr., USN (Ret.), addressed WFO and other NOAA staff at the National Weather Center.

OU Career Fair

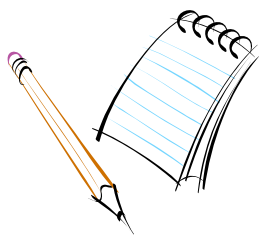
The National Weather Service's most valuable resource is not a radar, not a satellite or piece of equipment. What makes the NWS great are the dedicated employees who work to support our mission. As part of a continuing effort to find the best future employees, WFO Norman joined a variety of other government agencies and private meteorological companies in the University of Oklahoma School of Meteorology's Annual Career Fair on November 8th. NWS staff spoke one-on-one with students about their career interests, volunteer and employment opportunities at the NWS, and developing a strong professional resume.

Welcome Our New Employee

We'd like to welcome the newest employee at WFO Norman. Andy Taylor joined the National Weather Service staff as a meteorologist intern (typically the entry-level, full-time position in a NWS forecast office) in late November. Andy will be performing a wide variety of duties, ranging from launching weather balloons to helping maintain our cooperative observer network to assisting in severe weather operations. Andy has a bachelor's degree from the University of Utah and a master's degree from the University of Oklahoma. He is currently completing work toward a doctorate degree in meteorology at the University of Oklahoma. Welcome, Andy, to the WFO Norman team!

Editor's Note

I've enjoyed producing this, my first issue of the Southern Plains Cyclone. Our ever-changing weather makes doing this a breeze; there is always plenty to talk about! I would like to thank all of my colleagues who contributed articles, graphics, and ideas. I look forward to hearing from our readers as well, so please let us know what you liked, what we could do differently, or what you would like to see in future issues. You can look for the Winter 2008 edition by the end of February.



Norman Office Forecast Notebook - A Complete Look at Events and Happenings

National Weather Festival

An estimated 2000 people gathered at the National Weather Center on Saturday, October 20th for the second annual National Weather Festival. The Norman Chamber of Commerce teamed up with the University of Oklahoma and various meteorological organizations to showcase a community rich in weather research and forecasting. Traditional activities included hourly weather balloon launches, booths with weather related information and products, tours of the one-of-a-kind National Weather Center building, and the always popular Storm Chaser Car Show. New programs this year included a children's learning center, screenings of storm documentaries, and HydroWorld, a station dedicated to those agencies dealing in precipitation and earth's water cycle. Visitors are encouraged to ask questions to learn more about weather and how meteorologists are continually working to better understand and predict it.

The National Weather Festival will be back in October of 2008. If you want to find out more about this year's event, visit <http://www.norman.noaa.gov/nwf07/>.

Storm Spotter Training Calendar

The days are getting shorter, there's a nip in the air and the holidays are upon us. That can only mean one thing – it's almost time for storm spotter training to begin! Once again in 2008, National Weather Service meteorologists will take to the road to conduct free training across the region to help prepare storm spotters for the spring severe weather season. Spotter training is organized by local emergency management officials. Classes start in mid January and run through the end of March. Most classes are open to the public.

To find a storm spotter class near you, visit our website at <http://weather.gov/norman/skywarn>.

Winter Weather Awareness Day

If we think about devastating winter storms, we don't have to go too far back in time to find examples of how wintry precipitation can affect north Texas and Oklahoma. Last year's winter storms brought hazardous travel conditions, and even deaths and injuries.

To help get ready for the upcoming winter, the National Weather Service, in partnership with Oklahoma and Texas Departments of Emergency Management will observe **December 11, 2007**, as Winter Weather Awareness Day in Texas and Oklahoma. We hope you will use this day to think about how to prepare yourself and your family for a winter storm. How would you deal with an extended power outage? Would you have enough food, water and medications if snow or ice made it impossible to leave your home? How can you take advantage of the NWS information services to know the storm is coming and how bad it will be? Winter Weather Awareness Day is designed to arm you with the information to answer these questions.

For more information on winter weather preparedness, visit <http://www.nws.noaa.gov/om/winter/>.

Nat'l Severe Weather Workshop

Mark your calendars for Thursday to Saturday, **March 6-8, 2008**. Those are the dates for the annual National Severe Weather Workshop to be held at the National Center for Employee Development in Norman. The 2008 edition of the workshop promises to be bigger and better than ever! The event presents a great chance for anyone interested in hazardous weather to meet experts in meteorology, emergency management, and broadcasting, and learn how these partners are working together to get the word out about dangerous weather. Check the NWS Norman website for more updates as the workshop gets closer.

Cooperative Observer Notes

Bonnie Jants Receives Prestigious Jefferson Award

At a ceremony October 9th, 2007, Bonnie Jants, COOP observer for Helena 1 SSE in Northwest Oklahoma, was honored with the National Weather Service's highest possible recognition for an observer, the Thomas Jefferson Award.

The award's namesake, and our nation's third President, took weather observations for over 50 years. The award recognizes an observer's dedication to maintaining and sharing excellent weather records, serving the community, and persevering through unusual and challenging weather. The observer must have at least 25 years of service and have previously received the John Companius Holm Award, which is also a national award. Competition for the Thomas Jefferson Award includes well over 100 applicants nominated by their local NWS Forecast Office. Jantz was one of only seven recipients this year.

Pictured to the right, David Andra, Science Operations Officer at the Norman Forecast Office, presents Bonnie Jantz of Helena, OK, with the Thomas Jefferson Award.

Mrs. Jantz began taking weather observations in 1965. She, along with other Thomas Jefferson Award recipients, including Clemon Clewell of Watonga, are standards of excellence who help fulfill the mission of the National Weather Service. Congratulations Bonnie!



David Andra, Science Operations Officer at the Norman Forecast Office, presents Bonnie Jantz of Helena, OK, with the Thomas Jefferson Award.

Length of Service Awards:

Ruby Hinds - 50 years
Cordell, OK

Frankia Story - 25 Years
Wanette, OK

Other Awards

Charles and Mary Jo Eisenhour
Newkirk, OK, 1NW...15 Years

Eugene Daniel
Truscott, TX , 3W... 10 Years

Marty Logan
Fort Supply, OK, 3SE... 10 Years

Recently Departed

Alfred Vanschuyver, Wanette, OK,
passed away November 30, 2007.

Tommy Thorton, Burkburnett, TX,
passed away November 20, 2007.

The heartfelt condolences of the NWS Norman staff go out to the families of these fine people and fine weather observers.

The Norman NWS Cooperative Observer Program Team:

Forrest Mitchell

Daryl Williams

John Pike

Ty Judd

Andy Taylor



In This Issue:

- ⇒ Tropical Cyclone Erin
- ⇒ Flash Flood on the North Canadian at Watonga
- ⇒ New Record Annual Rainfall at Oklahoma City
- ⇒ Storm-based Warnings
- ⇒ Meet Your Weatherman
- ⇒ Events Notebook
- ⇒ Cooperative Observer Notes

**National Weather Service
Forecast Office
Norman, OK**

Phone Number:
405-325-3816

Web Page:
weather.gov/norman

Meteorologist-in-Charge:
Mike Foster

Warning Coordination Meteorologist:
Rick Smith

Science and Operations Officer:
David Andra

Editor:
Patrick Burke

National Weather Service Forecast Office
120 David L. Boren Blvd. Suite 2400
Norman, OK 73072

Check out our text-based and graphical
forecasts for your county at
weather.gov/norman.



If you'd like to visit our office and learn more about what goes on at the National Weather Center, go to http://nwc.ou.edu/visitor_center.php for more details on scheduling your visit. We'd love to see you!

Please share this with friends, relatives, and colleagues. Comments and suggestions are always appreciated, by phone at 405-325-3816 or by e-mail at Patrick.Burke@noaa.gov.