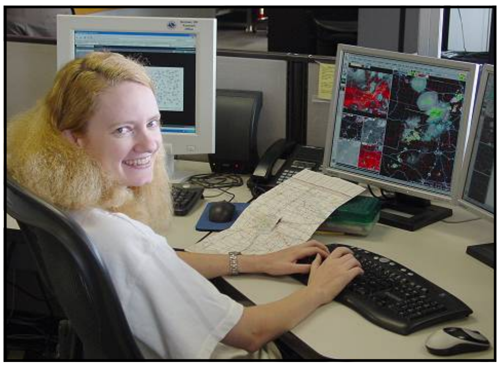
The Southern Plains Cyclone

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 3 Fall 2005 Issue 4

Meet Your Weatherman Erin Maxwell



Hello! My name is Erin Maxwell. I am a General Forecaster at the National Weather Service in Norman, Oklahoma.

I grew up on a farm in central Indiana where we mainly grew corn and soybeans and raised cattle. Living on a farm, weather was an everyday concern and was discussed over meals or in the fields. I also remember hearing stories about a tornado that almost hit my grandparents' house during the super outbreak of April 3, 1974. However, when I was in 3rd grade I went through an event that has left a lasting memory. I was waiting on the school bus to go home when suddenly I had to get off the bus and run inside. A tornado warning had been issued for the county. After I got home, I found out that the tornado had gone through part of my great-grandfather's farm, which was about two miles southeast of my house. The tornado eventually dissipated near a little town about two to three miles south of the school. Even though I had this experience, the seed to work in the weather field wasn't really planted until the 5th grade when I was fortunate enough to have a teacher that did a 6 week weather unit. After that I did a weather project in 4-H and was hooked.

See **Weatherman** on Page 7

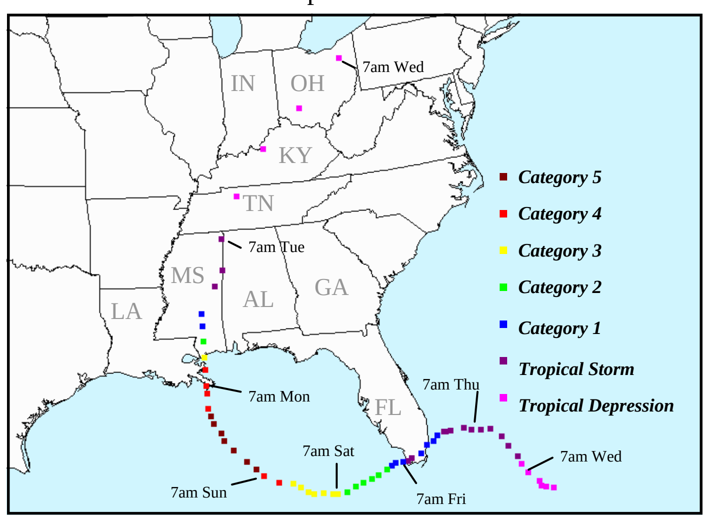
Special Report: Hurricane Katrina

By
Rick Smith, Warning Coordination Meteorologist,
Mike Branick, Lead Forecaster and
Jennifer Palucki, Meteorologist Intern

Hurricane Katrina will likely go in the record books as the worst natural disaster in United States history. The wrath of Hurricane Katrina spanned 7 states and caused catastrophic damage in Louisiana and Mississippi. On its heels was Hurricane Rita, which also caused devastating damage in Texas and Louisiana. In this article we will focus on Hurricane Katrina. We will discuss the optimal conditions needed for a hurricane to form, the life cycle of Hurricane Katrina, and how the National Weather Service responded.

How a Hurricane Forms. There are several environmental conditions which are favorable for hurricane development. However, even if all of the conditions are met, it does not mean that a tropical cyclone will form.

The first requirement is warm ocean water. Water temperatures of at least 80 degrees Fahrenheit throughout a depth on the order of 150 feet is needed to fuel the heat engine of a tropical cyclone. Secondly, an atmosphere which cools fast enough with height is needed to support thunderstorm development. The thunderstorms allow the heat stored in the ocean to be released for cyclone development. Third, moist conditions at mid levels are needed to sustain the thunderstorm activity. Fourth, tropical cyclone development needs to be at least 300 miles from the equator so the Coriolis force can maintain the circulation of the tropical cyclone. The Coriolis force is the effect earth's rotation has on the storm -- it tends to pull the winds to the right (in the Northern Hemisphere). Fifth, a pre-existing surface disturbance needs to be present. Lastly, vertical wind shear, or the change in wind speed and direction with height, must be weak. In other words, light winds aloft are conducive to tropical cyclone development.



Track of Hurricane Katrina. Image created by Jennifer Palucki, NWS Norman.

The Life Cycle of Hurricane Katrina. Katrina began its life cycle on August 23, 2005 and continued on its track through August 30, 2005. During

See **Katrina** on Page 3

Climate Commentary

By Jennifer Palucki, Meteorologist Intern

Wet Summer in Wichita Falls. This August, Wichita Falls, TX received 7.42 inches of rain. This makes August 2005 the 3rd wettest August since records began in 1897. The wettest August on record was in 1914 when 11.05 inches of precipitation fell.

The large amount of rain that fell in August, combined with the rain from June and July, totaled to 12.65 inches of rain which makes this summer the 10th wettest summer since 1897. The wettest summer was in 1950, when 22.30 inches of precipitation fell.

Fall Severe Weather Season Begins. Severe weather returned to Oklahoma and western north Texas on September 13th and 14th, 2005. By late afternoon on the 13th, severe weather developed across southwestern Oklahoma and by early evening had spread northeast into north central Oklahoma. Storms were forming along a cold front which was progressing slowly southeastward. Hail up to the size of quarters was reported across the region, with golf ball size hail reported in Greer and Jackson counties in southwestern Oklahoma. Wind gusts from 60 to 70 mph were measured across parts of Logan, Kingfisher and Oklahoma counties later that evening.

Severe weather redeveloped on the afternoon of the 14th along the same cold front which had only progressed slightly to the southeast. Severe thunderstorms developed across the southern Texas panhandle and moved east-northeast into our western north Texas counties and eventually into Oklahoma. Strong winds and hail to the size of quarters were reported throughout the area. However, a particularly strong storm produced baseball sized hail 4 miles south of Mangum in Greer county and went on to produce golf ball sized hail in the town of Mangum.

Widespread areas of 3 to 5 inches of rain fell across southwestern Oklahoma and western North Texas for the 48-hour period. Benjamin, TX received the most rain at 5.26 inches. Other locations receiving substantial rainfall include Mangum at 4.34” and Seymour at 3.93”.

Tales, Legends, and Other Sayings

By Jennifer Palucki, Meteorologist Intern

Weather-related sayings and stories have been commonplace in many cultures since the beginning of time, many of which have been passed down through the years. Are they truth, or are they myth? Can they really be used to predict the weather? This column will examine a different popular weather saying in each issue, exploring its origins and whether or not there is any real meteorological truth upon which it might be based.

If you have heard of a particular weather-related story or saying that you've always wondered about and would like us to look into it, please e-mail your questions and requests to *Jennifer.Palucki@noaa.gov*.

This Issue’s Topic – “We can destroy hurricanes.”

Every hurricane season, suggestions arise that we should use nuclear weapons to try and destroy hurricanes before they make landfall. While these suggestions are made with good intentions, it would not be a good idea for several reasons.

In order to modify a hurricane, an incredible amount of energy would be required. A fully developed hurricane can release heat energy at a rate of 5 to $20*10^{13}$ watts and converts less than 10% of the heat into the mechanical energy of the wind. In other words, the heat release is equivalent to a 10-megaton nuclear bomb exploding every 20 minutes. According to the 1993 World Almanac, the entire human race used energy at a rate of 10^{13} watts in 1990, a rate less than 20% of the power of a hurricane. This means if we could somehow store the energy from a hurricane, it would supply the entire human race with enough energy for at least 5 years! Needless to say, dropping one or several nuclear weapons would probably not alter the hurricane at all.

In addition, this idea neglects the fact that dropping a nuclear weapon would produce a radioactive fallout. The radiation would move with the trade winds causing it to affect land. This would cause devastating environmental problems and human illnesses.

Furthermore, an explosive produces a shock wave, or a pulse of high pressure, that propagates away from the site of the explosion somewhat faster than the speed of sound. This does not raise the barometric pressure after the shock has passed because the barometric pressure reflects the weight of the air above the ground. For normal atmospheric pressure, there are about 10 metric tons of air on each square meter of surface. In the strongest of hurricanes, there are nine. To change a Category 5 hurricane into a Category 2 hurricane you would have to add about a half ton of air for each square meter inside the eye of a hurricane. This is a bit more than half a billion (500,000,000) tons for a 20 kilometer radius eye. With present day knowledge, there is no practical way of moving this much air around.

Destroying tropical waves or depressions before they have a chance to grow into hurricanes would not work either. About 80 disturbances form each year in the Atlantic basin, but less than a tenth of them form into hurricanes in a typical year. There is no way to tell in advance which ones will develop into hurricanes. Regardless, a lot energy would still be required to destroy them.

There has been some experimental work in trying to develop a liquid that when placed over the ocean surface would prevent evaporation from occurring. This would have an effect on the intensity of the storm because hurricanes need huge amounts of oceanic evaporation to maintain or gain intensity. However, this idea failed because researchers were unable to find a substance that would be able to stay together in the rough seas of the cyclone.

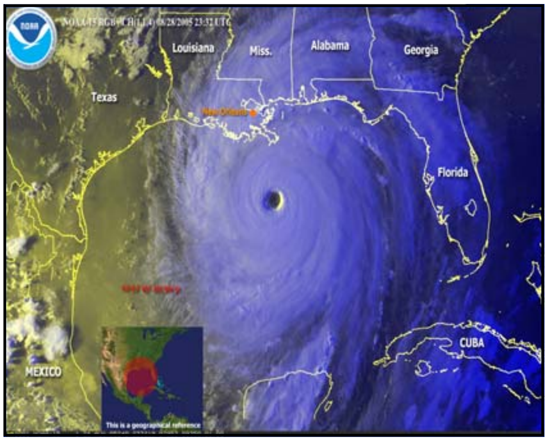
In summary, with current technologies, there is no way to destroy a hurricane. We can only be educated about their impact and be prepared for their arrival.

Reference: The National Hurricane Center’s Frequently Asked Questions page found at *www.nhc.noaa.gov*.

Katrina: From Page 1

its lifetime, it reached Category 5 hurricane status over the Gulf of Mexico. The following is a day by day account of Katrina's life cycle.

Tuesday, 23 August 2005: A broad low pressure area over the southern Bahamas becomes better organized. At 4pm (all times CDT), forecasters at the



Visible satellite image of Hurricane Katrina. During this time, Hurricane Katrina was a category 5 hurricane in the Gulf of Mexico. Image courtesy of *www.osei.noaa.gov*.

Tropical Prediction Center (TPC) designate the system Tropical Depression 12.

Wednesday, 24 August: Tropical Depression 12 drifts toward the northwest through the central Bahamas. At 4pm, it is upgraded to a tropical storm and named Katrina. Tropical storm watches and warnings are issued for southern Florida. By late evening, hurricane warnings are posted for parts of the southeastern Florida coast as Katrina makes the expected turn to the west.

Thursday, 25 August: Katrina continues to strengthen slowly and drift west. At 4pm, she is upgraded to a category-1 hurricane with 75 mph sustained winds as the center approaches the coast. The eye makes its first landfall at 5:30pm near the Broward/Miami-Dade county line, and then turns southwest across the Miami area. The eye passes over TPC and the National Weather Service office in Miami during the evening, where winds briefly go calm before increasing suddenly on the back side of the storm. The office records a peak gust of 87 mph from the southeast shortly after the eye passes.

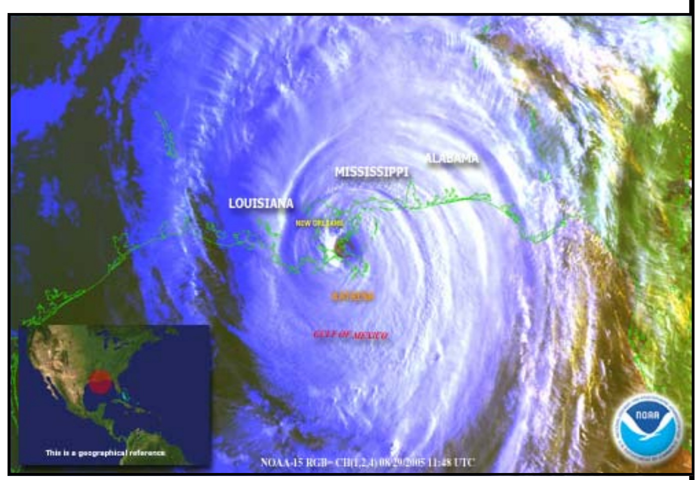
Friday, 26 August: The southwestward turn of Katrina, while not totally unexpected, takes the storm farther south than forecast. As a result, the center of Katrina quickly re-emerges over the Gulf of Mexico Friday morning after spending only about seven hours over land. The storm is now stronger and farther south than forecast, which results in an adjustment to the forecast. The forecast track is shifted westward early Friday, with landfall projected in or near the western Florida panhandle. At 4am, forecasters at TPC write, "It is certainly possible that Katrina could attain major hurricane status before making landfall somewhere on the northern Gulf coast."

During the day, Katrina strengthens to a category-2 hurricane but stubbornly continues moving to the west-southwest - she does not make an expected turn back to the west. The forecast track is shifted farther west, and by late afternoon beings the center onto the Mississippi/Alabama coast on Monday. The "cone of uncertainty" now includes areas from southeastern Louisiana eastward to the Florida panhandle.

Saturday, 27 August: Katrina finally turns due west, and strengthens into a major (category-3) hurricane. The forecast track will take the storm directly over the warm Loop Current of the Gulf, which TPC forecasters describe as, "like adding high-octane fuel to the fire." They now project Katrina to be a category-4 hurricane at landfall on Monday. Computer forecast models, which up to this point had shown a fair amount of variance on the forecast track, begin to converge. TPC forecasters become increasingly confident that Katrina is headed for southeastern Louisiana. A hurricane watch is issued at 10am that includes metropolitan New Orleans.

Late in the day, Katrina undergoes a "concentric eyewall replacement cycle" - a process which is very difficult to predict but typically delays the strengthening process in a hurricane. This results in Katrina remaining at category-3 strength through the evening. That's the good news. The bad news is that Katrina begins her turn to the northwest, taking aim on the central Gulf coast.

Sunday, 28 August: The eyewall replacement cycle concludes early in the morning, and before daybreak Katrina intensifies rapidly and grows into a large category-4 hurricane with sustained winds of 145 mph. She is now situated in an ideal environment of warm Gulf water and weak wind shear, and by 7am reaches category-5 strength with sustained winds of 160 mph. She still has not peaked, though. By 10am, sustained winds increase to an astounding 175 mph and the central pressure drops to 907 millibars. Forecasters at TPC issue hurricane warnings from Morgan City, LA eastward to include New Orleans, Lake Ponchartrain, and the entire Mississippi and Alabama coasts. Their 10am discussion provides a chilling hint of what is to come: "Katrina is



Visible satellite image of Hurricane Katrina just after landfall. Image courtesy of *www.osei.noaa.gov*.

comparable in intensity to Hurricane Camille of 1969, only larger." (Camille, a category-5 hurricane with 180 mph winds and a 25 foot storm surge, killed nearly 300 people in the central Gulf coast area.)

Reconnaissance aircraft measure a

See **Katrina** on page 4

Katrina: From Page 3

central pressure of 902 millibars in the eye Sunday afternoon. This is the fifth lowest pressure ever recorded in an Atlantic basin hurricane. (Superseding Katrina was Hurricane Rita, which dropped to 897 millibars.) Katrina makes a gradual turn to the northwest and then to the north-northwest, following the forecast track but at a slightly faster forward speed. Tropical storm force winds arrive in southeastern Louisiana, including New Orleans, by early evening. The storm backs off slightly from its earlier intensity, but maintains category-5 strength into the overnight hours.

Monday, 29 August: Katrina turns due north and slams into far southeastern Louisiana at about 7am. Maximum sustained winds drop slightly to 145 mph, making Katrina officially a category-4 hurricane at landfall. There initially is a mild wave of relief in New Orleans, as the northward turn spares most of the city from the wrath of the storm's eyewall. But the violent counter-clockwise winds drive Gulf water westward into Lake Ponchartrain ahead of the eye, and then drive that water southward into the canals and levees of New Orleans as the eye passes east of the city. Katrina continues to weaken gradually as she passes over the wetlands of southeastern Louisiana, but makes another landfall around 11am near the mouth of the Pearl River. Maximum winds drop back to 125 mph by this time, and the central pressure rises to 927 millibars. Katrina strikes the same areas that were devastated by Hurricane Camille. She is not as intense as Camille was, but is larger in size and thus drives and even higher storm surge into the Mississippi and Alabama coastlines. The storm surge from Katrina is estimated to be as high as 33 feet. Coastal areas are virtually wiped out, including most of the Mississippi towns of Waveland, Bay Saint Louis, Pass Christian, and Long Beach. The cities of Gulfport, Biloxi, and Pascagoula suffer extensive destruction along the coast, with major damage from flooding and wind stretching well inland.

Katrina weakens as she moves farther inland, but continues to produce hurricane-force winds more than 150 miles inland. At one point, it is estimated that three-fourths of the state of Mississippi is without power due to the storm.

Tuesday, 30 August: The remnants of Katrina weaken and accelerate northeastward across the eastern United States. Bands of thunderstorms produce roughly a dozen tornadoes from Georgia to Pennsylvania. Katrina becomes extratropical, and loses her identity almost exactly one week after she was born.

The National Weather Service Response. Max Mayfield, Director of the National Hurricane Center has been a very visible person in the media over the past several weeks. He became a familiar face on national news channels as he provided updates on Hurricanes Katrina and Rita while they took aim on the United States coastline. The National Hurricane Center is part of the National Weather Service, and provides a critical service in forecasting and tracking these dangerous storms.

Top 5 Strongest Atlantic Basin Hurricanes			
Number	*Name*	*Year*	*Minimum Pressure*
1	Gilbert	1988	888 mb
2	Unnamed -- Florida Keys	1935	892 mb
3	Rita	2005	897 mb
4	Allen	1980	899 mb
5	Katrina	2005	902 mb

What you do not usually see in the media, however, are signs of the hard work and dedication of other National Weather Service employees who perform tremendous public services in times of dangerous weather. This includes national and regional offices, and especially local forecast offices.

So what does a local forecast office do when a hurricane is threatening? First and most importantly, the local forecast office is responsible for taking the official forecast from the National Hurricane Center and tailoring it to their local area by adding specific details about how the storm will impact the local communities. Local forecasters also monitor radar for signs of developing tornadoes, which can be a big problem when a hurricane comes ashore. They watch for all types of hazardous weather, including flooding and coastal hazards, and issue warnings to help saves. In the midst of all this, the staff maintains all the routine forecast and information services. The local forecast office also works to maintain communications and radar service through the storm, and works closely with the local media and emergency managers to provide front line information.

Of course, this sometimes means that the forecasters are truly on the front lines, and sometimes directly affected by the storm. Hurricanes Katrina and Rita both directly impacted National Weather Service Forecast Offices (in Slidell and Lake Charles, LA, respectively), seriously impacting operations, damaging or destroying employees' homes, and creating some very tense moments for the dedicated meteorologists and support personnel who remained at their posts. During Katrina, the forecast office in Slidell (where 80% of the town's buildings where heavily damaged or destroyed) became a refuge for staff and their families.

In some cases, communications were lost at a forecast offices, which meant they could no longer send warnings or other information. When this happens, an emergency back-up plan goes into action, and services are transferred to an adjacent office. This happened in both Hurricane Katrina and Rita.

Local offices get support from the Southern Region Headquarters in Fort Worth, Texas. The meteorologists and technicians at the Regional Operations Center help to coordinate the transfer of services to back up offices, the repair and restoration of equipment and the needs of the employees and their families who may have been directly impacted by the storm. Personnel at Regional Headquarters also help conduct media interviews - request come literally from around the world when a hurricane threatens land.

Meteorologists from the National Weather Service were also deployed to remote locations to assist in the response

See **Katrina** on page 5

August Flooding in western north Texas

By Steve Kruckenberg, Service Hydrologist

In late July 2004, western north Texas and south central Oklahoma experienced a significant heavy rainfall and flooding event. It took slightly more than a year for the region to be plagued again by floodwaters during the middle of August 2005. During this period a stalled front, combined ample low-level moisture and weak disturbances moving

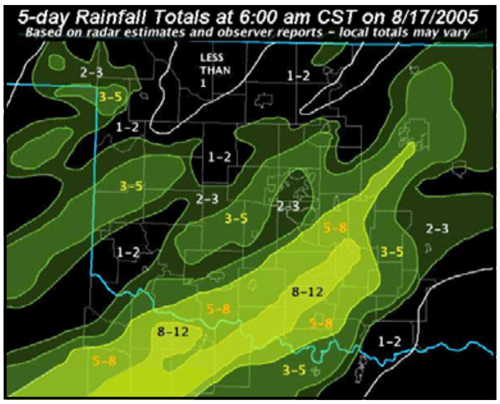


Figure 1: 5-day rainfall map ending at 6am August 17, 2005.

over the area, produced multiple rounds of showers thunderstorms in north Texas and southern Oklahoma during the 5-day period of August 13th-17th.

As seen in Figure 1, rainfall totals for the 5-day period ending at 6 am (all times CST) on August 17th reached 5 to 12 inches across parts of Knox, Wilbarger, Baylor, Wichita, Archer and Clay counties in western north Texas, and Jefferson, Stephens, Carter, Murray, Garvin Johnston, Pontotoc counties in south central Oklahoma. The hardest hit river basins included the Brazos River basin in Knox and Baylor counties, and parts of the Wichita and Little Wichita River basins in Knox, Baylor, Archer, and Clay counties. Drainage areas in the Arbuckle Mountains in south central Oklahoma also experienced large rainfall totals.

Some the highest totals measured in western north Texas: Archer City - 12.35 inches; Electra - 10.13 inches; Seymour – 8.67 inches; Electra 9S - 8.23 inches; Scotland - 7.86 inches; Henrietta - 7.80 inches; Lake Kemp - 7.78 inches; Charlie - 7.54 inches; Dundee 6NNW - 7.35 inches; and Charlie 3SE - 7.34 inches. In southern Oklahoma, the highest totals were as follows: Davis 4S – 13.39 inches; Allen, - 8.25 inches; Healdton – 8.03 inches; Randlett – 7.35 inches; Waurika – 7.16 inches; and Terral 1S – 7.00 inches.

A closer look at the storm total rainfall amount at the Davis 4S, OK rain gage shows that most of the precipitation fell during a 2-day period between noon on August 13th and noon on August 15th. Figure 2 shows that the heaviest precipitation fell initially during the early morning period on August 14th, with the greatest hourly rainfall total of 2.48 inches occurring from 2 to 3 am. A second, prolonged and heavier period of rainfall occurred during the late evening and early morning hours of August 14th-15th, when hourly rainfall rates topped 1.5 inches three times, and over 8 inches of rainfall was recorded for the period.

The subsequent heavy runoff produced by these rains generated flash flooding and riverine flooding in western

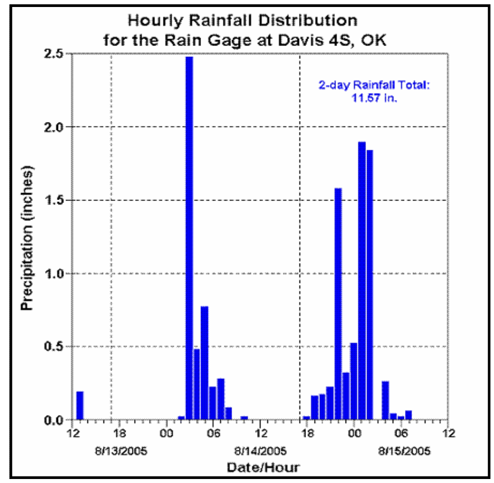


Figure 2: Hourly rainfall at the Davis 4S, OK raingage August 13-15, 2005.

north Texas and south central Oklahoma. Minor to moderate rural flooding occurred along the Brazos River and its tributaries in Knox and Baylor counties on August 16th-18th. See Figure 3.

The flood crest of 18.6 feet was the highest recorded at Seymour in at least 45 years, 3.7 feet higher than the crest

See **Flooding** on page 6

Katrina: From Page 4

response and recovery efforts. For example, during Hurricane Rita, NWS meteorologists worked shoulder-to-shoulder with FEMA and state emergency management officials in Texas and Louisiana, providing detailed weather briefings, tactical forecasts in support of recovery activities and helicopter operations, and hazardous weather that might impact responders and victims.

So the next time you see someone from the National Hurricane Center on the news, remember that there is also a team of National Weather service personnel working long hours, often in harm's way, to provide their local area with the most accurate and useful weather information possible.

Do hurricanes ever affect Oklahoma?

NWS Regional Operations Center at Southern Region Headquarters in Fort Worth, TX.

The answer is yes. Just before Hurricane Rita came ashore, the official forecast took her north into central Oklahoma and it was thought that flooding rainfall might occur. As it turns out, Rita took a right turn and only far southeastern Oklahoma saw any rainfall from her. Most often, Oklahoma and north Texas only see the remnants of hurricanes in the form of heavy, persistent rain. However, there have been a few times throughout history when tropical systems have still been classified as either a tropical storm or a tropical depression as it moved through north Texas or Oklahoma. Do you know which ones? To find out the answer, see the Autumn 2003 newsletter!

Editor's Note: Hurricane Wilma dropped to 882 mb, which is now the lowest pressure on record.

August Flooding: From Page 5

recorded in late July 2004, and the fourth highest crest on record.

Millers Creek, a tributary to the Brazos River that runs northward into southern Baylor, saw major flooding during mid August. Rainfall totals of 7 to 10+ inches fell over the headwaters of Millers Creek in Haskell and Throckmorton counties, just south of the NWS Norman area of responsibility. As a result, a near record crest of 17.5 feet occurred on Millers Creek in Throckmorton County on August 16th. This gage site is upstream of Millers Creek Reservoir, which straddles the Throckmorton/Baylor county line. Major inflows into Millers Creek Reservoir caused the lake elevation to rise above the conservation pool elevation of 1333.9 feet MSL, and eventually the emergency spillway elevation of 1340.0 feet MSL. Millers Creek Reservoir crested at a record elevation of 1342.52 feet MSL at noon on August 18th. The flood flows from Millers Creek eventually traveled into the Brazos River, and exacerbated flooding on the Brazos River in extreme southern Baylor County, and at points further downstream.

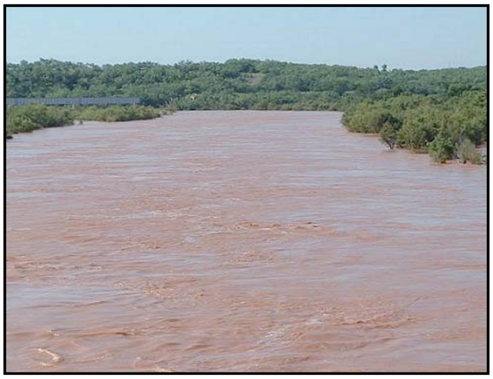


Figure 3: The Brazos River at Seymour August 16, 2005 looking downstream. Photo taken by Tommy Duncan, Baylor County Emergency Manager.

Further downstream below the confluence of the South Wichita River with the Wichita River, minor rural flooding occurred along the Wichita River in Baylor County near Seymour, TX and just upstream of Lake Kemp on August 14th-15th. The heavy runoff from the Wichita and South Wichita Rivers was beneficial for the Wichita Falls area as the reservoir levels at Lake Kemp rose to within a foot of the conservation pool level of 1144 feet MSL.

The Little Wichita River basin in Archer and Clay counties also saw significant rises during mid August. The reservoir levels increased at both Lake Kickapoo and Lake Arrowhead. Moderate to major flooding occurred along the Little Wichita River in Archer County between Lake Kickapoo and Lake Arrowhead near Archer City, TX on August 16th-18th. Moderate to major rural flooding occurred along the Little Wichita River in Clay County near Henrietta, TX between August 16th-20th. Some secondary roads and agricultural lands near the river were inundated during this period. Also, while not cresting at or above flood stage, the Wichita River at Wichita Falls, TX saw its highest peak since the August 1995 flood.

Moderate flooding occurred along Beaver Creek in Wilbarger and western Wichita counties on August 15th-18th. Storm total precipitation amounts of 3 to 7 inches kept Beaver Creek in flood for over 3 days and produced two crests above flood stage. Some secondary roads and agricultural lands near the creek were inundated during this period.

Riverine flooding was also seen in mid August along Mud Creek in Stephens County. Heavy runoff from storm total rainfall amounts of 4 to 7 inches caused Mud Creek to overflow its banks and produce moderate flooding during a broad crest August 15th-20th. Croplands and some secondary roads along Mud Creek were flooded during this period.

Flash Flooding in South Central Oklahoma. Rainfall totals of 4 to 8+ inches over the Arbuckle Mountains over Carter and Murray counties in south central Oklahoma on August 14th-15th triggered heavy runoff and flash flooding in Turner Falls Park. These heavy rainfall totals are shown in Figure 4. The flash flooding washed away beaches at Turner Falls, and eroded the bank along a building just downstream of the waterfall. Some campers were forced to evacuate from the park, while other campers became stranded when a low water crossing across Honey Creek, downstream of Turner Falls and 4 miles south of Davis, OK, became impassible for a couple of days.

A USGS river gage station located near the low water crossing recorded a significant rise for Honey Creek during the event. The 4-8 inch rainfall totals on August 14th-15th produced a flood crest 3.5 feet higher than the low water crossing elevation. Low stages at the site are usually around 1.4 feet. Brush and debris were deposited along Honey Creek, and 150 tons of sand was delivered to rebuild the washed-away beaches.

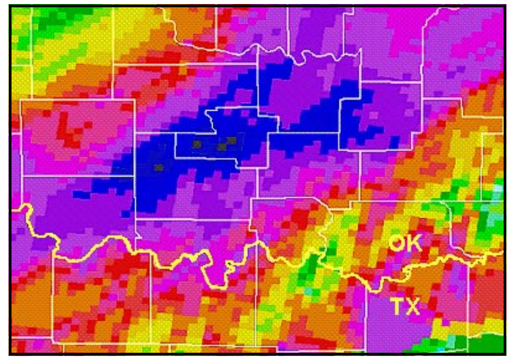


Figure 4: 48-hour rainfall map ending at 7am August 16, 2005. Key: light blue to yellow, 0-1 inches; orange to red, 1-2 inches; pink, 2-3 inches; purple, 3-5 inches; blue, 5-7 inches; gray to black, 8-10 inches.

Flash flooding also occurred during the late evening of August 14th and morning of August 15th in other parts of south central and central Oklahoma. Flash flooding damaged a few houses in the City of Sulphur in Murray County. Flooding also closed several roads in the area including State Highway 53.

Flash Flooding in western north Texas. The heavy rain that fell over the region during mid August generated multiple flash flood events across western north Texas on August 14th-16th. Numerous roads and highways were flooded, and authorities had to barricade many roads and reroute traffic through the area as seen in Figure 5.

Figure 5: Seymour Creek flooding at the Seymour city park in Seymour, August 16, 2005. Photo taken by Tommy Duncan, Baylor county Emergency Manager.

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

By Rick Smith, Warning Coordination Meteorologist

National Weather Festival November 5th. You're invited to join us on Saturday, November 5th from 9am to 1pm for the National Weather Festival. The event is free and open to the public. You will have an opportunity to visit the National Weather Service Forecast Office, as well as the National Severe Storms Laboratory, the Radar Operations Center and the Storm Prediction Center. You can watch weather balloon being launched and participate in demonstrations and other activities. This will be your last chance to visit the offices before they move to the National Weather Center next year!! Watch our webpage for more details.

National Severe Weather Workshop. If you are interested in learning more about weather and how partners in the media, National Weather Service and emergency management work to keep you informed during hazardous weather mark your calendars now for the 2006 National Severe Weather Workshop. This year's workshop will be different than previous years, and will feature a unique opportunity for you to be involved in a weather scenario. It will be held March 2-4, 2006. Keep an eye on our website for more details and registration information.

Spotter Training Season. While we gear up for winter weather, we are also looking forward to another season of storm spotter training. Each year, NWS meteorologists, at the invitation of local emergency managers, travel across north Texas and Oklahoma to help train storm spotters. If you are an emergency manager and you have yet to schedule your class, now is the time! If you are interested in attending a storm spotter class next year, they will be held from January through March across the area. We'll have a complete schedule on our webpage in the next few weeks.

StormReady News

By Rick Smith, Warning Coordination Meteorologist

We are proud to announce the latest additions to the StormReady family in the Norman county warning area! In August, the University of Oklahoma became the first university in the state of Oklahoma, and the tenth nationwide, to be formally recognized as StormReady. Also in August, Holdenville, Oklahoma and Grady County, Oklahoma were recognized for going above and beyond to be ready to handle weather emergencies. Congratulations to these communities and their dedicated emergency managers!

Nationwide, there are more than 950 StormReady communities in 47 states. There are 58 StormReady recognitions in Oklahoma and 51 in Texas. For more details on StormReady and how your community can apply, go to *http://www.stormready.noaa.gov/*.

Finally, Sooner Mall in Norman was recognized as a StormReady Supporter. A recognition ceremony was held on September 22nd in conjunction with a emergency preparedness information fair at the mall.

From left to right: David Grizzle, City of Norman Emergency Management Coordinator, David Andra, Science and Operations Office, NWS WFO Norman, Lynn Palmerton, General Manager, Sooner Mall, and Adam Krech, Public Safety Director, Sooner Mall.

Watch for more new StormReady communities in the next edition of the newsletter!

Welcome!

From the Staff at NWS Norman

We would like to welcome Patrick Burke to the NWS Norman family. Patrick comes to Norman as a general forecaster from NWS Goodland, KS. After graduating from the University of Oklahoma, Patrick interned at NWS Williston, ND and then moved to Goodland as a forecaster. He has now found himself back in Oklahoma. Welcome home Patrick!

We would also like to welcome James Hocker to NWS Norman. James will be volunteering his time to learn and support routine and severe weather operations. He is currently a Masters student at the University of Oklahoma. Welcome!

Weatherman: From Page 1

Though Purdue University was my first choice for college, I found out the University of Oklahoma had a good program. I graduated from the OU in 1999 with a Bachelor's Degree in Meteorology with a math minor. While at OU, I worked in a research group associated with OU called Environmental Verification and Analysis (EVAC). After graduating from OU, I took a job at the University of Kentucky in the Agricultural Weather Center where we tailor made or collected forecasts and data that would be useful for agricultural purposes. After a year and a half I decided that I wanted to do more forecasting. I applied and was selected for a meteorological intern position at the NWS in 2001. The following spring I was selected as the new general forecaster. Along with all of the normal forecaster duties, I am the Storm Data focal point. I collect all the severe weather reports of hail, tornadoes, and wind, to flooding, snow and ice storms that we receive and enter them into the official database for historical records.

When I am not working, I like to storm chase, read books, watch movies, hang out with my friends and spend time with my two cats. I also like sports, basketball being my favorite.

I enjoy working at NWS Norman. I hope to continue to work here providing service to people in Oklahoma and Texas for many more years to come.

Cooperative Observer Notes

Measuring Winter Precipitation

By Forrest Mitchell, Observations Program Leader

Its been rather warm and dry, but the season is changing, and we will all too soon begin dealing with wintertime precipitation. Here are a few guidelines and tips to help you with the task.

Before the winter precipitation arrives, the funnel and the measuring tube should be removed from the rain gage and left indoors. This is especially true at those sites with plastic funnels and tubes.

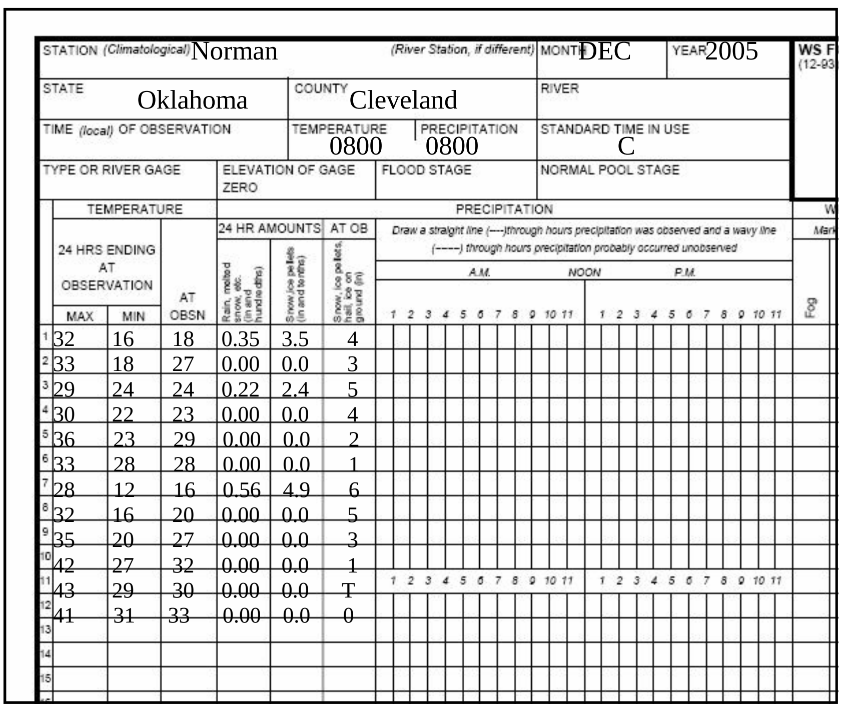
When freezing precipitation occurs, the outer can often stick to the gage stand. To prevent this from happening, you may want to try one of two things: spray WD-40 or a similar lubricant on the inside surface of the stand and the bottom of the outer can or place a smooth piece of wood between the bottom of the stand and the outer can. Either method makes it easier to separate the outer can from the stand.

When it is time to measure the freezing rain, sleet or snow, the frozen precipitation must be melted to obtain the water equivalence. The easiest way to do this is by adding warm water. Pour warm water into the measuring tube, taking care to measure and write down how much water is in the tube. Pour the warm water into the outer can, and swirl it around until everything has melted.

Place the funnel on top of the tube, and taking care to avoid spilling any liquid, slowly pour the melted precipitation from the outer can into the tube. Measure the amount of liquid in the tube, subtract the warm water that you added, and enter this amount on your B-91 weather form. Measuring snowfall on the ground will always be a challenge in this part of the country due to the wind. Using your metal snow stick, take several readings from spots where the snow is fairly uniform, away from drifts. If you are measuring on a grassy surface, clear away a spot of snow so you can see the bottom of the snow layer to keep from including the depth of the grass in the measurement. If you use a snow board, place a marker next to it so that can find it when it is covered in snow.

When you are ready to enter the amounts on your B-91, enter the total meltdown, to the nearest hundredth of an inch, in the same column as you do rainfall. The next column to the immediate right is where you enter the 24-hour snowfall to the nearest tenth of an inch. The next column is the total amount of snow on the ground, to the nearest whole inch. This should be recorded until all the snow is gone. To the left is an example of how the B-91 should be filled out. In this example, there are two winter precipitation events, and the latter one occurs when there is still snow on the ground from the first snowfall. Another example is located on the inside front cover of your B-91 booklet.

As always, if you have any questions, don't hesitate to call us.



STATION (Climatological) Norman (River Station, if different) MONTH DEC YEAR 2005 WS F (12-93

STATE Oklahoma COUNTY Cleveland RIVER

TIME (local) OF OBSERVATION TEMPERATURE 0800 PRECIPITATION 0800 STANDARD TIME IN USE C

TYPE OR RIVER GAGE ELEVATION OF GAGE ZERO FLOOD STAGE NORMAL POOL STAGE

	TEMPERATURE: 24 HRS ENDING AT OBSERVATION MAX	MIN	AT OBSN	PRECIPITATION: 24 HR AMOUNTS Rain, melted snow, etc. (in and hundredths)	Snow, ice pellets (in and tenths)	AT OB Snow, ice pellets, hail, ice on ground (in)
1	32	16	18	0.35	3.5	4
2	33	18	27	0.00	0.0	3
3	29	24	24	0.22	2.4	5
4	30	22	23	0.00	0.0	4
5	36	23	29	0.00	0.0	2
6	33	28	28	0.00	0.0	1
7	28	12	16	0.56	4.9	6
8	32	16	20	0.00	0.0	5
9	35	20	27	0.00	0.0	3
10	42	27	32	0.00	0.0	1
11	43	29	30	0.00	0.0	T
12	41	31	33	0.00	0.0	0
13						
14						
15						

Draw a straight line (—) through hours precipitation was observed and a wavy line (~~~) through hours precipitation probably occurred unobserved

A.M. NOON P.M.

An example of a B-91 during a hypothetical wintertime precipitation event for Norman, OK.

Award Recipients

The following observers have recently received Length of Service Awards:

Joe Carter, Jr. - 15 years
Alfred Vanschuyver - 10 years

Thank you for the hard work and valuable meteorological data you have collected. We look forward to working with you for many more years to come!

Remember to mail the previous month's cooperative observer forms and recording rain gage tapes by the 5th of the month!

The Norman NWS Cooperative Observer Program Team:

Daryl Williams Forrest Mitchell Jennifer Palucki Ty Judd John Pike

National Weather Service
Forecast Office
Norman, OK

Phone Number:
405-360-5928

Web Page:
www.srh.noaa.gov/oun

Meteorologist-in-Charge:
Mike Foster

Warning Coordination Meteorologist:
Rick Smith

Science and Operations Officer:
David Andra

Editor:
Jennifer Palucki

In This Issue:

⇒ Special Report: Hurricane Katrina
⇒ August Flooding in western north Texas
⇒ Meet Your Weatherman
⇒ Tales, Legends, and Other Sayings
⇒ Climate Commentary
⇒ Norman Forecast Office Notebook
⇒ Cooperative Observer Notes

National Weather Service Forecast Office
1200 Westheimer Drive, Room 101
Norman, OK 73069

Check out our text-based and graphical forecasts for your county at *www.srh.noaa.gov/oun*.

Please share this with friends, relatives, and colleagues. Comments and suggestions are always appreciated, by phone at 405-360-5928 or by e-mail at Jennifer.Palucki@noaa.gov.