The Dryline

The Official Newsletter of the National Weather Service in Amarillo

WFO Amarillo Hosts 6th Annual Volunteer Appreciation Day

By Steve Drillette, Warning Coordination Meteorologist

The Amarillo National Weather Service (NWS) held its 6th annual Spotter and Cooperative Observer Appreciation Day on Saturday, August 12th at the NWS office. Nearly 130 people attended the event which included spotters,

(continued on Page 2)

Fig. 1. Juannah Brice (center) and José Garcia (right) serve our guests.

Summer Rains Bring Drought Relief

By Roland Nuñez, Senior Forecaster

August of 2006 will go into the annals as WET! After facing nearly nine months of below normal precipitation, the summer months reduced the rainfall deficit over parts of the Texas and Oklahoma Panhandles. *(continued on Page 2)*

Also in this issue:

Volunteer Appreciation Day

(Continued from page 1.)

observers, emergency managers and various NWS partners. This event is just one way the Amarillo NWS staff celebrates all of its volunteers, partners, and valued customers for their role in meeting the NWS mission of protecting life and property. Wal-Mart of Amarillo and Canyon helped sponsor the event, as they have for the past 4 years, donating all of the food and most of the door prizes. Juannah and Andy Brice graciously prepared the meal, which included smoked brisket and sausage. Juannah serves as the primary

Fig. 2. Guest enjoys tasty barbeque.

HAMS Net Control Operator at the NWS office during severe weather events, while Andy serves as a severe storm spotter.

Summer Rains

(Continued from page 1.)

The weather pattern that led to a drought over much of the south-central United States began changing before summer. Through the summer, the dominant upper level high pressure system over the Western United States started to weaken, and the westerlies gradually shifted south. (The westerlies are the prevailing winds in the middle latitudes between 30˚ and 60˚ latitude.) This change allowed upper level disturbances and surface fronts to work their way towards the Southern High Plains, including the Oklahoma and Texas Panhandles.

The Panhandles also had a persistent moisture connection to the Gulf of Mexico. As a result, the airmass was frequently moist and unstable when disturbances and fronts moved through or near the area. Furthermore, the wind fields that determine the storm motion and speed were weak and created slow storm motions. These conditions enhanced the potential for slow moving thunderstorms with the capability of heavy rain.

In the months leading into the summer, much of the Panhandles were trailing the normal rainfall amounts by anywhere from two to five inches (see Table 1). That trend began to change as the frequency of showers and thunderstorms increased in June. This trend continued into July. By August, soils were at or near saturation, and playa lakes, creeks and rivers collected water runoff.

Many cities experienced urban flooding as drainage could not keep up with the torrential rainfall. Amarillo, for example, had widespread flash flooding that resulted in one death, led to emergency rescues, and threatened many homes and businesses (See Fig. 3 and 4). The Rick Husband Airport in Amarillo recorded 1.78 inches of rain from August 20-21. (For more information on the August 21st flash flood event in Amarillo, go to:

http://www.srh.noaa.gov/ama/flood_august21/index.htm

Fig. 3. Flash flooding threatened homes in the Puckett West neighborhood of Amarillo on Monday, August 21, 2006.

Fig. 4. Amarillo Fire Department rescues a man from his stalled vehicle on Monday, August 21st near the intersection of Amarillo Boulevard and Mississippi Street. (Photo courtesy of the Amarillo Globe News.)

2006 Precipitation	Location	Jan-May 2006	Jun	Jul	Aug	Jan-Aug 2006
Observed	Amarillo	3.13	1.02	4.40	6.67	15.22
	Borger	3.21	0.86	0.76	3.63	8.46
	Dalhart	2.33	2.55	2.71	4.50	12.09
	Guymon	4.17	1.77	2.38	5.57	14.37
Departure from Normal	Amarillo	-3.01	-2.26	+1.72	+3.73	+0.18
	Borger	-4.54	-2.34	-1.92	+0.47	-8.34
	Dalhart	-3.74	+0.28	-0.40	+1.51	-2.35
	Guymon	-2.11	-0.69	+0.48	+3.51	+1.19

Table 1. 2006 Precipitation and Departure from Normal for Amarillo, Borger, Dalhart, and Guymon

Lance Goehring — June 2006 Employee of the Month

Lance was born in San Clemente, CA. He grew up in Sioux Falls, SD and Ft. Collins, CO, and attended college at the University of Northern Colorado, in Greeley, CO. Lance became interested in meteorology in his 8th grade science class when a strong cold front pushed through central South Dakota. It was 80 degrees that day in Sioux Falls with severe thunderstorms while, on the other side of the state, Rapid City had a high of 32 degrees with a foot of snow! His first job with the NWS was in Cheyenne, where he served as a Cooperative Observer during his college days. Lance served his internship at the National Weather Service Office in Moline, IL. He transferred to Amarillo in 1994 as a Journeyman Forecaster, and was promoted on station to a Senior Forecaster in 2001. He currently serves as the Hydrologic Focal Point for the Texas and Oklahoma Panhandles, and is a member of several office support teams.

Science Corner

LANDSPOUT TORNADOES

A look at the science behind landspout tornadoes and some commonly held misconceptions.

By Matthew R. Kramar
Journeyman Forecaster and Science and Training Team Leader

Landspout tornado outbreaks are a common occurrence in the Eastern Plains of Colorado, but seem much less frequent in the Texas and Oklahoma Panhandles. But on 21 June 2006, a landspout outbreak unfolded across the northern sections of the WFO Amarillo forecast area. This article will discuss how landspouts form and address common misconceptions about landspouts.

Formation: There are two methods by which tornadoes are thought to form: the Top-Down process, and the Bottom-Up process. Most tornadoes (which themselves are a relatively rare occurrence) associated with supercell thunderstorms form by the former process, where rotation in the middle levels of the storm (giving rise to the storm's mesocyclone) is concentrated and descends to the lower levels of the storm. Landspout tornadoes, however, form by the Bottom-Up process. Typically, this process occurs under a developing or rapidly intensifying thunderstorm or towering cumulus cloud. Small low-level vortices (areas of concentrated rotation) exist in abundance along certain surface boundaries, particularly nearly stationary fronts exhibiting strong wind convergence. As the strengthening updraft of the storm moves over these vortices, the upward motion acts like a vacuum, stretching the low-level vortex and tightening it into a landspout tornado. This process may be compared to a rotating figure skater: when the skater's arms are extended, he/she spins slower; when the skater's arms are pulled in, the rotational velocity increases. Once the storm moves away from the boundary (and the source of the low-level rotation), the landspout weakens and dissipates.

Fig. 5. Landspout tornado northwest of Spearman on 21 June 2006. Photo courtesy of Gary Garrett, Deputy, Hansford County SO.

The formation process of landspouts makes it inherently difficult to warn for these tornadoes. They typically form very quickly under benign-looking radar echoes or even no echoes at all, do not give indications of their presence aloft in the storm (owing to the Bottom-Up formation), and are nearly impossible to detect at greater distances from the radar since the radar beam overshoots the lower levels at such a distance. From the forecaster's perspective, proper anticipation relies on a good diagnosis of surface features, possible detection of the pre-existing vortices along the surface boundary, and most importantly on accurate and timely spotter reports of the developing landspout itself.

Fig. 6. A landspout tornado on 21 June that formed near Adams, OK in eastern Texas County. Photo courtesy of Harold Tyson, Texas County Emergency Manager.

Misconceptions: A few perhaps dangerous myths about landspout tornadoes continue to circulate (no pun intended), and should be dispelled:

Myth 1: Landspouts are not tornadoes.

Response: A tornado is defined as a violently rotating column of air in contact with the ground, and beneath or attached to a cumuliform cloud. While the formation process is different for landspout and mesocyclone tornadoes, both are tornadoes by definition.

Myth 2: Landspouts are weak and not dangerous.

Response: While there is no documented landspout tornado as strong as the strongest mesocyclone tornadoes, and most are usually on the weaker side, landspout tornadoes can reach F2 to F3 intensity (winds up to 200 mph) and can last for twenty minutes or more. In fact, they can do as much damage as a moderate tornado, and should be regarded as equally dangerous. This was unfortunately realized in Colorado, where F2- and F3-rated landspouts hit the Denver area on 15 June 1988.

Myth 3: No wall cloud or funnel cloud means no landspout.

Response: Since landspouts do not form from a mesocyclone, and often form beneath developing storm updrafts (although they can just as easily form beneath a well-defined storm), a wall cloud is unlikely to be present when a landspout is developing or occurring. Nor does the lack of a funnel cloud mean that a tornado is not occurring. As with mesocyclone tornadoes, funnel clouds do not always come into contact with the ground. The best indicator of contact with the ground is a sustained and well-organized dust whirl beneath the funnel, but even this indicator is not conclusive. Indeed, many of the landspouts on 21 June 2006 were observed beneath flat cloud bases.

While landspouts are relatively unusual in the Texas and Oklahoma Panhandles, it is exactly their rarity that makes them potentially more hazardous. Landspout tornadoes are just as dangerous and capable of damage as their mesocyclonic counterparts, and must be regarded with equal concern.

3-Month Temperatures Outlook On Web

By Rich Wynne, Science & Operations Officer

The National Weather Service Climate Services Division has created a **Local 3-Month Temperatures Outlook** (L3MTO) at individual stations around the Texas Panhandle. L3MTO was officially released in July. Amarillo, Borger, Clarendon, Dalhart, Dumas, Hereford, Pampa, and Perryton (Fig. 7) are the initial locations available. It is meant to complement the 12-month national outlooks that have been available for years. The website is:

http://www.weather.gov/climate/calendar_outlook.php?wfo=ama

All eight locations will have local temperature outlooks available in three formats: pie charts, tables and graphs. The pie charts will illustrate the chance distribution of above-normal, normal, or below-normal temperatures for the location. The tables will have two forms of information: three category outlooks and probability of exceedance. Three category outlooks tables also display color-enhanced chances of above-normal, normal, or below-normal temperatures. Probability of exceedance tables (Fig. 8) will show the expected chance, in percent, for the average 3-month temperature to exceed (be higher than) a specified temperature in degrees Fahrenheit. The graphical formats (Fig. 9) will show the temperature range during each 3-month period of the year for a particular location. All of these products, as well as other climate information, can be accessed through the Climate section of the WFO Amarillo webpage:

http://www.weather.gov/climate/index.php?wfo=ama

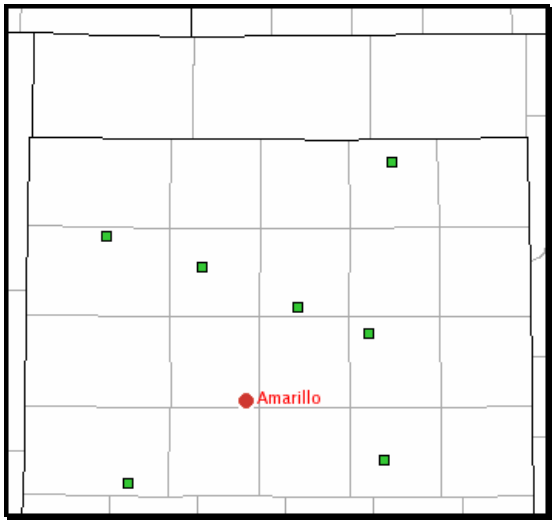

Fig. 7. Stations available in L3MTO

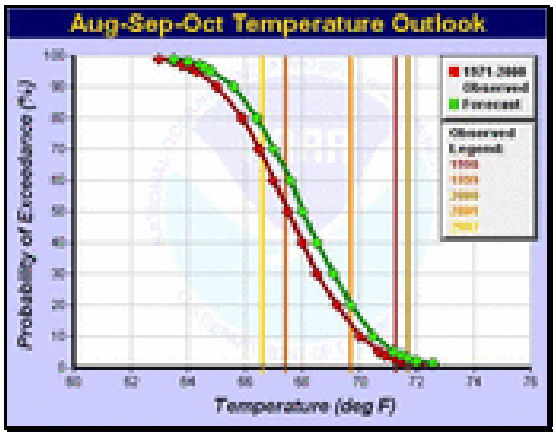

Fig. 8. Probability of Exceedance (PoE)

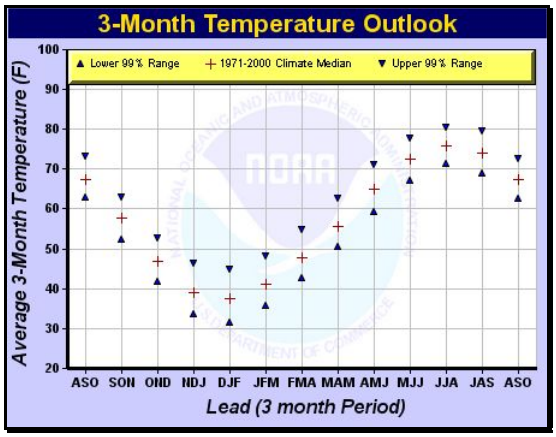

Fig. 9. Temperature Range

ASK A SCIENTIST

By Matthew Kramar,
Journeyman Forecaster and Science and Training Team Leader

Do you have a question about the weather that you have always wanted to have answered? *Ask A Scientist* is your forum! Send your question to us by mail, or e-mail it to matthew.kramar@noaa.gov, and it could be featured in our next issue of the *Dryline*.

The question for this quarter comes from Cindy, who asks about tornado development and detection within the storm bands of a hurricane. She writes:

> **The storm bands I have witnessed do not appear as thunderstorms I am used to seeing in the Panhandle. Does the tornado develop in the same manner? Are the tornadoes weaker? How does a tornado spotter detect a developing tornado?**

Answer: It is correct that the thunderstorms in outer hurricane bands are not like the storms typically seen in the Panhandles. Outer hurricane band thunderstorms form in a very tropical airmass, and a highly sheared environment. Which is to say that the storms are generally low-topped (storms in the Panhandle often reach 50000 feet into the atmosphere, whereas these may reach less than 30000 feet). In a standard hurricane environment out over the ocean, the storms themselves would not develop the mesocyclone rotation that characterizes supercell storms. However, when the hurricane bands move over land, the winds aloft continue to flow at their normal speeds, while the winds at the surface experience friction with the terrain, resulting in low-level wind shear (winds that change direction and/or speed with height). In order to have a rotating storm, wind shear is a necessary ingredient. The friction caused by the low-level winds flowing over the terrain (and not the smooth ocean surface) is enough to cause a mesocyclone to develop, and perhaps subsequently a tornadic circulation.

A second factor that may contribute to tornado formation is the temperature of the rear-flank downdraft (RFD) of the thunderstorm. The ability of a thunderstorm to sustain itself for long periods of time is highly dependent on a delicate balance between inflow (the warm, moist air feeding the thunderstorm) and outflow (the usually cool air flowing out of the thunderstorm). The colder the outflow air, the harder that balance becomes to achieve, and the more likely a storm is to have its inflow cut off by the outflow air. The warmer the outflow air, the more buoyant it is (that is, it wants to flow back up into the thunderstorm: remember that warm air rises and cold air sinks). It is very common in the Panhandles to have cold air and winds result from thunderstorm outflow. But in a tropical environment, the thunderstorm outflow is naturally warmer, perhaps making it easier for tornadoes to form in a sheared thunderstorm.

The thunderstorms that spawn these mesocyclones and tornadoes are typically small, low-topped storms, with very heavy rain and ragged bases. This makes the detection of wall clouds and tornadoes extremely difficult, especially given that the storms generally move very quickly (upwards of 50 miles per hour). Tornadoes in the Southeast US (and in tropical airmasses in general) are often hard to

detect, because the cloud bases are usually so low to the ground owing to the high air moisture content, that often times it is impossible to identify the wall cloud or tornado, and you simply have to be in the right place at the right time in order to observe it. They are best diagnosed on radar, as seen from this image from the New Orleans WSR-88D, with a cell in the outer bands of Hurricane Rita, north of Baton Rouge (Fig. 10). Even then, they can be difficult to see on the reflectivity pattern because the storms are so small. A great example of a tropical mini-supercell is seen in Fig. 7., where the very subtle hook echo, and accompanying rotation identify the storm as potentially tornadic.

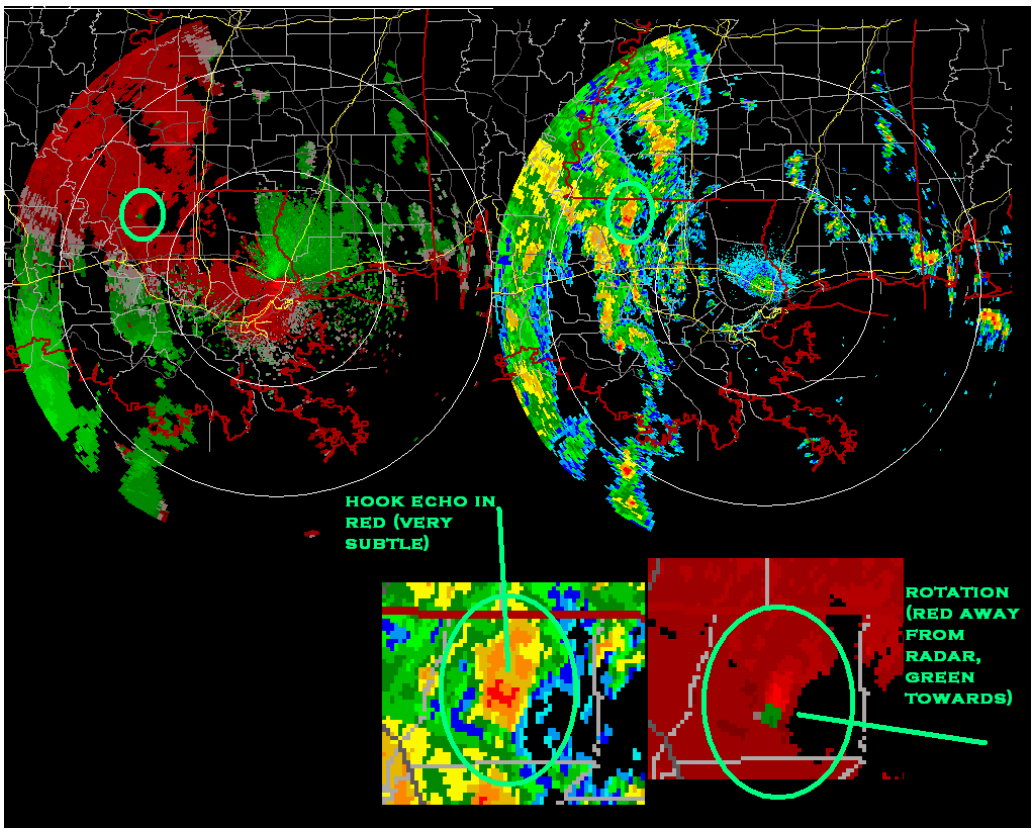

Fig. 10. Velocity and reflectivity images from KLIX radar during Hurricane Rita. A tropical mini-supercell is noted in the inset.

John Cockrell — July 2006 Employee of the Month

John is a Senior Forecaster and has served in this capacity since the time WFO Amarillo became a fully modernized office in 1995. John is originally from Chickasha, Oklahoma, and began forecasting for the private sector in 1981. John joined the National Weather Service in 1986, serving as an observer and intern in Apalachicola, Florida. He then served as a General Forecaster in Fort Worth from 1989 through 1994. He is our WSR-88D (radar) focal point and makes sure that the operational staff is trained to use the system and informed about the latest upgrades. John studied meteorology at the University of Oklahoma, where he earned a Bachelor of Science (1981). Prior to obtaining steady work as a meteorologist, he worked as a trim carpenter and cabinet maker. During his free time, John enjoys woodworking, photography, stargazing, music and being outdoors.

Upper Air System Upgraded

By Tabatha Tripp, Hydrometeorological Technician

In May 2006, the Radiosonde Replacement System (RRS) was deployed to NWS Amarillo. The old upper air (weather balloon) equipment dated back to the 1950s and the system for processing the data had been in operation since the 1980s. It was definitely time for an upgrade!

The RRS uses a Global Positioning System (GPS) tracking antenna, a new surface weather observing system, and precision digital barometers. These three components have increased the data accuracy and consistency. More important to weather operations, the data received from the new RRS system give the highest-resolution picture available of the current atmosphere.

The RRS sends the upper air data rapidly to our Advanced Weather Interactive Processing System (AWIPS) for immediate use by the entire forecasting community. The new system also creates a data archive to be sent after every flight to the National Climatic Data Center (NCDC). Now researchers have the ability to analyze the complete summary of current weather on a daily basis instead of viewing it at the end of the month.

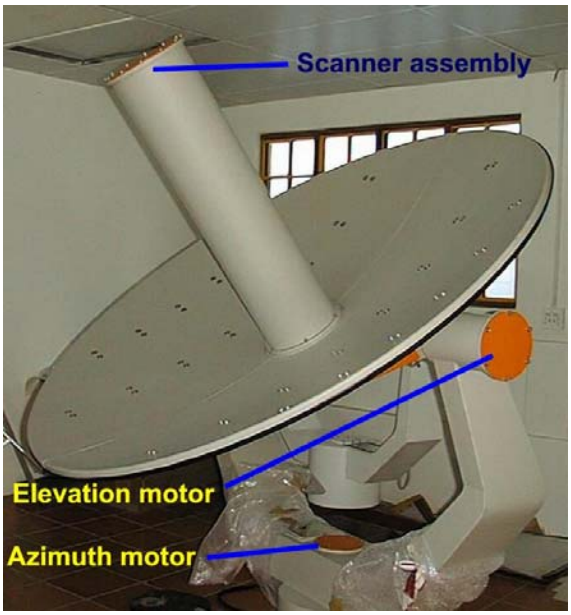

Fig. 11. New Telemetry Receiver System

Kids Weather Hour will once again allow elementary aged kids from across the Panhandles to send in weather questions to be answered live on NOAA Weather Radio by NWS meteorologists. For the past two years, hundreds of questions about weather, ranging from "Why is the sky blue?" to "How do tornadoes work?" were answered live on NOAA Weather Radio. This year will mark the third anniversary of Kids Weather Hour and we at the NWS are very excited to participate again in this fun and interesting program. With the installation of new radio transmitters across the Panhandles later this year, NOAA Weather Radio will be able to reach even more schools. If you are interested in Kids Weather Hour, or for information on whether your area is in current or future transmitter range, please send an e-mail to John Brost at John.Brost@noaa.gov for information.

NOAA Weather Radio Partners With Homeland Security

By Mike Johnson, Journeyman Forecaster

On July 21, 2006, the National Weather Service office in Amarillo completed the requirements to activate the All-Hazards Emergency Message Collection System. This system, otherwise known as HazCollect, will allow Non-Weather Emergency Messages (NWEMs) to be disseminated over NOAA Weather Radio. These messages cover a wide range of emergencies, including, but not limited to, Amber Alerts, Radiological Hazard Warnings and Fire Warnings.

When the installation of the HazCollect system is complete, Emergency Managers will be able to produce and send these products themselves. This will provide a more efficient and faster way to disseminate NWEMs, as well as reduce communication errors, since a third party will not be needed to relay the messages. After these messages are processed by the HazCollect servers, they will then be relayed to the NOAA Weather Radio system to be transmitted to the public. The entire procedure should take a matter of seconds to complete.

There are currently seventeen NWEM products that are covered by HazCollect at this time. These messages include:

- **Avalanche Watch***
- **Avalanche Warning**
- **Child Abduction Emergency (Amber Alert)***
- **Civil Danger Warning**
- **Civil Emergency Message**
- **Evacuation Immediate Warning**
- **Earthquake Warning**
- **Fire Warning**
- **Hazardous Materials Warning**
- **Local Area Emergency***
- **Law Enforcement Warning**
- **Nuclear Power Plant Warning**
- **Radiological Hazard Warning**
- **Shelter in Place Warning**
- **911 Telephone Outage Emergency***
- **Volcano Warning**
- **Administrative/Follow-up Statement***

Except for five (denoted with asterisks above), all of these products contain the 1050 Hz and Specific Area Message Encoding (SAME) tones. While some of these messages will prove impractical for the Texas and Oklahoma Panhandles, the suite as a whole will provide a much faster and more efficient means of communicating threats to the public.

The National Weather Service in Amarillo has radio transmitters located in Amarillo, Borger, and Miami. Additional transmitters in Perryton, Guymon and Childress are expected to come online in the next year.

Amarillo National Weather Service Supports Amarillo's Polk Street Block Party

By Steve Drillette, Warning Coordination Meteorologist

The WFO Amarillo served as the official rainfall and weather observer at the annual Polk Street Block Party in Amarillo on August 19, 2006. The Block Party is the primary fundraiser for Amarillo's "Center City" organization. Approximately 10,000 people attended this year's event.

The Amarillo NWS was responsible for measuring the official rainfall during the event. The fundraiser was insured against rainfall totals that met or exceeded 0.25 inch during the event. Fortunately, the rain held off and only 0.01 inch of rain was recorded (which occurred after 1100 pm). The NWS also briefed officials and partygoers on the current and expected weather conditions throughout the evening.

The Polk Street Block Party is a community-wide multicultural festival. The once-thriving and rapidly-emerging Polk Street, in the heart of downtown Amarillo, is transformed into a musical theme park. Six city blocks are closed to traffic to create a party space for a large venue of things to see and do. The Block Party was initially conceived as a way of bringing more public exposure to the downtown area, while hosting a fundraiser that is accessible and affordable to everyone in Amarillo.

Interested in becoming an Amarillo NWS Severe Storm Spotter?

Join TOPSCAN!

TOPSCAN (Texas & Oklahoma Panhandle Skywarn Cellular Area Network) is comprised of trained volunteers, who utilize the cellular phone network to provide timely reports during severe weather.

For more information contact: James Mullins, Club President 806-341-0033 or 806-570-6219 james.mullins@cox.net

Amateur Radio Operator Receives National Weather Service Special Service Award

By Steve Drillette, Warning Coordination Meteorologist

In a surprise presentation, WFO Amarillo presented Mrs. Juannah Brice with a Special Service Award for her many years of voluntary service as a HAMS Skywarn spotter and dispatch operator. The presentation took place on Thursday, August 10th in the Commons Area at Highland Park High School as the HPISD staff looked on.

Mrs. Brice is a longtime member of the Potter/Randall Counties Amateur Radio Emergency Services organization. These amateur radio operators, also known as HAMS, serve as severe storm spotters and radio information to a base relay station at the Amarillo NWS. Mrs. Brice, who is also a science teacher at Highland Park High School, has served as the primary HAMS dispatch operator at the Amarillo NWS office since 1999. When severe weather threatens the Texas and Oklahoma Panhandles, the Amarillo NWS contacts Mrs. Brice to activate the HAMS Skywarn spotters. On many occasions, Mrs. Brice must leave her teaching job early in order to serve as the HAMS dispatch operator at the Amarillo NWS. "An excellent situation for us," said NWS Warning Coordination Meteorologist Steve Drillette. "With Highland Park only a couple of miles down the road, Juannah can be here in minutes." Meteorologist-In-Charge Jose Garcia also credits the Highland Park Administration. "We really appreciate the administration and staff at Highland Park. We realize how difficult it can be to find someone to fill in for Juannah when she is called on by us. They are to be commended for their cooperation in this critical and potentially life-saving service."

Mr. Vernon Alexander, the immediate-past President of the Potter & Randall Counties Amateur Radio Emergency Services (HAMS) Organization, also attended the ceremony. Mr. Alexander also praised Mrs. Brice and Highland Park school officials for their sacrifice and dedication in making the Texas and Oklahoma Panhandles a safer place.

Fig. 12. Steve Drillette (left) and Vernon Alexander (right) pose with Juannah Brice.

In YOUR Community...

The National Weather Service in Amarillo has participated in numerous outreach events since our last Dryline issued in June 2006. We would love to participate in an event ***In YOUR Community***!! To schedule the NWS in your next community event, please email Steve Drillette at steve.drillette@noaa.gov , or call 806-335-1121.

June 17	Business Expo Pampa, TX	Amarillo NWS Staff participated in the Pampa Chamber of Commerce Business Expo. See Photo Gallery section.
June 18 – 24	Lightning Awareness Week Texas & Oklahoma Panhandles	Amarillo NWS visited area swimming pools in Amarillo and Panhandle each day to promote lightning safety.
June 23	KGNC-AM Amarillo, TX	WCM Steve Drillette was the guest on KGNC's "Let me Speak to the Realtor program.
June 27	Boy Scouts Amarillo, TX	Two boy scouts toured the NWS office as part of earning their "Citizenship in Nation" merit badge.
June 27	Sanborn Elementary Amarillo, TX	18 elementary students and teachers toured the NWS office.
June 28	Amarillo College Amarillo, TX	14 students from Amarillo College toured the NWS office.
June 28	City Hall Perryton, TX	Science & Operations Officer Rich Wynne presented two lightning safety programs to city officials and personnel.
July 15	North Texas Soccer Association Dallas, TX	MIC Jose Garcia presented a weather and lightning safety program to 100 attendees at the NTSA annual meeting.
July 17	Panhandle Ind. Living Center Amarillo, TX	WCM Steve Drillette presented a weather program for 33 disabled students and their sponsors.
July 24	Wayland Baptist University Hereford, TX	16 students in the Introductory Meteorology Class toured the Amarillo NWS.
Aug 8-9	Panhandle Regional Planning Commission - Amarillo, TX	NWS Amarillo participated in a Texas Panhandle regional emergency exercise.
Aug 12	Storm Spotter Appreciation Day NWS Amarillo, TX	A complimentary meal and door prizes were provided to Amarillo NWS Storm Spotters, Cooperative Observers and other partners and volunteers of the Amarillo NWS.
Aug 19	Polk Street Block Party Amarillo, TX	The Amarillo NWS served as the official rainfall and weather observer at the annual Polk Street Block Party.

Gabe Morgan — August 2006 Employee of the Month

Gabe is a student volunteer who assisted us in our audiovisual transition and helped us expand our climatology research. He attends Bible Heritage School. Gabe is considering a future in meteorology and is interested in attending Texas A&M University.

NWS Amarillo Photo Gallery

Vernon Alexander Recognized

Meteorologist-In-Charge Jose Garcia and Warning Coordination Meteorologist Steve Drillette presented Vernon Alexander with a Special Service Award at a dinner in his honor on June 13, 2006. Vernon recently retired from his position as the District 1 Emergency Coordinator for the Potter/Randall Counties Amateur Radio Emergency Services organization. Vernon has been a loyal Amateur Radio (HAMS) Skywarn spotter for the Amarillo National Weather Service since the mid 1980's. Despite his retirement, Vernon pledged to continue to assist in serving as a HAMS Skywarn spotter for the NWS.

Pampa Business Expo

Warning Coordination Meteorologist Steve Drillette and his son Josh staffed a booth at the annual Pampa Business Expo on Saturday, June 17, 2006. More than 250 local residents visited the NWS booth.

Conlen Observer Reaches 10-Year Mark

Tabatha Tripp presented Mr. Elliott Crabtree with his 10-Year Length of Service award. Mr. Elliott is the Cooperative Observer in Conlen, Texas.

The Dryline 1900 English Road, Amarillo, TX 79108
www.srh.noaa.gov/ama 806.335.1121

•José Garcia—*Publisher and Meteorologist-In-Charge*

•Roland Nuñez—*Editor-in-Chief*
•Matthew Kramar—*Editor*
•Angela Margrave—*Administrative Assistant*
•Richard Wynne—*Science and Operations Officer*
•Steve Drillette—*Warning Coordination Meteorologist*