



THE TEXAS THUNDERBOLT

NATIONAL WEATHER SERVICE -- FORT WORTH, TX
SERVING ALL OF NORTH TEXAS
WWW.WEATHER.GOV/FORTWORTH

SUMMER 2009

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NWS Fort Worth Leadership Team

Meteorologist-In-Charge
Bill Bunting

Science and Operations
Officer
Greg Patrick

Warning Coordination
Meteorologist
Mark Fox

Contributors:

Dennis Cavanaugh
Tara Dudzik
Nick Hampshire
Alana McCants
Ted Ryan
Jessica Schultz

Editors:

Jessica Schultz
Greg Patrick

Questions? Comments?
sr-fwd.webmaster@noaa.gov

*Background image is
courtesy of Alan Moller.
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Hyperthermia

by Dennis Cavanaugh

Hyperthermia is a heat-related illness that occurs when the amount of heat that a person is exposed to exceeds their ability to cool down, causing a person's core body temperature (CBT) to quickly exceed normal (about 98.6°F) levels. During the summer months, it is natural to step outside and expect near 100 degree heat in North Texas. Most residents of the area are accustomed to the summer heat, and know that if engaging in outdoor activities, you need to drink plenty of fluids and take frequent breaks. Heat exhaustion occurs when a person's CBT is greater than or equal to 104°F, and the life-threatening onset of heat stroke occurs at a CBT greater than or equal to 107°F.

The human body cools itself through perspiration, or sweat, which cools off the body through evaporative cooling (sweat evaporating off the skin) and conduction (sweat rolling off the body, carrying body heat with it). When the relative humidity is high (greater than 35-40% during the summer), this limits the body's ability to cool itself by reducing the speed of evaporation.

In order to factor in the role of higher summertime humidity levels, you'll often hear meteorologists talk about the "heat index", which attempts to measure how hot the environment "feels" based on how efficiently the body can cool itself through perspiration. Your NWS in Fort Worth will issue a heat advisory when the heat index is expected to reach or exceed 105°F on consecutive days, with an overnight low temperature holding in the upper 70s. These conditions have been shown to put unhealthy heat stress on people undertaking normal outdoor activities and those without access to air conditioning.



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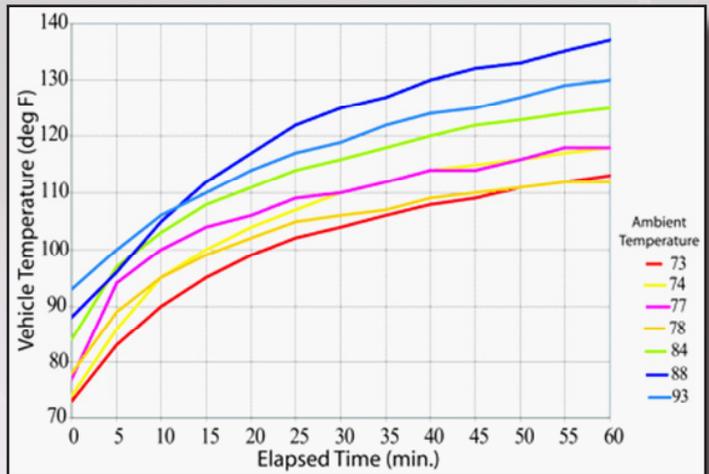
NWS Fort Worth bids farewell to Warning
Coordination Meteorologist, Gary Woodall.
See page 3 for details!

Hyperthermia Continued

During the summer months, every driver reading this article has inevitably gotten into his or her car after being parked outside and noticed the blast furnace type heat. Have you ever wondered how hot that air is? What would happen to someone left inside that car for a lengthy period of time?

Jan Null, among other researchers, has been trying to raise awareness on hyperthermia deaths in children due to parents leaving them inside a car during the heat of the day. Some of her research can be viewed online at <http://www.pediatrics.org/cgi/content/full/116/1/e109>.

Research has shown that the average temperature increase inside a vehicle, even with the windows cracked open a few inches, is over 30°F in only 30 minutes. These tests were conducted inside vehicles in indirect sunlight, so direct sunlight can cause this increase in temperature in as little as 15 minutes. In fact, with outdoor temperatures of about 98°F, readings inside vehicles in direct sunlight were found to increase up to 124 to 153°F in 15 minutes.



Above:
From McLaren et al, 2005. Web reference included within the text of this article. This graphic shows the increase of temperature with time inside a vehicle not in direct sunlight for different outdoor temperatures. As you can see, even when the outdoor temperature is in the 70s, the temperature inside a vehicle easily exceeds 110 °F.

When confronted by the heat inside a vehicle, adults are able to turn on the air conditioner, roll down the windows, or even leave the car for a short period of time. Children, especially young ones, do not typically have those abilities. For ethical and safety reasons, research has not been able to test the effects of extreme heat on young children. However, research has shown that in general, children respond to environmental temperatures 3 to 5 times faster than adults. This is in part to children being physically less able to self-regulate their body temperatures.

It is NEVER safe to leave a child in a car for any amount of time, especially during the summer months. Null and her colleagues tested several other variables including different colored cars, leaving the windows cracked open, and having the car air conditioned before being parked. Research found that none of these variables affected the final temperature inside the car after 30 minutes.

Null reports that since 1998, an average of 38 hyperthermia deaths have occurred in children in the United States yearly. Many times, the child is unknowingly left in the car for a period of time. The Null research shows that it can only take 15 minutes for the inside of an automobile to heat up to dangerous or lethal levels.

It is critical that parents never leave their children in a car, even to run a quick errand. If you're out and about, it may also be prudent to check the backseat, just to make sure you're alone, before heading away from your vehicle this summer.



We say Farewell to Gary Woodall, NWS Fort Worth Warning Coordination Meteorologist

In July, staff of NWS Fort Worth said farewell to WCM Gary Woodall. Gary headed for the National Weather Service office in Phoenix, AZ where he will serve as Meteorologist-In-Charge.

Gary is a graduate of Florida State University and the University of Oklahoma. Until his recent move to Phoenix, he spent his entire NWS career in Texas. Gary began as a Meteorologist Intern at the NWS in Midland before becoming the Warning Preparedness Meteorologist at the NWS in Lubbock in the early '90s.

In 1993, Gary moved to our Southern Region Headquarters office in downtown Fort Worth. For 7 years he served as the Regional Warning Coordination and External Affairs Meteorologist. He joined WFO Fort Worth as WCM in July 2000.

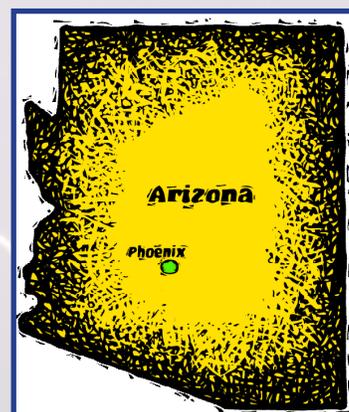
Gary was a critical asset for NWS Fort Worth in fostering relationships with local emergency management personnel, local/state/federal agencies, spotter and amateur radio networks, local media, and the general public. He led our office's outreach program and presented hundreds of spotter training programs across North Texas over the years.

Gary's family, friends, colleagues, and emergency management and media partners joined at a local Fort Worth restaurant in mid July to send him best wishes in his new endeavors in Phoenix.

We will miss Gary and wish him the best of luck in Phoenix!



*Above:
NWS Fort Worth WCM, Gary Woodall.*



*Below:
NWS Fort Worth forecaster Jason Dunn
presents Gary with several gifts from the
NWS staff.*



DR. WEATHER'S WISDOM



MICROBURSTS

BY TED RYAN

The microburst is a common culprit of damaging winds during the summer months over North Texas. A microburst is a localized, rapidly sinking column of air that causes strong and sometimes damaging winds at the surface. Very intense microbursts have been known to produce winds over 100 mph with damage equal to that of a weak tornado.

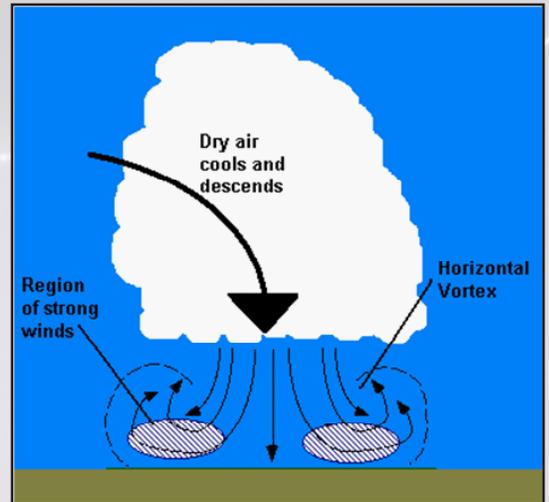
Microbursts can occur with showers or thunderstorms that otherwise may not be particularly intense, at times producing little to no hail, lightning, or even rainfall.

Microbursts require atmospheric instability, which means extreme differences in temperatures at various heights aloft. This instability can cause violent vertical movements of air as colder, heavier air sinks and warmer, lighter air rises.

The lifecycle of a microburst begins in the middle levels of a shower or thunderstorm when dry air enters the cloud (see top image to right). Cloud droplets and raindrops begin to evaporate when they encounter this dry air, which causes the temperature of the air to cool very rapidly. This colder pocket of air begins to fall toward the ground since it is denser and weighs more than the surrounding air. Upon reaching the surface, the pocket of air spreads out in all directions. A horizontal vortex, or sideways spinning column of air, develops just above the ground and results in an acceleration of winds at the surface.

Visually, storm spotters can identify that a wet microburst is occurring by the presence of a "rain foot", or an area of rain that spreads out horizontally above the surface.

The middle image to the right is a time series of a microburst with a well-defined horizontal vortex (NOAA photo). The bottom right photo depicts a rain foot, captured by Al Moller.



Mark your Calendars!

Spotter training classes begin in January. Check our website in November for the latest schedule!
www.weather.gov/fortworth

Ominous Clouds

by Tara Dudzik

The ominous, bumpy clouds pictured to the right are commonly mistaken as a precursor for severe weather. However, it is actually quite the opposite. Mammatus clouds, the meteorological name for these pouch-like clouds, usually form after the strongest part of a severe thunderstorm has moved through the area. Mammatus clouds are formed by sinking air, rather than rising air. When a storm weakens or moves away, the cool, saturated air sinks and forms these “udder-like” clouds. These clouds are important to pilots, however, as they can indicate areas of atmospheric turbulence.



Above:
Mammatus clouds over Fort Worth in July 2009.
Photo by Tara Dudzik.

Did you Know?

by Nick Hampshire

The month of June was especially hot across the region. DFW Airport recorded five 100 degree days for the month, with 103 being the hottest reading. June was 2.9 degrees above normal.

One might think June was a hot month at DFW, but Waco was hotter! There were 14 100 degree days, with 106 as the hottest at the Waco Airport. June was 4.4 degrees above normal for Waco.

Waco is only 90 miles from DFW, so why was there such a difference in temperature?

The answer in this case is likely related to the differences in soil moisture, which is the quantity of water held in the soil. This moisture plays an important role with afternoon temperatures. Moist soil will not heat up as efficiently as dry soil. When the soil is moist, part of the sun's energy is spent evaporating the water, which inhibits the ground from warming. When the soil is dry, more of the sun's energy is available to heat the ground and thereby the surrounding air.

Areas of the DFW Metro received up to 8 inches of rain on June 10th and 11th, while Waco received nothing but sunshine. On June 13th, the next sunny day, DFW only topped out at 96 degrees. Meanwhile, Waco reached 101 on the 13th. This was the first 100+ degree day of the 2009 summer for Waco. There were 7 more days of 100 degrees or higher reported at Waco before DFW had the first of the season on June 23rd. Waco experienced a span from May 28th to June 29th with no measurable rainfall, keeping soils dry and temperatures hot.



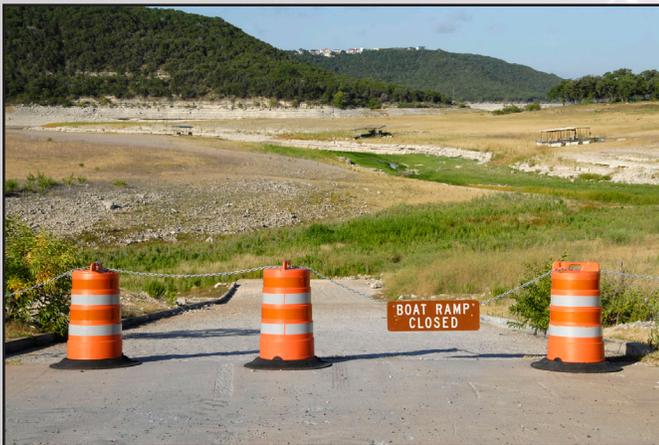
Drought Corner

by Alana McCants, West Gulf RFC

The infamous drought continues to plague areas of Texas, especially in central and southern portions of the state. Over the past few months, a strong mid and upper level ridge of high pressure remained in control of the weather across our region. Essentially, the lack of any significant rainfall and scorching hot temperatures added to the extended misery of the drought. During the month of June, average temperatures across the state ranged between 90-100 degrees.

Drought conditions across North Texas temporarily improved over the past few months, thanks in part to adequate spring rainfall over the area. Recent rainfall amounts of 2 to 3 inches over Hamilton and Leon counties in North Texas (within a 24 hour period) provided a short-term benefit. Drought conditions are returning to North Texas, however nearly every lake remains above at least 80% conservation, with most above 90%.

May and June were among the driest on record in portions of central Texas, which has experienced uninterrupted drought conditions since May 2008. Also, severe to exceptional drought conditions continue across portions of the eastern Hill Country, central Texas, and the middle Texas coast. The city of Victoria enacted a mandatory water restriction due to the drought conditions and low flows on the Guadalupe River. Furthermore, several media outlets in and around the Austin area are extremely concerned about the drought's effects on the source of drinking water. Currently, the lake at Mansfield Dam is just above the minimal level, and recently the lake has been losing about two feet of water per week. According to the Lower Colorado River Authority's website, "if Mansfield Dam drops below 640ft, the boat launch will completely close, therefore leading to a closing of all boat launches at Lake Travis."



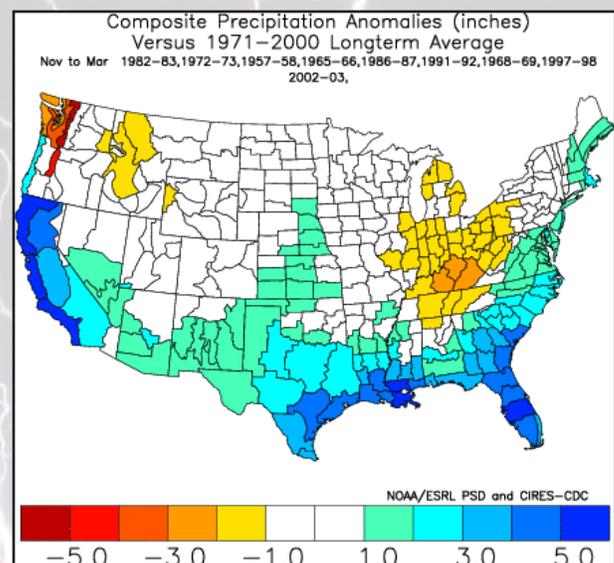
Above:
Boat ramp closed at Cypress Creek Park near Lake Travis on July 15, 2009.

**In the next Texas Thunderbolt:
Meet our new Warning Coordination
Meteorologist, Mark Fox**

**Weather on the Web: 24/7
www.weather.gov/fortworth**

So what is the drought outlook for the coming months???

There are some indications that El Niño conditions might bring some relief to the Lone Star State soon. Current analysis indicates the development of El Niño conditions across the equatorial Pacific Ocean, which are forecast to strengthen and last through the winter. This means that portions of Texas may finally experience above normal rainfall and below normal temperatures.



Above:
Precipitation Anomalies during El Niño years. The blue colors indicate higher precip amounts associated with El Niño events. Note the increase in precip along the Gulf Coast.