Flood Alley Flash

Inside This Issue:

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No Business Like Snow Business!

Downtown Fredericksburg on the morning of February 23rd, 2010 .
Photo courtesy of Wallace Britton, Fredericksburg Fire Marshall.

After a record-breaking hot summer across South Central Texas, cold and wet weather settled in for winter. Several cold fronts during the autumn season helped cool the region before stronger cold fronts arrived December through February. The first snow came December 4th, when flurries and trace amounts of snow fell across the Hill Country and even the

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Snow Business, continued from page 1

BY: MARIANNE SUTTON

Snowstorms can't stop this dedicated Round Rock Police Officer from doing his job. Photo courtesy of Lieutenant Richard Johnson, Round Rock Police Department

Austin metro area. More wintery weather and snow events occurred through December and January, but the most notable was the morning and early afternoon on February 23rd. Eastern portions of the Hill Country received an average of one to three inches of snow, with as much as over four inches near Georgetown! Sleet was reported further south, which melted quickly. While the last snow amount of over a trace recorded at Austin was only about a year ago (December 9th, 2008), San Antonio has not had snow amounts greater than a trace since the Valentine's Day snow event on February 13th and 14th, 2004.

What caused this winter to be so cold and wet? El Niño and other global-scale patterns combined to send storms further south more frequently and with much colder air. The warm El Niño phase of the El Niño-Southern Oscillation (ENSO) occurs at irregular intervals about every 3 to 5 years, so why was this year different? Also, just how did these other global patterns affect what happened across South Central Texas this winter? Was this winter a record-breaker as far as being cold and wet? What can we expect this summer? These answers and more are discussed in this issue of the *Flood Alley Flash*. For additional information on the El Niño-Southern Oscillation phenomenon itself, please refer to the Fall 2009 issue of the *Flood Alley Flash*, or visit the Climate Prediction Center's website.

A snowman friend constructed on February 23rd by the Round Rock Police Department. Photo courtesy of Lieutenant Richard Johnson, Round Rock Police Department

Spring has Arrived, But is El Niño Here to Stay?

BY: AMANDA FANNING

This past winter had exceptional weather patterns that overwhelmed South Central Texas. The El Niño Southern Oscillation (ENSO) was a factor since it became a moderate-to-strong event. However, these weather events cannot be blamed on ENSO solely. Two oscillations in particular, called the Arctic Oscillation (AO) and the North Atlantic Oscillation (NAO), combined with El Niño to bring the area very cold weather. The Arctic Oscillation fluctuates every few weeks as the Arctic gets colder and warmer, creating what's known as negative and positive oscillations. As it gets colder, storms are

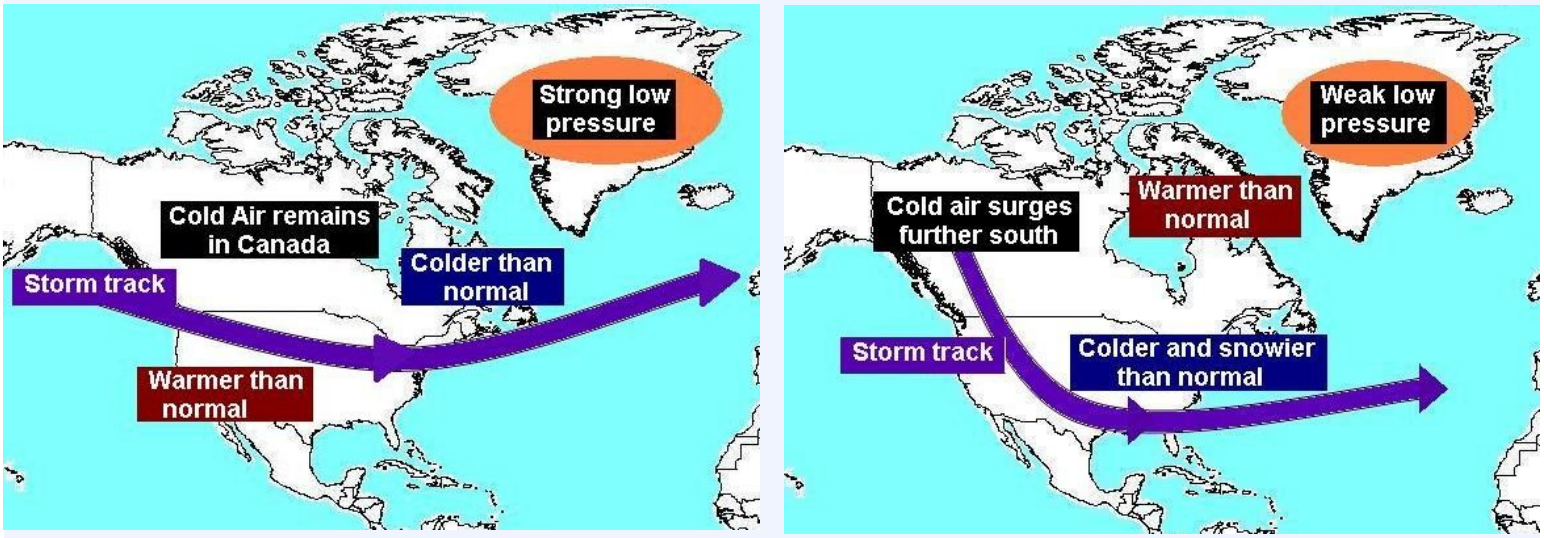

Figure 1. Positive phase (left) and negative phase (right) of the North Atlantic Oscillation

sent further south into the United States. The North Atlantic Oscillation is similar, but oscillates on a monthly basis, and can sometimes stay in one phase for several months at a time. During a negative phase of the NAO, winds begin to weaken in the Atlantic due to both low and high pressure systems over the ocean weakening. As the circulation around the low pressure weakens, this allows colder air to push further south than normal. When these oscillations combined with El Niño this winter, colder weather was able to make its way down into South Central Texas. The combination of El Niño, and the AO becoming very negative at the same time that the NAO stayed negative, was enough to send very cold air and even snow to our area. South Central Texas also experienced several days with below average temperatures and above average rainfall because of these oscillations coming together. For more information about any of these oscillations, visit the Climate Prediction Center's website.

Now that we know why the winter was cold and wet, what can we expect over the next few months? For the spring season, El Niño is predicted to gradually weaken and by the summer it will become neutral. What does this mean for South Central Texas? Even with a weakening ENSO, the region can expect to see above average rainfall and possibly more severe weather events. Springtime is

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known for being the severe weather season in South Central Texas, and with El Niño bringing storms that could become severe, our area could experience anything from flash flooding to tornadoes. During the spring of 1997, a weak to moderate El Niño was affecting the United States. On May 27, 1997 a cold front pushed through South Central Texas and caused a tornado outbreak. These very strong thunderstorms produced the infamous F5 Jarrell tornado which killed 27 people (see Figure 2). It also produced an F3 in Cedar Park which killed 2 people (see Figure 3 for damage), and an F4 in Pedernales Valley which killed 1 person (see Figure 4 for damage). Outbreaks such as these are not common across South Central Texas and the Hill Country, but with the help of El Niño they are possible under the right conditions.

Figure 2. F5 tornado near Jarrell, TX. The darker shadow of a "walking man" indicates that there are additional spin-up tornadoes inside the main tornado.

Figure 4. A vehicle in Pedernales Valley destroyed by the F4 tornado.

Figure 3. Home destroyed in Cedar Park by the F3 tornado. Several people took shelter in a utility closet, shown just to the left of the woman in the picture.

The Climate Prediction Center does predict that El Niño will become neutral just in time for hurricane season. ENSO is normally known for decreasing the number of hurricanes in the Atlantic Ocean; this is why the 2009 hurricane season was very quiet. As ENSO becomes neutral, the 2010 hurricane season is expected to be more active. Visit the Climate Prediction Center's website for more updates on El Niño and the National Hurricane Center's website for updates on the upcoming hurricane season.

Co-op Corral

BY: STEVE SMART

Welcome back! Since our last newsletter, we have had the honor of presenting or delivering length of service (LOS) awards to the following cooperative observers:

Individual Awards

- **October 1, 2009 - Guy Nobles of Yorktown - 25 years**
- **December 1, 2009 - George Bomar of Dripping Springs - 25 years**
- **March 1, 2010 - Al Siebenaler of Kerrville -10 Years**

Additionally, we are proud to announce that Stuart J. Haby of Vanderpool was presented with the coveted and prestigious Thomas Jefferson Award in October, 2009. This is the highest meritorious award the NWS can present to a cooperative observer. Only five or six observers from over 11,000 observers nationwide are selected for this prestigious award each year. Mr. Haby was presented his award at a luncheon event in Kerrville, Texas. From the NWS, many thanks are given to these and all our great cooperative observers for the time, work and effort they give to support the rainfall, climate and spotter networks.

Stuart Haby (left) receives his Thomas Jefferson Award from NWS Austin/San Antonio MIC Joe Arellano. Photo by Steve Smart, Observing Program Leader, NWS Austin/San Antonio.

Mark Your Calendar!

Upcoming Safety Awareness

May 3-7 -- Air Quality Awareness Week
May 23-29 -- Hurricane Preparedness Week
June 20-26 -- Lightning Safety Awareness Week

SKYWARN:

May:

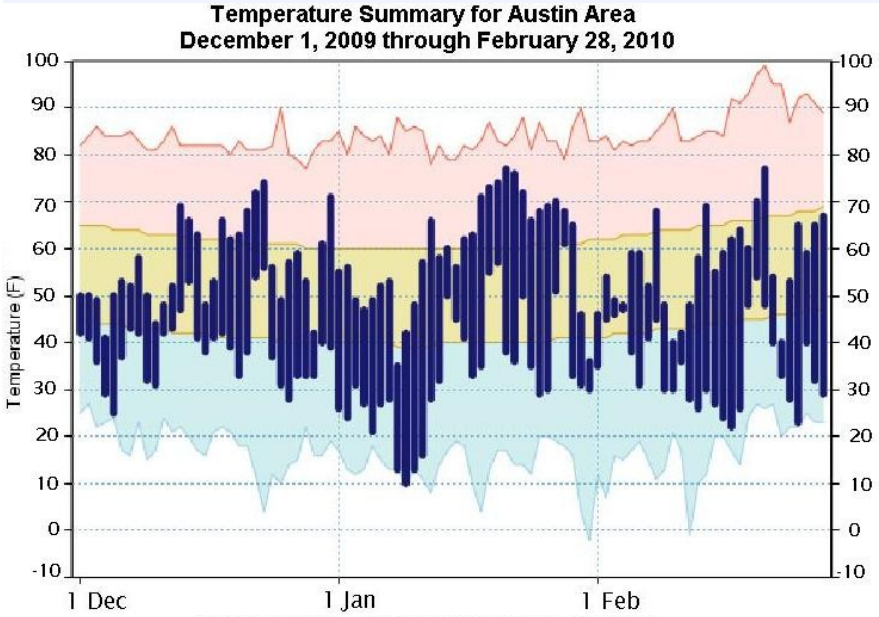
10th - Schertz, Guadalupe County
11th - Giddings, Lee County
13th - Lexington, Lee County
26th - Hutto, Williamson County
27th - Pleasanton, Atascosa County

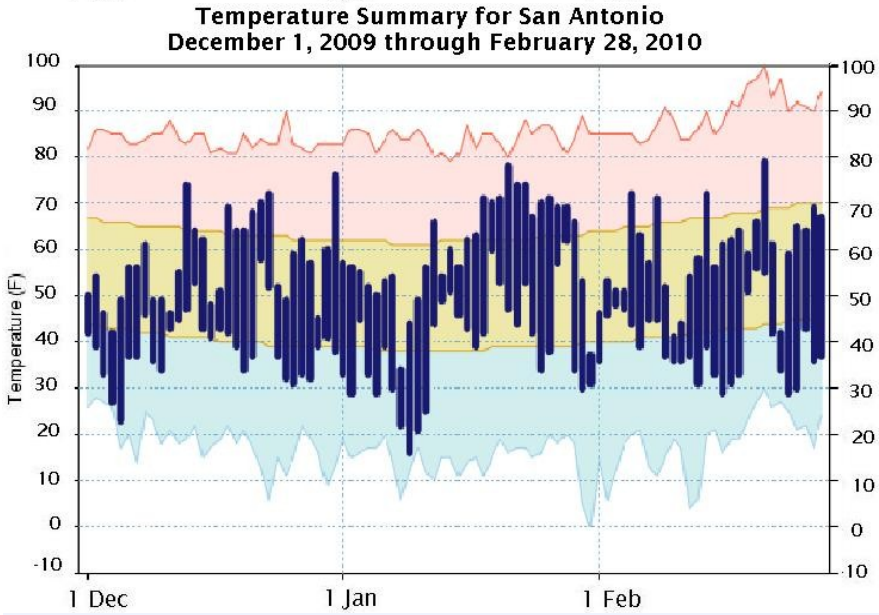
For additional information and a current list of training dates, please visit our **SKYWARN website**.

Climate Review: Winter 2009-2010

By: Robert Blaha

After the warmest summer (from June to August) of record in 2009, cooler and wetter than usual conditions came in September and October. November was mild for much of the month until November 30th, when much cooler weather came. The trend of cooler than normal conditions persisted from December 2009 through February 2010. Some large scale synoptic features that made the winter colder for South Central Texas was the strong El Niño, and the most negative North Atlantic Oscillation (NAO) since 1950. When the NAO is negative, cold air outbreaks are more common across the Eastern U.S. and Texas. The winter season from December 2009 to February 2010 was the coldest for South Central Texas and the Hill Country since the winters of 1976/1977, 1977/1978, 1978/1979, and 1983/1984.





Temperature profiles from December1, 2009-February 28, 2010. Observed high and low temperatures are connected by the dark blue bar. Area between normal high and low represented by the tan shading. Red line connects daily record high temperatures. Light blue line connects daily low record temperatures.

The average temperature from December 2009 through February 2010 was a tie for the 4th coldest at Del Rio; the 7th coldest at San Antonio; and a tie for the 8th coldest at Austin Mabry. The average for the state of Texas this winter season was the 5th coldest on record since 1895, and the coldest since 1978/1979.

The overall averages did not capture the complete scope on how cool the winter was. The charts to the left and records show that the cool weather in the winter of 2009/2010 was much more consistent than usual, with only short warming trends. The frequent cold fronts with limited warming trends in between coupled with more clouds in the day from active weather systems, and higher soil moisture all contributed to more consistent cool temperatures from day to day and month to month.

The winter of 2009/2010 was the first winter since 1885 at San Antonio where the average monthly temperature for December, January and February all stayed below 50 degrees. At Austin Mabry, the averages also stayed below 50; however, this has happened in other winters at Austin. At Del Rio, the average monthly temperature was

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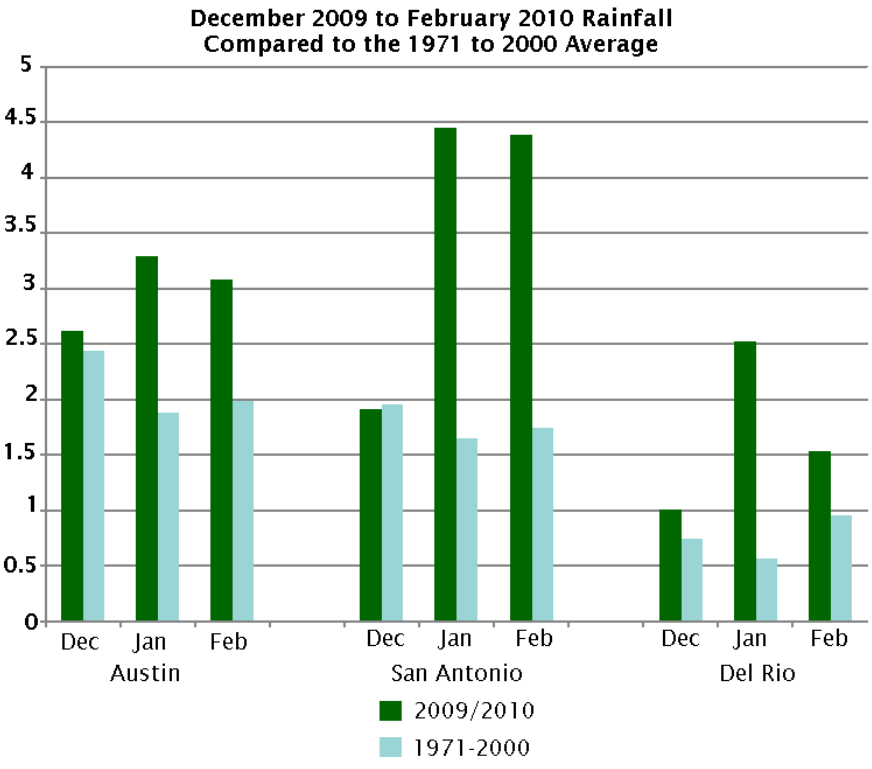
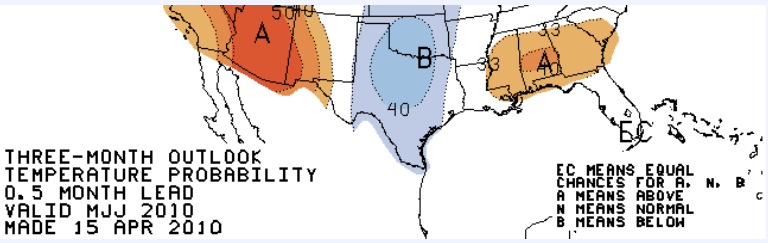


below 50 in December and January, but slightly above 50 in February. On average, this past winter had average temperatures well below the 1971-2000 normal.

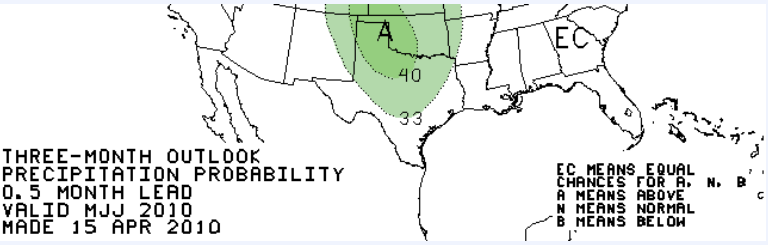
Frequent widespread rains came in the winter of 2009/2010. The biggest rain events came on January 14th to 16th, February 3rd, and February 11th. The winter of 2009/2010 was the 8th wettest at Del Rio since December 1905; the 8th wettest at San Antonio since 1871; and a tie for the 40th wettest at Austin Mabry since 1856, with December 1945 to February 1946. Several winter precipitation events came from early December to February. The most extensive of these events came February 23rd, when snow fell from the Hill Country to adjacent parts of Central Texas, with reports of sleet and trace amounts of snow from Del Rio to San Antonio to Yoakum. The most snow measured across South Central Texas and the Hill Country on February 23rd was 2 to near 4 inches across Williamson County.

Want even more information? We have a wealth of climate information such as observed weather, El Niño resources, normals and extremes, and much more. To get started, please visit our **Climate website**.

Climate Outlook



Three-month temperature outlook for May through July



Three-month precipitation outlook for April through June

The Climate Prediction Center (CPC) issues seasonal outlook maps of the probability of departures from normal temperature and precipitation, each of which covers a period of 3 adjacent calendar months. These three-month outlooks are updated by **CPC** on the third Thursday of each month.

The latest climate outlook from the CPC indicates higher chances for below normal temperatures through July. The precipitation outlook shows a slightly higher chance for above normal precipitation across the Hill Country, and equal chances for above, below, and near-normal rainfall across the rest of South Central Texas through July. Click on either picture for a U.S. scale view, or visit the **CPC website**.

Test Your Weather Knowledge!

BY: DAVID SCHUMACHER

1. The National Weather Service releases weather balloons at various locations around the United States twice each day. Are these NWS weather balloons recycled? Yes, or No?

2.Are the following definitions true, or false?

Tornado Watch -- Conditions are favorable for the development of severe thunderstorms that can produce tornadoes, be prepared to take cover.

Tornado Warning -- a tornado has formed and may be imminent, take cover now!

3. Which of the following is the least amount of measurable precipitation?
a. 0.005 b. 0.01 c. 0.05 d. trace

4. The name of the instrument that measures relative humidity is a ?
a. humidor b. dewmometer. c . hygrometer. d. barometer

5. In what city and country was the hottest all-time temperature of 136 F (57.8 C) degrees recorded?
a. Death Valley CA, USA. b. El Azizia, Libya. c. Riyadh, Saudi Arabia d. Addis Ababa, Ethiopia

6. True or False? When outdoors and you hear thunder, you should immediately seek shelter in building or a car.

Answers:

1. Answer: Yes, while the balloon itself tears, the attached sensing equipment is reusable. About 20-25 percent are returned by the public free through the U.S. mail, then reconditioned, and reused.

2. Answer: True.

3. Answer: b. 0.01

4. Answer: c. hygrometer

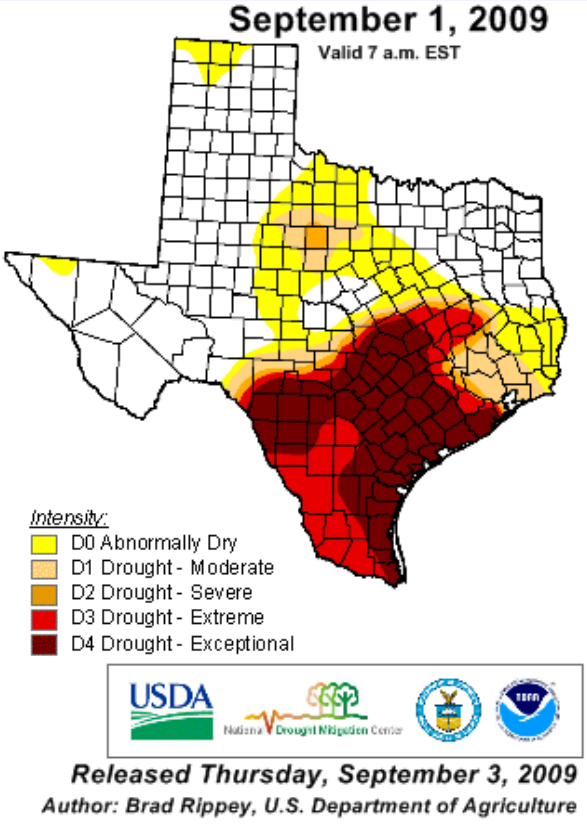
5. Answer: El Azizia, Libya on September 13th, 1922. Death Valley is a close second at 134 degrees.

6. Answer: True, *"When thunder roars, go indoors!"* On average, lightning kills about 58 people in the U.S. each year (based on the last 30 years). If you seek shelter in car, the windows should be rolled up and the car should not be a convertible.

Historic Drought Finally Ends

BY: BOB FOGARTY

It started quite suddenly. In the fall of 2007, after eight months of above normal rainfall, the clouds simply dried up. From January through August 2007, San Antonio measured nearly 45 inches of rain, when we would normally expect around 22 inches. Then from September through the end of the year, a mere 2.64 inches of rain fell when the normal is about 11 inches. We went from double the amount of rain to one third. The culprit appears to be La Niña, which according to the National Weather Service's Climate Prediction Center began in September 2007 and lasted until about June 2008. We then went into what we call neutral conditions for the rest of 2008 through the first five months of 2009. Even though El Niño returned in June 2009, precipitation across South Central Texas remained below normal through the summer of that year. From September 2007 through August 2009, San Antonio received about 25 inches of rain. That's a two year period when the normal rainfall is around 66 inches. Said another way, we had less than half of the expected rain for two years. During that time there were only three months with above normal rainfall.



Drought monitor from September 3, 2009. Nearly 20% of the state was in the worst category, D4, all of which was across South Central and South Texas.

This drought was of historic proportions. In a report from the Office of the Texas State Climatologist by John Nielsen-Gammon and Brent McRoberts, "We find that, compared to historical droughts of the 20th and 21st centuries, the 2007-09 Texas Drought is probably the most severe drought on record from a precipitation standpoint alone in Bastrop, Caldwell, and Lee counties." Robert Blaha, Climatology Focal Point in our office, reported that for San Antonio, the 24 month period ending in August 2009 was the driest on record dating back to 1885, and was the 3rd driest at Austin Camp Mabry, where records date back to 1856.

Among the effects of the drought was the draining of area reservoirs. In August 2009, the level of Lake Travis was 636.25 feet. This was the 3rd lowest level on record and only about 22 feet higher than the record low of 614.2 feet set in 1954. In September 2009, Canyon Lake was at 892.7 feet breaking the 1984 record low of 899.7 feet.

Another major problem caused by the drought was the impact on agriculture. The Texas AgriLife Extension Service reported in July 2009 that crop and livestock losses were $3.6 billion across the state in that year.

In February 2010, Prof. Nielson-Gammon declared the end of the drought after six months of above normal rainfall. From September 2009 through February 2010, San Antonio received nearly 32 inches of rain, which is about the normal yearly rainfall amount. South Central Texas tends to have wetter than normal fall and winter seasons during El Niño events and luckily, this year followed that trend.

It's That Time Of Year--Hurricane Season!

BY: ORLANDO BERMÚDEZ

Every year, the Atlantic Hurricane Season officially begins on June 1st and ends on November 30th. Last year, the tropical season was quiet with below normal conditions. A typical Atlantic tropical cyclone season averages about 10 named storms--6 of which become hurricanes, and 3 of those becoming major hurricanes (111 mph or greater sustained winds). During the tropical season of 2009, only nine named storms, three hurricanes and two major hurricanes formed. So, what happened?

Weather conditions constantly change every minute, hour, day…and the list goes on. However, there are climatological features such as the ENSO (El Niño-Southern Oscillation) that play a big role on cyclone generation across the globe. ENSO is a climate pattern that occurs across the tropical Pacific Ocean on average every three to five years, but it affects the entire Northern Hemisphere. El Niño and La Niña represent opposite extremes in the ENSO cycle. El Niño refers to the above-average sea-surface temperatures that periodically develop across the east-central equatorial Pacific. It represents the warm phase of the ENSO cycle, and is sometimes referred to as a Pacific warm episode. When this occurs, the tropical Atlantic Hurricane season sees less tropical cyclone formation due to stronger winds aloft, which limits thunderstorm activity and cyclogenesis.

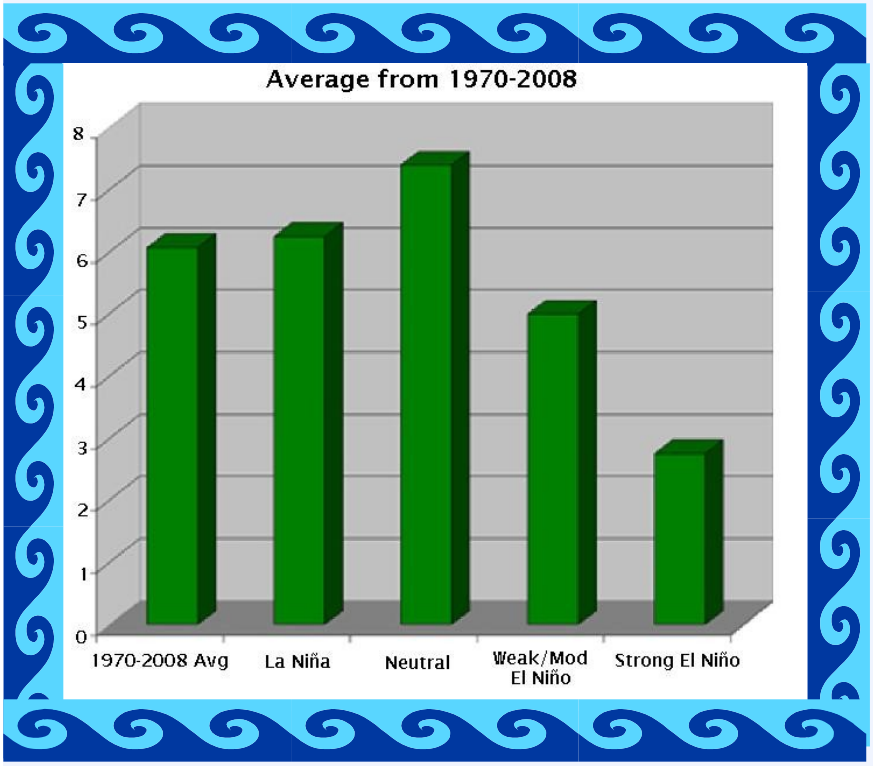


Fig. 1 shows the occurrences of hurricanes across the Atlantic basin from 1970 to 2008. The neutral phase of ENSO is the most active for named storms.

La Niña refers to the periodic cooling of sea-surface temperatures across the east-central equatorial Pacific. It represents the cold phase of the ENSO cycle, and is sometimes referred to as a Pacific cold episode. This feature creates weaker winds aloft, inducing thunderstorm development and tropical cyclone formation. Since the summer of 2009, a moderate to strong El Niño episode has prevailed across the tropical Pacific Ocean, which in turn helped last year's tropical Atlantic Hurricane season to be less active. So, what is in store for this year? ENSO experts and researchers believe that El Niño will phase out during the summer, which will translate to weak or neutral conditions.

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Since we are expecting a weaker El Nino or neutral conditions for the 2010 hurricane season, now is the time to update your family hurricane preparedness plan before hurricane season begins. The following is a list of suggested activities that the National Weather Service encourages you to do:

- Discuss the type of hazards that could affect your family. For example: flooding, high winds.
- Locate a safe room or the safest areas in your home for each hurricane hazard. In certain circumstances the safest areas may not be your home itself, but within your community. Therefore, know you local shelter localities.
- Determine escape routes from your home and places to meet. Draw a local map, make copies for the family members and do not forget to include local low water crossings on it, as they will likely become impassible.
- Have an out-of-state friend as a family contact, so all your family members have a single point of contact.
- Make a plan now for what to do with your pets if you need to evacuate.
- Post emergency telephone numbers by your home phone or record them in your cell phone and make sure your children know how and when to call 911.
- Check your insurance coverage; flooding may not be covered.
- Stock non-perishable emergency supplies such as canned food and a hand-powered can opener, as well as a Disaster Supply Kit.

For more information and tips, please click the following link: Hurricane Preparedness: Be Prepared.

Get Cuckoo for CoCoRaHS!

CoCoRaHS stands for Community Collaborative Rain, Hail & Snow network. It is a grassroots network of volunteer weather observers who measure rain, hail, and snow. Volunteers input their 24-hour rainfall total each day on the CoCoRaHS website. These reports are plotted on a map, and are then used by a variety of individuals and groups, such as farmers, teachers, engineers, and of course, your National Weather Service. An archive is also kept on the CoCoRaHS website, so you can access past rainfall information.

Our region currently has nearly 1,100 CoCoRaHS observers, but we still need more! Other than the cost of the rain gauge, it is free to join. The information collected is very important to us, especially during heavy rain events. Anyone of any age can become a CoCoRaHS observer-all it requires is a desire to observe and report weather observations. For more information, please visit our **CoCoRaHS website**, "because every drop counts!"

A Constitution for Personal Flood Safety
Part Three

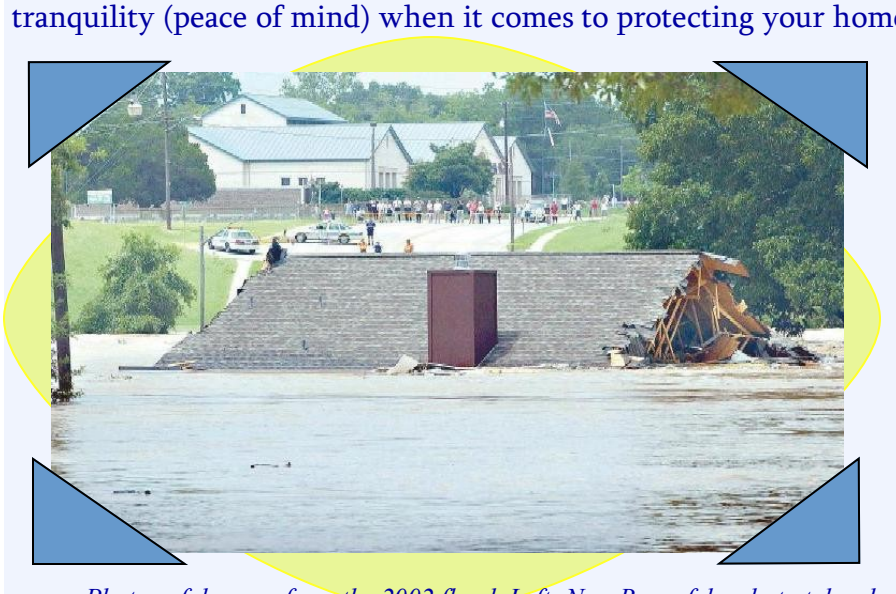
BY: JON ZEITLER

The largest financial asset for most people is their home. Many also have an emotional tie to their home and neighborhood; so protecting the ability to repair or replace one's home is important - in a play on the U.S. Constitution's words: ensuring domestic tranquility. The irony is that most homeowners' insurance policies do not cover flood damage. Too often, homeowners find this out only after they have been flooded. Fortunately, supplemental, low-cost flood insurance is available, and it's one of the best deals around.

Flood insurance is available from the National Flood Insurance Program (NFIP). This program is administered by the Federal Government, but is available through regular insurance agents. The insurance is very reasonably priced and covers flood damage to the home structure and contents. How reasonably priced? Coverage for a $150,000 home and $60,000 of contents is only $296 per year for a home without a basement in low to moderate flood risk areas. The table at right shows the cost for various amounts of coverage for owners and renters - for homes outside the 100-year flood plain. The edge of the 100-year flood plain has a one percent chance per year, or 30 percent chance over a standard 30-year mortgage, of being flooded. More than 25 percent of NFIP claims have come from structures in these low-risk areas outside identified flood plains - meaning those claimants received a substantial benefit for a small cost. The one-stop shop for more information on flood insurance and the NFIP is www.floodsmart.gov, or by contacting a local insurance agent.

Building & Contents			Contents Only[1,4]		
Coverage	Annual Premium[2,3]		Coverage	Annual Premium[2]	
	Without Basement or Enclosure	With Basement or Enclosure		Contents Above Ground (more than one floor)	All Other Locations (basement only not eligible)
$20,000/$8,000	$119	$144	$8,000	$39	$58
$30,000/$12,000	$148	$173	$12,000	$53	$80
$50,000/$20,000	$196	$221	$20,000	$81	$113
$75,000/$30,000	$230	$260	$30,000	$93	$130
$100,000/$40,000	$257	$287	$40,000	$105	$147
$125,000/$50,000	$277	$307	$50,000	$117	$164
$150,000/$60,000	$296	$326	$60,000	$129	$181
$200,000/$80,000	$326	$361	$80,000	$153	$201
$250,000/$100,000	$348	$388	$100,000	$177	$221

The next installment in the series will cover ways to make your home flood resistant. Those preparations will help prevent or limit flood losses, but in the meantime consider flood insurance as the best way to domestic tranquility (peace of mind) when it comes to protecting your home from flooding.



Photos of damage from the 2002 flood. Left: New Braunfels, photo taken by Tom Reel. Right: Concan, photo by William Luther.