Flood Alley Flash

VOLUME 4, ISSUE 1 WINTER 2011

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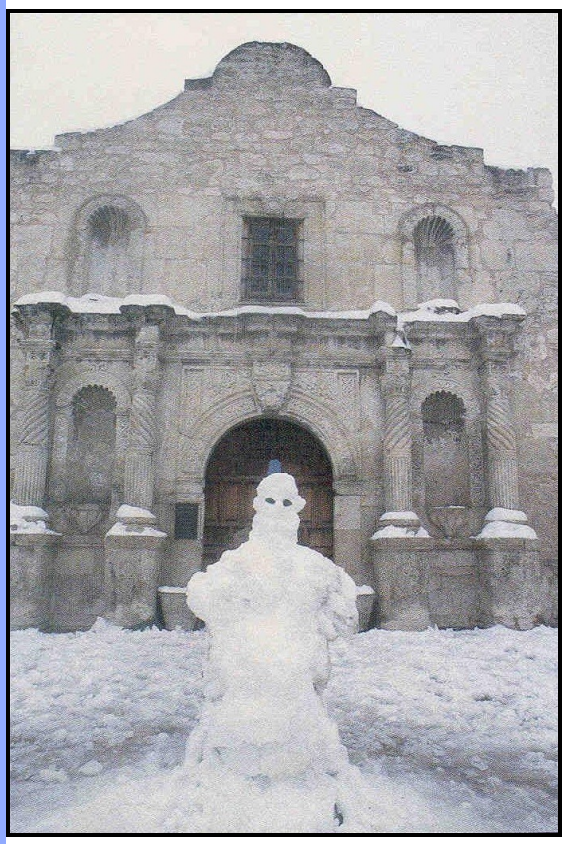
La Niña Winters; Always Warm and Dry?



The Alamo was blanketed in snow after a major event brought over a foot of snow to the city January 11-13, 1985. The winter of 1984-1985 was during a La Niña period.

A chaotic and complex variety of atmospheric phenomena combine to create unique winter weather patterns from year to year across South Central Texas. These events determine not only the duration of warm, cold, wet or dry periods in the winter, but also their magnitude. La Niña is only one of many factors which contribute to the outcome of winter. La Niña is the term used to describe a period of cooler than usual sea surface temperatures across the Tropical Pacific. El Niño is the opposite of La Niña, when the sea surface temperatures across the Tropical Pacific are warmer than normal. These phenomena influence weather patterns across the continental U.S. from fall through winter and usually subside by early spring.

On average, the effects of La Niña lead to a greater chance of above normal temperatures and below normal precipitation across South Central Texas. This is because the active wintertime jet stream and storm track, which bring rain and cold air masses behind fronts, is displaced further north than usual, helping

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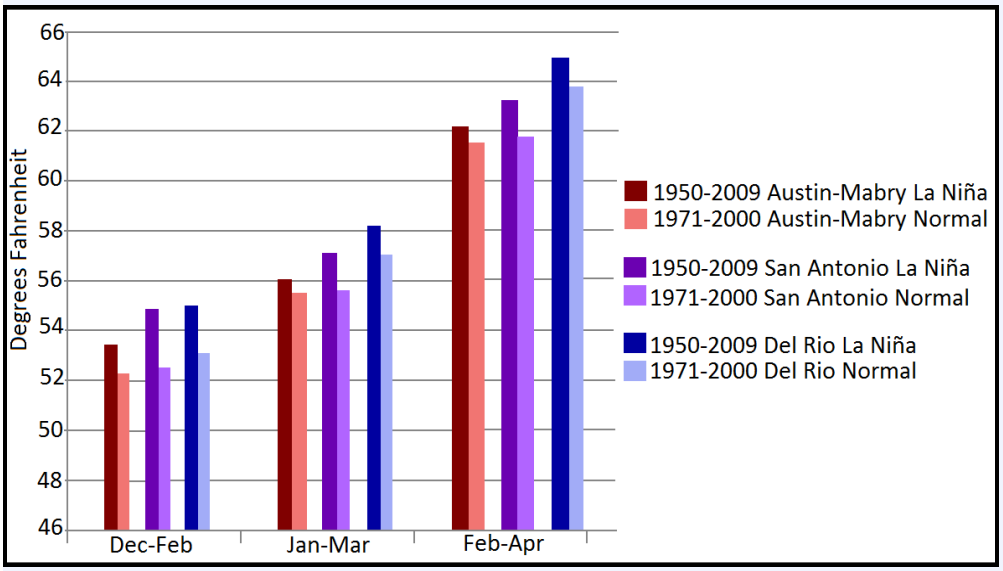
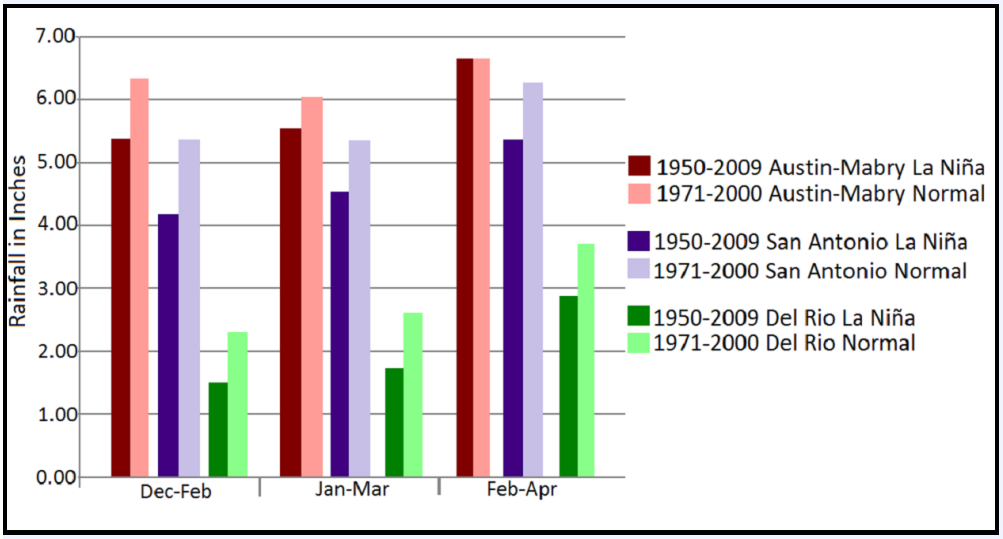
La Niña, continued from page 1

By: Robert Blaha

to make it warmer and drier across the Southwest U.S. and Texas. For South Central Texas, about two-thirds to three-quarters of the time, La Niña periods bring warmer and drier conditions. However, the other one-quarter to one-third of the time, it can be much colder and wetter than during normal years.



Above: 3-month average temperatures during La Niña years compared to normal.
Below: 3-month average rainfall during La Niña years compared to normal.



In some La Niña years, the jet stream has dug further south, and brought cold air masses to South Central Texas, sometimes resulting in heavy rainfall and winter precipitation events. As a result, the averages are a summation, and do not pick up the extremes that have occurred since the winter of 1950 La Niña event.

One feature that shows up with La Niña winters is more extremes between warm and cold, especially with the dry winters. Dry soil is able to cool off, and warm up, more quickly than wet soil. Because of this, it is easier to see more extreme changes from warm to cold and vice-versa during dry winters. Through the winter to early spring, dry conditions set up a greater risk of getting more intense freezes behind cold fronts. Conversely, temperatures will get warmer more quickly when warm air masses are transported across South Central Texas.

Significant strong arctic cold fronts have occurred during La Niña winters. One extreme example was February of 1996. The beginning of the month was very cold as an arctic air mass brought freezing temperatures and winter-precipitation across the Hill Country and even to Austin and San Antonio. Only a few weeks later, all-time highs for the entire month of February were recorded on the 21st. On that day, the high at Austin Mueller Airport was 99°F, San Antonio peaked at 100°F, and Austin Bergstrom reached 101°F. Del Rio had a high of 99°F on February 21st, 1996, which was later tied on

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February 25th, 2008, another La Niña winter. Very cold conditions returned during the end of February, 1996, with several nights of freezing temperatures extending into early March. Figure 1, below, shows a profile of daily high and low temperatures from January 1 through March 31, 1996.

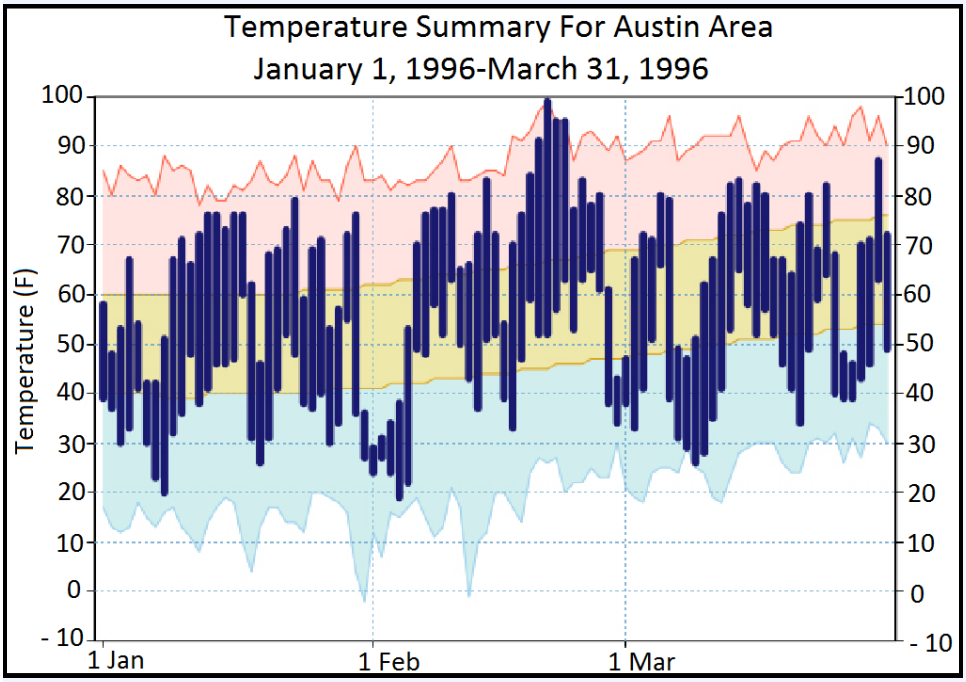


Figure 1. Daily temperature chart for Austin from Jan 1-March 31, 1996. Observed daily maximum and minimum connected by dark blue line. The red line connects record high temperatures, and the blue line connects record low temperatures.

Rainfall and winter-precipitation extremes also show up in La Niña winters. The winter of 1967/1968 was wetter than usual at Austin, Del Rio, and San Antonio. The rainfall in January 1968 caused a flood similar to the December 1991 floods. The comparison of these two winters is noteworthy since the January 1968 case occurred during a weak La Niña period, while the December 1991 case occurred during a moderate to strong El Niño. La Niña winters can also bring heavy snow events. One example is January 1985, when there were a number of cold outbreaks. The first snow event came January 2nd, followed by a second snow event from January 11th to 13th. January 1985 holds the record for the most snow in a single month at San Antonio (15.9 inches) and at Del Rio, (9.8 inches). For Austin, January 1985 comes in 2nd place with 7.5 inches of snow (the record is 9.7 inches of snow in November 1937).

These examples help to illustrate that even though averages indicate that La Niña winters are usually warmer and drier than normal, the averages can be misleading. Due to the variability in temperatures and rainfall during La Niña winters, the extreme events tend to get hidden and smoothed out when calculating averages. It is important to keep in mind that there are other factors which combine with La Niña to shape the final outcome of a winter season.

Additional information on La Niña impacts can be found by clicking **here** (http://www.srh.noaa.gov/images/ewx/wxevent/laninascntrltx.pdf). Also, more climate information is available on our **local climate webpage** (http://www.srh.noaa.gov/ewx/?n=scntrltxclimate.htm).

Above: The San Antonio Riverwalk on January 14, 1985.

Co-op Corral

BY: MARIANNE SUTTON

Welcome back! To honor and recognize the achievements of its volunteer observers, the National Weather Service has a Cooperative Weather Observer Awards Program. Since our last edition, the following Length of Service Awards have been presented:

Individual Awards:

- March 5, 2010 - Charlotte Mercer of Kingsbury - 10 years
- April 23, 2010 - John Taylor of Taylor - 10 years
- May 12, 2010 - Steve Sands of San Marcos - 25 years
- May 19, 2010 - Maggie Montgomery of Bankersmith - 10 years
- May 25, 2010 - Larry Rothbauer of Hallettsville - 35 years
- August 11, 2010 - Mike Knezek of Brackettville - 10 years
- October 1, 2010 - Larry Weisner of Giddings - 20 years
- October 7, 2010 - Jimmy Jo Smith of El Indio - 15 years
- December 8, 2010 - Rex and Beth Bourland of Comfort - 10 years

Institution Awards:

- May 26, 2010 - The City of Brackettville - 75 years

Additionally, we are proud to announce that Ms. Elizabeth "Liz" Lindig of Johnson City was awarded the prestigious John Campanius Holm award. The Holm award is named after John Campanius Holm, the first person known to have taken systematic weather observations in the American Colonies. The Holm award is granted annually to honor observers for outstanding accomplishments not only in the field of meteorological observations, but also in community service. No more than twenty-five awards are given nationwide annually. Ms Lindig has been taking the daily observations of rainfall and temperature at the Lyndon B. Johnson National Historical Park in Johnson City since 1983. Throughout her 27 years as a cooperative observer, Ms. Lindig has ensured that her observation data has been completed on time and without missing data. Her daily weather reports have been critical for the daily operations of the park as well as the safety of the park's visitors. Additionally, the weather data has enabled LBJ National Historical Park to protect its resources from threats such as fire and severe weather. The reports which Ms. Lindig keeps on a daily basis have benefitted a number of government and commercial partners, including Texas Parks and Wildlife, Blanco County commissioners, the National Park Service, and the Blanco County Extension Office. We congratulate Ms. Lindig for her much-deserved award!

Above: Ms. Elizabeth "Liz" Lindig receives her Holm Award. From left: Steve Smart, WFO Austin/San Antonio Observing Program Leader; Mike Asmus, Southern Region Cooperative Program Manager; Liz Lindig; Joe Arellano, WFO Austin/San Antonio Meteorologist-in-Charge; and Patrick McDonald, WFO Austin/San Antonio Hydrometeorological Technician.

NWS Forecasters Meet With Fire Weather Partners

By: Monte Oaks

Fire Weather Program Leaders (FWPLs) from the NWS and their partner wildfire protection agencies in Texas are bracing for what could be a historic fire weather season over the next few months. In the past fifteen years, drought-related wildfire seasons across Texas have prompted numerous disaster declarations and consumed millions of dollars in resources and lost property. Recent cool season drought episodes in 2005-6 and in 2009 had devastating wildfire impacts on Texas due to an abundance of dry vegetation that developed in the wet periods of the preceding warm seasons. Strong springtime storm systems can produce very strong winds along with warm and dry air, resulting in massive wildfire outbreaks capable of consuming millions of acres of land in just a day or two. Above normal rainfall in the summer of 2010, combined with ongoing drought conditions, are expected to bring conditions similar to those noted in these recent severe wildfire seasons.

Above: Dr. John Nielsen-Gammon presents a climate outlook and introduces his new Drought Monitor program from the Office of the State Climatologist.

In preparation for the upcoming wildfire season, the Texas Forest Service (TFS) hosted a climate outlook and fire risk assessment meeting in College Station on December 7th and 8th. During this meeting, NWS fire weather forecasters collaborated with partner agencies at federal and state levels. TFS and NWS led the preparedness campaign with numerous presentations on recent fire weather-related climate research projects and decision support events. The meeting was highlighted by a presentation from the Texas State Climatologist, Dr. John Nielsen-Gammon, who warned of future abnormally warm years and introduced a new drought monitor program for Texas. The NWS and TFS also unveiled a collaborative awareness program on a particularly dangerous fire weather pattern dubbed the **South Plains Fire Weather Outbreak Pattern** *(link goes to the Texasfirestorm.org webpage hosted by the TFS)*, which has been blamed for the majority of wildfire-related fatalities in Texas over the past five years.

Above: Tom Spencer relays Predictive Services concerns about the expected wildfire season as TFS Director Thomas Boggus looks on. From Left: Thomas Boggus (TFS State Forester and Director), Monte Oaks (FWPL Austin/San Antonio), Tom Spencer (TFS Predictive Services Department Head), William Adams (FWPL/IMET Shreveport), and James Stockie (US Fish and Wildlife Service Fire Management Officer).

The remainder of the meeting was conducted as a workshop, focusing on preferred methods of communicating and disseminating fire weather threats. These discussions included a presentation by National Fire Weather Operations Coordinator Larry VanBussum on the three-tiered Incident Meteorologist (IMET) program and another by Denver Ingram of the Southern Area Coordination Center. These discussions identified several new concepts that can utilize the latest technological developments for improved communication and situational awareness.

Minimizing Wildfire Danger to Your Home

BY: DAVID SCHUMACHER

On December 21, 2010, Texas Governor Rick Perry issued a "Disaster Proclamation for Threat of Extreme Wildfires" across 244 of Texas' 254 counties. This disaster proclamation includes all of South Texas and the Hill Country as being prone for extreme wildfires. Due to plentiful rains this past spring and summer, a growth spurt of vegetation resulted across much of South Central Texas and the Hill Country. Grasses, shrubs, and undergrowth all grew prolifically during this time. However, with the onset of La Niña, the rains abruptly ended in late September. Rainfall totals from October through most of December were well below normal.

Along with the dry conditions, the recurring freezes have also helped cure (dry out) any remaining green vegetation. Consequently, with the widespread cured grasses and undergrowth in place, an unusual amount of fuel is available to supply and spread wildfires. The much needed rainfall that fell in late December will only provide temporary relief as little or no green up (renewed growth) is expected until spring.

In the picture to the right, notice the tall cured grasses and nearby stand of cedar trees. A wildfire could quickly spread from the grass to the cedar trees. If certain precautions are not taken to reduce fuels, the home in the background could be threatened by a wildfire.

As a homeowner, what can you do to help prevent a wildfire from damaging or destroying your home or property? Below are few simple tips that will help minimize wildfire danger:

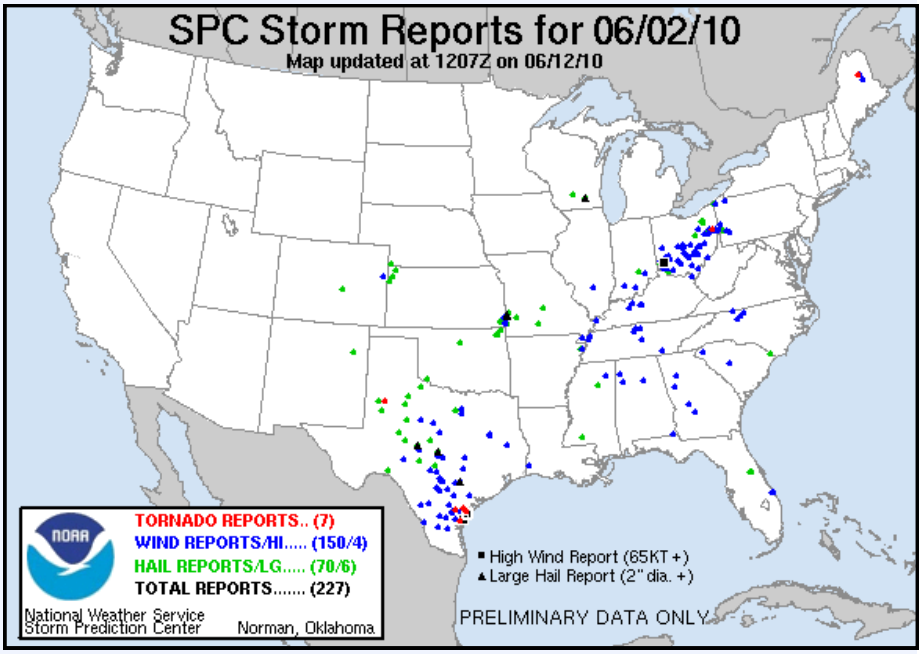
- When possible, keep a barrier of green grass of at least 30 feet or more surrounding your home.
- In the winter, keep dry dormant grasses mowed to two inches or less. Remove all dead brushes and shrubs next your home.
- Roof and gutters should be kept clean of debris such as leaves and fallen branches.
- Keep leaves raked and away from your home. Leaves often accumulate into drifts next to the house or fence during windy conditions.
- Combustibles such as firewood, brush piles, and stacked lumber should be at least 30 feet away from your home.
- Keep volatile trees such as cedars and pines trees as far away from your home as possible.
- Tree limbs should be pruned at least 10 feet away from the roof.
- Remove branches from tree trunks near the home to a height of 6 to 10 feet.
- Contact your insurance agent to ensure you have adequate home owners insurance to cover fire damage to your home. Structures such as sheds or garages not attached to your home may not be covered.

For more detailed information on wildfire prevention strategies visit:
Texas Forest Service Web Site at: http://txforestservice.tamu.edu/
National Fire Protection Association's Firewise Communities program at: http://www.firewise.org/index.php

Storm Data

BY: BOB FOGARTY

Storm Data and Unusual Weather Phenomena (*Storm Data*) is a publication of the NOAA Satellite and Information Service's National Climatic Data Center (NCDC). NCDC is the official keeper of weather records for the United States. One of the products they produce is *Storm Data*. The information in this publication comes from the 125 National Weather Service Weather Forecast Offices (WFOs) across the country and the U.S. overseas territories. *Storm Data* is, "a chronological listing, by state, of hurricanes, tornadoes, thunderstorms, hail, floods, drought conditions, lightning, high winds, snow, temperature extremes and other weather phenomena". The storm reports in it contain statistics on deaths, personal injuries, and damage estimates. This publication is the official source of this information from the National Weather Service.



Above: An example of the Storm Prediction Center's Storm Reports plot.

The data are collected by the WFOs from the general public, trained storm spotters, our media partners, or from storm damage surveys conducted by the NWS. Spotter reports usually are collected in one of two ways. While we hope that people who experience reportable weather call or email our office with the information, this is not always the case. The other way for us to gather a storm report is to contact people in places where we believe severe weather has occurred. This is a time consuming process for us since we have to find people in the area we think a storm hit. After we get the storm information, we send out a local storm report (LSR). If the severe weather was a tornado, large hail, or damaging wind, the report can be viewed on the **Storm Prediction Center's website**. These data are preliminary. After the event, we verify the information and send it on to NCDC.

Why do we do this? One reason is to verify our forecasts and warnings to find out how well we're doing. Did we provide a warning of upcoming weather and how much time did we give the public to prepare? Did we miss anything? Did we send out a false alarm? We use all this information to improve our service. A second use of *Storm Data* is to create a climatology of extreme weather. Climate includes when, where, and how much extreme weather occurs in a place and helps us answer questions like, "Is South Central Texas really flash flood alley?" We can find out how much flash flooding happens here as compared to other places. One other use of *Storm Data* is in research. When researchers try to determine why certain weather events happened or how to predict them in the future, they need a

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source of historical events and *Storm Data* is where they turn.

What does *Storm Data* look like? Here is an example from the June 2010 edition:

TEXAS, South Central
Guadalupe County
1 N Clear Spg 09 0715CST 0 0 50.00K 0.00K Thunderstorm Wind (50EG)

Straight line thunderstorm winds from a small microburst caused extensive tree damage to an area near Lake Dunlap and Clear Springs. Hardest hit areas were between Zip Road and Potthast Drive near the Guadalupe River bend. Large trees were broken and toppled. Many trees fell on homes and cars in the neighborhood. A roof was blown off a mobile home along Highway 46 in Clear Springs.

An upper level area of low pressure combined with deep boundary layer moisture to produce a slow moving mesoscale convective system. This MCS produced excessive rainfall from Atascosa to Comal counties. CoCoRAHs observers reported 7.81 inches of rain near Pleasanton and 11.30 inches near New Braunfels. Heavy rain...

This shows what we call an event, the thunderstorm wind report, and part of an episode summary which describes the overall weather pattern during which the event happened. The numbers in the event report are the date, time, number of fatalities, number of injuries, property damage cost, and crop damage cost. If this had been a tornado report, it would also include the path length and width. *Storm Data* is published each month and contains reports for the entire country. Anyone can purchase a copy from NCDC by going to http://lwf.ncdc.noaa.gov/oa/ncdc.html and searching for Storm Data.

Mark Your Calendar!

Upcoming Safety Awareness:

Feb. 20-26, 2011--Texas Severe Weather Awareness Week
March 14-18, 2011--Flood Safety Awareness Week
May 22-28, 2011 --Hurricane Preparedness Week
June 9-25, 2011--Lightning Safety Awareness Week

SKYWARN:

For a current list of training dates, please visit our SKYWARN website, or call Paul Yura at 830-629-0130, ext 223.

A Constitution for Personal Flood Safety
Part Four

By: Jon Zeitler

Even if you understand the flash flood threat, and have flood insurance in place for your home or business, more can be done to be safe from floods. There are simple steps to prevent or minimize flood damage. In addition, just knowing the threat of flash floods is not enough; rapid changes in streams and rivers may mean little or no advance warning, so an action plan is critical to maximize reaction time and safety.

Repairing flood damage takes significant time (months) and effort (thousands of dollars). Even with insurance coverage, the disruption of normal life while flood damage is being repaired is extremely stressful. Three simple steps can prevent a lot of grief and get a flooded property close to normal function rapidly after flood waters have subsided. The first step is sandbagging around basement windows and gas, oven, and dryer vents. While many homes in Texas do not have basements, homes in other parts of the country do, and sandbagging around basement windows may keep water out entirely or at least minimize flooding in the basement. Even with solid concrete slabs in Texas, natural gas, oven, and dryer vents may be near ground level, and offer an easy path for water to get into the home. Turning off those appliances and plugging the holes may keep water out. The second step is to elevate the outside air conditioning unit. Loss of air conditioning from the outside unit (compressor) being flooded and short circuiting will make living in the home unbearable during summer months, and exacerbate mold and other flood-related damage. Simply elevating this unit 2-4 feet above ground-level on an elevated brick stack would halve the risk of damage in many areas. The third step is simply shutting off the power to the home or business at the main circuit breaker when water is about to enter the building (or when you evacuate). This will prevent appliances from short-circuiting and eliminate the threat of electrocution. After flood waters have subsided and the appliances are dry, they may be cleaned, checked, and likely powered back on.

Above: A family discusses their primary and alternate evacuation routes.

Once the additional precautions for your home or business are complete, focus shifts to making good decisions about evacuation. In many emergency situations, people either panic or withdraw--neither of which leads to effective action. Gathering information and developing a plan of action beforehand helps alleviate these reactions. One example is purchasing detailed road maps for your area, or having a GPS map device. These allow you to plan an evacuation route and find alternatives if floodwaters or traffic block your primary route. Most metropolitan areas have detailed maps available at special map stores; residents in rural counties should contact emergency management officials or the county sheriff for assistance. Once flash flood watches (or especially flash flood warnings) are issued, an excellent source of information is a National Oceanic and Atmospheric Administration (NOAA) Weather Radio All Hazards (NWR). NWRs receive continuous broadcasts of forecasts, statements, and warnings from the NWS twenty-four hours a day. Many models have an alarm feature that will sound a tone when a warning is issued for user-selected counties. NWRs are available at electronics stores and through internet sites, generally running from $30 to $75.

At this point in the series, realization of the flash flood threat and effective planning will likely eliminate significant financial loss from a flood, and provide a good head start for evacuating if flood waters threaten your home or business. In the final two parts of this series, we'll look at how to avoid the number one cause of death during floods, and consider how we can make a difference in our communities.

GIS: What's Here Now & What's Coming Soon

BY: CHRISTOPHER MORRIS

With the rapid increase in Geographic Information Systems (GIS) usage, the National Weather Service (NWS) has taken steps to provide a number of its products in a GIS format accessible through the NWS **GIS Portal webpage** (www.weather.gov/gis). The site contains over 40 different products from the NWS, the Storm Prediction Center (SPC), the National Hurricane Center (NHC), the National Climatic Data Center (NCDC), and other sources in both KML and shapefile formats. If you don't have any GIS software but want to view the images, the NWS GIS Portal provides links to free downloads of some common GIS software such as Google Earth, ArcExplorer, and the NASA World Wind Viewer.

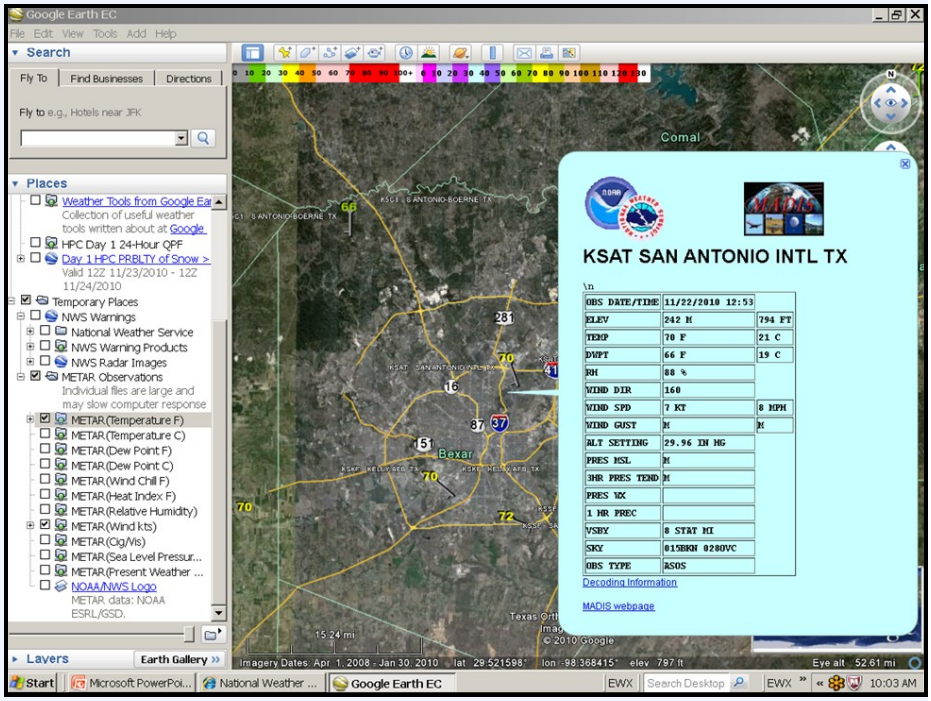

Figure 1: Surface Observations available from the NWS GIS Portal displayed in Google Earth. Available at www.weather.gov/gis

Each product on the GIS site is divided into 5 categories: Current Weather, Forecasts, Past Weather, Fire Weather, and Additional Info. The "Current Weather" section contains real-time severe weather watches and warnings, radar imagery, surface observations, satellite imagery, and river gages. Each product has an enabled pop-up window that contains detailed information about what is displayed as well as a hyperlink to the source webpage (see figure 1, above). In the "Forecasts" section, users can find local forecasts, model forecast soundings, river gage forecasts, and severe weather outlooks (Figure 2, at left). "Past Weather" provides archived radar data, NCDC Climate Atlas, storm reports, tornado tracks, and past hurricane tracks. The "Fire Weather" page illustrates where the NWS is currently supporting firefighting efforts by providing spot forecasts. Under "Additional Info", links are provided to websites which have an array of supplemental information, such as the NOAA nowCOAST. The NOAA nowCOAST offers users the latest displays of surface weather and ocean observations, satellite imagery, radar mosaics, sea surface temperature analyses and gridded forecasts. Additionally, the Hydrometeorological Prediction Center's (HPC) Quantitative

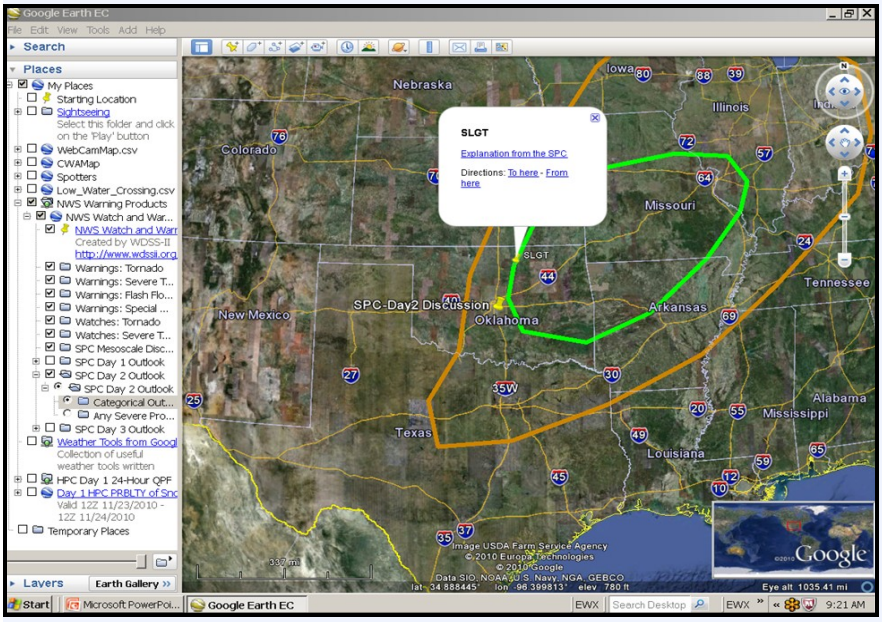

Figure 2: SPC Day 2 Convective Outlook from the NWS GIS Portal displayed in Google Earth.

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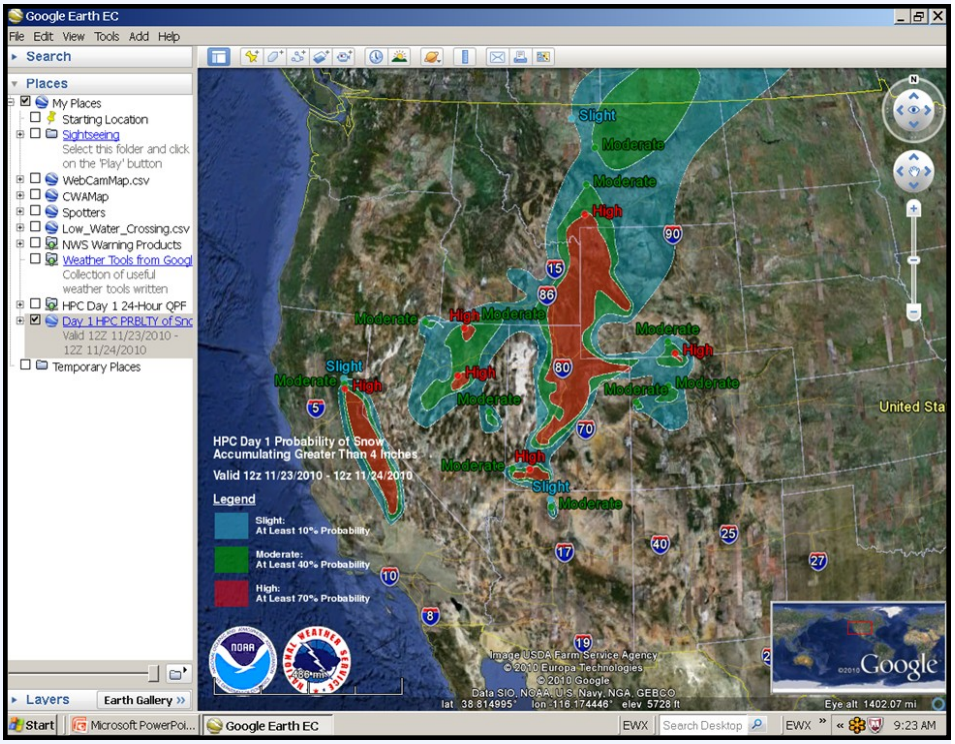
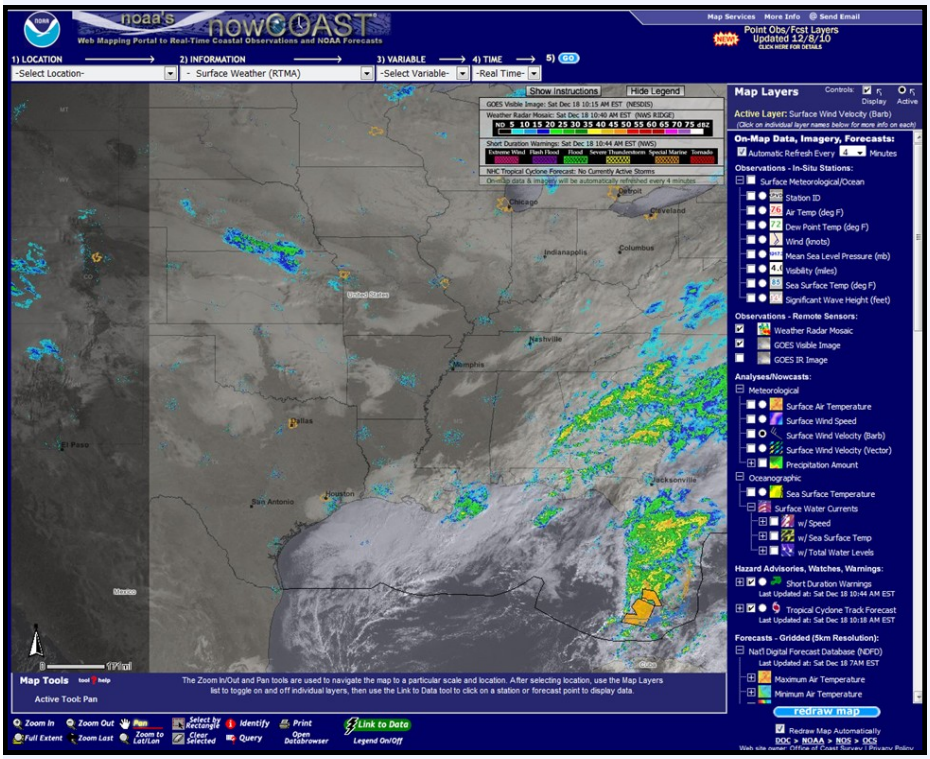
Precipitation Forecasts, which show the expected rainfall accumulation, are available in KML but not shapefile. The HPC also produces Winter Weather Outlooks, but currently are only available on their **webpage** (http://www.hpc.ncep.noaa.gov/kml/kmlproducts.php#winwx).

As more products become available in a GIS format on a national scale, regional teams and local forecast offices are working on providing smaller-scale projects in a GIS format. These projects are still in the developmental and experimental phases, however, some are currently available. For example, the San Diego, CA office has developed a display of local storm reports from across the nation viewable in **Google Maps** (www.wrh.noaa.gov/sgx/kml/lsr.php?cwa=nws&lsr=All). The Birmingham, AL and Amarillo, TX, offices have developed a graphical interpolation of CoCoRaHS rainfall reports which are updated daily (**Birmingham**: www.srh.noaa.gov/bmx/rainfallPlots/index.php, **Amarillo**: www.srh.noaa.gov/ama/?n=precipmap). The Little Rock, AR office has created a **website** (www.srh.noaa.gov/lzk/?n=gisdata.htm) containing downloadable GIS files for significant storm events for their area. Finally, the Austin/San Antonio office has utilized GIS software in a similar fashion as these offices, but currently mainly to accompany an overall event review. These can be found on our **event review website** (www.srh.noaa.gov/ewx/?n=postwx.htm).



Above: HPC Day 1 Winter Weather Probability displayed in Google Earth.



Above: NOAA nowCOAST displaying visible satellite and a radar mosaic.

Even though there are more than 40 different products currently available in both KML and shapefile format, the NWS is striving to provide more of its products through the NWS GIS Portal webpage. Meanwhile, both regional teams and local offices are integrating GIS software to provide smaller scale projects and information. To learn more about these projects, please visit your local NWS office's webpage.