Southwest Weather Bulletin

Spring-Summer 2006 Edition

National Weather Service Santa Teresa/El Paso

Winter Brings Record Drought and Warm Temperatures Across the Borderland

After some early autumn storms, record drought and warm temperatures prevailed across the southwestern United States through the late autumn, winter and early spring. This was especially true for southern New Mexico and far western Texas. After thunderstorms dropped heavy rains and produced a tornado on October 15, most of the region received less than a half-inch of total rainfall through the winter season. El Paso, Texas set a new record for the cool season by going 101 consecutive days without measurable rain. Further west it was even drier for Phoenix, which set a record after going 143 days consecutive days with no rainfall.

On October 15, 2005, a small tornado developed near Animas New Mexico. (Photographed by Richard Shamp)

The winter of 2005-2006 was the second driest on record for all of New Mexico and the tenth driest for El Paso with the city receiving only .33 of an inch of rainfall for the season. Ski areas were impacted as snowfall was well below normal across southern New Mexico mountains. Most of the Cloudcroft area, which normally receives over 80 inches of snow a year, saw less than a foot of snow this season.

Only 16 inches of snow fell over Ski Apache in Ruidoso, in extreme contrast to last winter when 173 inches of snow fell over the popular winter resort.

In addition to the drought, temperatures across the southwest were well above normal with the December through February period the second warmest on record for much of southern New Mexico and western Texas. **(continued on page 2)**

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Autumn-Winter 2005-2006 Weather Continued

The combination of record drought and warmth created an unusually high fire danger across Oklahoma, northern and western Texas, New Mexico and Arizona during the late winter period. At least 10 persons died from wildfires across Texas where 660,000 acres burned by the middle of March. Closer to home, wildfires burned around 120,000 acres over eastern New Mexico with periods of high winds further enhancing the fire danger.

The warm dry weather was caused by an atmospheric circulation pattern dominated by westerly winds and high pressure across the southwestern United States from late autumn through the early spring. The resultant flow transported mild dry air into the region for much of the season while keeping moisture to the north and east.

During the morning of Oct.15, 2005, strong thunderstorms flooded the playground at the Mitzi Bond Elementary School in El Paso. (Photographed by Joe Rogash)

During the winter of 2005-2006 wildfires burned thousands of acres across portions of western Texas, including the Mineral Wells area (above). (Texas Forest Service)

Seasonal Weather Highlights

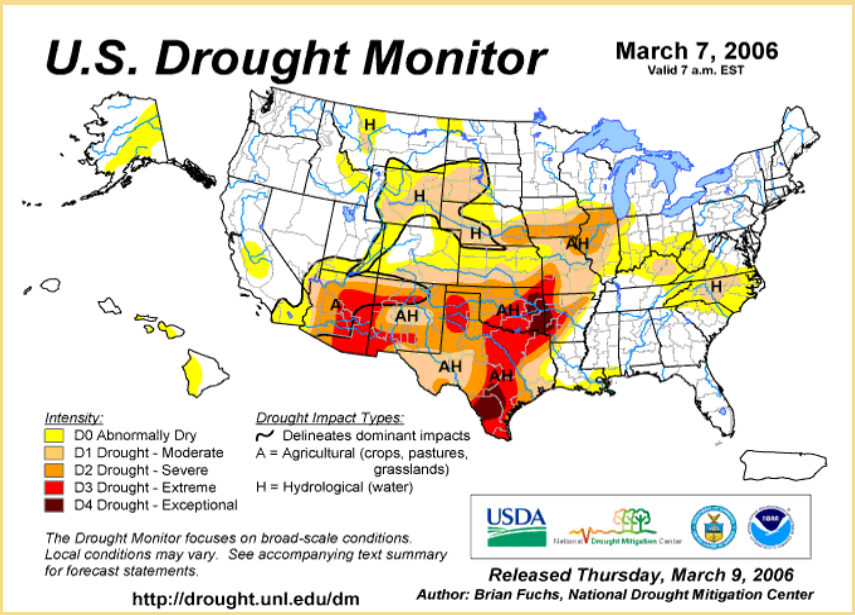
Oct. 8: Evening thunderstorms dump heavy rains across southwestern New Mexico with street flooding around Silver City and Animas.

Oct. 9: Morning severe thunderstorms drop penny-sized hail over portions of east El Paso.

Oct. 15: Morning thunderstorms bring heavy rains across the borderland with rain amounts from a half-inch to an inch from around El Paso north to near Las Cruces. During the early afternoon thunderstorms produce a small tornado near Animas while to the north, almost an inch of rain falls within an hour over portions of Silver City.

November 2005: Little or no precipitation falls across southern New Mexico and far western Texas making it one of the driest Novembers on record.

Nov 9-11: Unusually warm weather across southern New Mexico and far western Texas with high temperatures from the upper 70's to mid 80s over most of the deserts. New record high temperatures are set at El Paso all three days with the city reaching 84 degrees on the 9th and 10th and 83 on the 11th. (Continued on page 3)



Weather Highlights Continued

Nov. 26-27: Windy across the borderland with winds gusting over 50 mph in some areas. South of the border, winds collapse a concrete wall In Juarez, Mexico, killing a woman. Winds gust to 62 mph in El Paso, blowing down city power lines and causing numerous power outages.

December 2005: Another dry month with little or no rain or snow falling over southern New Mexico and far western Texas.

Dec. 6-10: Much colder air flows into the region behind a strong cold front. Chilly morning low temperatures range from 5 to 15 degrees for much of the area through the period. The cold air causes numerous pipes and waterlines to burst across El Paso.

Jan 25: El Paso's streak of days without measurable precipitation comes to an end as .02 inch of rain falls at the airport. The city had gone 101 consecutive days without rain setting a new record for the cool season.

Feb 24: Scattered strong thunderstorms with small hail move across the southern New Mexico and western Texas including the El Paso area.

Through the winter of 2005-2006 the Sacramento Mountains around Tularosa, which is normally covered with deep snow, rarely received more than a dusting. (Photographed by Lynn Rogash)

Feb 28: Warm weather returns with El Paso reaching 83 degrees to set a new record for the day.

Mar 9: High winds with blowing dust occur across the borderland including wind gusts to 74 mph which cause minor damage over east El Paso. The winds blow part of a roof off a house in Cornudas, TX.

Mar 20: Winter storm dumps 5 to 8 inches of snow over the Cloudcroft area.

Fire Weather - in the Southwest

Text and photographs by Thomas Bird, Forecaster National Weather Service, El Paso

Most folks living in the Southwest Deserts of Far West Texas and Southern New Mexico don't think much about Wildfire. We are surrounded by sparse vegetation so the wildfire concern to desert dwellers is nearly non-existent. However the southwest is full of mountainous areas known as Sky Islands. These higher elevation areas receive much more precipitation than their surrounding desert and thus support lush forest. During drought and dry times of the year these forests become dry tinder and provide plenty of fuel for wildfires. Even the deserts burn when grasses and shrubs sprout up after a wet winter. Numerous land management agencies watch over the public lands of Southern New Mexico and Far West Texas. The U.S. Forest Service manages a number of local National Forests; the Gila, Lincoln, and Cibola. The Bureau of Land Management watches over the majority of the lowlands.

Fire is a frequent occurrence across the mountains of the southwest. Much of it is planned prescribed burns used to reduce the risk of wildfire. However the region does have an active wildfire season. Each year thousands of acres of southern New Mexico forests, in the Gila and Lincoln, burn due to lightning strikes and human activity. The primary season for wildfire across the southwest runs from **late March through mid July**. This window corresponds perfectly with the spring dry season which lies between the wet winter storms and the onset of the summer monsoon wet season.

Weather and Fire

Fire is very dependant upon the state of the weather. The forest won't burn when wet weather predominates and fuels become moistened. The trees are more prone to burn whey they are dry and warm. This is why forest fires are rare during the cooler, wetter winter months. Another weather factor that has great impact on wildfire is wind. Historically, the largest fires occur during high wind events. This is because fire is spread by wind, and the faster the wind speeds, the faster the fire moves. Therefore, wildfires are most likely during extended weather patterns that create dry, hot, and windy conditions.

It is essential that land management officials and fire crews are kept up to date on current and forecast weather conditions. This includes important information such as temperatures, relative humidity, winds, and lightning.

In wildfire suppression, firefighter and public safety are most dependant on the weather. Because of this the **National Weather Service** and the land management agencies have forged close ties. Daily fire weather forecasts are issued for the various land areas across the southwest. The agencies use these forecasts to plan for prescribed burns and to project fire danger and resource needs in the near future. In addition, the weather service also prepares point forecasts of expected weather, temperature, humidity, and wind speeds for prescribed burns across the area. Maybe most important is the Issuance of fire weather warnings called Red Flag Warnings. These are used to alert the fire weather community of critical fire dangers posed by dry and windy conditions combined with dry fuels.

The Global Warming Phenomena

That the earth is warming is now a widely accepted fact. Over the past century the average temperature of the planet has warmed 1 degree Fahrenheit around the world. In addition the spring thaw in the northern hemisphere occurs 9 days earlier than it did 150 year ago. The 1990's was the warmest decade on record but the first decade of the 21st century may surpass it as the year 2005 was the warmest year ever recorded. January 2006 was also almost 9 degrees above normal for the United States making it the warmest January on record for the nation.

Some scientists believe global warming is causing the development of stronger hurricanes such as Katrina (above).

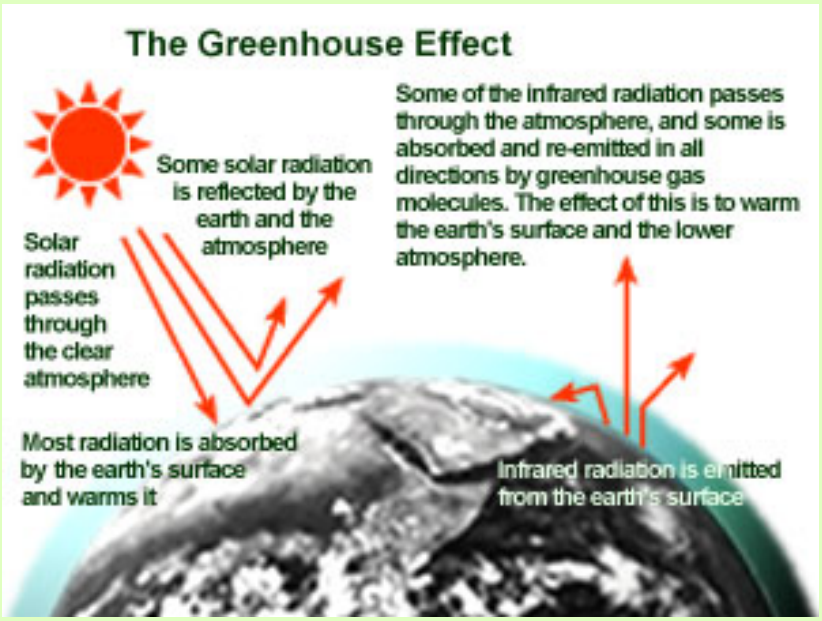
Global Warming Impacts

The effects of the warming are becoming noticeable from the far north to the tropics. Latest studies have found that over the past 35 years the number of severe destructive hurricanes such as Katrina has doubled, due much to the warming of the oceans. Even more catastrophic was the record heat wave which scorched Europe in August 2003, causing an estimated 35,000 deaths. August 2003 also was the hottest August on record over the northern hemisphere with London recording temperatures over 100 for the very first time.

Across the Arctic, the rate of ice melting is increasing, significantly changing the habitat. In September 2003, the largest ice shelf in the Arctic broke up after existing for over 3000 years. Melting permafrost has damaged hundreds of buildings, railroad lines, airport runways and gas pipelines across Russia. Meanwhile melting glaciers continue to adversely affect Switzerland's winter sports and tourist industry. Closer to home, when Montana's Glacier National Park was established in 1910, it included some 150 glaciers. Today only 30 glaciers remain and these are noticeably shrinking.

Global warming has significantly melted the ice across the Polar regions, threatening such native animals as the Polar Bear. (U.S. Fish and Wildlife)

Some scientists blame global warming for more severe and prolonged droughts, including the record dry conditions over the southwestern United States this past winter. The United Nations also believes global warming contributes to the expansion of desert regions across Pakistan, India and China. One consequence of the desertification of Asia is that sand storms are becoming more intense and more frequent. (Continued on page 6)



The climate changes associated with global warming are significantly impacting wildlife across the world. Melting ice in the polar regions threatens the habitat and feeding areas of seals, penguins and especially Polar Bears, which may soon be declared an endangered species. A deadly fungus, aggravated by global heating, has wiped out frog species in central and South America with other amphibians at risk for extinction around the world. Hotter drier summers and wetter winters are also changing bird populations and migrations in some regions. Even in the oceans, the warmer water is adversely affecting some cold water fish species.

The Global Warming Debate

While it is now almost universally accepted across the science community that global warming is real, a great scientific and political debate rages as to its causes and what, if anything should be done about it. A number of environmental scientists and organizations attribute much of global warming to the emission of greenhouse gasses such as carbon dioxide, which is produced when fossil fuels are burned. The World Meteorological Organization recently reported that greenhouse gasses have reached their highest levels ever in the atmosphere. Consequently there are a number of scientists and environmental activists who believe a solution to global warming is a restriction of such fossil fuel-burning activities as driving plus a radical modification of industrial production technology so to reduce greenhouse gas emissions. Energy conservation is also strongly advocated by those who believe global warming is related to human activities.

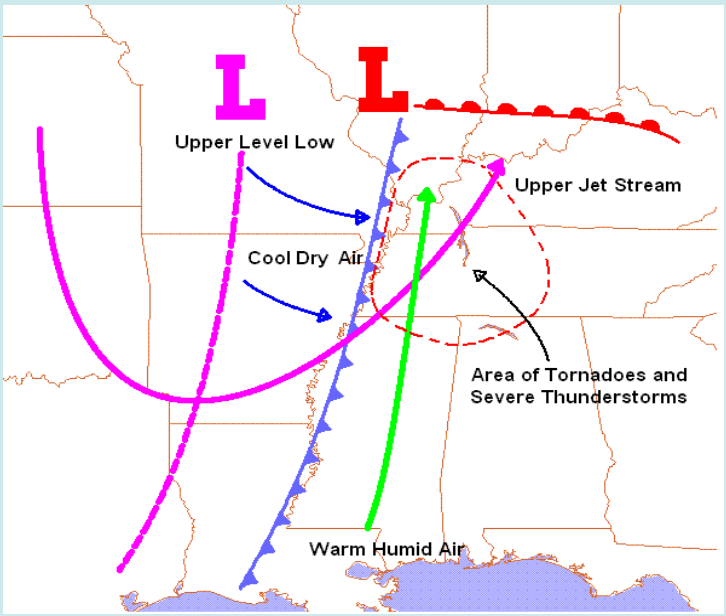
In contrast there are scientists and politicians who correctly point out that radical climate and temperature variations have been taking place across the earth for millions of years with causes unrelated to human fossil fuel burning. Such temperature fluctuations have been attributed to variations in the sun's radiation, gradual changes in the earth's orbit, volcanic activity, meteor strikes, and other natural phenomena. Proponents of this theory argue mankind has little affect on the climate and thus no radical measures should be taken to enforce the reduction of fossil fuel burning.

As the debate continues we should continue to expect and prepare for more extreme, interesting and even bizarre weather in the coming years.

*TORNADOES...*Natures Most Violent Storms

The cool season of 2005-2006 will also be remembered for the strong and violent tornado outbreaks which tragically brought death and destruction across the central United States. On November 6, a tornado killed 25 people as it destroyed portions of the Evansville, Indiana area. April 2, 2006 saw a tornado outbreak kill 26 people and bring widespread damage, mostly across Tennessee. Just 5 days later, another tornado outbreak struck the south central United States with 11 more deaths over Tennessee. In each case the tornadoes developed south of a surface low pressure system and ahead of a trailing cold front where cool dry Canadian air lifted unseasonably warm moist air which strong southerly winds transported northward from the Gulf of Mexico.

This strong tornado moved through southeastern Missouri during the April 2, 2006 outbreak. (Photographed by Scott McCord)



A series of low pressure systems with strong cold fronts moving into warm moist unstable air resulted in several major tornado outbreaks across the central United States this season.

How Do Tornadoes Form ?

Thunderstorms which develop within an environment where the air is warm and moist at low levels and cool and dry aloft can become strong or severe. But when the storms move along a surface boundary such as a warm or cold front they can develop rotation and produce tornadoes. Another factor important for tornado development is the presence of wind shear where wind speeds increase with height. Thus many tornado outbreaks occur in the proximity of the upper jet stream where the winds may blow over 100 mph 30,000 feet above the ground. When strong wind shear interacts with a thunderstorm updraft, the warm moist air feeding the thunderstorm can develop rotation which may ultimately generate tornadoes. (continued on page 8)

Tornadoes Across the Borderland

Although most strong and violent tornadoes and major tornado outbreaks occur over the central and southeastern United States, isolated tornadoes occasionally develop over south central and southwestern New Mexico and far western Texas. Tornadoes are possible any time of the year but here in the southwest they are most frequent from May to October from the mid afternoon through the early evening. The large majority of the tornadoes developing over the borderland are weak with winds less than 100 mph and widths under 100 yards. However occasionally the meteorological conditions do become more favorable for the formation of stronger and more damaging tornadoes, especially in late spring and early autumn.

A tornado moves across White Sands Missile Range.

Persons traveling should also remember that the risk of strong and violent tornadoes greatly increases east of the Rockies, particularly during the spring.

Tornado Safety

Stay informed of the latest weather information and forecasts by listening to NOAA Weather Radio and your local broadcast media. When traveling always obtain the weather forecast for areas along your route of destination.

Keep an eye on the sky for developing or approaching thunderstorms. Be especially alert for rotating clouds, large hail and a dark or greenish sky. Tornadoes may also become hidden from view in the rain so listen for a load roaring sound like a freight train.

When the National Weather Service issues a ***Tornado Watch***, it means conditions are favorable for tornadoes during the next several hours in the area covered by the Watch.

When the National Weather Service issues a ***Tornado Warning,*** it means a tornado has been sighted or weather radar indicates a tornado is likely.

When Tornadoes are Approaching Your Area…

Go to a designated shelter. If a tornado shelter is not available go to the lowest floor and to an interior room such as a closet or hallway. Stay away from windows.

If in a mobile home evacuate to a stronger building. Mobile homes offer little or no protection from strong or especially violent tornadoes.

FLOODS...THE AWESOME POWER

Floods are the number one cause of deaths associated with stormy weather. Each year an average of 140 people die from floods and over the past 40 years twice as many people have been killed from floods as they have from tornadoes.

Flash floods are floods which develop within a 6 hour period. Thus they are especially dangerous because they can cause a rapid or extreme rise in water in a short amount of time. Flash floods are a powerful weather phenomena which can demolish buildings, wash out roads and bridges and swiftly carry away motor vehicles and even railroad locomotives.

Most floods over New Mexico and western Texas occur during the summer and are the result of intense slow moving clusters of thunderstorms which drop heavy rainfalls over the same area for several hours or more. However remnants of hurricanes and even winter storms and melting mountain snows can cause flooding. Thus floods are possible anytime of the year across the borderland.

What Areas Are Vulnerable to Flash Floods ?

Flash flooding is especially likely near or along rivers and streams, arroyos, dried out creek beds or even drainage ditches. Such features can rapidly fill with water and overflow, washing out roads and flooding nearby buildings.

Low lying urban or developed locations can also experience flooding. Paved areas including roads and parking lots have little capacity to absorb rainfall so streets and highways can become like swift moving rivers, washing away cars and flooding neighborhoods.

Heavy rains flooded this El Paso neighborhood during the summer monsoon season.

Thunderstorms with heavy rains flooded portions of northeast El Paso Sep 29, 2004. (Photographed by Linda Stelter El Paso Times)

Canyons and areas near the foothills of mountains can become very dangerous during heavy rains. Mountainous terrain can channel water runoff into very localized areas causing even dried out creeks to become raging torrents of water. Some of the worst floods in history occurred when heavy rains fell on mountain slopes. (Continued on page 10)

When Heavy Rains Are Falling In Your Vicinity…

Continue to monitor NOAA Weather Radio or local television and radio stations for weather updates. A **FLOOD WARNING** or **FLASH FLOOD WARNING** means flooding is imminent or is already occurring in the warned area.

Stay alert for rising waters and evacuate to safe or higher ground if flooding threatens. Remember floods can destroy homes and buildings so do not stay in your house when flooding is likely in your immediate vicinity.

When traveling ***NEVER DRIVE THROUGH FLOODED ROADS OR HIGHWAYS***. Most flood deaths occur when motor vehicles are swept away by water. If the road ahead is flooded turn around immediately.

If hiking or camping near rising streams or arroyos, move to higher ground immediately. Small streams or dried out riverbeds can experience a sudden or rapid rise in water, especially near mountain slopes and within canyons.

Never attempt to walk through flowing floodwaters since swiftly moving water even a foot deep can sweep you away.

Spotters…Please Call The National Weather Service If You Observe:

Tornado or Funnel Cloud…Report Time, Location and Movement

Hail…1/2 Inch or Larger

Damaging Winds…Damage To Buildings, Motor Vehicles, Trees, Power Lines And Other Structures

Flooding or Flash Flooding…Flooding Of Streets and Buildings , Or If Rivers, Streams And Arroyos Flood Or Overflow

Heavy Rains…1/2 Inch of Rain Or More In Less Than 30 Minutes Or At Least 1 Inch Of Rain in Less Than 2 Hours

Blowing Dust…Whenever Blowing Dust Reduces The Visibility To Less Than 2 Miles