



# **Southwest Weather Bulletin**

**Spring Summer 2014 Edition**

**National Weather Service El Paso-Santa Teresa**



## **Warm Dry Weather and Drought Return to the Borderland**

After a stormy and wet summer monsoon in 2013, relatively tranquil and mostly benign weather returned to south central and southwestern New Mexico and far western Texas from the autumn through the winter and early spring of 2014. The weather pattern for most of the period was conducive for westerly winds or high pressure with the resultant circulation transporting dry and frequently warm air into the region.

So despite a few late autumn and early winter storms and cold air outbreaks, temperatures from October through mid April were generally above normal, with February 2014 the second warmest on record for El Paso. In addition while there were a few days with high winds, no extreme wind or blowing dust events occurred until late April.

Though the weather was pleasant for most outdoor activities, the lack of rain and snowfall brought a return to severe drought conditions across much of the region. From October through mid April the majority of locations received rainfall that was less than 25 percent of normal with snowfall



Hail covers the ground over east El Paso after severe thunderstorms moved across the area on April 19. (Ray Jackson/KFOX14 El Paso)

rather sparse and much below average over the mountains.

The dry weather temporarily ended abruptly and violently on April 19 when severe thunderstorms brought torrential rainfalls, flooding and large hail to portions of the Borderland.



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On February 2 snow covered much of the Sacramento Mountains.

## Seasonal Weather Highlights

October 2013: A dry month with little rainfall across the region.

October 11: Windy across the Borderland as winds gusted to 73 mph near Fort Bliss Texas with gusts around 40 to 50 mph elsewhere.

November 12: Windy across portions of the region with gusts from 50 to 60 mph over Dona Ana and El Paso counties.

November 16: Storm brings .5 to 1 inch rainfalls over Grant County including the Silver City area with around .5 inch rainfalls near Cloudcroft.

November 23-24: Early winter storm drops 3 to 5 inches of snow around Silver City and Truth or Consequences with 2 to 4 inches near Alamogordo and 1 to 2 inch snows falling elsewhere. Icy conditions caused the closure of portions of Interstates 10 and 25, State Highway 70 and other roads. Unusually cold temperatures occurred on the 24<sup>th</sup> with daytime highs only in the 30s across the lower elevations.

December 4: Very windy across the region with winds gusting around 60 mph over Dona Ana and El Paso counties.

December 20-21: Winter storm dumps 12 to 16 inches of snow around Cloudcroft and 2 to 4 inches of snow on the Silver City area.

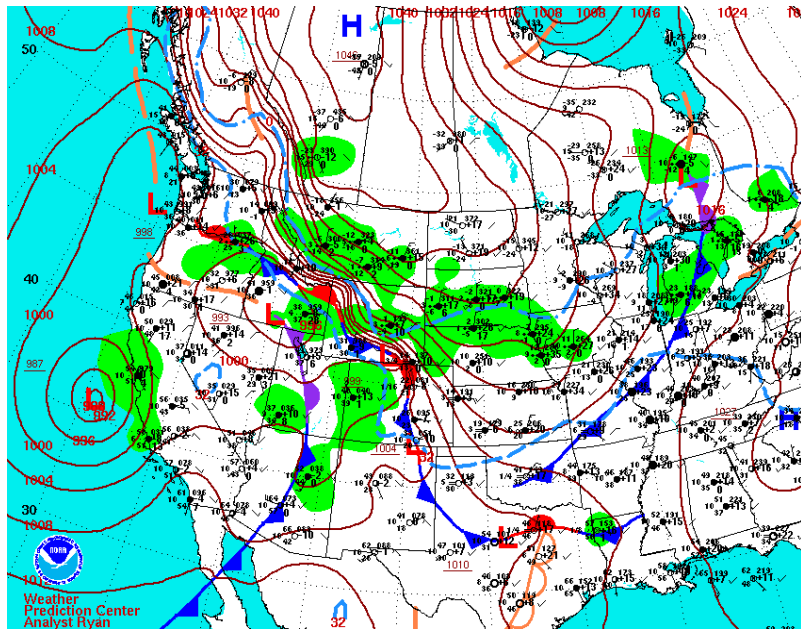
January 2014: Driest January on record for New Mexico with little or no rain or snow falling across the state.

January 31: Windy with gusts near 60 mph at White Sands Missile range and gusts around 40 to 50 mph elsewhere.

February 2014: A warm dry month and the second warmest February on record for El Paso.

February 3-4: Six to nine inches of snow fell around Cloudcroft.

February 18: A very warm day with El Paso, Deming and Truth or Consequences setting or tying records by reaching high temperatures of 80, 77, and 75 respectively.



**March 1 2014 surface weather map showing the storm system which brought high winds and heavy rains to the region.**

March 1-2: A storm system brings wet and windy weather to much of the region. Winds gusted around 50 to 60 mph across portions of El Paso and Dona Ana counties while in Hidalgo County 1.5 inches of rain fell at Cloverdale with almost an inch falling at Rodeo. Around 1 to 1.5 inch rainfalls were reported around Silver City, Cliff and Mule Creek across Grant County. Elsewhere .25 to .50 inch rainfalls were common.

March 15: Windy with winds gusting around 45 to 55 mph over much of southern New Mexico and far western Texas.

March 26-27: Afternoon and overnight winds gust around 60 to 70 mph over White Sands Missile Range with gusts from 40 to 50 mph most elsewhere.

April 2: Another windy day with gusts to 60 mph around El Paso, White Sands Missile Range and near Mescalero and Tularosa. Blowing dust lowers the visibility to less than 2 miles over portions of the El Paso vicinity.

April 15: A cold morning with low temperatures in the 20s over much of Hudspeth County and mountain areas and in the 30s most elsewhere.



**This thunderstorm moved across southern Dona Ana County on March 15 2014. (Greg Lundeen/ NWS)**



**On April 2 high winds produced blowing dust around the El Paso-Santa Teresa area. (Joe Rogash/NWS)**



**Thunderstorms dropped large hail over much of El Paso during the afternoon of April 19. (Maria Garcia KVIA ABC-7 TV El Paso)**

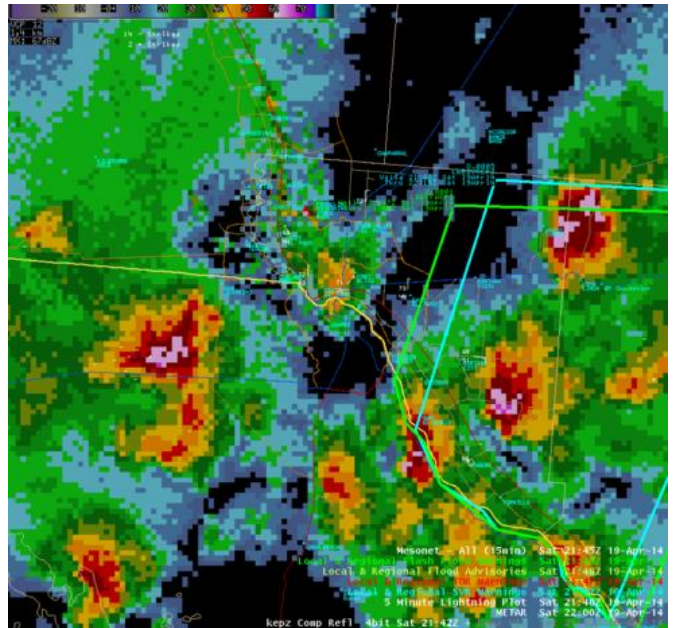
April 19: A major severe weather and heavy rain event strikes far west Texas and southern New Mexico. A deep upper level trough advanced into the region from the west pulling moist unstable air into the area while providing strong vertical wind shear where the wind velocity substantially increased with height. As a result thunderstorms dropped both larger hail and torrential rainfalls over portions of the area. Strongest storms hit El Paso and western Hudspeth counties. Hail the size of golf balls fell near Tornillo with 1 inch diameter hail occurring around sections of east El Paso. In addition over 2 inches of rain fell upon areas of southwest Hudspeth County including Fort Hancock and 1 to 2 inch rains were measured around east El Paso causing widespread street flooding. Tragically one person died when floodwaters and hail swept her in a drainage ditch in northeast El Paso. Further west storms dropped nickel-size hail southwest of Deming.



**A member of the El Paso Fire Department walks through a flooded and hail covered arroyo in search of a woman swept away by floodwaters on April 19. (El Paso Times/El Paso Fire department)**



**The April 19 thunderstorms also dumped heavy rains across the El Paso area causing widespread flooding. (Maria Garcia KVIA ABC-7 TV El Paso)**



**Radar image showing the April 19 severe thunderstorms moving into portions of El Paso and western Hudspeth Counties.**

April 26: A strong low pressure system generated very strong hurricane force winds across portions of southern New Mexico and west Texas. On Saint Augustine pass wind speeds were measured to 90 mph while winds gusted to 76 mph over northeast El Paso with gusts to 71 mph near White Sands Missile Range main post. Elsewhere gusts around 50 to 60 mph were common including gusts to 68 mph near Rodeo NM. The high winds produced widespread blowing dust across the region with areas of visibilities under a mile. Because of the dangerous driving conditions, Interstate 10 was closed from Las Cruces to the Arizona border while portions of Highway 11 were shut down between Deming and Columbus.



**High winds and blowing dust almost obscured the El Paso power plant during the afternoon April 26. (Joe Rogash/NWS)**

April 27: Another windy day across the Borderland with winds gusting around 45 to 55 mph over much of the area. There was considerably less blowing dust however due to a cold frontal passage which brought cooler more stable conditions.



**Blowing dust shrouds Sunland Park NM. (Joe Rogash/ NWS)**

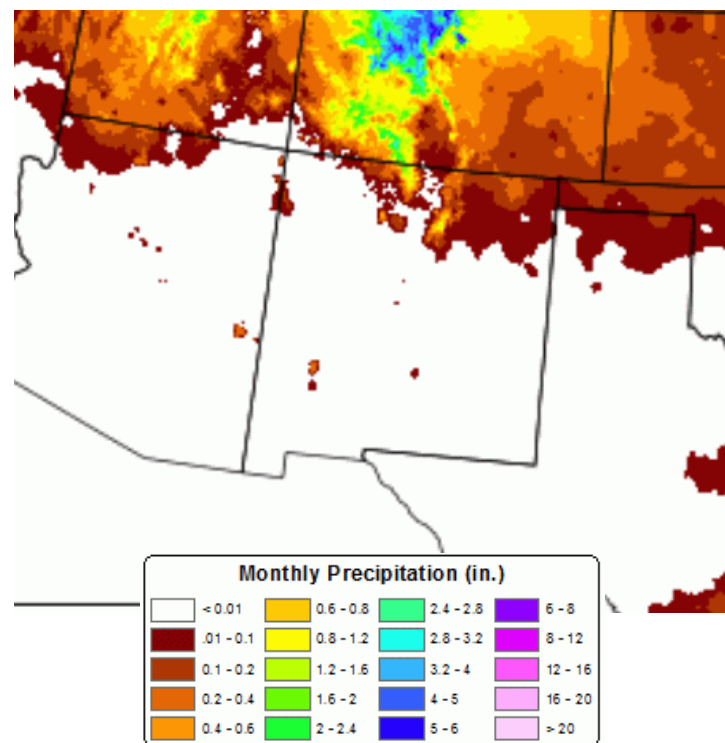
# Severe Drought Conditions Return to the Borderland

After a wet summer monsoon in 2013 extremely dry conditions returned to most of southern New Mexico and far western Texas from the early autumn periods through the winter and early spring of 2014. Total rainfall for El Paso from October 2013 through mid April 2014 was well below normal at only .54 inch while a meager .36 inch of precipitation fell at Las Cruces. January 2014 ranked the driest on record for New Mexico with no significant precipitation falling over the state. Since 2009 El Paso has lost almost 12 inches of rainfall which is equivalent to losing 1.3 years worth of rain.

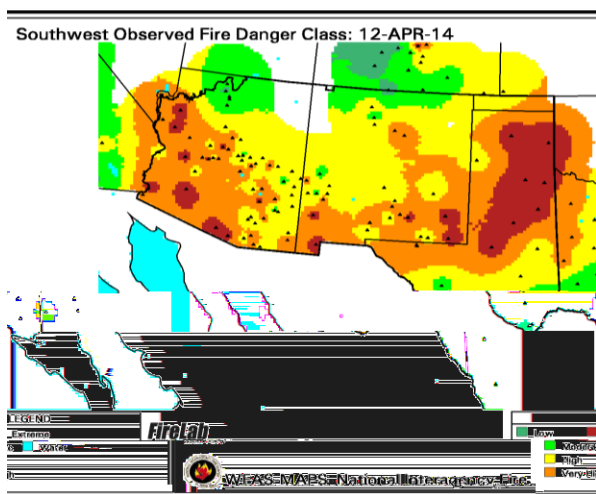
Most locations over the Sacramento Mountains received under 40 inches of snow which is less than half of normal. By April Elephant Butte Reservoir was only at 18 percent capacity and the snow pack over the northern New Mexico and southern Colorado Mountains was also well below normal. These factors indicate more hardships for area farmers as the water available for irrigation would again be very limited. The lack of rain and snowfall also caused the wild fire danger to reach critical levels by early spring.



The Benson wild fire developed near Alamogordo in April. (Erich Wuersching )



January 2014 was the driest on record for much of the southwest with little or no rain or snow falling.



By early April the fire danger was very high to extreme across much of the southwestern U.S.

# ***DAMAGING DOWNBURSTS... A FREQUENT DANGER IN THE SOUTHWEST***

Unlike tornadoes, damaging thunderstorm winds are relatively common across southern New Mexico and far western Texas. Under certain atmospheric conditions thunderstorms and even rain showers will produce strong straight-line winds known as **DOWNBURSTS**. And within downbursts there may be more concentrated swaths of destructive winds called **MICROBURSTS**. Microburst winds may blow at speeds up to 100 mph making them as destructive as a tornado.

What is usually required for a downburst or microburst is an environment which includes a moist unstable air mass either above or below a layer of much drier air. When thunderstorms or rain showers develop and the rain falls through the dry air, the rain evaporates causing the air to cool and become much heavier or more dense than the surrounding atmosphere. This heavier rain-cooled air mass sinks rapidly to the ground where upon impact it spreads outward causing an onrush of sometimes damaging winds.

In situations where the moist unstable air is aloft and the dry air is near the surface, a dry microburst may ensue and the strong winds will occur with some lightning and thunder but little or no rainfall. In contrast, a wet microburst is more likely if the moist air covers the lowest layers beneath very dry air aloft. During wet microbursts damaging winds may also be accompanied by heavy rains and even flash floods.

Each year downbursts and microbursts damage property including homes and businesses across southern New Mexico and western Texas, usually during the late spring, summer and early autumn period. Another danger from downbursts is blowing sand and dust which can rapidly reduce visibilities.



**A thunderstorm microburst estimated at 90 mph destroyed this trailer home in Gila NM in 2010. (Mike Hardiman NWS )**



**Microbursts of 80 mph caused extensive damage around Elephant Butte NM in July 2013. (John Fausett NWS)**



**Damaging thunderstorm downdrafts with moderate to heavy rainfall are often associated with low hanging rapidly moving shelf clouds (above). Destructive winds usually begin along or just ahead of the shelf cloud.**

Downburst-induced dust storms and resultant lowered visibilities have caused numerous accidents, some with loss of life, along Interstate 10, especially between Las Cruces and Lordsburg.

Finally microbursts are extremely dangerous to aircraft, primarily during taking off and landing. In 1985 a microburst directly caused a major airline crash at Dallas-Fort Worth International Airport killing 137 persons. In 2007 a microburst was believed to have caused a plane crash at Santa Teresa Airport in New Mexico which killed 2 people.

Remember when the National Weather Service issues a **Severe Thunderstorm Warning** it can mean thunderstorms may produce wind gusts of 58 mph or higher with the possibility of wind damage. Persons in the path of a severe thunderstorm should therefore take shelter in a strong building. Travelers encountering obstructions to vision from blowing dust and sand should drive well below normal speed limits or even pull over and cease driving until the visibility has improved. And finally pilots must always get a thorough weather briefing along their flight paths and avoid flying near thunderstorms.

Detecting damaging downdrafts is difficult and challenging here in the southwest, even with advanced radar technology, meaning they can strike with little or no warning.



**Severe thunderstorms with 80 mph wind gusts destroyed this trailer at Tularosa NM in May 2008. (Joan Price Alamogordo Daily News)**



**A thunderstorm dry microburst produced this intense dust storm over Columbus NM. (Len Zgonina )**



# The Southwest Monsoon in Southern New Mexico and Far Western Texas



**This thunderstorm dropped large hail around the El Paso area in September 2009. (Joe Rogash NWS/NOAA)**

The climate of the southwestern United States including southern New Mexico and far western Texas is considered semi-arid or even desert since compared to most areas of the country, this region has abundant sunshine and little rainfall. El Paso Texas is called the “Sun City” for good reason: according to solar radiation statistics it is the fifth sunniest city in the nation, receiving 83 percent of possible sunshine. And in most years, from October through the middle of June the threat of heavy rain is low because during this period the prevailing wind flow across the southwestern United States is from west to east. As a result, most of the moisture from the Pacific Ocean is blocked by the extensive mountains to the west while moisture from the Gulf of Mexico is literally blown far to the east. This circulation pattern keeps the weather mostly sunny, warm and dry most days from early autumn through the spring.

However as the deserts heat up during the late spring and summer, important changes take place in the pressure and wind fields which can rapidly increase the threat of heavy rainfall. The reasons

for these changes can be understood if we remember that in most circumstances warmer air is lighter than cooler air and thus exerts less pressure on the earth’s surface. So during the late spring and into summer the hot temperatures across the deserts of the southwestern United States develop a broad area of low pressure around southern California, Arizona, western New Mexico and Nevada. Further east where the air is comparatively cooler, high pressure will often extend across the Mississippi Valley into east Texas.

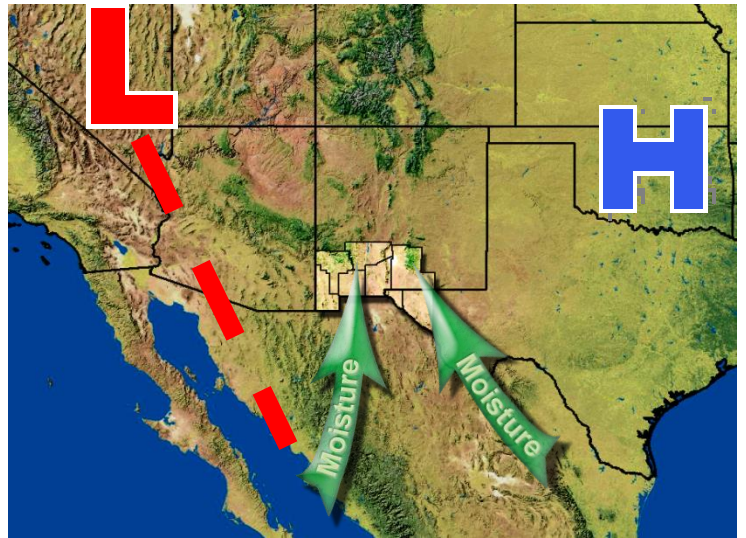
This pressure field generates south and southeasterly winds in the lower and sometimes middle layers of the atmosphere which transport moisture from the Gulf of Mexico and Gulf of California into southern New Mexico and far western Texas. The increase in moisture combined with warm summer temperatures create an unstable air mass favorable for thunderstorms which may produce heavy rains and flooding, damaging winds, hail, and even an isolated tornado.

The summer monsoon and associated “rainy season” generally begins in late June or early July and typically ends in late September. There is a wide variation in rainfall with monsoon thunderstorm activity from year to year, day to day and place to place depending on weather patterns and other meteorological factors as well as geographical effects. For example on August 1, 2006 5 to 10 inches fell over portions of El Paso Texas while little rainfall occurred around Las Cruces. Thus while you may not have a downpour at your particular location do not assume it won’t happen somewhere else in the vicinity.

During the monsoon season thunderstorms can develop anywhere but they often form and strengthen near meteorological boundaries such as cold fronts or outflow boundaries produced by previous storms. In addition disturbances such as a trough or low pressure system in the upper atmosphere act to both increase and intensify thunderstorm activity including heavy rains and flash floods. Thunderstorm initiation is especially favored over the mountains including the Sacramento, the Gila Wilderness area and the Franklins. On August 19, 1978 10 inches of rain fell along the east slopes of the Organ Mountains at White Sands Missile Range causing flash flooding which drowned 5 people.

One process favorable for flash flooding is when thunderstorms with heavy rains become stationary, dropping several inches of rain over a given area. A second mechanism for flooding occurs when multiple thunderstorms move repeatedly over a given location.

During the middle and late summer heavy rains and flooding may also be caused by weakening hurricanes which move inland from the Pacific Ocean or even the Gulf of Mexico. In July 2008 the remnants of Hurricane Dolly brought 3 to 5 inches of rain to much of the region including the El Paso area.



**The summer monsoon begins when a desert develops over the southwestern United States. As winds become more southerly moisture from the Gulf of Mexico or Gulf of California streams into the region.**



**Flooding over Alamogordo in June 2006.**



**Summer 2008 Flooding in El Paso. (Rudy Gutierrez El Paso Times)**



**A Lunar eclipse occurred on the night of April 15.  
(Tom Ruen)**



**In March students and faculty from the Universidad Autonoma de Ciudad Juarez visited the National Weather Service Forecast Office in Santa Teresa.**



**NWS El Paso hosted the Spring 2014 Media Workshop on April 28.**

**Tornado**

**And Other Structures**

**Arroyos Flood Or Overflow**

**Rain In Less Than 2 Hours**

**Snow Amounts Greater Than An Inch**