

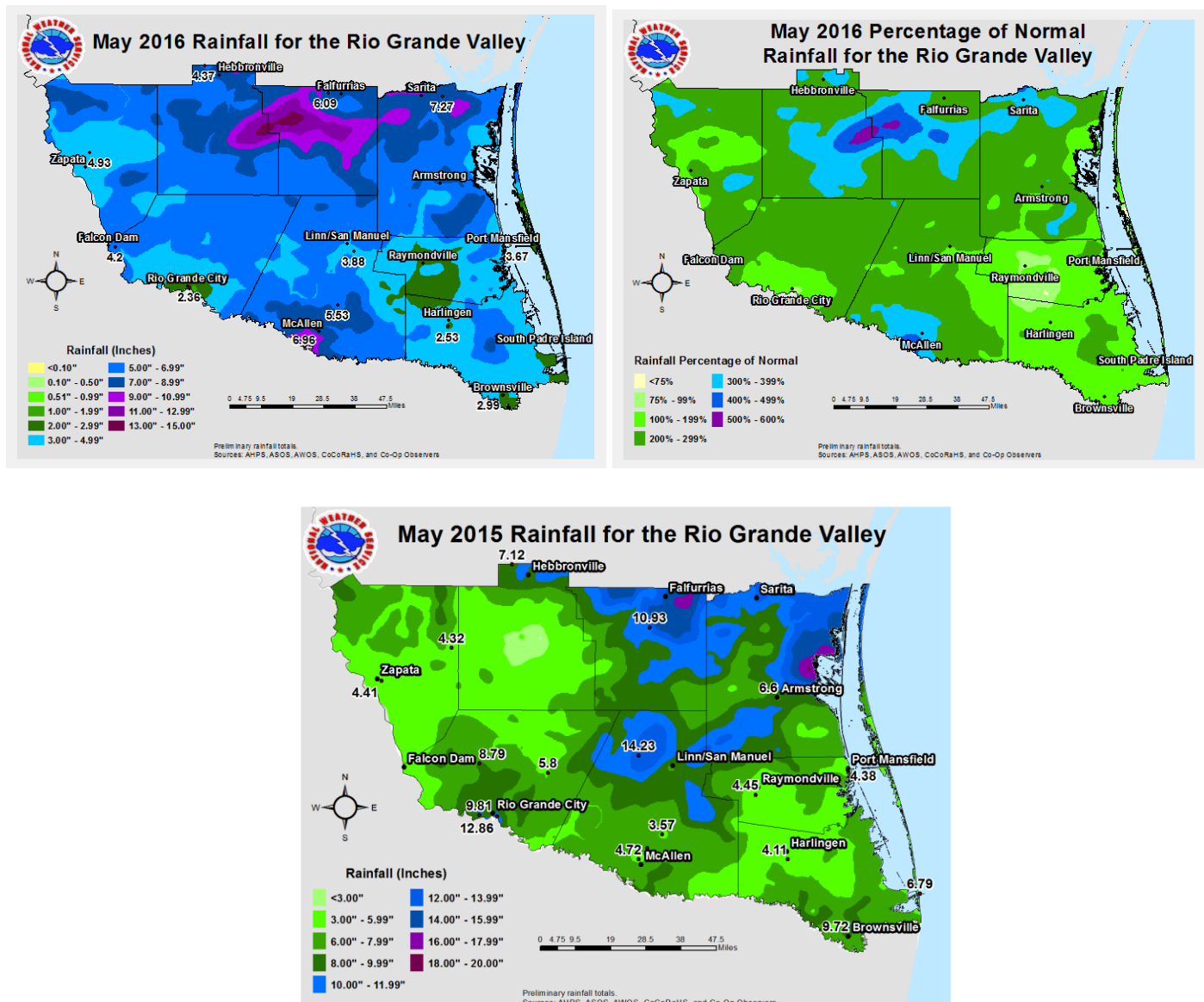
## A Lot of Rain Keeps the Drought Away Flooding and Damaging Thunderstorms Punctuate a "Green" Valley For Second Year in Row Between March and May

But El Niño Had Little to Do With It

The Wet...

The rains came. And came again and again. By the time spring 2016 was over, nearly the entire Rio Grande Valley/Deep South Texas ranchland region had received above average totals. The ranchlands of Jim Hogg, Brooks, and Kenedy County were eerily similar to 2015 in reaching “jackpot” status – though substantially lower than the exceptionally wet 2015, which ranked #1 and #2 across the Deep South Ranchlands and Rio Grande Valley, respectively (2016 ranked #27 wettest in both areas). Many areas receiving 12 to 20 inches of rainfall for the period, or two to four times the 20<sup>th</sup> century spring average (4.5 to 6 inches). One pocket that often missed the significant rainfall was in the Lower Valley between Harlingen and Raymondville, where totals of 3 to 6 inches were right around the three month average. Notable rain events (often occurring with damaging winds and some hail) occurred between March 8-10, April 18-19, May 14-20, and May 30-31. Links to these events are included in the “Stormy” section below. May 2016 (below, rainfall and percentage) 2016, similar to May 2015, was the month that put the majority of the region over the top with widespread areas of 200 to 300 percent of average, and pockets of 400 to 600 percent above average (across the ranchlands). At the end of this report, a table of observation sites around the Valley and Deep South Texas, along with departures from their 1981-2010 averages.

The rain was largely welcome, but did come with mostly nuisance consequences in the form of street flooding and some poor drainage location flooding, mainly across the densely populated lower and mid Valley as well as a couple of cases along U.S. 83 in Starr and Zapata County.



Above, Left: May 2016 observed rainfall; Right: percentage of rainfall compared to the 1981-2010 average. Bottom: Comparison of areas with heaviest rains in 2015 vs. 2016, which showed the ranchlands north of the Valley did well each year.



Widespread wind damage to Chimney Park mobile home/RV community south of Mission, Texas, after May 31<sup>st</sup> downburst.

### **The Stormy**

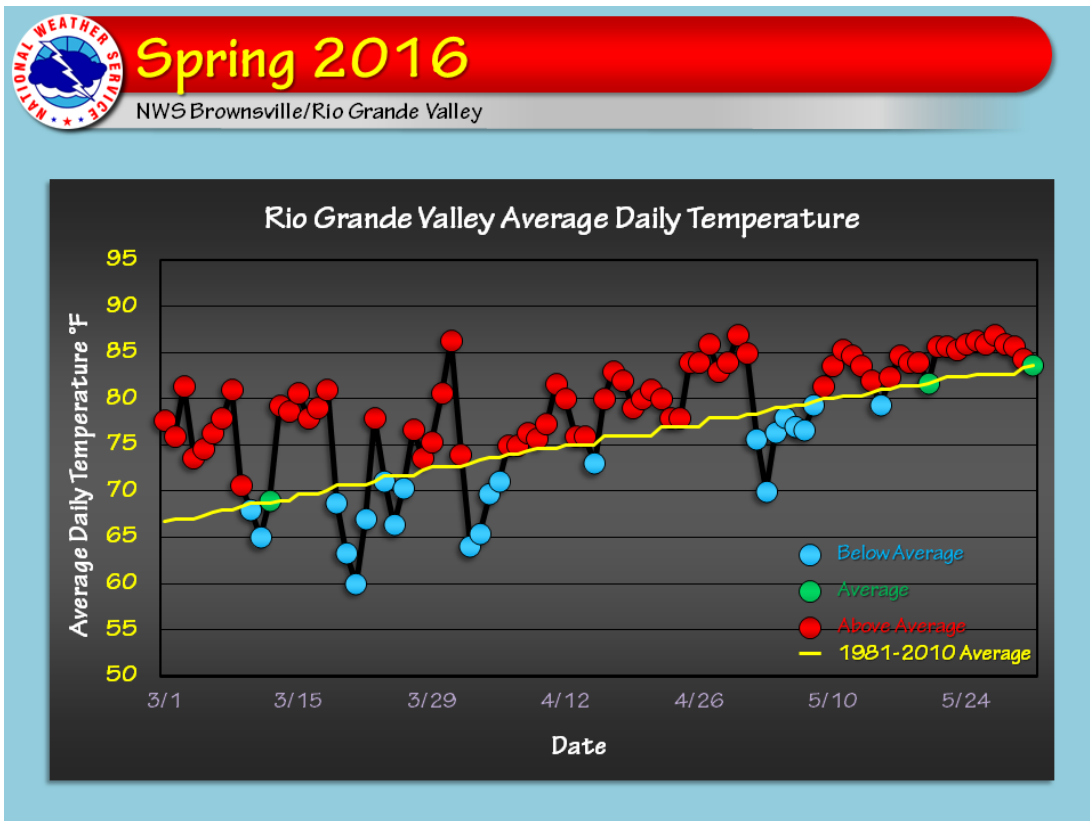
Severe weather season – when damaging windstorms, hailstorms, and lightning storms are most common across the Rio Grande Valley – typically occurs from late March through mid-May. 2016's stormy season generally fit into the mold, with the first isolated minor hail events occurring as part of an unusual upper level disturbance that dove deep into Mexico between [March 8<sup>th</sup> and 10<sup>th</sup>](#). Localized minor wind damage and quarter sized hail occurred in the mid Valley, between McAllen and Linn/San Manuel. April brought lightning storms that took out power to portions of the Lower Valley, along with pockets of gusty winds and quarter sized hail, on the [18<sup>th</sup> and 19<sup>th</sup>](#). Less than a week later, a supercell thunderstorm drove southward through Kenedy County behind an exiting upper level disturbance, and produced golfball sized hail from the King Ranch through northern Willacy County on [April 24<sup>th</sup>](#).

The more notable events waited until May, with the “coup de grace” on the final day of the month. Between [May 14<sup>th</sup> and 20<sup>th</sup>](#), a combination of wind and hailstorms, as well as some flooding rains, occurred. More than three dozen homes in *colonias* east of Edinburg sustained roof, carport, and other damage when 60 to 65 mph winds surged through in a quick-hitting microburst during the afternoon of the 14<sup>th</sup>. On the 16<sup>th</sup>, discrete hailstorms pounded rural Jim Hogg, Zapata, and Starr County. Fortunately, populated areas were spared, but hail up to 2” in diameter was observed in El Sauz and near Rio Grande City. The big one waited until the 31<sup>st</sup>, when an individual cell along a broken line of storms intensified and dropped a [long-lived downburst with 85 to 95 mph estimated winds](#) from south Mission to Hidalgo. The fun wasn't *quite* done with the start of June; bands of morning thunderstorms on June 4<sup>th</sup> dropped up to 2.5 inches of rain from San Benito to Harlingen, and 60 mph wind felled trees in Rancho Viejo.

### **The Warm and the Dirty**

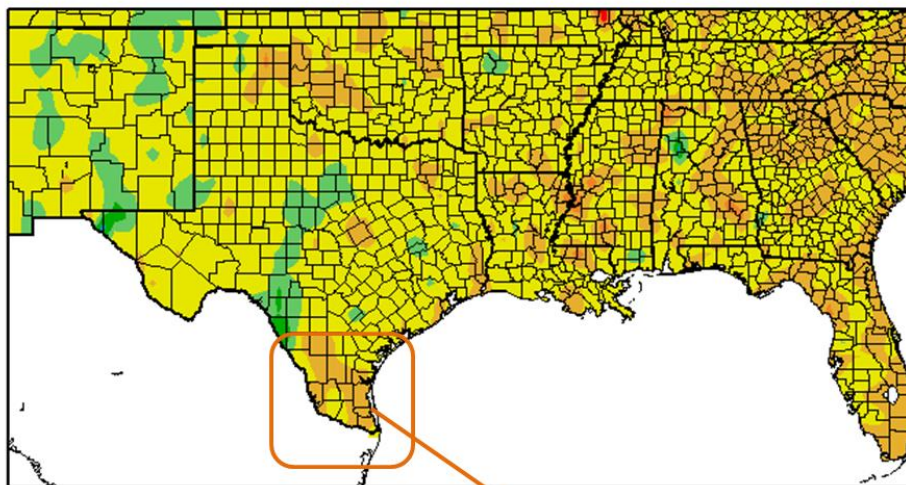
While the long-term spring forecast for March to May largely panned out for rainfall potential (a 35 percent probability of above average for the region), the forecast for below average temperature (37 percent probability of below average) fell short again by a long shot. Persistent southerly flow of tropical air and cloud cover kept nights warm on most days, and heat and humidity by day became an issue in April and May. The southerly

flow brought abundant pollutants (known as Fine Particulate Matter, or varying levels of smoke, dust, and dirt) from industrial and agricultural burning in southern Mexico and Central America on a number of days between March and May, with several bouts of air quality that was “unhealthy for sensitive groups”. Often, pollutants became trapped under a strong subsidence inversion and peaked by late morning. The worst day was March 31<sup>st</sup>, when air quality reached 155, or unhealthy for all groups. By the end of spring, temperature departure from average was 2 to 4°F (second image below) – a far cry from below normal once again.



This line chart says it all: More than three-quarters of all days from March through May 2016 were above the 1981-2010 average across the Rio Grande Valley.

Departure from Normal Temperature (F)  
3/1/2016 – 5/31/2016

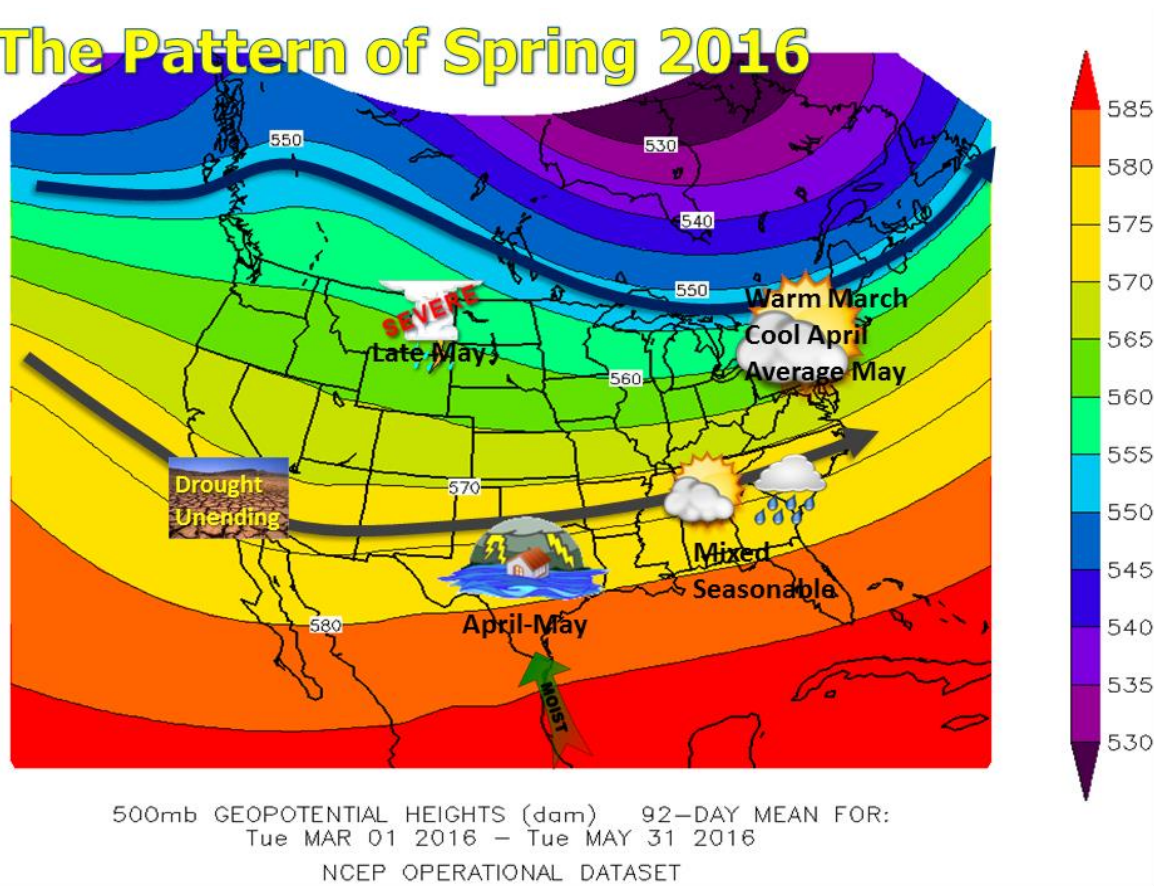




## El Niño...Or Not?

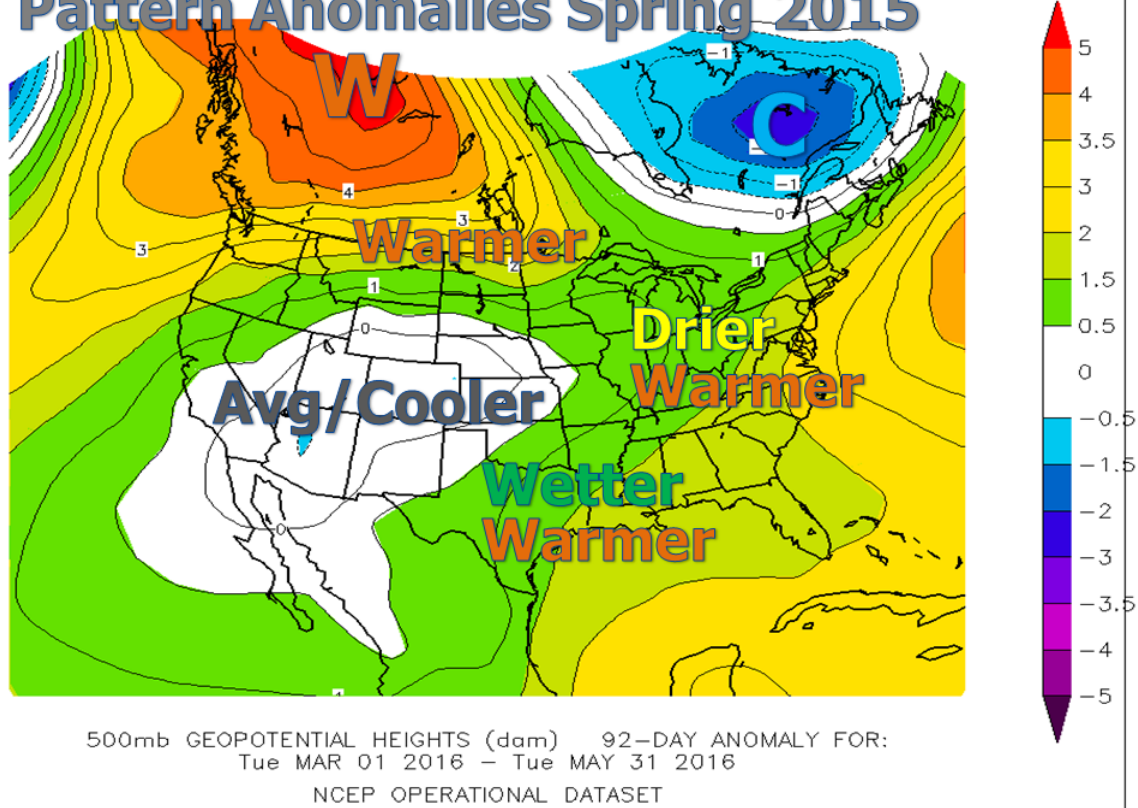
Despite the hype of El Niño, the warm phase of the oscillation had little to do with the spring 2016 outcomes. In fact, the general pattern was not too different across the southwest U.S. than in 2015, when El Niño was just getting started. Unlike 2015, when the rain was more pronounced across all of Texas, including the Valley, rain was a bit less so in 2016. The flow pattern was a smidge more amplified in 2015 than 2016, but the jet stream “dip” was similar. Click [here and scroll to page 2](#) for the mean and anomalous steering pattern across the southern and southwestern U.S. from March to May, 2015. In 2016, nearly all of the systems that caused the hazardous weather in the Valley originated from the temperate (mid-latitudes) of the eastern Pacific, and “dipped” into the southwest U.S. where they moved slowly but were able to pull in sufficient atmospheric moisture ahead of them, on which the disturbances would “trigger” the combination of lightning, wind, hail, and flooding rainstorms. Put another way, a full-on El Niño impact that overwhelms all other factors brings above normal rainfall from southern California through parts of Texas into Florida. In 2016, only the eastern half of that area saw the expected rains; severe to exceptional drought remained across southern California, much of Arizona, and western New Mexico.

## The Pattern of Spring 2016



Above: Average steering pattern for the continental U.S. during March-May 2016. The polar jet (dark blue) kept cool air out of the west, but allowed some “invasion” of late winter type air into the Northeast and Midwest in late April and May. The subtropical jet generally remained well south of the U.S. but was “tapped” by the flow (gray arrow) that dipped into the southwest U.S., peaking in Texas (green “moist” arrow).

# Pattern Anomalies Spring 2015



Above: Departure from average of the steering pattern, March through May, 2016. Similar to 2015, a pocket of average to lower (“cooler”) values existed over the Southwest U.S., with above average (“warmer”) values to the east. The differences between the two in 2016 were not as stark as in 2015, which explains why rainfall rankings in Texas were a bit lower – but still among the higher standings on record.

**Table of Selected Rainfall Observations and Departure from 1981-2010 Average, March-May, 2016.**  
**NOTE: A number of locations were missing up to 25% of data, so total values may be incomplete.**

Location	Rainfall (inches)	Departure
Sarita 7 E	10.44	+4.82
McAllen/Cooperative	9.17	+4.77
McAllen/Miller	8.33	+3.71
Falfurrias (Cooperative-west)	8.22	+2.52
Brownsville/SPI Int'l Airport	8.11	+2.70
Edinburg Cooperative	7.75	+2.61
La Joya	7.28	+3.62
Falcon Dam	6.67	+2.35
Port Mansfield	6.16	+0.98
Rio Grande City	5.94	+1.69
Harlingen/Cooperative	5.00	-1.74
Harlingen/VIA	4.98	-0.47
Santa Rosa	4.92	+0.23
South Padre Island	3.76	-1.80
Weslaco 2 E Cooperative	3.70	-1.36