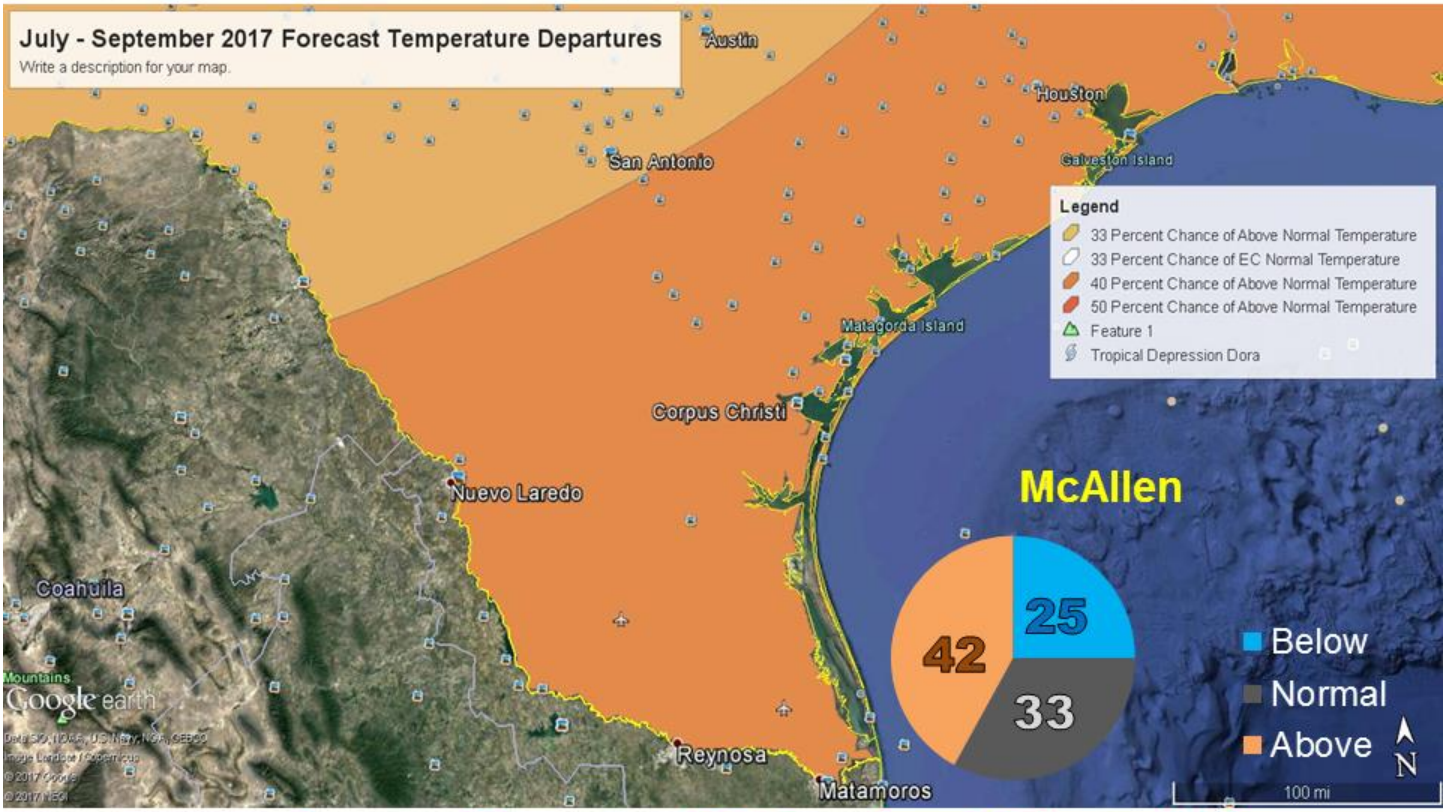
RGV July-September 2017 Outlook

The Heat Goes On and On and…



Based on 1981-2010:

Average Afternoon: 92° Beaches, 95° Lower Valley, 97-99° Mid-Upper Valley

Average Wake-Up: ~80° Beaches, 74-77 Elsewhere

Average All Hours: 86-89°

Record 2017 Heat to Continue Through Late Summer…

…But How Much Will It Rain? Predictive Data Remain In Different Camps

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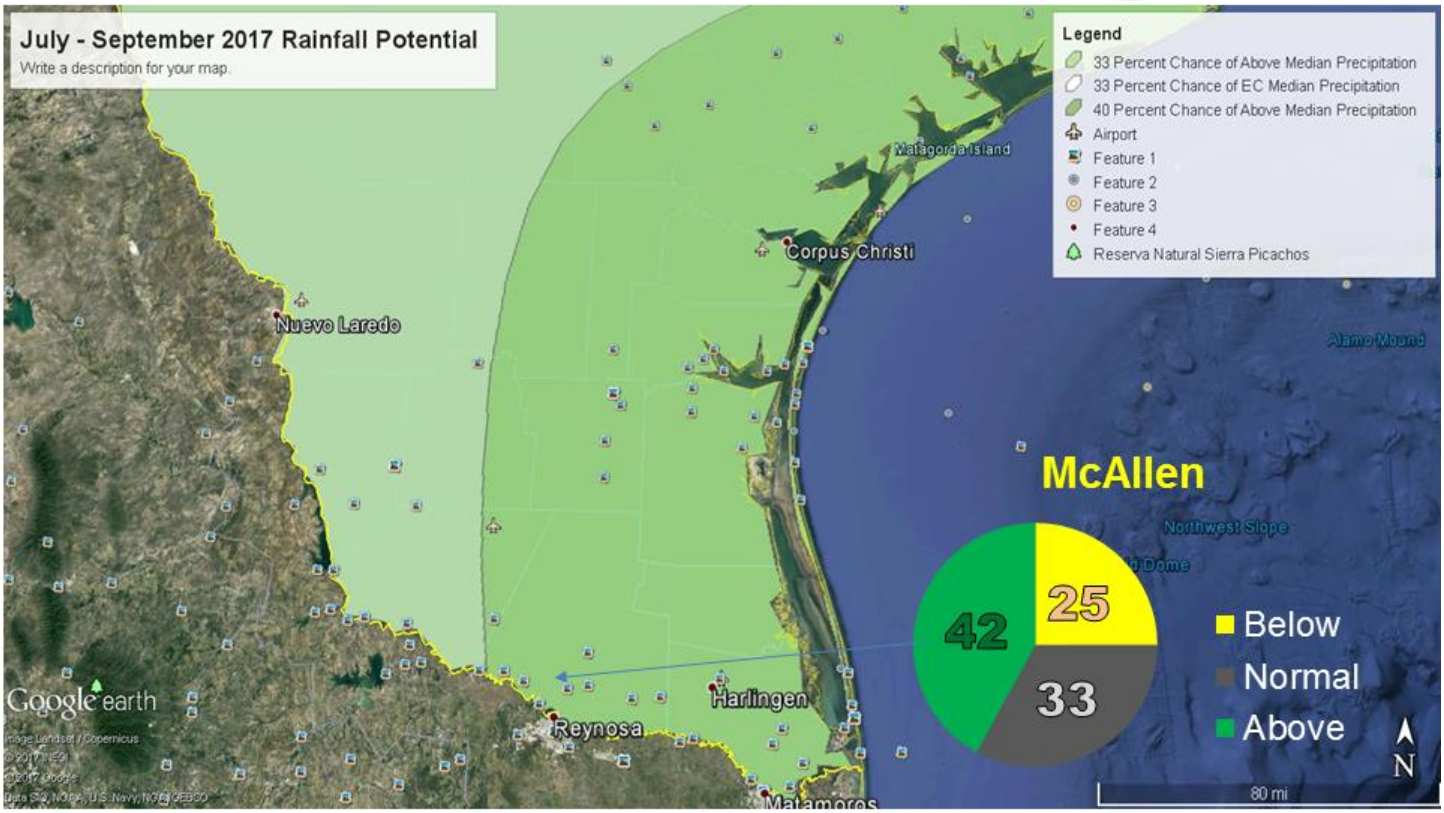
Tropical Forecast Highly Uncertain; Drought May Worsen

Overview

The heat remains the story for 2017 across the Rio Grande Valley. With a sizzing heat wave through most of the month that peaked when Tropical Cyclone Cindy tracked into southwest Louisiana and brought a "blast furnace" surge of daily record to all-time record heat between June 21st and 23rd, June continued the streak of above average temperature months, Valley-wide, since July 2016 (a full year) – and a staggering ***27 straight months*** at McAllen/Miller Airport. As of this writing (June 29), McAllen/Miller Airport, one of the region's known hot spots, had reached 28 days of 100˚F, well on the way to closing in on the 2016 record of 90 such days (with the peak of summer yet to come). For the second month in a row – and despite average temperatures reaching toward their summer peaks – the values for 2017 were once again 1 to 3 degrees above the 1981-2010 average. June's rain was also lacking for most areas; aside from greater Brownsville, which hit jackpot (2 to nearly 4 inches) toward month's end, most areas were generally between 25 and 75 percent of the 1981-2010 average.

Whether “La Canícula” dominates July and August or is slightly modified (see Pattern Matters, below), the expectation (42 percent chance) of above average temperatures (only 25% chance below) suggest plenty more opportunity for triple-digit afternoons especially along and west of US 281/IH 69C through August and probably for a few days in September as well. Outside of a significant pattern shift or a significant rain-making tropical cyclone towards the start of the peak of the Valley’s tropical season (i.e. around August 1), heat and humidity along with a frequent return to the “Valley Wind Machine” (breezy south to southeast winds) will dominate well into August. September is often a “wild card” and climatology shows the month as the wettest, by far, on average – but this climatology is dictated by the general dominance of the Bermuda (vs. Canícula) ridge and an open door to tropical moisture, waves, or cyclones from the moisture-rich Caribbean and southern Gulf of Mexico. In 2016, vestiges of La Canícula remained and were critical in keeping rainfall below average across the region. This could well be the case for the entire late summer period, despite the favorable forecast for ***above*** average rainfall.

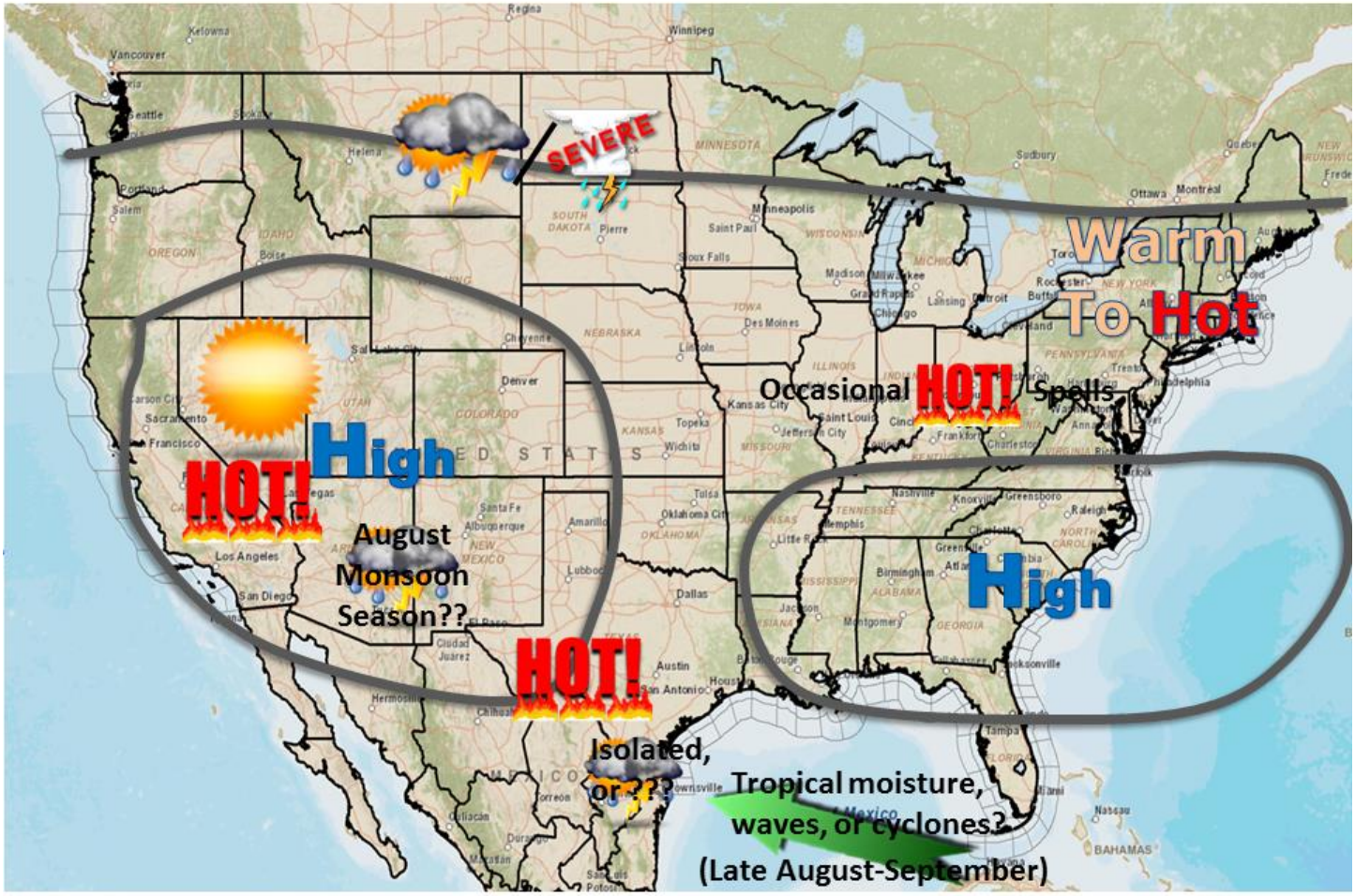
...But Will It Rain Enough?



Based on 1981-2010:

Average Rainfall:
7 to 9 Inches West
8 to 10 inches East

This Steering Pattern, July-September 2017?



Pattern Matters

***Possibility A:* Canícula Recession**

The hot and wet forecast for late summer 2017 is predicated on the forecast steering pattern, above. This would favor equal impact from a receding La Canícula ridge and an encroaching Bermuda ridge (High centered over/east of the Carolinas), with a "weakness" between the two which would allow deep tropical moisture to "shoot the gap" and take aim at coastal Texas and Louisiana with enough rainfall to keep values near or above the typical lower averages for June through mid-August, then a more open door for heavier rainfall by September – bringing the three month totals above the 7 to 10 inch normals for the season. Unfortunately, *confidence* in this outcome remains low – and June, 2017 was just one example of why the confidence was low; initial 0.5 (half month out) long-lead forecasts were for above average rainfall, Valley-wide; the update (issued on the last day of May) dropped this back to "equal chances" (~33 percent for all possibilities) and the reality – with the exception of a pocket near Hebbronville and the late-month relief for Brownsville – was the aforementioned 25 to 75 percent of the 1981-2010 average (below).

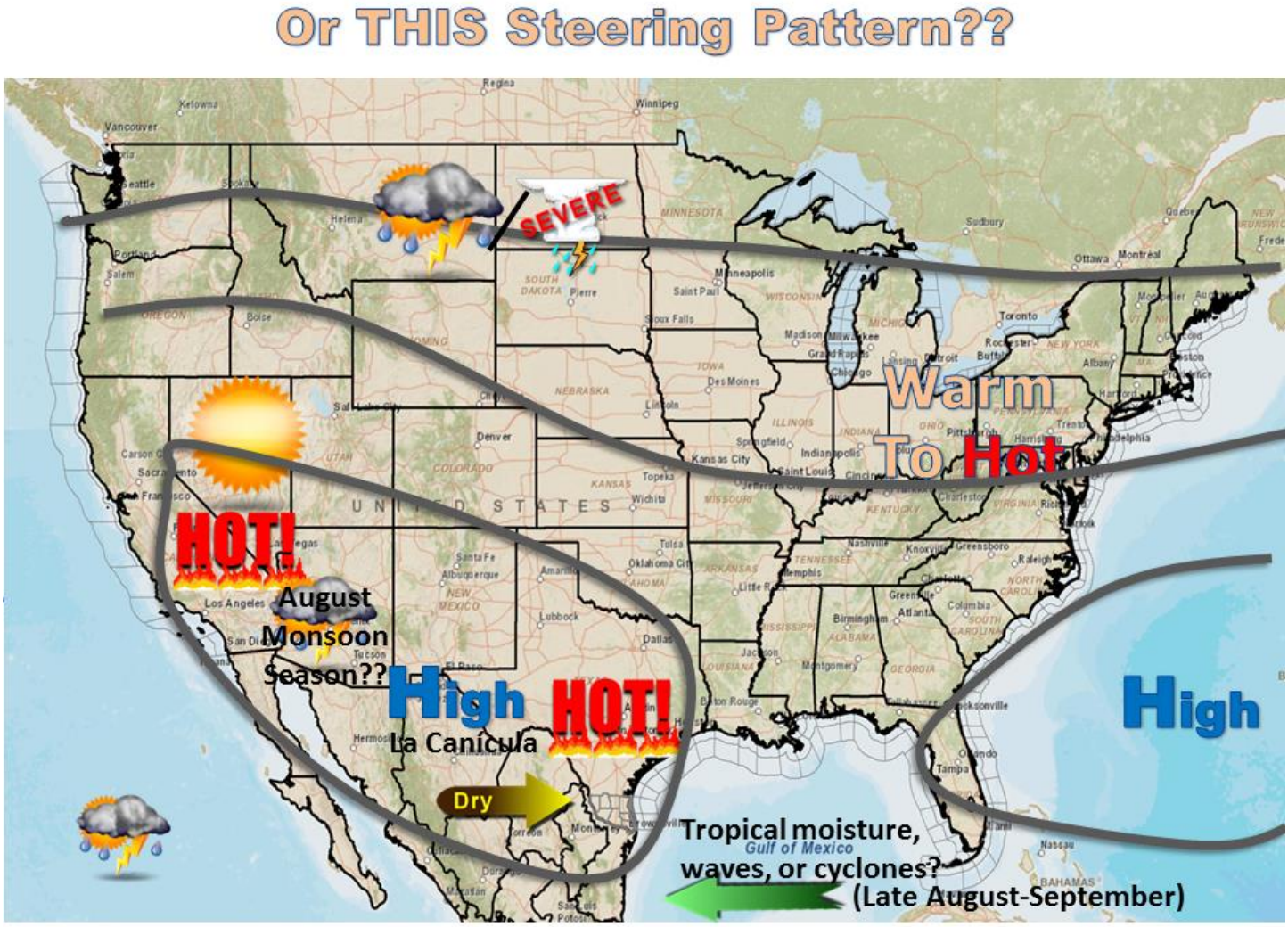
***Possibility B:* Canícula Sustenance**

Sometimes, persistence is the best forecast. La Canícula did not recede through the summer of 2016, even as a southward displaced western Atlantic ridge "linked up" with the parked ridge over southwest Texas/northeast Mexico. In June 2017, the southwest US ridge was dominant and the cause of new record scorching heat from Phoenix to Las Vegas and many surrounding locations, with the eastward extend reaching into South Texas and the Rio Grande Valley most of the month. If Canícula sets up in its usual location over west Texas, northern Mexico, and New Mexico and extends into south Texas (map, below), two things will occur:

- Dry and hot to very hot air will be dominant underneath the ridge, including the Rio Grande Valley, which would suppress rainfall to below the typically low average in July and August
- A continuation into September would sharply reduce rainfall totals across the Valley, on average, to one-half or less (for example, 2 to 4 inches rather than 4 to 6 inches)
- Tropical moisture, waves, and cyclones would be directed from the Caribbean into southern Mexico (i.e. Veracruz rather than Tamaulipas)

This was largely the situation in 2016, where the northwest Gulf (Texas coast) was void of any direct peak-of-season landfalls, and the nearest approach to the Valley was from Tropical Cyclone Earl, which was steered into Belize and hugged the northern coast of Mexico along the Bay of Campeche before creating killer floods and mudslides in Veracruz and Puebla, where scores died. In the "gap" between the weaker western Atlantic ridge extension and Canícula, Hurricanes Hermine (eastern Gulf) and Matthew (along the east coast of Florida) tracked, causing nearly $16 billion in total damage from the Caribbean to the U.S.

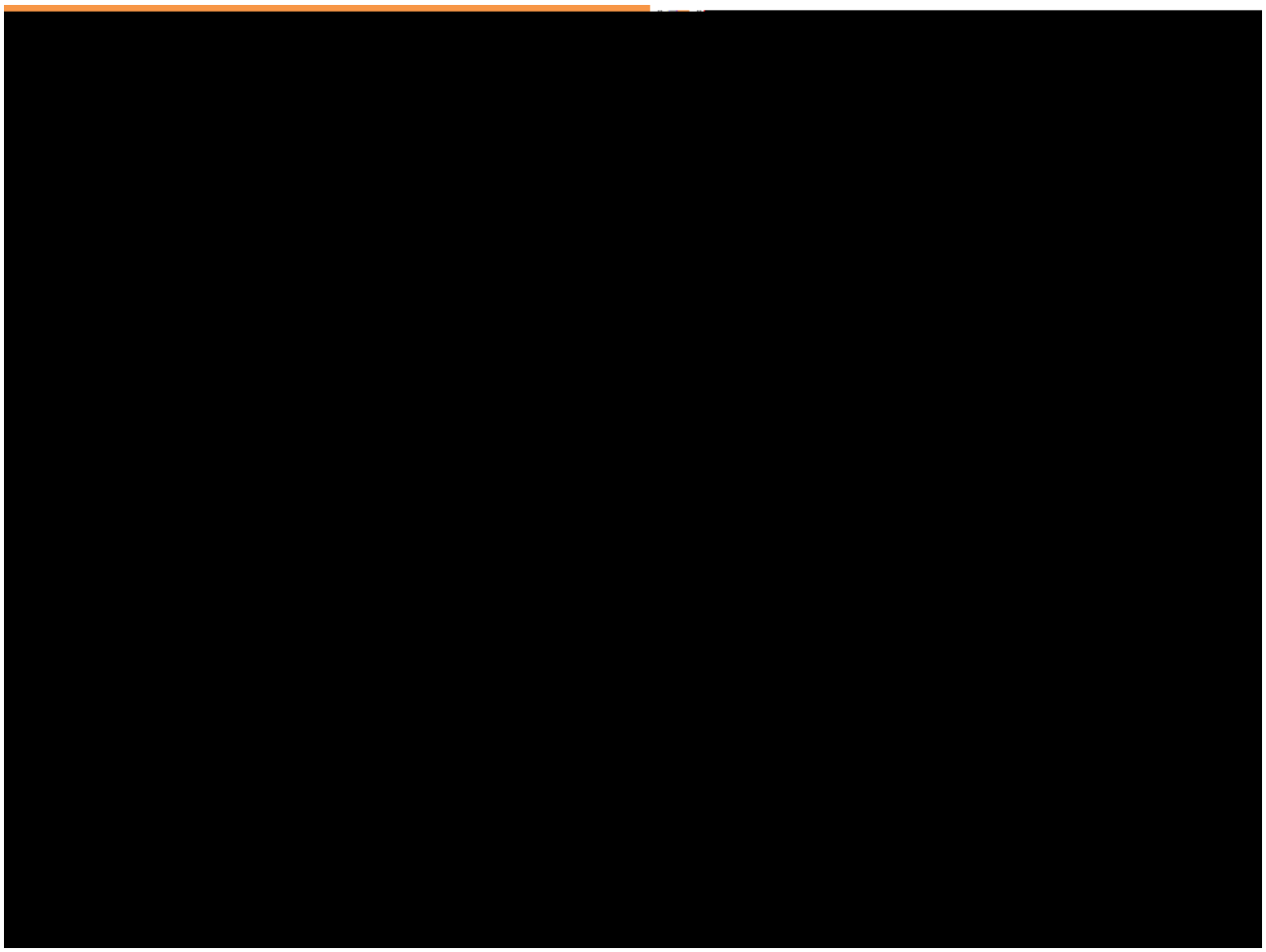
As of this writing, confidence in Possibility B is medium – a bit higher than Possibility A, but still uncertain. As is the case in any summer, just one period of a wet pattern can tilt the seasonal precipitation to *above* average; this was most recently seen in Brownsville on June 27-28, when two separate thunderstorms were enough to turn a monthly rainfall deficit into a surplus.



The Wildcard: **September and the Tropics**

September in most years is when average rainfall spikes to between 4.5 and 6 inches, Valley-wide – and when the Bermuda/western Atlantic ridge typically "takes over" and opens the door to the necessary tropical moisture to produce multiple events of locally heavy rainfall, whether or not a tropical cyclone is associated. In 2016, Canícula held forth and rainfall was just 25 to 75% of these averages (except in Zapata County). This could be

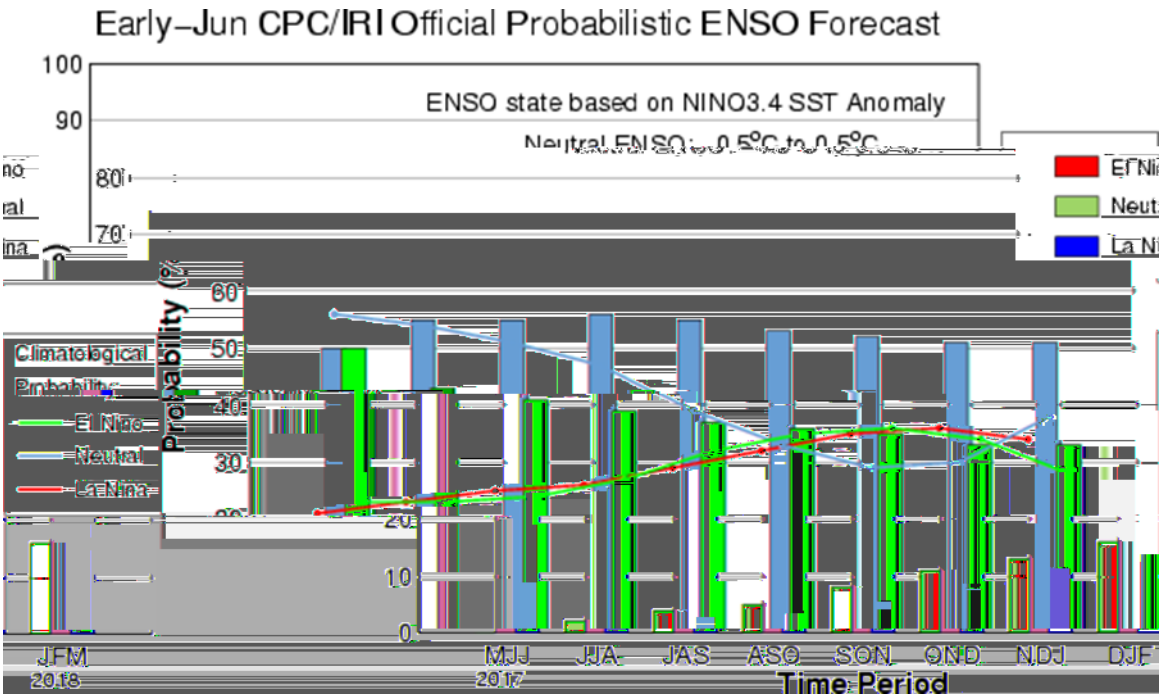
the case again in 2017, especially if the forecast through mid-July (below) verifies, and extends through August or beyond. However, with some puzzle pieces in place for a more active tropical season, including a neutral El Niño/Southern Oscillation (ENSO), warm Atlantic Ocean temperatures, and a mixed opportunity for low wind shear in the Caribbean and Gulf, the northwest Gulf will need to be on the lookout for bigger rains – especially if Possibility A (above) pans out. Stay tuned, but as always, be prepared for tropical moisture that could produce flooding rains toward the end of the July-September period, as always.



Above: Forecast steering pattern (~18,000 feet) through July 13, 2017. In general, this pattern tends to suppress rainfall in New Mexico, Texas, and northeast Mexico and press down tropical moisture in the southwest Gulf/Bay of Campeche area.

Teleconnections: ENSO Parked in Neutral?

Through the end of June, ENSO struggled to achieve a strong enough positive index to be considered even a weak El Niño after an early spring burst which faded into a steady state "neutral leaning positive" phase into June. Historically, spring warm surges have the potential to be "false positives" – and the neutral ENSO phase can last longer than expected, which remained the case in summer and into fall of 2017. As shown below, through the peak of the 2017 Atlantic tropical season ENSO is forecast to be neutral, with a positive lean (very low probabilities of an eastern tropical Pacific "cooling" below average compared with "warming" – which is the El Niño phase). Interestingly, atmospheric wind shear has been persistent in the Caribbean through spring and early summer – *perhaps* a function of the weak but notable eastern tropical Pacific warming for most of spring 2017. Whether this continues through late summer and early autumn, a period when wind shear reaches its low point, is uncertain at the end of June.



Above: Probabilistic ENSO forecast through early spring 2018 (JFM), showing neutral conditions as the most likely outcome through summer and fall 2017.

What to Watch For: Summer Heat, Worsening Drought. Rain??

Overall, for the remainder of meteorological summer (through August) into September, the following situations are expected to predominate:

- *Heat.* All systems are "go" for another stronger than average Canícula period through July, with August more uncertain. This period in any year is from July 3 through August 11, and may well expand on both sides of the calendar to cover the first two thirds of August. This would ensure McAllen sees at least 25 days of 100°F or more in July, and a good chance for that number in August. This would end summer (August) with more than 70 days for the city, ranking it among the top five years on record with 100°F days. Heat Index, or "feels like" temperatures, would consequently be higher – though the drier atmosphere would keep them in check and generally ranging from 103 to 109°F. (Valley danger typically begins at around 111°F). While temperatures will be a little lower near the coast, a typical afternoon may see Harlingen top out at 98°F and Brownsville at 95°F – in all cases, 1 to 2 degrees above average by day. Sultry mornings in the upper 70s to around 80 would be some 2 to 4 degrees above average – similar to long periods during the summers of 2015 and 2016.

- *Drought.* Addition heat with little to no rainfall increases the stress on Valley/Brush Country grasses, trees, and brush. At the end of June, moderate drought (known as "D1") continued along the Rio Grande from Brownsville the McAllen; some of the late June rains around Brownsville may temporarily improve conditions to "abnormally dry" (no official drought). A dry, hot summer would ensure expansion of moderate drought with potential for severe drought in some of the more agriculturally-rich Rio Grande Valley areas. The future of any July/August drought expansion would then rest heavily on whether September plays out as "normal" (wettest month of the year) – or relatively dry, similar to 2016.

- *Tropics Watch.* The seasonal Atlantic Basin forecast is slightly above average – with a 45% chance for an above average number of cyclones (11 to 17 vs. 12), hurricanes (5 to 9 vs. 6), and major hurricanes (2 to 4 vs. 2). As of this writing three cyclones (Arlene, Bret, and Cindy) had already occurred. However, western Gulf action requires the following elements, or "puzzle pieces" to fall into place:

    - *Pattern.* Canícula locks down the western Gulf by providing subsidence (dry air) and a steering pattern that brings any cyclone moving west from the Caribbean on a westward track into

central America, the Yucatan, or Veracruz. Canícula will have to break in August to allow any cyclones to nudge into the southwest or western Gulf and make a direct or nearby strike. September is typically the best month for deep tropical moisture and a favorable steering pattern – and there's a slight lean away from this outcome.

- *Wind Shear.* Caribbean wind shear, as of this writing, remained somewhat hostile, but not as much so as in early to mid-June. The evolution of wind shear through summer is unknown, though a strong Canícula ridge can be part of a pattern that favors upper level troughing to the east, with an increase amount of wind shear that can remain in the tropics and subtropics, including much of the Caribbean and western Atlantic. There remains uncertainty on the evolution of wind shear by late August and September.
- *Moisture.* Wind shear dominance can also come with a dearth of moisture. And, there's always the unknown strength of Saharan Desert dust storms (and movement) from east to west which can add more dry air into the mix across the eastern through central tropical Atlantic, reducing the ability of African waves to develop particularly from late July through August.
- *Sea Surface Temperature.* This is one element that is expected to be "high octane gasoline" for any tropical engines that develop and move across the favored areas of the Gulf, Caribbean, and western Atlantic. Cooling of the central and eastern Gulf from precipitation associated with upper level disturbances and Cindy's atmospheric river may flip back to normal or above in July and August. Time will tell.

Outlook: Summer 2017

July should see hot temperatures with low rainfall conditions prevail, along with occasional bouts of the "Valley Wind Machine" and the occasional pattern break that allows some sea breeze showers and thunderstorms to develop, especially near the coast, from mid-morning through early afternoon. Should pattern Possibility A (earlier in this article) come to pass, deep tropical moisture pinned into the Bay of Campeche to Veracruz (normal for the month) could "escape" northwestward from time to time, aided by upper level weakness (troughs) and reach Tamaulipas and the Valley. Such an event (or two) would quickly bring monthly rainfall above average (average is around 2 inches. Should the trends of a weak El Niño or neutral/negative lean remains established, and neutral to negative North Atlantic Oscillation (NAO) join up, Canícula will set up shop with an upper level ridge becoming established over west Texas/New Mexico extending into northern Mexico. If neutral ENSO and some type of +NAO prevail, the potential for the Bermuda ridge to dominate increases. This is leaning unlikely in July, but a bit more uncertain than for June – so expect temperatures to range from 1 to 2°F above the already swelting summer values, and drought conditions could worsen incrementally and potentially spread from the Lower and Mid Valley out the Upper Valley and ranchlands by month's end.

August may begin where July left off, but uncertainty develops by mid-month as it typically does when trying to forecast teleconnections and combine with the ability of the tropics to maximize moisture availability. For now, the "lean" is to remain dry, with increasing uncertainty on whether Canícula shifts to a Bermuda high at some point and opens the door for deeper tropical moisture in any form. That situation would favor the second half of the month.

September is always the wild card, and no more than in 2017. Given the amount of neutrality with nearly all of the teleconnections, predicting whether La Canícula reigns, or the western Atlantic/Bermuda high "rains", is virtually impossible at the end of June. The lean here is for Canícula to still have a shadow influence in September, which would favor at least pockets of the Valley below the 4.5" to 6" 1981-2010 average.

Preparedness, Awareness

The forecast is confident for a hot July and August, and slightly leaning toward dry versus wet weather for the same period, uncertainty increases to close August as well as the expectation for a slightly above average Atlantic tropical cyclone season makes July the perfect time to finish up revisiting, reassessing, and restocking hurricane/tropical supply "stay" and "go" plans and kits, make your home or community #hurricanestrong, and purchase wind and flood insurance well in advance of any possible strike. Take advantage of the expected quiet period for the first half of summer, at least.

- ***Heat and Hydration.*** Late June saw some of the hottest temperatures – "feels like" and actual – on record. The Fourth of July Weekend was forecast to flirt with 110˚F heat index values, and more such days are likely to prevail in July and at least through the first half of August, if not longer. Though September is a wild card, a hot pattern or another tropical cyclone tracking into Louisiana can bring a heat spike, similar to what occurred with Cindy this year in June, and more appropriately with Tropical Storm Lee in 2011. Residents should continue to follow heat safety tips, found on our local heat awareness page and the NWS national page. Most importantly, remember to Look Before You Lock your vehicle, especially as more people will be out and beginning the back to school shopping season.

- ***Drought Severity.*** This could be a late summer, and if September doesn't achieve normal rainfall, an autumn to revisit two important "-ations" of the Valley's complicated water use system: Those include smart **irrigation** and **conservation**. The persistent extreme to exceptional drought of 2011 to 2013 demonstrated to the Rio Grande Valley that one year's feast (the 2010 record **wet** water year, defined as October through September, rainfall) can become the next year's famine (2011 record **dry** water year). September 2016's drier (and hotter) than average result, followed by a much warmer and generally drier than average winter (December 2016 – February 2017) set the stage for the most irrigation water needs since 2013 for large and small crop growers alike. Residents can begin conserving water at any time to be ready in case September rains fail to materialize and tropical waves or cyclones stay away for yet another year.

Drought Severity Classification

			Ranges				
Category	Description	Possible Impacts	Palmer Drought Severity Index (PDSI)	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: ▪ short-term dryness slowing planting, growth of crops or pastures Coming out of drought: ▪ some lingering water deficits ▪ pastures or crops not fully recovered	-1.0 to -1.9	21 to 30	21 to 30	-0.5 to -0.7	21 to 30
D1	Moderate Drought	▪ Some damage to crops, pastures ▪ Streams, reservoirs, or wells low, some water shortages developing or imminent ▪ Voluntary water-use restrictions requested	-2.0 to -2.9	11 to 20	11 to 20	-0.8 to -1.2	11 to 20
D2	Severe Drought	▪ Crop or pasture losses likely ▪ Water shortages common ▪ Water restrictions imposed	-3.0 to -3.9	6 to 10	6 to 10	-1.3 to -1.5	6 to 10
D3	Extreme Drought	▪ Major crop/pasture losses ▪ Widespread water shortages or restrictions	-4.0 to -4.9	3 to 5	3 to 5	-1.6 to -1.9	3 to 5
D4	Exceptional Drought	▪ Exceptional and widespread crop/pasture losses ▪ Shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less	0 to 2	0 to 2	-2.0 or less	0 to 2

- ***Flooding Rains.*** Will Canícula fail to hold? If it fails, the rains will come – and could fall hard and fast, changing the dry landscape to a wet one – perhaps even a scene of a few "mini" lakes – in a hurry. As a Texas meteorologist once stated nearly a century ago: "Texas is a state of drought, broken by the occasional devastating flood." We saw this statewide in 2015, just four years after a record dry water and calendar year (2011) – where dozens drowned and billions of dollars in property damage was noted. Willacy County became "Lake Willacy" that October. What can you do in July, which should remain relatively dry?
    - Clean out drainage ditches and canals of brush and debris. This is a very common reason for flooding that can be mitigated against
    - Wet and dry-proof your home. Lean more at http://flash.org/peril_flood.php and http://ready.gov/floods
    - Know your roads had have alternate routes ready should flooding develop in your community
    - Keep a first aid and flood safety kit in your vehicle
    - Purchase flood insurance, even if you're not in a designated flood zone! Remember, it takes 30 days to activate flood insurance – so waiting until August may be too late. http://floodsmart.gov

- ***All Things Tropical!*** Become hurricane ready in July! Typically a quiet month, this may be ***your last*** chance if activity begins to percolate and head toward the Gulf in August, and especially in September. Remember, this is the 50th Anniversary of Hurricane Beulah (September 20th landfall) in the Rio Grande Valley, so no better time to get serious about preparing than now – using the Valley's storm of record to recall the difficulties for Valley residents at a time when the population was about 25% of what it is today, and when infrastructure and land use was far different as well (the ability to recover from devastating floods and winds may be much more involved in 2017).
    - **Become HurricaneStrong Today!**
    - **Adjust Your Plans at http://hurricanes.gov/prepare**
    - **Are you insured? Start your coverage at http://twia.org**
    - **How about for floods? Floods can inundate *anyone*** in the Valley. Insurance is less expensive outside of a designated flood zone, but no less important. Learn more at **http://floodsmart.gov**
    - **Check out more with our hurricane guides, in English and Spanish.**